

BTRS-7960CG / BTRS-7960C-SPG

1490 nm TX/ 1310 nm RX , 3.3V / 1250 Mbps **RoHS Compliant Single-Fiber Transceiver**

FEATURES

- | Bi-Directional Single-Fiber **3W-TRX™** Transceiver
- | Compliant with IEEE 802.3ah 1000BASE-BX
- | 1490 nm DFB LD Transmitter
- | 1310 nm Receiver
- | Link distance up to 60 km
- | Industry Standard 1 x 9 Footprint
- | Single +3.3 V Power Supply
- | RoHS Compliant
- | 0 to 70°C Operating
- | LVPECL Differential Inputs and Outputs
- | LVTTTL Signal Detect Output
- | Wave Solderable and Aqueous Washable
- | Class 1 Laser International Safety Standard IEC-60825 Compliant

DESCRIPTION

The BTRS-7960CG series is high performance module for single fiber communications by using 1490 nm transmitter and 1310 nm receiver. The transmitter section uses a multiple quantum well 1490 nm DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section is designed to receive 1310 nm and block 1490 nm signal. This feature is suitable for IEEE 802.3ah 1000BASE-BX and ITU-T 983.3 application. A PECL logic interface simplifies interface to external circuitry. LVTTTL signal Detect is used.

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.

APPLICATIONS

- | WDM Gigabit Ethernet Links
- | SONET/SDH Equipment Interconnect
- | Fiber Channel Links

ORDER INFORMATION

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| P/No. | IEEE 802.3ah 1000BASE | Bit Rate (Gb/s) | Distance (km) | TX (nm) | RX (nm) | Voltage (V) | Package | Temp (°C) | TX Power (dBm) | RX Sens. (dBm) | RoHS Compliant |
|-------------|-----------------------|-----------------|---------------|----------|---------|-------------|---------|-----------|----------------|----------------|----------------|
| BTRS-7960CG | BX | 1.25 | 60 | 1490 DFB | 1310 | 3.3 | SC, 2X5 | 0 to 70 | 2 to -3 | -26 | Yes |

- Note: 1. BTRS-XXXXXG is SC/PC receptacle type package with standard case
 2. BTRS-XXXXXEG is SC/PC eceptacle type package with extended case
 3. BTRS-XXXXX-APBBBG is pigtail type package with different connector, A=S is SC connector, A=F is FC connector, A=T is ST connector, A=L is LC connector, A=M is MU connector; BBB is the length of fiber in cm.

| 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 |
| Soldering Temperature | --- | | 260 | °C | 10 seconds on leads only |
| Power Supply Voltage | Vcc | 0 | 3.6 | V | |
| Input Voltage | --- | GND | Vcc | V | |
| Output Current | Iout | 0 | 30 | mA | |

| Recommended Operating Conditions | | | | | |
|----------------------------------|--------|------|------|------|----------------------|
| Parameter | Symbol | Min | Typ | Max | Units / Notes |
| Power Supply Voltage | Vcc | 3.13 | 3.3 | 3.47 | V |
| Operating Temperature | Topr | 0 | | 70 | °C / air flow 1m/sec |
| Data Rate | | | 1250 | 1300 | Mb/s |
| Power Supply Current | Icc | | | 280 | mA |

