Luminent
Bringing Communications to Light™

# 622 Mbps Single Mode Transceiver

## C-1x-622(C)-T(DFB)-SSCx


**Features**

- SC Duplex Single Mode Transceiver
- Industry Standard 1x9 Footprint
- Complies with SONET OC-12 SDH STM-4
- Single +5V Power Supply
- OperatingTemperature Range: 0 to 70°C
- PECL Differential Inputs and Outputs
- PECL Signal Detection Output (C-1x-622-Tx-SSCx)
- TTL Signal Detection Output (C-1x-622C-Tx-SSCx)
- Wave Solderable and Aqueous Washable
- Uncooled laser diode with MQW structure
- Complies with Telcordia (Bellcore) GR-468-CORE
- SONET OC-12 Application

**Absolute Maximum Rating**

| Parameter | Symbol | Min. | Max. | Unit | Note |
|---|---|---|---|---|---|
| Power Supply Voltage | $V_{cc}$ | 0 | 6 | V | |
| Output Current | $I_{out}$ | 0 | 30 | mA | |
| Soldering Temperature | - | - | 260 | °C | 10 seconds on leads only |
| Operating temerature | $T_{opr}$ | 0 | 70 | °C | |
| Storage Temperature | $T_{stg}$ | -40 | 85 | °C | |

**Recommended Operating Condition**

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Power Supply Voltage | $V_{cc}$ | 4.75 | 5 | 5.25 | V |
| Operating Temperature | $T_{opr}$ | 0 | - | 70 | °C |
| Data Rate | - | - | 622 | - | Mbps |

**Transmitter Specifications, (0°C<Topr<70°C, 4.75V < $V_{CC}$ < 5.25V)**

| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
|---|---|---|---|---|---|---|
| **Optical** | | | | | | |
| Optical Transmit Power | $P_o$ | -15 | - | -8 | dBm | C-13-622(C)-T-SSC |
| Optical Transmit Power | $P_o$ | -3 | - | +2 | dBm | C-1x-622(C)-Tx-SSC4 |
| Output center Wavelength | $\lambda_p$ | 1274 | 1310 | 1356 | nm | C-13-622(C)-T-SSC |
| Output center Wavelength | $\lambda_p$ | 1280 | 1310 | 1335 | nm | C-13-622(C)-TDFB-SSC4 |
| Output center Wavelength | $\lambda_p$ | 1480 | 1550 | 1580 | nm | C-15-622(C)-TDFB-SSC4 |
| Output Spectrum Width | $\Delta\lambda_{rms}$ | - | - | 2.5 | nm | RMS(σ), C-13-622(C)-T-SSC |
| Output Spectrum Width | $\Delta\lambda$ | - | - | 1 | nm | -20 dB width, C-1x-622(C)-TDFB-SSC4 |
| Side Mode Suppression Ratio | $S_r$ | 30 | 35 | - | dB | CW, $P_o$ = 5 mW, C-1x-622(C)-TDFB-SSC4 |
| Extinction Ratio | ER | 8.2 | - | - | dB | C-13-622(C)-T-SSC |
| Extinction Ratio | ER | 10 | - | - | dB | C-1x-622(C)-Tx-SSC4 |
| Output Eye | | Compliant with ITU-T G.957/STM-4 Eye Mask | | | | |
| Optical Rise Time | $t_r$ | - | - | 1.2 | ns | 10% to 90% Values |
| Optical Fall Time | $t_f$ | - | - | 1.2 | ns | 10% to 90% Values |
| Relative Intensity Noise | RIN | - | - | -120 | dB/Hz | |
| Total Jitter | TJ | - | - | 0.55 | ns | Measured with $2^{23}$-1 PRBS with 72 ones and 72 zeros. |

