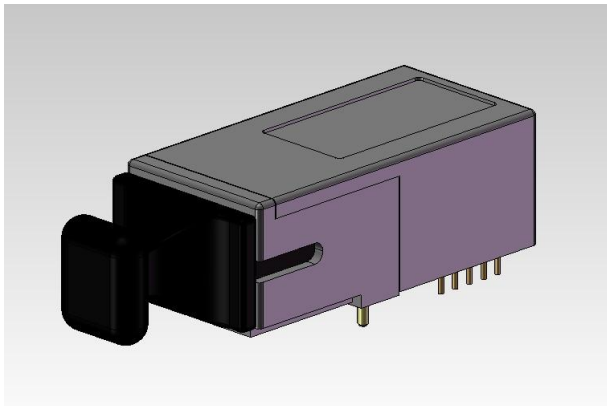


125 Mb/s SC-RJ Transceiver

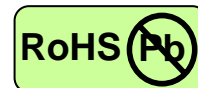


2x5 SFF, SC-RJ Connector, 1 mm POF and 200 μ m HCS, RoHS Compliant

Preliminary Data Sheet



Features



- 650 nm LED
- Multi-rate: 10-125 Mb/s, NRZ
- Single +3.3 V Power Supply
- RoHS Compliant and Lead-free
- PECL Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor (SFF) 2x5 Footprint
- SC-RJ Connector
- Eye Safety
Designed to meet LED Class 1

Applications

- Fast Ethernet
- FDDI
- Multimode fiber links
- Optical-Electrical Interface Conversion

Description

The CT-0125NPF-R41C-A from Coretek Opto Corp. is the high performance and cost-effective module for serial optical data communication applications specified for data rates of 125 Mb/s. It operates with +3.3 V power supply. The module is intended for multi-mode fiber, operates at a nominal wavelength of 650 nm and complies with Multi-Source Agreement (MSA) Small Form Factor (SFF) 2x5 foot print. Each module consists of a transmitter optical subassembly, a receiver optical subassembly and an electrical subassembly. All of them are housed in a plastic package and the combination produces a reliable component. The module is a transceiver with SC-RJ connector designed for use in Fast Ethernet (100 Mb/s) or Ethernet (10 Mb/s) over 50 meters POF and 100 meters HCS fiber.

EMC

Most equipment utilizing high-speed transceivers will be required to meet the following requirements:

- 1) FCC in the United States
- 2) CENELEC EN55022 (CISPR 22) in Europe
- 3) EN 61000-6-4 (September 2011)

To assist the customer in managing the overall equipment EMC performance, the transceivers have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

Eye Safety

This LED based multi-mode transceiver is an AEL Class 1 product. It complies with IEC 60825-1 (+A11).

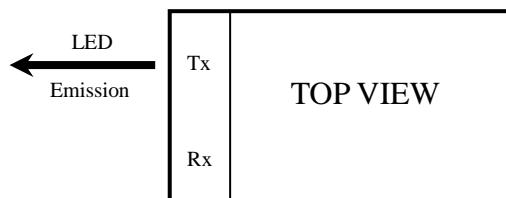
AEL CLASS 1 LED PRODUCT

To meet LED safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Note: All adjustments have been made at the factory prior to shipment of the devices. No maintenance or alteration to the device is required. Tampering with or modifying the performance of the device will result in voided product warranty.

LED Emission Data

| | |
|--|----------------------------|
| Wavelength | : 650 nm |
| Maximum total output power (as defined by IEC : 7 mm aperture at 14 mm distance) | : 0.394 mW / -4 dBm |
| Beam divergence (full angle) / NA (half angle) | : 17.5° / 0.15 rad |



Required Labels

IEC : "Class 1 LED Product"

125 Mb/s SC-RJ Transceiver



LED Class 1 Laser Product Information:

| Model Number | Operating Voltage & SD Output | Distance | Wavelength |
|-------------------|-------------------------------|------------------------------------|------------|
| CT-0125NPF-R41C-A | 3.3 V PECL AC/DC | 50 m 0.5NA POF 100 m 0.37NA HCS | 650 nm |

