



### FEATURES

- Supports 9.95Gb/s to 11.3Gb/s bit rates
- 0 to 70°C operating case temperature
- SFP+ package with duplex LC receptacle connector
- Hot-pluggable capability
- Single 3.3V power supply
- CWDM DFB transmitter and high performance PIN-TIA receiver
- Up to 13dB Power Budget
- Low power dissipation
- SFI electrical interface
- Low EMI and excellent ESD protection
- Built-in Digital Diagnostic Monitoring (DDM) function
- Class I laser safety standard IEC-60825 compliant
- RoHS-6 compliance

### APPLICATIONS

- 10GBASE-LR/LW
- CWDM Network
- 10Gb/s Fiber Channel

### STANDARDS

- Complies with SFP+ MSA (SFF-8431)
- Complies with SFF-8472
- Compliant with IEEE 802.3ae
- 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	$T_{STG}$	-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 Consumption	P			1	W	
Date Rate		9.95		11.3	Gbps	
Data Rate Drift		-100		+100	PPM	

**TRANSMITTER OPTICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Centre Wavelength	$\lambda_c$	$\lambda - 6.5$	$\lambda$	$\lambda + 6.5$	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	$P_{OUT}$	-2		+3	dBm	Launched into SMF Fiber
Average Power of OFF Transmitter	$P_{OUT-OFF}$			-30	dBm	
Extinction Ratio	ER	3.5			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter and Dispersion Penalty	TDP			3.2	dB	10km SMF

**TRANSMITTER ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Input Differential Swing		180		700	mV	
Input Differential Impedance		85	100	115	$\Omega$	
TX Disable	Disable	2		$V_{CC}+0.3$	V	
	Enable	-0.3		0.8	V	
TX Fault	Fault	2.4		$V_{CC_{HOST}}$	V	
	Normal	-0.3		0.4	V	

**RECEIVER OPTICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength	$\lambda_c$	1260		1620	nm	
Sensitivity	SEN			-15	dBm	PRBS2 <sup>31</sup> -1 @ 10.3125Gbps BER $\leq 1 \times 10^{-12}$
Saturation Optical Power	SAT	0.5			dBm	
LOS De-Assert	LOS <sub>D</sub>			-18	dBm	
LOS Assert	LOS <sub>A</sub>	-32			dBm	
LOS Hysteresis	HYS	0.5		5	dB	

**RECEIVER ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Differential data output swing	V <sub>out</sub>	350		850	mV	
Rx_LOS Output Voltage - High	High	2.4		V <sub>CC_HOST</sub>	V	
Rx_LOS Output Voltage - Low	Low	-0.3		0.4	V	
Output Rise Time, 20%~80%	TR	28			ps	
Output Fall Time, 20%~80%	TF	28			ps	

PIN DESCRIPTION			
PIN	Name	Description	Notes
1	V <sub>EE</sub> 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 <sub>EE</sub> T or V <sub>EE</sub> 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 <sub>EE</sub> R	Receiver Ground	
11	V <sub>EE</sub> R	Receiver Ground	
12	RD-	Inv. Received Data Out	AC-coupled, CML
13	RD+	Received Data Out	AC-coupled, CML
14	V <sub>EE</sub> R	Receiver Ground	
15	V <sub>CC</sub> R	Receiver Power	
16	V <sub>CC</sub> T	Transmitter Power	
17	V <sub>EE</sub> T	Transmitter Ground	
18	TD+	Transmit Data In	AC-coupled, CML
19	TD-	Inv. Transmit Data In	AC-coupled, CML
20	V <sub>EE</sub> T	Transmitter Ground	

## PIN OUT DRAWING (TOP VIEW)

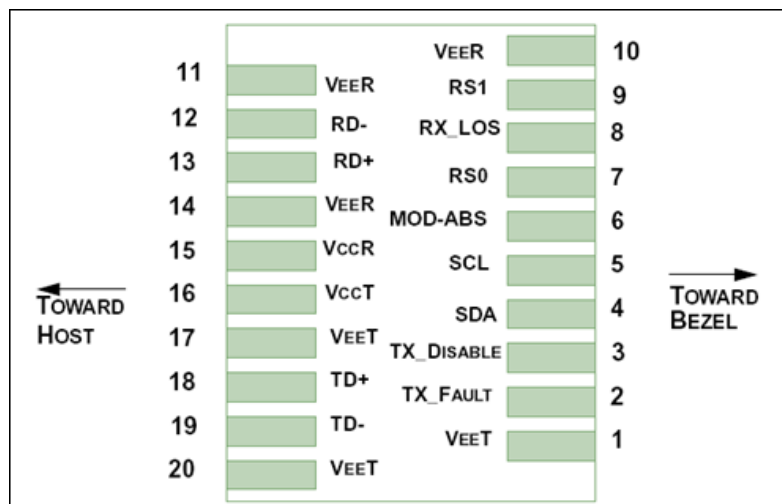


Figure 1 Pin Out Drawing (Top view)

