The GigaTech Products **7SK-000-GT** is programmed to be fully compatible and functional with all intended ACCEDIAN NETWORKS switching devices. This SFP optical transceiver is based on the Fast Ethernet standard and is designed to be compliant with SFF-8472 SFP Multi-source Agreement (MSA). This module is designed for multimode fiber and operates at a nominal wavelength of 1310nm.

## Features:

- Up to 125MBd bi-directional data links

- Hot-pluggable SFP footprint

- 1310nm LED transmitter

- Duplex LC Connectors

- Up to 2km over MMF

- Single power supply 3.3V

- Operating temperature range

  C-Temp: 0℃ to 70℃
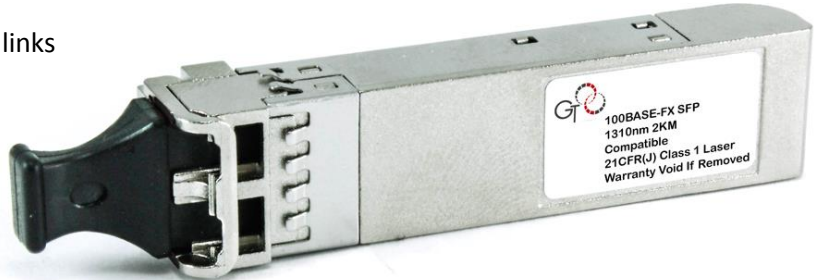
## Compliance:

- 100BASE-FX

- SFP MSA SFF-8472

- RoHS

- Class 1 laser product EN 60825

## Applications

- 125MBd Fast Ethernet

## Warranty:

GigaTech Branded Optical Transceivers- Lifetime Warranty

## General Specifications

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Data Rate | $DR$ | | 125 | | MBd | Fast Ethernet |
| Bit Error Rate | $BER$ | | | $10^{-12}$ | | |
| Input Voltage | $V_{CC}$ | 3.0 | 3.3 | 3.6 | V | |
| Maximum Voltage | $V_{MAX}$ | -0.5 | | 4.5 | V | Electric Power Interface |
| Supply Current | $I_S$ | | 165 | 300 | mA | Electric Power Interface |
| Storage Temperature | $T_{STO}$ | -40 | | 85 | ℃ | Ambient Temperature |

## Optical Characteristics - Transmitter

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Optical Center Wavelength | $\lambda$ | 1280 | | 1380 | nm | |
| Output Optical Power @ 62.5 | $P_{OUT\_1}$ | -20 | | -14 | dBm | |
| Output Optical Power @ 50 | $P_{OUT\_2}$ | -2.35 | | -14 | dBm | |
| Extinction Ratio | $ER$ | 10 | | | dB | |
| Spectral Width (FWMH) | $\Delta\lambda$ | | | 175 | nm | FDDI PMD3 |
| Relative Intensity Noise | $RIN$ | | | $-120$ | dB/Hz | |
| Optical Rise/Fall Time | $T_{RF\_IN}$ | | 1000 | 3000 | ps | 20%-80% |
| Generated Jitter (peak to peak) | $GT_T$ | | | 0.07 | UI | |
| Generated Jitter (rms) | $GT_{RMS}$ | | | 0.007 | UI | |
| Random Jitter Contribution | $TX\Delta RJ$ | | | 0.76 | ns | |

