

Specification**Small Form Factor**

Duplex LC Receptacle – SFF

Optical Transceivers

STM-1 / OC-3 / 100BASE

155.52Mbit/s

**Ordering Information****T S P - F x A A 1 - M 2 1**

Voltage / Temperature

1 : 3.3V / +0 ~ +70°C

2 : 3.3V / -40 ~ +85°C

Model Name	Voltage	Category	Device type	Interface	SD/LOS	Temperature	Distance
TSP-F1AA1-M21	3.3V	W/O DDMI	FP / PIN	DC / DC Coupling	LVPECL	+0 ~+70°C	60Km
TSP-F2AA1-M21						-40 ~+85°C	

Features

- **ROHS Compliant**
- **Standard Small Form Factor Package – SFF MSA Compliant**
- **SONET/SDH Standard Compliant**
- **Fast Ethernet Standard Compliant**
- **Laser Class 1 Product – IEC/EN 60825-1 Compliant**
- **Standard Duplex LC Receptacle Optical Interface**
- **Single + 3.3 V Power Supply**
- **Differential LVPECL Data Input and Output**
- **LVPECL Signal Detect**
- **Low Power Consumption**

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Storage temperature	T _s	-40		85	°C
Supply voltage	V _{CC}	0		4	V
Operating Relative Humidity	RH	5		95	%
Input voltage	V _{IN}	0		V _{CC}	V

Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V _{CC}	3.1	3.3	3.5	V
Operating Case temperature (TSP-F1AA1-M21)	Top	0		70	°C
Operating Case temperature (TSP-F2AA1-M21)		-40		85	
Current	I _{cc}	-	-	250	mA
Soldering Temperature (10sec)	T _{sold}	-		260	°C

Transmitter Specifications

(Vcc =3.1 ~ 3.5V ; Top = 0 ~ 70°C / Top = -40 ~ 85°C)

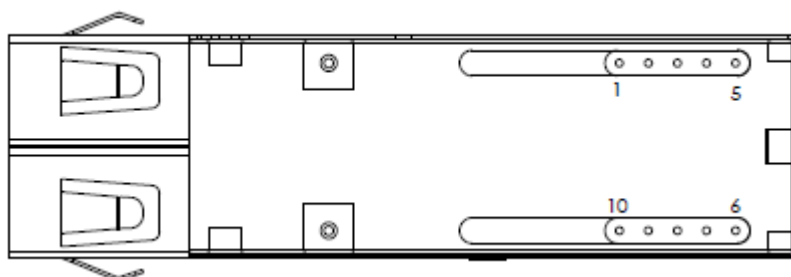
Parameter	Symbol	Min	Typ	Max	Unit
Optical Characteristics					
Output Optical Power	P _O	-5	--	0	dBm
Extinction Ratio	ER	9	--	--	dB
Center Wavelength	λ	1270	1310	1355	nm
Spectral Width (RMS)	σλ	--	--	2.5	nm
Rise/Fall time (10-90%)	T _r / T _f	--	--	2	ns
Relative Intensity Noise	RIN	--	--	-120	dB/Hz
Output Eye	Compliant with IEEE 802.3z				
Max. P _{out} TX-DISABLE Asserted	P _{OFF}	--	--	-45	dBm
Electrical Characteristics					
Transmitter Data Input Voltage - High	V _{IH} -Vcc	-1.1	--	-0.74	V
Transmitter Data Input Voltage - Low	V _{IL} -Vcc	-2.0		-1.58	V
Tx_Disable_Input_High	V _{DISH}	2.0	--	Vcc+0.3	V
Tx_Disable_Input_Low	V _{DISL}	0	--	0.8	V

Receiver Specifications

(Vcc =3.1 ~ 3.5V ; Top = 0 ~ 70°C / Top = -40 ~ 85°C)

Parameter	Symbol	Min	Typ	Max	Unit
Optical Characteristics					
Optical Input Power-maximum	P _{max}	-3	--	--	dBm
Receiver Sensitivity (PRBS=2 ²³ -1 ; BER ≤ 10 ⁻¹⁰)	Sens	--	--	-35	dBm
Operating Center Wavelength	λ	1260	--	1610	nm
Signal Detect – Asserted	P _{SA}	--	--	-35	dBm
Signal Detect – De-asserted	P _{SD}	-45	--	--	dBm
Signal Detect – Hysteresis	P _{SH}	0.5		6	dB
Electrical Characteristics					
Differential Output Voltage	V _{DIFF}	0.4	--	2.0	V
Signal Detect Output Voltage - High	V _{OH} -Vcc	-1.1	--	-0.74	V
Signal Detect Output Voltage - Low	V _{OL} -Vcc	-2.0		-1.58	V

