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**BTRS-5820G / BTRS-5820-SPG / BTRS-5820AG / BTRS-5820A-SPG****1310 nm TX / 1490 nm RX , 3.3V / 622 Mbps **RoHS Compliant** SFF Single-Fiber Transceiver**  
\*\*\*\*\***FEATURES**

- | 1-Fiber Bi-Directional SFF Transceiver
- | 1310 nm Transmitter
- | 1490 nm Receiver
- | 1550 nm Video Block
- | Distance Up to 20 km
- | Single +3.3 V Power Supply
- | RoHS Compliant
- | LVPECL Differential Inputs and Outputs
- | 0 to 70°C Operating : BTRS-5820G
- | -20 to 85°C Operating : BTRS-5820AG
- | Wave Solderable and Aqueous Washable
- | Class 1 Laser International Safety Standard IEC 825 Compliant

**APPLICATIONS**

- | WDM 622/155 Mb/s Links
- | SONET/SDH Equipment Interconnect
- | Fiber Channel 532 Mb/s Links

**DESCRIPTION**

The BTRS-5820G series is high performance module for single fiber communications by using 1310 nm transmitter and 1490 nm receiver. **This module is equipped with 3W-TRX™ OE device to reject 1.55 um high power video signal.** The transmitter section uses a multiple quantum well 1310 nm laser and is a class 1 laser compliant according to International Safety Standard IEC-825. The receiver section uses an integrated 1490 nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. A LVPECL logic interface simplifies interface to external circuitry.

**LASER SAFETY**

This single mode transceiver is a Class 1 laser product. It complies with IEC 825 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 (Mb/s) | Distance (km) | TX (nm) | RX (nm) | Voltage (V) | Package | Temp (°C)        | TX Power (dBm) | RX Sens. (dBm) | RoHS Compliant |
|--------------------|-----------------|---------------|---------|---------|-------------|---------|------------------|----------------|----------------|----------------|
| BTRS-5820G         | 622             | 20            | 1310    | 1490    | 3.3         | 2X5 SC  | 0 to 70          | -8 to -14      | -28            | Yes            |
| <b>BTRS-5820AG</b> | 622             | 20            | 1310    | 1490    | 3.3         | 2X5 SC  | <b>-20 to 85</b> | -8 to -14      | -28            | Yes            |

Note: 1. BTRS-XXXXXX: 2X5 SC receptacle type package. BTRL-XXXXXX: 2X5 LC receptacle type package.

2. BTRX-XXXXXX-APBBB is 2X5 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.

3. **3W-TRX™** is trade-mark co-owned by Zenko Technologies Inc. and Optoway Technology Inc.

| Absolute Maximum Ratings |        |          |          |       |                           |
|--------------------------|--------|----------|----------|-------|---------------------------|
| Parameter                | Symbol | Min      | Max      | Units | Notes                     |
| Storage Temperature      | Tstg   | -40      | 85       | °C    |                           |
| Operating Temperature    | Topr   | 0<br>-20 | 70<br>85 | °C    | BTRS-5820G<br>BTRS-5820AG |
| Soldering Temperature    | ---    |          | 260      | °C    | 10 seconds on leads only  |
| Power Supply Voltage     | Vcc    | 0        | 4.5      | 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<br>-20 |     | 70<br>85 | °C / BTRS-5820G<br>°C / BTRS-5820AG |
| Data Rate                        |        | 50       | 622 | 650      | Mb/s                                |
| Power Supply Current             | Icc    |          |     | 260      | mA                                  |

