

GBM-104 (RoHS compliant)
850 nm Multi-mode Transceiver
Small Form Pluggable (SFP), 3.3V
1.0625Gbd Fiber Channel/1.25 Gigabit Ethernet



Features

- Compliant with Fiber Channel 100-M5-SN-I and 100-M6-SN-I standard
- Compliant with IEEE802.3z Gigabit Ethernet standard
- Industry standard small form pluggable (SFP) package
- Duplex LC connector
- Differential LVPECL inputs and outputs
- Single power supply 3.3V
- TTL signal detect indicator
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1

Application

- Distributed multi-processing
- Switch to switch interface
- High speed I/O for file server
- Bus extension application
- Channel extender, data storage

■ **Ordering Information**

| PART NUMBER | INPUT/OUTPUT | SIGNAL DETECT | VOLTAGE | TEMPERATURE |
|-------------|--------------|---------------|---------|-------------|
| GBM-104 | AC/AC | TTL | 3.3V | 0°C to 70°C |

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■ **Absolute Maximum Ratings**

| PARAMETER | SYMBOL | MIN | MAX | UNITS | NOTE |
|---------------------|----------|------|----------|-------|------|
| Storage Temperature | T_S | -40 | 85 | °C | |
| Supply Voltage | V_{CC} | -0.5 | 4.0 | V | |
| Input Voltage | V_{IN} | -0.5 | V_{CC} | V | |
| Output Current | I_o | --- | 50 | mA | |
| Operating Current | I_{OP} | --- | 400 | mA | |

■ **Recommended Operating Conditions**

| PARAMETER | SYMBOL | MIN | MAX | UNITS | NOTE |
|----------------------------|-------------------|-----|-----|-------|---------|
| Case Operating Temperature | T_C | 0 | 70 | °C | GBM-104 |
| Supply Voltage | V_{CC} | 3.1 | 3.5 | V | |
| Supply Current | $I_{TX} + I_{RX}$ | --- | 250 | mA | |

■ **Transmitter Electro-optical Characteristics**

$V_{CC} = 3.1 \text{ V to } 3.5 \text{ V}, T_C = 0 \text{ }^\circ\text{C to } 70 \text{ }^\circ\text{C} (-20 \text{ }^\circ\text{C to } 85 \text{ }^\circ\text{C}) (-40 \text{ }^\circ\text{C to } 85 \text{ }^\circ\text{C})$

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNITS | NOTE |
|---|---------------------------|------|------|------|-------|------|
| Output Optical Power (50/125 μm fiber, NA=0.20) (62.5/125 μm fiber, NA=0.275) | P_{out} | -9.5 | --- | -4 | dBm | |
| Extinction Ratio | ER | 9 | --- | --- | dB | |
| Coupled Power Ratio | CPR | 9 | --- | --- | dB | |
| Center Wavelength | λ_C | 830 | 850 | 860 | nm | |
| Spectral Width (RMS) | $\Delta\lambda$ | --- | --- | 0.85 | nm | |
| Rise/Fall Time, (20–80%) | $T_{r,f}$ | --- | --- | 260 | ps | |
| Relative Intensity Noise | RIN | --- | --- | -117 | dB/Hz | |
| Total Jitter | TJ | --- | --- | 227 | ps | |
| Output Eye | Compliant with IEEE802.3z | | | | | |
| Max. P_{out} TX-DISABLE Asserted | P_{OFF} | --- | --- | -45 | dBm | |
| Differential Input Voltage | V_{DIFF} | 0.4 | --- | 2.0 | V | |

