深圳市源拓光电技术有限公司
SHENZHEN WIN TOP OPTICAL TECHNOLOGY CO.,LTD.

# WT-SFP+-BD/U-10L

# 10Gb/s SFP+ BIDI Transceiver

## 1.Feature

- SFP+ package with LC connector
- 1270nm(1330nm) DFB Laser and PIN-TIA photodetector
- Up to 10Km transmission on SMF
- Up to 11.3Gbps Data Links
- Support dual CDR in TX and RX channel(optional)
- +3.3V single power supply
- Power dissipation<1.5W
- 2-wire interface with integrated Digital Diagnostic monitoring
- Low EMI and excellent ESD protection
- laser safety standard IEC-60825 compliant
- Compatible with RoHS
- Compliant with SFF-8472 SFP+ MSA
- Compliant to SFP+ SFF-8431 and SFF-8432

## 2.Application

- Ethernet
- Telecom
- Fiber Channel

## 3.Absolute Maximum Ratings

| Parameter | Symbol | Minimum | Maximum | Units |
|---|---|---|---|---|
| Storage Temperature | Tst | -40 | +85 | °C |
| Supply Voltage | Vcc | -0.3 | +4.0 | V |
| Operating Relative Humidity | RH | 5 | 95 | % |

## 4.Operation Environment

| Parameter | | Symbol | Min | Typical | Max | Units |
|---|---|---|---|---|---|---|
| Supply Voltage | | Vcc | 3.15 | 3.3 | 3.45 | V |
| Operating Case Temperature | Commercial | Tc | -5 | | +70 | °C |
| | Industrial | | -40 | | +85 | |
| Power Dissipation | | | | | 1.5 | W |
| Data Rate | | | | 10.3125 | | Gbps |

## 5.Optical Characteristics

(Ambient Operating Temperature 0°C to +70°C, Vcc =3.3 V)

| **Parameter** | | **Symbol** | **Min.** | **Typ.** | **Max.** | **Units** |
|---|---|---|---|---|---|---|
| **Transmitter Section** | | | | | | |
| Center Wavelength | Tx 1270 | λo | 1260 | 1270 | 1280 | nm |
| | Tx 1330 | | 1320 | 1330 | 1340 | |
| Spectral Width(-20dB) | Tx 1270 | Δλ | | | 1 | nm |
| | Tx 1330 | | | | 1 | |
| Average Output Power | Tx 1270 | Po | -5 | | 0 | dBm |
| | Tx 1330 | | -5 | | 0 | |
| Extinction Ratio | | Er | 3.5 | | | dB |

| | | | | | | |
|---|---|---|---|---|---|---|
| Side-Mode Suppression Ratio | | SMSR | 35 | | | dB |
| Total jitter | | Tj | IEEE 802.3ae | | | |
| **Receiver Section** | | | | | | |
| Center Wavelength | Rx 1330 | λo | 1320 | 1330 | 1340 | nm |
| | Rx 1270 | | 1260 | 1270 | 1280 | |
| Receiver Sensitivity | | Rsen | | | -13 | dBm |
| Receiver Overload | | Rov | -3 | | | dBm |
| Return Loss | | | 12 | | | dB |
| LOS Assert | | $LOS_A$ | -22 | | | dBm |
| LOS Dessert | | $LOS_D$ | | | -18 | dBm |
| LOS Hysteresis | | | 0.5 | | 4 | |

## 6.Electrical Characteristics

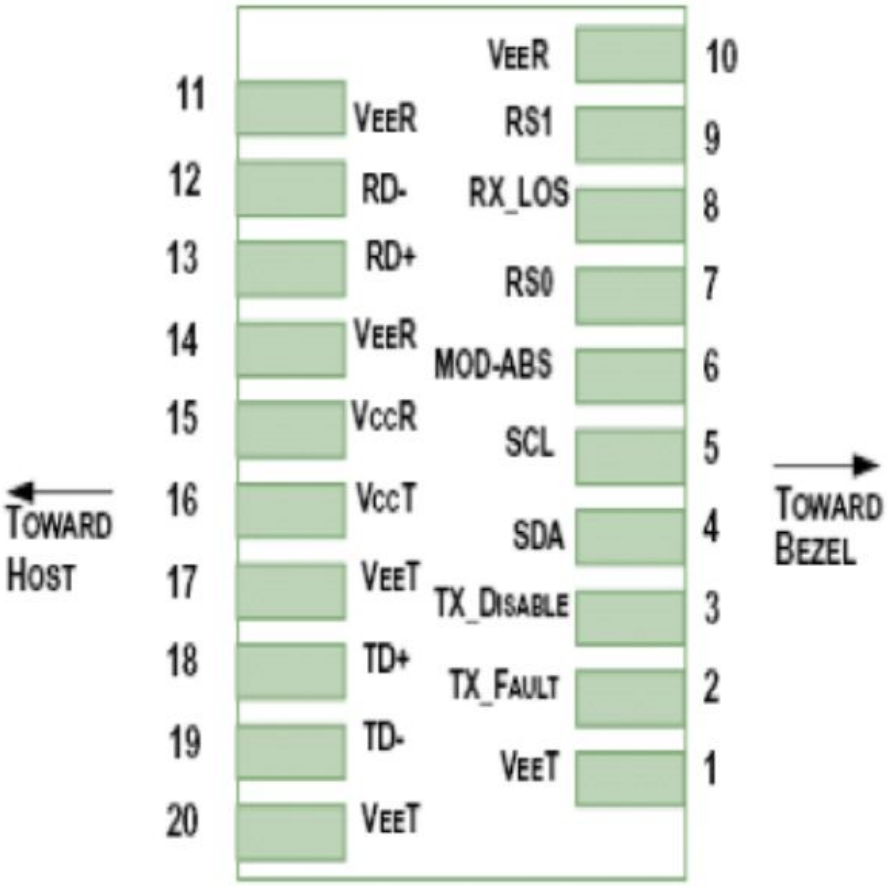
(Ambient Operating Temperature 0°C to +70°C, Vcc =3.3 V)

| Parameter | | Symbol | Min. | Typ. | Max. | unit |
|---|---|---|---|---|---|---|
| **Transmitter Section** | | | | | | |
| Input Differential Impendence | | Zin | 90 | 100 | 110 | Ohm |
| Data Input Swing Differential | | Vin | 180 | | 700 | mV |
| TX Disable | Disable | | 2.0 | | Vcc | V |
| | Enable | | -0.3 | | 0.8 | V |
| TX Fault | Assert | | 2.4 | | Vcc | V |
| | Deassert | | -0.3 | | 0.8 | V |
| **Receiver Section** | | | | | | |
| Output differential impendence | | Zout | 80 | 100 | 120 | Ohm |
| Data Input Swing Differential | | Vout | 300 | | 850 | mV |
| Rx_LOS | Assert | | 2.0 | | Vcc | V |
| | Deassert | | -0.3 | | 0.4 | V |

## 7.Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration |
|---|---|---|---|---|
| Temperature | -5 ~ 70 | ±3 | ℃ | Internal |
| Voltage | 0 ~ VCC | 0.1 | V | Internal |
| Bias Current | 0 ~ 120 | ±2 | mA | Internal |
| Tx Power | -5 ~ +5 | ±1 | dBm | Internal |
| Rx Power | -30 ~ 0 | ±2 | dBm | Internal |

## 8.Pin Description



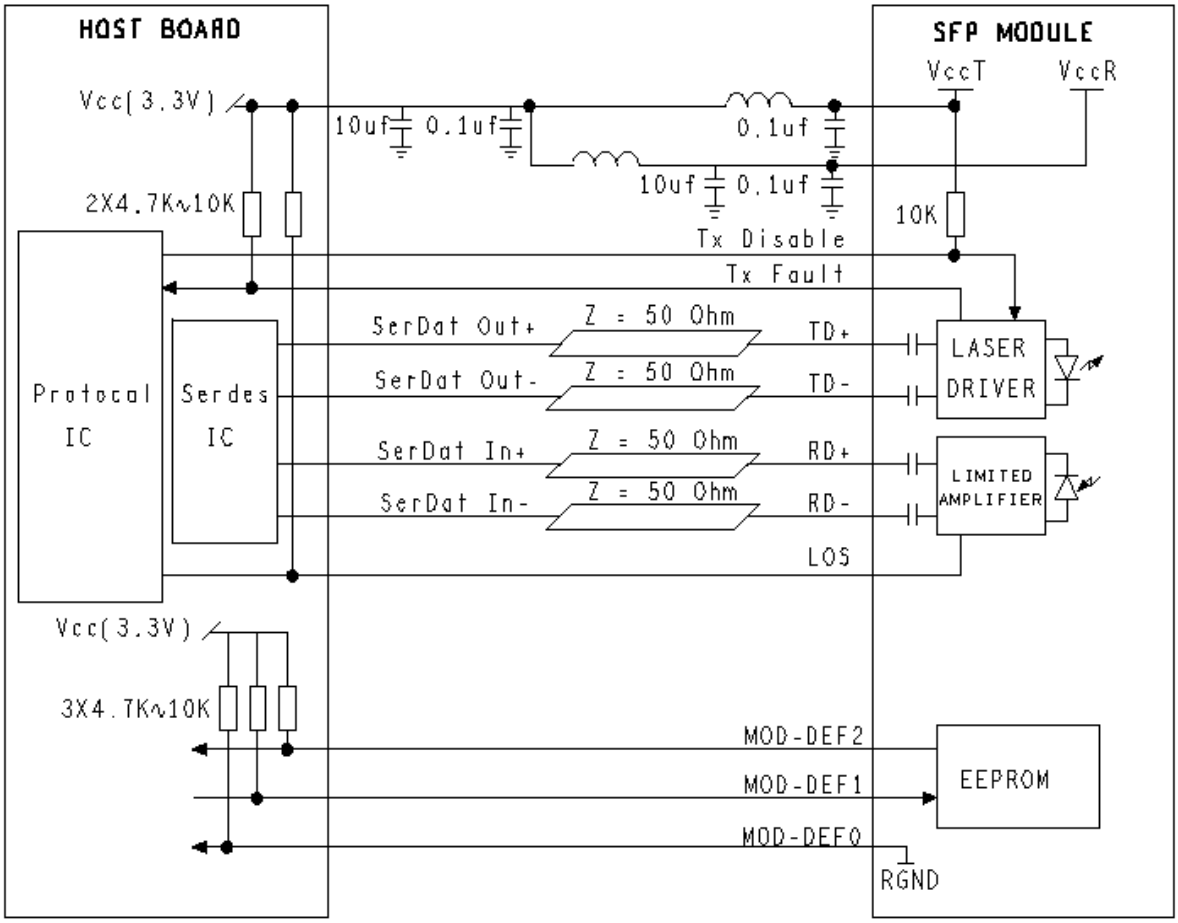

| Pins | Name | Discription | NOTE |
|---|---|---|---|
| 1 | VeeT | Transmitter Ground | |
| 2 | Tx Fault | Transmitter Fault Indication | 1 |
| 3 | Tx Disable | Transmitter Disable | 2 |

| | | | |
|---|---|---|---|
| 4 | MOD DEF2 | Module Definition 2 | 3 |
| 5 | MOD DEF1 | Module Definition 1 | 3 |
| 6 | MOD DEF0 | Module Definition 0 | 3 |
| 7 | RS0 | Not Connected | |
| 8 | LOS | Loss of Signal | 4 |
| 9 | RS1 | Not Connected | |
| 10 | VeeR | Receiver Ground | |
| 11 | VeeR | Receiver Ground | |
| 12 | RD- | Inv. Received Data Output | 5 |
| 13 | RD+ | IReceived Data Output | 5 |
| 14 | VeeR | Receiver Ground | |
| 15 | VccR | Receiver Power | |
| 16 | VccT | Transmitter Power | |
| 17 | VeeT | Transmitter Ground | |
| 18 | TD+ | Transmit Data Input | 6 |
| 19 | TD- | Inv. Transmit Data Input | 6 |
| 20 | VeeT | Transmitter Ground | |

Notes:

1. TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
2. TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. Its states are:
   Low (0~0.8V): Transmitter on
   (>0.8V, <2.0V): Undefined
   High (2.0~3.3V): Transmitter Disabled
   Open: Transmitter Disabled
3. MOD-DEF 0,1,2 are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor onthe host board. The pull-up voltage shall be VccT or VccR.
   MOD-DEF 0 is grounded by the module to indicate that the module is present
   MOD-DEF 1 is the clock line of two wire serial interface for serial ID
   MOD-DEF 2 is the data line of two wire serial interface for serial ID
4. LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates loss of signal. In the low state, the output will be pulled to less than 0.8V.
5. These are the differential receiver output. They are internally AC-coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES.
6. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module.

## 9. Recommended Application Circuit



## 10. Outline drawing (mm)