

## Specification

### Small Form Factor Pluggable

Duplex LC Receptacle – SFP

### Optical Transceivers

STM-1 / OC-3 / 100BASE  
155Mbit/s




## Ordering Information

**TSP-SxAA1-MAV**

Voltage / Temperature

1. 3.3V / +0°C ~ +70°C
2. 3.3V / -40°C ~ +85°C

Model Name	Voltage	Category	Device type	Interface	LOS	Temperature	Distance	Latch Color
TSP-S1AA1-MAV	3.3V	W/O DDMI	FP / PIN	AC / AC Coupling	LVTTL	0°C~+70°C	60km	Blue
TSP-S2AA1-MAV						-40°C~+85°C		

## Features

- 1310nm uncooled FP LD
- 60Km link distance (indicative only)
- Hot pluggable
- Metal enclosure, low EMI
- Single +3.3V Power Supply
- Low Power Dissipation

## Applications

- Metro Access Rings
- Point-to-Point networking
- Suitable for Fast Ethernet and OC-3

## Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Storage Temperature	$T_s$	-40		85	°C
Supply Voltage	$V_{CC,T/R}$	0		4.0	V
Relative Humidity	RH	0		85	%

## Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case temperature ( TSP-S1AA1-MAV )	Top	0		70	°C
Operating Case temperature ( TSP-S2AA1-MAV )	Top	-40		85	°C
Supply Voltage	$V_{CC,T,R}$	3.14	3.3	3.47	V
Supply Current	$I_{TX+RX}$		200	300	mA

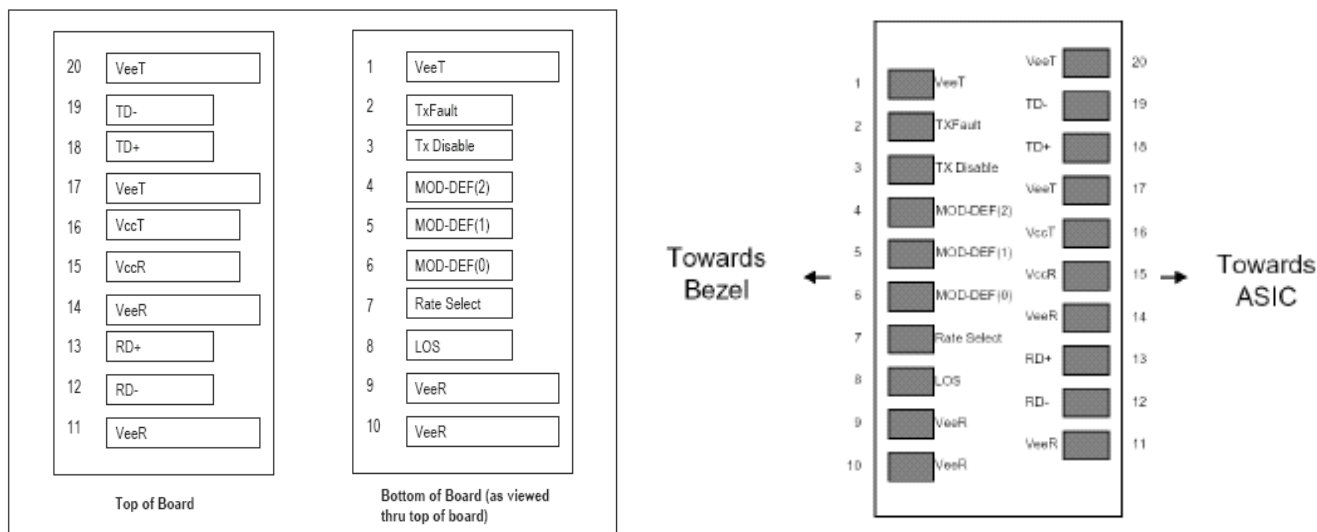
**Transmitter Specifications** (  $V_{CC}=3.1V\sim 3.5V$  ;  $T_c= 0^{\circ}C\sim 70^{\circ}C$  /  $T_c= -40^{\circ}C\sim 85^{\circ}C$  )

