**SFP-10GBASE-LRL-I-CN2-OPC**

Ciena® Compatible TAA 10GBase-LR-Lite SFP+ Transceiver (SMF, 1310nm, 2km, LC, DOM, -40 to 85C)

**Features**

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Uncooled DFB transmitter and PIN receiver
- Single-mode Fiber
- Industrial Temperature -40 to 85 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free

**Applications:**

- 10GBase-LR Ethernet
- 8x/10x Fibre Channel
- Access, Datacenter and Enterprise
- Mobile Fronthaul CPRI/OBSAI

**Product Description**

This Ciena® compatible SFP+ transceiver provides 10GBase-LR throughput up to 2km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It can operate at temperatures between -40 and 85C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Ciena®. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

**Absolute Maximum Ratings**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Maximum Supply Voltage** | Vcc | -0.5 | | 4 | V | 1 |
| **Storage Temperature** | TS | -40 | | 85 | °C | 2 |
| **Operating Case Temperature** | Tc | -40 | | 85 | °C | 3 |
| **Data Rate** | DR | 9.83 | 10.3125 | 11.3 | Gbps | 4 |
| **Bit Error Rate** | BER | | | $10^{-12}$ | | |

**Notes:**

1. For electrical power interface
2. Ambient Temperature
3. Case Temperature
4. IEEE 802.3ae

**Link Distances**

| Data Rate | Fiber Type | Distance Range (km) |
|---|---|---|
| 9.83 –11.3 Gb/s | 9/125um SMF | 2 |

**Electrical Characteristics** (VCC=3.14V to 3.46V, TC=-0°C to 70°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Power Supply Voltage** | Vcc | 3.14 | 3.30 | 3.46 | V | |
| **Power Supply Current** | Icc | | 230 | 300 | mA | |
| **Transmitter** | | | | | | |
| **Differential data input swing** | VIN,pp | 180 | | 700 | mV | |
| **Input differential impedance** | RIN | | 100 | | Ω | |
| **Transmit Disable Voltage** | $V_D$ | 2 | | Vcc | V | |
| **Transmit Enable Voltage** | $V_{EN}$ | $V_{EE}$ | | $V_{EE}$+0.8 | V | |
| **Receiver** | | | | | | |
| **Differential data output swing** | VOUT, pp | 300 | | 850 | mV | |
| **Data output rise/fall time (20%-80%)** | Tr /Tf | 28 | | | ps | |
| **LOS Asset** | VLOSA | 2 | | Host_Vcc | V | |
| **LOS De-Assert** | VLOSD | Vcc | | Vcc+0.5 | V | |

**Optical Characteristics**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| **Output Optical Power** | Ptx | -8.2 | | 0.5 | dBm | 1 |
| **Optical Center Wavelength** | λc | 1260 | 1310 | 1355 | nm | |
| **Optical Modulation Amplitude** | OMA | -5.2 | | | dBm | 2 |
| **Extinction Ratio** | ER | 3.5 | | | dB | |
| **Side Mode Suppression Ratio** | SMSR | 30 | | | dB | |
| **Relative Intensity Noise** | RIN | | | -128 | dB/Hz | |
| **Transmitter Dispersion Penalty** | TDP | | | 3.2 | dB | |
| **Launch Power of OFF Transmitter** | Poff | | | -30 | dBm | 1 |
| **Receiver** | | | | | | |
| **Optical Center Wavelength** | λc | 1260 | | 1355 | nm | |
| **Average Receive Power** | Prx | -14.4 | | 0.5 | dBm | |
| **Receiver Sensitivity @10.3Gb/s** | S | | | -14.4 | dBm | 3 |
| **Receiver Reflectance** | RL | | | -12 | dB | |
| **LOS Assert** | LOSA | -30 | | | dBm | |
| **LOS De-Assert** | LOSD | | | -15 | dBm | |
| **LOS Hysteresis** | LOSH | 0.5 | | | dB | |