## Optical Characteristics - Receiver

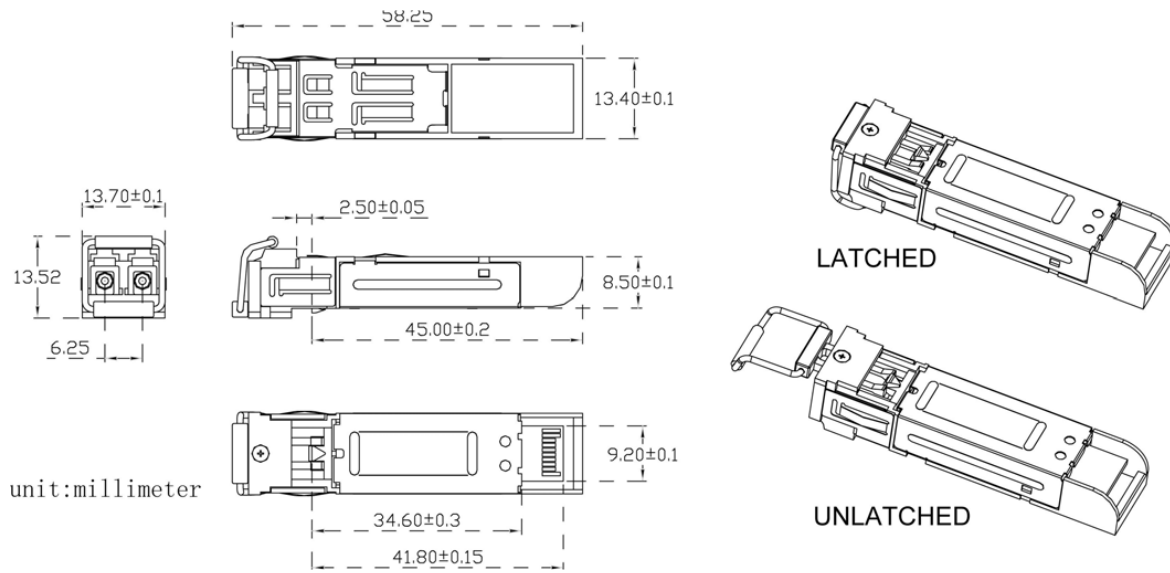| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Optical Center Wavelength | $\lambda_C$ | 1270 | | 1600 | nm | |
| Optical Receive Power | $P_{RX}$ | | | -14 | dBm | BER < $10^{-12}$ |
| Receiver Sensitivity @ FE | $R_{SENSI}$ | | | -31 | dBm | PRBS $2^{-23}$-1 |
| Optical Return Loss | $ORL$ | 12 | | | dB | |
| RX Electrical 3dB Upper Cutoff | | | | 1500 | MHz | |
| Loss of Signal-Asserted | $P_{LOS\_A}$ | -45 | | | dBm | |
| Loss of Signal-Deasserted | $P_{LOS\_D}$ | | | -33 | dBm | |
| Loss of Signal-Hysteresis | | 1.5 | | | dB | |

## Electrical Characteristics – Transmitter

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Input differential impedance | $R_{IN}$ | | 100 | | Ω | Non Condensing |
| Single ended data input swing | $V_{IN\_PP}$ | 250 | | 1200 | mV | |
| Transmit Disable Voltage | $V_D$ | 2 | | $V_{CC}$ | V | |
| Transmit Enable Voltage | $V_{EN}$ | $V_{EE}$ | | $V_{EE}$ +0.8 | V | |
| Transmit Disable Assert Time | | | | 10 | us | |

## Electrical Characteristics – Receiver

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|---|---|---|---|---|---|
| Single ended data output swing | $V_{OUT\_PP}$ | 250 | 450 | 900 | mV | |
| Data output rise time | $T_{R/F}$ | 0.6 | | 5 | ns | 10%-90% |
| LOS Fault | $V_{LOS\_F}$ | 2 | | $V_{CC\_HOST}$ | V | |
| LOS Normal | $V_{LOS\_N}$ | $V_{EE}$ | | $V_{EE}$ +0.5 | V | |

