1550nm 10G SFP+, LC/PC Duplex, 80km
HOLS-PP158077-LD-xE

FEATURES

- Supports 8.5Gb/s to 11.3Gb/s bit rates
- 0 to 70°C operating case temperature for C-temp class, and -40 to 85°C operating case temperature for I-temp class,
- SFP+ package with duplex LC Receptacle connector
- Hot-pluggable capability
- Single 3.3V power supply
- 1550nm Temperature-stabilized EML transmitter and High sensitivity APD receiver
- Up to 80km 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
- Class I laser product
- RoHS-6 compliance

APPLICATIONS

- 10GBASE-ZR/ZW
- STM-64 L-64.2/L-64.3
- 10Gb/s Fiber Channel

STANDARDS

- Complies with SFP+ MSA (SFF-8431)
- Complies with SFF-8472 Rev 10.4
- Complies with ITU-T G.691
- Compliant with IEEE 802.3ae

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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	0	70	°C	For C-temp class
	T_c	-40	85	°C	For I-temp class
Operating Humidity	OH	5	95	%	
Power Supply Voltage	V_{CC}	-0.5	3.6	V	
Soldering Temperature			260	°C	10 seconds

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	Tc	0		+70	°C	For C-temp class
	Tc	-40		+85	°C	For I-temp class
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Supply Consumption	P			2.5	W	
Date Rate		8.5		11.3	Gbps	NOTE1
Data Rate Drift		-100		+100	PPM	

NOTE1**:** The 80km SFP+ is equipped with internal clock and data recovery (CDR) units on both the receiver and the transmitter sides. The host can set the CDR's to lock at 8.5Gb/s, between 9.95 and 11.3 Gb/s, by setting the soft bits. (A2 bit 110.3)

A2 bit 110.3 = 0, select between 9.95 and 11.3G (default value)

A2 bit 110.3 = 1, select between 8.5G

A2 byte 110 is Random Access Memory. It recovery the default value after power up.

TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Centre Wavelength	λ_C	1530	1550	1565	nm	
Spectral Width (RMS)				1	nm	
Average Output Power		0		5	dBm	Launched into SMF Fiber
Average Power of OFF Transmitter				-30	dBm	
Extinction Ratio	ER	8.2			dB	8.5～10.7Gbps
		6			dB	10.7～11.3Gbps
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter and Dispersion Penalty	TDP			3	dB	9.95～10.7Gbps
	TDP			5	dB	8.5～9.95Gbps，10.7～11.3Gbps

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	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	λ_C	1260		1600	nm	
Sensitivity	SEN			-22	dBm	PRBS2^{31}-1@10.3125Gbps BER ≤1×10^{-12}
Saturation Optical Power	SAT	-8			dBm	
LOS De-Assert	LOS_D			-24	dBm	
LOS Assert	LOS_A	-30			dBm	
LOS Hysteresis	HYS	0.5		6	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	V	
Rx_LOS Output Voltage - Low	Low	0		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}

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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)

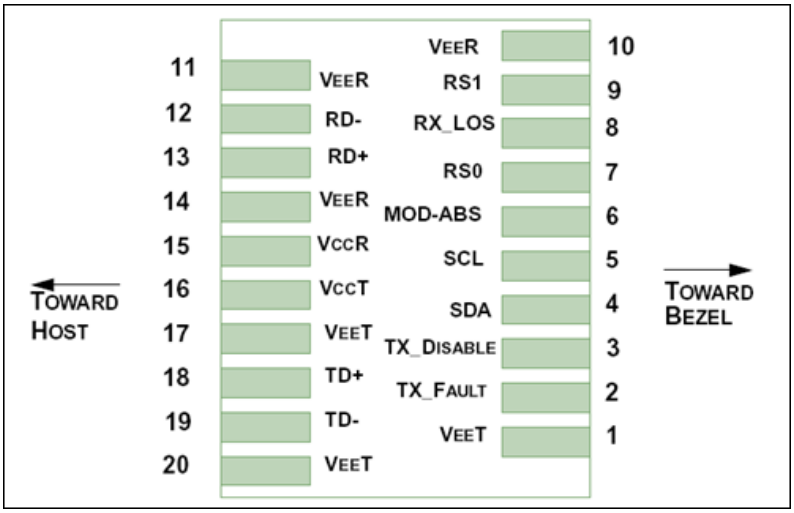

Figure 1 Pin Out Drawing (Top view)

