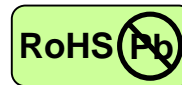


# 2.488 Gbps ATM-Single Mode Transceiver



SFP BIDI, Single LC Connector, 1490nm DFB LD for Single Mode Fiber, RoHS Compliant  
Digital Diagnostics Functions, Extended Operating Temperature from -40 to +85°C



## Features

- 1490nm DFB LD
- Multi Data Rate: from 1.062 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)
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- 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-2500TBP-JB5L-E 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 1.062 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 Tx: 1490nm / Rx: 1310nm and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module is integrated digital diagnostics functions via an I<sup>2</sup>C serial interface.

The module is a single fiber connector transceiver designed to provide ATM/SONET OC-48/SDH STM-16 compliant link at 2.488 Gb/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-2500TBP-JB5L-E | 3.3V TTL AC/AC                | 20 km    | 1490 nm DFB          | -5 ~ 0 dBm   | ≤ -20 dBm   |

## ABSOLUTE MAX RATINGS

| PARAMETER           | SYMBOL          | MIN | MAX             | UNIT | NOTE |
|---------------------|-----------------|-----|-----------------|------|------|
| Storage Temperature | T <sub>S</sub>  | -40 | 85              | °C   |      |
| Supply Voltage      | V <sub>CC</sub> | 0   | 6               | V    |      |
| Data Input Voltage  | ---             | 0   | V <sub>CC</sub> | V    |      |
| Supply Current      | I <sub>S</sub>  |     | 300             | mA   |      |

## OPERATING CONDITIONS

| PARAMETER                  | SYMBOL          | MIN. | TYP. | MAX. | UNIT | NOTE |
|----------------------------|-----------------|------|------|------|------|------|
| Case Operating Temperature | T <sub>A</sub>  | -40  |      | 85   | °C   |      |
| Supply Voltage             | V <sub>CC</sub> | 3.1  |      | 3.5  | V    |      |
| Data Input Voltage Swing   | V <sub>ID</sub> | 300  |      | 1860 | mV   |      |

## ELECTRICAL CHARACTERISTICS

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

## TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER                        | SYMBOL                                  | MIN  | TYP. | MAX  | UNIT  | NOTE |
|----------------------------------|---|------|------|------|-------|------|
| Optical Output Power             | P <sub>O</sub>                          | -5   |      | 0    | dBm   | 1    |
| Extinction Ratio                 | ER                                      | 8.2  |      |      | dB    |      |
| Center Wavelength                | λ <sub>c</sub>                          | 1480 |      | 1500 | 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 <sub>r</sub>                          |      |      | 180  | ps    | 2    |
| Optical Fall time (20%-80% )     | t <sub>f</sub>                          |      |      | 180  | ps    | 2    |
| Jitter Generation (peak to peak) |   |      |      | 0.1  | UI    |      |
| Output Eye                       | Compliant with ITU recommendation G.957 |      |      |      |       |      |

# 2.488 Gbps ATM-Single Mode Transceiver



## RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER                   | SYMBOL      | MIN  | TYP. | MAX  | UNIT | NOTE |
|-----------------------------|-------------|------|------|------|------|------|
| Maximum Input Optical Power | $P_{max}$   | 0    |      |      | dBm  | 3    |
| Minimum Input Optical Power | $P_{min}$   |      |      | -20  | dBm  | 3    |
| Operating Wavelength        | $\lambda$   | 1260 |      | 1360 | nm   |      |
| Loss of Signal - Asserted   | $P_A$       | -35  |      |      | dBm  |      |
| Loss of Signal - Deasserted | $P_D$       |      |      | -20  | dBm  |      |
| Loss of Signal - Hysteresis | $P_D - P_A$ | 0.5  |      |      | dB   |      |

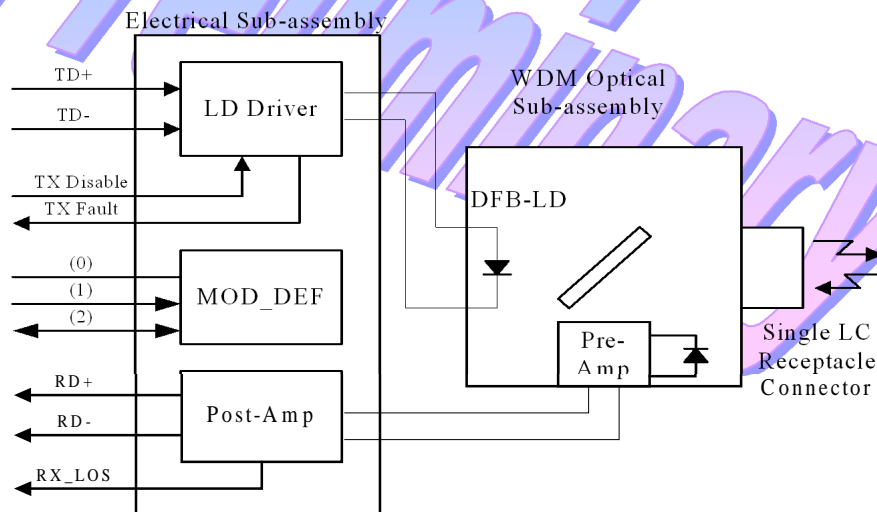
### Notes:

