

## Foreword

The information in this catalog is correct as of March 2011.

All products listed in this catalog are RoHS compliant, a fact that will be explicitly noted in the respective data sheet. For up-to-date information concerning the background, implementation and availability of RoHS compliant products as well as conventional products, please visit our website at <http://www.osram-os.com/rohs>.

For details concerning the labeling, please refer to either our website or the section "Tape and Reel".

Please note that the product specifications list only a selection of key parameters. Unless otherwise marked, the data supplied reflects typical values, which in concrete cases will be subject to statistical variations.

Because of future technical advancements, changes in the products' properties are possible and to be expected. For specific product evaluations we therefore strongly recommend that you obtain detailed, up-to-date information either from our website - <http://catalog.osram-os.com> - or by contacting one of our authorized distributors (see the "Addresses" section below).

Please note: The release of the next edition of this catalog is scheduled for October 2012.

## Vorwort

Die Angaben in diesem Katalog entsprechen dem Stand März 2011.

Alle in diesem Katalog aufgeführten Produkte entsprechen den RoHS-Richtlinien, worauf im jeweiligen Datenblatt explizit hingewiesen wird. Für aktuelle Informationen bezüglich Hintergrund, Einführung und Verfügbarkeit RoHS-konformer und herkömmlicher Produkte empfehlen wir unsere Webseite <http://www.osram-os.com/rohs>.

Hinweise zur Kennzeichnung entnehmen Sie bitte ebenfalls der Webseite oder dem Abschnitt "Gürtung und Verpackung".

Bitte beachten Sie, dass die Produktbeschreibungen lediglich einen Auszug der wichtigsten Parameter darstellen. Sofern nicht anders gekennzeichnet, handelt es sich bei den Angaben um typische Werte, die in der konkreten Ausprägung statistischen Schwankungsbreiten unterworfen sind.

Aufgrund technischer Weiterentwicklungen sind zukünftig Veränderungen in den Eigenschaften der Produkte möglich und zu erwarten.

Für konkrete Produktevaluierungen wird aus diesen Gründen dringend empfohlen, detaillierte und aktuelle Informationen entweder über unsere Website <http://catalog.osram-os.com> einzuholen, oder sich an einen unserer autorisierten Vertriebspartner zu wenden (siehe Abschnitt "Addresses").

Bitte beachten Sie: Die nächste Ausgabe dieses Katalogs wird voraussichtlich im Oktober 2012 erscheinen.

## General Information

Colored tabs at the right side of the pages make it easier to locate the catalog's major chapters. In our fast-moving times, the details of a catalog such as this are subject to almost constant change; OSRAM Opto Semiconductors can therefore neither guarantee their absolute accuracy, nor accept liability or responsibility for any errors concerning the content. Experience also shows that mistakes can hardly be avoided altogether.

OSRAM Opto Semiconductors continually strives to further improve the quality of its product range and to bring its contents to perfection. Our users' experience and judgement in helping us to achieve this cannot be rated highly enough. In particular, we welcome your criticism, corrections and suggestions for improvement. In this way you can help to make the next edition more up to date.

Please send all comments to

OSRAM Opto Semiconductors GmbH  
Leibnizstr. 4  
D-93055 Regensburg  
Phone: +49-941-850 5  
Fax: +49-941-850 444 1700  
e-mail: [support@osram-os.com](mailto:support@osram-os.com)

The author would like to thank you in advance for your cooperation. All respondents will receive a small gift in appreciation of their effort. Along with your name and address, your message should indicate the title and the edition you are referring to.

## Allgemeine Hinweise

Abgesetzte Streifen an den rechten Seitenrändern erleichtern das Auffinden der Großkapitel des vorliegenden Lieferprogramms. Da die Angaben eines solchen Lieferprogramms in der heute so schnelllebigen Zeit fast ständig Veränderungen unterworfen sind, kann OSRAM Opto Semiconductors weder Gewähr für die absolute Richtigkeit leisten noch die Haftung oder Verantwortung für eventuelle inhaltliche Fehler übernehmen. Auch lehrt die Erfahrung, dass sich Irrtümer kaum gänzlich vermeiden lassen.

OSRAM Opto Semiconductors ist ständig bemüht, die Qualität seines Lieferprogramms noch zu steigern und seinen Inhalt weiter zu vervollkommen. Hierbei können ganz besonders die Erfahrungen und Urteile aus dem Benutzerkreis als wertvolle Hilfe gar nicht hoch genug eingeschätzt werden. Vor allem Ihre Kritik, Berichtigungen und Verbesserungsvorschläge sind uns stets willkommen. Sie helfen damit, die nächste Ausgabe noch aktueller zu gestalten. Bitte schreiben Sie in jedem Falle an die

OSRAM Opto Semiconductors GmbH  
Leibnizstr. 4  
93055 Regensburg  
Telefon: +49 941 850 5  
Fax: +49 941 850 444 1700  
e-Mail: [support@osram-os.com](mailto:support@osram-os.com)

Der Verfasser dankt Ihnen im Voraus bestens für Ihre Mitarbeit. Jede Einsenderin und jeder Einsender erhält ein kleines Dankeschön. Ihre Zuschrift sollte also neben der Angabe des Titels und der Auflage, auf welche Sie sich beziehen, auch Ihren Namen und Ihre Anschrift enthalten.

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## Light Emitting Diodes (LED)





### Safety Instructions

The use of new chip technologies means that OSRAM LEDs are delivering higher and higher levels of optical performance. Thus, even eye safety issues might increasingly need to be considered. In general, the EU product safety legislation requires conformity with EC directives (such as the "Low Voltage Directive") which define the "essential requirements", e.g., protection of health and safety, that goods must meet when they are placed on the market. We therefore recommend that the current version of the IEC 62471 standard is taken into account right from the outset, i.e. at the equipment development stage, and that suitable protection facilities are provided in your laboratories.

### Eye Safety Information

The light output of modern High-Power-LEDs is strong enough for eye irritation and temporal blinding effects. Therefore, in general, do not stare into the light beam of any LED at close range. Optical radiation hazards by LED-based lamps, lamp systems or luminaires have to be assessed and classified according to the requirements of IEC62471 ("Photobiological safety of lamps and lamp systems").

Within the risk grouping system of this IEC standard, most LEDs specified in this catalogue fall into the "exempt" group. However, high-power "blue" LEDs and the most important "white" LEDs for general lighting may need some attention. Due to their dominating photochemical hazard potential, extensive deliberate long-term direct viewing from close distance can indeed be hazardous. Under worst case conditions of classification, these high power light sources can even be allocated to the "moderate risk group" i.e. safety bases on aversion reactions against bright light. However, under real circumstances (for exposure time, eye pupils, observation distance), it is assumed that no endangerment to the eye exists from these devices. This is valid for single LEDs under the mentioned conditions and operating conditions defined in the data sheet. Complex Multi-LED-designs, additional optics or extreme application conditions demand a separate evaluation of the entire system.

As a matter of principle, however, it should be mentioned that intense light sources have a high secondary exposure potential due to their blinding effect. As for any bright light source, when viewing into it (e.g. headlights), temporary reduction in visual acuity and afterimages can occur, leading to irritation, annoyance, visual impairment, and even accidents, depending on the situation.

### Remarks:

User shall not reverse engineer by disassembling or analysis of the LEDs without having the prior written consent of OSRAM Opto Semiconductors GmbH. When defective LEDs are found, user shall inform to OSRAM Opto Semiconductors GmbH directly before disassembling or analysis.

The appearance and specifications of the product may be modified for improvement without notice.

### Sicherheitshinweise

OSRAM LEDs erreichen aufgrund von neuen Chip-Technologien immer höhere optische Leistungen. Deshalb müssen auch Sicherheitsaspekte bezüglich Augensicherheit zunehmend in Betracht gezogen werden. Generell fordern die EU Produkt-Sicherheitsgesetze Konformität mit den EU Richtlinien (z.B. die "Niederspannungsrichtlinie"), die wesentliche Forderungen festlegen, z.B. an Sicherheit und Gesundheitsschutz, die die auf den Markt gebrachten Produkte erfüllen müssen. Wir empfehlen daher, schon bei der Entwicklung von Geräten, die zu diesem Zeitpunkt gültige Norm IEC 62471 zu beachten und insbesondere auf den Gebrauch von entsprechenden Schutzvorrichtungen in Ihren Labors hinzuweisen.

### Informationen zur Augensicherheit

Die Lichtausbeute der modernen Hochleistung-LEDs ist stark genug, um Augenreizungen und zeitliche Blindheitseffekte hervorzurufen. Daher sollten Sie generell nicht aus kurzer Entfernung in den Lichtstrahl jeglicher LED blicken. Risiken durch optische Strahlung, die durch LED-basierte Lampen, Lampen-Systeme oder Leuchter entstehen, müssen eingeschätzt und nach der Forderungen des IEC62471 Standards ("Photobiological safety of lamps and lamp systems") bewertet werden.

Im Rahmen des Risikogruppensystems des IEC Standards fallen die meisten in diesem Katalog beschriebenen LEDs in die "exempt" (befreit) Gruppe. Jedoch sollten hochleistungsfähige blaue LEDs und die wichtigsten weißen LEDs näher betrachtet werden. Auf Grund ihres hohen photochemischen Risiko-Potenzials kann das langfristige, bewusste, direkte Ansehen gefährlich sein. Bei ungünstigsten Bedingungen der Anordnung können die Hochleistungs-LEDs sogar der "moderate risk group" (gemäßigte Risikogruppe) zugeordnet werden, d.h. die Sicherheit beruht auf Aversions-Reaktionen auf helles Licht. Unter realen Umständen (in Bezug auf Belichtungszeit, Pupillen, Betrachtungsabstand) kann jedoch angenommen werden, dass keine Gefahr für die Augen von diesen Geräten ausgeht. Dies gilt für einzelne LEDs unter den genannten Konditionen und im Datenblatt definierten Betriebsbedingungen. Komplexe Multi-LED Designs, zusätzliche Optik oder außergewöhnliche Anwendungsbedingungen fordern eine gesonderte Bewertung des ganzen Systems.

Prinzipiell ist jedoch zu erwähnen, dass starke Lichtquellen auf Grund ihrer Blendwirkung ein hohes, sekundäres Gefahrenpotenzial besitzen. Wie bei jeder hellen Lichtquelle kann das direkte Anschauen (z.B. Scheinwerfer) zur Reduzierung der Sehschärfe oder zu Nachbildern führen, was Reizungen, Irritationen und sogar Unfälle verursachen kann.

### Anmerkungen:

Der Anwender darf keinen Ausbau oder Analyse der LEDs vornehmen, ohne die vorherige schriftliche Zustimmung von OSRAM Opto Semiconductors GmbH zu haben. Wenn defekte LEDs gefunden werden, soll der Anwender baldmöglichst OSRAM Opto Semiconductors GmbH informieren, bevor er einen Ausbau oder eine Analyse vornimmt. Erscheinungsform und technische Daten des Produktes können zwecks Verbesserung ohne Benachrichtigung geändert werden.



### TOPLED

#### TOPLED Standard

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TOPLED



TOPLED black surface

#### TOPLED with lens

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TOPLED with lens



TOPLED with lens black package

### Mini TOPLED

#### Mini TOPLED

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Mini TOPLED



Mini TOPLED white

## Power TOPLED

### Power TOPLED Standard

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Power TOPLED



Power TOPLED Silicone

### Power TOPLED with lens

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Power TOPLED with lens

## Advanced Power TOPLED

### Advanced Power TOPLED

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Advanced Power TOPLED



Advanced Power TOPLED white

Advanced Power TOPLED Silicone

### Advanced Power TOPLED Plus

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Advanced Power TOPLED Plus

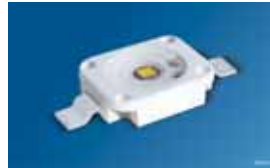
### DRAGON Family

#### Golden DRAGON

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Golden DRAGON



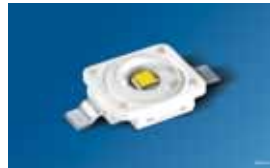
Golden DRAGON white

#### Golden DRAGON Plus

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Golden DRAGON Plus



Golden DRAGON Plus white

#### Golden DRAGON oval Plus

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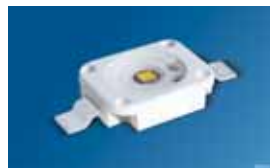
Golden DRAGON oval Plus

#### Platinum DRAGON

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Platinum DRAGON



Platinum DRAGON white

#### Diamond DRAGON

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Diamond DRAGON



Diamond DRAGON white

### OSLON Family

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#### OSLON SX

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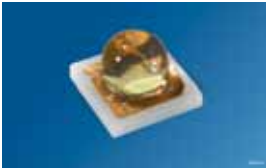
#### OSLON SX ECE

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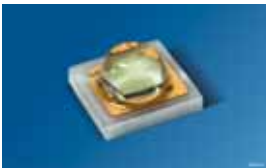
#### OSLON MX ECE

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#### OSLON LX

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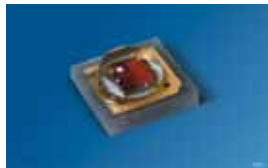


#### OSLON SSL

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OSLON SSL 80



OSLON SSL 150

## Top Emitting

### OSLON Black series

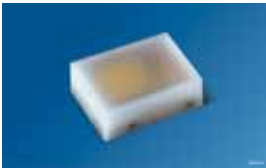
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### CERAMOS

#### CERAMOS

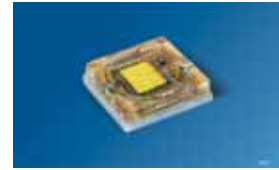
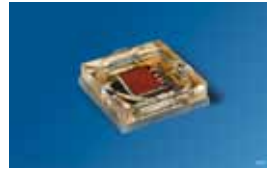
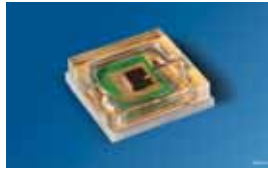
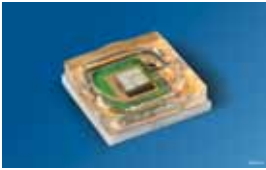
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## OSRAM OSTAR Family

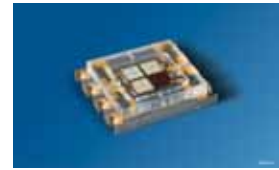
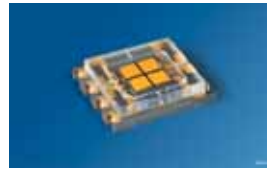
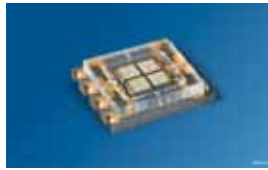
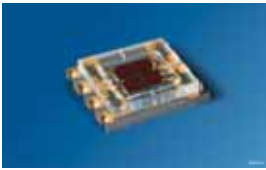
### OSRAM OSTAR Compact

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### OSRAM OSTAR SMT

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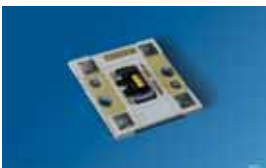
### OSRAM OSTAR Lighting Plus

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### OSRAM OSTAR Headlamp

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## Top Emitting

### PointLED

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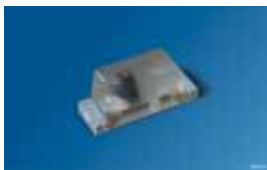
PointLED



PointLED white

### SmartLED

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SmartLED 0603 0.6 mm

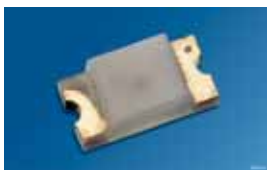


SmartLED 0603 0.6 mm white

### CHIPLED

#### CHIPLED 1206

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CHIPLED 1206

#### CHIPLED 1206 with lens

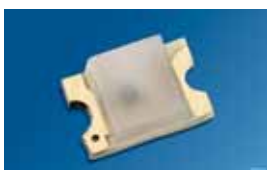
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CHIPLED 1206 with lens

#### CHIPLED 0805

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CHIPLED 0805

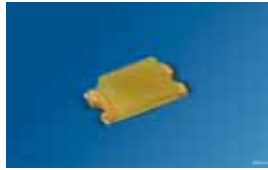
## Top Emitting

### CHIPLED 0603 0.4 mm

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CHIPLED 0603 0.4 mm



CHIPLED 0603 0.4 mm white

### CHIPLED 0603 0.6 mm

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### CHIPLED 0603 0.8 mm

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CHIPLED 0603 0.8 mm

### CHIPLED 0402

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CHIPLED 0402



CHIPLED 0402 white

### Multicolor Packages

#### Multi TOPLED

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Multi TOPLED



Multi TOPLED



Multi TOPLED RG

#### MULTILED

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MULTILED inline



MULTILED inline, black package



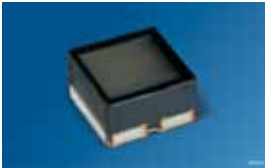
MULTILED inline, black surface



MULTILED

#### Multi CHIPLED

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#### Multi CERAMOS

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## SIDELED

### SIDELED

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SIDELED



SIDELED Silicone white

### Micro SIDELED

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Micro SIDELED 1 mm

## FIREFLY

### FIREFLY

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FIREFLY 0402 0.35 mm







FIREFLY 0402 0.35 mm white

## Top Emitting

## TOPLED






## TOPLED Standard

| Package                                                                             | Type              | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$        | $\Phi_V$<br>(typ.)<br>[mlm] | at $f$ | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------|-------------------|----------------|-----------------------------------------------------|--------------|-----------------------------|--------|---------------------------------------|---------------|-----------------|
|                                                                                     |                   |                |                                                     | [mcd]        |                             | [mA]   |                                       |               |                 |
|    | LS T67K-J1K2-1    | ● super red    | 630                                                 | 4.5 ... 11.2 | 25                          | 2      | 120                                   | Q65110A2011   | 1               |
|                                                                                     | LS T67K-K1L2-1    |                |                                                     | 7.1 ... 18   | 40                          |        |                                       | Q65110A2012   |                 |
|                                                                                     | LS T67K-J1L2-1    |                |                                                     | 4.5 ... 18   | 30                          |        |                                       | Q65110A2013   |                 |
|                                                                                     | LO T67K-K1L2-24   | ● orange       | 606                                                 | 7.1 ... 18   | 40                          |        |                                       | Q65110A2035   |                 |
|                                                                                     | LO T67K-L1M2-24   |                |                                                     | 11.2 ... 28  | 60                          |        |                                       | Q65110A2036   |                 |
|                                                                                     | LO T67K-K1M2-24   |                |                                                     | 7.1 ... 28   | 50                          |        |                                       | Q65110A2037   |                 |
|                                                                                     | LY T67K-J2L1-26   | ● yellow       | 587                                                 | 5.6 ... 14   | 30                          |        |                                       | Q65110A2059   |                 |
|                                                                                     | LY T67K-K2M1-26   |                |                                                     | 9 ... 22.4   | 50                          |        |                                       | Q65110A2060   |                 |
|                                                                                     | LY T67K-J2M1-26   |                |                                                     | 5.6 ... 22.4 | 40                          |        |                                       | Q65110A2061   |                 |
|                                                                                     | LG T67K-G2J1-24   | ● green        | 570                                                 | 2.24 ... 5.6 | 12                          |        |                                       | Q65110A2182   |                 |
|                                                                                     | LG T67K-H2K1-24   |                |                                                     | 3.55 ... 9   | 19                          |        |                                       | Q65110A2183   |                 |
|                                                                                     | LG T67K-G2K1-24   |                |                                                     | 2.24 ... 9   | 16                          |        |                                       | Q65110A2184   |                 |
|                                                                                     | LP T67K-E1F2-25   | ● pure green   | 560                                                 | 0.71 ... 1.8 | 4                           |        |                                       | Q65110A2185   |                 |
|                                                                                     | LP T67K-F1G2-25   |                |                                                     | 1.12 ... 2.8 | 6                           |        |                                       | Q65110A2186   |                 |
|                                                                                     | LP T67K-E1G2-25   |                |                                                     | 0.71 ... 2.8 | 5                           |        |                                       | Q65110A2187   |                 |
|  | LS T676-Q1R2-1    | ● super red    | 633                                                 | 71 ... 180   | 380                         | 20     | 120                                   | Q65110A2151   | 1               |
|                                                                                     | LS T676-R1S1-1    |                |                                                     | 112 ... 224  | 480                         |        |                                       | Q65110A2152   |                 |
|                                                                                     | LS T676-P2S1-1    |                |                                                     | 56 ... 224   | 420                         |        |                                       | Q65110A2153   |                 |
|                                                                                     | LA T676-Q2T1-24   | ● amber-red    | 615                                                 | 90 ... 355   | 600                         |        |                                       | Q65110A9273   |                 |
|                                                                                     | LA T676-R1S2-24   |                |                                                     | 112 ... 280  | 760                         |        |                                       | Q65110A9274   |                 |
|                                                                                     | LA T676-S1T1-24   |                |                                                     | 180 ... 355  | 665                         |        |                                       | Q65110A9275   |                 |
|                                                                                     | LO T676-R1S2-24   | ● orange       | 605                                                 | 112 ... 280  | 600                         |        |                                       | Q65110A2148   |                 |
|                                                                                     | LO T676-S1T1-24   |                |                                                     | 180 ... 355  | 760                         |        |                                       | Q65110A2149   |                 |
|                                                                                     | LO T676-Q2T1-24   |                |                                                     | 90 ... 355   | 665                         |        |                                       | Q65110A2150   |                 |
|                                                                                     | LY T676-R1S2-26   | ● yellow       | 587                                                 | 112 ... 280  | 600                         |        |                                       | Q65110A2154   |                 |
|                                                                                     | LY T676-S1T1-26   |                |                                                     | 180 ... 355  | 760                         |        |                                       | Q65110A2155   |                 |
|                                                                                     | LY T676-Q2T1-26   |                |                                                     | 90 ... 355   | 665                         |        |                                       | Q65110A2156   |                 |
|                                                                                     | LG T676-P1Q2-24   | ● green        | 570                                                 | 45 ... 112   | 240                         |        |                                       | Q65110A2178   |                 |
|                                                                                     | LG T676-P2R1-24   |                |                                                     | 56 ... 140   | 265                         |        |                                       | Q65110A4007   |                 |
|                                                                                     | LP T676-L1M2-25   |                |                                                     | 11.2 ... 28  | 60                          |        |                                       | Q65110A2179   |                 |
|                                                                                     | LP T675-N1Q1-25   | ● pure green   | 560                                                 | 28 ... 90    | 180                         | 30     | 120                                   | Q65110A9017   | 1               |
|  | LR T67D-T2V2-1-1  | ● red          | 625                                                 | 355 ... 1120 | 2200                        | 20     | 120                                   | Q65110A9920   |                 |
|                                                                                     | LO T67D-U1AA-24-1 | ● orange       | 606                                                 | 450 ... 1400 | 2800                        |        |                                       | Q65110A9919   |                 |
|  | LS T67F-T2V2-1-1  | ● super red    | 633                                                 | 355 ... 1120 | 2200                        | 20     | 120                                   | Q65110A9233   | 1               |
|                                                                                     | LR T67F-U1AA-1-1  | ● red          | 625                                                 | 450 ... 1400 | 2700                        |        |                                       | Q65110A9232   |                 |
|                                                                                     | LA T67F-U2AB-24-1 | ● amber-red    | 617                                                 | 560 ... 1800 | 3500                        |        |                                       | Q65110A9268   |                 |
|                                                                                     | LO T67F-V1AB-24-1 | ● orange       | 606                                                 | 710 ... 1800 | 3700                        |        |                                       | Q65110A9230   |                 |
|                                                                                     | LY T67F-U1AA-36-1 | ● yellow       | 587                                                 | 450 ... 1400 | 2700                        |        |                                       | Q65110A9231   |                 |




## Top Emitting

## TOPLED






## TOPLED Standard

| Package                                                                           | Type               | Emission color                                                                                         | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$        | $\Phi_V$<br>(typ.)<br>[mlm] | at $I_F$ | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------|-----------------------------|----------|---------------------------------------|---------------|--------------|
|                                                                                   |                    |                                                                                                        |                                                     | [mcd]        |                             | [mA]     |                                       |               |              |
|  | LT T673-P1Q2-25    |  true green           | 532                                                 | 45 ... 112   | 240                         | 10       | 120                                   | Q65110A1966   | 1            |
|                                                                                   | LT T673-Q1R2-25    |                                                                                                        |                                                     | 71 ... 180   | 380                         |          |                                       | Q65110A1967   |              |
|                                                                                   | LT T673-N2S1-25    |                                                                                                        |                                                     | 35.5 ... 224 | 350                         |          |                                       | Q65110A1968   |              |
|                                                                                   | LT T673-L2N2-35    |                                                                                                        |                                                     | 14 ... 45    | 90                          | 2        |                                       | Q65110A5953   |              |
|  | LW T673-P2R1-5K8L  |  white                | 0.33 / 0.33                                         | 56 ... 140   | 300                         | 10       | 120                                   | Q65110A1939   | 1            |
|                                                                                   | LW T673-Q2R2-5K8L  |                                                                                                        |                                                     | 90 ... 180   | 380                         |          |                                       | Q65110A1940   |              |
|                                                                                   | LW T673-P1S1-5K8L  |                                                                                                        |                                                     | 45 ... 224   | 480                         |          |                                       | Q65110A1941   |              |
|                                                                                   | LW T673-P2R1-3K6L  |                                                                                                        |                                                     | 56 ... 140   | 300                         |          |                                       | Q65110A4100   |              |
|                                                                                   | LCB T67S-P1R1-3J7L |  color on demand blue | 0.2 / 0.3                                           | 45 ... 140   | 240                         | 10       | 120                                   | on request    | 1            |

## TOPLED Silicone

|                                                                                    |                    |                                                                                                 |             |               |      |    |     |             |   |
|------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------|-------------|---------------|------|----|-----|-------------|---|
|  | LW T6SG-V2BA-JKPL  |  white        | 0.33 / 0.33 | 900 ... 2240  | 4700 | 20 | 120 | Q65110A8982 | 2 |
|                                                                                    | LW T6SG-V1AA-JKPL  |                                                                                                 |             | 710 ... 1400  | 3150 |    |     | Q65110A8981 |   |
|                                                                                    | LUW T6SG-AABA-4N7Q |  ultra white | 0.31 / 0.32 | 1120 ... 2240 | 5040 | 20 | 120 | Q65110A7881 | 2 |
|                                                                                    | LUW T6SG-ABBB-4N7Q |                                                                                                 |             | 1400 ... 2800 | 5880 |    |     | Q65110A8477 |   |



## TOPLED black surface

|                                                                                     |                   |                                                                                            |     |              |      |    |     |             |   |
|-------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------|-----|--------------|------|----|-----|-------------|---|
|  | LY T686-R1S2-26   |  yellow | 587 | 112 ... 280  | 590  | 20 | 120 | Q65110A2211 | 1 |
|                                                                                     | LY T686-S1T1-26   |                                                                                            |     | 180 ... 355  | 800  |    |     | Q65110A2212 |   |
|                                                                                     | LY T686-Q2T1-26   |                                                                                            |     | 90 ... 355   | 665  |    |     | Q65110A2213 |   |
|  | LR T68F-U1AA-1-1  |  red    | 625 | 450 ... 1400 | 2800 | 20 | 120 | Q65110A7321 | 3 |
|                                                                                     | LY T68F-U1AA-46-1 |  yellow | 590 |              |      |    |     | Q65110A7730 |   |
|                                                                                     | LY T68F-T2V2-35-1 |                                                                                            |     | 355 ... 1120 | 2200 |    |     | Q65110A7796 |   |









## Top Emitting

## TOPLED

## TOPLED with lens

| Package                                                                           | Type            | Emission color                                                                               | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$      | $\Phi_V$<br>(typ.)<br>[mlm] | at $I_f$ | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------|------------|-----------------------------|----------|---------------------------------------|---------------|-----------------|
|                                                                                   |                 |                                                                                              |                                                     | [mcd]      |                             | [mA]     |                                       |               |                 |
|  | LP T655-Q1R2-25 |  pure green | 560                                                 | 71 ... 180 | 140                         | 30       | 60                                    | Q65110A2355   | 4               |

## TOPLED with lens black series

|                                                                                   |                   |                                                                                          |     |               |      |    |    |             |   |
|-----------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------------|-----|---------------|------|----|----|-------------|---|
|  | LR T66F-ABBB-1-1  |  red    | 625 | 1400 ... 2800 | 1900 | 20 | 55 | Q65110A8571 | 4 |
|                                                                                   | LO T66F-AACA-24-1 |  orange | 606 | 1120 ... 3550 | 2300 |    |    | Q65111A0147 |   |
|                                                                                   | LY T66F-ABBB-46-1 |  yellow | 587 | 1120 ... 2240 | 1900 |    |    | Q65110A8570 |   |
|                                                                                   | LY T66F-AABA-35-1 |                                                                                          |     | 1400 ... 2800 | 2200 |    |    | Q65110A8569 |   |
|  | LR T64F-BBDB-1-1  |  red    | 625 | 1800 ... 5600 | 1120 | 20 | 30 | Q65111A0256 | 4 |
|                                                                                   | LO T64F-CBEB-24-1 |  orange | 606 | 3350 ... 1120 | 2430 |    |    | Q65111A0265 |   |
|                                                                                   | LY T64F-BBDA-35-1 |  yellow | 587 | 2240 ... 5600 | 1294 |    |    | Q65111A0257 |   |
|                                                                                   | LY T64F-CADB-46-1 |                                                                                          |     | 2800 ... 7100 | 1634 |    |    | Q65111A0258 |   |

## Top Emitting


## Mini TOPLED

| Package                                                                           | Type            | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$         | $\Phi_V$<br>(typ.)<br>[mIm] | at $\xi$ | 2 $\varphi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------|-----------------|----------------|-----------------------------------------------------|---------------|-----------------------------|----------|-------------------------------------------|---------------|-----------------|
|                                                                                   |                 |                |                                                     | [mcd]         |                             | [mA]     |                                           |               |                 |
|  | LS M67K-H2K1-1  | ● super red    | 630                                                 | 3.55 ... 9    | 18                          | 2        | 120                                       | Q65110A2026   | 5               |
|                                                                                   | LS M67K-J2L1-1  |                |                                                     | 5.6 ... 14    | 28                          |          |                                           | Q65110A2027   |                 |
|                                                                                   | LS M67K-H2L1-1  |                |                                                     | 3.55 ... 14   | 25                          |          |                                           | Q65110A2028   |                 |
|                                                                                   | LO M67K-J2L1-24 | ● orange       | 606                                                 | 5.6 ... 14    | 28                          |          |                                           | Q65110A2053   |                 |
|                                                                                   | LO M67K-K2M1-24 |                |                                                     | 9 ... 22.4    | 45                          |          |                                           | Q65110A2054   |                 |
|                                                                                   | LO M67K-J2M1-24 |                |                                                     | 5.6 ... 22.4  | 40                          |          |                                           | Q65110A2055   |                 |
|                                                                                   | LY M67K-J1K2-26 | ● yellow       | 587                                                 | 4.5 ... 11.2  | 22                          |          |                                           | Q65110A2074   |                 |
|                                                                                   | LY M67K-K1L2-26 |                |                                                     | 7.1 ... 18    | 35                          |          |                                           | Q65110A2075   |                 |
|                                                                                   | LY M67K-J1L2-26 |                |                                                     | 4.5 ... 18    | 30                          |          |                                           | Q65110A2076   |                 |
|                                                                                   | LG M67K-G1H2-24 | ● green        | 570                                                 | 1.8 ... 4.5   | 9.5                         |          |                                           | Q65110A2393   |                 |
|                                                                                   | LG M67K-H1J2-24 |                |                                                     | 2.8 ... 7.1   | 15                          |          |                                           | Q65110A2394   |                 |
|                                                                                   | LG M67K-G1J2-24 |                |                                                     | 1.8 ... 7.1   | 13                          |          |                                           | Q65110A2395   |                 |
|                                                                                   | LP M67K-D2F1-25 | ● pure green   | 560                                                 | 0.56 ... 1.4  | 3                           |          |                                           | Q65110A2396   |                 |
|                                                                                   | LP M67K-E2G1-25 |                |                                                     | 0.9 ... 2.24  | 4.8                         |          |                                           | Q65110A2397   |                 |
|                                                                                   | LP M67K-D2G1-25 |                |                                                     | 0.56 ... 2.24 | 4.2                         |          |                                           | Q65110A2398   |                 |
|                                                                                   | LS M676-P2R1-1  | ● super red    | 633                                                 | 56 ... 140    | 300                         | 20       | 120                                       | Q65110A1897   | 5               |
|                                                                                   | LS M676-Q2S1-1  |                |                                                     | 90 ... 224    | 480                         |          |                                           | Q65110A2363   |                 |
|                                                                                   | LS M676-P2S1-1  |                |                                                     | 56 ... 224    | 420                         |          |                                           | Q65110A2364   |                 |
|                                                                                   | LA M676-Q2S1-1  | ● amber-red    | 615                                                 | 90 ... 224    | 480                         |          |                                           | Q65110A2356   |                 |
|                                                                                   | LA M676-R2T1-1  |                |                                                     | 140 ... 355   | 760                         |          |                                           | Q65110A2357   |                 |
|                                                                                   | LA M676-Q2T1-1  |                |                                                     | 90 ... 355    | 660                         |          |                                           | Q65110A2358   |                 |
|                                                                                   | LO M676-Q2S1-24 | ● orange       | 606                                                 | 90 ... 224    | 480                         |          |                                           | Q65110A2359   |                 |
|                                                                                   | LO M676-R2T1-24 |                |                                                     | 140 ... 355   | 760                         |          |                                           | Q65110A2360   |                 |
|                                                                                   | LO M676-Q2T1-24 |                |                                                     | 90 ... 355    | 660                         |          |                                           | Q65110A2361   |                 |
|                                                                                   | LY M676-Q2S1-26 | ● yellow       | 587                                                 | 90 ... 224    | 480                         |          |                                           | Q65110A1898   |                 |
|                                                                                   | LY M676-R2T1-26 |                |                                                     | 140 ... 355   | 760                         |          |                                           | Q65110A2366   |                 |
|                                                                                   | LY M676-Q2T1-26 |                |                                                     | 90 ... 355    | 660                         |          |                                           | Q65110A2367   |                 |
|                                                                                   | LG M676-N2Q1-24 | ● green        | 570                                                 | 35.5 ... 90   | 190                         |          |                                           | Q65110A2389   |                 |
|                                                                                   | LP M676-L1M2-25 | ● pure green   | 560                                                 | 11.2 ... 28   | 60                          |          |                                           | Q65110A7809   |                 |
|                                                                                   | LP M675-M2P1-25 | ● pure green   | 560                                                 | 22.4 ... 56   | 120                         | 30       | 120                                       | Q65110A2399   | 5               |
|                                                                                   | LS M67F-S2U2-1  | ● super red    | 633                                                 | 224 ... 710   | 1400                        | 20       | 120                                       | Q65110A8888   | 6               |
|                                                                                   | LO M67F-U2AB-24 | ● orange       | 606                                                 | 560 ... 1800  | 3300                        |          |                                           | Q65110A8973   |                 |
|                                                                                   | LY M67F-T2V2-36 | ● yellow       | 590                                                 | 355 ... 1120  | 2400                        |          |                                           | Q65110A8980   |                 |
|                                                                                   | LT M673-N2Q1-25 | ● true green   | 532                                                 | 35.5 ... 90   | 190                         | 10       | 120                                       | Q65110A5929   | 5               |
|                                                                                   | LT M673-P2R1-25 |                |                                                     | 56 ... 140    | 300                         |          |                                           | Q65110A1964   |                 |
|                                                                                   | LT M673-N1R2-25 |                |                                                     | 28 ... 180    | 310                         |          |                                           | Q65110A5930   |                 |
|                                                                                   | LB M673-L1M2-25 | ● blue         | 471                                                 | 11.2 ... 28   | 60                          |          |                                           | Q65111A1008   |                 |
|                                                                                   | LB M673-L1N2-25 |                |                                                     | 11.2 ... 45   | 80                          |          |                                           | Q65111A1010   |                 |
|                                                                                   | LB M673-M1N2-25 |                |                                                     | 18 ... 45     | 95                          |          |                                           | Q65111A1009   |                 |



## Top Emitting

## Mini TOPLED

| Package                                                                           | Type                      | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |              |                 |          | 2 $\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|---------------------------|----------------|-----------------------------------------|--------------|-----------------|----------|---------------------------------|---------------|--------------|
|                                                                                   |                           |                |                                         | $I_V$        | $\Phi_V$ (typ.) | at $I_f$ |                                 |               |              |
|                                                                                   |                           |                | [nm / -]                                | [mcd]        | [mlm]           | [mA]     | [°]                             |               |              |
|  | LW M673-P1Q2-5K8L         | ○ white        | 0.33 / 0.33                             | 45 ... 112   | 240             | 10       | 120                             | Q65110A1933   | 5            |
|                                                                                   | LW M673-Q1R2-5K8L         |                |                                         | 71 ... 180   | 380             |          |                                 | Q65110A1934   |              |
|                                                                                   | LW M673-N2R2-5K8L         |                |                                         | 35.5 ... 180 | 320             |          |                                 | Q65110A1935   |              |
|                                                                                   | LW M673-P1Q2-3K6L         |                |                                         | 45 ... 112   | 240             | 20       |                                 | Q65110A4099   |              |
|                                                                                   | LW M67C-S1T2-5K8L         |                |                                         | 180 ... 450  | 950             |          |                                 | Q65110A1936   |              |
|                                                                                   | LW M67C-T1U2-5K8L         |                |                                         | 280 ... 710  | 1500            |          |                                 | Q65110A1937   |              |
|                                                                                   | LW M67C-S1U2-5K8L         |                |                                         | 180 ... 710  | 1330            |          |                                 | Q65110A1938   |              |
| LCB M67S-K1M1                                                                     | ● color on demand<br>blue | 0.2 / 0.3      | 7.1 ... 22.4                            | 45           | 2               | 120      | on request                      | 5             |              |













## Top Emitting

## Power TOPLED

## Power TOPLED Standard

| Package                                                                           | Type                 | Emission color                                                                               | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$         | $\Phi_V$<br>(typ.)<br>[mIm] | at $f$ | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------|-----------------------------|--------|---------------------------------------|---------------|-----------------|
|                                                                                   |                      |                                                                                              |                                                     | [mcd]         |                             | [mA]   |                                       |               |                 |
|  | LP E675-P1Q2-25      |  pure green | 560                                                 | 45 ... 112    | 240                         | 50     | 120                                   | Q65110A2334   | 20              |
|                                                                                   | LP E675-P2R1-25      |                                                                                              |                                                     | 56 ... 140    | 300                         |        |                                       | Q65110A7298   |                 |
|  | LA E67F-BACA-24-3A4B |  amber-red  | 617                                                 | 1120 ... 3550 | 8000                        | 50     | 120                                   | Q65110A9090   | 21              |
|                                                                                   | LA E67F-BACA-24-3B5A |                                                                                              |                                                     |               |                             |        |                                       | Q65110A9089   |                 |
|                                                                                   | LY E67F-AABA-35-1    |  yellow     | 587                                                 | 1120 ... 2240 | 5040                        |        |                                       | Q65110A9019   |                 |
|                                                                                   | LY E67F-ABBB-46-1    |                                                                                              |                                                     | 1120 ... 2800 | 6300                        |        |                                       | Q65110A9018   |                 |


## Power TOPLED Silicone

|                                                                                     |                   |                                                                                                |     |               |       |    |     |             |    |
|-------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------------------|-----|---------------|-------|----|-----|-------------|----|
|    | LS E6SF-V2BA-1-1  |  super red    | 633 | 900 ... 2240  | 4650  | 50 | 120 | Q65110A4135 | 21 |
|                                                                                     | LR E6SF-ABCA-1-1  |  red          | 625 |               | 7425  |    |     | Q65111A0958 |    |
|                                                                                     | LA E6SF-BBCB-24-1 |  amber-red    | 617 | 2240 ... 4500 | 10110 |    |     | Q65110A6262 |    |
|                                                                                     | LO E6SF-ABCB-24-1 |  orange       | 606 | 1400 ... 4500 | 8800  |    |     | Q65110A7524 |    |
|                                                                                     | LY E6SF-V2AB-35-1 |  yellow     | 590 | 900 ... 1800  | 4030  |    |     | Q65110A7525 |    |
|                                                                                     | LY E6SF-AABA-46-1 |                                                                                                |     | 1120 ... 2240 | 4980  |    |     | Q65110A6209 |    |
|  | LA ETSF-AABA-24-1 |  amber-red  | 617 | 1120 ... 2240 | 4980  | 50 | 120 | Q65110A9776 | 21 |
|                                                                                     | LA ETSF-BACB-24-1 |                                                                                                |     | 1800 ... 9450 | 9450  |    |     | Q65110A9777 |    |
|                                                                                     | LY ETSF-AABA-35-1 |  yellow     | 590 | 1120 ... 2240 | 4980  |    |     | Q65110A9778 |    |
|                                                                                     | LY ETSF-ABCA-46-1 |                                                                                                |     | 1400 ... 3550 | 7425  |    |     | Q65110A9779 |    |
|  | LT E6SG-AABA-35   |  true green | 525 | 1120 ... 2240 | 5050  | 30 | 120 | Q65110A7885 | 22 |
|                                                                                     | LB E6SG-T1U2-35   |  blue       | 469 | 280 ... 710   | 1500  |    |     | Q65110A7883 |    |


## Top Emitting


## Power TOPLED

## Power TOPLED Standard

| Package                                                                           | Type                  | Emission color                    | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |               |                    |             | 2 $\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-----------------------|-----------------------------------|-----------------------------------------|---------------|--------------------|-------------|---------------------------------|---------------|--------------|
|                                                                                   |                       |                                   |                                         | $I_V$         | $\Phi_V$<br>(typ.) | at $\angle$ |                                 |               |              |
|                                                                                   |                       |                                   | [nm / -]                                | [mcd]         | [mlm]              | [mA]        | [°]                             |               |              |
|  | LW E6SG-AABA-JKPL-1   | ○ white                           | 0.33 / 0.33                             | 1120 ... 2240 | 5050               | 30          | 120                             | Q65110A8964   | 22           |
|                                                                                   | LCW E6SG-V1AB-4U9X    | ○ warm white                      | 0.42 / 0.4                              | 710 ... 1800  | 3200               |             |                                 | Q65110A7736   |              |
|                                                                                   | LCW E6SG-V1AB-4R9T    |                                   |                                         |               | 3500               |             |                                 | Q65110A7737   |              |
|                                                                                   | LCW E6SG-V2BA-4O9Q    |                                   |                                         |               | 3800               |             |                                 | Q65110A7733   |              |
|                                                                                   | LCW E6SG-V2BA-4L8N    |                                   |                                         | 900 ... 2240  | 4100               |             |                                 | Q65110A7734   |              |
|                                                                                   | LCW E6SG-V2BA-4J8K    |                                   |                                         |               | 4200               |             |                                 | Q65110A7735   |              |
|                                                                                   | LCP E6SC-S2U1-45      | ● color on demand<br>pure green   | 0.39 / 0.58                             | 224 ... 560   | 1200               | 30          | 120                             | on request    | 20           |
|                                                                                   | LCP E6SC-T2V1-45      |                                   |                                         | 355 ... 900   | 1900               |             |                                 |               |              |
|                                                                                   | LCR E6SG-U1V2-DMDQ-46 | ● color on demand<br>crystal pink | 0.38 / 0.24                             | 450 ... 1120  | 2360               |             |                                 | Q65110A7166   |              |
|                                                                                   | LW E6SH-BACA-JKPL-1   | ○ white                           | 0.33 / 0.33                             | 1800 ... 3550 | 8025               | 30          | 120                             | Q65110A9523   | 22           |
|                                                                                   | LW E6SH-BBCB-JKPL-1   |                                   |                                         | 2240 ... 4500 | 10100              |             |                                 | Q65110A9526   |              |
|                                                                                   | LW ETSG-AABB-JKPL-1   | ○ white                           | 0.33 / 0.33                             | 1120 ... 2240 | 5050               | 30          | 120                             | Q65111A0196   | 20           |
|                                                                                   | LCB E6SG-V1AB         | ● color on demand<br>blue         | 0.2 / 0.3                               | 710 ... 1800  | 3770               | 30          | 120                             | on request    | 20           |



## Power TOPLED with lens

| Package                                                                             | Type                 | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |               |                    |             | 2 $\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|----------------------|----------------|-----------------------------------------|---------------|--------------------|-------------|---------------------------------|---------------|--------------|
|                                                                                     |                      |                |                                         | $I_V$         | $\Phi_V$<br>(typ.) | at $\angle$ |                                 |               |              |
|                                                                                     |                      |                | [nm / -]                                | [mcd]         | [mlm]              | [mA]        | [°]                             |               |              |
|  | LS E65F-BBDA-1       | ● super red    | 633                                     | 2240 ... 5600 | 4480               | 50          | 60                              | Q65110A4106   | 23           |
|                                                                                     | LA E65F-CBEA-24-3A4B | ● amber-red    | 617                                     | 3550 ... 9000 | 7170               |             |                                 | Q65110A4104   |              |
|                                                                                     | LA E65F-CADA-24-3B5A |                |                                         | 2800 ... 5600 | 4800               |             |                                 | Q65110A2335   |              |
|                                                                                     | LY E65F-BBCB-35-1    | ● yellow       | 587                                     | 2240 ... 4500 | 3850               |             |                                 | Q65110A4110   |              |
|                                                                                     | LY E65F-CADA-46-1    |                |                                         | 2800 ... 5600 | 4800               |             |                                 | Q65110A4109   |              |

| Package                                                                             | Type                 | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |                |                    |             | 2 $\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|----------------------|----------------|-----------------------------------------|----------------|--------------------|-------------|---------------------------------|---------------|--------------|
|                                                                                     |                      |                |                                         | $E_V$          | $\Phi_V$<br>(typ.) | at $\angle$ |                                 |               |              |
|                                                                                     |                      |                | [nm / -]                                | [lux]          | [mlm]              | [mA]        | [°]                             |               |              |
|  | LS E63F-DBFA-1       | ● super red    | 633                                     | 5600 ... 14000 | 3750               | 50          | 30                              | Q65110A4105   | 24           |
|                                                                                     | LA E63F-EBGA-24-3A4B | ● amber-red    | 617                                     | 9000 ... 22400 | 6000               |             |                                 | Q65110A4103   |              |
|                                                                                     | LA E63F-EAFA-24-3B5A |                |                                         | 7100 ... 14000 | 4200               |             |                                 | Q65110A1845   |              |
|                                                                                     | LY E63F-DBEB-35-1    | ● yellow       | 590                                     | 5600 ... 11200 | 3350               |             |                                 | Q65110A4108   |              |
|                                                                                     | LY E63F-EAFA-46-1    |                |                                         | 7100 ... 14000 | 4200               |             |                                 | Q65110A4107   |              |

## Top Emitting


## Advanced Power TOPLED


| Package                                                                           | Type                | Emission color              | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$          | $\Phi_V$<br>(typ.)<br>[mlm] | at $\varphi$ | 2 $\varphi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------|---------------------|-----------------------------|-----------------------------------------------------|----------------|-----------------------------|--------------|-------------------------------------------|---------------|-----------------|
|                                                                                   |                     |                             |                                                     | [mcd]          |                             | [mA]         |                                           |               |                 |
|  | LR G6SP-CBEA-1-1    | ● red                       | 625                                                 | 3550 ... 9000  | 17000                       | 140          | 120                                       | Q65111A0536   | 25              |
|                                                                                   | LA G6SP-DAEB-24-1   | ● amber-red                 | 617                                                 | 4500 ... 11200 | 21200                       |              |                                           | Q65111A0336   |                 |
|                                                                                   | LY G6SP-CADB-36-1   | ● yellow                    | 590                                                 | 2240 ... 7100  | 12600                       |              |                                           | Q65110A4721   |                 |
|                                                                                   | LT G6SP-CBEB-25-1   | ● true green                | 528                                                 | 3550 ... 11200 | 18700                       | 140          | 120                                       | Q65110A5874   | 26              |
|                                                                                   | LB G6SP-V2BB-35-1   | ● blue                      | 470                                                 | 900 ... 2800   | 4950                        |              |                                           | Q65110A4678   |                 |
|  | LW G6CP-EAFA-JKQL-1 | ○ white                     | 0.34 / 0.34                                         | 7100 ... 14000 | 31600                       | 140          | 120                                       | Q65110A8947   | 26              |
|  | LCY G6SP-CBDB-5E    | ● color on demand<br>yellow | 0.56 / 0.42                                         | 2800 ... 9000  | 14900                       | 140          | 120                                       | Q65110A8813   | 26              |


## Top Emitting

## Advanced Power TOPLED

## Advanced Power TOPLED Plus

| Package                                                                           | Type              | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$         | $\Phi_V$<br>(typ.)<br>[mIm] | at $\varphi$ | 2 $\varphi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-------------------|----------------|-----------------------------------------------------|---------------|-----------------------------|--------------|------------------------------------|---------------|--------------|
|                                                                                   |                   |                |                                                     | [mcd]         |                             | [mA]         | [°]                                |               |              |
|  | LR G5AP-BZCZ-1-1  | ● red          | 623                                                 | 2400 ... 4500 | 13800                       | 100          | 145                                | Q65110A8036   | 27           |
|                                                                                   | LT G5AP-CZEX-36-1 | ● true green   | 527                                                 | 3900 ... 8200 | 24200                       |              |                                    | Q65110A8431   |              |




| Package                                                                           | Type              | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_E$         | at $\varphi$ | 2 $\varphi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-------------------|----------------|-----------------------------------------------------|---------------|--------------|------------------------------------|---------------|--------------|
|                                                                                   |                   |                |                                                     | [mW/sr]       | [mA]         | [°]                                |               |              |
|  | LD G5AP-4M4N-35-1 | ● deep blue    | 457                                                 | 20.1 ... 35.5 | 100          | 145                                | Q65110A8037   | 27           |


| Package                                                                             | Type               | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$        | typ. $I_V$<br>(typ.)<br>[mcd] | at $\varphi$ | 2 $\varphi$ (typ.)<br>(50% $I_V$ ) | IESNA<br>LM-80 | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|--------------------|----------------|-----------------------------------------------------|-----------------|-------------------------------|--------------|------------------------------------|----------------|---------------|--------------|
|                                                                                     |                    |                |                                                     | [mIm]           |                               | [mA]         | [°]                                |                |               |              |
|  | LCW G5GP-FZHX-5L7N | ○ warm white   | 0.42 / 0.4                                          | 15000 ... 33000 | 22250                         | 100          | 135                                | -              | Q65110A9081   | 27           |
|                                                                                     | LCW G5GP-FYHX-508Q |                |                                                     | 13000 ... 33000 | 6100                          |              |                                    |                | Q65110A9078   |              |
|                                                                                     | LCW G5GP-FYGY-5R8T |                |                                                     | 13000 ... 24000 | 17660                         |              |                                    |                | Q65110A9079   |              |
|                                                                                     | LUW G5GP-GXHY-5C8E | ○ ultra white  | 0.31 / 0.32                                         | 18000 ... 39000 | 26500                         |              |                                    | ✓              | Q65110A9093   |              |
|                                                                                     | LUW G5GP-GXHY-5F8G |                |                                                     |                 |                               |              |                                    |                | Q65110A9091   |              |

## Top Emitting

## DRAGON Family

## Golden DRAGON

| Package                                                                           | Type               | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |                  |                      |              | $2\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |  |
|-----------------------------------------------------------------------------------|--------------------|----------------|-----------------------------------------|------------------|----------------------|--------------|--------------------------------|---------------|--------------|--|
|                                                                                   |                    |                |                                         | $\Phi_V$         | typ. $I_V$<br>(typ.) | at $\varphi$ |                                |               |              |  |
|                                                                                   |                    |                | [nm / -]                                | [mlm]            | [mcd]                | [mA]         | [°]                            |               |              |  |
|  | LR W5SM-HZJZ-1     | ● red          | 625                                     | 39000 ... 71000  | 18300                | 400          | 120                            | Q65110A9341   | 29           |  |
|                                                                                   | LA W5SM-JYKX-24    | ● amber-red    | 617                                     | 52000 ... 82000  | 22300                |              |                                | Q65110A7521   |              |  |
|                                                                                   | LY W5SM-HZJZ-35    | ● yellow       | 590                                     | 39000 ... 71000  | 18300                |              |                                | Q65110A9644   |              |  |
|                                                                                   | LY W5SM-HZJZ-46    |                |                                         |                  |                      |              |                                | Q65110A9645   |              |  |
|  | LT W5SM-JYKY-25    | ● true green   | 528                                     | 52000 ... 97000  | 24600                | 350          | 120                            | Q65110A9212   | 29           |  |
|                                                                                   | LT W5SM-JXKX-36    |                |                                         | 45000 ... 82000  | 21000                |              |                                | Q65110A8417   |              |  |
|                                                                                   | LB W5SM-FYGZ-24    | ● blue         | 470                                     | 13000 ... 28000  | 6800                 |              |                                | Q65110A9224   |              |  |
|                                                                                   | LB W5SM-FZHX-35    |                |                                         | 15000 ... 33000  | 7900                 |              |                                | Q65110A9221   |              |  |
|  | LW W5SM-JYKY-JKQL  | ○ white        | 0.33 / 0.33                             | 52000 ... 97000  | 25000                | 350          | 120                            | Q65110A9133   | 29           |  |
|                                                                                   | LCW W5SM-JXKX-4U9X | ○ warm white   | 0.42 / 0.4                              | 45000 ... 82000  | 18500                |              |                                | Q65110A9692   |              |  |
|                                                                                   | LCW W5SM-JYKY-4R9T |                |                                         | 52000 ... 97000  | 24800                |              |                                | Q65110A9693   |              |  |
|                                                                                   | LCW W5SM-JXKY-409Q |                |                                         | 39000 ... 97000  | 24000                |              |                                | Q65110A9681   |              |  |
|                                                                                   | LCW W5SM-JYKY-4L8N |                |                                         | 52000 ... 97000  | 24800                |              |                                | Q65110A9694   |              |  |
|                                                                                   | LCW W5SM-JYKZ-4J8K |                |                                         | 52000 ... 112000 | 27300                |              |                                | Q65110A9698   |              |  |
|                                                                                   | LUW W5SM-KXLX-4C8E | ○ ultra white  | 0.31 / 0.32                             | 71000 ... 130000 | 33500                |              |                                | Q65111A0542   |              |  |
|                                                                                   | LUW W5SM-KXLX-5F8G |                |                                         |                  |                      |              |                                | Q65111A0543   |              |  |
|                                                                                   | LUW W5SM-KXLX-5P7R |                |                                         | 61000 ... 112000 | 28800                |              |                                | Q65111A0544   |              |  |
|                                                                                   | LUW W5SM-JZKZ-6P7Q |                |                                         |                  |                      |              |                                | Q65111A0545   |              |  |

| Package                                                                             | Type            | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |             |              | 2 $\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|-----------------|----------------|-----------------------------------------|-------------|--------------|---------------------------------|---------------|--------------|
|                                                                                     |                 |                |                                         | $\Phi_E$    | at $\varphi$ |                                 |               |              |
|                                                                                     |                 |                | [nm / -]                                | [mW]        | [mA]         | [°]                             |               |              |
|  | LD W5SM-4S4T-35 | ● deep blue    | 455                                     | 250 ... 450 | 350          | 120                             | Q65110A9216   | 29           |









## Top Emitting





## DRAGON Family

## Golden DRAGON Plus

| Package | Type | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$ | $I_V$ (typ.) | at $I_F$<br>[mA] | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|---------|------|----------------|-----------------------------------------------------|----------|--------------|------------------|----------------------------------------|---------------|--------------|
|         |      |                |                                                     | [mlm]    | [mcd]        |                  |                                        |               |              |



## color

|                                                                                   |                 |                                                                                               |     |                  |       |     |     |             |    |
|-----------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------|-----|------------------|-------|-----|-----|-------------|----|
|  | LR W5AM-HZKX-1  |  red         | 625 | 39000 ... 82000  | 19400 | 400 | 170 | Q65111A0250 | 30 |
|                                                                                   | LA W5AM-JYKY-24 |  amber-red   | 617 | 52000 ... 97000  | 23000 |     |     | Q65111A0329 |    |
|                                                                                   | LY W5AM-HZJZ-36 |  yellow      | 590 | 39000 ... 71000  | 19250 |     |     | Q65111A0330 |    |
|  | LT W5AM-KXKZ-36 |  true green  | 528 | 71000 ... 112000 | 32000 | 350 | 170 | Q65111A0224 | 30 |
|                                                                                   | LV W5AM-JYKY-25 |  verde green | 505 | 52000 ... 97000  | 26100 |     |     | Q65110A9063 |    |
|                                                                                   | LB W5AM-GXHY-25 |  blue        | 470 | 18000 ... 39000  | 10000 |     |     | Q65111A0225 |    |

| Package                                                                             | Type            | Emission color                                                                                | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_E$    | at $I_F$<br>[mA] | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------|------------------|----------------------------------------|---------------|--------------|
|                                                                                     |                 |                                                                                               |                                                     | [mW]        |                  |                                        |               |              |
|  | LH W5AM-1T3T-1  |  hyper red | 656                                                 | 280 ... 400 | 400              | 170                                    | Q65110A9422   | 30           |
|  | LD W5AM-3T4U-35 |  deep blue | 455                                                 | 355 ... 710 | 350              | 170                                    | Q65111A0226   | 30           |

| Package | Type | Emission color | Color temperature<br>(typ.)<br>[K] | $\Phi_V$ | $I_V$ (typ.) | at $I_F$<br>[mA] | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------------|----------|--------------|------------------|----------------------------------------|---------------|--------------|
|         |      |                |                                    | [mlm]    | [mcd]        |                  |                                        |               |              |

## warm white (CRI 82)

|                                                                                     |                    |                                                                                           |      |                  |       |     |     |             |    |
|-------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------|------|------------------|-------|-----|-----|-------------|----|
|  | LCW W5AM-JZKY-4U9X |  white | 2700 | 61000 ... 97000  | 19800 | 350 | 170 | Q65110A9535 | 31 |
|                                                                                     | LCW W5AM-JZKY-4R9T |                                                                                           | 3000 |                  |       |     |     | Q65110A8160 |    |
|                                                                                     | LCW W5AM-JZKZ-409Q |                                                                                           | 3500 | 61000 ... 112000 | 21650 |     |     | Q65110A9536 |    |
|                                                                                     | LCW W5AM-KXKZ-4L8N |                                                                                           | 4000 | 71000 ...        | 22800 |     |     | Q65110A7601 |    |
|                                                                                     | LCW W5AM-KXKZ-4J8K |                                                                                           | 4500 | 112000           |       |     |     | Q65110A8986 |    |


## Top Emitting

## DRAGON Family

## Golden DRAGON Plus


| Package | Type | Emission color | Color temperature (typ.) [K] | $\Phi_V$ | $I_V$ (typ.) | at $f$ | 2 $\phi$ (typ.) (50% $I_V$ ) | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------|----------|--------------|--------|------------------------------|---------------|--------------|
|         |      |                |                              | [mlm]    | [mcd]        |        | [°]                          |               |              |

## neutral white (CRI 70)

|                                                                                   |                       |         |      |                  |       |     |     |             |    |
|-----------------------------------------------------------------------------------|-----------------------|---------|------|------------------|-------|-----|-----|-------------|----|
|  | LCW W5AM.PC-KTLP-4L8N | ○ white | 4000 | 97000 ... 121000 | 27500 | 350 | 170 | Q65111A1036 | 30 |
|                                                                                   | LCW W5AM.PC-KTLP-4J8K |         | 4500 |                  |       |     |     | Q65111A1037 |    |
|                                                                                   | LCW W5AM.PC-KTLP-4H8I |         | 5000 |                  |       |     |     | Q65111A1038 |    |


| Package | Type | Emission color | Cx/Cy | $\Phi_V$ | $I_V$ (typ.) | at $f$ | 2 $\phi$ (typ.) (50% $I_V$ ) | IESNA LM-80 | Ordering Code | Package Fig. |
|---------|------|----------------|-------|----------|--------------|--------|------------------------------|-------------|---------------|--------------|
|         |      |                |       | [mlm]    | [mcd]        |        | [°]                          |             |               |              |

## cool white (CRI 80)

|                                                                                     |                   |         |             |                  |       |     |     |   |             |    |  |  |  |
|-------------------------------------------------------------------------------------|-------------------|---------|-------------|------------------|-------|-----|-----|---|-------------|----|--|--|--|
|  | LW W5AM-KXLX-5K8L | ○ white | 0.33 / 0.33 | 71000 ... 130000 | 96070 | 350 | 170 | ✓ | Q65110A9850 | 31 |  |  |  |
|                                                                                     | LW W5AM-KXLX-LKQL |         |             | 71000 ... 112000 | 89170 |     |     |   | Q65111A0033 |    |  |  |  |
|                                                                                     | LW W5AM-KXKZ-LKQL |         |             |                  |       |     |     |   | Q65111A0034 |    |  |  |  |

| Package | Type | Emission color | Color temperature (typ.) [K] | $\Phi_V$ | $I_V$ (typ.) | at $f$ | 2 $\phi$ (typ.) (50% $I_V$ ) | IESNA LM-80 | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------|----------|--------------|--------|------------------------------|-------------|---------------|--------------|
|         |      |                |                              | [mlm]    | [mcd]        |        | [°]                          |             |               |              |

## cool white (CRI 70)

|                                                                                     |                    |         |      |                  |       |     |     |   |             |    |
|-------------------------------------------------------------------------------------|--------------------|---------|------|------------------|-------|-----|-----|---|-------------|----|
|  | LUW W5AM-KZLY-6P7R | ○ white | -    | 97000 ... 140000 | 30900 | 350 | 170 | ✓ | Q65110A8397 | 31 |
|                                                                                     | LUW W5AM-KYLY-5F8G |         | 5700 | 82000 ... 140000 | 29000 |     |     |   | Q65110A8833 |    |
|                                                                                     | LUW W5AM-KYLX-5F8G |         | 6500 | 82000 ... 130000 | 26500 |     |     |   | Q65110A9531 |    |




## Top Emitting

## DRAGON Family

## Golden DRAGON oval Plus


| Package | Type | Emission color | Color temperature (typ.) [K] | $\Phi_V$ | at $\varphi$ | Viewing angle at 50 % $I_V$ [°] | IESNA LM-80 | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------|----------|--------------|---------------------------------|-------------|---------------|--------------|
|         |      |                |                              | [mlm]    | [mA]         |                                 |             |               |              |

## warm white (CRI 82)

|                                                                                   |                    |         |      |                  |     |                               |   |             |    |
|-----------------------------------------------------------------------------------|--------------------|---------|------|------------------|-----|-------------------------------|---|-------------|----|
|  | LCW W5PM-JYKX-5U8X | ○ white | 2700 | 52000 ... 82000  | 350 | horizontal 120°, vertical 70° | - | Q65110A9012 | 33 |
|                                                                                   | LCW W5PM-JYKY-5R8T |         | 3000 | 52000 ... 97000  |     |                               |   | Q65110A9005 |    |
|                                                                                   | LCW W5PM-JYKY-508Q |         | 3500 | 61000 ... 97000  |     |                               |   | Q65110A9009 |    |
|                                                                                   | LCW W5PM-JZKY-5L7N |         | 4000 | 61000 ... 112000 |     |                               |   | Q65110A9001 |    |
|                                                                                   | LCW W5PM-JZKZ-5J7K |         | 4500 | 61000 ... 112000 |     |                               |   | Q65110A9003 |    |


| Package | Type | Emission color | Cx/Cy | $\Phi_V$ | at $\varphi$ | Viewing angle at 50 % $I_V$ [°] | IESNA LM-80 | Ordering Code | Package Fig. |
|---------|------|----------------|-------|----------|--------------|---------------------------------|-------------|---------------|--------------|
|         |      |                |       | [mlm]    | [mA]         |                                 |             |               |              |

## cool white (CRI 80)

|                                                                                     |                   |         |             |                  |     |                               |   |             |    |
|-------------------------------------------------------------------------------------|-------------------|---------|-------------|------------------|-----|-------------------------------|---|-------------|----|
|  | LW W5PM-KXLX-6K8L | ○ white | 0.33 / 0.33 | 71000 ... 130000 | 350 | horizontal 120°, vertical 70° | ✓ | Q65110A9008 | 33 |
|                                                                                     | LW W5PM-KXKZ-5K8L |         |             | 71000 ... 112000 |     |                               |   | Q65110A9013 |    |

| Package | Type | Emission color | Cx/Cy | $\Phi_V$ | at $\varphi$ | Viewing angle at 50 % $I_V$ [°] | IESNA LM-80 | Ordering Code | Package Fig. |
|---------|------|----------------|-------|----------|--------------|---------------------------------|-------------|---------------|--------------|
|         |      |                |       | [mlm]    | [mA]         |                                 |             |               |              |



## cool white (CRI 70)



|                                                                                     |                    |         |             |                  |     |                               |   |             |    |
|-------------------------------------------------------------------------------------|--------------------|---------|-------------|------------------|-----|-------------------------------|---|-------------|----|
|  | LUW W5PM-KYLX-5P7R | ○ white | 0.31 / 0.32 | 82000 ... 130000 | 350 | horizontal 120°, vertical 70° | ✓ | Q65110A9004 | 33 |
|-------------------------------------------------------------------------------------|--------------------|---------|-------------|------------------|-----|-------------------------------|---|-------------|----|

## Top Emitting

## DRAGON Family

## Platinum DRAGON

| Package                                                                            | Type               | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |                  |                      | at $\varphi$ | 2 $\varphi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|------------------------------------------------------------------------------------|--------------------|----------------|-----------------------------------------|------------------|----------------------|--------------|------------------------------------|---------------|--------------|
|                                                                                    |                    |                |                                         | $\Phi_V$         | typ. $I_V$<br>(typ.) |              |                                    |               |              |
|                                                                                    |                    |                | [nm / -]                                | [mlm]            | [mcd]                | [mA]         | [°]                                |               |              |
|   | LR W5SN-JYKY-1     | ● red          | 625                                     | 52000 ... 97000  | 24800                | 700          | 120                                | Q65110A6011   | 29           |
|                                                                                    | LA W5SN-JZKZ-24    | ● amber-red    | 617                                     | 61000 ... 112000 | 288800               |              |                                    | Q65110A6010   |              |
|                                                                                    | LY W5SN-KXLX-35    | ● yellow       | 590                                     | 71000 ... 130000 | 33500                |              |                                    | Q65111A0327   |              |
|                                                                                    | LY W5SN-KXLX-46    |                |                                         | Q65111A0328      |                      |              |                                    |               |              |
|                                                                                    | LT W5SN-KXKZ-25    | ● true green   | 525                                     | 71000 ... 112000 | 30200                |              |                                    | Q65110A7901   |              |
|                                                                                    | LT W5SN-KYLY-25    |                |                                         | 82000 ... 150000 | 38600                |              |                                    | Q65110A9211   |              |
|                                                                                    | LV W5SN-JXKZ-25-S  | ● verde green  | 505                                     | 45000 ... 112000 | 26200                |              |                                    | Q65110A8309   |              |
|                                                                                    | LV W5SN-KXLX-25    |                |                                         | 71000 ... 130000 | 96100                |              |                                    | Q65111A0320   |              |
|                                                                                    | LB W5SN-GZJX-35    | ● blue         | 470                                     | 24000 ... 52000  | 12700                |              |                                    | Q65110A7464   |              |
|                                                                                    | LB W5SN-GYHZ-25    |                |                                         | 21000 ... 45000  | 11000                |              |                                    | Q65110A9222   |              |
|  | LCW W5SN-KXLX-4U9X | ○ warm white   | 0.42 / 0.4                              | 71000 ... 130000 | 29800                | 700          | 120                                | Q65110A9713   | 29           |
|                                                                                    | LCW W5SN-KYLY-4R9T |                |                                         | 82000 ... 150000 | 31200                |              |                                    | Q65110A9717   |              |
|                                                                                    | LCW W5SN-KXLX-409Q |                |                                         | 71000 ... 130000 | 29800                |              |                                    | Q65110A7708   |              |
|                                                                                    | LCW W5SN-KYLY-4L8N |                |                                         | 82000 ... 150000 | 31200                |              |                                    | Q65110A7706   |              |
|                                                                                    | LCW W5SN-KYLY-4J8K |                |                                         | 82000 ... 140000 | 32400                |              |                                    | Q65110A7707   |              |
|                                                                                    | LW W5SN-KYLY-JKQL  | ○ white        | 0.33 / 0.33                             | 82000 ... 150000 | 38000                |              |                                    | Q65110A8946   |              |

| Package                                                                             | Type            | Emission color                                                                                | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br><br>[nm / -] | $\Phi_{\text{E}}$ | at $I_{\text{F}}$ | 2 $\phi$ (typ.)<br>(50% $I_{\text{V}}$ ) | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------|-------------------|------------------------------------------|---------------|--------------|
|                                                                                     |                 |                                                                                               |                                                         | [mW]              | [mA]              | [°]                                      |               |              |
|  | LD W5SN-1U2V-35 |  deep blue | 455                                                     | 450 ... 900       | 700               | 120                                      | Q65111A0040   | 29           |

## Top Emitting


## DRAGON Family

## Diamond DRAGON

| Package                                                                           | Type               | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$             | typ. $I_V$<br>(typ.)<br>[mcd] | at $I_F$ | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|--------------------|----------------|-----------------------------------------------------|----------------------|-------------------------------|----------|----------------------------------------|---------------|--------------|
|                                                                                   |                    |                |                                                     | [mlm]                |                               | [mA]     |                                        |               |              |
|  | LR W5AP-LXMY-1     | ● red          | 625                                                 | 112000 ...<br>240000 | 51000                         | 1400     | 140                                    | Q65111A0576   | 32           |
|                                                                                   | LA W5AP-LZMZ-24    | ● amber-red    | 617                                                 | 150000 ...<br>280000 | 62400                         |          |                                        | Q65111A0573   |              |
|                                                                                   | LY W5AP-LXMY-36    | ● yellow       | 590                                                 | 112000 ...<br>240000 | 51000                         |          |                                        | Q65111A0579   |              |
|                                                                                   | LT W5AP-MXNX-25    | ● true green   | 528                                                 | 180000 ...<br>330000 | 243720                        |          |                                        | Q65111A0577   |              |
|  | LUW W5AP-MYNY-5F8G | ○ ultra white  | 0.31 / 0.32                                         | 210000 ...<br>390000 | 80000                         | 1400     | 140                                    | Q65110A7820   | 32           |
|                                                                                   | LUW W5AP-MYNY-4C8E |                |                                                     |                      |                               |          |                                        | Q65110A7819   |              |
|                                                                                   | LUW W5AP-MZMZ-4C8G |                |                                                     | 240000 ...<br>450000 | 92000                         |          |                                        | Q65111A0131   |              |

| Package | Type | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_E$ | at $I_F$ | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|---------|------|----------------|-----------------------------------------------------|----------|----------|----------------------------------------|---------------|--------------|
|         |      |                |                                                     | [mW]     | [mA]     |                                        |               |              |



## deep blue


|                                                                                     |                 |             |     |               |      |     |             |    |
|-------------------------------------------------------------------------------------|-----------------|-------------|-----|---------------|------|-----|-------------|----|
|  | LD W5AP-5A8A-35 | ● deep blue | 455 | 1120 ... 1800 | 1400 | 140 | Q65111A0575 | 32 |
|-------------------------------------------------------------------------------------|-----------------|-------------|-----|---------------|------|-----|-------------|----|

## Top Emitting


## OSLON Family

## OSLON SX

| Package                                                                           | Type                 | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$        | $I_V$ (typ.) | at $I_F$ | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|----------------------|----------------|-----------------------------------------------------|-----------------|--------------|----------|---------------------------------------|---------------|--------------|
|                                                                                   |                      |                |                                                     | [mIm]           | [mcd]        | [mA]     |                                       |               |              |
|  | LA CN5M-GAHA-24-1    | ● amber-red    | 617                                                 | 18000 ... 35500 | 19000        | 140      | 60                                    | Q65111A1207   | 28           |
|                                                                                   | LY CN5M-FBGB-36-1    | ● yellow       | 587                                                 | 14000 ... 28000 | 15000        |          |                                       | Q65111A1208   |              |
|                                                                                   | LT CN5M-GAHB-25-1    | ● true green   | 528                                                 | 18000 ... 45000 | 22500        |          |                                       | Q65110A9086   |              |
|  | LUW CN5M-GAHA-5P7R-1 | ○ ultra white  | 0.31 / 0.32                                         | 18000 ... 35500 | 19100        | 140      | 60                                    | Q65110A8682   | 28           |


| Package                                                                            | Type              | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_E$    | at $I_F$ | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|------------------------------------------------------------------------------------|-------------------|----------------|-----------------------------------------------------|-------------|----------|---------------------------------------|---------------|--------------|
|                                                                                    |                   |                |                                                     | [mW]        | [mA]     |                                       |               |              |
|  | LD CN5M-4Q4R-35-1 | ● deep blue    | 453                                                 | 100 ... 180 | 140      | 60                                    | Q65110A8683   | 28           |
|                                                                                    | LD CN5M-1R1S-35-1 |                |                                                     | 112 ... 201 |          |                                       | Q65110A9085   |              |

## OSLON SX ECE


| Package                                                                             | Type                 | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$        | $I_V$ (typ.) | at $I_F$ | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|----------------------|----------------|-----------------------------------------------------|-----------------|--------------|----------|---------------------------------------|---------------|--------------|
|                                                                                     |                      |                |                                                     | [mIm]           | [mcd]        | [mA]     |                                       |               |              |
|  | LUW CN7M-HYJY-EMKM-1 | ○ ultra white  | 0.32 / 0.32                                         | 33000 ... 61000 | 21000        | 200      | 90                                    | Q65110A9509   | 28           |

## OSLON Family

## OSLON MX ECE

| Package                                                                           | Type                  | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$            | $I_V$ (typ.) | at $\varphi$ | 2 $\varphi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-----------------------|----------------|-----------------------------------------------------|---------------------|--------------|--------------|------------------------------------|---------------|--------------|
|                                                                                   |                       |                |                                                     | [mlm]               | [mcd]        | [mA]         | [°]                                |               |              |
|  | LUW CN7N-KYLX-EMKM-46 | ○ ultra white  | 0.31 / 0.32                                         | 82000 ...<br>130000 | 56000        | 350          | 80                                 | Q65110A9810   | 28           |

## OSLON LX

| Package                                                                           | Type                     | Emission color        | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$            | $I_V$ (typ.) | at $\varphi$ | 2 $\varphi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|--------------------------|-----------------------|-----------------------------------------------------|---------------------|--------------|--------------|------------------------------------|---------------|--------------|
|                                                                                   |                          |                       |                                                     | [mlm]               | [mcd]        | [mA]         | [°]                                |               |              |
|  | LMW CNAP-6J7K-37-DF-LH   | ○ multiphosphor white | 0.27 / 0.23                                         | 50000 ...<br>100000 | 21000        | 350          | 125                                | Q65110A9161   | 28           |
|                                                                                   | LUW CNAP-8J6L-BJ-P4P6-LH | ○ ultra white         | 0.26 / 0.22                                         | 50000 ...<br>140000 | 27000        | 350          | 125                                | Q65111A0024   | 28           |

## Top Emitting

## OSLON Family




## OSLON SSL

| Package                                                                             | Type            | Emission color                                                                                 | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] |                   |                       |                  | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------|-----------------------|------------------|---------------------------------------|---------------|-----------------|
|                                                                                     |                 |                                                                                                |                                                     | $\Phi_V$<br>[mlm] | $I_V$ (typ.)<br>[mcd] | at $\xi$<br>[mA] |                                       |               |                 |
| color                                                                               |                 |                                                                                                |                                                     |                   |                       |                  |                                       |               |                 |
|    | LA CP7P-JXKX-24 |  amber        | 617                                                 | 45000 ... 82000   | 36000                 | 400              | 80                                    | Q65110A9067   | 57              |
|    | LA CPDP-JYKX-24 |  amber        | 617                                                 | 52000 ... 82000   | 15400                 | 400              | 150                                   | Q65111A0400   | 58              |
|    | LR CP7P-HZKX-1  |  red          | 625                                                 | 39000 ... 82000   | 34000                 | 400              | 80                                    | Q65111A0345   | 57              |
|   | LR CPDP-HZKX-1  |  red          | 625                                                 | 39000 ... 82000   | 13900                 | 400              | 150                                   | Q65111A0343   | 58              |
|  | LT CP7P-JYKZ-26 |  true green | 528                                                 | 52000 ... 112000  | 44000                 | 350              | 80                                    | Q65110A9074   | 57              |
|  | LT CPDP-KXKZ-26 |  true green | 528                                                 | 71000 ... 112000  | 21800                 | 350              | 150                                   | Q65111A0402   | 58              |
|  | LY CP7P-HZJZ-36 |  yellow     | 590                                                 | 39000 ... 71000   | 31000                 | 400              | 80                                    | Q65111A0346   | 57              |
|  | LY CPDP-HZJZ-36 |  yellow     | 590                                                 | 39000 ... 71000   | 12600                 | 400              | 150                                   | Q65111A0344   | 58              |
|  | LB CPDP-GYHY-35 |  blue       | 470                                                 | 21000 ... 39000   | 7100                  | 350              | 150                                   | Q65111A0403   | 58              |
|  | LB CP7P-GYHY-35 |  blue       | 470                                                 | 21000 ... 39000   | 16800                 | 350              | 80                                    | Q65111A1091   | 57              |

## Top Emitting



## OSLON Family

## OSLON SSL

| Package                                                                           | Type            | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_E$    | at $I_f$ | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-----------------|----------------|-----------------------------------------------------|-------------|----------|----------------------------------------|---------------|--------------|
|                                                                                   |                 |                |                                                     | [mW]        | [mA]     |                                        |               |              |
|  | LH CP7P-1T3T-1  | hyper red      | 656                                                 | 280 ... 400 | 400      | 80                                     | Q65111A0296   | 57           |
|  | LH CPDP-1T3T-1  | hyper red      | 656                                                 | 280 ... 400 | 400      | 150                                    | Q65111A0334   | 58           |
|  | LD CP7P-3T3U-35 | deep blue      | 455                                                 | 355 ... 630 | 350      | 80                                     | Q65111A0887   | 57           |

| Package | Type | Emission color | Color temperature<br>(typ.)<br>[K] | $\Phi_V$ | $I_V$ (typ.) | at $I_f$ | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------------|----------|--------------|----------|----------------------------------------|---------------|--------------|
|         |      |                |                                    | [mlm]    | [mcd]        | [mA]     |                                        |               |              |

## warm white (CRI 95)

|                                                                                     |                         |       |      |                 |       |     |     |             |    |
|-------------------------------------------------------------------------------------|-------------------------|-------|------|-----------------|-------|-----|-----|-------------|----|
|  | LCW CQDP.CC-JUKQ-5U8X-1 | white | 2700 | 65800 ... 82000 | 19000 | 350 | 150 | Q65111A0846 | 58 |
|                                                                                     | LCW CQDP.CC-KPKR-5R8T-1 |       | 3000 | 71000 ... 89200 | 21000 |     |     | Q65111A0850 |    |
|                                                                                     | LCW CQDP.CC-KQKS-508Q-1 |       | 5500 | 76300 ... 97000 | 22500 |     |     | Q65111A0854 |    |
|  | LCW CQ7P.CC-JUKQ-5U8X-1 | white | 2700 | 65800 ... 82000 | 41400 | 350 | 80  | Q65111A1107 | 57 |
|                                                                                     | LCW CQ7P.CC-KPKR-5R8T-1 |       | 3000 | 71000 ... 89200 | 45000 |     |     | Q65111A0844 |    |
|                                                                                     | LCW CQ7P.CC-KQKS-508Q-1 |       | 3500 | 76300 ... 97000 | 48500 |     |     | Q65111A0857 |    |



## Top Emitting

## OSLON Family

## OSLON SSL



| Package | Type | Emission color | Color temperature (typ.) [K] |                      |                             |           | 2φ (typ.) (50% I <sub>V</sub> ) [°] | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------|----------------------|-----------------------------|-----------|-------------------------------------|---------------|--------------|
|         |      |                |                              | Φ <sub>V</sub> [mlm] | I <sub>V</sub> (typ.) [mcd] | at f [mA] |                                     |               |              |

## warm white (CRI 82)

|                                                                                   |                         |         |      |                  |       |     |     |             |    |
|-----------------------------------------------------------------------------------|-------------------------|---------|------|------------------|-------|-----|-----|-------------|----|
|  | LCW CQ7P.EC-KRKT-5U8X-1 | ○ white | 2700 | 82000 ... 104200 | 52000 | 350 | 80  | Q65111A0765 | 57 |
|                                                                                   | LCW CQ7P.EC-KSKU-5R8T-1 |         | 3000 | 89200 ... 112000 | 56000 |     |     | Q65111A0760 |    |
|                                                                                   | LCW CQ7P.EC-KSKU-508Q-1 |         | 3500 |                  |       |     |     | Q65111A0757 |    |
|  | LCW CQDP.EC-KRKT-5U8X-1 | ○ white | 2700 | 82000 ... 104200 | 24000 | 350 | 150 | Q65111A0785 | 58 |
|                                                                                   | LCW CQDP.EC-KSKU-5R8T-1 |         | 3000 | 89200 ... 112000 | 26000 |     |     | Q65111A0788 |    |
|                                                                                   | LCW CQDP.EC-KSKU-508Q-1 |         | 3500 |                  |       |     |     | Q65111A0789 |    |

| Package | Type | Emission color | Color temperature (typ.) [K] |                      |                             |           | 2φ (typ.) (50% I <sub>V</sub> ) [°] | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------|----------------------|-----------------------------|-----------|-------------------------------------|---------------|--------------|
|         |      |                |                              | Φ <sub>V</sub> [mlm] | I <sub>V</sub> (typ.) [mcd] | at f [mA] |                                     |               |              |

## neutral white (CRI 95)

|                                                                                     |                         |         |      |                 |       |     |     |             |    |
|-------------------------------------------------------------------------------------|-------------------------|---------|------|-----------------|-------|-----|-----|-------------|----|
|  | LCW CQDP.CC-KQKS-5L7N-1 | ○ white | 4000 | 76300 ... 97000 | 22500 | 350 | 150 | Q65111A0856 | 58 |
|  | LCW CQ7P.CC-KQKS-5L7N-1 | ○ white | 4000 | 76300 ... 97000 | 48500 | 350 | 80  | Q65111A0859 | 57 |
|                                                                                     | LCW CQ7P.CC-JUQ-5U8X-1  |         | 2700 | 65800 ... 82000 | 41400 |     |     | Q65111A1107 |    |





## Top Emitting

## OSLON Family

## OSLON SSL



| Package | Type | Emission color | Color temperature (typ.) [K] |                      |                             |                        | 2φ (typ.) (50% I <sub>V</sub> ) [°] | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------|----------------------|-----------------------------|------------------------|-------------------------------------|---------------|--------------|
|         |      |                |                              | Φ <sub>V</sub> [mlm] | I <sub>V</sub> (typ.) [mcd] | at I <sub>F</sub> [mA] |                                     |               |              |

## neutral white (CRI 82)

|                                                                                   |                         |         |      |                  |       |     |     |             |    |
|-----------------------------------------------------------------------------------|-------------------------|---------|------|------------------|-------|-----|-----|-------------|----|
|  | LCW CQ7P.EC-KSKU-5L7N-1 | ○ white | 4000 | 89200 ... 112000 | 56000 | 350 | 80  | Q65111A0756 | 57 |
|                                                                                   | LCW CQ7P.EC-KTLP-5J7K-1 |         | 4500 | 97000 ... 121000 | 61000 |     |     | Q65111A0749 |    |
|                                                                                   | LCW CQ7P.EC-KTLP-5H7I-1 |         | 5000 |                  |       |     |     | Q65111A0783 |    |
|  | LCW CQDP.EC-KSKU-5L7N-1 | ○ white | 4000 | 89200 ... 112000 | 26000 | 350 | 150 | Q65111A0790 | 58 |
|                                                                                   | LCW CQDP.EC-KTLP-5J7K-1 |         | 4500 | 97000 ... 121000 | 28000 |     |     | Q65111A0780 |    |
|                                                                                   | LCW CQDP.EC-KTLP-5H7I-1 |         | 5000 |                  |       |     |     | Q65111A0781 |    |

| Package | Type | Emission color | Color temperature (typ.) [K] |                      |                             |                        | 2φ (typ.) (50% I <sub>V</sub> ) [°] | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------|----------------------|-----------------------------|------------------------|-------------------------------------|---------------|--------------|
|         |      |                |                              | Φ <sub>V</sub> [mlm] | I <sub>V</sub> (typ.) [mcd] | at I <sub>F</sub> [mA] |                                     |               |              |

## neutral white (CRI 70)

|                                                                                     |                         |         |      |                   |        |     |     |             |    |
|-------------------------------------------------------------------------------------|-------------------------|---------|------|-------------------|--------|-----|-----|-------------|----|
|  | LCW CQ7P.PC-KTLP-5L7N-1 | ○ white | 4000 | 97000 ... 121000  | 61000  | 350 | 80  | Q65111A0794 | 57 |
|                                                                                     | LCW CQ7P.PC-KULQ-5J7K-1 |         | 4500 | 104200 ... 130000 | 66000  |     |     | Q65111A0800 |    |
|                                                                                     | LCW CQ7P.PC-KULQ-5H7I-1 |         | 5000 |                   |        |     |     | Q65111A0812 |    |
|  | LCW CQDP.PC-KTLP-5L7N-1 | ○ white | 4000 | 97000 ... 121000  | 108340 | 350 | 150 | Q65111A0813 | 58 |
|                                                                                     | LCW CQDP.PC-KULQ-5J7K-1 |         | 4500 | 104200 ... 130000 | 116390 |     |     | Q65111A0816 |    |
|                                                                                     | LCW CQDP.PC-KULQ-5H7I-1 |         | 5000 |                   |        |     |     | Q65111A0817 |    |



## Top Emitting

## OSLON Family

## OSLON SSL

| Package | Type | Emission color | Color temperature (typ.) [K] |                      |                             |                        | 2φ (typ.) (50% I <sub>V</sub> ) [°] | IESNA LM-80 | Ordering Code | Package Fig. |
|---------|------|----------------|------------------------------|----------------------|-----------------------------|------------------------|-------------------------------------|-------------|---------------|--------------|
|         |      |                |                              | Φ <sub>V</sub> [mlm] | I <sub>V</sub> (typ.) [mcd] | at I <sub>F</sub> [mA] |                                     |             |               |              |

## cool white (CRI 70)

|                                                                                   |                      |         |      |                   |        |     |     |   |             |    |
|-----------------------------------------------------------------------------------|----------------------|---------|------|-------------------|--------|-----|-----|---|-------------|----|
|  | LUW CQ7P-LPLR-5E8G-1 | ○ white | 5700 | 112000 ... 140000 | 71000  | 350 | 80  | ✓ | Q65111A0824 | 57 |
|                                                                                   | LUW CQ7P-LPLR-5C8E-1 |         | 6500 |                   |        |     |     |   | Q65111A0825 |    |
|                                                                                   | LUW CQ7P-LPLR-5D8F-1 |         | 6000 |                   |        |     |     |   | Q65111A0826 |    |
|  | LUW CQDP-LPLR-5E8G-1 | ○ white | 5700 | 112000 ... 140000 | 125220 | 350 | 150 | ✓ | Q65111A0864 | 58 |
|                                                                                   | LUW CQDP-LPLR-5C8E-1 |         | 6500 |                   |        |     |     |   | Q65111A0865 |    |
|                                                                                   | LUW CQDP-LPLR-5D8F-1 |         | 6000 |                   |        |     |     |   | Q65111A0866 |    |

| Package | Type | Emission color | Cx/Cy (typ.) |                      |                             |                        | 2φ (typ.) (50% I <sub>V</sub> ) [°] | IESNA LM-80 | Ordering Code | Package Fig. |
|---------|------|----------------|--------------|----------------------|-----------------------------|------------------------|-------------------------------------|-------------|---------------|--------------|
|         |      |                |              | Φ <sub>V</sub> [mlm] | I <sub>V</sub> (typ.) [mcd] | at I <sub>F</sub> [mA] |                                     |             |               |              |




## cool white (CRI 65)

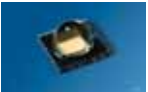
|                                                                                     |                    |         |             |                   |       |     |     |   |             |    |
|-------------------------------------------------------------------------------------|--------------------|---------|-------------|-------------------|-------|-----|-----|---|-------------|----|
|  | LUW CQDP-LQLS-M8MI | ○ white | 0.37 / 0.44 | 121000 ... 150000 | 35000 | 350 | 150 | ✓ | Q65111A0880 | 58 |
|                                                                                     | LUW CQDP-LRLT-MJMW |         |             | 130000 ... 164000 | 38000 |     |     |   | Q65111A0882 |    |


## Top Emitting

## OSLON Family

## OSLON Black series





| Package                                                                           | Type                 | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] |                   |                       |                  | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|----------------------|----------------|-----------------------------------------------------|-------------------|-----------------------|------------------|----------------------------------------|---------------|--------------|
|                                                                                   |                      |                |                                                     | $\Phi_V$<br>[mlm] | $I_V$ (typ.)<br>[mcd] | at $I_F$<br>[mA] |                                        |               |              |
|  | LR H9GP-HZKX-1-1     | ● red          | 625                                                 | 39000 ... 82000   | 29600                 | 350              | 90                                     | Q65111A0914   | 54           |
|                                                                                   | LA H9GP-JYKY-24-1    | ● amber        | 617                                                 | 52000 ... 97000   | 36500                 |                  |                                        | Q65111A0913   |              |
|                                                                                   | LY H9GP-HZKX-36-1    | ● yellow       | 590                                                 | 39000 ... 82000   | 29600                 |                  |                                        | Q65111A0915   |              |
|  | LT H9GP-JZKZ-26-1    | ● true green   | 525                                                 | 61000 ... 112000  | 42400                 | 350              | 90                                     | Q65111A0911   | 54           |
|                                                                                   | LB H9GP-GYHY-35-1    | ● blue         | 465                                                 | 21000 ... 39000   | 14700                 |                  |                                        | Q65111A0917   |              |
|  | LUW H9GP-KYLY-EMKM   | ○ ultra white  | 0.31 / 0.32                                         | 82000 ... 1500000 | 107140                | 350              | 90                                     | Q65110A9865   | 54           |
|                                                                                   | LUW H9GP-KYLY-4C8E-1 |                |                                                     |                   |                       |                  |                                        | Q65111A0924   |              |
|                                                                                   | LUW H9GP-KYLY-5F8G-1 |                |                                                     |                   |                       |                  |                                        | Q65111A0925   |              |

| Package                                                                             | Type                 | Emission color | Color temperature<br>(typ.)<br>[K] |                   |                       |                  | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|----------------------|----------------|------------------------------------|-------------------|-----------------------|------------------|----------------------------------------|---------------|--------------|
|                                                                                     |                      |                |                                    | $\Phi_V$<br>[mlm] | $I_V$ (typ.)<br>[mcd] | at $I_F$<br>[mA] |                                        |               |              |
|  | LCW H9GP-KXLX-4J8K-1 | ○ warm white   |                                    | 71000 ... 130000  | 49020                 | 350              | 90                                     | Q65111A0923   | 54           |

| Package                                                                             | Type              | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] |                  |                  | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|-------------------|----------------|-----------------------------------------------------|------------------|------------------|----------------------------------------|---------------|--------------|
|                                                                                     |                   |                |                                                     | $\Phi_E$<br>[mW] | at $I_F$<br>[mA] |                                        |               |              |
|  | LD H9GP-3T3U-35-1 | ● deep blue    | 455                                                 | 355 ... 630      | 350              | 90                                     | Q65111A0916   | 54           |

## Top Emitting




## CERAMOS


| Package                                                                           | Type             | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br><br>[nm / -] | $\Phi_v$          | at $I_f$ | peak. Viewing<br>angle at 100<br>% $\Phi_{1/2}$<br>2 $\phi$<br>(typ.)<br>[°] | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------|------------------|----------------|---------------------------------------------------------|-------------------|----------|------------------------------------------------------------------------------|---------------|-----------------|
|                                                                                   |                  |                |                                                         | [mIm]             | [mA]     |                                                                              |               |                 |
|  | LUW C9EP-N4N6-EG | ○ ultra white  | 0.31 / 0.32                                             | 75000 ... 105000  | 500      | 120                                                                          | Q65110A7878   | 35              |
|  | LUW C9SP-N4N6-EG | ○ ultra white  | 0.31 / 0.32                                             | 75000 ... 105000  | 500      | 120                                                                          | Q65110A7879   | 35              |
|  | LUW C9SM-N1N3-EG | ○ ultra white  | 0.31 / 0.32                                             | 40000 ... 70000   | 300      | 120                                                                          | Q65110A9502   | 36              |
|  | LUW CAEP-LFLZ-G3 | ○ ultra white  | 0.33 / 0.36                                             | 125000 ... 180000 | 500      | 120                                                                          | Q65110A8628   | 35              |


