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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

### Small Form Factor

Duplex LC Receptacle – SFF

### Optical Transceivers

100BASE  
155Mbit/s



## Ordering Information

**S F F – 8 5 1 3 – M 1 1 1 3 – 2 2 E - N**

**ForOE Model Name : TSP-F2AH1-D21**

Model Name	Voltage	Device type	Interface	SD/LOS	Temperature	Distance
SFF-8513-M1113-22E-N	3.3V	VCSEL / PIN	DC / DC Coupling	LVPECL	-40°C~+85°C	2km

## Features

- Small Form Factor MSA compliant
- 155 Mbps SONET OC-3/STM-1 compliant
- 850 nm VCSEL, InGaAs PIN 830 to 1600 nm
- LC duplex connector
- For multimode fiber application
- Meets Telcordia GR-468-CORE
- PECL signal detect
- Low power consumption
- Reach rated 2km
- Extended operating temp range (-40 to 85°C)
- No grounding clip
- Duplex dust cover included
- Class 1 Laser Product

## Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Storage Temperature	T <sub>s</sub>	-50		90	°C
Power Supply Voltage	V <sub>CC</sub>	-0.5		3.5	V
Soldering Temperature (10 seconds on leads only)				250	°C

## Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V <sub>CC</sub>	3.15	3.3	3.45	V
Operating Case temperature <sub>(Note 1)</sub>	T <sub>c</sub>	-40		85 <sub>(Note2)</sub>	°C
Power Supply Current	I <sub>CC</sub>		105	120	mA
Total Supply Current (TX disabled)	I <sub>CCDIS</sub>			65	mA
Data Rate			155		Mbps

### Note:

1. Without air flow around the unit.
2. The Max. case temp. is 90 deg C measured at the center of the top metal cover.

**Transmitter Specifications** (  $V_{CC}=3.15V\sim 3.45V$  ;  $T_C=-40^{\circ}C\sim 85^{\circ}C$  )

Parameter	Symbol	Min	Typ	Max	Unit
<b>Optical Characteristics</b>					
Optical Transmit Power	$P_O$	-6.5		-4	dBm
Optical Center Wavelength	$\lambda_C$	830	850	860	nm
Output Spectrum Width (RMS)	$\Delta\lambda$			1	nm
Extinction Ratio	$E_R$	9			dB
Optical Rise / Fall Time <small>(Note1)</small>	$T_r / T_f$			2	ns
Total Jitter (p-p)	$T_{JPP}$			0.5	ns
<b>Electrical Characteristics</b>					
TX Supply Current	$I_T$			45	mA
Data Input Voltage – Low	$V_{IHS}$	2.1		2.4	V
Data Input Voltage -- High	$V_{ILS}$	1.4		1.7	V
DC-Bias Disable Input Voltage -- Low	$V_{TDIS,L}$			0.8	V
DC-Bias Enable Input Voltage -- High	$V_{TDIS,H}$	2.0			V
TX Enable Time	$T_{EN}$			10	us
TX Disable Time	$T_{DIS}$			10	us

Note:

1. Test method and condition defined in ITU G.957.



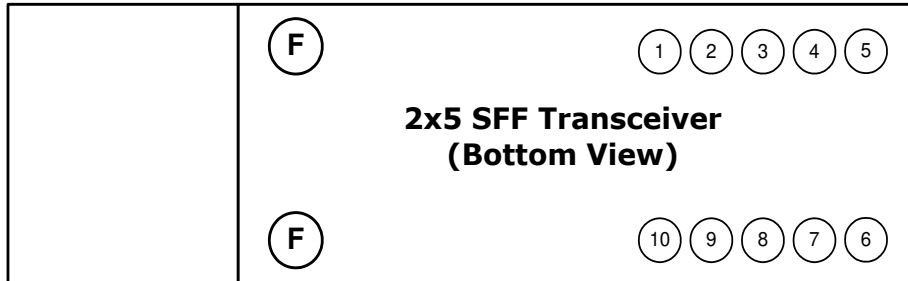
**Receiver Specifications** (  $V_{CC}=3.15V\sim 3.45V$  ;  $T_C=-40^{\circ}C\sim 85^{\circ}C$  )

Parameter	Symbol	Min	Typ	Max	Unit
<b>Optical Characteristics</b>					
Sensitivity (@ 1350 nm) <small>(Note1)</small>	$P_{IN}$			-32	dBm
Sensitivity (@ 850 nm) <small>(Note1)</small>	$P_{IN}$			-25	dBm
Maximum Input Power(Saturation) ( PRBS= $2^{23}-1$ ; BER $\leq 10^{-10}$ )	$P_{MAX}$	-5			dBm
Operating Center Wavelength	$\lambda_c$	830		1600	nm
Signal Detect-Asserted (@ 1350 nm)	$P_A$			-34	dBm
Signal Detect-Deasserted (@ 1350 nm)	$P_D$	-45			dBm
Signal Detect-Asserted (@ 850 nm)	$P_A$			-26	dBm
Signal Detect-Deasserted (@ 850 nm)	$P_D$	-36			dBm
Signal Detect - Hysteresis	$P_{HYS}$	1		4	dB
<b>Electrical Characteristics</b>					
RX supply current <small>(Note2)</small>	$I_R$			65	mA
Data Output Voltage – Low	$V_{OH}$	2.1		2.4	V
Data Output Voltage – High	$V_{OL}$	1.5		1.8	V
Signal Detect Timing Asserted	$P_A$			100	us
Signal Detect Timing Deasserted	$P_D$			100	us

Note:

1. Test method and condition defined in ITU G.957.
2. Does not include current drawn by elements connected to the SD pin.

**Pin Definition and Descriptions**



PIN	Symbol	Description
1	VEER	Receiver Ground (Common with Transmitter Ground)
2	VCCR	Receiver Power Supply
3	SD	Signal Detect (Logic 1 indicates normal operation)
4	RD-	Receiver Inverted Data Output
5	RD+	Receiver Data Output
6	VCCT	Transmitter Power Supply
7	VEET	Transmitter Ground
8	DIS	Transmitter Disable
9	TD+	Transmitter Data Input
10	TD-	Transmitter Inverted Data Input

**Mechanical Outlines**

( Unit : mm )

