

## 10G ER SFP+ Optical Module

### Product Features

- Supports data rate 9.8~11.3Gbps
- Up to 40km transmission distance over SMF
- Transmitter with EML laser
- 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 0~70°C for commercial
- RoHS compliance, and Class 1 laser safety

### Operating Conditions

| Parameter            | Unit | Min.  | Typical | Max.  |
|----------------------|------|-------|---------|-------|
| Storage Temperature  | °C   | -40   |         | 85    |
| Operating Case Temp  | °C   | 0     |         | 70    |
| Power Supply Voltage | V    | 3.135 | 3.3     | 3.465 |
| Power Dissipation    | W    |       |         | 1.5   |
| Bit Rate             | Gbps |       | 10.3125 |       |

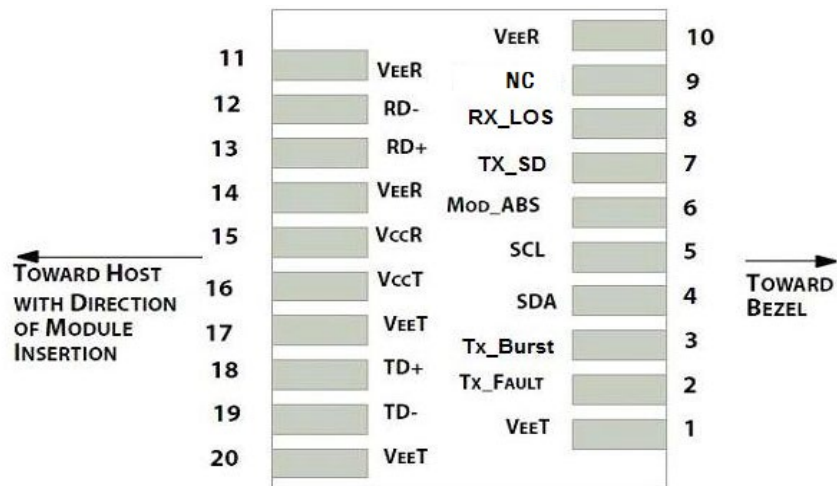
**Characteristics**

All performance is specified at whole working temperature and conditions

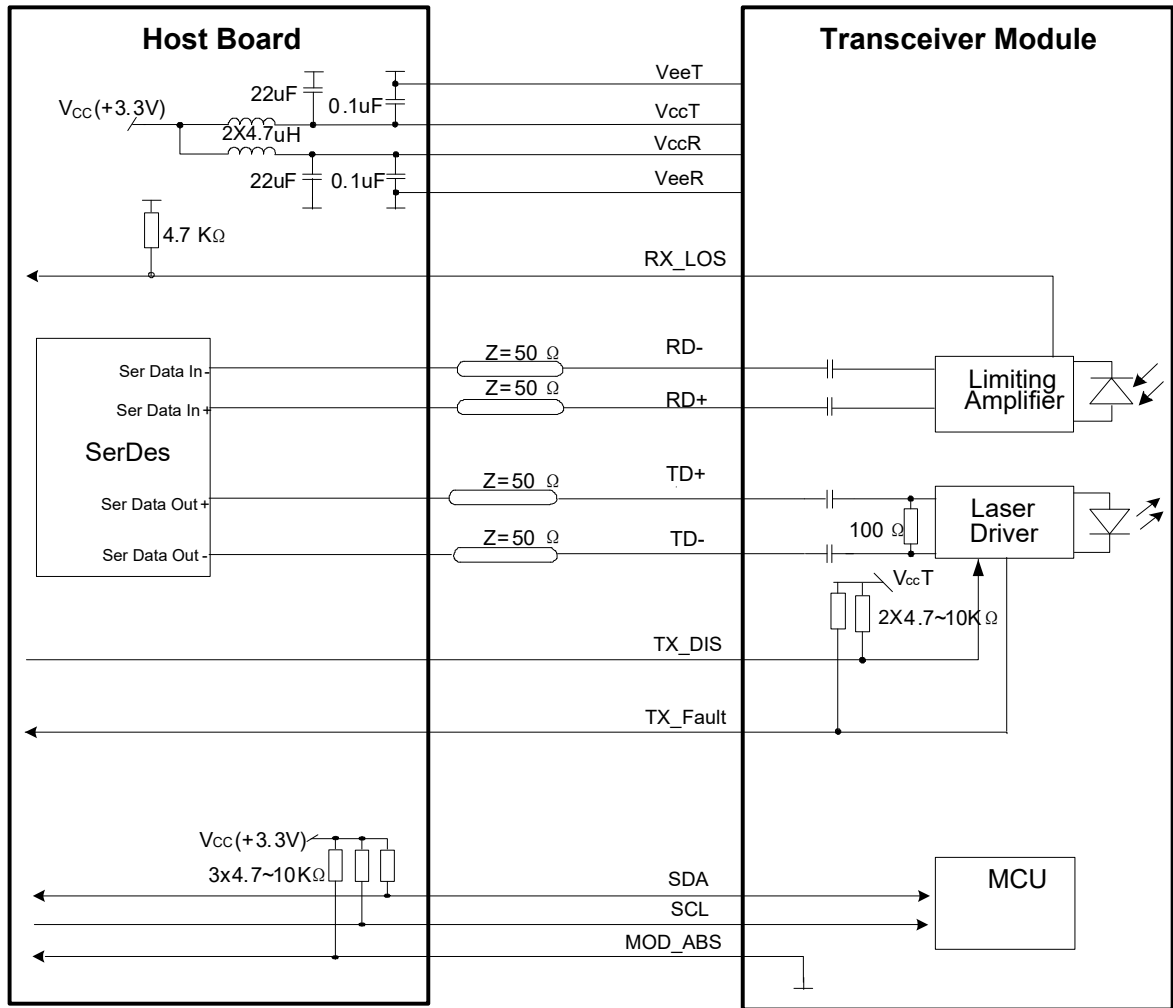
| Parameter   | Unit                            | Min. | Typical | Max.                 |
|---|---------------------------------|------|---------|----------------------|
| <b>Transmitter</b>  |                                 |      |         |                      |
| TX Central Wavelength   | nm                              | 1528 | 1550    | 1565                 |
| Spectral Width (-20dB)  | nm                              |      |         | 1                    |
| Side Mode Suppression Ratio (SMSR)  | dB                              | 30   |         |                      |
| Mean Launched Power   | dBm                             | -4.7 |         | 4                    |
| Mean Launched Power (TX Off)  | dBm                             |      |         | -45                  |
| Extinction Ratio  | dB                              | 3.5  |         |                      |
| Optical Return Loss Tolerance   | dB                              | -12  |         |                      |
| Transmitter and dispersion Penalty  | dB                              |      |         | 2                    |
