

Fiber Optic SFP DFB 1.25G CWDM Transceiver with DDMI

Data Sheet

OFD3356-XX



The OFD3356-XX transceiver module operates at wavelengths of 1470-1610 nm and at 1.25 Gb/s for CWDM, Gigabit Ethernet 1000BASE-XD and 1x Fiber Channel applications.

Features

- Hot-pluggable
- Single +3.3 V supply
- Duplex LC connector interface
- CWDM Distributed Feedback LD
- Low power dissipation
- Gigabit Ethernet 1000BASE-XD compliant
- Fiber Channel compliant
- 50 km link distance
- Operates in wavelengths of 1470/1490/1510/1530/1550/1570/1590/1610nm
- Internal Digital Diagnostics calibration
- Digital Diagnostics Monitoring for SFF-8472 compatible
- Multi-Source Agreement (MSA) for Small Form Factor Pluggable (SFP) Compliant

Applications

- Telecommunications and Data Communications system networks
- Gigabit Ethernet
- Point-to-Point networking
- Metro Access Rings
- 1x Fiber Channel

Description

The OFD3356-XX transceiver provides signal conversion and processing for serial optical data communication applications. It operates over single mode fiber by converting lightwave information over specific wavelengths from 1470-1610nm into an electrical signal and vice versa at a data rate of 1.25 Gb/s.

Housed in a compact metal package, the transceiver module consists of a transmitter and receiver optical subassembly coupled with a duplex LC receptacle. A high-speed uncooled DFB laser diode operates as light source while a photodiode subsequently acts as a detector.

This dual-fiber connector transceiver is designed for use in CWDM, Gigabit Ethernet 1000BASE-XD and 1x Fiber Channel applications.

Transceiver Monitoring Interface

OFD3356-XX provides an enhanced monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a normal factory-set range. The monitoring interface makes use of two wire address 1010001X (A2h) and is backward compatible with the Small Form Pluggable Multi-Source Agreement (SFP MSA).

Serial Identification (EEPROM)

An SFP having module definition 4 provides access to sophisticated identification information that describes the SFP transceiver’s capabilities, standard interface, manufacturer and other information. An EEPROM containing the detailed product information and digital diagnostic function for the host equipment is accessed by the 2-wire serial CMOS EEPROM protocol. See SFP MSA for detailed description.

Performance Specifications

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause damage to the optical device. Operations of the optical device are suggested to remain within the recommended operating conditions. Exposure to the absolute maximum ratings for extended periods can adversely affect device reliability.

| Parameter | Symbol | Minimum | Maximum | Unit |
|---------------------|-----------------|---------|---------|------|
| Storage Temperature | T _S | -40 | +85 | °C |
| Supply Voltage | V _{CC} | 0 | 4.0 | V |
| Relative Humidity | RH | 5 | 85 | % |

Recommended Operating Conditions

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|-----------------------|-----------------------------------|---------|---------|---------|------|
| Operating Temperature | T _{OP} | 0 | | 70 | °C |
| Supply Voltage | V _{CC} | 3.1 | 3.3 | 3.5 | V |
| Supply Current | I _{TX} + I _{RX} | | 200 | 300 | mA |

Safety

Laser Compliance Statement

The OFD3356-XX is classified as a Class I Laser Product and complies with IEC 60825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions. Because the transceiver is designed to be inherently eye safe, it does not require open fiber control thus eliminating complex electronics or mechanics.

Caution - use of device other than those specified herein may result in hazardous laser radiation exposure or other damage. Please embrace all customary precautions and discretion while handling this device.

Transmitter Electro-Optical Interface (T_C = 0~70°C; V_{CC}T,R = 3.1V < V_{CC} < 3.5V)

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|--|---------------------------------|-------------------|----------------|-----------------------|-------|
| Transmitter Differential Input Voltage | TD +/- | 400 | | 2000 | mVp-p |
| Optical Output Power ¹ | P _O | 0 | | +5 | dBm |
| Optical Extinction Ratio ¹ | E _R | 9 | | | dB |
| Center Wavelength ¹ | λ _C | λ _C -6 | λ _C | λ _C +7 | nm |
| Spectral Width ¹ | Δλ | | | < 1 | nm |
| Side Mode Suppression Ratio ¹ | SMSR | 30 | | | dB |
| Optical Rise/ Fall Time ² | t _r / t _f | | | 0.25 | nsec |
| Tx_Fault - HIGH | V _{Fault_H} | 2 | | V _{CC} | V |
| Tx_Fault - LOW | V _{Fault_L} | V _{ee} | | V _{ee} + 0.5 | V |
| Tx_Disable - High | V _{Disable_H} | 2 | | V _{CC} | V |
| Tx_Disable - LOW | V _{Disable_L} | V _{ee} | | V _{ee} + 0.8 | V |

Note:

1. Measured at 1250 Mbps, PRBS 2⁷-1, NRZ.
2. 20%-80%

Receiver Electro-Optical Specifications (T_C = 0~70°C; V_{CC}T,R = 3.1V < V_{CC} < 3.5V)

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|---|-----------------------|---------|---------|---------|-------|
| Receiver Differential Output Voltage | RD +/- | 600 | 800 | | mVp-p |
| Receiver Overload ^{1,2} | P _{IN} MAX | -3 | | | dBm |
| Receiver Sensitivity ^{1,2} | P _{IN} MAX | | -24 | -18 | dBm |
| Operating Center Wavelength | λ _C | 1270 | | 1620 | nm |
| Receiver LOS Assert Level ² | P _{RX_LOS A} | -35 | | | dBm |
| Receiver LOS Deassert Level ² | P _{RX_LOS D} | | | -18.5 | dBm |
| Receiver Loss of Signal Hysteresis ² | | 0.5 | 2 | | dB |

Note:

1. With BER better than or equal to 1x10⁻¹².
2. Measured in center of eye opening with 2⁷-1 PRBS, NRZ.

Pin Assignment

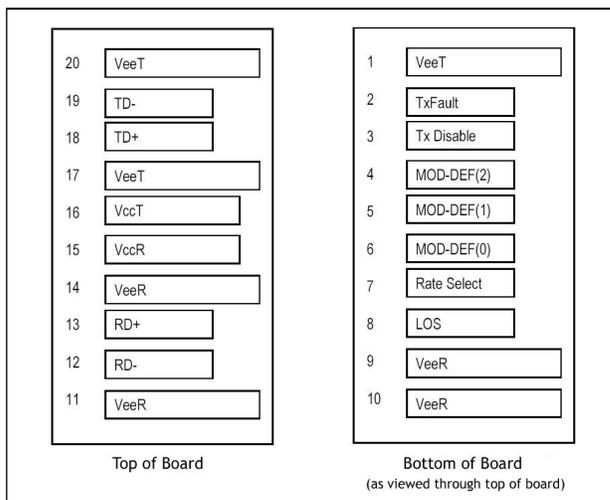


Figure 1. SFP Transceiver Electric Pad Layout

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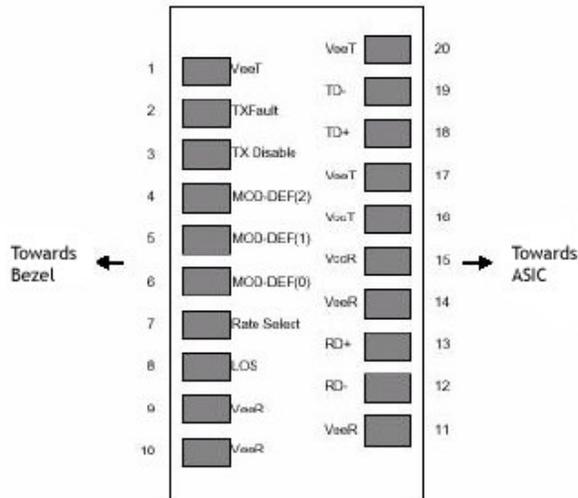


