

#### FEATURES

- Dual GbE in one C-SFP form factor
- Two single fiber bi-directional data links symmetric 1.25Gbps application
- 1310nm FP transmitter, 1490nm PIN-TIA receiver
- 0 to 70°C operating case temperature
- SFP+ package with duplex LC/PC SMF receptacle connector
- Up to 10km distance
- Hot-pluggable capability
- Single 3.3V power supply
- Built-in Digital Diagnostic monitoring (DDM) function
- Low EMI and excellent ESD protection
- Class I laser safety standard IEC-60825 compliant
- RoHS-6 compliance



#### APPLICATIONS

- CPRI 1.2288Gbps
- Gigabit Ethernet 1.25Gbps
- Switch to switch interface
- Switched backplane applications
- High Speed Interface for server farms

#### STANDARDS

- Complies with SFP+ MSA (SFF-8431)
- Complies with SFF-8472 Rev 10.4
- Complies with FCC 47 CFR Part 15, Class B
- Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

### ABSOLUTE MAXIMUM RATING

Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Ambient Temperature	T <sub>STG</sub>	-40	85	°C	
Operating Case Temperature	T <sub>C</sub>	0	70	°C	
Operating Humidity	OH	5	95	%	
Power Supply Voltage	V <sub>CC</sub>	0	4	V	
Receiver Damaged Threshold		+4		dBm	

### RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	T <sub>C</sub>	0		70	°C	
Power Supply Voltage	V <sub>CC</sub>	3.13	3.3	3.47	V	
Power Supply Current	I <sub>CC</sub>		200	300	mA	
Date Rate		1.2288		1.25	Gbps	
Data Rate Drift		-100		+100	PPM	

### TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Centre Wavelength	$\lambda_c$	1260	1310	1360	nm	
Spectral Width (RMS)				3	nm	
Average Output Power	P <sub>o</sub>	-9		-3	dBm	
Burst off Average Output Power				-45	dBm	
Extinction Ratio	ER	6			dB	
Optical Return Loss Tolerance				12	dB	
RIN <sub>15</sub> OMA				-115	dB/Hz	
Output Optical Eye		IEEE Std 802.3ah™-2004				PRBS 2 <sup>7</sup> -1 @1.25Gbps

**TRANSMITTER ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Input Differential Swing		200		1200	mV	CML input, AC coupled
Input Differential Impedance		90	100	110	$\Omega$	
TX Disable	Disable	2		VCC	V	
	Enable	0		0.8	V	
TX Fault	Normal	2.4		VCC	V	
	Fault	0		0.4	V	

**RECEIVER OPTICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength	$\lambda_c$	1480	1490	1500	nm	
Sensitivity (OMA)	SEN			-22	dBm	PRBS 2 <sup>7</sup> -1 BER $\leq$ 10E-12, ER=9dB
Saturation Optical Power	SAT	-3			dBm	
Loss of Signal De-Assert Level	LOSD			-22	dBm	
Loss of Signal Assert Level	LOSA	-45			dBm	
Loss of Signal Hysteresis		0.5			dBm	

**RECEIVER ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Output Differential Swing		200		1200	mV	CML output, AC coupled
Loss of Signal - Low		0		0.4	V	
Loss of Signal - High		2.4		V <sub>CC</sub>	V	

PIN DESCRIPTION			
PIN	Name	Description	Notes
1	V <sub>EE</sub>	Transceiver Ground	
2	TX_Fault	Transmitter Fault Indication	
3	TX_Disable1	Transmitter Disable of channel1	Low: transmitter on; High: transmitter off
4	SDA	SDA	The data line of two wire serial interface
5	SCL	SCL	The clock line of two wire serial interface
6	TD-2	Inv. Transmit Data In of channel2	AC-coupled, CML
7	TD+2	Transmit Data In of channel2	AC-coupled, CML
8	LOS1	Loss of signal for channel1	
9	RD+2	Received Data Out of channel2	AC-coupled, CML
10	RD-2	Inv. Received Data Out of channel2	AC-coupled, CML
11	V <sub>EE</sub>	Transceiver Ground	
12	RD-1	Inv. Received Data Out of channel1	AC-coupled, CML
13	RD+1	Received Data Out of channel1	AC-coupled, CML
14	LOS2	Loss of signal for channel2	
15	V <sub>CC</sub> R	Receiver Power	
16	V <sub>CC</sub> T	Transmitter Power	
17	TX_Disable2	Transmitter Disable of channe2	Low: transmitter on; High: transmitter off
18	TD+1	Transmit Data In of channel1	AC-coupled, CML
19	TD-1	Inv. Transmit Data In of channel1	AC-coupled, CML
20	V <sub>EE</sub>	Transceiver Ground	