## Top Emitting

## OSRAM OSTAR Family

## OSRAM OSTAR Compact

| Package                                                                           | Type                        | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$          | $L_V$<br>(typ.)<br>[cd/m <sup>2</sup> ] | at $\varphi$<br>[mA] | 2 $\varphi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-----------------------------|----------------|-----------------------------------------------------|-------------------|-----------------------------------------|----------------------|-------------------------------------------|---------------|--------------|
|                                                                                   |                             |                |                                                     | [mlm]             |                                         |                      |                                           |               |              |
|  | LE A Q9WN-JXJZ-1-0-700-R18  | ● amber        | 617                                                 | 45000 ... 71000   | 30*10 <sup>6</sup>                      | 700                  | 120                                       | Q65110A9135   | 53           |
|                                                                                   | LE T Q9WN-KZLZ-25-0-700-R18 | ● true green   | 525                                                 | 97000 ... 180000  | 59*10 <sup>6</sup>                      |                      |                                           | Q65110A9134   |              |
|                                                                                   | LE B Q9WN-HXJY-24-0-700-R18 | ● blue         | 465                                                 | 28000 ... 61000   | 19*10 <sup>6</sup>                      |                      |                                           | Q65110A9132   |              |
|  | LE A Q9WM-GYHY-1-0-350-R18  | ● amber        | 617                                                 | 21000 ... 39000   | 21*10 <sup>6</sup>                      | 350                  | 120                                       | Q65110A9136   | 59           |
|                                                                                   | LE T Q9WM-JXKX-25-0-350-R18 | ● true green   | 525                                                 | 45000 ... 82000   | 52*10 <sup>6</sup>                      |                      |                                           | Q65110A9131   |              |
|                                                                                   | LE B Q9WM-FXGX-23-0-350-R18 | ● blue         | 465                                                 | 11200 ... 21000   | 13*10 <sup>6</sup>                      |                      |                                           | Q65110A9130   |              |
|  | LE A Q9WP-KZLZ-1-0-A40-R18  | ● amber        | 617                                                 | 97000 ... 180000  | 27*10 <sup>6</sup>                      | 1400                 | 120                                       | Q65110A9145   | 60           |
|                                                                                   | LE T Q9WP-MXNX-25-0-A40-R18 | ● true green   | 525                                                 | 180000 ... 330000 | 49*10 <sup>6</sup>                      |                      |                                           | Q65110A9137   |              |

| Package                                                                             | Type                        | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_E$     | $L_E$<br>(typ.)<br>[W/m <sup>2</sup> /sr] | at $\varphi$<br>[mA] | 2 $\varphi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|-----------------------------|----------------|-----------------------------------------------------|--------------|-------------------------------------------|----------------------|-------------------------------------------|---------------|--------------|
|                                                                                     |                             |                |                                                     | [mW]         |                                           |                      |                                           |               |              |
|  | LE B Q9WP-3V7A-24-0-A40-R18 | ● blue         | 465                                                 | 900 ... 1590 | 0.24*10 <sup>6</sup>                      | 1400                 | 120                                       | Q65110A9144   | 60           |


| Package                                                                             | Type                 | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$          | $\Phi_V$<br>(typ.)<br>[mlm] | at $\varphi$<br>[mA] | 2 $\varphi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|----------------------|----------------|-----------------------------------------------------|-------------------|-----------------------------|----------------------|-------------------------------------------|---------------|--------------|
|                                                                                     |                      |                |                                                     | [mlm]             |                             |                      |                                           |               |              |
|  | LE UW Q9WP-8M7N-GMKM | ○ ultra white  | 0.31 / 0.32                                         | 250000 ... 400000 | 282000                      | 1400                 | 120                                       | Q65110A9235   | 61           |

## Top Emitting



## OSRAM OSTAR Family

## OSRAM OSTAR SMT

| Package                                                                           | Type                | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$             | $I_V$ (typ.) | at $\xi$ | 2 $\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|---------------------|----------------|-----------------------------------------------------|----------------------|--------------|----------|---------------------------------|---------------|--------------|
|                                                                                   |                     |                |                                                     | [mlm]                | [mcd]        | [mA]     | [°]                             |               |              |
|  | LE A S2W-MXNX-34    | amber          | 617                                                 | 180000 ...<br>330000 | 85000        | 700      | 120                             | Q65110A8181   | 56           |
|  | LE T S2W-NYPY-35    | true green     | 525                                                 | 330000 ...<br>610000 | 140000       | 700      | 120                             | Q65110A8185   | 56           |
|                                                                                   | LE B S2W-KYLY-23    | blue           | 465                                                 | 82000 ...<br>140000  | 35000        |          |                                 | Q65110A8184   |              |
|  | LE UW S2W-NZPZ-4P7R | ultra white    | 0.31 / 0.32                                         | 390000 ...<br>710000 | 170000       | 700      | 120                             | Q65111A0205   | 56           |


| Package                                                                             | Type                              | Emission color              | $\lambda_{\text{dom}}$ (typ.)<br>[nm] | $I_V$ (typ.) [mcd] |         |         |                  | 2 $\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|-----------------------------------|-----------------------------|---------------------------------------|--------------------|---------|---------|------------------|----------------------------------------|---------------|--------------|
|                                                                                     |                                   |                             |                                       | color 1            | color 2 | color 3 | at $\xi$<br>[mA] |                                        |               |              |
|  | LE ATB S2W-JWKW-1+MANA-24+GWHW-23 | amber<br>true green<br>blue | 617                                   | 25000              | 10000   | 85000   | 700              | 120                                    | Q65111A0730   | 56           |

## OSRAM OSTAR Lighting Plus

| Package                                                                             | Type                   | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $\Phi_V$             | $I_V$ (typ.) | at $\xi$ | 2 $\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|------------------------|----------------|-----------------------------------------------------|----------------------|--------------|----------|---------------------------------|---------------|--------------|
|                                                                                     |                        |                |                                                     | [mlm]                | [mcd]        | [mA]     | [°]                             |               |              |
|  | LE CW S2LN-NXNZ-5L7N-K | warm white     | 0.42 / 0.4                                          | 280000 ...<br>450000 | 375000       | 350      | 140                             | Q65111A0586   | 62           |
|                                                                                     | LE CW S2LN-NXNZ-5R8T-K |                |                                                     |                      | 365000       |          |                                 | Q65110A9749   |              |
|                                                                                     | LE CW S2LN-NXNZ-5U8X-K |                |                                                     |                      | 355000       |          |                                 | Q65111A0587   |              |
|  | LE UW S2LN-NYPX-5C8E-K | ultra white    | 0.31 / 0.32                                         | 330000 ...<br>520000 | 425000       | 350      | 140                             | Q65110A9750   | 62           |
|                                                                                     | LE UW S2LN-NYPX-5E8G-K |                |                                                     |                      |              |          |                                 | Q65110A9751   |              |

## OSRAM OSTAR Family

## OSRAM OSTAR Headlamp



| Package                                                                           | Type                        | Emission color | Color coordinates Cx/Cy typ. | $\Phi_V$           | $\Phi_V$ (typ.) | at $I_f$ | 2 $\phi$ (typ.) (50% $I_V$ ) | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-----------------------------|----------------|------------------------------|--------------------|-----------------|----------|------------------------------|---------------|--------------|
|                                                                                   |                             |                |                              | [mlm]              | [mlm]           |          |                              |               |              |
|  | LE UW D1W1 01-5L6M-GMKM-T01 | ○ ultra white  | 0.335 / 0.345                | 112000 ... 224000  | 150000          | 700      | 120                          | Q65110A8591   |              |
|                                                                                   | LE UW D1W2 01-7M7N-GMKM-T01 |                |                              | 224000 ... 400000  | 300000          |          |                              | Q65110A8590   |              |
|                                                                                   | LE UW D1W3 01-7N7P-GMKM-T01 |                |                              | 3550000 ... 355000 | 450000          |          |                              | Q65110A8588   |              |
|                                                                                   | LE UW D1W4 01-5P6Q-GMKM-T01 |                |                              | 450000 ... 630000  | 600000          |          |                              | Q65110A8593   |              |
|                                                                                   | LE UW D1W5 01-7P8Q-GMKM-T01 |                |                              | 560000 ... 1120000 | 750000          |          |                              | Q65110A8589   |              |

## Top Emitting

## PointLED

| Package                                                                             | Type                 | Emission color            | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |              |                 |             | 2 $\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|----------------------|---------------------------|-----------------------------------------|--------------|-----------------|-------------|---------------------------------|---------------|--------------|
|                                                                                     |                      |                           |                                         | $I_V$        | $\Phi_V$ (typ.) | at $\xi$    |                                 |               |              |
|                                                                                     |                      |                           | [nm / -]                                | [mcd]        | [mlm]           | [mA]        | [°]                             |               |              |
|    | LS P47K-H1J2-1       | ● super red               | 630                                     | 2.8 ... 7.1  | 15              | 2           | 120                             | Q65110A1455   | 7            |
|                                                                                     | LS P47K-J1K2-1       |                           |                                         | 4.5 ... 11.2 | 25              |             |                                 | Q65110A1464   |              |
|                                                                                     | LS P47K-H1K2-1       |                           |                                         | 2.8 ... 11.2 | 20              |             |                                 | Q65110A2733   |              |
|                                                                                     | LY P47K-J1K2-26      | ● yellow                  | 587                                     | 4.5 ... 11.2 | 25              |             |                                 | Q65110A1450   |              |
|                                                                                     | LY P47K-K1L2-26      |                           |                                         | 7.1 ... 18   | 35              |             |                                 | Q65110A1449   |              |
|                                                                                     | LY P47K-J1L2-26      |                           |                                         | 4.5 ... 18   | 30              |             |                                 | Q65110A2738   |              |
|                                                                                     | LG P47K-G2J1-24      | ● green                   | 570                                     | 2.24 ... 5.6 | 10              | 20          | 120                             | Q65110A1467   |              |
|                                                                                     | LG P47K-H2K1-24      |                           |                                         | 3.55 ... 9   | 19              |             |                                 | Q65110A1468   |              |
|                                                                                     | LG P47K-G2K1-24      |                           |                                         | 2.24 ... 9   | 15              |             |                                 | Q65110A2730   |              |
|                                                                                     | LO P476-R2T1-24      | ● orange                  | 606                                     | 140 ... 355  | 760             |             |                                 | Q65110A7018   |              |
|                                                                                     | LY P476-Q2S1-26      | ● yellow                  | 587                                     | 90 ... 224   | 480             |             |                                 | Q65110A3955   |              |
|                                                                                     | LY P476-R2T1-26      |                           |                                         | 140 ... 355  | 760             |             |                                 | Q65110A3956   |              |
|                                                                                     | LY P476-Q2T1-26      |                           |                                         | 90 ... 355   | 675             | Q65110A4881 |                                 |               |              |
|  | LS P47F-U1AA-1-1     | ● super red               | 633                                     | 450 ... 1400 | 2780            | 30          | 120                             | Q65110A4859   | 8            |
|                                                                                     | LR P47F-U2AB-1-1     | ● red                     | 625                                     | 560 ... 1800 | 3540            |             |                                 | Q65110A4861   |              |
|                                                                                     | LA P47F-V2BB-24-3A4B | ● amber                   | 617                                     | 900 ... 2800 | 5550            |             |                                 | Q65110A4857   |              |
|                                                                                     | LA P47F-V2BB-24-3B5A |                           |                                         |              |                 |             |                                 | Q65110A9267   |              |
|                                                                                     | LY P47F-U2AB-36-4A5B | ● yellow                  | 590                                     | 560 ... 1800 | 3540            |             |                                 | Q65110A9266   |              |
|                                                                                     | LY P47F-U2AB-36-3B5A |                           |                                         |              |                 |             |                                 | Q65110A4860   |              |
|  | LB P4SG-S2U1-35      | ● blue                    | 470                                     | 224 ... 560  | 850             | 20          | 120                             | Q65110A8252   | 8            |
|                                                                                     | LT P4SG-V1AB-36-1    | ● true green              | 528                                     | 710 ... 1800 | 3010            |             |                                 | Q65110A7127   |              |
|  | LCB P473-P2R2        | ● color on demand<br>blue | 0.2 / 0.3                               | 56 ... 180   | 350             | 10          | 120                             | on request    | 7            |




## PointLED Silicone

|                                                                                     |                     |              |             |              |      |    |     |             |   |
|-------------------------------------------------------------------------------------|---------------------|--------------|-------------|--------------|------|----|-----|-------------|---|
|  | LB P4SG-S2U1-35     | ● blue       | 470         | 224 ... 560  | 850  | 20 | 120 | Q65110A8252 | 8 |
|                                                                                     | LT P4SG-V1AB-36-1   | ● true green | 528         | 710 ... 1800 | 3010 |    |     | Q65110A7127 |   |
|  | LW P4SG-V2AB-JKPL-1 | ○ white      | 0.33 / 0.33 | 900 ... 1800 | 4050 | 20 | 120 | Q65110A9047 | 7 |



## Top Emitting

## SmartLED





| Package                                                                             | Type                | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$        | $\Phi_V$<br>(typ.)<br>[mIm] | at $I_f$ | Viewing<br>angle at 50<br>% $I_V$<br>[°]   | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------|---------------------|----------------|-----------------------------------------------------|--------------|-----------------------------|----------|--------------------------------------------|---------------|-----------------|
|                                                                                     |                     |                |                                                     | [mcd]        |                             | [mA]     |                                            |               |                 |
|    | LS L29K-G1H2-1      | ● super red    | 630                                                 | 1.8 ... 4.5  | 13                          | 2        | extremely<br>wide<br>viewing<br>angle 160° | Q65110A1758   | 9               |
|                                                                                     | LS L29K-H1J2-1      |                |                                                     | 2.8 ... 7.1  | 20                          |          |                                            | Q65110A1756   |                 |
|                                                                                     | LS L29K-G1J2-1      |                |                                                     | 1.8 ... 7.1  | 17                          |          |                                            | Q65110A1757   |                 |
|                                                                                     | LO L29K-H2K1-24     | ● orange       | 606                                                 | 3.55 ... 9   | 25                          |          |                                            | Q65110A1747   |                 |
|                                                                                     | LO L29K-J2L1-24     |                |                                                     | 5.6 ... 14   | 40                          |          |                                            | Q65110A1752   |                 |
|                                                                                     | LO L29K-H2L1-24     |                |                                                     | 3.55 ... 14  | 35                          |          |                                            | Q65110A1751   |                 |
|                                                                                     | LY L29K-H1J2-26     | ● yellow       | 587                                                 | 2.8 ... 7.1  | 20                          |          | extremely<br>wide<br>viewing<br>angle 160° | Q65110A1765   |                 |
|                                                                                     | LY L29K-J1K2-26     |                |                                                     | 4.5 ... 11.2 | 32                          |          |                                            | Q65110A1748   |                 |
|                                                                                     | LY L29K-H1K2-26     |                |                                                     | 2.8 ... 11.2 | 28                          |          |                                            | Q65110A1766   |                 |
|                                                                                     | LG L29K-F2H1-24     | ● green        | 570                                                 | 1.4 ... 3.55 | 8                           |          |                                            | Q65110A1744   |                 |
|                                                                                     | LG L29K-G2J1-24     |                |                                                     | 2.24 ... 5.6 | 12                          |          |                                            | Q65110A1746   |                 |
|                                                                                     | LG L29K-F2J1-24     |                |                                                     | 1.4 ... 5.6  | 10                          |          |                                            | Q65110A1745   |                 |
|  | LS L296-N2Q1-1      | ● super red    | 633                                                 | 35.5 ... 90  | 250                         | 20       | extremely<br>wide<br>viewing<br>angle 160° | Q65110A1753   | 9               |
|                                                                                     | LS L296-P2Q2-1      |                |                                                     | 56 ... 112   | 320                         |          |                                            | Q65110A1755   |                 |
|                                                                                     | LS L296-N1Q2-1      |                |                                                     | 28 ... 112   | 275                         |          |                                            | Q65110A1754   |                 |
|                                                                                     | LA L296-P2R1-1      | ● amber-red    | 615                                                 | 56 ... 140   | 400                         |          |                                            | Q65110A3236   |                 |
|                                                                                     | LA L296-Q2R2-1      |                |                                                     | 90 ... 180   | 500                         |          |                                            | Q65110A3237   |                 |
|                                                                                     | LA L296-P1R2        |                |                                                     | 45 ... 180   | 445                         |          |                                            | Q65110A3235   |                 |
|                                                                                     | LO L296-P2R1-24     | ● orange       | 606                                                 | 56 ... 140   | 400                         |          |                                            | Q65110A1906   |                 |
|                                                                                     | LO L296-Q2S1-24     |                |                                                     | 90 ... 224   | 640                         |          |                                            | Q65110A1904   |                 |
|                                                                                     | LO L296-P1S1-24     |                |                                                     | 45 ... 224   | 530                         |          |                                            | Q65110A1905   |                 |
|                                                                                     | LY L296-P2R1-26     | ● yellow       | 587                                                 | 56 ... 140   | 400                         |          |                                            | Q65110A1763   |                 |
|                                                                                     | LY L296-Q2R2-26     |                |                                                     | 90 ... 180   | 500                         |          |                                            | Q65110A1762   |                 |
|                                                                                     | LY L296-P1R2-26     |                |                                                     | 45 ... 180   | 445                         |          |                                            | Q65110A1764   |                 |
|                                                                                     | LP L296-J2L2-25     | ● pure green   | 560                                                 | 5.6 ... 18   | 35                          |          |                                            | Q65110A3342   |                 |
|  | LW L28G-R2S2-3K6L-1 | ○ white        | 0.3 / 0.28                                          | 140 ... 280  | 1010                        | 10       | horizontal<br>170°, verti-<br>cal 130°     | Q65110A2460   | 10              |
|  | LS L196-N1R2-1      | ● super red    | 633                                                 | 28 ... 180   | 430                         | 20       | wide<br>viewing<br>angle 150 °             | Q65111A0708   | 63              |
|                                                                                     | LY L196-P1S1-26     | ● yellow       | 587                                                 | 45 ... 224   | 560                         |          |                                            | Q65111A0703   |                 |

## Top Emitting





## CHIPLED

| Package | Type | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$ | $\Phi_V$<br>(typ.)<br>[mlm] | at $I_F$ | Viewing angle<br>at 50 % $I_V$<br>[°] | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-----------------------------------------------------|-------|-----------------------------|----------|---------------------------------------|---------------|-----------------|
|         |      |                |                                                     | [mcd] |                             | [mA]     |                                       |               |                 |








## CHIPLED 1206

|                                                                                   |         |                                                                                             |     |            |     |    |                                         |             |    |
|-----------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------------------------|-----|------------|-----|----|-----------------------------------------|-------------|----|
|  | LH N974 |  hyper red | 645 | 7.1 ... 45 | 15  | 20 | extremely wide<br>viewing angle<br>160° | Q62702P5192 | 12 |
|                                                                                   | LY N971 |  yellow    | 587 | 2.8 ... 18 | 40  | 20 | extremely wide<br>viewing angle<br>160° | Q62702P5193 | 11 |
|                                                                                   | LG N971 |  green     | 570 | 7.1 ... 45 | 105 |    |                                         | Q62702P5191 |    |








## CHIPLED 1206 with lens

|                                                                                   |                   |                                                                                              |     |                   |      |    |      |             |    |
|-----------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------|-----|-------------------|------|----|------|-------------|----|
|  | LA N91E-DBFB-24   |  amber-red  | 617 | 5600 ...<br>18000 | 3500 | 20 | 20 ° | Q65110A8697 | 18 |
|                                                                                   | LB N91E-AADA-35-1 |  blue       | 470 | 1120 ...<br>5600  | 1100 |    |      | Q65110A8735 |    |
|                                                                                   | LT N91E-DBFB-25-1 |  true green | 530 | 5600 ...<br>18000 | 3500 |    |      | Q65110A8707 |    |

## CHIPLED 0805

|                                                                                     |         |                                                                                               |     |            |     |    |                                         |             |    |
|-------------------------------------------------------------------------------------|---------|-----------------------------------------------------------------------------------------------|-----|------------|-----|----|-----------------------------------------|-------------|----|
|  | LO R971 |  orange    | 605 | 2.8 ... 18 | 28  | 20 | extremely wide<br>viewing angle<br>160° | Q62702P5180 | 13 |
|                                                                                     | LY R971 |  yellow    | 590 |            |     |    |                                         | Q62702P5181 |    |
|                                                                                     | LG R971 |  green     | 570 |            |     |    |                                         | 7.1 ... 45  |    |
|                                                                                     | LS R976 |  super red | 633 | 28 ... 180 | 330 | 20 | extremely wide<br>viewing angle<br>160° | Q62702P5178 | 13 |
|                                                                                     | LO R976 |  orange    | 606 | 45 ... 280 | 520 |    |                                         | Q62702P5101 |    |
|                                                                                     | LY R976 |  yellow    | 588 |            |     |    |                                         | Q62702P5177 |    |

## CHIPLED 0603 0.4 mm



|                                                                                     |                     |                                                                                                |            |            |     |   |                                      |             |    |
|-------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------|------------|------------|-----|---|--------------------------------------|-------------|----|
|  | LT Q39E-Q1S2-25-1   |  true green | 530        | 71 ... 280 | 440 | 5 | horizontal<br>155°, vertical<br>135° | Q65110A7998 | 15 |
|                                                                                     | LB Q39E-L2N2-35-1   |  blue       | 470        | 14 ... 45  | 75  |   |                                      | Q65110A7212 |    |
|                                                                                     | LT Q39G-Q1S2-25-1   |  true green | 530        | 71 ... 280 | 550 |   |                                      | Q65110A7997 |    |
|                                                                                     | LB Q39G-L2N2-35-1   |                                                                                                |            | 14 ... 45  | 95  |   |                                      | Q65110A7211 |    |
|  | LB Q39G-N1P1-35-1   |  blue       | 470        | 28 ... 56  | 140 | 5 | horizontal<br>160°, vertical<br>135° | Q65110A7940 | 16 |
|                                                                                     | LW Q38G-Q1S1-3K6L-1 |  white      | 0.3 / 0.28 | 71 ... 224 | 440 |   |                                      | Q65110A7209 |    |
|                                                                                     | LW Q38G-Q2R2-3K5L-1 |                                                                                                |            | 90 ... 180 | 400 |   |                                      | Q65110A7584 |    |
|                                                                                     | LW Q38E-Q1S2-3K6L-1 |                                                                                                |            | 71 ... 280 | 520 |   |                                      | Q65110A7210 |    |
|                                                                                     | LW Q38E-Q2R2-3K5L   |                                                                                                |            | 90 ... 180 | 400 |   |                                      | Q65110A7939 | 15 |

## Top Emitting






## CHIPLED

| Package | Type | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |       |                    |          | Viewing angle<br>at 50 % $I_V$ | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-----------------------------------------|-------|--------------------|----------|--------------------------------|---------------|-----------------|
|         |      |                |                                         | $I_V$ | $\Phi_V$<br>(typ.) | at $\xi$ |                                |               |                 |
|         |      |                | [nm / -]                                | [mcd] | [mlm]              | [mA]     | [°]                            |               |                 |










## CHIPLED 0603 0.6 mm

|                                                                                   |               |                                                                                         |     |           |     |    |      |             |    |
|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------------|-----|-----------|-----|----|------|-------------|----|
|  | LG Q976-MP-24 |  green | 572 | 18 ... 71 | 135 | 20 | 130° | Q65110A8842 | 52 |
|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------------|-----|-----------|-----|----|------|-------------|----|

## CHIPLED 0603 0.8 mm

|                                                                                   |                 |                                                                                             |     |            |     |    |                                         |             |    |
|-----------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------|-----|------------|-----|----|-----------------------------------------|-------------|----|
|  | LS Q971         |  super red | 628 | 7.1 ... 45 | 11  | 20 | extremely wide<br>viewing angle<br>160° | Q65110A4282 | 17 |
|                                                                                   | LO Q971         |  orange    | 606 | 4.5 ... 28 | 9   |    |                                         | Q65110A4285 |    |
|                                                                                   | LY Q971-H1L2-36 |  yellow    | 587 | 2.8 ... 9  | 6   |    |                                         | Q62703Q4699 |    |
|                                                                                   | LG Q971         |  green     | 570 | 7.1 ... 45 | 10  |    |                                         | Q62702P5189 |    |
|  | LS Q976         |  super red | 633 | 28 ... 180 | 330 | 20 | extremely wide<br>viewing angle<br>160° | Q62702P5187 | 17 |
|                                                                                   | LO Q976         |  orange    | 605 | 45 ... 280 | 520 |    |                                         | Q62702P5188 |    |
|                                                                                   | LY Q976         |  yellow    | 587 |            |     |    |                                         | Q62702P5276 |    |



## CHIPLED 0402

|                                                                                     |                     |                                                                                                |             |            |     |   |                                      |             |    |
|-------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------|-------------|------------|-----|---|--------------------------------------|-------------|----|
|  | LR QH9F-P2R1-1      |  red        | 625         | 56 ... 140 | 300 | 5 | horizontal<br>120°, vertical<br>130° | Q65110A8031 | 19 |
|                                                                                     | ZO QH9F-M2P2-24-1   |  orange     | 606         | 18 ... 71  | 140 | 2 |                                      | Q65110A8074 |    |
|                                                                                     | LY QH9F-P1R1-36     |  yellow     | 590         | 45 ... 140 | 380 | 5 |                                      | Q65110A8028 |    |
|  | LT QH9G-Q2S2-25-1   |  true green | 525         | 90 ... 280 | 550 | 5 | horizontal<br>155°, vertical<br>170° | Q65110A9219 | 19 |
|                                                                                     | LB QH9G-N1P2-35-1   |  blue       | 470         | 28 ... 71  | 150 |   |                                      | Q65110A8032 |    |
|  | LW QH8G-Q2S2-3K5L-1 |  white      | 0.29 / 0.27 | 90 ... 280 | 550 | 5 | horizontal<br>120°, vertical<br>145° | Q65110A8029 | 19 |


## Top Emitting

## Multicolor Packages

## Multi TOPLED

| Package                                                                           | Type                        | Emission color          | $\lambda_{\text{dom}}$<br>(typ.)<br>[nm] | $I_V$ [mcd]   |               |                  | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-----------------------------|-------------------------|------------------------------------------|---------------|---------------|------------------|---------------------------------------|---------------|--------------|
|                                                                                   |                             |                         |                                          | color 1       | color 2       | at $I_f$<br>[mA] |                                       |               |              |
|  | LSY T676-P2R1-1-0+Q2S1-35   | ● super red<br>● yellow | 633 / 587                                | 56 ... 140    | 90 ... 224    | 20               | 120                                   | Q65110A2446   | 42           |
|                                                                                   | LSG T676-P7Q7-1+N7P7-24     | ● super red<br>● green  | 633 / 570                                |               | 35.5 ... 90   |                  |                                       | Q65110A4186   |              |
|  | LAY T67F-AABB-1-1+AABA-45-1 | ● amber-red<br>● yellow | 617 / 590                                | 1120 ... 2800 | 1120 ... 2240 | 50               | 120                                   | Q65110A7526   | 42           |

## Multi TOPLED Reverse Gullwing

|                                                                                   |                        |                        |           |            |              |   |     |             |    |
|-----------------------------------------------------------------------------------|------------------------|------------------------|-----------|------------|--------------|---|-----|-------------|----|
|  | LOG T77K-JL-1-0+GJ-1-0 | ● orange<br>● green    | 606 / 570 | 4.5 ... 18 | 1.8 ... 7.1  | 2 | 120 | Q65110A3338 | 49 |
|                                                                                   | LSG T77K-JL-1-0+HK-1-0 | ● super red<br>● green | 630 / 570 | 4.5 ... 18 | 2.8 ... 11.2 | 2 | 120 | Q65111A0238 | 42 |


## Top Emitting

## Multicolor Packages

## MULTILED


| Package | Type | Emission color | Cx/Cy | $I_V$       |               | $2\phi$ (typ.) (50% $I_V$ ) | Ordering Code | Package Fig. |
|---------|------|----------------|-------|-------------|---------------|-----------------------------|---------------|--------------|
|         |      |                |       | $I_V$ [mcd] | at $I_F$ [mA] |                             |               |              |

## MULTILED inline


|                                                                                   |                    |         |             |               |                            |     |             |    |
|-----------------------------------------------------------------------------------|--------------------|---------|-------------|---------------|----------------------------|-----|-------------|----|
|  | LTRBGFSG-ABCB-QKY0 | ○ white | 0.31 / 0.31 | 1400 ... 4500 | 20 (T)<br>20 (R)<br>10 (B) | 120 | Q65110A9484 | 45 |
|-----------------------------------------------------------------------------------|--------------------|---------|-------------|---------------|----------------------------|-----|-------------|----|


| Package | Type | Emission color | $\lambda_{dom}$ (typ.) [nm] | $I_V$ [mcd] |         |         | at $I_F$ [mA] | $2\phi$ (typ.) (50% $I_V$ ) [°] | Ordering Code | Package Fig. |
|---------|------|----------------|-----------------------------|-------------|---------|---------|---------------|---------------------------------|---------------|--------------|
|         |      |                |                             | color 1     | color 2 | color 3 |               |                                 |               |              |

## MULTILED inline, black package

|                                                                                    |                               |                                 |                 |            |             |              |    |     |             |    |
|------------------------------------------------------------------------------------|-------------------------------|---------------------------------|-----------------|------------|-------------|--------------|----|-----|-------------|----|
|  | LRTBGFUG-P9R7-1+S7U-29+M7Q-49 | ● red<br>● true green<br>● blue | 625 / 528 / 470 | 63 ... 224 | 224 ... 710 | 22.4 ... 112 | 10 | 120 | Q65110A8176 | 46 |
|------------------------------------------------------------------------------------|-------------------------------|---------------------------------|-----------------|------------|-------------|--------------|----|-----|-------------|----|

## MULTILED inline, black surface


|                                                                                     |                                    |                                 |                 |              |              |             |    |     |             |    |
|-------------------------------------------------------------------------------------|------------------------------------|---------------------------------|-----------------|--------------|--------------|-------------|----|-----|-------------|----|
|  | LRTB GFTG-T7AW-1+V7A7-29+R5T9-49-L | ● red<br>● true green<br>● blue | 625 / 528 / 470 | 355 ... 1800 | 900 ... 2240 | 125 ... 630 | 20 | 120 | Q65110A8177 | 45 |
|                                                                                     | LRTB GFTG-T7AW-1+V7A7-29+R5T9-49-S |                                 |                 |              |              |             |    |     | Q65110A9105 |    |
|                                                                                     | LRTBGFTM-ST7-1+VV9-25+Q5R7-49-L    | ● red<br>● true green<br>● blue | 625 / 528 / 470 | 180 ... 560  | 710 ... 1590 | 80 ... 224  | 10 | 120 | Q65110A9407 | 45 |
|                                                                                     | LRTBGFTM-ST7-1+VV9-25+Q5R7-49-S    |                                 |                 |              |              |             |    |     | Q65110A9442 |    |

| Package                                                                             | Type                  | Emission color        | $\lambda_{dom}$ (typ.) [nm] | $I_V$ [mcd] |              | at $I_F$ [mA] | $2\phi$ (typ.) (50% $I_V$ ) [°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------------|-------------|--------------|---------------|---------------------------------|---------------|--------------|
|                                                                                     |                       |                       |                             | color 1     | color 2      |               |                                 |               |              |
|  | LRT GFTM-ST7-1+VV9-29 | ● red<br>● true green | 625 / 528                   | 180 ... 560 | 710 ... 1590 | 10            | 120                             | Q65111A0439   | 64           |


## Top Emitting

## Multicolor Packages


## MULTILED


| Package                                                                           | Type             | Emission color | $\lambda_{\text{dom}}$<br>(typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$         |                             |                  | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|------------------|----------------|--------------------------------------------------------|---------------|-----------------------------|------------------|---------------------------------------|---------------|--------------|
|                                                                                   |                  |                |                                                        | [mcd]         | $\Phi_V$<br>(typ.)<br>[mlm] | at $I_f$<br>[mA] |                                       |               |              |
|  | LYYYG6SF-CADB-35 | ● yellow       | 587                                                    | 2800 ... 7100 | 14900                       | 50               | 120                                   | Q65110A5713   | 44           |

## Multi CHIPLED

| Package                                                                           | Type                          | Emission color                  | $\lambda_{\text{dom}}$<br>(typ.)<br>[nm] | $I_V$ [mcd] |             |            |                  | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-------------------------------|---------------------------------|------------------------------------------|-------------|-------------|------------|------------------|---------------------------------------|---------------|--------------|
|                                                                                   |                               |                                 |                                          | color 1     | color 2     | color 3    | at $I_f$<br>[mA] |                                       |               |              |
|  | LRTBR98G-R7T5-1+S7U-26+P7R-26 | ● red<br>● true green<br>● blue | 625 /<br>528 /<br>470                    | 140 ... 500 | 224 ... 710 | 56 ... 180 | 20               | 120                                   | Q65110A8602   | 47           |


## Multi CERAMOS

| Package                                                                             | Type                            | Emission color                  | $\lambda_{\text{dom}}$<br>(typ.)<br>[nm] | $I_V$ [mcd]      |                   |                  |                  | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|---------------------------------|---------------------------------|------------------------------------------|------------------|-------------------|------------------|------------------|---------------------------------------|---------------|--------------|
|                                                                                     |                                 |                                 |                                          | color 1          | color 2           | color 3          | at $I_f$<br>[mA] |                                       |               |              |
|  | LRTBC9TP-CWD5-1+D5E7-25+A9C5-49 | ● red<br>● true green<br>● blue | 625 /<br>528 /<br>470                    | 2800 ...<br>8000 | 5000 ...<br>14000 | 1400 ...<br>4000 | 140              | 120                                   | Q65110A8879   | 48           |

| Package                                                                             | Type               | Emission color | Cx/Cy      | $I_V$          |                  | $2\phi$ (typ.) (50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|--------------------|----------------|------------|----------------|------------------|------------------------------------|---------------|--------------|
|                                                                                     |                    |                |            | [mcd]          | at $I_f$<br>[mA] |                                    |               |              |
|  | LRTDC9TP-EAFB-GHQN | ○ white        | 0.2 / 0.28 | 7100 ... 18000 | 160              | 120                                | Q65110A8562   | 65           |

## Side Emitting

## SIDELED






| Package                                                                           | Type              | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$         | $\Phi_V$<br>(typ.) | at $I_f$ | $2\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|-------------------|----------------|-----------------------------------------------------|---------------|--------------------|----------|--------------------------------|---------------|--------------|
|                                                                                   |                   |                |                                                     | [mcd]         | [mlm]              |          |                                |               |              |
|  | LS A67K-K1L2-1    | ● super red    | 630                                                 | 7.1 ... 18    | 35                 | 2        | 120                            | Q65110A2017   | 37           |
|                                                                                   | LS A67K-J1L2-1    |                |                                                     | 4.5 ... 18    | 30                 |          |                                | Q65110A2018   |              |
|                                                                                   | LS A67K-J1K2-1    |                |                                                     | 4.5 ... 11.2  | 22                 |          |                                | Q65110A2016   |              |
|                                                                                   | LO A67K-K1L2-24   | ● orange       | 606                                                 | 7.1 ... 18    | 40                 |          |                                | Q65110A4968   |              |
|                                                                                   | LO A67K-K1M2-24   |                |                                                     | 7.1 ... 28    | 50                 |          |                                | Q65110A4969   |              |
|                                                                                   | LO A67K-L1M2-24   |                |                                                     | 11.2 ... 28   | 60                 |          |                                | Q65110A4970   |              |
|                                                                                   | LY A67K-J2L1-26   | ● yellow       | 587                                                 | 5.6 ... 14    | 30                 |          |                                | Q65110A2065   |              |
|                                                                                   | LY A67K-K2M1-26   |                |                                                     | 9 ... 22.4    | 45                 |          |                                | Q65110A2066   |              |
|                                                                                   | LY A67K-J2M1-26   |                |                                                     | 5.6 ... 22.4  | 40                 |          |                                | Q65110A2067   |              |
|                                                                                   | LG A67K-H2K1-24   | ● green        | 570                                                 | 3.55 ... 9    | 19                 |          |                                | Q65110A2290   |              |
|                                                                                   | LG A67K-G2K1-24   |                |                                                     | 2.24 ... 9    | 17                 |          |                                | Q65110A2291   |              |
|                                                                                   | LP A67K-E1F2-25   | ● pure green   | 560                                                 | 0.71 ... 1.8  | 4                  |          |                                | Q65110A2292   |              |
|                                                                                   | LP A67K-F1G2-25   |                |                                                     | 1.12 ... 2.8  | 6                  |          |                                | Q65110A2293   |              |
|                                                                                   | LP A67K-E1G2-25   |                |                                                     | 0.71 ... 2.8  | 5                  |          |                                | Q65110A2294   |              |
|                                                                                   | LS A676-Q1R2-1    | ● super red    | 633                                                 | 71 ... 180    | 350                | 20       | 120                            | Q65110A2259   | 37           |
|                                                                                   | LS A676-R1S1-1    |                |                                                     | 112 ... 224   | 470                |          |                                | Q65110A2260   |              |
|                                                                                   | LS A676-P2S1-1    |                |                                                     | 56 ... 224    | 400                |          |                                | Q65110A2261   |              |
|                                                                                   | LA A676-R1S2-1    | ● amber-red    | 615                                                 | 112 ... 280   | 550                |          |                                | Q65110A2253   |              |
|                                                                                   | LA A676-S1T1-1    |                |                                                     | 180 ... 355   | 750                |          |                                | Q65110A2254   |              |
|                                                                                   | LA A676-Q2T1-1    |                |                                                     | 90 ... 355    | 630                |          |                                | Q65110A2255   |              |
|                                                                                   | LO A676-R1S2-24   | ● orange       | 606                                                 | 112 ... 280   | 550                |          |                                | Q65110A2256   |              |
|                                                                                   | LO A676-S1T1-24   |                |                                                     | 180 ... 355   | 750                |          |                                | Q65110A2257   |              |
|                                                                                   | LO A676-Q2T1-24   |                |                                                     | 90 ... 355    | 630                |          |                                | Q65110A2258   |              |
|                                                                                   | LY A676-R1S2-26   | ● yellow       | 587                                                 | 112 ... 280   | 550                |          |                                | Q65110A2262   |              |
|                                                                                   | LY A676-S1T1-26   |                |                                                     | 180 ... 355   | 750                |          |                                | Q65110A2263   |              |
|                                                                                   | LY A676-Q2T1-26   |                |                                                     | 90 ... 355    | 630                |          |                                | Q65110A2264   |              |
|                                                                                   | LG A676-P1Q2-24   | ● green        | 570                                                 | 45 ... 112    | 240                |          |                                | Q65110A2285   |              |
|                                                                                   | LP A676-L1M2-25   | ● pure green   | 560                                                 | 11.2 ... 28   | 60                 |          |                                | Q65110A2286   |              |
|                                                                                   | LP A675-N1P2-25   | ● pure green   | 560                                                 | 28 ... 71     | 150                | 30       | 120                            | Q65110A2310   | 37           |
|                                                                                   | LS A67F-U1AA-1    | ● super red    | 633                                                 | 450 ... 1400  | 2780               | 30       | 120                            | Q65110A4723   | 37           |
|                                                                                   | LR A67F-U2AB-1    | ● red          | 625                                                 | 560 ... 1800  | 3540               |          |                                | Q65110A4729   |              |
|                                                                                   | LA A67F-AABB-24-1 | ● amber        | 617                                                 | 1120 ... 2800 | 6100               |          |                                | Q65111A0513   |              |
|                                                                                   | LO A67F-V2BB-24   | ● orange       | 606                                                 | 900 ... 2800  | 5550               |          |                                | Q65110A4867   |              |
|                                                                                   | LY A67F-U2AB-36   | ● yellow       | 590                                                 | 560 ... 1800  | 3540               |          |                                | Q65110A4722   |              |

## Side Emitting

## SIDELED

| Package | Type | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$ | $\Phi_V$<br>(typ.)<br>[mlm] | at $I_f$ | $2\phi$ (typ.)<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|---------|------|----------------|-----------------------------------------------------|-------|-----------------------------|----------|---------------------------------------|---------------|--------------|
|         |      |                |                                                     | [mcd] |                             | [mA]     |                                       |               |              |

## SIDELED Silicone

|                                                                                   |                   |                                                                                              |             |              |      |    |     |             |    |
|-----------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------|-------------|--------------|------|----|-----|-------------|----|
|  | LT A6SG-V2AB-35   |  true green | 528         | 900 ... 1800 | 4050 | 20 | 120 | Q65110A7884 | 38 |
|                                                                                   | LB A6SG-T1U2-35   |  blue       | 470         | 280 ... 710  | 1480 |    |     | Q65110A9377 |    |
|  | LW A6SG-V2BA-JKPL |  white      | 0.33 / 0.33 | 900 ... 2240 | 4700 | 20 | 120 | Q65110A8994 | 38 |




## Side Emitting

## SIDELED



## Micro SIDELED

| Package | Type | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy |       |                    |          | 2 $\phi$ (typ.)<br>(50% $I_V$ ) | Ordering Code | Package Fig. |
|---------|------|----------------|-----------------------------------------|-------|--------------------|----------|---------------------------------|---------------|--------------|
|         |      |                |                                         | $I_V$ | $\Phi_V$<br>(typ.) | at $\xi$ |                                 |               |              |
|         |      |                | [nm / -]                                | [mcd] | [mlm]              | [mA]     | [°]                             |               |              |


## Micro SIDELED 1 mm

|                                                                                   |                 |             |     |             |     |    |     |             |    |
|-----------------------------------------------------------------------------------|-----------------|-------------|-----|-------------|-----|----|-----|-------------|----|
|  | LS Y876-P2R1-1  | ● super red | 633 | 56 ... 140  | 300 | 20 | 120 | Q65110A2411 | 39 |
|                                                                                   | LS Y876-Q2S1-1  |             |     | 90 ... 224  | 480 |    |     | Q65110A1628 |    |
|                                                                                   | LS Y876-P2S1-1  |             |     | 56 ... 224  | 420 |    |     | Q65110A2412 |    |
|                                                                                   | LO Y876-Q2S1-24 | ● orange    | 605 | 90 ... 224  | 480 |    |     | Q65110A2408 |    |
|                                                                                   | LO Y876-R2T1-24 |             |     | 140 ... 355 | 760 |    |     | Q65110A2409 |    |
|                                                                                   | LO Y876-Q2T1-24 |             |     | 90 ... 355  | 665 |    |     | Q65110A2410 |    |
|                                                                                   | LY Y876-Q2S1-26 | ● yellow    | 587 | 90 ... 224  | 480 |    |     | Q65110A2413 |    |
|                                                                                   | LY Y876-R2T1-26 |             |     | 140 ... 355 | 760 |    |     | Q65110A2414 |    |
|                                                                                   | LY Y876-Q2T1-26 |             |     | 90 ... 355  | 665 |    |     | Q65110A2415 |    |
|                                                                                   | LG Y876-P1Q2-24 | ● green     | 570 | 45 ... 112  | 240 |    |     | Q65110A8025 |    |

## Micro SIDELED Silicone 1 mm

|                                                                                     |                     |              |            |              |      |    |     |             |    |
|-------------------------------------------------------------------------------------|---------------------|--------------|------------|--------------|------|----|-----|-------------|----|
|  | LW Y8SG-U1V1-3K6L-1 | ○ white      | 0.3 / 0.28 | 450 ... 900  | 1900 | 20 | 120 | Q65110A1709 | 40 |
|                                                                                     | LR Y8SF-U1V2-1      | ● red        | 625        | 560 ... 1400 | 2750 | 20 | 120 | Q65110A8972 | 40 |
|  | LY Y8SF-U1V2-36     | ● yellow     | 587        |              |      |    |     | Q65110A8977 |    |
|                                                                                     | LT Y8SG-V1AB-36-1   | ● true green | 528        | 710 ... 1800 | 3500 | 20 | 120 | Q65110A8975 | 40 |
|                                                                                     | LB Y8SG-T1U2-35-1   | ● blue       | 470        | 180 ... 710  | 1250 |    |     | Q65110A8976 |    |

## Micro SIDELED Silicone 0.8 mm









|                                                                                     |                     |         |            |               |      |    |     |             |    |
|-------------------------------------------------------------------------------------|---------------------|---------|------------|---------------|------|----|-----|-------------|----|
|  | LW Y1SG-AEBE-EKFM-1 | ○ white | 0.3 / 0.28 | 1000 ... 1600 | 3900 | 20 | 120 | Q65110A9541 | 41 |
|                                                                                     | LW Y1SG-AEBE-GKJM-1 |         |            |               |      |    |     | Q65110A9542 |    |
|                                                                                     | LW Y1SG-AFBF-EKFM-1 |         |            | 1200 ... 1800 | 4500 |    |     | Q65110A9543 |    |
|                                                                                     | LW Y1SG-AFBF-GKJM-1 |         |            |               |      |    |     | Q65110A9544 |    |
|                                                                                     | LW Y1SG-BFCF-EKFM-1 |         |            | 1600 ... 2200 | 5700 |    |     | Q65110A9545 |    |
|                                                                                     | LW Y1SG-BFCF-GKJM-1 |         |            |               |      |    |     | Q65110A9546 |    |

## Side Emitting

## FIREFLY

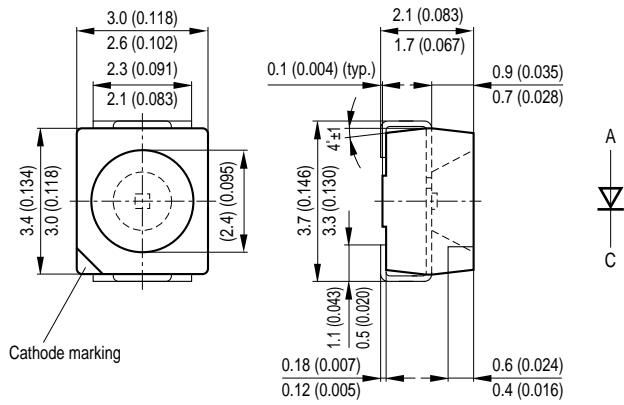
| Package | Type | Emission color | $\lambda_{\text{dom}}$ (typ.)/<br>Cx/Cy<br>[nm / -] | $I_V$ | $\Phi_V$<br>(typ.)<br>[mlm] | at $I_f$ | Viewing angle<br>at 50 % $I_V$<br>(50% $I_V$ )<br>[°] | Ordering Code | Package Fig. |
|---------|------|----------------|-----------------------------------------------------|-------|-----------------------------|----------|-------------------------------------------------------|---------------|--------------|
|         |      |                |                                                     | [mcd] |                             | [mA]     |                                                       |               |              |

## FIREFLY 0402 0.35 mm

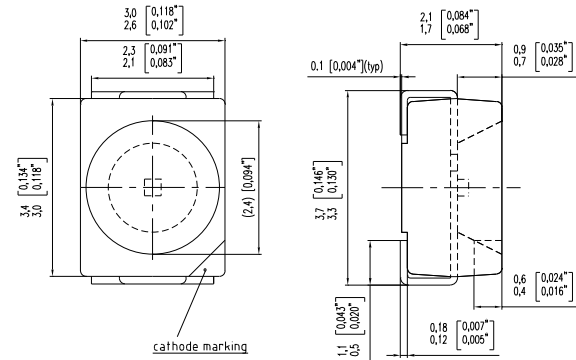
|                                                                                   |                     |                                                                                              |               |            |     |   |                                      |             |    |
|-----------------------------------------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------|---------------|------------|-----|---|--------------------------------------|-------------|----|
|  | LA VH9F-Q1R2-24     |  amber-red  | 617           | 71 ... 180 | 380 | 5 | horizontal<br>140°, vertical<br>165° | Q65110A8082 | 51 |
|                                                                                   | LR VH9F-P2R1-1      |  red        | 625           | 56 ... 140 | 300 |   |                                      | Q65110A8088 |    |
|  | LT VH9G-Q2S2-25-1   |  true green | 525           | 90 ... 280 | 550 | 5 | horizontal<br>140°, vertical<br>165° | Q65110A9228 | 51 |
|                                                                                   | LB VH9G-N1P2-35-1   |  blue       | 470           | 28 ... 71  | 150 |   |                                      | Q65110A8083 |    |
|  | LW VH8G-Q2S2-4M6N-1 |  white      | 0.285 / 0.275 | 90 ... 280 | 550 | 5 | horizontal<br>140°, vertical<br>180° | Q65110A8090 | 51 |

Dimensions in mm (inch)

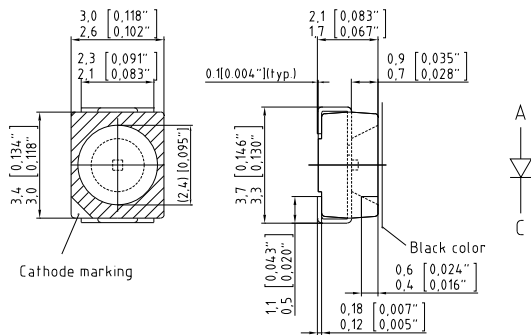
**Figure 1:** L\* T670, LG T671, L\* T673, LH T674, LP T675, L\* T676, L\* T68B, L\* T686, L\* T67C, L\* T679, L\* T67K, LW T6SC, L\* T67F, LCB T67S, LCB T67C



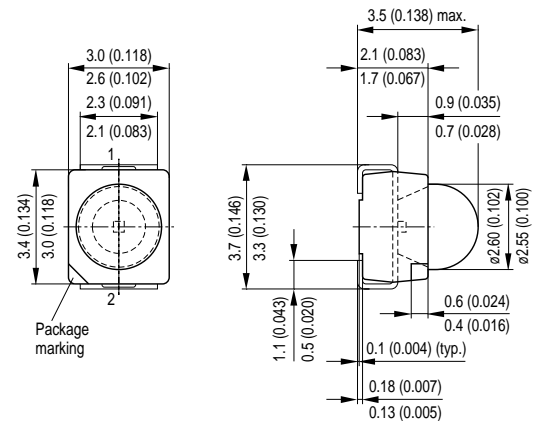
**Figure 2:** LW T6SG



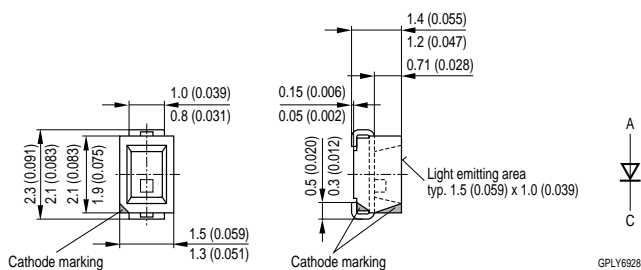
**Figure 3:** L\* T68F



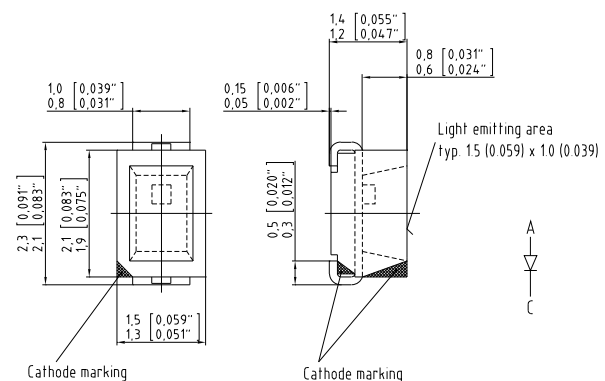
**Figure 4:** LP T655, L\* T656



**Figure 5:** L\* M670, L\* M676, L\* M673, L\* M67K, LP M675, L\* M67B, L\* M67C



**Figure 6:**



Dimensions in mm (inch)

Figure 7:

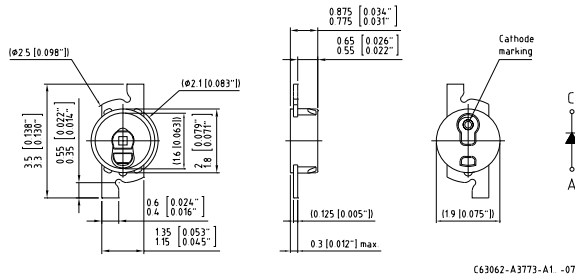


Figure 8:

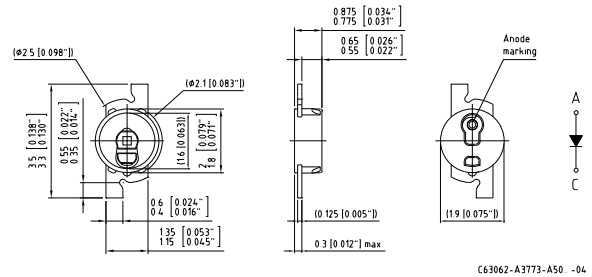


Figure 9: L\* L296, L\* L29S, L\* L293, L\* 29K, LW L283

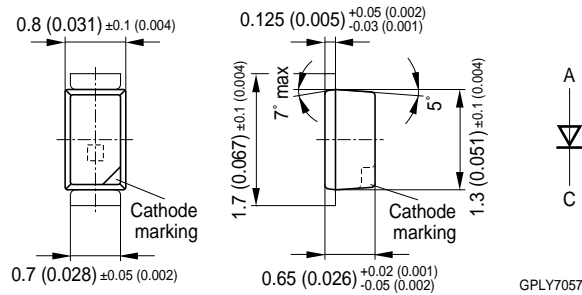


Figure 10: LB L29G, LW L28G, LCW L28G

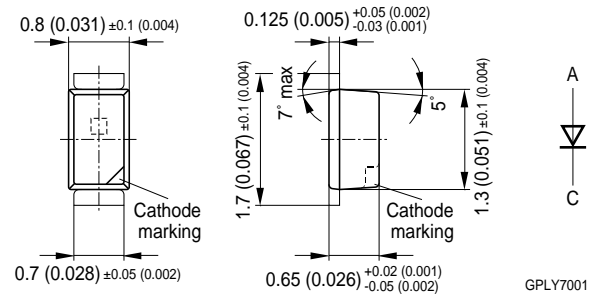


Figure 11: L\* N971

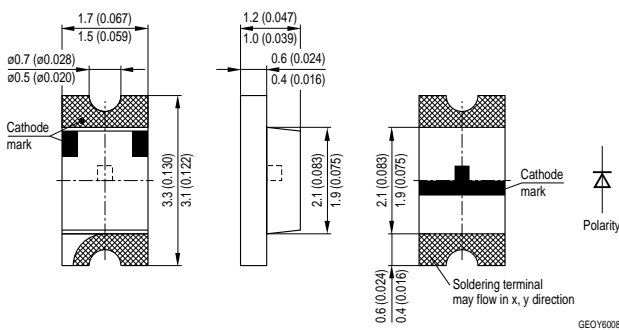
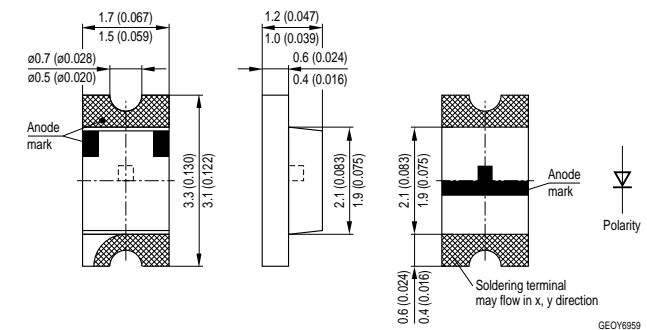
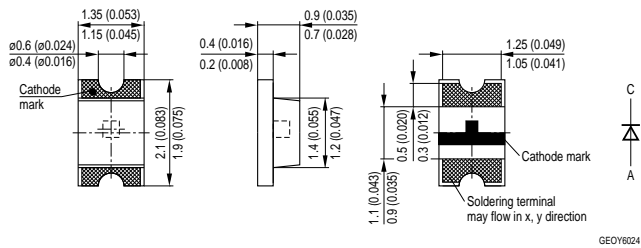


Figure 12: LH N974

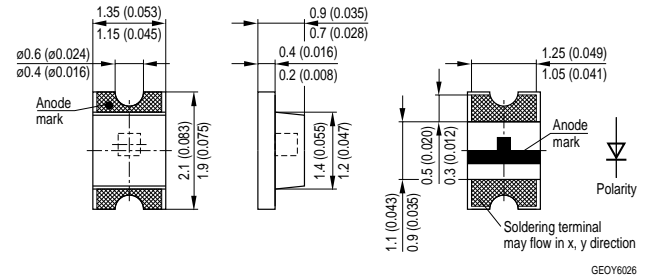


Dimensions in mm (inch)

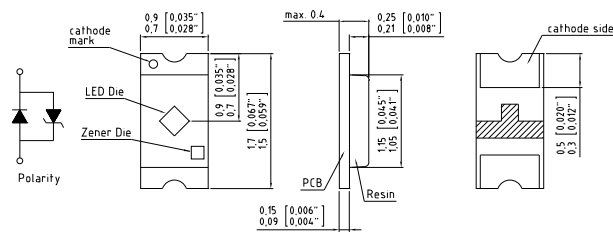
**Figure 13: L\* R971, L\* R976**



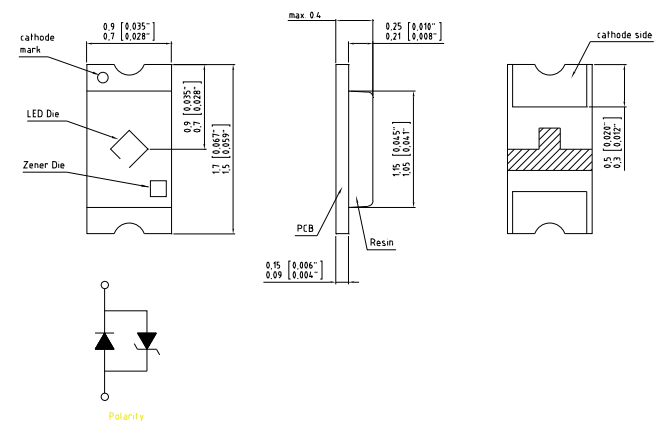
**Figure 14: LH R974**



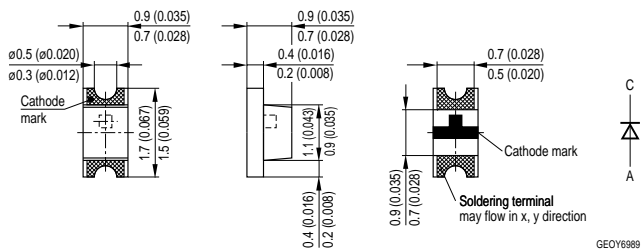
**Figure 15: L\* Q38E, L\* Q39E**



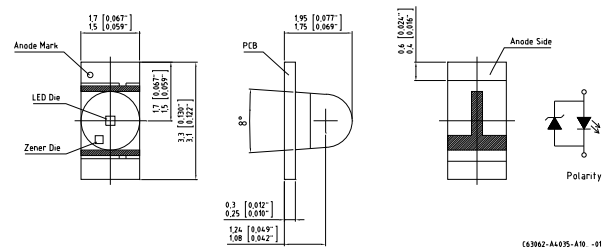
**Figure 16: L\* Q38G, L\* Q39G**



**Figure 17: L\* Q971, L\* Q976**

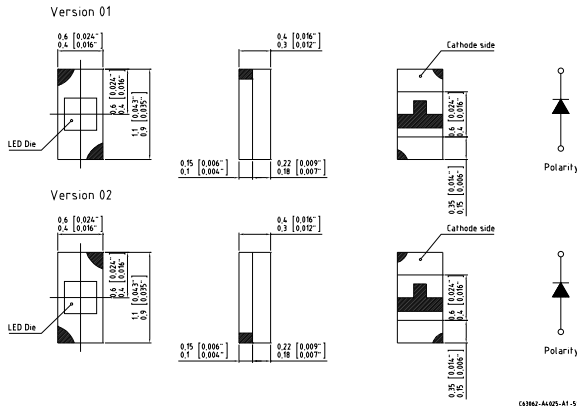


**Figure 18: L\* N91E, L\* N91F**

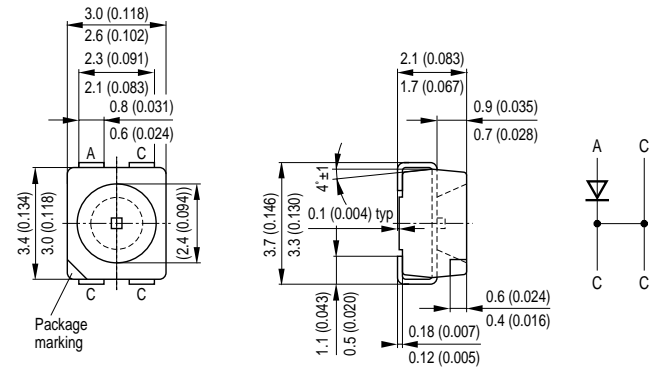


Dimensions in mm (inch)

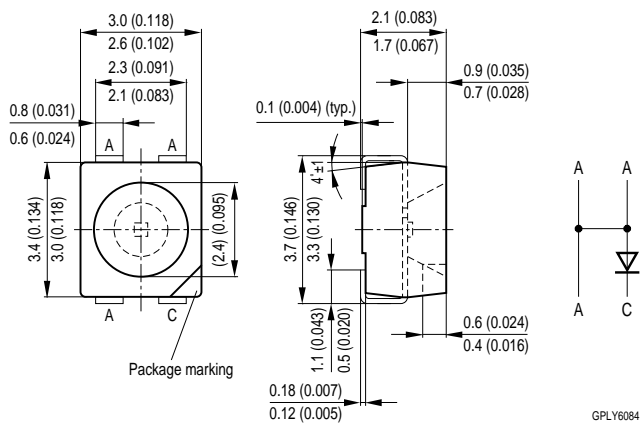
**Figure 19: L\* QH8G, L\* QH9G, L\* QH9F**



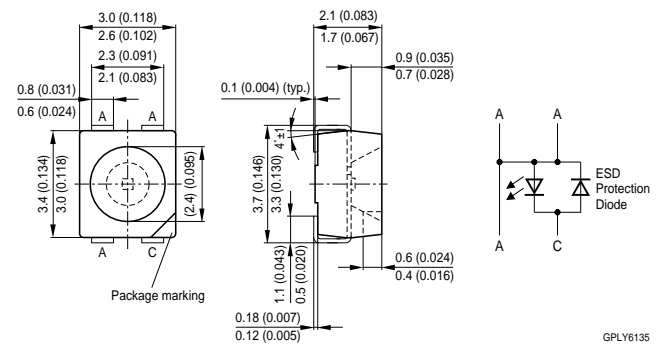
**Figure 20: LP E675, L\*E 67C, L\* E67B, L\* E6SC**



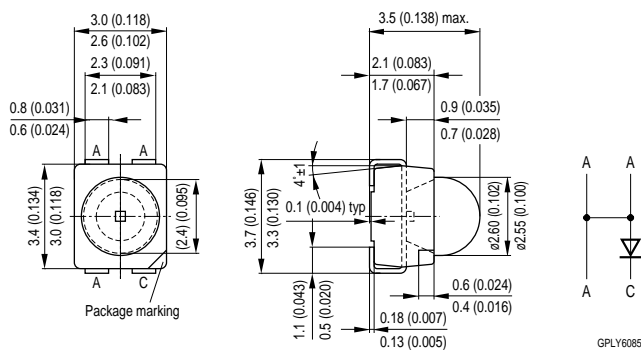
**Figure 21: LA E67F, L\* E6SF**



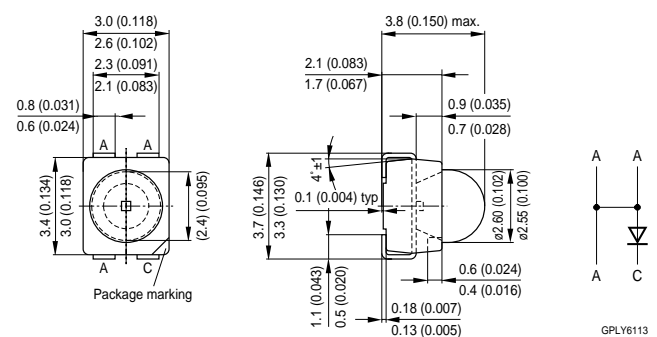
**Figure 22: L\* E6SG**



**Figure 23: LA E65F**



**Figure 24: LA E63F**



**Figure 25: LA G6SP, LR G6SP, LY G6SP**

Top view dimensions: 3.5 (0.138), 3.1 (0.122), 2.8 (0.110), 2.6 (0.102). Pin pitch: 0.7 (0.028), 0.5 (0.020). Package marking: A, C.

Side view dimensions: 2.0 (0.078), 1.6 (0.062), 0...0.15 (0.006). Mounting hole diameter: 3.6 (0.142). Pin height: 3.2 (0.126), 0.9 (0.035), 0.4 (0.016).

Pin connection diagram: A, C, A.

GPLY6099

**Figure 26: LB G6SP, LT G6SP, LW G6SP, LCW G6SP, LCY G6SP**

Top view dimensions: 3.5 (0.138), 3.1 (0.122), 2.8 (0.110), 2.6 (0.102). Pin pitch: 0.7 (0.028), 0.5 (0.020). Package marking: A, C, A.

Side view dimensions: 2.1 (0.083), 1.7 (0.067), 0...0.15 (0.006). Mounting hole diameter: 3.6 (0.142). Pin height: 3.2 (0.126), 0.9 (0.035), 0.4 (0.016).

Pin connection diagram: Protection Diode, A, C, A.

GPLY6117

**Figure 27: L\* G5AP, LCW G5GP**

Top view dimensions: 3.6, 3.7, 0.22, 0.08, 1.15, 0.79, 1.12, 0.29, 0.5, 0.00, 4.3, 6.0, 5.6. Laser code: A, A.

Side view dimensions: 3.6, 3.2, 1.8, 1.6, 1.75, 1.55, 0.7, 0.4. Laser code: A, A.

Laser code: A, A.

Note: If No mechanical force on silicone-lens allowed.

**Figure 28: L\*W CN5M**

Top view dimensions: 3.1 (0.122), 2.9 (0.114), 3.8 (0.152), 2.8 (0.110). Cathode mark: cathode mark.

Side view dimensions: 2.35 (0.093), 2.11 (0.083), R0.2, 0.25 (0.010), 0.25 (0.010), 0.35 (0.013).

Thermal pad view: cathode, anode, thermal pad (el neutral), R0.2, (2.7), (1.7), (0.75), (2.7).

C63062-A4-072-A1 -04

**Figure 29: L\* W5SM, L\* W5SN**

Top view dimensions: 6.2 (0.244), 5.8 (0.228), 4.25 (0.167), 4.15 (0.163), 0.81 (0.031), 0.73 (0.028), 5.35 (0.210), 5.25 (0.206), 1.9 (0.075), 1.7 (0.067). Heat sink: Heat sink. Protection Diode: Protection Diode. Cathode: Cathode.

Side view dimensions: 11.2 (0.441), 10.8 (0.425), 1.2 (0.047), 0.8 (0.031), 0.42 (0.165), 0.29 (0.011), 0.24 (0.009), 0.65 (0.026), 0.45 (0.018), 7.2 (0.283), 6.8 (0.268), 1.1 (0.043), 0.9 (0.035), 2.0 (0.079), 1.6 (0.063).

Heat sink: Heat sink. Protection Diode: Protection Diode. Cathode: Cathode.

GPLY6147

**Figure 30: L\* W5AM**

Top view dimensions: 6.2 (0.244), 5.8 (0.228), 4.25 (0.167), 4.15 (0.163), 0.81 (0.031), 0.73 (0.028), 5.35 (0.210), 5.25 (0.206), 1.9 (0.075), 1.7 (0.067). Heat sink: Heat sink. Protection Diode: Protection Diode. Cathode: Cathode.

Side view dimensions: 11.2 (0.441), 10.8 (0.425), 1.2 (0.047), 0.8 (0.031), 0.42 (0.165), 0.29 (0.011), 0.24 (0.009), 0.65 (0.026), 0.45 (0.018), 7.2 (0.283), 6.8 (0.268), 1.1 (0.043), 0.9 (0.035), 2.0 (0.079), 1.6 (0.063).

Heat sink: Heat sink. Protection Diode: Protection Diode. Cathode: Cathode.

**Figure 31: L\* W5AM**

**Figure 32: L\* W5AP**

**Figure 33:**

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**Figure 34: L\* W5JM**

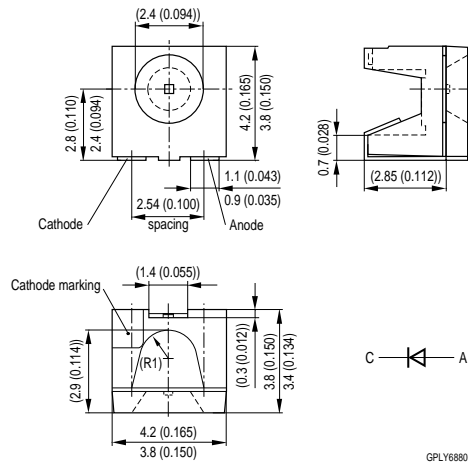
**Figure 35: LUW C9EP, LUW C9SP**

**Figure 36: L\* C9SM**

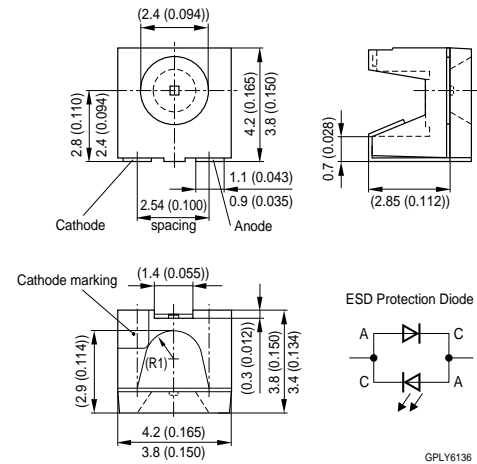


Dimensions in mm (inch)

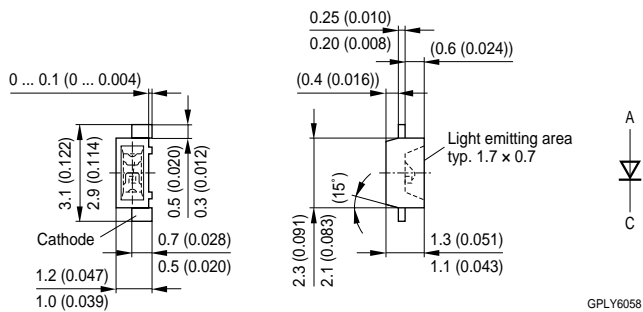
**Figure 37: L\* A676, L\* A673, L\* A67B, L\* A67F, L\* A67K, L\*A67C, LP A675**



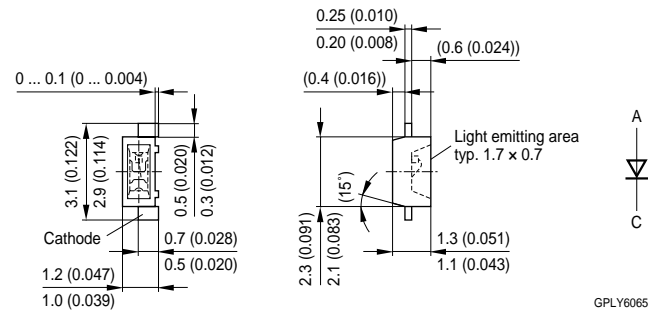
**Figure 38: L\* A6SG**



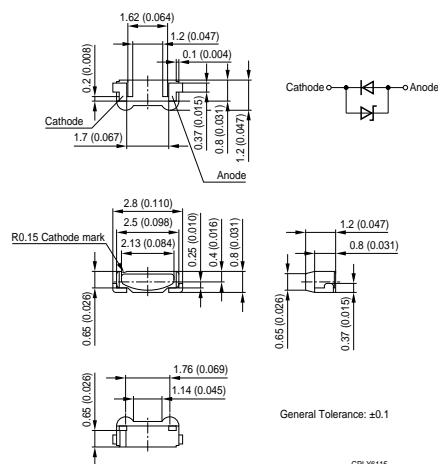
**Figure 39: L\* Y870, L\* Y876, L\* Y87S, L\* Y87C**



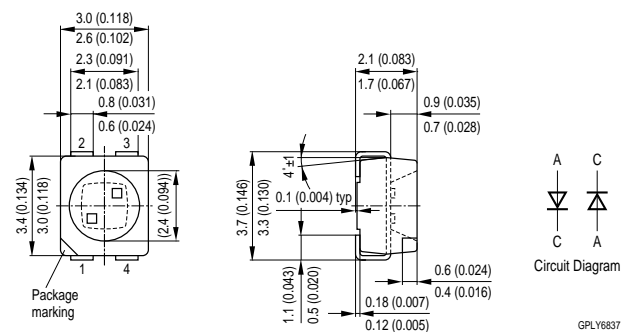
**Figure 40: LW, LB, LT Y8SG, LR, LY Y8SF**



**Figure 41: LW Y1SG**

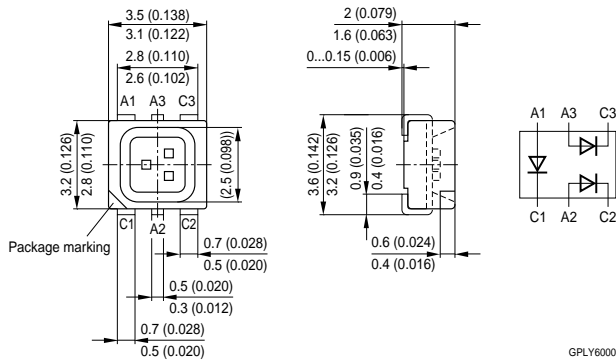


**Figure 42: L\*\* T671, L\*\* T676, L\*\* T670, L\*\*T67B, L\*\* T67C**

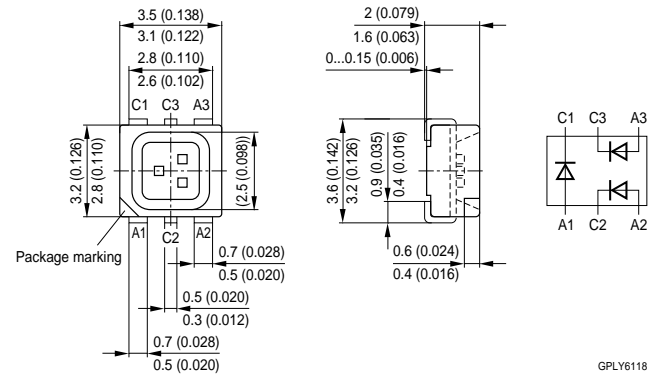


Dimensions in mm (inch)

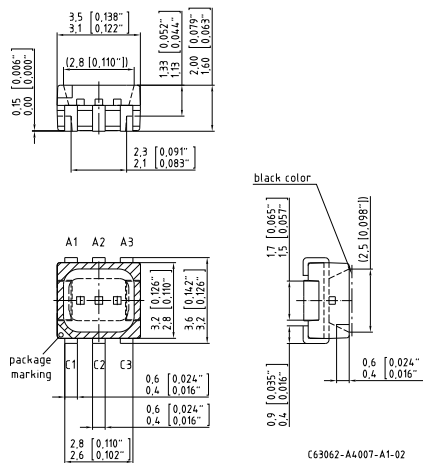
**Figure 43: LATB G66B**



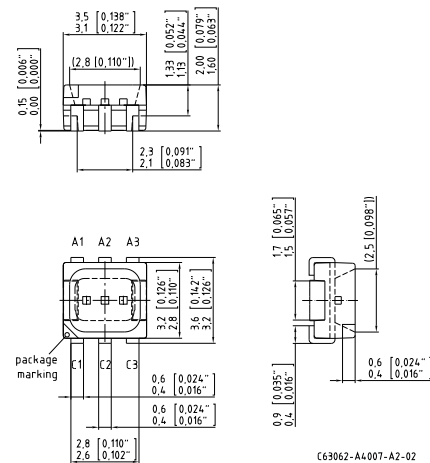
**Figure 44: LRTB G6SG, LRTB G6TG, LWWW G6SG, LYYY G6SF, LRTB G6SF**



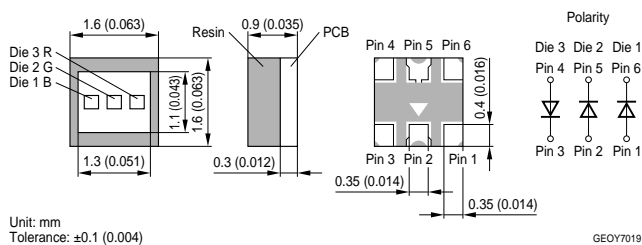
**Figure 45: LRTB GFTG**



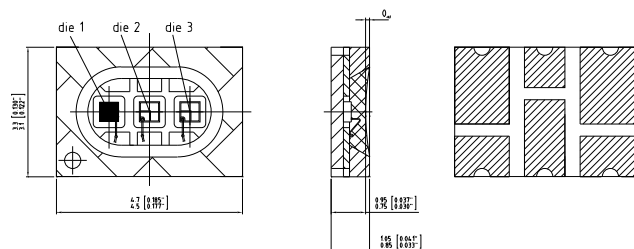
**Figure 46: LRTB GFUG**



**Figure 47: LATBR98G**

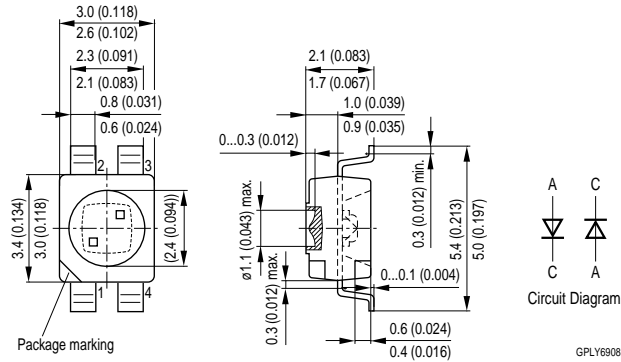


**Figure 48: LRTB C9TP**

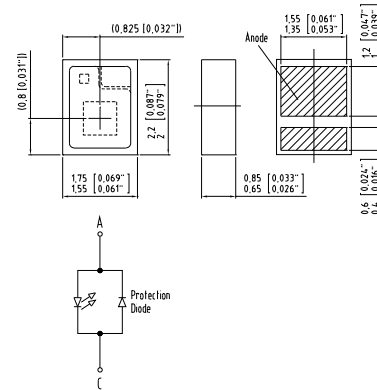


Dimensions in mm (inch)

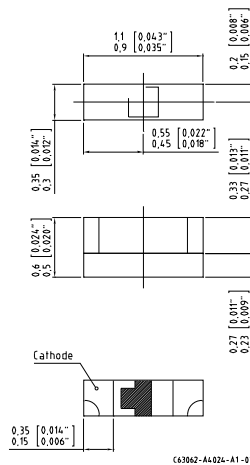
**Figure 49: L\*\* T770, L\*\* T77K**



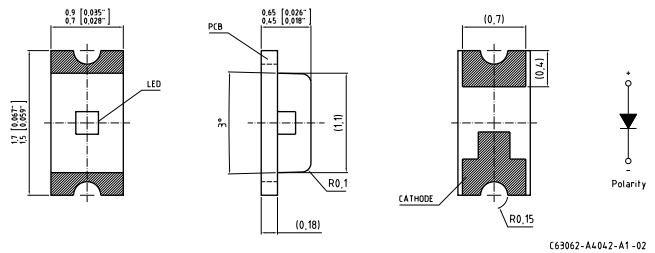
**Figure 50: L\* C9SN**



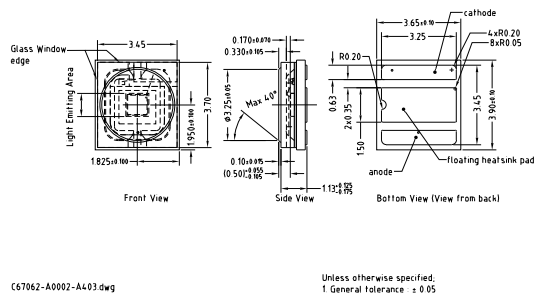
**Figure 51: L\* VH9F**



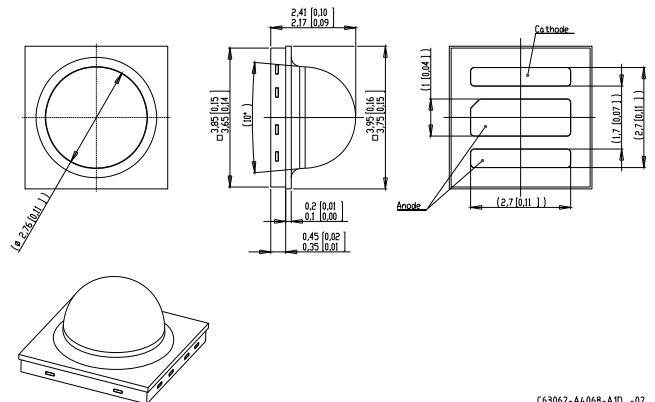
**Figure 52: LG Q976**



**Figure 53: LE \* Q9WN**

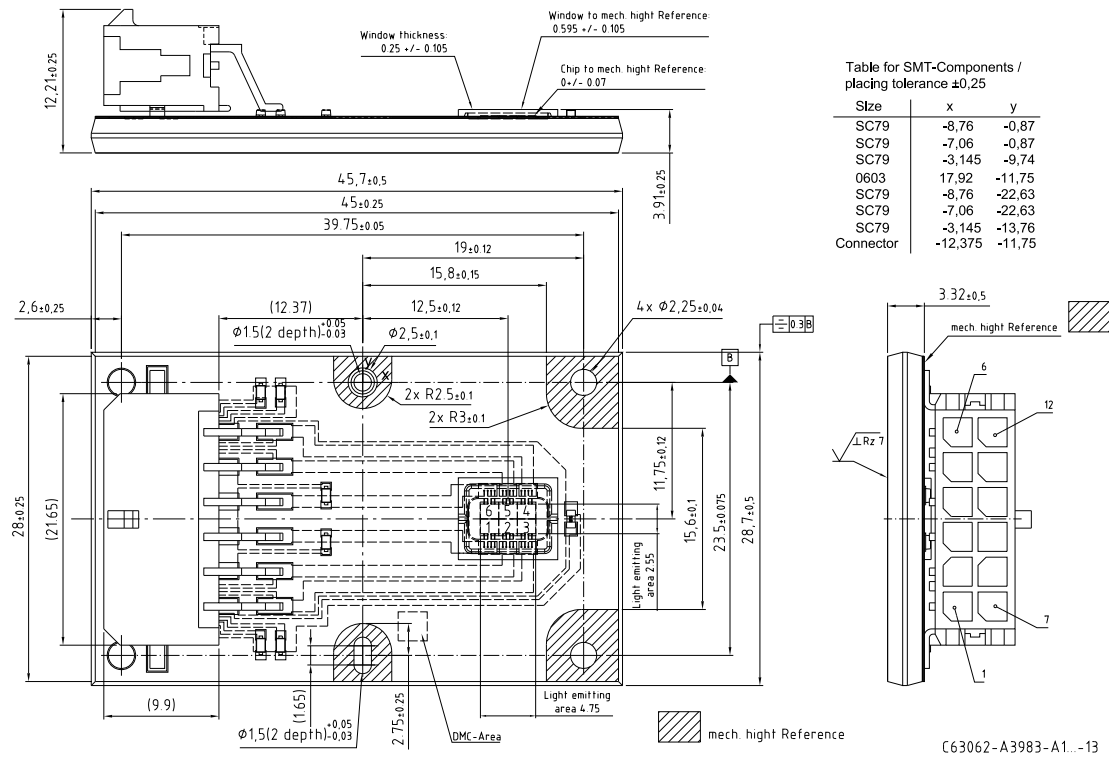


**Figure 54: L\* H9GP**

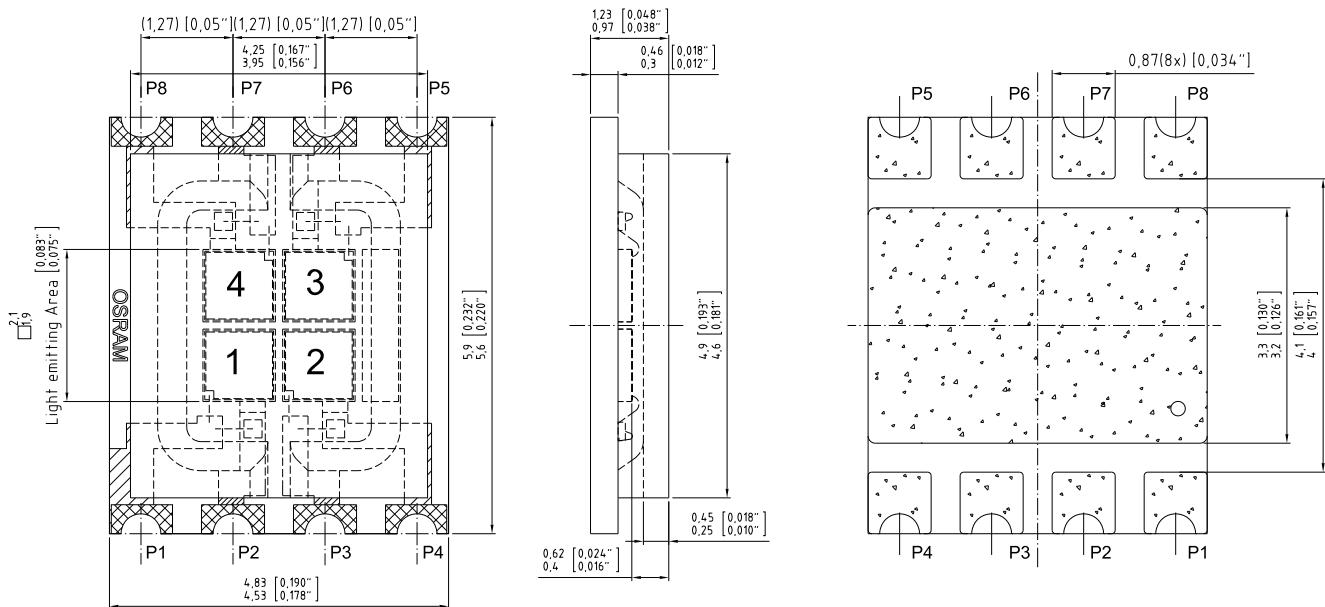


Dimensions in mm (inch)

**Figure 55: LE \* P3W**



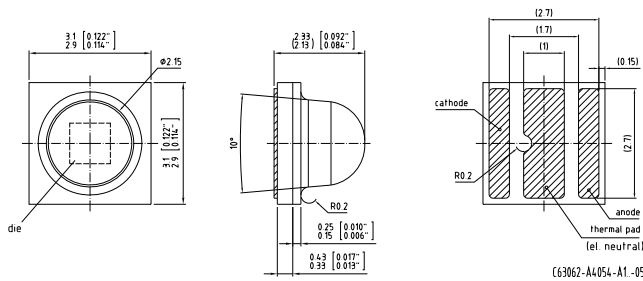
**Figure 56: LE \* S2W**



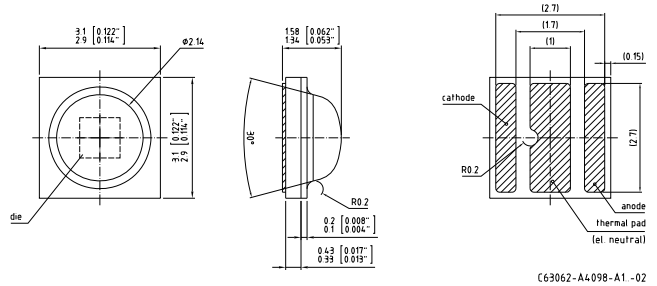
C63062-A4028-A1..-03

Dimensions in mm (inch)

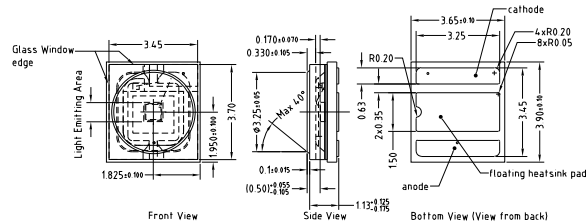
**Figure 57: L\* CP7P**



**Figure 58: L\* CPDP**



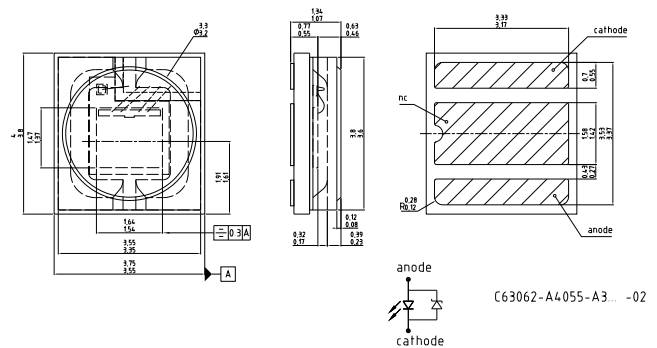
**Figure 59: LE \* Q9WM**



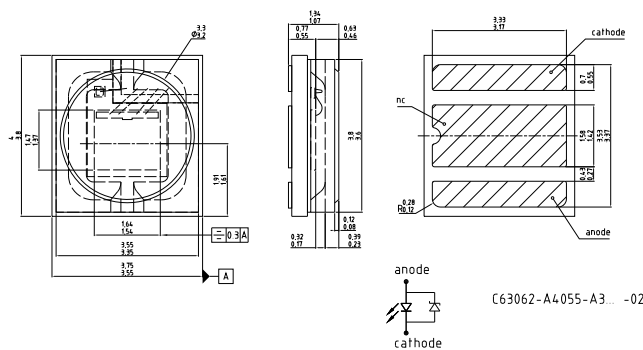
C67062-A0002-A111.dwg

Unless otherwise specified,  
1 General tolerance:  $\pm 0.05$

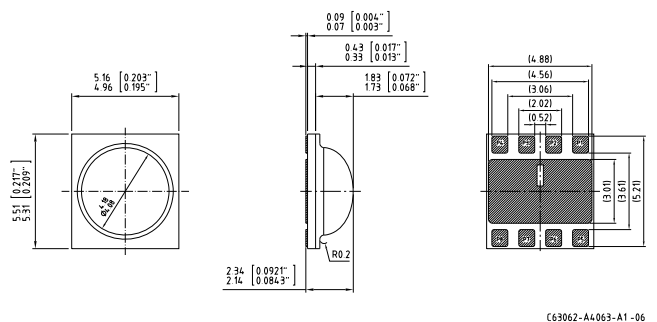
**Figure 60: LE \* Q9WP**



**Figure 61: LE UW Q9WP**

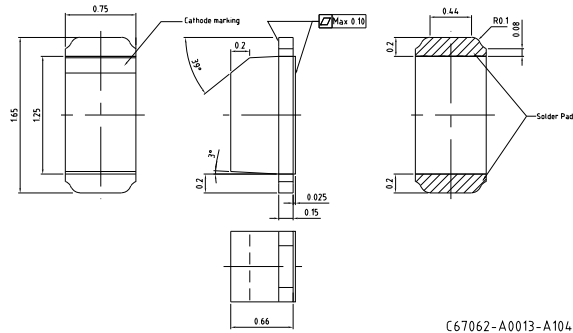


**Figure 62: LE \* S2LN**

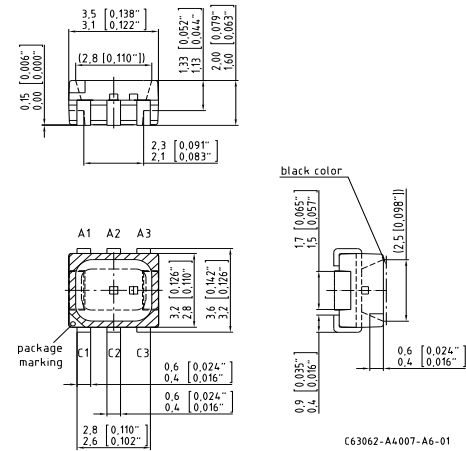


Dimensions in mm (inch)