| Transmitter Mask<br>(PRBS <sup>231</sup> -1@10.3125G)                       | Compliant With IEEE Std 802.3ae |      |         |                      |
| <b>Receiver</b>   |                                 |      |         |                      |
| Receive Wavelength  | nm                              | 1260 |         | 1600                 |
| Sensitivity (PRBS <sup>231</sup> -1@10.3125G, ER=6, BER<10 <sup>-12</sup> ) | dBm                             |      |         | -15.8                |
| Overload (PRBS <sup>231</sup> -1@10.3125G, ER=6, BER<10 <sup>-12</sup> )    | dBm                             | -1   |         |                      |
| LOS De-assert Level   | dBm                             |      |         | -18                  |
| LOS Assert Level  | dBm                             | -35  |         |                      |
| 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                  |
| LVTTTL Output High  | V                               | 2.4  |         | V <sub>CC</sub>      |
| LVTTTL Output Low   | V                               | 0    |         | 0.4                  |
| LVTTTL Input High   | V                               | 2.0  |         | V <sub>CC</sub> +0.3 |
| LVTTTL 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 | LVTTTL-O      | Module Transmitter Fault Indication                         |
| 3       | Tx_DIS   | LVTTTL-I      | Transmitter Disable; Active High Disable Transmitter Output |
| 4       | SDA      | LVTTTL-I      | 2-Wire Serial Interface Data Line                           |
| 5       | SCL      | LVTTTL-I/O    | 2-Wire Serial Interface Clock                               |
| 6       | MOD_ABS  | LVTTTL-O      | Module Absent, connected to ground in the module            |
| 7       | RS0      |               | Not Connected   |
| 8       | RX_LOS   | LVTTTL-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                                   |