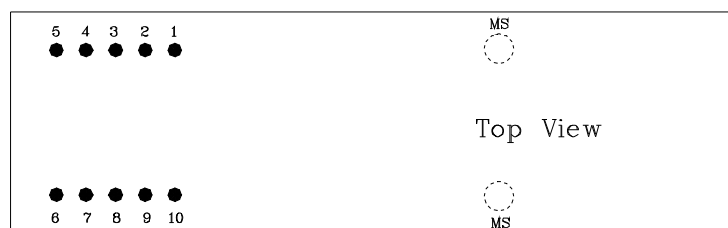
| Transmitter Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V) | | | | | | |
|---|-----------------------------------|-----------|-----|-------|-------|--------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| Optical | | | | | | |
| Optical Transmit Power | Po | -3 | | 2 | dBm | 1 |
| Output Center Wavelength | λ | 1480 | | 1500 | nm | |
| Output Spectrum Width | σ_λ | | | 1 | nm | -20 dB Width |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Extinction Ratio | ER | 9 | | | dB | |
| Output Eye | Compliant with IEEE 802.3z | | | | | |
| Optical Rise Time | t _r | | | 0.26 | ns | 20% to 80% Values |
| Optical Fall Time | t _f | | | 0.26 | ns | 20% to 80% Values |
| Relative Intensity Noise | RIN | | | -120 | dB/Hz | |
| Total Jitter | TJ | | | 0.227 | ns | 2 |
| Electrical | | | | | | |
| Data Input Current – Low | I _{IL} | -350 | | | μA | |
| Data Input Current – High | I _{IH} | | | 350 | μA | |
| Differential Input Voltage | V _{IH} - V _{IL} | 300 | | 1600 | mV | |
| Data Input Voltage – Low | V _{IL} - V _{CC} | -2.0 | | -1.58 | V | 3 |
| Data Input Voltage -- High | V _{IH} - V _{CC} | -1.1 | | -0.74 | V | 3 |
| Disable Input Voltage -- Low | V _{TDIS,L} | 0 | | 0.8 | V | TX Output Enabled |
| Disable Input Voltage -- High | V _{TDIS,H} | Vcc - 1.3 | | Vcc | V | TX Output Disabled |
| Shut Off Time for TxDis | t _{DIS} | | | 1 | ms | |

- Notes: 1. Output power is power coupled into a 9/125 μm single mode fiber.
 2. Measured with a 2⁷-1 PRBS.
 3. These inputs are compatible with 10K, 10KH and 100K ECL and LVPECL inputs.

| Receiver Specifications (0°C < Topr < 70°C, 3.13 V < Vcc < 3.47V) | | | | | | |
|---|-----------------------------------|-------|-----|----------------------|-------|-------------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| Optical | | | | | | |
| Sensitivity | --- | --- | --- | -26 | dBm | 1 |
| Maximum Input Power | Pin | -3 | --- | --- | dBm | |
| Signal Detect -- Asserted | Pa | --- | --- | -26 | dBm | Transition: low to high |
| Signal Detect -- Deasserted | Pd | -40 | --- | --- | dBm | Transition: high to low |
| Signal detect -- Hysteresis | | 1.0 | --- | | dB | |
| Wavelength of Operation | | 1260 | | 1360 | nm | 2,3 |
| Optical Return Loss | ORL | 20 | | | dB | |
| Electrical | | | | | | |
| Data Output Voltage Swing | V _{OH} – V _{OL} | 0.575 | | 0.930 | V | |
| SD Output Voltage -- Low | V _{OL} | 0 | | 0.8 | V | |
| SD Output Voltage -- High | V _{OH} | 2.0 | | V _{cc} +0.3 | V | |
| Signal Detect Assert Time | AS _{MAX} | | | 100 | μs | OFF to ON |
| Signal Detect Deassert Time | ANS _{MAX} | | | 300 | μs | ON to OFF |

