

BTRS-9720G / BTRS-9720-SPG / BTRS-9720AG / BTRS-9720A-SPG

1550 nm TX / 1310 nm RX, 3.3V / 2.5 Gbps **RoHS Compliant** Single-Fiber WDM Transceiver

FEATURES

- Single Fiber WDM Transceiver
- Speed up to 2.67 Gb/s
- 1550 nm DFB LD Transmitter
- 1310 nm Receiver
- Distance up to 20 km
- Single +3.3 V Power Supply
- RoHS Compliant
- PECL Differential Inputs and Outputs
- LVTTTL Signal Detect Output
- 0 to 70°C Operating: BTRS-9720G
- -40 to 85°C Operating: BTRS-9720AG
- Wave Solderable
- Class 1 Laser International Safety Standard IEC-60825 Compliant

APPLICATIONS

- WDM OC-48 / STM-16 Links
- SONET/SDH Equipment Interconnect
- Fiber Channel Links

DESCRIPTION

The BTRS-9720G series are high performance modules for single fiber communications by using 1550 nm transmitter and 1310 nm receiver. The transmitter section uses a multiple quantum well 1550 nm laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated 1310 nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. A PECL logic interface simplifies interface to external circuitry. LV-TTL Signal Detect is used.

LASER SAFETY

This multi-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) | Distance (km) | TX (nm) | RX (nm) | Voltage (V) | Package | Temp. (°C) | TX Power (dBm) | RX Sens. (dBm) |
|-------------|-----------------|---------------|----------|---------|-------------|---------|------------|----------------|----------------|
| BTRS-9720G | 2.5 / 1.25 | 20 | 1550 DFB | 1310 | 3.3 | 2X5 SC | 0 to 70 | 0 to -5 | -18 |
| BTRS-9720AG | 2.5 / 1.25 | 20 | 1550 DFB | 1310 | 3.3 | 2X5 SC | -40 to 85 | 0 to -5 | -18 |

| Absolute Maximum Ratings | | | | | |
|--------------------------|--------|----------|----------|-------|---|
| Parameter | Symbol | Min | Max | Units | Notes |
| Storage Temperature | Tstg | -40 | 85 | °C | |
| Operating Temperature | Topr | 0 -40 | 70 85 | °C | BTRS-9720G/Air flow 1m/sec BTRS-9720AG/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 |
| Power Supply Current | I _{CC,TX} +I _{CC,RX} | | 200 | 280 | mA |
| Operating Temperature | Topr | 0 -40 | | 70 85 | °C / BTRS-9720G °C / BTRS-9720AG air flow 1m/sec |
| Data Rate | | 0.622 | 2.488 | 2.67 | Gb/s |

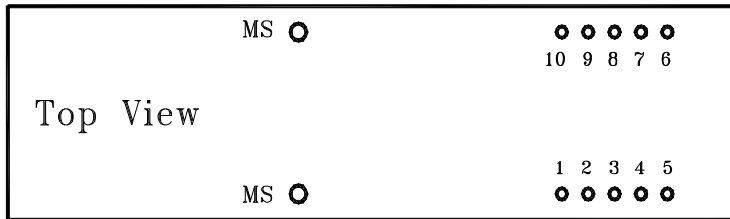
| Transmitter Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V) | | | | | | |
|---|-----------------------------------|---------|------|-------|-------|--------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| Optical | | | | | | |
| Optical Transmit Power | Po | -5 | | 0 | dBm | 1 |
| Output Center Wavelength | λ | 1480 | 1550 | 1580 | nm | |
| Output Spectrum Width | $\Delta\lambda$ | --- | --- | 1 | nm | -20 dB Width |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Extinction Ratio | E _R | 8.2 | | | dB | |
| Output Eye | Compliant with IEEE 802.3z | | | | | |
| Optical Rise Time | t _r | | | 150 | Ps | 20% to 80% Values |
| Optical Fall Time | t _f | | | 150 | Ps | 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. Measure with 2⁷-1 PRBS.
 3. These inputs are compatible with 10K, 10KH and 100K ECL and LVPECL inputs.

| Receiver Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V) | | | | | | |
|--|-----------------------------------|-------|-----|----------|-------|-------------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| Optical | | | | | | |
| Sensitivity | --- | --- | --- | -18 | dBm | 1 |
| Maximum Input Power | P _{in} | 0 | | --- | dBm | |
| Signal Detect -- Asserted | P _a | --- | --- | -18 | dBm | Transition: low to high |
| Signal Detect -- Deasserted | P _d | -31 | --- | --- | dBm | Transition: high to low |
| Signal detect -- Hysteresis | | 1.0 | --- | | dB | |
| Wavelength of Operation | | 1260 | --- | 1360 | Nm | 2 |
| 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 | | Vcc+ 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 |

