



FEATURES

- Supports 9.95Gb/s to 11.3Gb/s rates
- 0 to 70°C operating case temperature
- SFP+ package with duplex LC Receptacle connector
- Hot-pluggable capability
- Single 3.3V power supply
- Low Power dissipation
- 1550nm EML transmitter and High performance PIN receiver
- Up to 40km transmission distance over SMF
- Built-in CDR in both transmitter and receiver
- SFI electrical interface
- Low EMI and excellent ESD protection
- Built- in Digital Diagnostic monitoring (DDM) function
- Class1 laser safety standard IEC-60825 compliant
- RoHS-6 compliance

APPLICATIONS

- 10GBASE-ER/EW
- 10Gb/s Fiber Channel

STANDARDS

- Complies with SFP+ MSA (SFF-8431)
- Complies with SFF-8472
- Compliant with IEEE 802.3ae

ABSOLUTE MAXIMUM RATING

Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Ambient Temperature	T_{STG}	-40	85	°C	
Operating Case Temperature	T_c	0	70	°C	
Operating Humidity	OH	5	95	%	
Power Supply Voltage	V_{CC}	-0.5	3.6	V	

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	T_c	0		70	°C	
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Supply Current	I_{CC}			500	mA	Case 70°C
Data Rate		9.95		11.3	Gbps	
Data Rate Drift		-100		+100	PPM	

TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Centre Wavelength	λ_c	1530	1550	1565	nm	
Spectral Width (-20dB)	$\Delta\lambda$			0.5	nm	
Average Output Power	P_{OUT}	-4.7		4	dBm	Launched into SMF Fiber
Average Power of OFF Transmitter	$P_{OUT-OFF}$			-30	dBm	
Extinction Ratio	ER	3			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter and Dispersion Penalty	TDP			3	dB	PRBS ³¹ -1@10.7Gbps

TRANSMITTER ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Input Differential Swing		180		700	mV	
Input Differential Impedance		85	100	115	Ω	
TX Disable	Disable	2		VCC+0.3	V	
	Enable	-0.3		0.8	V	
TX Fault	Fault	2.4		VCC _{HOST}	V	
	Normal	-0.3		0.4	V	

RECEIVER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength	λ_c	1260		1600	nm	
Sensitivity	SEN			-15.8	dBm	PRBS2 ³¹ -1@10.3125Gbps BER $\leq 1 \times 10^{-12}$
Saturation Optical Power	SAT	0			dBm	
LOS De-Assert	LOS _D			-18	dBm	
LOS Assert	LOS _A	-30			dBm	
LOS Hysteresis	HYS	0.5		5	dB	

RECEIVER ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Differential data output swing	V _{out}	350		850	mV	
Rx_LOS Output Voltage - High	High	2.4		VCC _{HOST}	V	
Rx_LOS Output Voltage - Low	Low	-0.3		0.4	V	
Output Rise Time, 20%~80%	TR			70	ps	PRBS2 ³¹ -1@10.3125Gbps
Output Fall Time, 20%~80%	TF			70	ps	PRBS2 ³¹ -1@10.3125Gbps

PIN DESCRIPTION			
PIN	Name	Description	Notes
1	V _{EE} T	Transmitter Ground	
2	TX_Fault	Transmitter Fault Indication	Low: normal; High: abnormal
3	TX_Disable	Transmitter Disable	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	MOD_ABS	Module Absent	Connected to V _{EE} T or V _{EE} R in the module
7	RS0	Not Connected	
8	RX_LOS	Loss of Signal	Low: signal detected; High: loss of signal
9	RS1	Not Connected	
10	V _{EE} R	Receiver Ground	
11	V _{EE} R	Receiver Ground	
12	RD-	Inv. Received Data Out	AC-coupled, CML
13	RD+	Received Data Out	AC-coupled, CML
14	V _{EE} R	Receiver Ground	
15	V _{CC} R	Receiver Power	
16	V _{CC} T	Transmitter Power	
17	V _{EE} T	Transmitter Ground	
18	TD+	Transmit Data In	AC-coupled, CML
19	TD-	Inv. Transmit Data In	AC-coupled, CML
20	V _{EE} T	Transmitter Ground	

PIN OUT DRAWING (TOP VIEW)