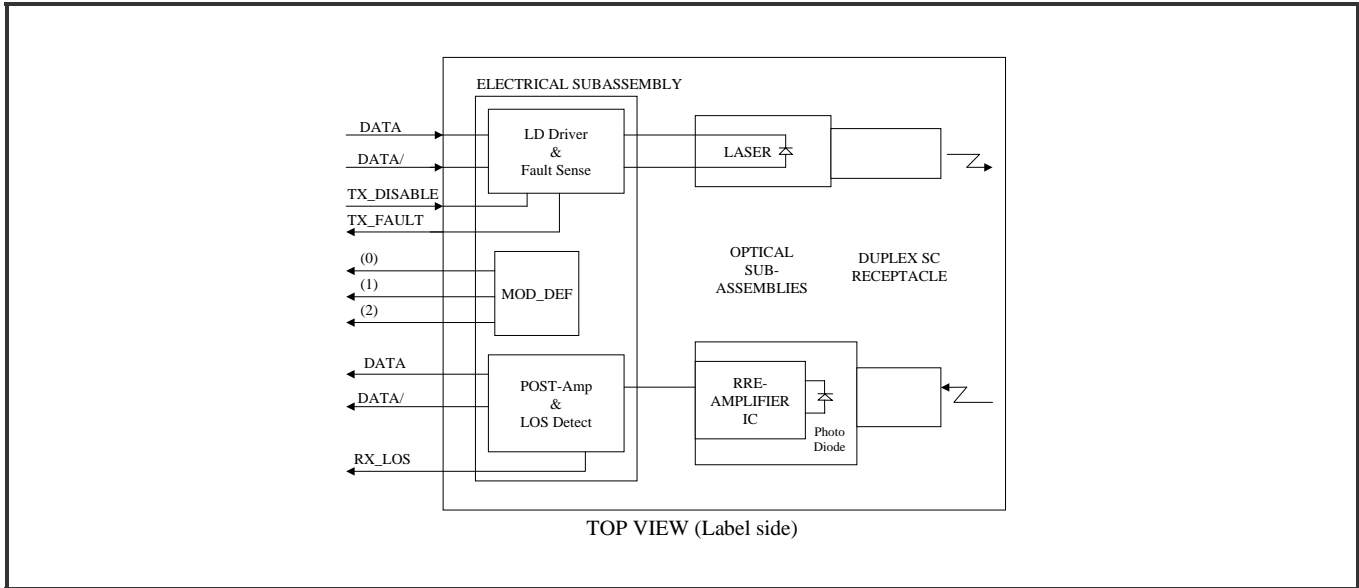
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■ **Receiver Electro-optical Characteristics**

$V_{CC} = 3.1\text{ V to }3.5\text{ V}$, $T_C = 0^\circ\text{C to }70^\circ\text{C}$ ($-40^\circ\text{C to }85^\circ\text{C}$)

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNITS | NOTE |
|--|-------------|-----|------|----------|-------|------------------|
| Optical Input Power-maximum | P_{IN} | 0 | --- | --- | dBm | BER < 10^{-12} |
| Optical Input Power-minimum (Sensitivity) | P_{IN} | --- | --- | -18 | dBm | BER < 10^{-12} |
| Operating Center Wavelength | λ_C | 770 | --- | 860 | nm | |
| Optical Return Loss | ORL | 12 | --- | --- | dB | |
| Loss of Signal-Asserted | P_A | --- | --- | -18 | dBm | |
| Loss of Signal-Deasserted | P_D | -35 | --- | --- | dBm | |
| Differential Output Voltage | V_{DIFF} | 0.5 | --- | 1.2 | V | |
| Data Output Rise, Fall Time (20–80%) | $T_{r,f}$ | --- | --- | 0.35 | ns | |
| Receiver Loss of Signal Output Voltage-Low | RX_LOS_L | 0 | --- | 0.5 | V | |
| Receiver Loss of Signal Output Voltage-High | RX_LOS_H | 2.4 | --- | V_{CC} | V | |

■ **Block Diagram of Transceiver**



Transmitter Section

The transmitter section consists of a 850 nm VCSEL in an eye safe optical subassembly (OSA) which mates to the fiber cable. The laser OSA is driven by a LD driver IC which converts differential input LVPECL logic signals into an analog laser driving current.

TX_DISABLE

The TX_DISABLE signal is high (TTL logic “1”) to turn off the laser output. The laser will turn on when TX_DISABLE is low (TTL logic “0”).