**Dimensions**

58.25

13.40±0.1

13.70±0.1

13.52

6.25

2.50±0.05

8.50±0.1

45.00±0.2

unit:millimeter

9.20±0.1

34.60±0.3

41.80±0.15

LATCHED

UNLATCHED

ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED UNIT: mm
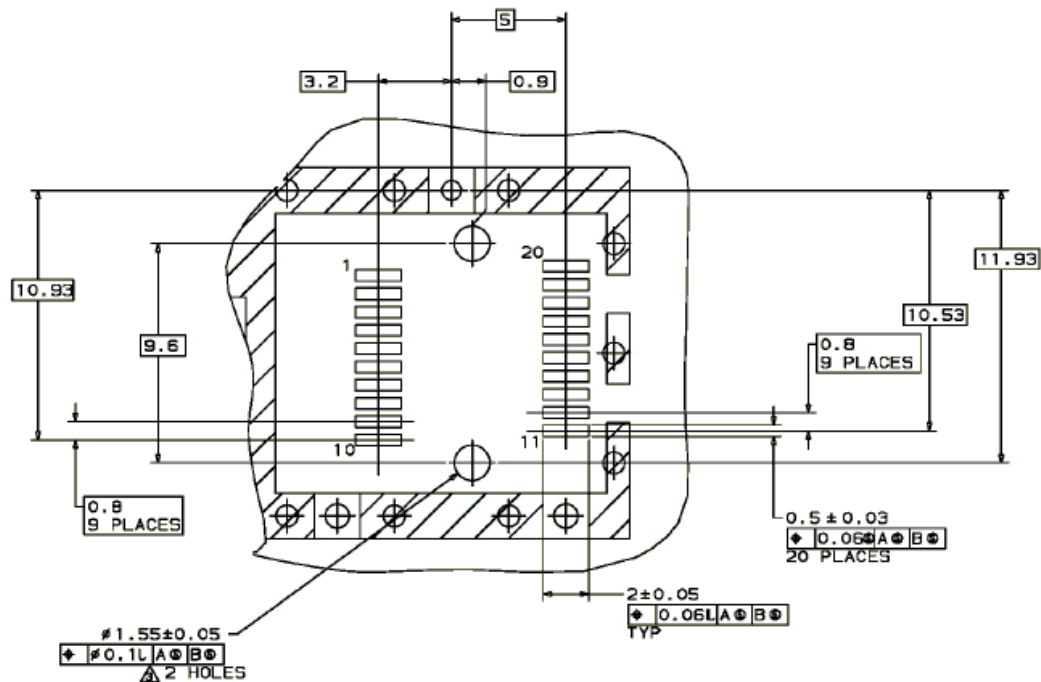
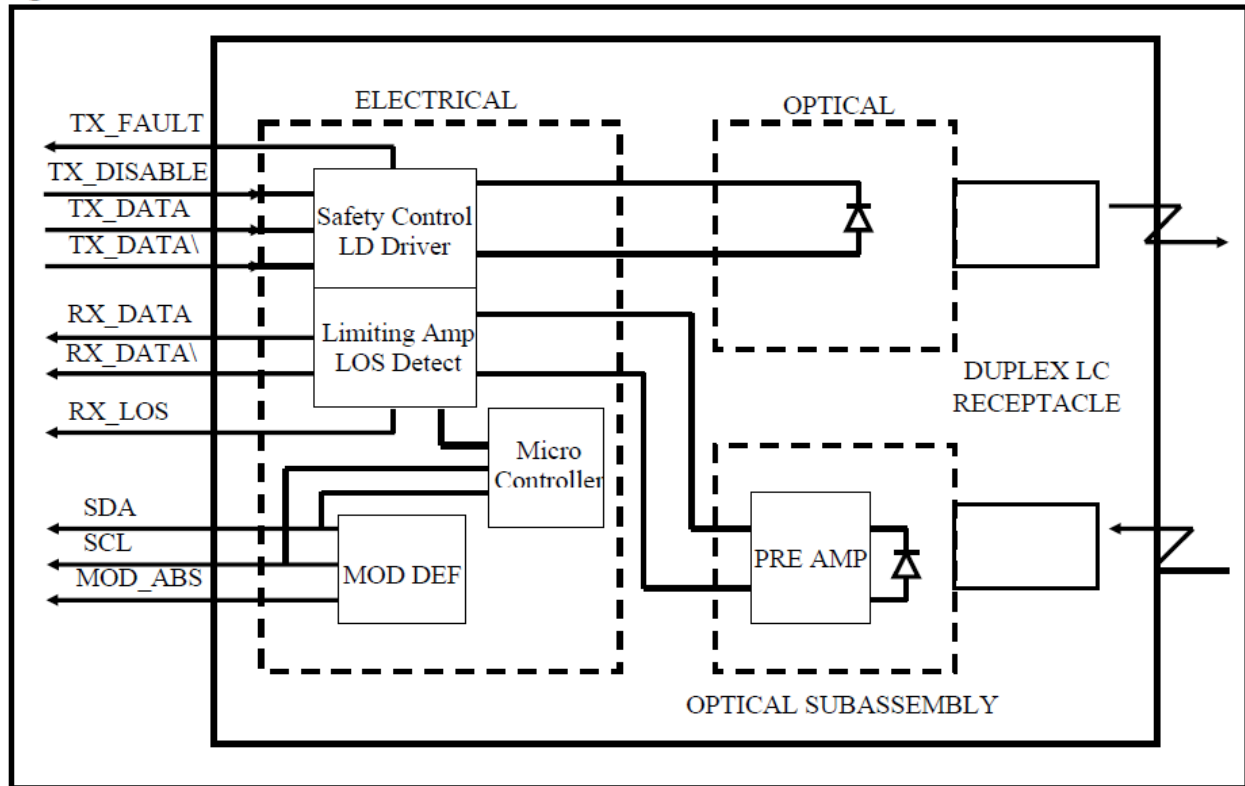**PCB Layout Recommendation**
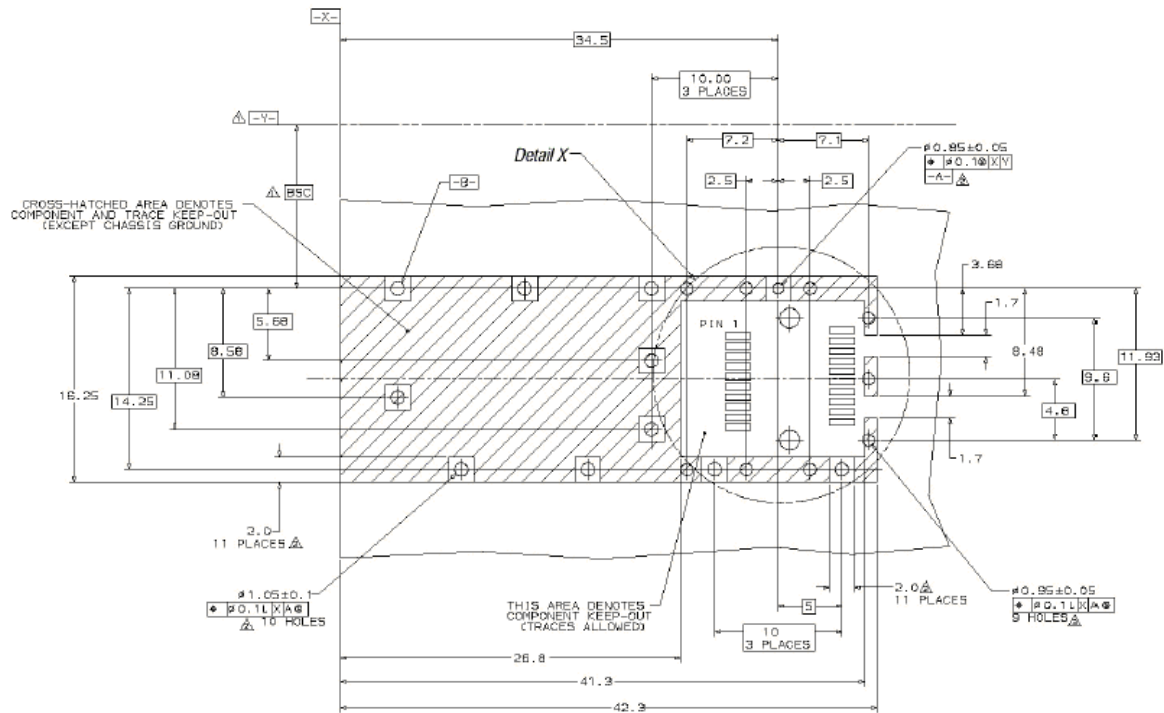


