

## C-13-622(C)-T(3)-SSC4



## Features

- SC Duplex Single Mode Transceiver
- Industry Standard 1x9 Footprint
- Complies with SONET OC-12 SDH STM-4
- Single +3.3V/+5V Power Supply
- Operating Temperature Range: 0 to 70°C and -40 to 85°C
- PECL Differential Inputs and Outputs
- PECL/LVPECL Signal Detection Output [C-13-622-T(3)-SSC4]
- TTL/LVTTL Signal Detection Output [C-13-622C-T(3)-SSC4]
- Wave Solderable and Aqueous Washable
- Uncooled laser diode with MQW structure
- Complies with Telcordia (Bellcore) GR-468-CORE
- SONET OC-12 Application
- RoHS compliance available

## Absolute Maximum Rating

| Parameter             | Symbol    | Min. | Max. | Unit | Note                     |
|-----------------------|-----------|------|------|------|--------------------------|
| Power Supply Voltage  | $V_{CC}$  | 0    | 6    | V    | C-13-622(C)-T-SSC4       |
| Power Supply Voltage  | $V_{CC}$  | 0    | 3.6  | V    | C-13-622(C)-T3-SSC4      |
| Output Current        | $I_{out}$ | 0    | 30   | mA   |                          |
| Soldering Temperature | -         | -    | 260  | °C   | 10 seconds on leads only |
| Storage Temperature   | $T_{stg}$ | -40  | 85   | °C   |                          |

## Recommended Operating Condition

| Parameter                    | Symbol    | Min. | Typ. | Max. | Unit | Note                        |
|------------------------------|-----------|------|------|------|------|-----------------------------|
| Power Supply Voltage         | $V_{CC}$  | 4.75 | 5    | 5.25 | V    | C-13-622(C)-T-SSC4          |
| Power Supply Voltage         | $V_{CC}$  | 3.1  | 3.3  | 3.5  | V    | C-13-622(C)-T3-SSC4         |
| Operating Temperature (Case) | $T_{opr}$ | 0    | -    | 70   | °C   | C-13-622(C)-T(3)-SSC4(D/E)  |
| Operating Temperature (Case) | $T_{opr}$ | -40  | -    | 85   | °C   | C-13-622(C)-T(3)-SSC4A(B/C) |
| Data Rate                    | -         | -    | 622  | -    | Mbps |                             |

## Transmitter Specifications

| Parameter                | Symbol                                    | Min  | Typical | Max  | Unit  | Notes                                                            |
|--------------------------|-------------------------------------------|------|---------|------|-------|------------------------------------------------------------------|
| <b>Optical</b>           |                                           |      |         |      |       |                                                                  |
| Optical Transmit Power   | $P_O$                                     | -3   | -       | +2   | dBm   |                                                                  |
| Output center Wavelength | $\lambda_p$                               | 1296 | 1310    | 1330 | nm    | 25°C                                                             |
| Output Spectrum Width    | $\Delta\lambda_{rms}$                     | -    | -       | 2.5  | nm    | RMS( $\sigma$ )                                                  |
| Extinction Ratio         | ER                                        | 8.2  | -       | -    | dB    |                                                                  |
| 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 <sup>23</sup> -1 PRBS with 72 ones and 72 zeros. |

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## Transmitter Specifications

| Parameter                  | Symbol          | Min  | Typical | Max   | Unit    | Notes                                                                       |
|----------------------------|-----------------|------|---------|-------|---------|-----------------------------------------------------------------------------|
| <b>Electrical</b>          |                 |      |         |       |         |                                                                             |
| Power Supply Current       | $I_{CC}$        | -    | -       | 180   | mA      | Maximum current is specified at $V_{CC}$ =<br>Maximum @ maximum temperature |
| Data Input Current-Low     | $I_{IL}$        | -350 | -       | -     | $\mu A$ |                                                                             |
| Data Input Current-High    | $I_{IH}$        | -    | -       | 350   | $\mu A$ |                                                                             |
| 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<br>and 100K ECL and PECL inputs  |
| Data Input Voltage-High    | $V_{IH}-V_{CC}$ | -1.1 | -       | -0.74 | V       |                                                                             |

