

GBS-9250-CXX0

5V / CWDM / 2.125 Gb/s Single-Mode Gigabit Interface Converter (GBIC)

FEATURES

- 18-Wavelength CWDM GBIC Transceivers
- 2.5 Gbps Bi-directional Data Links
- Compliant with 1X / 2X Fibre Channel FC-PI 13.0
- Compliant with Gigabit Interface Converter (GBIC) Specification Rev. 5.5
- CWDM DFB Laser Transmitter
- APD High Sensitivity Receiver
- Multi-rate Operation for 2.5 / 2.125 / 1.062 / 1.25 Gbps
- Duplex SC Connector
- 21 dB Power Budget At Least
- SCA-2 Host Connector
- Single +5 V Power Supply
- Differential PECL Inputs and Outputs
- TTL RX-LOS Output
- Hot Pluggable
- Class 1 Laser International Safety Standard IEC-60825 Compliant

APPLICATIONS

- 2.5 Gb/s Switch to Switch Interface
- High Speed Interface for File Servers
- Bus Extension Application
- Data Storage
- Dual Rate 1.06 / 2.125 Gb/s Fibre Channel

DESCRIPTION

The GBS-9250-CXX0 series optical transceivers meet the Gigabit Interface Converter (GBIC) specification Rev. 5.5. It satisfies the optical interface specifications defined in IEEE 802.3z Drift 5.0 1000 BASE for Gigabit Ethernet and 1x/2x Fiber Channel FC-PI13.0. This module is designed for single-mode fiber and operates at a nominal wavelength of CWDM. There are eighteen center wavelengths available from 1270 nm to 1610 nm, each step 20 nm. A guaranteed minimum optical link budget of 21 dB is offered. The transmission distance is depended on the wavelength and loss of fiber. The transmitter section uses a multiple quantum well CWDM DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. A PECL input / output logic interface is used. TTL RX-LOS output simplifies interface to external circuitry. A 20-pin SCA-2 host connector is used to connect the converter to the host system.

LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

ORDER INFORMATION

| P/No. | Bit Rate (Gb/s) | Power Budget (dB) | Wavelength (nm) | Voltage (V) | Connector | Temp. (°C) | TX Power (dBm) | RX Sens. (dBm) |
|---------------|-----------------|-------------------|-----------------|-------------|-----------|------------|----------------|----------------|
| GBS-9250-CXX0 | 2.5 | > 21 | CWDM* | 5 | SC | 0 to 70 | 5 to 0 | -21 |

CWDM Wavelength (0 to 70°C)

| Central Wavelength | Min. (nm) | Typ. (nm) | Max. (nm) | Central Wavelength | Min. (nm) | Typ. (nm) | Max. (nm) |
|--------------------|-----------|-----------|-----------|--------------------|-----------|-----------|-----------|
| -C270 | 1264.5 | 1270 | 1277.5 | -C450 | 1444.5 | 1450 | 1457.5 |
| -C290 | 1284.5 | 1290 | 1297.5 | -C470 | 1464.5 | 1470 | 1477.5 |
| -C310 | 1304.5 | 1310 | 1317.5 | -C490 | 1484.5 | 1490 | 1497.5 |
| -C330 | 1324.5 | 1330 | 1337.5 | -C510 | 1504.5 | 1510 | 1517.5 |
| -C350 | 1344.5 | 1350 | 1357.5 | -C530 | 1524.5 | 1530 | 1537.5 |
| -C370 | 1364.5 | 1370 | 1377.5 | -C550 | 1544.5 | 1550 | 1557.5 |
| -C390 | 1384.5 | 1390 | 1397.5 | -C570 | 1564.5 | 1570 | 1577.5 |
| -C410 | 1404.5 | 1410 | 1417.5 | -C590 | 1584.5 | 1590 | 1597.5 |
| -C430 | 1424.5 | 1430 | 1437.5 | -C610 | 1604.5 | 1610 | 1617.5 |

CWDM*: 18 Wavelengths from 1270 nm to 1610 nm, each step 20 nm.

| Absolute Maximum Ratings | | | | | | |
|--------------------------|--------|------|-----|-------|-----------------|--|
| Parameter | Symbol | Min | Max | Units | Notes | |
| Storage Temperature | Tstg | -40 | 85 | °C | | |
| Operating Temperature | Topr | 0 | 70 | °C | Air flow 1m/sec | |
| Power Supply Voltage | Vcc | -0.5 | 6 | V | | |
| Input Voltage | --- | -0.5 | Vcc | V | | |

| Recommended Operating Conditions | | | | | | |
|----------------------------------|-----------------------------------|------|------------------------------|------|-------|-------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Conditions |
| Power Supply Voltage | Vcc | 4.75 | 5 | 5.25 | V | Reference to GND. |
| Power Supply Current | I _{TX} + I _{RX} | | 200 | 300 | mA | |
| Operating Temperature | Topr | 0 | | 70 | °C | Air flow 1m/sec |
| Data Rate | | | 1.0625 / 1.25 2.125 / 2.5 | | Gb/s | |