**Transmitter Specifications, (0°C<Topr<70°C, 4.75V < $V_{CC}$ < 5.25V)**

| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
|---|---|---|---|---|---|---|
| **Electrical** | | | | | | |
| Power Supply Current | $I_{CC}$ | - | - | 180 | mA | Maximum current is specified at Vcc= Maximum @ maximum temperature |
| Data Input Current-Low | $I_{IL}$ | -350 | - | - | µA | |
| Data Input Current-High | $I_{IH}$ | - | - | 350 | µA | |
| Differential Input Voltage | $V_{IH}$-$V_{IL}$ | 300 | - | - | mV | |
| Data Input Voltage-Low | $V_{IL}$-$V_{CC}$ | -2.0 | - | -1.58 | V | These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs |
| Data Input Voltage-High | $V_{IH}$-$V_{CC}$ | -1.1 | - | -0.74 | V | |

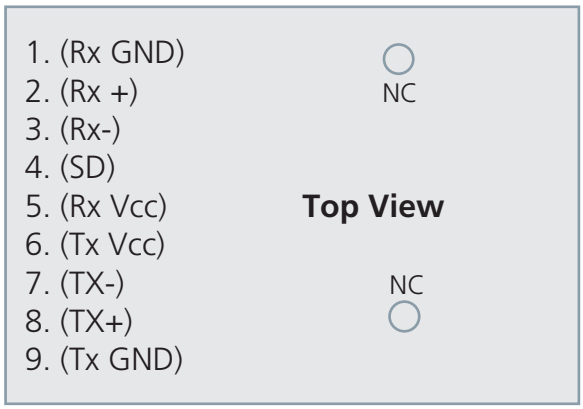
**Receiver Specifications, (0°C<Topr<70°C, 4.75V < $V_{CC}$ < 5.25V)**

| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
|---|---|---|---|---|---|---|
| **Optical** | | | | | | |
| Sensitivity | - | - | - | -28 | dBm | Measured with $2^{23}$-1 PRBS,BER= $10^{-10}$ |
| Maximum Input Power | $P_{in}$ | -3 | - | - | dBm | |
| Signal Detect-Asserted | Pa | - | - | -28 | dBm | Measured on transition: low to high |
| Signal Detect-Deasserted | Pd | -40 | - | - | dBm | Measured on transition: high to low |
| Signal Detect-Hysteresis | | 1 | - | 5 | dB | |
| Wavelength of Operation | | 1100 | - | 1600 | nm | |

**Receiver Specifications, (0°C<Topr<70°C, 4.75V < $V_{CC}$ < 5.25V)**

| Parameter | Symbol | Min | Typical | Max | Unit | Note |
|---|---|---|---|---|---|---|
| **Electrical** | | | | | | |
| Power Supply Current | $I_{CC}$ | - | - | 100 | mA | The current excludes the output load current |
| Data output Voltage-Low | $V_{OL}$ -$V_{cc}$ | -2 | - | -1.58 | V | These outputs are compatible with 10K, 10KH and 100KECL and LVPECL outputs |
| Data Output Voltage-High | $V_{OH}$- $V_{cc}$ | -1.1 | - | -0.74 | V | |
| Signal Detect Output Voltage-Low | $V_{SDLt}$ | - | - | 0.5 | V | C-1x-622C-Tx-SSCx |
| Signal Detect Output Voltage-High | $V_{SDH}$ | 2.0 | - | - | V | |
| Signal Detect Output Voltage-Low | $V_{SDL}$-$V_{cc}$ | -2.0 | - | -1.58 | V | C-1x-622-Tx-SSCx |
| Signal Detect Output Voltage-High | $V_{SDH}$- $V_{cc}$ | -1.1 | - | -0.74 | V | |