### PIN OUT DRAWING (TOP VIEW)

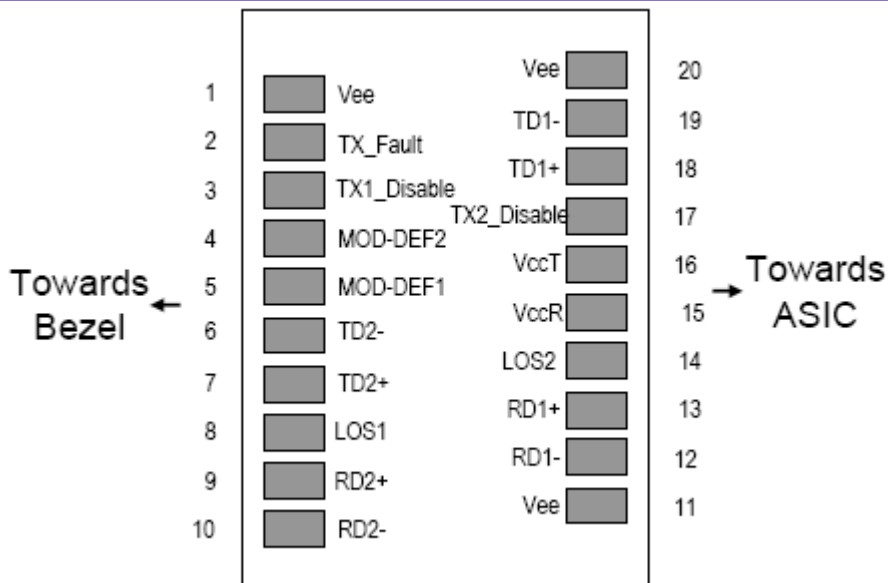


Figure 1 Pin Out Drawing

TYPICAL INTERFACE CIRCUIT

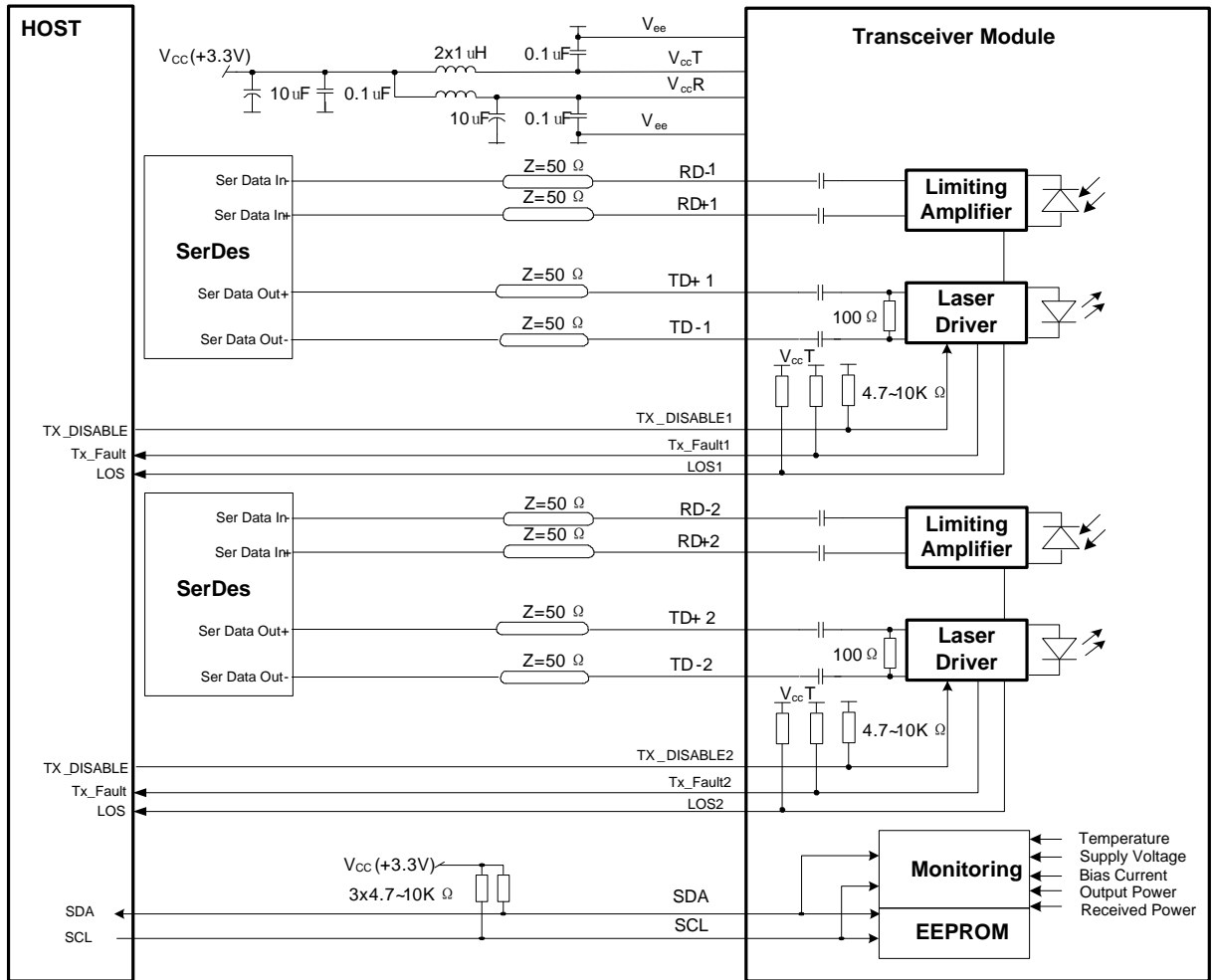


