Luminent
Bringing Communications to Light™

# 155 Mbps Single Mode Transceiver (Long-Reach)

## C-13-155(C)-T(3)-SSC7(9)

**Features**

- Duplex SC Single Mode Transceiver
- Industry Standard 1x9 Footprint
- Long reach SONET OC-3 SDH STM-1 Compliant
- Single +5V/ 3.3V Power Supply
- PECL Differential Inputs and Outputs
- Wave Solderable and Aqueous Washable
- LED Multisourced 1x9 Transceiver Interchangeable
- Class 1 Laser Int. Safety Standard IEC 825 Compliant
- Uncooled Laser Diode with MQW Structure
- Complies with Telcordia (Bellcore) GR-468-CORE
- ATM 155 Mbps links Application
- SONET/SDH Equipment Interconnect 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 | - | - | 240 | °C | 10 seconds on leads only |
| Operating Temperature | $T_{opr}$ | 0 | 70 | °C | C-13-155-T(3)-SSC7(9)(D/E) |
| Operating temperature | $T_{opr}$ | -40 | 85 | °C | C-13-155-T(3)-SSC7(9)A(B/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 |
| Power Supply Voltage | $V_{cc}$ | 3.1 | 3.3 | 3.5 | V |
| Data Rate | | - | 155 | - | Mbps |

**Transmitter Specifications, ($-40<T_{opr}<85°C$, $4.75V<V_{CC}<5.25V$)**

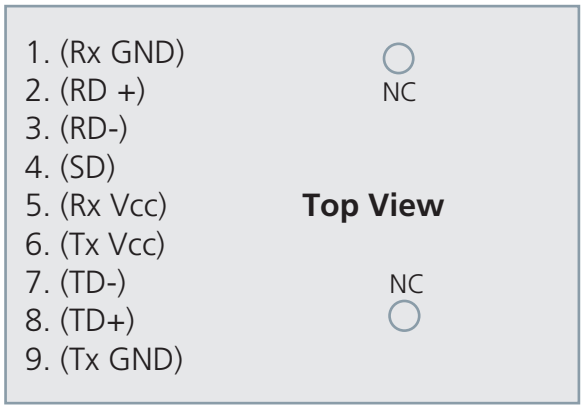
| Parameter | Symbol | Min | Typical | Max | Unit | Notes |
|---|---|---|---|---|---|---|
| **Optical** | | | | | | |
| Optical Transmit Power | $P_o$ | -3 | - | +3 | dBm | Output power is coupled into a 9/125 µm single mode fiber C-13-155-T(3)-SSC7(A/B/C/D/E) |
| Optical Transmit Power | $P_o$ | 0 | - | +5 | dBm | Output power is coupled into a 9/125 µm single mode fiber C-13-155-T(3)-SSC9(A/B/C/D/E) |
| Output Center Wavelength | λ | 1290 | 1310 | 1330 | nm | 25°C |
| Output Spectrum Width | Δλ | - | - | 5 | nm | RMS(σ) |
| Extinction Ratio | ER | 8.2 | - | - | dB | |
| Output Pulse Mask | | Compliant with FDDI SMF-PMD1 | | | | |
| Output Eye | | Compliant with ITU-T recommendation G.957 | | | | |
| Optical Rise Time | tr | - | - | 2 | ns | 10% to 90% Values |
| Optical Fall Time | tf | - | - | 2 | ns | 10% to 90% Values |
| Relative Intensity Noise | RIN | - | - | -116 | dB/Hz | |
| Total Jitter | TJ | - | - | 1.2 | ns | Measured with $2^{23}$-1 PRBS with 72 ones and 72 zeros. |

