

## Product Specification

### XFP WDM 10G ER 40km TX1330 10Gb/s BIDI XFP Transceiver



#### 1. Product Features

- Hot-pluggable XFP footprint
- Up to 10.7Gbps Data Links
- XFI Loopback Mode
- RoHS-6 Compliant (lead-free)
- Power dissipation < 1.5W
- Case operating temperature: -5 °C ~ 70 °C
- Single + 3.3 V Power Supply and LVTTTL Logic
- Single Mode LC Receptacle Bi-directional Transceiver
- Up to 40km transmission on SMF
- 1330nm DFB laser and PIN receiver
- 2-wire interface with integrated Digital Diagnostic monitoring
- EEPROM with Serial ID Functionality
- Compliant with FC\_PI\_4 REV 7.0
- Compliant with XFP MSA with duplex LC connector

#### 2. Applications

- 10GBASE-BX 10.3125Gb/s Ethernet
- 10GBASE-BX 9.953Gb/s Ethernet
- SONET OC-192 SR-1 SDH STM I-64.1

#### 3. Description

XFP WDM 10G ER 40km TX1330 is hot pluggable 3.3 V Small-Form-Factor transceiver module. It designed expressly for high-speed communication applications that require rates up to 10.7Gb/s, it designed to be compliant with XFP MSA. The module data link up to 40km in 9/125um single mode fiber. The optical output can be disabled by a LVTTTL logic high-level input of Tx Disable. Tx Fault is provided to indicate that degradation of the laser. Loss of signal

(LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner.

#### 4. Absolute Maximum Ratings

| Parameter                   | Symbol          | Min.                 | Max.                 | Unit |
|-----------------------------|-----------------|----------------------|----------------------|------|
| Storage Temperature         | T <sub>s</sub>  | -40                  | 85                   | °C   |
| Storage Ambient Humidity    | HA              | 5                    | 95                   | %    |
| Operating Relative Humidity | RH              | -                    | 85                   | %    |
| Power Supply Voltage        | V <sub>cc</sub> | -0.3                 | 4                    | V    |
| Signal Input Voltage        | V <sub>cc</sub> | V <sub>cc</sub> -0.3 | V <sub>cc</sub> +0.3 | V    |

#### 5. Recommended Operating Conditions

| Parameter                  | Symbol            | Min.                             | Typical | Max. | Unit              |
|----------------------------|-------------------|----------------------------------|---------|------|-------------------|
| Case Operating Temperature | T <sub>case</sub> | -5                               |         | 70   | °C <sup>[2]</sup> |
| Power Supply Voltage       | V <sub>cc</sub>   | 3.14                             | 3.3     | 3.47 | V                 |
| Power Supply Current       | I <sub>cc</sub>   | -                                | -       | 450  | mA                |
| Data Rate                  | BR                |                                  | 10.3125 |      | Gbps              |
| Transmission Distance      | T <sub>d</sub>    | 2                                | -       | 20   | km <sup>[1]</sup> |
| Coupled fiber              |                   | Single mode fiber <sup>[3]</sup> |         |      |                   |

**Notes:**

- [1] Measured with SMF
- [2] Without air flow
- [3] ITU-T G.652

#### 6. Specification of Transmitter

| Parameter                         | Symbol               | Min.  | Typical | Max. | Unit               |
|-----------------------------------|----------------------|---|---------|------|--------------------|
| Average Launched Power            | P <sub>O</sub>       | 0   |         | 4    | dBm                |
| Average Launched Power(Laser Off) | P <sub>OUT-OFF</sub> | -   | -       | -30  | dBm <sup>[1]</sup> |
| Optical Modulation Amplitude      | OMA                  | -3  | -       | -    | dBm <sup>[1]</sup> |
| Centre Wavelength Range           | λ <sub>C</sub>       | 1320  | 1330    | 1340 | nm                 |
| Side mode suppression ratio       | SMSR                 | 30  | -       | -    | dB                 |
| Spectrum Bandwidth(-20dB)         | σ                    | -   | -       | 1    | nm                 |
| Extinction Ratio                  | ER                   | 3.5   | 6       | -    | dB <sup>[2]</sup>  |
| Output Eye Mask                   |                      | Compliant with FC_PI_4 REV 7.0 <sup>[2]</sup> |         |      |                    |

**Notes:**

- [1] The optical power is launched into SMF
- [2] Measured with RPBS 2<sup>31</sup>-1 test pattern @10.3125Gbps

