1310nm 10G SFP+, LC/PC Duplex, 20km
HOLS-PP132077-LD-xD

FEATURES

- Supports 9.95 to 11.1Gb/s bit rates
- -40 to 85°C operating case temperature
- SFP+ package with duplex LC Receptacle connector
- Hot-pluggable capability
- Single 3.3V power supply
- Power dissipation<2W
- 1310nm DFB transmitter and High performance PIN receiver
- Up to 20km 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

- STM-64 S-64.1
- 10Gb/s Fiber Channel

STANDARDS

- Complies with SFP+ MSA (SFF-8431)
- Complies with SFF-8472 Rev 10.4
- Complies with ITU G.691

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ABSOLUTE MAXIMUM RATING

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

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	Tc	-40		85	°C	
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Supply Current	I_{CC}			575	mA	
Date Rate		9.95		11.1	Gbps	
Data Rate Drift		-100		+100	PPM	

TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Centre Wavelength	λ_C	1291	1310	1329	nm	
Average Output Power		-0.5		+5	dBm	Launched into SMF Fiber
Average Power of OFF Transmitter				-30	dBm	
Extinction Ratio	ER	6			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter and Dispersion Penalty	TDP			1	dB	

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	Normal Operation		-0.3		0.8	V	
	Disable		2		VCC+0.3	V	
TX Fault	Normal Operation		-0.3		0.4	V	
	Fault		2.4		VCC_{Host}	V	

RECEIVER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength	λ_C	1260		1600	nm	
Sensitivity	SEN			-14.4	dBm	PRBS2^{31}-1@10.3125Gbps BER ≤1×10^{-12}
Saturation Optical Power	SAT	0.5			dBm	
Receiver Reflectance				-14	dB	
LOS De-Assert	LOS_D			-18	dBm	
LOS Assert	LOS_A	-32			dBm	
LOS Hysteresis	HYS	0.5			dBm	

RECEIVER ELECTRIAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Differential data output swing	Vout	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 BER ≤1×10^{-12}
Output Fall Time, 20%~80%	TF			70	ps	PRBS2^{31}-1@10.3125Gbps BER ≤1×10^{-12}

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)

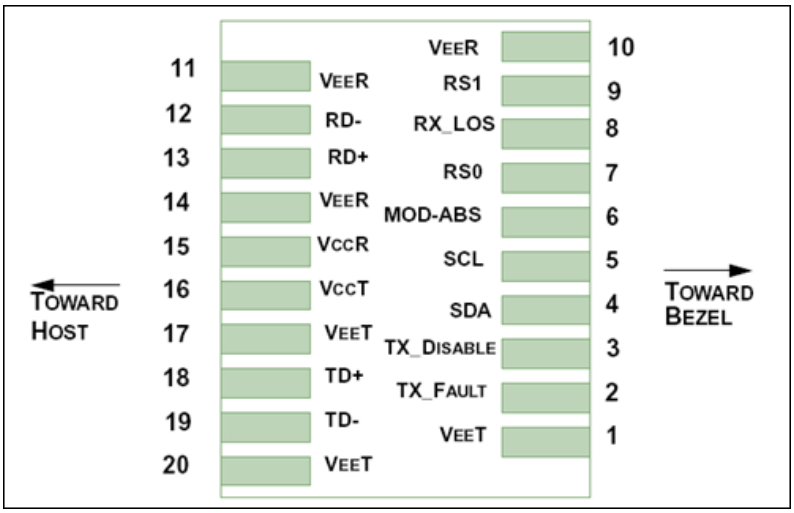

Figure 1 Pin Out Drawing (Top view)