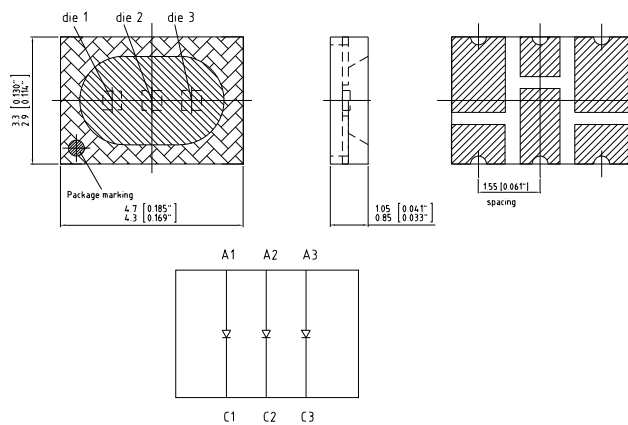
**Figure 63: L\* L196**



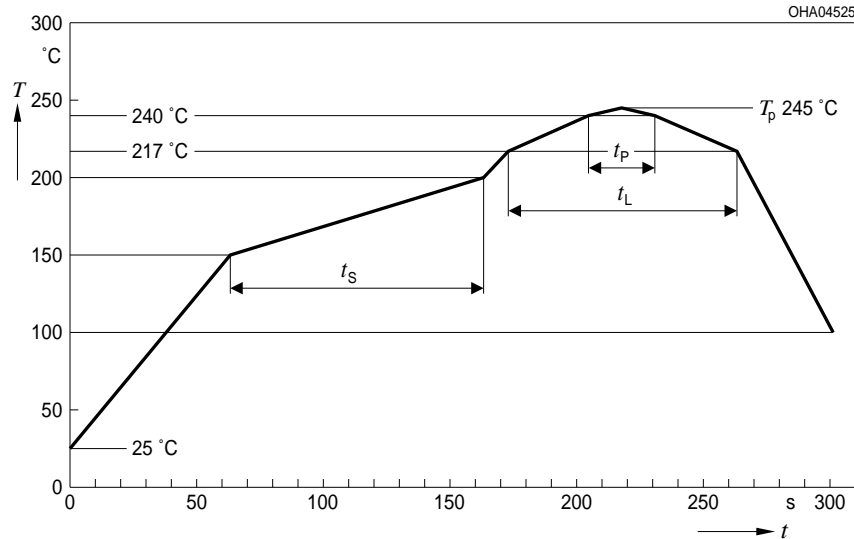
**Figure 64: L\* GFTM**



**Figure 65: L\* C9TP**



Reflow soldering profile acc. to J-STD-020D.01



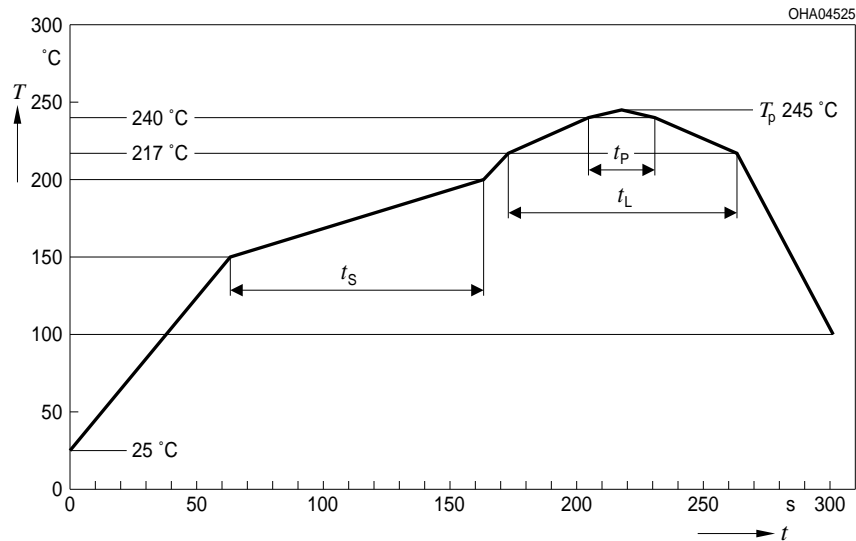
Components under 2.5 mm height

OHA04612

| Profil-Charakteristik<br>Profile Feature                                          | Symbol<br>Symbol | Pb-Free (SnAgCu) Assembly |                |         | Einheit<br>Unit |
|-----------------------------------------------------------------------------------|------------------|---------------------------|----------------|---------|-----------------|
|                                                                                   |                  | Minimum                   | Recommendation | Maximum |                 |
| Ramp-up Rate to Preheat*)<br>$25\text{ °C} \leq T \leq 150\text{ °C}$             |                  |                           | 2              | 3       | K/s             |
| Time from $T_{Smin}$ to $T_{Smax}$<br>$150\text{ °C} \leq T_S \leq 200\text{ °C}$ | $t_S$            | 60                        | 100            | 120     | s               |
| Ramp-up Rate to Peak*)<br>$T_{Smax} \leq T \leq T_P$                              |                  |                           | 2              | 3       | K/s             |
| Liquidus Temperature                                                              | $T_L$            | 217                       |                |         | °C              |
| Time above Liquidus temperature                                                   | $t_L$            |                           | 80             | 100     | s               |
| Time<br>$25\text{ °C} \leq T \leq T_P$                                            |                  |                           |                | 480     | s               |
| Peak Temperature                                                                  | $T_P$            |                           | 245            | 260     | °C              |
| Time within 5 °C of the specified peak<br>temperature $T_P - 5\text{ K}$          | $t_P$            | 10                        | 20             | 30      | s               |
| Ramp-down Rate*<br>$T_P \leq T \leq 100\text{ °C}$                                |                  |                           | 3              | 6       | K/s             |

All temperatures refer to the center of the package, measured on the top of the component  
 \* slope calculation  $\Delta T/\Delta t$ :  $\Delta t$  max. 5 s; fulfillment for the whole T-range

Reflow soldering profile acc. to J-STD-020D.01



Components over 2.5 mm height

OHA04613

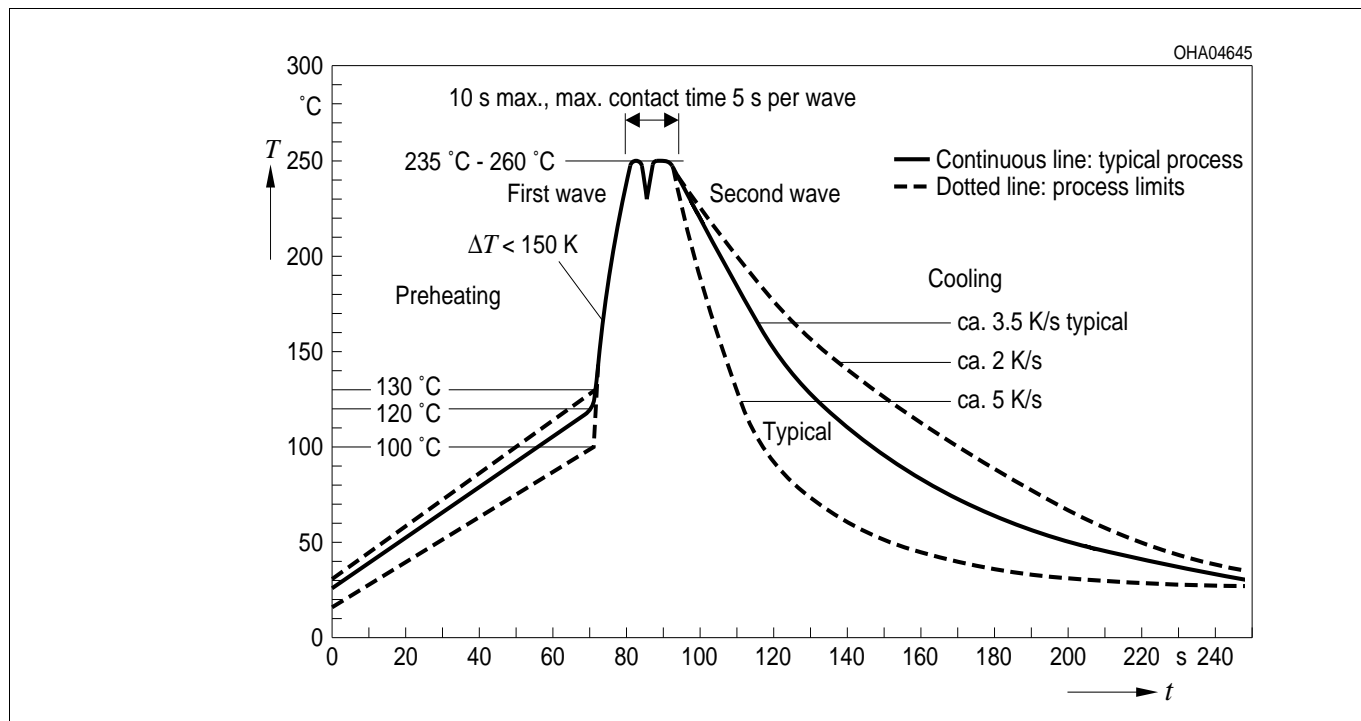
| Profil-Charakteristik<br>Profile Feature                                                      | Symbol<br>Symbol | Pb-Free (SnAgCu) Assembly |                |         | Einheit<br>Unit    |
|-----------------------------------------------------------------------------------------------|------------------|---------------------------|----------------|---------|--------------------|
|                                                                                               |                  | Minimum                   | Recommendation | Maximum |                    |
| Ramp-up Rate to Preheat*)<br>$25^{\circ}\text{C} \leq T \leq 150^{\circ}\text{C}$             |                  |                           | 2              | 3       | K/s                |
| Time from $T_{Smin}$ to $T_{Smax}$<br>$150^{\circ}\text{C} \leq T_S \leq 200^{\circ}\text{C}$ | $t_S$            | 60                        | 100            | 120     | s                  |
| Ramp-up Rate to Peak*)<br>$T_{Smax} \leq T \leq T_P$                                          |                  |                           | 2              | 3       | K/s                |
| Liquidus Temperature                                                                          | $T_L$            | 217                       |                |         |                    |
| Time above Liquidus temperature                                                               | $t_L$            |                           | 80             | 100     | s                  |
| Time<br>$25^{\circ}\text{C} \leq T \leq T_P$                                                  |                  |                           |                | 480     | s                  |
| Peak Temperature                                                                              | $T_P$            |                           | 245            | 250     | $^{\circ}\text{C}$ |
| Time within $5^{\circ}\text{C}$ of the specified peak<br>temperature $T_P - 5\text{ K}$       | $t_P$            | 10                        | 20             | 30      | s                  |
| Ramp-down Rate*<br>$T_P \leq T \leq 100^{\circ}\text{C}$                                      |                  |                           | 3              | 4       | K/s                |

All temperatures refer to the center of the package, measured on the top of the component

\* slope calculation  $\Delta T/\Delta t$ :  $\Delta t$  max. 5 s; fulfillment for the whole T-range



## TTW soldering profile acc. to IEC 61760-1

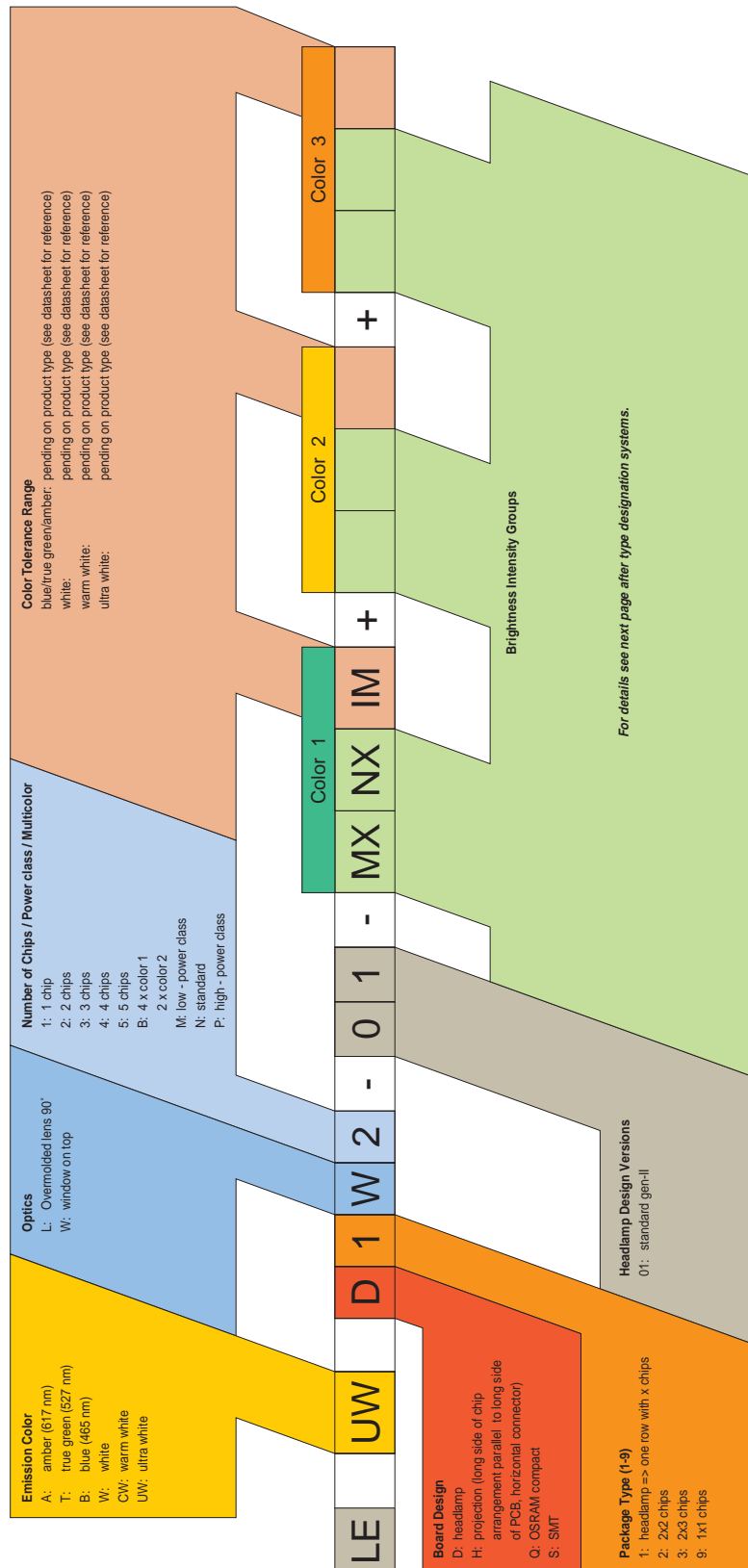


OHA04644

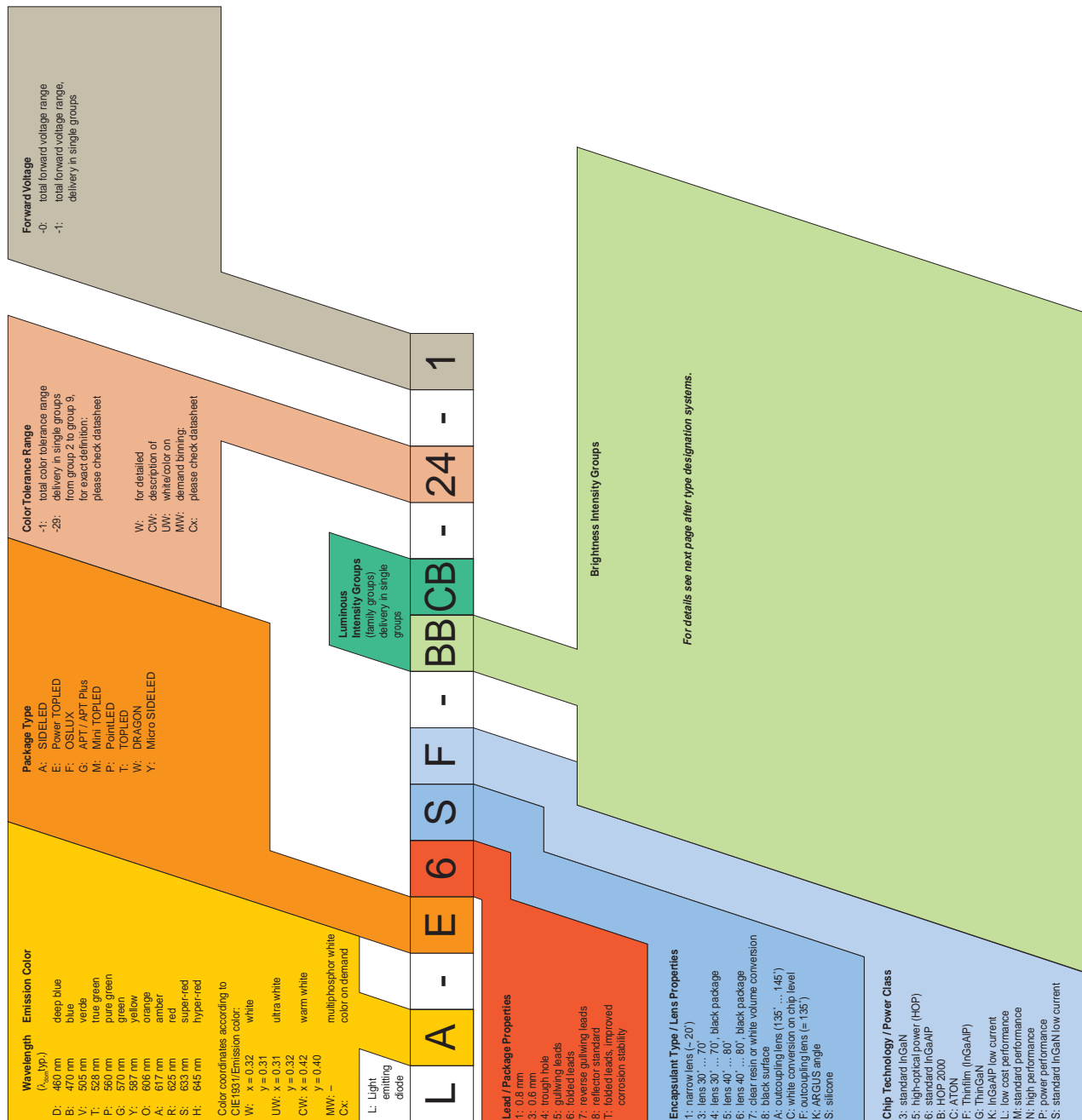
| Profile Feature                 | Recommendation | Max. Ratings                                |
|---------------------------------|----------------|---------------------------------------------|
| Preheating T<br>25 °C to 120 °C | 120 °C         | min. 100 °C / max. 130 °C                   |
| Ramp-Up to Peak $\Delta T$      |                | < 150 K                                     |
| Peak Temperature $T_p$          | 250 °C         | min. 235 °C max. 260 °C                     |
| Time $t_p$ (contact time)       |                | 10 s max.<br>max. Contact time 5 s per wave |
| Ramp-Down Rate                  | 3.5 K/s        | min. 2 K/sec / max. 5 K/sec                 |

Temperature/time profile for double wave soldering (terminal temperatures)

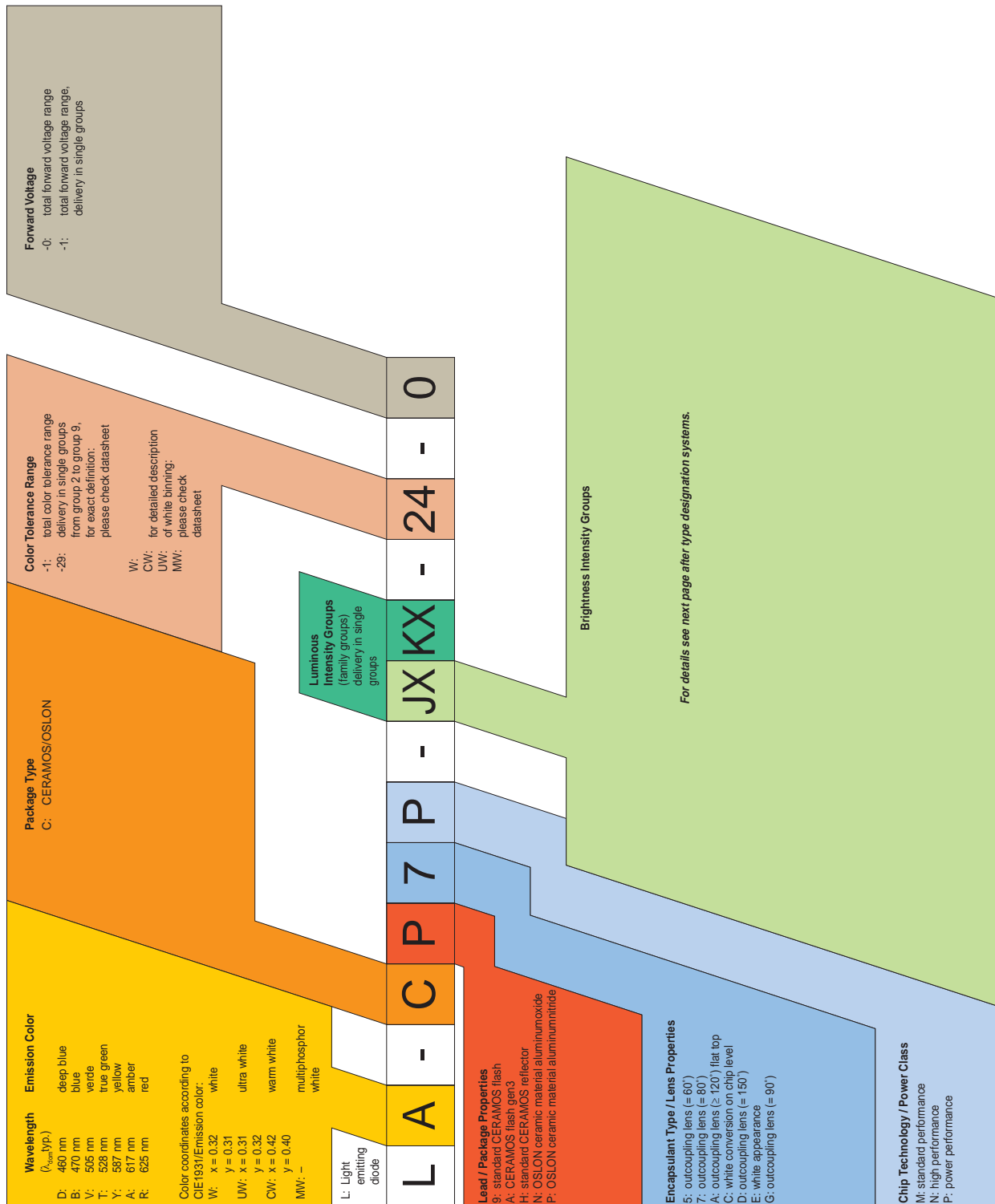
## OSRAM OSTAR type designation system



## Premolded LED type designation system



## Ceramics based LED type designation system



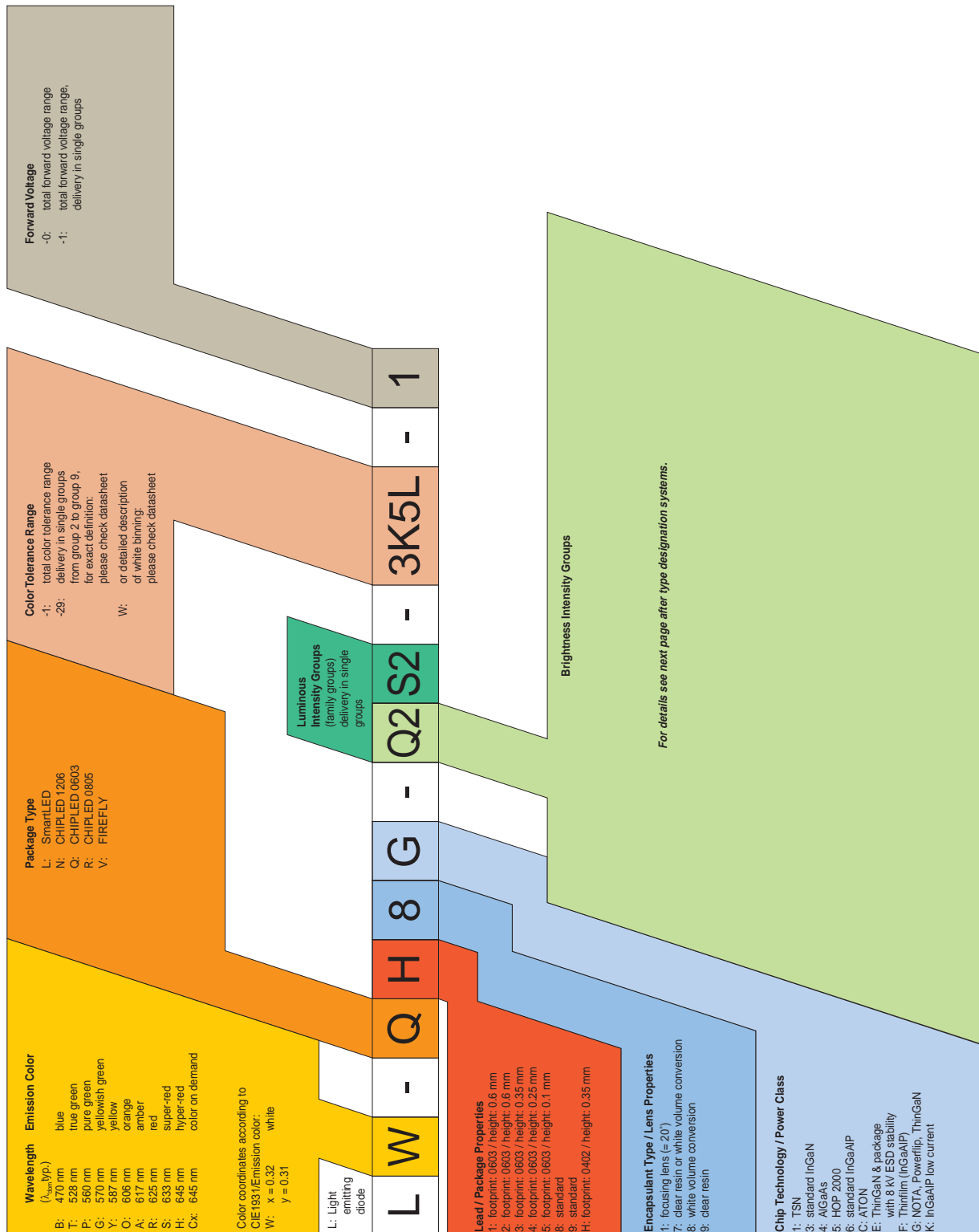
## Taping of LEDs

All SMT LEDs are available in 8 mm resp. 12 mm tapes.

## Gurtung von Lumineszenzdiode

Alle SMT-LED werden im 8- bzw. 12-mm Gurt geliefert.

## Miniature package LED type designation system



### Taping of LEDs

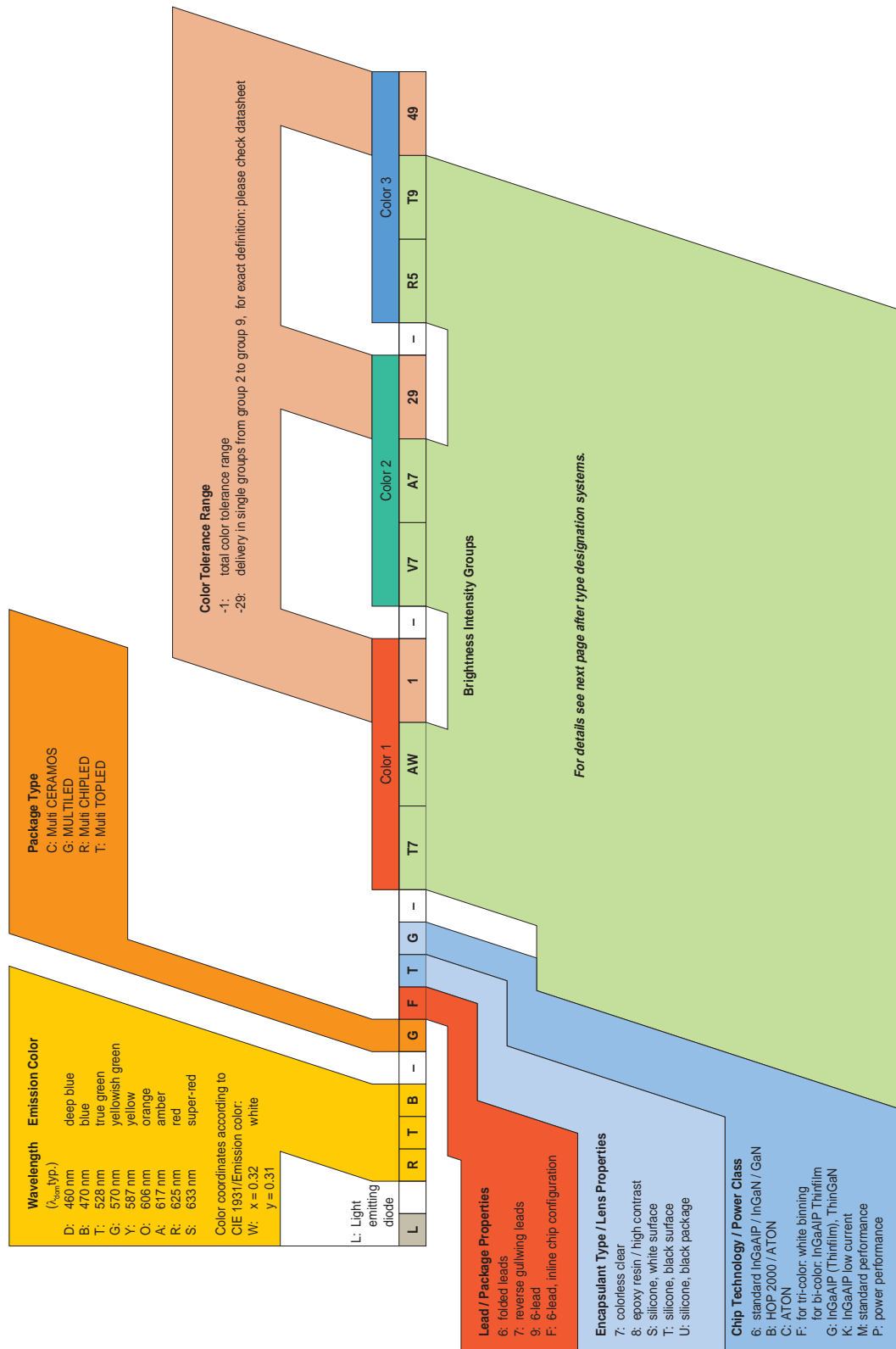
All SMT LEDs are available in 8 mm resp. 12 mm tapes.

### Gurtung von Lumineszenzdioden

Alle SMT-LED werden im 8- bzw. 12-mm Gurt geliefert.

For more detailed product information and Technical Datasheets, please visit <http://catalog.osram-os.com>

## Multi chip LED type designation system



## Taping of LEDs

All SMT LEDs are available in 8 mm resp. 12 mm tapes.

## Gurtung von Lumineszenzdiode

Alle SMT-LED werden im 8- bzw. 12-mm Gurt geliefert.

## Brightness Intensity Groups

| 1/1 Grouping |       |       | 1/2 Grouping |       |       | 1/3 Grouping |       |       | 1/4 Grouping |       |       | 1/6 Grouping |       |       |
|--------------|-------|-------|--------------|-------|-------|--------------|-------|-------|--------------|-------|-------|--------------|-------|-------|
| Bin          | min.  | max.  | Bin          | min.  | max.  | Bin          | min.  | max.  | Bin          | min.  | max.  | Bin          | min.  | max.  |
| C            | 0.28  | 0.45  | C1           | 0.28  | 0.36  |              |       |       | 1C           | 0.28  | 0.32  |              |       |       |
|              |       |       | C2           | 0.36  | 0.45  |              |       |       | 2C           | 0.32  | 0.36  |              |       |       |
| D            | 0.45  | 0.71  |              |       |       |              |       |       | 3C           | 0.36  | 0.40  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4C           | 0.40  | 0.45  |              |       |       |
|              |       |       | D1           | 0.45  | 0.56  |              |       |       | 1D           | 0.45  | 0.50  |              |       |       |
|              |       |       | D2           | 0.56  | 0.71  |              |       |       | 2D           | 0.50  | 0.56  |              |       |       |
| E            | 0.71  | 1.12  |              |       |       |              |       |       | 3D           | 0.56  | 0.63  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4D           | 0.63  | 0.71  |              |       |       |
|              |       |       | E1           | 0.71  | 0.90  |              |       |       | 1E           | 0.71  | 0.80  |              |       |       |
|              |       |       | E2           | 0.90  | 1.12  |              |       |       | 2E           | 0.80  | 0.90  |              |       |       |
| F            | 1.12  | 1.80  |              |       |       |              |       |       | 3E           | 0.90  | 1.00  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4E           | 1.00  | 1.12  |              |       |       |
|              |       |       | F1           | 1.12  | 1.40  |              |       |       | 1F           | 1.12  | 1.25  |              |       |       |
|              |       |       | F2           | 1.40  | 1.80  |              |       |       | 2F           | 1.25  | 1.40  |              |       |       |
| G            | 1.80  | 2.80  |              |       |       |              |       |       | 3F           | 1.40  | 1.59  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4F           | 1.59  | 1.80  |              |       |       |
|              |       |       | G1           | 1.80  | 2.24  |              |       |       | 1G           | 1.80  | 2.01  |              |       |       |
|              |       |       | G2           | 2.24  | 2.80  |              |       |       | 2G           | 2.01  | 2.24  |              |       |       |
| H            | 2.80  | 4.50  |              |       |       |              |       |       | 3G           | 2.24  | 2.50  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4G           | 2.50  | 2.80  |              |       |       |
|              |       |       | H1           | 2.80  | 3.55  |              |       |       | 1H           | 2.80  | 3.15  |              |       |       |
|              |       |       | H2           | 3.55  | 4.50  |              |       |       | 2H           | 3.15  | 3.55  |              |       |       |
| J            | 4.50  | 7.10  |              |       |       |              |       |       | 3H           | 3.55  | 4.00  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4H           | 4.00  | 4.50  |              |       |       |
|              |       |       | J1           | 4.50  | 5.60  |              |       |       | 1J           | 4.50  | 5.00  |              |       |       |
|              |       |       | J2           | 5.60  | 7.10  |              |       |       | 2J           | 5.00  | 5.60  |              |       |       |
| K            | 7.10  | 11.2  |              |       |       |              |       |       | 3J           | 5.60  | 6.30  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4J           | 6.30  | 7.10  |              |       |       |
|              |       |       | K1           | 7.10  | 9.00  |              |       |       | 1K           | 7.10  | 8.00  |              |       |       |
|              |       |       | K2           | 9.00  | 11.2  |              |       |       | 2K           | 8.00  | 9.00  |              |       |       |
| L            | 11.2  | 18.0  |              |       |       |              |       |       | 3K           | 9.00  | 10.00 |              |       |       |
|              |       |       |              |       |       |              |       |       | 4K           | 10.00 | 11.2  |              |       |       |
|              |       |       | L1           | 11.2  | 14.0  |              |       |       | 1L           | 11.2  | 12.5  |              |       |       |
|              |       |       | L2           | 14.0  | 18.0  |              |       |       | 2L           | 12.5  | 14.0  |              |       |       |
| M            | 18.0  | 28.0  |              |       |       |              |       |       | 3L           | 14.0  | 15.9  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4L           | 15.9  | 18.0  |              |       |       |
|              |       |       | M1           | 18.0  | 22.4  |              |       |       | 1M           | 18.0  | 20.1  |              |       |       |
|              |       |       | M2           | 22.4  | 28.0  |              |       |       | 2M           | 20.1  | 22.4  |              |       |       |
| N            | 28.0  | 45.0  |              |       |       |              |       |       | 3M           | 22.4  | 25.0  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4M           | 25.0  | 28.0  |              |       |       |
|              |       |       | N1           | 28.0  | 35.5  |              |       |       | 1N           | 28.0  | 31.5  |              |       |       |
|              |       |       | N2           | 35.5  | 45.0  |              |       |       | 2N           | 31.5  | 35.5  |              |       |       |
| P            | 45.0  | 71.0  |              |       |       |              |       |       | 3N           | 35.5  | 40.0  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4N           | 40.0  | 45.0  |              |       |       |
|              |       |       | P1           | 45.0  | 56.0  |              |       |       | 1P           | 45.0  | 50.0  |              |       |       |
|              |       |       | P2           | 56.0  | 71.0  |              |       |       | 2P           | 50.0  | 56.0  |              |       |       |
| Q            | 71.0  | 112   |              |       |       |              |       |       | 3P           | 56.0  | 63.0  |              |       |       |
|              |       |       |              |       |       |              |       |       | 4P           | 63.0  | 71.0  |              |       |       |
|              |       |       | Q1           | 71.0  | 90.0  |              |       |       | 1Q           | 71.0  | 80.0  |              |       |       |
|              |       |       | Q2           | 90.0  | 112   |              |       |       | 2Q           | 80.0  | 90.0  |              |       |       |
| R            | 112   | 180   |              |       |       |              |       |       | 3Q           | 90.0  | 100.0 |              |       |       |
|              |       |       |              |       |       |              |       |       | 4Q           | 100.0 | 112   |              |       |       |
|              |       |       | R1           | 112   | 140   |              |       |       | 1R           | 112   | 125   |              |       |       |
|              |       |       | R2           | 140   | 180   |              |       |       | 2R           | 125   | 140   |              |       |       |
| S            | 180   | 280   |              |       |       |              |       |       | 3R           | 140   | 159   |              |       |       |
|              |       |       |              |       |       |              |       |       | 4R           | 159   | 180   |              |       |       |
|              |       |       | S1           | 180   | 224   |              |       |       | 1S           | 180   | 201   |              |       |       |
|              |       |       | S2           | 224   | 280   |              |       |       | 2S           | 201   | 224   |              |       |       |
| T            | 280   | 450   |              |       |       |              |       |       | 3S           | 224   | 250   |              |       |       |
|              |       |       |              |       |       |              |       |       | 4S           | 250   | 280   |              |       |       |
|              |       |       | T1           | 280   | 355   |              |       |       | 1T           | 280   | 315   |              |       |       |
|              |       |       | T2           | 355   | 450   |              |       |       | 2T           | 315   | 355   |              |       |       |
| U            | 450   | 710   |              |       |       |              |       |       | 3T           | 355   | 400   |              |       |       |
|              |       |       |              |       |       |              |       |       | 4T           | 400   | 450   |              |       |       |
|              |       |       | U1           | 450   | 560   |              |       |       | 1U           | 450   | 500   |              |       |       |
|              |       |       | U2           | 560   | 710   |              |       |       | 2U           | 500   | 560   |              |       |       |
| V            | 710   | 1 120 |              |       |       |              |       |       | 3U           | 560   | 630   |              |       |       |
|              |       |       |              |       |       |              |       |       | 4U           | 630   | 710   |              |       |       |
|              |       |       | V1           | 710   | 900   |              |       |       | 1V           | 710   | 800   |              |       |       |
|              |       |       | V2           | 900   | 1 120 |              |       |       | 2V           | 800   | 900   |              |       |       |
| AW           | 1 120 | 1 800 |              |       |       |              |       |       | 3V           | 900   | 1 000 |              |       |       |
|              |       |       |              |       |       |              |       |       | 4V           | 1 000 | 1 120 |              |       |       |
|              |       |       | AA           | 1 120 | 1 400 | AX           | 1 120 | 1 300 | 5A           | 1 120 | 1 250 | AP           | 1 120 | 1 210 |
|              |       |       | AB           | 1 400 | 1 800 | AY           | 1 300 | 1 500 | 6A           | 1 250 | 1 400 | AQ           | 1 210 | 1 300 |
| BW           | 1 800 | 2 800 |              |       |       | AZ           | 1 500 | 1 800 | 7A           | 1 400 | 1 590 | AR           | 1 300 | 1 400 |
|              |       |       |              |       |       |              |       |       | 8A           | 1 590 | 1 800 | AS           | 1 400 | 1 500 |
|              |       |       |              |       |       |              |       |       |              |       |       | AT           | 1 500 | 1 640 |
|              |       |       |              |       |       |              |       |       |              |       |       | AU           | 1 640 | 1 800 |
| CW           | 2 800 | 4 500 |              |       |       |              |       |       |              |       |       | BP           | 1 800 | 1 940 |
|              |       |       | BA           | 1 800 | 2 240 | BX           | 1 800 | 2 100 | 5B           | 1 800 | 2 010 | BQ           | 1 940 | 2 100 |
|              |       |       | BB           | 2 240 | 2 800 | BY           | 2 100 | 2 400 | 6B           | 2 010 | 2 240 | BR           | 2 100 | 2 240 |
|              |       |       |              |       |       | BZ           | 2 400 | 2 800 | 7B           | 2 240 | 2 500 | BS           | 2 240 | 2 400 |
| DW           | 4 500 | 7 100 |              |       |       |              |       |       | 8B           | 2 500 | 2 800 | BT           | 2 400 | 2 590 |
|              |       |       |              |       |       |              |       |       |              |       |       | BU           | 2 590 | 2 800 |
|              |       |       | CA           | 2 800 | 3 550 | CX           | 2 800 | 3 300 | 5C           | 2 800 | 3 150 | CP           | 2 800 | 3 040 |
|              |       |       | CB           | 3 550 | 4 500 | CY           | 3 300 | 3 900 | 6C           | 3 150 | 3 550 | CQ           | 3 040 | 3 300 |
|              |       |       |              |       |       | CZ           | 3 900 | 4 500 | 7C           | 3 550 | 4 000 | CR           | 3 300 | 3 590 |
|              |       |       |              |       |       |              |       |       | 8C           | 4 000 | 4 500 | CS           | 3 590 | 3 900 |
|              |       |       |              |       |       |              |       |       |              |       |       | CT           | 3 900 | 4 190 |
|              |       |       |              |       |       |              |       |       |              |       |       | CU           | 4 190 | 4 500 |
|              |       |       | DA           | 4 500 | 5 600 | DX           | 4 500 | 5 200 | 5D           | 4 500 | 5 000 | DP           | 4 500 | 4 840 |
|              |       |       | DB           | 5 600 | 7 100 | DY           | 5 200 | 6 100 | 6D           | 5 000 | 5 600 | DQ           | 4 840 | 5 200 |
|              |       |       |              |       |       | DZ           | 6 100 | 7 100 | 7D           | 5 600 | 6 300 | DR           | 5 200 | 5 630 |
|              |       |       |              |       |       |              |       |       | 8D           | 6 300 | 7 100 | DS           | 5 630 | 6 100 |
|              |       |       |              |       |       |              |       |       |              |       |       | DT           | 6 100 | 6 580 |
|              |       |       |              |       |       |              |       |       |              |       |       | DU           | 6 580 | 7 100 |
|              |       |       |              |       |       |              |       |       |              |       |       |              |       |       |
|              |       |       |              |       |       |              |       |       |              |       |       |              |       |       |

## Brightness Intensity Groups

| 1/1 Grouping (cont.) |           |            | 1/2 Grouping (cont.) |           |            | 1/3 Grouping (cont.) |           |            | 1/4 Grouping (cont.) |            |            | 1/6 Grouping (cont.) |            |            |
|----------------------|-----------|------------|----------------------|-----------|------------|----------------------|-----------|------------|----------------------|------------|------------|----------------------|------------|------------|
| Bin                  | min.      | max.       | Bin                  | min.      | max.       | Bin                  | min.      | max.       | Bin                  | min.       | max.       | Bin                  | min.       | max.       |
| EW                   | 7 100     | 11 200     | EA                   | 7 100     | 9 000      | EX                   | 7 100     | 8 200      | 5E                   | 7 100      | 8 000      | EP                   | 7 100      | 7 630      |
|                      |           |            | EB                   | 9 000     | 11 200     | EY                   | 8 200     | 9 700      | 6E                   | 8 000      | 9 000      | EQ                   | 7 630      | 8 200      |
|                      |           |            |                      |           |            | EZ                   | 9 700     | 11 200     | 7E                   | 9 000      | 10 000     | ER                   | 8 200      | 8 920      |
|                      |           |            |                      |           |            |                      |           |            | 8E                   | 10 000     | 11 200     | ES                   | 8 920      | 9 700      |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | ET                   | 9 700      | 10 420     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | EU                   | 10 420     | 11 200     |
| FW                   | 11 200    | 18 000     | FA                   | 11 200    | 14 000     | FX                   | 11 200    | 13 000     | 5F                   | 11 200     | 12 500     | FP                   | 11 200     | 12 100     |
|                      |           |            | FB                   | 14 000    | 18 000     | FY                   | 13 000    | 15 000     | 6F                   | 12 500     | 14 000     | FQ                   | 12 100     | 13 000     |
|                      |           |            |                      |           |            | FZ                   | 15 000    | 18 000     | 7F                   | 14 000     | 15 900     | FR                   | 13 000     | 14 000     |
|                      |           |            |                      |           |            |                      |           |            | 8F                   | 15 900     | 18 000     | FS                   | 14 000     | 15 000     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | FT                   | 15 000     | 16 400     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | FU                   | 16 400     | 18 000     |
| GW                   | 18 000    | 28 000     | GA                   | 18 000    | 22 400     | GX                   | 18 000    | 21 000     | 5G                   | 18 000     | 20 100     | GP                   | 18 000     | 19 400     |
|                      |           |            | GB                   | 22 400    | 28 000     | GY                   | 21 000    | 24 000     | 6G                   | 20 100     | 22 400     | GQ                   | 19 400     | 21 000     |
|                      |           |            |                      |           |            | GZ                   | 24 000    | 28 000     | 7G                   | 22 400     | 25 000     | GR                   | 21 000     | 22 400     |
|                      |           |            |                      |           |            |                      |           |            | 8G                   | 25 000     | 28 000     | GS                   | 22 400     | 24 000     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | GT                   | 24 000     | 25 900     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | GU                   | 25 900     | 28 000     |
| HW                   | 28 000    | 45 000     | HA                   | 28 000    | 35 500     | HX                   | 28 000    | 33 000     | 5H                   | 28 000     | 31 500     | HP                   | 28 000     | 30 400     |
|                      |           |            | HB                   | 35 500    | 45 000     | HY                   | 33 000    | 39 000     | 6H                   | 31 500     | 35 500     | HQ                   | 30 400     | 33 000     |
|                      |           |            |                      |           |            | HZ                   | 39 000    | 45 000     | 7H                   | 35 500     | 40 000     | HR                   | 33 000     | 35 900     |
|                      |           |            |                      |           |            |                      |           |            | 8H                   | 40 000     | 45 000     | HS                   | 35 900     | 39 000     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | HT                   | 39 000     | 41 900     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | HU                   | 41 900     | 45 000     |
| JW                   | 45 000    | 71 000     | JA                   | 45 000    | 56 000     | JX                   | 45 000    | 52 000     | 5J                   | 45 000     | 50 000     | JP                   | 45 000     | 48 400     |
|                      |           |            | JB                   | 56 000    | 71 000     | JY                   | 52 000    | 61 000     | 6J                   | 50 000     | 56 000     | JQ                   | 48 400     | 52 000     |
|                      |           |            |                      |           |            | JZ                   | 61 000    | 71 000     | 7J                   | 56 000     | 63 000     | JR                   | 52 000     | 56 300     |
|                      |           |            |                      |           |            |                      |           |            | 8J                   | 63 000     | 71 000     | JS                   | 56 300     | 61 000     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | JT                   | 61 000     | 65 800     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | JU                   | 65 800     | 71 000     |
| KW                   | 71 000    | 112 000    | KA                   | 71 000    | 90 000     | KX                   | 71 000    | 82 000     | 5K                   | 71 000     | 80 000     | KP                   | 71 000     | 76 300     |
|                      |           |            | KB                   | 90 000    | 112 000    | KY                   | 82 000    | 97 000     | 6K                   | 80 000     | 90 000     | KQ                   | 76 300     | 82 000     |
|                      |           |            |                      |           |            | KZ                   | 97 000    | 112 000    | 7K                   | 90 000     | 100 000    | KR                   | 82 000     | 89 200     |
|                      |           |            |                      |           |            |                      |           |            | 8K                   | 100 000    | 112 000    | KS                   | 89 200     | 97 000     |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | KT                   | 97 000     | 104 200    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | KU                   | 104 200    | 112 000    |
| LW                   | 112 000   | 180 000    | LA                   | 112 000   | 140 000    | LX                   | 112 000   | 130 000    | 5L                   | 112 000    | 125 000    | LP                   | 112 000    | 121 000    |
|                      |           |            | LB                   | 140 000   | 180 000    | LY                   | 130 000   | 150 000    | 6L                   | 125 000    | 140 000    | LQ                   | 121 000    | 130 000    |
|                      |           |            |                      |           |            | LZ                   | 150 000   | 180 000    | 7L                   | 140 000    | 159 000    | LR                   | 130 000    | 140 000    |
|                      |           |            |                      |           |            |                      |           |            | 8L                   | 159 000    | 180 000    | LS                   | 140 000    | 150 000    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | LT                   | 150 000    | 164 000    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | LU                   | 164 000    | 180 000    |
| MW                   | 180 000   | 280 000    | MA                   | 180 000   | 224 000    | MX                   | 180 000   | 210 000    | 5M                   | 180 000    | 201 000    | MP                   | 180 000    | 194 000    |
|                      |           |            | MB                   | 224 000   | 280 000    | MY                   | 210 000   | 240 000    | 6M                   | 201 000    | 224 000    | MQ                   | 194 000    | 210 000    |
|                      |           |            |                      |           |            | MZ                   | 240 000   | 280 000    | 7M                   | 224 000    | 250 000    | MR                   | 210 000    | 224 000    |
|                      |           |            |                      |           |            |                      |           |            | 8M                   | 250 000    | 280 000    | MS                   | 224 000    | 240 000    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | MT                   | 240 000    | 259 000    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | MU                   | 259 000    | 280 000    |
| NW                   | 280 000   | 450 000    | NA                   | 280 000   | 355 000    | NX                   | 280 000   | 330 000    | 5N                   | 280 000    | 315 000    | NP                   | 280 000    | 304 000    |
|                      |           |            | NB                   | 355 000   | 450 000    | NY                   | 330 000   | 390 000    | 6N                   | 315 000    | 355 000    | NQ                   | 304 000    | 330 000    |
|                      |           |            |                      |           |            | NZ                   | 390 000   | 450 000    | 7N                   | 355 000    | 400 000    | NR                   | 330 000    | 359 000    |
|                      |           |            |                      |           |            |                      |           |            | 8N                   | 400 000    | 450 000    | NS                   | 359 000    | 390 000    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | NT                   | 390 000    | 419 000    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | NU                   | 419 000    | 450 000    |
| PW                   | 450 000   | 710 000    | PA                   | 450 000   | 560 000    | PX                   | 450 000   | 520 000    | 5P                   | 450 000    | 500 000    | PP                   | 450 000    | 484 000    |
|                      |           |            | PB                   | 560 000   | 710 000    | PY                   | 520 000   | 610 000    | 6P                   | 500 000    | 560 000    | PQ                   | 484 000    | 520 000    |
|                      |           |            |                      |           |            | PZ                   | 610 000   | 710 000    | 7P                   | 560 000    | 630 000    | PR                   | 520 000    | 563 000    |
|                      |           |            |                      |           |            |                      |           |            | 8P                   | 630 000    | 710 000    | PS                   | 563 000    | 610 000    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | PT                   | 610 000    | 658 000    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | PU                   | 658 000    | 710 000    |
| QW                   | 710 000   | 1 120 000  | QA                   | 710 000   | 900 000    | QX                   | 710 000   | 820 000    | 5Q                   | 710 000    | 800 000    | QP                   | 710 000    | 763 000    |
|                      |           |            | QB                   | 900 000   | 1 120 000  | QY                   | 820 000   | 970 000    | 6Q                   | 800 000    | 900 000    | QQ                   | 763 000    | 820 000    |
|                      |           |            |                      |           |            | QZ                   | 970 000   | 1 120 000  | 7Q                   | 900 000    | 1 000 000  | QR                   | 820 000    | 892 000    |
|                      |           |            |                      |           |            |                      |           |            | 8Q                   | 1 000 000  | 1 120 000  | QS                   | 892 000    | 970 000    |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | QT                   | 970 000    | 1 042 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | QU                   | 1 042 000  | 1 120 000  |
| RW                   | 1 120 000 | 1 800 000  | RA                   | 1 120 000 | 1 400 000  | RX                   | 1 120 000 | 1 300 000  | 5R                   | 1 120 000  | 1 250 000  | RP                   | 1 120 000  | 1 210 000  |
|                      |           |            | RB                   | 1 400 000 | 1 800 000  | RY                   | 1 300 000 | 1 500 000  | 6R                   | 1 250 000  | 1 400 000  | RQ                   | 1 210 000  | 1 300 000  |
|                      |           |            |                      |           |            | RZ                   | 1 500 000 | 1 800 000  | 7R                   | 1 400 000  | 1 590 000  | RR                   | 1 300 000  | 1 400 000  |
|                      |           |            |                      |           |            |                      |           |            | 8R                   | 1 590 000  | 1 800 000  | RS                   | 1 400 000  | 1 500 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | RT                   | 1 500 000  | 1 640 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | RU                   | 1 640 000  | 1 800 000  |
| SW                   | 1 800 000 | 2 800 000  | SA                   | 1 800 000 | 2 240 000  | SX                   | 1 800 000 | 2 100 000  | 5S                   | 1 800 000  | 2 010 000  | SP                   | 1 800 000  | 1 940 000  |
|                      |           |            | SB                   | 2 240 000 | 2 800 000  | SY                   | 2 100 000 | 2 400 000  | 6S                   | 2 010 000  | 2 240 000  | SQ                   | 1 940 000  | 2 100 000  |
|                      |           |            |                      |           |            | SZ                   | 2 400 000 | 2 800 000  | 7S                   | 2 240 000  | 2 500 000  | SR                   | 2 100 000  | 2 240 000  |
|                      |           |            |                      |           |            |                      |           |            | 8S                   | 2 500 000  | 2 800 000  | SS                   | 2 240 000  | 2 400 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | ST                   | 2 400 000  | 2 590 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | SU                   | 2 590 000  | 2 800 000  |
| TW                   | 2 800 000 | 4 500 000  | TA                   | 2 800 000 | 3 550 000  | TX                   | 2 800 000 | 3 300 000  | 5T                   | 2 800 000  | 3 150 000  | TP                   | 2 800 000  | 3 040 000  |
|                      |           |            | TB                   | 3 550 000 | 4 500 000  | TY                   | 3 300 000 | 3 900 000  | 6T                   | 3 150 000  | 3 550 000  | TQ                   | 3 040 000  | 3 300 000  |
|                      |           |            |                      |           |            | TZ                   | 3 900 000 | 4 500 000  | 7T                   | 3 550 000  | 4 000 000  | TR                   | 3 300 000  | 3 590 000  |
|                      |           |            |                      |           |            |                      |           |            | 8T                   | 4 000 000  | 4 500 000  | TS                   | 3 590 000  | 3 900 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | TT                   | 3 900 000  | 4 190 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | TU                   | 4 190 000  | 4 500 000  |
| UW                   | 4 500 000 | 7 100 000  | UA                   | 4 500 000 | 5 600 000  | UX                   | 4 500 000 | 5 200 000  | 5U                   | 4 500 000  | 5 000 000  | UP                   | 4 500 000  | 4 840 000  |
|                      |           |            | UB                   | 5 600 000 | 7 100 000  | UY                   | 5 200 000 | 6 100 000  | 6U                   | 5 000 000  | 5 600 000  | UQ                   | 4 840 000  | 5 200 000  |
|                      |           |            |                      |           |            | UZ                   | 6 100 000 | 7 100 000  | 7U                   | 5 600 000  | 6 300 000  | UR                   | 5 200 000  | 5 630 000  |
|                      |           |            |                      |           |            |                      |           |            | 8U                   | 6 300 000  | 7 100 000  | US                   | 5 630 000  | 6 100 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | UT                   | 6 100 000  | 6 580 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | UU                   | 6 580 000  | 7 100 000  |
| VW                   | 7 100 000 | 11 200 000 | VA                   | 7 100 000 | 9 000 000  | VX                   | 7 100 000 | 8 200 000  | 5V                   | 7 100 000  | 8 000 000  | VP                   | 7 100 000  | 7 630 000  |
|                      |           |            | VB                   | 9 000 000 | 11 200 000 | VY                   | 8 200 000 | 9 700 000  | 6V                   | 8 000 000  | 9 000 000  | VQ                   | 7 630 000  | 8 200 000  |
|                      |           |            |                      |           |            | VZ                   | 9 700 000 | 11 200 000 | 7V                   | 9 000 000  | 10 000 000 | VR                   | 8 200 000  | 8 920 000  |
|                      |           |            |                      |           |            |                      |           |            | 8V                   | 10 000 000 | 11 200 000 | VS                   | 8 920 000  | 9 700 000  |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | VT                   | 9 700 000  | 10 420 000 |
|                      |           |            |                      |           |            |                      |           |            |                      |            |            | VU                   | 10 420 000 | 11 200 000 |



## Intelligent Displays (IDIS)



## Ceramic Hi-rel Intelligent Displays

### 8-digit 5x7 Ceramic Hi-rel Intelligent Display (Parallel Input / Character Set & UDC)

Page 93

**IPD213X Display**

Parallel Input with a Character Set & User Definable Characters

### 4-digit 5x7 Ceramic Hi-rel Intelligent Display (Serial Input / Shift Register Driver)

Page 93

**ISD201X Display**

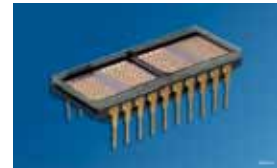
Serial Input with a shift register driver

**ISD231X Display**

Serial Input with a shift register driver

**ISD235X Display**

Serial Input with a shift register driver

**IPD254XA Display**

Parallel Input with a character set

## 10-digit Plastic Package Intelligent Displays

### 10-digit Slimline 5X5 Intelligent Display (Serial Input / Character RAM)

Page 94

**SCD5510XA Display**

Serial Input with a Character RAM

## 8-digit Plastic Package Intelligent Displays

### 8-digit wide body 5X7 Intelligent Display (Parallel Input)

Page 95

**HDSP211XS Display**

Parallel Input with a Character Set &amp; User Definable Characters

**PDSP211X Display**

Parallel Input with a Character Set

### 8-digit Slimline 5X7 Intelligent Display

Page 95

**PDSP188X Display**

Parallel Input with a Character Set &amp; User Definable Characters

**SCE578X Display**

Serial Input with a Character RAM

### 8-digit Slimline 5X5 Intelligent Display (Serial Input / Character RAM)

Page 96

**SCD558XA Display**

Serial Input with a Character RAM

## 4-digit Plastic Package Intelligent Displays

### 4-digit wide body 5X7 Intelligent Display (Parallel Input / Character Set)

Page 97



**PD243X Display**  
Parallel Input with a Character Set



**PD353X Display**  
Parallel Input with a Character Set



**PD443X Display**  
Parallel Input with a Character Set

### 4-digit domino series 5X7 Intelligent Display (Parallel Input / Character Set)

Page 97



**DLX1414 Display**  
Parallel Input with a Character Set



**DLX2416 Display**  
Parallel Input with a Character Set



**DLX3416 Display**  
Parallel Input with a Character Set

### 4-digit wide body serial interface 5X7 Intelligent Display

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**SCF574X Display**  
Serial Input with a Character RAM

### 4-digit Slimline 5X7 Intelligent Display (Parallel Input / Character Set)

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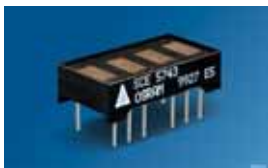
**SLX2016 Display**  
Parallel Input with a Character Set



**HDSP200XLP Display**  
Serial Input with a Shift Register Driver

### 4-digit Slimline 5X7 Intelligent Display with serial interface (Serial Input / Character RAM)

Page 98



**SCE574X Display**  
Serial Input with a Character RAM DIP  
Package Pinout

**4-digit Slimline 5X7 Intelligent Display with serial interface and single-inline leads**

Page 99

**SCE574XP Display**

Serial Input with a Character RAM SIP  
Package Pinout

**4-digit Slimline 5X7 Intelligent Display with serial interface and 90 degree form single inline leads (Q-SIP)**

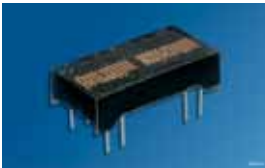
Page 99

**SCE574XQ Display**

Serial Input with a Character RAM 90  
Degree Form SIP Package Pinout

**4-digit Vertical & Square Format Plastic Package Displays****4-digit Vertical Format Intelligent Display (Serial Input / Character RAM)**

Page 100

**SCDV554X Display**

Serial Input with a Character RAM

**4-digit Square Format Intelligent Displays with straight single inline leads (SIP) (Serial Input / Character RAM)**

Page 100

**SCDQ554XP Display**

Serial Input with a Character RAM SIP  
Package Pinout

**4-digit Square Format Intelligent Displays with 90 degree bend single inline leads (Q-SIP) (Serial Input / Character RAM)**

Page 100

**SCDQ554XQ Display**

Serial Input with a Character RAM SIP  
Package Pinout with 90 Degree Formed

### 4-digit Square Format Intelligent Displays with molex connector (Serial Input / Character RAM)

Page 100

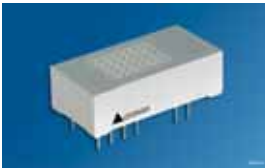
**SCDQ554XR Display**

Serial Input with a Character RAM Single  
Row Molex Connector Interface

## Single digit Plastic Package Intelligent Displays

### Single digit Intelligent Displays (Parallel Input / Character Set)

Page 101

**DLX413X Display**

Parallel Input with a Character Set

**DLX713X Display**

Parallel Input with a Character Set

## Features

### Display devices

Intelligent displays are alphanumeric LED displays with built-in CMOS circuits. They are totally self-contained peripherals which allow a wide variety of design configurations, minimize design time and reduce design costs.

- ASCII character set for 128 and 256 characters, or user definable characters
- Bright, high-contrast LED technology
- TTL-compatible, CMOS logic
- 5 V operation
- Very high life expectancy
- Compatible with microprocessor systems
- Access time from 45 ns up to 525 ns
- Independent access to each digit
- Highly compact, flat packages
- Easily stackable for longer message lengths
- Intensity coded for display uniformity

## Mounting Instructions

### Handling

Observe ESD precautions

- Avoid touching the pins; handle the body only.
- Keep the devices in anti-static tubes or conductive material when transporting
- Use a conductive and grounded work area (conductive flooring, conductive work benches, individual wrist straps, etc.)

### Soldering

- Max. soldering temperature: 260 °C
- Max. soldering time: 5 s
- Min. solder distance: > 1.59 mm below the seating plane

In case of wave soldering, the package temperature of Intelligent Displays is not allowed to exceed the max. operating temperature.

**It is necessary to use water soluble or alcohol-free soldering flux.**

### Solvents

**Do not use any cleaning solvents containing alcohol.**

## Eigenschaften

### Einzelbausteine

Intelligente Anzeigen sind alphanumerische LED Displays mit eingebautem CMOS-Schaltkreis. Sie sind völlig unabhängige, anwenderfreundliche Peripheriebausteine, die eine große Vielfalt von Gestaltungsmöglichkeiten zulassen, Entwicklungszeit einsparen und -kosten reduzieren.

- ASCII-Zeichensatz für 128 und 256 Zeichen, oder frei programmierbarer Zeichensatz
- Helle, kontraststarke LED-Technologie
- TTL-kompatibel, CMOS-Logik
- Betrieb mit 5 V Versorgungsspannung
- Sehr hohe Lebenserwartung
- Kompatibel zu Microcomputer-Systemen
- Zugriffszeit von 45 ns bis 525 ns
- Direkter, unabhängiger Zugriff auf jede Stelle
- Sehr kompakte, flache Gehäuse
- Einfach aneinanderreihbar für erweiterte Textlängen
- Helligkeitscode für gleichmäßig leuchtende Anzeige

## Einbauhinweise

### Handhabung

ESD-Vorsichtsmaßnahmen sind zu beachten

- Vermeiden Sie, Anschlüsse zu berühren. Fassen Sie nur am Gehäuse an.
- Transportieren Sie die Bausteine nur in antistatischen Schienen oder auf leitendem Material.
- Die Arbeitsumgebung muß leitend geerdet sein (leitender Fußboden, leitende Arbeitstische, individuelle Handgelenk-Ableitbänder, usw.)

### Löten

- Max. Löttemperatur: 260 °C
- Max. Lötzeit: 5 s
- Min. Lötabstand: > 1,59 mm

Bei Wellenlötbadern darf die Gehäusetemperatur die max. Betriebstemperatur nicht überschreiten.

**Es muß wasserlösliches bzw. alkoholfreies Flußmittel verwendet werden.**

### Lösungsmittel

**Zum Reinigen der Platinen keine alkoholhaltigen Lösungsmittel benutzen.**



## Ceramic Hi-rel Intelligent Displays

| Package | Type | Emission Color | # of chars. | Char. height<br>[mm] | Pack-<br>age size<br>[mm] | Inter-<br>face | # of dots<br>per char-<br>acter | Temperature<br>range Opera-<br>ting / Storage<br>[°C] | Features | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-------------|----------------------|---------------------------|----------------|---------------------------------|-------------------------------------------------------|----------|---------------|-----------------|
|---------|------|----------------|-------------|----------------------|---------------------------|----------------|---------------------------------|-------------------------------------------------------|----------|---------------|-----------------|

### 8-digit 5x7 Ceramic Hi-rel Intelligent Display (Parallel Input / Character Set & UDC)

|  |         |                       |   |      |               |          |             |                              |                                                                                                                                                                                                                                                               |             |   |
|--|---------|-----------------------|---|------|---------------|----------|-------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|
|  | IPD2131 | yellow                | 8 | 4.85 | 42.7<br>x 9.9 | parallel | 35<br>5 x 7 | -55 ... 100 /<br>-65 ... 125 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver</li> <li>128 character ASCII character ROM</li> <li>16 user definable characters</li> <li>Rugged ceramic package, hermetically sealed flat glass lens</li> </ul> | Q68000A8904 | 1 |
|  | IPD2132 | super red             |   |      |               |          |             |                              |                                                                                                                                                                                                                                                               | Q68000A8836 |   |
|  | IPD2133 | high efficiency green |   |      |               |          |             |                              |                                                                                                                                                                                                                                                               | Q68000A8906 |   |


### 4-digit 5x7 Ceramic Hi-rel Intelligent Display (Serial Input / Shift Register Driver)

|  |          |                       |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   |             |   |
|--|----------|-----------------------|---|------|------------------|-----------------------|-------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|
|  | IPD2545A | high efficiency green | 4 | 6.4  | 30.48<br>x 12.45 | parallel              | 35<br>5 x 7 | -55 ... 100 /<br>-65 ... 125 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver</li> <li>128 character ASCII character ROM</li> <li>Rugged ceramic package, hermetically sealed flat glass lens</li> </ul>                                                                                                                                                           | Q68000A9883 | 4 |
|  | IPD2547A | green                 |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A9884 |   |
|  | IPD2548A | yellow                |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A9885 |   |
|  | ISD2010  | hyper red             | 4 | 3.7  | 17.7<br>x 7.87   | serial shift register | 35<br>5 x 7 | -55 ... 100 /<br>-65 ... 125 | <ul style="list-style-type: none"> <li>Serial input. Easily cascaded for multiple displays</li> <li>Built-in low power CMOS shift register and constant current LED row drivers</li> <li>External column strobing allows use of standard and custom alphanumeric fonts</li> <li>Rugged ceramic package, hermetically sealed flat glass lens</li> </ul>                            | Q68000A8134 | 2 |
|  | ISD2011  | yellow                |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A8135 |   |
|  | ISD2012  | super red             |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A8136 |   |
|  | ISD2013  | high efficiency green |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A8137 |   |
|  | ISD2310  | hyper red             | 4 | 4.88 | 20.07<br>x 8.43  | serial shift register | 35<br>5 x 7 | -55 ... 100 /<br>-65 ... 125 | <ul style="list-style-type: none"> <li>Serial input. Easily cascaded for multiple displays</li> <li>Built-in low power CMOS shift register and constant current LED row drivers</li> <li>External column strobing allows use of standard and custom alphanumeric fonts</li> <li>Rugged ceramic package, hermetically sealed flat glass lens</li> </ul>                            | Q68000A8138 | 3 |
|  | ISD2311  | yellow                |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A8139 |   |
|  | ISD2312  | super red             |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A8140 |   |
|  | ISD2313  | high efficiency green |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A8141 |   |
|  | ISD2351  | yellow                | 4 | 4.88 | 20.07<br>x 8.43  | serial shift register | 35<br>5 x 7 | -55 ... 100 /<br>-65 ... 125 | <ul style="list-style-type: none"> <li>Sunlight viewable</li> <li>Serial input. Easily cascaded for multiple displays</li> <li>Built-in low power CMOS shift register and constant current LED row drivers</li> <li>External column strobing allows use of standard and custom alphanumeric fonts</li> <li>Rugged ceramic package, hermetically sealed flat glass lens</li> </ul> | Q68000A8142 | 3 |
|  | ISD2352  | super red             |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A8143 |   |
|  | ISD2353  | high efficiency green |   |      |                  |                       |             |                              |                                                                                                                                                                                                                                                                                                                                                                                   | Q68000A8144 |   |

## 10-digit Plastic Package Intelligent Displays

| Package | Type | Emission Color | # of chars. | Char. height<br>[mm] | Pak-<br>age<br>size<br>[mm] | Inter-<br>face | Viewing<br>angle x/<br>y-axis<br>[deg.] | # of dots<br>per cha-<br>racter | Tempera-<br>ture range<br>Operating /<br>Storage<br>[°C] | Features | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------|----------------------------------------------------------|----------|---------------|-----------------|
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------|----------------------------------------------------------|----------|---------------|-----------------|


### 10-digit Slimline 5X5 Intelligent Display (Serial Input / Character RAM)

|                                                                                   |           |                       |    |      |             |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |   |
|-----------------------------------------------------------------------------------|-----------|-----------------------|----|------|-------------|--------|-----------|-------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|
|  | SCD55104A | high efficiency green | 10 | 3.68 | 38.1 x 3.68 | serial | 55 / ± 65 | 25<br>5 x 5 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>• Optimum display surface efficiency,</li> <li>• Lower Power - 30% less than 5X7 dot matrix,</li> <li>• High speed serial data input - 5MHz,</li> <li>• Readable from 6 feet (1.8 meters),</li> <li>• Attributes: 250 bit RAM for user definable characters, Eight dimming levels, Power down mode, Hardware/software CLEAR function, Lamp test.</li> <li>• Internal or external mux clock.</li> </ul> | Q68100A0992 | 5 |
|                                                                                   | SCD55103A | green                 |    |      |             |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               | Q68100A0991 |   |
|                                                                                   | SCD55102A | super red             |    |      |             |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               | Q68100A0990 |   |
|                                                                                   | SCD55101A | yellow                |    |      |             |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               | Q68100A0989 |   |
|                                                                                   | SCD55100A | red                   |    |      |             |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               | Q68100A0988 |   |



## 8-digit Plastic Package Intelligent Displays

| Package | Type | Emission Color | # of chars. | Char. height<br>[mm] | Pak-<br>age<br>size<br>[mm] | Inter-<br>face | Viewing<br>angle x/<br>y-axis<br>[deg.] | # of<br>dots<br>per<br>cha-<br>racter | Tempera-<br>ture range<br>Operating /<br>Storage<br>[°C] | Features | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|

### 8-digit wide body 5X7 Intelligent Display (Parallel Input)

|                                                                                     |           |                       |   |     |                     |               |              |             |                             |                                                                                                                                                                                   |             |   |
|-------------------------------------------------------------------------------------|-----------|-----------------------|---|-----|---------------------|---------------|--------------|-------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|
|    | HDSP2110S | hyper red             | 8 | 5.1 | 42.67<br>x<br>19.58 | paral-<br>lel | 55 / ±<br>65 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver,</li> <li>128 ASCII character ROM,</li> <li>16 user definable characters,</li> </ul> | Q68000A8560 | 6 |
|                                                                                     | HDSP2111S | yellow                |   |     |                     |               |              |             |                             |                                                                                                                                                                                   | Q68000A8561 |   |
|                                                                                     | HDSP2112S | super red             |   |     |                     |               |              |             |                             |                                                                                                                                                                                   | Q68000A8562 |   |
|                                                                                     | HDSP2113S | green                 |   |     |                     |               |              |             |                             |                                                                                                                                                                                   | Q68000A8563 |   |
|                                                                                     | HDSP2114S | high efficiency green |   |     |                     |               |              |             |                             |                                                                                                                                                                                   | Q68000A8564 |   |
|                                                                                     | HDSP2115S | orange                |   |     |                     |               |              |             |                             |                                                                                                                                                                                   | Q68000A8907 |   |
|  | PDSP2110  | hyper red             | 8 | 5.1 | 42.67<br>x<br>19.58 | paral-<br>lel | 55 / ±<br>65 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver,</li> <li>256 ASCII character ROM,</li> </ul>                                        | Q68000A8474 | 6 |
|                                                                                     | PDSP2111  | yellow                |   |     |                     |               |              |             |                             |                                                                                                                                                                                   | Q68000A8503 |   |
|                                                                                     | PDSP2112  | super red             |   |     |                     |               |              |             |                             |                                                                                                                                                                                   | Q68000A8504 |   |
|                                                                                     | PDSP2113  | green                 |   |     |                     |               |              |             |                             |                                                                                                                                                                                   | Q68000A8505 |   |
|                                                                                     | PDSP2114  | high efficiency green |   |     |                     |               |              |             |                             |                                                                                                                                                                                   | Q68000A8533 |   |


### 8-digit Slimline 5X7 Intelligent Display

|                                                                                     |          |                       |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |   |
|-------------------------------------------------------------------------------------|----------|-----------------------|---|------|---------------------|---------------|--------------|-------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|
|  | PDSP1880 | hyper red             | 8 | 4.57 | 42.93<br>x<br>11.43 | paral-<br>lel | 55 / ±<br>65 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver,</li> <li>128 ASCII character ROM,</li> <li>16 user definable characters,</li> </ul>                                                                                                                                                                                                                                                               | Q68000A9105 | 7 |
|                                                                                     | PDSP1881 | yellow                |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68000A9106 |   |
|                                                                                     | PDSP1882 | super red             |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68000A9107 |   |
|                                                                                     | PDSP1883 | green                 |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68000A9108 |   |
|                                                                                     | PDSP1884 | high efficiency green |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68000A9109 |   |
|  | SCE5780  | hyper red             | 8 | 4.57 | 42.93<br>x<br>11.43 | paral-<br>lel | 55 / ±<br>65 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial Input, Dot Addressable Display. Ideal for User Defined Characters</li> <li>Built-in Decoders, Multiplexers and LED Drivers</li> <li>Readable from 8 Feet (2.5 meters)</li> <li>Programmable Features: Clear Function, Eight Dimming Levels, Peak Current Select (12.5% or Full Peak Current), Prescaler Function (External Oscillator Divided by 16 or 1), Internal or External Clock.</li> </ul> | Q68000A9100 | 8 |
|                                                                                     | SCE5781  | yellow                |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68000A9101 |   |
|                                                                                     | SCE5782  | super red             |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68000A9102 |   |
|                                                                                     | SCE5783  | green                 |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68000A9103 |   |
|                                                                                     | SCE5784  | high efficiency green |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68000A9104 |   |
|                                                                                     | SCE5785  | soft orange           |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68100A0550 |   |
|                                                                                     | SCE5786  | InGaAlP red           |   |      |                     |               |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Q68100A1435 |   |

## 8-digit Plastic Package Intelligent Displays

| Package | Type | Emission Color | # of chars. | Char. height<br>[mm] | Pak-<br>kage<br>size<br>[mm] | Inter-<br>face | Viewing<br>angle x/<br>y-axis<br>[deg.] | # of dots<br>per<br>cha-<br>racter | Tempera-<br>ture range<br>Operating /<br>Storage<br>[°C] | Features | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-------------|----------------------|------------------------------|----------------|-----------------------------------------|------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|
|---------|------|----------------|-------------|----------------------|------------------------------|----------------|-----------------------------------------|------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|




### 8-digit Slimline 5X5 Intelligent Display (Serial Input / Character RAM)

|                                                                                   |          |                       |   |      |           |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                 |             |   |
|-----------------------------------------------------------------------------------|----------|-----------------------|---|------|-----------|--------|-----------|-------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|
|  | SCD5584A | high efficiency green | 8 | 3.68 | 38.1 x 10 | serial | 55 / ± 65 | 25<br>5 x 5 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>• Optimum display surface efficiency,</li> <li>• Lower Power - 30% less than 5X7 dot matrix,</li> <li>• High speed serial data input - 5MHz,</li> <li>• Readable from 6 feet (1.8 meters),</li> <li>• Attributes: 200-bit RAM for user definable characters, Eight dimming levels, Power down</li> </ul> | Q68100A1000 | 9 |
|                                                                                   | SCD5583A | green                 |   |      |           |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                 | Q68100A0998 |   |
|                                                                                   | SCD5582A | super red             |   |      |           |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                 | Q68100A0997 |   |
|                                                                                   | SCD5581A | yellow                |   |      |           |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                 | Q68100A0996 |   |
|                                                                                   | SCD5580A | hyper red             |   |      |           |        |           |             |                             |                                                                                                                                                                                                                                                                                                                                                 | Q68100A0994 |   |




## 4-digit Plastic Package Intelligent Displays

| Package | Type | Emission Color | # of chars. | Char. height<br>[mm] | Pak-<br>age size<br>[mm] | Inter-<br>face | Viewing<br>angle x/<br>y-axis<br>[deg.] | # of<br>dots<br>per<br>cha-<br>racter | Tempera-<br>ture range<br>Operating /<br>Storage<br>[°C] | Features | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-------------|----------------------|--------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|
|---------|------|----------------|-------------|----------------------|--------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|

### 4-digit wide body 5X7 Intelligent Display (Parallel Input / Character Set)

|                                                                                     |        |                     |   |       |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                        |             |    |
|-------------------------------------------------------------------------------------|--------|---------------------|---|-------|---------------|----------|-----------|-------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|    | PD2435 | high efficiency red | 4 | 5.08  | 25.4 x 17.78  | parallel | 55 / ± 65 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver, 128 ASCII character ROM.</li> <li>3 dimming levels plus blank</li> <li>Blinking cursor, character, lamp test functions</li> <li>Internal or external mux clock.</li> <li>End stackable.</li> </ul>                                                                       | Q68000A3561 | 10 |
|                                                                                     | PD2436 | red                 |   |       |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                        | Q68000A8366 |    |
|                                                                                     | PD2437 | green               |   |       |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                        | Q68000A3562 |    |
|    | PD3535 | high efficiency red | 4 | 6.86  | 35.56 x 18.29 | parallel | 55 / ± 65 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver, 128 ASCII character ROM.</li> <li>3 dimming levels plus blank</li> <li>Blinking cursor, character, lamp test functions</li> <li>Internal or external mux clock</li> <li>End stackable.</li> </ul>                                                                        | Q68000A7964 | 11 |
|                                                                                     | PD3536 | red                 |   |       |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                        | Q68000A8365 |    |
|                                                                                     | PD3537 | bright green        |   |       |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                        | Q68000A7965 |    |
|  | PD4435 | high efficiency red | 4 | 11.43 | 38.1 x 20.83  | parallel | 55 / ± 65 | 35<br>5 x 7 | -40 ... 70 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Reflector product produces large solid pixels with no cross-talk.</li> <li>Built-in CMOS decoder, multiplexer, memory and driver, 128 ASCII character ROM.</li> <li>3 dimming levels plus blank</li> <li>Blinking cursor, character, lamp test functions</li> <li>Internal or external clock</li> <li>end stackable.</li> </ul> | Q68000A8367 | 12 |
|                                                                                     | PD4436 | red                 |   |       |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                        | Q68000A8368 |    |
|                                                                                     | PD4437 | bright green        |   |       |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                        | Q68000A8369 |    |


### 4-digit domino series 5X7 Intelligent Display (Parallel Input / Character Set)

|                                                                                     |         |                     |   |     |               |          |           |             |                             |                                                                                                                                                           |             |    |
|-------------------------------------------------------------------------------------|---------|---------------------|---|-----|---------------|----------|-----------|-------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|  | DLG1414 | green               | 4 | 3.7 | 17.78 x 20.32 | parallel | 50 / ± 75 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver, 128 ASCII character ROM.</li> <li>End stackable.</li> </ul> | Q68000A8093 | 13 |
|                                                                                     | DLO1414 | high efficiency red |   |     |               |          |           |             |                             |                                                                                                                                                           | Q68000A8092 |    |
|                                                                                     | DLR1414 | red                 |   |     |               |          |           |             |                             |                                                                                                                                                           | Q68000A8091 |    |
|  | DLG2416 | green               | 4 | 5   | 25.4 x 20.32  | parallel | 50 / ± 75 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver, 128 ASCII character ROM.</li> <li>End stackable.</li> </ul> | Q68000A8096 | 14 |
|                                                                                     | DLO2416 | high efficiency red |   |     |               |          |           |             |                             |                                                                                                                                                           | Q68000A8095 |    |
|                                                                                     | DLR2416 | red                 |   |     |               |          |           |             |                             |                                                                                                                                                           | Q68000A8094 |    |
|  | DLG3416 | green               | 4 | 6.9 | 33.02 x 20.07 | parallel | 50 / ± 75 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Built-in CMOS decoder, multiplexer, memory and driver, 128 ASCII character ROM.</li> <li>End stackable.</li> </ul> | Q68000A8099 | 15 |
|                                                                                     | DLO3416 | high efficiency red |   |     |               |          |           |             |                             |                                                                                                                                                           | Q68000A8098 |    |
|                                                                                     | DLR3416 | red                 |   |     |               |          |           |             |                             |                                                                                                                                                           | Q68000A8097 |    |



## 4-digit Plastic Package Intelligent Displays

| Package | Type | Emission Color | # of chars. | Char. height<br>[mm] | Pak-<br>age<br>size<br>[mm] | Inter-<br>face | Viewing<br>angle x/<br>y-axis<br>[deg.] | # of<br>dots<br>per<br>cha-<br>racter | Tempera-<br>ture range<br>Operating /<br>Storage<br>[°C] | Features | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|


### 4-digit wide body serial interface 5X7 Intelligent Display

|                                                                                   |         |                       |   |      |                     |        |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                      |             |    |
|-----------------------------------------------------------------------------------|---------|-----------------------|---|------|---------------------|--------|--------------|-------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|  | SCF5740 | red                   | 4 | 6.86 | 33.02<br>x<br>20.07 | serial | 55 / ±<br>65 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial Input, Dot Addressable Display. Ideal for User Defined Characters</li> <li>Built-in Decoders, Multiplexers and LED Drivers</li> <li>Programmable Features: Clear Function, Eight Dimming Levels, Peak Current Select (12.5% or Full Peak Current), Prescaler Function (External Oscillator Divided by 16 or 1), Internal or External Clock.</li> </ul> | Q68000A8848 | 16 |
|                                                                                   | SCF5742 | high efficiency red   |   |      |                     |        |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                      | Q68000A8901 |    |
|                                                                                   | SCF5744 | high efficiency green |   |      |                     |        |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                                                      | Q68000A8903 |    |

### 4-digit Slimline 5X7 Intelligent Display (Parallel Input / Character Set)

|                                                                                     |            |                     |   |      |                     |                |              |             |                             |                                                                                                                                                                                                                                                                                                                                   |             |    |
|-------------------------------------------------------------------------------------|------------|---------------------|---|------|---------------------|----------------|--------------|-------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|   | SLG2016    | green               | 4 | 4.72 | 19.91<br>x<br>10.16 | parallel       | 50 / ±<br>75 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Optimum display surface efficiency</li> <li>Very close multi-line spacing, 0.4" centers.</li> <li>128 special ASCII character ROM</li> <li>Clear function that clears character memory</li> <li>True blanking for intensity dimming applications</li> </ul>                                | Q68000A8642 | 17 |
|                                                                                     | SLO2016    | high efficiency red |   |      |                     |                |              |             |                             |                                                                                                                                                                                                                                                                                                                                   | Q68000A8641 |    |
|                                                                                     | SLR2016    | red                 |   |      |                     |                |              |             |                             |                                                                                                                                                                                                                                                                                                                                   | Q68000A8640 |    |
|                                                                                     | SLY2016    | yellow              |   |      |                     |                |              |             |                             |                                                                                                                                                                                                                                                                                                                                   | Q68000A8643 |    |
|  | HDSP2000LP | red                 | 4 | 3.7  | 17.75<br>x<br>8.89  | shift register | 50 / ±<br>75 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial input. Easily cascaded for multiple displays.</li> <li>Built-in low power CMOS shift register and constant current LED row drivers.</li> <li>External column strobing allows use of standard and custom alphanumeric fonts.</li> <li>Blanking input for dimming control.</li> </ul> | Q68000A8131 | 18 |
|                                                                                     | HDSP2001LP | yellow              |   |      |                     |                |              |             |                             |                                                                                                                                                                                                                                                                                                                                   | Q68000A8304 |    |
|                                                                                     | HDSP2002LP | high efficiency red |   |      |                     |                |              |             |                             |                                                                                                                                                                                                                                                                                                                                   | Q68000A8132 |    |
|                                                                                     | HDSP2003LP | green               |   |      |                     |                |              |             |                             |                                                                                                                                                                                                                                                                                                                                   | Q68000A8133 |    |

### 4-digit Slimline 5X7 Intelligent Display with serial interface (Serial Input / Character RAM)

|                                                                                     |         |                       |   |      |                     |                                     |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         |             |    |
|-------------------------------------------------------------------------------------|---------|-----------------------|---|------|---------------------|-------------------------------------|--------------|-------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|  | SCE5740 | red                   | 4 | 4.57 | 19.91<br>x<br>10.16 | serial with dual inline leads (DIP) | 55 / ±<br>55 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial Input, Dot Addressable Display. Ideal for User Defined Characters</li> <li>Built-in Decoders, Multiplexers and LED Drivers</li> <li>Programmable Features: Clear Function, Eight Dimming Levels, Peak Current Select, Prescaler Function (External Oscillator Divided by 16 or 1), Internal or External Clock.</li> </ul> | Q68100A1369 | 19 |
|                                                                                     | SCE5741 | yellow                |   |      |                     |                                     |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1370 |    |
|                                                                                     | SCE5742 | super red             |   |      |                     |                                     |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1371 |    |
|                                                                                     | SCE5743 | green                 |   |      |                     |                                     |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1372 |    |
|                                                                                     | SCE5744 | high efficiency green |   |      |                     |                                     |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1373 |    |
|                                                                                     | SCE5745 | orange                |   |      |                     |                                     |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1374 |    |

## 4-digit Plastic Package Intelligent Displays

| Package | Type | Emission Color | # of chars. | Char. height<br>[mm] | Pak-<br>age<br>size<br>[mm] | Inter-<br>face | Viewing<br>angle x/<br>y-axis<br>[deg.] | # of dots<br>per cha-<br>racter | Tempera-<br>ture range<br>Operating /<br>Storage<br>[°C] | Features | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------|----------------------------------------------------------|----------|---------------|-----------------|
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------|----------------------------------------------------------|----------|---------------|-----------------|

### 4-digit Slimline 5X7 Intelligent Display with serial interface and single-inline leads (SIP)

|  |          |                       |   |      |                     |                                                                        |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                          |             |    |
|--|----------|-----------------------|---|------|---------------------|------------------------------------------------------------------------|--------------|-------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|  | SCE5745P | orange                | 4 | 4.57 | 19.91<br>x<br>10.54 | serial<br>with<br>straigh<br>t sin-<br>gle<br>inline<br>leads<br>(SIP) | 50 / ±<br>65 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial Input, Dot Addressable Display. Ideal for User Defined Characters,</li> <li>Built-in Decoders, Multiplexers and LED Drivers</li> <li>Programmable Features: Clear Function, Eight Dimming Levels, Peak Current Select (12.5% or Full Peak Current), Prescaler Function (External Oscillator Divided by 16 or 1)</li> </ul> | Q68100A1483 | 20 |
|  | SCE5744P | high efficiency green |   |      |                     |                                                                        |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                          | Q68100A1482 |    |
|  | SCE5743P | green                 |   |      |                     |                                                                        |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                          | Q68100A1481 |    |
|  | SCE5742P | super red             |   |      |                     |                                                                        |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                          | Q68100A1480 |    |
|  | SCE5741P | yellow                |   |      |                     |                                                                        |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                          | Q68100A1479 |    |


### 4-digit Slimline 5X7 Intelligent Display with serial interface and 90 degree form single inline leads (Q-SIP)

|  |          |                       |   |     |                     |                                                                                       |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         |             |    |
|--|----------|-----------------------|---|-----|---------------------|---------------------------------------------------------------------------------------|--------------|-------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|  | SCE5745Q | orange                | 4 | 4.7 | 19.91<br>x<br>10.54 | serial<br>with<br>90 de-<br>gree<br>form<br>sin-<br>gle<br>inline<br>leads<br>(Q-SIP) | 55 / ±<br>55 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial Input, Dot Addressable Display. Ideal for User Defined Characters</li> <li>Built-in Decoders, Multiplexers and LED Drivers</li> <li>Programmable Features: Clear Function, Eight Dimming Levels, Peak Current Select (12.5% or Full Peak Current), Prescaler Function (External Oscillator Divided by 16 or 1)</li> </ul> | Q68100A1488 | 21 |
|  | SCE5744Q | high efficiency green |   |     |                     |                                                                                       |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1487 |    |
|  | SCE5743Q | green                 |   |     |                     |                                                                                       |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1486 |    |
|  | SCE5742Q | super red             |   |     |                     |                                                                                       |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1485 |    |
|  | SCE5741Q | yellow                |   |     |                     |                                                                                       |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1484 |    |
|  | SCE5740Q | red                   |   |     |                     |                                                                                       |              |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1440 |    |


## 4-digit Vertical & Square Format Plastic Package Displays

| Package | Type | Emission Color | # of chars. | Char. height<br>[mm] | Pak-<br>age<br>size<br>[mm] | Inter-<br>face | Viewing<br>angle x/<br>y-axis<br>[deg.] | # of<br>dots<br>per<br>cha-<br>racter | Tempera-<br>ture range<br>Operating /<br>Storage<br>[°C] | Features | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|
|---------|------|----------------|-------------|----------------------|-----------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|


### 4-digit Vertical Format Intelligent Display (Serial Input / Character RAM)

|                                                                                   |          |                       |   |      |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         |             |    |
|-----------------------------------------------------------------------------------|----------|-----------------------|---|------|---------------|----------|-----------|-------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|  | SCDV5544 | high efficiency green | 4 | 3.12 | 19.91 x 10.16 | parallel | 55 / ± 55 | 25<br>5 x 5 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial Input, Dot Addressable Display. Ideal for User Defined Characters</li> <li>Built-in Decoders, Multiplexers and LED Drivers</li> <li>Programmable Features: Clear Function, Eight Dimming Levels, Peak Current Select (12.5% or Full Peak Current), Prescaler Function (External Oscillator Divided by 16 or 1)</li> </ul> | Q68000A8894 | 22 |
|                                                                                   | SCDV5543 | green                 |   |      |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68000A8893 |    |
|                                                                                   | SCDV5542 | super red             |   |      |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68000A8892 |    |
|                                                                                   | SCDV5541 | yellow                |   |      |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68000A8891 |    |
|                                                                                   | SCDV5540 | red                   |   |      |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68000A8890 |    |


### 4-digit Square Format Intelligent Displays with straight single inline leads (SIP) (Serial Input / Character RAM)

|                                                                                   |           |                       |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         |               |    |
|-----------------------------------------------------------------------------------|-----------|-----------------------|---|-----|---------------|----------|-----------|-------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----|
|  | SCDQ5544P | high efficiency green | 4 | 3.4 | 19.91 x 10.16 | parallel | 55 / ± 55 | 25<br>5 x 5 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial Input, Dot Addressable Display. Ideal for User Defined Characters</li> <li>Built-in Decoders, Multiplexers and LED Drivers</li> <li>Programmable Features: Clear Function, Eight Dimming Levels, Peak Current Select (12.5% or Full Peak Current), Prescaler Function (External Oscillator Divided by 16 or 1)</li> </ul> | Q68100A1474 P | 25 |
|                                                                                   | SCDQ5543P | green                 |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1473 P |    |
|                                                                                   | SCDQ5542P | super red             |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1078 P |    |
|                                                                                   | SCDQ5541P | yellow                |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1472 P |    |

### 4-digit Square Format Intelligent Displays with 90 degree bend single inline leads (Q-SIP) (Serial Input / Character RAM)

|                                                                                     |           |                       |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         |               |    |
|-------------------------------------------------------------------------------------|-----------|-----------------------|---|-----|---------------|----------|-----------|-------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----|
|  | SCDQ5544Q | high efficiency green | 4 | 3.4 | 19.91 x 10.16 | parallel | 55 / ± 55 | 25<br>5 x 5 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial Input, Dot Addressable Display. Ideal for User Defined Characters</li> <li>Built-in Decoders, Multiplexers and LED Drivers</li> <li>Programmable Features: Clear Function, Eight Dimming Levels, Peak Current Select (12.5% or Full Peak Current), Prescaler Function (External Oscillator Divided by 16 or 1)</li> </ul> | Q68100A1474 Q | 25 |
|                                                                                     | SCDQ5543Q | green                 |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1473 Q |    |
|                                                                                     | SCDQ5542Q | super red             |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1078 Q |    |
|                                                                                     | SCDQ5541Q | yellow                |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1472 Q |    |

