

## 10G LR SFP+ Optical Transceiver

### Product Features

- Support 10GBASE LR/LW, 10G FC and 10G CPRI application
- Up to 10km transmission distance over SMF
- 1310nm transmitter with DFB laser
- 1310nm receiver with PIN-TIA
- 2-wire interface for integrated digital diagnostic Monitoring
- SFP+ package with duplex LC/UPC receptacle optical interface and SFI electrical interface
- Single +3.3V power supply
- Operation case temperature -40~85°C for industrial
- RoHS compliance, and Class 1 laser safety

### Operating Condition

Parameter	Unit	Min.	Typical	Max.
Storage Temperature	°C	-40		85
Operating Case Temp	°C	-40		85
Power Supply Voltage	V	3.135	3.3	3.465
Power Dissipation	W			1
Bit Rate	Gbps	4.9152	9.8304	10.3125

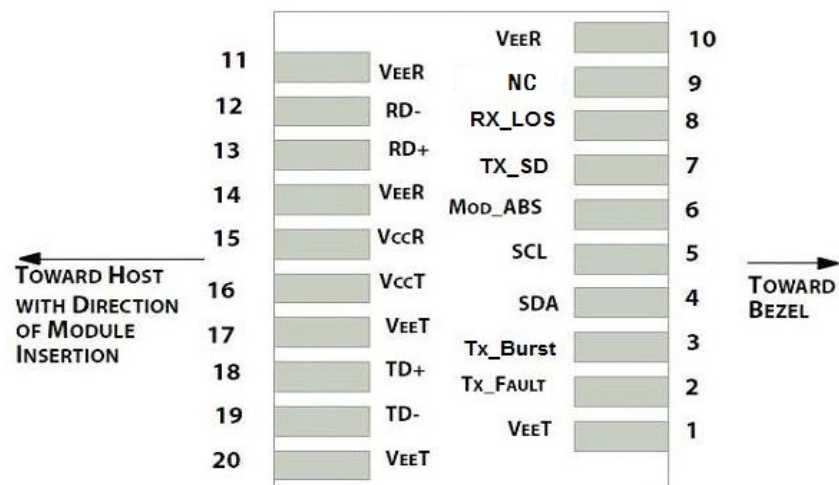
**Characteristics**

All performance is specified at whole working temperature and conditions

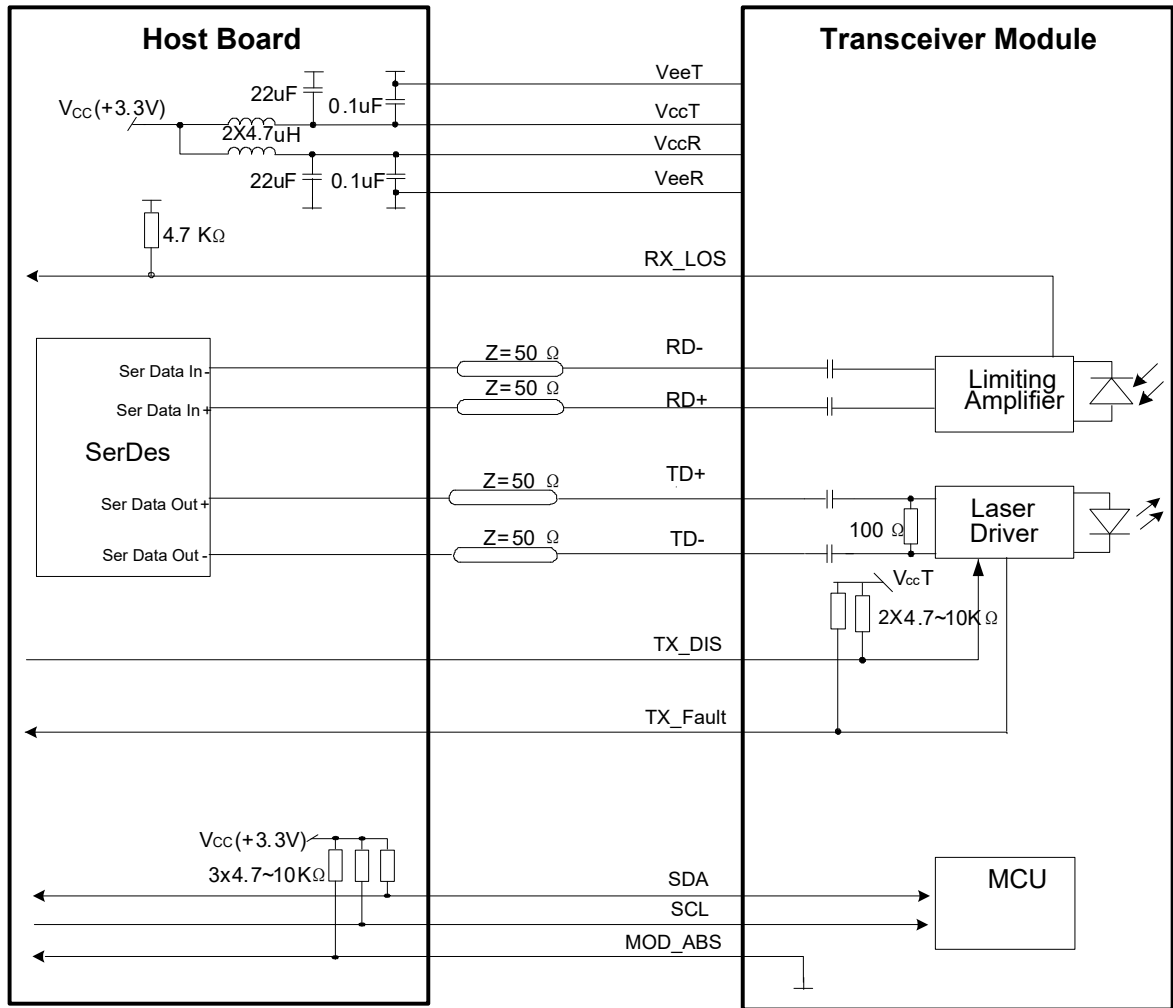
Parameter	Unit	Min.	Typical	Max.
<b>Transmitter</b>				
TX Central Wavelength	nm	1260	1310	1355
Spectral Width (-20dB)	nm			1
Side Mode Suppression Ratio (SMSR)	dB	30		
Mean Launched Power	dBm	-8.2		0.5
Mean Launched Power (OMA)	dBm	-5.2		
Mean Launched Power (TX Off)	dBm			-45
Extinction Ratio	dB	3.5		
Optical Return Loss Tolerance	dB			12
Transmitter and dispersion Penalty	dB			3.2
Transmitter Mask (PRBS2 <sup>31</sup> -1@10.3125G)	Compliant With IEEE Std 802.3ae Eye Mask Margin > 5%			
<b>Receiver</b>				
Receive Wavelength	nm	1260	1310	1565
Sensitivity (PRBS2 <sup>31</sup> -1@10.3125G, ER=6, BER<10 <sup>-12</sup> , EOL)	dBm			-14.4