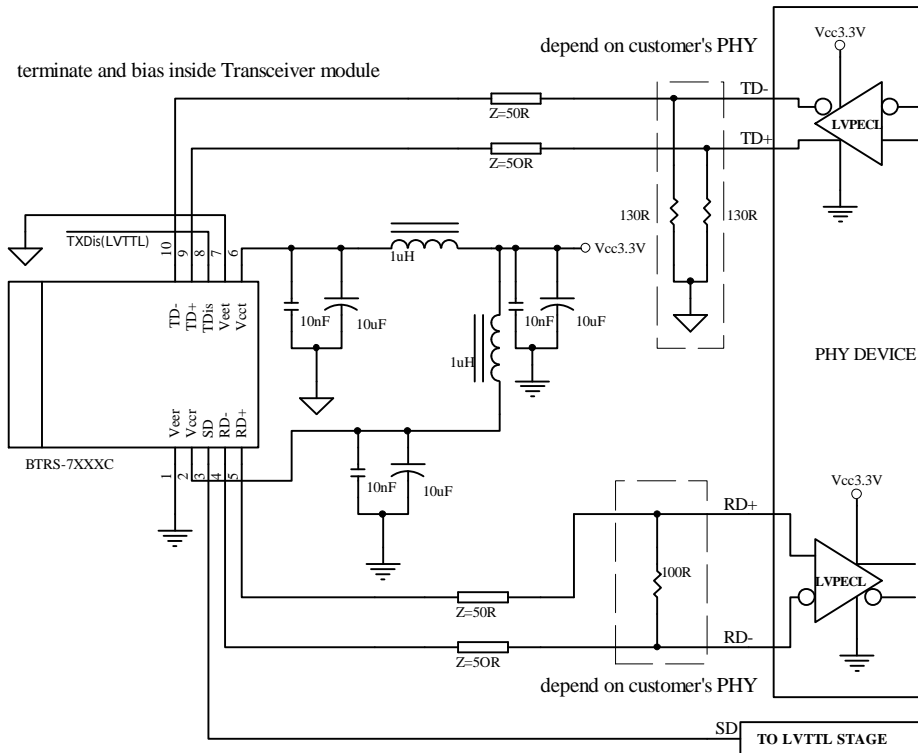
Notes: 1. Minimum sensitivity and saturation levels at BER 1E-12 for a 2⁷-1 PRBS.
 2. At least 30 dB optical isolation for the wavelength 1480 to 1500 nm.
 3. At least 30 dB optical isolation for the wavelength 1550 to 1600 nm.

CONNECTION DIAGRAM



| PIN | Symbol | Notes |
|-----|-------------------|---|
| 1 | V _{EEF} | Directly connect this pin to the receiver ground plane |
| 2 | V _{CC F} | +3.3V dc power for the receiver section |
| 3 | SD | Active high on this indicates a received optical signal. |
| 4 | RD- | Receiver Dataout Bar. See recommended circuit schematic |
| 5 | RD+ | Receiver Dataout. See recommended circuit schematic |
| 6 | V _{CC t} | +3.3V dc power for the transmitter section |
| 7 | V _{EEt} | Directly connect this plan to the transmitter ground plane |
| 8 | TxDis | Transmitter Disable. Connect this pin to +3.3V TTL logic "1" to disable module To enable module connect to TTL logic low "0" |
| 9 | TD+ | Transmitter Data In. See recommended circuit schematic |
| 10 | TD- | Transmitter Data In Bar. See recommended circuit schematic |
| MS | MS | Mounting Studs. Connect to Chassis Ground |

