

Fiber Optic GBIC 1310nm FP 1.25G Lightwave Transceiver

Data Sheet

OGB2332



The OGB2332 transceiver module operates a wavelength of 1310 nm and at 1.25 Gb/s for 1000BASE-LX applications.

Features

- Hot-pluggable
- Single +3.3 V to +5.0 V supply
- SC duplex interface, singlemode fiber
- 10 km link distance with IEC 60793-2 Type B1.1 compliant fibers
- 1310nm Fabry-Perot (FP) laser with fiber stub in optical receptacle
- SFF-8053 Gigabit Interface Converter (GBIC) Specification compliant
- IEEE 802.3z Gigabit Ethernet 1000BASE-LX compliant
- EEPROM with Serial ID Functionality
- Fiber Channel (100-SM-LC-L) compliant
- ESD Class 2 per MIL-STD 883D Method 3015.7
- FCC (Class B) and EN 55022 compliant

Applications

- Telecommunications and Data Communications system networks
- Gigabit Ethernet
- Fiber Channel
- SONET/ SDH
- Network devices (bridges/routers/hubs)
- LAN, SAN, WAN

Description

The OGB2332 transceiver provides signal conversion and processing for serial optical data communication applications. It is based upon the Physical-Medium-Dependent (PMD) sublayer and baseband medium, type 1000BASE-LX (long wavelength). It operates over singlemode fiber by converting lightwave information into an electrical signal and vice versa at a data rate of 1.25 Gb/s.

The Gigabit singlemode transceiver is a single unit comprised of a transmitter, a receiver, and a duplex SC receptacle. This transceiver features hot-pluggable function and is specially developed for distances of up to 10 km with 9/125 μm singlemode fibers.

This dual-fiber connector transceiver is designed for use in LAN, SAN, WAN at 1.25 Gb/s from a single power supply (+3.3 V to +5.0 V) for Gigabit Ethernet 1000BASE-LX and Fiber Channel applications.

Serial Identification (EEPROM)

A GBIC transceiver having module definition 4 provides access to sophisticated identification information that describes the GBIC transceiver’s capabilities, standard interface, manufacturer and other information. An EEPROM containing the detailed product information for the host equipment is accessed by the 2-wire serial CMOS EEPROM protocol of the ATMEL AT24C01A. See GBIC specification (SFF-8053) for detailed description.

Safety

Laser Compliance Statement

The OGB2332 is classified as a Class I Laser Product. It 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.

Regulatory Compliance

| Feature | Standard | Comments |
|---|--|---|
| Electrostatic Discharge (ESD) to the Electrical Pins | MIL-STD 883D Method 3015.7 | Class 1 (>1000V) |
| Immunity: Electrostatic Discharge (ESD) to the Duplex SC Receptacle | EN 61000-4-2 IEC 1000-4-2 | Discharges of ±15kV with an air discharge probe on the receptacle cause no damage. |
| Immunity: Radio Frequency Electromagnetic Field | EN 61000-4-3 IEC 1000-4-3 | With a field strength of 3 V/m rms, noise frequency ranges from 10 MHz to 1 GHz. No effect on transceiver performance between specification limits. |
| Emission: Electromagnetic Interference (EMI) | FCC Class B EN 55022 Class B CISPR 22 | Noise frequency range: 30 MHz to 5 GHz |

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 |
| Operating Temperature | T _A | 0 | 70 | °C |
| Power Supply Voltage | V _{CC} | -0.5 | 6.0 | V |

Recommended Operating Conditions

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|---|-----------------|---------|---------|---------|------|
| Supply Voltage | V _{CC} | 3.15 | | 5.25 | V |
| Supply Current (I _{TX} + I _{RX}) | I _{CC} | | 175 | 300 | mA |

Transmitter Electro-Optical Interface (T_A = 25 °C)

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|---------------------------------------|------------------|----------------------|---------|----------------------|-------|
| Launched Power (Average) ¹ | P _O | -10 | | -3 | dBm |
| Center Wavelength | λ _C | 1270 | 1310 | 1355 | nm |
| Spectral Width (RMS) | Δλ | | | 4 | nm |
| Relative Intensity Noise | RIN | | | -120 | dB/Hz |
| Extinction Ratio (Dynamic) | E _r | 9 | | | dB |
| Rise Time, 20% - 80% | t _R | | | 260 | ps |
| Fall Time, 20% - 80% | t _F | | | 260 | ps |
| Total Jitter | TJ | | | 227 | ps |
| Transmitter Disable Voltage | V _{DIS} | V _{CC} -1.3 | | V _{CC} | V |
| Transmitter Enable Voltage | V _{EN} | V _{ee} | | V _{ee} +0.8 | V |

Notes:

1. Into a singlemode fiber, 9-μm core diameter.

Receiver Electro-Optical Specifications

| Parameter | Symbol | Minimum | Typical | Maximum | Unit |
|--|------------------------------------|---------|---------|---------|------|
| Sensitivity (Average Power) ¹ | P _{SEN} | | | -19 | dBm |
| Maximum Receiving Power (Average) | P _{MAX} | -3 | | | dBm |
| Operating Center Wavelength | λ _R | 1100 | | 1600 | nm |
| Signal Loss Deassert Level ² | P _{SLD} | | | -19 | dBm |
| Signal Loss Assert Level ³ | P _{SLA} | -30 | | | dBm |
| Signal Loss Hysteresis | P _{SLD} -P _{SLA} | 0.5 | | 5 | dB |
| Data Output Rise Time (20% - 80%), PECL | t _r | | | 400 | ps |
| Data Output Fall Time (20% - 80%), PECL | t _f | | | 400 | ps |
| PECL Amplitude (Differential, pk-pk) | V _{OUT} | 0.4 | | 2.0 | V |
| PECL Skew | T _{SKEW} | | | 200 | ps |
| Return Loss of Receiver | RL | 12 | | | dB |

Notes:

1. Average optical power at which the BER is 1x10⁻¹². Measured with a 2⁷-1 NRZ PRBS and ER = 9 dB.
2. Optical power above which the SIGNAL LOSS toggles from High to Low state.
3. Optical power below which the SIGNAL LOSS toggles from Low to High state.

Timing Parameters¹

| | Symbol | Min | Max | Units | Condition |
|---|--------------------|-----|-----|-------|--|
| Tx Disable Assert Time | t _{off} | | 10 | μs | Time from rising edge of Tx Disable to when the optical output falls below 10% of nominal |
| Tx Disable Negate Time | t _{on} | | 1 | ms | Time from falling edge of Tx Disable to when the modulated optical output rises above 90% of nominal |
| Time to initialize, Including reset of Tx Fault | t _{init} | | 300 | ms | From power on or negation of Tx Fault using Tx Disable |
| Tx Fault Assert Time | t _{fault} | | 100 | μs | Time from fault to Tx fault on |
| Tx Disable to reset | t _{reset} | 10 | | μs | Time Tx Disable must be held |

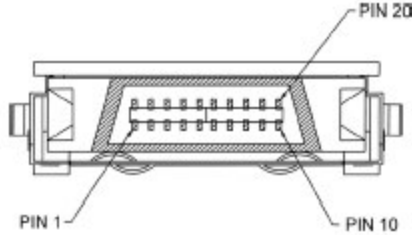
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| | | | | | |
|----------------------|----------------|--|-----|-----|--|
| | | | | | high to reset Tx Fault |
| LOS Assert Time | t_loss_on | | 100 | μs | Time from LOS state to Rx LOS assert |
| LOS Deassert Time | t_loss_off | | 100 | μs | Time from non-LOS state to Rx LOS deassert |
| Serial ID Clock Rate | f_serial_clock | | 100 | kHz | |

Note:

1. See GBIC Specifications (SFF-8053) for detailed descriptions of control and status timing requirements.

Pin Assignment and Plug-in Sequence¹ (1-Gnd and Signal; 2-Power)



| Pin No. | Name | Description | Plug-in Sequence | Notes |
|---------|------------|--------------------------------|------------------|--|
| 1 | Rx_LOS | Receiver Loss of Signal | 2 | Receiver Loss of Signal, logic high, open collector compatible, 4.7k to 10k Ω pullup to V _{CC} T on host. |
| 2 | RGND | Receiver Ground | 2 | |
| 3 | RGND | Receiver Ground | 2 | |
| 4 | MOD-DEF 0 | Module Definition 0 | 2 | GBIC module definition and presence, bit 0, 4.7k to 10k Ω pullup to V _{CC} T on host. |
| 5 | MOD-DEF 1 | Module Definition 1 | 2 | |
| 6 | MOD-DEF 2 | Module Definition 2 | 2 | |
| 7 | Tx_Disable | Transmitter Disable | 2 | Transmitter Disable, logic high, open collector compatible, 4.7k to 10k Ω pullup to V _{CC} T on GBIC. |
| 8 | TGND | Transmitter Ground | 2 | |
| 9 | TGND | Transmitter Ground | 2 | |
| 10 | Tx_Fault | Transmitter Fault Indication | 2 | Transmitter Fault, logic high, open collector compatible, 4.7k to 10k Ω pullup to V _{CC} T on host. |
| 11 | RGND | Receiver Ground | 1 | |
| 12 | -Rx_DAT | Receive Data Differential PECL | 1 | AC coupled 150Ω differential lines which should be terminated with 150Ω (differential) at the user SERDES. |
| 13 | +Rx_DAT | | 1 | |
| 14 | RGND | Receiver Ground | 1 | |
| 15 | VccR | Receiver Power | 2 | 5.0 V ± 5% |
| 16 | VccT | Transmitter Power | 2 | 5.0 V ± 5% |
| 17 | TGND | Transmitter Ground | 1 | |
| 18 | +Tx_DAT | Transmit Data | 1 | AC-coupled, differential lines |

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| | | | | |
|----|---------|--------------------|---|---|
| 19 | -Tx_DAT | Differential PECL | 1 | with 150Ω differential termination inside the module. |
| 20 | TGND | Transmitter Ground | 1 | |

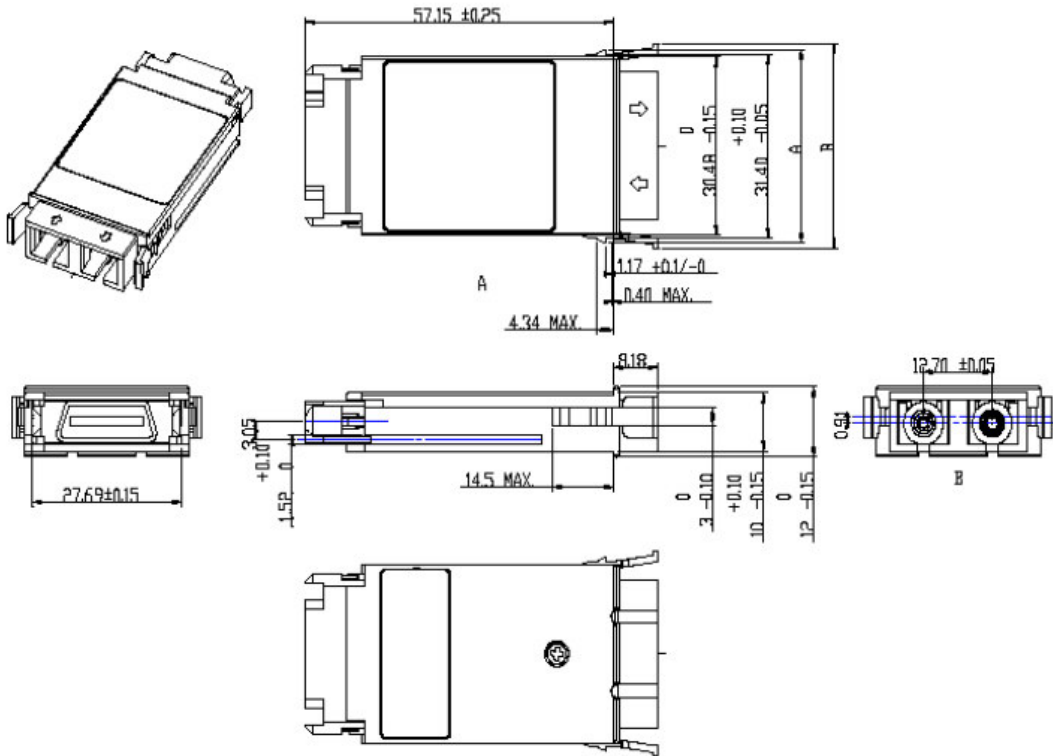
Note:

1. Pin engagement sequence during hot plugging.

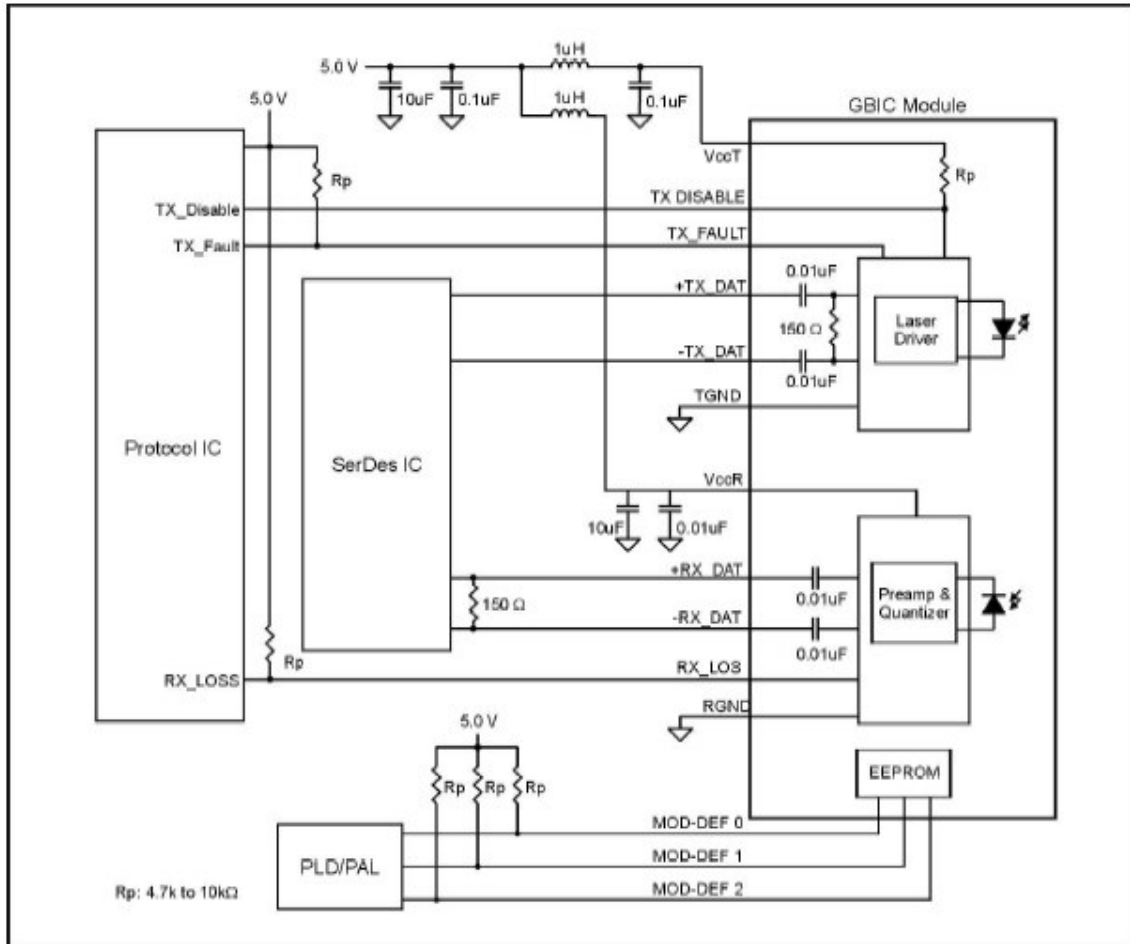
Physical Characteristics

Outline Diagram

Dimensions for the device package are given in millimeters.



Recommended Interface Diagram



Additional Information

Contact

For additional information, product specifications, or information about Optocom:

Internet: <http://www.optocom.com>

Email: sales@optocom.com

Tel: +1 978 988 8711

Fax: +1 978 988 8722

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