**Notes:**

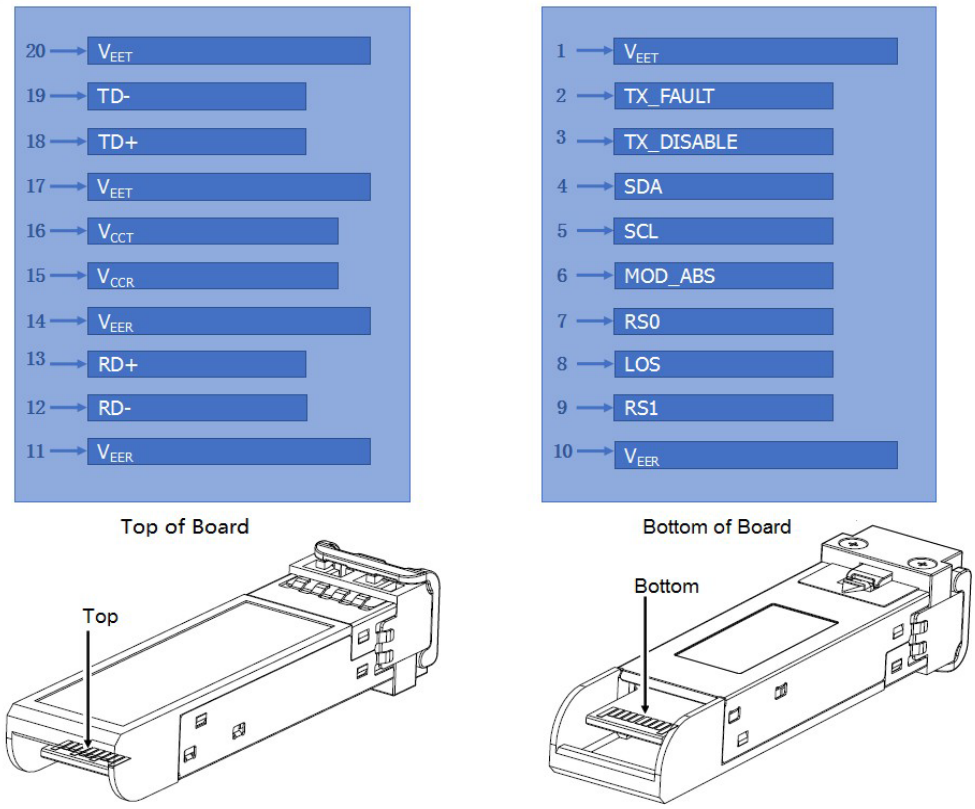
1. Average.
2. According to IEEE 802.3ae requirement.
3. Average. Test the resulting value using the minimum ER value within the defined range: BER<$10^{-12}$, PRBS $2^{31}$-1.

**Pin Descriptions**

| Pin | Symbol | Name/Descriptions | Ref. |
|---|---|---|---|
| **1** | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |
| **2** | Tx_Fault | Transmitter Fault. | 2 |
| **3** | Tx_Disable | Transmitter Disable. Laser output disabled on “high” or “open.” | 3 |
| **4** | SDA | 2-Wire Serial Interface Data Line. | 4 |
| **5** | SCL | 2-Wire Serial Interface Clock Line. | 4 |
| **6** | MOD_ABS | Module Absent. Grounded within the module. | 4 |
| **7** | RS0 | No connection required. | |
| **8** | LOS | Loss of Signal indication. Logic 0 indicates normal operation | 5 |
| **9** | RS1 | No connection required. | 1 |
| **10** | $V_{eeR}$ | Receiver Ground (Common with Transmitter Ground). | 1 |
| **11** | $V_{eeR}$ | Receiver Ground (Common with Transmitter Ground). | 1 |
| **12** | RD– | Receiver Inverted Data Out. AC Coupled. | |
| **13** | RD+ | Receiver Non-Inverted Data Out. AC Coupled. | |
| **14** | $V_{eeR}$ | Receiver Ground (Common with Transmitter Ground). | 1 |
| **15** | VccR | Receiver Power Supply | |
| **16** | VccT | Transmitter Power Supply | |
| **17** | $V_{eeT}$ | Transmitter Ground (Common with Receiver Ground). | 1 |
| **18** | TD+ | Transmitter Non-Inverted Data In. AC Coupled. | |
| **19** | TD– | Transmitter Inverted Data In. AC Coupled. | |
| **20** | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |

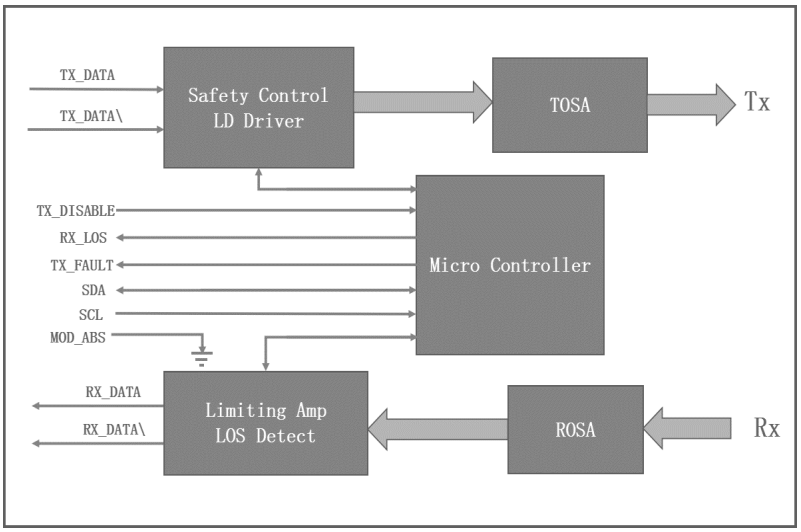
**Notes:**

1. Circuit ground is isolated from the chassis ground.
2. Tx_Fault is the open collector output and should be pulled up with 4.7kΩ-10kΩ on the host board to a voltage between 2V and Vcc+0.3V.
3. Disabled: $T_{DIS}$>2V or open, enabled: $T_{DIS}$<0.8V.
4. Should be pulled up with 4.7kΩ-10kΩ on the host board to a voltage between 2V and Vcc+0.3V.
5. LOS is an open collector output and should be pulled up with 4.7kΩ-10kΩ on the host board to a voltage between 2V and Vcc+0.3V. The logic "0" indicates normal operation, and the logic "1" indicates that the receiver signal is lost.



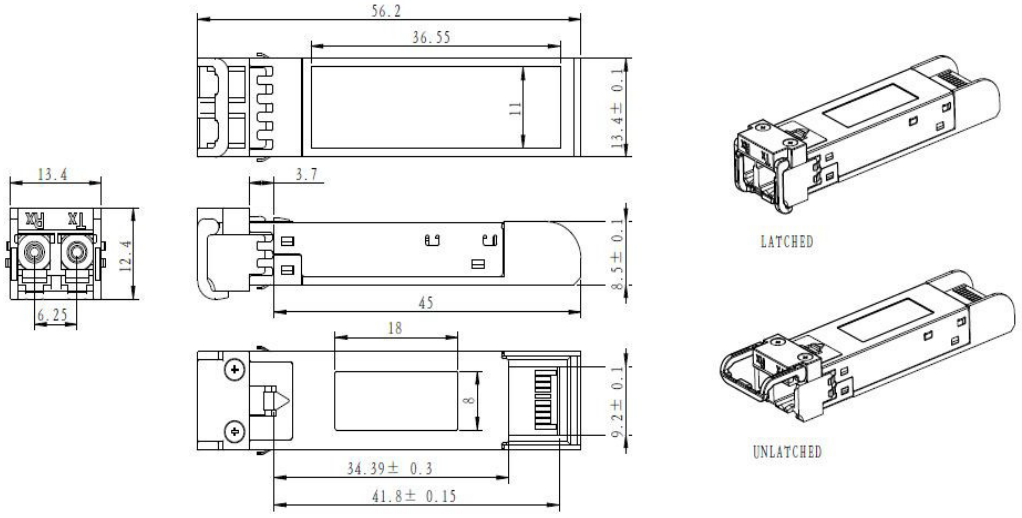

Pin-out of connector Block on Host board

**Block Diagram**



**Mechanical Specifications**

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).




ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED

UNIT: mm

**EEPROM Information**

EEPROM memory map specific data field description is as below: