



## 155M SFP Bidi Transceiver(T1310/R1550,40KM)

| Features                                                                                                                  | Applications                                  |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Compliant with ITU-T G.957,G.958<br>Single Mode Bi-directional Transmission<br>Single +3.3V Power Supply<br>Hot-Pluggable | SDH/SONET<br>Fast Ethernet<br>WDM Application |

**Specifications****Electrical and Optical Characteristics(Condition: T<sub>a</sub>=T<sub>op</sub>)**

| Parameter                              | Symbol          | Min. | Typical | Max.            | Unit   |
|----------------------------------------|-----------------|------|---------|-----------------|--------|
| Transmitter Differential Input Voltage | +/-TX_DAT       | 200  | --      | 1600            | mV p-p |
| Supply Current                         | I <sub>cc</sub> | --   | 130     | 180             | mA     |
| Tx_Disable Input Voltage – Low         | V <sub>IL</sub> | 0    | --      | 0.8             | V      |
| Tx_Disable Input Voltage – High        | V <sub>IH</sub> | 2.0  | --      | V <sub>cc</sub> | V      |
| Tx_Fault Output Voltage – Low          | V <sub>OL</sub> | 0    | --      | 0.8             | V      |
| Tx_Fault Output Voltage – High         | V <sub>OH</sub> | 2.0  | --      | V <sub>cc</sub> | V      |
| Receiver Differential Output Voltage   | +/-RX_DAT       | 600  | --      | 1400            | mV p-p |
| Rx_LOS Output Voltage- Low             | V <sub>OL</sub> | 0    | --      | 0.8             | V      |
| Rx_LOS Output Voltage- High            | V <sub>OH</sub> | 2.0  | --      | V <sub>cc</sub> | V      |

**Transmitter**

| Parameter             | Symbol           | Min.                       | Typical | Max.  | Unit |
|-----------------------|------------------|----------------------------|---------|-------|------|
| Data Rate             | B                | --                         | 155     | --    | Mb/s |
| Center Wavelength     | $\lambda_c$      | 1270                       | 1310    | 1355  | nm   |
| Output Spectral Width | $\Delta \lambda$ | --                         | --      | 4     | nm   |
| Average Output Power  | P <sub>0</sub>   | -5                         | --      | 0     | dBm  |
| Extinction Ratio      | E.R.             | 10                         | --      | --    | dB   |
| Supply Current        | I <sub>cc</sub>  | --                         | 90      | 150   | mA   |
| Operating Voltage     | V <sub>cc</sub>  | +3.0                       | --      | +3.6  | V    |
| Input Voltage-Low     | V <sub>IL</sub>  | -1.82                      | --      | -1.48 | V    |
| Input Voltage-High    | V <sub>IH</sub>  | -1.16                      | --      | -0.89 | V    |
| Output Optical Eye    |                  | Compliant with ITU-T G.957 |         |       |      |

**Receiver**

| Parameter                         | Symbol           | Min.                  | Typical | Max.                  | Unit |
|-----------------------------------|------------------|-----------------------|---------|-----------------------|------|
| Receive Sensitivity               | P <sub>min</sub> | --                    | --      | -33                   | dBm  |
| Maximum Input Power               | P <sub>MAX</sub> | -3                    | --      | --                    | dBm  |
| Signal Detect Threshold-De-Assert | S <sub>D</sub>   | --                    | --      | -34                   | dBm  |
| Signal Detect Threshold-Assert    | S <sub>A</sub>   | -44                   | --      | --                    | dBm  |
| Hysteresis                        | --               | --                    | 3.0     | --                    | dBm  |
| Output High Voltage               | V <sub>OH</sub>  | V <sub>CC</sub> -1.03 | --      | V <sub>CC</sub> -0.89 | V    |
| Output Low Voltage                | V <sub>OL</sub>  | V <sub>CC</sub> -1.82 | --      | V <sub>CC</sub> -1.63 | V    |
| Operating Wavelength              | λ <sub>c</sub>   | 1480                  | 1550    | 1580                  | nm   |
| Supply Current                    | I <sub>CC</sub>  | ---                   | 80      | 110                   | mA   |

**Absolute Maximum Ratings(TC=25°C)**

| Parameter             | Symbol                              | Min. | Max. | Unit |
|-----------------------|-------------------------------------|------|------|------|
| Storage Temperature   | T <sub>ST</sub>                     | -40  | +85  | °C   |
| Operating Temperature | T <sub>IP</sub> ( Commercial grade) | 0    | +70  | °C   |
|                       | T <sub>IP</sub> ( Industrial grade) | -40  | +85  | °C   |
| Input Voltage         | T <sub>CC</sub>                     | 0    | +5   | V    |