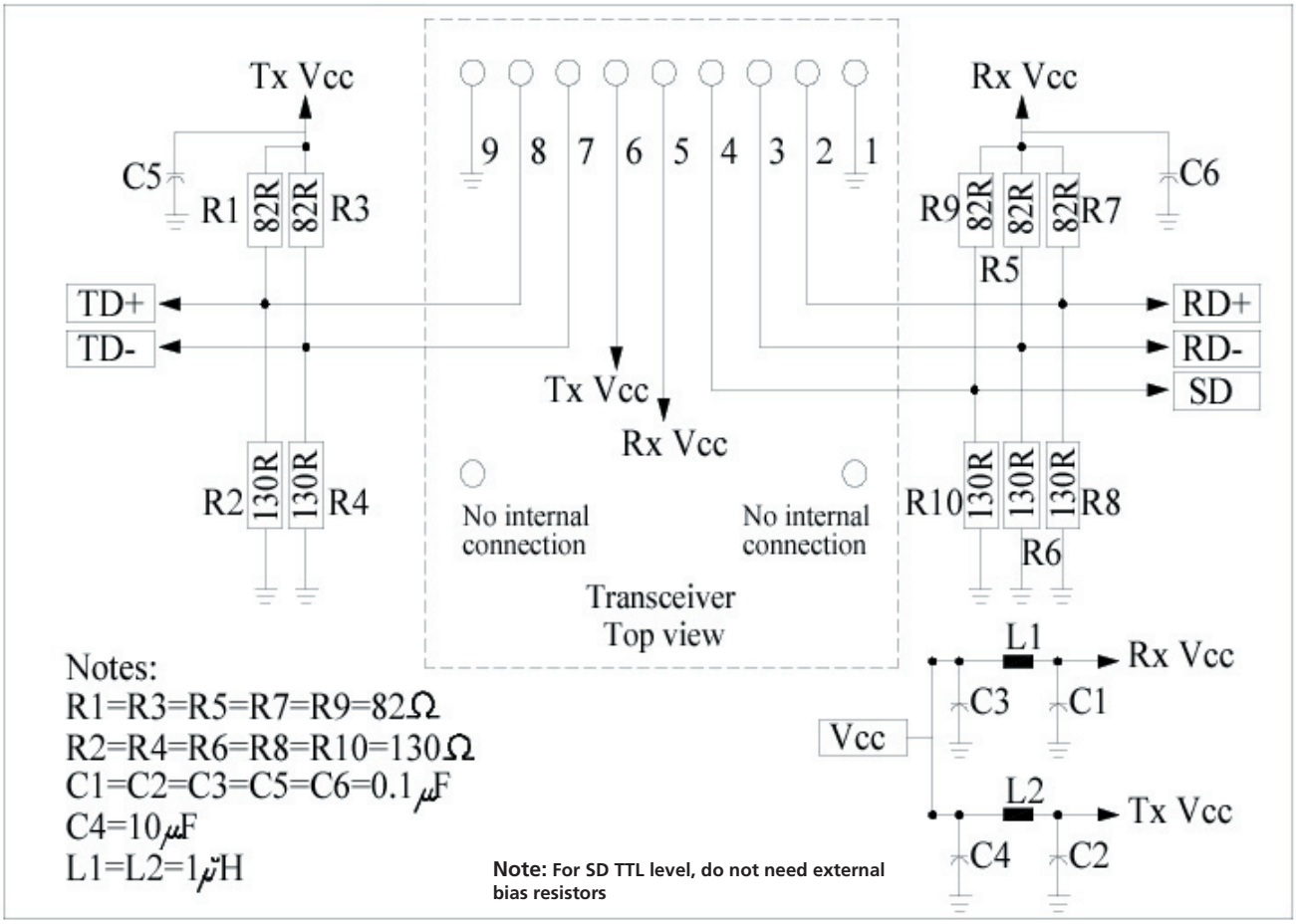
## Connection Diagram




Receiver Signal Ground
Receiver Data Out
Receiver Data Out Bar
Signal Detect
Receiver Power Supply
Transmitter Power Supply
Transmitter Data In Bar
Transmitter Data in
Transmitter Signal Ground

