

Datasheet

10 Gbps 40 km XFP Transceivers

XFP-10GD-IR2



Highlights

- XFP transceiver
- Data Rates: 9.952 - 11.09 Gbps
- Protocols:
 - 10 Gigabit Ethernet
 - 10 Gigabit Fibre Channel
 - SONET OC-192/STM-64
 - SONET OC-192/STM-64 over FEC
- Single-mode fiber
- 1550 nm
- 12 to 40 km range
- Duplex LC connector
- Digital Diagnostics (SFF-8472)
- XFI Loopback
- Hot-swap

Overview

MRV Communications' XFP transceivers provide the high speeds and compact dimensions that today's demanding networks require while delivering the deployment flexibility and inventory control that network administrators demand. Designed to Multi-Source Agreement (MSA) standards for broadest compatibility, they perfectly match MRV's wide range of optical transport solutions.

Visit the MRV website at www.mrv.com or contact your nearest authorized MRV Communications dealer for more information.

Specifications Overview

| | |
|-----------------------------|--------------------|
| Data Rate | 9.952 - 11.09 Gbps |
| Tx Wavelength | 1550 nm |
| Tx Power (Minimum) | -1 dBm |
| Tx Dispersion Penalty | 2 dB |
| Tx Disable | Yes |
| Rx Wavelength Range | 1530 - 1565 nm |
| Rx Sensitivity | -16 dBm |
| Rx Saturation | -1 dBm |
| Operating Temperature Range | 0 to 70 °C |
| Power Consumption | 2.65 Watts |

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Optical Specifications

| Parameter | Symbol | Minimum | Maximum | Unit | Notes |
|-----------------------------|--|---------|---------|------|-------|
| Operating Data Rate | DR | 9.953 | 11.1 | Gbps | - |
| Center Wavelength | c | 1530 | 1565 | nm | - |
| Transmitter | | | | | |
| Average Output Power | P _{OUT} | -1 | 2 | dBm | 1 |
| Spectral Width | Δλ | - | 1 | nm | - |
| Side Mode Suppression Ratio | SMSR | 30 | - | dB | - |
| Extinction Ratio | ER | 8.2 | - | dB | 2 |
| Dispersion Penalty | DP | - | 2 | dB | 2 |
| Optical Eye Mask | Compliant with ITU-T G.691 and GR-253-CORE | | | | - |
| Receiver | | | | | |
| Sensitivity | P _{IN} | - | -16 | dBm | 3 |
| Saturation | P _{IN} | -1 | - | dBm | 3 |
| LOS Assert | LOS _A | -25 | - | dBm | - |
| LOS De-Assert | LOS _D | - | -15 | dBm | - |
| LOS Hysteresis | - | 1 | 4 | dB | - |
| Reflectance | - | - | -27 | dB | - |

- Notes:**
1. The optical power is launched into SMF.
 2. Measured with a PRBS 2³¹-1 test pattern @9.953 Gbps.
 3. Measured with a PRBS 2³¹-1 test pattern @9.953 Gbps, BER ≤ 10⁻¹²

Monitoring Specifications

| Data Address | Parameter | Range | Accuracy | Notes |
|--------------|--------------------------|------------------|----------|-------|
| 96-97 | Temperature | -10 to 80 °C | ± 3 °C | - |
| 100-101 | Bias Current | 0 to 100 mA | ± 10 % | - |
| 102-103 | TX Power | -2 to 3 dBm | ± 2 dB | - |
| 104-105 | RX Power | -18 to 0 dBm | ± 2 dB | - |
| 106-107 | V _{CC5} Voltage | +4.5 V to +5.5 V | ± 3 % | - |
| 108-109 | V _{CC3} Voltage | +3.0 V to +3.7 V | ± 3 % | - |

Absolute Maximum Rating

| Parameter | Symbol | Min. | Max. | Unit | Notes |
|-----------------------------|------------------|------|------|------|-------|
| Supply Voltage (3.3V) | V _{CC3} | -0.5 | 4.0 | V | - |
| Supply Voltage (5.0V) | V _{CC5} | -0.5 | 6.0 | V | - |
| Operating Relative Humidity | RH | - | 85 | % | - |
| Storage Temperature | T _s | -40 | 85 | °C | - |

