

2.488 Gbps ATM-Single Mode Transceiver



SFP, Duplex LC Connector, 1550nm DFB LD for Single Mode Fiber, RoHS Compliant

Extended Operating Temperature from -40 to $+85$ °C



Features

- 1550nm DFB LD
- Multi Data Rate: from 155M to 2.67Gbps, NRZ
- Single +3.3V Power Supply
- RoHS Compliant and Lead-free
- AC/AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Duplex LC Connector
- Compliance with ATM standard
- Compliance with specifications for IEEE-802.3z Gigabit Ethernet
- Compliance with ANSI specifications for Fibre Channel applications
- Eye Safety
Designed to meet Laser Class 1 comply with EN60825-1

Applications

- ATM/SONET/SDH
- Gigabit Ethernet
- Fibre Channel Links

Description

The CT-2500TSP-KB5L-A from Coretek Opto Corp. is the high performance and cost-effective module for serial optical data communication applications specified for single mode of multi-rate from 155M to 2.67 Gb/s. It operates with +3.3V power supply. The module is intended for single mode fiber, operates at a nominal wavelength of 1550nm and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module consists of a transmitter optical subassembly, a receiver optical subassembly and an electrical subassembly. All of them are housed in a metal package and the combination produces a reliable component.

The module is a duplex LC connector transceiver designed to provide ATM/SONET OC-48/SDH STM-16 compliant link at 2.488 Gb/s, ATM/SONET OC-12/SDH STM-4 compliant link at 622 Mb/s, ATM/SONET OC-3/SDH STM-1 compliant link at 155 Mb/s, Gigabit Ethernet compliant link at 1.25 Gb/s, Fibre Channel compliant link at 1.062 and 2.125 Gb/s applications. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

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

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

The transceivers have been designed to meet Class 1 eye safety and comply with EN 60825-1.

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Product Information

| Model Number | Operating Voltage & SD Output | Distance | LD Type & Wavelength | Output Power | Sensitivity |
|-------------------|-------------------------------|----------|----------------------|--------------|----------------|
| CT-2500TSP-KB5L-A | 3.3V TTL AC/AC | 15 km | 1550 nm DFB | -5 ~ 0 dBm | ≤ -18 dBm |

ABSOLUTE MAX RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---------------------|-----------------|-----|-----------------|------|------|
| Storage Temperature | T _S | -40 | 85 | °C | |
| Supply Voltage | V _{CC} | 0 | 6 | V | |
| Data Input Voltage | --- | 0 | V _{CC} | V | |
| Supply Current | I _S | | 300 | mA | |

OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | NOTE |
|----------------------------|-----------------|------|------|------|------|------|
| Case Operating Temperature | T _A | -40 | | 85 | °C | |
| Supply Voltage | V _{CC} | 3.1 | | 3.5 | V | |
| Data Input Voltage Swing | V _{ID} | 300 | | 1860 | mV | |

ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---|-------------------|-----------------------|-----------------------|------|------|
| Transmitter | | | | | |
| Transmitter Supply Current | I _{CC} T | | 200 | mA | |
| Tx_Disable Input Voltage - Low | V _{IL} | 0 | 0.8 | V | |
| Tx_Disable Input Voltage - High | V _{IH} | 2.0 | V _{CC} | V | |
| Tx_Fault Output Voltage - Low | V _{OL} | 0 | 0.8 | V | |
| Tx_Fault Output Voltage - High | V _{OH} | 2.0 | V _{CC} | V | |
| Receiver | | | | | |
| Receiver Supply Current | I _{CC} R | | 100 | mA | |
| Receiver Data Output Differential Voltage | V _{OD} | 0.4 | 1.3 | V | |
| Rx_LOS Output Voltage - Low | V _{OL} | 0 | 0.8 | V | |
| Rx_LOS Output Voltage - High | V _{OH} | 2.0 | V _{CC} | V | |
| MOD_DEF (1) , MOD_DEF (2) - Low | V _{IL} | -0.6 | V _{CC} × 0.3 | V | |
| MOD_DEF (1) , MOD_DEF (2) - High | V _{IH} | V _{CC} × 0.7 | V _{CC} + 0.5 | V | |

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|----------------------------------|----------------|---|------|------|-------|------|
| Optical Output Power | P _O | -5 | | 0 | dBm | 1 |
| Extinction Ratio | ER | 8.2 | | | dB | |
| Center Wavelength | λ _c | 1530 | 1550 | 1570 | nm | |
| Spectral Width (-20dB) | Δλ | | | 1 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| RIN | RIN | | | -117 | dB/Hz | |
| Optical Rise time (20%-80%) | t _r | | | 180 | ps | 2 |
| Optical Fall time (20%-80%) | t _f | | | 180 | ps | 2 |
| Jitter Generation (peak to peak) | | | | 0.1 | UI | |
| Output Eye | | Compliant with ITU recommendation G.957 | | | | |