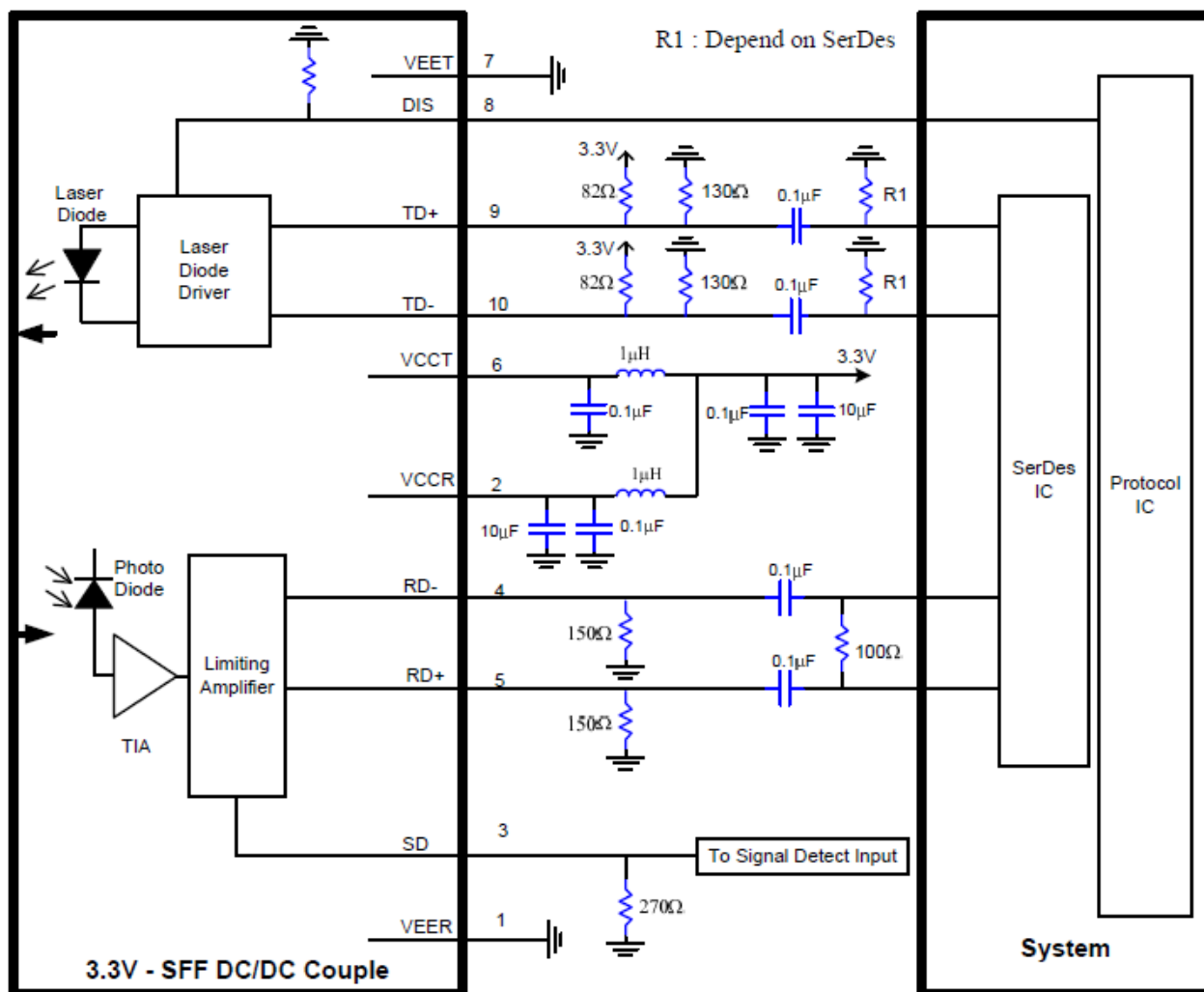
Pin Definition and Descriptions



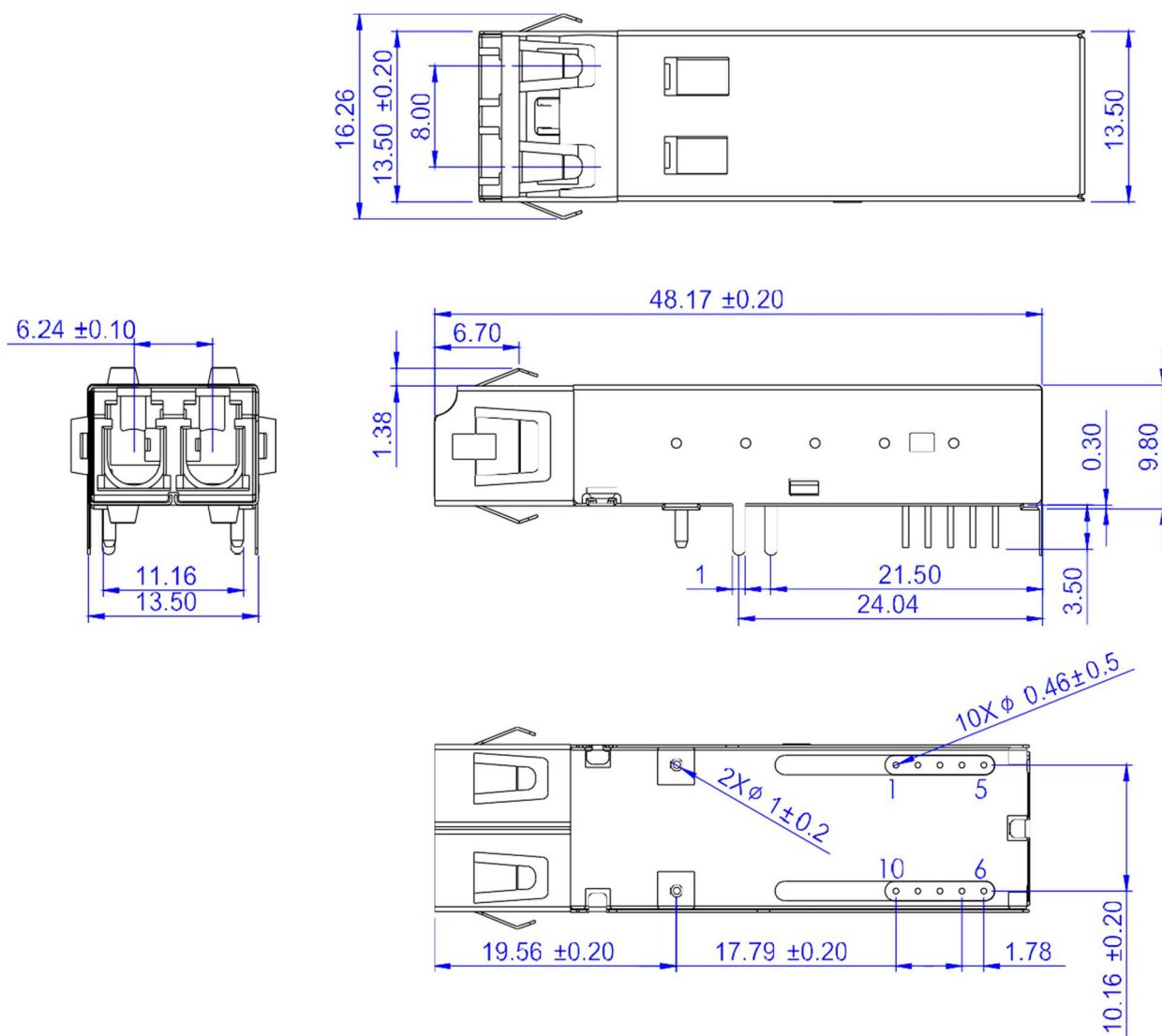
Bottom View

Pin	Name	Input-Output /Level	Description	Ref.
1	VEER	Input	Receiver ground	
2	VCCR	Input	Receiver power supply	
3	SD	Output/LVPECL	Receiver signal detect. High signal indicates optical signal is present at receiver input.	
4	RD-	Output/LVPECL	Inverted receiver data output	
5	RD+	Output/LVPECL	Non-inverted receiver data output	
6	VCCT	Input	Transmitter power supply	
7	VEET	Input	Transmitter ground	
8	DIS	Input/LVTTL	Transmitter Disable Control	
9	TD+	Input/LVPECL	Transmitter non-inverted data input	
10	TD-	Input/LVPECL	Transmitter inverted data input	

Recommended Circuit Diagram



Mechanical Outlines (Unit : mm)



ESD

Normal ESD precautions are required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.



Contact Information

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