Recommended Operation Conditions

| Parameter | Symbol | Min | Max | Unit | Notes |
|------------------------------|------------------|-------|------|------|-------|
| Operating Temperature (Case) | T _C | 0 | 70 | °C | - |
| Power Supply Voltage (3.3V) | V _{CC3} | 3.13 | 3.47 | V | - |
| Power Supply Voltage (5V) | V _{CC5} | 4.75 | 5.25 | V | - |
| Power Supply Current (3.3V) | I _{CC3} | - | 750 | mA | - |
| Power Supply Current (5V) | I _{CC5} | - | 200 | mA | - |
| Power Dissipation | P _D | - | 3.5 | W | - |
| Data Rate | DR | 9.953 | 11.1 | Gbps | - |

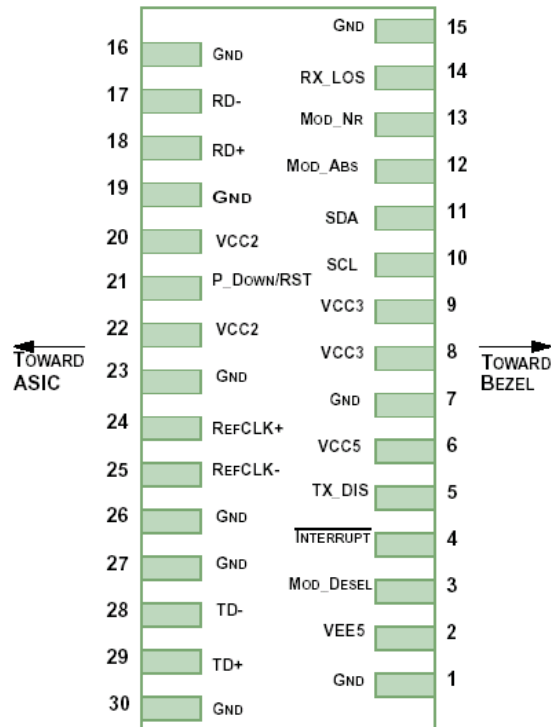
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Electrical Specifications

| Parameter | Symbol | Minimum | Maximum | Unit | Notes |
|--|------------------|---------|----------|------|-------|
| High-Speed Signal (CML) Interface Specification | | | | | |
| Input Data Rate | - | 9.953 | 11.1 | Gbps | - |
| Differential Data Input Amplitude ¹ | - | 120 | 1000 | mVpp | 1 |
| Input Differential Impedance | - | 80 | 120 | Ω | - |
| Output Data Rate | - | 9.953 | 11.1 | Gbps | - |
| Differential Data Output Amplitude ¹ | - | 500 | 800 | mVpp | 1 |
| Output Differential Impedance | - | 80 | 120 | Ω | - |
| Low-Speed Signal (LVTTTL) Interface Specification | | | | | |
| Input High Voltage | - | 2.0 | Vdd1=3.3 | V | - |
| Input Low Voltage | - | GND | 0.8 | V | - |
| Output High Voltage | - | 2.4 | Vdd1=3.3 | V | - |
| Output Low Voltage | - | GND | 0.4 | V | - |
| 2-Wire Serial Interface(LVTTTL) Specification | | | | | |
| Clock Frequency | f _{SCL} | - | 400 | kHz | - |
| Reference Clock Interface Specification | | | | | |
| No Reference Clock Needed | | | | | |

Notes: 1. Internally AC coupled.