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RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|-----------------------------|-------------|------|------|------|------|------|
| Maximum Input Optical Power | P_{max} | 0 | | | dBm | 3 |
| | 2.5Gb/s | | | -18 | | 3 |
| | 2.1Gb/s | | | -21 | | 4 |
| Minimum Input Optical Power | P_{min} | | | | dBm | 4 |
| | 1.25Gb/s | | | -22 | | 4 |
| | 622Mb/s | | | -22 | | 3 |
| | 155Mb/s | | | -23 | | 3 |
| Operating Wavelength | λ | 1100 | | 1600 | nm | |
| Loss of Signal - Asserted | P_A | -35 | | | dBm | |
| Loss of Signal - Deasserted | P_D | | | -17 | dBm | |
| Loss of Signal - Hysteresis | $P_D - P_A$ | 0.5 | | | dB | |

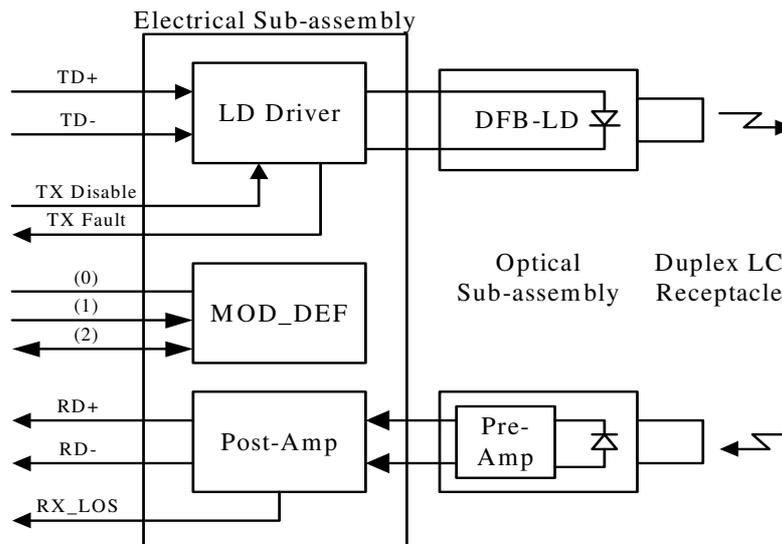
Notes:

1. Measured average power coupled into 9/125 μ m single mode fiber.
2. These are 20-80% values.
3. Measured with $2^{23}-1$ PRBS at BER< 10^{-10}
4. Measured with 2^7-1 PRBS at BER< 10^{-12}

TIMING CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|---|-----------------|-----|------|-----|---------|------|
| TX_DISABLE Assert Time | t_{off} | | | 10 | μ s | |
| TX_DISABLE Negate Time | t_{on} | | | 1 | ms | |
| Time to initialize, include reset of TX_FAULT | t_{init} | | | 300 | ms | |
| TX_FAULT from fault to assertion | t_{fault} | | | 100 | μ s | |
| TX_DISABLE time to start reset | t_{reset} | 10 | | | μ s | |
| Receiver Loss of Signal Assert Time (off to on) | t_{A,RX_LOS} | | | 100 | μ s | |
| Receiver Loss of Signal Assert Time (on to off) | t_{D,RX_LOS} | | | 100 | μ s | |

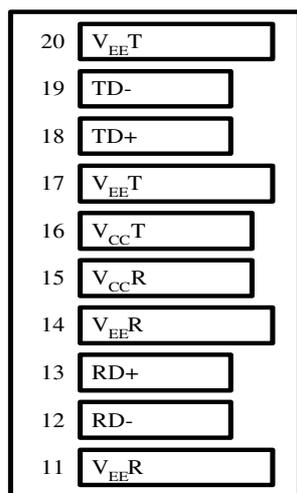
BLOCK DIAGRAM OF TRANSCEIVER



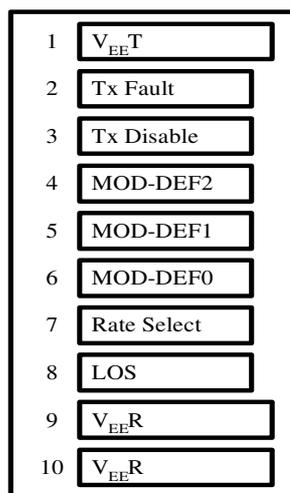
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PIN OUT DIAGRAM OF TRANSCEIVER



Top of Board



Bottom of Board (As Viewed through Top of Board)