| Transmitter Specifications, ($-40<T_{opr}<85°C$, $4.75V<V_{CC}<5.25V$) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Typical** | **Max** | **Unit** | **Notes** |
| **Electrical** | | | | | | |
| Power Supply Current | $I_{CC}$ | - | - | 200 | mA | Maximum current is specified at $V_{cc}$= 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, ($-40<T_{opr}<85°C$, $4.75V<V_{CC}<5.25V$) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Typical** | **Max** | **Unit** | **Notes** |
| **Optical** | | | | | | |
| Sensitivity | - | - | - | -37 | dBm | measured with $2^{23}$-1 PRBS with 72 ones and 72 zeros. |
| Maximum Input Power | $P_{in}$ | 0 | - | - | dBm | |
| Signal Detect-Asserted | Pa | - | - | -37 | dBm | Measured on transition: low to high |
| Signal Detect-Deasserted | Pd | -48 | - | - | dBm | Measured on transition: high to low |
| Signal Detect-Hysteresis | | 1.0 | - | 4.0 | dB | |
| Wavelength of Operation | | 1100 | - | 1600 | nm | |

| Receiver Specifications, ($-40<T_{opr}<85°C$, $4.75V<V_{CC}<5.25V$) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Min** | **Typical** | **Max** | **Unit** | **Notes** |
| **Electrical** | | | | | | |
| Power Supply Current | $I_{CC}$ | - | - | 100 | mA | The current excludes the output load current |
| Data Input Voltage-Low | $V_{OL}$ -$V_{cc}$ | -2 | - | -1.58 | V | These outputs are compatible with 10K, 10KH and 100K ECL and PECL outputs. |
| Data Input Voltage-High | $V_{OH}$- $V_{cc}$ | -1.1 | - | -0.74 | V | |
| Signal Detect Output Voltage-Low | $V_{SDL}$-$V_{cc}$ | -2 | - | -1.58 | V | |
| Signal Detect Output Voltage-High | $V_{SDH}$- $V_{cc}$ | -1.1 | - | -0.74 | V | |

## Connection Diagram

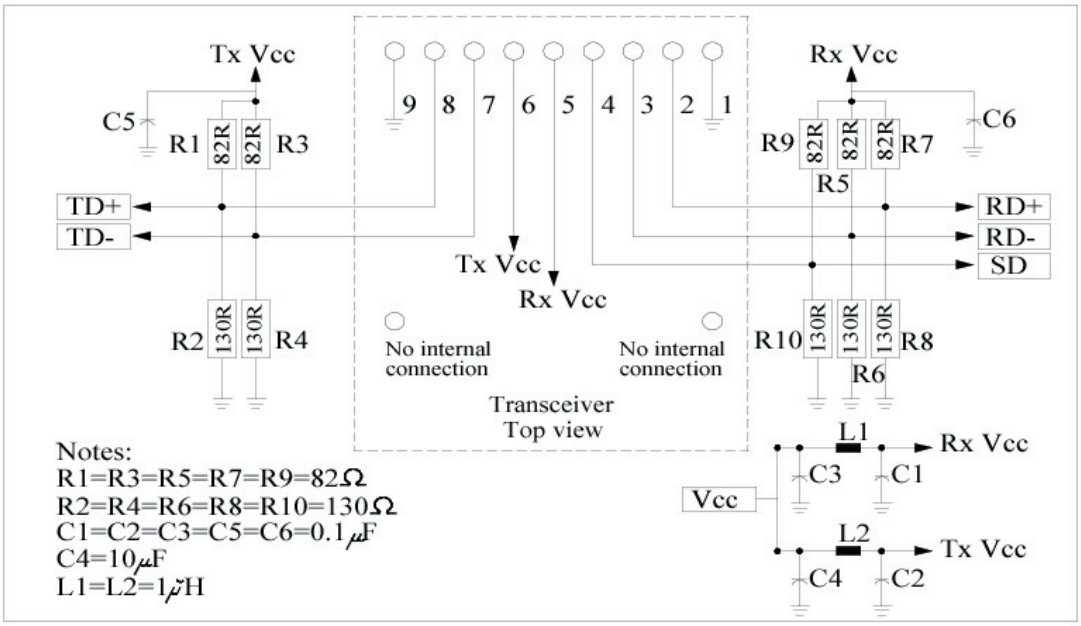



Receiver Signal Ground
Receiver Data Out
Receiver Data Out Bar
Signal Detect
Receiver Power Supply
Transmitter Power Supply
Transmitter Data In Bar
Transmitter Data in
Transmitter Signal Ground