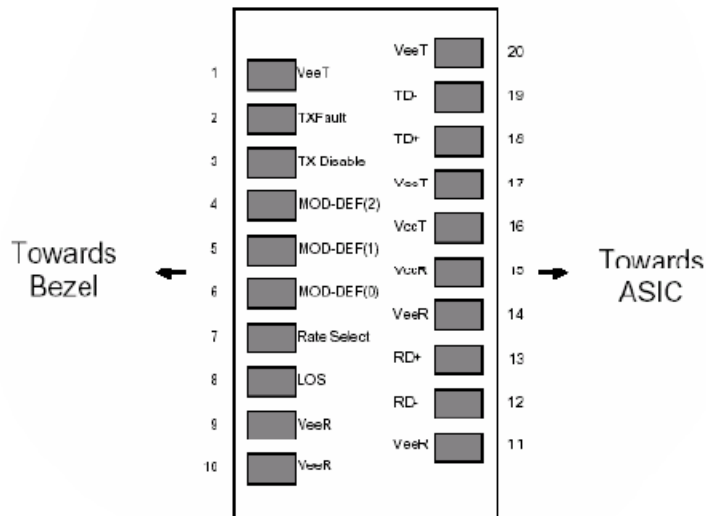
**Recommended Operating Environment**

| Parameter             | Symbol                              | Min. | Typical | Max. | Unit |
|-----------------------|-------------------------------------|------|---------|------|------|
| Supply Voltage        | V <sub>CC</sub>                     | +3.0 | +3.3    | +3.6 | V    |
| Operating Temperature | T <sub>OP</sub> ( Commercial grade) | 0    | --      | +70  | °C   |
|                       | T <sub>OP</sub> ( Industrial grade) | -40  | --      | +85  | °C   |

**Timing Characteristics:**

| Parameter                                       | Symbol                 | Min. | Typical | Max.       | Unit |
|-------------------------------------------------|------------------------|------|---------|------------|------|
| TX_DISABLE Assert Time                          | t <sub>off</sub>       |      | 3       | 10         | usec |
| TX_DISABLE Negate Time                          | t <sub>on</sub>        |      | 0.5     | 1          | msec |
| Time to Initialize Include Reset of TX_FAULT    | t <sub>int</sub>       |      | 30      | 300        | msec |
| TX_FAULT from Fault to Assertion                | t <sub>fault</sub>     |      | 20      | <b>100</b> | usec |
| TX_DISBEL Time to Start Reset                   | t <sub>reset</sub>     | 10   |         |            | usec |
| Receiver Loss of Signal Assert Time (Off to On) | T <sub>A</sub> ,RX_LOS |      |         | 100        | usec |
| Receiver Loss of Signal Assert Time (On to Off) | T <sub>d</sub> ,RX_LOS |      |         | 100        | usec |

**Pin Description**



| Pin | Symbol             | Description                                                   |
|-----|--------------------|---------------------------------------------------------------|
| 1   | V <sub>EET</sub>   | Transmitter Ground(Common with Receiver Ground)               |
| 2   | T <sub>FAULT</sub> | Transmitter Fault. Not supported                              |
| 3   | T <sub>DIS</sub>   | Transmitter Disable.Laser output disabled on high or open     |
| 4   | MOD_DEF(2)         | Module Definition 2.Data line for Serial ID                   |
| 5   | MOD_DEF(1)         | Module Definition 1.Data line for Serial ID                   |
| 6   | MOD_DEF(0)         | Module Definition 0.Grounded within the moudle                |
| 7   | Rate Select        | No connection required                                        |
| 8   | LOS                | Loss of Signal indication.Logic 0 indicates normal operation. |
| 9   | V <sub>EER</sub>   | Receiver Ground(Common with Transmitter Ground)               |
| 10  | V <sub>EER</sub>   | Receiver Ground(Common with Transmitter Ground)               |
| 11  | V <sub>EER</sub>   | Receiver Ground(Common with Transmitter Ground)               |
| 12  | RD-                | Receiver Inverted DATA out.AC Coupled                         |
| 13  | RD+                | Receiver Non-inverted DATA out.AC Coupled                     |
| 14  | V <sub>EER</sub>   | Receiver Ground(Common with Transmitter Ground)               |
| 15  | V <sub>CCR</sub>   | Receiver Power Supply                                         |
| 16  | V <sub>CCT</sub>   | Transmitter Power Supply                                      |
| 17  | V <sub>EET</sub>   | Transmitter Ground(Common with Receiver Ground)               |
| 18  | TD+                | Transmitter Non-inverted DATA in.AC Coupled                   |
| 19  | TD-                | Transmitter Inverted DATA in.AC Coupled                       |
| 20  | V <sub>EET</sub>   | Transmitter Ground(Common with Receiver Ground)               |

1. Circuit ground is internally isolated from chassis ground.
  2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
  3. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V.
- MOD\_DEF(0) pulls line low to indicate module is plugged in.



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4. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

### Ordering Information

| TRAN | Packaging | Data Rate | Distance | Wavelength | LD/PD Type                     | Operation Temperature | Fiber Type | DDMI      |
|------|-----------|-----------|----------|------------|--------------------------------|-----------------------|------------|-----------|
| TRAN | BidiSFP   | 155M      | 2KM      | T1310/     | 1:FP-LD/PIN-TIA                | 1=0~+70 C             | S:SM       | 1:Without |
|      |           | 622M      | 15KM     | R1550.     | 2:DFB-LD/PIN-TIA               | 2=-4 ~+85 C           | M:MM       | DDMI      |
|      |           | 1.25G     | 40KM     | T1550/     | 3:VCSEL/PIN-TIA                |                       |            | 2:With    |
|      |           | 2.5G      | 80KM     | R1310      | 5:DFB-LD/APD                   |                       |            | DDMI      |
|      |           |           | 100KM    |            | 6:DFB-LD with Isolator/PIN-TIA |                       |            |           |
|      |           |           |          |            | 7:DFB-LD with Isolator/APD     |                       |            |           |