1. Datum and Basic Dimension Established by Customer
2. Pads and Vias are Chassis Ground, 11 Places
3. Through Holes are Unplated

## Block Diagram of Transceiver



**Transmitter Section-** The laser driver accept differential input data and provide bias and modulation currents for driving a laser. An automatic power-control (APC) feedback loop is incorporated to maintain a constant average optical power.1310nm LED in an eye safe optical subassembly (OSA) mates to the fiber cable.

**TX_DISABLE-** The TX_DISABLE signal is high (TTL logic "1") to turn off the laser output. The laser will turn on within 1ms when TX_DISABLE is low (TTL logic "0").
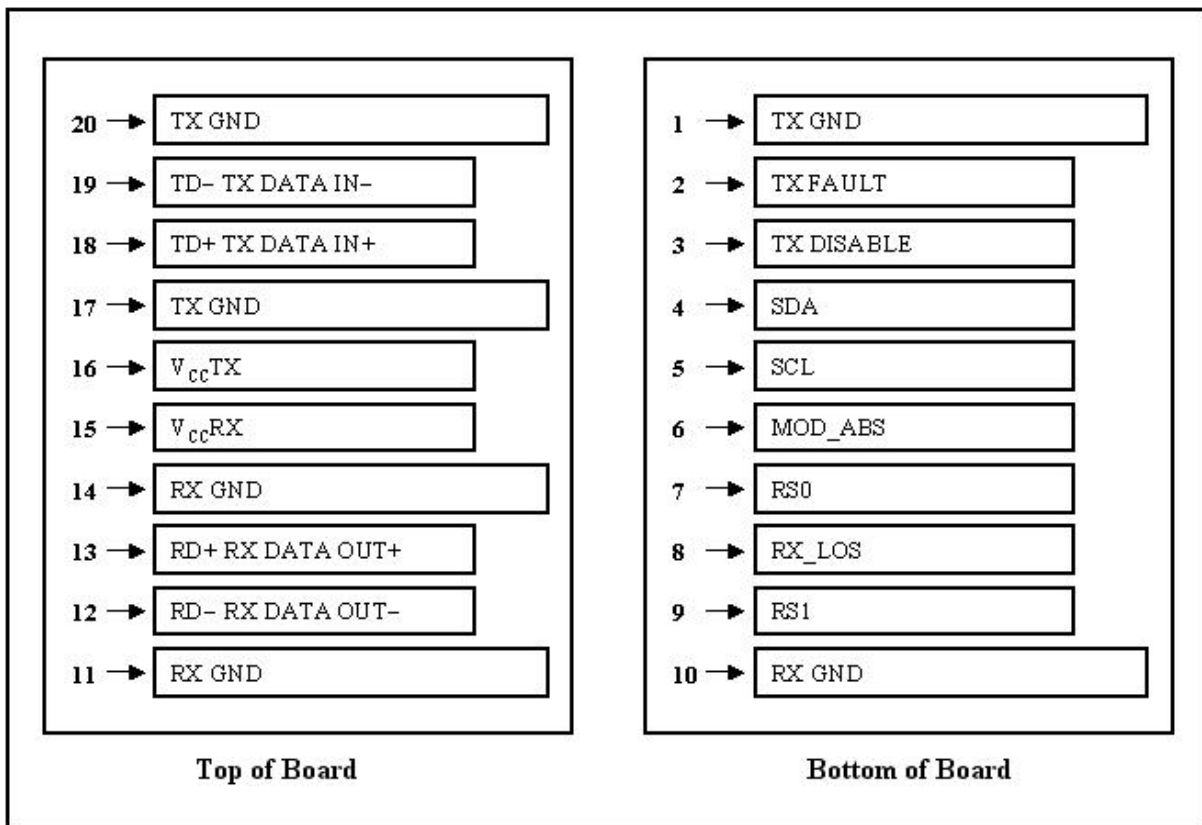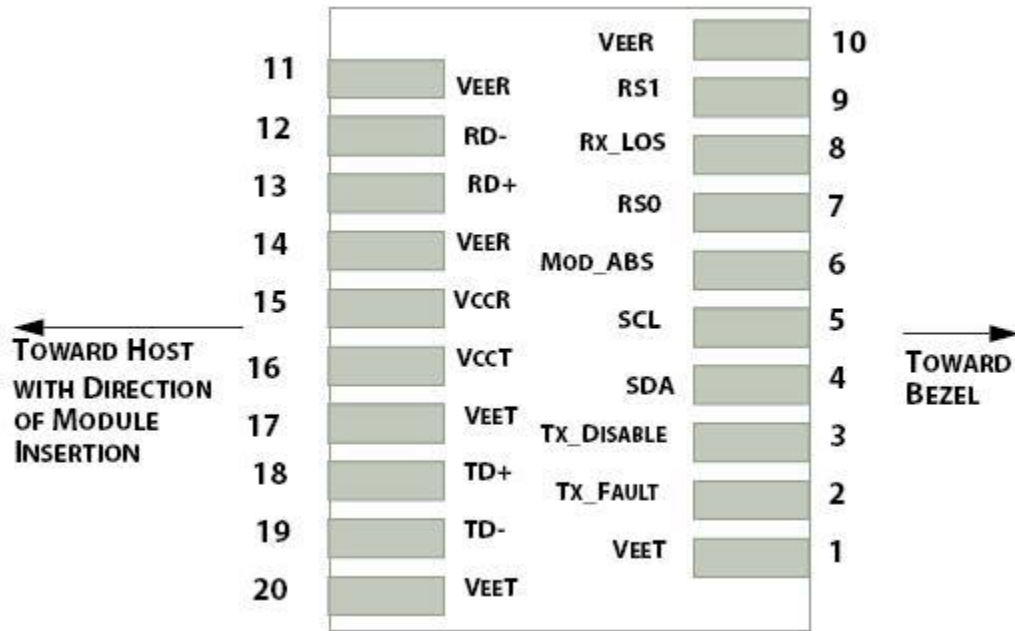
**TX_FAULT-** When the TX_FAULT signal is high, output indicates a laser fault of some kind. Low indicates normal operation.