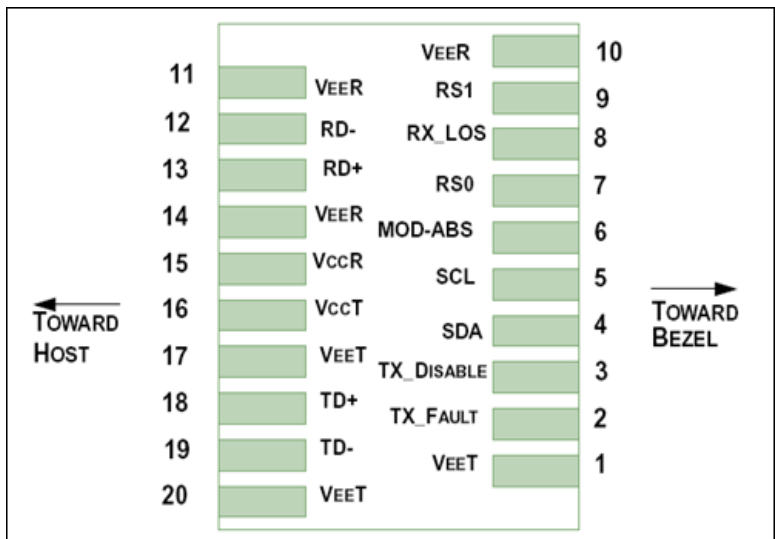


Figure 1 Pin Out Drawing (Top view)