### 4-digit Square Format Intelligent Displays with molex connector (Serial Input / Character RAM)



|                                                                                     |           |                       |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         |               |    |
|-------------------------------------------------------------------------------------|-----------|-----------------------|---|-----|---------------|----------|-----------|-------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----|
|  | SCDQ5544R | high efficiency green | 4 | 3.4 | 19.91 x 10.16 | parallel | 55 / ± 55 | 25<br>5 x 5 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>Serial Input, Dot Addressable Display. Ideal for User Defined Characters</li> <li>Built-in Decoders, Multiplexers and LED Drivers</li> <li>Programmable Features: Clear Function, Eight Dimming Levels, Peak Current Select (12.5% or Full Peak Current), Prescaler Function (External Oscillator Divided by 16 or 1)</li> </ul> | Q68100A1474 R | 25 |
|                                                                                     | SCDQ5543R | green                 |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1473 R |    |
|                                                                                     | SCDQ5542R | super red             |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1078 R |    |
|                                                                                     | SCDQ5541R | yellow                |   |     |               |          |           |             |                             |                                                                                                                                                                                                                                                                                                                                                                         | Q68100A1472 R |    |



## Single digit Plastic Package Intelligent Displays

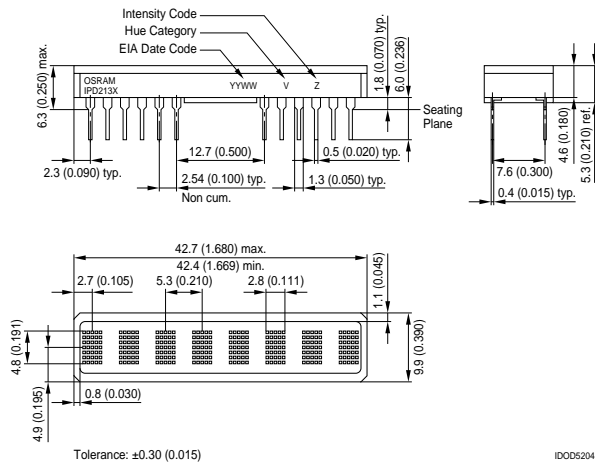
| Package | Type | Emission Color | # of chars. | Char. height<br>[mm] | Pak-<br>age size<br>[mm] | Inter-<br>face | Viewing<br>angle x/<br>y-axis<br>[deg.] | # of<br>dots<br>per<br>cha-<br>racter | Tempera-<br>ture range<br>Operating /<br>Storage<br>[°C] | Features | Ordering Code | Package<br>Fig. |
|---------|------|----------------|-------------|----------------------|--------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|
|---------|------|----------------|-------------|----------------------|--------------------------|----------------|-----------------------------------------|---------------------------------------|----------------------------------------------------------|----------|---------------|-----------------|

## Single digit Intelligent Displays (Parallel Input / Character Set)

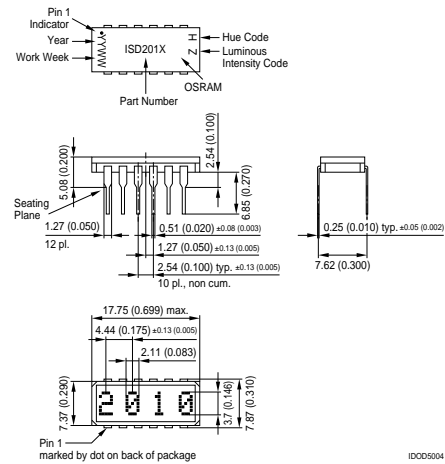
|                                                                                   |         |           |   |       |                  |               |              |             |                             |                                                                                                                                                                                                                                                                                                           |             |    |
|-----------------------------------------------------------------------------------|---------|-----------|---|-------|------------------|---------------|--------------|-------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----|
|  | DLG4137 | green     | 1 | 17.27 | 25.4<br>x 12.7   | paral-<br>lel | 75 / ±<br>75 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>• Built-in CMOS decoder, multiplexer, memory and driver,</li> <li>• Reflector product produces large solid pixels with no cross-talk.</li> <li>• 4 programmable brightness levels.</li> <li>• Built-in 96 ASCII character ROM.</li> <li>• XY stackable.</li> </ul> | Q68000A4299 | 23 |
|                                                                                   | DLO4135 | super red |   |       |                  |               |              |             |                             |                                                                                                                                                                                                                                                                                                           | Q68000A4297 |    |
|  | DLG7137 | green     | 1 | 10.92 | 20.32<br>x 17.78 | paral-<br>lel | 75 / ±<br>75 | 35<br>5 x 7 | -40 ... 85 /<br>-40 ... 100 | <ul style="list-style-type: none"> <li>• Built-in CMOS decoder, multiplexer, memory and driver,</li> <li>• Reflector product produces large solid pixels with no cross-talk.</li> <li>• 4 programmable brightness levels.</li> <li>• Built-in 96 ASCII character ROM.</li> <li>• XY stackable.</li> </ul> | Q68000A7159 | 24 |
|                                                                                   | DLO7135 | super red |   |       |                  |               |              |             |                             |                                                                                                                                                                                                                                                                                                           | Q68000A7157 |    |

Dimensions in mm (inch)

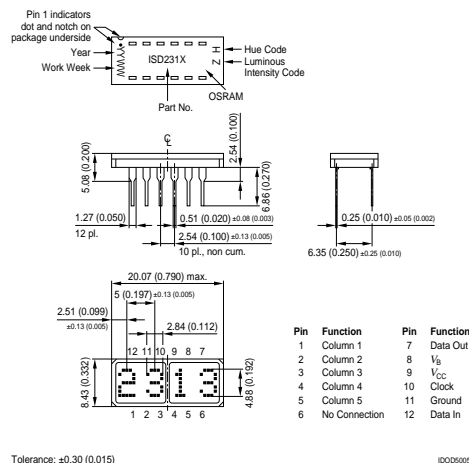
**Figure 1: IPD 213X**



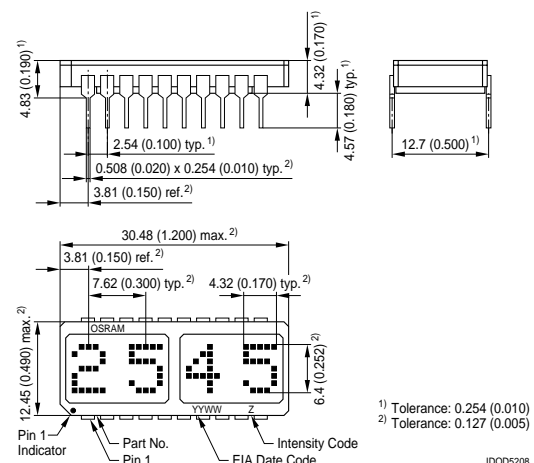
**Figure 2: ISD 201X**



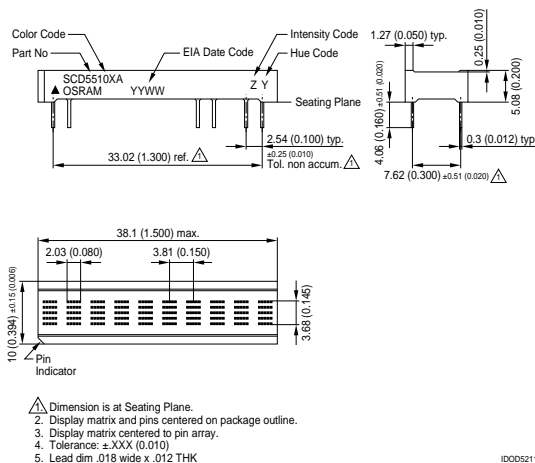
**Figure 3: ISD 231X, ISD 235X**



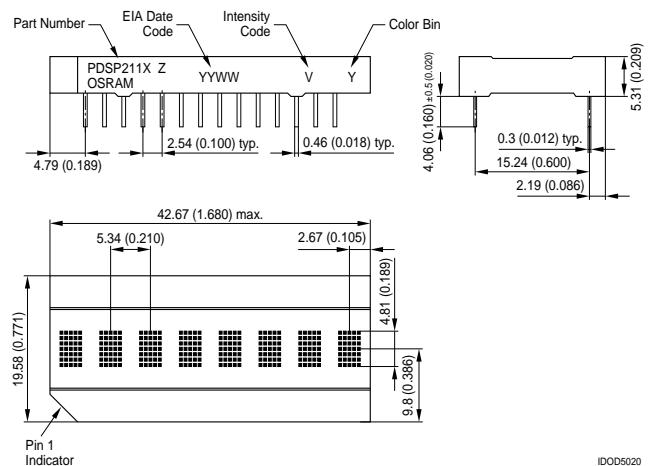
**Figure 4: IPD 2545 A, IPD 2547 A**



**Figure 5: SCD 5510XA**

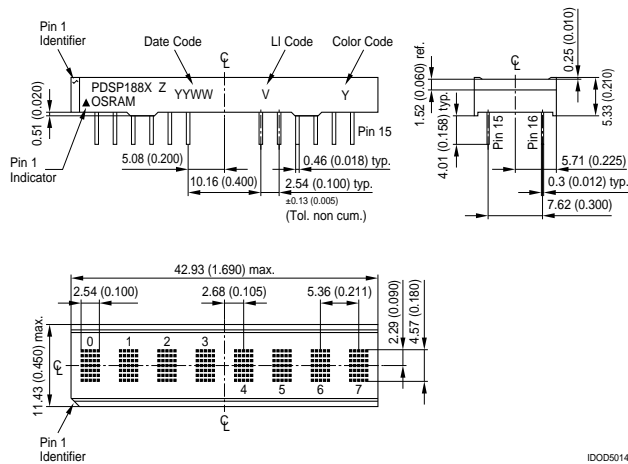


**Figure 6: PDSP 211X, HDSP 211X**

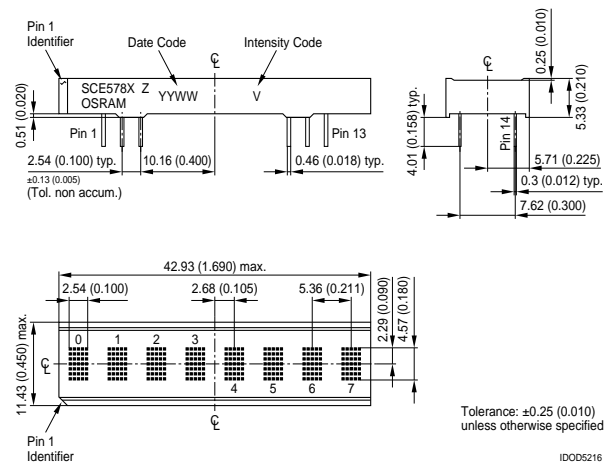


Dimensions in mm (inch)

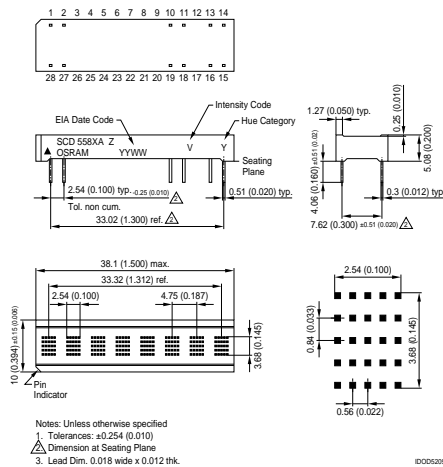
**Figure 7: PDSP 188X**



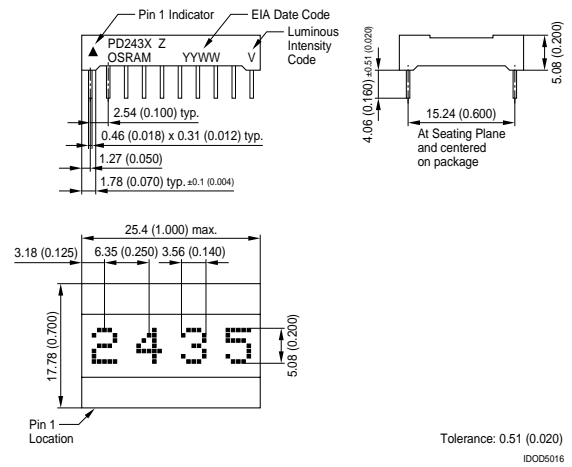
**Figure 8: SCE 578X**



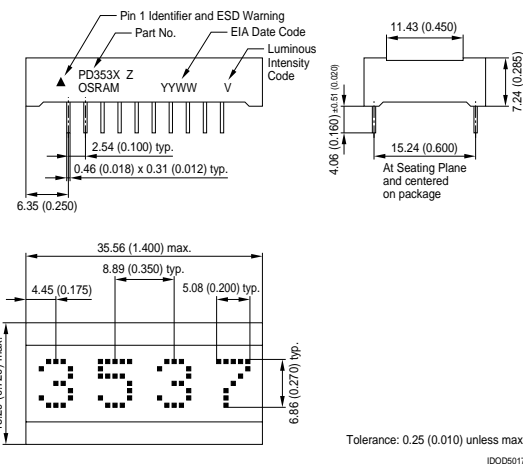
**Figure 9: SCD 558XA**



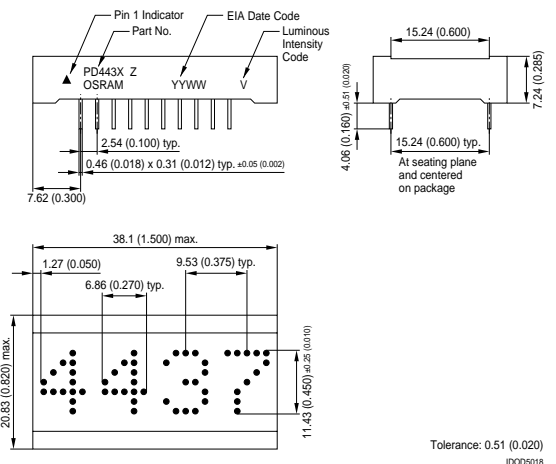
**Figure 10: PD 2435, PD 2436, PD 2437**



**Figure 11: PD 3535, PD 3536, PD 3537**

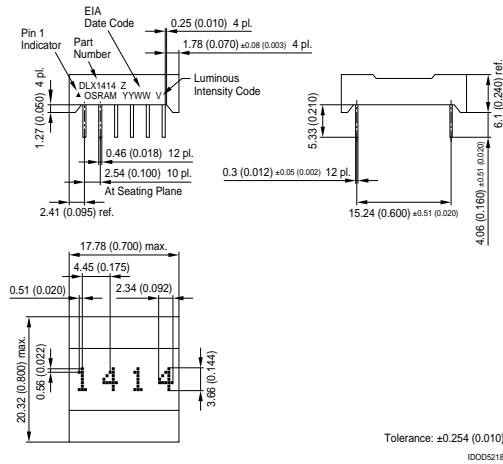


**Figure 12: PD 4435, PD 4436, PD 4437**

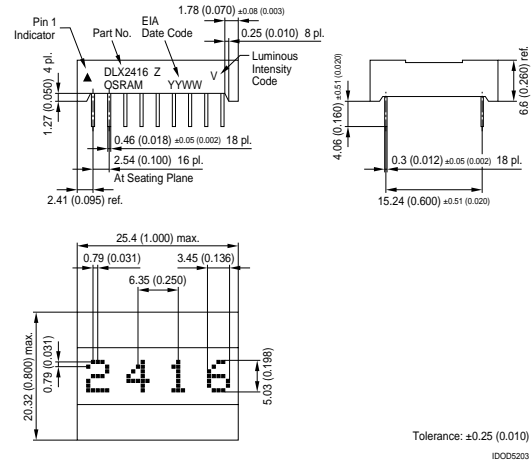


Dimensions in mm (inch)

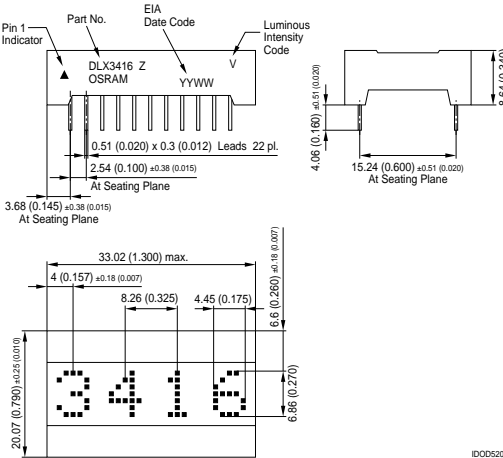
**Figure 13: DLX 1414**



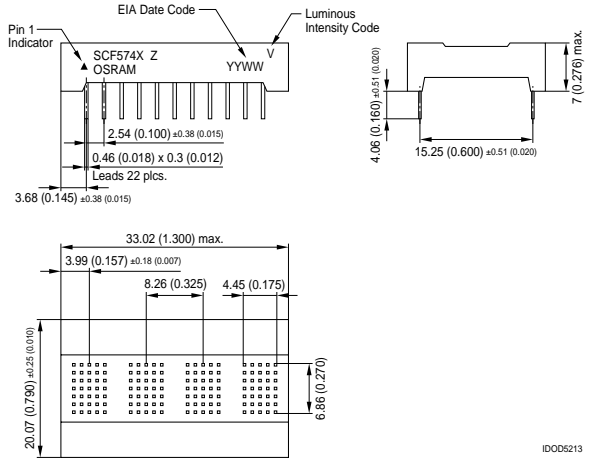
**Figure 14: DLX 2416**



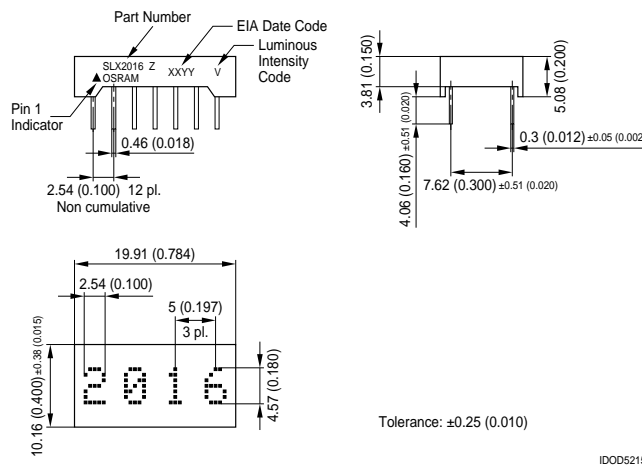
**Figure 15: DLX 3416**



**Figure 16: SCF 574X**

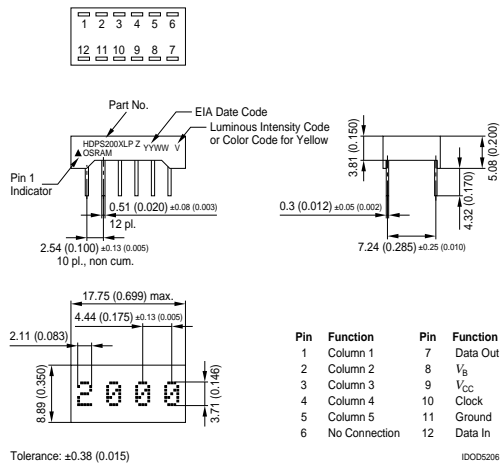


**Figure 17: SLX 2016**

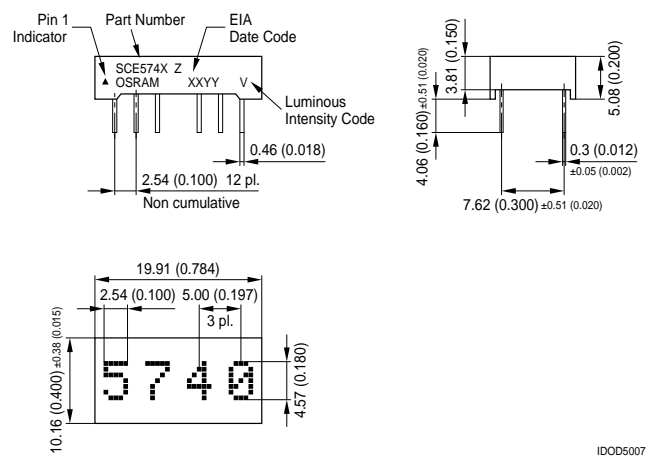


Dimensions in mm (inch)

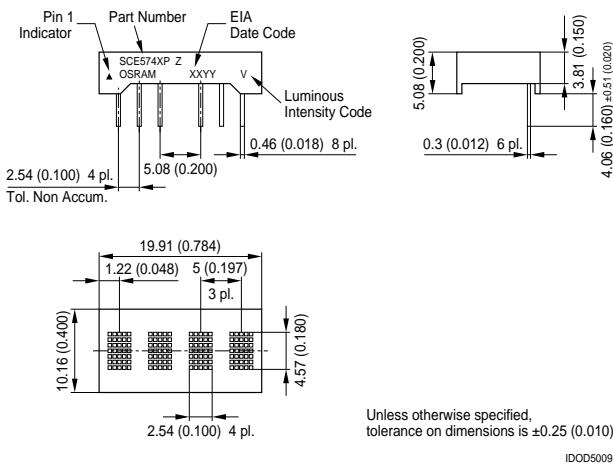
**Figure 18: HDSP 200XLP**



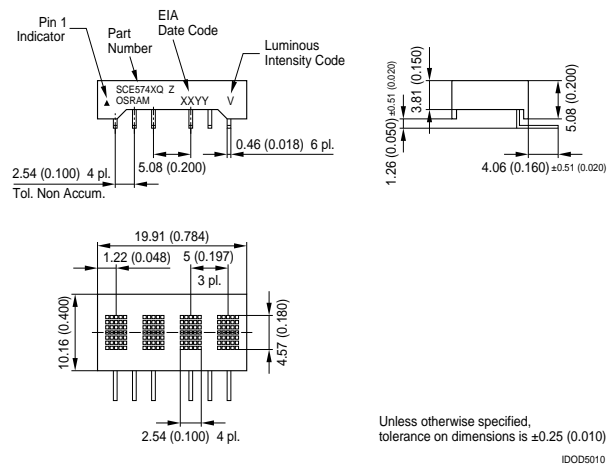
**Figure 19: SCE 574x**



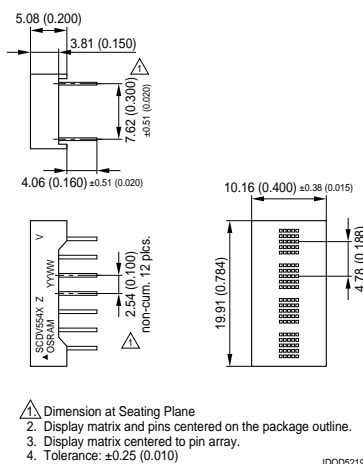
**Figure 20: SCE 574xP**



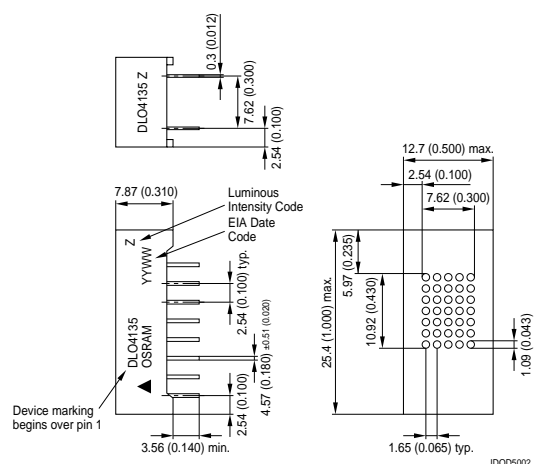
**Figure 21: SCE 574xQ**



**Figure 22: SCDV 554X**



**Figure 23: DLO 4135, DLG 4137**



**Figure 24: DLO 7135, DLG 7137**



Figure 1: Typical Package Outline & Matrix. The figure shows four views of the SC00554XK 9W SIP package. The top view shows a rectangular package with a main body of 10.91 (0.784) and a base of 5.08 (0.200). The pin pitch is 2.80 (0.112), the pin width is 4.75 (0.187), and the pin spacing is 3.4 (0.134). The side view shows a height of 1.85 (0.065) and a base width of 5.08 (0.200). The front and back views show a pin pitch of 5.96 (0.235) and a pin width of 4.06 (0.160).

- 1) Part marking is on this side of the display.  
RoHS Compliant (lead-free) have a "Z" marked to the right of the date code.
- 2) Molex header, 53290-0510 mounted on the display.
- 3) Molex receptacle, 52418-0510 mounted on the customer's PCB. Supplied by the customer.  
Use Pin 1 designation on this drawing, not the Molex connector specification.
- 4) Unless otherwise specified all tolerances are  $\pm 0.25$  (0.010).

ECCO/SA

## Infrared Components

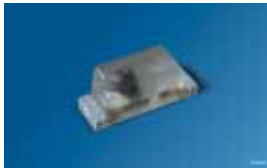




## Phototransistors

### SMT Transistors

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**SmartLED 0603**  
SFH 3010



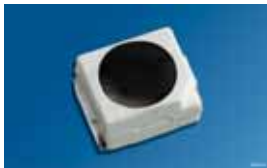
**CHIPLED with lens**  
SFH 3015 FA



**Micro SIDELED**  
SFH 3204



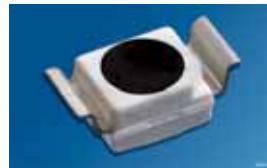
**TOPLED**  
SFH 320



**TOPLED**  
SFH 320 FA



**TOPLED with Lens**  
SFH 3219



**TOPLED RG**  
SFH 3211 FA



**SIDELED**  
SFH 325



**SIDELED**  
SFH 325 FA



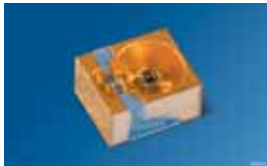
**SmartDIL**  
SFH 3400 / SFH 3401



**Premolded SMD**  
SFH 3201

### SMT Transistors in low profile, narrow angle MIDLED package

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**MIDLED**  
SFH 3600



**MIDLED**  
SFH 3605

### Detector/Emitter in Multi TOPLED package

Page 118



**Multi TOPLED**  
SFH 331 / SFH 7221 / SFH 7225

## Silicon Photodetectors

## Phototransistors in clear plastic package

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**T 1**  
SFH 309 / SFH 310



**T 1**  
SFH 309 P



**T 1 3/4**  
SFH 300



**T 1 3/4**  
SFH 314



**T1 3/4 SMR**  
SFH 3500



**Sidelooker**  
LPT 80 A

## Plastic package with daylight blocking filter for 880/950 nm IRED

Page 121



**T 1**  
SFH 309 FA / SFH 310 FA



**T 1**  
SFH 309 PFA



**T 1 3/4**  
SFH 300 FA / SFH 313 FA



**T 1 3/4**  
SFH 314 FA



**T 1 3/4**  
SFH 303 FA



**Mini Sidelooker**  
SFH 3100 F

## Photodiodes

### SMT PIN Photodiodes in clear package

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**SMT DIL**  
BP 104 S / BPW 34 S / BPW 34 BS



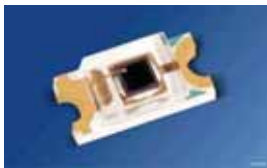
**SMT DIL RG**  
BPW 34 SR, BP 104 SR



**Smart DIL**  
SFH 2400



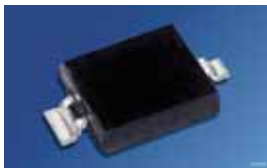
**T1 3/4 SMR**  
SFH 2505



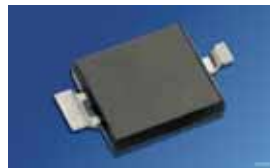
**CHIPLED**  
SFH 2701

### SMT PIN Photodiodes with daylight blocking filter

Page 123



**SMT DIL**  
BP 104 FS / BP 104 FAS / BPW 34 FS /  
BPW 34 FAS



**SMT DIL RG**  
BP 104 FASR, BPW 34 FSR, BPW 34  
FASR



**Smart DIL**  
SFH 2400 FA



**Smart DIL RG**  
SFH 2400 FAR



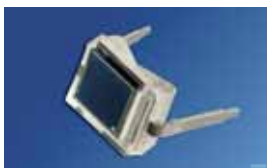
**T1 3/4 SMR**  
SFH 2500 FA



**T1 3/4 SMR**  
SFH 2505 FA

### PIN Photodiodes in clear plastic package

Page 124



**DIL**  
BPW 34 / BPW 34 B



**T1**  
SFH 229



**T1 3/4**  
SFH 203 / SFH 213



**T1 3/4**  
SFH 203 P



**Sidelooker**  
SFH 206 K

## Silicon Photodetectors

## PIN Photodiodes with daylight blocking filter matched for 880 nm IRED

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**DIL**  
BPW 34 FA



**T092**  
SFH 225 FA / SFH 235 FA



**T 1**  
SFH 229 FA



**T 1 3/4**  
SFH 203 FA / SFH 213 FA



**T 1 3/4**  
SFH 203 PFA



**Sidelooker**  
SFH 205 FA

## PIN Photodiodes with daylight blocking filter matched for 950 nm IRED

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**DIL**  
BP 104 F, BPW 34 F



**Sidelooker**  
SFH 205 F

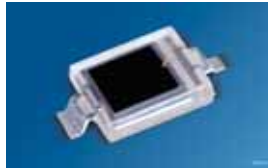
## Ambient Light Sensors

### Photodiode Ambient Light Sensors

Page 127



**T039**  
BPW 21



**SMT DIL**  
SFH 2430



**TOPLED RG**  
SFH 2270 R

### Phototransistor Ambient Light Sensors

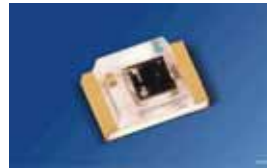
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**T 1**  
SFH 3310



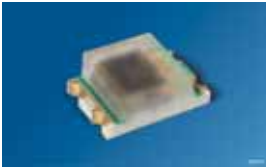
**Smart DIL**  
SFH 3410



**CHIPLED**  
SFH 3710

### High Accuracy Ambient Light Sensors

Page 128



**CHIPLED**  
SFH 5711

### Ambient Light Sensors with I<sup>2</sup>C bus interface

Page 128



**CHIPLED**  
SFH 5712

## Photodetectors for special applications

### Phototransistor Arrays in plastic package

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**Mini Array**  
SFH 305



**Mini Array**  
BPX 81



**Array**  
BPX 80 / BPX 82-89

### Phototransistors in metal package

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**T018**  
BPY 62 / BPX 43



**T018**  
BPX 38



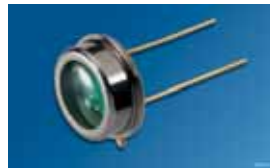
**T018**  
BP 103

### PIN photodiodes in metal package

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**T018**  
BPX 65



**T039**  
BPX 61

### Schmitt Trigger

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**Smart DIL**  
SFH 5440



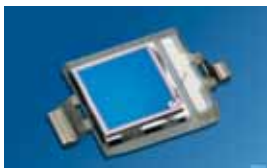
**Mini Sidelooker**  
SFH 5140 F



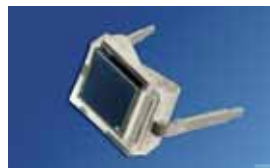
**SMT RLS**  
SFH 9240

### Blue sensitive photodiode

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**SMT DIL**  
BPW 34 BS



**DIL**  
BPW 34 B

## Silicon Photodetectors

### Dual photodiodes

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**T039**  
SFH 221



**DIL**  
BPX 48



**SMT DIL**  
KOM 2125

## Phototransistors



## SMT Transistors

| Package                                                                                                        | Type            | Half angle<br>$\varphi$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_{PCE}$   | Measurement cond.                                                                  | $V_{CE}$ max.<br>[V] | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ.<br>[μs] | Ordering Code | Package Fig. |
|----------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------|---------------------------------------------------|-------------|------------------------------------------------------------------------------------|----------------------|-------------------------------|-------------------------|---------------|--------------|
|                                                                                                                |                 |                                |                                                   | [μA]        |                                                                                    |                      |                               |                         |               |              |
| <br><b>SmartLED 0603</b>      | SFH 3010        | ± 80                           | 0.04                                              | ≥ 25        | $\lambda = 950 \text{ nm}, E_{\theta} = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 15                   | 420 ... 1100                  | 7                       | Q65110A6458   | 1            |
| <br><b>CHIPLED with lens</b>  | SFH 3015 FA     | ± 13                           | 0.04                                              | 100 ... 800 | $\lambda = 950 \text{ nm}, E_{\theta} = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 15                   | 770 ... 1090                  | 7                       | Q65110A9730   | 92           |
| <br><b>Micro SIDELED</b>      | SFH 3204        | ± 60                           | 0.04                                              | ≥ 32        | $\lambda = 950 \text{ nm}, E_{\theta} = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 15                   | 450 ... 1120                  | 7                       | Q65110A2506   | 6            |
| <br><b>TOPLED</b>            | SFH 320         | ± 60                           | 0.038                                             | 16 ... 80   | $\lambda = 950 \text{ nm}, E_{\theta} = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1150                  | 7                       | Q65110A2471   | 2            |
|                                                                                                                | SFH 320-3       |                                |                                                   | 25 ... 50   |                                                                                    |                      |                               | 7.5                     | Q65110A2469   |              |
|                                                                                                                | SFH 320-3/4     |                                |                                                   | 25 ... 80   |                                                                                    |                      |                               | 7.5                     | Q65110A1781   |              |
|                                                                                                                | SFH 320-4       |                                |                                                   | 40 ... 80   |                                                                                    |                      |                               | 8                       | Q65110A2510   |              |
| <br><b>TOPLED</b>           | SFH 320 FA      | ± 60                           | 0.038                                             | 16 ... 80   | $\lambda = 950 \text{ nm}, E_{\theta} = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 750 ... 1120                  | 7                       | Q65110A2472   | 2            |
|                                                                                                                | SFH 320 FA-3    |                                |                                                   | 25 ... 50   |                                                                                    |                      |                               | 7.5                     | Q65110A2470   |              |
|                                                                                                                | SFH 320 FA-3/4  |                                |                                                   | 25 ... 80   |                                                                                    |                      |                               | 7.5                     | Q65110A2475   |              |
|                                                                                                                | SFH 320 FA-4    |                                |                                                   | 40 ... 80   |                                                                                    |                      |                               | 8                       | Q65110A1836   |              |
| <br><b>TOPLED with Lens</b> | SFH 3219        | ± 25                           | 0.038                                             | ≥ 63        | $\lambda = 950 \text{ nm}, E_{\theta} = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1150                  | 7                       | Q65110A2651   | 3            |
| <br><b>TOPLED RG</b>        | SFH 3211 FA     | ± 60                           | 0.038                                             | 16 ... 80   | $\lambda = 950 \text{ nm}, E_{\theta} = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 750 ... 1120                  | 7                       | Q65110A2526   | 4            |
|                                                                                                                | SFH 3211 FA-3/4 |                                |                                                   | 25 ... 80   |                                                                                    |                      |                               | 7.5                     | Q65110A2528   |              |
| <br><b>SIDELED</b>          | SFH 325         | ± 60                           | 0.038                                             | 16 ... 80   | $\lambda = 950 \text{ nm}, E_{\theta} = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1120                  | 7                       | Q65110A2486   | 5            |
|                                                                                                                | SFH 325-3       |                                |                                                   | 25 ... 50   |                                                                                    |                      |                               | 7.5                     | Q65110A2488   |              |
|                                                                                                                | SFH 325-3/4     |                                |                                                   | 25 ... 80   |                                                                                    |                      |                               | 7.5                     | Q65110A2491   |              |
|                                                                                                                | SFH 325-4       |                                |                                                   | 40 ... 80   |                                                                                    |                      |                               | 8                       | Q65110A2484   |              |
| <br><b>SIDELED</b>          | SFH 325 FA      | ± 60                           | 0.038                                             | 16 ... 80   | $\lambda = 950 \text{ nm}, E_{\theta} = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 750 ... 1120                  | 7                       | Q65110A2487   | 5            |
|                                                                                                                | SFH 325 FA-3    |                                |                                                   | 25 ... 50   |                                                                                    |                      |                               | 7.5                     | Q65110A2482   |              |
|                                                                                                                | SFH 325 FA-3/4  |                                |                                                   | 25 ... 80   |                                                                                    |                      |                               | 7.5                     | Q65110A2490   |              |
|                                                                                                                | SFH 325 FA-4    |                                |                                                   | 40 ... 80   |                                                                                    |                      |                               | 8                       | Q65110A2485   |              |





## Phototransistors

## SMT Transistors

| Package                                                                                            | Type         | Half angle<br>$\varphi$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_{PCE}$   | Measurement cond.                                                           | $V_{CE}$ max.<br>[V] | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ<br>[μs] | Ordering Code | Package Fig. |
|----------------------------------------------------------------------------------------------------|--------------|--------------------------------|---------------------------------------------------|-------------|-----------------------------------------------------------------------------|----------------------|-------------------------------|------------------------|---------------|--------------|
|                                                                                                    |              |                                |                                                   | [μA]        |                                                                             |                      |                               |                        |               |              |
| <br>SmartDIL      | SFH 3400     | ± 60                           | 0.55                                              | 63 ... 320  | $\lambda = 950 \text{ nm}, E_g = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 20                   | 460 ... 1080                  | 24                     | Q65110A2629   | 7            |
|                                                                                                    | SFH 3400-2/3 |                                |                                                   | 100 ... 320 |                                                                             |                      |                               | 29                     | Q65110A2634   |              |
|                                                                                                    | SFH 3401     | ± 60                           | 0.55                                              | 63 ... 320  | $\lambda = 950 \text{ nm}, E_g = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 20                   | 460 ... 1080                  | 24                     | Q65110A2635   | 8            |
|                                                                                                    | SFH 3401-2/3 |                                |                                                   | 100 ... 320 |                                                                             |                      |                               | 29                     | Q65110A2644   |              |
| <br>Premolded SMD | SFH 3201     | ± 60                           | 0.55                                              | 63 ... 320  | $\lambda = 950 \text{ nm}, E_g = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 20                   | 460 ... 1080                  | 24                     | Q65110A1207   | 9            |
|                                                                                                    | SFH 3201-2/3 |                                |                                                   | 100 ... 320 |                                                                             |                      |                               | 29                     | Q65110A2479   |              |


## SMT Transistors in low profile, narrow angle MIDLED package

| Package                                                                                       | Type         | Half angle<br>$\varphi$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_{PCE}$   | Measurement cond.                                                           | $V_{CE}$ max.<br>[V] | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ<br>[μs] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------------------|--------------|--------------------------------|---------------------------------------------------|-------------|-----------------------------------------------------------------------------|----------------------|-------------------------------|------------------------|---------------|--------------|
|                                                                                               |              |                                |                                                   | [μA]        |                                                                             |                      |                               |                        |               |              |
| <br>MIDLED | SFH 3600     | ± 20                           | 0.04                                              | 100 ... 500 | $\lambda = 950 \text{ nm}, E_g = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 500 ... 1100                  | 45                     | Q65110A1573   | 10           |
|                                                                                               | SFH 3600-2/3 |                                |                                                   | 100 ... 320 |                                                                             |                      |                               | 37                     | Q65110A2665   |              |
|                                                                                               | SFH 3600-3/4 |                                |                                                   | 160 ... 500 |                                                                             |                      |                               | 57                     | Q65110A2666   |              |
| <br>MIDLED | SFH 3605     | ± 20                           | 0.04                                              | 100 ... 500 | $\lambda = 950 \text{ nm}, E_g = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 500 ... 1100                  | 45                     | Q65110A1574   | 10           |
|                                                                                               | SFH 3605-2/3 |                                |                                                   | 100 ... 320 |                                                                             |                      |                               | 37                     | Q65110A2663   |              |
|                                                                                               | SFH 3605-3/4 |                                |                                                   | 160 ... 500 |                                                                             |                      |                               | 57                     | Q65110A2664   |              |


## Silicon Photodetectors

## Phototransistors

## Detector/Emitter in Multi TOPLED package

| Package                                                                                           | Type       | Emitter<br>$\lambda_{\text{peak typ}}$<br>[nm] | Half angle<br>$\varphi$<br>[°] | $I_V$<br>[mcd] | Measurement<br>cond.  | $V_F$<br>[V]     | Measurement<br>cond.  | Ordering Code | Package<br>Fig. |
|---------------------------------------------------------------------------------------------------|------------|------------------------------------------------|--------------------------------|----------------|-----------------------|------------------|-----------------------|---------------|-----------------|
| <br>Multi TOPLED | SFH 331-JK | 635                                            | $\pm 60$                       | 6 (4 ... 12.5) | $I_F = 10 \text{ mA}$ | 2 ( $\leq 2.6$ ) | $I_F = 10 \text{ mA}$ | Q65110A2821   | 11              |


| Detector                                               |                   |                                                                             |                              |                                       |                           |  |
|--------------------------------------------------------|-------------------|-----------------------------------------------------------------------------|------------------------------|---------------------------------------|---------------------------|--|
| Radiant sensi-<br>tive area typ.<br>[mm <sup>2</sup> ] | $I_{PCE}$<br>[μA] | Measurement<br>cond.                                                        | $V_{CE \text{ max.}}$<br>[V] | $\lambda_{10\% \text{ typ.}}$<br>[nm] | $t_r, t_f$<br>typ<br>[μs] |  |
| 0.038                                                  | $\geq 16$         | $\lambda = 950 \text{ nm}, E_e = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                           | 440 ... 1150                          | 7                         |  |

| Package                                                                                             | Type     | Emitter<br>$\lambda_{\text{peak typ}}$<br>[nm] | Half angle<br>$\varphi$<br>[°] | $I_e$<br>[mW/sr] | Measurement<br>cond.                        | $V_F$<br>[V]       | Measurement<br>cond.                        | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------------------------|----------|------------------------------------------------|--------------------------------|------------------|---------------------------------------------|--------------------|---------------------------------------------|---------------|-----------------|
| <br>Multi TOPLED | SFH 7221 | 880                                            | $\pm 60$                       | $\geq 4$         | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | Q65110A2741   | 12              |

| Detector                                               |                   |                                                                             |                              |                                       |                           |  |
|--------------------------------------------------------|-------------------|-----------------------------------------------------------------------------|------------------------------|---------------------------------------|---------------------------|--|
| Radiant sensi-<br>tive area typ.<br>[mm <sup>2</sup> ] | $I_{PCE}$<br>[μA] | Measurement<br>cond.                                                        | $V_{CE \text{ max.}}$<br>[V] | $\lambda_{10\% \text{ typ.}}$<br>[nm] | $t_r, t_f$<br>typ<br>[μs] |  |
| 0.038                                                  | $\geq 16$         | $\lambda = 880 \text{ nm}, E_e = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                           | 440 ... 1150                          | 7                         |  |







## Phototransistors

### Detector/Emitter in Multi TOPLED package

| Package                                                                                           | Type     | Emitter<br>$\lambda_{\text{peak typ}}$<br>[nm]                                                                                                                                                                                                | Half angle<br>$\varphi$<br>[°] | $I_V$<br>[mcd]                                              |                                            | $V_F$<br>[V]     | Measurement<br>cond.                        | Ordering Code | Package<br>Fig. |
|---------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------------------------|--------------------------------------------|------------------|---------------------------------------------|---------------|-----------------|
| <br>Multi TOPLED | SFH 7225 | 591                                                                                                                                                                                                                                           | ± 60                           | 63 ... 200                                                  | $I_F = 20 \text{ mA}, t_p = 20 \text{ ms}$ | 2 ( $\leq 2.6$ ) | $I_F = 20 \text{ mA}, t_p = 20 \text{ ms}$  | Q65110A2743   | 11              |
|                                                                                                   |          | <b>Detector</b><br>Radiant sensi-<br>tive area typ.<br>[mm <sup>2</sup> ]<br>$I_{CE \text{ typ}}$<br>[μA]<br>Measurement<br>cond.<br>$V_{CE \text{ max.}}$<br>[V]<br>Crosstalk<br>$I_{PCE, \text{ typ}}$<br>[mA]<br>Measurement<br>Conditions |                                |                                                             |                                            |                  |                                             |               |                 |
|                                                                                                   |          | 0.038                                                                                                                                                                                                                                         | 650                            | Std. Light A, $E_v = 1000 \text{ lx}, V_{CE} = 5 \text{ V}$ | 35                                         | 0.5 ... 5        | $I_F = 20 \text{ mA}, V_{CE} = 5 \text{ V}$ |               |                 |









## Phototransistors

## Phototransistors in clear plastic package

| Package                                                                                                  | Type        | Half angle<br>$\varphi$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_{PCE}$    | Measurement cond.                                                           | $V_{CE}$ max.<br>[V] | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ<br>[μs] | Ordering Code | Package Fig. |
|----------------------------------------------------------------------------------------------------------|-------------|--------------------------------|---------------------------------------------------|--------------|-----------------------------------------------------------------------------|----------------------|-------------------------------|------------------------|---------------|--------------|
|                                                                                                          |             |                                |                                                   | [mA]         |                                                                             |                      |                               |                        |               |              |
| <br><b>T 1</b>          | SFH 309     | ± 12                           | 0.038                                             | 0.4 ... 5    | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 380 ... 1150                  | 7                      | Q62702P0859   | 13           |
|                                                                                                          | SFH 309-3/4 |                                |                                                   | 0.63 ... 2   |                                                                             |                      |                               | 6.5                    | Q62702P3592   |              |
|                                                                                                          | SFH 309-4   |                                |                                                   | 1 ... 2      |                                                                             |                      |                               | 7                      | Q62702P0998   |              |
|                                                                                                          | SFH 309-4/5 |                                |                                                   | 1 ... 3.2    |                                                                             |                      |                               | 7.5                    | Q62702P3593   |              |
|                                                                                                          | SFH 309-5   |                                |                                                   | 1.6 ... 3.2  |                                                                             |                      |                               | 8                      | Q62702P0999   |              |
|                                                                                                          | SFH 309-5/6 |                                |                                                   | 1.6 ... 5    |                                                                             |                      |                               | 8.5                    | Q62702P3594   |              |
|                                                                                                          | SFH 310     | ± 25                           | 0.11                                              | 0.63 ... 3.2 | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1100                  | 9                      | Q62702P0874   | 14           |
|                                                                                                          | SFH 310-2/3 |                                |                                                   | 0.63 ... 2   |                                                                             |                      |                               | 7.5                    | Q62702P3595   |              |
| <br><b>T 1</b>          | SFH 309 P   | ± 75                           | 0.038                                             | ≥ 0.063      | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 380 ... 1180                  | 6                      | Q62702P0245   | 15           |
| <br><b>T 1 3/4</b>    | SFH 314     | ± 40                           | 0.55                                              | ≥ 0.63       | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 70                   | 460 ... 1080                  | 11                     | Q62702P1668   | 16           |
|                                                                                                          | SFH 314-2/3 |                                |                                                   | 1 ... 3.2    |                                                                             |                      |                               |                        | Q62702P3600   |              |
| <br><b>T 1 3/4</b>    | SFH 300     | ± 25                           | 0.11                                              | ≥ 0.63       | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1100                  | 10                     | Q62702P1189   | 17           |
|                                                                                                          | SFH 300-3/4 |                                |                                                   | ≥ 1          |                                                                             |                      |                               |                        | Q62702P3586   |              |
| <br><b>T1 3/4 SMR</b> | SFH 3500    | ± 13                           | 0.55                                              | 4 ... 20     | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1060                  | 19                     | Q65110A2636   | 18           |
| <br><b>Sidelooker</b> | LPT 80A     | ± 35                           | 0.11                                              | ≥ 0.25       | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 30                   | 450 ... 1100                  | 10                     | Q68000A7852   | 19           |

## Phototransistors

## Plastic package with daylight blocking filter for 880/950 nm IRED

| Package                                                                                                | Type           | Half angle<br>$\varphi$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_{PCE}$   | Measurement cond.                                                           | $V_{CE}$ max.<br>[V] | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ<br>[μs] | Ordering Code | Package Fig. |
|--------------------------------------------------------------------------------------------------------|----------------|--------------------------------|---------------------------------------------------|-------------|-----------------------------------------------------------------------------|----------------------|-------------------------------|------------------------|---------------|--------------|
|                                                                                                        |                |                                |                                                   | [mA]        |                                                                             |                      |                               |                        |               |              |
| <br>T 1               | SFH 309 FA     | ± 12                           | 0.038                                             | 0.4 ... 5   | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 730 ... 1120                  | 7                      | Q62702P0941   | 13           |
|                                                                                                        | SFH 309 FA-3/4 |                                |                                                   | 0.63 ... 2  |                                                                             |                      |                               | 6.5                    | Q62702P3590   |              |
|                                                                                                        | SFH 309 FA-4   |                                |                                                   | 1 ... 2     |                                                                             |                      |                               | 7                      | Q62702P0178   |              |
|                                                                                                        | SFH 309 FA-4/5 |                                |                                                   | 1 ... 3.2   |                                                                             |                      |                               | 7.5                    | Q62702P3591   |              |
|                                                                                                        | SFH 309 FA-5   |                                |                                                   | 1.6 ... 3.2 |                                                                             |                      |                               | 8                      | Q62702P0180   |              |
|                                                                                                        | SFH 309 FA-5/6 |                                |                                                   | 1.6 ... 5   |                                                                             |                      |                               | 8.5                    | Q62702P5199   |              |
| <br>T 1               | SFH 310 FA     | ± 25                           | 0.11                                              | 0.4 ... 3.2 | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 740 ... 1100                  | 9                      | Q62702P1673   | 14           |
|                                                                                                        | SFH 310 FA-2/3 |                                |                                                   | 0.63 ... 2  |                                                                             |                      |                               | 7.5                    | Q62702P3596   |              |
| <br>T 1             | SFH 309 PFA    | ± 75                           | 0.038                                             | ≥ 0.063     | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 730 ... 1120                  | 6                      | Q62702P0246   | 15           |
| <br>T 1 3/4         | SFH 313 FA     | ± 10                           | 0.55                                              | ≥ 2.5       | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 70                   | 740 ... 1080                  | 10                     | Q62702P1674   | 20           |
|                                                                                                        | SFH 313 FA-2/3 |                                |                                                   | 4 ... 12.5  |                                                                             |                      |                               | 11                     | Q62702P3597   |              |
|                                                                                                        | SFH 313 FA-3/4 |                                |                                                   | ≥ 6.3       |                                                                             |                      |                               | 13                     | Q62702P5196   |              |
| <br>T 1 3/4         | SFH 300 FA     | ± 25                           | 0.11                                              | ≥ 0.63      | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 730 ... 1120                  | 10                     | Q62702P1193   | 17           |
|                                                                                                        | SFH 300 FA-3/4 |                                |                                                   | ≥ 1         |                                                                             |                      |                               |                        | Q62702P3585   |              |
| <br>T 1 3/4         | SFH 314 FA     | ± 40                           | 0.55                                              | ≥ 0.63      | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 70                   | 740 ... 1080                  | 11                     | Q62702P1675   | 16           |
|                                                                                                        | SFH 314 FA-2/3 |                                |                                                   | 1 ... 3.2   |                                                                             |                      |                               |                        | Q62702P3599   |              |
| <br>T 1 3/4         | SFH 303 FA     | ± 20                           | 0.11                                              | ≥ 1         | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 750 ... 1120                  | 13                     | Q62702P0958   | 21           |
|                                                                                                        | SFH 303 FA-3/4 |                                |                                                   | ≥ 1.6       |                                                                             |                      |                               | 14                     | Q62702P3587   |              |
| <br>Mini Sidelooker | SFH 3100 F     | ± 14                           | 0.11                                              | 0.4 ... 5   | $\lambda = 950 \text{ nm}, E_e = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 850 ... 1100                  | 9                      | Q62702P5073   | 22           |

## Photodiodes

## SMT PIN Photodiodes in clear package

| Package                                                                                                  | Type      | Half angle<br>$\varphi$<br>$\pm$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_p$            | Measurement cond.                                | $I_R$             | Measurement cond. | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ | Measurement cond.                                                          | Ordering Code | Package Fig. |
|----------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------|---------------------------------------------------|------------------|--------------------------------------------------|-------------------|-------------------|-------------------------------|----------------|----------------------------------------------------------------------------|---------------|--------------|
|                                                                                                          |           |                                         |                                                   | [ $\mu$ A]       |                                                  | [nA]              |                   |                               | [ $\mu$ s]     |                                                                            |               |              |
| <br><b>SMT DIL</b>      | BP 104 S  | $\pm 60$                                | 4.84                                              | 55 ( $\geq 40$ ) | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 2 ( $\leq 30$ )   | $V_R = 10$ V      | 400 ... 1100                  | 0.02           | $V_R = 5$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm                  | Q65110A2626   | 29           |
|                                                                                                          | BPW 34 S  | $\pm 60$                                | 7.02                                              | 80 ( $\geq 50$ ) | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 2 ( $\leq 30$ )   | $V_R = 10$ V      | 400 ... 1100                  | 0.02           | $V_R = 5$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm                  | Q65110A1209   | 29           |
|                                                                                                          | BPW 34 BS | $\pm 60$                                | 7.45                                              | 75               | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 2 ( $\leq 30$ )   | $V_R = 10$ V      | 350 ... 1100                  | 0.025          | $V_R = 5$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm                  | Q65110A2625   | 29           |
| <br><b>SMT DIL RG</b>   | BP 104 SR | $\pm 60$                                | 4.84                                              | 55 ( $\geq 40$ ) | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 2 ( $\leq 30$ )   | $V_R = 10$ V      | 400 ... 1100                  | 0.02           | $V_R = 5$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm                  | Q65110A4262   | 30           |
|                                                                                                          | BPW 34 SR | $\pm 60$                                | 7.02                                              | 80 ( $\geq 50$ ) | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 2 ( $\leq 30$ )   | $V_R = 10$ V      | 400 ... 1100                  | 0.02           | $V_R = 5$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm                  | Q65110A2701   | 30           |
| <br><b>Smart DIL</b>  | SFH 2400  | $\pm 60$                                | 1.00                                              | 10 ( $> 6$ )     | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 1 ( $\leq 5$ )    | $V_R = 20$ V      | 400 ... 1100                  | 0.005          | $V_R = 20$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm                 | Q65110A2628   | 31           |
| <br><b>T1 3/4 SMR</b> | SFH 2505  | $\pm 15$                                | 1.00                                              | 100              | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 1 ( $\leq 5$ )    | $V_R = 20$ V      | 400 ... 1100                  | 0.005          | $V_R = 20$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm                 | Q65110A1203   | 32           |
| <br><b>CHIPLED</b>    | SFH 2701  | $\pm 60$                                | 0.36                                              | 1.4              | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 0.05 ( $\leq 5$ ) | $V_R = 5$ V       | 400 ... 1050                  | 0.002          | $V_R = 5$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 650$ nm,<br>$I_p = 1$ mA | Q65110A2960   | 33           |






## Photodiodes

## SMT PIN Photodiodes with daylight blocking filter

| Package                                                                                             | Type         | Half angle<br>$\varphi$<br>$\pm$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_p$<br>[μA]      | Measurement cond.                                                               | $I_R$<br>[nA]   | Measurement cond.    | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ<br>[μs] | Measurement cond.                                                           | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------------------------|--------------|-----------------------------------------|---------------------------------------------------|--------------------|---------------------------------------------------------------------------------|-----------------|----------------------|-------------------------------|------------------------|-----------------------------------------------------------------------------|---------------|--------------|
| <br>SMT DIL        | BP 104 FS    | $\pm 60$                                | 4.84                                              | 34 ( $\geq 25$ )   | $\lambda = 950 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 ( $\leq 30$ ) | $V_R = 10 \text{ V}$ | 800 ...<br>1100               | 0.02                   | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$  | Q65110A2627   | 34           |
|                                                                                                     | BP 104 FAS   |                                         |                                                   |                    | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ |                 |                      | 730 ...<br>1100               |                        |                                                                             | Q65110A2672   |              |
| <br>SMT DIL        | BPW 34 FS    | $\pm 60$                                | 7.02                                              | 50 ( $\geq 40$ )   | $\lambda = 950 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 ( $\leq 30$ ) | $V_R = 10 \text{ V}$ | 780 ...<br>1100               | 0.02                   | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$  | Q65110A2700   | 34           |
|                                                                                                     | BPW 34 FAS   |                                         |                                                   |                    | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ |                 |                      | 730 ...<br>1100               |                        |                                                                             | Q65110A3121   |              |
| <br>SMT DIL RG     | BP 104 FASR  | $\pm 60$                                | 4.84                                              | 34 ( $\geq 25$ )   | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 ( $\leq 30$ ) | $V_R = 10 \text{ V}$ | 730 ...<br>1100               | 0.02                   | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$  | Q65110A4263   | 35           |
| <br>SMT DIL RG   | BPW 34 FSR   | $\pm 60$                                | 7.02                                              | 50 ( $\geq 40$ )   | $\lambda = 950 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 ( $\leq 30$ ) | $V_R = 10 \text{ V}$ | 780 ...<br>1100               | 0.02                   | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$  | Q65110A2740   | 35           |
|                                                                                                     | BPW 34 FASR  |                                         |                                                   |                    | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ |                 |                      | 730 ...<br>1100               |                        |                                                                             | Q65110A2699   |              |
| <br>Smart DIL    | SFH 2400 FA  | $\pm 60$                                | 1.00                                              | 6.2 ( $\geq 3.6$ ) | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 1 ( $\leq 5$ )  | $V_R = 20 \text{ V}$ | 750 ...<br>1100               | 0.005                  | $V_R = 20 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q65110A2638   | 31           |
| <br>Smart DIL RG | SFH 2400 FAR | $\pm 60$                                | 1.00                                              | 6.2 ( $\geq 3.6$ ) | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 1 ( $\leq 5$ )  | $V_R = 20 \text{ V}$ | 750 ...<br>1100               | 0.005                  | $V_R = 20 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q65110A9563   | 93           |
| <br>T1 3/4 SMR   | SFH 2500 FA  | $\pm 15$                                | 1.00                                              | 70 ( $\geq 50$ )   | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 1 ( $\leq 5$ )  | $V_R = 20 \text{ V}$ | 750 ...<br>1100               | 0.005                  | $V_R = 20 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q65110A1202   | 18           |
| <br>T1 3/4 SMR   | SFH 2505 FA  | $\pm 15$                                | 1.00                                              | 70 ( $\geq 50$ )   | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 1 ( $\leq 5$ )  | $V_R = 20 \text{ V}$ | 750 ...<br>1100               | 0.005                  | $V_R = 20 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q65110A1204   | 32           |

## Photodiodes




## PIN Photodiodes in clear plastic package

| Package                                                                                                  | Type      | Half angle<br>$\varphi$<br>±<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | Measurement cond. |                                                  | Measurement cond. |              | $\lambda_{10\%}$ typ.<br>[nm] | Measurement cond.      |                                                            | Ordering Code | Package Fig. |
|----------------------------------------------------------------------------------------------------------|-----------|-------------------------------------|---------------------------------------------------|-------------------|--------------------------------------------------|-------------------|--------------|-------------------------------|------------------------|------------------------------------------------------------|---------------|--------------|
|                                                                                                          |           |                                     |                                                   | $I_p$<br>[μA]     |                                                  | $I_R$<br>[nA]     |              |                               | $t_r, t_f$ typ<br>[μs] |                                                            |               |              |
| <br><b>DIL</b>          | BPW 34    | ± 60                                | 7.02                                              | 80 (≥ 50)         | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 2 (≤ 30)          | $V_R = 10$ V | 400 ... 1100                  | 0.02                   | $V_R = 5$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm  | Q62702P0073   | 37           |
|                                                                                                          | BPW 34 B  | ± 60                                | 7.45                                              | 75                | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 2 (≤ 30)          | $V_R = 10$ V | 350 ... 1100                  | 0.025                  | $V_R = 5$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm  | Q65110A3126   | 37           |
| <br><b>T 1</b>          | SFH 229   | ± 17                                | 0.31                                              | 28 (≥ 18)         | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 0.05 (≤ 5)        | $V_R = 10$ V | 380 ... 1100                  | 0.01                   | $V_R = 10$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm | Q62702P0215   | 13           |
| <br><b>T 1 3/4</b>      | SFH 203   | ± 20                                | 1.00                                              | 80 (≥ 50)         | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 1 (≤ 5)           | $V_R = 20$ V | 400 ... 1100                  | 0.005                  | $V_R = 20$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm | Q62702P0955   | 39           |
|                                                                                                          | SFH 213   | ± 10                                | 1.00                                              | 135 (≥ 100)       | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 1 (≤ 5)           | $V_R = 20$ V | 400 ... 1100                  | 0.005                  | $V_R = 20$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm | Q62702P0930   | 20           |
| <br><b>T 1 3/4</b>    | SFH 203 P | ± 75                                | 1.00                                              | 9.5 (≥ 5)         | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 1 (≤ 5)           | $V_R = 20$ V | 400 ... 1100                  | 0.005                  | $V_R = 20$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm | Q62702P0942   | 40           |
| <br><b>Sidelooker</b> | SFH 206 K | ± 60                                | 7.02                                              | 80 (≥ 50)         | $E_v = 1000$ lx,<br>Std. Light A,<br>$V_R = 5$ V | 2 (≤ 30)          | $V_R = 10$ V | 400 ... 1100                  | 0.02                   | $V_R = 5$ V,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850$ nm  | Q62702P0129   | 38           |





## Photodiodes

## PIN Photodiodes with daylight blocking filter matched for 880 nm IRED

| Package                                                                                                  | Type        | Half angle<br>$\varphi$<br>$\pm$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | Measurement cond. |                                                                                 | Measurement cond. |                      | $\lambda_{10\%}$ typ.<br>[nm] | Measurement cond.      |                                                                             | Ordering Code | Package Fig. |
|----------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------|---------------------------------------------------|-------------------|---------------------------------------------------------------------------------|-------------------|----------------------|-------------------------------|------------------------|-----------------------------------------------------------------------------|---------------|--------------|
|                                                                                                          |             |                                         |                                                   | $I_p$<br>[μA]     |                                                                                 | $I_R$<br>[nA]     |                      |                               | $t_r, t_f$ typ<br>[μs] |                                                                             |               |              |
| <br><b>DIL</b>          | BPW 34 FA   | ± 60                                    | 7.02                                              | 50 (≥ 40)         | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 (≤ 30)          | $V_R = 10 \text{ V}$ | 730 ... 1100                  | 0.02                   | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$  | Q62702P1129   | 41           |
|                                                                                                          | SFH 225 FA  | ± 60                                    | 4.84                                              | 34 (≥ 25)         | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 (≤ 30)          | $V_R = 10 \text{ V}$ | 740 ... 1120                  | 0.02                   | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$  | Q62702P1051   | 42           |
| <br><b>TO92</b>         | SFH 235 FA  | ± 65                                    | 7.02                                              | 50 (≥ 40)         | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 (≤ 30)          | $V_R = 10 \text{ V}$ | 740 ... 1120                  | 0.02                   | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$  | Q62702P0273   | 42           |
|                                                                                                          | SFH 229 FA  | ± 17                                    | 0.31                                              | 20 (≥ 10.8)       | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 0.05 (≤ 5)        | $V_R = 10 \text{ V}$ | 730 ... 1100                  | 0.01                   | $V_R = 10 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q62702P0216   | 13           |
| <br><b>T 1 3/4</b>    | SFH 203 FA  | ± 20                                    | 1.00                                              | 50 (≥ 30)         | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 1 (≤ 5)           | $V_R = 20 \text{ V}$ | 800 ... 1100                  | 0.005                  | $V_R = 20 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q62702P0956   | 39           |
|                                                                                                          | SFH 213 FA  | ± 10                                    | 1.00                                              | 90 (≥ 65)         | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 1 (≤ 5)           | $V_R = 20 \text{ V}$ | 750 ... 1100                  | 0.005                  | $V_R = 20 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q62702P1671   | 20           |
| <br><b>T 1 3/4</b>    | SFH 203 PFA | ± 75                                    | 1.00                                              | 6.2 (≥ 3.6)       | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 1 (≤ 5)           | $V_R = 20 \text{ V}$ | 750 ... 1100                  | 0.005                  | $V_R = 20 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q62702P0947   | 40           |
| <br><b>Sidelooker</b> | SFH 205 FA  | ± 60                                    | 7.02                                              | 60 (≥ 45)         | $\lambda = 870 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 (≤ 30)          | $V_R = 10 \text{ V}$ | 740 ... 1100                  | 0.02                   | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$  | Q62702P1677   | 43           |




## Photodiodes

## PIN Photodiodes with daylight blocking filter matched for 950 nm IRED




| Package                                                                                         | Type      | Half angle<br>$\varphi$<br>$\pm$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_p$            | Measurement cond.                                                               | $I_R$           | Measurement cond.    | $\lambda_{10\%}$ typ. | $t_r, t_f$ typ | Measurement cond.                                                          | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------------------|-----------|-----------------------------------------|---------------------------------------------------|------------------|---------------------------------------------------------------------------------|-----------------|----------------------|-----------------------|----------------|----------------------------------------------------------------------------|---------------|--------------|
|                                                                                                 |           |                                         |                                                   | [ $\mu$ A]       |                                                                                 | [nA]            |                      | [nm]                  | [ $\mu$ s]     |                                                                            |               |              |
| <br>DIL        | BP 104 F  | $\pm 60$                                | 4.84                                              | 34 ( $\geq 25$ ) | $\lambda = 950 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 ( $\leq 30$ ) | $V_R = 10 \text{ V}$ | 800 ... 1100          | 0.02           | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q62702P0084   | 41           |
|                                                                                                 | BPW 34 F  | $\pm 60$                                | 7.02                                              | 50 ( $\geq 40$ ) | $\lambda = 950 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 ( $\leq 30$ ) | $V_R = 10 \text{ V}$ | 780 ... 1100          | 0.02           | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q62702P0929   | 41           |
| <br>Sidelooker | SFH 205 F | $\pm 60$                                | 7.02                                              | 60 ( $\geq 45$ ) | $\lambda = 950 \text{ nm}$ ,<br>$E_e = 1 \text{ mW/cm}^2$ , $V_R = 5 \text{ V}$ | 2 ( $\leq 30$ ) | $V_R = 10 \text{ V}$ | 800 ... 1100          | 0.02           | $V_R = 5 \text{ V}$ ,<br>$R_L = 50 \Omega$ ,<br>$\lambda = 850 \text{ nm}$ | Q62702P0102   | 43           |

## Ambient Light Sensors

### Photodiode Ambient Light Sensors


| Package                                                                                               | Type       | Half angle<br>$\varphi$<br>[°] | Radiant sensi-<br>tive area<br>typ.<br>[mm <sup>2</sup> ] | Measurement cond. |                                                                           | Measurement cond. |             | $\lambda_{10\%}$<br>typ.<br>[nm] | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------------------------|------------|--------------------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------------------|-------------------|-------------|----------------------------------|---------------|-----------------|
|                                                                                                       |            |                                |                                                           | $I_P$<br>[μA]     |                                                                           | $I_R$<br>[nA]     |             |                                  |               |                 |
| <br><b>TO39</b>      | BPW 21     | ± 55                           | 7.45                                                      | 10 (≥ 5.5)        | $E_V = 1000$<br>lx, Std. Light<br>A, $V_R = 5$ V                          | 2 (≤ 30)          | $V_R = 5$ V | 350 ... 820                      | Q62702P0885   | 45              |
| <br><b>SMT DIL</b>   | SFH 2430   | ± 60                           | 7.02                                                      | 6.3 (≥ 5)         | $E_V = 1000$<br>lx, Std. Light<br>A, $V_R = 5$ V                          | 0.1 (≤ 5)         | $V_R = 5$ V | 400 ... 900                      | Q65110A2673   | 50              |
| <br><b>TOPLED RG</b> | SFH 2270 R | ± 60                           | 0.16                                                      | 0.0056 (≥ 0.0044) | $E_b = 10$ μW/<br>cm <sup>2</sup> , $\lambda =$<br>560 nm, $V_R$<br>= 1 V | 0.005 (≤ 0.15)    | $V_R = 1$ V | 480 ... 650                      | Q65110A9911   | 97              |

### Phototransistor Ambient Light Sensors


| Package                                                                                                 | Type         | Half angle<br>$\varphi$<br>[°] | Radiant sensi-<br>tive area typ.<br>[mm <sup>2</sup> ] | Measurement cond. |                                                                          | $V_{CE}$<br>max.<br>[V] | $\lambda_{10\%}$<br>typ.<br>[nm] | Ordering Code | Package<br>Fig. |
|---------------------------------------------------------------------------------------------------------|--------------|--------------------------------|--------------------------------------------------------|-------------------|--------------------------------------------------------------------------|-------------------------|----------------------------------|---------------|-----------------|
|                                                                                                         |              |                                |                                                        | $I_{PCE}$<br>[μA] |                                                                          |                         |                                  |               |                 |
| <br><b>T 1</b>       | SFH 3310     | ± 75                           | 0.29                                                   | 2.5 ... 8         | $\lambda = 560$ nm, $E_b =$<br>10 μW/cm <sup>2</sup> , $V_{CE} =$<br>5 V | 5.5                     | 350 ... 970                      | Q65110A5343   | 15              |
| <br><b>Smart DIL</b> | SFH 3410     | ± 60                           | 0.29                                                   | 3.2 ... 25        | $E_V = 20$ lx, Std.<br>Light A, $V_{CE} = 5$ V                           | 5.5                     | 350 ... 970                      | Q65110A1211   | 51              |
|                                                                                                         | SFH 3410-1/2 |                                |                                                        | 3.2 ... 10        |                                                                          |                         |                                  | Q65110A2653   |                 |
|                                                                                                         | SFH 3410-2/3 |                                |                                                        | 5 ... 16          |                                                                          |                         |                                  | Q65110A2654   |                 |
|                                                                                                         | SFH 3410-3/4 |                                |                                                        | 8 ... 25          |                                                                          |                         |                                  | Q65110A2655   |                 |
| <br><b>CHIPLED</b>   | SFH 3710     | ± 60                           | 0.29                                                   | 2.5 ... 12.5      | $\lambda = 560$ nm, $E_b =$<br>10 μW/cm <sup>2</sup> , $V_{CE} =$<br>5 V | 5.5                     | 350 ... 950                      | Q65110A3107   | 52              |
|                                                                                                         | SFH 3710-2/3 |                                |                                                        | 2.5 ... 8         |                                                                          |                         |                                  | Q65110A3512   |                 |
|                                                                                                         | SFH 3710-3/4 |                                |                                                        | 4 ... 12.5        |                                                                          |                         |                                  | Q65110A3511   |                 |

## Ambient Light Sensors

### High Accuracy Ambient Light Sensors




| Package                                                                                      | Type         | Half angle<br>$\phi$<br>[°] | Radiant sensitive<br>area typ.<br>[mm <sup>2</sup> ] | $I_{out}$       | Measurement Condi-<br>tions          | $\lambda_{10\%}$<br>typ.<br>[nm] | Ordering Code | Package<br>Fig. |
|----------------------------------------------------------------------------------------------|--------------|-----------------------------|------------------------------------------------------|-----------------|--------------------------------------|----------------------------------|---------------|-----------------|
|                                                                                              |              |                             |                                                      | [mA]            |                                      |                                  |               |                 |
| <br>CHIPLED | SFH 5711-2/3 | ± 60                        | 0.16                                                 | 0.027 ... 0.032 | $E_V = 1000 \text{ lx Std. Light A}$ | 475 ... 650                      | Q65110A4513   | 53              |

### Ambient Light Sensors with I<sup>2</sup>C bus interface

| Package                                                                                      | Type         | Half angle<br>$\phi$<br>±<br>[°] | Digital out<br>Out | Digital out reso-<br>lution<br>Out | Measurement condi-<br>tions         | $\lambda_{20\%}$<br>typ.<br>[nm] | Ordering Code | Package<br>Fig. |
|----------------------------------------------------------------------------------------------|--------------|----------------------------------|--------------------|------------------------------------|-------------------------------------|----------------------------------|---------------|-----------------|
|                                                                                              |              |                                  | [counts]           | [counts/lx]                        |                                     |                                  |               |                 |
| <br>CHIPLED | SFH 5712-2/3 | ± 60                             | 3 ... 65000        | 0.5 ... 1.6                        | $E_V = 1000 \text{ lx (white LED)}$ | 400 ... 680                      | Q65110A8485   | 98              |




## Photodetectors for special applications

## Phototransistor Arrays in plastic package



| Package                                                                                         | Type        | Half angle<br>$\varphi$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_{PCE}$     | Measurement cond.                                                           | $V_{CE}$ max.<br>[V] | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ<br>[μs] | Ordering Code   | Package Fig. |
|-------------------------------------------------------------------------------------------------|-------------|--------------------------------|---------------------------------------------------|---------------|-----------------------------------------------------------------------------|----------------------|-------------------------------|------------------------|-----------------|--------------|
|                                                                                                 |             |                                |                                                   | [mA]          |                                                                             |                      |                               |                        |                 |              |
| <br>Mini Array | SFH 305     | ± 16                           | 0.11                                              | 0.25 ... 1.25 | $\lambda = 950 \text{ nm}, E_b = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1100                  | 6                      | Q62702P0836     | 23           |
|                                                                                                 | SFH 305-2/3 |                                |                                                   | 0.25 ... 0.8  |                                                                             |                      |                               |                        | Q62702P3589     |              |
| <br>Mini Array | BPX 81      | ± 18                           | 0.11                                              | ≥ 0.25        | $\lambda = 950 \text{ nm}, E_b = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1100                  | 7                      | Q62702P0020     | 24           |
|                                                                                                 | BPX 81-2/3  |                                |                                                   | 0.25 ... 0.8  |                                                                             |                      |                               |                        | Q62702P3583     |              |
|                                                                                                 | BPX 81-3    |                                |                                                   | 0.4 ... 0.8   |                                                                             |                      |                               |                        | Q62702P0043S003 |              |
|                                                                                                 | BPX 81-3/4  |                                |                                                   | ≥ 0.4         |                                                                             |                      |                               |                        | Q62702P3584     |              |
|                                                                                                 | BPX 81-4    |                                |                                                   | ≥ 0.63        |                                                                             |                      |                               |                        | Q62702P0043S004 |              |
| <br>Array      | BPX 80      | ± 18                           | 0.11                                              | ≥ 0.32        | $\lambda = 950 \text{ nm}, E_b = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1100                  | 6                      | Q62702P0028     | 25           |
|                                                                                                 | BPX 82      |                                |                                                   |               |                                                                             |                      |                               |                        | Q62702P0021     |              |
|                                                                                                 | BPX 83      |                                |                                                   |               |                                                                             |                      |                               |                        | Q62702P0025     |              |
|                                                                                                 | BPX 84      |                                |                                                   |               |                                                                             |                      |                               |                        | Q62702P0030     |              |
|                                                                                                 | BPX 85      |                                |                                                   |               |                                                                             |                      |                               |                        | Q62702P0031     |              |
|                                                                                                 | BPX 86      |                                |                                                   |               |                                                                             |                      |                               |                        | Q62702P0022     |              |
|                                                                                                 | BPX 87      |                                |                                                   |               |                                                                             |                      |                               |                        | Q62702P0032     |              |
|                                                                                                 | BPX 88      |                                |                                                   |               |                                                                             |                      |                               |                        | Q62702P0033     |              |
|                                                                                                 | BPX 89      |                                |                                                   |               |                                                                             |                      |                               |                        | Q62702P0026     |              |

## Photodetectors for special applications

## Phototransistors in metal package



| Package                                                                                     | Type       | Half angle<br>$\varphi$<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_{PCE}$     | Measurement cond.                                                           | $V_{CE}$ max.<br>[V] | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ.<br>[μs] | Ordering Code   | Package Fig. |
|---------------------------------------------------------------------------------------------|------------|--------------------------------|---------------------------------------------------|---------------|-----------------------------------------------------------------------------|----------------------|-------------------------------|-------------------------|-----------------|--------------|
|                                                                                             |            |                                |                                                   | [mA]          |                                                                             |                      |                               |                         |                 |              |
| <br>TO18   | BPY 62     | ± 8                            | 0.11                                              | 0.5 ... 4     | $\lambda = 950 \text{ nm}, E_g = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 400 ... 1100                  | 8                       | Q60215Y0062     | 26           |
|                                                                                             | BPY 62-3/4 |                                |                                                   | 0.8 ... 2.5   |                                                                             |                      |                               |                         | Q62702P5198     |              |
|                                                                                             | BPY 62-4   |                                |                                                   | 1.25 ... 2.5  |                                                                             |                      |                               |                         | Q60215Y1113     |              |
|                                                                                             | BPX 43     | ± 15                           | 0.675                                             | ≥ 0.8         | $\lambda = 950 \text{ nm}, E_g = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 50                   | 450 ... 1100                  | 14                      | Q62702P0016     | 26           |
|                                                                                             | BPX 43-3/4 |                                |                                                   | 1.25 ... 4    |                                                                             |                      |                               |                         | Q62702P3581     |              |
|                                                                                             | BPX 43-4   |                                |                                                   | 2 ... 4       |                                                                             |                      |                               |                         | Q62702P0016S004 |              |
|                                                                                             | BPX 43-4/5 |                                |                                                   | ≥ 2           |                                                                             |                      |                               |                         | Q62702P3582     |              |
|                                                                                             | BPX 43-5   |                                |                                                   | ≥ 3.2         |                                                                             |                      |                               | 18                      | Q62702P0016S005 |              |
| <br>TO18   | BPX 38     | ± 40                           | 0.675                                             | ≥ 0.2         | $\lambda = 950 \text{ nm}, E_g = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 50                   | 450 ... 1120                  | 12                      | Q62702P0015     | 27           |
|                                                                                             | BPX 38-2/3 |                                |                                                   | 0.2 ... 0.63  |                                                                             |                      |                               | 11                      | Q62702P3578     |              |
|                                                                                             | BPX 38-3   |                                |                                                   | 0.32 ... 0.63 |                                                                             |                      |                               | 12                      | Q62702P0015S003 |              |
|                                                                                             | BPX 38-4   |                                |                                                   | 0.5 ... 1     |                                                                             |                      |                               | 15                      | Q62702P0015S004 |              |
| <br>TO18 | BP 103     | ± 55                           | 0.11                                              | ≥ 0.08        | $\lambda = 950 \text{ nm}, E_g = 0.5 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                   | 450 ... 1100                  | 8                       | Q62702P0075     | 28           |
|                                                                                             | BP 103-3/4 |                                |                                                   | 0.125 ... 0.4 |                                                                             |                      |                               |                         | Q62702P3577     |              |


## PIN photodiodes in metal package

| Package                                                                                     | Type   | Half angle<br>$\varphi$<br>±<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_p$      | Measurement cond.                                        | $I_R$    | Measurement cond.    | $\lambda_{10\%}$ typ.<br>[nm] | $t_r, t_f$ typ.<br>[μs] | Measurement cond.                                              | Ordering Code | Package Fig. |
|---------------------------------------------------------------------------------------------|--------|-------------------------------------|---------------------------------------------------|------------|----------------------------------------------------------|----------|----------------------|-------------------------------|-------------------------|----------------------------------------------------------------|---------------|--------------|
|                                                                                             |        |                                     |                                                   | [μA]       |                                                          | [nA]     |                      |                               |                         |                                                                |               |              |
| <br>TO18 | BPX 65 | ± 40                                | 1.00                                              | 10 (≥ 5.5) | $E_g = 1000 \text{ lx, Std. Light A}, V_R = 5 \text{ V}$ | 1 (≤ 5)  | $V_R = 20 \text{ V}$ | 350 ... 1100                  | 0.012                   | $V_R = 5 \text{ V}, R_L = 50 \Omega, \lambda = 850 \text{ nm}$ | Q62702P0027   | 44           |
| <br>TO39 | BPX 61 | ± 55                                | 7.02                                              | 70 (≥ 50)  | $E_g = 1000 \text{ lx, Std. Light A}, V_R = 5 \text{ V}$ | 2 (≤ 30) | $V_R = 10 \text{ V}$ | 400 ... 1100                  | 0.02                    | $V_R = 5 \text{ V}, R_L = 50 \Omega, \lambda = 850 \text{ nm}$ | Q62705P0025   | 45           |



## Photodetectors for special applications

## Schmitt Trigger

| Package                                                                                              | Type       | Half angle<br>$\varphi$<br>[°] | $V_{CC}$<br>[V] | $E_e$ typ.           | Measurement<br>cond.                    | $\lambda_{10\%}$<br>typ.<br>[nm] | $I_{OUT}$<br>max<br>[mA] | $t_{PLH}$<br>[μs] | Ordering Code | Package<br>Fig. |
|------------------------------------------------------------------------------------------------------|------------|--------------------------------|-----------------|----------------------|-----------------------------------------|----------------------------------|--------------------------|-------------------|---------------|-----------------|
|                                                                                                      |            |                                |                 | [mW/m <sup>2</sup> ] |                                         |                                  |                          |                   |               |                 |
| <br>Smart DIL       | SFH 5440   | ± 60                           | 4 ... 18        | +1700 (≤ +3200)      | $V_{CC} = 5V, \lambda = 950 \text{ nm}$ | 400 ... 1100                     | 16                       | 5 (≤ 15)          | Q65110A1212   | 46              |
| <br>Mini Sidelooker | SFH 5140 F | ± 12                           | 4 ... 18        | +150 (≤ +500)        | $V_{CC} = 5V, \lambda = 950 \text{ nm}$ | 840 ... 1080                     | 16                       | 5 (≤ 15)          | Q62702P5112   | 47              |




| Package                                                                                       | Type     | Features                                | $V_{CC}$<br>[V] | $I_{F,on}$ | Measurement cond.                                                                       | $E_{e,off} / E_{e,on}$<br>[-] | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------------------|----------|-----------------------------------------|-----------------|------------|-----------------------------------------------------------------------------------------|-------------------------------|---------------|-----------------|
|                                                                                               |          |                                         |                 | [mA]       |                                                                                         |                               |               |                 |
| <br>SMT RLS | SFH 9240 | Schmitt Trigger Output,<br>active "low" | 4 ... 18        | 3 (≤ 10)   | Kodak neutral white<br>testcard with 90%<br>reflection; $V_{CC} = 5V, d = 1 \text{ mm}$ | 0.6 (0.5 ... 0.9)             | Q65110A2714   | 55              |

## Blue sensitive photodiode

| Package                                                                                        | Type      | Half angle<br>φ<br>[°] | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | I <sub>P</sub> | Measure-<br>ment cond.                                                   | I <sub>R</sub> | Measure-<br>ment cond. | λ <sub>10%<br/>typ.</sub><br>[nm] | t <sub>r</sub> , t <sub>f</sub><br>typ | Measure-<br>ment cond.                                  | Ordering Code | Package Fig. |
|------------------------------------------------------------------------------------------------|-----------|------------------------|---------------------------------------------------|----------------|--------------------------------------------------------------------------|----------------|------------------------|-----------------------------------|----------------------------------------|---------------------------------------------------------|---------------|--------------|
|                                                                                                |           |                        |                                                   | [μA]           |                                                                          | [nA]           |                        |                                   | [μs]                                   |                                                         |               |              |
| <br>SMT DIL | BPW 34 BS | ± 60                   | 7.45                                              | 14.8 (≥ 10.8)  | λ = 400 nm, E <sub>e</sub> = 1 mW/cm <sup>2</sup> , V <sub>R</sub> = 5 V | 2 (≤ 30)       | V <sub>R</sub> = 10 V  | 350 ... 1100                      | 0.025                                  | V <sub>R</sub> = 5 V, R <sub>L</sub> = 50 Ω, λ = 850 nm | Q65110A2625   | 29           |
| <br>DIL     | BPW 34 B  | ± 60                   | 7.45                                              | 14.8 (≥ 10.8)  | λ = 400 nm, E <sub>e</sub> = 1 mW/cm <sup>2</sup> , V <sub>R</sub> = 5 V | 2 (≤ 30)       | V <sub>R</sub> = 10 V  | 350 ... 1100                      | 0.025                                  | V <sub>R</sub> = 5 V, R <sub>L</sub> = 50 Ω, λ = 850 nm | Q65110A3126   | 37           |

## Photodetectors for special applications

## Dual photodiodes

| Package                                                                                             | Type     | Half angle<br>$\varphi$ | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | I <sub>p</sub>                          |                                            | I <sub>R</sub>                        |                   | $\lambda_{10\%}$ typ.<br>[nm] | t <sub>r</sub> , t <sub>f</sub> typ |                                               | Ordering Code   | Package Fig. |
|-----------------------------------------------------------------------------------------------------|----------|-------------------------|---------------------------------------------------|-----------------------------------------|--------------------------------------------|---------------------------------------|-------------------|-------------------------------|-------------------------------------|-----------------------------------------------|-----------------|--------------|
|                                                                                                     |          |                         |                                                   | [μA]                                    | Measurement cond.                          | [nA]                                  | Measurement cond. |                               | [μs]                                | Measurement cond.                             |                 |              |
| <br><b>TO39</b>    | SFH 221  | ± 55                    | 1.54                                              | 24 (≥ 15)                               | $E_v = 1000$ lx, Std. Light A, $V_R = 5$ V | 10 (≤ 100)                            | $V_R = 10$ V      | 400 ... 1100                  | 0.5                                 | $V_R = 5$ V, $R_L = 1$ kΩ, $\lambda = 850$ nm | Q62702P0270     | 48           |
| <br><b>DIL</b>     | BPX 48   | ± 60                    | 1.54                                              | 24 (≥ 15)                               | $E_v = 1000$ lx, Std. Light A, $V_R = 5$ V | 10 (≤ 100)                            | $V_R = 10$ V      | 400 ... 1150                  | 0.5                                 | $V_R = 5$ V, $R_L = 1$ kΩ, $\lambda = 850$ nm | Q62702P0017S001 | 49           |
| <br><b>SMT DIL</b> | KOM 2125 | ± 60                    | 4 diode A<br>10 diode B                           | 40 (≥ 30) diode A<br>100 (≥ 75) diode B | $E_v = 1000$ lx, Std. Light A, $V_R = 5$ V | 5 (≤ 30) diode A<br>10 (≤ 30) diode B | $V_R = 10$ V      | 400 ... 1100                  | 0.018                               | $V_R = 5$ V, $R_L = 50$ Ω, $\lambda = 850$ nm | Q65110A2703     | 36           |



## Slotted Interrupters

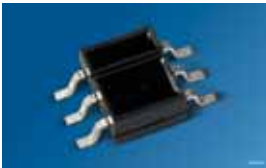
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**Interrupter**  
SFH 9500

## SMT Reflective Sensors

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**SMT RLS**  
SFH 9201 / SFH 9202

## SMT Proximity Sensors

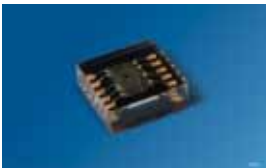
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**COB**  
SFH 7740 / SFH 7741 / SFH 7743


## SMT Proximity and Ambient Light Sensors

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**COB**  
SFH 7770

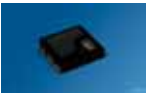
## Slotted Interrupters

| Package                                                                                          | Type     | Features                                                                                | Slot Width<br>[mm] | Aperture slit width on emitter / sensor side typ<br>[mm] | $I_{PCE}$ min | Measurement cond.                | $I_{CE0}$       | Measurement cond. | Ordering Code | Package Fig. |
|--------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------|--------------------|----------------------------------------------------------|---------------|----------------------------------|-----------------|-------------------|---------------|--------------|
|                                                                                                  |          |                                                                                         |                    |                                                          | [ $\mu$ A]    |                                  | [nA]            |                   |               |              |
| <br>Interrupter | SFH 9500 | with vertical aperture slits, SMT version, suitable for reflow soldering, locating pins | 5                  | 0.5 / 0.5                                                | 1000          | $I_F = 20$ mA,<br>$V_{CE} = 5$ V | 2 ( $\leq 50$ ) | $V_{CE} = 20$ V   | Q65110A3108   | 54           |
|                                                                                                  |          |                                                                                         |                    |                                                          |               |                                  |                 |                   |               |              |

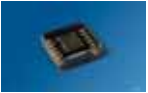
## SMT Reflective Sensors

| Package                                                                                      | Type         | $I_{PCE}$    | Measurement cond.                                                                              | $I_{CE0}$        | Measurement cond.           | $V_{CE}$ max. | $V_F$                | Measurement cond. | Ordering Code | Package Fig. |
|----------------------------------------------------------------------------------------------|--------------|--------------|------------------------------------------------------------------------------------------------|------------------|-----------------------------|---------------|----------------------|-------------------|---------------|--------------|
|                                                                                              |              | [ $\mu$ A]   |                                                                                                | [nA]             |                             | [V]           | [V]                  |                   |               |              |
| <br>SMT RLS | SFH 9201     | 250 ... 2000 | Kodak neutral white testcard with 90% reflection;<br>$I_F = 10$ mA, $V_{CE} = 5$ V, $d = 1$ mm | 3 ( $\leq 200$ ) | $V_{CE} = 20$ V,<br>$E = 0$ | 16            | 1.25 ( $\leq 1.65$ ) | $I_F = 50$ mA     | Q65110A2708   | 55           |
|                                                                                              | SFH 9201-2/3 | 400 ... 1250 |                                                                                                |                  |                             |               |                      |                   | Q65110A2698   |              |
|                                                                                              | SFH 9201-3/4 | 630 ... 2000 |                                                                                                |                  |                             |               |                      |                   | Q65110A2716   |              |
|                                                                                              | SFH 9202     | 63 ... 800   | Kodak neutral white testcard with 90% reflection;<br>$I_F = 10$ mA, $V_{CE} = 5$ V, $d = 1$ mm | 5 ( $\leq 50$ )  | $V_{CE} = 20$ V             | 16            | 1.25 ( $\leq 1.65$ ) | $I_F = 50$ mA     | Q65110A2712   | 55           |
|                                                                                              | SFH 9202-2/3 | 63 ... 200   |                                                                                                |                  |                             |               |                      |                   | Q65110A2705   |              |
|                                                                                              | SFH 9202-3/4 | 100 ... 320  |                                                                                                |                  |                             |               |                      |                   | Q65110A2710   |              |
|                                                                                              | SFH 9202-4/5 | 160 ... 500  |                                                                                                |                  |                             |               |                      |                   | Q65110A2709   |              |
|                                                                                              | SFH 9202-5/6 | 250 ... 800  |                                                                                                |                  |                             |               |                      |                   | Q65110A2711   |              |
|                                                                                              |              |              |                                                                                                |                  |                             |               |                      |                   |               |              |
|                                                                                              |              |              |                                                                                                |                  |                             |               |                      |                   |               |              |
|                                                                                              |              |              |                                                                                                |                  |                             |               |                      |                   |               |              |
|                                                                                              |              |              |                                                                                                |                  |                             |               |                      |                   |               |              |
|                                                                                              |              |              |                                                                                                |                  |                             |               |                      |                   |               |              |

## SMT Proximity Sensors

| Package                                                                                  | Type     | Working distance<br>d<br>typ<br>[mm] | Supply voltage<br>$V_{dd}$<br>[V] | Max LED driver current<br>$I_f$<br>[mA] | Ordering Code | Package<br>Fig. |
|------------------------------------------------------------------------------------------|----------|--------------------------------------|-----------------------------------|-----------------------------------------|---------------|-----------------|
| <br>COB | SFH 7740 | 0.5 ... 4                            | 2.4 ... 3.6                       | 60                                      | Q65110A6668   | 56              |
|                                                                                          | SFH 7741 | 0.5 ... 35                           | 2.4 ... 3.6                       | 60                                      | Q65110A7073   | 56              |
|                                                                                          | SFH 7743 | 0.5 ... 150                          | 2.4 ... 3.6                       | 60                                      | Q65110A8870   | 56              |

## SMT Proximity and Ambient Light Sensors

| Package                                                                                  | Type     | Working distance<br>d<br>typ<br>[mm] | Supply voltage<br>$V_{dd}$<br>[V] | Max LED driver current<br>$I_f$<br>[mA] | Sensor Signal Out<br>[counts] | Digital out Out | Digital out resolution Out | Measurement conditions         | $\lambda_{20\%}$ typ.<br>[nm] | Ordering Code | Package Fig. |
|------------------------------------------------------------------------------------------|----------|--------------------------------------|-----------------------------------|-----------------------------------------|-------------------------------|-----------------|----------------------------|--------------------------------|-------------------------------|---------------|--------------|
|                                                                                          |          |                                      |                                   |                                         |                               | [counts]        | [counts/lx]                |                                |                               |               |              |
| <br>COB | SFH 7770 | 0 ... 100                            | 2.3 ... 3.1                       | 200                                     | 0 ... 254                     | 3 ... 65000     | 0.6 ... 1.5                | $E_V = 1000$<br>lx (white LED) | 480 ... 660                   | Q65110A9565   | 56           |



