

# 10Gbps Copper SFP+ Transceiver

## SFP-10G-T-80

### Product Features

- Up to 10Gbps bi-directional data links
- RJ45 Max link distance 80 meters using cat 6a/7 cable
- Fully metallic enclosure for low EMI
- Compact RJ-45 Connector assembly
- Hot-pluggable SFP footprint
- Low power dissipation
- Extended case temperature: 0°C to 70°C
- RoHS compliant and Lead Free
- Access to physical layer IC via 2-wire serial bus



### Applications

- 10 Gigabit Ethernet over Cat 6a/7 cable
- 5GBASE-T over Cat 5e cable
- 2.5GBASE-T over Cat 5e cable
- 1000BASE-T (1G Ethernet) over Cat 5e cable
- 100M Ethernet over Cat 5e cable
- 10M Ethernet over Cat 5e cable

## 1. Product Description

The SFP-10G-T-80 is Copper Small Form plug-gable (SFP) transceiver, which is based on SFP multi-sourcing agreement (MSA). It compliant with wide variety of host-side interfaces including USXGMII, XFI, RXAUI, 2500BASE-X, 5GBASE-X, and SGMII to support full backward compatibility with lower speed legacy Ethernet rates including: 1Gbps, 100Mbps and 10Mbps.

## 2. +3.3V Volt Electrical Power Interface

The SFP-10G-T-80 has an input voltage range of 3.3V +/-5%, The 4 V maximum voltage is not allowed for continuous operation.

| Parameter            | Symbol | Min. | Typ | Max  | Units | Notes/Conditions                                                                 |
|----------------------|--------|------|-----|------|-------|----------------------------------------------------------------------------------|
| Supply Current       | Is     |      |     | 750  | mA    | 3.0W max power over full range of voltage and temperature.see caution note below |
| Power Supply Voltage | Vcc    | 3.13 | 3.3 | 3.47 | v     | Referenced to GND                                                                |
| Maximum Voltage      | Vmax   |      |     | 4    | v     |                                                                                  |
| Surge Current        | Isurge |      |     | 30   | mA    | Hot plug above steady state current,See caution note below                       |

Caution:Power consumption and surge current are higher than the specified values in the SFP MSA

**Table 1.+3.3 Volt electrical power interface**

## 3. Low-Speed Signals

| Parameter       | Symbol | Min.         | Max          |  | Units | Notes/Conditions                                             |
|-----------------|--------|--------------|--------------|--|-------|--------------------------------------------------------------|
| SFP Output LOW  | VOL    | 0            | 0.5          |  | V     | 4.7k to 10k pull-up to host Vcc,measured at host side of     |
| SFP Output HIGH | VOH    | Host Vcc-0.5 | Host Vcc+0.3 |  | V     | 4.7k to 10k pull-up to host Vcc,measured at host side of     |
| SFP Input LOW   | VIL    | 0            | 0.8          |  | V     | 4.7k to 10k pull-up to Vcc,measured at SFP side of connector |
| SFP Input HIGH  | VIH    | 2            | Vcc+0.3      |  | V     | 4.7k to 10k pull-up to Vcc,measured at SFP side of connector |

**Table 2. Low-speed signals,electronic characteristics**

## 4. High-Speed Electrical Interface

ALL high-speed signals are AC-coupled internally

(1)High-speed Electrical Interface Transmission Line-SFP

| Parameter           | Symbol  | Min. | Typ | Max  | Units | Notes/Conditions                                         |
|---------------------|---------|------|-----|------|-------|----------------------------------------------------------|
| Line Frequency      | fL      | 10   | 125 | 1000 | MHZ   | 5-level encoding,per IEEE 802.3                          |
| Tx Output Impedance | Zout,TX |      | 100 |      | Ohm   | Differential,for all frequencies between 1MHz and 125MHz |
| Rx Input Impedance  | Zin,RX  |      | 100 |      | Ohm   | Differential,for all frequencies between 1MHz and 125MHz |

**Table 3. High-speed electrical interface,transmission line-SFP**

(2)High-speed Electrical Interface,Host-SFP

| Parameter                      | Symbol   | Min. | Typ | Max  | Units | Notes/Conditions |
|--------------------------------|----------|------|-----|------|-------|------------------|
| Single ended data input swing  | Vinsing  | 250  |     | 1200 | mV    | Single ended     |
| Single ended data output swing | Voutsing | 350  |     | 850  | mV    | Single ended     |
| Rise/Fall Time                 | Tr,Tf    |      | 175 |      | psec  | 20%-80%          |
| Tx Input Impedance             | Zin      |      | 50  |      | Ohm   | Single ended     |
| Rx Output Impedance            | Zout     |      | 50  |      | Ohm   | Single ended     |