Parameter	Symbol	Min	Typ	Max	Unit
<b>Optical Characteristics</b>					
Transmitter Differential Input Voltage	TD +/-	400		2000	mVp-p
Optical Output Power	P <sub>o</sub>	-5		0	dBm
Optical Extinction Ratio	ER	10			dB
Center Wavelength	$\lambda_c$	1280	1310	1355	nm
Spectral Width	$\Delta\lambda$			4	nm
Optical Rise/Fall Time	t <sub>r</sub> /t <sub>f</sub>			3	nsec
<b>Electrical Characteristics</b>					
TX_Fault - High	T <sub>Fault H</sub>	2.0		V <sub>CC</sub>	V
TX_Fault - Low	T <sub>Fault L</sub>	V <sub>ee</sub>		V <sub>ee</sub> +0.5	V
TX_Disable - High	T <sub>Disable H</sub>	2.0		V <sub>CC</sub>	V
TX_Disable - Low	T <sub>Disable L</sub>	V <sub>ee</sub>		V <sub>ee</sub> +0.8	V

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

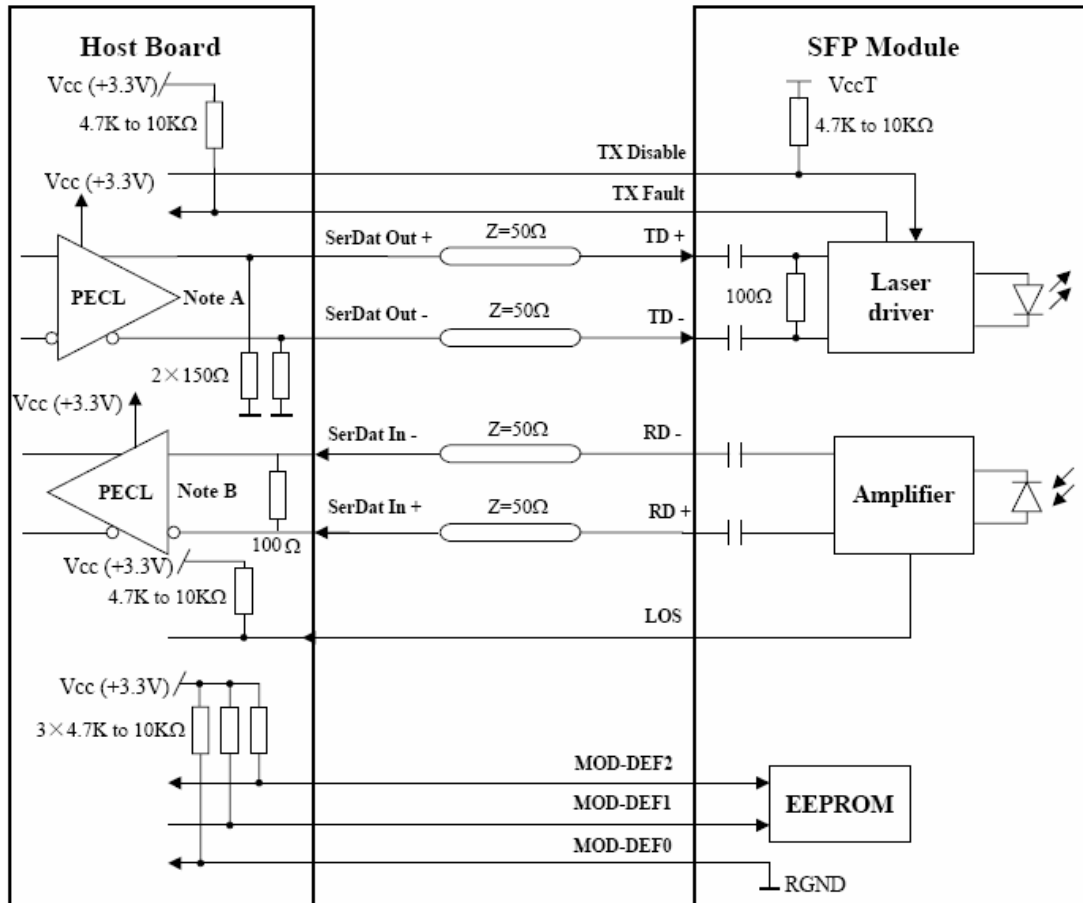
Parameter	Symbol	Min	Typ	Max	Unit
<b>Optical Characteristics</b>					
Receiver Differential Output Voltage	RD +/-	600	800		mV <sub>p-p</sub>
Receiver Overload	P <sub>IN</sub> MAX	-3			dBm
Receiver Sensitivity	P <sub>IN</sub> MIN			-34	dBm
Operating Center Wavelength	$\lambda_c$	1270		1620	nm
<b>Electrical Characteristics</b>					
Receiver Loss Assert Level	P <sub>RX</sub> LOSA	-45			dBm
Receiver Loss Deassert Level	P <sub>RX</sub> LOSD			-34.5	dBm
Receiver Loss of Signal Hysteresis		0.5	2		dB