| Transmitter Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V) |                                                                    |           |      |       |       |                    |
|---------------------------------------------------------------------|--------------------------------------------------------------------|-----------|------|-------|-------|--------------------|
| Parameter                                                           | Symbol                                                             | Min       | Typ  | Max   | Units | Notes              |
| <b>Optical</b>                                                      |                                                                    |           |      |       |       |                    |
| Optical Transmit Power                                              | Po                                                                 | -14       |      | -8    | dBm   | 1                  |
| Output Center Wavelength                                            | $\lambda$                                                          | 1260      | 1310 | 1360  | nm    |                    |
| Output Spectrum Width                                               | $\sigma_{\lambda}$                                                 |           |      | 4     | nm    | RMS ( $\sigma$ )   |
| Extinction Ratio                                                    | E <sub>R</sub>                                                     | 8.2       |      |       | dB    |                    |
| Output Eye                                                          | Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957 |           |      |       |       |                    |
| Optical Rise Time                                                   | t <sub>r</sub>                                                     |           |      | 1.2   | ns    | 10% to 90% Values  |
| Optical Fall Time                                                   | t <sub>f</sub>                                                     |           |      | 1.2   | ns    | 10% to 90% Values  |
| Relative Intensity Noise                                            | RIN                                                                |           |      | -116  | dB/Hz |                    |
| Total Jitter                                                        | TJ                                                                 |           |      | 0.55  | ns    | 2                  |
| <b>Electrical</b>                                                   |                                                                    |           |      |       |       |                    |
| Data Input Current – Low                                            | I <sub>IL</sub>                                                    | -350      |      |       | μA    |                    |
| Data Input Current – High                                           | I <sub>IH</sub>                                                    |           |      | 350   | μA    |                    |
| Differential Input Voltage                                          | V <sub>IH</sub> - V <sub>IL</sub>                                  | 300       |      | 1600  | mV    |                    |
| Data Input Voltage – Low                                            | V <sub>IL</sub> - V <sub>CC</sub>                                  | -2.0      |      | -1.58 | V     | 3                  |
| Data Input Voltage -- High                                          | V <sub>IH</sub> - V <sub>CC</sub>                                  | -1.1      |      | -0.74 | V     | 3                  |
| Disable Input Voltage -- Low                                        | V <sub>TDIS,L</sub>                                                | 0         |      | 0.8   | V     | TX Output Enabled  |
| Disable Input Voltage -- High                                       | V <sub>TDIS,H</sub>                                                | Vcc – 1.3 |      | Vcc   | V     | TX Output Disabled |
| Shut Off Time for TxDis                                             | t <sub>DIS</sub>                                                   |           |      | 1     | ms    |                    |

Notes: 1. Output power is power coupled into a 9/125 μm single mode fiber.

2. Measured with a 2<sup>23</sup>-1 PRBS with 72 ones and 72 zeros.

3. These inputs are compatible with 10K, 10KH and 100K ECL and LVPECL inputs.

## Receiver Specifications (0°C &lt; Topr &lt; 70°C, 3.13 V &lt; Vcc &lt; 3.47V)

| Parameter                   | Symbol                            | Min  | Typ | Max   | Units | Notes                   |
|-----------------------------|-----------------------------------|------|-----|-------|-------|-------------------------|
| <b>Optical</b>              |                                   |      |     |       |       |                         |
| Sensitivity                 | ---                               | ---  | --- | -28   | dBm   | 1                       |
| Maximum Input Power         | Pin                               | -8   | --- | ---   | dBm   |                         |
| Signal Detect -- Asserted   | Pa                                | ---  | --- | -28   | dBm   | Transition: low to high |
| Signal Detect -- Deasserted | Pd                                | -42  | --- | ---   | dBm   | Transition: high to low |
| Signal detect -- Hysteresis |                                   | 1.0  | --- | 4.0   | dB    |                         |
| Wavelength of Operation     |                                   | 1450 |     | 1500  | nm    | 2,3                     |
| Optical Return Loss         | ORL                               | 14   |     |       | dB    |                         |
| <b>Electrical</b>           |                                   |      |     |       |       |                         |
| Data Output Voltage -- Low  | V <sub>OL</sub> - V <sub>CC</sub> | -2.0 |     | -1.58 | V     | 4                       |
| Data Output Voltage -- High | V <sub>OH</sub> - V <sub>CC</sub> | -1.1 |     | -0.74 | V     | 4                       |
| SD Output Voltage -- Low    | V <sub>OL</sub> - V <sub>CC</sub> | -2.0 |     | -1.58 | V     | 4                       |
| SD Output Voltage -- High   | V <sub>OH</sub> - V <sub>CC</sub> | -1.1 |     | -0.74 | V     | 4                       |
| Signal Detect Assert Time   | AS <sub>MAX</sub>                 |      |     | 100   | μs    | OFF to ON               |
| Signal Detect Deassert Time | ANS <sub>MAX</sub>                |      |     | 300   | μs    | ON to OFF               |

Notes: 1. Minimum sensitivity and saturation levels at BER 1E-10 for a 2<sup>23</sup>-1 PRBS with 72 ones and 72 zeros.