Sensitivity (PRBS2 <sup>31</sup> -1@10.3125G, OMA, BER<10 <sup>-12</sup> , EOL)	dBm			-12.6
Saturation (PRBS2 <sup>31</sup> -1@10.3125G, ER=6, BER<10 <sup>-12</sup> )	dBm	0.5		
LOS De-assert Level	dBm			-15
LOS Assert Level	dBm	-30		
LOS Hysteresis	dB	0.5		
<b>Electrical Interface Characteristics</b>				
Data Input Swing Differential/TX	mV	200	-	2000
Data Output Swing Differential/RX	mV	400		1600
Data Differential Impedance	Ω	90	100	110
LVTTL Output High	V	2.4		Vcc
LVTTL Output Low	V	0		0.4
LVTTL Input High	V	2.0		Vcc+0.3
LVTTL Input Low	V	0		0.8
<b>Timing Characteristics</b>				
LOS Assert Time (T <sub>LOSA</sub> )	us			100
LOS De-assert Time (T <sub>LOSD</sub> )	us			100

**PIN Definition**

Pin No.	Symbol	Level / Logic	Description
1	VeeT		Module Transmitter Ground
2	Tx_Fault	LVTTL-O	Module Transmitter Fault Indication
3	Tx_DIS	LVTTL-I	Transmitter Disable; Active High Disable Transmitter Output
4	SDA	LVTTL-I	2-Wire Serial Interface Data Line
5	SCL	LVTTL-I/O	2-Wire Serial Interface Clock
6	MOD_ABS	LVTTL-O	Module Absent, connected to ground in the module
7	RS0		Not Connected
8	RX_LOS	LVTTL-O	Loss of Receiver Signal Indication
9	RS1		Not Connected
10	VeeR		Module Receiver Ground
11	VeeR		Module Receiver Ground
12	RD-	CML-O	Receiver Inverted Data Output
13	RD+	CML-O	Receiver Non-Inverted Data Output
14	VeeR		Module Receiver Ground
15	VccR		Module Receiver 3.3V Supply
16	VccT		Module Transmitter 3.3V Supply
17	VeeT		Module Transmitter Ground
18	TD+	CML-I	Transmitter Non-Inverted Data Input
19	TD-	CML-I	Transmitter Inverted Data Input
20	VeeT		Module Transmitter Ground