ABSOLUTE MAX RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---------------------------------|------------|------|----------|------|----------------|
| Storage Temperature | T_S | -40 | 85 | °C | |
| Supply Voltage | V_{CC} | -0.5 | 4 | V | |
| Lead Soldering Temperature/Time | T_{SOLD} | | 260 | °C | 10 sec on lead |
| Data Input Voltage | --- | -0.5 | V_{CC} | V | |

OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | NOTE |
|----------------------------|----------|------|------|------|------|------|
| Case Operating Temperature | T_C | -40 | | 85 | °C | |
| Supply Voltage | V_{CC} | 2.97 | | 3.63 | V | |
| Supply Current | I_{CC} | | | 220 | mA | |

ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---|-------------------|--------------|----------|------|------|
| Transmitter | | | | | |
| Differential Input Voltage | V_D | 0.4 | 1.6 | V | |
| TTL Transmit Disable Input Voltage - Low | V_{IL} | | 0.8 | V | |
| TTL Transmit Disable Input Voltage - High | V_{IH} | $V_{CC}-1.3$ | V_{CC} | V | |
| Receiver | | | | | |
| Data Output Voltage – Low | $V_{OL}-V_{CC}$ | | -1.63 | V | 1 |
| Data Output Voltage – High | $V_{OH}-V_{CC}$ | | -0.99 | V | 1 |
| Data Output Voltage Swing | $ V_{OH}-V_{OL} $ | 0.4 | 0.8 | V | |
| Data Output Rise Time | t_r | 0.35 | 2.2 | ns | |
| Data Output Fall Time | t_f | 0.35 | 2.2 | ns | |
| Duty Cycle Distortion | DCD | -1 | +1 | ns | |
| Data Dependent Jitter (rise/fall) | DDJ | | 1.5 | ns | |
| Random Jitter | RJ | | 0.2 | ns | |
| Signal Detect Output Voltage – Low | $V_{OL}-V_{CC}$ | -1.810 | -1.63 | V | 1 |
| Signal Detect Output Voltage – High | $V_{OH}-V_{CC}$ | -1.025 | -0.99 | V | 1 |

125 Mb/s SC-RJ Transceiver



TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|--|------------------|-----|------|------|------|--------------|
| Average Launched Power (1mm POF, NA=0.5) | P _o | -12 | -8 | -2 | dBm | |
| Average Launched Power (200um HCS, NA=0.37) | P _o | -14 | -10 | -4 | dBm | |
| Optical Modulation Amplitude (POF) | OMA | -10 | | -0.5 | dBm | |
| Optical Modulation Amplitude (HCS) | OMA | -12 | | -3.5 | dBm | |
| Duty Cycle Distortion Contributed by the Transmitter | DCD | -1 | | +1 | ns | Peak to peak |
| Random Jitter Contributed by the Transmitter | RJ | | | 0.2 | ns | Peak to peak |
| Center Wavelength | λ_c | 635 | 650 | 660 | nm | 2 |
| Spectral Width (RMS) | $\Delta \lambda$ | | | 17 | nm | 2 |
| Optical Rise time (10%-90%) | t _r | | | 6.5 | ns | |
| Optical Fall time (10%-90%) | t _f | | | 6.5 | ns | |
| Overshoot | | | | 40 | % | |

RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|--|---------------------------------|-------|------|-----|------|------|
| Input Optical Power Maximum, OMA (POF) | P _{max} | | | +1 | dBm | |
| Input Optical Power Maximum, OMA (HCS) | P _{max} | | | -3 | dBm | |
| Unstressed receiver sensitivity, OMA (POF) | OMA | -23 | | | dBm | 3 |
| Unstressed receiver sensitivity, OMA (HCS) | OMA | -26.8 | | | dBm | 3 |
| Operating Wavelength | λ | 635 | 650 | 660 | nm | |
| Signal Detect - Asserted | P _A | | | 2 | dB | 4 |
| Signal Detect - Deasserted | P _D | | | 5 | dB | 4 |
| Signal Detect - Hysteresis | P _A - P _D | 1.5 | | 3 | dB | |

