



**Features:**

- Support CPRI wireless and 25GBASE-LR application
- Support multi-rate for both 10Gps and 25Gbps
- Up to 2km transmission on SMF
- 1310nm DFB laser and PIN receiver
- SFI high speed electrical interface
- 2-wire interface with integrated Digital Diagnostic monitoring
- SFP+ MSA package with duplex LC connector
- Single +3.3V power supply
- Power consumption lower than 1W
- Operating case temperature: -40~+85°C

**Regulatory Compliance**

**Table 1 – Regulatory Compliance**

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000V for other pins.)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B)	Compatible with standards
Immunity	IEC 61000-4-3	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class I laser product.
RoHS	2011/65/EU	Compliant with standards

**Absolute Maximum Ratings**

**Table 2 – Absolute Maximum Ratings**

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TS	-40	-	+85	°C	
Operating Relative Humidity	RH	5	-	+85	%	

## Recommended Operating Conditions

**Table 3 – Recommended Operating Conditions**

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T <sub>OPR</sub>	-40	-	85	°C	
Power Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V	
Power Supply Current	I <sub>CC</sub>	-	-	300	mA	1
Power Dissipation	P	-	-	1	W	
Bit Rate	BR1	9.8304	10.3125	-	Gbps	2
	BR2	24.33	25.78125	-	Gbps	3
Transmission Distance	TD	-	-	2	km	

Note:

1. Max. current at 3.3V;
2. With CDR bypass mode;
3. With CDR enable, default.

## Optical and Electrical Characteristics

**Table 4 – Transmitter Optical Specifications**

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength Range	$\lambda_c$	1260		1360	nm	
Average Output Power	P <sub>OUT</sub>	-7	-	2	dBm	1
Optical power OMA	OMA	-4	-	2.2	dBm	
Average Output Power (Laser Off)	P <sub>OUT-OFF</sub>	-	-	-30	dBm	1
Extinction Ratio	ER	3	-	-	dB	2
Transmitter and Dispersion Penalty	TDP	-	-	2.7	dB	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} Hit ratio 5 x 10 <sup>-5</sup> hits per sample.	-	0.35, 0.44, 0.47, 0.35, 0.35, 0.56				2
RIN <sub>20OMA</sub>	-	-	-	-130	dB/Hz	
Optical return loss tolerance	-	-	-	20	dB	
Transmitter reflectance	-	-	-	-26	dB	

Note:

1. The optical power is launched into SMF.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78125Gbps.

**Table 5 – Receiver Optical Specifications**

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength Range	$\lambda_c$	1260	-	1360	nm	
Receiver sensitivity (OMA)	-	-	-	-9	dBm	Note
Receiver Overload	$P_{IN-OL}$	2	-	-	dBm	Note
Damage threshold	-	3	-	-	dBm	Note
LOS Assert	$LOS_A$	-30	-		dBm	
LOS De-assert	$LOS_D$	-	-	-14	dBm	
LOS Hysteresis	$LOS_H$	0.5	-	-	dB	
Receiver reflectance	-	-	-	-26	dB	

Note: Measured with a PRBS  $2^{31}-1$  test pattern @25.78125Gbps,  $BER \leq 5 \times 10^{-5}$ .

**Table 6 – Electrical Specifications**

Transmitter (Module Input)							
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes	
Differential Data Input Amplitude	$V_{IN,P-P}$	180	-	900	mVpp		
Input Differential Impedance	$Z_{IN}$	90	100	110	$\Omega$		
Tx_Fault	Normal Operation	$V_{OL}$	-0.3	-	0.4	V	
	Transmitter Fault	$V_{OH}$	2.4	-	$V_{CC}$	V	
Tx_Disable	Normal Operation	$V_{IL}$	-0.3	-	0.8	V	
	Laser Disable	$V_{IH}$	2.0	-	$V_{CC}+0.3$	V	
Receiver (Module Output)							
Differential Data Output Amplitude	$V_{OUT,P-P}$	300	-	1000	mVpp		
Output Differential Impedance	$Z_O$	90	100	110	$\Omega$		
Rx_LOS	Normal Operation	$V_{OL}$	-0.3	-	0.4	V	
	Lose Signal	$V_{OH}$	2.4	-	$V_{CC}$	V	

