



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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## 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 - H 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-H21	3.3 V	W/O DDMI	FP / PIN	DC / DC Coupling	LVPECL	+0°C ~ +70°C	30km
TSP-D2AA2-H21						-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-H21 )	T <sub>c</sub>	0	-	70	°C
Operating Case temperature (TSP-D2AA2-H21 )		-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	$P_{out}$	-9	--	-3	dBm
Extinction Ratio	ER	9	--	--	dB
Center Wavelength	$\lambda_C$	1270	1310	1355	nm
Spectral Width (RMS)	$\sigma$	--	--	3	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= $2^{23}-1$ ; $BER \leq 10^{-10}$ )	$P_{SAN}$	--	--	-34	dBm
Operating Center Wavelength	$\lambda_C$	1260		1610	nm
Signal Detect – Asserted	$P_{SA}$	--	--	-34	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

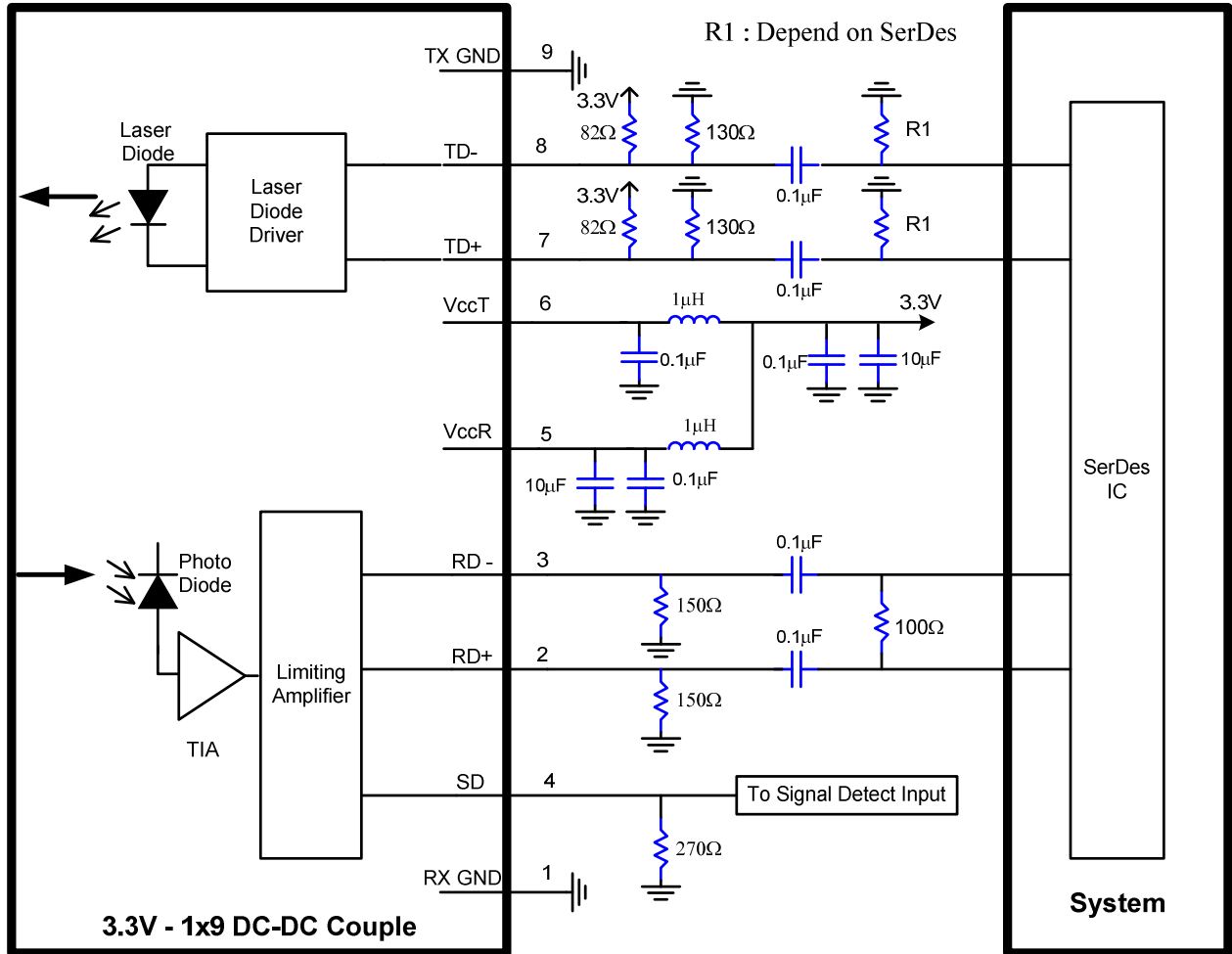
### Pin Definition and Descriptions

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)