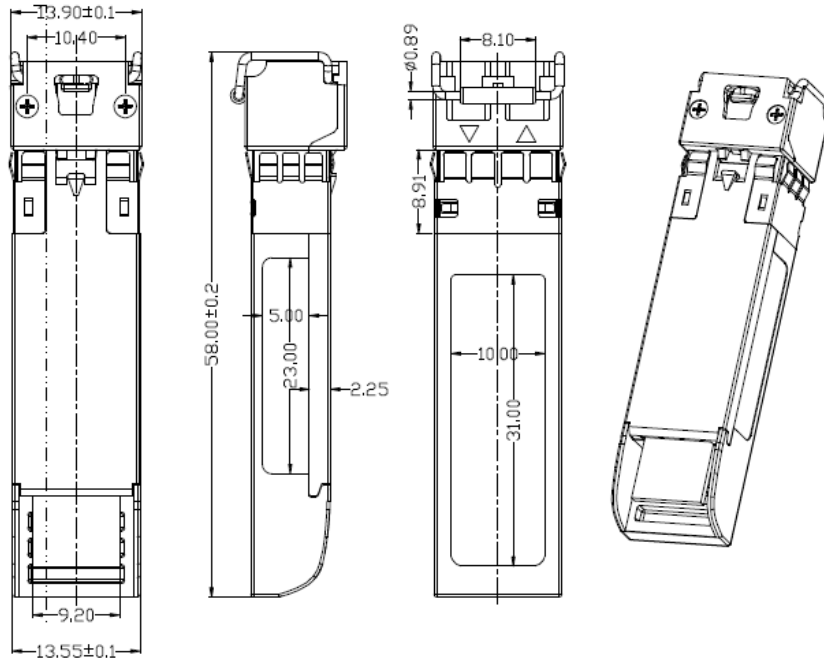


Typical Interface Circuit



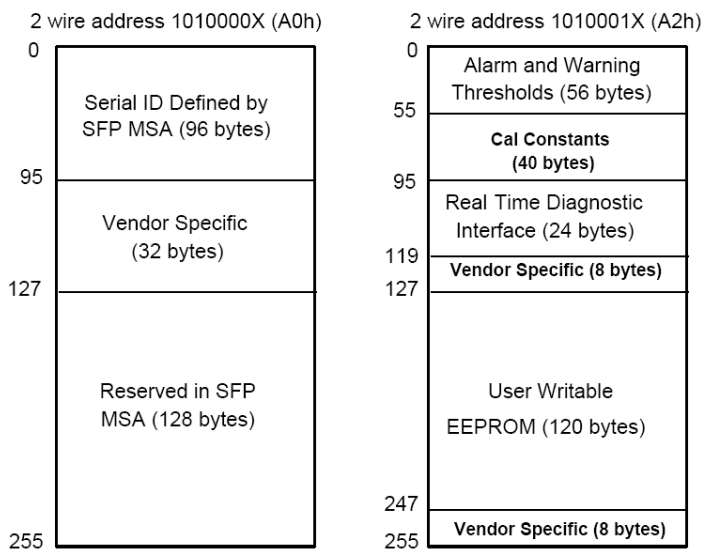
**Mechanical Diagram**

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  |
|---------------|--|
| D45599-SLCA   | 10G SFP+, 40km, 9.8~11.3Gbps, Tx 1550nm, Rx 1550nm, SFP+ form-factor, Duplex LC/UPC receptacle connector, 0~70°C Commercial temperature, EML+PIN+CDR |

## Contact Us

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