## Receiver Specifications

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

## Receiver Specifications

| Parameter                         | Symbol           | Min  | Typical | Max   | Unit | Note                                                                          |
|-----------------------------------|------------------|------|---------|-------|------|-------------------------------------------------------------------------------|
| <b>Electrical</b>                 |                  |      |         |       |      |                                                                               |
| 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,<br>10KH and 100KECL and LVPECL outputs |
| Data Output Voltage-High          | $V_{OH}-V_{CC}$  | -1.1 | -       | -0.74 | V    |                                                                               |
| Signal Detect Output Voltage-Low  | $V_{SDL}$        | -    | -       | 0.5   | V    | C-13-622C-T(3)-SSC4                                                           |
| Signal Detect Output Voltage-High | $V_{SDH}$        | 2.0  | -       | -     |      |                                                                               |
| Signal Detect Output Voltage-Low  | $V_{SDL}-V_{CC}$ | -2.0 | -       | -1.58 | V    | C-13-622-T(3)-SSC4                                                            |
| Signal Detect Output Voltage-High | $V_{SDH}-V_{CC}$ | -1.1 | -       | -0.74 | V    |                                                                               |

## C-13-622(C)-T(3)-SSC4

## Connection Diagram

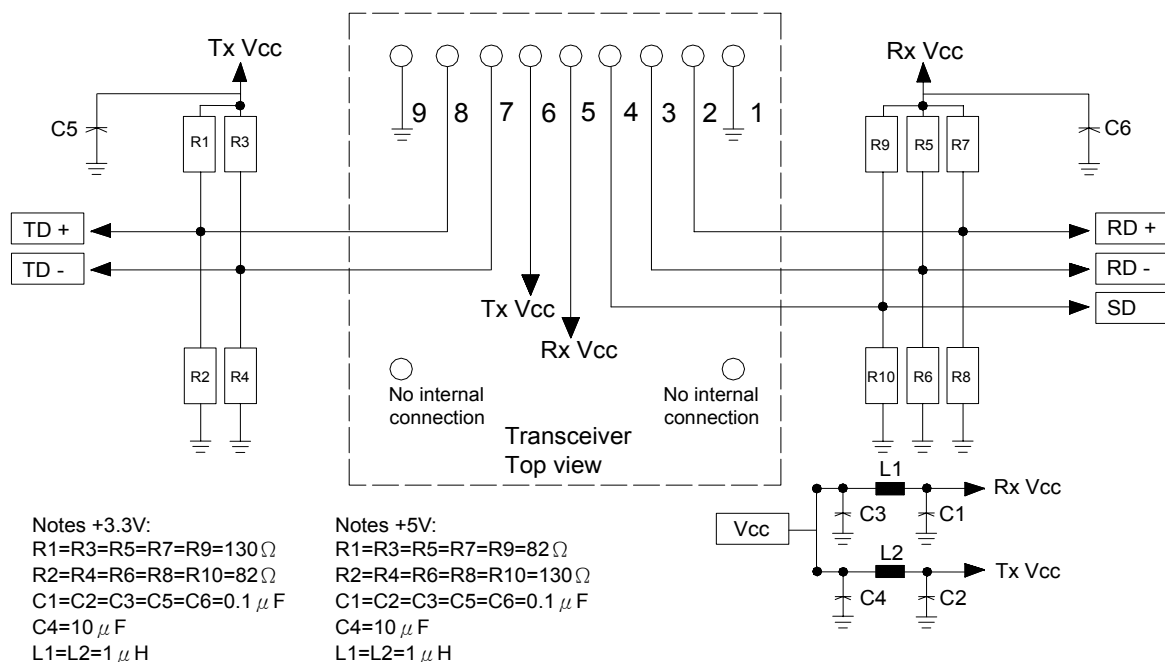


| PIN | Symbol | Notes                                                     |
|-----|--------|-----------------------------------------------------------|
| 1   | RxGND  | Directly connect this pin to the receiver ground plane    |
| 2   | RD+    | See recommended circuit schematic                         |
| 3   | RD-    | See recommended circuit schematic                         |
| 4   | SD     | Active high on this indicates a received optical signal   |
| 5   | RxVcc  | +3.3V/5V dc power for the receiver section                |
| 6   | TxVcc  | +3.3V/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 |

