

TRS-7380-CXX0G / TRS-7380T-CXX0G / TRS-7380F-CXX0G

CWDM 3.3V / 1.25 Gbps **RoHS Compliant** Optical Single-Mode Transceiver

FEATURES

- | Duplex SC SM Transceiver: TRS-7380-CXX0G
- | Duplex ST SM Transceiver: TRS-7380T-CXX0G
- | Duplex FC SM Transceiver: TRS-7380F-CXX0G
- | Compliant with IEEE-802.3z Gigabit Ethernet
- | **18-Wavelength** CWDM DFB LD Transmitter from 1270 nm to 1610 nm, with step 20 nm
- | 24 dB Link Budget at Least
- | Industry Standard 1 x 9 Footprint
- | Single +3.3 V Power Supply
- | **RoHS Compliant**
- | LVPECL Signal Detect Output: TRS-7380-CXX0G
- | LVTTTL Signal Detect Output: TRS-7380C-CXX0G
- | Wave Solderable and Aqueous Washable
- | Class 1 Laser International Safety Standard IEC 60825 Compliant

DESCRIPTION

The TRS-7380-CXX0G series single mode transceivers is low power, high performance CWDM modules for bi-directional serial optical data communications such as Gigabit Ethernet and Fibre Channel. There are eighteen center wavelengths available from 1270 nm to 1610 nm, each step 20 nm. A guaranteed minimum optical link budget of 24 dB is offered. The transmitter section uses a multiple quantum well 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 logic interface simplifies interface to external circuitry.

APPLICATIONS

- | Gigabit Ethernet Links
- | SONET/SDH Equipment Interconnect
- | Fibre Channel Links
- | CWDM

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 (Mb/s) | 1000 BASE | Power Budget (dB) | Wavelength (nm) | Voltage (V) | Package | Temp. (°C) | TX Power (dBm) | RX Sens. (dBm) | RoHS Compliant |
|----------------|-----------------|-----------|-------------------|-----------------|-------------|--------------|------------|----------------|----------------|----------------|
| TRS-7380-CXX0G | 1250 | ZX | > 24 | CWDM* | 3.3 | 1X9 SC/ST/FC | 0 to 70 | 5 to 0 | -24 | Y |

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 | With air flow 1m/sec |
| 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 |
| Power Supply Voltage | Vcc | 3.1 | 3.3 | 3.5 | V |
| Operating Temperature | Topr | 0 | | 70 | °C/ air flow 1m/sec |
| Data Rate | | | 1250 | 1300 | Mb/s |
| Power Supply Current | Icc | | 200 | 280 | mA |

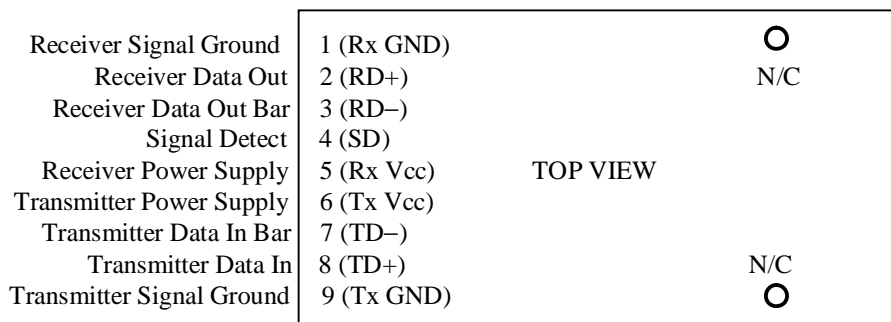
| Transmitter Specifications (0°C < Topr < 70°C, 3.1V < Vcc < 3.5V) | | | | | | |
|---|--|---------------|-----------|---------------|---------|-------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| Optical | | | | | | |
| Optical Transmit Power | Po | 0 | --- | 5 | dBm | 1 |
| Output Center Wavelength | λ | $\lambda-5.5$ | λ | $\lambda+7.5$ | nm | 2 |
| Output Spectrum Width | $\Delta\lambda$ | --- | --- | 1 | nm | -20 dB Width |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Extinction Ratio | E_R | 9 | --- | --- | dB | |
| Output Eye | Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957 | | | | | |
| 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 | 3 |
| Electrical | | | | | | |
| Data Input Current – Low | I_{IL} | -350 | | | μ A | |
| Data Input Current – High | I_{IH} | | | 350 | μ A | |
| Differential Input Voltage | $V_{IH} - V_{IL}$ | 300 | | | mV | |
| Data Input Voltage – Low | $V_{IL} - V_{CC}$ | -2.0 | | -1.58 | V | 4 |
| Data Input Voltage -- High | $V_{IH} - V_{CC}$ | -1.1 | | -0.74 | V | 4 |

- Notes: 1. Output power is power coupled into a 9/125 μ m single mode fiber.
 2. ITU-T G.694.2 CWDM wavelength from 1270 nm to 1610 nm, each step 20 nm.
 3. Measured with a 2⁷-1 PRBS.
 4. These inputs are compatible with 10K, 10KH and 100K ECL and LVPECL inputs.

