

FEATURES

- Supports 9.95 to 10.3Gb/s bit rates
- -10 to 85°C operating case temperature
- SFP+ package with duplex LC Receptacle connector
- 100GHz ITU Grid, C Band
- Hot-pluggable capability
- Single 3.3V power supply
- Low Power dissipation
- Temperature-stabilized DWDM EML transmitter and High performance PIN receiver
- Up to 40km transmission distance over SMF
- Built-in CDR
- SFI electrical interface
- Low EMI and excellent ESD protection
- Built- in Digital Diagnostic monitoring (DDM) function
- Class I laser product
- RoHS-6 compliance

APPLICATIONS

- DWDM Network
- 10GBASE-ER/EW
- CPRI

STANDARDS

- Complies with IEEE802.3ae
- Complies with SFP+ MSA (SFF-8431)
- Complies with SFF-8472
- 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	-10	85	°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	-10		+85	°C	
Power Supply Voltage	V _{CC3}	3.13	3.3	3.47	V	
Power Supply Current	I _{CC}			550	mA	
Nominal upstream line rate		9.95		10.3	Gbps	

TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Average Launch Optical Power	P _{OUT}	-2	-	3	dBm	
Extinction Ratio	ER	3			dB	
Centre Wavelength space			100		GHz	
Centre Wavelength (BOL)	λ	X-40	X	X+40	pm	
Centre Wavelength (EOL)	λ	X-100	X	X+100	pm	
Spectral Width (-20dB)	Δλ			0.3	nm	
Side Mode Suppression Mode	SMSR	35			dB	
Tx Jitter (SONET) 20kHz-80MHz	T _{xj1}			0.3	UI	
Tx Jitter (SONET) 4MHz-80MHz	T _{xj2}			0.1	UI	
Transmitter Dispersion Penalty (@ 800 ps/nm)	TDP			3	dB	40km SMF

TRANSMITTER ELECTRICAL CHARACTERISTICS

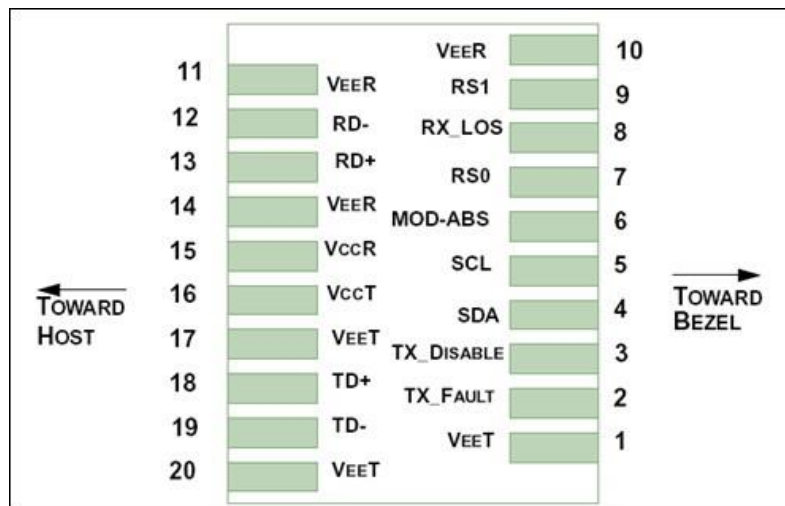
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Input Differential Impedance	Z _{IN}	90	100	110	Ω	
Data Input Swing Differential	V _{IN}	120		820	mV	
Transmit Disable Voltage	V _D	2		V _{CC} +0.3	V	
Transmit Enable Voltage	V _{EN}	-0.3		0.8	V	
Transmit Fault - Normal Voltage		-0.3		0.4	V	
Transmit Fault - Fault Voltage		2.4		V _{CC} _{HOST}	V	

RECEIVER ELECTRICAL CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Differential data output swing	V _{out}	340	650	850	mV	
RX_LOS	High	2.4		V _{CC_HOST}	V	
	Low	-0.3		0.4	V	

RECEIVER CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Optical Center Wavelength	λ_c	1270	-	1620	nm	
Receiver Sensitivity (BOL)	SEN			-15.8	dBm	PRBS2 ³¹ -1@10.3125Gbps BER $\leq 1 \times 10^{-12}$
Receiver Overload	SAT	0			dBm	
LOS De-Assert	LOS _D			-18	dBm	
LOS Assert	LOS _A	-30			dBm	
LOS Hysteresis	HYS	0.5		5	dB	