## Standard Emitters (&lt; 40 mW)

## SMT Emitters

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**CHIPLED**  
SFH 4053



**CHIPLED with lens**  
SFH 4058



**TOPLED**  
SFH 420 / SFH 421 / SFH 4243 / SFH  
4283 / SFH 4253



**TOPLED RG**  
SFH 4281



**Black TOPLED RG**  
SFH 4257 R



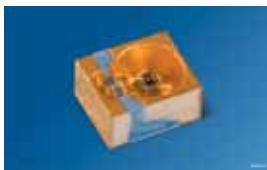
**Black TOPLED**  
SFH 4257 / SFH 4271



**Mini TOPLED**  
SFH 4247



**SIDELED**  
SFH 425 / SFH 426 / SFH 4244



**MIDLED**  
SFH 4680 / SFH 4641 / SFH 4651



**MIDLED**  
SFH 4685 / SFH 4646 / SFH 4656



**T1 3/4 SMR**  
SFH 4580



**T1 3/4 SMR**  
SFH 4585

## Emitters in plastic package

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**T1**  
SFH 487



**T1**  
SFH 487 P



**T1**  
SFH 409



**T1 3/4**  
SFH 484 / SFH 485 / SFH 486



**T1 3/4**  
SFH 485 P



**T1 3/4**  
LD 274



**T1 3/4**  
LD 271



**T1 3/4**  
SFH 4512 / SFH 4516



**Sidelooker**  
IRL 80 A / IRL 81 A

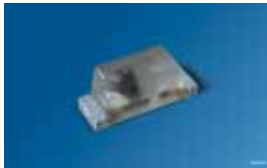


**Mini Sidelooker**  
SFH 4110

## Power Emitters (&gt; 40 mW)

## SMT Emitters

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**SmartLED 0603**  
SFH 4050



**CHIPLED with lens**  
SFH 4045



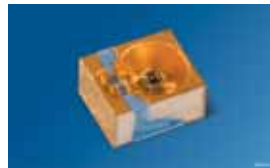
**CHIPLED with lens**  
SFH 4056



**CHIPLED with lens**  
SFH 4059 / SFH 4059S



**REFLED**  
SFH 4450



**MIDLED**  
SFH 4640 / SFH 4650



**MIDLED**  
SFH 4645 / SFH 4655



**Power TOPLED**  
SFH 4240 / SFH 4250 / SFH 4250S



**SIDELED**  
SFH 4255



**PowerTOPLED w. Lens**  
SFH 4248 / SFH 4249 / SFH 4258 / SFH 4259 / SFH 4258S / SFH 4259S



**T1 3/4 SMR**  
SFH 4542



**T1 3/4 SMR**  
SFH 4543



**T1 3/4 SMR**  
SFH 4551

## Emitters in plastic package

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**T1**  
SFH 4350



**T1 3/4**  
SFH 4556 / SFH 4546 / SFH 4547 / SFH 4557



**T1 3/4**  
SFH 4550



**T1**  
SFH 4341



**T1 3/4**  
SFH 4545 / SFH 4555

## High Power Emitters (> 500 mW)

### SMT Emitters

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**Platinum DRAGON**  
SFH 4232 / SFH 4233 / SFH 4235



**DRAGON with lens**  
SFH 4236 / SFH 4239



**OSRAM OSTAR Lighting**  
SFH 4750 / SFH 4751



**OSRAM OSTAR Observation**  
SFH 4730



**OSRAM OSTAR Observation**  
SFH 4740 / SFH 4761

## Emitters for special applications

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**Multi TOPLED**SFH 331 / SFH 7222 / SFH 7221 /  
SFH 7225**Array**

LD 261

**Array**

LD 260 / LD 262-269

**Array**

SFH 405

**T018**

SFH 4850 E7800

**T018**

SFH 4860

**T018**

SFH 400 / SFH 480

**T018**

SFH 464 / SFH 483 / LD 242

**T018**

SFH 482

**T018**

SFH 401

**T046**

SFH 4881 / SFH 4811

**T046**

SFH 4883 / SFH 4813



## Infrared Emitters

## Standard Emitters (&lt; 40 mW)






## SMT Emitters

| Package                                                                                                       | Type       | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Half angle<br>$\varphi$<br>[°] |                         |                   |                                                   |                    |                                                   | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package<br>Fig. |
|---------------------------------------------------------------------------------------------------------------|------------|----------------------------------------|--------------------------------|-------------------------|-------------------|---------------------------------------------------|--------------------|---------------------------------------------------|---------------------------|---------------|-----------------|
|                                                                                                               |            |                                        |                                | $\Phi_e$<br>typ<br>[mW] | $I_e$<br>[mW/sr]  | Measure-<br>ment cond.                            | $V_F$<br>[V]       | Measure-<br>ment cond.                            |                           |               |                 |
| <br><b>CHIPLED</b>           | SFH 4053   | 860                                    | $\pm 70$                       | 35                      | 6 ( $\geq 4$ )    | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 1.6 ( $\leq 2$ )   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 12                        | Q65111A0651   | 101             |
| <br><b>CHIPLED with lens</b> | SFH 4058   | 860                                    | $\pm 40$                       | 33                      | 15 ( $\geq 6.3$ ) | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 1.6 ( $\leq 2$ )   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 10                        | Q65110A9218   | 95              |
| <br><b>TOPLED</b>            | SFH 420    | 950                                    | $\pm 60$                       | 18                      | 5 ( $\geq 2.5$ )  | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.3 ( $\leq 1.5$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 500                       | Q65110A2473   | 59              |
|                                                                                                               | SFH 421    | 880                                    | $\pm 60$                       | 23                      | 7 ( $\geq 4$ )    | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 500                       | Q65110A1218   | 59              |
| <br><b>TOPLED</b>           | SFH 4283   | 880                                    | $\pm 60$                       | 23                      | 7 ( $\geq 4$ )    | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 600                       | Q65110A2517   | 62              |
| <br><b>TOPLED</b>          | SFH 4243   | 950                                    | $\pm 60$                       | 33                      | 11 ( $\geq 4$ )   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 1.6 ( $\leq 2$ )   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 11                        | Q65110A7515   | 59              |
|                                                                                                               | SFH 4253   | 860                                    | $\pm 60$                       | 35                      | 11 ( $\geq 4$ )   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 1.6 ( $\leq 2$ )   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 10                        | Q65110A6657   | 59              |
| <br><b>TOPLED RG</b>       | SFH 4281   | 880                                    | $\pm 60$                       | 23                      | 6 (4 ... 12.5)    | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 500                       | Q65110A2516   | 60              |
| <br><b>Black TOPLED RG</b> | SFH 4257 R | 860                                    | $\pm 60$                       | 24                      | 12 ( $\geq 6.3$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 12                        | Q65110A8706   | 96              |
| <br><b>Black TOPLED</b>    | SFH 4257   | 860                                    | $\pm 60$                       | 18                      | 7 (6.3 ... 12.5)  | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 12                        | Q65110A2466   | 62              |
|                                                                                                               | SFH 4271   | 880                                    |                                | 5                       | 1 ... 3.2         |                                                   |                    |                                                   | 500                       | Q65110A2521   |                 |
| <br><b>Mini TOPLED</b>     | SFH 4247   | 950                                    | $\pm 65$                       | 33                      | 8 ( $\geq 4$ )    | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 1.5 ( $\leq 1.9$ ) | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 11                        | Q65110A8091   | 63              |

## Infrared Emitters







## Standard Emitters (&lt; 40 mW)

## SMT Emitters

| Package                                                                                                  | Type     | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Half angle<br>$\Phi$<br>[°] |                         |                  |                                                  |                  |                                                  | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package<br>Fig. |
|----------------------------------------------------------------------------------------------------------|----------|----------------------------------------|-----------------------------|-------------------------|------------------|--------------------------------------------------|------------------|--------------------------------------------------|---------------------------|---------------|-----------------|
|                                                                                                          |          |                                        |                             | $\Phi_e$<br>typ<br>[mW] | $I_e$<br>[mW/sr] | Measure-<br>ment cond.                           | $V_F$<br>[V]     | Measure-<br>ment cond.                           |                           |               |                 |
| <br><b>SIDELED</b>      | SFH 425  | 950                                    | $\pm 60$                    | 18                      | $5 (\geq 2.5)$   | $I_F=100 \text{ mA}$ ,<br>$t_p=20 \text{ ms}$    | $1.3 (\leq 1.5)$ | $I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$   | 500                       | Q65110A2463   | 66              |
|                                                                                                          | SFH 426  | 880                                    | $\pm 60$                    | 23                      | $7 (\geq 4)$     | $I_F=100 \text{ mA}$ ,<br>$t_p=20 \text{ ms}$    | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$   | 500                       | Q65110A2512   | 66              |
|                                                                                                          | SFH 4244 | 950                                    | $\pm 60$                    | 33                      | $11 (\geq 4)$    | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | $1.6 (\leq 2)$   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 11                        | Q65110A7516   | 66              |
| <br><b>MIDLED</b>       | SFH 4680 | 880                                    | $\pm 20$                    | 23                      | $20 (\geq 10)$   | $I_F=100 \text{ mA}$ ,<br>$t_p=20 \text{ ms}$    | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$   | 500                       | Q65110A1570   | 10              |
|                                                                                                          | SFH 4641 | 950                                    | $\pm 15$                    | 33                      | $40 (\geq 16)$   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | $1.6 (\leq 2)$   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 11                        | Q65110A8098   |                 |
|                                                                                                          | SFH 4651 | 860                                    |                             |                         |                  | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ |                  | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 10                        | Q65110A8396   |                 |
| <br><b>MIDLED</b>      | SFH 4685 | 880                                    | $\pm 20$                    | 23                      | $20 (\geq 10)$   | $I_F=100 \text{ mA}$ ,<br>$t_p=20 \text{ ms}$    | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$   | 500                       | Q65110A1571   | 10              |
|                                                                                                          | SFH 4646 | 950                                    | $\pm 15$                    | 33                      | $40 (\geq 16)$   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | $1.6 (\leq 2)$   | $I_F = 70 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 11                        | Q65110A8099   |                 |
|                                                                                                          | SFH 4656 | 860                                    |                             |                         |                  | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ |                  | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 10                        | Q65110A8395   |                 |
| <br><b>T1 3/4 SMR</b> | SFH 4580 | 880                                    | $\pm 15$                    | 25                      | $55 (\geq 25)$   | $I_F=100 \text{ mA}$ ,<br>$t_p=20 \text{ ms}$    | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$   | 600                       | Q65110A2632   | 68              |
| <br><b>T1 3/4 SMR</b> | SFH 4585 | 880                                    | $\pm 15$                    | 25                      | $55 (\geq 25)$   | $I_F=100 \text{ mA}$ ,<br>$t_p=20 \text{ ms}$    | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$   | 600                       | Q65110A2631   | 69              |

## Standard Emitters (&lt; 40 mW)





## Emitters in plastic package

| Package                                                                                        | Type      | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Half angle<br>$\varphi$<br>[°] |                         |                     |                                              |                  |                                                     | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package<br>Fig. |
|------------------------------------------------------------------------------------------------|-----------|----------------------------------------|--------------------------------|-------------------------|---------------------|----------------------------------------------|------------------|-----------------------------------------------------|---------------------------|---------------|-----------------|
|                                                                                                |           |                                        |                                | $\Phi_e$<br>typ<br>[mW] | $I_e$<br>[mW/sr]    | Measure-<br>ment cond.                       | $V_F$<br>[V]     | Measure-<br>ment cond.                              |                           |               |                 |
| <br>T 1       | SFH 487   | 880                                    | $\pm 20$                       | 25                      | $\geq 12.5$         | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 600                       | Q62703Q1095   | 76              |
|                                                                                                | SFH 487-2 |                                        |                                |                         | 40 (20 ... 80)      |                                              |                  |                                                     |                           | Q62703Q2174   |                 |
|                                                                                                | SFH 487-3 |                                        |                                |                         | 60 (31 ... 125)     |                                              |                  |                                                     |                           | Q62703Q2175   |                 |
| <br>T 1       | SFH 487 P | 880                                    | $\pm 65$                       | 25                      | $4 (\geq 2)$        | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 600                       | Q62703Q0517   | 82              |
| <br>T 1       | SFH 409   | 950                                    | $\pm 20$                       | 18                      | $\geq 6.3$          | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$ | $1.3 (\leq 1.5)$ | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 500                       | Q62702P0860   | 85              |
|                                                                                                | SFH 409-2 |                                        |                                |                         | $17 (\geq 10)$      |                                              |                  |                                                     |                           | Q62702P1002   |                 |
| <br>T 1 3/4  | SFH 484   | 880                                    | $\pm 8$                        | 25                      | $100 (\geq 50)$     | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 600                       | Q62703Q1092   | 74              |
|                                                                                                | SFH 484-2 |                                        |                                |                         | $\geq 80$           |                                              |                  |                                                     |                           | Q62703Q1756   |                 |
|                                                                                                | SFH 486   | 880                                    | $\pm 11$                       | 25                      | $70 (\geq 40)$      | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 600                       | Q62703Q1094   | 79              |
|                                                                                                | SFH 485   | 880                                    | $\pm 20$                       | 25                      | $40 (25 \dots 160)$ | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 600                       | Q62703Q1093   | 80              |
|                                                                                                | SFH 485-2 |                                        |                                |                         | $25 \dots 100$      |                                              |                  |                                                     |                           | Q62703Q1547   |                 |
| <br>T 1 3/4 | SFH 485 P | 880                                    | $\pm 40$                       | 25                      | $5 (\geq 3.15)$     | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 600                       | Q62703Q0516   | 81              |
| <br>T 1 3/4 | LD 274    | 950                                    | $\pm 10$                       | 20                      | $90 (\geq 50)$      | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$ | $1.3 (\leq 1.5)$ | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 500                       | Q62703Q1031   | 83              |
|                                                                                                | LD 274-3  |                                        |                                |                         | $\geq 80$           |                                              |                  |                                                     |                           | Q62703Q1820   |                 |

## Infrared Emitters

## Standard Emitters (&lt; 40 mW)







## Emitters in plastic package

| Package                                                                                                | Type      | $\lambda_{\text{peak}}$<br>typ | Half angle<br>$\varphi$ |                 |                    |                                                 |                    |                                                     | $t_r, t_f$<br>typ | Ordering Code | Package<br>Fig. |
|--------------------------------------------------------------------------------------------------------|-----------|--------------------------------|-------------------------|-----------------|--------------------|-------------------------------------------------|--------------------|-----------------------------------------------------|-------------------|---------------|-----------------|
|                                                                                                        |           | [nm]                           |                         | $\Phi_e$<br>typ | $I_e$              | Measure-<br>ment cond.                          | $V_F$              | Measure-<br>ment cond.                              |                   |               |                 |
|                                                                                                        |           |                                | [°]                     | [mW]            | [mW/sr]            |                                                 | [V]                |                                                     | [ns]              |               |                 |
| <br>T 1 3/4           | LD 271    | 950                            | $\pm 25$                | 18              | 15 ( $\geq 10$ )   | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$    | 1.3 ( $\leq 1.5$ ) | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 1000              | Q62703Q0148   | 84              |
|                                                                                                        | LD 271 H  |                                |                         |                 | 24 ( $\geq 16$ )   |                                                 |                    |                                                     |                   | Q62703Q0256   |                 |
|                                                                                                        | LD 271 L  | 950                            | $\pm 25$                | 18              | 15 ( $\geq 10$ )   | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$    | 1.3 ( $\leq 1.5$ ) | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 1000              | Q62703Q0833   | 39              |
|                                                                                                        | LD 271 LH |                                |                         |                 | 24 ( $\geq 16$ )   |                                                 |                    |                                                     |                   | Q62703Q0838   |                 |
| <br>T 1 3/4           | SFH 4512  | 950                            | $\pm 10$                | 20              | 40 ( $\geq 25$ )   | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$    | 1.3 ( $\leq 1.5$ ) | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 500               | Q65110A2106   | 103             |
|                                                                                                        | SFH 4516  | 950                            | $\pm 17$                | 20              | 45 ( $\geq 25$ )   | $I_F=100 \text{ mA},$<br>$t_p=20 \text{ ms}$    | 1.3 ( $\leq 1.5$ ) | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 500               | Q65111A0380   | 39              |
| <br>Sidelooker       | IRL 81A   | 880                            | $\pm 25$                | 5               | 2.5 ( $\geq 1$ )   | $I_F = 20 \text{ mA},$<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 2$ )   | $I_F = 100$<br>$\text{mA}, t_p = 20$<br>$\text{ms}$ | 600               | Q68000A8000   | 86              |
|                                                                                                        | IRL 80A   | 950                            | $\pm 30$                | 3.5             | 2.5 ( $\geq 0.4$ ) | $I_F = 20 \text{ mA},$<br>$t_p = 20 \text{ ms}$ | 1.2 ( $\leq 1.5$ ) | $I_F = 20 \text{ mA}$                               | 500               | Q68000A7851   | 86              |
| <br>Mini Sidelooker | SFH 4110  | 950                            | $\pm 9$                 | 2               | 4.7 ( $\geq 2.5$ ) | $I_F = 20 \text{ mA},$<br>$t_p = 20 \text{ ms}$ | 1.2 ( $\leq 1.4$ ) | $I_F = 20 \text{ mA},$<br>$t_p = 20 \text{ ms}$     | 450               | Q62702P5072   | 22              |

## Infrared Emitters

## Power Emitters (&gt; 40 mW)





## SMT Emitters


| Package                                                                                                 | Type      | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Half angle<br>$\varphi$<br>[°] |                         |                  |                                         |                  |                                             | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package<br>Fig. |
|---------------------------------------------------------------------------------------------------------|-----------|----------------------------------------|--------------------------------|-------------------------|------------------|-----------------------------------------|------------------|---------------------------------------------|---------------------------|---------------|-----------------|
|                                                                                                         |           |                                        |                                | $\Phi_e$<br>typ<br>[mW] | $I_e$<br>[mW/sr] | Measure-<br>ment cond.                  | $V_F$<br>[V]     | Measure-<br>ment cond.                      |                           |               |                 |
| <br>SmartLED 0603      | SFH 4050  | 860                                    | $\pm 80$                       | 50                      | $7 (\geq 4)$     | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 12                        | Q65110A6460   | 58              |
| <br>CHIPLED with lens  | SFH 4045  | 950                                    | $\pm 9$                        | 40                      | $90 (\geq 40)$   | $I_F=70 \text{ mA}, t_p=20 \text{ ms}$  | $1.6 (\leq 2)$   | $I_F = 70 \text{ mA}, t_p = 20 \text{ ms}$  | 12                        | Q65110A9731   | 92              |
| <br>CHIPLED with lens  | SFH 4056  | 860                                    | $\pm 22$                       | 40                      | $35 (\geq 16)$   | $I_F=70 \text{ mA}, t_p=20 \text{ ms}$  | $1.6 (\leq 2)$   | $I_F = 70 \text{ mA}, t_p = 20 \text{ ms}$  | 12                        | Q65110A9942   | 94              |
| <br>CHIPLED with lens | SFH 4059  | 860                                    | $\pm 10$                       | 40                      | $100 (\geq 40)$  | $I_F=70 \text{ mA}, t_p=20 \text{ ms}$  | $1.6 (\leq 2)$   | $I_F = 70 \text{ mA}, t_p = 20 \text{ ms}$  | 12                        | Q65111A0020   | 99              |
|                                                                                                         | SFH 4059S |                                        | $\pm 15$                       | 70                      | $130 (\geq 63)$  |                                         | $3 (\leq 3.5)$   |                                             | 20                        | Q65111A0278   |                 |
| <br>MIDLED           | SFH 4640  | 950                                    | $\pm 15$                       | 45                      | $60 (\geq 25)$   | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 11                        | Q65110A7060   | 10              |
|                                                                                                         | SFH 4650  | 860                                    |                                |                         | $50 (\geq 16)$   |                                         |                  |                                             | 12                        | Q65110A1572   |                 |
| <br>MIDLED           | SFH 4645  | 950                                    | $\pm 15$                       | 45                      | $60 (\geq 25)$   | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 11                        | Q65110A9367   | 10              |
|                                                                                                         | SFH 4655  | 860                                    |                                |                         | $50 (\geq 16)$   |                                         |                  |                                             | 12                        | Q65110A1569   |                 |
| <br>Power TOPLED     | SFH 4240  | 950                                    | $\pm 60$                       | 45                      | $15 (\geq 10)$   | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 11                        | Q65110A7513   | 61              |
|                                                                                                         | SFH 4250  | 860                                    | $\pm 60$                       | 45                      | $15 (\geq 10)$   | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 12                        | Q65110A2465   | 61              |
|                                                                                                         | SFH 4250S | 860                                    | $\pm 60$                       | 70                      | $22 (\geq 12.5)$ | $I_F=70 \text{ mA}, t_p=20 \text{ ms}$  | $3 (\leq 3.5)$   | $I_F = 70 \text{ mA}, t_p = 20 \text{ ms}$  | 20                        | Q65111A0128   | 61              |
| <br>SIDELED          | SFH 4255  | 860                                    | $\pm 60$                       | 45                      | $15 (\geq 10)$   | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 12                        | Q65110A2467   | 66              |

## Infrared Emitters

## Power Emitters (&gt; 40 mW)

## SMT Emitters





| Package                                                                                                           | Type      | $\lambda_{\text{peak}}$<br>typ | Half angle<br>$\Phi$ | $\Phi_e$<br>typ | $I_e$             | Measure-<br>ment cond.                  | $V_F$              | Measure-<br>ment cond.                      | $t_r, t_f$<br>typ | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------|----------------------|-----------------|-------------------|-----------------------------------------|--------------------|---------------------------------------------|-------------------|---------------|-----------------|
|                                                                                                                   |           | [nm]                           |                      | [mW]            | [mW/sr]           |                                         | [V]                |                                             | [ns]              |               |                 |
|  <b>Power TOPLED<br/>w. Lens</b> | SFH 4248  | 950                            | $\pm 15$             | 50              | 100 ( $\geq 40$ ) | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 11                | Q65110A7518   | 65              |
|                                                                                                                   | SFH 4249  |                                | $\pm 25$             |                 | 55 ( $\geq 25$ )  |                                         |                    |                                             |                   | Q65110A7519   | 64              |
|                                                                                                                   | SFH 4258  | 860                            | $\pm 15$             | 50              | 90 ( $\geq 40$ )  | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 12                | Q65110A2975   | 65              |
|                                                                                                                   | SFH 4258S |                                |                      | 80              | 100 ( $\geq 40$ ) | $I_F=70 \text{ mA}, t_p=20 \text{ ms}$  | 3 ( $\leq 3.5$ )   | $I_F = 70 \text{ mA}, t_p = 20 \text{ ms}$  | 20                | Q65111A1158   |                 |
|                                                                                                                   | SFH 4259  | 860                            | $\pm 25$             | 50              | 55 ( $\geq 25$ )  | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 12                | Q65110A2464   | 64              |
|                                                                                                                   | SFH 4259S |                                |                      | 80              | 60 ( $\geq 25$ )  | $I_F=70 \text{ mA}, t_p=20 \text{ ms}$  | 3 ( $\leq 3.5$ )   | $I_F = 70 \text{ mA}, t_p = 20 \text{ ms}$  | 20                | Q65111A1159   |                 |
|  <b>T1 3/4 SMR</b>              | SFH 4542  | 950                            | $\pm 10$             | 50              | 200 ( $\geq 63$ ) | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 11                | Q65110A8093   | 68              |
|  <b>T1 3/4 SMR</b>             | SFH 4543  | 950                            | $\pm 10$             | 50              | 200 ( $\geq 63$ ) | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 11                | Q65110A8094   | 69              |
|  <b>T 1 3/4 SMR</b>            | SFH 4551  | 860                            | $\pm 10$             | 50              | 180 ( $\geq 63$ ) | $I_F=100 \text{ mA}, t_p=20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 12                | Q65111A0506   | 68              |

| Package                                                                                           | Type     | $\lambda_{\text{peak}}$<br>typ | Half angle<br>$\Phi$ | $\Phi_e$<br>typ | $I_e$   | Measure-<br>ment cond.                 | $V_F$            | Measure-<br>ment cond.                     | Irra-<br>diance<br>$E_e$  | Measure-<br>ment cond.                     | $t_r, t_f$<br>typ | Ordering Code | Package<br>Fig. |
|---------------------------------------------------------------------------------------------------|----------|--------------------------------|----------------------|-----------------|---------|----------------------------------------|------------------|--------------------------------------------|---------------------------|--------------------------------------------|-------------------|---------------|-----------------|
|                                                                                                   |          | [nm]                           |                      | [mW]            | [mW/sr] |                                        | [V]              |                                            | [mW/<br>cm <sup>2</sup> ] |                                            | [ns]              |               |                 |
|  <b>REFLED</b> | SFH 4450 | 860                            | $\pm 17$             | 30              | 40      | $I_F=70 \text{ mA}, t_p=20 \text{ ms}$ | 1.6 ( $\leq 2$ ) | $I_F = 70 \text{ mA}, t_p = 20 \text{ ms}$ | 8 ( $\geq 4$ )            | $I_F = 70 \text{ mA}, t_p = 20 \text{ ms}$ | 12                | Q65110A9958   | 102             |

## Infrared Emitters

## Power Emitters (&gt; 40 mW)




## Emitters in plastic package



| Package                                                                                        | Type     | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Half angle<br>$\varphi$<br>[°] |                         |                    |                              |                    |                                     | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package<br>Fig. |
|------------------------------------------------------------------------------------------------|----------|----------------------------------------|--------------------------------|-------------------------|--------------------|------------------------------|--------------------|-------------------------------------|---------------------------|---------------|-----------------|
|                                                                                                |          |                                        |                                | $\Phi_e$<br>typ<br>[mW] | $I_e$<br>[mW/sr]   | Measure-<br>ment cond.       | $V_F$<br>[V]       | Measure-<br>ment cond.              |                           |               |                 |
| <br>T 1       | SFH 4350 | 860                                    | $\pm 13$                       | 50                      | 110 ( $\geq 40$ )  | $I_F=100$ mA,<br>$t_p=20$ ms | 1.5 ( $\leq 1.8$ ) | $I_F = 100$<br>mA, $t_p = 20$<br>ms | 12                        | Q65110A2091   | 76              |
|                                                                                                | SFH 4341 | 950                                    | $\pm 11$                       | 40                      | 80 ( $\geq 25$ )   | $I_F=70$ mA,<br>$t_p=20$ ms  | 1.6 ( $\leq 2$ )   | $I_F = 70$ mA,<br>$t_p = 20$ ms     | 11                        | Q65110A8092   | 76              |
| <br>T 1 3/4   | SFH 4550 | 860                                    | $\pm 3$                        | 50                      | 700 ( $\geq 400$ ) | $I_F=100$ mA,<br>$t_p=20$ ms | 1.5 ( $\leq 1.8$ ) | $I_F = 100$<br>mA, $t_p = 20$<br>ms | 12                        | Q65110A1772   | 74              |
|                                                                                                | SFH 4555 | 860                                    | $\pm 5$                        | 50                      | 500 ( $\geq 160$ ) | $I_F=100$ mA,<br>$t_p=20$ ms | 1.5 ( $\leq 1.8$ ) | $I_F = 100$<br>mA, $t_p = 20$<br>ms | 12                        | Q65110A7341   | 78              |
| <br>T 1 3/4  | SFH 4545 | 950                                    | $\pm 5$                        | 50                      | 500 ( $\geq 160$ ) | $I_F=100$ mA,<br>$t_p=20$ ms | 1.5 ( $\leq 1.8$ ) | $I_F = 100$<br>mA, $t_p = 20$<br>ms | 11                        | Q65110A8095   | 78              |
|                                                                                                | SFH 4546 | 950                                    | $\pm 20$                       | 50                      | 140 ( $\geq 40$ )  | $I_F=100$ mA,<br>$t_p=20$ ms | 1.5 ( $\leq 1.8$ ) | $I_F = 100$<br>mA, $t_p = 20$<br>ms | 11                        | Q65110A8096   | 75              |
| <br>T 1 3/4 | SFH 4547 | 950                                    | $\pm 30$                       | 55                      | 75 ( $\geq 40$ )   | $I_F=100$ mA,<br>$t_p=20$ ms | 1.5 ( $\leq 1.8$ ) | $I_F = 100$<br>mA, $t_p = 20$<br>ms | 12                        | Q65111A1141   | 104             |
|                                                                                                | SFH 4556 | 860                                    | $\pm 20$                       | 50                      | 130 ( $\geq 40$ )  | $I_F=100$ mA,<br>$t_p=20$ ms | 1.5 ( $\leq 1.8$ ) | $I_F = 100$<br>mA, $t_p = 20$<br>ms | 12                        | Q65110A6087   | 75              |
|                                                                                                | SFH 4557 | 860                                    | $\pm 30$                       | 60                      | 80 ( $\geq 40$ )   | $I_F=100$ mA,<br>$t_p=20$ ms | 1.5 ( $\leq 1.8$ ) | $I_F = 100$<br>mA, $t_p = 20$<br>ms | 12                        | Q65111A1142   | 104             |

## Infrared Emitters

## High Power Emitters (&gt; 500 mW)

## SMT Emitters

| Package                                                                                                          | Type     | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Half angle<br>$\varphi$<br>[°] |                         |                  |                                            |              |                                            | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package Fig. |
|------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|--------------------------------|-------------------------|------------------|--------------------------------------------|--------------|--------------------------------------------|---------------------------|---------------|--------------|
|                                                                                                                  |          |                                        |                                | $\Phi_e$<br>typ<br>[mW] | $I_e$<br>[mW/sr] | Measure-<br>ment cond.                     | $V_F$<br>[V] | Measure-<br>ment cond.                     |                           |               |              |
| <br><b>Platinum DRAGON</b>      | SFH 4232 | 860                                    | ± 60                           | 530                     | 180              | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 1.5 (≤ 1.8)  | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 7                         | Q65110A8754   | 57           |
|                                                                                                                  | SFH 4233 | 950                                    | ± 60                           | 500                     | 170              | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 1.4 (≤ 1.8)  | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 10                        | Q65110A8901   | 57           |
|                                                                                                                  | SFH 4235 | 860                                    | ± 60                           | 950                     | 320              | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 3 (≤ 3.4)    | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 7                         | Q65110A8900   | 57           |
| <br><b>DRAGON with lens</b>     | SFH 4236 | 860                                    | ± 20                           | 530                     | 630              | $I_F = 1 \text{ A}, t_p = 10 \text{ ms}$   | 1.5 (≤ 1.8)  | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 10                        | Q65110A9564   | 100          |
|                                                                                                                  | SFH 4239 | 950                                    | ± 20                           | 460                     | 550 (≥ 250)      | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 1.4 (≤ 1.8)  | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 10                        | Q65110A9549   | 100          |
| <br><b>OSRAM OSTAR Lighting</b> | SFH 4750 | 860                                    | ± 70                           | 3500                    | 1000             | $I_F = 1 \text{ A}, t_p = 20 \text{ ms}$   | 9.5 (≤ 12)   | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 10                        | Q65110A8280   | 72           |
|                                                                                                                  | SFH 4751 | 950                                    | ± 70                           | 3100                    | 900              | $I_F = 1 \text{ A}, t_p = 20 \text{ ms}$   | 9.8 (≤ 12)   | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 10                        | Q65110A8867   | 72           |


| Package                                                                                                               | Type     | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Half angle<br>$\varphi$<br>[°] |                 |                  |                                          |              |                                            | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|--------------------------------|-----------------|------------------|------------------------------------------|--------------|--------------------------------------------|---------------------------|---------------|--------------|
|                                                                                                                       |          |                                        |                                | $\Phi_e$<br>[W] | $I_e$<br>[mW/sr] | Measure-<br>ment cond.                   | $V_F$<br>[V] | Measure-<br>ment cond.                     |                           |               |              |
| <br><b>OSRAM OSTAR Observation</b> | SFH 4730 | 860                                    | ± 60                           | 3.6             | 1200             | $I_F = 1 \text{ A}, t_p = 20 \text{ ms}$ | 15.5 (≤ 19)  | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 10                        | Q65110A5452   | 70           |
| <br><b>OSRAM OSTAR Observation</b> | SFH 4740 | 860                                    | ± 60                           | 4.3             | 1400             | $I_F = 1 \text{ A}, t_p = 20 \text{ ms}$ | 15.5 (≤ 19)  | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 10                        | Q65110A6190   | 71           |
|                                                                                                                       | SFH 4761 | 860                                    | ± 60                           | 4.3             | 1400 (≥ 1120)    | $I_F = 1 \text{ A}, t_p = 20 \text{ ms}$ | 1.5 (≤ 1.8)  | $I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$ | 10                        | Q65110A8758   | 73           |




## Infrared Emitters

## Emitters for special applications


## Detector/Emitter in Multi TOPLED package

| Package                                                                           | Type              | Emitter                                                                     | Half angle<br>$\varphi$<br>[°] | $I_V$<br>[mcd]                   | Measurement<br>cond.      | $V_F$<br>[V] | Measurement<br>cond.  | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------|--------------------------------|----------------------------------|---------------------------|--------------|-----------------------|---------------|-----------------|
| $\lambda_{\text{peak}}$<br>typ<br>[nm]                                            |                   |                                                                             |                                |                                  |                           |              |                       |               |                 |
|  | SFH 331-JK        | 635                                                                         | ± 60                           | 6 (4 ... 12.5)                   | $I_F = 10 \text{ mA}$     | 2 (≤ 2.6)    | $I_F = 10 \text{ mA}$ | Q65110A2821   | 11              |
| Multi TOPLED                                                                      |                   |                                                                             |                                |                                  |                           |              |                       |               |                 |
| Detector                                                                          |                   |                                                                             |                                |                                  |                           |              |                       |               |                 |
| Radiant sensi-<br>tive area typ.<br>[mm <sup>2</sup> ]                            | $I_{PCE}$<br>[μA] | Measurement<br>cond.                                                        | $V_{CE \text{ max.}}$<br>[V]   | $\lambda_{10\%}$<br>typ.<br>[nm] | $t_r, t_f$<br>typ<br>[μs] |              |                       |               |                 |
| 0.038                                                                             | ≥ 16              | $\lambda = 950 \text{ nm}, E_e = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                             | 440 ... 1150                     | 7                         |              |                       |               |                 |

## 2 Emitters in Multi TOPLED package

| Package                                                                             | Type     | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Half angle<br>$\varphi$<br>[°] | $\Phi_e$<br>typ<br>[mW] | $I_e$<br>[mW/sr] | Measure-<br>ment cond.                      | $V_F$<br>[V]               | Measure-<br>ment cond.                                                                    | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------|----------|----------------------------------------|--------------------------------|-------------------------|------------------|---------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------|---------------------------|---------------|-----------------|
|  | SFH 7222 | 880<br>565                             | ± 60                           | 23                      | 7 (≥ 4)          | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 1.5 (≤ 1.8)<br>2.0 (≤ 2.6) | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$<br>$I_F = 10 \text{ mA}, t_p = 20 \text{ ms}$ | 500                       | Q65110A2742   | 67              |
| Multi TOPLED                                                                        |          |                                        |                                |                         |                  |                                             |                            |                                                                                           |                           |               |                 |


## Detector/Emitter in Multi TOPLED package

| Package                                                                             | Type              | Emitter                                                                     | Half angle<br>$\varphi$<br>[°] | $I_e$<br>[mW/sr]                 | Measurement<br>cond.                        | $V_F$<br>[V] | Measurement<br>cond.                        | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------|--------------------------------|----------------------------------|---------------------------------------------|--------------|---------------------------------------------|---------------|-----------------|
| $\lambda_{\text{peak}}$<br>typ<br>[nm]                                              |                   |                                                                             |                                |                                  |                                             |              |                                             |               |                 |
|  | SFH 7221          | 880                                                                         | ± 60                           | ≥ 4                              | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | 1.5 (≤ 1.8)  | $I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$ | Q65110A2741   | 12              |
| Multi TOPLED                                                                        |                   |                                                                             |                                |                                  |                                             |              |                                             |               |                 |
| Detector                                                                            |                   |                                                                             |                                |                                  |                                             |              |                                             |               |                 |
| Radiant sensi-<br>tive area typ.<br>[mm <sup>2</sup> ]                              | $I_{PCE}$<br>[μA] | Measurement<br>cond.                                                        | $V_{CE \text{ max.}}$<br>[V]   | $\lambda_{10\%}$<br>typ.<br>[nm] | $t_r, t_f$<br>typ<br>[μs]                   |              |                                             |               |                 |
| 0.038                                                                               | ≥ 16              | $\lambda = 880 \text{ nm}, E_e = 0.1 \text{ mW/cm}^2, V_{CE} = 5 \text{ V}$ | 35                             | 440 ... 1150                     | 7                                           |              |                                             |               |                 |




## Infrared Emitters

## Emitters for special applications

## Detector/Emitter in Multi TOPLED package








| Package                                                                           | Type     | Emitter                                           |                                |                                                             |                                            |                                             |                                             | Ordering Code | Package Fig. |
|-----------------------------------------------------------------------------------|----------|---------------------------------------------------|--------------------------------|-------------------------------------------------------------|--------------------------------------------|---------------------------------------------|---------------------------------------------|---------------|--------------|
|                                                                                   |          | $\lambda_{\text{peak typ}}$<br>[nm]               | Half angle<br>$\varphi$<br>[°] | $I_V$<br>[mcd]                                              |                                            | $V_F$<br>[V]                                | Measurement cond.                           |               |              |
|  | SFH 7225 | 591                                               | ± 60                           | 63 ... 200                                                  | $I_F = 20 \text{ mA}, t_p = 20 \text{ ms}$ | 2 (≤ 2.6)                                   | $I_F = 20 \text{ mA}, t_p = 20 \text{ ms}$  | Q65110A2743   | 11           |
| Multi TOPLED                                                                      |          |                                                   |                                |                                                             |                                            |                                             |                                             |               |              |
|                                                                                   |          | Detector                                          |                                |                                                             |                                            |                                             |                                             |               |              |
|                                                                                   |          | Radiant sensitive area typ.<br>[mm <sup>2</sup> ] | $I_{CE \text{ typ}}$<br>[μA]   | Measurement cond.                                           | $V_{CE \text{ max.}}$<br>[V]               | Crosstalk<br>$I_{PCE, \text{ typ}}$<br>[mA] | Measurement Conditions                      |               |              |
|                                                                                   |          | 0.038                                             | 650                            | Std. Light A, $E_v = 1000 \text{ lx}, V_{CE} = 5 \text{ V}$ | 35                                         | 0.5 ... 5                                   | $I_F = 20 \text{ mA}, V_{CE} = 5 \text{ V}$ |               |              |

## Emitter arrays in plastic package

| Package                                                                                      | Type       | $\lambda_{\text{peak typ}}$<br>[nm] | Half angle<br>$\phi$<br>[°] | $\Phi_e$<br>typ<br>[mW] | $I_e$<br>[mW/sr] | Measure-<br>ment cond.                           | $V_F$<br>[V] | Measure-<br>ment cond.                           | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package<br>Fig. |
|----------------------------------------------------------------------------------------------|------------|-------------------------------------|-----------------------------|-------------------------|------------------|--------------------------------------------------|--------------|--------------------------------------------------|---------------------------|---------------|-----------------|
| <br>Array | LD 261     | 950                                 | ± 15                        | 9                       | 5.5 (2 ... 10)   | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.25 (≤ 1.4) | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1000                      | Q62703Q0395   | 24              |
|                                                                                              | LD 261-5/6 |                                     |                             |                         | 5.5 (3.2 ... 10) |                                                  |              |                                                  |                           | Q65110A3337   |                 |
| <br>Array | LD 262     | 950                                 | ± 15                        | 9                       | 5 (≥ 2)          | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.25 (≤ 1.4) | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1000                      | Q62703Q0070   | 25              |
|                                                                                              | LD 263     |                                     |                             |                         |                  |                                                  |              |                                                  |                           | Q62703Q0071   |                 |
|                                                                                              | LD 264     |                                     |                             |                         |                  |                                                  |              |                                                  |                           | Q62703Q0072   |                 |
|                                                                                              | LD 265     |                                     |                             |                         |                  |                                                  |              |                                                  |                           | Q62703Q0073   |                 |
|                                                                                              | LD 266     |                                     |                             |                         |                  |                                                  |              |                                                  |                           | Q62703Q0074   |                 |
|                                                                                              | LD 267     |                                     |                             |                         |                  |                                                  |              |                                                  |                           | Q62703Q0075   |                 |
|                                                                                              | LD 268     |                                     |                             |                         |                  |                                                  |              |                                                  |                           | Q62703Q0076   |                 |
|                                                                                              | LD 269     |                                     |                             |                         |                  |                                                  |              |                                                  |                           | Q62703Q0077   |                 |
|                                                                                              | LD 260     |                                     |                             |                         |                  |                                                  |              |                                                  |                           | Q62703Q0078   |                 |
| <br>Array | SFH 405    | 950                                 | ± 16                        | 7                       | 2.5 (≥ 1.6)      | $I_F = 40 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.25 (≤ 1.4) | $I_F = 40 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1000                      | Q62702P0835   | 23              |


## Emitters for special applications

## Emitters in metal package

| Package                                                                                            | Type              | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Half angle<br>$\varphi$<br>[°] |                         |                     |                                                   |                    |                                                   | $t_r, t_f$<br>typ<br>[ns] | Ordering Code | Package<br>Fig. |
|----------------------------------------------------------------------------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------------|---------------------|---------------------------------------------------|--------------------|---------------------------------------------------|---------------------------|---------------|-----------------|
|                                                                                                    |                   |                                        |                                | $\Phi_e$<br>typ<br>[mW] | $I_e$<br>[mW/sr]    | Measure-<br>ment cond.                            | $V_F$<br>[V]       | Measure-<br>ment cond.                            |                           |               |                 |
| <br><b>TO18</b>   | SFH 4850 E7800    | 860                                    | $\pm 23$                       | 50                      | 7 ( $\geq 4$ )      | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 12                        | Q65110A2093   | 77              |
|                                                                                                    |                   |                                        |                                |                         |                     |                                                   |                    |                                                   |                           |               |                 |
| <br><b>TO18</b>   | SFH 4860          | 660                                    | $\pm 50$                       | 3                       | 1.3 ( $\geq 0.63$ ) | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 2 ( $\leq 2.8$ )   | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 100                       | Q62702P5053   | 87              |
| <br><b>TO18</b>   | SFH 400           | 950                                    | $\pm 6$                        | 8                       | 36 ( $\geq 20$ )    | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.3 ( $\leq 1.5$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1000                      | Q62702P0096   | 88              |
|                                                                                                    | SFH 480           | 880                                    | $\pm 6$                        | 12                      | 75 ( $\geq 40$ )    | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 600                       | Q62703Q1087   | 88              |
|                                                                                                    | SFH 480-2/3       |                                        |                                |                         |                     |                                                   |                    |                                                   |                           | Q62702P5195   |                 |
| <br><b>TO18</b> | SFH 464 E7800     | 660                                    | $\pm 23$                       | 11                      | 1.5 ( $\geq 1$ )    | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 2.1 ( $\leq 2.8$ ) | $I_F = 50 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$  | 100                       | Q62702P1745   | 77              |
|                                                                                                    | SFH 483 L/M E7800 | 880                                    | $\pm 23$                       | 23                      | 2 (1 ... 3.2)       | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 600                       | Q62703Q4755   | 77              |
|                                                                                                    | LD 242-2/3        | 950                                    | $\pm 40$                       | 16                      | 6 ( $\geq 4$ )      | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.3 ( $\leq 1.5$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1000                      | Q62703Q4749   | 77              |
|                                                                                                    | LD 242 E7800      |                                        |                                |                         | 2.5 (1 ... 3.2)     |                                                   |                    |                                                   |                           | Q62703Q3509   |                 |
| <br><b>TO18</b> | SFH 482           | 880                                    | $\pm 30$                       | 12                      | 7 ( $\geq 3.15$ )   | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 600                       | Q62703Q1089   | 44              |
|                                                                                                    | SFH 482-1/2       |                                        |                                |                         | 5.5 (3.15 ... 10)   |                                                   |                    |                                                   |                           | Q62703Q4771   |                 |
|                                                                                                    | SFH 482-2/3       |                                        |                                |                         | 8 ( $\geq 5$ )      |                                                   |                    |                                                   |                           | Q62703Q4754   |                 |
|                                                                                                    | SFH 482 M E7800   |                                        |                                |                         | 2.4 (1.6 ... 3.2)   |                                                   |                    |                                                   |                           | Q62703Q2186   |                 |
| <br><b>TO18</b> | SFH 401           | 950                                    | $\pm 15$                       | 8                       | $\geq 10$           | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.3 ( $\leq 1.5$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1000                      | Q62702P0097   | 89              |
| <br><b>TO46</b> | SFH 4881          | 880                                    | $\pm 5$                        | 12                      | 72 ( $\geq 40$ )    | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.5 ( $\leq 1.8$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 500                       | Q62702P5302   | 90              |
|                                                                                                    | SFH 4811          | 950                                    | $\pm 5$                        | 8                       | 40 ( $\geq 25$ )    | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 1.3 ( $\leq 1.5$ ) | $I_F = 100 \text{ mA}$ ,<br>$t_p = 20 \text{ ms}$ | 500                       | Q62702P5300   | 90              |

## Emitters for special applications

### Emitters in metal package

| Package                                                                                   | Type     | $\lambda_{\text{peak}}$<br>typ | Half angle<br>$\varphi$ |                 |                  |                                               |                  |                                                | $t_r, t_f$<br>typ | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------------|----------|--------------------------------|-------------------------|-----------------|------------------|-----------------------------------------------|------------------|------------------------------------------------|-------------------|---------------|-----------------|
|                                                                                           |          | [nm]                           |                         | $\Phi_e$<br>typ | $I_e$            | Measure-<br>ment cond.                        | $V_F$            | Measure-<br>ment cond.                         |                   |               |                 |
|                                                                                           |          |                                | [°]                     | [mW]            | [mW/sr]          |                                               | [V]              |                                                | [ns]              |               |                 |
| <br>TO46 | SFH 4883 | 880                            | $\pm 35$                | 15              | $8 (\geq 4)$     | $I_F=100 \text{ mA}$ ,<br>$t_p=20 \text{ ms}$ | $1.5 (\leq 1.8)$ | $I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$ | 500               | Q62702P5303   | 91              |
|                                                                                           | SFH 4813 | 950                            | $\pm 35$                | 8               | $4.5 (\geq 2.5)$ | $I_F=100 \text{ mA}$ ,<br>$t_p=20 \text{ ms}$ | $1.3 (\leq 1.5)$ | $I_F = 100 \text{ mA}$ , $t_p = 20 \text{ ms}$ | 500               | Q62702P5301   | 91              |

[illegible]

**Figure 7: SFH 3400**

(chip position)

Active area 0.55mm<sup>2</sup>

C63062-A4-002-A1 -03

**Figure 8: SFH 3401**

(chip position)

Active area 0.55mm<sup>2</sup>

C63062-A4-002-A2 -03

**Figure 9: SFH 3201**

|   |   |         |           |   |   |
|---|---|---------|-----------|---|---|
| 1 | 2 | 3       | 4         | 5 | 6 |
| - | - | Emitter | Collector | - | - |

GEOY6982

**Figure 10: SFH 3600, SFH 3605, SFH 4640, SFH 4641, SFH 4645, SFH 4646, SFH 4650, SFH 4651, SFH 4655, SFH 4656, SFH 4680, SFH 4685**

For polarity, please see Datasheet

Silicone area<sup>1)</sup>

Isolating area

Pad 1 metallisation

Pad 2 metallisation

Backside metallisation

<sup>1)</sup> Device casted with silicone.  
Avoid mechanical stress on silicone surface.

OHF02956

**Figure 11: SFH 331, SFH 7225**

Package marking

Emission color : super-red (SFH 331)

GPLY6924

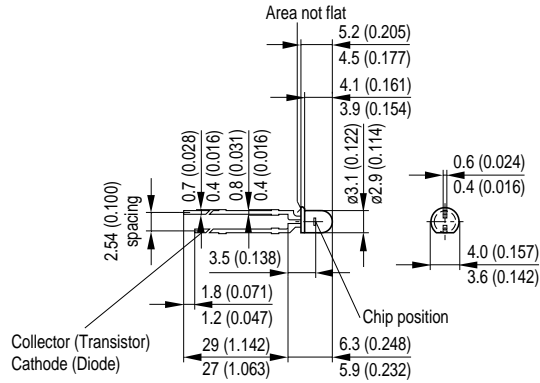
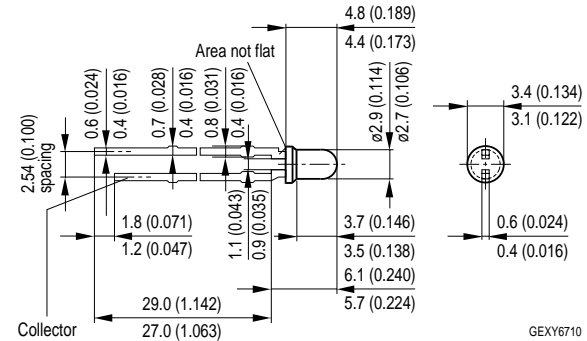
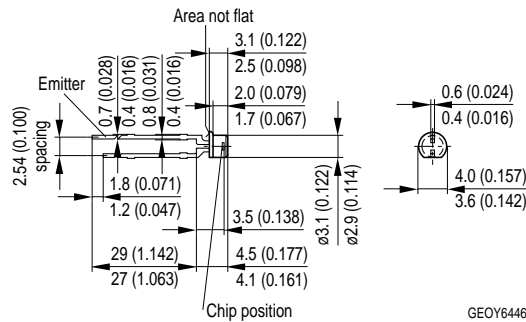
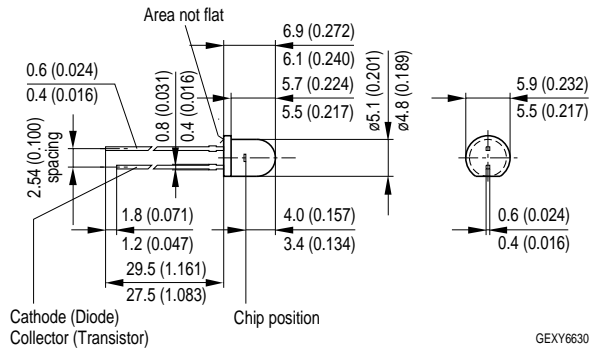
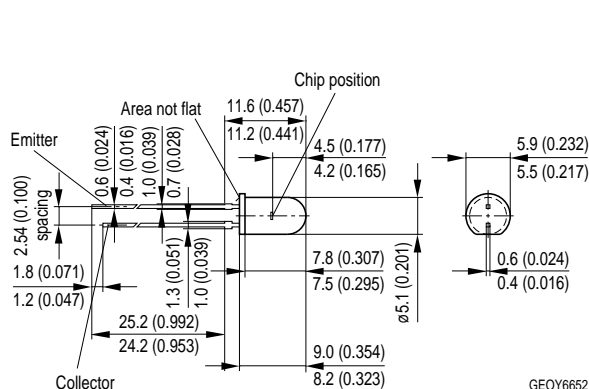
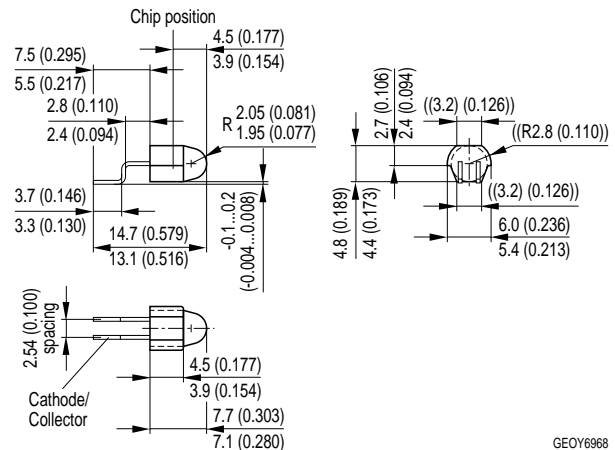
  

**Figure 12: SFH 7221**

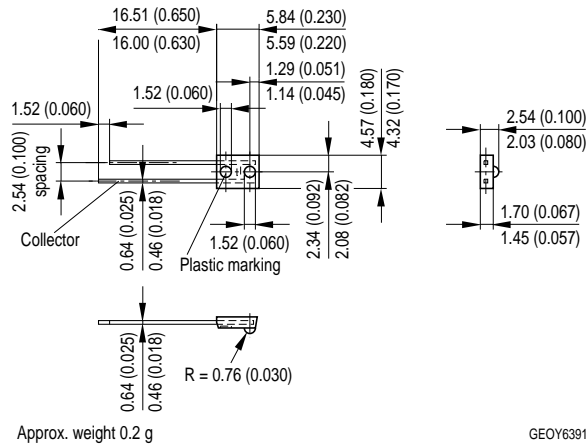
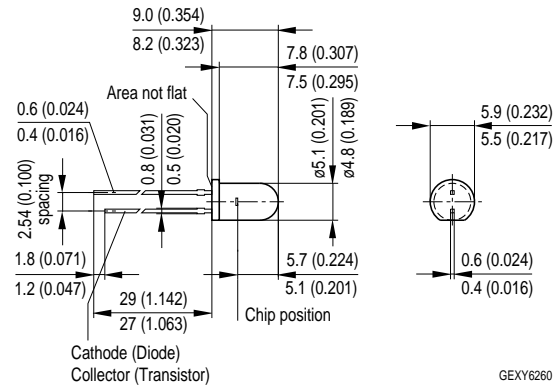
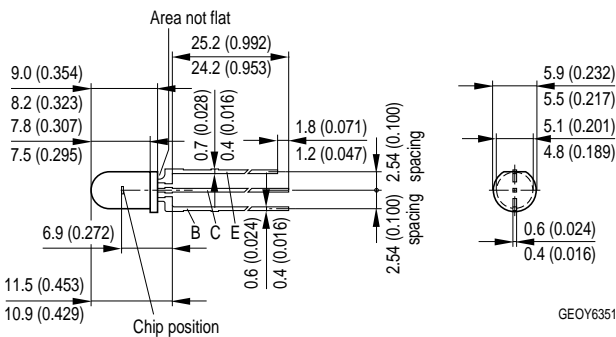
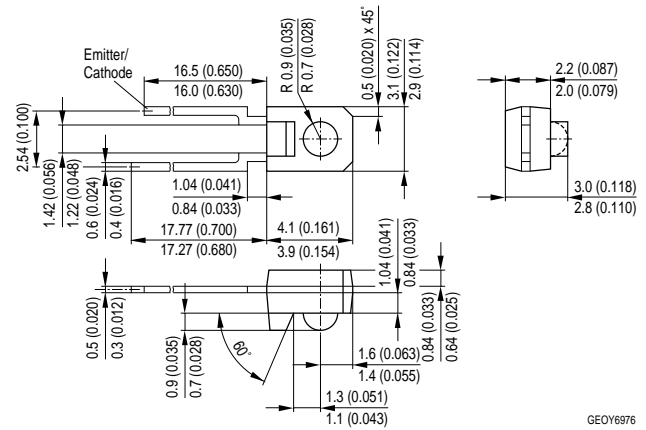
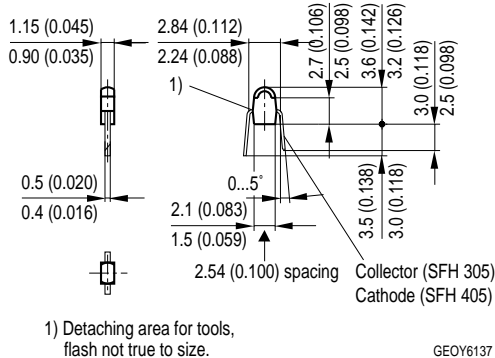
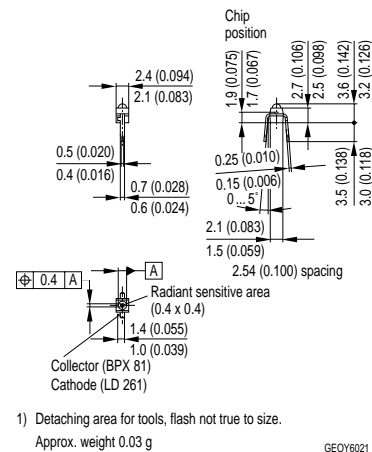
Package marking

GPLY6965

Dimensions in mm (inch)

**Figure 13: SFH 309, SFH 309 FA, SFH 229, SFH 229 FA****Figure 14: SFH 310, SFH 310 FA****Figure 15: SFH 309 P, SFH 309 PFA, SFH 3310****Figure 16: SFH 314, SFH 314 FA****Figure 17: SFH 300, SFH 300 FA****Figure 18: SFH 3500, SFH 2500 FA**

Dimensions in mm (inch)

**Figure 19: LPT 80 A****Figure 20: SFH 213, SFH 213 FA****Figure 21: SFH 303 FA****Figure 22: SFH 3100 F, SFH 4110****Figure 23: SFH 305, SFH 405****Figure 24: BPX 81, LD 261**



**Figure 25: BPX 80, BPX 82-89, LD 260, LD 262-269**

Chip position

Collector (BPX 83)  
Cathode (LD 263)

GEOY6367

**Figure 26: BPX 43, BPY 62**

Chip position

Radiant sensitive area

GMOY6019

**Figure 27: BPX 38**

Chip position

Radiant sensitive area

Approx. weight 1.0 g

GMOY6018

**Figure 28: BP 103**

Chip position

Radiant sensitive area

GETY6017

**Figure 29: BPW 34 S, BPW 34 BS, BP 104 S**

chip position

photosensitive area = A

Cathode lead

C63062-A31T1-A2 - 07

**Figure 30: BP 104 SR, BPW 34 SR**

chip position

photosensitive area = A

Cathode lead

C63062-A31T1-A10 - 09

Dimensions in mm (inch)

Figure 31: SFH 2400, SFH 2400 FA

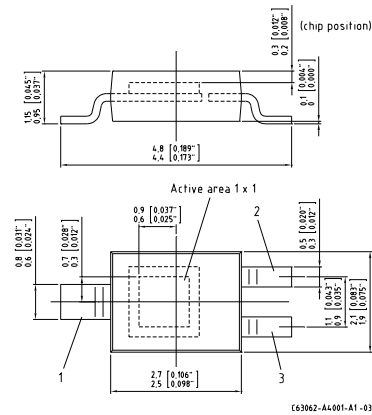
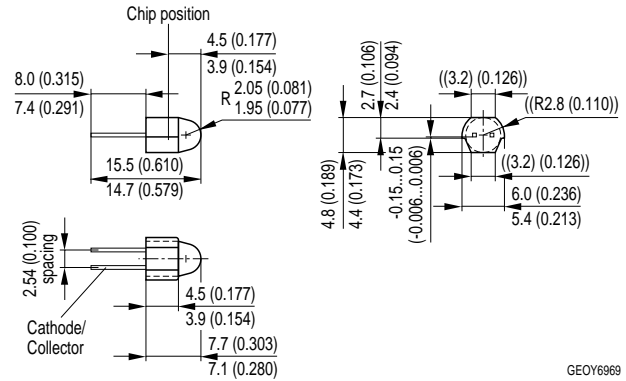
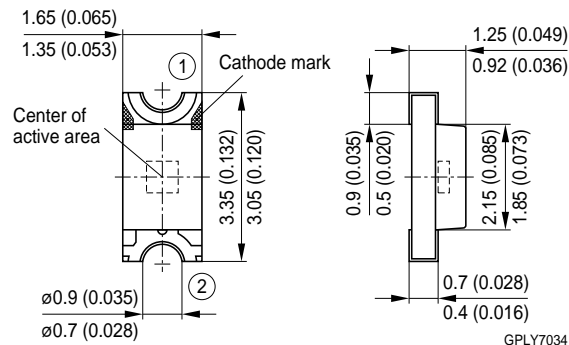


Figure 32: SFH 2505, SFH 2505 FA



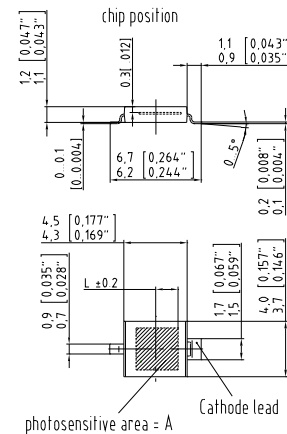
GEOY6969

Figure 33: SFH 2701



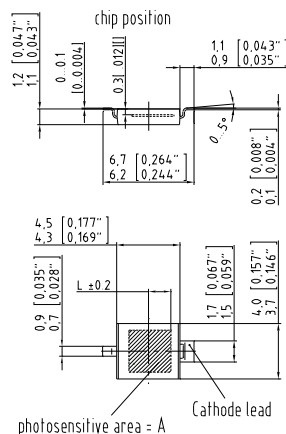
GPLY7034

Figure 34: BP 104 FS, BP 104 FAS, BPW 34 FS, BPW 34 FAS



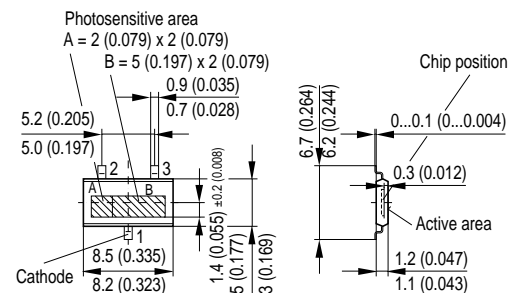
C63062-A3092-A2 -10

Figure 35: BP 104 FASR, BPW 34 FSR, BPW 34 FASR



C63062-A3092-A18 -10

Figure 36: KOM 2125



GEOY6860

**Figure 37: BPW 34, BPW 34 B**

Technical drawing of BPW 34 and BPW 34 B photodiodes. The drawing includes a side view and a top view. The side view shows dimensions for cathode marking, chip position, and spacing. The top view shows the photosensitive area A and a flash area. Dimensions are in inches and millimeters.

63062-A3170-A1 - 06

**Figure 38: SFH 206 K**

Technical drawing of SFH 206 K photodiode. The drawing includes a side view and a top view. The side view shows dimensions for area not flat, radiant sensitive area, cathode, and spacing. The top view shows the cathode and chip position. Dimensions are in inches and millimeters.

GEOY6647

**Figure 39: SFH 203, SFH 203 FA, LD 271 L/LH**

Technical drawing of SFH 203, SFH 203 FA, and LD 271 L/LH photodiodes. The drawing includes a side view and a top view. The side view shows dimensions for cathode, area not flat, chip position, and spacing. The top view shows the cathode and chip position. Dimensions are in inches and millimeters.

GEOY6645

**Figure 40: SFH 203 P, SFH 203 PFA**

Technical drawing of SFH 203 P and SFH 203 PFA photodiodes. The drawing includes a side view and a top view. The side view shows dimensions for area not flat, cathode, chip position, and spacing. The top view shows the cathode and chip position. Dimensions are in inches and millimeters.

GEOY6648

**Figure 41: BP 104 F, BPW 34 FA, BPW 34 F**

Technical drawing of BP 104 F, BPW 34 FA, and BPW 34 F photodiodes. The drawing includes a side view and a top view. The side view shows dimensions for cathode marking, chip position, and spacing. The top view shows the photosensitive area A and a flash area. Dimensions are in inches and millimeters.

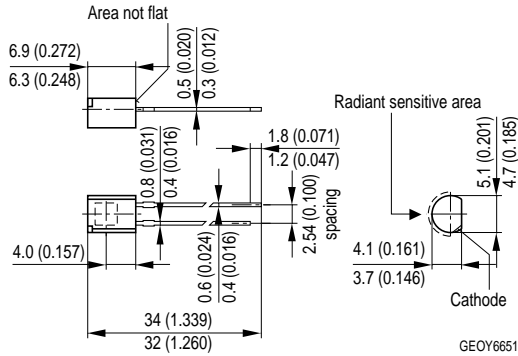
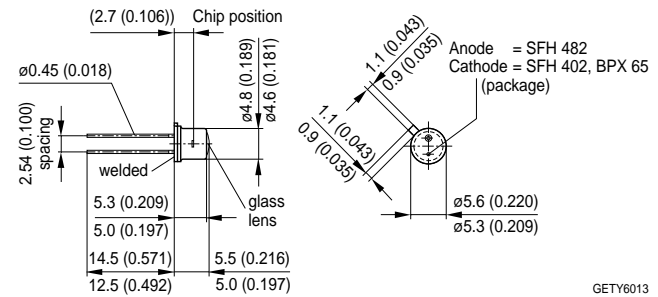
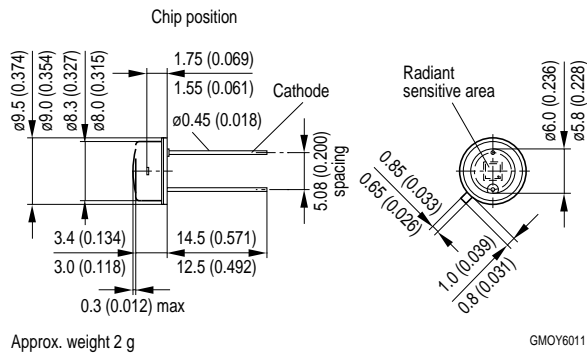
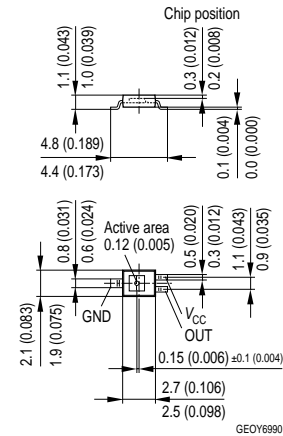
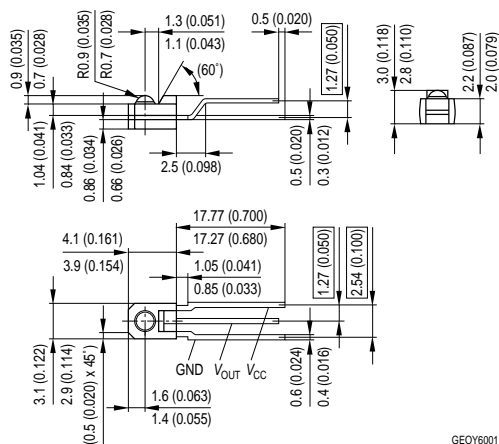
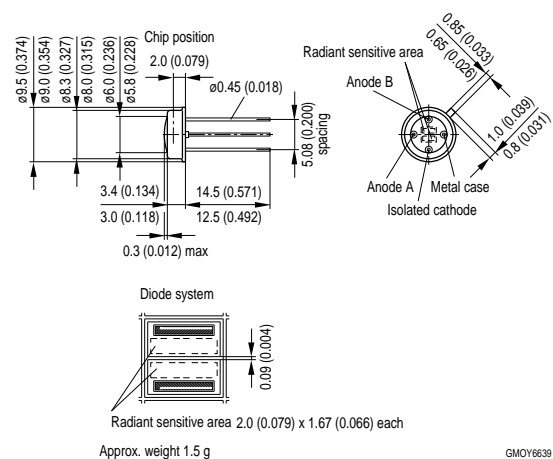
63062-A365-A6 -11

**Figure 42: SFH 225 FA, SFH 235 FA**

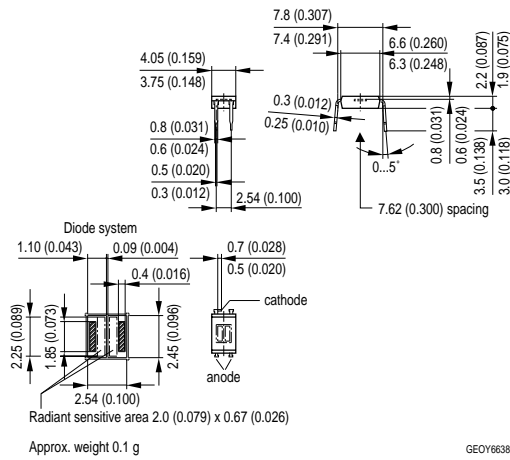
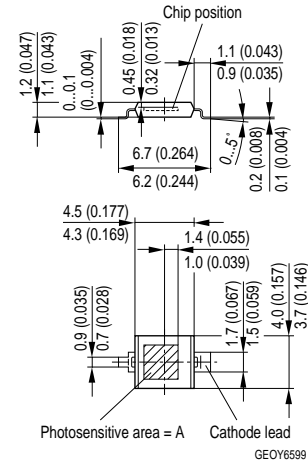
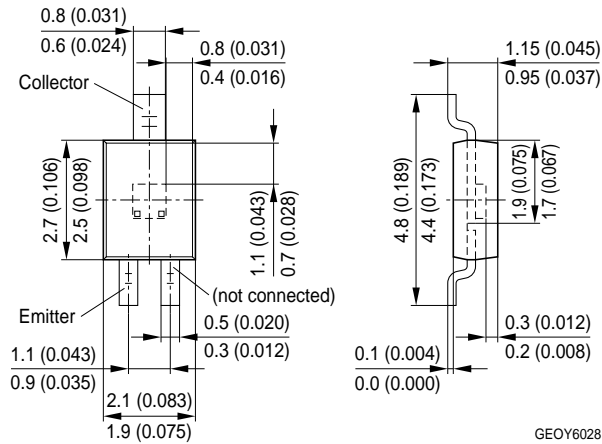
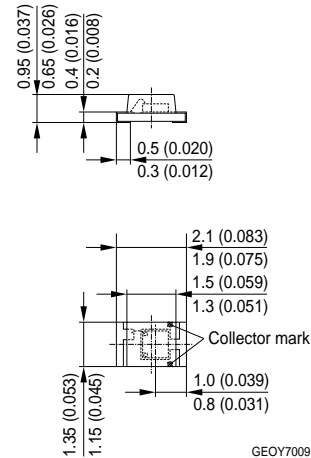
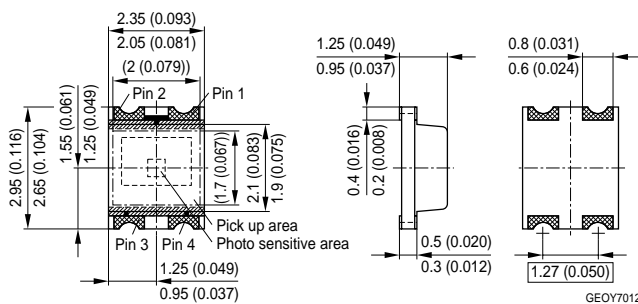
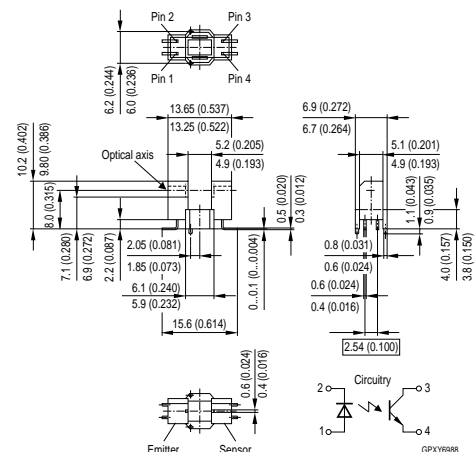
Technical drawing of SFH 225 FA and SFH 235 FA photodiodes. The drawing includes a side view and a top view. The side view shows dimensions for cathode, surface not flat, photosensitive area, and spacing. The top view shows the cathode and chip position. Dimensions are in inches and millimeters.

GEOY6422

Dimensions in mm (inch)

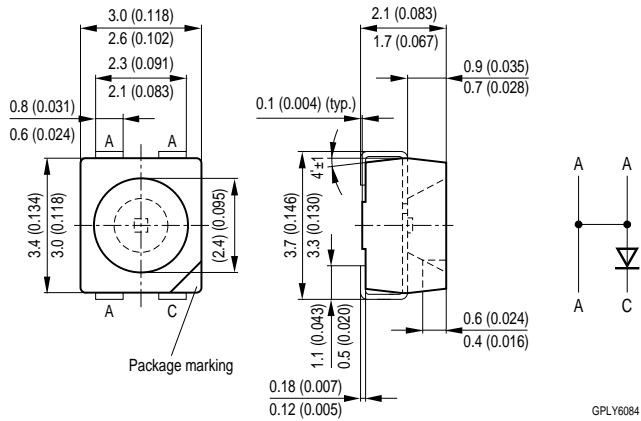
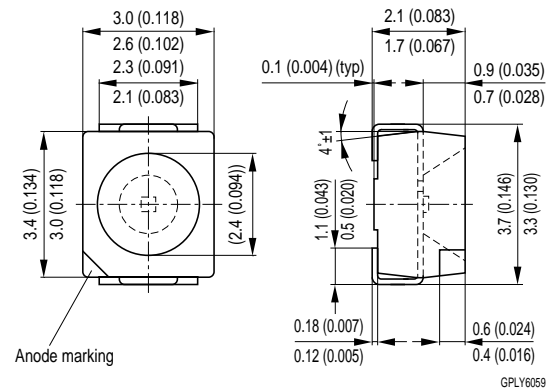
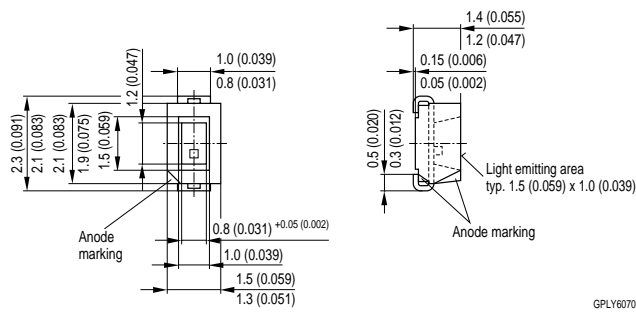
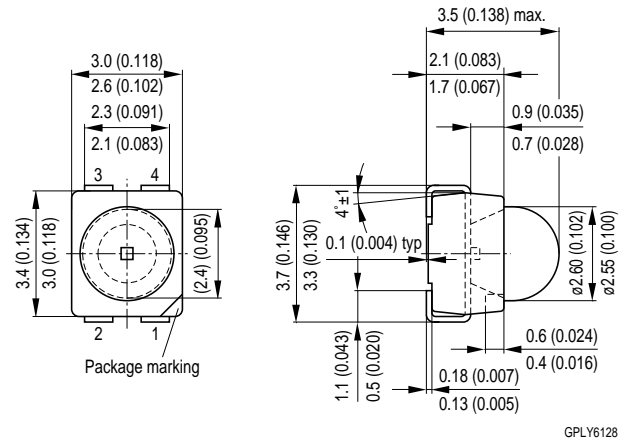
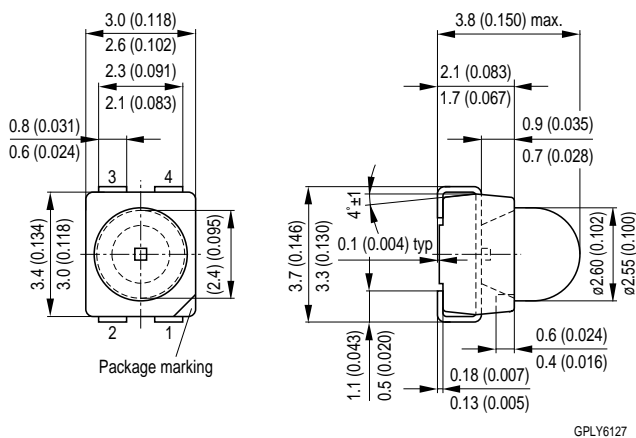
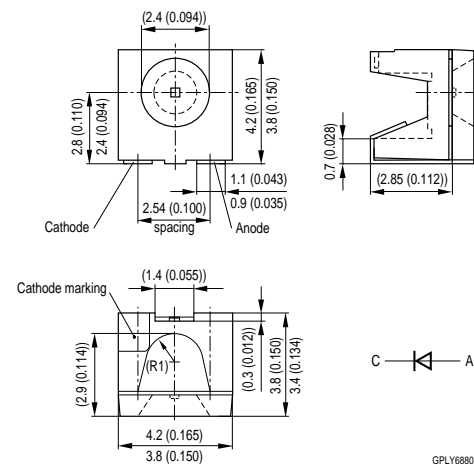
**Figure 43: SFH 205 F, SFH 205 FA****Figure 44: SFH 482, BPX 65****Figure 45: BPW 21, BPX 61****Figure 46: SFH 5440****Figure 47: SFH 5140 F****Figure 48: SFH 221**

Dimensions in mm (inch)

**Figure 49: BPX 48****Figure 50: SFH 2430****Figure 51: SFH 3410****Figure 52: SFH 3710****Figure 53: SFH 5711****Figure 54: SFH 9500**

[illegible]

Dimensions in mm (inch)

**Figure 61: SFH 4240, SFH 4250, SFH 4250S****Figure 62: SFH 4271, SFH 4257, SFH 4283****Figure 63: SFH 4247****Figure 64: SFH 4249, SFH 4259, SFH 4259S****Figure 65: SFH 4248, SFH 4258, SFH 4258S****Figure 66: SFH 425, SFH 426, SFH 4244, SFH 4255**

**Figure 67: SFH 7222**

Top view dimensions: 3.0 (0.118), 2.6 (0.102), 2.3 (0.091), 2.1 (0.083), 0.8 (0.031), 0.6 (0.024), 3.4 (0.134), 3.0 (0.118), 2.4 (0.095), 1.1 (0.043), 0.5 (0.020), 0.18 (0.007), 0.12 (0.005).

Side view dimensions: 0.1 (0.004) (typ.), 0.9 (0.035), 0.7 (0.028), 3.7 (0.146), 3.3 (0.130), 0.6 (0.024), 0.4 (0.016).

Detail view dimensions: 2.1 (0.083), 1.7 (0.067), 0.9 (0.035), 0.7 (0.028).

Package marking: 1, 2, 3, 4.

GEOY07023

**Figure 68: SFH 4542, SFH 4580**

Top view dimensions: 7.5 (0.295), 5.5 (0.217), 2.8 (0.110), 2.4 (0.094), 3.7 (0.146), 3.3 (0.130), 2.54 (0.100) spacing, 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Side view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Detail view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Chip position: 4.5 (0.177), 3.9 (0.154), 2.05 (0.081), 1.95 (0.077), R 1.95 (0.077), 14.7 (0.579), 13.1 (0.516), -0.1..0.2, (-0.004...0.008).

Detail view dimensions: 2.7 (0.106), 2.4 (0.094), ((3.2) (0.126)), ((R2.8 (0.110))), 6.0 (0.236), 5.4 (0.213).

GEOY6960

**Figure 69: SFH 4543, SFH 4585**

Top view dimensions: 8.0 (0.315), 7.4 (0.291), 15.5 (0.610), 14.7 (0.579), 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Side view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Detail view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Chip position: 4.5 (0.177), 3.9 (0.154), 2.05 (0.081), 1.95 (0.077), R 1.95 (0.077), 14.7 (0.579), 13.1 (0.516), -0.1..0.2, (-0.004...0.008).

Detail view dimensions: 2.7 (0.106), 2.4 (0.094), ((3.2) (0.126)), ((R2.8 (0.110))), 6.0 (0.236), 5.4 (0.213).

GEOY6961

**Figure 70: SFH 4730**

Top view dimensions: 8.0 (0.315), 7.4 (0.291), 15.5 (0.610), 14.7 (0.579), 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Side view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Detail view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Chip position: 4.5 (0.177), 3.9 (0.154), 2.05 (0.081), 1.95 (0.077), R 1.95 (0.077), 14.7 (0.579), 13.1 (0.516), -0.1..0.2, (-0.004...0.008).

Detail view dimensions: 2.7 (0.106), 2.4 (0.094), ((3.2) (0.126)), ((R2.8 (0.110))), 6.0 (0.236), 5.4 (0.213).

GEOY6961

**Figure 71: SFH 4740**

Top view dimensions: 8.0 (0.315), 7.4 (0.291), 15.5 (0.610), 14.7 (0.579), 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Side view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Detail view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Chip position: 4.5 (0.177), 3.9 (0.154), 2.05 (0.081), 1.95 (0.077), R 1.95 (0.077), 14.7 (0.579), 13.1 (0.516), -0.1..0.2, (-0.004...0.008).

Detail view dimensions: 2.7 (0.106), 2.4 (0.094), ((3.2) (0.126)), ((R2.8 (0.110))), 6.0 (0.236), 5.4 (0.213).

GEOY6961

**Figure 72: SFH 4750, SFH 4751**

Top view dimensions: 8.0 (0.315), 7.4 (0.291), 15.5 (0.610), 14.7 (0.579), 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Side view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

Detail view dimensions: 4.5 (0.177), 3.9 (0.154), 7.7 (0.303), 7.1 (0.280).

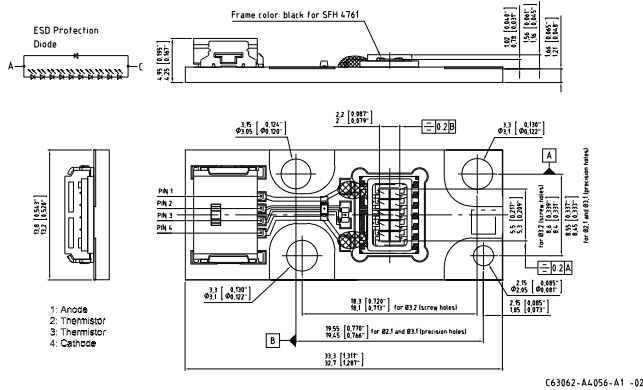
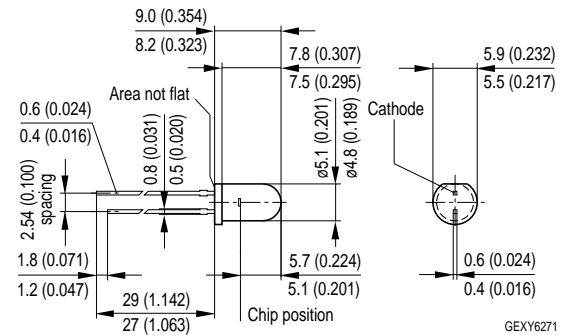
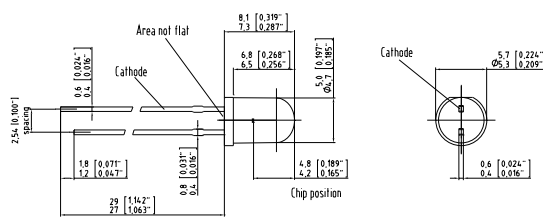
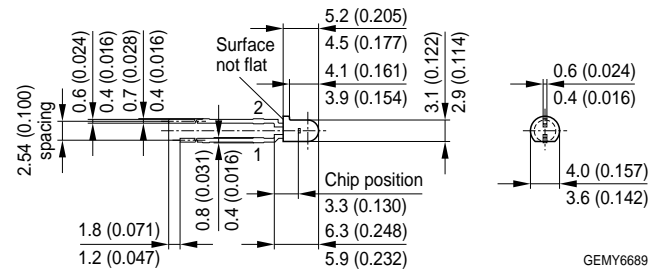
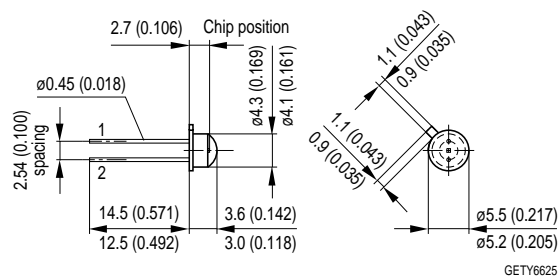
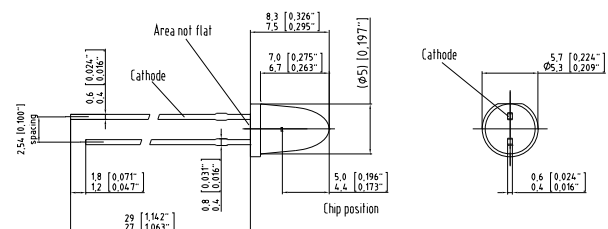
Chip position: 4.5 (0.177), 3.9 (0.154), 2.05 (0.081), 1.95 (0.077), R 1.95 (0.077), 14.7 (0.579), 13.1 (0.516), -0.1..0.2, (-0.004...0.008).

Detail view dimensions: 2.7 (0.106), 2.4 (0.094), ((3.2) (0.126)), ((R2.8 (0.110))), 6.0 (0.236), 5.4 (0.213).