## 7. Specification of Receiver

| Parameter                         | Symbol         | Min. | Typical | Max. | Unit               |
|-----------------------------------|----------------|------|---------|------|--------------------|
| Input Optical Wavelength          | $\lambda_{IN}$ | 1260 | 1270    | 1280 | nm                 |
| Receiver Sensitivity in average   | PIN            | -    | -       | -15  | dBm <sup>[1]</sup> |
| Input Saturation Power (Overload) | PSAT           | 0.5  | -       | -    | dBm <sup>[1]</sup> |
| LOS -Assert Power                 | PA             | -30  | -       | -    | dBm                |
| LOS -Deassert Power               | PD             | -    | -       | -18  | dBm                |
| LOS -Hysteresis                   | PHys           | 0.5  | -       | 4    | dB                 |

**Notes:**

[1] Measured with RPBS 2<sup>31</sup>-1 test pattern @10.3125Gbs BER=<10<sup>-12</sup> ER=6dB

## 8. Electrical Interface Characteristics

| Parameter                          | Symbol  | Min. | Typical | Max.    | Unit  |
|------------------------------------|---------|------|---------|---------|-------|
| Total power supply current         | Icc     | -    | -       | 350     | mA    |
| <b>Transmitter</b>                 |         |      |         |         |       |
| Differential Data Input Voltage    | VDT     | 120  | -       | 820     | mVp-p |
| Differential line input Impedance  | RIN     | 85   | 100     | 115     | Ohm   |
| Transmitter Fault Output-High      | VFaultH | 2.4  | -       | Vcc     | V     |
| Transmitter Fault Output-Low       | VFaultL | -0.3 | -       | 0.8     | V     |
| Transmitter Disable Voltage- High  | VDisH   | 2    | -       | Vcc+0.3 | V     |
| Transmitter Disable Voltage- low   | VDisL   | -0.3 | -       | 0.8     | V     |
| <b>Receiver</b>                    |         |      |         |         |       |
| Differential Data Output Voltage   | VDR     | 300  | -       | 850     | mVp-p |
| Differential line Output Impedance | ROUT    | 80   | 100     | 120     | Ohm   |
| Receiver LOS Pull up Resistor      | RLOS    | 4.7  | -       | 10      | KOhm  |
| Data Output Rise/Fall time         | tr/tf   | 20   | -       | -       | ps    |
| LOS Output Voltage-High            | VLOSH   | 2    | -       | Vcc     | V     |
| LOS Output Voltage-Low             | VLOSL   | -0.3 | -       | 0.4     | V     |