2. At least 30 dB optical isolation for the wavelength 1260 to 1360 nm.

3. At least 30 dB optical isolation for the wavelength 1550 to 1600 nm

4. These outputs are compatible with 10K, 10KH and 100K ECL and LVPECL outputs.

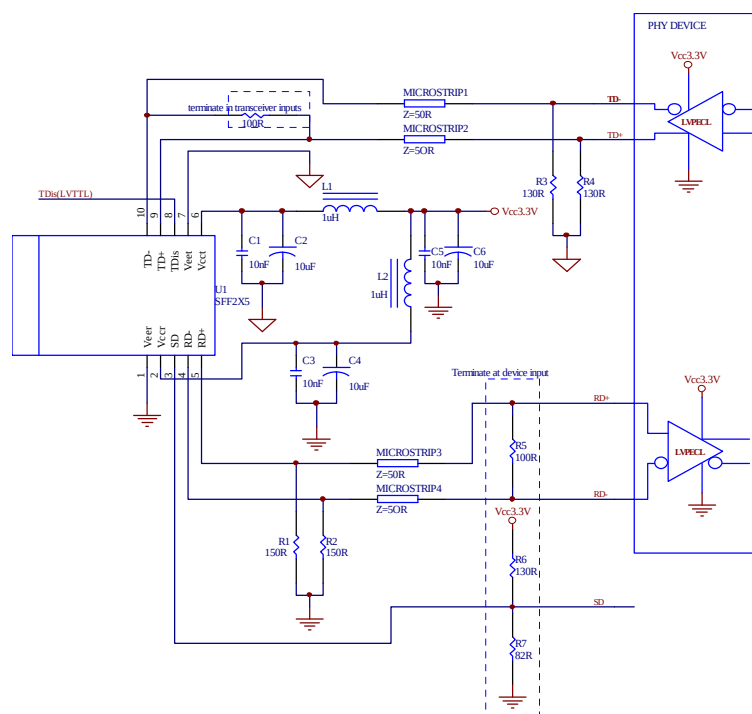
## CONNECTION DIAGRAM



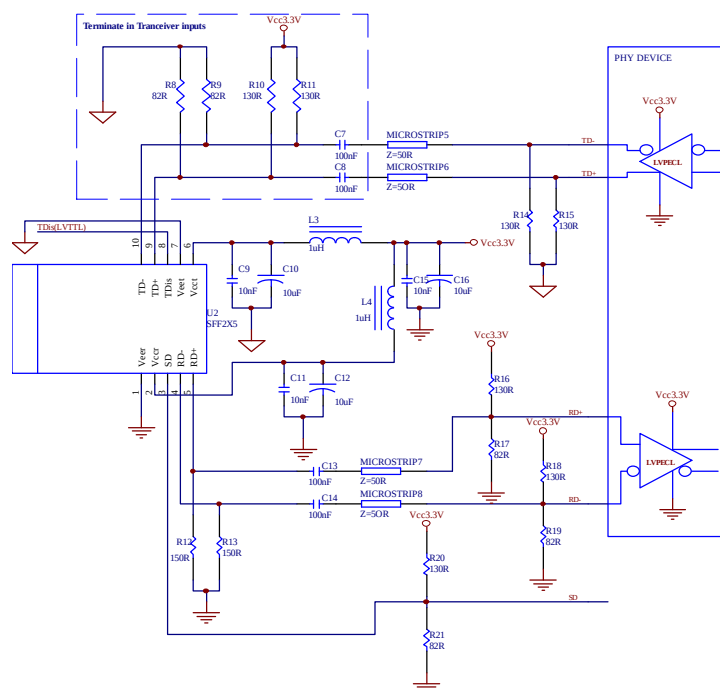
| PIN | Symbol            | Notes                                                                                                                           |
|-----|-------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 1   | V <sub>EE</sub> r | Directly connect this pin to the receiver ground plane                                                                          |
| 2   | V <sub>CC</sub> r | +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 <sub>CC</sub> t | +3.3V dc power for the transmitter section                                                                                      |
| 7   | V <sub>EE</sub> t | 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<br>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