| Transmitter Specifications (0°C < Topr < 70°C, 4.75V < Vcc < 5.25V) | | | | | | |
|---|-----------------------------------|-----------|-----|-----------|------------------|------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| Optical | | | | | | |
| Optical Transmit Power | P _o | 0 | --- | 5 | dBm | 1 |
| Output Center Wavelength | λ | λ-5.5 | λ | λ+7.5 | nm | 2 |
| Output Spectrum Width | Δλ | | --- | 1 | nm | -20 dB Width |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Extinction Ratio | E _R | | 9 | --- | dB | |
| Optical Rise Time | t _r | | | 150 | ps | 20% to 80% value |
| Optical Fall Time | t _f | | | 150 | ps | 20% to 80% value |
| Electrical | | | | | | |
| Differential Input Voltage | V _{IH} - V _{IL} | 0.65 | | 2.0 | V _{p-p} | |
| Transmit Fault Load | TX-FAULT _{LOAD} | 4.7 | | 10 | kΩ | 3 |
| Transmit Fault Output-Low | V _{TX-FAULT-L} | 0.0 | | 0.5 | V | |
| Transmit Fault Output-High | V _{TX-FAULT-H} | Vcc - 0.5 | | Vcc + 0.3 | V | |
| TX-Disable Input - Low | V _{TX-DISABLE-L} | 0 | | 0.8 | V | |
| TX-Disable Input - High | V _{TX-DISABLE-H} | 2.0 | | Vcc + 0.3 | V | |
| TX-Disable Assert Time | t _{off} | | | 10 | μs | |
| TX-Disable Negate Time | t _{on} | | | 1 | ms | |
| Time to initialize, includes reset of TX-FAULT | t _{int} | | | 300 | ms | |
| TX FAULT from fault to assertion | t _{fault} | | | 100 | μs | |
| TX-Disable time to start reset | t _{reset} | 10 | | | μs | |

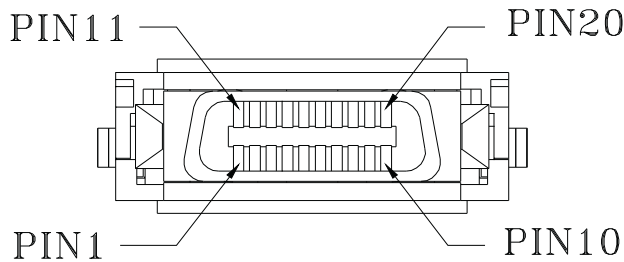
1. Output power is power coupled into a 9/125 μm SM fiber.
2. ITU-T G.694.2 CWDM wavelength from 1270 nm to 1610 nm, each step 20 nm.
3. Pull-up resistor on host Vcc.

Receiver Specifications (0°C < Topr < 70°C, 4.75 V < Vcc < 5.25V)

| Parameter | Symbol | Min | Typ | Max | Units | Notes |
|--|------------------------|------|-----|------|-------|-------------------------|
| Optical | | | | | | |
| Sensitivity @2.125Gb/s @ BER=10 ⁻¹² | SENS | -- | -- | -21 | dBm | 4 |
| Maximum Input Power | Pin | -3 | | -- | dBm | 4 |
| Signal detect ! Hysteresis | | 1.0 | -- | | dB | |
| Wavelength of Operation | | 1260 | -- | 1620 | nm | |
| RX-LOS ! Asserted | Pa | -- | -- | -21 | dBm | Transition: low to high |
| RX-LOS ! Deasserted | Pd | -33 | -- | -- | dBm | Transition: high to low |
| Electrical | | | | | | |
| Differential Output Voltage | +/- RX-DAT | 0.37 | | 2.0 | Vp-p | |
| Data Output Rise Time | T _{IRX-DAT} | | | 0.35 | ns | |
| Data Output Fall Time | T _{FRX-DAT} | | | 0.35 | ns | |
| Receiver Loss of Light Load | RX-LOS _{LOAD} | 4.7 | | 10 | kΩ | 5 |
| Loss of Signal Output Voltage --- Low | RX-LOS _L | 0 | | 0.5 | V | |
| Loss of Signal Output Voltage --- High | RX-LOS _H | 2.4 | | Vcc | V | |
| Loss of Signal Assert Time (off to on) | T _{ARX-LOS} | | | 100 | μs | |
| Loss of Signal Deassert Time (on to off) | T _{DRX-LOS} | | | 100 | μs | |

- 4. Minimum sensitivity and saturation levels at BER=1E-12 for a 2⁷-1 PRBS.
- 5. Pull-up resistor on host Vcc.