### Pin Definition and Descriptions



Pin	Name	Input/Output Level	Description
1	VeeT	Input	Transmitter ground
2	TXFault	Output/LVTTL	Laser failure indication. High level indicates "laser failure". Externally pulled up
3	TXDisable	Input/LVTTL	Transmitter disable, High signal/open disables TX laser output. Low level enables TX output, internally pulled up.
4	MOD-DEF(2)	Input/output	Module definition 2, SDA, Data line for I2C bus. Externally pulled up
5	MOD-DEF(1)	Input	Module definition 1, SCL, Clock for I2C bus. Externally pulled up
6	MOD-DEF(0)	Output	Module definition 0, Module present. Ground inside module.
7	Rate Select	-	No connection.
8	LOS	Output/LVTTL	Receiver loss of signal indication. Low signal indicates optical signal is present at RX input. Should be Externally pulled up.
9	VeeR	Input	Receiver ground
10	VeeR	Input	Receiver ground
11	VeeR	Input	Receiver ground
12	RD -	Output/LVPECL	Inverted receiver data output (AC coupled)
13	RD +	Output/LVTTL	Non-inverted receiver data output (AC coupled)
14	VeeR	Input	Receiver ground
15	VccR	Input	Receiver power supply
16	VccT	Input	Transmitter power supply
17	VeeT	Input	Transmitter ground
18	TD +	Input/LVPECL	non-inverted transmitter data input (AC coupled)
19	TD -	Input/LVPECL	Inverted transmitter data input (AC coupled)
20	VeeT	Input	Transmitter ground

Recommended Circuit



**Content in 2-Wire Address A0H**

Address	HEX	Name of Field	Description
00	03	Identifier	SFP
01	04	Extended Identifier	SFP
02	07	Connector type	LC
03	00	Infiniband Compliance Codes	Not compliant
04	00	SONET Compliance Codes	Not compliant
05	04	SONET Compliance Codes	OC-3, SM long reach
06	00	Ethernet Compliance Codes	Not compliant
07	00	Fiber Channel link length	Not compliant
08	00	Fiber Channel transmitter technology	Not compliant
09	00	Fiber Channel transmission media	Not compliant
10	00	Fiber Channel speed	Not compliant
11	03	Encoding codes:	NRZ
12	02	Nominal Bit Rate (units of 100Mbps)	200Mbps
13	00	Rate identifier	Unspecified
14	3C	Link length supported for 9um fiber	60km (units of km)
15	FF	Link length supported for 9um fiber	60km (units of 100m)
16	00	Link length supported for 50um,OM2	N/A (units of 10m)
17	00	Link length supported for 62.5um,OM1	N/A (units of 10m)
18	00	Link length supported for copper	N/A (units of 1m)
19	00	Link length supported for 50um,OM3	N/A (units of 10m)
20 ~ 35	46,4F,52,4D,45,52,49,43, 41,4F,45,20,20,20,20,20	Vendor Name	FORMERICA OE
36	00	Unallocated	
37 ~ 39	00,00,00	Vendor OUI	Unspecified
40 ~ 55	54,53,50,2D,53,31(32),41,41, 31,2D,4D,41,56,20,20,20	Part Number	TSP-S1(2)AA1-MAV
56 ~ 59	00,00,00,00	Vendor Revision number	Unspecified
60 ~ 61	05,1E	Laser Wavelength	1310nm
62	00	Unallocated	
63		CC_BASE:	Check sum of byte 0 ~ 62
64	00	Options	
65	12	Options	TX-DIS, RX-LOS
66	00	Bit Rate, max.	Unspecified
67	00	Bit Rate, min.	Unspecified
68 ~ 83	Serial Number	Serial Number	
84 ~ 89	yy/mm/dd	Date Code	
90 ~ 91	20,20	Vendor specific lot code	Unspecified
92	00	Diagnostic Monitoring Type	W/O DDMI
93	00	Enhanced Options (soft)	Unallocated
94	00	SFF-8472 Compliance	Not Included
95		CC_EXT	Check sum of byte 64 ~ 94
96~127		Vendor specific	

### Mechanical Outlines

(Unit : mm)