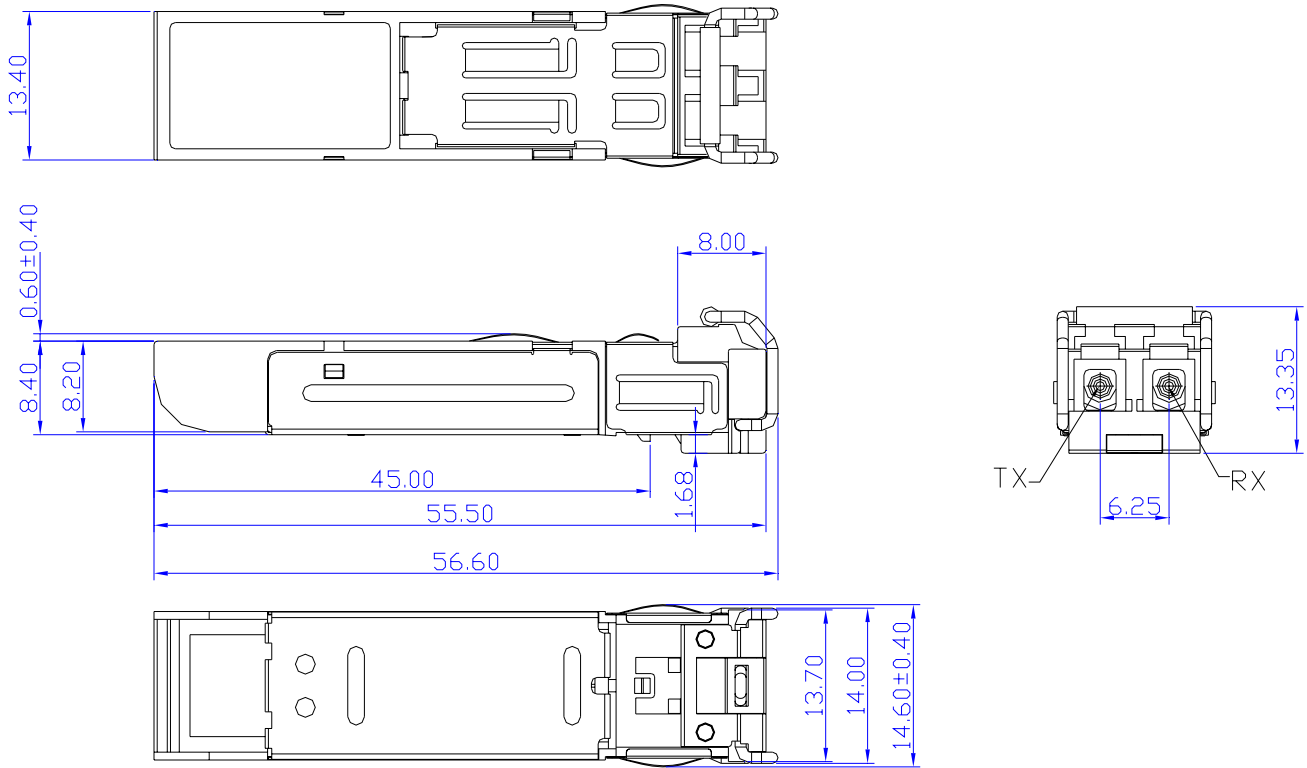
Receiver Section

The receiver utilizes a MSM detector integrated with a trans-impedance preamplifier in an OSA. This OSA is connected to a circuit providing post-amplification quantization, and optical signal detection.

Receive Loss (RX_LOS)

The RX_LOS is high (logic “1”) when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