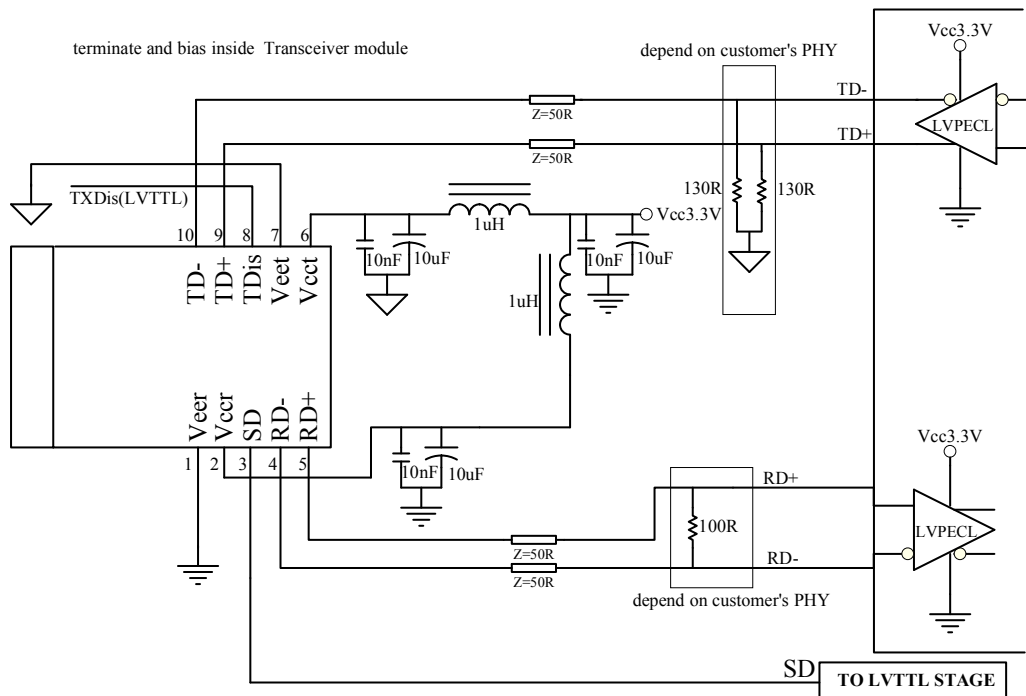
- Notes: 1. Minimum sensitivity and saturation levels at BER=1E-10 for a 2²³-1 PRBS.
 2. At least 30 dB optical isolation for the wavelength 1480 to 1580 nm.

CONNECTION DIAGRAM



| PIN | Symbol | Notes |
|-----|------------------|---|
| 1 | V _{EEf} | Directly connect this pin to the receiver ground plane |
| 2 | V _{CCf} | +3.3V dc power for the receiver section |
| 3 | SD | Active high on this indicates a received optical signal. |
| 4 | RD- | Receiver Data out Bar. See recommended circuit schematic |
| 5 | RD+ | Receiver Data out.. See recommended circuit schematic |
| 6 | V _{CCt} | +3.3V dc power for the transmitter section |
| 7 | V _{EEt} | Directly connect this pin 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