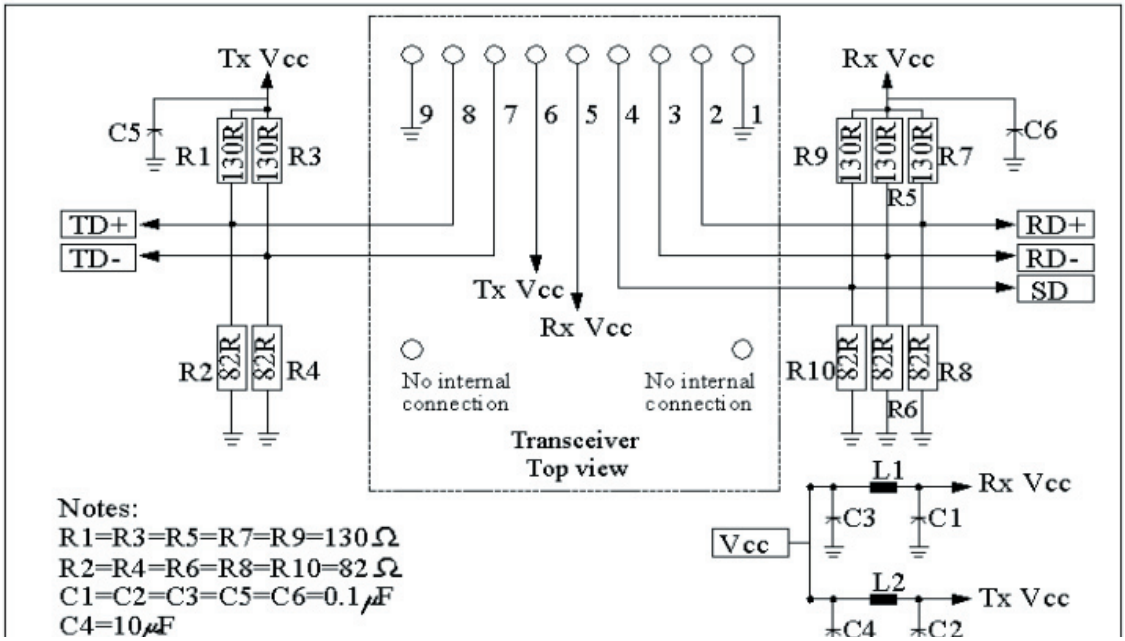
| PIN | Symbol | Notes |
|---|---|---|
| 1 | RxGND | Directly connect this pin to the receiver ground plane |
| 2 | RD+ | See recommended circuit schematic |
| 3 | RD- | See recommended circuit schematic |
| 4 | SD | Active high on this indicates a received optical signal |
| 5 | RxVcc | dc power for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