| Receiver Specifications (0°C < Topr < 70°C, 3.1 V < Vcc < 3.5V) | | | | | | |
|---|-----------------------------------|------|-----|-------|-------|-------------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| Optical | | | | | | |
| Sensitivity | --- | --- | --- | -24 | dBm | 1 |
| Maximum Input Power | Pin | -3 | --- | --- | dBm | |
| Signal Detect -- Asserted | Pa | --- | --- | -24 | dBm | Transition: low to high |
| Signal Detect -- Deasserted | Pd | -36 | --- | --- | dBm | Transition: high to low |
| Signal Detect -- Hysteresis | | 1.0 | --- | | dB | |
| Wavelength of Operation | | 1100 | --- | 1620 | nm | |
| Electrical | | | | | | |
| Data Output Voltage – Low | V _{OL} - V _{CC} | -2.0 | | -1.58 | V | 2 |
| Data Output Voltage – High | V _{OH} - V _{CC} | -1.1 | | -0.74 | V | 2 |
| Signal Detect Output Voltage -- Low | V _{OL} - V _{CC} | -2.0 | | -1.58 | V | TRS-7380-CXX0G |
| Signal Detect Output Voltage -- High | V _{OH} - V _{CC} | -1.1 | | -0.74 | V | |
| Signal Detect Output Voltage -- Low | V _{SDL} | | | 0.8 | V | TRS-7380C-CXX0G |
| Signal Detect Output Voltage -- High | V _{SDH} | 2.0 | | | V | |

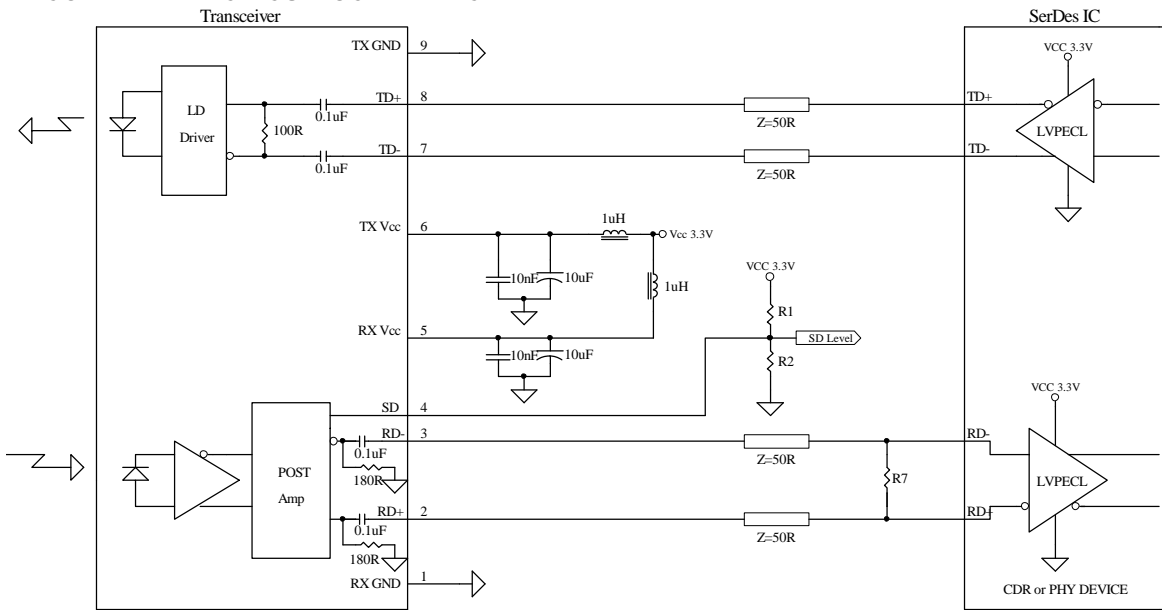
Notes: 1. Minimum sensitivity and saturation levels at BER=1E-12 for a 2⁷-1 PRBS at ER= 9 dB.
 2. These outputs are compatible with 10K, 10KH and 100K ECL and PECL outputs.

CONNECTION DIAGRAM



| PIN | Symbol | Notes |
|-----|--------|--|
| 1 | Rx GND | Directly connect this pin to the receiver ground plane |
| 2 | RD+ | See recommended circuit schematic |
| 3 | RD- | See recommended circuit schematic |
| 4 | SD | Active high on this indicates a received optical signal |
| 5 | Rx Vcc | +3.3V dc power for the receiver section |
| 6 | Tx Vcc | +3.3V dc power for the transmitter section |
| 7 | TD- | See recommended circuit schematic |
| 8 | TD+ | See recommended circuit schematic |
| 9 | Tx GND | Directly connect this plan to the transmitter ground plane |