■ **Dimensions**



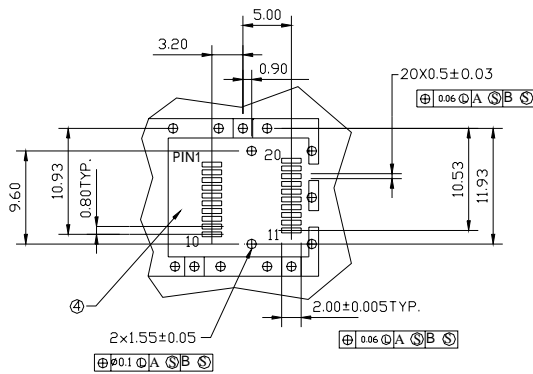
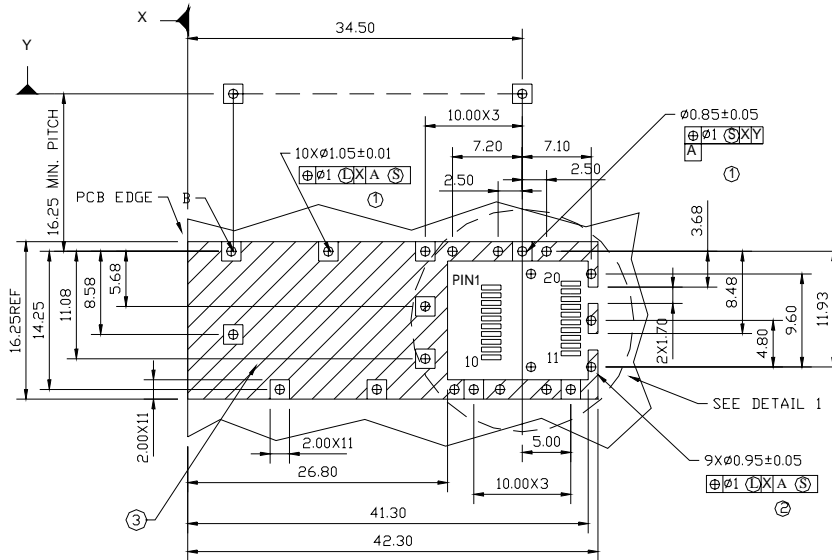
DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE ± 0.2mm UNLESS OTHERWISE SPECIFIED

Unit: mm

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■ **SFP host board mechanical layout**