## TYPICAL INTERFACE CIRCUIT

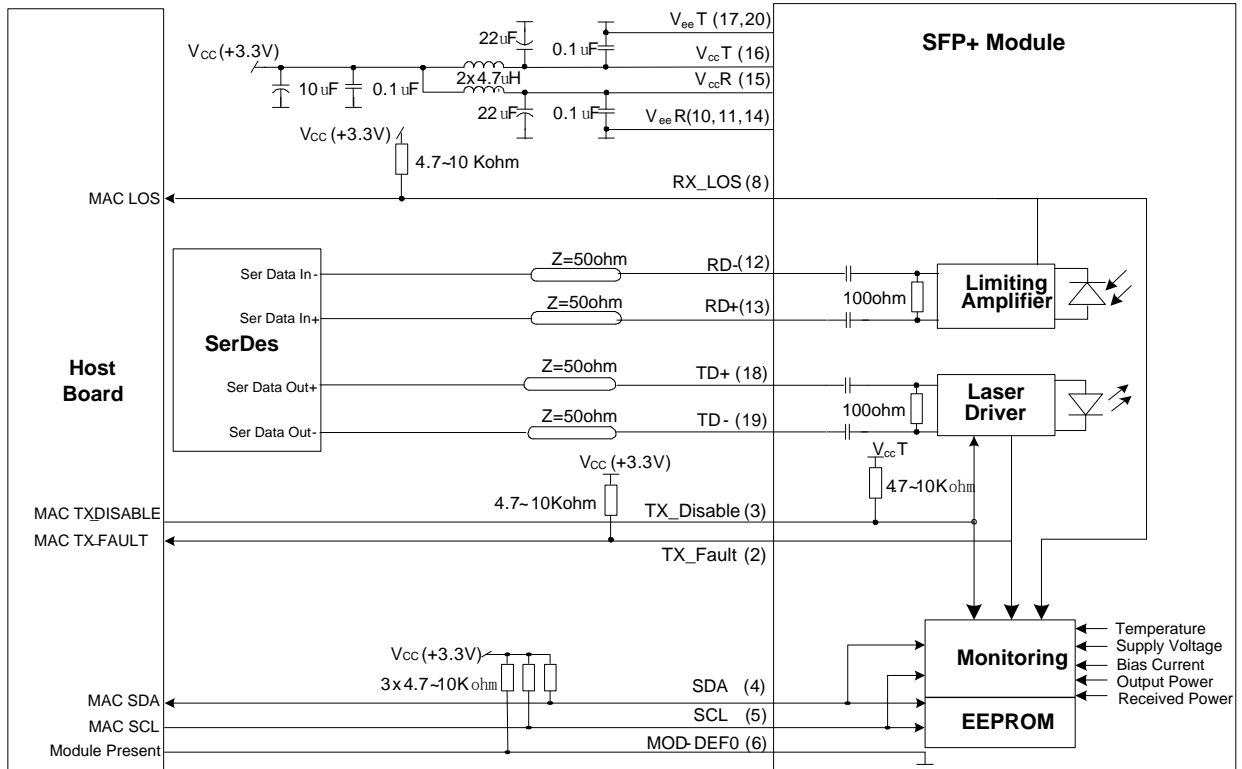


Figure 2 Typical Interface Circuit

## PACKAGE OUTLINE

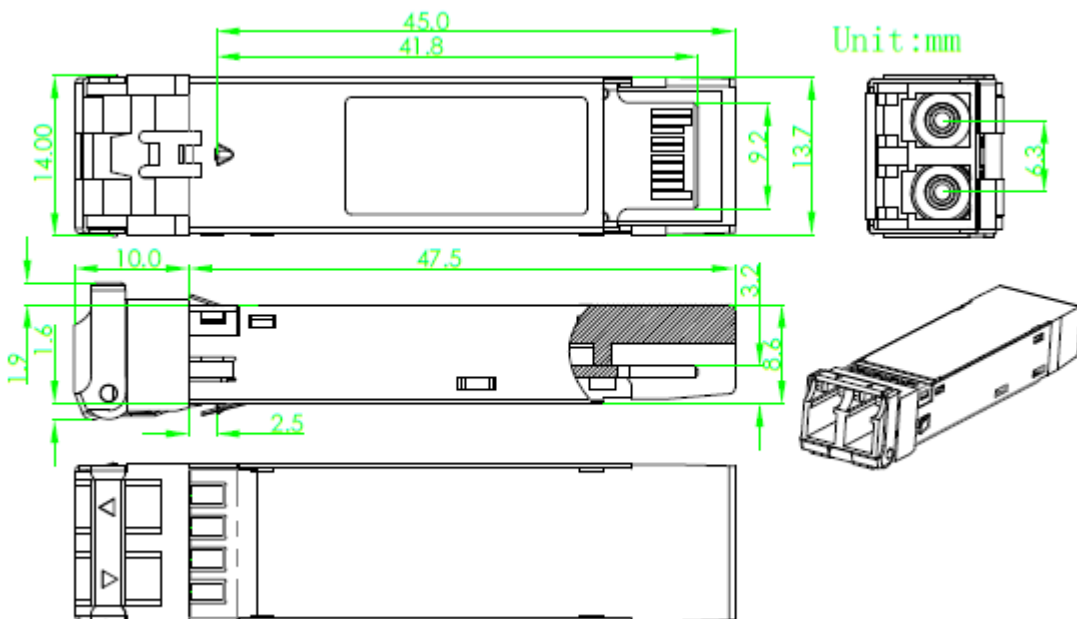


Figure 3 Package Outline

## EEPROM INFORMATION

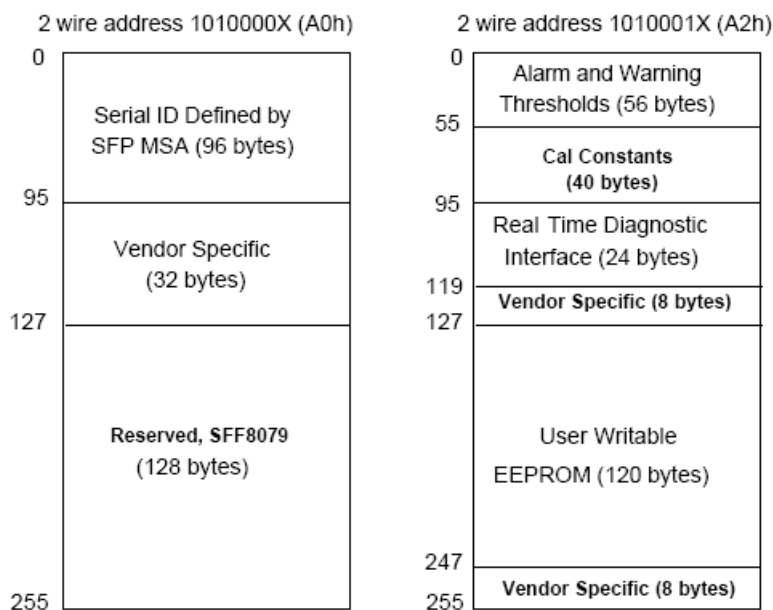


Figure 4 EEPROM Memory Map Specific Data Field Descriptions

## DIGITAL DIAGNOSTIC MONITORING INTERFACE

Parameter	Range	Accuracy	Calibration	NOTES
Temperature	-5 to 70°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	-3 to +4dBm	±3dB	Internal	LSB: 0.1uW
RX Power	-16 to +1dBm	±3dB	Internal	LSB: 0.1uW

ORDERING INFORMATION		
Wavelength Code	Product Code	Center Wavelength (nm)
27	SO01CW77-PLGA-27	1271
29	SO01CW77-PLGA-29	1291
31	SO01CW77-PLGA-31	1311
33	SO01CW77-PLGA-33	1331
35	SO01CW77-PLGA-35	1351
37	SO01CW77-PLGA-37	1371
39	SO01CW77-PLGA-39	1391
41	SO01CW77-PLGA-41	1411
43	SO01CW77-PLGA-43	1431
45	SO01CW77-PLGA-45	1451
47	SO01CW77-PLGA-47	1471
49	SO01CW77-PLGA-49	1491
51	SO01CW77-PLGA-51	1511
53	SO01CW77-PLGA-53	1531
55	SO01CW77-PLGA-55	1551
57	SO01CW77-PLGA-57	1571
59	SO01CW77-PLGA-59	1591
61	SO01CW77-PLGA-61	1611

**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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