RECOMMENDED CIRCUIT SCHEMATIC



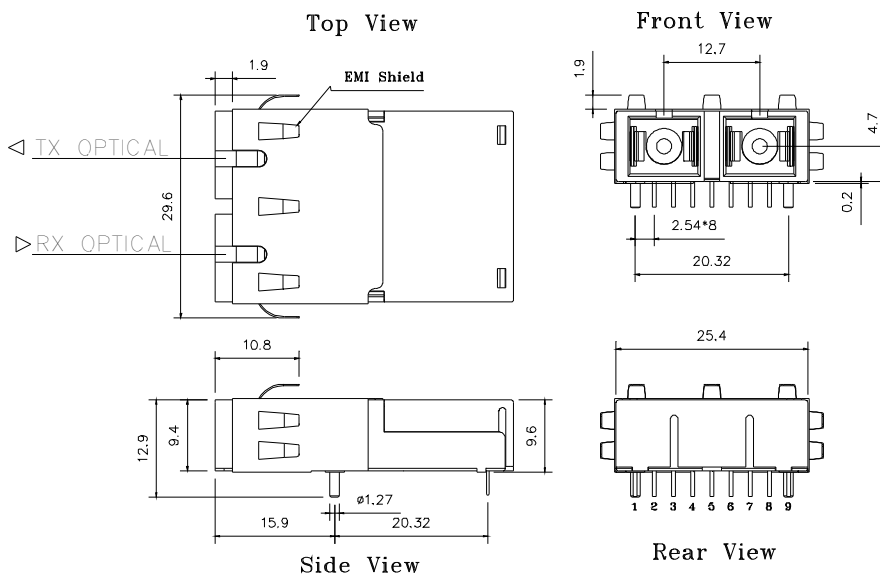
For TTL SD Level, R1=R2=N.C., R7=100 ohm
 For PECL SD Level, R1=130 ohm, R2=82 ohm, R7=100 ohm

The split-load terminations for ECL signals need to be located at the input of devices receiving those ECL signals. The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module Rx Vcc and Tx Vcc. A GND plane under the module is required for good EMI and sensitivity performance.

PACKAGE DIAGRAM

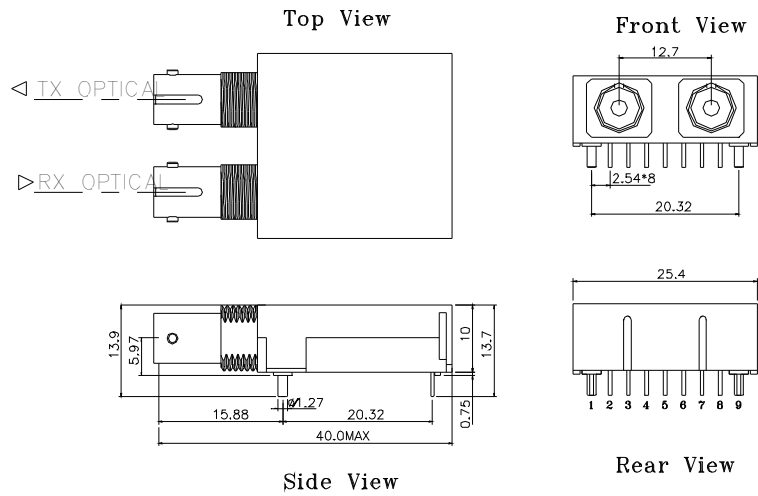
Units in mm

1) SC Type with Extended Shielding



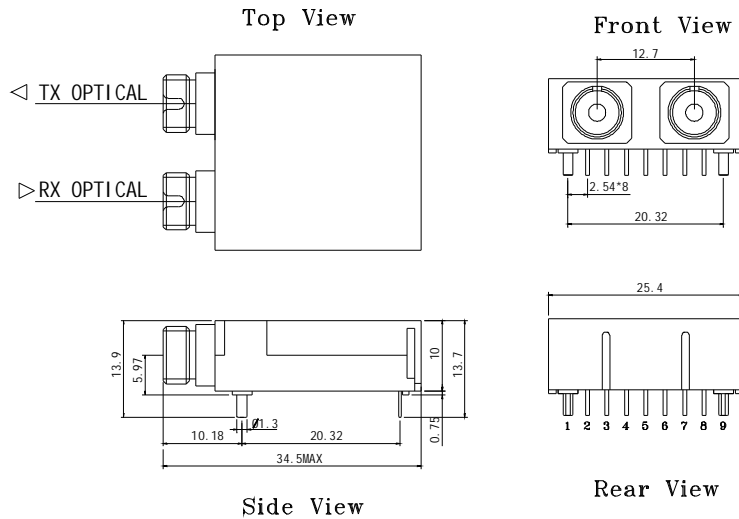
TRS-7380-CXX0-EMG / TRS-7380C-CXX0-EMG

2) ST Type



TRS-7380T-CXX0G / TRS-7380CT-CXX0G

3) FC Type



TRS-7380F-CXX0G / TRS-7380CF-CXX0G

Note: Specifications subject to change without notice.