RECOMMENDED CIRCUIT SCHEMATIC

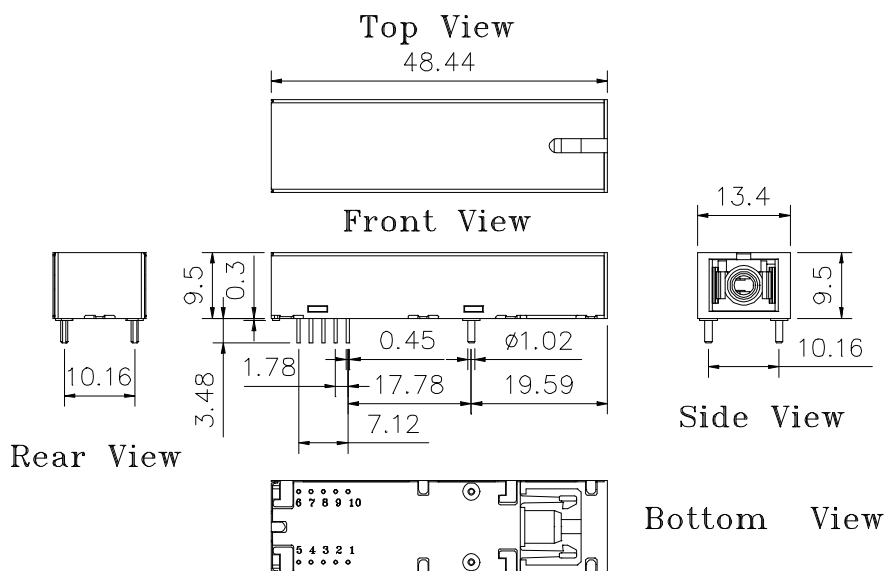


PACKAGE DIAGRAM

Units in mm

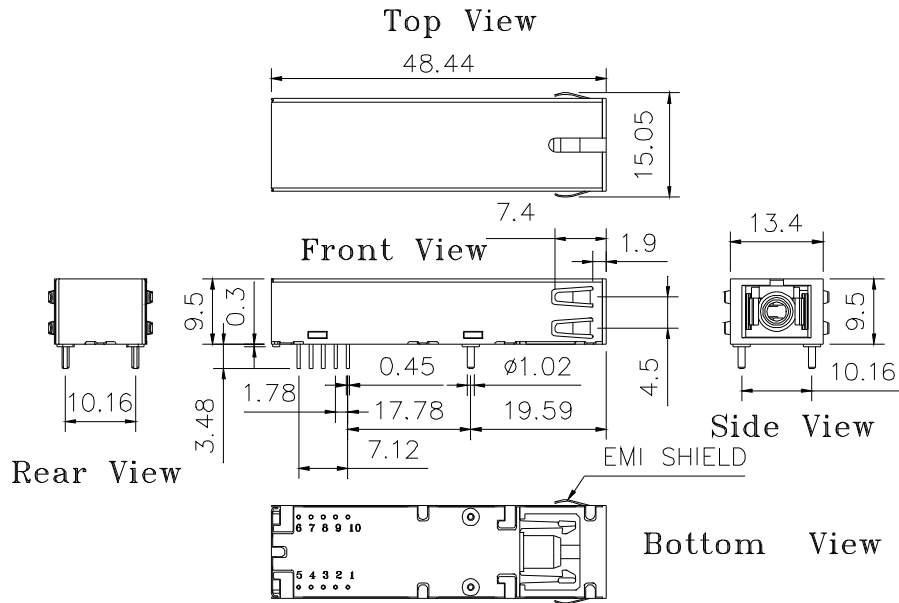
1) SC Receptacle

A) Standard Case



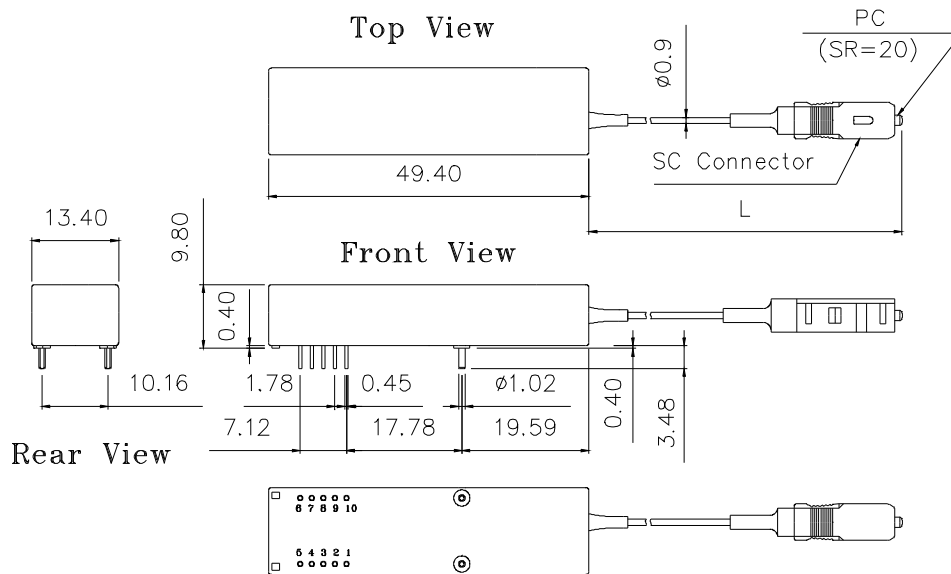
BTRS-7960CG

B) Extended Case



BTRS-7960CEG

2) Pigtail



BTRS-7960C-SP50G

Note: Length L is 50 ± 3 cm. Other pigtail's length is available upon request.

Note: Specifications subject to change without notice.