PIN ASSIGNMENT



| PIN | Signal Name | Sequence | Description |
|-----|-------------------|----------|--|
| 1 | RX-LOS | 2 | Receiver Loss of Signal, logic high, open collector compatible, 4.7K to 10K ohm pull-up to V _{CC} T on host |
| 2 | R _{GND} | 2 | Receiver Ground |
| 3 | R _{GND} | 2 | Receiver Ground |
| 4 | MOD-DEF(0) | 2 | TTL Low |
| 5 | MOD-DEF(1) | 2 | SCL Serial Clock Signal |
| 6 | MOD-DEF(2) | 2 | SDA Serial Data Signal |
| 7 | TX-DIABLE | 2 | Transmitter Disable, logic high, open collector compatible |
| 8 | T _{GND} | 2 | Transmitter Ground |
| 9 | T _{GND} | 2 | Transmitter Ground |
| 10 | TX-FAULT | 2 | Transmitter Fault, logic high, open collector compatible, 4.7K to 10K ohm pull-up to V _{CC} T on GBIC |
| 11 | R _{GND} | 1 | Receiver Ground |
| 12 | -RX-DAT | 1 | Receiver Data Bar, Differential PECL, AC coupled |
| 13 | +RX-DAT | 1 | Receiver Data, Differential PECL, AC coupled |
| 14 | R _{GND} | 1 | Receiver Ground |
| 15 | V _{CCR} | 2 | Receiver +3.3V Supply |
| 16 | V _{CC} T | 2 | Transmitter +3.3V Supply |
| 17 | T _{GND} | 1 | Transmitter Ground |
| 18 | +TX-DAT | 1 | Transmitter Data, Differential PECL, AC coupled |
| 19 | -TX-DAT | 1 | Transmitter Data Bar, Differential PECL, AC coupled |
| 20 | T _{GND} | 1 | Transmitter Ground |

A sequence value of 1 indicates that the signal is in the first group to engage during plugging of a module. A sequence value of 2 indicates that the signal is the second and last group. The two guide pins on the connector are electrically connected to the transceiver circuit ground. These two guide pins make contact with circuit prior to sequence 1 signals.

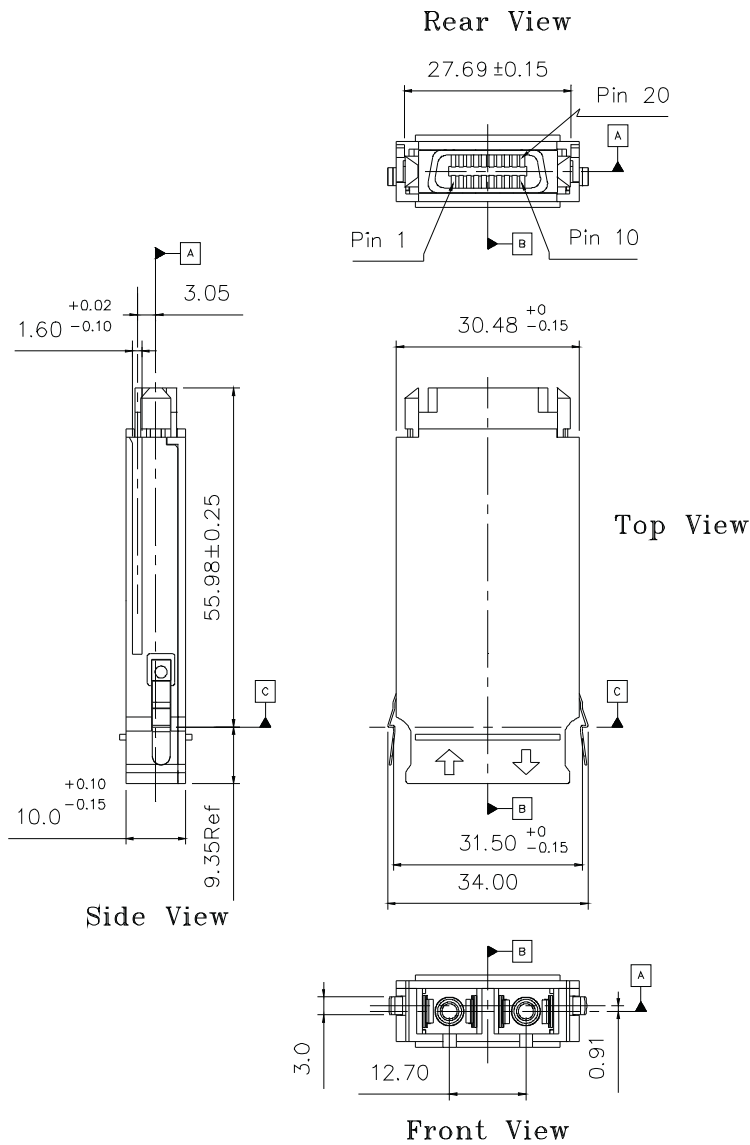
Module Definition

| Module Definition | MOD-DEF(0) PIN 4 | MOD-DEF (1) PIN 5 | MOD-DEF (2) PIN 6 | Interpretation by Host |
|-------------------|---------------------|----------------------|----------------------|--------------------------------------|
| 4 | TTL Low | SCL | SDA | Serial module definition protocol |

Module Definition 4 specifies a serial definition protocol. For this definition, upon power up, MOD-DEF(1:2) appear as no connector (NC) and MOD-DEF(0) is TTL LOW. When the host system detects this condition, it activates the serial protocol. The protocol uses the 2-wire serial CMOS E²PROM protocol of the ATMEL AT24C01A/02/04 family of components.

PACKAGE DIAGRAM

Units in mm



Note: Specifications subject to change without notice.