**Table 4. High-speed electrical interface,host-SFP**

## 5. General Specifications

| Parameter    | Symbol | Min. | Typ | Max   | Units  | Notes/Conditions                                  |
|--------------|--------|------|-----|-------|--------|---------------------------------------------------|
| Data Rate    | BR     | 10   |     | 10000 | Mb/sec | IEEE 802.3 compatible.See Notes 2 through 4 below |
| Reach Length | L      |      |     | 80    | Meter  | Category 5 UTP.BER<10 <sup>-12</sup>              |

**Table 5. General specifications**

Note:

- 1.Clock tolerance is +/- 50 ppm
- 2.By default,the SFP-10G-T-80 is a full duplex device in preferred master mode
- 3.Automatic crossover detection is enabled. External crossover cable is not required
4. Multi- BASE-T operation requires the host system to have an SGMII interface with no clocks, and the module PHY to be configured per Applications Note AN-2036.With a SERDES that does not support SGMII,the module will operate at single rate only.

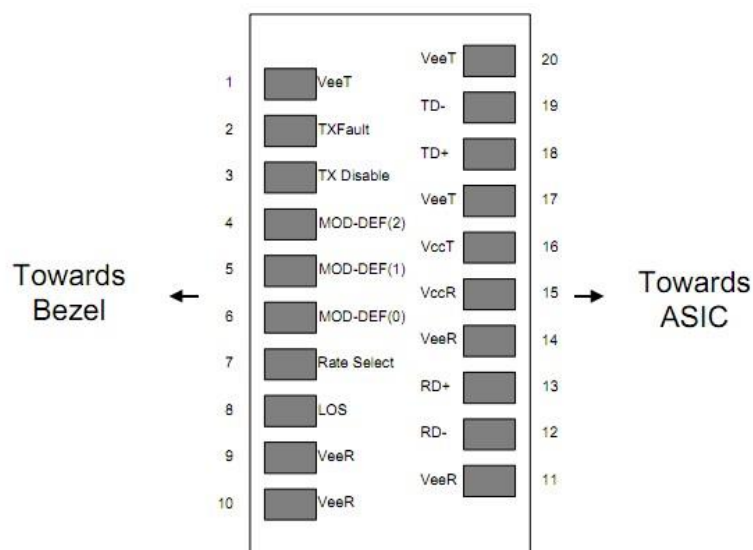
## 6. Environmental Specifications

The SFP-10G-T-80 has an extended range from -40°C to +85°C case temperature as specified in Table.

| Parameter             | Symbol | Min. | Typ | Max | Units | Notes/Conditions    |
|-----------------------|--------|------|-----|-----|-------|---------------------|
| Operating Temperature | Top    | 0    |     | 70  |       | Case temperature    |
| Storage Temperature   | Tsto   | -40  |     | 85  |       | Ambient temperature |

**Table 6. Environmental specifications**

## 7. Pin Descriptions



**Diagram of Host Board Connector Block Pin Numbers and Names**

| Pin | Symbol      | Description                                                 | Ref. |
|-----|-------------|-------------------------------------------------------------|------|
| 1   | VEET        | Transmitter Ground (Common with Receiver Ground)            | 7.1  |
| 2   | TFAULT      | Transmitter Fault. Not supported.                           |      |
| 3   | TDIS        | Transmitter Disable. Laser output disabled on high or open. | 7.2  |
| 4   | MOD_DEF(2)  | Module Definition 2. Data line for Serial ID.               | 7.3  |
| 5   | MOD_DEF(1)  | Module Definition 1. Clock line for Serial ID.              | 7.3  |
| 6   | MOD_DEF(0)  | Module Definition 0. Grounded within the module.            | 7.3  |
| 7   | Rate Select | No connection required                                      |      |
| 8   | LOS         | High indicates no linked. low indicates linked.             | 7.4  |
| 9   | VEER        | Receiver Ground (Common with Transmitter Ground)            | 7.1  |
| 10  | VEER        | Receiver Ground (Common with Transmitter Ground)            | 7.1  |
| 11  | VEER        | Receiver Ground (Common with Transmitter Ground)            | 7.1  |
| 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)            | 7.1  |
| 15  | VCCR        | Receiver Power Supply                                       |      |
| 16  | VCCT        | Transmitter Power Supply                                    |      |
| 17  | VEET        | Transmitter Ground (Common with Receiver Ground)            | 7.1  |
| 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) | 7.1 |
|----|------|--------------------------------------------------|-----|