PIN DESCRIPTION			
PIN	Name	Description	Notes
1	VEET	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



TYPICAL INTERFACE CIRCUIT

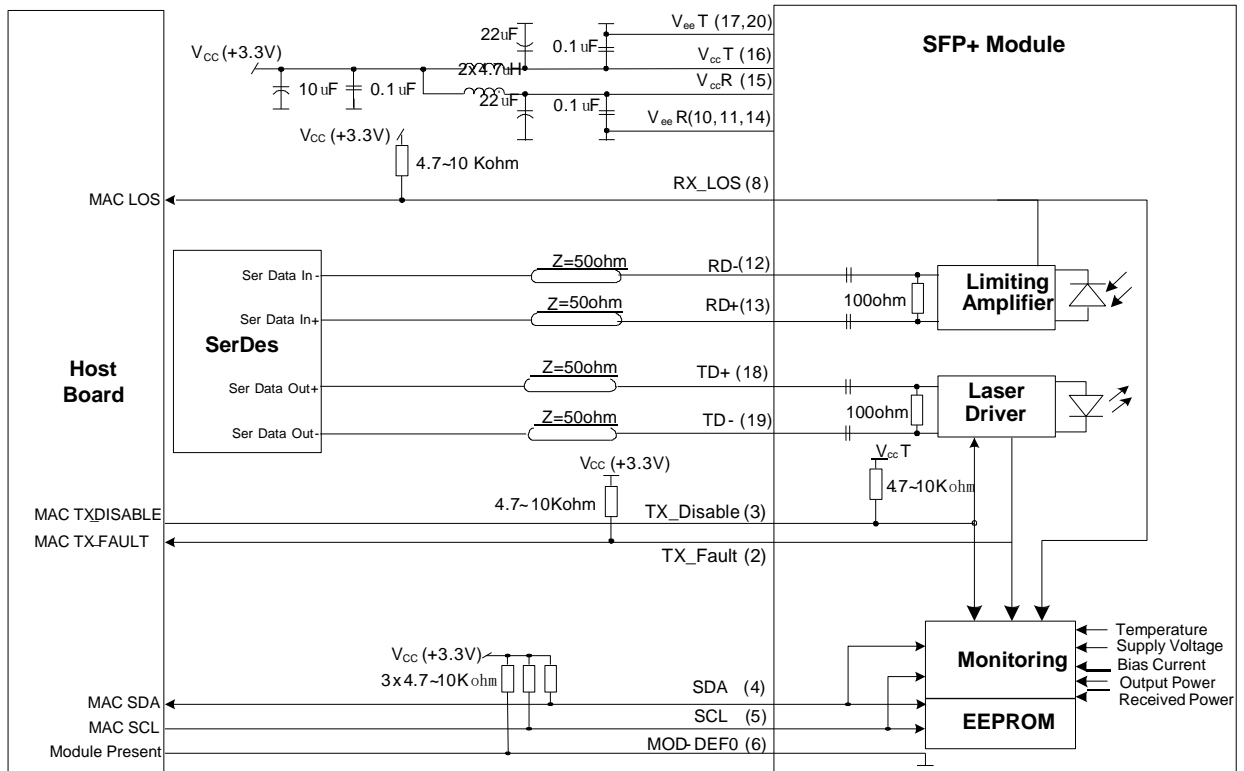


Figure 2 Typical Interface Circuit

PACKAGE OUTLING

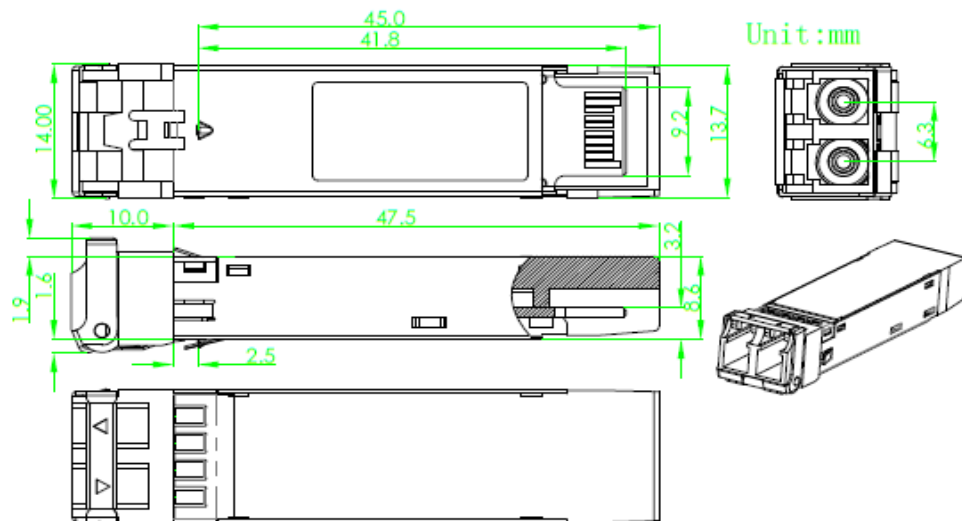


Figure 3 Package Outline

EEPROM INFORMATION

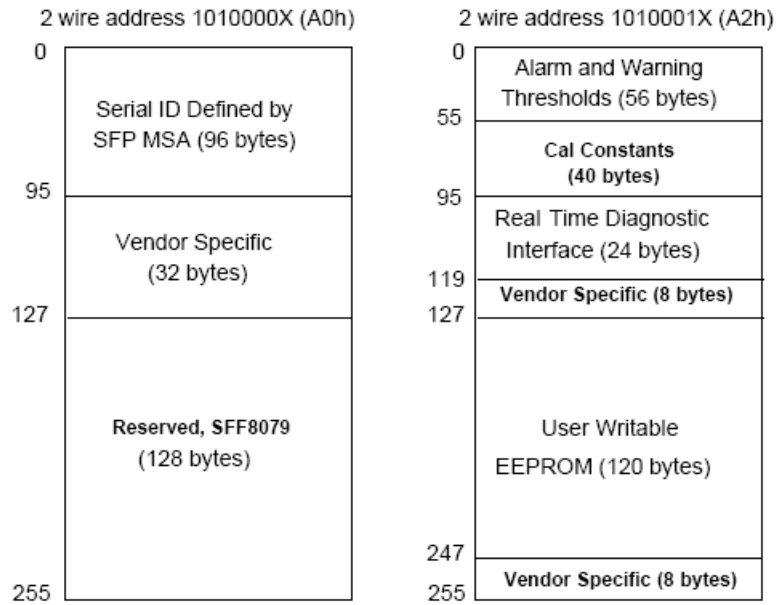


Figure 4 EEPROM Memory Map Specific Data Field Descriptions

DIGITAL DIAGNOSTIC MONITORING INTERFACE				
Parameter	Range	Accuracy	Calibration	NOTES
Temperature	-10 to 85°C	±5°C	Internal	LSB: 1/256C
Voltage	2.97 to 3.63V	±3%	Internal	LSB: 0.1mV
Bias Current	0 to 120mA	±10%	Internal	LSB: 2uA
TX Power	-3 to +4dBm	±2dB	Internal	LSB: 0.1uW
RX Power	-17 to 1dBm	±3dB	Internal	LSB: 0.1uW

ORDERING INFORMATION

Part No.	Tx/Rx	Data Rate	Operating Temp	Distance
HOLS-PPDxx4077-LD-CE	EML/PIN	10.3125G	0 to +70°C	40km
HOLS-PPDxx4077-LD-IE	EML/PIN	10.3125G	-40 to +85°C	40km

Note:

XX is ITU-T DWDM channel code as in the table below:

C-band λ c Wavelength Guide

ITU Channel Code	Frequency(THz)	Wavelength	ITU Channel Code	Frequency(THz)	Wavelength
17	191.7	1563.86	40	194.0	1545.32
18	191.8	1563.05	41	194.1	1544.53
19	191.9	1562.23	42	194.2	1543.73
20	192.0	1561.42	43	194.3	1542.94
21	192.1	1560.61	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.35
23	192.3	1558.98	46	194.6	1540.56
24	192.4	1558.17	47	194.7	1539.77
25	192.5	1557.36	48	194.8	1538.98
26	192.6	1556.55	49	194.9	1538.19
27	192.7	1555.75	50	195.0	1537.40
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82
30	193.0	1553.33	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
32	193.2	1551.72	55	195.5	1533.47
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.12	57	195.7	1531.90
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.51	59	195.9	1530.33

37	193.7	1547.72	60	196.0	1529.55
38	193.8	1546.92	61	196.1	1528.77
39	193.9	1546.12			

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.