TYPICAL INTERFACE CIRCUIT

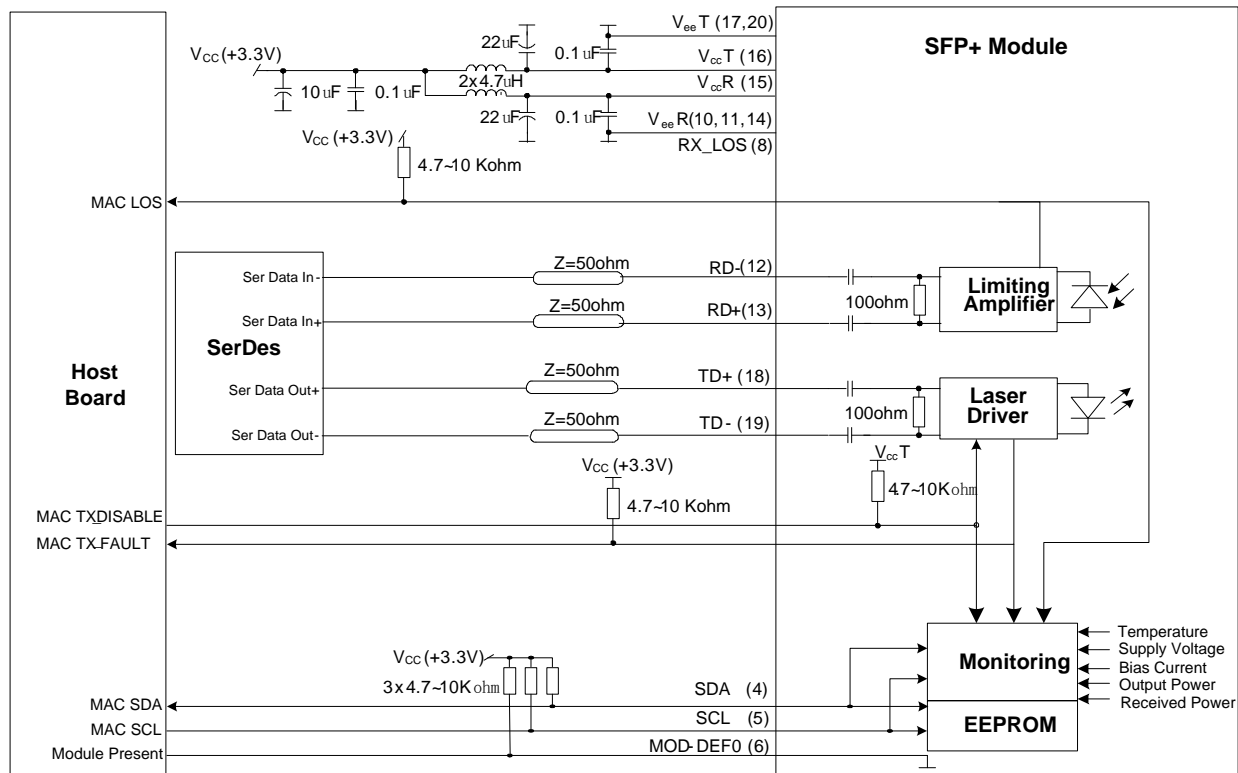


Figure 2 Typical Interface Circuit

PACKAGE OUTLINE

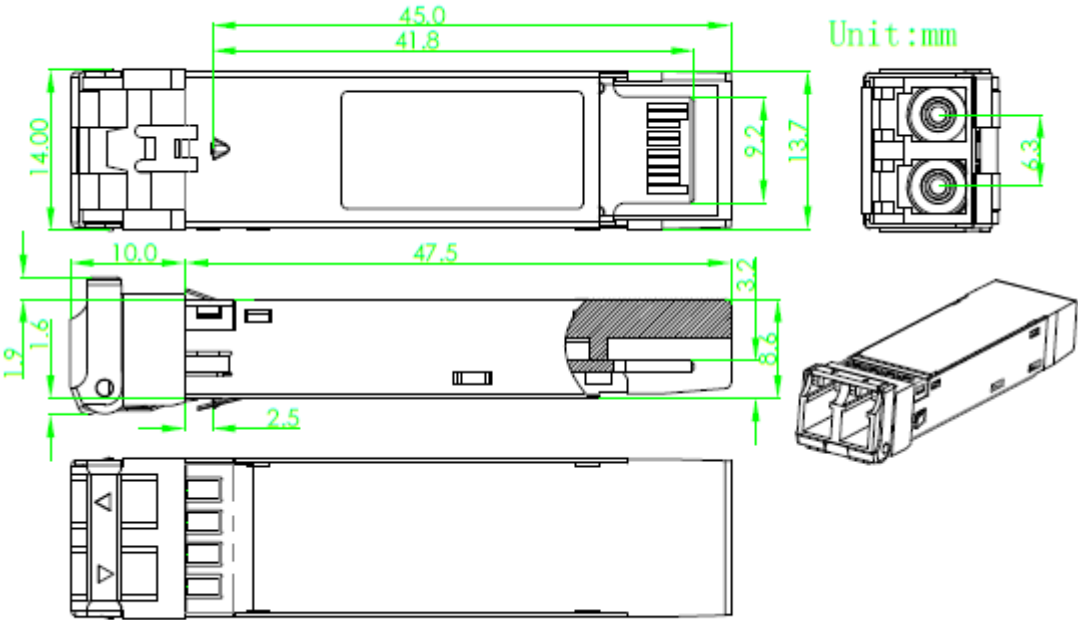
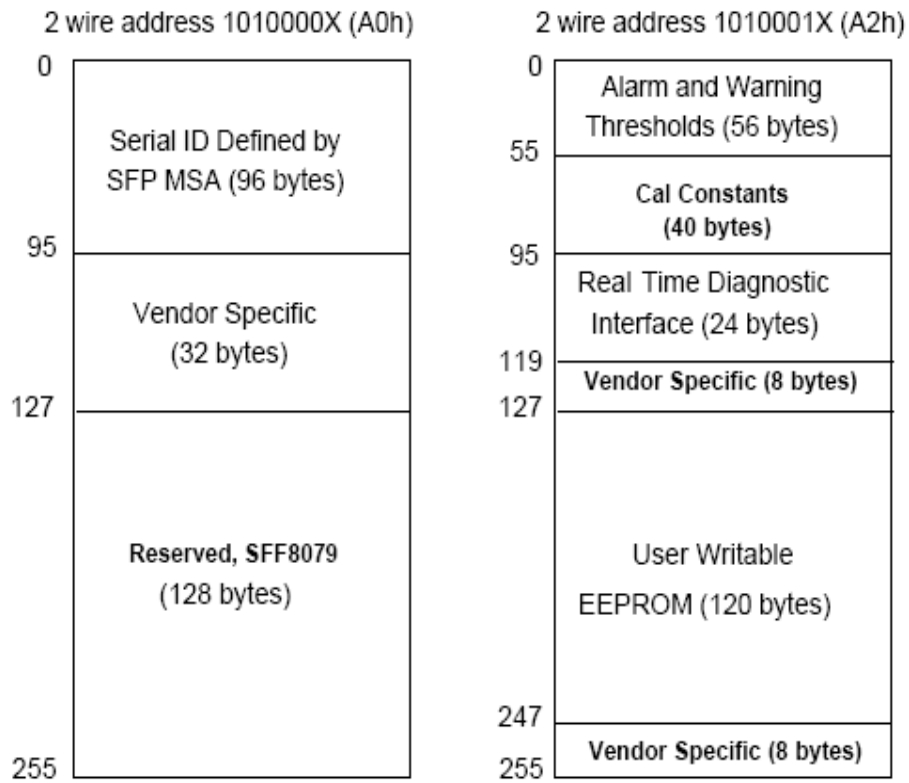


Figure 3 Package Outline

EEPROM INFORMATION

Figure 4 EEPROM Memory Map Specific Data Field Descriptions
DIGITAL DIAGNOSTIC MONITORING INTERFACE

Parameter	Range	Accuracy	Calibration	NOTES
Temperature	-5 to 75°C	±5°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	-5.7 to +5dBm	±2dB	Internal	LSB: 0.1uW
RX Power	-17 to +1dBm	±3dB	Internal	LSB: 0.1uW

ORDERING INFORMATION

PN	Temperature Rating	Unit
SO045577-PLGA	0 – 70	°C

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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