Figure 2 Typical Interface Circuit

SFP RECOMMENDED HOST BOARD POWER SUPPLY FILTERING NETWORK

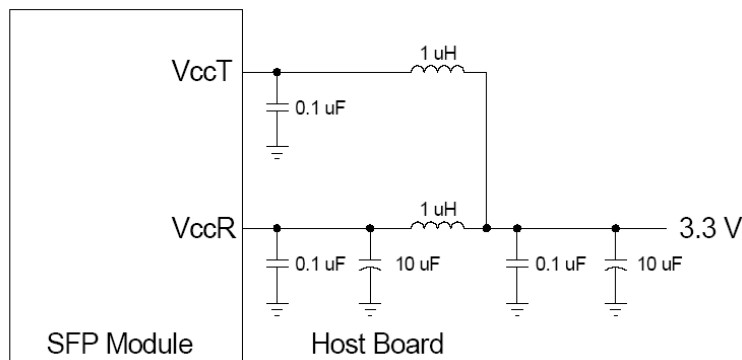
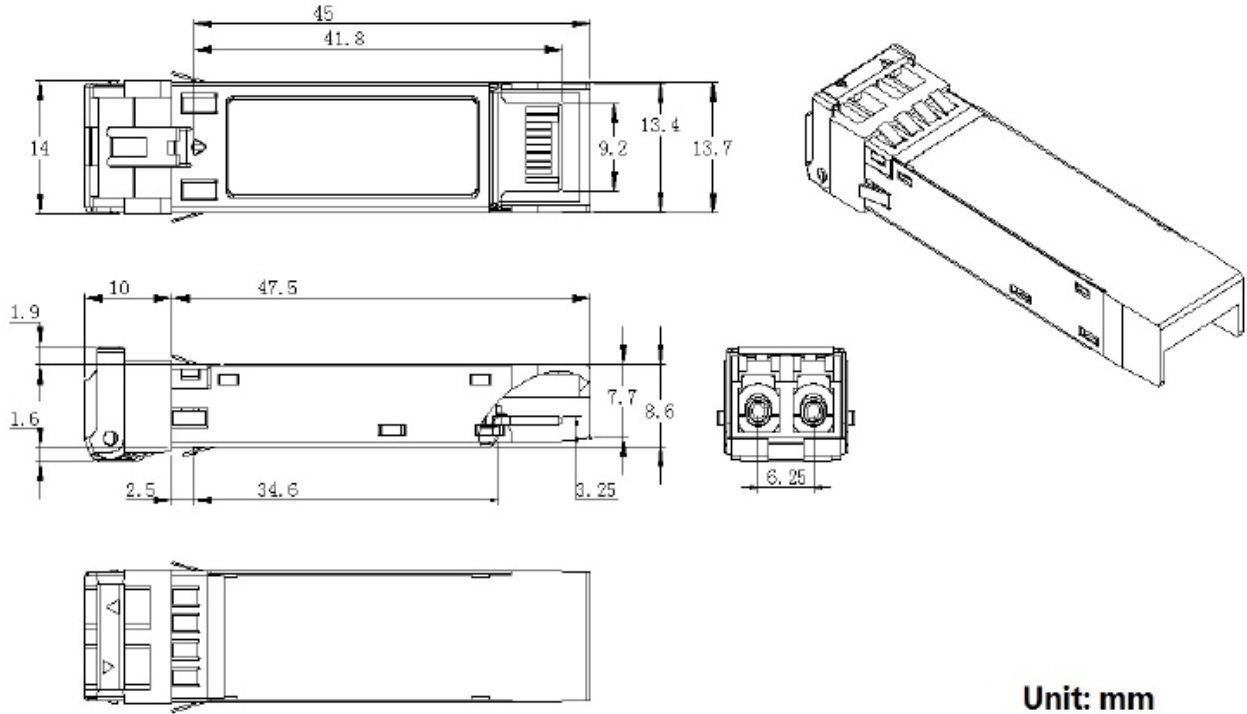