**Receiver Section-** The receiver utilizes a PIN detector integrated with a trans-impedance preamplifier in an OSA. This OSA is connected to a Limiting Amplifier which providing post-amplification quantization, and optical signal detection. The limiting Amplifier is AC-coupled to the transimpedance amplifier, with internal 100Ω differential termination.

**Receive Loss (RX_LOS)-** The RX_LOS is high (logic "1") when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

**Controller Section-** The micro controller unit monitors the operation information of LD driver and Limiting Amplifier and report these status to the customer.

**Electrical Pad Layout**

| Pin | Signal | | Signal | Pin |
|-----|--------|--|--------|-----|
| 11 | VEER | | VEER | 10 |
| 12 | RD- | | RS1 | 9 |
| 13 | RD+ | | RX_LOS | 8 |
| 14 | VEER | | RS0 | 7 |
| 15 | VccR | | MOD_ABS | 6 |
| 16 | VccT | | SCL | 5 |
| 17 | VEET | | SDA | 4 |
| 18 | TD+ | | TX_DISABLE | 3 |
| 19 | TD- | | TX_FAULT | 2 |
| 20 | VEET | | VEET | 1 |

**TOWARD HOST WITH DIRECTION OF MODULE INSERTION** ←

**TOWARD BEZEL** →

| Pin | Top of Board | | Pin | Bottom of Board |
|-----|--------------|--|-----|-----------------|
| 20 | TX GND | | 1 | TX GND |
| 19 | TD- TX DATA IN- | | 2 | TX FAULT |
| 18 | TD+ TX DATA IN+ | | 3 | TX DISABLE |
| 17 | TX GND | | 4 | SDA |
| 16 | $V_{CC}TX$ | | 5 | SCL |
| 15 | $V_{CC}RX$ | | 6 | MOD_ABS |
| 14 | RX GND | | 7 | RS0 |
| 13 | RD+ RX DATA OUT+ | | 8 | RX_LOS |
| 12 | RD- RX DATA OUT- | | 9 | RS1 |
| 11 | RX GND | | 10 | RX GND |

**Top of Board**     **Bottom of Board**

**Pin Assignment**

| PIN # | Symbol | Description | Remarks |
|---|---|---|---|
| 1 | VEET | Transmitter ground (common with receiver ground) | Circuit ground is isolated from chassis ground |
| 2 | TFAULT | Transmitter Fault | |
| 3 | TDIS | Transmitter Disable. Laser output disable on high or open | Disabled: TDIS>2V or open Enabled: TDIS<0.8V |
| 4 | SDA | Data line for serial ID | Should Be pulled up with 4.7k – 10k ohm on host board to a voltage between 2V and 3.6V |
| 5 | SCL | Clock line for serial ID | |
| 6 | MOD_ABS | Module Absent.  Ground within the module | |
| 7 | RS0 | No Connection required | |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation | LOS is open collector output |
| 9 | RS1 | +3.3V Power Supply | Circuit ground is isolated from chassis ground |
| 10 | VEER | Receiver ground (common with transmitter ground) | |
| 11 | VEER | Receiver ground (common with transmitter ground) | |
| 12 | RD- | Receiver Inverted DATA out. AC coupled | |
| 13 | RD+ | Receiver Non-inverted DATA out. AC coupled | |
| 14 | VEER | Receiver ground (common with transmitter ground) | Circuit ground is isolated from chassis ground |
| 15 | VCCR | Receiver power supply | |
| 16 | VCCT | Transmitter power supply | Same as Pin# 1 |
| 17 | VEET | Transmitter ground (common with receiver ground) | Circuit ground is connected to chassis ground |
| 18 | TD+ | Transmitter Non-inverted DATA out. AC coupled | |
| 19 | TD- | Transmitter Inverted DATA out. AC coupled | |
| 20 | VEET | Transmitter ground (common with receiver ground) | Circuit ground is connected to chassis ground |

**References**

1. IEEE standard 802.3. IEEE Standard Department, 2002.

2. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.

4. ISO/IEC 9314-3 "Information