

## Specification

### 1X9 Form Factor

Duplex SC Receptacle – DSC

### Optical Transceivers

STM-1 / OC-3 / 100BASE  
155.52Mbit/s



## Ordering Information

**T S P - D x A A 2 - M 2 1**

**Voltage / Temperature**

1: 3.3V / +0°C~ +70°C

2: 3.3V / -40 °C~ +85°C

Model Name	Voltage	Category	Device type	Interface	SD/LOS	Temperature	Distance
TSP-D1AA2-M21	3.3 V	W/O DDMI	FP / PIN	DC / DC Coupling	LVPECL	+ 0 °C~ + 70 °C	60km
TSP-D2AA2-M21						-40 °C~ + 85 °C	

## Features

- ROHS Compliant
- Standard 1X9 Form Factor
- SONET/SDH Standard Compliant
- Fast Ethernet Standard Compliant
- Laser Class 1 Product – IEC60825-1 Compliant
- Standard Duplex SC 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 <sub>s</sub>	-40	-	85	°C
Supply voltage	V <sub>CC</sub>	0	-	4	V
Operating Relative Humidity	-	5	-	95	%
Input voltage	V <sub>IN</sub>	0	-	V <sub>CC</sub>	V

## Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V <sub>CC</sub>	3.1	3.3	3.5	V
Operating Case temperature ( TSP-D1AA2-M21 )	T <sub>c</sub>	0	-	70	°C
Operating Case temperature (TSP-D2AA2-M21 )		-40	-	85	
Total Current ( Transmitter + Receiver )	I <sub>CC</sub>	-	-	250	mA
Hand Lead Soldering Temperature / Time	Th	-	-	260/10	°C /sec
Wave Lead Soldering Temperature / Time	Tw	-	-	260/10	°C /sec

**Transmitter Specifications** (  $V_{CC}=3.1V\sim 3.5V$  ;  $T_C= 0^{\circ}C\sim 70^{\circ}C$  /  $T_C= -40^{\circ}C\sim 85^{\circ}C$  )

Parameter	Symbol	Min	Typ	Max	Unit
<b>Optical Characteristics</b>					
Output Optical Power	$P_{out}$	-5	--	0	dBm
Extinction Ratio	ER	9	--	--	dB
Center Wavelength	$\lambda_c$	1270	1310	1355	nm
Spectral Width (RMS)	$\sigma$	--	--	2.5	nm
Rise/Fall time (10-90%)	$T_{r,f}$	--	--	2	ns
Relative Intensity Noise	RIN	--	--	-120	dB/Hz
Output Eye	Compliant with ITU-T G.957				
<b>Electrical Characteristics</b>					
Transmitter Data Input Voltage - High	$V_{IH}-V_{CC}$	-1.1	--	-0.74	V
Transmitter Data Input Voltage - Low	$V_{IL}-V_{CC}$	-2.0		-1.58	V

**Receiver Specifications** (  $V_{CC}=3.1V\sim 3.5V$  ;  $T_C= 0^{\circ}C\sim 70^{\circ}C$  /  $T_C= -40^{\circ}C\sim 85^{\circ}C$  )

Parameter	Symbol	Min	Typ	Max	Unit
<b>Optical Characteristics</b>					
Optical Input Power-maximum	$P_{SATIN}$	-3	--	--	dBm
Receiver Sensitivity ( PRBS= $2^{23}-1$ ; $BER \leq 10^{-10}$ )	$P_{SAN}$	--	--	-35	dBm
Operating Center Wavelength	$\lambda_c$	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
<b>Electrical Characteristics</b>					
Differential Output Voltage	$V_{DIFF}$	0.4	--	2.0	V
Signal Detect Output Voltage - High	$V_{OH}-V_{CC}$	-1.1	--	-0.74	V
Signal Detect Output Voltage - Low	$V_{OL}-V_{CC}$	-2.0		-1.58	V

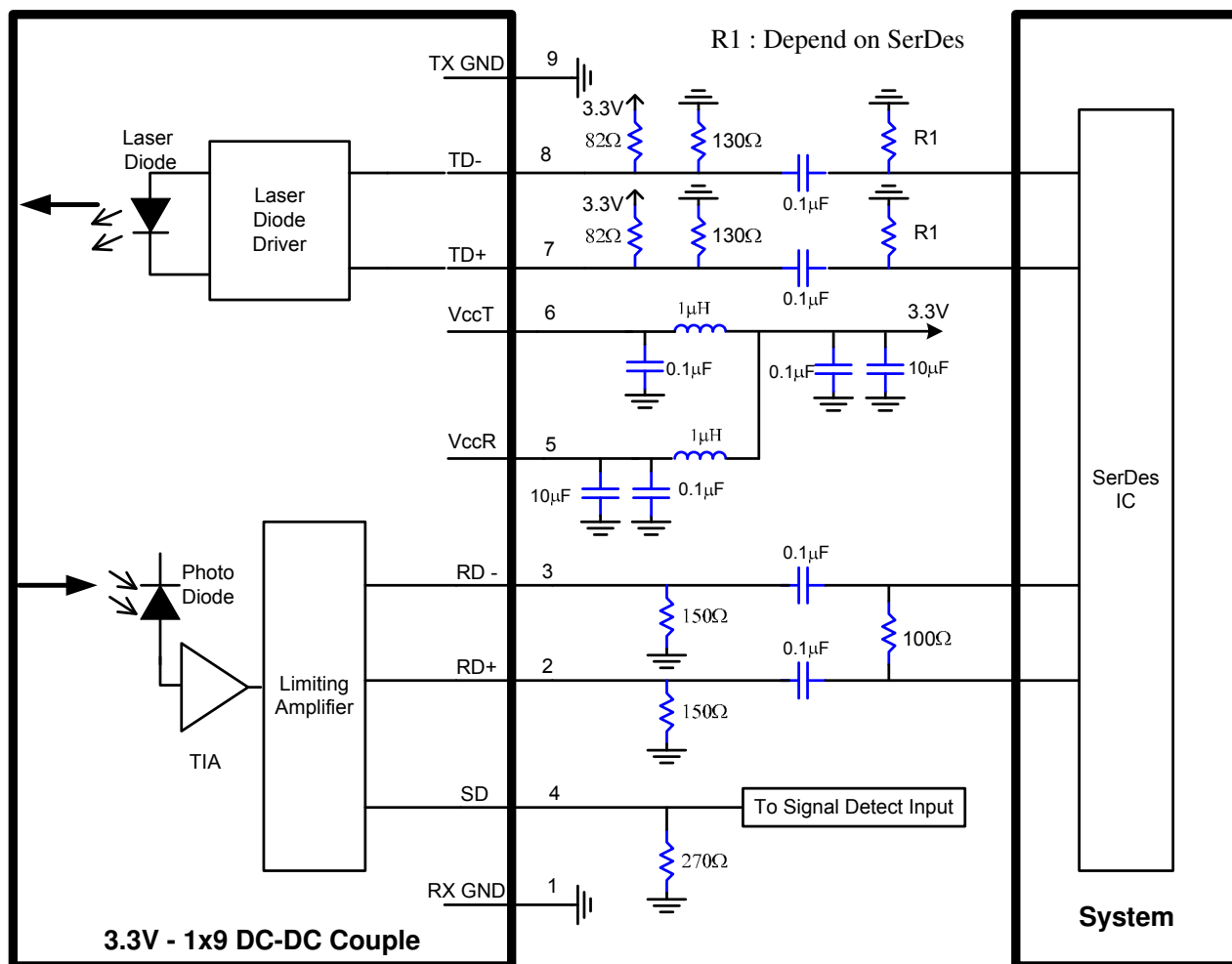
## Pin Definition and Descriptions

9. TX GND <sub>r</sub>	
8. TD+	N/C
7. TD-	
6. V <sub>CCT</sub>	
5. V <sub>CCR</sub>	
4. SD	
3. RD-	
2. RD+	N/C
1. RX GND	

Bottom VIEW

Pin	Name	Description
1	RX GND	Receiver Signal Ground
2	RD+	Receiver Data Out
3	RD-	Receiver Data Out Bar
4	SD	Signal Detect
5	V <sub>CCR</sub>	Receiver Power Supply
6	V <sub>CCT</sub>	Transmitter Power Supply
7	TD-	Transmitter Data In Bar
8	TD+	Transmitter Data In
9	TX GND	Transmitter Signal Ground

Recommended Circuit Diagram



### Mechanical Outlines

( Unit : mm )

