

10Gb/s XFP 20km BIDI Tx1270/Rx1330 Optical Transceiver

Product Features

- Supports 8.0Gb/s to 11.1Gb/s bit rates
- Hot-pluggable XFP footprint, Built-in digital diagnos
- Maximum link length of 20km with SMF
- 1270nm DFB laser and PIN photodiode
- XFP MSA package with duplex LC connector
- No reference clock required
- Single +3.3V power supply
- Power dissipation <1.5W
- Compatible with RoHS
- Temperature range : -5 to +85° C

Applications

- SONET OC-192&SDH STM-64 at 9.953Gbps
- 10GBASE-LR/LW 10G Ethernet
- 1200-SM-LL-L 10G Fibre Channel
- 10GE over G.709 at 11.09Gbps
- OC192 over FEC at 10.709Gbps
- Other optical links, up to 11.1Gbps

This product is compliant with the 10G Small Form-Factor Pluggable (XFP) Multi-Source Agreement (MSA), supporting data-rate of 8.0~11.1Gbps, and transmission distance up to 20km on SMF.

The transceiver module comprises a transmitter with 1270nm DFB laser and a receiver with a PIN photodiode. Transmitter and receiver are separate within a wide temperature range and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10 GbE systems.

Ordering Information

| Part Number | Description |
|---------------------|--|
| AC-B-XFPBI20-E23-xx | XFP 10G BIDI Tx1270nm/Rx1330nm 20km Extended Temperature Optical Transceiver |

Regulatory Compliance

| Feature | Standard | Performance |
|--------------------------------------|--|---------------------------------------|
| Electromagnetic Interference (EMI) | FCC Part 15 Class B EN 55022:2010, Class B | Compatible with standards |
| Electromagnetic susceptibility (EMS) | EN 55024:2010 | Compatible with standards |
| Laser Eye Safety | FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2 | Compatible with Class I laser product |

Absolute Maximum Ratings

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

| Parameter | Symbol | Min | Max | Unit | Notes |
|--------------------------------------|--------|------|-----|------|-------|
| Storage Temperature | TS | -40 | 85 | degC | |
| Power Supply Voltage | VCC | -0.5 | 4.5 | V | |
| Relative Humidity (non-condensation) | RH | 5 | 85 | % | |

Recommended Operating Conditions and Power Supply Requirements

| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
|----------------------------|--------|-------|---------|-------|------|-------|
| Operating Case Temperature | TOP | -5 | | 85 | degC | |
| Power Supply Voltage | VCC | 3.135 | 3.3 | 3.465 | V | |
| Data Rate, each Lane | | 8.0 | | 11.1 | Gb/s | |
| Power Supply Current | Icc | | | 500 | mA | |

Optical Characteristics

| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
|-------------------------------|------------------|------|---------|------|----------|-------|
| Transmitter | | | | | | |
| Centre Wavelength | λ_c | 1260 | 1270 | 1280 | nm | |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | |
| Side-Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Average Output Power | P _{out} | -3 | | +2 | dBm | 1 |
| Extinction Ratio | ER | 3.5 | | | dB | |
| Data Input Swing Differential | V _{IN} | 180 | | 950 | mV | 2 |
| Input Differential Impedance | Z _{IN} | 90 | 100 | 110 | Ω | |
| TX Disable | Disable | 2.0 | | Vcc | V | |

| | | | | | | | |
|--------------------------------|------------------|------|------|-----------------|-----|---|---|
| | Enable | | 0 | | 0.8 | V | |
| Receiver | | | | | | | |
| Centre Wavelength | λ_c | 1320 | 1330 | 1340 | nm | | |
| Receiver Sensitivity | | | | -14.5 | dBm | | 3 |
| Receiver Overload | | 0.5 | | | dBm | | 3 |
| LOS De-Assert | LOS _D | | | -15.5 | dBm | | |
| LOS Assert | LOS _A | -26 | | | dBm | | |
| LOS Hysteresis | | 0.5 | | 4 | dB | | |
| Data Output Swing Differential | V _{out} | 400 | 600 | 800 | mV | | 2 |
| LOS | High | 2.0 | | V _{cc} | V | | |
| | Low | | | 0.8 | V | | |

Notes:

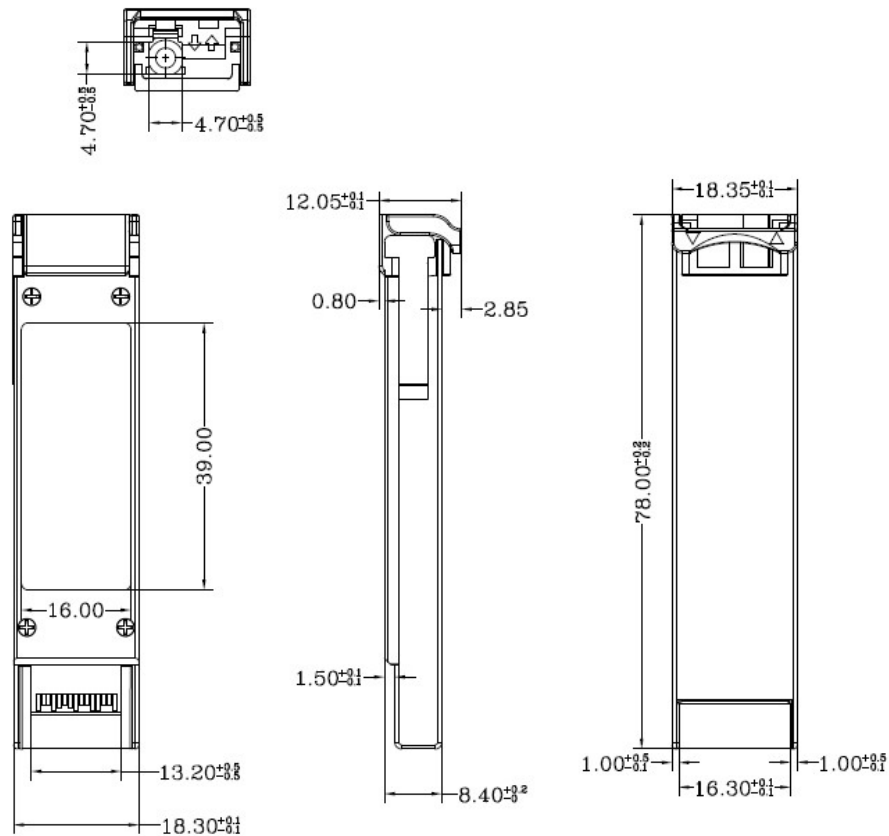
1. The optical power is launched into SMF.
2. Internally AC-coupled.
3. Measured with a PRBS 2³¹-1 test pattern @9953Mbps, BER $\leq 1 \times 10^{-12}$.

Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the normal operating conditions unless otherwise specified.

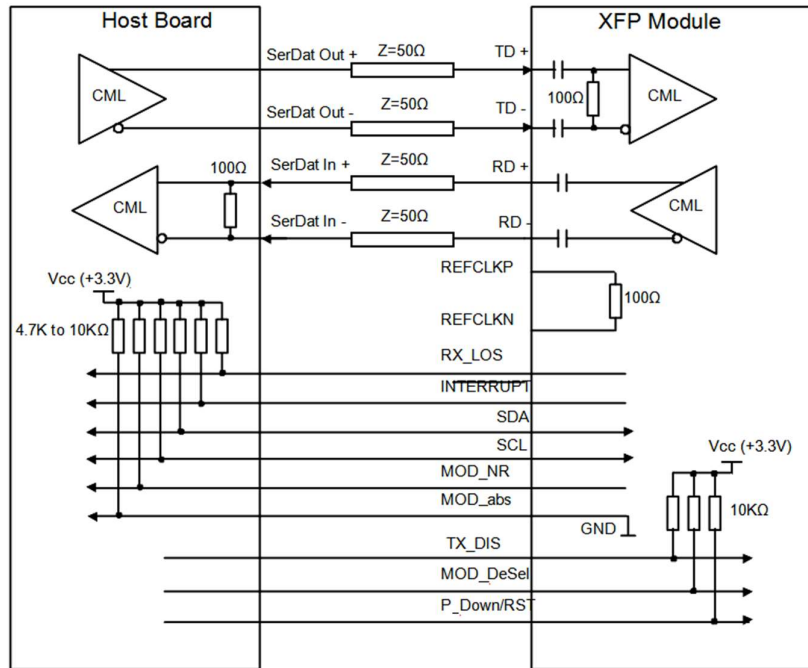
| Parameter | Symbol | Min | Max | Unit | Notes |
|---|-----------|------|-----|------|----------------------|
| Temperature monitor absolute error | DMI_Temp | -3 | 3 | degC | Over operating temp |
| Supply voltage monitor absolute error | DMI_VCC | -0.1 | 0.1 | V | Full operating range |
| Channel RX power monitor absolute error | DMI_RX | -3 | 3 | dB | Per channel |
| Channel Bias current monitor | DMI_Ibias | -10% | 10% | mA | Per channel |
| Channel TX power monitor absolute error | DMI_TX | -3 | 3 | dB | Per channel |