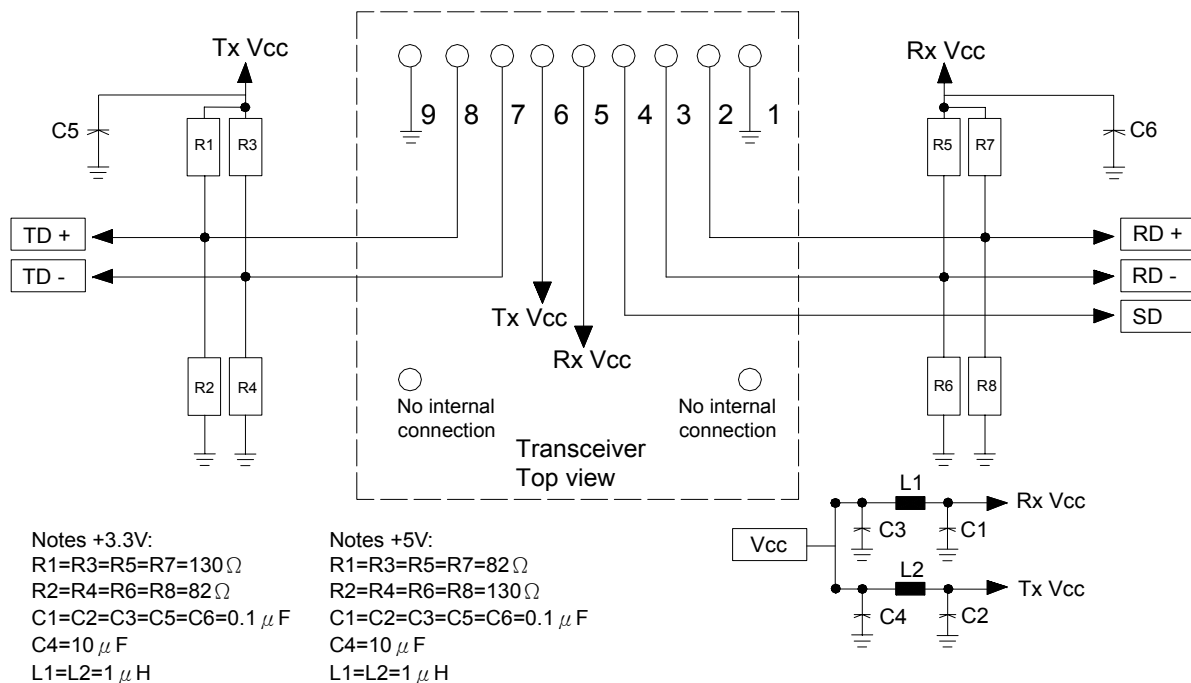
## C-13-622(C)-T(3)-SSC4

## Recommended Circuit Schematic

## C-13-622-T(3)-SSC4



## C-13-622C-T(3)-SSC4



The split-loaded terminations for ECL signals need to be located at the input of devices receiving those ECL signals.

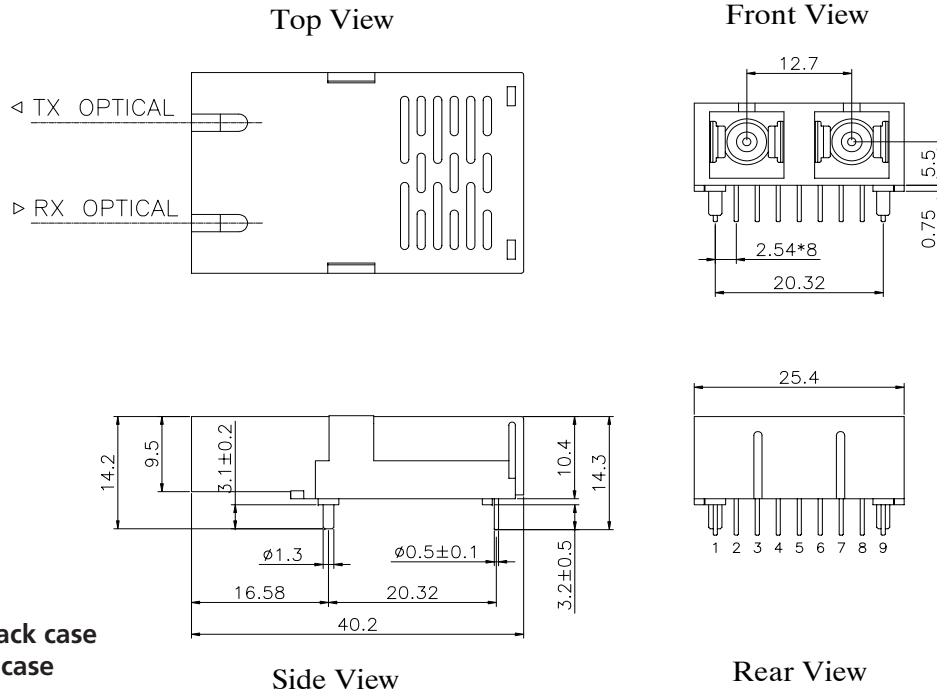
The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module Rx Vcc.

A GND plane under the module is required for good EMI and sensitivity performance.