**Table 7. SFP to host connector pin assignments and descriptions**

Notes:

7.1 Circuit ground is connected to chassis ground.

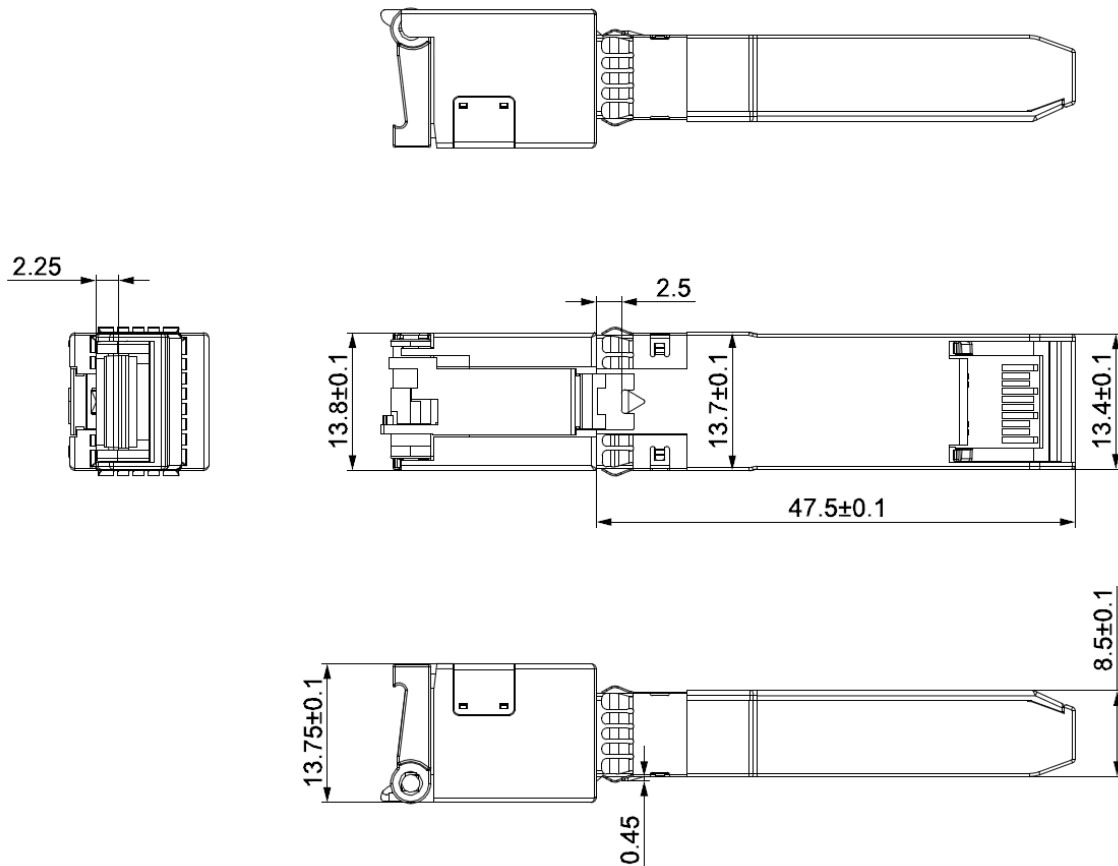
7.2 PHY disabled on TDIS>2.0V or open, enabled on TDIS<0.8V.

7.3 Should be pulled up with 4.7k - 10k Ohms on host board to a voltage between 2.0V and 3.6V.

MOD\_DEF(0) pulls line low to indicate module is plugged in.

7.4 LVTTTL compatible with a maximum voltage of 2.5V.

## 8. Mechanical Specifications



## 9. Serial Communication Protocol

SFP-10G-T-80 supports the 2-wire serial communication protocol outlined in the SFP MSA. The physical layer IC can also be accessed via the 2-wire serial bus at address Ach.

### Serial Bus Timing Requirements

| Parameter     | Symbol | Min. | Typ | Max    | Units | Notes/Conditions |
|---------------|--------|------|-----|--------|-------|------------------|
| IC Clock Rate |        | 0    |     | 100000 | Hz    |                  |

## Ordering Information

| Part No.     | Data Rate | Tx_DIS | Link Indicator<br>on Rx_LOS Pin | Temp     |
|--------------|-----------|--------|---------------------------------|----------|
| SFP-10G-T-80 | 10G       | Yes    | Yes                             | 0°C~70°C |

### NOTICE:

Connlight reserves the right to make changes to this product in this specification without notice, in order to improve product performance.