Mechanical Dimension

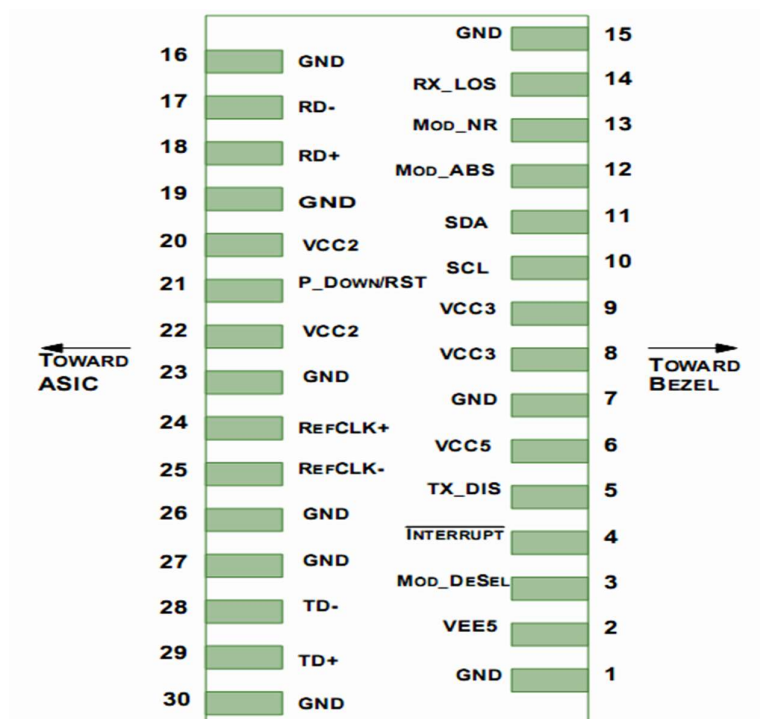


(Unit: mm [inch])

Recommended High-speed Interface Circuit



Pin Assignment and Description



Pin Assignment

| Pin | Logic | Symbol | Name/Description | Ref |
|-----|----------|----------------|--|-----|
| 1 | | GND | Module Ground | 1 |
| 2 | | VEE5 | Optional –5.2 Power Supply – Not required | |
| 3 | LVTTTL-I | Mod-Desel | Module De-select; When held low allows the module to, respond to 2-wire serial interface commands | |
| 4 | LVTTTL-O | Interrupt | Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface | 2 |
| 5 | LVTTTL-I | TX_DIS | Transmitter Disable; Transmitter laser source turned off | |
| 6 | | VCC5 | +5 Power Supply – Not required | |
| 7 | | GND | Module Ground | 1 |
| 8 | | VCC3 | +3.3V Power Supply | |
| 9 | | VCC3 | +3.3V Power Supply | |
| 10 | LVTTTL-I | SCL | Serial 2-wire interface clock | 2 |
| 11 | LVTTTL- | SDA | Serial 2-wire interface data line | 2 |
| 12 | LVTTTL-O | Mod_Abs | Module Absent; Indicates module is not present. Grounded in the module. | 2 |
| 13 | LVTTTL-O | Mod_NR | Module Not Ready; | 2 |
| 14 | LVTTTL-O | RX_LOS | Receiver Loss of Signal indicator | 2 |
| 15 | | GND | Module Ground | 1 |
| 16 | | GND | Module Ground | 1 |
| 17 | CML-O | RD- | Receiver inverted data output | |
| 18 | CML-O | RD+ | Receiver non-inverted data output | |
| 19 | | GND | Module Ground | 1 |
| 20 | | VCC2 | +1.8V Power Supply – Not required | |
| 21 | LVTTTL-I | P_Down/RS T | Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset | |
| | | | Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. | |
| 22 | | VCC2 | +1.8V Power Supply – Not required | |
| 23 | | GND | Module Ground | 1 |
| 24 | PECL-I | RefCLK+ | Reference Clock non-inverted input, AC coupled on the host board – Not required | 3 |
| 25 | PECL-I | RefCLK- | Reference Clock inverted input, AC coupled on the host board – Not required | 3 |
| 26 | | GND | Module Ground | 1 |
| 27 | | GND | Module Ground | 1 |
| 28 | CML-I | TD- | Transmitter inverted data input | |
| 29 | CML-I | TD+ | Transmitter non-inverted data input | |
| 30 | | GND | Module Ground | 1 |

Notes:

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector, should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.
3. A Reference Clock input is not required.