Host Board Connector Pinout



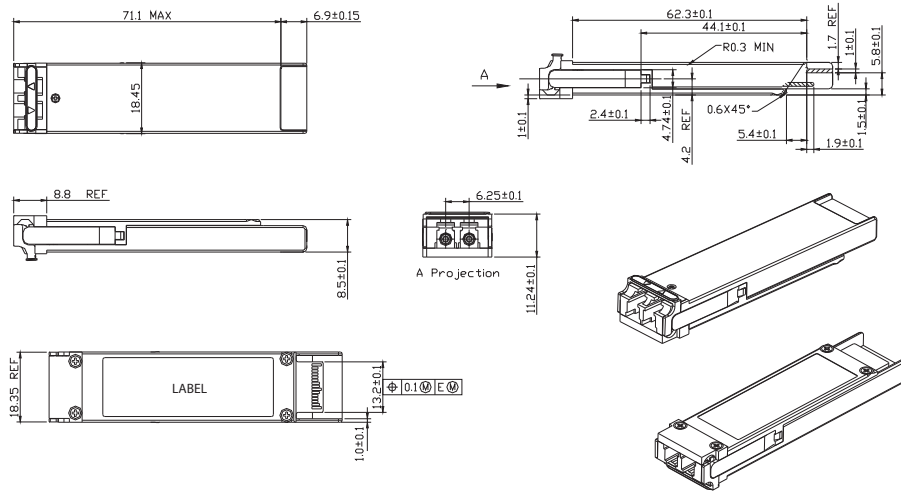
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Host Board Connector Legend

| Pin | Logic | Symbol | Name/Description | Note |
|-----|------------|------------------|--|------|
| 1 | | GND | Module Ground | 1 |
| 2 | | V _{EE5} | Optional -5.2V power supply (Not Implemented) | |
| 3 | LVTTTL-I | Mod_DeSel | Module De-Select; when held low allows module to respond to 2-wire serial interface | |
| 4 | LVTTTL-O | Interrupt | Interrupt; indicates presence of an important condition which can be read over the 2-wire serial interface | 2 |
| 5 | LVTTTL-I | TX_DIS | Transmitter Disable; turns off transmitter laser output | |
| 6 | | V _{CC5} | +5 V Power Supply | |
| 7 | | GND | Module Ground | 1 |
| 8 | | V _{CC3} | +3.3 V Power Supply | |
| 9 | | V _{CC3} | +3.3 V Power Supply | |
| 10 | LVTTTL-I/O | SCL | 2-Wire Serial Interface Clock | 2 |
| 11 | LVTTTL-I/O | SDA | 2-Wire Serial Interface Data Line | 2 |
| 12 | LVTTTL-O | Mod_Abs | Indicates module is not present. Grounded in the module | 2 |
| 13 | LVTTTL-O | Mod_NR | Module Not Ready; indicating module operational fault | 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 | | V _{CC2} | +1.8 V Power Supply (Not Implemented) | 3 |
| 21 | LVTTTL-I | P_Down/RST | Power Down; When high, requires the module to limit power consumption to 1.5 W or below. 2-wire serial interface must be functional in the low power mode. Reset; the falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. | |
| 22 | | V _{CC2} | +1.8 V Power Supply (Not Implemented) | 3 |
| 23 | | GND | Module Ground | 1 |
| 24 | PECL-I | RefCLK+ | Not used, internally terminated to 50 ohm (100 ohm diff). | 4 |
| 25 | PECL-I | RefCLK- | Not used, internally terminated to 50 ohm (100 ohm diff). | 4 |
| 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 ground pins GND are isolated from the module case and chassis ground within the module.
 2. Shall be pulled up with 4.7 K-10 Kohms to a voltage between 3.15 V and 3.45 V on the host board.
 3. The pins are open within module.
 4. Reference Clock is not required.

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Mechanical Drawing



Ordering Information

| Model | Description | Data Rate | Wavelength (nm) | Dispersion Penalty (dB) | Bail Latch Color | Distance (km) |
|---------------------|--|-------------------|-----------------|-------------------------|------------------|---------------|
| XFP-10GD-IR2 | OC192/STM-64, OC192/STM-64 over FEC, 10GE or 10G FC, single-mode XFP transceiver with Digital Diagnostics. | 9.953 - 11.1 Gbps | 1550 | 2.0 | Magenta | 12 - 40 |

Regulatory and Industry Compliances

Class 1 Laser Product, complies with EN 60825-1 and 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007
MSA INF-8077i; Digital Diagnostic SFF-8472
Certified by one or more of the following agencies: TÜV, UL, CSA;
RoHS Directive; China RoHS; California RoHS Law, REACH Directive SVHC; WEEE Directive
The Quality Management System is certified to ISO 9001 by QMI-SAI Global
The Environmental Management System is in compliance with ISO 14001

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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