DETAIL 1

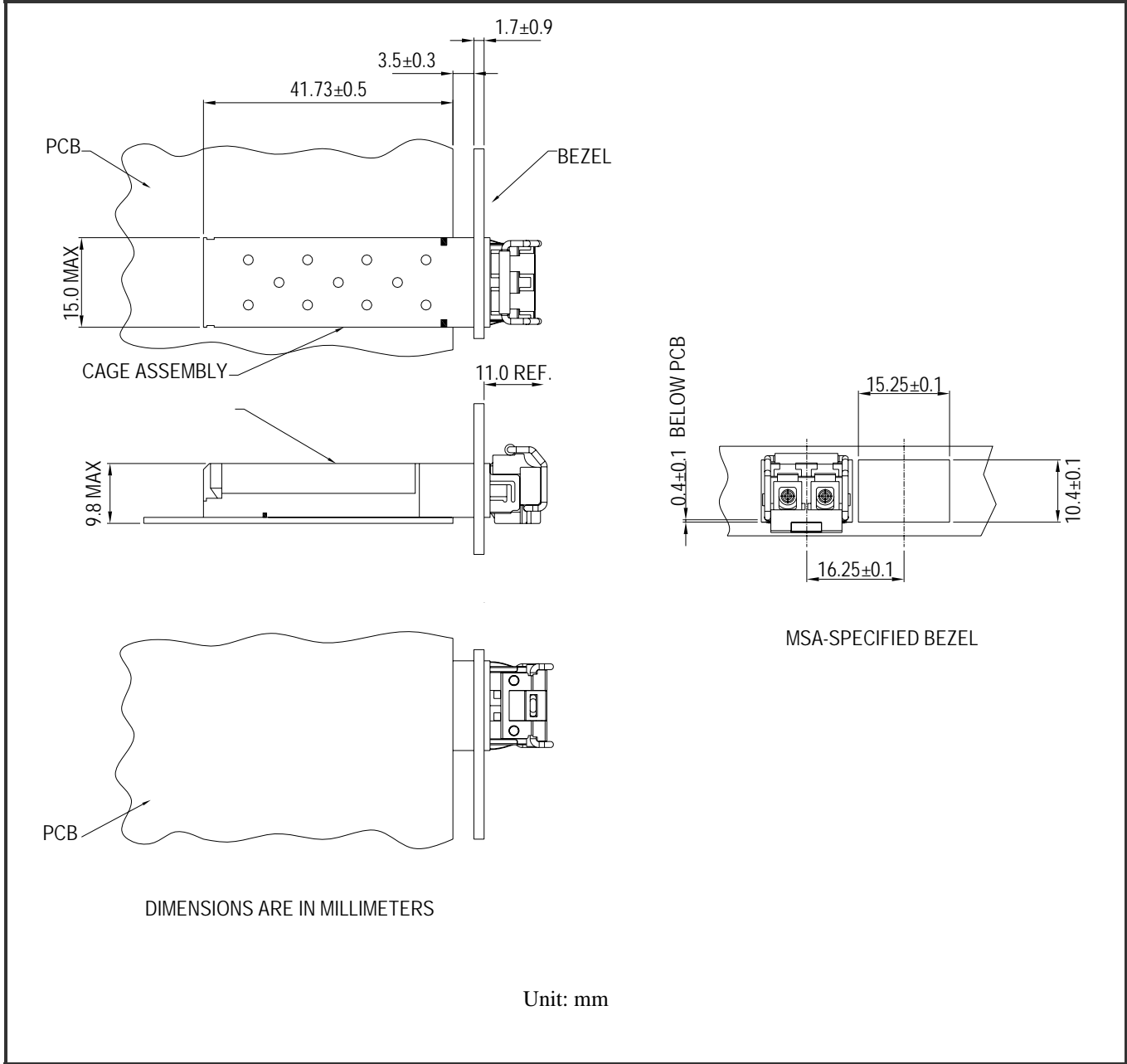
LEGEND

1. PADS AND VIAS ARE CHASSIS GROUND
2. THROUGH HOLES, PLATING OPTIONAL
3. HATCHED AREA DENOTES COMPONENT AND TRACE KEEPOUT (EXCEPT CHASSIS GROUND)
4. AREA DENOTES COMPONENT KEEPOUT (TRACES ALLOWED)

DIMENSIONS ARE IN MILLIMETERS

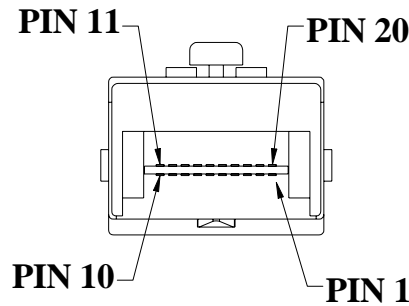
Unit: mm

■ **Assembly drawing**



■ **Pin Assignment**

Pin-Out



| Pin | Signal Name | Description |
|-----|----------------|---|
| 1 | T_{GND} | Transmit Ground |
| 2 | TX_FAULT | Transmit Fault |
| 3 | $TX_DISABLE$ | Transmit Disable |
| 4 | $MOD_DEF (2)$ | SDA Serial Data Signal |
| 5 | $MOD_DEF (1)$ | SCL Serial Clock Signal |
| 6 | $MOD_DEF (0)$ | TTL Low |
| 7 | $RATE_SELECT$ | Open Circuit |
| 8 | RX_LOS | Receiver Loss of Signal, TTL High, open collector |
| 9 | R_{GND} | Receiver Ground |
| 10 | R_{GND} | Receiver Ground |
| 11 | R_{GND} | Receiver Ground |
| 12 | $RX-$ | Receive Data Bar, Differential PECL, ac coupled |
| 13 | $RX+$ | Receive Data, Differential PECL, ac coupled |
| 14 | R_{GND} | Receiver Ground |
| 15 | V_{CCR} | Receiver Power Supply |
| 16 | V_{CCT} | Transmitter Power Supply |
| 17 | T_{GND} | Transmitter Ground |
| 18 | $TX+$ | Transmit Data, Differential PCEL, ac coupled |
| 19 | $TX-$ | Transmit Data Bar, Differential PCEL, ac coupled |
| 20 | T_{GND} | Transmitter Ground |



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■ **Eye Safety Mark**

The GBM series multimode transceiver is a class 1 laser product. It complies with EN 60825-1 and FDA 21 CFR 1040.10 and 1040.11. In order to meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Caution

All adjustments have been done at the factory before the shipment of the devices. No maintenance and user serviceable part is required. Tampering with and modifying the performance of the device will result in voided product warranty.

Required Mark

Class 1 Laser Product
Complies with
21 CFR 1040.10 and 1040.11

Note : All information contained in this document is subject to change without notice.