## C-13-622(C)-T(3)-SSC4

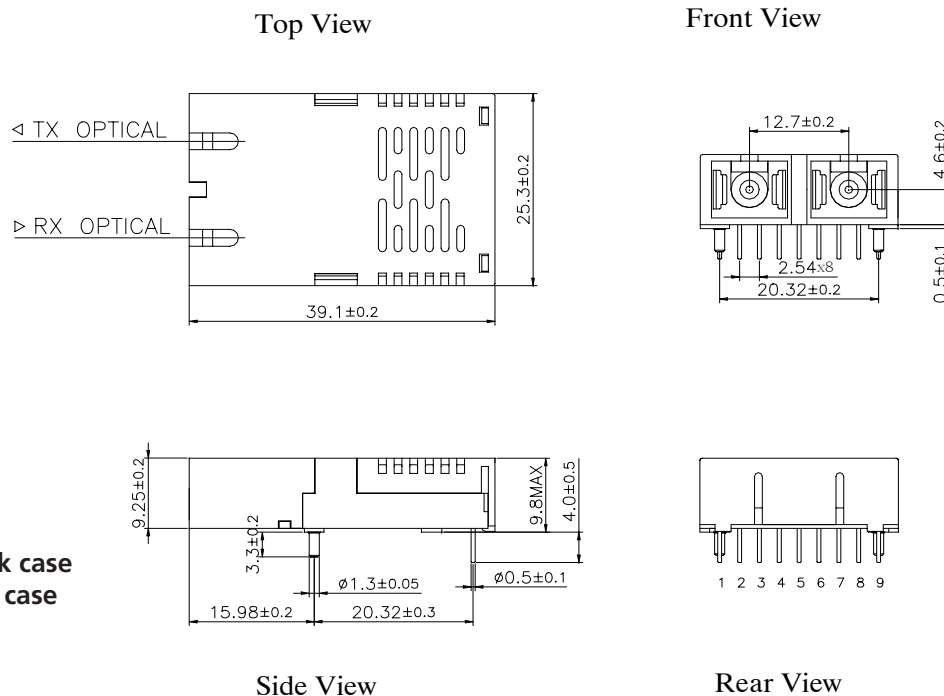
## Package Diagram (10.4 mm SC transceiver assembly)

## SC Transceiver Assembly 10.4mm



## Package Diagram (9.8 mm SC transceiver assembly)

## SC Transceiver Assembly 9.8mm



## C-13-622(C)-T(3)-SSC4

## Ordering Information

## Available Options:

|                         |                         |                         |
|-------------------------|-------------------------|-------------------------|
| C-13-622-T(3)-SSC4      | C-13-622-T(3)-SSC4B     | C-13-622-T(3)-SSC4D     |
| C-13-622C-T(3)-SSC4     | C-13-622C-T(3)-SSC4B    | C-13-622C-T(3)-SSC4D    |
| C-13-622-T(3)-SSC4-G5   | C-13-622-T(3)-SSC4B-G5  | C-13-622-T(3)-SSC4D-G5  |
| C-13-622C-T(3)-SSC4-G5  | C-13-622C-T(3)-SSC4B-G5 | C-13-622C-T(3)-SSC4D-G5 |
| C-13-622-T(3)-SSC4A     | C-13-622-T(3)-SSC4C     | C-13-622-T(3)-SSC4E     |
| C-13-622C-T(3)-SSC4A    | C-13-622C-T(3)-SSC4C    | C-13-622C-T(3)-SSC4E    |
| C-13-622-T(3)-SSC4A-G5  | C-13-622-T(3)-SSC4C-G5  | C-13-622-T(3)-SSC4E-G5  |
| C-13-622C-T(3)-SSC4A-G5 | C-13-622C-T(3)-SSC4C-G5 | C-13-622C-T(3)-SSC4E-G5 |

## Part unnumbering Definition:

C - 13 - 622(C) - T(3) - S SC TxPower Temperature and Package -RoHS

- Wavelength  
13= 1310 nm

- Communication protocol  
(622 Mbps)  
622 = PECL/LVPEC Signal Detection Output  
622C = TTL/LVTTL Signal Detection Output

- +3.3V / 5V FP Transceiver  
T = 5V transceiver  
T3 = 3.3V transceiver

- Single mode fiber

- Connector options  
SC

- Tx Power range  
4 = -3 to +2 dBm

- Temperature range and package  
Blank = commercial temperature(0 to 70 °C), 10.4 mm, Black case  
A = industrial temperature(-40 to 85 °C), 10.4 mm, Black case  
B = industrial temperature(-40 to 85 °C), 9.8 mm, Blue case  
C = industrial temperature(-40 to 85 °C), 9.8 mm, Black case  
D = commercial temperature(0 to 70 °C), 9.8 mm, Black case  
E = commercial temperature(0 to 70 °C), 9.8 mm, Blue case

- Ordering Information  
Blank = RoHS non-compliant product  
G5 = RoHS 5/6-compliant product (lead exemption)

**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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