### 5V Series



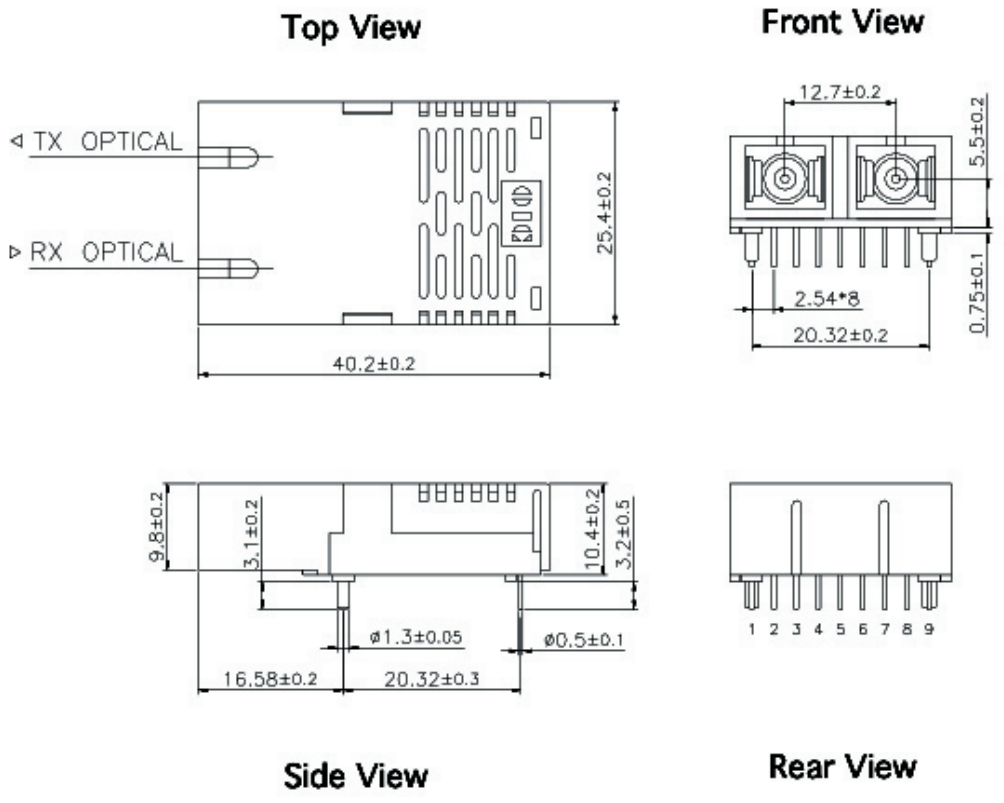

### 3.3V Series




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.

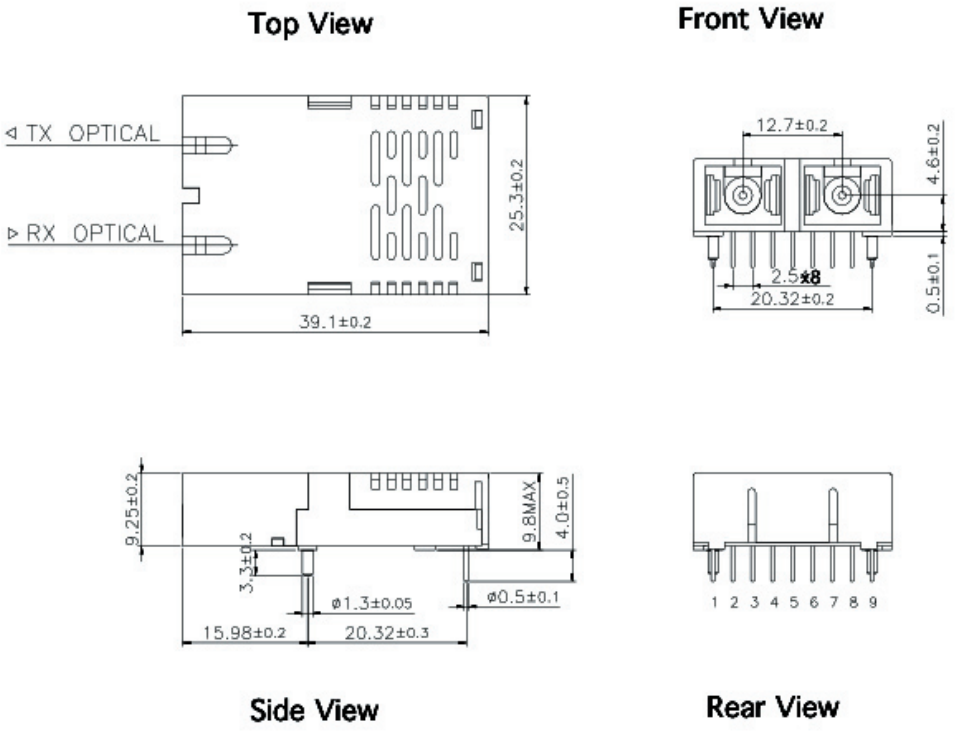
## Package Diagram

### SC Transceiver Assembly 10.4 mm




Blank :Black Case
A : Blue Case

### SC Transceiver Assembly 9.8mm




B/E :Blue Case
C/D : Black Case

## Ordering Information

C -13 - 155 - T(3) - SSC 7(9) (A/B/C/D/E)

- Wavelength = 1310 nm
- Communication protocol (155 Mbps)
- +5V/(3.3V) Transceiver
- Single mode fiber
- Connector options
- Ultra Long Reach
- Blank: Black Case (10.4 mm)
  A: Black Case (10.4 mm)
  B/E: Blue Case (9.8mm)
  C/D: Black Case (9.8mm)

## 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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