## 9. Pin Descriptions

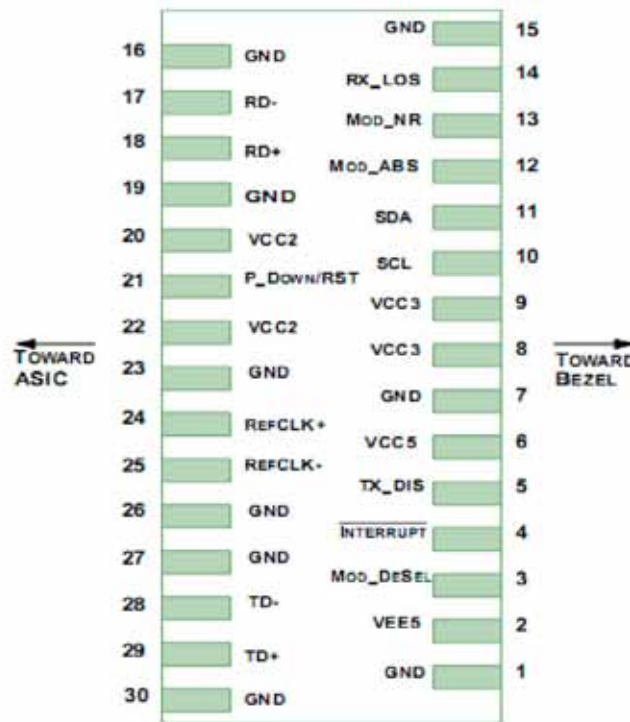


Diagram of Host Board Connector Block Pin Numbers and Name

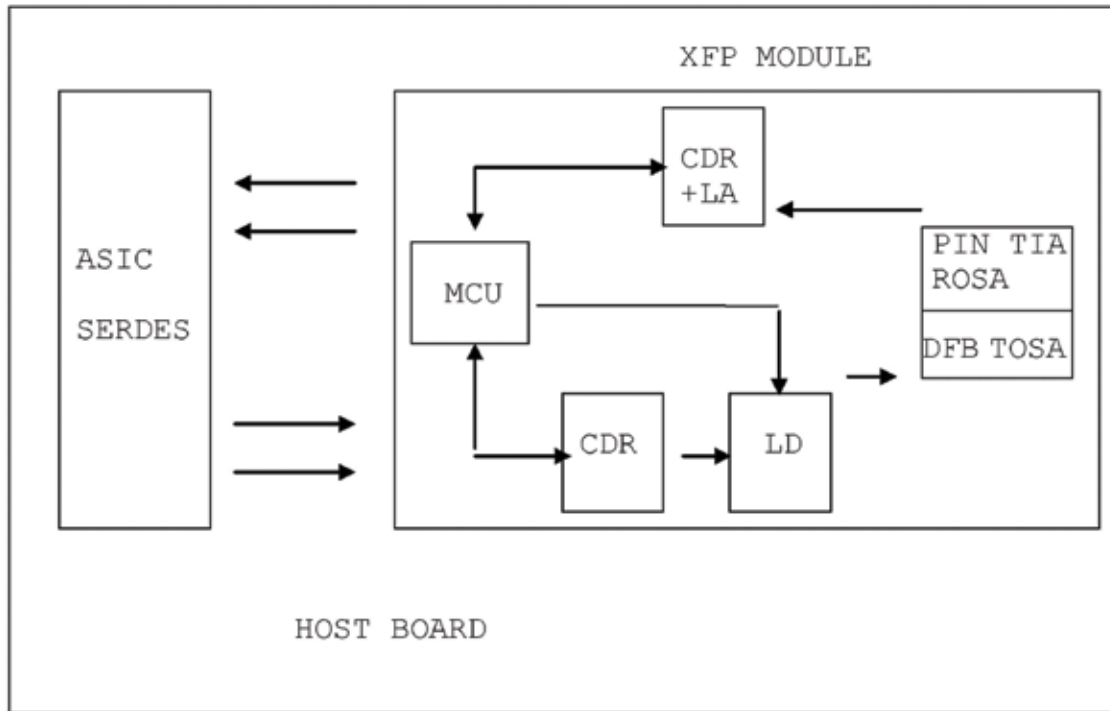
| Pin | Logic    | Symbol    | Name/Description  |
|-----|----------|-----------|---|
| 1   |          | GND       | Module Ground <sup>[1]</sup>  |
| 2   |          | VEE5      | Optional -5.2 Power Supply - <b>Not required</b>  |
| 3   | LVTTL-I  | Mod-Desel | Module De-select; When held low allows the module to respond to 2-wire serial interface commands                                |
| 4   | LVTTL-O  | Interrupt | Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface <sup>[2]</sup> |
| 5   | LVTTL-I  | TX_DIS    | Transmitter Disable; Transmitter laser source turned off  |
| 6   |          | VCC5      | +5 Power Supply   |
| 7   |          | GND       | Module Ground <sup>[1]</sup>  |
| 8   |          | VCC3      | +3.3V Power Supply  |
| 9   |          | VCC3      | +3.3V Power Supply  |
| 10  | LVTTL-I  | SCL       | Serial 2-wire interface clock <sup>[2]</sup>  |
| 11  | LVTTLI/O | SDA       | Serial 2-wire interface data line <sup>[2]</sup>  |
| 12  | LVTTL-O  | Mod_Abs   | Module Absent; Indicates module is not present. Grounded in the module. <sup>[2]</sup>  |

| Pin | Logic   | Symbol     | Name/Description   |
|-----|---------|------------|--|
| 13  | LVTTL-O | Mod_NR     | Module Not Ready; XGIGA defines it as a logical OR between RX LOS and Loss of Lock in TX/RX. <sup>[2]</sup>  |
| 14  | LVTTL-O | RX_LOS     | Receiver Loss of Signal indicator  |
| 15  |         | GND        | Module Ground <sup>[1]</sup>   |
| 16  |         | GND        | Module Ground <sup>[1]</sup>   |
| 17  | CML-O   | RD-        | Receiver inverted data output  |
| 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) <sup>[1]</sup>  |
| 18  | CML-O   | RD+        | Receiver non-inverted data output  |
| 19  |         | GND        | Module Ground <sup>[1]</sup>   |
| 20  |         | VCC2       | +1.8V Power Supply - <b>Not required</b>   |
| 21  | LVTTL-I | P Down/RST | 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<br>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 - <b>Not required</b>   |
| 23  |         | GND        | Module Ground <sup>[1]</sup>   |
| 24  | PECL-I  | RefCLK+    | Reference Clock non-inverted input, AC coupled on the host board - <b>Not required</b> <sup>[3]</sup>  |
| 25  | PECL-I  | RefCLK-    | Reference Clock inverted input, AC coupled on the host board - <b>Not required</b> <sup>[3]</sup>  |
| 26  |         | GND        | Module Ground <sup>[1]</sup>   |
| 27  |         | GND        | Module Ground <sup>[1]</sup>   |
| 28  | CML-I   | TD-        | Transmitter inverted data input  |
| 29  | CML-I   | TD+        | Transmitter non-inverted data input  |
| 30  |         | GND        | Module Ground <sup>[1]</sup>   |