TYPICAL INTERFACE CIRCUIT

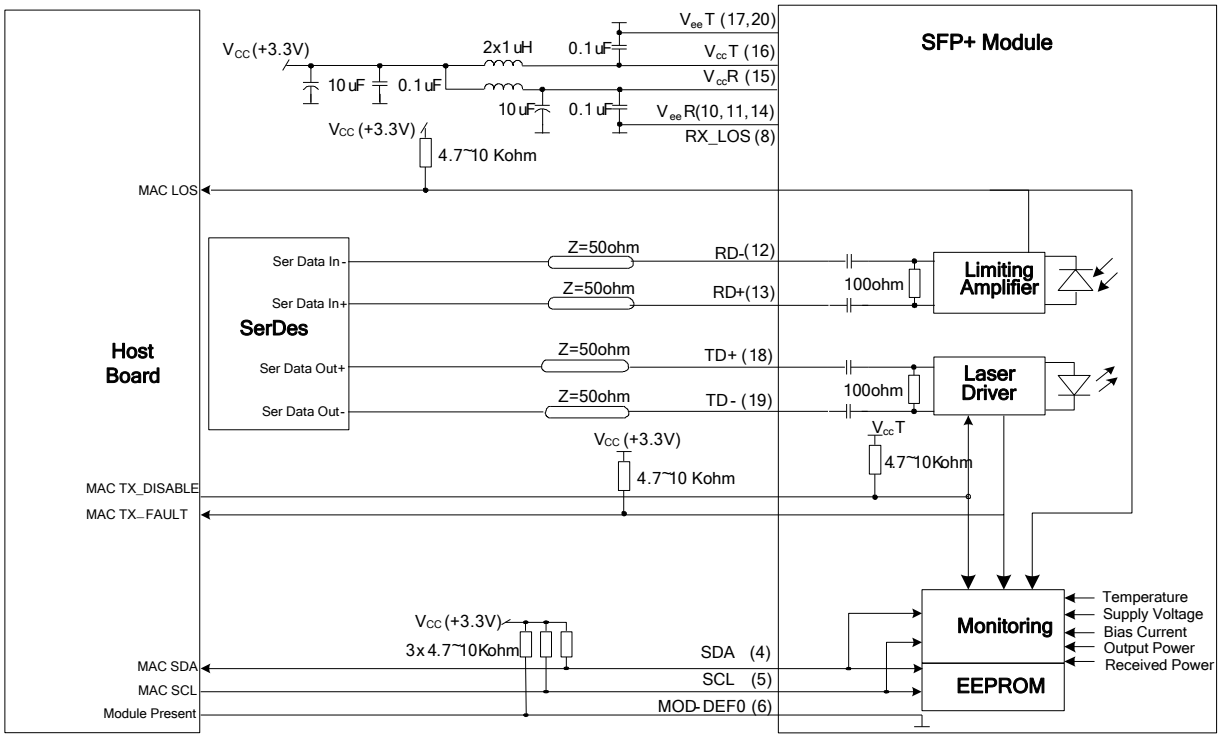

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Figure 2 Typical Interface Circuit