Figure 2. Diagram of Host Board Connector Block Pin

Pin Description and Plug-in Sequence¹ (1-Grd, 2-Power, 3-Signal)

| Pin No. | Name | Description | Plug-in Sequence | Notes |
|---------|-------------|------------------------------|------------------|--|
| 1 | VeeT | Transmitter Ground | 1 | Circuit ground is internally isolated from chassis ground. |
| 2 | TX Fault | Transmitter Fault Indication | 3 | Open-Collector outputs, asserted when LD and/or APC function fail. |
| 3 | TX Disable | Transmitter Disable | 3 | Disable when high voltage (>2.0V or Open). |
| 4 | MOD-DEF 2 | Module Definition 2 | 3 | Should be pulled up with 4.7k - 10 kΩ on host board to voltage between 2.0V and 5.5V. MOD-DEF (0) pulls line low to indicate module is plugged in. |
| 5 | MOD-DEF 1 | Module Definition 1 | 3 | See notes for Pin 4. |
| 6 | MOD-DEF 0 | Module Definition 0 | 3 | See notes for Pin 4. |
| 7 | Rate Select | Bandwidth Selection | 3 | No connection required. |
| 8 | LOS | Loss of Signal | 3 | LOS is Open-Collector output. Should be pulled up with 4.7k - 10kΩ on host board to a voltage between 2.0V and 5.5V. Logic 0 indicates normal operation; logic 1 indicates loss of signal. |
| 9 | VeeR | Receiver Ground | 1 | See notes for Pin 1. |
| 10 | VeeR | Receiver Ground | 1 | See notes for Pin 1. |
| 11 | VeeR | Receiver Ground | 1 | See notes for Pin 1. |
| 12 | RD- | Inv. Received Data Out | 3 | |
| 13 | RD+ | Received Data Out | 3 | |
| 14 | VeeR | Receiver Ground | 1 | See notes for Pin 1. |
| 15 | VccR | Receiver Power | 2 | |
| 16 | VccT | Transmitter Power | 2 | |

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| | | | | |
|----|------|-----------------------|---|----------------------|
| 17 | VeeT | Transmitter Ground | 1 | See notes for Pin 1. |
| 18 | TD+ | Transmit Data In | 3 | |
| 19 | TD- | Inv. Transmit Data In | 3 | |
| 20 | VeeT | Transmitter Ground | 1 | See notes for Pin 1. |

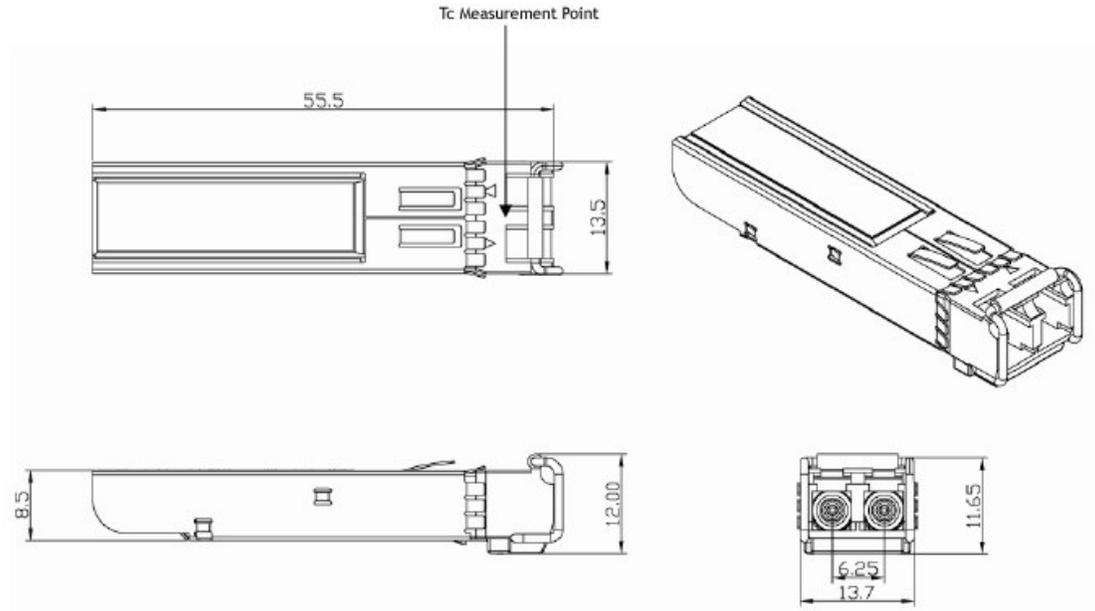
Note:

1. Pin engagement sequence during hot plugging.

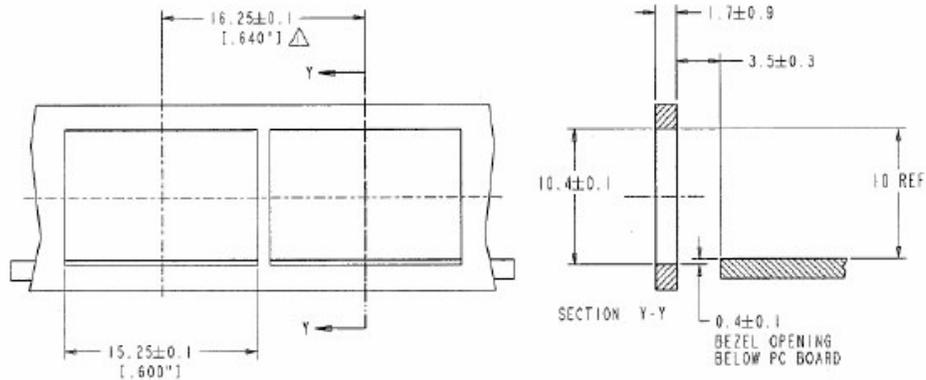
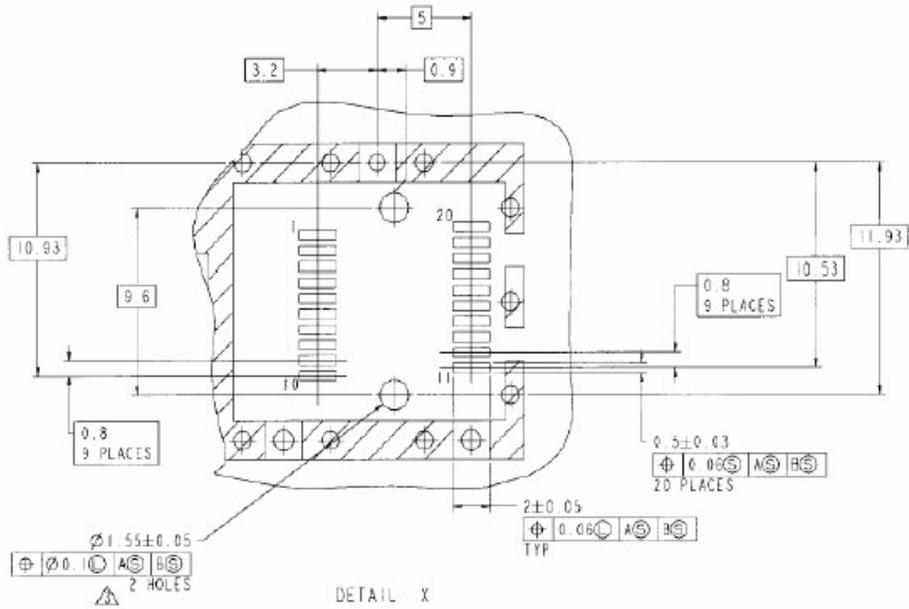
Physical Characteristics

Outline Diagram

Dimensions for the device package are given in millimeters.



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NOTES:

- 1. Δ MINIMUM PITCH ILLUSTRATED, ENGLISH DIMENSIONS ARE FOR REFERENCE ONLY
- 2. NOT RECOMMENDED FOR PCI EXPANSION CARD APPLICATIONS

Additional Information

Ordering Information

| Center Wavelength | Part Number |
|-------------------|-------------|
| 1470 nm | OFD3356-47 |
| 1490 nm | OFD3356-49 |
| 1510 nm | OFD3356-51 |
| 1530 nm | OFD3356-53 |
| 1550 nm | OFD3356-55 |
| 1570 nm | OFD3356-57 |
| 1590 nm | OFD3356-59 |
| 1610 nm | OFD3356-61 |

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