Notes:

1. These outputs are compatible with 10K, 10KH, 100K ECL and PECL inputs.
2. Measured at the chip level in the axial direction.
3. Measured with PRBS 2⁷-1 at BER<2.5X10⁻¹⁰
4. Signal Detect Asserted and De-asserted levels are indicated as dB below unstressed receiver sensitivity level for either POF or HCS

Timing characteristics

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|--------------------------|---------------------|-----|-----|------|------|
| TX_DISABLE assert time | t _{off} | | 10 | μs | 5 |
| TX_DISABLE negative time | t _{on} | | 1 | ms | 6 |
| Time to initialize | t _{init} | | 100 | ms | 7 |
| RX_SD assert time | t _{sd_on} | | 100 | μs | 8 |
| RX_SD de-assert time | t _{sd_off} | | 100 | μs | 9 |

Notes:

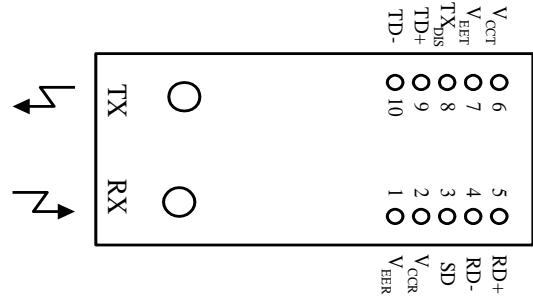
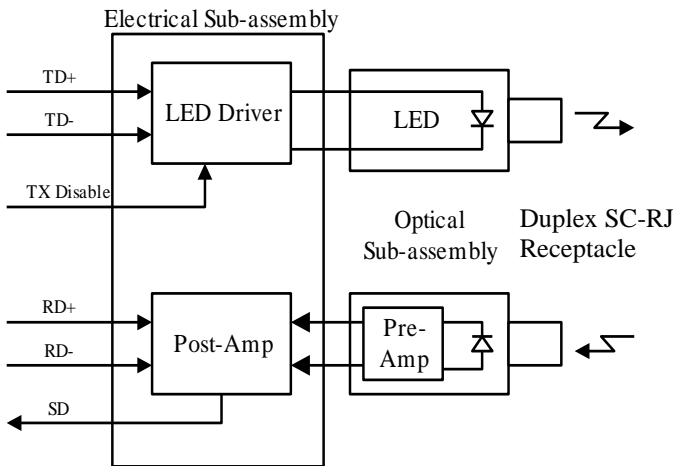
5. Time from rising edge of TX_DISABLE to when the optical output falls below 10% of nominal.
6. Time from falling edge of TX_DISABLE to when the optical output rises above 90% of nominal.
7. Time from Power on or falling edge of TX_DISABLE to when the modulated optical output rises above 90% of normal.
8. Time from valid optical signal to RX_SD assertion.
9. Time from loss of optical signal to RX_SD de-assertion.