PACKAGE OUTLINE

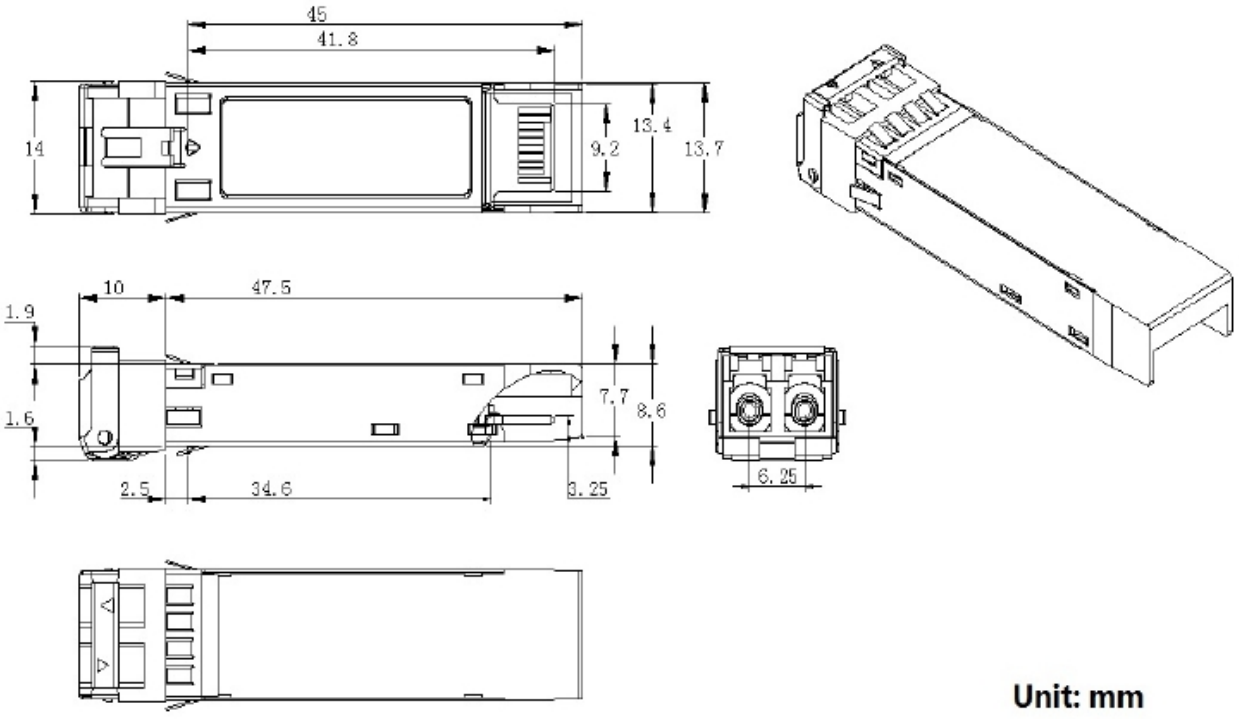

Figure 3 Package Outline

EEPROM INFORMATION

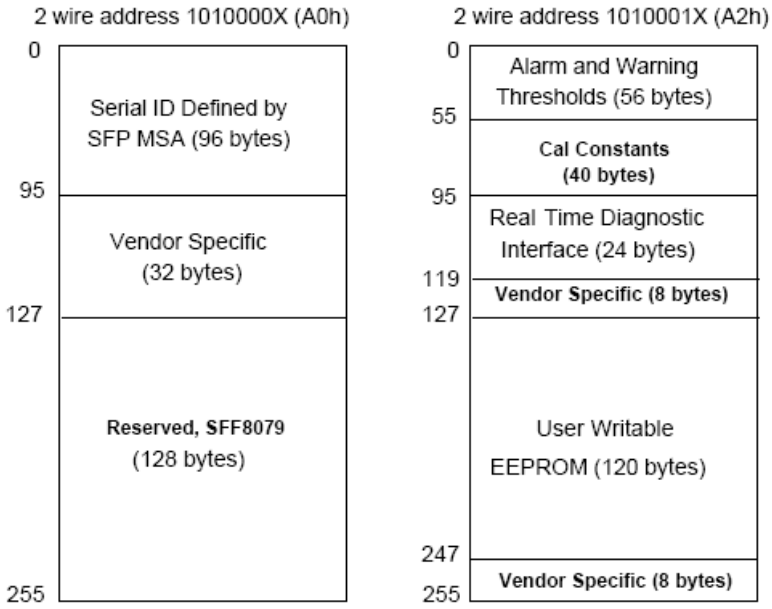

Figure 4 EEPROM Memory Map Specific Data Field Descriptions

DIGITAL DIAGNOSTIC MONITORING INTERFACE

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

Parameter	Range	Accuracy	Calibration
Temperature	-40 to 85°C	±3°C	Internal
Voltage	2.97 to 3.63V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal

TX Power	+1 to +5dBm	±2dB	Internal
RX Power monitor	-16 to +0.5dBm	±2dB	Internal

ORDERING INFORMATION

PN	Temperature Rating	Unit
HOLS-PP132077-LD-CD	0 ~ 70	℃
HOLS-PP132077-LD-ID	-40 ~ 85	℃

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.