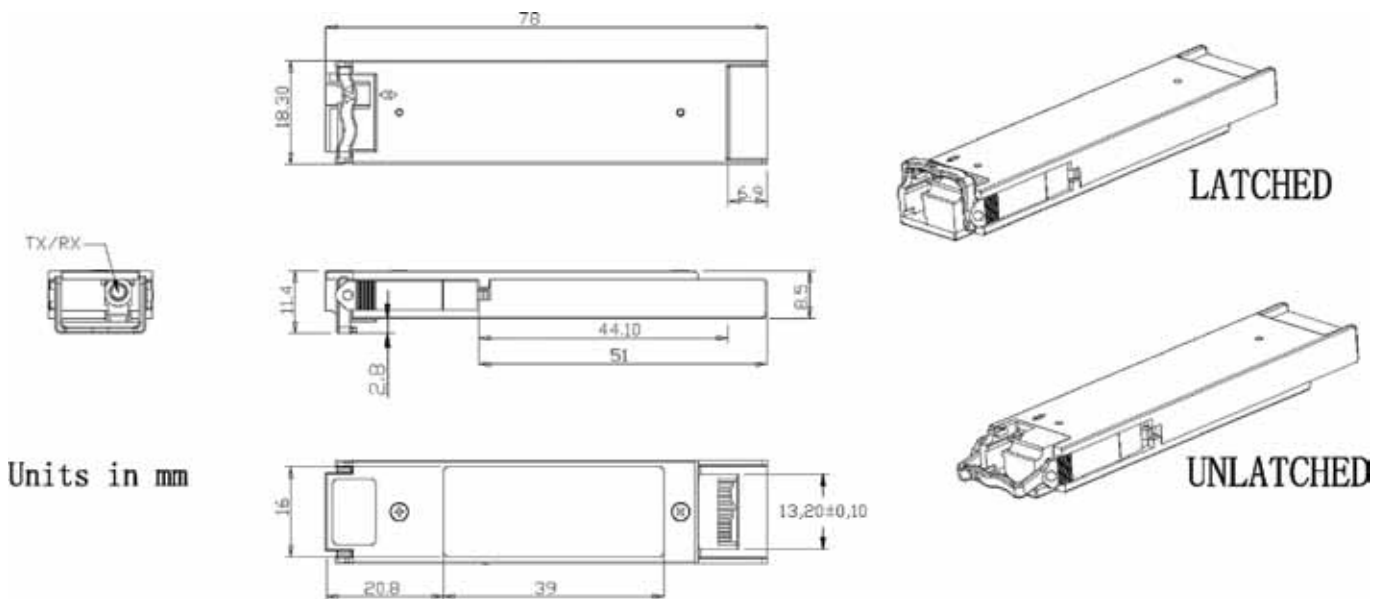
**Notes:**

- [1] Module circuit ground is isolated from module chassis ground within the module.
- [2] Open collector; should be pulled up with 4.7k - 10kohms on host board to a voltage between 3.15V and 3.6V.
- [3] A Reference Clock input is not required by the XFBL-273396-40D. If present, it will be ignored.

## 10. Recommended Block Circuit



## 11. Outline Dimensions



## 12. Regulatory Compliance

| Feature                            | Reference   | Performance               |
|------------------------------------|---|---------------------------|
| Electrostatic discharge (ESD)      | IEC/EN 61000-4-2                                    | Compatible with standards |
| Electromagnetic Interference (EMI) | FCC Part 15 Class B EN 55022<br>Class B (CISPR 22A) | Compatible with standards |
| Laser Eye Safety                   | FDA 21CFR 1040.10, 1040.11<br>IEC/EN 60825-1, 2     | Class 1 laser product     |
| Component Recognition              | IEC/EN 60950 , UL                                   | Compatible with standards |
| ROHS                               | 2002/95/EC  | Compatible with standards |
| EMC                                | EN61000-3   | Compatible with standards |