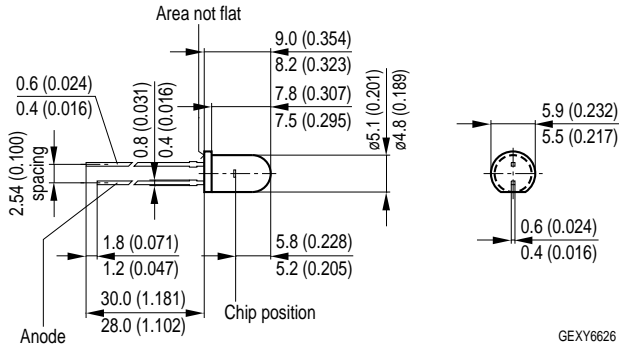
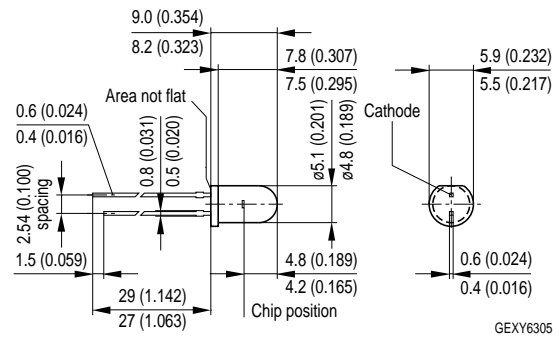
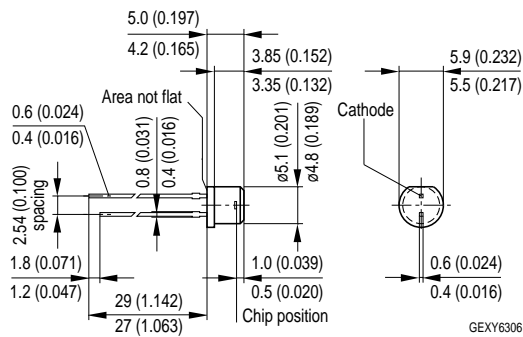
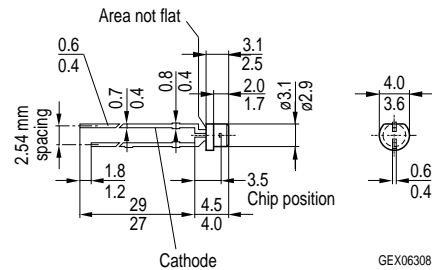
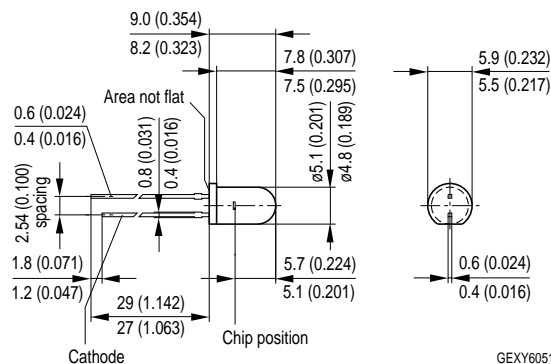
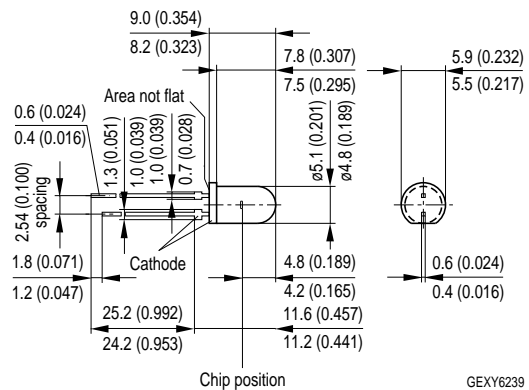
GEOY6961



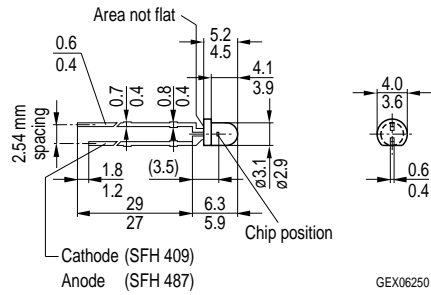
Dimensions in mm (inch)

**Figure 73: SFH 4761****Figure 74: SFH 484, SFH 4550****Figure 75: SFH 4546, SFH 4556****Figure 76: SFH 487, SFH 4341, SFH 4350****Figure 77: SFH 4850, SFH 464, LD 242, SFH 483****Figure 78: SFH 4545, SFH 4555**

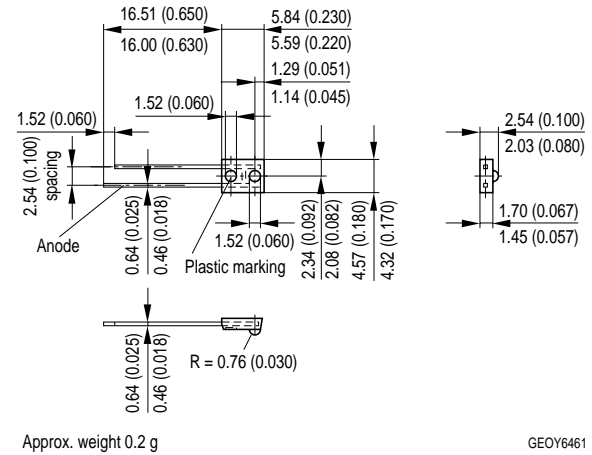
Dimensions in mm (inch)

**Figure 79: SFH 486****Figure 80: SFH 485****Figure 81: SFH 485 P****Figure 82: SFH 487 P****Figure 83: LD 274****Figure 84: LD 271, LD 271 H**

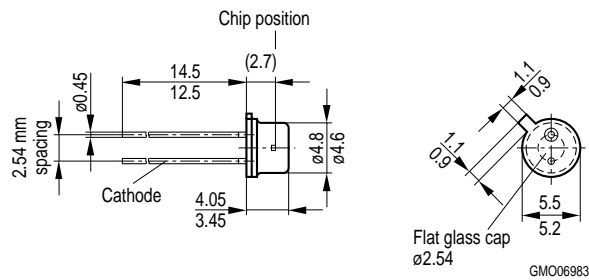
Dimensions in mm (inch)

**Figure 85: SFH 409**

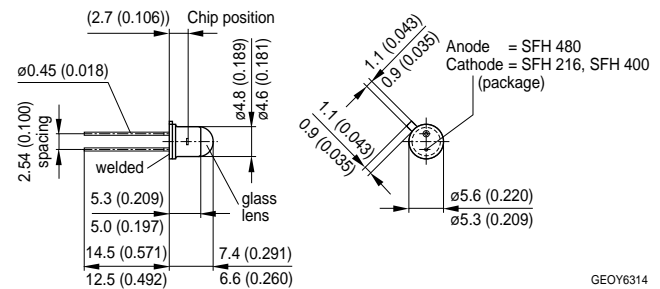
GEX06250

**Figure 86: IRL 80 A, IRL 81 A**

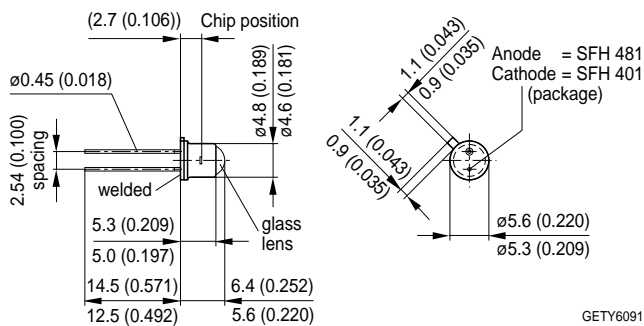
GEOY6461

**Figure 87: SFH 4860**

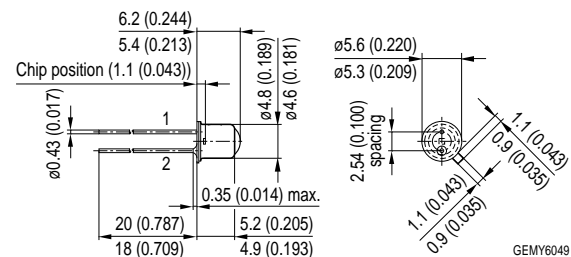
GMO06983

**Figure 88: SFH 400, SFH 480**

GEOY6314

**Figure 89: SFH 401**

GETY6091

**Figure 90: SFH 4811, SFH 4881**

GEMY6049

Dimensions in mm (inch)

Figure 91: SFH 4883, SFH 4813

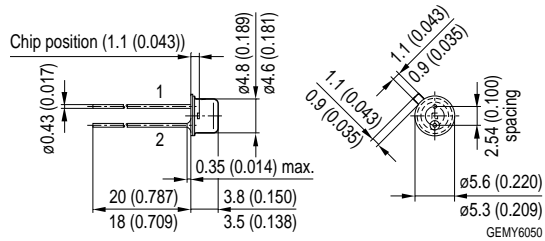


Figure 92: SFH 3015 FA, SFH 4045

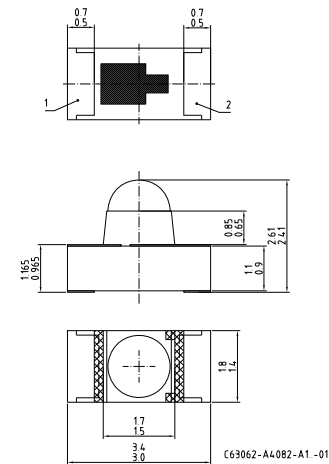


Figure 93: SFH 2400 FAR

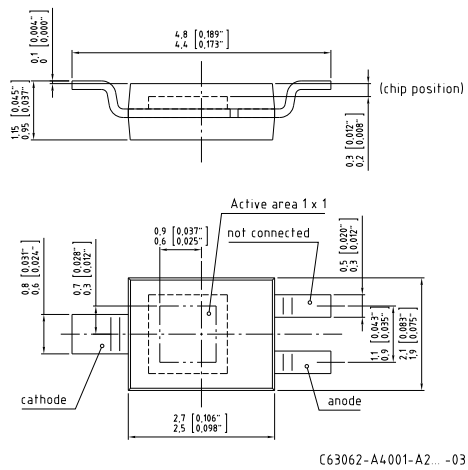


Figure 94: SFH 4056

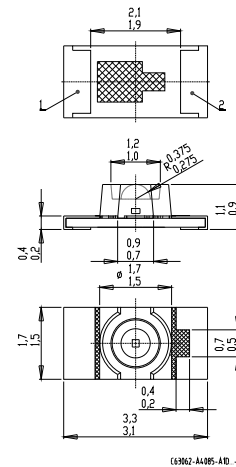


Figure 95: SFH 4058

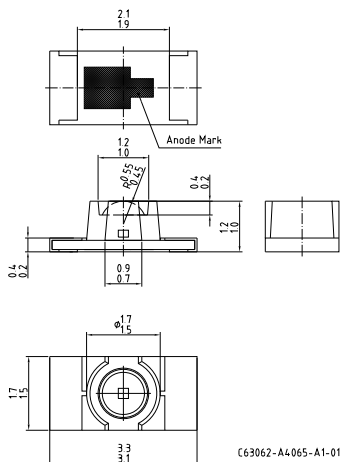
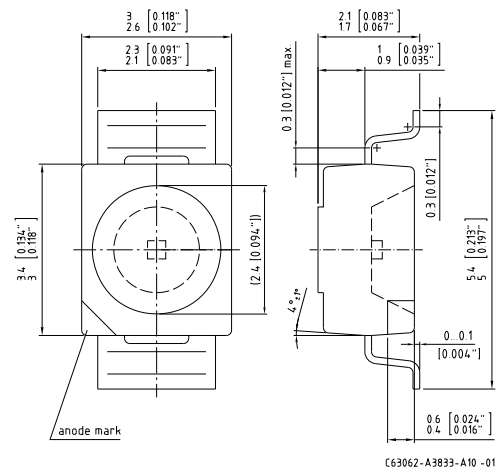


Figure 96: SFH 4257 R



Dimensions in mm (inch)

Figure 97: SFH 2270 R

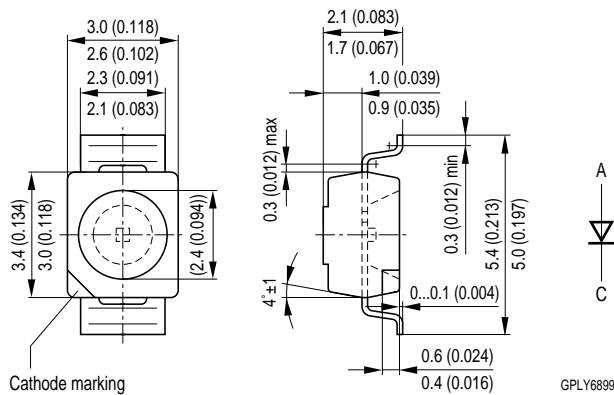


Figure 98: SFH 5712

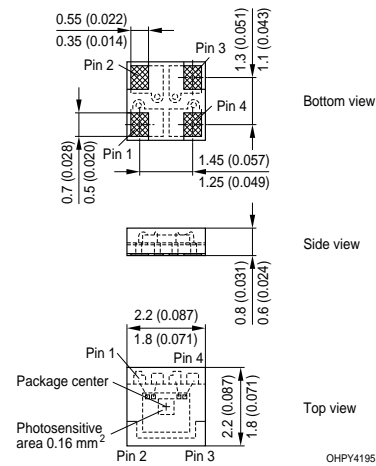


Figure 99: SFH 4059, SFH 4059S

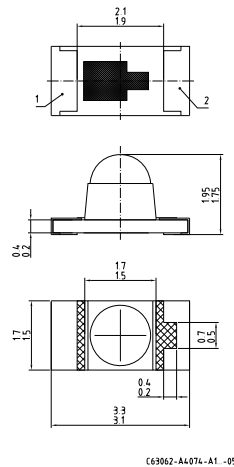


Figure 100: SFH 4236, SFH 4239

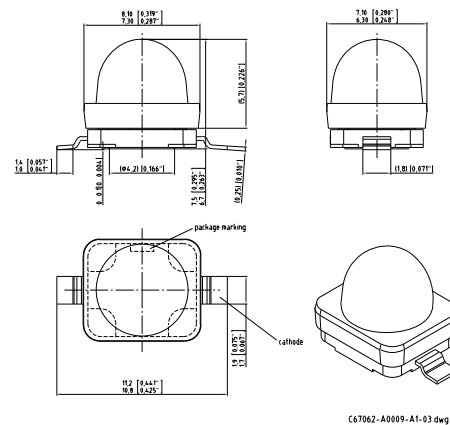


Figure 101: SFH 4053

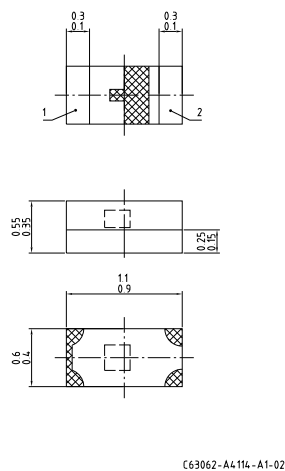
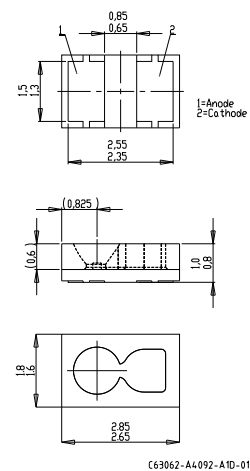
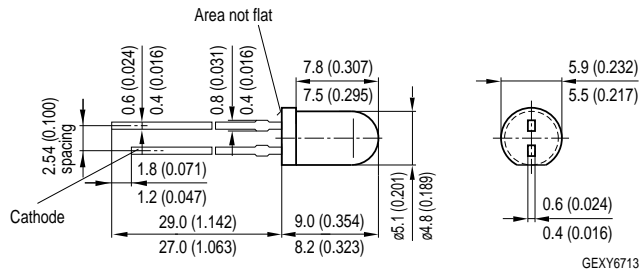
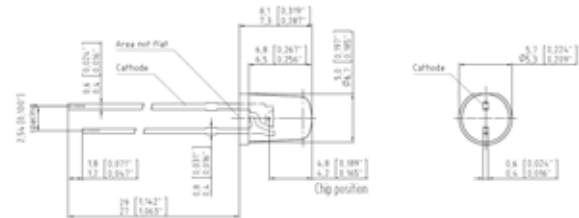


Figure 102: SFH 4450



Dimensions in mm (inch)

**Figure 103: SFH 4512****Figure 104: SFH 4547, SFH 4557**

## Laser Diodes





## Laser Diodes

### Blue Laser Diode

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PL 450B

### Pulsed laser diodes

Page 175



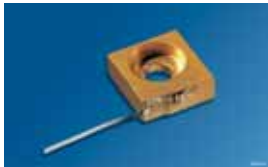
SPL PLxx



SPL LLxx

### CW laser diodes (single emitter)

Page 175



SPL CGxx



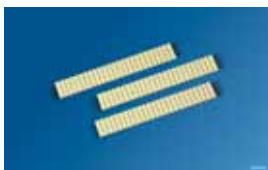
SPL 2Fxx



SPL TD85-C

### Unmounted laser bars

Page 176



SPL BGxx / SPL BKxx



SPL BXxx



SPL BSxx

### Pulsed laser dies

Page 176



SPL DLxx

**Safety Advice**

Depending on the mode of operation, these devices emit highly concentrated non visible infrared light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1 "Safety of laser products".

**Informationen zur Augensicherheit**

Je nach Betriebsart emittieren diese Bauteile hochkonzentrierte, nicht sichtbare Infrarot-Strahlung, die gefährlich für das menschliche Auge sein kann. Produkte, die diese Bauteile enthalten, müssen gemäß den Sicherheitsrichtlinien der IEC-Norm 60825-1 behandelt werden.

**Type Designation****Bezeichnungsschema**

| SPL | Type | Package                  | Subtype | Chip Type/Opt. Output                    | Wavelength | nm (Center) |
|-----|------|--------------------------|---------|------------------------------------------|------------|-------------|
|     | P    | Plastic package          | L       | Pulsed laser                             | 81         | 808         |
|     | L    | Lead frame based package | G       | 25 emitters, 200/400 µm, 50% Fill factor | 85         | 850         |
|     | C    | C-mount carrier          | K       | 25 emitters, 200/400 µm, 50% Fill factor | 90         | 905         |
|     | 2    | sealed housing (TO- 220) | X       | 19 emitters, 150/500 µm, 30% Fill factor | 91         | 915         |
|     | B    | Bar, unmounted           | S       | 75 emitters, 82% Fill factor             | 94         | 940         |
|     | D    | Die, chip                | F       | Fiber connector (FC)                     | 98         | 975         |
|     | T    | TO-56                    | D       | Single emitter with 80µm aperture        |            |             |


**Note:**

cw = continuous wave




qcw = quasi continuous wave

xx in the type name (e.g. SPL PLxx) refers to the wavelength



## Blue Laser Diode

| Package                                                                           | Type    | $\lambda_{\text{peak typ}}$<br><br>[nm] | Opt. peak power<br>$P_{\text{opt}}$<br>[W] | $V_F$<br>typ<br>[V] | Measure-<br>ment<br>cond. | Beam diver-<br>gence (FWHM)<br>$\Theta_{\perp} \times \Theta_{\parallel}$<br>[°] | Package Features  | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------|---------|-----------------------------------------|--------------------------------------------|---------------------|---------------------------|----------------------------------------------------------------------------------|-------------------|---------------|-----------------|
|                                                                                   |         |                                         |                                            |                     |                           |                                                                                  |                   |               |                 |
|  | PL 450B | 450                                     | 0.08                                       | 5.8                 | $I_F = 100$<br>mA         | 21° x 7°                                                                         | T038 iCut package | Q65111A0518   | 1               |


## Pulsed laser diodes

| Package                                                                             | Type         | Package Outline                        | $\lambda_{\text{peak typ}}$<br>[nm] | Opt. peak power<br>$P_{\text{opt}}$<br>[W] | Beam diver-<br>gence (FWHM)<br>$\Theta_{\perp} \times \Theta_{\parallel}$<br>[°] | Package Features                                                      | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|--------------|----------------------------------------|-------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------|--------------|
|    | SPL PL85     | Plastic housing                        | 850                                 | 10                                         | 25° x 11°                                                                        | 5 mm radial plastic package, pulse width < 100 ns                     | Q62702P1759   | 2            |
|                                                                                     | SPL PL90_0   |                                        | 905                                 | 4                                          |                                                                                  |                                                                       | Q62702P5270   |              |
|                                                                                     | SPL PL90     |                                        |                                     | 25                                         |                                                                                  |                                                                       | Q62702P1760   |              |
|                                                                                     | SPL PL90_3   |                                        |                                     | 75                                         |                                                                                  |                                                                       | Q62702P5353   |              |
|  | SPL PL90_0-B | Plastic housing                        | 905                                 | 4                                          | 25° x 11°                                                                        | 5 mm radial plastic package, pulse width < 100 ns bended leads        | Q65110A8790   | 3            |
|  | SPL LL85     | Plastic housing with integrated driver | 850                                 | 14                                         | 30° x 15°                                                                        | Integrated laser driver circuit, plastic package, pulse width < 50 ns | Q62702P3558   | 4            |
|                                                                                     | SPL LL90_3   |                                        | 905                                 | 70                                         |                                                                                  |                                                                       | Q65110A1009   | 5            |




## CW laser diodes (single emitter)

| Package                                                                             | Type        | Package Outline    | $\lambda_{\text{peak typ}}$<br>[nm] | Opt. power<br>$P_{\text{opt}}$<br>[W] | Beam diver-<br>gence (FWHM)<br>$\Theta_{\perp} \times \Theta_{\parallel}$<br>[°] | Package Features                  | Ordering Code | Package Fig. |
|-------------------------------------------------------------------------------------|-------------|--------------------|-------------------------------------|---------------------------------------|----------------------------------------------------------------------------------|-----------------------------------|---------------|--------------|
|  | SPL CG81-2S | Laser on sub-mount | 808                                 | 2                                     | 38° x 7°                                                                         | Open heat sink (C-type)           | Q65110A1832   | 6            |
|                                                                                     | SPL CG94-2S |                    | 940                                 |                                       |                                                                                  |                                   | Q65110A1833   |              |
|  | SPL TD85-C  | T0-56              | 845                                 | 0.45                                  | 40° x 6°                                                                         | Hermetically sealed metal package | Q65111A0232   | 7            |


## CW laser diodes (single emitter)

| Package                                                                           | Type            | Package Outline           | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Opt.<br>power<br>$P_{\text{opt}}$<br>[W] | Fiber diame-<br>ter<br>$\varnothing$<br>[μm] | Numerical<br>aperture<br>NA | Package Features                                                                                              | Ordering Code | Package<br>Fig. |
|-----------------------------------------------------------------------------------|-----------------|---------------------------|----------------------------------------|------------------------------------------|----------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------|---------------|-----------------|
|  | SPL 2F81-2S     | T0-220 FC (fiber coupled) | 808                                    | 1.5                                      | 200                                          | 0.22                        | T0-220 package, FC-receptacle for efficient fiber coupling, thermistor for temperature and wavelength control | Q65110A1722   | 8               |
|                                                                                   | SPL 2F81-2S-105 |                           |                                        | 1.2                                      | 105                                          |                             |                                                                                                               | Q65110A8451   |                 |
|                                                                                   | SPL 2F94-2S     |                           | 940                                    | 1.5                                      | 200                                          |                             |                                                                                                               | Q65110A1828   |                 |

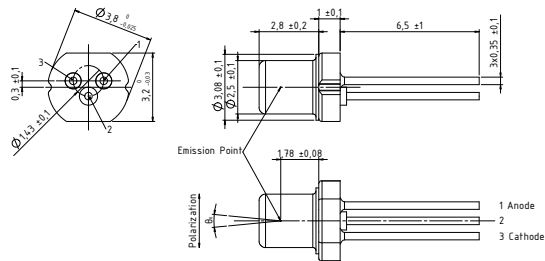
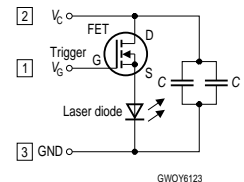
## Unmounted laser bars

| Package                                                                             | Type          | Package Out-<br>line   | $\lambda_{\text{peak}}$<br>typ<br>[nm] | $P_{\text{opt}}$<br>typ<br>[W] | Beam diver-<br>gence full angle<br>(1/e <sup>2</sup> )<br>$\Theta_{\perp} \times \Theta_{\parallel}$<br>[°] | Package Features                                                                                               | Chip size<br><br>[mm x mm] | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------|---------------|------------------------|----------------------------------------|--------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------|---------------|-----------------|
|    | SPL BG81-9S   | unmounted<br>laser bar | 808                                    | 50                             | 65° x 9°                                                                                                    | 50% filling factor,<br>25 emitters,<br>emitter width 200 μm,<br>emitter pitch 400 μm                           | 10 x 0.9                   | Q62702P5503   |                 |
|                                                                                     | SPL BK81-12S  |                        | 60                                     | 10 x 1.2                       |                                                                                                             |                                                                                                                | Q65110A8104                |               |                 |
|                                                                                     | SPL BK91-12S  |                        |                                        |                                |                                                                                                             |                                                                                                                | Q65110A8801                |               |                 |
|                                                                                     | SPL BK94-12S  |                        |                                        |                                |                                                                                                             |                                                                                                                | Q65110A8820                |               |                 |
|                                                                                     | SPL BK98-12S  |                        | 980                                    | 100                            |                                                                                                             |                                                                                                                | Q65110A8878                |               |                 |
|                                                                                     | SPL BK81-20H  |                        | 808                                    |                                |                                                                                                             |                                                                                                                | Q65110A8725                |               |                 |
|                                                                                     | SPL BK91-20HT |                        | 915                                    | 120                            |                                                                                                             |                                                                                                                | Q65110A8594                |               |                 |
|                                                                                     | SPL BK94-20HT |                        | 940                                    |                                |                                                                                                             |                                                                                                                | Q65110A8595                |               |                 |
|                                                                                     | SPL BK98-20HT |                        | 980                                    |                                |                                                                                                             |                                                                                                                | Q65110A8596                |               |                 |
|  | SPL BX81-2S   | unmounted<br>laser bar | 808                                    | 40                             | 65° x 9°                                                                                                    | 30% filling factor,<br>19 emitters,<br>emitter width 150 μm,<br>emitter pitch 500 μm                           | 9.5 x 1.2                  | Q62702P5510   |                 |
|                                                                                     | SPL BX94-2S   |                        | 940                                    |                                |                                                                                                             |                                                                                                                |                            | Q62702P5512   |                 |
|                                                                                     | SPL BX98-2S   |                        | 980                                    |                                |                                                                                                             |                                                                                                                |                            | Q65110A0740   |                 |
|  | SPL BS81-6    | unmounted<br>laser bar | 808                                    | 100                            | 70° x 12°                                                                                                   | 82.5% filling factor,<br>75 emitters,<br>emitter width 110 μm,<br>emitter pitch 130 μm<br>for qcw applications | 10 x 0.6                   | Q62702P1719   |                 |
|                                                                                     | SPL BS81-9S   |                        |                                        | 150                            | 65° x 9°                                                                                                    |                                                                                                                | 10 x 0.9                   | Q65110A2676   |                 |
|                                                                                     | SPL BS94-2S   |                        | 940                                    | 200                            |                                                                                                             |                                                                                                                | 10 x 1.2                   | Q65110A6958   |                 |

## Pulsed laser dies

| Package                                                                             | Type       | Package Out-<br>line    | $\lambda_{\text{peak}}$<br>typ<br>[nm] | Opt.<br>peak<br>power<br>$P_{\text{opt}}$<br>[W] | Beam diver-<br>gence (FWHM)<br>$\Theta_{\perp} \times \Theta_{\parallel}$<br>[°] | Package Features     | Chip size<br>[mm x mm] | Ordering Code | Package<br>Fig. |
|-------------------------------------------------------------------------------------|------------|-------------------------|----------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------|----------------------|------------------------|---------------|-----------------|
|  | SPL DL90_3 | unmounted<br>laser chip | 905                                    | 75                                               | 25° x 11°                                                                        | emitter width 200 μm | 0.6 x 0.6              | Q65110A2591   |                 |

**Figure 1: PL 450B**

[illegible][illegible]

**Figure 5: SPL LL90, SPL LL90\_3**

**Figure 6: SPL CGxx**

**Figure 7: SPL TD85-C**

**Figure 8: SPL 2Fxx**

## Tape and Reel





## SMT Components

### Tape and Reel

SMT components must be packed properly to assure perfect and economical processing. OSRAM Opto Semiconductors offers you, based on the in house experience, the packing in 8 mm-, 12 mm-, 16 mm- or 24 mm-standard tapes.

The leads are galvanic tin plated with pure tin (SN 100, thickness 4 -12  $\mu\text{m}$ ) for RoHS compliant devices, which ensures good solderability even after more than 2 years storage time. For the judgement of the solderability we follow the well accepted international standards IEC 68-2-20 or JESD22-B102-D.

**Tape dimensions acc. to IEC 60286-3, EIA 481-D**

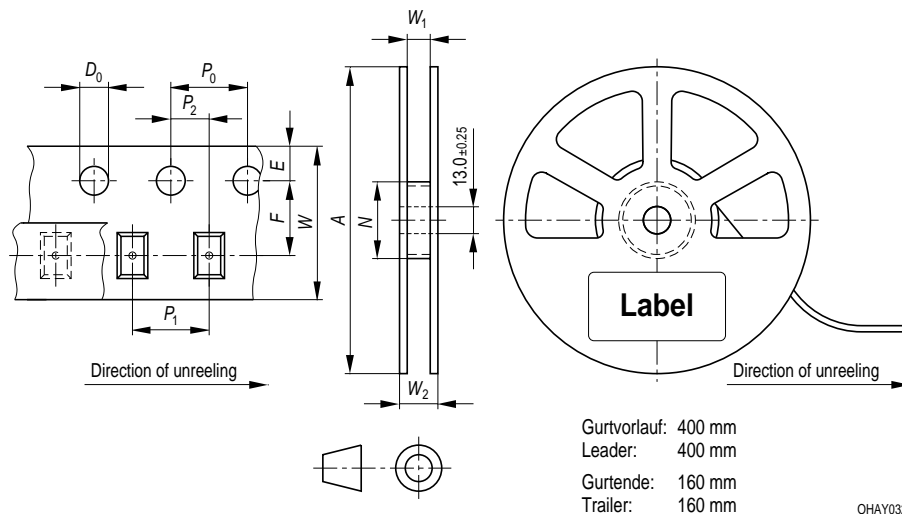
## SMT-Bauelemente

### Gurtverpackung

SMT-Bauelemente müssen in geeigneter Form verpackt sein, um eine einwandfreie und ökonomische Verarbeitung zu gewährleisten. Hier kann OSRAM Opto Semiconductors, basierend auf der "In-House-Erfahrung", die Verpackungen in 8 mm-, 12 mm-, 16 mm- oder 24 mm-Standardgurt anbieten.

Die galvanische Verzinnung der Anschlüsse mit Reinzinn (SN 100, Schichtdicke 4 -12  $\mu\text{m}$ ) bei RoHS konformen Bauteilen gewährleistet gute Löteigenschaften auch bei mehr als 2-jähriger Lagerzeit. Die Beurteilung der Lötbarkeit erfolgt nach den Kriterien der international anerkannten Standards IEC 68-2-20 oder JESD22-B102-D.

**Gurtmaße nach IEC 60286-3, EIA 481-D**



### Method of Taping/Polarity and Orientation

### Gurtausführung/Polarität und Lage

Tape dimensions in mm (inch)

| $W$                                            | $P_0$                          | $P_1$                                                                | $P_2$                           | $D_0$                          | $E$                               | $F$                               |
|------------------------------------------------|--------------------------------|----------------------------------------------------------------------|---------------------------------|--------------------------------|-----------------------------------|-----------------------------------|
| $8 + 0.3 / - 0.1$<br>(0.315 + 0.112 / -0.004)  | $4 \pm 0.1$<br>(0.157 ± 0.004) | $2 \pm 0.05$<br>(0.079 ± 0.002) or<br>$4 \pm 0.1$<br>(0.157 ± 0.004) | $2 \pm 0.05$<br>(0.079 ± 0.002) | $1.5 + 0.1$<br>(0.059 + 0.004) | $1.75 \pm 0.1$<br>(0.069 ± 0.004) | $3.5 \pm 0.05$<br>(0.138 ± 0.002) |
| $12 + 0.3 / - 0.1$<br>(0.472 + 0.112 / -0.004) | $4 \pm 0.1$<br>(0.157 ± 0.004) | $4 \pm 0.1$<br>(0.157 ± 0.004) or<br>$8 \pm 0.1$<br>(0.315 ± 0.004)  | $2 \pm 0.05$<br>(0.079 ± 0.002) | $1.5 + 0.1$<br>(0.059 + 0.004) | $1.75 \pm 0.1$<br>(0.069 ± 0.004) | $5.5 \pm 0.05$<br>(0.217 ± 0.002) |
| $16 + 0.3 / - 0.1$<br>(0.630 + 0.112 / -0.004) | $4 \pm 0.1$<br>(0.157 ± 0.004) | $12 \pm 0.1$<br>(0.472 ± 0.004)                                      | $2 \pm 0.1$<br>(0.079 ± 0.004)  | $1.5 + 0.1$<br>(0.059 + 0.004) | $1.75 \pm 0.1$<br>(0.069 ± 0.004) | $7.5 \pm 0.1$<br>(0.295 ± 0.004)  |
| $24 + 0.3 / - 0.1$<br>(0.945 + 0.112 / -0.004) | $4 \pm 0.1$<br>(0.157 ± 0.004) | $8 \pm 0.1$<br>(0.315 ± 0.004) or<br>$12 \pm 0.1$<br>(0.472 ± 0.004) | $2 \pm 0.1$<br>(0.079 ± 0.004)  | $1.5 + 0.1$<br>(0.059 + 0.004) | $1.75 \pm 0.1$<br>(0.069 ± 0.004) | $11.5 \pm 0.1$<br>(0.453 ± 0.004) |

Reel dimensions in mm (inch)

| $A$                | $W$        | $N_{\min}$               | $W_1$                      | $W_2 \max$   |
|--------------------|------------|--------------------------|----------------------------|--------------|
| 180 (7) / 330 (13) | 8 (0.315)  | 60 (2.362)               | $8.4 + 2 (0.331 + 0.079)$  | 14.4 (0.567) |
| 180 (7) / 330 (13) | 12 (0.472) | 60 (2.362)               | $12.4 + 2 (0.488 + 0.079)$ | 18.4 (0.724) |
| 180 (7) / 330 (13) | 16 (0.630) | 60 (2.362) / 100 (3.937) | $16.4 + 2 (0.646 + 0.079)$ | 22.4 (0.882) |
| 180 (7) / 330 (13) | 24 (0.945) | 60 (2.362) / 100 (3.937) | $24.4 + 2 (0.961 + 0.079)$ | 30.4 (1.197) |

## SMT Components

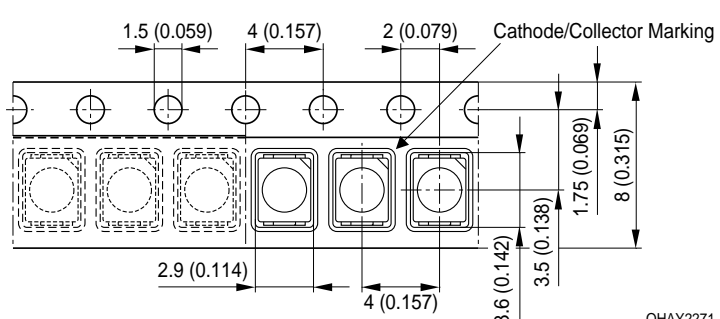
### Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## SMT-Bauelemente

### Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Gehäuse<br>Package                  | Verpackungseinheit<br>Packing Unit                                                      | Gurtführung<br>Method of Taping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TOPLD<br><br>8 mm-Gurt<br>8 mm-Tape | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7)<br><br>8000 / Rolle Ø 330<br>8000 / Reel (Ø 13) |  <p>The diagram illustrates the tape layout for TOPLD packages. It shows a series of rectangular packages on a carrier tape. Key dimensions and markings are labeled: 1.5 (0.059) for the first hole spacing, 4 (0.157) for the package pitch, 2 (0.079) for the second hole spacing, and 2.9 (0.114) for the package width. Vertical dimensions include 3.6 (0.142) for the tape thickness, 3.5 (0.138) for the package height, 1.75 (0.069) for the package width, and 8 (0.315) for the total tape height. A 'Cathode/Collector Marking' is indicated on the package. The reference code OHAY2271 is shown at the bottom right.</p> |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Package<br>Gehäuse                                               | Packing Unit<br>Verpackungseinheit                                                      | Method of Taping<br>Gurtführung                                                                                                                                                       |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TOPLED with Lens<br><br>12 mm-Gurt<br>12 mm-Tape                 | 2000 / Rolle Ø 330<br>2000 / Reel (Ø 13)                                                | <p style="text-align: right;">OHAY0476</p>                                                                                                                                            |
| TOPLED<br>Reverse Gullwing<br><br>12 mm-Gurt<br>12 mm-Tape       | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7)<br><br>8000 / Rolle Ø 330<br>8000 / Reel (Ø 13) | <p style="text-align: right;">OHAY2272</p>                                                                                                                                            |
| Multi TOPLED<br><br>8 mm-Gurt<br>8 mm-Tape                       | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7)<br><br>8000 / Rolle Ø 330<br>8000 / Reel (Ø 13) | <p style="text-align: right;">OHAY0536</p> <p>Elektrisches Ersatzschaltbild siehe Produkt-Datenblatt.<br/>For alternative electrical circuit diagram refer to product data sheet.</p> |
| Multi TOPLED<br>Reverse Gullwing<br><br>12 mm-Gurt<br>12 mm-Tape | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7)<br><br>8000 / Rolle Ø 330<br>8000 / Reel (Ø 13) | <p style="text-align: right;">OHAY1236</p>                                                                                                                                            |

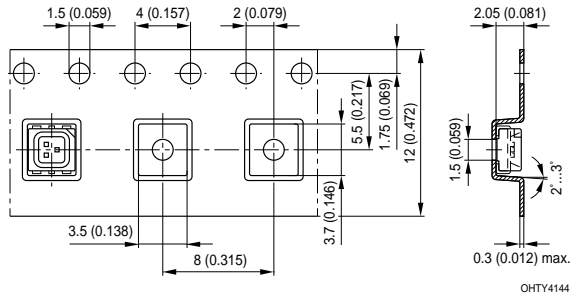
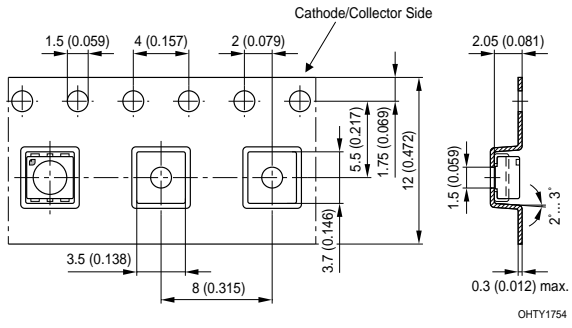
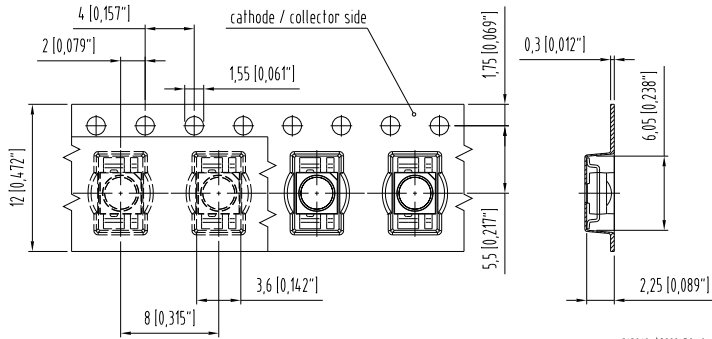
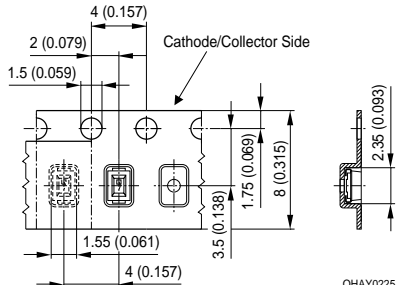
Note: The cathode identification for Multi TOPLED refers to the LED die with the higher wavelength.  
Hinweis: Bei Multi TOPLED bezieht sich die Polaritätsangabe Cathode auf den LED-Chip mit der höheren Wellenlänge.

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Package<br>Gehäuse                                          | Packing Unit<br>Verpackungseinheit                                                        | Method of Taping<br>Gurtführung                                                                                                                                                                                                                |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6-lead TOPLED<br><br>12 mm-Gurt<br>12 mm-Tape               | 1000 / Rolle Ø 180<br>1000 / Reel (Ø 7)<br><br>4000 / Rolle Ø 330<br>4000 / Reel (Ø 13)   |  <p>OHTY4144</p> <p>Elektrisches Ersatzschaltbild siehe Produkt-Datenblatt.<br/>For alternative electrical circuit diagram refer to product data sheet.</p>  |
| Advanced Power TOPLED<br><br>12 mm-Gurt<br>12 mm-Tape       | 1000 / Rolle Ø 180<br>1000 / Reel (Ø 7)<br><br>4000 / Rolle Ø 330<br>4000 / Reel (Ø 13)   |  <p>OHTY1754</p> <p>Elektrisches Ersatzschaltbild siehe Produkt-Datenblatt.<br/>For alternative electrical circuit diagram refer to product data sheet.</p> |
| Advanced Power TOPLED Plus<br><br>12 mm-Gurt<br>12 mm-Tape  | 3500 / Rolle Ø 330<br>3500 / Reel (Ø 13)                                                  |  <p>63062-A3998-B9 - 04</p>                                                                                                                                |
| Mini TOPLED<br>(folded leads)<br><br>8 mm-Gurt<br>8 mm-Tape | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7)<br><br>12000 / Rolle Ø 330<br>12000 / Reel (Ø 13) |  <p>OHA0225</p>                                                                                                                                            |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

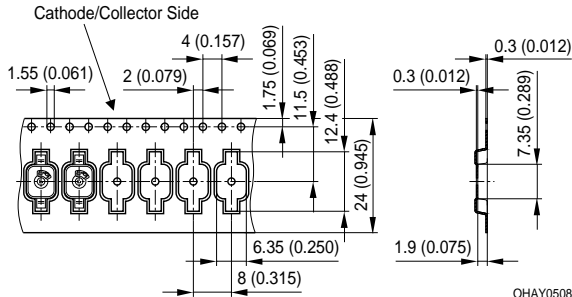
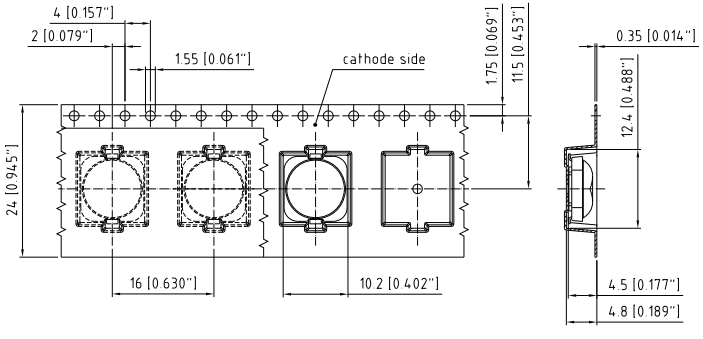
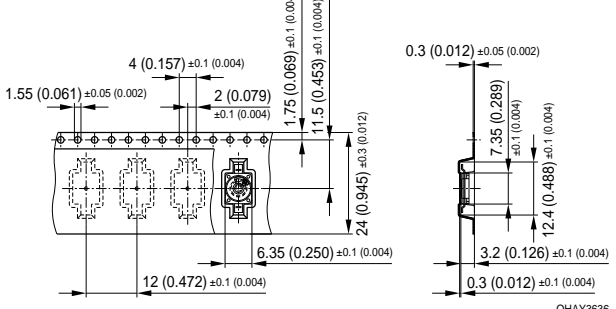
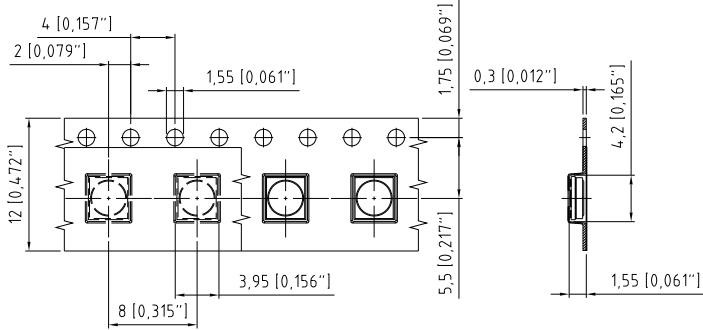
| Package<br>Gehäuse                                        | Packing Unit<br>Verpackungseinheit                                                      | Method of Taping<br>Gurtführung                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mini TOPLED Santana<br><br>12 mm-Gurt<br>12 mm-Tape       | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7)<br><br>11800/Rolle Ø 330<br>11800/Reel (Ø 13)   | <p>Technical drawing of Mini TOPLED Santana tape. Dimensions: 4 (0.157), 2 (0.079), 1.5 (0.059), 1.75 (0.069), 5.5 (0.217), 12 (0.472), 1.55 (0.061), 4 (0.157). Cathode/Collector Side. OHAY1358</p>                                                                                                                                                                                                                                               |
| Power TOPLED<br><br>8 mm-Gurt<br>8 mm-Tape                | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7)<br><br>8000 / Rolle Ø 330<br>8000 / Reel (Ø 13) | <p>Technical drawing of Power TOPLED tape. Dimensions: 1.5 (0.059), 4 (0.157), 2 (0.079), 2.9 (0.114), 4 (0.157), 3.6 (0.142), 3.5 (0.138), 1.75 (0.069), 8 (0.315). Cathode/Collector Marking. OHAY0536</p>                                                                                                                                                                                                                                        |
| PointLED<br><br>8 mm-Gurt<br>8 mm-Tape                    | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7)<br><br>10000/Rolle Ø 330<br>10000/Reel (Ø 13)   | <p>Technical drawing of PointLED tape. Dimensions: 1.5 (0.059) ±0.1 (0.004), 4 (0.157), 2 (0.079) ±0.05 (0.002), 1.75 (0.069) ±0.05 (0.002), 2.8 (0.110) ±0.05 (0.002), 3.5 (0.138) ±0.05 (0.002), 8.1 (0.319) ±0.1 (0.004), 1.1 (0.043), 0.8 (0.031) ±0.05 (0.002), 1.5 (0.059) ±0.05 (0.002), 0.3 (0.012) max., 5° max., 0.45 (0.018) ±0.05 (0.002), 1.15 (0.045) ±0.05 (0.002), 3.75 (0.148) ±0.05 (0.002). Cathode/Collector Side. OHAY1306</p> |
| Power TOPLED<br>with Lens<br><br>12 mm-Gurt<br>12 mm-Tape | 2000 / Rolle Ø 330<br>2000 / Reel (Ø 13)                                                | <p>Technical drawing of Power TOPLED with Lens tape. Dimensions: 1.5 (0.059), 4 (0.157), 2 (0.079), 3 (0.118), 8 (0.315), 3.8 (0.150), 5.5 (0.217), 1.75 (0.069), 12 (0.472). Cathode/Collector Side. OHAY0734</p>                                                                                                                                                                                                                                  |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Package<br>Gehäuse                                      | Packing Unit<br>Verpackungseinheit                                                    | Method of Taping<br>Gurtführung                                                                                  |
|---------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Golden DRAGON<br><br>24 mm-Gurt<br>24 mm-Tape           | 800 / Rolle Ø 180<br>800 / Reel (Ø 7)<br><br>3500 / Rolle Ø 330<br>3500 / Reel (Ø 13) |  <p>OHAY0508</p>               |
| Golden DRAGON oval Plus<br><br>24 mm-Gurt<br>24 mm-Tape | 100 / Rolle Ø 180<br>100 / Reel (Ø 7)<br><br>700 / Rolle Ø 330<br>700 / Reel (Ø 13)   |  <p>(670602-A0003-B3-02)</p>  |
| Golden DRAGON Plus<br><br>24 mm-Gurt<br>24 mm-Tape      | 200 / Rolle Ø 180<br>200 / Reel (Ø 7)                                                 |  <p>OHAY3636</p>             |
| OSRAM OSTAR Compact<br><br>12 mm-Gurt<br>12 mm-Tape     | 500 / Rolle Ø 180<br>500 / Reel (Ø 7)                                                 |  <p>(670602-A4055-B6-03)</p> |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Package<br>Gehäuse                                             | Packing Unit<br>Verpackungseinheit                                                        | Method of Taping<br>Gurtführung |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------|
| SIDELED<br>Multi SIDELED<br><br>12 mm-Gurt<br>12 mm-Tape       | 2000 / Rolle Ø 330<br>2000 / Reel (Ø 13)                                                  |                                 |
| Micro SIDELED<br><br>8 mm-Gurt<br>8 mm-Tape                    | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7)<br><br>10000 / Rolle Ø 330<br>10000 / Reel (Ø 13) |                                 |
| Micro SIDELED 0.8<br><br>Lx Y1xx<br><br>8 mm-Gurt<br>8 mm-Tape | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7)                                                   |                                 |

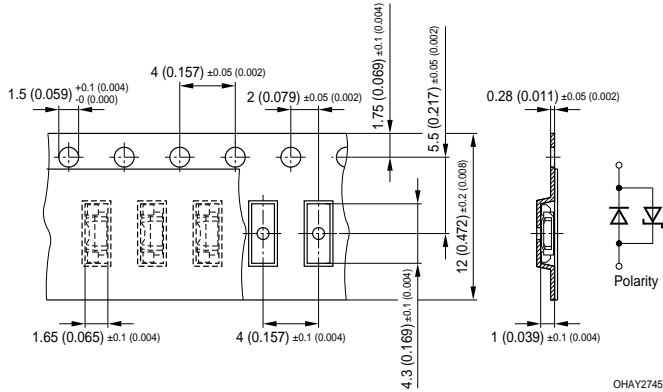
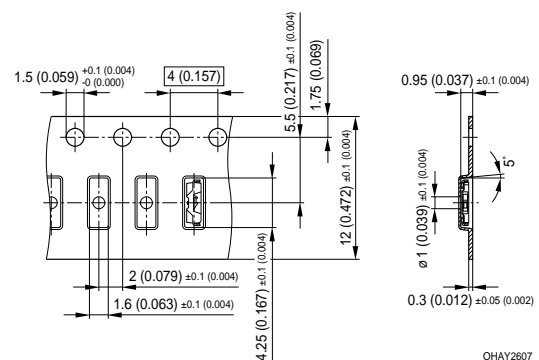
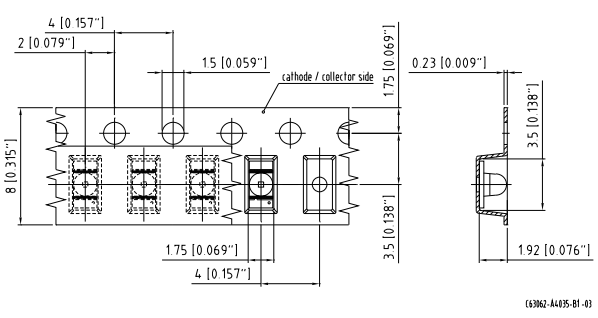
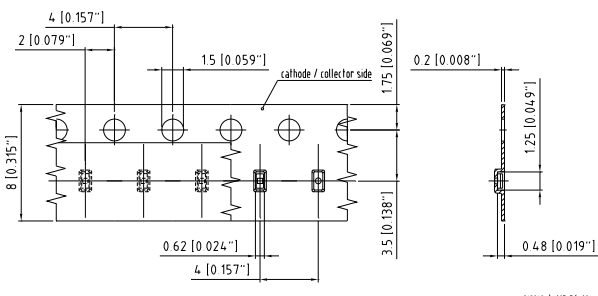
Note: The cathode identification for Multi SIDELED refers to the LED die with the higher wavelength.  
 Hinweis: Bei Multi SIDELED bezieht sich die Polaritätsangabe Cathode auf den LED-Chip mit der höheren Wellenlänge.

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Package<br>Gehäuse                                               | Packing Unit<br>Verpackungseinheit      | Method of Taping<br>Gurtführung                                                                                |
|------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Micro SIDELED 0.8<br><br>Lx Y2xx<br><br>12 mm-Gurt<br>12 mm-Tape | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7) |  <p>OHAY2745</p>             |
| Micro SIDELED 0.6<br><br>12 mm-Gurt<br>12 mm-Tape                | 3500 / Rolle Ø 180<br>3500 / Reel (Ø 7) |  <p>OHAY2607</p>            |
| CHIPLD with Lens<br><br>8 mm-Gurt<br>8 mm-Tape                   | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7) |  <p>(63862-4405-81-83)</p> |
| CHIPLD 0402<br><br>8 mm-Gurt<br>8 mm-Tape                        | 4000 / Rolle Ø 180<br>4000 / Reel (Ø 7) |  <p>(63862-4405-81-82)</p> |



## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Package<br>Gehäuse                         | Packing Unit<br>Verpackungseinheit      | Method of Taping<br>Gurtführung                    |
|--------------------------------------------|-----------------------------------------|----------------------------------------------------|
| CHIPLD 0603<br><br>8 mm-Gurt<br>8 mm-Tape  | 4000 / Rolle Ø 180<br>4000 / Reel (Ø 7) | <p style="text-align: right;">OHAY1538</p>         |
| CHIPLD 0805<br><br>8 mm-Gurt<br>8 mm-Tape  | 4000 / Rolle Ø 180<br>4000 / Reel (Ø 7) | <p style="text-align: right;">OHAY0530</p>         |
| CHIPLD 1206<br><br>8 mm-Gurt<br>8 mm-Tape  | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7) | <p style="text-align: right;">OHAY0529</p>         |
| FIREFLY 0402<br><br>8 mm-Gurt<br>8 mm-Tape | 4000 / Rolle Ø 180<br>4000 / Reel (Ø 7) | <p style="text-align: right;">(SMD-440X-81-42)</p> |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

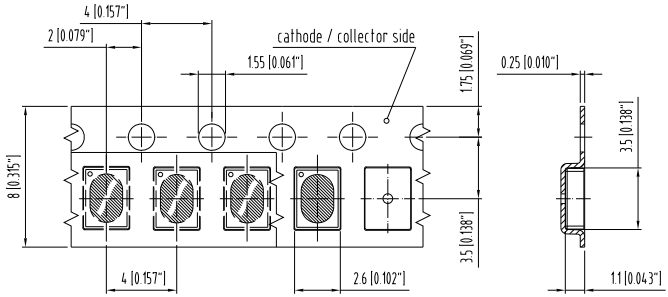
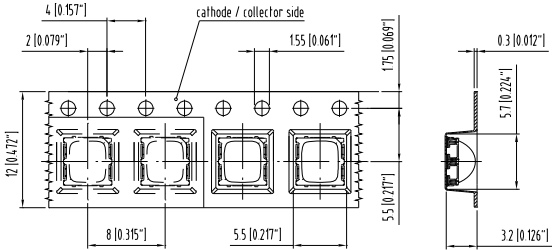
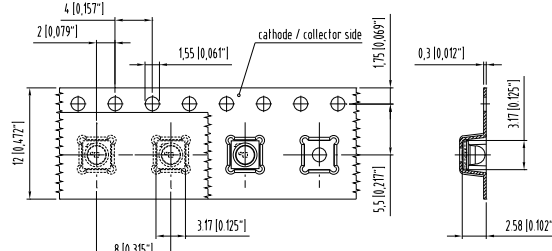
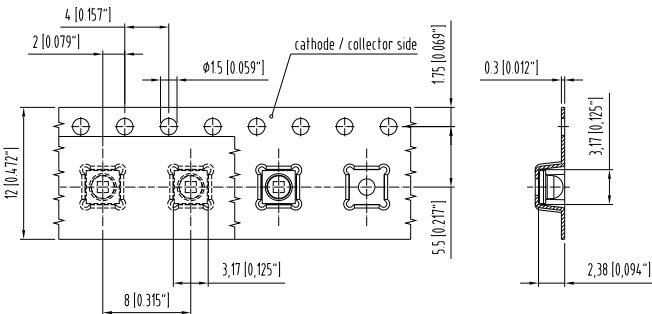
| Package<br>Gehäuse                                   | Packing Unit<br>Verpackungseinheit                                                    | Method of Taping<br>Gurtführung                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Firefly 0.3<br><br>8 mm-Gurt<br>8 mm-Tape            | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7)                                               | <p>Technical drawing of Firefly 0.3 package. Top view dimensions: 1.5 (0.059) mm, 4 (0.157) mm, 2 (0.079) mm, 3.5 (0.138) mm, 1.75 (0.069) mm, 8 (0.315) mm, 4 (0.157) mm, 1.1 (0.043) ±0.05 (0.002) mm. Side view dimensions: 2 (0.079) ±0.05 (0.002) mm. Label: OHAY2907.</p>                                         |
| OSRAM OSTAR SMT<br><br>12 mm-Gurt<br>12 mm-Tape      | 500 / Rolle Ø 180<br>500 / Reel (Ø 7)                                                 | <p>Technical drawing of OSRAM OSTAR SMT package. Top view dimensions: 4 [0.157"] mm, 2 [0.079"] mm, 1.55 [0.061"] mm, 12 [0.472"] mm, 8 [0.315"] mm, 4.95 [0.195"] mm, 5.5 [0.217"] mm, 1.75 [0.069"] mm. Side view dimensions: 0.3 [0.012"] mm, 6 [0.236"] mm, 1.45 [0.057"] mm. Label: (63062-A395-B7-01).</p>        |
| OSRAM OSTAR SMT Plus<br><br>12 mm-Gurt<br>12 mm-Tape | 200 / Rolle Ø 180<br>200 / Reel (Ø 7)<br><br>3000 / Rolle Ø 330<br>3000 / Reel (Ø 13) | <p>Technical drawing of OSRAM OSTAR SMT Plus package. Top view dimensions: 4 [0.157"] mm, 2 [0.079"] mm, 12 [0.472"] mm, 8 [0.315"] mm, 5.41 [0.213"] mm, 5.5 [0.217"] mm, 1.75 [0.069"] mm, Ø15 [0.059"] mm. Side view dimensions: 0.3 [0.012"] mm, 5.76 [0.227"] mm, 2.5 [0.098"] mm. Label: (63062-A4063-B6-06).</p> |
| CERAMOS<br><br>8 mm-Gurt<br>8 mm-Tape                | 4000 / Rolle Ø 180<br>4000 / Reel (Ø 7)                                               | <p>Technical drawing of CERAMOS package. Top view dimensions: 4 [0.157"] mm, 2 [0.079"] mm, 1.55 [0.061"] mm, 8 [0.315"] mm, 4 [0.157"] mm, 18 [0.071"] mm, 3.5 [0.138"] mm, 1.75 [0.069"] mm. Side view dimensions: 0.3 [0.012"] mm, 2.25 [0.089"] mm, 0.9 [0.035"] mm. Label: (63062-A3939-B4-06).</p>                |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

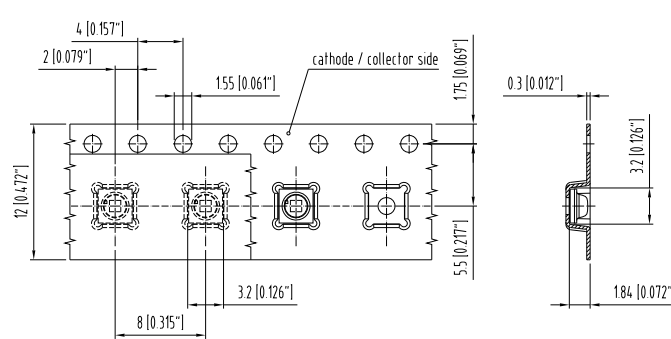
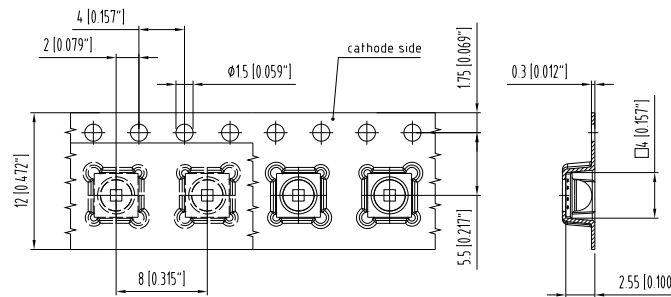
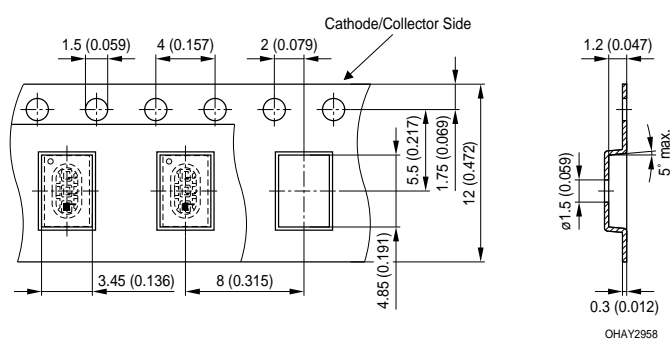
| Package<br>Gehäuse                                                          | Packing Unit<br>Verpackungseinheit                                                    | Method of Taping<br>Gurtführung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CERAMOS Reflector<br><br>8 mm-Gurt<br>8 mm-Tape                             | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7)                                               |  <p>Technical drawing of CERAMOS Reflector tape. The top view shows a series of five rectangular components with dimensions: 4 [0.157"] between components, 2 [0.079"] from the left edge to the first component, 155 [0.061"] for the central component, 26 [0.102"] for the last component, and 8 [0.315"] for the total width. The side view shows a height of 1.75 [0.069"] and a thickness of 0.25 [0.010"]. The component height is 3.5 [0.138"] and the base width is 1.1 [0.043"].</p> <p>(63062-A3994-B4 -02)</p> |
| OSLUX<br><br>12 mm-Gurt<br>12 mm-Tape                                       | 500 / Rolle Ø 180<br>500 / Reel (Ø 7)<br><br>2500 / Rolle Ø 330<br>2500 / Reel (Ø 13) |  <p>Technical drawing of OSLUX tape. The top view shows four rectangular components with dimensions: 4 [0.157"] between components, 2 [0.079"] from the left edge to the first component, 155 [0.061"] for the central component, and 8 [0.315"] for the total width. The side view shows a height of 1.75 [0.069"] and a thickness of 0.3 [0.012"]. The component height is 5.7 [0.224"] and the base width is 3.2 [0.126"].</p> <p>(63062-A4477-B3 -02)</p>                                                             |
| OSLON SX<br><br>12 mm-Gurt<br>12 mm-Tape                                    | 600 / Rolle Ø 180<br>600 / Reel (Ø 7)<br><br>3000 / Rolle Ø 330<br>3000 / Reel (Ø 13) |  <p>Technical drawing of OSLON SX tape. The top view shows four rectangular components with dimensions: 4 [0.157"] between components, 2 [0.079"] from the left edge to the first component, 155 [0.061"] for the central component, and 8 [0.315"] for the total width. The side view shows a height of 1.75 [0.069"] and a thickness of 0.3 [0.012"]. The component height is 3.17 [0.125"] and the base width is 2.58 [0.102"].</p> <p>(63062-A3991-B9 -07)</p>                                                       |
| OSLON XX ECE<br>OSLON LX<br>OSLON SSL (80°)<br><br>12 mm-Gurt<br>12 mm-Tape | 600 / Rolle Ø 180<br>600 / Reel (Ø 7)<br><br>3000 / Rolle Ø 330<br>3000 / Reel (Ø 13) |  <p>Technical drawing of OSLON XX ECE/LX/SSL tape. The top view shows four rectangular components with dimensions: 4 [0.157"] between components, 2 [0.079"] from the left edge to the first component, 155 [0.061"] for the central component, and 8 [0.315"] for the total width. The side view shows a height of 1.75 [0.069"] and a thickness of 0.3 [0.012"]. The component height is 3.17 [0.125"] and the base width is 2.38 [0.094"].</p> <p>(63062-A4054-B6 -05)</p>                                            |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Package<br>Gehäuse                                 | Packing Unit<br>Verpackungseinheit                                                      | Method of Taping<br>Gurtführung                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OSLON SSL (150°)<br><br>12 mm-Gurt<br>12 mm-Tape   | 1000 / Rolle Ø 180<br>1000 / Reel (Ø 7)<br><br>4000 / Rolle Ø 330<br>4000 / Reel (Ø 13) |  <p>Technical drawing of OSLON SSL package showing top and side views. Dimensions include: 4 [0.157"], 2 [0.079"], 155 [0.061"], 12 [0.472"], 8 [0.315"], 3.2 [0.126"], 5.5 [0.217"], 1.75 [0.069"], 0.3 [0.012"], 3.2 [0.126"], 1.84 [0.072"]. Labels: cathode / collector side.</p> <p>63062-AA051-B6-04</p> |
| OSLON Black Series<br><br>12 mm-Gurt<br>12 mm-Tape | 600 / Rolle Ø 180<br>600 / Reel (Ø 7)<br><br>3000 / Rolle Ø 330<br>3000 / Reel (Ø 13)   |  <p>Technical drawing of OSLON Black Series package showing top and side views. Dimensions include: 4 [0.157"], 2 [0.079"], 15 [0.059"], 12 [0.472"], 8 [0.315"], 5.5 [0.217"], 1.75 [0.069"], 0.3 [0.012"], 2.55 [0.100"]. Labels: cathode side.</p> <p>63062-AA068-B10-05</p>                               |
| Multi CERAMOS<br><br>12 mm-Gurt<br>12 mm-Tape      | 1000 / Rolle Ø 180<br>1000 / Reel (Ø 7)<br><br>3000 / Rolle Ø 330<br>3000 / Reel (Ø 13) |  <p>Technical drawing of Multi CERAMOS package showing top and side views. Dimensions include: 1.5 (0.059), 4 (0.157), 2 (0.079), 12 (0.472), 5.5 (0.217), 1.75 (0.069), 4.85 (0.191), 8 (0.315), 3.45 (0.136), 1.2 (0.047), 0.3 (0.012), 5° max. Labels: Cathode/Collector Side.</p> <p>OHAY2958</p>        |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

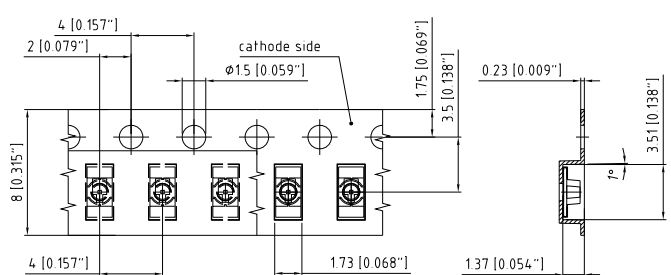
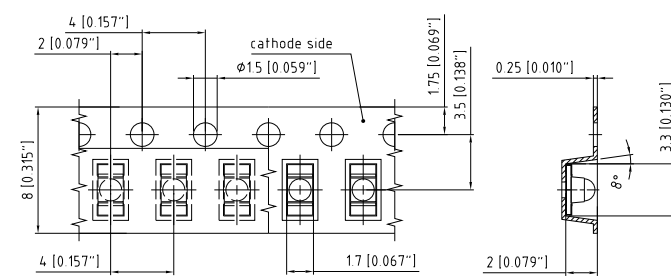
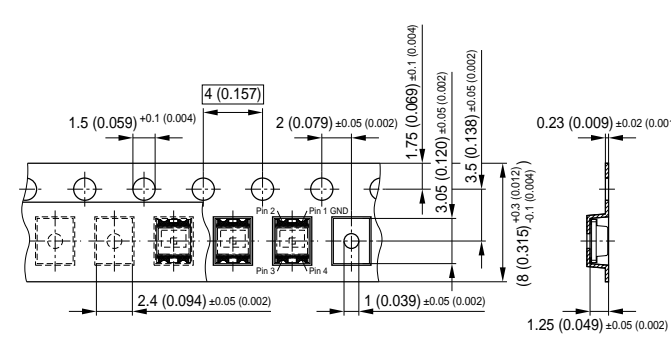
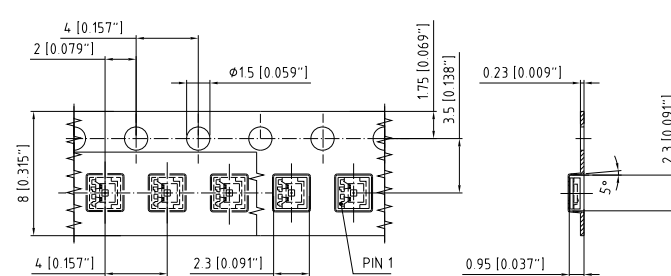
| Package<br>Gehäuse                                             | Packing Unit<br>Verpackungseinheit      | Method of Taping<br>Gurtführung                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CHIPLD<br>SFH 3710<br><br>8 mm-Gurt<br>8 mm-Tape               | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7) | <p>Technical drawing of SFH 3710 tape showing dimensions and cathode/collector side orientation. Dimensions include: 1.5 (0.059) ±0.1 (0.004), 4 (0.157), 2 (0.079) ±0.05 (0.002), 1.75 (0.069) ±0.1 (0.004), 2.27 (0.089) ±0.1 (0.004), 3.5 (0.138) ±0.05 (0.002), 8 (0.315) ±0.3 (0.012), 1.47 (0.058) ±0.1 (0.004), 1 (0.039) ±0.25 (0.010), 0.23 (0.009) ±0.02 (0.001), 1.04 (0.041) ±0.1 (0.004). Reference: OHAY2862.</p> |
| CHIPLD<br>SFH 4045 / SFH 3015 FA<br><br>8 mm-Gurt<br>8 mm-Tape | 1500 / Rolle Ø 180<br>1500 / Reel (Ø 7) | <p>Technical drawing of SFH 4045 / SFH 3015 FA tape showing dimensions and anode/collector side orientation. Dimensions include: 4 (0.157"), 2 (0.079"), 8 (0.315"), 4 (0.157"), 1.75 (0.069"), 3.5 (0.138"), 1.2 (0.047"), 2.72 (0.107"), 0.23 (0.009"), 3.42 (0.135"), 1.75 (0.069"), 1.98 (0.078"). Reference: C63062-A4082-B1-01.</p>                                                                                       |
| CHIPLD<br>SFH 4053<br><br>8 mm-Gurt<br>8 mm-Tape               | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7) | <p>Technical drawing of SFH 4053 tape showing dimensions and cathode side orientation. Dimensions include: 4 (0.157"), 2 (0.079"), 8 (0.315"), 4 (0.157"), 1.75 (0.069"), 3.5 (0.138"), 0.61 (0.024"), 0.21 (0.008"), 1.12 (0.044"), 0.61 (0.024"). Reference: C63062-A4116-B1-02.</p>                                                                                                                                          |
| CHIPLD<br>SFH 4056<br><br>8 mm-Gurt<br>8 mm-Tape               | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7) | <p>Technical drawing of SFH 4056 tape showing dimensions and cathode side orientation. Dimensions include: 4 (0.157"), 2 (0.079"), 8 (0.315"), 4 (0.157"), 1.75 (0.069"), 3.5 (0.138"), 1.73 (0.068"), 0.23 (0.009"), 3.51 (0.138"), 1.37 (0.054"). Reference: C63062-A4085-B1-01.</p>                                                                                                                                          |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

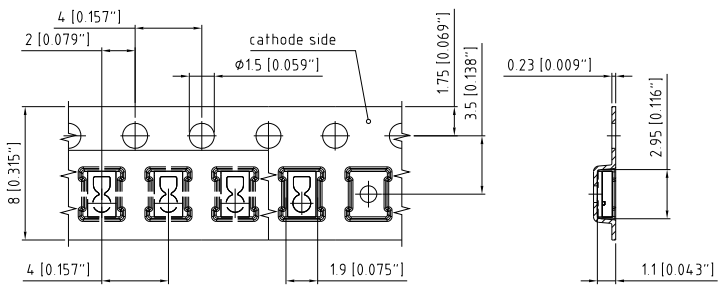
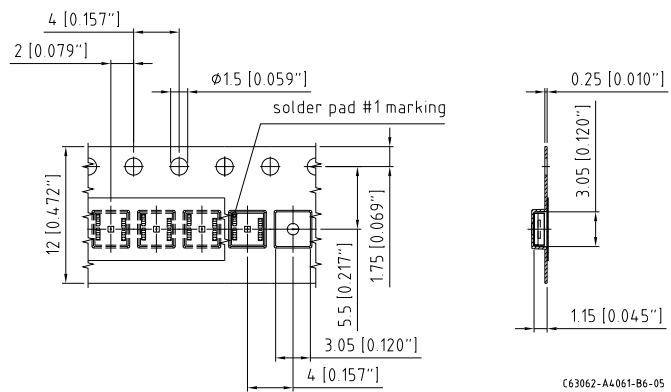
| Package<br>Gehäuse                                | Packing Unit<br>Verpackungseinheit      | Method of Taping<br>Gurtführung                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CHIPLED<br>SFH 4058<br><br>8 mm-Gurt<br>8 mm-Tape | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7) |  <p>Technical drawing of SFH 4058 package showing top and side views. Dimensions include: 4 [0.157"], 2 [0.079"], 8 [0.315"], 175 [0.069"], 3.5 [0.138"], 0.23 [0.009"], 1.37 [0.054"], 173 [0.068"], 4 [0.157"], and cathode side Ø1.5 [0.059"].</p> <p>C63062-A4065-B1 - 01</p>                                                                                                                 |
| CHIPLED<br>SFH 4059<br><br>8 mm-Gurt<br>8 mm-Tape | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7) |  <p>Technical drawing of SFH 4059 package showing top and side views. Dimensions include: 4 [0.157"], 2 [0.079"], 8 [0.315"], 175 [0.069"], 3.5 [0.138"], 0.25 [0.010"], 3.3 [0.130"], 1.7 [0.067"], 4 [0.157"], and cathode side Ø1.5 [0.059"].</p> <p>C63062-A4074-B1 - 01</p>                                                                                                                 |
| CHIPLED<br>SFH 5711<br><br>8 mm-Gurt<br>8 mm-Tape | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7) |  <p>Technical drawing of SFH 5711 package showing top and side views. Dimensions include: 1.5 (0.059) ±0.1 (0.004), 4 (0.157), 2 (0.079) ±0.05 (0.002), 1.75 (0.069) ±0.1 (0.004), 3.05 (0.120) ±0.05 (0.002), 3.5 (0.138) ±0.05 (0.002), 0.23 (0.009) ±0.02 (0.001), 8 (0.315) ±0.1 (0.004), 2.4 (0.094) ±0.05 (0.002), 1 (0.039) ±0.05 (0.002), 1.25 (0.049) ±0.05 (0.002), and OHAY2870.</p> |
| CHIPLED<br>SFH 5712<br><br>8 mm-Gurt<br>8 mm-Tape | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7) |  <p>Technical drawing of SFH 5712 package showing top and side views. Dimensions include: 4 [0.157"], 2 [0.079"], 8 [0.315"], 175 [0.069"], 3.5 [0.138"], 0.23 [0.009"], 2.3 [0.091"], 0.95 [0.037"], 4 [0.157"], and PIN 1.</p> <p>C63062-A4031-B1 - 02</p>                                                                                                                                    |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

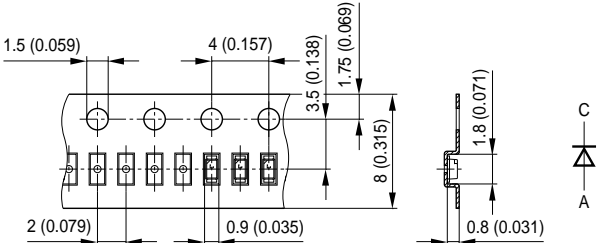
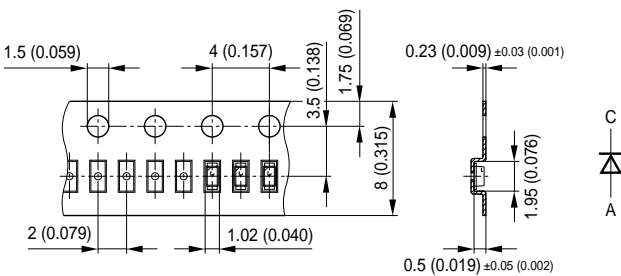
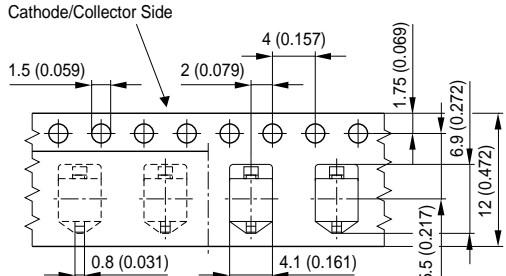
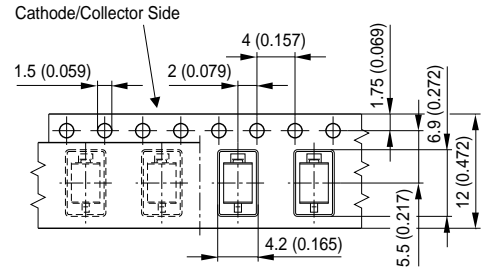
| Package<br>Gehäuse                       | Packing Unit<br>Verpackungseinheit                                                        | Method of Taping<br>Gurtführung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SFH 4450<br><br>8 mm-Gurt<br>8 mm-Tape   | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7)<br><br>12000 / Rolle Ø 330<br>12000 / Reel (Ø 13) |  <p>Technical drawing of SFH 4450 package showing top and side views with dimensions:</p> <ul style="list-style-type: none"> <li>Top view dimensions: 4 [0.157"], 2 [0.079"], 8 [0.315"], 4 [0.157"], 1.9 [0.075"], 1.75 [0.069"], 3.5 [0.138"], 0.23 [0.009"], 2.95 [0.116"], 1.1 [0.043"]</li> <li>Side view dimensions: 0.23 [0.009"], 2.95 [0.116"], 1.1 [0.043"]</li> <li>Other labels: cathode side, Ø1.5 [0.059"]</li> </ul> <p>C63062-A4-092-B6 -02</p>              |
| SFH 7770<br><br>12 mm-Gurt<br>12 mm-Tape | 3000 / Rolle Ø 180<br>3000 / Reel (Ø 7)<br><br>14000 / Rolle Ø 330<br>14000 / Reel (Ø 13) |  <p>Technical drawing of SFH 7770 package showing top and side views with dimensions:</p> <ul style="list-style-type: none"> <li>Top view dimensions: 4 [0.157"], 2 [0.079"], 12 [0.472"], 5.5 [0.217"], 1.75 [0.069"], 3.05 [0.120"], 4 [0.157"], 0.25 [0.010"], 3.05 [0.120"], 1.15 [0.045"]</li> <li>Side view dimensions: 0.25 [0.010"], 3.05 [0.120"], 1.15 [0.045"]</li> <li>Other labels: Ø1.5 [0.059"], solder pad #1 marking</li> </ul> <p>C63062-A4-061-B6-05</p> |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Package<br>Gehäuse                                                                   | Packing Unit<br>Verpackungseinheit                                                             | Method of Taping<br>Gurtführung                                                                                                 |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| SmartLED® 0603 0.6 mm<br><br>8 mm-Gurt<br>8 mm-Tape                                  | 5000 / Rolle Ø 180<br>5000 / Reel (Ø 7)<br><br>10000 / Rolle Ø 180<br>on request / auf Anfrage |  <p style="text-align: right;">OHAY1491</p>   |
| SmartLED® 0603 0.3 mm<br><br>8 mm-Gurt<br>8 mm-Tape                                  | 5000 / Rolle Ø 180<br>5000 / Reel (Ø 7)                                                        |  <p style="text-align: right;">OHAY2100</p>  |
| SMT-Photodiode<br>(e.g. BPW 34S)<br><br>12 mm-Gurt<br>12 mm-Tape                     | 1500 / Rolle Ø 180<br>1500 / Reel (Ø 7)                                                        |  <p style="text-align: right;">OHAY2287</p> |
| SMT-Photodiode<br>reverse gullwing<br>(e.g. BPW 34S)<br><br>12 mm-Gurt<br>12 mm-Tape | 1500 / Rolle Ø 180<br>1500 / Reel (Ø 7)                                                        |  <p style="text-align: right;">OHAY6684</p> |

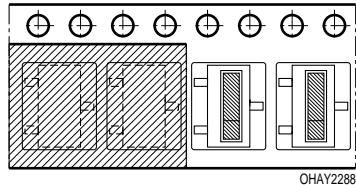
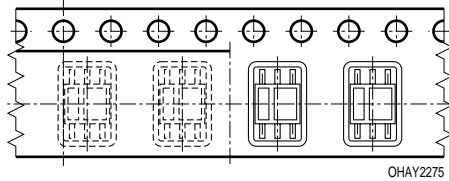
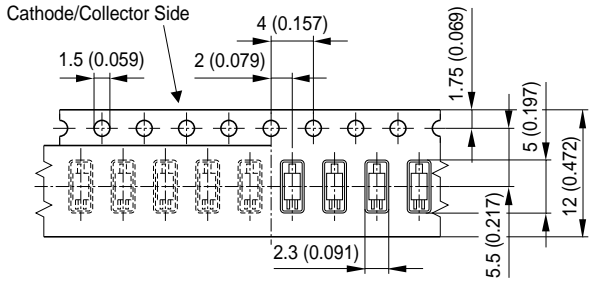
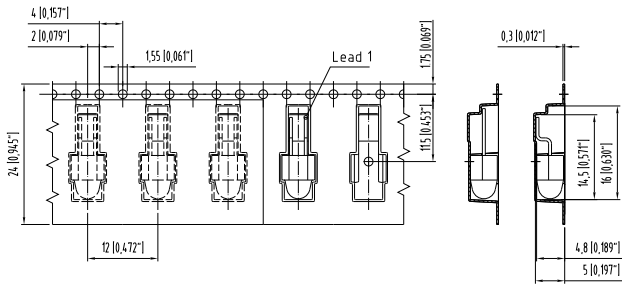


## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

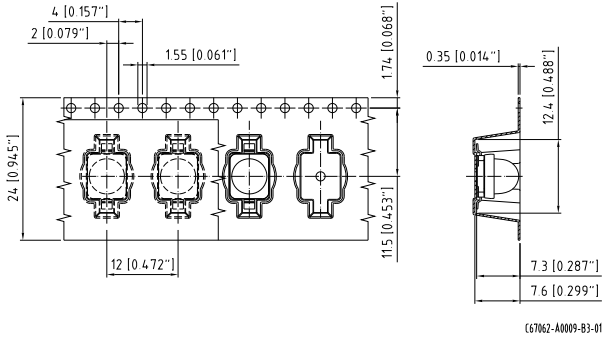
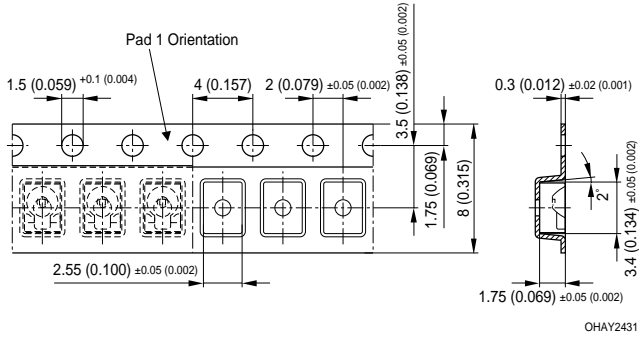
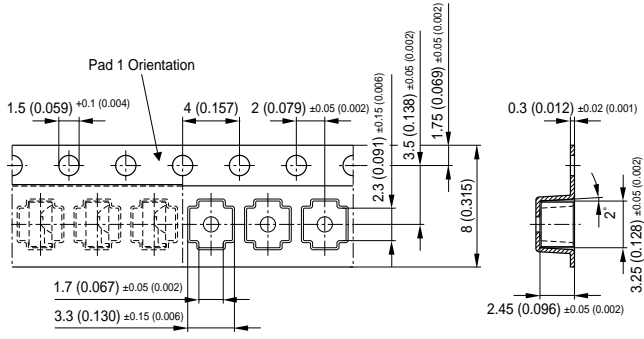
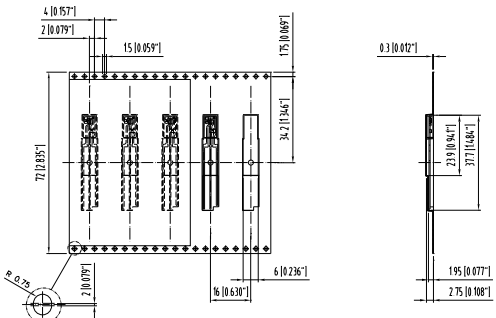
| Package<br>Gehäuse                                         | Packing Unit<br>Verpackungseinheit       | Method of Taping<br>Gurtführung                                                                               |
|------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| SMT-Photodiode<br>KOM 2125<br><br>12 mm-Gurt<br>12 mm-Tape | 1400 / Rolle Ø 180<br>1400 / Reel (Ø 7)  |  <p>OHAY2288</p>            |
| SMT-RLS<br><br>12 mm-Gurt<br>12 mm-Tape                    | 1000 / Rolle Ø 180<br>1000 / Reel (Ø 7)  |  <p>OHAY2275</p>           |
| Smart DIL<br><br>12 mm Gurt<br>12 mm Tape                  | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7)  |  <p>OHAY6764</p>          |
| SMT Radial (5 mm)<br><br>24 mm-Gurt<br>24 mm-Tape          | 1000 / Rolle Ø 330<br>1000 / Reel (Ø 13) |  <p>63062-A3252-B3-05</p> |

## Method of Taping/Polarity and Orientation

Dimensions in mm (inch)

## Gurtausführung/Polarität und Lage

Maße in mm (inch)

| Package<br>Gehäuse                                                                    | Packing Unit<br>Verpackungseinheit                                                  | Method of Taping<br>Gurtführung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SFH 4236<br>SFH 4239<br><br>24 mm-Gurt<br>24 mm-Tape                                  | 100 / Rolle Ø 180<br>100 / Reel (Ø 7)<br><br>500/Rolle Ø 330<br>500/Reel (Ø 13)     |  <p>Technical drawing of SFH 4236/SFH 4239 tape. The top view shows a series of four packages with dimensions: 4 [0.157"], 2 [0.079"], 155 [0.061"], 174 [0.068"], 24 [0.945"], 12 [0.472"], 115 [0.453"]. The side view shows dimensions: 0.35 [0.014"], 12.4 [0.488"], 7.3 [0.287"], 7.6 [0.299"]. Reference: (57062-A0009-83-01).</p>                                                                                                       |
| MIDLED<br>Toplooker<br><br>8 mm-Gurt<br>8 mm-Tape                                     | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7)<br><br>9000/Rolle Ø 330<br>9000/Reel (Ø 13) |  <p>Technical drawing of MIDLED Toplooker tape. The top view shows dimensions: 1.5 (0.059) +0.1 (0.004), 4 (0.157), 2 (0.079) ±0.05 (0.002), 3.5 (0.138) ±0.05 (0.002), 1.75 (0.069), 8 (0.315), 2.55 (0.100) ±0.05 (0.002). The side view shows dimensions: 0.3 (0.012) ±0.02 (0.001), 3.4 (0.134) ±0.05 (0.002), 1.75 (0.069) ±0.05 (0.002). Reference: OHAY2431.</p>                                                                       |
| MIDLED<br>Sidelooker<br><br>8 mm-Gurt<br>8 mm-Tape                                    | 2000 / Rolle Ø 180<br>2000 / Reel (Ø 7)<br><br>7000/Rolle Ø 330<br>7000/Reel (Ø 13) |  <p>Technical drawing of MIDLED Sidelooker tape. The top view shows dimensions: 1.5 (0.059) +0.1 (0.004), 4 (0.157), 2 (0.079) ±0.05 (0.002), 3.5 (0.138) ±0.05 (0.002), 1.75 (0.069) ±0.05 (0.002), 8 (0.315), 2.3 (0.091) ±0.15 (0.006), 1.7 (0.067) ±0.05 (0.002), 3.3 (0.130) ±0.15 (0.006). The side view shows dimensions: 0.3 (0.012) ±0.02 (0.001), 3.25 (0.128) ±0.05 (0.002), 2.45 (0.096) ±0.05 (0.002). Reference: OHAY2430.</p> |
| Pulsed laser diodes<br>SPL LL90 R33<br>SPL LL90_3 R33<br><br>72 mm-Gurt<br>72 mm-Tape | 1200 / Rolle Ø 330<br>1200 / Reel (Ø 13)                                            |  <p>Technical drawing of Pulsed laser diodes tape. The top view shows dimensions: 4 [0.157"], 2 [0.079"], 15 [0.059"], 175 [0.069"], 72 [2.835"], 34.2 [1.345"], 6 [0.236"], 16 [0.630"], 2 [0.079"], R 0.75. The side view shows dimensions: 0.3 [0.012"], 23.9 [0.941"], 37.7 [1.484"], 195 [0.077"], 2.75 [0.108"]. Reference: (57062-A2508-87-01).</p>                                                                                   |

## Radial Components

### Packaging of Radial Taped Components on Reels

The taped components are wound onto reels and supplied in cartons, with two reels to a carton. With 5 mm (T 1 $\frac{3}{4}$ ) types there are 1.000 components on each reel, and with 3 mm (T 1) types there are 2.000.

Each reel and each carton is separately labeled as follows:

- manufacturer's name
- type designation
- quantity
- date code (YYWW)
- Packing Variant
- Lot number

When tapes are spliced, the splices shall be equal in strength to the original tape. The splice shall be so precise that the misalignment of the holes in each direction is no more than 0.3 mm and the total thickness of the tape no more than 1.5 mm.

## Radiale Bauelemente

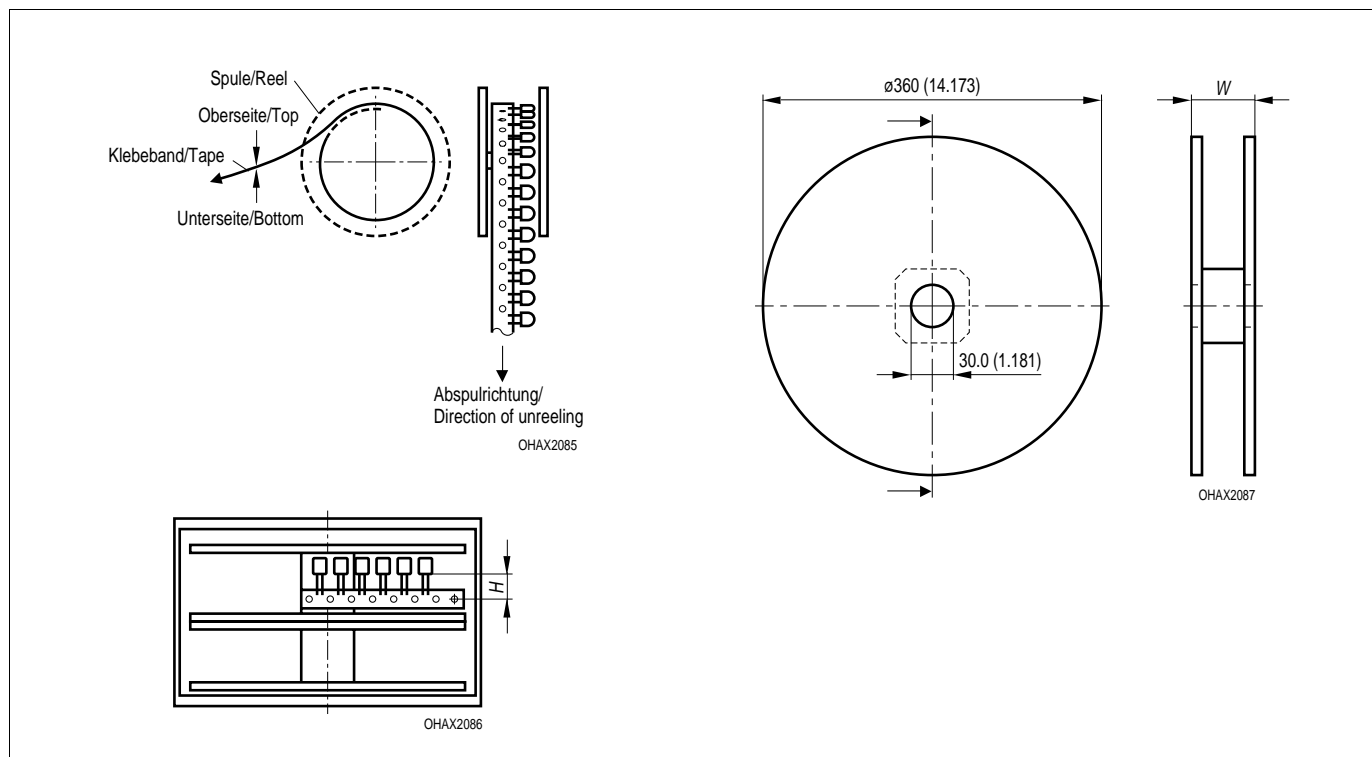
### Verpackung von radialen gegurteten Bauelementen auf Spulen

Die gegurteten Bauelemente sind auf Spulen gewickelt und werden in Kartons geliefert, die je zwei Spulen enthalten. Bei 5 mm (T 1 $\frac{3}{4}$ )-Bauformen ist jede Spule mit 1000 Bauelementen bestückt, bei 3 mm (T 1)-Bauformen mit 2000 Stück pro Spule.

Jede Spule und jeder Karton ist mit einem Etikett gekennzeichnet, welches folgende Angaben enthält:

- Herstellername
- Typenbezeichnung
- Stückzahl
- Datumscode (JJWW)
- Verpackungsvariante
- Losnummer

Wenn Gurtbänder geklebt werden, dann weist die Verbindungsstelle die gleiche Festigkeit auf wie das Gurtband selbst. Die Gurtverbindung ist so genau, dass die Lageabweichung der Löcher in jeder Richtung nicht mehr als 0,3 mm und die Gesamtdicke des Gurtbandes nicht mehr als 1,5 mm betragen.



Dimensions in mm (inch)

| Gurthöhe H<br>Height of Tape H | Spulenbreite W<br>Width of Reel W |                                                  |
|--------------------------------|-----------------------------------|--------------------------------------------------|
| = 18 (0.709)                   | max. 56 (2.205)                   | (entsprechend IEC 60286-2) (acc. to IEC 60286-2) |
| > 18 (0.709)                   | max. 64 (2.520)                   | —                                                |

## Radial Components

### Packaging of Radial Components in Ammopacks

The component tape has a gap after every 24th component that is followed by a fold and is packed in meandering fashion into foldup cartons holding 1,500 pieces (5 mm (T 1¾) type) or 2,000 pieces (3 mm (T 1) type).

Each foldup carton is labeled as follows:

- manufacturer's name
- type designation
- quantity
- date code (YYWW)
- Packing Variant
- Lot number

Polarity identification: both sides of the foldup carton are marked with - or +. The appropriate polarity is shown in the tables on pages 203/204.

## Radiale Bauelemente

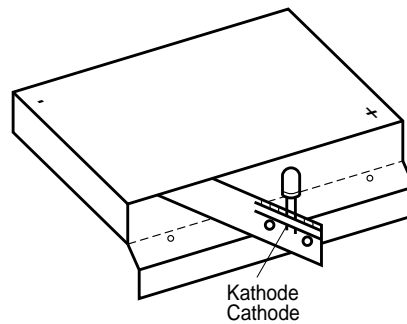
### Verpackung von radialen Bauelementen im Ammo-Pack

Der Bauelemente-Gurt hat nach jedem 24. Bauelement eine Leerstelle mit anschließender Soll-Knickstelle und wird mäanderförmig in Faltschachteln zu je 1500 Stück (5 mm (T 1¾)-Bauform) und 2000 Stück (3 mm (T 1)-Bauform) verpackt.

Jede Faltschachtel ist mit einem Etikett gekennzeichnet, welches folgende Angaben enthält:

- Herstellername
- Typenbezeichnung
- Stückzahl
- Datumscode (JJWW)
- Verpackungsvariante
- Losnummer

Polaritätskennzeichnung: Die beiden Schmalseiten der Faltschachtel sind mit einem Aufdruck - bzw. + gekennzeichnet. Die entsprechende Polarität ist aus den Tabellen Seite 203/204 ersichtlich.



OHAX2088

### Taping

The cardboard carrier tape is not expand-able, but the hold down tape is expandable and flexible so that it can adapt to the leads of the components during taping. The hold down tape is formed in such a way that there is no danger

- of the taped components slipping out from the leads side, or
- that the leads of the taped components are subject to chemical action e.g. corrosion or oxidation
- which would result in difficulties in soldering.

**Break force of the tape:**  $\geq 15 \text{ N}$

**Extraction force** in the tape plane  
vertically to the direction of unreeling  $\geq 5 \text{ N}$

All polarized components are arranged in one direction during taping. The polarity can be seen from the following drawings and tables. There are only components of one selection group on a reel or ammpack. The total number of components missing on a reel, excluding the empty spaces on the leader and trailer, should not exceed 0.1% or one position. Directly behind there is no gap allowed.

### Gurtung

Das Kartonträgerband ist nicht dehnfähig, dagegen ist das Klebeband dehnbar und flexibel, um sich beim Gurtungsvorgang den Anschlussdrähten der Bauelemente anpassen zu können. Außerdem ist das Klebeband so beschaffen, dass bei Lagerung keine Gefahr besteht,

- dass sich gegurtete Bauelemente in Richtung der Anschlussdrähte herauslösen,
- dass durch Ausdünstungen Schwierigkeiten beim Löten entstehen, oder
- dass die Eigenschaften der gegurteten Bauelemente und deren Anschlussdrähte durch chemische Vorgänge beeinträchtigt werden (z.B. durch Korrosion).

**Reißfestigkeit des Gurtbandes:**  $\geq 15 \text{ N}$

**Ausziehungskraft** in der Gurtbandebene  
senkrecht zur Abspulrichtung  $\geq 5 \text{ N}$

Bei der Gurtung sind alle gepolten Bauelemente in einer Richtung angeordnet. Die jeweilige Polarität ist den entsprechenden Tabellen zu entnehmen. Auf einer Spule bzw. Ammo-Pack befinden sich immer nur Bauelemente einer Selektionsgruppe.

## Radial Components

At the beginning and end (leader and trailer) of the tape there are at least five gaps to simplify threading in and out of an automatic insertion system.

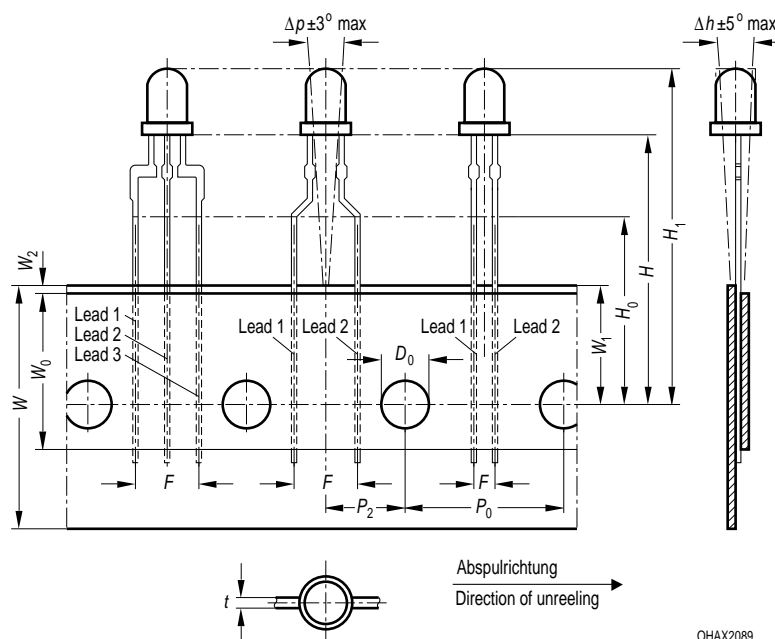
## Radiale Bauelemente

Die Fehlmenge der Bauelemente pro Spule darf maximal 0.1% oder eine Position betragen, wobei keine aufeinanderfolgenden Plätze leer sein dürfen.

Am Beginn und am Ende (Vor- bzw. Nachspann) des Gurtbandes sind zur Erleichterung des Ein- und Ausfädelns auf dem Bestückungsautomat mindestens 5 Leerstellen vorhanden.