Figure 3 SFP Recommended Host Board Power Supply Filtering Network

PACKAGE OUTLINE



Unit: mm

Figure 4 Package Outline

EEPROM INFORMATION

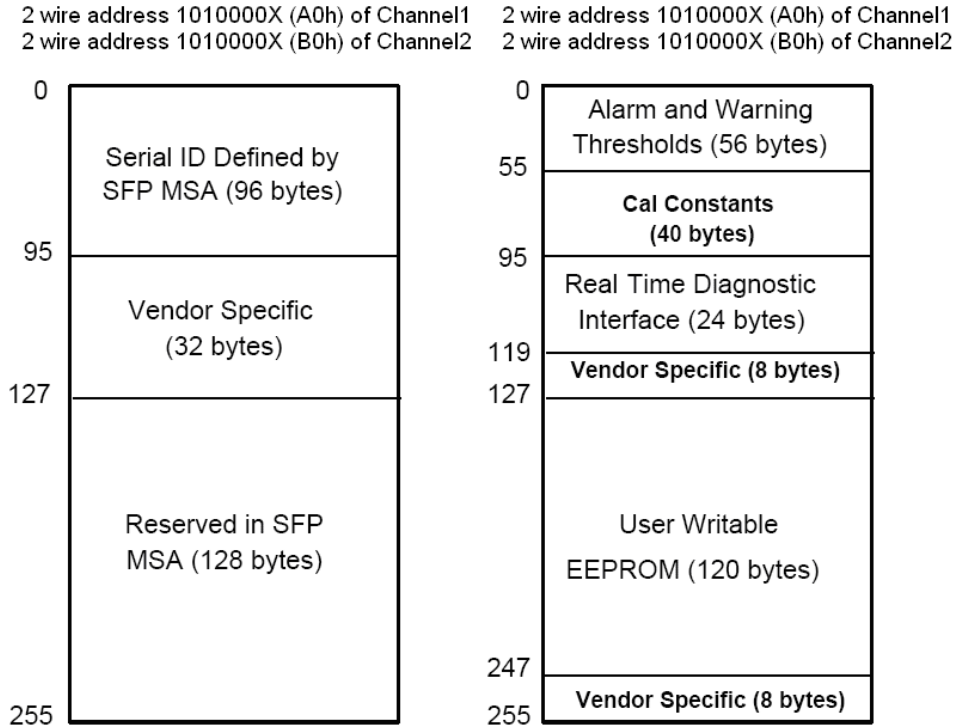


Figure 5 EEPROM Memory Map Specific Data Field Descriptions

DIGITAL DIAGNOSTIC MONITORING INTERFACE

Parameter	Range	Accuracy	Calibration	NOTES
Temperature	0 to 70°C	±3°C	Internal	LSB: 1/256C
Voltage	2.97 to 3.63V	±3%	Internal	LSB: 0.1mV
Bias Current	0 to 100mA	±10%	Internal	LSB: 2uA
TX Power	-8 to -2dBm	±3dB	Internal	LSB: 0.1uW
RX Power	-21 to -2dBm	±3dB	Internal	LSB: 0.1uW

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.