**Recommended Host Board Power Supply Circuit**

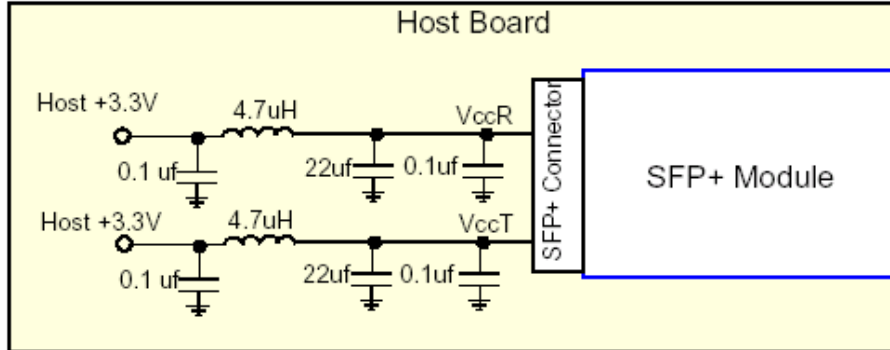


Figure 1, Recommended Host Board Power Supply Circuit

**Recommended Interface Circuit**

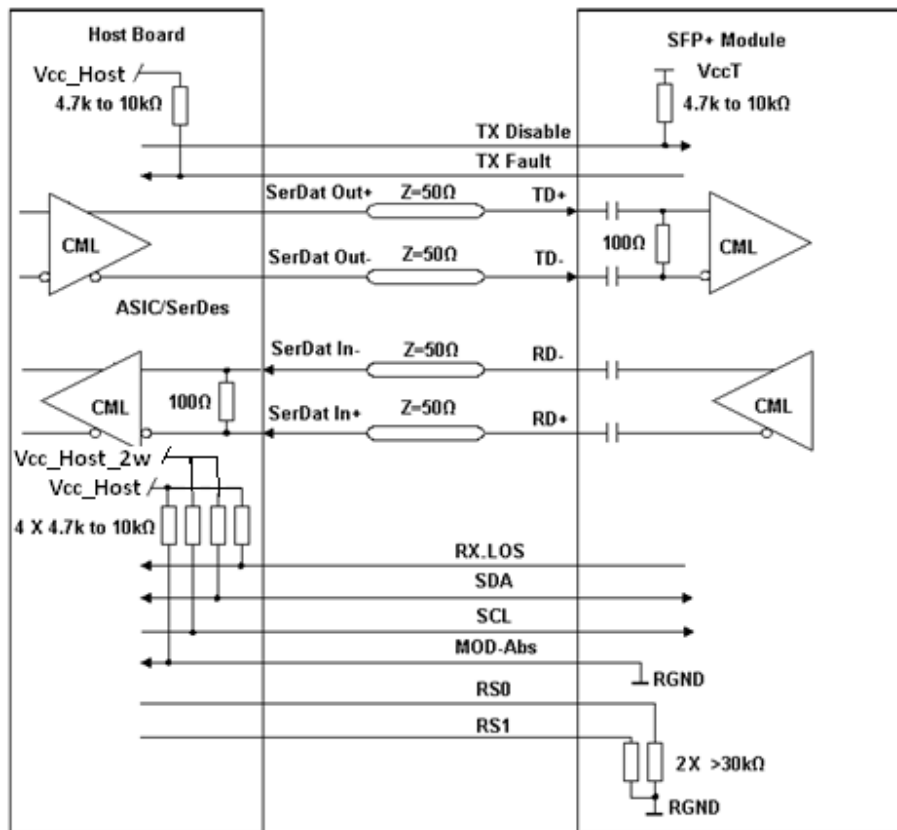


Figure 2, Recommended Interface Circuit

**Pin Definitions**

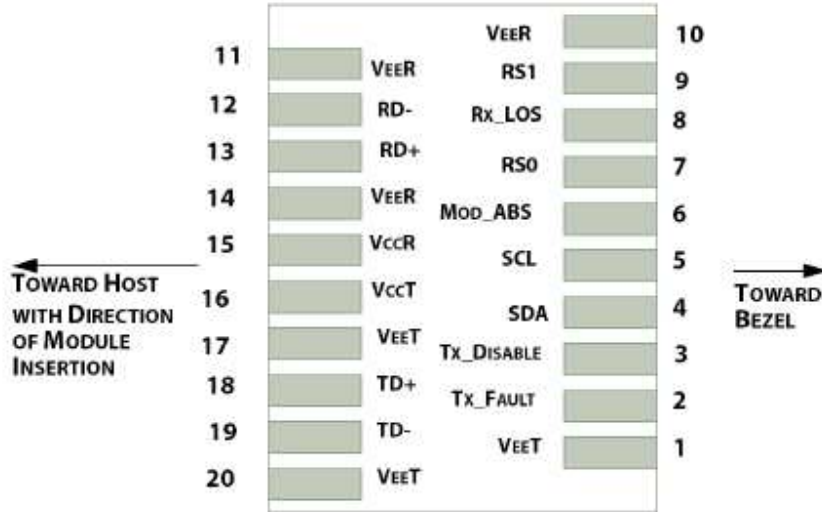


Figure 3, Pin View

**Table 7 – Pin Definitions**

Cont acts	Logic	Symbol	Description	Notes
case		case	Module case	2
1		VEE T	Module Transmitter Ground	3
2	LVTTTL-O	TX_FAULT	Module Transmitter Fault	4
3	LVTTTL-I	TX_DISABLE	Transmitter Disable; Turns off transmitter laser output	5
4	LVTTTL-I/O	SDA	2-wire Serial Interface Data Line(Same as MOD-DEF2 in INF-8074i)	6
5	LVTTTL-I/O	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 in INF-8074i)	6
6		MOD_ABS	Module Absent, connected to VEE T or VEE R in the module	7
7	LVTTTL-I	RS0	Rate Select 0, optionally controls SFP+ module receiver.	8
8	LVTTTL-O	RX_LOS	Receiver Loss of Signal Indication(In FC designated as Rx_LOS and in Ethernet designated as Signal Detect)	4
9	LVTTTL-I	RS1	Rate Select 1, optionally controls SFP+ module transmitter	8
10		VEE R	Module Receiver Ground	3
11		VEE R	Module Receiver Ground	3

12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	
14		V <sub>EE</sub> R	Module Receiver Ground	3
15		V <sub>CC</sub> R	Module Receiver 3.3 V Supply	
16		V <sub>CC</sub> T	Module Transmitter 3.3 V Supply	
17		V <sub>EE</sub> T	Module Transmitter Ground	3