## Tape and Packaging Versions

## Gurt- und Verpackungsvarianten



OHAX2089

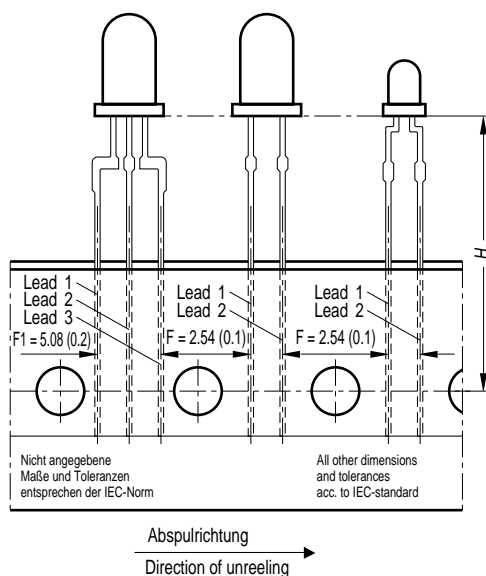
## Radial Components

## Radiale Bauelemente

| Symbol         | Bezeichnung<br>Designation                                                               | Maße<br>Dimension<br>mm (inch)                        | Toleranz<br>Tolerance<br>mm (inch) |
|----------------|------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------|
| W              | Gurtbreite<br>Carrier tape width                                                         | 18 (0.709)                                            | + 1 (0.039)<br>– 0.5 (0.020)       |
| W <sub>0</sub> | Klebebandbreite<br>Hold down tape width                                                  | max. 15 (0.591)                                       | –                                  |
| W <sub>1</sub> | Abstand Lochmitte zu Bandoberkante<br>Sprocket hole position                             | 9 (0.354)                                             | + 0.75 (0.030)<br>– 0.5 (0.020)    |
| W <sub>2</sub> | Lage des Klebebandes<br>Hold down tape position                                          | ≤ 3 (0.118)                                           | –                                  |
| T              | Gesamtdicke von Gurt- und Klebeband<br>Total thickness of carrier and hold down tape     | max. 0.9 (0.035)                                      | –                                  |
| D <sub>0</sub> | Führungslochdurchmesser<br>Sprocket hole diameter                                        | 4 (0.157)                                             | ± 0.2 (0.008)                      |
| H              | Abstand Lochmitte zu Bauteilunterkante<br>Sprocket hole center to bottom<br>of component | je nach Eintrag<br>depends on suffix                  |                                    |
| H <sub>0</sub> | Abstand Lochmitte zur Aufsetzebene<br>Sprocket hole center of seating plane              | 16 (0.630)                                            | ± 0.5 (0.020)                      |
| H <sub>1</sub> | Abstand Lochmitte zu Bauteiloberkante<br>Sprocket hole center to top of component body   | je nach Eintrag und Typ<br>depends on suffix and type |                                    |
| P <sub>0</sub> | Führungslohabstand<br>Sprocket hole pitch                                                | 12.7 (0.500)                                          | ± 0.3 (0.012)                      |
| P <sub>2</sub> | Abstand Führungsloch zu Bauteilmitte<br>Distance sprocket hole to center of component    | 6.35 (0.250)                                          | ± 0.7 (0.028)                      |
| F              | Rastermaß<br>Component lead pitch                                                        | 2.54 (0.100) or<br>5.08 (0.200)                       | + 0.6 (0.024)<br>– 0.1 (0.004)     |

## Radial Components

## Radiale Bauelemente



- 1) Entspricht IEC-Norm 286.2
- 1) Acc. to IEC-Standard 286.2

### Gurtung auf Spule Tape and Reel

| Packing Variant |  | H                                     | Polarity Lead 1<br>2 Lead devices      | Polarity Lead 1<br>3 Lead devices |
|-----------------|--|---------------------------------------|----------------------------------------|-----------------------------------|
| R N 1 8 A       |  | $18^{+2.1}_{(0.709 \pm 0.079)}$       | Kathode/Kollektor<br>Cathode/Collector | Anode 1/Emitter                   |
| R N 1 8 C       |  | $18^{+2.1}_{(0.709 \pm 0.079)}$       | Anode/Emitter                          | Anode 2/Base                      |
| R N 2 1 A       |  | $20.5 \pm 0.5$<br>$(0.807 \pm 0.020)$ | Kathode/Kollektor<br>Cathode/Collector | Anode 1/Emitter                   |
| R N 2 1 C       |  | $20.5 \pm 0.5$<br>$(0.807 \pm 0.020)$ | Anode/Emitter                          | Anode 2/Base                      |
| R N 2 3 A       |  | $22.5 \pm 0.5$<br>$(0.886 \pm 0.020)$ | Kathode/Kollektor<br>Cathode/Collector | Anode 1/Emitter                   |
| R N 2 3 C       |  | $22.5 \pm 0.5$<br>$(0.886 \pm 0.020)$ | Anode/Emitter                          | Anode 2/Base                      |
| R N 2 5 A       |  | $25 \pm 0.5$<br>$(0.984 \pm 0.020)$   | Kathode/Kollektor<br>Cathode/Collector | Anode 1/Emitter                   |
| R N 2 5 C       |  | $25 \pm 0.5$<br>$(0.984 \pm 0.020)$   | Anode/Emitter                          | Anode 2/Base                      |
| R N 2 9 A       |  | $28.5 \pm 0.5$<br>$(1.122 \pm 0.020)$ | Kathode/Kollektor<br>Cathode/Collector | Anode 1/Emitter                   |
| R N 2 9 C       |  | $28.5 \pm 0.5$<br>$(1.122 \pm 0.020)$ | Anode/Emitter                          | Anode 2/Base                      |

### Ammo-Pack

| Packing Variant |  | H                                     | Box Side | Polarity Lead 1<br>2 Lead devices      | Polarity Lead 1<br>3 Lead devices |
|-----------------|--|---------------------------------------|----------|----------------------------------------|-----------------------------------|
| A N 1 8         |  | $18 \pm 2$<br>$(0.709 \pm 0.079)$     | -        | Anode/Emitter                          | Anode 2/Base                      |
|                 |  |                                       | +        | Kathode/Kollektor<br>Cathode/Collector | Anode 1/Emitter                   |
| A N 2 3         |  | $22.5 \pm 0.5$<br>$(0.886 \pm 0.020)$ | -        | Anode/Emitter                          | Anode 2/Base                      |
|                 |  |                                       | +        | Kathode/Kollektor<br>Cathode/Collector | Anode 1/Emitter                   |
| A N 2 7         |  | $27 \pm 0.5$<br>$(1.063 \pm 0.020)$   | -        | —                                      | SFH 5110 $V_{DD}$<br>SFH 5111 GND |
|                 |  |                                       | +        | —                                      | $V_{OUT}$                         |

OHAX2296

Dimensions in mm (inch)

Maße in mm (inch)

### Polarity identification Ammopack:

both sides of the foldup carton are marked with "-" or "+".

#### Note:

The leadmarking depends on the choice of the unreeling direction ("- or "+").

In case of 2-color LEDs, the polarity of Anode 1 refers to the LED with the higher wavelength, resp. Anode 2 to the LED with the lower wavelength.

### Polaritätskennzeichnung Ammopack:

Die beiden Schmalseiten der Faltschachtel sind mit einem Aufdruck "-" bzw. "+" gekennzeichnet.

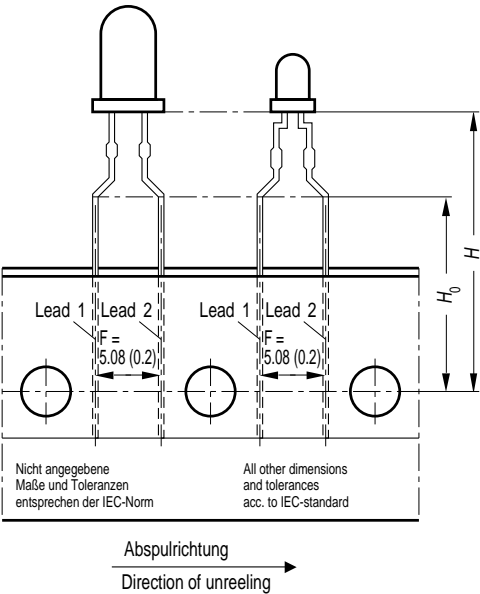
#### Hinweis:

die Leadbezeichnung ist abhängig von der Wahl der Abspülrichtung ("- bzw. "+").

Bei 2-Farben LEDs bezieht sich die Polaritätsangabe Anode 1 auf die LED mit der größeren Wellenlänge, bzw Anode 2 auf die LED mit der kürzeren Wellenlänge.

Radial Components

Radiale Bauelemente



Gurtung auf Spule  
Tape and Reel

| Packing Variant | H <sub>0</sub>          | H                         | Polarity Lead 1                        |
|-----------------|-------------------------|---------------------------|----------------------------------------|
| R B 2 1 A       | 16±0.5<br>(0.630±0.020) | 20.5±0.5<br>(0.807±0.020) | Kathode/Kollektor<br>Cathode/Collector |
| R B 2 3 A       | 16±0.5<br>(0.630±0.020) | 22.5±0.5<br>(0.886±0.020) | Kathode/Kollektor<br>Cathode/Collector |
| R B 2 4 A       | 16±0.5<br>(0.630±0.020) | 24±0.5<br>(0.945±0.020)   | Kathode/Kollektor<br>Cathode/Collector |
| R B 2 5 A       | 16±0.5<br>(0.630±0.020) | 25±0.5<br>(0.984±0.020)   | Kathode/Kollektor<br>Cathode/Collector |
| R B 2 6 A       | 16±0.5<br>(0.630±0.020) | 25.7±0.7<br>(1.012±0.028) | Kathode/Kollektor<br>Cathode/Collector |
| R B 2 8 C       | 16±0.5<br>(0.630±0.020) | 28±0.5<br>(1.102±0.020)   | Anode/Emitter                          |
| R B 2 8 A       | 16±0.5<br>(0.630±0.020) | 28±0.5<br>(1.102±0.020)   | Kathode/Kollektor<br>Cathode/Collector |

Ammo-Pack

| Packing Variant | H <sub>0</sub>          | H                         | Box Side | Polarity Lead 1                        |
|-----------------|-------------------------|---------------------------|----------|----------------------------------------|
| A B 2 1         | 16±0.5<br>(0.630±0.020) | 20.5±0.5<br>(0.807±0.020) | —        | Anode/Emitter                          |
|                 |                         |                           | +        | Kathode/Kollektor<br>Cathode/Collector |
| A B 2 3         | 16±0.5<br>(0.630±0.020) | 22.5±0.5<br>(0.886±0.020) | —        | Anode/Emitter                          |
|                 |                         |                           | +        | Kathode/Kollektor<br>Cathode/Collector |

OHAX2295

Dimensions in mm (inch)

Maße in mm (inch)

Polarity identification Ammopack:

both sides of the foldup carton are marked with "-" or "+".

Note:

The leadmarking depends on the choice of the unreeling direction ("- or "+").  
In case of 2-color LEDs, the polarity refers to the LED with the higher wavelength.

Polaritätskennzeichnung Ammopack:

Die beiden Schmalseiten der Faltschachtel sind mit einem Aufdruck "-" bzw. "+" gekennzeichnet.

Hinweis:

Die Leadbezeichnung ist abhängig von der Wahl der Abspulrichtung ("- bzw. "+").  
Bei 2-Farben LEDs beziehen sich die Polaritätsangaben auf die LED mit der größeren Wellenlänge.



## Dry Pack

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### 1. Introduction

This document gives an overview about the requirements for packing, labeling, handling and storage of moisture sensitive components in dry pack of OSRAM Opto Semiconductors.

### 2. Definitions and Abbreviations

|     |                          |
|-----|--------------------------|
| BPL | Barcode Product Label    |
| ESD | Electro Static Discharge |
| ID  | Identification           |
| OS  | Opto Semiconductors      |
| PCB | Printed Circuit Board    |
| RH  | Relative Humidity        |

## Trockenverpackung

### Inhalt

1. Einleitung
2. Definitionen und Abkürzungen
3. Normenbezug
4. Prüfen von Produkten auf Feuchteempfindlichkeit
  - 4.1 Feuchtekontrolle
  - 4.2 Prüfen der Feuchteempfindlichkeit von Bauformen
5. Trockenverpackungsprozess und Materialien
  - 5.1 Trockenbeutel
  - 5.2 Trockenmittel
  - 5.3 Feuchteindikatorkarte
  - 5.4 Trockenverpackungsetiketten
6. Handhabung trockenverpackter Bauteile
  - 6.1 Eingangskontrolle
  - 6.2 Öffnen von Trockenbeuteln
  - 6.3 Ausheizen von Bauteilen
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  - 6.5 Lagerung unverpackter Bauteile
  - 6.6 Lagerung von ungeöffneten Trockenverpackungen

### 1. Einleitung

Dieses Dokument soll einen Überblick geben über die Anforderungen für Verpacken, Etikettieren, Handhaben und Lagern von feuchteempfindlichen Bauteilen in Trockenverpackungen für OSRAM Opto Semiconductors.

### 2. Definitionen und Abkürzungen

|     |
|-----|
| BPL |
| ESD |
| ID  |
| OS  |
| PCB |
| RH  |

## 3. Normative References

|                |                                                                                                     |
|----------------|-----------------------------------------------------------------------------------------------------|
| JEDEC-STD-020C | Moisture/Reflow Sensitivity Classification for Plastic Integrated Circuit Surface Mount Devices     |
| JEDEC-STD-033B | Standard for Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices |
| EIA – 583      | Packaging Material Standards für Moisture Sensitive Items                                           |
| EIA/JEP 113-B  | Symbol and Labels for Moisture-Sensitive Devices                                                    |
| EIA/JEP 124    | Guidelines for the Packing, Handling and Repacking of Moisture-Sensitive Components                 |
| MIL-B-81705 C  | Barrier Materials                                                                                   |
| MIL-D-3464     | Desiccants                                                                                          |

## 4. Testing Products for Moisture Sensitivity

### 4.1 Controlling Moisture

OSRAM Opto Semiconductors in its design of packing materials and packing methods takes into consideration the susceptibility of some OSRAM Opto Semiconductors packages to moisture induced damage. The risk of this damage being greatest when naturally permeable plastic encapsulation materials are used as the moisture in the package increases or decreases with the Relative Humidity (RH) of the surrounding environment. Such damage may include delamination between the die and the plastic encapsulation material, which may result in open connections due to broken wirebonds.

Package cracking may also occur when the components are exposed to the high temperatures and steep temperatures gradients used in reflow board assembly techniques. Moisture in the package having reached a critical level will fracture the package in order to escape. This phenomenon being known as the "popcorn effect".

Therefore the control of moisture levels in the package body is critical to reducing the risk of moisture-induced failures.

### 4.2 Testing Products for Moisture Sensitivity

A procedure to define the sensitivity of a component against moisture is set out in JEDEC-STD-020C.

In this standard, moisture sensitive components are classified in eight different groups, each differing in their permissible storage time in a defined climate (characterized by temperature and relative humidity at normal pressure).

## 3. Normenbezug

|                |                                                                                                     |
|----------------|-----------------------------------------------------------------------------------------------------|
| JEDEC-STD-020C | Moisture/Reflow Sensitivity Classification for Plastic Integrated Circuit Surface Mount Devices     |
| JEDEC-STD-033B | Standard for Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices |
| EIA – 583      | Packaging Material Standards für Moisture Sensitive Items                                           |
| EIA/JEP 113-B  | Symbol and Labels for Moisture-Sensitive Devices                                                    |
| EIA/JEP 124    | Guidelines for the Packing, Handling and Repacking of Moisture-Sensitive Components                 |
| MIL-B-81705 C  | Barrier Materials                                                                                   |
| MIL-D-3464     | Desiccants                                                                                          |

## 4. Prüfen von Produkten auf Feuchteempfindlichkeit

### 4.1 Feuchtekontrolle

Mit besonderem Design von Verpackungsmaterial und durch entsprechende Verpackungsmethoden ist OSRAM Opto Semiconductors sensibilisiert hinsichtlich der Empfindlichkeit von einigen OSRAM Opto Semiconductors-Gehäusen bezüglich durch Feuchte verursachte Beschädigungen. Das Risiko ist dann am höchsten, wenn Kunststoffpressmasse verwendet wird, da Kunststoff natürlicherweise feuchtedurchlässig ist. Die Feuchte im Gehäuse erhöht oder verringert sich entsprechend der Relativen Feuchte (RH) in unmittelbarer Umgebung.

Daher ist das Einhalten eines bestimmten Feuchtelevels im Gehäuse wichtig, um das Risiko einer durch Feuchte verursachten Beschädigung zu vermeiden. Solche Beschädigungen können auch als Delamination zwischen dem Chip und der umhüllenden Pressmasse entstehen, was sich in offenen Verbindungen bis zu gebrochenen Bonddrähten zeigt. Gehäusebrüche können auch hervorgerufen werden, wenn die Komponenten hohen Temperaturen und steil ansteigenden Temperaturkurven ausgesetzt werden wie beim Reflow Lötverfahren. Wenn im Gehäuse ein kritischer Grad an Feuchte erreicht würde, wird diese, um zu entweichen, das Gehäuse zerbrechen. Dieses Phänomen ist bekannt als „Popcorn Effekt“.

### 4.2 Prüfen der Feuchteempfindlichkeit von Bauformen

Eine Bewertung der Empfindlichkeit einer Bauform gegen Feuchte erfolgt in einem bezüglich Temperatur und Feuchte definierten Klima über eine bestimmte Zeit. Eine derartige Prozedur beschreibt die JEDEC-STD-020C.

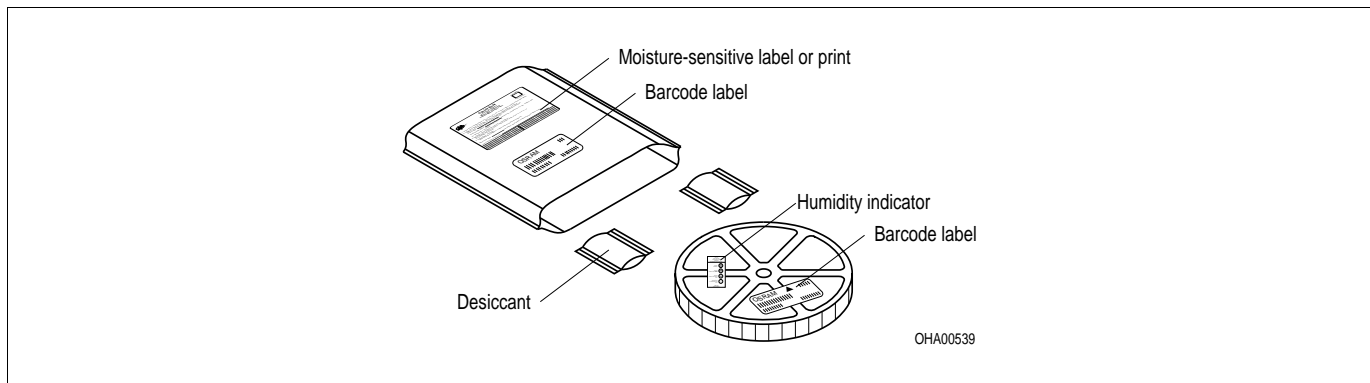
Danach werden feuchteempfindliche Bauelemente in acht verschiedene Klassen eingeteilt, die sich durch eine unterschiedliche zulässige Lagerungsdauer in einem definierten Klima (gekennzeichnet durch Temperatur und Feuchte) bei Normaldruck unterscheiden.

## 5. Dry Packing Process and Materials

The first step in the dry packing process is to remove any moisture built up in the package. This is done by baking the finished product for 2.5 to 48 hours between 85 °C and 125 °C depending on package type. During baking, the product is contained in high temperature resistant device trays, aluminium trays or tubes. Within 24 hours after baking, the product is sealed with a pre-scribed number of desiccant pouches and an indicator card in a dry bag under a partial vacuum. Details of OSRAM Opto Semiconductors dry pack materials are provided in the sections that follow.

## 5. Trockenverpackungsprozess und Materialien

Der erste Schritt im Trockenverpackungsprozess ist, alle aufgebaute Feuchte im Gehäuse durch Ausheizen des Produkts für 2.5 bis 48 Stunden, abhängig von Gehäusotyp, bei 85 °C bis 125 °C zu entfernen. Ausgeheizt wird das Produkt auf Tablett (hergestellt aus temperaturbeständigem Material) oder Aluminium-Tabletts oder Schienen. Nach dem Ausheizen werden die Bauteile innerhalb von 24 Stunden in Trockenbeutel verpackt und unter Vakuum verschweißt. Eine vorgeschriebene Anzahl von Trockenmittel und ein Feuchteindikator sind ebenso im Trockenbeutel beinhaltet. Einzelheiten über das OSRAM Opto Semiconductors Trockenverpackungsmaterial werden in den folgenden Abschnitten beschrieben.



**Figure 1.1: Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card**

**Bild 1.1: Feuchteempfindliche Produkte sind verpackt in einem Trockenbeutel zusammen mit einem Trockenmittel und einer Feuchteindikatorkarte**

### 5.1 Dry Pack Bag

The dry pack bag (moisture barrier bag) is of a three layer laminated design and is MIL-STD 81705C, type 1, class 1 compliant. ESD protection is provided by the middle layer of aluminium metallized polyester.

### 5.1 Trockenbeutel

Der von OSRAM Opto Semiconductors benutzte Trockenbeutel (bzw. Feuchteschutzbeutel) ist gemäß Vorschrift MIL-STD 81705C, type 1, class 1. und ist als 3-Schicht Verbundbeutel aufgebaut. Der ESD Schutz wird durch die mittlere aluminiumbeschichtete Polyesterschicht gewährleistet.

### 5.2 Desiccant

The desiccant material used exceeds the rigid standard of the military specification D-3464 D, type II, contains Silica Gel and Active Clay which are neither acutely nor chronically harmful, do not classify as dangerous nor special waste and can be disposed of in accordance with local and national laws. Testing confirms that the desiccant pouches in the bag greatly reduce the presence of moisture by maintaining the environment in the bag at no greater than 10 percent RH, thus protecting the devices during shipment and storage for 24 months. If a 24-month shelf life is exceeded, the devices will need to be dry baked again if the RH in the bag has exceeded 10 percent RH. This RH change can be seen when the color of the 10% monitor dot on the humidity-indicator card has changed from blue to pink.

### 5.2 Trockenmittel

Das verwendete Trockenmittelmateriale für das Verpacken von oberflächenmontierten Komponenten entspricht dem strengen Standard der Militärspezifikation D-3464 D, type II. Als Trockenmittel findet Silica Gel und Aktivton Anwendung. Beide Stoffe sind nicht akut oder chronisch schädlich und nicht als Gefahr- oder Sondermüll eingestuft. Normale Entsorgung entsprechend den örtlichen und nationalen Vorschriften. Tests zeigen, daß die Trockenbeutel umfassend die vorhandene Feuchte im Trockenbeutel reduziert. Die damit erhaltene niedrige Luftfeuchtigkeit im Trockenbeutel von weniger als 10 % RH (die Farbe des 10 % Punktes hat sich nicht von Blau zu Rosa verändert) schützt die Bauteile während des Transportes und der Lagerung für mindestens 24 Monate. Bei Überschreitung der 24 monatigen Lagerzeit sind die Bauteile nur dann auszuheizen, wenn die relative Feuchte im Trockenbeutel die 10% RH (die Farbe des 10% Punktes hat sich von Blau zu Rosa verfärbt) überschritten hat, welches anhand des Feuchteindicators zu ersehen ist.

The desiccant can also be regenerated at 120 °C - 125 °C or 16 hours, if the material of the bag is heat resistant.

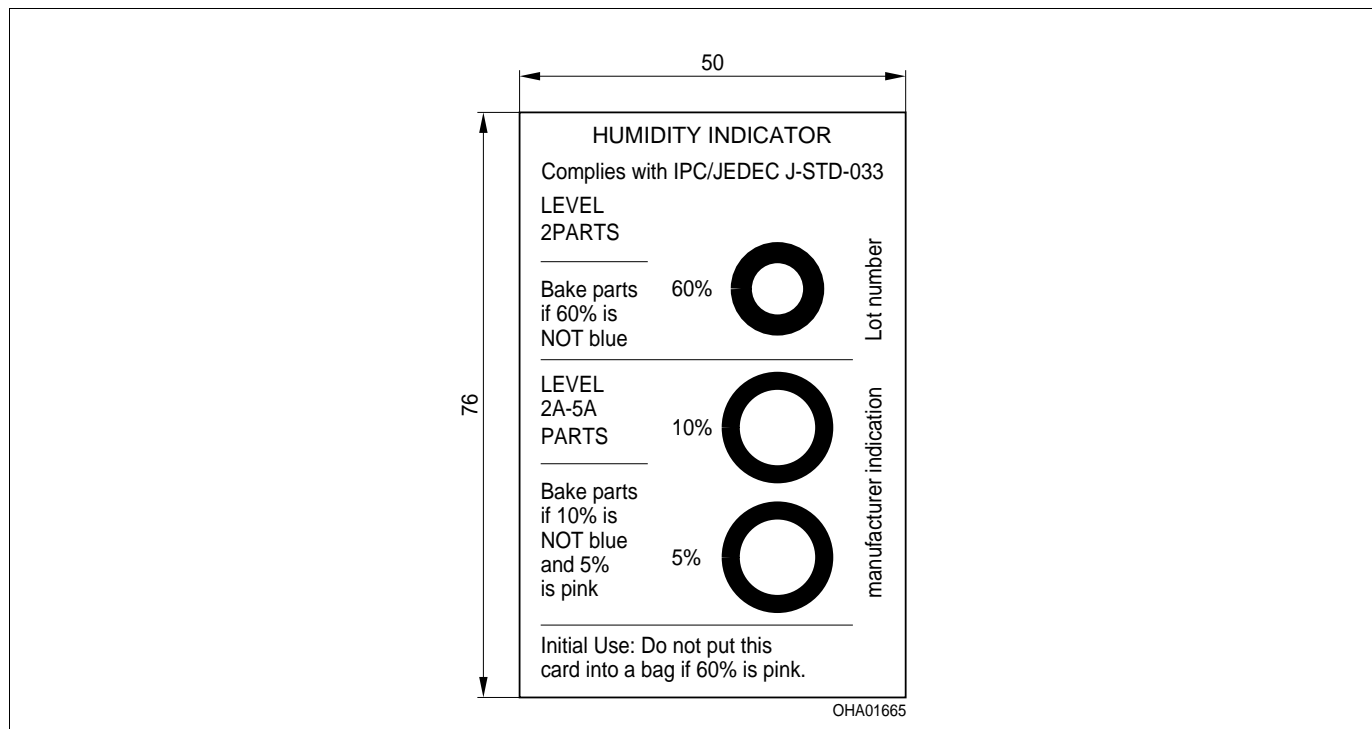
Das Trockenmittel kann bei 120 °C - 125 °C mit einer Trocknungszeit von 16 Stunden regeneriert werden, wenn das Material des Beutels hitzefest ist.

## 5.3 Humidity Indicator Card

Included in each dry pack bag is also a card with humidity-sensitive elements which turn from blue to pink whenever the specific RH level is exceeded (see Figure Humidity indicator card). The card may be reused provided all the sensors elements are blue.

## 5.3 Feuchteindikatorkarte

In jedem Trockenbeutel ist eine Karte mit feuchteempfindlichen Elementen enthalten. Diese wechseln ihre Farbe von blau zu rosa wenn der angegebene Feuchtigkeitsgrad erreicht ist. (siehe Bild Feuchteindikatorkarte). Die Karte kann wiederverwendet werden solange alle Sensorelemente blau sind.



**Figure 1.2:** Humidity indicator card is included in the dry bag. (Note: if the 10% dot has changed from blue to pink then product should be rebaked with MSL 2A-5A before board assembly whenever a reflow method is used.)\*

**Bild 1.2:** Feuchteindikatorkarte ist immer im Trockenbeutel ent-halten. (Bemerkung: wenn der 10% Punkt seine Farbe von blau nach rosa verändert hat, dann sollten die Bauteile mit MSAL 2A-5A ausgeheizt werden bevor sie verarbeitet werden.)\*

## 5.4 Dry Pack Labels

The following two labels are applied to the outside of the dry pack bag:

- A standard Barcode-Product-Label (BPL), identifies the contents by: producer (OSRAM Opto Semiconductors), country of origin, product designation, lot number, date code, material number and quantity.  
The BPL also includes a reference to ESD and if necessary extra details of the Moisture Level, development designation, brightness class and laser stamp (see Figure 1.3).

## 5.4 Trockenverpackungsetiketten

Die folgenden zwei Etiketten befinden sich auf dem Trockenbeutel:

- Ein Standard Barcode-Produkt-Etikett (BPL), welches die Informationen über den Hersteller (OSRAM Opto Semiconductors), Ursprungsangabe, Produkt-Benennung, Losnummer, Date-Code, Materialnummer und Menge beinhaltet. Das BPL beinhaltet zudem ein Verweis auf ESD und wenn erforderlich, als Zusatzinformation, die Feuchtekategorie, die Entwicklungsbezeichnung, Helligkeitsklasse und Gruppierung (siehe Bild 1.3).

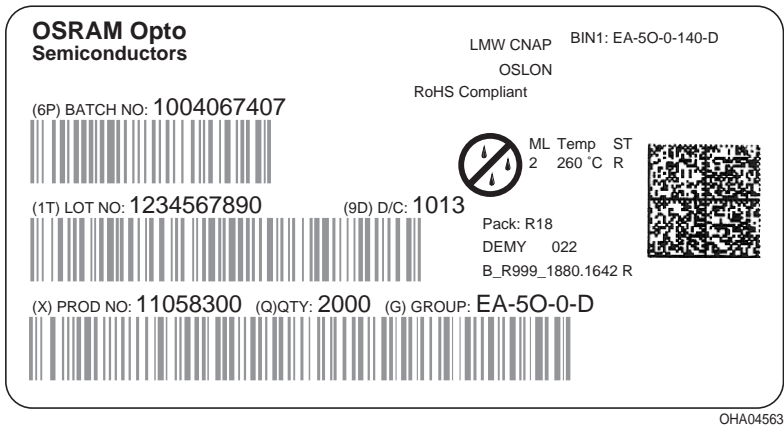


Figure 1.3: Barcode-Product-Label is applied to the outside of the dry pack bag.

Bild 1.3: Ein Barcode-Produkt-Etikett (BPL) befindet sich auf dem Trockenbeutel.

- An Opto Semiconductor dry pack caution label, which identifies the sealing date of the bag, the moisture level, the dry pack expiration date (which is 24 month later), as well as product handling guidelines (see Figure 1.4).
- Ein Opto Semiconductor Feuchteetikett, welches Informationen über das Versiegelungsdatum, Feuchtigkeitsklasse, Lagerzeit (welche 24 Monate beträgt) als auch Handhabungshinweise für die Bauteile beinhaltet (siehe Bild 1.4).

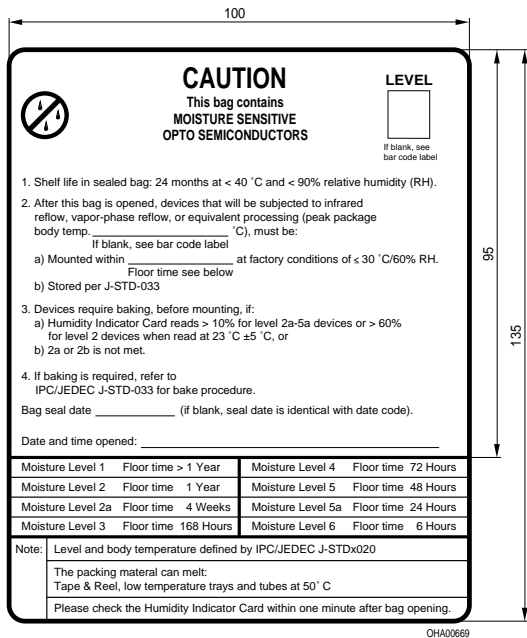


Figure 1.4: Moisture sensitive label or print is applied to the outside of the dry pack bag.

Bild 1.4: Ein Feuchteetikett oder Aufdruck mit entsprechender Feuchtigkeitsklasse befindet sich auf dem Trockenbeutel.

## 6. Handling Dry Packed Parts

### 6.1 Incoming Inspection

Moisture-sensitive components are shipped in vacuum-sealed moisture barrier bags packed with a desiccant material and a humidity indicator card.

Upon receipt, the bags should be inspected for damage to ensure that the bag integrity has been maintained. Inspection should verify no holes, gouges, tears, or punctures of any kind that may expose the contents of the bag.

### 6.2 Opening moisture barrier bags

To open the bag, simply cut across the top of the bags as close to the original seal as possible being careful not to damage the contents.

Before using dry packed components, it is essential that the humidity indicator be checked immediately after bag opening. Should it indicate a RH of less than 10% (the color of the 10% dot has not changed from blue to pink), the components contained are ready for use.

If the humidity indicator in the dry pack shows a RH of more than 10% (the color of the 10% dot has changed from blue to pink), the components must be rebaked.\*

In addition please check the dry pack for damage on opening or storage under too severe climatic condition.

Once the dry pack bag is opened, the desired quantity of units should be removed and the bag resealed within two hours. If the bag is left open longer than 30 minutes the desiccant should be replaced with dry desiccant. The closed desiccant pouches may be dried by baking them at 120 °C - 125 °C for 16 hours if the material of the bag is heat resistant.

#### \* Exception:

**Level 2 products only have to be rebaked if the 60% dot has changed the color to pink**

### 6.3 Rebaking of Devices

If devices have exceeded the specified floor life time for exposure described below or the indicator in a dry pack shows a RH of more than 10%, they may be baked according IPC/JEDEC J-STD-033B.

**Note:** When baking a product at 65 °C to 125 °C, the product must be put in metal tubes or metal trays, not in the tubes or reels in which the product was shipped.

## 6. Handhabung trockenverpacketer Bauteile

### 6.1 Eingangskontrolle

Feuchteempfindliche Bauteile werden in vakuumverschweißten Trockenbeutel zusammen mit Trockenmittel und Feuchteindikatorkarte versendet.

Nach Erhalt sollten die Beutel auf Beschädigungen untersucht werden. Die Vollständigkeit der Beutel sollte ebenfalls überprüft werden. Es sollten keine Löcher, Dellen oder Risse jeglicher Art vorhanden sein, welche den Inhalt des Beutels beeinträchtigen.

### 6.2 Öffnen von Trockenbeuteln

Zum Öffnen des Beutels einfach vorsichtig am Ende des Beutels, entlang der Original-Siegellinie aufschneiden, damit keine Bauteile beschädigt werden.

Bevor die Bauteile verarbeitet werden, ist es unbedingt erforderlich, die Feuchteindikatorkarte umgehend nach dem Öffnen des Beutels zu überprüfen. Sollte diese eine relative Feuchte von weniger als 10% anzeigen (die Farbe des 10% Punktes ist nicht von blau nach rosa umgeschlagen), so können die Bauteile verarbeitet werden.

Wenn die Feuchteindikatorkarte in einem Trockenbeutel mehr als 10% beträgt (die Farbe des 10% Punktes ist von blau nach rosa umgeschlagen), müssen die Bauteile vor der Verarbeitung getrocknet werden.\* Zusätzlich sollte der Beutel auf Beschädigungen oder Lagerung unter falschen klimatischen Bedingungen untersucht werden.

Wenn der Trockenbeutel geöffnet wurde, sollte die gewünschte Menge an Bauteilen herausgenommen und der Beutel innerhalb von 30 Minuten wieder zugeschweißt werden.

Sollte der Beutel länger geöffnet sein, ist das Trockenmittel durch ein neues Trockenmittel zu ersetzen. Die Trockenmittelbeutel können bei 120 °C - 125 °C für 16 Stunden regeneriert werden, wenn das Beutelmateriale hitzefest ist.

#### \* Ausnahme:

**Level 2 Produkte müssen erst ausgeheizt werden, wenn der 60% Punkt seine Farbe nach rosa verändert hat**

### 6.3 Ausheizen von Bauteilen

Im Falle, daß Bauteile die vorgeschriebene Lagerzeit überschritten haben, wie weiter unten beschrieben, oder der Feuchteindikator in einem Trockenbeutel mehr als 10% relative Feuchte anzeigt, können die Bauteile in den Original-Kunststoffspulen entsprechend IPC/JEDEC J-STD-033B ausgeheizt werden. Es ist wichtig daran zu erinnern, daß Metallschienen oder Metalltablets verwendet werden müssen, wenn das Ausheizen der Bauteile bei 65 °C - 125 °C erfolgt. Auf keinen Fall können die Schienen oder Spulen verwendet werden, mit denen das Produkt angeliefert wurde.

## 6.4 Resealing a Dry Pack

After the devices have completed the bake out period they should immediately be resealed in the moisture proof bags.

If not all the components from a dry pack are used, the original desiccant and humidity detector should be reinserted and the dry pack resealed by using commercially available vacuum - heat - sealing equipment. New desiccant must be added if the humidity indicator has changed color.

Once the devices are removed from the dry pack bag, the total exposure time to the factory environment, prior to mounting the parts onto a circuit board, should not exceed the recommended time specified on the dry pack caution label. (see item 2a in Figure 1.4). This out-of-bag time varies depending on the moisture-sensitivity rating for the product. If the cumulative out-of-bag time for the components exceeds 6 hours at 30 °C and 60% RH the allowable floor life specified by the manufacturer must be adjusted accordingly.

For example, if the manufacturer specifies Level 3 with a floor life of 168 hours and the components are out of the bag for 24 hours, then an adjusted floor life of 144 h should be written on the label.

## 6.5 Storing Unpacked Devices

Unpacked devices may be mounted under environmental conditions not exceeding 30 °C and humidity levels of 60% RH. Devices must be soldered on PCB assemblies within specified floor life hours.

| Moisture Sensitive Level | Floor Life |
|--------------------------|------------|
| 1                        | no limit   |
| 2                        | 1 year     |
| 2a                       | 4 weeks    |
| 3                        | 168 hours  |
| 4                        | 72 hours   |
| 5                        | 48 hours   |
| 5a                       | 24 hours   |
| 6                        | 6 hours    |

The floor life of in-process materials may be extended by the use of controlled environments. Packages may be stored outside the Moisture Barrier Bag independent of moisture/reflow sensitivity considerations, if the ambient relative humidity is  $\leq 10\%$  RH. The use of desiccator cabinets with dry N<sub>2</sub> or dry air is suggested for such storage.

## 6.6 Storing moisture-proof packs prior to opening

Devices packaged in moisture-proof packaging should be stored in ambient conditions not exceeding temperatures of 40 °C or humidity levels of 90% RH. Storage life at these conditions should not exceed 24 months.

## 6.4 Verschließen von Trockenbeuteln

Nachdem die Bauteile die Ausheizzeit erreicht haben, sollten diese schnellstmöglich in einem Trockenbeutel eingeschweißt werden.

Wenn die Bauteile nicht verarbeitet werden, sollten diese zusammen mit dem Original-Trockenmittel und dem Feuchteindikator in einem Trockenbeutel eingeschweißt werden. Dazu ist ein im Handel erhältliches Vacuum-Folienschweißgerät zu verwenden. Neues Trockenmittel muß hinzugefügt werden, wenn sich die Feuchteindikatorkarte verfärbt hat.

Sollten die Bauteile aus dem Trockenbeutel entnommen sein, so ist diese Entnahmezeit, vorrangig um die Bauteile auf Leiterplatten zu montieren, nicht zu überschreiten. Die empfohlene Verarbeitungszeit ist auf dem Feuchteetikett angegeben (siehe Punkt 2a in Bild 1.4). Diese Verarbeitungszeit variiert entsprechend der Feuchteklasse des betreffenden Bauteils. Wenn die aufgelaufene Verarbeitungszeit des Bauteils 6 Stunden bei 30 °C und 60% RH überschreitet, muß die erlaubte Lagerzeit (festgelegt vom Hersteller) umgehend angepaßt werden. Zum Beispiel: Wenn der Hersteller eine Feuchteklasse "3" festlegt, welches einer Lagerzeit von 168 Stunden entspricht, und die Bauteile außerhalb des Trockenbeutels 24 Stunden lang verarbeitet werden, so muß die verbleibende Verarbeitungszeit von 144 Stunden auf das Feuchteetikett geschrieben werden.

## 6.5 Lagerung unverpackter Bauteile

Unverpackte Bauteile können verarbeitet werden unter Umgebungsbedingungen von nicht größer als 30 °C und einem Feuchtigkeitsgrad von 60% RH. Die Bauteile müssen innerhalb der unten angegebenen Verarbeitungszeit auf Leiterplatten gelötet sein.

| Feuchtigkeitsgrad | Lagerzeit           |
|-------------------|---------------------|
| 1                 | keine Einschränkung |
| 2                 | 1 Jahr              |
| 2a                | 4 Wochen            |
| 3                 | 168 Stunden         |
| 4                 | 72 Stunden          |
| 5                 | 48 Stunden          |
| 5a                | 24 Stunden          |
| 6                 | 6 Stunden           |

Die Verarbeitungszeit von sich im Prozeß befindlichem Material kann durch eine kontrollierte Umgebung verlängert werden. Gehäuse können außerhalb des Trockenbeutels unabhängig von der Berücksichtigung der Feuchte/Reflow - Empfindlichkeit gelagert werden, wenn die Umgebungsbedingungen  $\leq 10\%$  RH, beträgt. Die Verwendung von Trockenschränken mit trockenem N<sub>2</sub> oder trockener Luft wird für solch eine Lagerung vorgeschlagen.

## 6.6 Lagerung von ungeöffneten Trockenverpackungen

Bauteile, verpackt in feuchtedichten Verpackungen, sollten bei Umgebungsbedingungen von nicht mehr als 40 °C oder einem Feuchtegehalt von max. 90% RH gelagert werden. Die Lagerzeit unter diesen Bedingungen sollte 24 Monate nicht überschreiten.





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| Q65110A2258   | LO A676-Q2T1-24      | 59   |
| Q65110A2259   | LS A676-Q1R2-1       | 59   |
| Q65110A2260   | LS A676-R1S1-1       | 59   |
| Q65110A2261   | LS A676-P2S1-1       | 59   |
| Q65110A2262   | LY A676-R1S2-26      | 59   |
| Q65110A2263   | LY A676-S1T1-26      | 59   |
| Q65110A2264   | LY A676-Q2T1-26      | 59   |
| Q65110A2285   | LG A676-P1Q2-24      | 59   |
| Q65110A2286   | LP A676-L1M2-25      | 59   |
| Q65110A2290   | LG A67K-H2K1-24      | 59   |
| Q65110A2291   | LG A67K-G2K1-24      | 59   |
| Q65110A2292   | LP A67K-E1F2-25      | 59   |
| Q65110A2293   | LP A67K-F1G2-25      | 59   |
| Q65110A2294   | LP A67K-E1G2-25      | 59   |
| Q65110A2310   | LP A675-N1P2-25      | 59   |
| Q65110A2334   | LP E675-P1Q2-25      | 30   |
| Q65110A2335   | LA E65F-CADA-24-3B5A | 31   |
| Q65110A2355   | LP T655-Q1R2-25      | 27   |
| Q65110A2356   | LA M676-Q2S1-1       | 28   |
| Q65110A2357   | LA M676-R2T1-1       | 28   |
| Q65110A2358   | LA M676-Q2T1-1       | 28   |
| Q65110A2359   | LO M676-Q2S1-24      | 28   |
| Q65110A2360   | LO M676-R2T1-24      | 28   |
| Q65110A2361   | LO M676-Q2T1-24      | 28   |

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| Q65110A2363   | LS M676-Q2S1-1            | 28       |
| Q65110A2364   | LS M676-P2S1-1            | 28       |
| Q65110A2366   | LY M676-R2T1-26           | 28       |
| Q65110A2367   | LY M676-Q2T1-26           | 28       |
| Q65110A2389   | LG M676-N2Q1-24           | 28       |
| Q65110A2393   | LG M67K-G1H2-24           | 28       |
| Q65110A2394   | LG M67K-H1J2-24           | 28       |
| Q65110A2395   | LG M67K-G1J2-24           | 28       |
| Q65110A2396   | LP M67K-D2F1-25           | 28       |
| Q65110A2397   | LP M67K-E2G1-25           | 28       |
| Q65110A2398   | LP M67K-D2G1-25           | 28       |
| Q65110A2399   | LP M675-M2P1-25           | 28       |
| Q65110A2408   | LO Y876-Q2S1-24           | 61       |
| Q65110A2409   | LO Y876-R2T1-24           | 61       |
| Q65110A2410   | LO Y876-Q2T1-24           | 61       |
| Q65110A2411   | LS Y876-P2R1-1            | 61       |
| Q65110A2412   | LS Y876-P2S1-1            | 61       |
| Q65110A2413   | LY Y876-Q2S1-26           | 61       |
| Q65110A2414   | LY Y876-R2T1-26           | 61       |
| Q65110A2415   | LY Y876-Q2T1-26           | 61       |
| Q65110A2446   | LSY T676-P2R1-1-0+Q2S1-35 | 56       |
| Q65110A2460   | LW L28G-R2S2-3K6L-1       | 53       |
| Q65110A2463   | SFH 425                   | 142      |
| Q65110A2464   | SFH 4259                  | 146      |
| Q65110A2465   | SFH 4250                  | 145      |
| Q65110A2466   | SFH 4257                  | 141      |
| Q65110A2467   | SFH 4255                  | 145      |
| Q65110A2469   | SFH 320-3                 | 116      |
| Q65110A2470   | SFH 320 FA-3              | 116      |
| Q65110A2471   | SFH 320                   | 116      |
| Q65110A2472   | SFH 320 FA                | 116      |
| Q65110A2473   | SFH 420                   | 141      |
| Q65110A2475   | SFH 320 FA-3/4            | 116      |
| Q65110A2479   | SFH 3201-2/3              | 117      |
| Q65110A2482   | SFH 325 FA-3              | 116      |
| Q65110A2484   | SFH 325-4                 | 116      |
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| Q65110A2486   | SFH 325                   | 116      |
| Q65110A2487   | SFH 325 FA                | 116      |
| Q65110A2488   | SFH 325-3                 | 116      |
| Q65110A2490   | SFH 325 FA-3/4            | 116      |
| Q65110A2491   | SFH 325-3/4               | 116      |
| Q65110A2506   | SFH 3204                  | 116      |
| Q65110A2510   | SFH 320-4                 | 116      |
| Q65110A2512   | SFH 426                   | 142      |
| Q65110A2516   | SFH 4281                  | 141      |
| Q65110A2517   | SFH 4283                  | 141      |
| Q65110A2521   | SFH 4271                  | 141      |
| Q65110A2526   | SFH 3211 FA               | 116      |
| Q65110A2528   | SFH 3211 FA-3/4           | 116      |
| Q65110A2591   | SPL DL90_3                | 176      |
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| Q65110A2626   | BP 104 S                  | 122      |
| Q65110A2627   | BP 104 FS                 | 123      |
| Q65110A2628   | SFH 2400                  | 122      |
| Q65110A2629   | SFH 3400                  | 117      |
| Q65110A2631   | SFH 4585                  | 142      |
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| Q65110A2644   | SFH 3401-2/3         | 117      |
| Q65110A2651   | SFH 3219             | 116      |
| Q65110A2653   | SFH 3410-1/2         | 127      |
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| Q65110A2655   | SFH 3410-3/4         | 127      |
| Q65110A2663   | SFH 3605-2/3         | 117      |
| Q65110A2664   | SFH 3605-3/4         | 117      |
| Q65110A2665   | SFH 3600-2/3         | 117      |
| Q65110A2666   | SFH 3600-3/4         | 117      |
| Q65110A2672   | BP 104 FAS           | 123      |
| Q65110A2673   | SFH 2430             | 127      |
| Q65110A2676   | SPL BS81-9S          | 176      |
| Q65110A2698   | SFH 9201-2/3         | 134      |
| Q65110A2699   | BPW 34 FASR          | 123      |
| Q65110A2700   | BPW 34 FS            | 123      |
| Q65110A2701   | BPW 34 SR            | 122      |
| Q65110A2703   | KOM 2125             | 132      |
| Q65110A2705   | SFH 9202-2/3         | 134      |
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| Q65110A2711   | SFH 9202-5/6         | 134      |
| Q65110A2712   | SFH 9202             | 134      |
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| Q65110A2716   | SFH 9201-3/4         | 134      |
| Q65110A2730   | LG P47K-G2K1-24      | 52       |
| Q65110A2733   | LS P47K-H1K2-1       | 52       |
| Q65110A2738   | LY P47K-J1L2-26      | 52       |
| Q65110A2740   | BPW 34 FSR           | 123      |
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| Q65110A2960   | SFH 2701             | 122      |
| Q65110A2975   | SFH 4258             | 146      |
| Q65110A3107   | SFH 3710             | 127      |
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| Q65110A3121   | BPW 34 FAS           | 123      |
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| Q65110A3235   | LA L296-P1R2         | 53       |
| Q65110A3236   | LA L296-P2R1-1       | 53       |
| Q65110A3237   | LA L296-Q2R2-1       | 53       |
| Q65110A3337   | LD 261-5/6           | 150      |
| Q65110A3338   | LOG T77K-JL-1-0+GJ-1 | 56       |
| Q65110A3342   | LP L296-J2L2-25      | 53       |
| Q65110A3511   | SFH 3710-3/4         | 127      |
| Q65110A3512   | SFH 3710-2/3         | 127      |
| Q65110A3955   | LY P476-Q2S1-26      | 52       |
| Q65110A3956   | LY P476-R2T1-26      | 52       |
| Q65110A4007   | LG T676-P2R1-24      | 25       |
| Q65110A4099   | LW M673-P1Q2-3K6L    | 29       |
| Q65110A4100   | LW T673-P2R1-3K6L    | 26       |
| Q65110A4103   | LA E63F-EBGA-24-3A4B | 31       |
| Q65110A4104   | LA E65F-CBEA-24-3A4B | 31       |
| Q65110A4105   | LS E63F-DBFA-1       | 31       |
| Q65110A4106   | LS E65F-BBDA-1       | 31       |
| Q65110A4107   | LY E63F-EAFA-46-1    | 31       |
| Q65110A4108   | LY E63F-DBEB-35-1    | 31       |
| Q65110A4109   | LY E65F-CADA-46-1    | 31       |
| Q65110A4110   | LY E65F-BBCB-35-1    | 31       |

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| Q65110A4135   | LS E6SF-V2BA-1-1            | 30   |
| Q65110A4186   | LSG T676-P7Q7-1+N7P7-24     | 56   |
| Q65110A4262   | BP 104 SR                   | 122  |
| Q65110A4263   | BP 104 FASR                 | 123  |
| Q65110A4282   | LS Q971                     | 55   |
| Q65110A4285   | LO Q971                     | 55   |
| Q65110A4513   | SFH 5711-2/3                | 128  |
| Q65110A4678   | LB G6SP-V2BB-35-1           | 32   |
| Q65110A4721   | LY G6SP-CADB-36-1           | 32   |
| Q65110A4722   | LY A67F-U2AB-36             | 59   |
| Q65110A4723   | LS A67F-U1AA-1              | 59   |
| Q65110A4729   | LR A67F-U2AB-1              | 59   |
| Q65110A4857   | LA P47F-V2BB-24-3A4B        | 52   |
| Q65110A4859   | LS P47F-U1AA-1-1            | 52   |
| Q65110A4860   | LY P47F-U2AB-36-3B5A        | 52   |
| Q65110A4861   | LR P47F-U2AB-1-1            | 52   |
| Q65110A4867   | LO A67F-V2BB-24             | 59   |
| Q65110A4881   | LY P476-Q2T1-26             | 52   |
| Q65110A4968   | LO A67K-K1L2-24             | 59   |
| Q65110A4969   | LO A67K-K1M2-24             | 59   |
| Q65110A4970   | LO A67K-L1M2-24             | 59   |
| Q65110A5343   | SFH 3310                    | 127  |
| Q65110A5452   | SFH 4730                    | 148  |
| Q65110A5713   | LYYG6SF-CADB-35             | 58   |
| Q65110A5874   | LT G6SP-CBEB-25-1           | 32   |
| Q65110A5929   | LT M673-N2Q1-25             | 28   |
| Q65110A5930   | LT M673-N1R2-25             | 28   |
| Q65110A5953   | LT T673-L2N2-35             | 26   |
| Q65110A6010   | LA W5SN-JZKZ-24             | 38   |
| Q65110A6011   | LR W5SN-JYKY-1              | 38   |
| Q65110A6087   | SFH 4556                    | 147  |
| Q65110A6190   | SFH 4740                    | 148  |
| Q65110A6209   | LY E6SF-AABA-46-1           | 30   |
| Q65110A6262   | LA E6SF-BBCB-24-1           | 30   |
| Q65110A6458   | SFH 3010                    | 116  |
| Q65110A6460   | SFH 4050                    | 145  |
| Q65110A6657   | SFH 4253                    | 141  |
| Q65110A6668   | SFH 7740                    | 135  |
| Q65110A6958   | SPL BS94-2S                 | 176  |
| Q65110A7018   | LO P476-R2T1-24             | 52   |
| Q65110A7060   | SFH 4640                    | 145  |
| Q65110A7073   | SFH 7741                    | 135  |
| Q65110A7127   | LT P4SG-V1AB-36-1           | 52   |
| Q65110A7166   | LCR E6SG-U1V2-DMDQ-46       | 31   |
| Q65110A7209   | LW Q38G-Q1S1-3K6L-1         | 54   |
| Q65110A7210   | LW Q38E-Q1S2-3K6L-1         | 54   |
| Q65110A7211   | LB Q39G-L2N2-35-1           | 54   |
| Q65110A7212   | LB Q39E-L2N2-35-1           | 54   |
| Q65110A7298   | LP E675-P2R1-25             | 30   |
| Q65110A7321   | LR T68F-U1AA-1-1            | 26   |
| Q65110A7341   | SFH 4555                    | 147  |
| Q65110A7464   | LB W5SN-GZJX-35             | 38   |
| Q65110A7513   | SFH 4240                    | 145  |
| Q65110A7515   | SFH 4243                    | 141  |
| Q65110A7516   | SFH 4244                    | 142  |
| Q65110A7518   | SFH 4248                    | 146  |
| Q65110A7519   | SFH 4249                    | 146  |
| Q65110A7521   | LA W5SM-JYKX-24             | 34   |
| Q65110A7524   | LO E6SF-ABCB-24-1           | 30   |
| Q65110A7525   | LY E6SF-V2AB-35-1           | 30   |
| Q65110A7526   | LAY T67F-AABB-1-1+AABA-45-1 | 56   |



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| Q65110A7584   | LW Q38G-Q2R2-3K5L-1                | 54   |
| Q65110A7601   | LCW W5AM-KXKZ-4L8N                 | 35   |
| Q65110A7706   | LCW W5SN-KYLY-4L8N                 | 38   |
| Q65110A7707   | LCW W5SN-KYLY-4J8K                 | 38   |
| Q65110A7708   | LCW W5SN-KXLX-409Q                 | 38   |
| Q65110A7730   | LY T68F-U1AA-46-1                  | 26   |
| Q65110A7733   | LCW E6SG-V2BA-409Q                 | 31   |
| Q65110A7734   | LCW E6SG-V2BA-4L8N                 | 31   |
| Q65110A7735   | LCW E6SG-V2BA-4J8K                 | 31   |
| Q65110A7736   | LCW E6SG-V1AB-4U9X                 | 31   |
| Q65110A7737   | LCW E6SG-V1AB-4R9T                 | 31   |
| Q65110A7796   | LY T68F-T2V2-35-1                  | 26   |
| Q65110A7809   | LP M676-L1M2-25                    | 28   |
| Q65110A7819   | LUW W5AP-MYNY-4C8E                 | 39   |
| Q65110A7820   | LUW W5AP-MYNY-5F8G                 | 39   |
| Q65110A7878   | LUW C9EP-N4N6-EG                   | 48   |
| Q65110A7879   | LUW C9SP-N4N6-EG                   | 48   |
| Q65110A7881   | LUW T6SG-AABA-4N7Q                 | 26   |
| Q65110A7883   | LB E6SG-T1U2-35                    | 30   |
| Q65110A7884   | LT A6SG-V2AB-35                    | 60   |
| Q65110A7885   | LT E6SG-AABA-35                    | 30   |
| Q65110A7901   | LT W5SN-KXKZ-25                    | 38   |
| Q65110A7939   | LW Q38E-Q2R2-3K5L                  | 54   |
| Q65110A7940   | LB Q39G-N1P1-35-1                  | 54   |
| Q65110A7997   | LT Q39G-Q1S2-25-1                  | 54   |
| Q65110A7998   | LT Q39E-Q1S2-25-1                  | 54   |
| Q65110A8025   | LG Y876-P1Q2-24                    | 61   |
| Q65110A8028   | LY QH9F-P1R1-36                    | 55   |
| Q65110A8029   | LW QH8G-Q2S2-3K5L-1                | 55   |
| Q65110A8031   | LR QH9F-P2R1-1                     | 55   |
| Q65110A8032   | LB QH9G-N1P2-35-1                  | 55   |
| Q65110A8036   | LR G5AP-BZCZ-1-1                   | 33   |
| Q65110A8037   | LD G5AP-4M4N-35-1                  | 33   |
| Q65110A8074   | ZO QH9F-M2P2-24-1                  | 55   |
| Q65110A8082   | LA VH9F-Q1R2-24                    | 62   |
| Q65110A8083   | LB VH9G-N1P2-35-1                  | 62   |
| Q65110A8088   | LR VH9F-P2R1-1                     | 62   |
| Q65110A8090   | LW VH8G-Q2S2-4M6N-1                | 62   |
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| Q65110A8092   | SFH 4341                           | 147  |
| Q65110A8093   | SFH 4542                           | 146  |
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| Q65110A8096   | SFH 4546                           | 147  |
| Q65110A8098   | SFH 4641                           | 142  |
| Q65110A8099   | SFH 4646                           | 142  |
| Q65110A8104   | SPL BK81-12S (802+/-3nm)           | 176  |
| Q65110A8160   | LCW W5AM-JZKY-4R9T                 | 35   |
| Q65110A8176   | LRTBFUG-P9R7-1+S7U-29+M7Q-49       | 57   |
| Q65110A8177   | LRTB GFTG-T7AW-1+V7A7-29+R5T9-49-L | 57   |
| Q65110A8181   | LE A S2W-MXNX-34                   | 50   |
| Q65110A8184   | LE B S2W-KYLY-23                   | 50   |
| Q65110A8185   | LE T S2W-NYPY-35                   | 50   |
| Q65110A8252   | LB P4SG-S2U1-35                    | 52   |
| Q65110A8280   | SFH 4750                           | 148  |
| Q65110A8309   | LV W5SN-JXKZ-25-S                  | 38   |
| Q65110A8395   | SFH 4656                           | 142  |
| Q65110A8396   | SFH 4651                           | 142  |
| Q65110A8397   | LUW W5AM-KZLY-6P7R                 | 36   |
| Q65110A8417   | LT W5SM-JXXK-36                    | 34   |
| Q65110A8431   | LT G5AP-CZEX-36-1                  | 33   |

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| Q65110A8451   | SPL 2F81-2S-105                 | 176  |
| Q65110A8477   | LUW T6SG-ABBB-4N7Q              | 26   |
| Q65110A8485   | SFH 5712-2/3                    | 128  |
| Q65110A8562   | LRTDC9TP-EAFB-GHQN              | 58   |
| Q65110A8569   | LY T66F-AABA-35-1               | 27   |
| Q65110A8570   | LY T66F-ABBB-46-1               | 27   |
| Q65110A8571   | LR T66F-ABBB-1-1                | 27   |
| Q65110A8588   | LE UW D1W3 01-7N7P-GMKM-T01     | 51   |
| Q65110A8589   | LE UW D1W5 01-7P8Q-GMKM-T01     | 51   |
| Q65110A8590   | LE UW D1W2 01-7M7N-GMKM-T01     | 51   |
| Q65110A8591   | LE UW D1W1 01-5L6M-GMKM-T01     | 51   |
| Q65110A8593   | LE UW D1W4 01-5P6Q-GMKM-T01     | 51   |
| Q65110A8594   | SPL BK91-20HT                   | 176  |
| Q65110A8595   | SPL BK94-20HT                   | 176  |
| Q65110A8596   | SPL BK98-20HT                   | 176  |
| Q65110A8602   | LRTBR98G-R7T5-1+S7U-26+P7R-26   | 58   |
| Q65110A8628   | LUW CAEP-LFLZ-G3                | 48   |
| Q65110A8682   | LUW CN5M-GAHA-5P7R-1            | 40   |
| Q65110A8683   | LD CN5M-4Q4R-35-1               | 40   |
| Q65110A8697   | LA N91E-DBFB-24                 | 54   |
| Q65110A8706   | SFH 4257 R                      | 141  |
| Q65110A8707   | LT N91E-DBFB-25-1               | 54   |
| Q65110A8725   | SPL BK81-20H (803+/-3 nm)       | 176  |
| Q65110A8735   | LB N91E-AADA-35-1               | 54   |
| Q65110A8754   | SFH 4232                        | 148  |
| Q65110A8758   | SFH 4761                        | 148  |
| Q65110A8790   | SPL PL90_0-B                    | 175  |
| Q65110A8801   | SPL BK91-12S (911+/-3nm)        | 176  |
| Q65110A8813   | LCY G6SP-CBDB-5E                | 32   |
| Q65110A8820   | SPL BK94-12S (934+/-3nm)        | 176  |
| Q65110A8833   | LUW W5AM-KYLY-5F8G              | 36   |
| Q65110A8842   | LG Q976-MP-24                   | 55   |
| Q65110A8867   | SFH 4751                        | 148  |
| Q65110A8870   | SFH 7743                        | 135  |
| Q65110A8878   | SPL BK98-12S (972+/-3nm)        | 176  |
| Q65110A8879   | LRTBC9TP-CWD5-1+D5E7-25+A9C5-49 | 58   |
| Q65110A8888   | LS M67F-S2U2-1                  | 28   |
| Q65110A8900   | SFH 4235                        | 148  |
| Q65110A8901   | SFH 4233                        | 148  |
| Q65110A8946   | LUW W5SN-KYLY-JKQL              | 38   |
| Q65110A8947   | LW G6CP-EAFA-JKQL-1             | 32   |
| Q65110A8964   | LW E6SG-AABA-JKPL-1             | 31   |
| Q65110A8972   | LR Y8SF-U1V2-1                  | 61   |
| Q65110A8973   | LO M67F-U2AB-24                 | 28   |
| Q65110A8975   | LT Y8SG-V1AB-36-1               | 61   |
| Q65110A8976   | LB Y8SG-T1U2-35-1               | 61   |
| Q65110A8977   | LY Y8SF-U1V2-36                 | 61   |
| Q65110A8980   | LY M67F-T2V2-36                 | 28   |
| Q65110A8981   | LW T6SG-V1AA-JKPL               | 26   |
| Q65110A8982   | LW T6SG-V2BA-JKPL               | 26   |
| Q65110A8986   | LCW W5AM-KXKZ-4J8K              | 35   |
| Q65110A8994   | LW A6SG-V2BA-JKPL               | 60   |
| Q65110A9001   | LCW W5PM-JZKY-5L7N              | 37   |
| Q65110A9003   | LCW W5PM-JZKZ-5J7K              | 37   |
| Q65110A9004   | LUW W5PM-KYLY-5P7R              | 37   |
| Q65110A9005   | LCW W5PM-JYKY-5R8T              | 37   |
| Q65110A9008   | LW W5PM-KXLX-6K8L               | 37   |
| Q65110A9009   | LCW W5PM-JYKY-5O8Q              | 37   |
| Q65110A9012   | LCW W5PM-JYKY-5U8X              | 37   |
| Q65110A9013   | LW W5PM-KXKZ-5K8L               | 37   |
| Q65110A9017   | LP T675-N1Q1-25                 | 25   |

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| Q65110A9018   | LY E67F-ABBB-46-1                  | 30   |
| Q65110A9019   | LY E67F-AABA-35-1                  | 30   |
| Q65110A9047   | LW P4SG-V2AB-JKPL-1                | 52   |
| Q65110A9063   | LV W5AM-JYKY-25                    | 35   |
| Q65110A9067   | LA CP7P-JXKX-24                    | 42   |
| Q65110A9074   | LT CP7P-JYKZ-26                    | 42   |
| Q65110A9078   | LCW G5GP-FYHX-508Q                 | 33   |
| Q65110A9079   | LCW G5GP-FYGY-5R8T                 | 33   |
| Q65110A9081   | LCW G5GP-FZHX-5L7N                 | 33   |
| Q65110A9085   | LD CN5M-1R1S-35-1                  | 40   |
| Q65110A9086   | LT CN5M-GAHB-25-1                  | 40   |
| Q65110A9089   | LA E67F-BACA-24-3B5A               | 30   |
| Q65110A9090   | LA E67F-BACA-24-3A4B               | 30   |
| Q65110A9091   | LUW G5GP-GXHY-5F8G                 | 33   |
| Q65110A9093   | LUW G5GP-GXHY-5C8E                 | 33   |
| Q65110A9105   | LRTB GFTG-T7AW-1+V7A7-29+R5T9-49-S | 57   |
| Q65110A9130   | LE B Q9WM-FXGX-23-0-350-R18        | 49   |
| Q65110A9131   | LE T Q9WM-JXKX-25-0-350-R18        | 49   |
| Q65110A9132   | LE B Q9WN-HXJY-24-0-700-R18        | 49   |
| Q65110A9133   | LW W5SM-JYKY-JKQL                  | 34   |
| Q65110A9134   | LE T Q9WN-KZLZ-25-0-700-R18        | 49   |
| Q65110A9135   | LE A Q9WN-JXJZ-1-0-700-R18         | 49   |
| Q65110A9136   | LE A Q9WM-GYHY-1-0-350-R18         | 49   |
| Q65110A9137   | LE T Q9WP-MXNX-25-0-A40-R18        | 49   |
| Q65110A9144   | LE B Q9WP-3V7A-24-0-A40-R18        | 49   |
| Q65110A9145   | LE A Q9WP-KZLZ-1-0-A40-R18         | 49   |
| Q65110A9161   | LMW CNAP-6J7K-37-DF-LH             | 41   |
| Q65110A9211   | LT W5SN-KYLY-25                    | 38   |
| Q65110A9212   | LT W5SM-JYKY-25                    | 34   |
| Q65110A9216   | LD W5SM-4S4T-35                    | 34   |
| Q65110A9218   | SFH 4058                           | 141  |
| Q65110A9219   | LT QH9G-Q2S2-25-1                  | 55   |
| Q65110A9221   | LB W5SM-FZHX-35                    | 34   |
| Q65110A9222   | LB W5SN-GYHZ-25                    | 38   |
| Q65110A9224   | LB W5SM-FYGZ-24                    | 34   |
| Q65110A9228   | LT VH9G-Q2S2-25-1                  | 62   |
| Q65110A9230   | LO T67F-V1AB-24-1                  | 25   |
| Q65110A9231   | LY T67F-U1AA-36-1                  | 25   |
| Q65110A9232   | LR T67F-U1AA-1-1                   | 25   |
| Q65110A9233   | LS T67F-T2V2-1-1                   | 25   |
| Q65110A9235   | LE UW Q9WP-8M7N-GMKM               | 49   |
| Q65110A9266   | LY P47F-U2AB-36-4A5B               | 52   |
| Q65110A9267   | LA P47F-V2BB-24-3B5A               | 52   |
| Q65110A9268   | LA T67F-U2AB-24-1                  | 25   |
| Q65110A9273   | LA T676-Q2T1-24                    | 25   |
| Q65110A9274   | LA T676-R1S2-24                    | 25   |
| Q65110A9275   | LA T676-S1T1-24                    | 25   |
| Q65110A9341   | LR W5SM-HZJZ-1                     | 34   |
| Q65110A9367   | SFH 4645                           | 145  |
| Q65110A9377   | LB A6SG-T1U2-35                    | 60   |
| Q65110A9407   | LRTBGFTM-ST7-1+VV9-25+Q5R7-49-L    | 57   |
| Q65110A9422   | LH W5AM 1T3T-1                     | 35   |
| Q65110A9442   | LRTBGFTM-ST7-1+VV9-25+Q5R7-49-S    | 57   |
| Q65110A9484   | LTRBGFSF-ABCB-QKY0                 | 57   |
| Q65110A9502   | LUW C9SM-N1N3-EG                   | 48   |
| Q65110A9509   | LUW CN7M-HYJY-EMKM-1               | 40   |
| Q65110A9523   | LW E6SH-BACA-JKPL-1                | 31   |
| Q65110A9526   | LW E6SH-BBCB-JKPL-1                | 31   |
| Q65110A9531   | LUW W5AM-KYLY-5F8G                 | 36   |
| Q65110A9535   | LCW W5AM-JZKY-4U9X                 | 35   |
| Q65110A9536   | LCW W5AM-JZKZ-409Q                 | 35   |

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| Q65110A9541   | LW Y1SG-AEBE-EKFM-1      | 61   |
| Q65110A9542   | LW Y1SG-AEBE-GKJM-1      | 61   |
| Q65110A9543   | LW Y1SG-AFBF-EKFM-1      | 61   |
| Q65110A9544   | LW Y1SG-AFBF-GKJM-1      | 61   |
| Q65110A9545   | LW Y1SG-BFCF-EKFM-1      | 61   |
| Q65110A9546   | LW Y1SG-BFCF-GKJM-1      | 61   |
| Q65110A9549   | SFH 4239                 | 148  |
| Q65110A9563   | SFH 2400 FAR             | 123  |
| Q65110A9564   | SFH 4236                 | 148  |
| Q65110A9565   | SFH 7770                 | 135  |
| Q65110A9644   | LY W5SM-HZJZ-35          | 34   |
| Q65110A9645   | LY W5SM-HZJZ-46          | 34   |
| Q65110A9681   | LCW W5SM-JYKY-409Q       | 34   |
| Q65110A9692   | LCW W5SM-JXKX-4U9X       | 34   |
| Q65110A9693   | LCW W5SM-JYKY-4R9T       | 34   |
| Q65110A9694   | LCW W5SM-JYKY-4L8N       | 34   |
| Q65110A9698   | LCW W5SM-JYKZ-4J8K       | 34   |
| Q65110A9713   | LCW W5SN-KXLX-4U9X       | 38   |
| Q65110A9717   | LCW W5SN-KYLY-4R9T       | 38   |
| Q65110A9730   | SFH 3015 FA              | 116  |
| Q65110A9731   | SFH 4045                 | 145  |
| Q65110A9749   | LE CW S2LN-NXNZ-5R8T-K   | 50   |
| Q65110A9750   | LE UW S2LN-NYPX-5C8E-K   | 50   |
| Q65110A9751   | LE UW S2LN-NYPX-5E8G-K   | 50   |
| Q65110A9776   | LA ETSF-AABA-24-1        | 30   |
| Q65110A9777   | LA ETSF-BACB-24-1        | 30   |
| Q65110A9778   | LY ETSF-AABA-35-1        | 30   |
| Q65110A9779   | LY ETSF-ABCA-46-1        | 30   |
| Q65110A9810   | LUW CN7N-KYLY-EMKM-46    | 41   |
| Q65110A9850   | LW W5AM-KXLX-5K8L        | 36   |
| Q65110A9865   | LUW H9GP-KYLY-EMKM       | 47   |
| Q65110A9911   | SFH 2270 R               | 127  |
| Q65110A9919   | LO T67D-U1AA-24-1        | 25   |
| Q65110A9920   | LR T67D-T2V2-1-1         | 25   |
| Q65110A9942   | SFH 4056                 | 145  |
| Q65110A9958   | SFH 4450                 | 146  |
| Q65111A0020   | SFH 4059                 | 145  |
| Q65111A0024   | LUW CNAP-8J6L-BJ-P4P6-LH | 41   |
| Q65111A0033   | LW W5AM-KXLX-LKQL        | 36   |
| Q65111A0034   | LW W5AM-KXKZ-LKQL        | 36   |
| Q65111A0040   | LD W5SN-1U2V-35          | 38   |
| Q65111A0128   | SFH 4250S                | 145  |
| Q65111A0131   | LUW W5AP-MZNN-4C8G       | 39   |
| Q65111A0147   | LO T66F-AACA-24-1        | 27   |
| Q65111A0196   | LW ETSF-AABB-JKPL-1      | 31   |
| Q65111A0205   | LE UW S2W-NZPZ-4P7R      | 50   |
| Q65111A0224   | LT W5AM-KXKZ-36          | 35   |
| Q65111A0225   | LB W5AM-GXHY-25          | 35   |
| Q65111A0226   | LD W5AM-3T4U-35          | 35   |
| Q65111A0232   | SPL TD85-C               | 175  |
| Q65111A0238   | LSG T77K-JL-1-0+HK-1-0   | 56   |
| Q65111A0250   | LR W5AM-HZKX-1           | 35   |
| Q65111A0256   | LR T64F-BBDB-1-1         | 27   |
| Q65111A0257   | LY T64F-BBDA-35-1        | 27   |
| Q65111A0258   | LY T64F-CADB-46-1        | 27   |
| Q65111A0265   | LO T64F-CBEB-24-1        | 27   |
| Q65111A0278   | SFH 4059S                | 145  |
| Q65111A0296   | LH CP7P-1T3T-1           | 43   |
| Q65111A0320   | LV W5SN-KXLX-25          | 38   |
| Q65111A0327   | LY W5SN-KXLX-35          | 38   |
| Q65111A0328   | LY W5SN-KXLX-46          | 38   |



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| Q65111A0330   | LY W5AM-HZJZ-36                   | 35   |
| Q65111A0334   | LH CPDP-1T3T-1                    | 43   |
| Q65111A0336   | LA G6SP-DAEB-24-1                 | 32   |
| Q65111A0343   | LR CPDP-HZKX-1                    | 42   |
| Q65111A0344   | LY CPDP-HZJZ-36                   | 42   |
| Q65111A0345   | LR CP7P-HZKX-1                    | 42   |
| Q65111A0346   | LY CP7P-HZJZ-36                   | 42   |
| Q65111A0380   | SFH 4516                          | 144  |
| Q65111A0400   | LA CPDP-JYKX-24                   | 42   |
| Q65111A0402   | LT CPDP-KXKZ-26                   | 42   |
| Q65111A0403   | LB CPDP-GYHY-35                   | 42   |
| Q65111A0439   | LRT GFTM-ST7-1+W9-29              | 57   |
| Q65111A0506   | SFH 4551                          | 146  |
| Q65111A0513   | LA A67F-AABB-24-1                 | 59   |
| Q65111A0518   | PL 450B                           | 175  |
| Q65111A0536   | LR G6SP-CBEA-1-1                  | 32   |
| Q65111A0542   | LUW W5SM-KXLX-4C8E                | 34   |
| Q65111A0543   | LUW W5SM-KXLX-5F8G                | 34   |
| Q65111A0544   | LUW W5SM-KXLX-5P7R                | 34   |
| Q65111A0545   | LUW W5SM-JZKZ-6P7Q                | 34   |
| Q65111A0573   | LA W5AP-LZMZ-24                   | 39   |
| Q65111A0575   | LD W5AP-5A8A-35                   | 39   |
| Q65111A0576   | LR W5AP-LXMY-1                    | 39   |
| Q65111A0577   | LT W5AP-MXNX-25                   | 39   |
| Q65111A0579   | LY W5AP-LXMY-36                   | 39   |
| Q65111A0586   | LE CW S2LN-NXNZ-5L7N-K            | 50   |
| Q65111A0587   | LE CW S2LN-NXNZ-5U8X-K            | 50   |
| Q65111A0651   | SFH 4053                          | 141  |
| Q65111A0703   | LY L196-P1S1-26                   | 53   |
| Q65111A0708   | LS L196-N1R2-1                    | 53   |
| Q65111A0730   | LE ATB S2W-JWKW-1+MANA-24+GWHW-23 | 50   |
| Q65111A0749   | LCW CQ7P.EC-KTLP-5J7K-1           | 45   |
| Q65111A0756   | LCW CQ7P.EC-KSKU-5L7N-1           | 45   |
| Q65111A0757   | LCW CQ7P.EC-KSKU-5O8Q-1           | 44   |
| Q65111A0760   | LCW CQ7P.EC-KSKU-5R8T-1           | 44   |
| Q65111A0765   | LCW CQ7P.EC-KRKT-5U8X-1           | 44   |
| Q65111A0780   | LCW CQDP.EC-KTLP-5J7K-1           | 45   |
| Q65111A0781   | LCW CQDP.EC-KTLP-5H7I-1           | 45   |
| Q65111A0783   | LCW CQ7P.EC-KTLP-5H7I-1           | 45   |
| Q65111A0785   | LCW CQDP.EC-KRKT-5U8X-1           | 44   |
| Q65111A0788   | LCW CQDP.EC-KSKU-5R8T-1           | 44   |
| Q65111A0789   | LCW CQDP.EC-KSKU-5O8Q-1           | 44   |
| Q65111A0790   | LCW CQDP.EC-KSKU-5L7N-1           | 45   |
| Q65111A0794   | LCW CQ7P.PC-KTLP-5L7N-1           | 45   |
| Q65111A0800   | LCW CQ7P.PC-KULQ-5J7K-1           | 45   |
| Q65111A0812   | LCW CQ7P.PC-KULQ-5H7I-1           | 45   |
| Q65111A0813   | LCW CQDP.PC-KTLP-5L7N-1           | 45   |
| Q65111A0816   | LCW CQDP.PC-KULQ-5J7K-1           | 45   |
| Q65111A0817   | LCW CQDP.PC-KULQ-5H7I-1           | 45   |
| Q65111A0824   | LUW CQ7P-LPLR-5E8G-1              | 46   |
| Q65111A0825   | LUW CQ7P-LPLR-5C8E-1              | 46   |
| Q65111A0826   | LUW CQ7P-LPLR-5D8F-1              | 46   |
| Q65111A0844   | LCW CQ7P.CC-KPKR-5R8T-1           | 43   |
| Q65111A0846   | LCW CQDP.CC-JUKQ-5U8X-1           | 43   |
| Q65111A0850   | LCW CQDP.CC-KPKR-5R8T-1           | 43   |
| Q65111A0854   | LCW CQDP.CC-KQKS-5O8Q-1           | 43   |
| Q65111A0856   | LCW CQDP.CC-KQKS-5L7N-1           | 44   |
| Q65111A0857   | LCW CQ7P.CC-KQKS-5O8Q-1           | 43   |
| Q65111A0859   | LCW CQ7P.CC-KQKS-5L7N-1           | 44   |
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| Q65111A0880   | LUW CQDP-LQLS-M8MI      | 46     |
| Q65111A0882   | LUW CQDP-LRLT-MJMW      | 46     |
| Q65111A0887   | LD CP7P-3T3U-35         | 43     |
| Q65111A0911   | LT H9GP-JZKZ-26-1       | 47     |
| Q65111A0913   | LA H9GP-JYKY-24-1       | 47     |
| Q65111A0914   | LR H9GP-HZKX-1-1        | 47     |
| Q65111A0915   | LY H9GP-HZKX-36-1       | 47     |
| Q65111A0916   | LD H9GP-3T3U-35-1       | 47     |
| Q65111A0917   | LB H9GP-GYHY-35-1       | 47     |
| Q65111A0923   | LCW H9GP-KXLX-4J8K-1    | 47     |
| Q65111A0924   | LUW H9GP-KYLY-4C8E-1    | 47     |
| Q65111A0925   | LUW H9GP-KYLY-5F8G-1    | 47     |
| Q65111A0958   | LR E6SF-ABCA-1-1        | 30     |
| Q65111A1008   | LB M673-L1M2-25         | 28     |
| Q65111A1009   | LB M673-M1N2-25         | 28     |
| Q65111A1010   | LB M673-L1N2-25         | 28     |
| Q65111A1036   | LCW W5AM.PC-KTLP-4L8N   | 36     |
| Q65111A1037   | LCW W5AM.PC-KTLP-4J8K   | 36     |
| Q65111A1038   | LCW W5AM.PC-KTLP-4H8I   | 36     |
| Q65111A1091   | LB CP7P-GYHY-35         | 42     |
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| Q65111A1142   | SFH 4557                | 147    |
| Q65111A1158   | SFH 4258S               | 146    |
| Q65111A1159   | SFH 4259S               | 146    |
| Q65111A1207   | LA CN5M-GAHA-24-1       | 40     |
| Q65111A1208   | LY CN5M-FBGB-36-1       | 40     |
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| Q68000A7851   | IRL 80A                 | 144    |
| Q68000A7852   | LPT 80A                 | 120    |
| Q68000A7964   | PD3535                  | 97     |
| Q68000A7965   | PD3537                  | 97     |
| Q68000A8000   | IRL 81A                 | 144    |
| Q68000A8091   | DLR1414                 | 97     |
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| Q68000A8093   | DLG1414                 | 97     |
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| Q68000A8503   | PDSP2111   | 95   |
| Q68000A8504   | PDSP2112   | 95   |
| Q68000A8505   | PDSP2113   | 95   |
| Q68000A8533   | PDSP2114   | 95   |
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| Q68000A8561   | HDSP2111S  | 95   |
| Q68000A8562   | HDSP2112S  | 95   |
| Q68000A8563   | HDSP2113S  | 95   |
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| Q68000A8641   | SL02016    | 98   |
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| Q68000A8836   | IPD2132    | 93   |
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| Q68000A8890   | SCDV5540   | 100  |
| Q68000A8891   | SCDV5541   | 100  |
| Q68000A8892   | SCDV5542   | 100  |
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| Q68000A8901   | SCF5742    | 98   |
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| Q68000A9104   | SCE5784    | 95   |
| Q68000A9105   | PDSP1880   | 95   |
| Q68000A9106   | PDSP1881   | 95   |
| Q68000A9107   | PDSP1882   | 95   |
| Q68000A9108   | PDSP1883   | 95   |
| Q68000A9109   | PDSP1884   | 95   |
| Q68000A9883   | IPD2545A   | 93   |
| Q68000A9884   | IPD2547A   | 93   |
| Q68000A9885   | IPD2548A   | 93   |
| Q68100A0550   | SCE5785    | 95   |
| Q68100A0988   | SCD55100A  | 94   |
| Q68100A0989   | SCD55101A  | 94   |
| Q68100A0990   | SCD55102A  | 94   |
| Q68100A0991   | SCD55103A  | 94   |
| Q68100A0992   | SCD55104A  | 94   |
| Q68100A0994   | SCD5580A   | 96   |
| Q68100A0996   | SCD5581A   | 96   |
| Q68100A0997   | SCD5582A   | 96   |
| Q68100A0998   | SCD5583A   | 96   |
| Q68100A1000   | SCD5584A   | 96   |
| Q68100A1078P  | SCDQ5542P  | 100  |
| Q68100A1078Q  | SCDQ5542Q  | 100  |
| Q68100A1078R  | SCDQ5542R  | 100  |

| Ordering code | Type      | Page |
|---------------|-----------|------|
| Q68100A1369   | SCE5740   | 98   |
| Q68100A1370   | SCE5741   | 98   |
| Q68100A1371   | SCE5742   | 98   |
| Q68100A1372   | SCE5743   | 98   |
| Q68100A1373   | SCE5744   | 98   |
| Q68100A1374   | SCE5745   | 98   |
| Q68100A1435   | SCE5786   | 95   |
| Q68100A1440   | SCE5740Q  | 99   |
| Q68100A1472P  | SCDQ5541P | 100  |
| Q68100A1472Q  | SCDQ5541Q | 100  |
| Q68100A1472R  | SCDQ5541R | 100  |
| Q68100A1473P  | SCDQ5543P | 100  |
| Q68100A1473Q  | SCDQ5543Q | 100  |
| Q68100A1473R  | SCDQ5543R | 100  |
| Q68100A1474P  | SCDQ5544P | 100  |
| Q68100A1474Q  | SCDQ5544Q | 100  |
| Q68100A1474R  | SCDQ5544R | 100  |
| Q68100A1479   | SCE5741P  | 99   |
| Q68100A1480   | SCE5742P  | 99   |
| Q68100A1481   | SCE5743P  | 99   |
| Q68100A1482   | SCE5744P  | 99   |
| Q68100A1483   | SCE5745P  | 99   |
| Q68100A1484   | SCE5741Q  | 99   |
| Q68100A1485   | SCE5742Q  | 99   |
| Q68100A1486   | SCE5743Q  | 99   |
| Q68100A1487   | SCE5744Q  | 99   |
| Q68100A1488   | SCE5745Q  | 99   |

## Europe

### Austria

#### OSRAM GmbH

Opto Semiconductors  
Lemboeckgasse 49/C/5  
A-1230 Vienna  
Phone: +43 1 68068-0  
E-Mail: [info@osram.at](mailto:info@osram.at)  
<http://www.osram-os.com>

### Czech Republic

#### OSRAM Česká Republika s.r.o

Obchodní oddělení Praha  
U Slávie 1540/2a  
100 00 Praha 10  
Phone: +420 272 118 890  
Fax: +420 272 118 851  
E-Mail: [p.koutensky@osram.com](mailto:p.koutensky@osram.com)  
<http://www.osram-os.com>

### Finland

#### Oy OSRAM Ab

Opto Semiconductors  
Majurinkatu 6  
FIN-02600 Espoo  
Phone: +358-9-74-22 33 03  
Fax: +358-9-74 22 33 74  
E-Mail: [johan.bischoff@osram.com](mailto:johan.bischoff@osram.com)  
<http://www.osram-os.com>

### France

#### OSRAM Opto Semiconductors

Immeuble de Bureaux Rosny 2  
Avenue du Général De Gaulle  
F-93118 Rosny-sous-Bois Cedex  
Phone: +33 1 5663 0831  
Fax: +33 1 5663 0843  
E-Mail: [o.jablonski@osram.fr](mailto:o.jablonski@osram.fr)  
<http://www.osram-os.com>

### Germany

#### OSRAM Opto Semiconductors GmbH

Leibnizstr. 4  
D-93055 Regensburg  
Phone: +49 941 850 1700  
Fax: +49 941 850 444 1700  
E-Mail: [support@osram-os.com](mailto:support@osram-os.com)  
<http://www.osram-os.com>

### Italy

#### OSRAM SpA

Via dell'Innovazione, 3  
I-20126 Milano  
Phone: +39 02 4249 1  
Fax: +39 02 4249 479  
E-Mail: [C.Bogani@osram.it](mailto:C.Bogani@osram.it)  
<http://www.osram-os.com>

### Portugal

#### OSRAM - Empresa de Aparelha-gem Electrica, Lda.

Opto Semiconductors Department  
Rua do Alto do Montijo, 15, 4º  
P-2794-069 Carnaxide  
Phone: +351 21 4165879  
Fax: +351 21 4171259  
E-Mail: [antonio.sousa@osram-os.com](mailto:antonio.sousa@osram-os.com)

### Romania

#### OSRAM Romania

Siriului 36-40  
014354 - Bucuresti 1  
Phone: +40 31 710 07 95  
Fax: +40 21 232 22 00  
E-Mail: [v.gligor@osram.com](mailto:v.gligor@osram.com)  
<http://www.osram-os.com>

### Russian Federation

#### OSRAM Russia

Ul. Malaja Kaluschskaja 15/4  
119071 Moskwa  
Phone: +7 (495) 9357070-121  
E-Mail: [v.basov@osram.com](mailto:v.basov@osram.com)  
<http://www.osram-os.com/ru>

### Spain

#### OSRAM S. A.

Opto Semiconductores  
Ronda de Europa, 5. Edif. 4DN  
E-28760 Tres Cantos  
Madrid  
Phone: +34 91 655 5659  
Fax: +34 91 675 3344  
E-Mail: [d.woerner@osram.com](mailto:d.woerner@osram.com)  
<http://www.osram-os.com>

### Sweden

#### OSRAM Opto Semiconductors

Box 504, Rudanvägen 1  
SE-136 25 Haninge  
Phone: +46 8 707 44 00  
Fax: +46 8 707 44 60  
E-Mail: [mark.karlsson@osram.se](mailto:mark.karlsson@osram.se)  
<http://www.osram-os.com>

### Turkey

#### OSRAM Ampul Tic. A.S.

Barbaros Bulvarı  
Morgasan Sok. Koza İşmerkezi  
B Blok Kat: 8 34349 Balmumcu  
Beşiktaş – İstanbul  
Phone: +90 (212) 306-9012  
Fax: +90 (212) 306-9050  
E-Mail: [o.bozarslan@osram.com.tr](mailto:o.bozarslan@osram.com.tr)  
<http://www.osram-os.com>

### United Kingdom

#### OSRAM Limited

OSRAM House  
Waterside Drive  
Langley  
Berkshire SL3 6EZ  
Phone: +44 1744 812 221  
Fax: +44 1753 484 118  
E-Mail: [paul.hatherall@osram-os.com](mailto:paul.hatherall@osram-os.com)  
<http://www.osram-os.com>

## North America

### United States

#### OSRAM Opto Semiconductors Inc.

1150 Kifer Road  
Suite 100  
Sunnyvale, CA 94086  
Phone: +1 866 993-5211  
Fax: +1 408 738-9120  
E-Mail: [info@osram-os.com](mailto:info@osram-os.com)  
<http://www.osram-os.com>

#### OSRAM Opto Semiconductors Inc.

21800 Haggerty Road  
Suite 220  
Northville, MI 48167  
Phone: +1 866 993-5211  
Fax: +1 248 596-0395  
E-Mail: [info@osram-os.com](mailto:info@osram-os.com)  
<http://www.osram-os.com>

## South America

### Brazil

#### OSRAM do Brasil Lampadas Elé-tricas Ltda.

Av. Dos Autonomistas, 4229  
06090-901 Osasco-SP  
Phone: +55-11-3684-7489  
Fax: +55 11 3683 9495  
E-Mail: [sac@osram.com.br](mailto:sac@osram.com.br)  
<http://www.osram.com.br>

## Asia Pacific

### Australia

#### OSRAM Australia Pty. Limited

Level 11, 423 Pennant Hills Road  
Pennant Hills, NSW 2120  
Phone: +612 9980 0766  
Fax: +612 9980 9127  
E-Mail: [w.lumsden@osram.com.au](mailto:w.lumsden@osram.com.au)  
<http://www.osram-os.com>

### China

#### OSRAM China Lighting

Shanghai office (Opto Semiconduc-  
tors)  
29F Harbour Ring Plaza  
No.18 Xi Zang (M) Road  
Shanghai 200001  
Phone: +86 21 5385 2669  
Fax: +86 21 5385 2868  
E-Mail: [prasia@osram-os.com](mailto:prasia@osram-os.com)  
<http://www.osram-os.cn>

#### OSRAM China Lighting

Beijing office (Opto Semiconductors)  
9/F.Tower B.No 9  
Wangjing Zhonghuan Nanlu  
Chaoyang District  
Beijing  
Phone: +86 10 8478 5101  
Fax: +86 10 8478 5009  
E-Mail: [prasia@osram-os.com](mailto:prasia@osram-os.com)  
<http://www.osram-os.cn>

#### OSRAM China Lighting

Shenzhen office (Opto Semiconduc-  
tors)  
5F, Hantang Building OCT (Oversea  
Chinese Town)  
Nanshan  
Shenzhen  
Phone: +86 755 3322 4946  
Fax: +86 755 2694 8300  
E-Mail: [prasia@osram-os.com](mailto:prasia@osram-os.com)  
<http://www.osram-os.cn>

### Hong Kong

#### OSRAM Opto Semiconductors

##### Asia Ltd

(Asia Regional Headquarters)  
Room 3006, China Resources Build-  
ding  
26 Harbour Road  
Wanchai, Hong Kong  
Phone: +852 3652 5522  
Fax: +852 2802 0880  
E-Mail: [prasia@osram-os.com](mailto:prasia@osram-os.com)  
<http://www.osram-os.cn>

### Malaysia

#### OSRAM Opto Semiconductors (Malaysia) Sdn Bhd

Bayan Lepas Free Industrial Zone  
Phase 1  
Bayan Lepas  
11900 Penang  
Phone: +604 643 4404  
Fax: +604 643 4063 / 642 2268  
E-Mail: [sales\\_malaysia@osram-os.com](mailto:sales_malaysia@osram-os.com)  
<http://www.osram-os.com>

### Singapore

#### OSRAM Singapore Pte. Ltd.

OSRAM Lighting Electronics Pte. Ltd.  
159 Sin Ming Road  
#05-04 Amtech Building (Lobby 1)  
Singapore 575625  
Phone: +65 6552 0110  
Fax: +65 6552 7117  
E-Mail:  
[sales\\_singapore@osram.com.sg](mailto:sales_singapore@osram.com.sg)  
<http://www.osram-os.com>

## Japan

### Japan

#### OSRAM Ltd.

Tobu Yokohama Building No. 3 (6F)  
8-29, Kitasaiwai 2-Chome  
Nishi-ku, Yokohama, 220-0004  
Phone: +81 45 313 1900  
Fax: +81 45 313 1901  
E-Mail: [sales\\_os@osram.co.jp](mailto:sales_os@osram.co.jp)  
<http://www.osram-os.jp>

## Africa

### South Africa

#### OSRAM South Africa

260 15th Road, Randjespark  
Midrand, 1683, RSA Gauteng  
Phone: +27 (0) 11 472 5264  
Fax: +27 (0) 11 388 3669  
E-Mail: [R.Hunt@osram.co.za](mailto:R.Hunt@osram.co.za)  
<http://www.osram-os.com>

## Europe

### Austria

**RS Components Handels-  
ges.m.b.H**  
Phone: +43 02852 505  
E-Mail: [verkauf@rs-components.at](mailto:verkauf@rs-components.at)  
<http://www.rs-components.at>