125 Mb/s SC-RJ Transceiver



BLOCK DIAGRAM OF TRANSCEIVER

PIN OUT DIAGRAM OF TRANSCEIVER



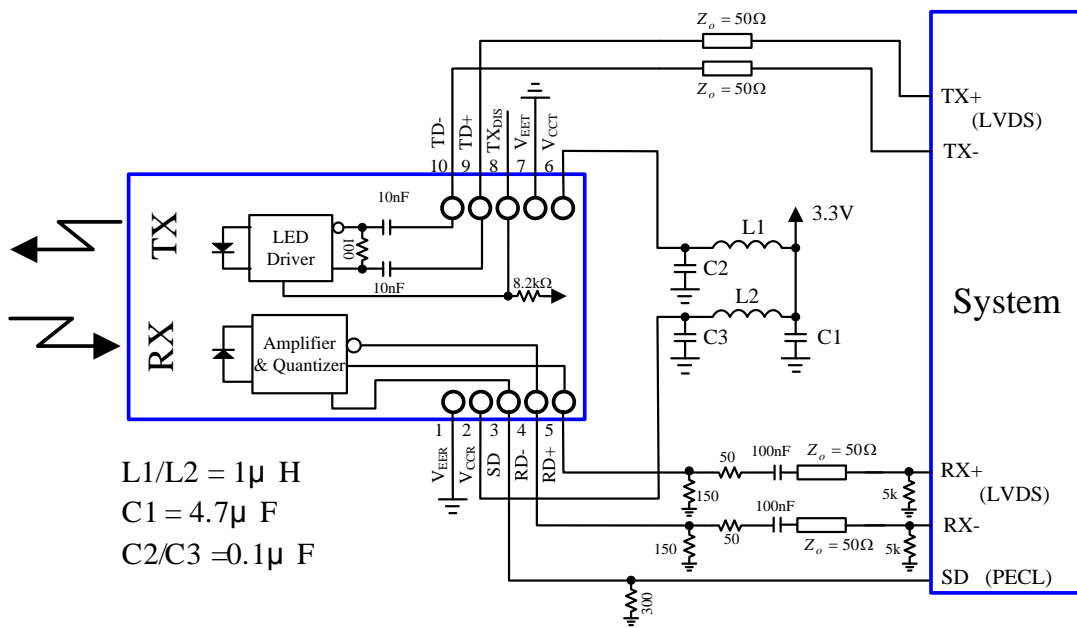
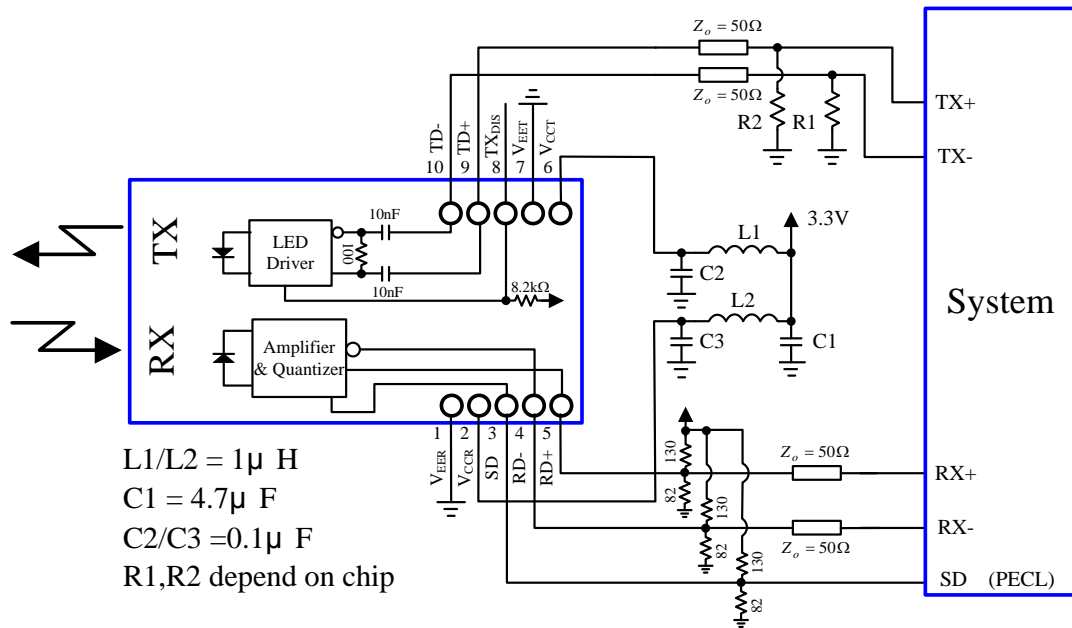
PIN OUT TABLE

| Pin | Symbol | Functional Description |
|----------------|-------------------|--|
| Mounting Posts | | The mounting posts are provided for transceiver mechanical attachment to the circuit board. They should not be connected to the circuit ground but can be connected to the chassis ground. |
| 1 | V _{EER} | Receiver Signal Ground |
| 2 | V _{CCR} | Receiver Power Supply |
| 3 | SD | Signal Detect is a LVPECL output. A high level indicates a received optical signal |
| 4 | RD- | Receiver Data Inverted Differential Output |
| 5 | RD+ | Receiver Data Non-inverted Differential Output |
| 6 | V _{CCT} | Transmitter Power Supply |
| 7 | V _{EET} | Transmitter Signal Ground |
| 8 | TX _{DIS} | Transmitter Disable "internally pulled up 8.2k ohm. High = Transmitter off" |
| 9 | TD+ | Transmitter Data Non-inverted Differential Input |
| 10 | TD- | Transmitter Data Inverted Differential Input |