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		V <sub>EE</sub> T	Module Transmitter Ground	3

Notes:

1. Labeling as inputs (I) and outputs (O) are from the perspective of the module.
2. The case makes electrical contact to the cage before any of the board edge contacts are made.
3. The module signal ground contacts, V<sub>ee</sub>R and V<sub>ee</sub>T, should be isolated from the module case.
4. This contact is an open collector/drain output contact and shall be pulled up on the host. Pull ups can be connected to one of several power supplies, however the host board design shall ensure that no module contact has voltage exceeding module V<sub>cc</sub>T/R + 0.5 V.
5. Tx\_Disable is an input contact with a 4.7 kOhms to 10 kOhms pullup to V<sub>cc</sub>T inside the module.
6. 2-wire interface.
7. The pins shall be pulled up with 4.7K-10Kohms to a voltage between 3.14V and 3.46V on host board.
8. The pins are pulled low to V<sub>ee</sub>T with a >30kΩ resistor in the module.

**Mechanics Drawing**

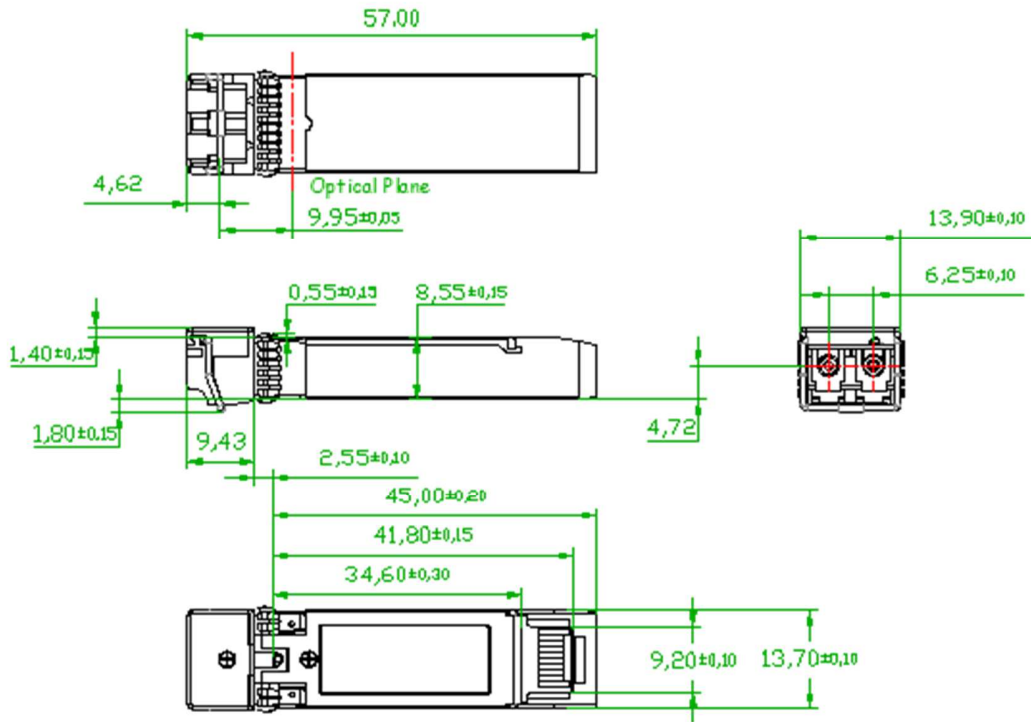


Figure 4 Mechanics drawing

**Order Information**

Table 8 – Order Information

Part No.	Application	Data Rate	Laser Source	Fiber Type
SP-25E-LR-IDFP	CPRI /25GBASE-LR application	9.8304G、 10.1376G、 10.3125G、 24.33024G、 25.78125G	DFB	SMF

## Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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