### Belgium

**RS Components Belux**  
Bd Paepsem 22  
BE-1070 Bruxelles  
Phone: +32 2 528 07 70  
Fax: +32 2 528 07 80  
E-Mail: [orders@rsonline.be](mailto:orders@rsonline.be)  
<http://www.rs-components.be>

### Denmark

**RS Components A/S**  
Phone: +45 38 16 99 00  
E-Mail: [Salg@rsonline.dk](mailto:Salg@rsonline.dk)  
<http://www.rsonline.dk>

### France

**Radiospares**  
Rue Norman King  
BP 40453  
F-60031 Beauvais Cedex  
Phone: +33 (0)825 034 034  
Fax: +33 (0)825 345 000  
<http://www.radiospares.fr>

### Germany

**RS Components GmbH**  
Hessenring 13b  
D-64546 Mörfelden-Walldorf  
Phone: +49 (0)6105/401-311  
E-Mail: [rs-gmbh@rsonline.de](mailto:rs-gmbh@rsonline.de)  
<http://www.rsonline.de>

**SOLiCOMP GmbH**  
(in addition worldwide Distributor for discontinued products and outbins)

Boehmerwaldstrasse 42a  
D-82538 Geretsried  
Phone: +49 (0)8171 99938-0  
Fax: +49 (0)8171 99938-9  
E-Mail: [dk@solicomp.de](mailto:dk@solicomp.de)  
<http://www.solicomp.de>

### Italy

**RS Components S.p.A.**  
Via De Vizzi 93/95  
I-20092 Cinisello Balsamo, Mi  
Phone: +39 02 66 058 058  
Fax: +39 02 66 058 059  
E-Mail: [scat@rs-components.com](mailto:scat@rs-components.com)  
<http://www.rs-components.it>

### Netherlands

**RS Components B.V.**  
Bingerweg 19  
NL-2031 AZ Haarlem  
Phone: +31 23 51 66 555  
Fax: +31 23 51 66 544  
E-Mail: [orders@rsonline.nl](mailto:orders@rsonline.nl)  
<http://www.rs-components.nl>

### Portugal

**Amidata S.A.**  
Avenida de Europa, 19  
ES-28224 - Pozuelo de Alarcón - Madrid  
Phone: +351 800 102 037  
Fax: +351 800 102 038  
E-Mail: [pedidos@rs-components.com](mailto:pedidos@rs-components.com)  
<http://www.rs-portugal.com>

### Spain

**Amidata S.A.**  
Avenida de Europa, 19  
ES-28224 - Pozuelo de Alarcón - Madrid  
Phone: +34 902 100 711  
Fax: +34 902 100 611  
E-Mail: [pedidos@rs-components.com](mailto:pedidos@rs-components.com)  
<http://www.amidata.es>

### United Kingdom

**Farnell InOne**  
Phone: +44 8701 200 200  
<http://www.farnellinone.com>

**RS Components Ltd**  
Birchington Road, Corby  
Northants, NN17 9RS  
Phone: +44 8457 201201  
Fax: +44 845 850 9911  
<http://rswww.com>

## North America

### United States

**Ambit Electronics, Inc.**  
(Distributor for discontinued products worldwide)  
30 West Street  
Spring Valley, NY 10977-4760  
Phone: +1 (845) 425-2254  
Fax: +1 (845) 425-5625  
E-Mail: [ambit@ambitsurplus.com](mailto:ambit@ambitsurplus.com)  
<http://www.ambitsurplus.com>

### Digi-Key

701 Brooks Ave. South  
Thief River Falls, MN 56701  
Phone: +1 800-344-4539  
Fax: +1 218-681-3380  
<http://www.digi-key.com>

### Mouser Electronics

1000 North Main Street  
Mansfield, TX 76063  
Phone: +1 800 346-6873  
Fax: +1 817 804-3899  
E-Mail: [sales@mouser.com](mailto:sales@mouser.com)  
<http://www.mouser.com/osramopto>

## South America

### Brazil

**RS do Brasil Ltda.**  
Av. Brig. Faria Lima, 2413 - 16º andar  
Jd. Paulistano - São Paulo - SP  
Cep. 01451-001  
Phone: +55-11-3031-0610  
<http://www.rsdo brasil.com.br>

## Asia Pacific

### Australia

**RS Components Pty Ltd**  
Phone: +61 1300 656 636  
<http://www.rsaustralia.com>

### China

**RS Components Ltd**  
Phone: +86 021 5359 9888  
E-Mail: [onlinehelp.cn@rs-components.com](mailto:onlinehelp.cn@rs-components.com)  
<http://china.rs-online.com>

### Hong Kong

**RS Components Ltd**  
Phone: +852 2421 9898  
E-Mail: [onlinehelp.hk@rs-components.com](mailto:onlinehelp.hk@rs-components.com)  
<http://www.rshongkong.com>

### Malaysia

**RS Components Sdn Bhd**  
Phone: +603 5032 7633  
E-Mail: [onlinehelp.MY@rs-components.com](mailto:onlinehelp.MY@rs-components.com)  
<http://www.rsmalaysia.com>

### New Zealand

**RS Components Ltd**  
Phone: +64 0800 888 780  
E-Mail: [nztech@rs-components.com](mailto:nztech@rs-components.com)  
<http://newzealand.rs-online.com>

### Philippines

**RS Components Ltd**  
Phone: +632 888 4030  
E-Mail: [onlinehelp.PH@rs-components.com](mailto:onlinehelp.PH@rs-components.com)  
<http://www.rsphilippines.com>

### Singapore

**RS Components Pte Ltd**  
Phone: +65 6865 3400  
E-Mail: [onlinehelp.SG@rs-components.com](mailto:onlinehelp.SG@rs-components.com)  
<http://www.rssingapore.com>

### Taiwan

**RS Components Ltd**  
Taiwan, R.O.C.  
Phone: +886 0800 088 238  
E-Mail: [onlinehelp.tw@rs-components.com](mailto:onlinehelp.tw@rs-components.com)  
<http://www.rstaiwan.com>

## Japan

### Thailand

**RS Components Co., Ltd.**

Phone: +66 2 648 6868

E-Mail: [onlinehelp.TH@rs-components.com](mailto:onlinehelp.TH@rs-components.com)

<http://thailand.rs-online.com>

### Japan

**RS Components K.K.**

West Tower 12F, Yokohama Business Park (YBP)

134 Godo-cho, Hodogaya-ku

Yokohama 240-0005

Phone: +81-45-335-8550

Fax: +81-45-335-8554

<http://rswww.co.jp>

## Europe

### Austria

#### Arrow Central Europe GmbH

Landstrasser Hauptstr. 97-101/1/4A  
A-1030 Wien  
Phone: +43 1 36046-0  
Fax: +43 1 3604690  
E-Mail: Vertrieb.Wien@sasco-holz.com  
<http://www.arrowce.com>

#### EBV Elektronik

Diefenbachgasse 35/1  
A-1150 Wien  
Phone: +43 18 91 52-0  
Fax: +43 18 91 52-30  
<http://www.ebv.com>

#### Rutronik Elektronische Bauelemente Ges. m. b. H.

Waidhausenstraße 19, Top 10  
A-1140 Vienna  
Phone: +43 (0) 1/4 19 65 50  
Fax: +43 (0) 1/4 19 65 50 33  
<http://www.rutronik.com>

### Belarus

#### Arrow Electronics Ukraine

Garmatna str 21/30  
UA-03067 Kiev  
Phone: Mobile BY: +375 293 305 306  
Fax: +380 4580590  
E-Mail: VDamasevich@arrowce.com  
<http://www.sasco.net>

### Belgium

#### Arrow Central Europe GmbH

Keiberg II  
Minervastraat 14/B2  
B-1930 Zaventem  
Phone: +32 2 7254660  
Fax: +32 2 7254511  
E-Mail: SalesOffice.Brussels@sascoholz.com  
<http://www.arrowce.com>

#### EBV Elektronik

Kouterveldstraat 20  
B-1831 Diegem  
Phone: +32 2 7160010  
Fax: +32 2 7208152  
<http://www.ebv.com>

### Rutronik

Keppekouter 1 - Ninovesteenweg 198  
B-9320 Erembodegem  
Phone: +32 53 606590  
Fax: +32 53 771262  
E-Mail: rutronik\_b@rutronik.com  
<http://www.rutronik.com>

### Bulgaria

#### Rutronik

Zheko Voyvoda street no. 5  
BG-1756 Sofia  
Phone: +359 2 9 74 86 46  
Fax: +359 2 9 74 86-45  
E-Mail: rutronik\_bg@rutronik.com  
<http://www.rutronik.com>

### Czech Republic

#### EBV Elektronik spol.s.r.o

Argentinská 38/286  
CZ-17000 Praha 7  
Phone: +420 234 091 011  
Fax: +420 234 091 010  
<http://www.ebv.com>

#### Rutronik

Elektronische Bauelemente CZ spol.s.r.o  
Rooseveltova 13  
CZ-16000 Praha 6  
Phone: +42 0 233 343 120  
Fax: +42 0 233 323 955  
E-Mail: rutronik\_cz@rutronik.com  
<http://www.rutronik.com>

#### Rutronik

Elektronische Bauelemente CZ spol.s.r.o  
Slavickova 1a  
CZ-63800 Brno  
Phone: +42 5 45193517  
Fax: +42 5 45222256  
E-Mail: rutronik\_cz@rutronik.com  
<http://www.rutronik.com>

### Denmark

#### Arrow Denmark A/S

Smedeholm 13A  
DK-2730 Herlev  
Phone: +45 70 102211  
Fax: +45 44 508210  
<http://www.arrowdk.com>

#### BFI OPTILAS

(Laser products only)  
Hedelykke, Hovedgaden 451K  
DK-2640 Hedehusene  
Phone: +45 46 55 99 99  
Fax: +45 46 55 99 98  
E-Mail: info.dk@bfiptilas.com  
<http://www.bfiptilas.dk>  
High-Power Laser products only

#### EBV Elektronik

Ved Lunden 9  
DK-8230 Åbyhøj  
Phone: +45 86 250466  
Fax: +45 86 250660  
<http://www.ebv.com>

#### RUTRONIK Elektronische Bauelemente GmbH

Herstedøstervej 27-29  
DK-2620 Albertslund  
Phone: +45 7020 1963  
Fax: +45 7020 1973  
E-Mail: rutronik@rutronik.com  
<http://www.rutronik.com>

### Estonia

#### Arrow Electronics Estonia OÜ

Sõpruse pst. 145  
Section B, floor 3  
EE-13417 Tallinn  
Phone: +372 6 77 42 50  
Fax: +372 6 77 42 51  
<http://www.arrowne.com>

#### EBV Elektronik OÜ

Ehitajate tee 114  
EE-13157 Tallinn  
Phone: +372 625 79 90  
Fax: +372 625 79 95  
<http://www.ebv.com>

### Finland

#### Arrow Finland OY

Kalkkipellontie 4  
P.O. Box280  
FIN-02600 Espoo  
Phone: +358 9 476660  
Fax: +358 9 4766 6442  
<http://www.arrowne.com>

### EBV Elektronik

Pihatörmä 1 a  
FIN-02240 Espoo  
Phone: +358 9 2705 2790  
Fax: +358 9 2709 5498  
<http://www.ebv.com>

#### RUTRONIK Elektronische Bauelemente GmbH

Kirkonkyläntie 3  
FIN-00700 Helsinki  
Phone: +358 9 3291 2200  
Fax: +358 9 3291 2222  
E-Mail: rutronik@rutronik.com  
<http://www.rutronik.com>

### France

#### Arrow Electronique SA

21 rue du Jura  
Silic 585  
F-94653 Rungis Cedex  
Phone: +33 1 4978 4900  
Fax: +33 1 4180 9630  
<http://www.arrow.com>

#### BFI OPTILAS

(Laser products only)  
4, Allée du Cantal Z.I.  
La Petite Montagne Sud  
CE 1834  
91018 - Evry Cedex  
Phone: +33 (0)1.60.79.59.00  
Fax: +33 (0)1.60.79.89.01  
E-Mail: info.fr@bfiptilas.com  
<http://www.bfiptilas.fr>  
High-Power Laser products only

#### EBV Elektronik

3, rue de la Renaissance  
F-92184 Anthony Cedex (Paris)  
Phone: +33 1 4096 3000  
Fax: +33 1 4096 3030  
<http://www.ebv.com>

#### Rutronik S.A.

6, Mail de l'Europe  
F-78170 La Celle St Cloud  
Phone: +33 1 3008 3394  
Fax: +33 1 3082 2063  
E-Mail: rutronik@rutronik.com  
<http://www.rutronik.com>

### Germany

#### Arrow Central Europe GmbH

Wernher-von-Braun-Str. 9a  
D-85640 Putzbrunn  
Phone: +49 89 45618-0  
Fax: +49 89 45618399  
E-Mail: Vertrieb.Muenchen@sascoholz.com  
<http://www.arrowce.com>



## Bfi OPTILAS

### (Laser products only)

Boschstrasse 12  
D-82178 Puchheim / Munich  
Phone: +49 (0) 89/89 01 35-0  
Fax: +49 (0) 89/ 800 25 61  
E-Mail: info.de@bfioptilas.com  
<http://www.bfioptilas.de>  
High-Power Laser products only

## EBV Elektronik

Im Technologiepark 2-8  
D-85586 Poing  
Phone: +49 8121 774-0  
Fax: +49 8121 774-422  
E-Mail: pr@ebv.com  
<http://www.ebv.com>

## Rutronik Elektronische Bauelemente GmbH

Industriestraße 2  
D-75228 Ispringen  
Phone: +49 7231 8010  
Fax: +49 7231 82282  
<http://www.rutronik.com>

## Sperger Handels GmbH (SHG) (LED and IR chips only)

Am Bahnsteig 2  
D-82024 Taufkirchen | Munich  
Phone: +49 (0)89 480 589 50  
Fax: +49 (0)89 480 589 70  
E-Mail: info@sperger-handel.eu  
<http://www.sperger-handel.eu>  
European Distributor for LED and Infrared chips only

## Greece

### EBV Elektronik

Anaxagora Str. 1  
GR-17778 Tavros  
Phone: +30 210 3414 300  
Fax: +30 210 3414 304  
<http://www.ebv.com>

## Hungary

### Arrow Central Europe GmbH

Váci út 140  
H-1138 Budapest  
Phone: +36 1 450 2380  
Fax: +36 1 450 2381  
E-Mail: SalesOffice.Buda-  
pest@arrowce.com  
<http://www.arrowce.com>

### EBV Elektronik Kft.

Budafoki út 91-93  
H-1117 Budapest  
Phone: +36 1 4367222  
Fax: +36 1 4367220  
<http://www.ebv.com>

## Rutronik

Magyarország Kft.  
Fehérvári út 89-95  
H-1119 Budapest  
Phone: +36 1 3710666  
Fax: +36 1 3710667  
E-Mail: rutronik\_h@rutronik.com  
<http://www.rutronik.com>

## Ireland

### EBV Elektronik

Ballymount Trading Estate  
Ballymount Road  
Walkinstown  
Dublin 12  
Phone: +353 1 4564034  
Fax: +353 1 4564035  
<http://www.ebv.com>

## Israel

### Nisko Projects Electronics & Communications Ltd.

2A Habarzel St.  
P.O. Box 58151  
61580 Tel Aviv  
Phone: +972 3 7657300  
Fax: +972 3 7657333  
E-Mail: moti@nisko.co.il  
<http://www.nisko-projects.com>

## Italy

### Arrow Electronics

Viale Fulvio Testi 280  
I-20126 Milano  
Phone: +39 02 661251  
E-Mail: arrowinfo@arrowitaly.com  
<http://www.arrowitaly.it>

### Bfi OPTILAS

#### (Laser products only)

Via Emilio De Marchi 27  
00141 Roma  
Phone: +39 06 86894259  
Fax: +39 06 86595354  
E-Mail: info.it@bfioptilas.com  
<http://www.bfioptilas.it>  
High-Power Laser products only

### EBV Elektronik

Via C. Frova, 34  
I-20092 Cinisello Balsamo, MI  
Phone: +39 02 6609 6290  
Fax: +39 02 6601 7020  
<http://www.ebv.com>

## RUTRONIK Italia S.r.l. Milano

Via Caldera, 21, Centro Direzionale  
S.Siro  
20153 Milano (MI)  
Phone: +39 02 40 951 1  
Fax: +39 02 40 951 224  
E-Mail: italia\_MI@rutronik.com  
<http://www.rutronik.com>

## Latvia

### Arrow Latvia

Unijas 47  
LV-1039 Riga  
Phone: +371 731 1490  
Fax: +371 731 3195  
E-Mail: latvia@arrownordic.com  
<http://www.arrowne.com>

## Lithuania

### Arrow Lithuania

Savanoriu pr. 363A-306  
LT-49425 Kaunas  
Phone: +370 37 759015  
Fax: +370 37 452801  
E-Mail: lithuania@arrownordic.com  
<http://www.arrowne.com>

### RUTRONIK Elektronische Bauelemente GmbH

Raudondvario pl.76  
LT-47182 Kaunas  
Phone: +370 37 261780  
Fax: +370 37 261780  
E-Mail: rutronik\_lt@rutronik.com  
<http://www.rutronik.com>

## Netherlands

### Arrow Central Europe GmbH

Elzenkade 3  
NL-3992 AD Houten  
Phone: +31 30 6391234  
Fax: +31 30 6391205  
E-Mail: SalesOffice.Utrecht@sasco-  
holz.com  
<http://www.arrowce.com>

### Bfi OPTILAS

#### (Laser products only)

Chr. Huygensweg 17  
2408 AJ Alphen aan den Rijn  
Phone: +(31) 0172-44 60 60  
Fax: +(31) 0172-44 34 14  
E-Mail: info.nl@bfioptilas.com  
<http://www.bfioptilas.nl>  
High-Power Laser products only

## EBV Elektronik

Planetenbaan 116  
NL-3606 AK Maarssenbroek  
Phone: +31 346 583010  
Fax: +31 364 583025  
<http://www.ebv.com>

## Rutronik

Madame Curiestraat 2  
NL-3316 GN Dordrecht  
Phone: +31 78 6521380  
Fax: +31 78 6521381  
E-Mail: rutronik\_nl@rutronik.com  
<http://www.rutronik.com>

## Norway

### Arrow Norway AS

Åmsosen  
N-5578 Nedre Vats  
Phone: +47 52 763000  
Fax: +47 52 765339  
<http://www.arrownordic.com>

### EBV Elektronik

Ryensvingen 3B  
Postboks 101, Manglerud  
N-0612 Oslo  
Phone: +47 22 671780  
Fax: +47 22 671789  
<http://www.ebv.com>

### RUTRONIK Elektronische Bauelemente GmbH

Olav Helset vei 6  
N-0694 Oslo  
Phone: +47 22 76 79 20  
Fax: +47 22 76 79 21  
E-Mail: rutronik@rutronik.com  
<http://www.rutronik.com>

## Poland

### Arrow Central Europe GmbH

ul. W. Rzymowskiego 53  
PL-02 697 Warsaw  
Phone: +48 22 55 88 282  
Fax: +48 22 55 88 283  
E-Mail: SalesOffice.War-  
saw@arrowce.com  
<http://www.arrowce.com>

### EBV Elektronik

Pl. Solny 16  
PL-50-062 Wrocław  
Phone: +48 7134 229 44  
Fax: +48 7134 229 10  
<http://www.ebv.com>



## Rutronic

Polska Sp. z o.o.  
Ul. Sasiedzkza 11  
PL-44244 Zory  
Phone: +48 32 461 2000  
Fax: +48 32 4759022  
E-Mail: [rutronic\\_pl@rutronic.com](mailto:rutronic_pl@rutronic.com)  
<http://www.rutronic.com>

## Portugal

### EBV Elektronik

C/Ronda de Poniente, 4  
Centro Empresarial Euronova  
1a planta, Oficina A.  
E-28760 Tres Cantos (Madrid)  
Phone: +34 918 063 292  
Fax: +34 918 044 103  
E-Mail: [juancarlos.castro@ebv.com](mailto:juancarlos.castro@ebv.com)  
<http://www.ebv.com>  
Mobile: +34 670 064 176

### RUTRONIK Elektronische Bauelemente GmbH

Avenida Dr. Carlos Bacelar  
Edificio Saza Nº 968, Escritório Nº 6-A  
4.760-103 Vila Nova de Famalicão  
Phone: +351 252 312 336  
Fax: +351 252 312 338  
<http://www.rutronic.com>  
Contact persons:  
Ms. Nadia Carlino,  
[Nadia\\_Carlino@rutronic.com](mailto:Nadia_Carlino@rutronic.com),  
mobile +351 964135434  
Mrs. Ana Ribeiro,  
[Ana\\_Ribeiro@rutronic.com](mailto:Ana_Ribeiro@rutronic.com)  
Mr. Emanuel Almeida,  
[Emanuel\\_Almeida@rutronic.com](mailto:Emanuel_Almeida@rutronic.com),  
mobile +351 960260017

## Romania

### EBV Elektronik SRL

Construdava Business Center  
Sos. Pipera-Tunari 4C  
RO-077190 Voluntari, Ilfov  
Phone: +40 21 529 6911  
Fax: +40 21 529 6901  
<http://www.ebv.com>

### RUTRONIK Elektronische Bauelemente GmbH

Maresal C-tin Prezan 142  
RO-300695 Timișoara  
Phone: +40 256 4 01-240  
Fax: +40 256 4 01-242  
E-Mail: [rutronic\\_ro@rutronic.com](mailto:rutronic_ro@rutronic.com)  
<http://www.rutronic.com>

## Russian Federation

### EBV Elektronik

Korovinskoye Shosse 10  
Build 2, Off. 28  
RUS-127486 Moskva  
Phone: +7 495 937 8707  
Fax: +7 495 937 8706  
<http://www.ebv.com>

### RUTRONIK Beteiligungsgesellschaft mbH

Leningradskoje Chaussee 16  
Building 3, Office 403  
RUS-125171 Moscow  
Phone: +7 (499) 159 92 55  
Fax: +7(495) 786 28 03  
E-Mail: [rutronic\\_ru@rutronic.com](mailto:rutronic_ru@rutronic.com)  
<http://www.rutronic.com>

## Serbia

### RUTRONIK Elektronische Bauelemente GmbH

YUBC Bul. Mihajla Pupina 10z/IV  
11070 Beograd  
Phone: +381 11 311 33 66-3  
Fax: +381 11 311 33 66-4

## Slovak Republic

### EBV Elektronik s.r.o.

Digital Park  
Einsteinova 21  
SK-85101 Bratislava  
Phone: +421 2 321 111 41  
Fax: +421 2 321 111 40  
E-Mail: [bratislava@ebv.com](mailto:bratislava@ebv.com)  
<http://www.ebv.com>

### RUTRONIK Elektronische Bauelemente GmbH

Lazovná 11  
SK-97401 Banská Bystrica  
Phone: +421 48 47223-05  
Fax: +421 48 47223-08  
E-Mail: [rutronic\\_sk@rutronic.com](mailto:rutronic_sk@rutronic.com)  
<http://www.rutronic.com>

## Slovenia

### EBV Elektronik

Dunajska c. 159  
SLO-1000 Ljubljana  
Phone: +386 1 56 09 778  
Fax: +386 1 56 09 877  
<http://www.ebv.com>

### RUTRONIK Elektronische Bauelemente GmbH

Motnica 5  
SLO-1236 Trzin  
Phone: +386 1 5 61 09 80  
Fax: +386 1 5 61 09 88  
E-Mail: [rutronic\\_si@rutronic.com](mailto:rutronic_si@rutronic.com)  
<http://www.rutronic.com>

## Spain

### BFI OPTILAS (Laser products only)

C/Anabel Segura  
7 Planta Acceso  
28108 Alcobendas Madrid  
Phone: +34 (91) 453 11 60  
Fax: +34 (91) 662 68 37  
E-Mail: [info.es@bfioptilas.com](mailto:info.es@bfioptilas.com)  
<http://www.bfioptilas.es>  
High-Power Laser products only

### EBV Elektronik

C/Ronda de Poniente, 4  
Centro Empresarial Euronova  
1a planta, Oficina A.  
E-28760 Tres Cantos (Madrid)  
Phone: +34 91 804 32 56  
Fax: +34 91 804 41 03  
E-Mail: [c.jareno@ebv.com](mailto:c.jareno@ebv.com)  
<http://www.ebv.com>

### RUTRONIK Espana S.L.

Ctra. Canillas 138 - 2a Planta - 9B  
E-28043 Madrid  
Phone: +34 91 300 55 28  
Fax: +34 91 300 53 28  
E-Mail: [rutronic\\_madrid@rutronic.com](mailto:rutronic_madrid@rutronic.com)  
<http://www.rutronic.com>

## Sweden

### Arrow Nordic Sweden

Kronborgsgränd 19  
Box 67  
S-16494 Kista  
Phone: +46 8 562 65 500  
Fax: +46 8 562 65 550  
<http://www.arrownordic.com>

## BFI OPTILAS

### (Laser products only)

Bangårdsgatan, 8  
P.O.Box 1335  
S-751 43 Uppsala  
Phone: +46 18 565830  
Fax: +46 18 696666  
E-Mail: [info.se@bfioptilas.com](mailto:info.se@bfioptilas.com)  
<http://www.bfioptilas.se>  
High-Power Laser products only

### EBV Elektronik

Sjöängsvägen 7  
S-19272 Sollentuna  
Phone: +46 8 594702 30  
Fax: +46 8 594702 31  
<http://www.ebv.com>

### RUTRONIK Nordic AB

Kista Science Tower  
Färögatan 33  
S-16451 Kista  
Phone: +46 8 505 54900  
Fax: +46 8 505 54950  
E-Mail: [rutronic@rutronic.com](mailto:rutronic@rutronic.com)  
<http://www.rutronic.com>

## Switzerland

### Arrow Central Europe GmbH

Riedmatt 9  
CH-8153 Rümlang  
Phone: +41 44 8176262  
Fax: +41 44 8176200  
E-Mail: [Vertrieb.Zuerich@sasco-holz.com](mailto:Vertrieb.Zuerich@sasco-holz.com)  
<http://www.arrowce.com>

### EBV Elektronik

Bernstrasse 394  
CH-8953 Dietikon  
Phone: +41 1 745 6161  
Fax: +41 1 745 6100  
<http://www.ebv.com>

### Rutronic Elektronische Bauelemente AG

Hölzliwisenstr. 5  
CH-8604 Volketswil  
Phone: +41 1 9473737  
Fax: +41 1 9473747  
<http://www.rutronic.com>

## Turkey

### EBV Elektronik

Bayar Cad. Güllübahar Sok. No. 17  
Perdemsac Plaza  
Sok. No:17, D:134 Kozyatagi  
TR-34742 Istanbul  
Phone: +90 216 463 1352  
Fax: +90 216 463 1355  
<http://www.ebv.com>

## Ukraine

### Arrow Electronics Ukraine

Garmatna str 21/30  
UA-03067 Kiev  
Phone: +38 044 456 4726  
Fax: +38 044 458 0590  
E-Mail: SalesOffice.Kiev@arrowce.com  
<http://www.sasco.net>

### EBV Elektronik

Vasilkovskaya str. 14  
Off. 422-423  
UA-03040 Kiev  
Phone: +380 44 496 22 26  
Fax: +380 44 496 22 27  
<http://www.ebv.com>

## United Kingdom

### Arrow Electronics (UK) Ltd.

Edinburgh Way  
Harlow - Essex CM20 2DF  
Phone: +44 1279 626777  
Fax: +44 1279 455777  
<http://www.arrowne.com>

### BFI OPTILAS

#### (Laser products only)

Mill Square, Wolverton Mill South  
Milton Keynes MK12 5ZY  
Phone: +44 (0)1908 326326  
Fax: +44 (0)1908 221110  
E-Mail: [info.uk@bfioptilas.com](mailto:info.uk@bfioptilas.com)  
<http://www.bfioptilas.co.uk>  
High-Power Laser products only

### EBV Elektronik

Thames House  
17 Marlow Road  
Maidenhead, Berkshire, SL6 7AA  
Phone: +44 1628 770 707  
Fax: +44 1628 783 811  
<http://www.ebv.com>

### Intelligent Display Solutions Ltd (T/A Intelligent LED Solutions)

3 Clerewater Place  
Lower Way  
Thatcham, Berkshire RG19 3RF  
Phone: +44 (0) 1635 294606  
Fax: +44 (0) 1635 869200  
E-Mail: [info@i-led.co.uk](mailto:info@i-led.co.uk)  
<http://www.i-led.co.uk>  
LED products and Lighting Solutions

### RUTRONIK UK Ltd.

Deakins Business Park  
Blackburn Road, Egerton  
BL7 9RP Bolton  
Lancashire  
Phone: +44 1204 602200  
Fax: +44 1204 602210  
E-Mail: [rutronik@rutronik.com](mailto:rutronik@rutronik.com)  
<http://www.rutronik.com>

## North America

### United States

#### Arrow Electronics, Inc.

50 Marcus Drive  
Melville, NY 11747  
Phone: +1 800 558-1903  
Fax: +1 516 391-4408  
<http://www.arrow.com>

#### Avnet Electronics Marketing

2211 South 47th Street  
Phoenix, AZ 85034  
Phone: +1 800-332-8638  
Fax: +1 480 643-8768  
<http://www.avnetexpress.com>

#### Mouser Electronics

1810 Gillespie Way  
Suite 101  
El Cajon, CA 92020  
Phone: +1 800 346-6873  
Fax: +1 619 449-6041  
E-Mail: [sales@mouser.com](mailto:sales@mouser.com)  
<http://www.mouser.com/osramopto>

#### Mouser Electronics

1000 North Main Street  
Mansfield, TX 76063  
Phone: +1 800 346-6873  
Fax: +1 817 804-3899  
E-Mail: [sales@mouser.com](mailto:sales@mouser.com)  
<http://www.mouser.com/osramopto>

### Canada

#### Mouser Electronics

1000 North Main Street  
Mansfield, TX 76063  
Phone: +1 800 346-6873  
Fax: +1 817 804-3898  
E-Mail: [canadasales@mouser.com](mailto:canadasales@mouser.com)  
<http://www.mouser.com/osramopto>

### Mexico

#### Arrow Dicopel

Calle Lateral Sur 579  
Parque Industrial Belenes  
Zapopan Jal, 45150  
Guadalajara  
Phone: +52 33 3120-2600  
Fax: +52 33 3833- 2291  
<http://www.arrowmx.com>

#### Avnet Central Mexico

Av. Iteso 8900, Edif 1-B  
Parque Industrial Jalisco  
Tlaquepaque, Jalisco 45080  
Phone: Toll free: 01 800 710 7387 -  
Direct: +52 (33) 31342300  
<http://www.em.avnet.com>

### Mouser Electronics

Av. Camino a la Tijera 806 Int. B3  
2do Piso  
Col. La Tijera  
Tlajomulco de Zúñiga, Jalisco  
CP. 45647  
Phone: +52 33 3612 7301  
Fax: +52 33 3612 7356  
E-Mail: [mexicosales@mouser.com](mailto:mexicosales@mouser.com)  
<http://www.mouser.com/osramopto>

### Puerto Rico

#### Avnet Puerto Rico

Metro Office Park  
Metro Office 6 Street 1, Suite 300  
Guaynabo, PR 00968  
Phone: +1 787-706-1888  
<http://www.avnet.com>

## South America

### Argentina

#### Electrocomponentes S.A.

Solis 225/27/29  
C1078AAE Ciudad de Buenos Aires  
Buenos Aires  
Phone: +54 11 4375-3366 / 4372-1864  
Fax: +54 11 4325-8076  
E-Mail: [iz@electrocomponentes.com](mailto:iz@electrocomponentes.com)  
<http://www.electrocomponentes.com>

#### Elko/Arrow

Constitucion 3040  
C1254AAZ Ciudad de Buenos Aires  
Buenos Aires  
Phone: +11 6777-3500  
Fax: +11 6777-3535  
<http://www.elkonet.com>

### Brazil

#### Avnet do Brasil

Rod. Sem Jose Emirio De Moraes  
Sorocaba, SP 18097-090  
Phone: +55 11-5079-2150  
<http://www.avnet.com.br>

#### Panamericana Arrow São Paulo

Rua José Gomes Falcão, 111  
Barra Funda  
São Paulo - SP 01139-010  
Phone: +55 11 3613-9300  
Fax: +55 11 3613-9355  
<http://www.pan-arrow.com.br>

## Asia Pacific

### Australia

#### Avnet (Australia) Pty. Ltd.

Suite 1, Level 6, 111 Phillip Street  
Parramatta, NSW, 2150  
Phone: +61 2 9585 5520  
Fax: +61 2 9585 5519  
E-Mail: manuel.esco-  
bar@avnet.com  
<http://www.avnet.com>

#### Soanar Pty Ltd

Level 1  
39 Hewish Road  
Croydon  
Phone: +61 8 8333 9200  
Fax: +61 8 8132 0230  
E-Mail: gjones@soanar.com  
<http://www.soanar.com>

### China

#### Arrow Electronics Distribution (Shanghai) Co. Ltd.

Beijing Office  
Room 1002, 10/F. Capital Group Plaza  
6 Chaoyangmen Beidajie  
Beijing PRC 100027  
Phone: +(86) 10 8528 2030  
Fax: +(86) 10 8528 2698  
<http://www.arrowasia.com>

#### Arrow Electronics Distribution (Shanghai) Co. Ltd.

Guangzhou Rep office  
Room 1807, East Tower, YangCheng International Comercial Center  
No 122, TiYuDong Rd, TianHe  
GuangZhou, PRC 510620  
Phone: +(86) 20 3887 1735 / 1736 / 1737  
Fax: +(86) 20 3887 1739  
<http://www.arrowasia.com>

#### Arrow Electronics Distribution (Shanghai) Co. Ltd.

Shanghai Office  
6/F, Building 1, Zhangjiang River Front Harbor  
3000 Long Dong Avenue  
Shanghai-201203, PRC  
Phone: +(86) 21 2893 2000  
Fax: +(86) 21 2893 2333  
<http://www.arrowasia.com>  
Further Sales offices in:  
Chengdu  
Fuzhou  
Hangzhou  
Nanjing  
Ningbo  
Qingdao  
Suzhou  
Shenyang  
Tianjin  
Wuhan  
Xiamen  
Xian  
Zhuhai  
Zhengzhou  
see <http://www.arrowasia.com.hk/public/MAR/SAOF/?version=en>

#### Arrow Electronics Distribution (Shanghai) Co. Ltd.

Shenzhen Rep office  
No 109-112 Building, International Commerce Exhibition Center  
No 1001 Honghua Road  
Futian Free Trade Zone, Shenzhen  
Phone: +(86) 755 8359 2920  
Fax: +(86) 755 8359 2377  
<http://www.arrowasia.com>

#### Avnet Sunrise Ltd. Beijing

Room 611-613, Everlast Plaza  
No. 39 Anding Road, Chao Yang District  
Beijing 100029  
Phone: +86 10 6441 3113  
Fax: +86 10 6443 8260  
<http://www.avnet.com>

#### Avnet Sunrise Ltd. Shanghai

21/F., Strength Plaza  
No 3, Lane 600, Tian Shan Road  
Shanghai 200051  
Phone: +86 21 5206 2288  
Fax: +86 21 5206 2299  
<http://www.avnet.com>

#### Avnet Sunrise Ltd. Shenzhen

10/F., Block A  
Electronics Science & Technology Building  
2070 Shennan Road Central  
Shenzhen 518031  
Phone: +86 755 8378 1886  
Fax: +86 755 8378 3656  
<http://www.avnet.com>

#### Fujitsu Microelectronics (Shanghai) Co., Ltd.

Rm 3102, Bund Center  
222 Yan An Rd (E)  
Shanghai 200002  
Phone: +86 21 6146 3688  
Fax: +86 21 6335 1615

#### Fujitsu Microelectronics (Shanghai) Co., Ltd.

Beijing Branch  
Room 1501B, 15th Floor, Tower A  
Ocean International Center  
No.56 Dong Si Huan Zhong Rd.,  
Chaoyang District  
Beijing 100025  
Phone: +86 10 5969 1600  
Fax: +86 10 5969 1611

#### Fujitsu Microelectronics (Shanghai) Co., Ltd.

Shenzhen Branch  
Rm 4509, Di Wang Commercial Centre  
5002 Shen Nan Dong Rd.  
Shenzhen 518008  
Phone: +86 755 2583 0028  
Fax: +86 755 8246 1510

#### Fujitsu Microelectronics (Shanghai) Co., Ltd.

Dalian Branch  
Room 2008B, Xiwang Tower  
No.136 Zhongshan Road, Zhongshan District  
Dalian 116001  
Phone: +86 411 3966 8668  
Fax: +86 411 3966 8669

#### Giatek Corp. Ltd. (Beijing Branch)

Room 1106, Beijing Satellite Building  
No. 63, Zhi Chun Road, Hai Dian District  
Beijing  
Phone: +86 10 5165 9886  
Fax: +86 10 6253 7066  
<http://www.yosun.com.tw>

#### Giatek Corp. Ltd. (Hangzhou Branch)

Room 1801, Canglong Ge Unit 2, Yunlong Apartment  
No. 23, Daomao Lane  
HangZhou  
Phone: +86 751 8729 6389  
Fax: +86 751 8721 5689  
<http://www.yosun.com.tw>

#### Giatek Corp. Ltd. (Nanjing Branch)

Room 906, Hongde Building, No.20 Yunnan Road, Gulou District  
Nanjing  
Phone: +86 25 8324 2698  
Fax: +86 25 8324 2698  
<http://www.yosun.com.tw>

#### Giatek Corp. Ltd. (Nanjing Branch)

Room 1005, 10F, No.181  
Chungshan E. Road  
Ning Bo  
Phone: +86 574 8734 4333  
Fax: +86 574 8734 4222  
<http://www.yosun.com.tw>

#### Giatek Corp. Ltd. (Qingdao Branch)

Room 202, Unit 2, No.17, Baotonghuayuan Building  
No. 601, Qingshan Road, Li Cang District  
Qing Dao  
Phone: +86 532 8762 0393  
Fax: +86 532 8789 1889  
<http://www.yosun.com.tw>

#### Giatek Corp. Ltd. (Shanghai Branch)

15 F., New Century Office Center  
No.1111, Pudong S. Rd., Pudong Newly Developed Area  
Shanghai  
Phone: +86 21 5836 5838  
Fax: +86 21 5835 5869  
E-Mail: Wind\_wan@cn.yosungroup.com  
<http://www.yosun.com.tw>

#### Giatek Corp. Ltd. (Shenzhen Branch)

19/F, No. 1016 Fuzhongyi Road  
Shenzhen Metro Building  
Futian District, Shenzhen 518026, PRC  
Phone: +8 755 82992288 Ext: 3241  
Fax: +86 755 82992280  
E-Mail: Wing\_wu@giatek.com.hk  
<http://www.yosun.com.tw>

## **Giatek Corp. Ltd. (Suzhou Branch)**

7 F., Xinchuang Building  
No.2, Shishan Rd.  
Suzhou  
Phone: +86 512 6809 4171  
Fax: +86 512 6809 4175  
<http://www.yosun.com.tw>

## **Giatek Corp. Ltd. (Wuhan Branch)**

No. 51(8-3-201), Xin-Xin Garden,  
Fang-Ji Village  
Xudong Rd, Wuchang District  
WuHan 430063  
Phone: +86 27 8861 4356  
Fax: +86 27 8861 4357  
<http://www.yosun.com.tw>

## **Giatek Corp. Ltd. (Xiamen Branch)**

No.H1, 14/F, International Bank Building  
No.8, LuJiang Road  
Xia Men  
Phone: +86 592 2117589  
Fax: +86 592 2117 595  
<http://www.yosun.com.tw>

## **Giatek Corp. Ltd. (Xian Branch)**

Rm 1-1007, Jing-Tian Garden, No. 485  
No. 485, Chang'an South Rd  
Xi An  
Phone: +86 29 8537 5812  
Fax: +86 29 8537 5826  
<http://www.yosun.com.tw>

## **RSL Microelectronics Co. Ltd. (SSL Products)**

Room E, 28/F., Noble Center  
1006 FuZhongSan Road, Futian Area  
Shenzhen  
Phone: +(86) 755 8826 2633  
Fax: +(86) 755 8826 2655  
E-Mail: [sales@rslgroup.com.hk](mailto:sales@rslgroup.com.hk)  
<http://www.rslgroup.com.hk>

## **RSL Microelectronics Co. Ltd. (SSL Products)**

Room 3012, Floor 30, Greenland Technology Island Building A, No.2 Lane 58, Xinjian East Road, Min Hang District  
Shanghai  
Phone: +(86) 21 5417 6067  
Fax: +(86) 21 5417 7231  
E-Mail: [sales@rslgroup.com.hk](mailto:sales@rslgroup.com.hk)  
<http://www.rslgroup.com.hk>

## **RSL Microelectronics Co. Ltd. (SSL Products)**

Room 1037, Block A, e-World Digital Center  
11 Zhong Guan Chun Road, Haidian District  
Beijing  
Phone: +(86) 10 6489 0698  
Fax: +(86) 10 6489 0698  
E-Mail: [sales@rslgroup.com.hk](mailto:sales@rslgroup.com.hk)  
<http://www.rslgroup.com.hk>

## **SAPL (China) Ltd**

Beijing Office  
612, No.3 Building PinGod  
612, No.3 Building PinGod, No.32 Baiziwan Road, Chaoyang  
BeiJing  
Phone: +86-10-6506 9948  
Fax: +86-10-5971 2070  
E-Mail: [lizako@sac.com.sg](mailto:lizako@sac.com.sg)  
<http://www.sapl.com.sg>

## **SAPL (China) Ltd**

Shanghai Office  
Room D, 9th Floor, Wuzhong Building  
No. 618, Wuzhong Road  
Shanghai 201103  
Phone: +86-21-3467 6988  
Fax: +86-21-3467 6989  
E-Mail: [shaunlee@sac.com.sg](mailto:shaunlee@sac.com.sg)  
<http://www.sapl.com.sg>

## **SAPL (China) Ltd**

Shenzhen Office  
Room 207-208, 2/F, Block A, Tianji Building  
Tian An Cyber Park, Futian District  
Shenzhen 518040  
Phone: +86-755-8358 3881  
Fax: +86-755-8358 3682  
E-Mail: [lizako@sac.com.sg](mailto:lizako@sac.com.sg)  
<http://www.sapl.com.sg>

## **SAPL (China) Ltd**

Wuhan Office  
7F Fangda Science Building  
Luo Yu Road, Hongshan  
WuHan  
Phone: +86 27 8785 1275  
Fax: +86 27 8785 1236  
E-Mail: [lizako@sac.com.sg](mailto:lizako@sac.com.sg)  
<http://www.sapl.com.sg>

## **SAPL (China) Ltd**

Nanjing Office  
6F/15, 420 Zhong Hua Road  
Nanjing 210006  
Phone: +86 25 5226 0028  
Fax: +86 25 5226 1028  
E-Mail: [lizako@sac.com.sg](mailto:lizako@sac.com.sg)  
<http://www.sapl.com.sg>

## **TG Electronics Co. Ltd. (SSL Products)**

Room 903B, Tower A, Tianan Hi-Tech Plaza  
Tianan Cyber Park  
Shenzhen, 518040  
Phone: +(86) 755 8343 9218  
Fax: (86) 755 8343 3885  
E-Mail: [ray.hung@tgehk.com](mailto:ray.hung@tgehk.com)  
<http://www.tgehk.com/index.html>

## **TG Electronics Co. Ltd. (SSL Products)**

Suite 1803, Harbour Ring Plaza  
18 XiZang Road(M)  
Shanghai, 200021  
Phone: +(86) 21 5385 8711  
Fax: +(86) 21 5385 9013  
E-Mail: [ray.hung@tgehk.com](mailto:ray.hung@tgehk.com)  
<http://www.tgehk.com/index.html>

## **TOMEN Electronics (Beijing) Branch**

Rm.1251, Office Bldg., Hotel Nikko-NewCentury Beijing  
No.6 SouthernRd., CapitalGym  
Haidian District, Beijing, 100044  
Phone: +86-10-6849-2358  
Fax: +86-10-6849-2359  
E-Mail: [johnson.jiang@tomen-ele.com.cn](mailto:johnson.jiang@tomen-ele.com.cn)  
<http://www.tomen-ele.co.jp/etop.htm>

## **TOMEN Electronics (Chengdu) Branch**

Rm.315, Tech.&Innv.Centre of Sichuan Univ.  
No.24, SouthSec.1, YihuanRd.  
Chengdu, Sichuan, 610041  
Phone: +(86)-28-8546-1898  
Fax: +(86)-28-8546-6148  
E-Mail: [samen.yu@tomen-ele.com.cn](mailto:samen.yu@tomen-ele.com.cn)  
<http://www.tomen-ele.co.jp/etop.htm>

## **TOMEN Electronics (Qingdao) Branch**

Rm.17-1-1003  
No.696, HeFei Rd.  
QingDao City, ShanDong Province  
Phone: +86-133-3500-6562  
Fax: +86-532-8878-2303  
E-Mail: [field.cao@tomen-ele.com.cn](mailto:field.cao@tomen-ele.com.cn)  
<http://www.tomen-ele.co.jp/etop.htm>

## **TOMEN Electronics (Shanghai) Co., Ltd.**

Rm.G-H, 25th Floor  
838 ZhangYang Rd.  
Pudong, Shanghai, 200122  
Phone: +(86)-21-6876-4727  
Fax: +(86)-21-6876-4729  
E-Mail: [shimamura@tomen-ele.com.cn](mailto:shimamura@tomen-ele.com.cn)  
<http://www.tomen-ele.co.jp/etop.htm>

## **TOMEN Electronics (Shenzhen) Ltd.**

Suite A03-04, 12/F., Anlian Plaza  
4018 Jintian Road  
Futian District, Shenzhen, 518026  
Phone: +(86)-755-8828-6262  
Fax: +(86)-755-8828-4569  
E-Mail: [carlos.shen@tomen-ele.com.cn](mailto:carlos.shen@tomen-ele.com.cn)  
<http://www.tomen-ele.co.jp/etop.htm>

## **TOMEN Electronics (Wuhan) Branch**

Rm.3-2-2-402, XueFuJiaYuan  
JiaYuan Rd.  
DongHuGaoXin District, Wuhan, 430074  
Phone: +86-27-8759-8257  
Fax: +86-27-8759-8257  
E-Mail: [bin.xu@tomen-ele.com.cn](mailto:bin.xu@tomen-ele.com.cn)  
<http://www.tomen-ele.co.jp/etop.htm>

## **YEL Electronics Shanghai Ltd. (Beijing)**

Room 1402, A Building, Yingjia Centre  
#10A Dongsanhuan Middle Road  
Chaoyang District, Beijing  
Phone: +86 10 6568 5327  
Fax: +86 10 6568 5326  
E-Mail: [sales@yelhkg.com](mailto:sales@yelhkg.com)  
<http://www.yel-electronics.com>



## **YEL Electronics Shanghai Ltd. (Shanghai)**

Room CD, 6/F Jinling Hai Xin Building  
666 Fu Zhou Rd  
Shanghai, Postal Code 200001  
Phone: +86 21 6391 7111  
Fax: +86 21 6391 7616  
E-Mail: sales@yelhkg.com  
<http://www.yel-electronics.com>

## **YEL Electronics Shanghai Ltd. (Suzhou)**

Rm 509, 1 Linjin Garden  
636 Gan Jiang Dong Road  
Suzhou, Postal Code 215005  
Phone: +86 512 6522 9122  
Fax: +86 512 6515 1332  
E-Mail: sales@yelhkg.com  
<http://www.yel-electronics.com>

## **YEL Electronics Shenzhen Ltd. (Shenzhen)**

Room 803, Tower A, Tian An High Tech Plaza  
Tian An Cyber Park, Futian District  
Shenzhen, Postal Code 518040  
Phone: +86 755 8349 6300  
Fax: +86 755 8349 6333  
E-Mail: sales@yelhkg.com  
<http://www.yel-electronics.com>

## **YEL Electronics Shenzhen Ltd. (Xiamen)**

Room 2105, Sichuan Building  
No. 339 Jia He Road  
Xiamen, Postal Code 361009  
Phone: +86 592 514 0781  
Fax: +86 592 514 0036  
E-Mail: sales@yelhkg.com  
<http://www.yel-electronics.com>

## **Hong Kong**

### **Arrow / Components Agent Ltd.**

Arrow Asia Pac Ltd.  
20/F, Tower Two, Ever Gain Plaza  
88 Container Port Road  
Kwai Chung, Hong Kong  
Phone: +(852) 2484 2484  
Fax: +(852) 2484 2122  
<http://www.arrowasia.com>

### **Avnet Sunrise Ltd.**

16/F, Spectrum Tower  
53 Hung To Road  
Kwung Tong, Kowloon  
Phone: +852 2176 5110  
Fax: +852 2376 1235  
E-Mail: carol.leung@avnet.com;  
david.xiao@avnet.com  
<http://www.avnet.com>

## **Fujitsu Microelectronics Pacific Asia Ltd.,**

10/F, World Commerce Centre  
11 Canton Road  
Tsim Sha Tsui, Kowloon, Hong Kong  
Phone: +852 2736 3232  
Fax: +852 2314 4207

### **Giatek Corp. Ltd.**

27/F., Enterprise Square Two  
3 Sheung Yuet Road, Kowloon Bay  
Kowloon  
Phone: +852 3189 2000 Ext 269  
Fax: +852 3105 1361  
E-Mail: Wing\_wu@giatek.com.hk  
<http://www.yosun.com.tw>

## **RSI Microelectronics Co. Ltd. (SSL Products)**

Rooms 601 - 603, 6/F., Tower B,  
Hung Hom Commercial Centre  
37 Ma Tau Wai Road  
Hung Hom, Kowloon  
Phone: +(852) 2333 0099  
Fax: +(852) 2773 9900  
E-Mail: sales@rslgroup.com.hk  
<http://www.rslgroup.com.hk>

### **SAPL (China) Ltd**

Hong Kong Office  
12/FI., D. J. Building  
173 Hoi Bun RD.  
Kwun Tong, Kowloon  
Hong Kong  
Phone: +852-9013 9644  
Fax: +852-3007 6593  
E-Mail: lizako@sac.com.sg  
<http://www.sacsys.com.tw>

## **TG Electronics Co. Ltd. (SSL Products)**

Suite No. 10B, 11/F, Tower 2, China  
Hong Kong City  
33 Canton Road  
Tsim Sha Tsui  
Phone: +(852) 2838 3620  
Fax: +(852) 2567 8130  
E-Mail: ray.hung@tgehk.com  
<http://www.tgehk.com/index.html>

## **TOMEN Electronics (Hong Kong) Ltd.**

Unit 2603-04, 26/F., Miramar Tower  
1 Kimberley Road  
TST, Kowloon Hong Kong  
Phone: +852-2312-6229  
Fax: +852-2312-1990  
E-Mail: philips.tung@tomen-  
ele.com.hk  
<http://www.tomen-ele.co.jp/etop.htm>

## **YEL Electronics Ltd.**

1203-04 Hilder Centre  
2 Sung Ping Street  
Hung Hom, Kowloon  
Phone: +852 3129 9833  
Fax: +852 2330 4207  
E-Mail: sales@yelhkg.com  
<http://www.yel-electronics.com>

## **India**

### **Arrow Electronics India Private Ltd.**

#26, 4th Floor, Akshaya Commercial Complex  
Victoria Road  
Bangalore - 560047  
Phone: +(91) 80 4135 3800  
Fax: +(91) 80 4112 7784  
E-Mail: sales.india@arrowasia.com  
<http://www.arrowasia.com>

### **Arrow Electronics India Private Ltd.**

3K, III Floor, Prince Arcade, New #29  
Cathedral Road  
Chennai - 600 086  
Phone: +(91) 44 4235 9002  
Fax: +(91) 44 2811 0358  
E-Mail: sales.india@arrowasia.com  
<http://www.arrowasia.com>

### **Arrow Electronics India Private Ltd.**

# 809, III floor, Hayat Towers, Near  
Juma Masjid Palarivattam - Kakka-  
nad Road  
Padamugul, Kakkanadu  
Kochi - 682021  
Phone: +(91) 95674 19262  
Fax: +(91) 44 2811 0358  
E-Mail: sales.india@arrowasia.com  
<http://www.arrowasia.com>

### **Arrow Electronics India Private Ltd.**

#505, 5th Floor, 3-6-322, Mahavir  
House  
Basheer Bagh  
Hyderabad - 500029  
Phone: +(91) 40 6677 4146  
Fax: +(91) 40 6677 4138  
E-Mail: sales.india@arrowasia.com  
<http://www.arrowasia.com>

## **Arrow Electronics India Private Ltd.**

BusinessSpace Business Center  
No.5, "Malancha", 4-A  
Lala Lajapat Rai Sarani, (Elgin Road)  
Kolkata - 700020  
Phone: +(91) 33 4003 4585  
Fax: +(91) 33 2283 2402  
E-Mail: sales.india@arrowasia.com  
<http://www.arrowasia.com>

### **Arrow Electronics India Private Ltd.**

#909, A - Wing, Sagar Tech Plaza  
Andheri Kurla Road, Andheri - East  
Mumbai - 400072  
Phone: +(91) 22 4091 2400  
Fax: +(91) 22 6692 1415  
E-Mail: sales.india@arrowasia.com  
<http://www.arrowasia.com>

### **Arrow Electronics India Private Ltd.**

C-96 , First Floor, Sector 2  
Noida  
New Delhi - 201301  
Phone: +(91) 0120 4535 500  
Fax: +(91) 0120 4535 505  
E-Mail: sales.india@arrowasia.com  
<http://www.arrowasia.com>

### **Arrow Electronics India Private Ltd.**

3rd Floor, Gulmohar Park  
ITI Road, Aundh, Above ICICI Bank  
Pune - 411007  
Phone: +(91) 20 4015 9006  
Fax: +(91) 20 4015 9010  
E-Mail: sales.india@arrowasia.com  
<http://www.arrowasia.com>

### **Avnet Asia**

No: 402, 4th floor, Tower 'B', RMZ -  
Infinity  
Old Madras Road  
Bangalore - 560 016  
Phone: +91 80 4060 4000  
Fax: +91 80 4060 4060  
E-Mail: R.chandran@avnet.com  
<http://www.avnet.com>

### **Avnet Asia**

# 45. 1st Floor  
Okhla Industrial Estate, Phase 3  
New Delhi - 110 020  
Phone: +91 11 2684 1700  
Fax: +91 11 2684 1709  
E-Mail: R.chandran@avnet.com  
<http://www.avnet.com>

## Avnet Asia

Landmark Office No.102, Opp. to  
Ferguson College Main gate  
Shirole Road  
Pune - 411 004  
Phone: +91 20 6640 4951/2/3/4  
Fax: +91 20 6640 4950  
E-Mail: R.chandran@avnet.com  
http://www.avnet.com

## Avnet Asia

2nd Floor, Asma Building  
#84, T.T.K Road, Alwarpet  
Chennai - 600 018  
Phone: +91 44 4203 0502  
Fax: +91 44 4203 0502  
E-Mail: R.chandran@avnet.com  
http://www.avnet.com

## Avnet Asia

DBS House  
1-7-43-46 Sardar Patel Road  
Secunderabad - 500 003 (A.P.)  
Phone: +91 40 2784 6970  
Fax: +91 40 5548 0034  
E-Mail: R.chandran@avnet.com  
http://www.avnet.com

## Fujitsu Microelectronics Asia Pte Ltd.

Bangalore Branch Office  
Unit No. 3, Level 8, Innovator, Inter-  
national Tech Park  
Whitefield Road  
Bangalore 560066  
Phone: +91 80-28419990  
Fax: +91 80-28416660

## Rabyte Electronics Pvt Ltd.

1/10-B, Asaf Ali Road  
New Delhi - 110002  
Phone: +91-11-42831000  
E-Mail: sales@rabyte.com  
http://www.rabyte.com

## Rabyte Electronics Pvt Ltd.

D-1610, Upvan Tower  
Near Raheja Township of Western  
Express Highway  
Malad East  
Mumbai - 4000097  
Phone: +91-22-4003-8300  
E-Mail: sales@rabyte.com  
http://www.rabyte.com

## Rabyte Electronics Pvt Ltd.

No.-6, Nr.Community Hall  
Nirmal Township, Kale Padal Road  
Sasane Nagar, Hadpsar, Pune  
Phone: +91-9791106967  
E-Mail: sales@rabyte.com  
http://www.rabyte.com

## Rabyte Electronics Pvt Ltd.

3-3-61/A, No. 101, Yash Kiriti Nivas  
New Gokhale Nagar, Ramanthapur  
Hyderabad - 50013  
Phone: +91-9704516444  
E-Mail: sales@rabyte.com  
http://www.rabyte.com

## Rabyte Electronics Pvt Ltd.

60/1, I C Main, BSM Extn  
K.S.Town, Bangalore  
Phone: +91-98864-26248  
E-Mail: sales@rabyte.com  
http://www.rabyte.com

## Rabyte Electronics Pvt Ltd.

Unit 3, 3rd street, Sri krishnanagar  
Extn  
Kilkattalai  
Chennai - 600117  
Phone: +91-9791106967  
E-Mail: sales@rabyte.com  
http://www.rabyte.com

## TOMEN Electronics (Bangalore) Pvt.Ltd.

S-3, 2nd Floor, Esteem Arcade  
# 26, Race Course Road  
Bangalore, 560001  
Phone: +91-80-6539-7949  
Fax: +91-80-2237-4674  
E-Mail: arindam.s@tomen-ele.co.in  
http://www.tomen-ele.co.jp/  
etop.htm

## TOMEN Electronics (Mumbai) Pvt.Ltd.

Gateway Plaza, 504, 5th Floor  
Hiranandani Gardens  
Powai Andheri ( E ) Mumbai, 76  
Phone: +91-22-6741-6511  
Fax: +91-22-6741-6519  
E-Mail: arindam.s@tomen-ele.co.in  
http://www.tomen-ele.co.jp/  
etop.htm

## TOMEN Electronics (New Delhi) Pvt.Ltd.

812 -15 Krishna Apra  
Netaji Subhash Place  
Pitam Pura Distt.Centre, New Delhi,  
110034  
Phone: +91-11-4563-9202  
Fax: +91-11-4702-4979  
E-Mail: arindam.s@tomen-ele.co.in  
http://www.tomen-ele.co.jp/  
etop.htm

## Korea

### Barun Electronics Co. Ltd.

275-6, 5F, Samho Bldg. B-Dong  
Yangjae-2Dong  
Seocho-Ku, Seoul  
Phone: +82 2 3463 0040  
Fax: +82 2 3463 4935  
E-Mail: johnjang@bec.co.kr  
http://www.bec.co.kr

### Dabo Industrial Systems Co., Ltd.

Room 909, Daeryung Technotown-  
3rd  
448 Gasan Dong  
Kum Chon-Gu, Seoul  
Phone: +82 2 2615 9999  
Fax: +82 2 2107 3328  
E-Mail: hyjeon@dabois.com  
http://www.dabois.com

## Malaysia

### Arrow Components (M) Sdn Bhd.

No.608, Block A Kelana Business  
Centre 97 Jalan SS 7/2  
Kelana Jaya  
47301 Petaling Jaya, Selangor  
Phone: +(60) 3 7804 6313  
Fax: +(60) 3 7804 6213  
E-Mail: sales.malaysia@arrowa-  
sia.com  
http://www.arrowasia.com

### Arrow Components (M) Sdn Bhd.

Unit 8.02 - 8.05, 8th Floor, Menara  
Boustead Penang  
39 Jalan Sultan Ahmad Shah  
10050 Penang  
Phone: +(60) 4 229 6613  
Fax: +(60) 4 229 6623  
E-Mail: sales.malaysia@arrowa-  
sia.com  
http://www.arrowasia.com

### Avnet Malaysia Sdn Bhd

303-5-19 Krystal Point  
Jalan Sultan Azlan Shah, Bayan  
Lepas  
11900 Penang  
Phone: +60 4 6462032  
Fax: +60 4 6461950  
E-Mail: SM.Chan@avnet.com  
http://www.avnet.com

## Fuji Electric Industries (M) Sdn Bhd

(FEIM)  
Lot 812, Blk A, Level 8, Kelana Buis-  
ness Centre, 97, SS7/2  
Kelana Jaya  
47301 Petaling Jaya, Selangor Darul  
Ehsan  
Phone: +60 3 7492 2816  
Fax: +60 3 7492 2814  
E-Mail: Fujielecindy@ppp.nasio-  
net.net

## Fujitsu Microelectronics Asia Pte Ltd.

Penang Branch Office  
Block B, 303-5-13  
Krystal PointJalan Sultan Azian Shah  
Sungai Nibong Penang Malaysia  
11900  
Phone: +604-645-2050  
Fax: +604-645-6658

## Serial Microelectronics Pte Ltd

Lot 13, Suite 15-5.7 Block E2  
Jalan PJU 1/42A Dataran Prima  
47301 Petaling Jaya  
Selangor Darul Ehsan  
Phone: +60-4-657-204  
E-Mail: david.ng@serialsystem.com  
http://www.serialsystem.com

## Serial System Sdn Bhd

No. 14, Jalan Sultan Azlan Shah  
11700 Gelugor, Pulau Pinang  
Phone: +60-4-657-204  
E-Mail: david.ng@serialsystem.com  
http://www.serialsystem.com

## Silicon Application Sdn Bhd

17-2-11, Bayan Point  
Medang Kampung Relau  
11900 Penang  
Phone: +60 4 643 3831  
Fax: +60 4 643 3834  
E-Mail: Douglaskhoo@sac.com.sg  
http://www.sapl.com.sg

## TOMEN ELECTRONICS MALAYSIA SDN BHD.

Room 1406, Wisma Lim Foo Yong  
86 Lalan Raja Chulan  
50200 Kuala Lumpur  
Phone: +60-3-2143-0173  
Fax: +60-3-2145-0985  
E-Mail: siang@tmes.com.sg  
http://www.tomen-ele.co.jp/  
etop.htm

## TOMEN ELECTRONICS Penang Office

Suite 12-01, Menara IJM Land  
1 Lebuhrudun 3  
11700 Gelugor, Penang  
Phone: +60-4-660-2600  
Fax: +60-4-660-2601  
E-Mail: [siang@tmes.com.sg](mailto:siang@tmes.com.sg)  
<http://www.tomen-ele.co.jp/etop.htm>

## New Zealand

### Avnet Asia

295 Cashel Street, P.O. Box 21-239  
Edgware Christchurch  
Phone: +64 3 3660191  
Fax: +64 3 3663911  
E-Mail: [andrew.plimmer@avnet.com](mailto:andrew.plimmer@avnet.com)  
<http://www.avnet.com>

## Philippines

### Arrow Electronics Labuan Pte. Ltd.

26/F, Tower 1, Insular Life Corporate Centre, Filinvest Corporate City Alabang  
1770 Muntinlupa City  
Phone: +(632) 772 3053  
Fax: +(632) 772 3054  
E-Mail: [sales.philippines@arrowasia.com](mailto:sales.philippines@arrowasia.com)  
<http://www.arrowasia.com>

## Singapore

### Arrow Electronics (S) Pte Ltd.

750E Chai Chee Road, #07-01/02 Technopark@Chai Chee  
Singapore 469005  
Phone: +(65) 6559 8388  
Fax: +(65) 6559 8288  
E-Mail: [sales.singapore@arrowasia.com](mailto:sales.singapore@arrowasia.com)  
<http://www.arrowasia.com>

### Avnet Asia Pte. Ltd.

Asia-Pacific Corporate Office and HQ  
151, Lorong Chuan  
#06-03 New Tech Park  
Singapore 556741  
Phone: +65 6580 6169  
Fax: +65 6580 6122  
E-Mail: [Phyllis.wong@avnet.com](mailto:Phyllis.wong@avnet.com)  
<http://www.avnet.com>

## F T Industrial Supplies Pte Ltd

Block 1, Kallang Sector #02-04  
Kolam Ayer Industrial Estate  
Singapore 349276  
Phone: +65 3682 3233  
Fax: +65 3682 3266  
E-Mail: [lilian@ftis.com.sg](mailto:lilian@ftis.com.sg)

### Fuji Electric Industries (Singapore) Pte. Ltd.

Genting Lane #05-01  
Ruby Land Complex Block II  
Singapore 349562  
Phone: +65 6742 7700  
Fax: +65 6742 7711  
E-Mail: [kenneth@fei.com.sg](mailto:kenneth@fei.com.sg)

### Fujitsu Microelectronics Asia Pte Ltd.

151 Lorong Chuan  
#05-08, New Tech Park  
Singapore 556741  
Phone: +65 6281 0770  
Fax: +65 6281 0220  
E-Mail: [alvin.tan@fdsf.fujitsu.com](mailto:alvin.tan@fdsf.fujitsu.com)

### Serial Microelectronics Pte Ltd

8 Ubi View #04-01 Serial System Building  
Singapore 408554  
Phone: +65-6510-2405  
E-Mail: [keith.khoo@serialsystem.com](mailto:keith.khoo@serialsystem.com)  
<http://www.serialsystem.com>

### Silicon Application Pte. Ltd.

2 Ang Mo Kio St 64  
Ang Mo Kio Industrial Park 3, 3rd Floor  
Singapore 569084  
Phone: +65 6483 7112  
Fax: +65 6483 7446  
E-Mail: [siew\\_peng@sac.com.sg](mailto:siew_peng@sac.com.sg); [yingying@sac.com.sg](mailto:yingying@sac.com.sg)  
<http://www.sacsys.com.tw>

### TOMEN (Singapore) Electronics Pte. Ltd

175A Bencoolen Street #09-00 Burlington Square  
Singapore, 189650  
Phone: +65 6221 1422  
Fax: +65 6221 0400  
E-Mail: [renny.chan@tmes.com.sg](mailto:renny.chan@tmes.com.sg)  
<http://www.tomen-ele.co.jp/etop.htm>

## Taiwan

### Arrow Electronics Taiwan Ltd.

Hsinchu office  
3F, No. 176, Gong Dao Wu Rd  
SEC2, Hsin-Chu  
Taiwan, R.O.C.  
Phone: +(886) 3 620 1968  
Fax: +(886) 3 620 2188  
<http://www.arrowasia.com>

### Arrow Electronics Taiwan Ltd.

Kao Hsiung office  
F Rm , 6F, No. 7, Hsin Wei Shin Rd  
Kao Hsiung 802  
Taiwan, R.O.C.  
Phone: +(886) 7 972 4288  
Fax: +(886) 7 972 4289  
<http://www.arrowasia.com>

### Arrow Electronics Taiwan Ltd. (Head office)

3F., No. 19-3, Sanchong Road  
Nangang District  
Taipei City 11501  
Taiwan, R.O.C.  
Phone: +886 2 7722 5168  
Fax: +886 2 7723 8168  
<http://www.arrowasia.com>

### Avnet Asia Pte. Ltd. (Taiwan Branch)

(Nan Kang Software Park)  
5F, No. 3, Yuan Cyu St.  
115 Taipei  
Taiwan, R.O.C.  
Phone: +886 2 8170 5714  
Fax: +886 2 2655 8666  
E-Mail: [tina.lin@avnet.com](mailto:tina.lin@avnet.com)  
<http://www.avnet.com>

### Fujitsu Microelectronics Pacific Asia Ltd.,

Taiwan Branch  
Taiwan, R.O.C.

### Giatek Corp. Ltd. (Taiwan Branch)

No. 489 Tiding Ave  
SEC. 2 Nei Hu, Taipei  
Taiwan, R.O.C.  
Phone: +886 2 2659 8168  
Fax: +886 2659 8167  
<http://www.yosun.com.tw>

## Silicon Application Corp.

18F, No. 2, Jiann-Ba Road  
Joung-Her City  
Taipei Hsien  
Taiwan, R.O.C.  
Phone: +886 2 8226 1500  
Fax: +886 2 8226 1503  
E-Mail: [vincent.chen@sacsys.com.tw](mailto:vincent.chen@sacsys.com.tw)  
<http://www.sacsys.com.tw>

### TOMEN Electronics Taiwan Branch

10F-2, No 577, LinShen North Rd.  
Taipei, Taiwan, R.O.C. 104  
Taiwan, R.O.C.  
Phone: +886-2-2596-1511  
Fax: +886-2-2596-1510  
<http://www.tomen-ele.co.jp/etop.htm>

### TOPCO Scientific Co., Ltd.

No.483, Sec.2, Tiding Blvd.  
Neihu, Taipei City 114  
Taiwan, R.O.C.  
Phone: +886 2 2799 0011  
Fax: +886 2 2799 8189  
E-Mail: [kenny.yang@topco-global.com](mailto:kenny.yang@topco-global.com)  
<http://www.topco-global.com>

## Thailand

### Arrow Electronics (Thailand) Ltd.

Le Concorde Tower, Unit 803, 8/F.  
202 Ratchadapisek Road,  
Kwaenghuay-Kwang, Khet Huaykwang  
Bangkok, 10310  
Phone: +(662) 694 2332  
Fax: +(662) 694 2331  
E-Mail: [sales.thailand@arrowasia.com](mailto:sales.thailand@arrowasia.com)  
<http://www.arrowasia.com>

### Avnet Asia

Thailand  
184/162 Forum Tower, 25th Floor  
Rachadapisek Road, Huay Kwang  
Bangkok 10320  
Phone: +66 2 6453678  
Fax: +66 2 6453681  
E-Mail: [saravut@linethai.co.th](mailto:saravut@linethai.co.th)  
<http://www.avnet.com>

## Serial Microelectronics Pte Ltd

184/116 Forum Tower, 20th Floor  
Rachadaphisek Road, Huay Kwang  
Bangkok 10320  
Phone: +66-2-645-3196  
E-Mail: thaniya.suthampawa-  
dee@serialsystem.com  
<http://www.serialsystem.com>

## Silicon Application (Thailand) Co., Ltd.

184/119 Forum Tower, 21st Floor  
184 Rachadapisek Road, Huay  
Kwang  
Bangkok 10320  
Phone: +66 2 276 0899  
Fax: +66 2 645 3899  
E-Mail: Ckloh@sac.com.sg

## TOMEN Electronics (THAILAND) Co., Ltd

87, M ThaiTower, 17th Floor  
All Seasons Place, Wittaya Rd.  
Lumpini, Pathumwan, Bangkok,  
10330  
Phone: +66-2-654-3140  
Fax: +66-2-654-3148  
E-Mail: suganuma@tomen-  
ele.co.th  
<http://www.tomen-ele.co.jp/etop.htm>

## Vietnam

## Arrow Electronics Asia (S) Pte. Ltd.

#717-1, Level 7, Me Linh Point  
Tower  
2 Ngo Duc Ke Street, District 1  
Ho Chi Minh City  
Phone: +(84 8) 823 7850  
Fax: +(84 8) 823 7840  
E-Mail: sales.vietnam@arrowa-  
sia.com  
<http://www.arrowasia.com>

## Serial Microelectronics Pte Ltd

Room 222, Lot R, Nguyen Kim  
Apartment  
Nguyen Kim Street, Ward 7, District  
10  
HCM City  
Phone: +84-8-2243-0943  
E-Mail: trongvan@serialsy-  
stem.com  
<http://www.serialsystem.com>

## Serial Microelectronics Pte Ltd

No 35, 6/31 Dang Van Ngu  
Dong Da District  
Hanoi  
Phone: +84-4-66731373  
E-Mail: tiendat@serialsystem.com  
<http://www.serialsystem.com>

## TOMEN Electronics Hanoi Liaison Office

Sun Red River Bldg., 6th Floor  
23 Phan Chu Trinh Street  
Hanoi  
Phone: +84-4-3933-3406  
Fax: +84-4-3933-3407  
E-Mail: takahata@tomen-  
ele.com.hk  
<http://www.tomen-ele.co.jp/etop.htm>

## Japan

### Japan

## Avnet Japan Co., Ltd.

Sphere Tower Tennoz 11F, 2-2-8  
Higashi-Shinagawa  
Shinagawa-ku  
Tokyo 140-0002  
Phone: +81-3-6894-3711  
Fax: +81-3-6894-3705  
E-Mail: JAPAN-OSRAM@Avnet.com  
<http://www.avnet.co.jp>

## Fujitsu Electronics Inc.

Shin-Yokohama Chuo Bldg.  
2-100-45 Shin-Yokohama, Kohoku-  
ku  
Yokohama, Kanagawa 222-8508  
Phone: +81-45-415-5823  
Fax: +81-45-415-5877  
E-Mail: fei-o-tec@ml.jp.fujitsu.com  
<http://jp.fujitsu.com/fei>

## Ryoyo Semicon Corporation

Konwa Bldg. 1-12-22 Tsukiji  
Chuo-ku  
Tokyo 104-0045  
Phone: +81-3-3546-5091  
Fax: +81-3-3546-5092  
E-Mail: rsc\_osram\_gr@semi-  
con.ryoyo.co.jp  
<http://www.ryoyosemicon.co.jp>

## Tomen Electronics Corp.

8-27 Kohnan 1 Chome  
Minato-ku  
Tokyo, 108-8510  
Phone: +81 3 5462 9603  
Fax: +81 3 5462 9684  
E-Mail: salesosram@tomen-  
ele.co.jp  
<http://www.tomen-ele.co.jp>

## Africa

### South Africa

## EBV Elektronik

Woodlands Office Park  
141 Western Service Road  
Building 14-2nd Floor  
Woodmead, Johannesburg 2157  
Phone: +27 11 23619 00  
Fax: +27 11 23619 13  
<http://www.ebv.com>

### United Arab Emirates

## EBV Elektronik

Sales Offices in United Arab Emira-  
tes  
Post Box No. 18657  
Warehouse No: FZS1AL06  
JAFZA South Zone  
Jebel Ali, Dubai  
Phone: +971 4 886 09 50  
Fax: +971 4 886 09 52  
<http://www.ebv.com>



## United States

### Alabama

#### Interep Associates, Inc.

2107 West Ferry Way  
Huntsville, AL 35801  
Phone: +1 256 881-1096  
Fax: +1 256 881-1182  
E-Mail: [alison@interep.net](mailto:alison@interep.net)  
<http://www.interepassociates.com>

### Arizona

#### Earle Associates, Inc.

8161 East Indian Bend Road  
Suite #101  
Scottsdale, AZ 85250  
Phone: +1 480 921-3305  
Fax: +1 480 921-3316  
E-Mail: [sales@earleaz.com](mailto:sales@earleaz.com)  
<http://www.earleassociates.com>

### California

#### Earle Associates, Inc.

7585 Ronson Road  
Suite 200  
San Diego, CA 92111  
Phone: +1 858 278-5441  
Fax: +1 858 278-5443  
E-Mail: [sales@earleassociates.com](mailto:sales@earleassociates.com)  
<http://www.earleassociates.com>

#### Everest Sales and Solutions

361 S. Glassell Street  
Orange, CA 92866  
Phone: +1 714 621-0021  
Fax: +1 714 621-0569  
<http://www.everestss.com>

#### Luscombe Engineering

4682 Calle Bolero  
Suite D  
Camarillo, CA 93012  
Phone: +1 805 987-4880  
Fax: +1 805 987-4700  
E-Mail: [info@lecc.com](mailto:info@lecc.com)  
<http://www.lecc.com>

#### Luscombe Engineering

3070 Bristol Street  
Suite 525  
Costa Mesa, CA 95626  
Phone: +1 714 546-4880  
Fax: +1 714 546-4700  
E-Mail: [info@lecc.com](mailto:info@lecc.com)  
<http://www.lecc.com>

#### Moulthrop Sales Inc.

6920 Koll Center Parkway  
Suite 225  
Pleasanton, CA 94566  
Phone: +1 925 461-7100  
Fax: +1 925 461-7120  
E-Mail: [msi@moulthrop.com](mailto:msi@moulthrop.com)  
<http://www.moulthrop.com>

### Colorado

#### Lange Sales, Inc.

1500 West Canal Court  
Building A, Suite 100  
Littleton, CO 80120  
Phone: +1 303 795-3600  
Fax: +1 303 795-0373  
E-Mail: [sales@langesales.com](mailto:sales@langesales.com)  
<http://www.langesales.com>

### Connecticut

#### JEBCO

John E. Boeing Company, Inc.  
1062 Barnes Rd.  
Suite 206  
Wallingford, CT 06492  
Phone: +1 203 265-1318  
Fax: +1 203 265-0235  
<http://www.jebconet.com>

### Delaware

#### TSI

102F Centre Blvd.  
Marlton, NJ 08053  
Phone: +1 856-988-9900  
Fax: +1 856-988-9909  
E-Mail: [tsi@tsirep.com](mailto:tsi@tsirep.com)  
<http://www.tsirep.com>

### Florida

#### Semtronic Associates, Inc.

195 W. Pine Ave  
Longwood, FL 32750  
Phone: +1 407-831-8233  
Fax: +1 407-831-2844  
<http://www.semtronic.com>

### Georgia

#### Interep Associates, Inc.

3675 Crestwood Parkway  
Suite 510  
Duluth, GA 30096  
Phone: +1 770 717-8777  
Fax: +1 770 717-8355  
<http://www.interepassociates.com>

### Idaho

#### EBCO Northwest

8654 154th Avenue NE  
Redmond, WA 98052-7604  
Phone: +1 425 885-5064  
Fax: +1 425 885-2262  
E-Mail: [sales@ebconw.com](mailto:sales@ebconw.com)  
<http://www.ebconw.com>

#### Lange Sales, Inc.

1500 West Canal Court  
Building A, Suite 100  
Littleton, CO 80120  
Phone: +1 303 795-3600  
Fax: +1 303 795-0373  
E-Mail: [sales@langesales.com](mailto:sales@langesales.com)  
<http://www.langesales.com>

### Illinois

#### Cen Tech, Inc.

3751 Pennridge Drive  
Suite 107  
Bridgeton, MO 63044  
Phone: +1 314-291-4230  
Fax: +1 314-291-4230  
E-Mail: [sharons@centech-inc.com](mailto:sharons@centech-inc.com)

#### TEQ Sales

920 Davis Road  
Suite 304  
Elgin, IL 60123  
Phone: +1 847 742-3767  
Fax: +1 847 742-3947  
E-Mail: [teqsales@interaccess.com](mailto:teqsales@interaccess.com)  
<http://www.teqsales.com>

### Indiana

#### Millennium Alliance

2529 Commerce Dr.  
Suite E  
Kokomo, IN 46902  
Phone: +1 765-453-4260  
Fax: +1 765-453-2125

#### Millennium Alliance

4000 East 96th Street  
Suite 160  
Indianapolis, IN 46240  
Phone: +1 317 575-4600  
Fax: +1 317 575-4610

#### Millennium Alliance

7524 Heffelfinger Rd  
Churubusco, IN 46723  
Phone: +1 260-693-0292  
Fax: +1 260-693-0671

### Iowa

#### Cahill, Schmitz & Cahill

897 St. Paul Avenue  
St. Paul, MN 55116  
Phone: +1 651 699-0200  
Fax: +1 651 699-0200  
E-Mail: [info@cahillsschmitz.com](mailto:info@cahillsschmitz.com)  
<http://www.cahillsschmitz.com>

### Kansas

#### Quad State Sales & Marketing

12160 Abrams Road  
Suite 406  
Dallas, TX 75243  
Phone: +1 972 669-8567  
Fax: +1 972 669-9654  
E-Mail: [sgreen@quadstatesales.com](mailto:sgreen@quadstatesales.com)  
<http://www.quadstatesales.com>

### Kentucky

#### Millennium Technical Sales

7155 Post Road  
Dublin, OH 43016  
Phone: +1 614-793-9545  
Fax: +1 614-793-0256  
E-Mail: [mschultheis@milltechsales.com](mailto:mschultheis@milltechsales.com)

### Louisiana

#### Quad State Sales & Marketing

12160 Abrams Road  
Suite 406  
Dallas, TX 75243  
Phone: +1 972 669-8567  
Fax: +1 972 669-9654  
E-Mail: [sgreen@quadstatesales.com](mailto:sgreen@quadstatesales.com)  
<http://www.quadstatesales.com>

### Maine

#### JEBCO

John E. Boeing Company, Inc.  
73 Princeton St.  
Unit 213  
North Chelmsford, MA 01863  
Phone: +1 978-251-1300  
Fax: +1 978-251-3533  
E-Mail: [info@jebcomail.com](mailto:info@jebcomail.com)  
<http://www.jebconet.com>

## Massachusetts

### JESCO

John E. Boeing Company, Inc.  
73 Princeton St.  
Unit 213  
North Chelmsford, MA 01863  
Phone: +1 978-251-1300  
Fax: +1 978-251-3533  
E-Mail: [info@jebcomail.com](mailto:info@jebcomail.com)  
<http://www.jebconet.com>

## Michigan

### Millennium Alliance

40000 Grand River  
Suite 202  
Novi, Michigan 48375  
Phone: +1 248-536-6700  
Fax: +1 248-536-6717  
E-Mail: [cmanquen@milltechsales.com](mailto:cmanquen@milltechsales.com)

## Minnesota

### Cahill, Schmitz & Cahill

897 St. Paul Avenue  
St. Paul, MN 55116  
Phone: +1 651 699-0200  
Fax: +1 651 699-0200  
E-Mail: [info@cahillsschmitz.com](mailto:info@cahillsschmitz.com)  
<http://www.cahillsschmitz.com>

## Mississippi

### Interep Associates, Inc.

E-Mail: [alison@interep.net](mailto:alison@interep.net)

## Missouri

### Cen Tech, Inc.

3751 Penridge Drive  
Suite 107  
Bridgeton, MO 63044  
Phone: +1 314-291-4230  
Fax: +1 314-291-4230  
E-Mail: [sharons@centech-inc.com](mailto:sharons@centech-inc.com)  
<http://www.centech-inc.com>

### Cen Tech, Inc.

4025 North East Lakewood Way  
Suite 290  
Lee's Summit, MO 64064  
Phone: +1 816 795-9019  
Fax: +1 816 795-0070  
<http://www.centech-inc.com>

## Montana

### Lange Sales, Inc.

1500 West Canal Court  
Building A, Suite 100  
Littleton, CO 80120  
Phone: +1 303 795-3600  
Fax: +1 303 795-0373  
E-Mail: [sales@langesales.com](mailto:sales@langesales.com)  
<http://www.langesales.com>

### EBCO Northwest

8654 154th Avenue NE  
Redmond, WA 98052-7604  
Phone: +1 425 885-5064  
Fax: +1 425 885-2262  
E-Mail: [sales@ebconw.com](mailto:sales@ebconw.com)  
<http://www.ebconw.com>

## Nebraska

### Cahill, Schmitz & Cahill

897 St. Paul Avenue  
St. Paul, MN 55116  
Phone: +1 651 699-0200  
Fax: +1 651 699-0200  
E-Mail: [info@cahillsschmitz.com](mailto:info@cahillsschmitz.com)  
<http://www.cahillsschmitz.com>

## Nevada

### Earle Associates, Inc.

8161 East Indian Bend Road  
Suite #101  
Scottsdale, AZ 85250  
Phone: +1 480 921-3305  
Fax: +1 480 921-3316  
E-Mail: [sales@earleaz.com](mailto:sales@earleaz.com)  
<http://www.earleassociates.com>

### Moulthrop Sales Inc.

6920 Koll Center Parkway  
Suite 225  
Pleasanton, CA 94566  
Phone: +1 925 461-7100  
Fax: +1 925 461-7120  
E-Mail: [msi@moulthrop.com](mailto:msi@moulthrop.com)  
<http://www.moulthrop.com>

## New Hampshire

### JESCO

John E. Boeing Company, Inc.  
73 Princeton St.  
Unit 213  
North Chelmsford, MA 01863  
Phone: +1 978-251-1300  
Fax: +1 978-251-3533  
E-Mail: [info@jebcomail.com](mailto:info@jebcomail.com)  
<http://www.jebconet.com>

## New Jersey

### TSI

102F Centre Blvd.  
Marlton, NJ 08053  
Phone: +1 856-988-9900  
Fax: +1 856-988-9909  
E-Mail: [tsi@tsirep.com](mailto:tsi@tsirep.com)  
<http://www.tsirep.com>

## New Mexico

### Earle Associates, Inc.

8161 East Indian Bend Road  
Suite #101  
Scottsdale, AZ 85250  
Phone: +1 480 921-3305  
Fax: +1 480 921-3316  
E-Mail: [sales@earleaz.com](mailto:sales@earleaz.com)  
<http://www.earleassociates.com>

## New York

### JESCO

John E. Boeing Company, Inc.  
135 Old Cove Road  
Liverpool, NY 13090  
Phone: +1 315 451-0800  
Fax: +1 315 451-6552  
<http://www.jebconet.com>

### TSI

102F Centre Blvd.  
Marlton, NJ 08053  
Phone: +1 856-988-9900  
Fax: +1 856-988-9909  
E-Mail: [tsi@tsirep.com](mailto:tsi@tsirep.com)  
<http://www.tsirep.com>

## North Carolina

### Interep Associates, Inc.

130 Edinburgh South  
Suite 104  
Cary, NC 27511  
Phone: +1 919 655-0000  
Fax: +1 919 655-0001  
E-Mail: [alison@interep.net](mailto:alison@interep.net)  
<http://www.interepassociates.com>

## North Dakota

### Cahill, Schmitz & Cahill

897 St. Paul Avenue  
St. Paul, MN 55116  
Phone: +1 651 699-0200  
Fax: +1 651 699-0200  
E-Mail: [info@cahillsschmitz.com](mailto:info@cahillsschmitz.com)  
<http://www.cahillsschmitz.com>

## Ohio

### Millennium Technical Sales

6255 Shadyglen Rd.  
Cincinnati, OH 45243  
Phone: +1 513-272-2205  
Fax: +1 513-272-2206

### Millennium Technical Sales

6325 Cochran Road  
Suite 7  
Solon, OH 44139  
Phone: +1 440-349-6600  
Fax: +1 440 349-6700

### Millennium Technical Sales

7155 Post Road  
Dublin, OH 43016  
Phone: +1 614-793-9545  
Fax: +1 614-793-0256  
E-Mail: [mschultheis@milltechsales.com](mailto:mschultheis@milltechsales.com)

## Oklahoma

### Quad State Sales & Marketing

3624 E. 70th Street  
Tulsa, OK 74136  
Phone: +1 918 499 1711  
Fax: +1 918 499 1709  
<http://www.quadstatesales.com>

## Oregon

### Earl & Brown Co. Inc.

7185 S.W. Sandburg Street  
Suite 100  
Tigard, OR 97223  
Phone: +1 503 639-2100  
Fax: +1 503 684-2001  
<http://www.ebconw.com>

## Pennsylvania

### Millennium Alliance

118 Stonebridge Dr.  
Oakdale, PA 15071  
Phone: +1 724-693-8943  
Fax: +1 724-693-8943

### TSI

102F Centre Blvd.  
Marlton, NJ 08053  
Phone: +1 856-988-9900  
Fax: +1 856-988-9909  
E-Mail: [tsi@tsirep.com](mailto:tsi@tsirep.com)  
<http://www.tsirep.com>

## Rhode Island

### JEBCO

John E. Boeing Company, Inc.  
73 Princeton St.  
Unit 213  
North Chelmsford, MA 01863  
Phone: +1 978-251-1300  
Fax: +1 978-251-3533  
E-Mail: [info@jebcomail.com](mailto:info@jebcomail.com)  
<http://www.jebconet.com>

## South Carolina

### Interep Associates, Inc.

130 Edinburgh South  
Suite 104  
Cary, NC 27511  
Phone: +1 919 655-0000  
Fax: +1 919 655-0001  
E-Mail: [alison@interep.net](mailto:alison@interep.net)  
<http://www.interepassociates.com>

## South Dakota

### Cahill, Schmitz & Cahill

897 St. Paul Avenue  
St. Paul, MN 55116  
Phone: +1 651 699-0200  
Fax: +1 651 699-0200  
E-Mail: [info@cahillschmitz.com](mailto:info@cahillschmitz.com)  
<http://www.cahillschmitz.com>

## Tennessee

### Interep Associates, Inc.

E-Mail: [alison@interep.net](mailto:alison@interep.net)

## Texas

### Quad State Sales & Marketing

12160 Abrams Road  
Suite 406  
Dallas, TX 75243  
Phone: +1 972 669-8567  
Fax: +1 972 669-9654  
E-Mail: [sgreen@quadstatesales.com](mailto:sgreen@quadstatesales.com)  
<http://www.quadstatesales.com>

### Quad State Sales & Marketing

3737 Executive Center Drive  
Suite 108  
Austin, TX 78731  
Phone: +1 512 346-7002 / -7003  
Fax: +1 512 346-3601  
<http://www.quadstatesales.com>

### Quad State Sales & Marketing

2019 Dunstan Road  
Houston, TX 77005  
Phone: +1 713 621-9092  
<http://www.quadstatesales.com>

## Utah

### Lange Sales, Inc.

Utah  
772 East 3300 South  
Suite 205  
Salt Lake City, UT 84106  
Phone: +1 801 487-0843  
Fax: +1 801 484-5408  
<http://www.langesales.com>

## Vermont

### JEBCO

John E. Boeing Company, Inc.  
73 Princeton St.  
Unit 213  
North Chelmsford, MA 01863  
Phone: +1 978-251-1300  
Fax: +1 978-251-3533  
E-Mail: [info@jebcomail.com](mailto:info@jebcomail.com)  
<http://www.jebconet.com>

## Virginia

### TSI

102F Centre Blvd.  
Marlton, NJ 08053  
Phone: +1 856-988-9900  
Fax: +1 856-988-9909  
E-Mail: [tsi@tsirep.com](mailto:tsi@tsirep.com)  
<http://www.tsirep.com>

## Washington

### EBCO Northwest

8654 154th Avenue NE  
Redmond, WA 98052-7604  
Phone: +1 425 885-5064  
Fax: +1 425 885-2262  
E-Mail: [sales@ebconw.com](mailto:sales@ebconw.com)  
<http://www.ebconw.com>

## West Virginia

### Millennium Technical Sales

6325 Cochran Road  
Suite 7  
Solon, OH 44139  
Phone: +1-440-349-6600  
Fax: +1 440 349-6700

## Wisconsin

### TEQ Sales

21700 Doral Road  
Waukesha, WI 53186  
Phone: +1 262 780-0340  
Fax: +1 262 780-0342  
E-Mail: [teqsales@earth.execpc.com](mailto:teqsales@earth.execpc.com)  
<http://www.teqsales.com>

## Cahill, Schmitz & Cahill

897 St. Paul Avenue  
St. Paul, MN 55116  
Phone: +1 651 699-0200  
Fax: +1 651 699-0200  
E-Mail: [info@cahillschmitz.com](mailto:info@cahillschmitz.com)  
<http://www.cahillschmitz.com>

## Canada

## British Columbia

### Neutronics Components Ltd.

200-4170 Still Creek Drive  
Burnaby, BC V5C 6C6  
Phone: (800) 694-5172  
Fax: (866) 273-2602  
<http://www.neutronics.ca>

## Ontario

### Neutronics Components Ltd.

55 King Street West  
7th Floor  
Kitchener, ON N2G 4W1  
Phone: (800) 694-5172  
Fax: (866) 418-0513  
<http://www.neutronics.ca>

### Neutronics Components Ltd.

Ottawa (Corporate Headquarters)  
245 Stafford Road  
Suite 301  
Ottawa, ON K2H 9E8  
Phone: (800) 694-5172  
Fax: (877) 505-2072  
<http://www.neutronics.ca>

## Quebec

### Neutronics Components Ltd.

189 Hymus Boulevard  
Suite 504  
Pointe-Claire, QC H9R 1E9  
Phone: +1 514 428 5838  
Fax: +1 514 428 5837  
<http://www.neutronics.ca>

## Mexico

### **Everest Sales and Solutions**

Av. Lázaro Cárdenas No. 2321 Pte.,  
Piso 3 Office 332  
Col. Residencial San Agustín CP  
San Pedro Garza García, N.L. 66260  
Phone: +52 81 1001-7048  
Fax: +52 81 1001-7047  
<http://www.everestss.com>

### **Everest Sales and Solutions**

Av. Manuel Acuña 2674-101  
Col. Ladrón de Guevara  
Guadalajara, Jalisco 44680  
Phone: +52 33 3642-2101  
Fax: +52 33 3640-6562  
<http://www.everestss.com>

### **Everest Sales and Solutions**

Matanzas 984-5  
Col. Lindavista  
Mexico City, D.F. 7300  
Phone: +52 55 9112-0163  
Fax: +52 55 9112-0162  
<http://www.everestss.com>

## Puerto Rico

### **Semtronic Associates, Inc.**

Urb. Palacios Reales  
Ca. Minive L-11 / Buzón 282  
Toa Alta, Puerto Rico 00953  
Puerto Rico  
Phone: +1 787-641-0584  
Fax: +1 407-831-2844  
E-Mail: [jortizpr@centennialpr.net](mailto:jortizpr@centennialpr.net)  
<http://www.avnet.com>