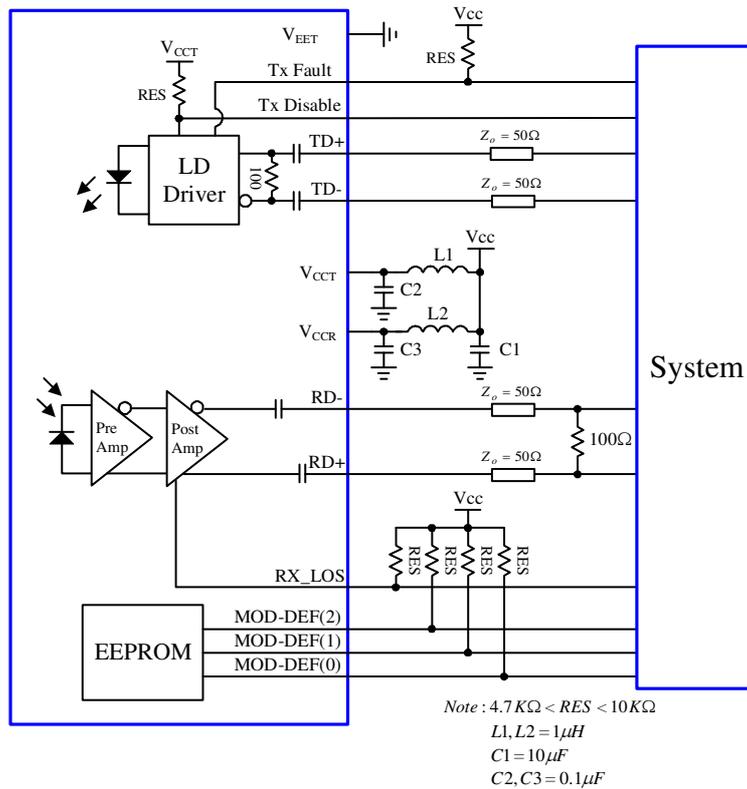
PIN OUT TABLE

| Pin | Symbol | Functional Description |
|-----|-------------|---|
| 1 | VeeT | Transmitter Ground |
| 2 | TX Fault | Transmitter Fault Indication |
| 3 | TX Disable | Transmitter Disable – Module disables on high or open |
| 4 | MOD-DEF(2) | Module Definition 2 – Two wire serial ID interface |
| 5 | MOD-DEF(1) | Module Definition 1 – Two wire serial ID interface |
| 6 | MOD-DEF(0) | Module Definition 0 – Grounded in module |
| 7 | Rate Select | Not Connected |
| 8 | LOS | Loss of Signal |
| 9 | VeeR | Receiver Ground |
| 10 | VeeR | Receiver Ground |
| 11 | VeeR | Receiver Ground |
| 12 | RD- | Inverse Received Data Out |
| 13 | RD+ | Received Data Out |
| 14 | VeeR | Receiver Ground |
| 15 | VccR | Receiver Power |
| 16 | VccT | Transmitter Power |
| 17 | VeeT | Transmitter Ground |
| 18 | TD+ | Transmitter Data In |
| 19 | TD- | Inverse Transmitter Data In |
| 20 | VeeT | Transmitter Ground |

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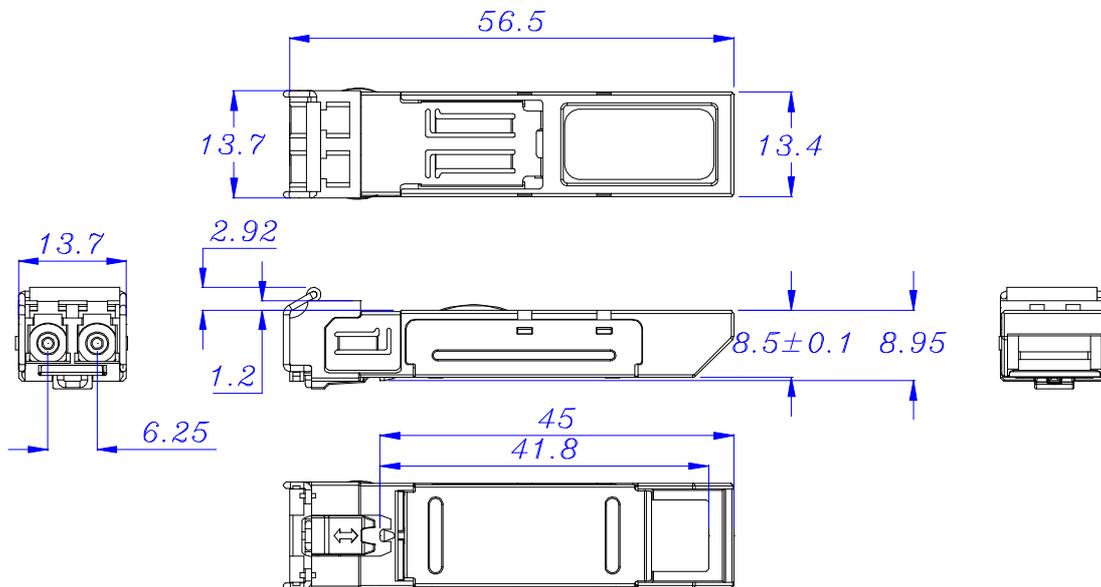


RECOMMENDED CIRCUIT SCHEMATIC



MECHANICAL DIMENSIONS

Units in mm



All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified.

Claim:

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