### 1) Recommended DC Coupled Interface Circuit



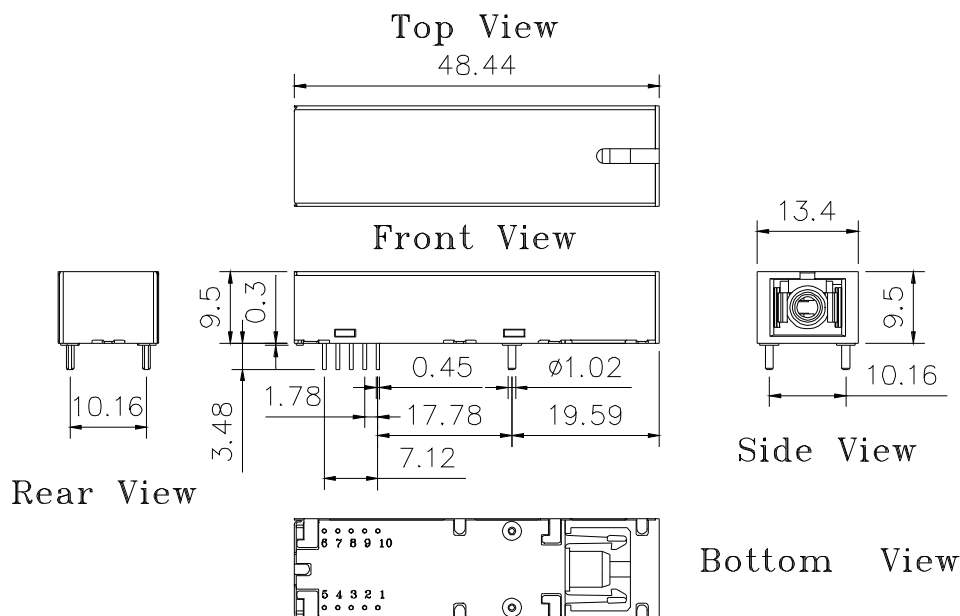
### 2) Recommended AC Coupled Interface Circuit



## PACKAGE DIAGRAM

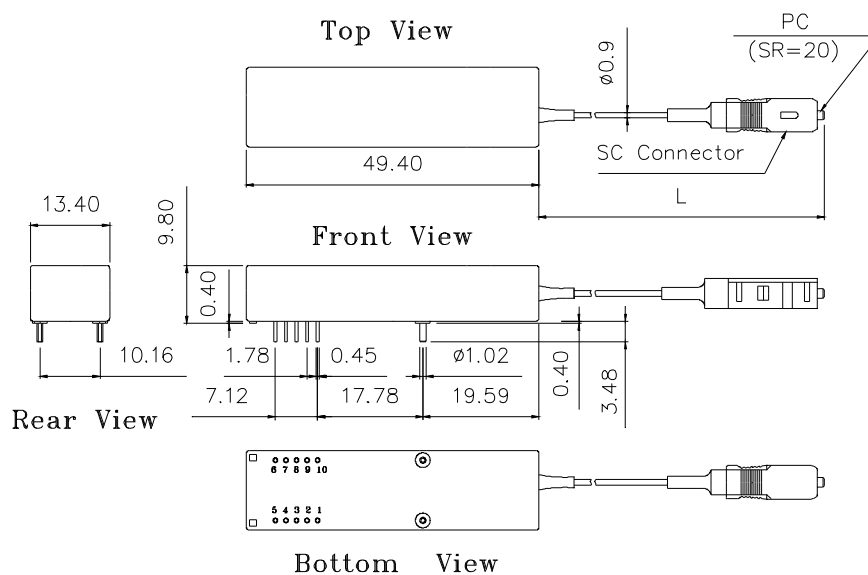
Units in mm

### 1) SC Receptacle



BTRS-5820G / BTRS-5820AG

### 2) Pigtail



BTRS-5820-SP50G / BTRS-5820A-SP50G

Note: Length L is  $50 \pm 2$  cm. Other pigtail's length is available upon request.

**Note:** Specifications subject to change without notice.