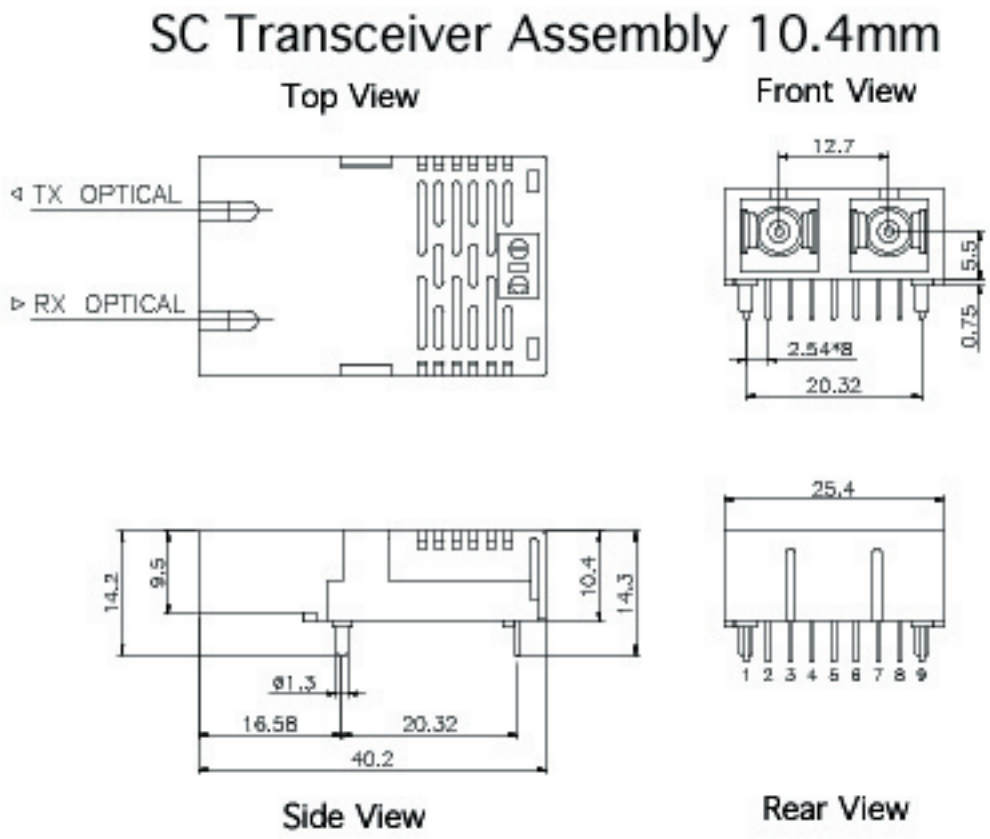
| PIN | Symbol | Notes |
|---|---|---|
| 1 | RxGND | Directly connect this pin to the receiver ground plane |
| 2 | RD+ | See recommended circuit schematic |
| 3 | RD- | See recommended circuit schematic |
| 4 | SD | Active high on this indicates a received optical signal |
| 5 | RxVcc | +5V dc power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

## Recommended Circuit Schematic




The split-loaded 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.
A GND plane under the module is required for good EMI and sensitivity performance.
For SD TTL output, C-1x-622C-T(DFB)-SSCx, R9 and R10 open.

## Package Diagram



## Ordering Information

C - 1x -622(C) - T(DFB) - S SC x

- Wavelength
  13= 1310 nm
  15= 1550 nm
- Communication protocol (622 Mbps)
  Blank = PECL Signal Detection Output
  C = TTL Signal Detection Output
- 5V Transceiver
  T = +5V, FP Laser
  TDFB = +5V, DFB Laser
- Single mode fiber
- Connector options
- Reach
  Blank = -8 to -15dBm output power
  4 = -3 to +2dBm output power

## Warnings

**Handling Precautions:** This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.
**Laser Safety:** Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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