TYPICAL INTERFACE CIRCUIT

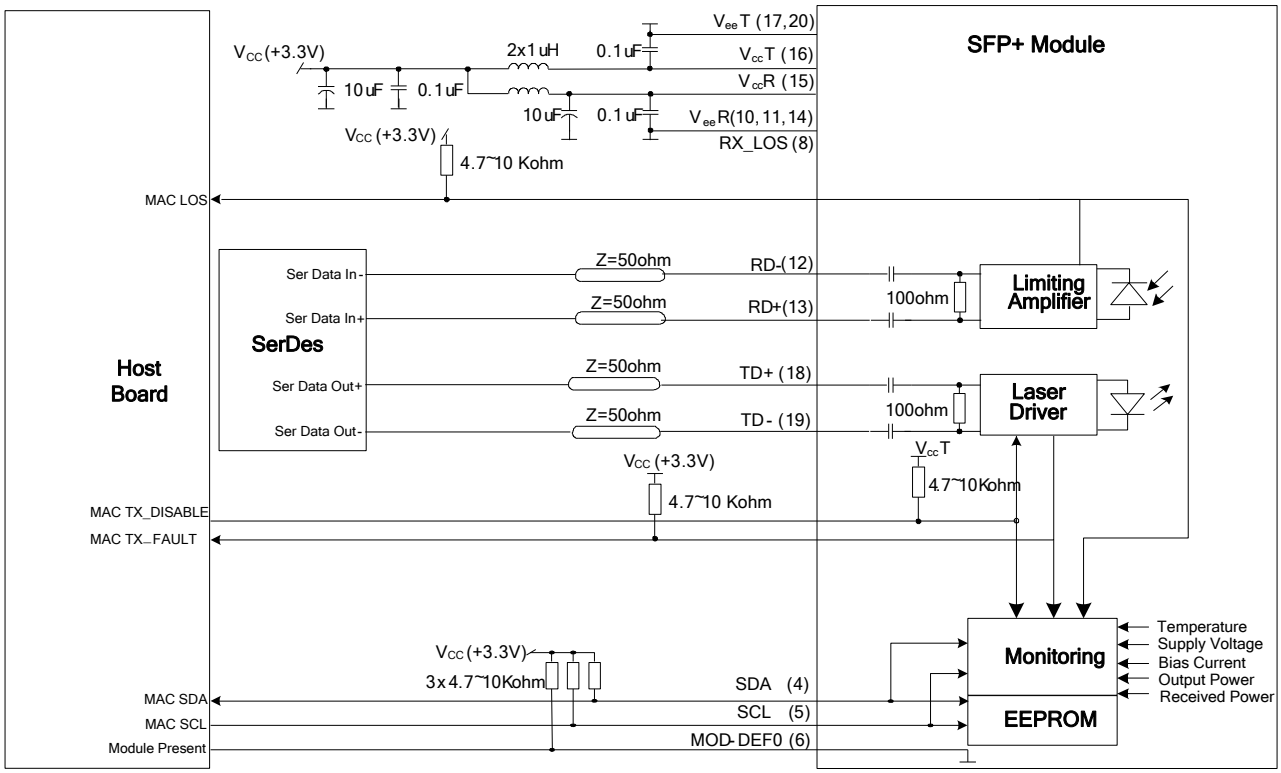

Figure 2 Typical Interface Circuit

PACKAGE OUTLINE

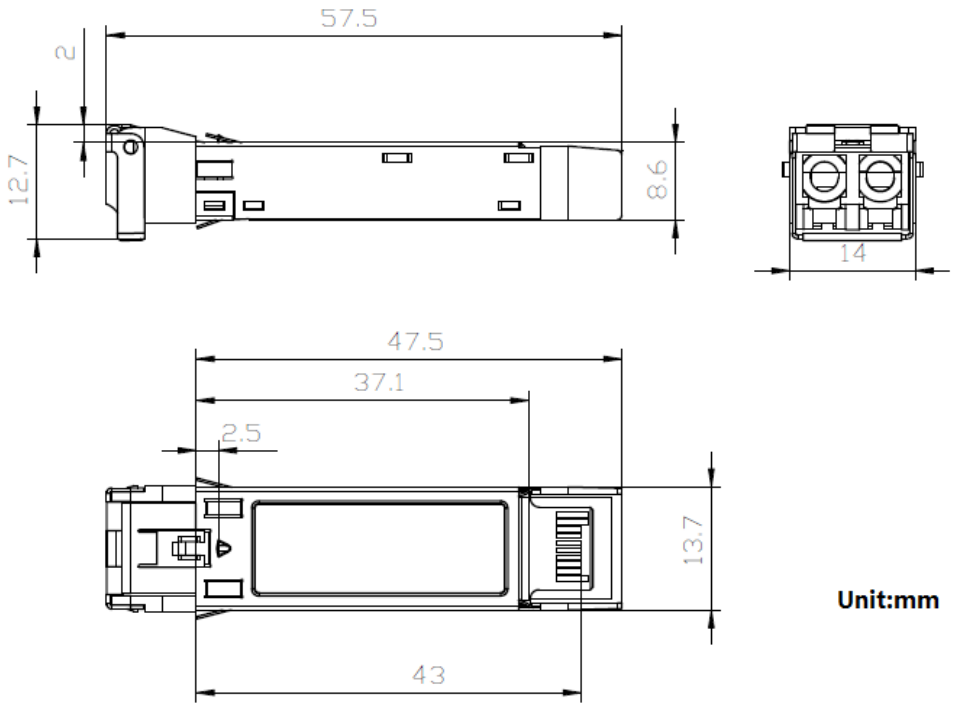

Figure 3 Package Outline

EEPROM INFORMATION

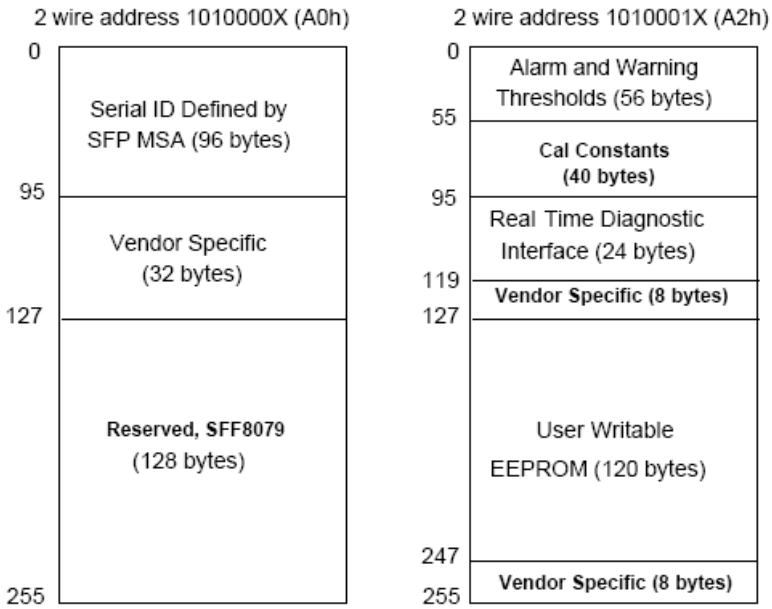

Figure 4 EEPROM Memory Map Specific Data Field Descriptions

DIGITAL DIAGNOSTIC MONITORING INTERFACE

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

Parameter	Range	Accuracy	Calibration	NOTES
Temperature	-40 to 85°C	±3°C	Internal	LSB: 1/256C
Voltage	2.97 to 3.63V	±10%	Internal	LSB: 0.1mV
Bias Current	0 to 100mA	±10%	Internal	LSB: 2uA
TX Power	0 to +5dBm	±2dB	Internal	LSB: 0.1uW
RX Power	-23 to -8dBm	±3dB	Internal	LSB: 0.1uW

ORDERING INFORMATION

PN	Temperature Rating	Unit
HOLS-PP158077-LD-CE	0 ~ 70	℃
HOLS-PP158077-LD-IE	-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.