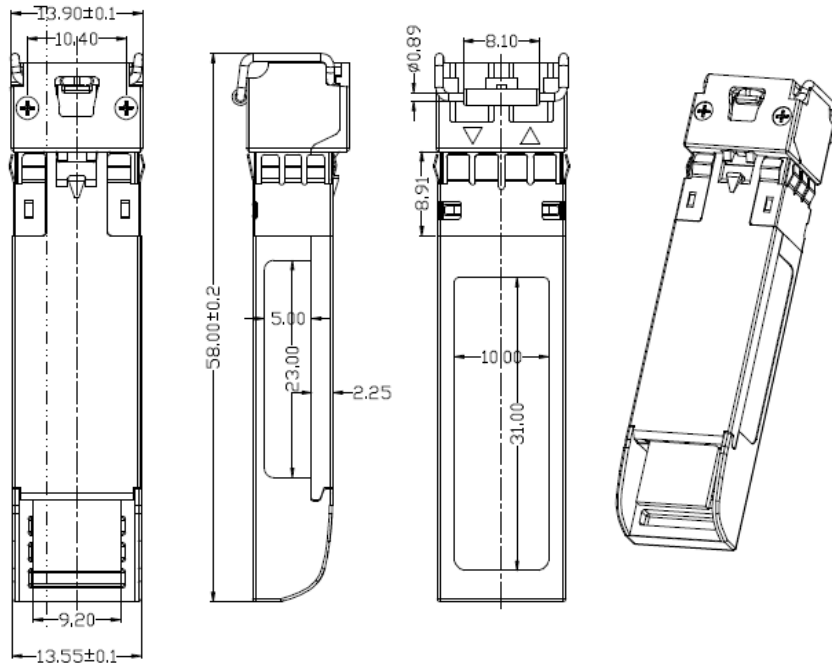


Typical Interface Circuit



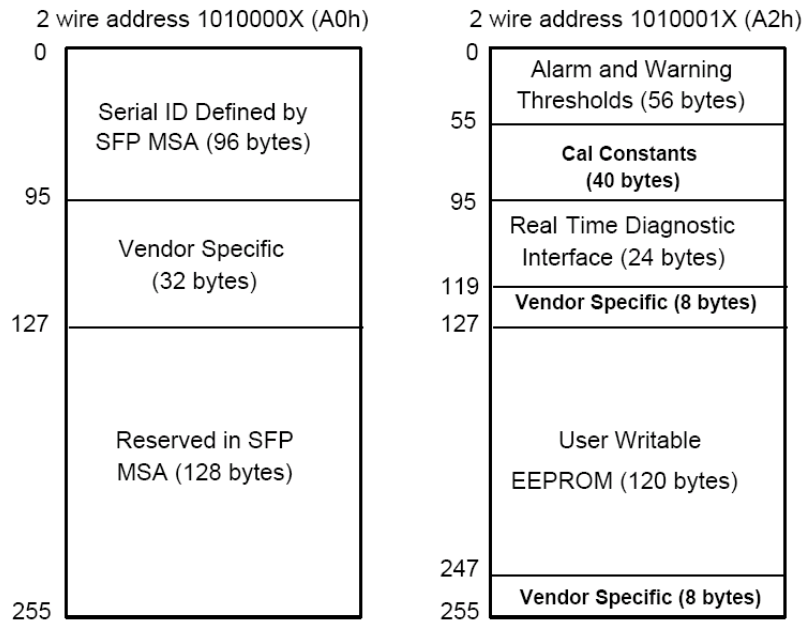
**Mechanical Diagram**

For detail mechanical information, please refer to the related document of SFF-8432



### EEPROM Memory Map

The digital diagnostic memory map specific data field define as following. For detail EEPROM information, please refer to the related document of SFF 8472 Rev 12.0.



### ESD

The SFP+ module and host SFI contacts (High Speed Contacts) shall withstand 1kV electrostatic discharge based on Human Body Model and all host contacts with exception of the SFI contacts (High Speed Contacts) shall withstand 2kV electrostatic discharge based on Human Body Model. The SFP+ module shall meet ESD requirements given in EN61000-4-2, criterion B test specification such that units are subjected to 15kV air discharges during operation and 8kV direct contact discharges to the case per section 2.9 in SFF-8431 REV4.1. However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

### Laser Safety

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

**Ordering Information**

Ordering P/Ns	Description
D13399-SLHA	10G LR SFP+, 10km,10.3125Gbps, Tx 1310nm, Rx 1310nm, SFP+ form-factor, Duplex LC/UPC receptacle connector, -40~85°C Industrial temperature

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