125 Mb/s SC-RJ Transceiver



RECOMMENDED CIRCUIT SCHEMATIC

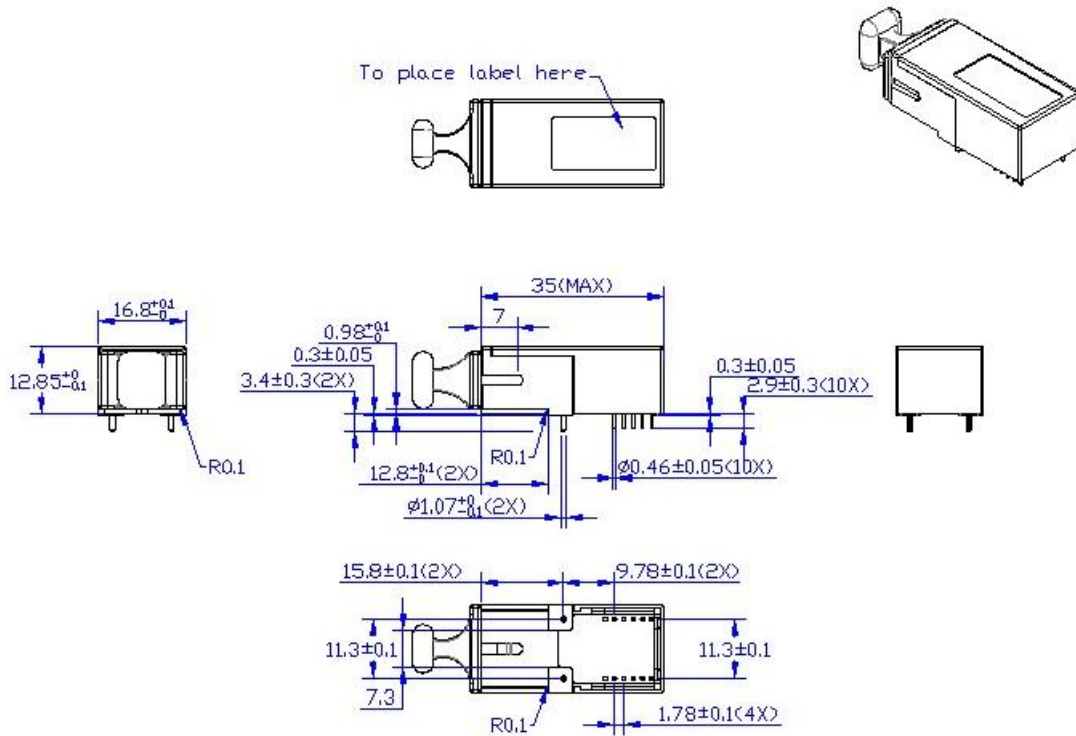


125 Mb/s SC-RJ Transceiver



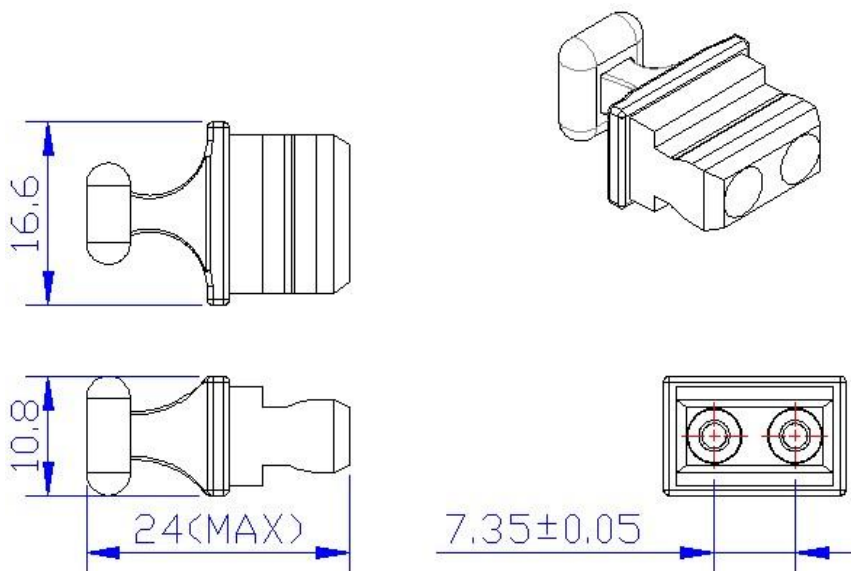
MECHANICAL DIMENSIONS

Units in mm



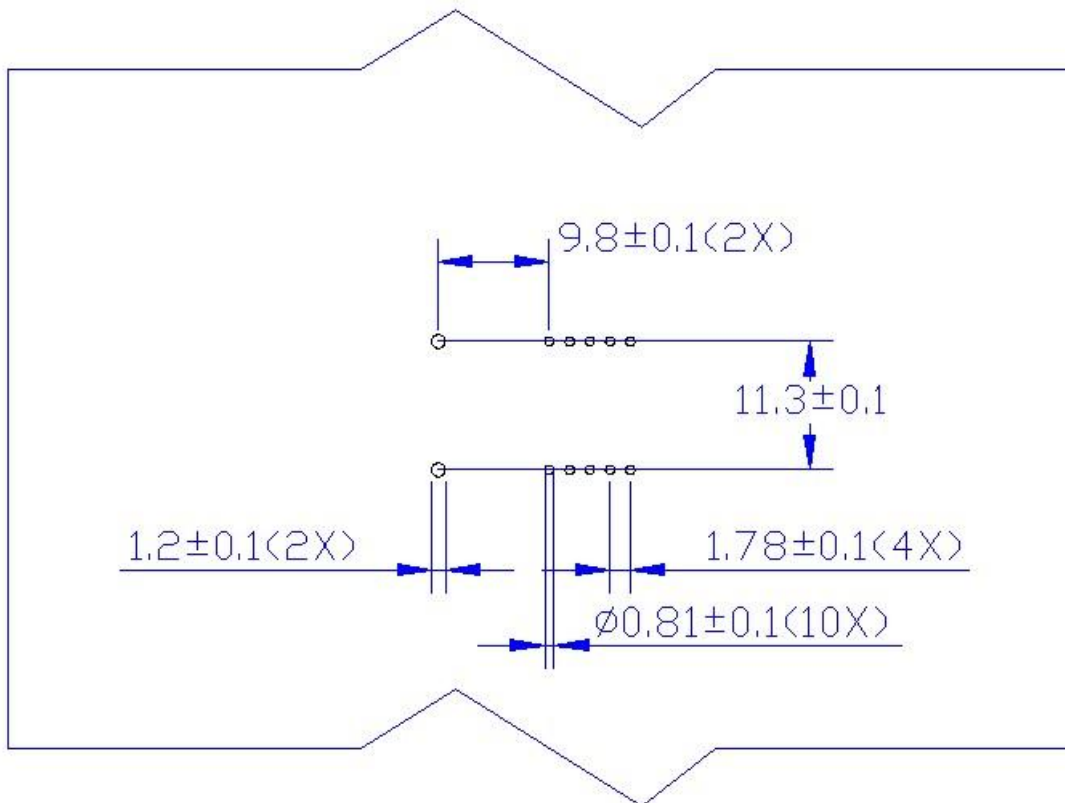
All dimensions are ±0.2mm unless otherwise specified.

DUST PLUG DIMENSIONS



RECOMMENDED SFF HOST BOARD LAYOUT

Units in mm



Claim:

CORETEK Opto Corp. reserves the right to make changes in the specification described hereinafter without prior notice.