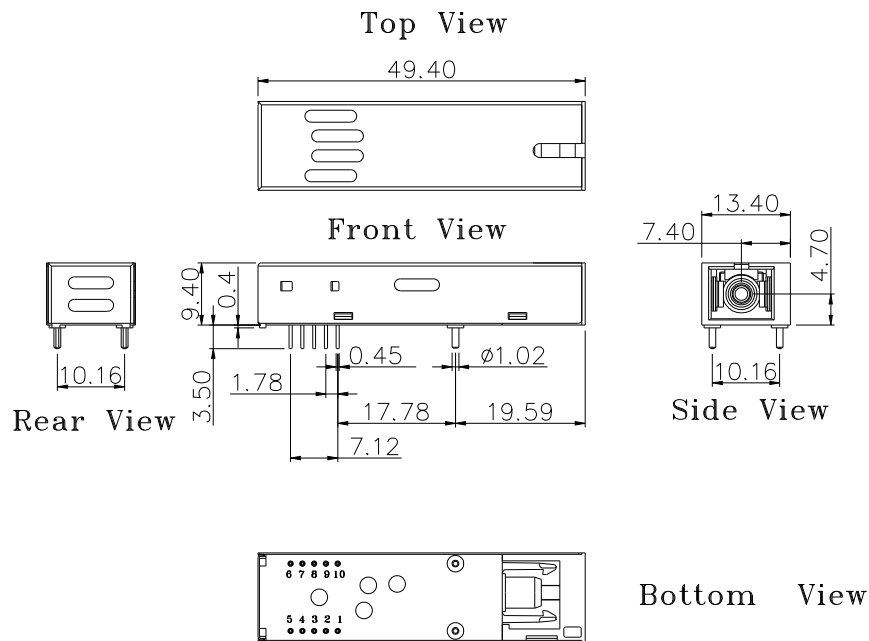


PACKAGE DIAGRAM

Units in mm

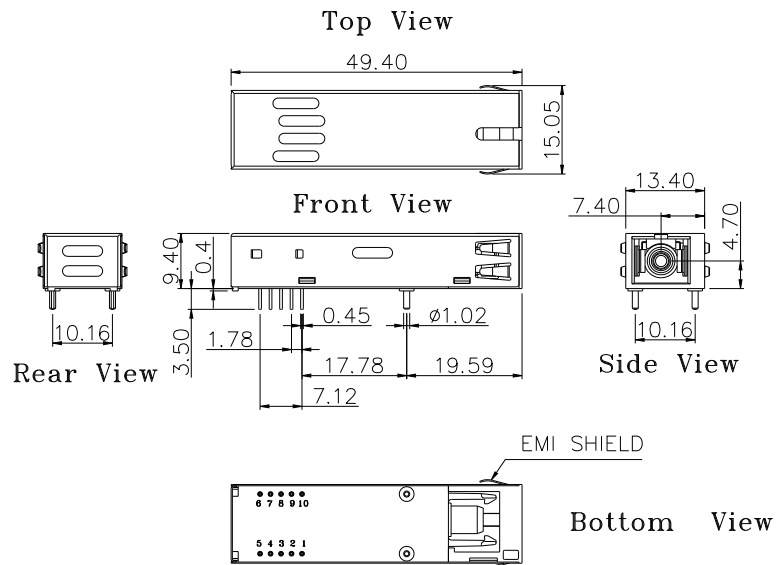
1) SC Receptacle

A) Standard Case



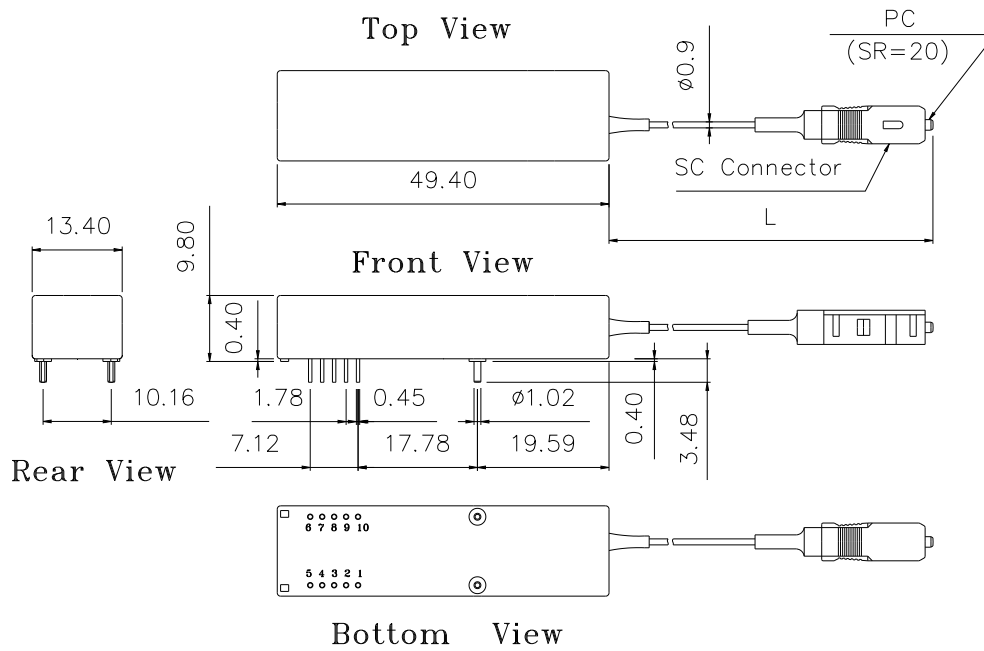
BTRS-9720G / BTRS-9720AG

B) Extended Case



BTRS-9720EG / BTRS-9720AEG

2) Pigtail



BTRS-9720-SP50G / BTRS-9720A-SP50G

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

Note: Specifications subject to change without notice.