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

## TIMING CHARACTERISTICS

| PARAMETER                                       | SYMBOL         | MIN | TYP. | MAX | UNIT    | NOTE |
|---|----------------|-----|------|-----|---------|------|
| TX_DISABLE Assert Time                          | $t_{off}$      |     |      | 10  | $\mu$ 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 | $\mu$ s |      |
| TX_DISABLE time to start reset                  | $t_{reset}$    | 10  |      |     | $\mu$ s |      |
| Receiver Loss of Signal Assert Time (off to on) | $t_{A,RX LOS}$ |     |      | 100 | $\mu$ s |      |
| Receiver Loss of Signal Assert Time (on to off) | $t_{D,RX LOS}$ |     |      | 100 | $\mu$ s |      |

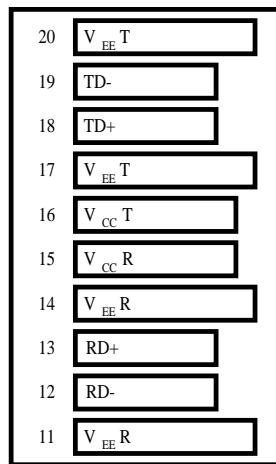
## BLOCK DIAGRAM OF TRANSCEIVER



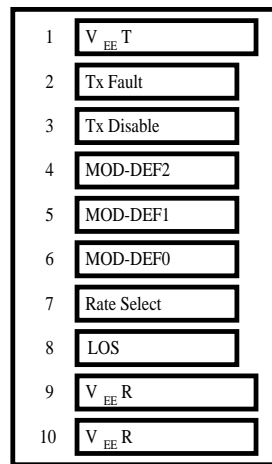
# 2.488 Gbps ATM-Single Mode Transceiver



## PIN OUT DIAGRAM OF TRANSCEIVER



Top of Board



Bottom of Board (As Viewed through Top of Board)

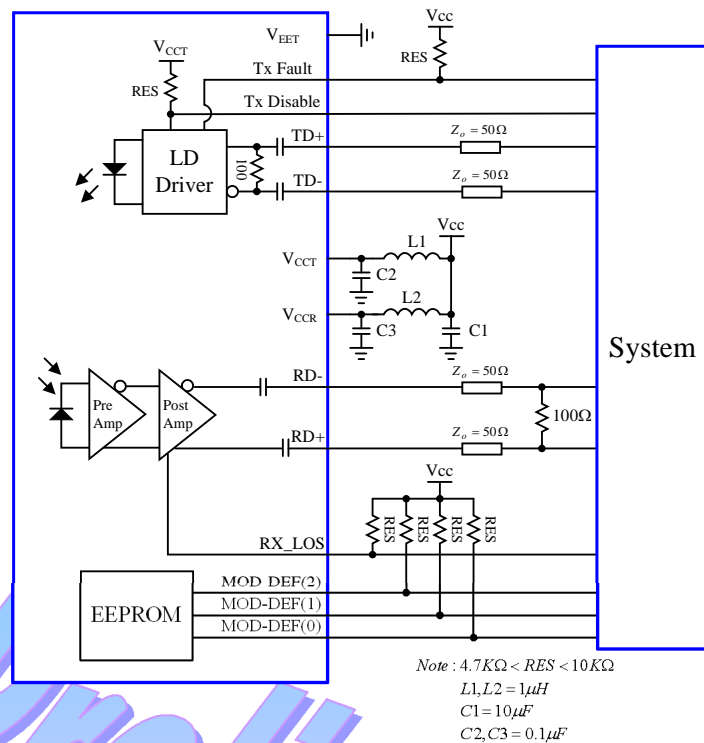
## PIN OUT TABLE

| 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                                    |

# 2.488 Gbps ATM-Single Mode Transceiver

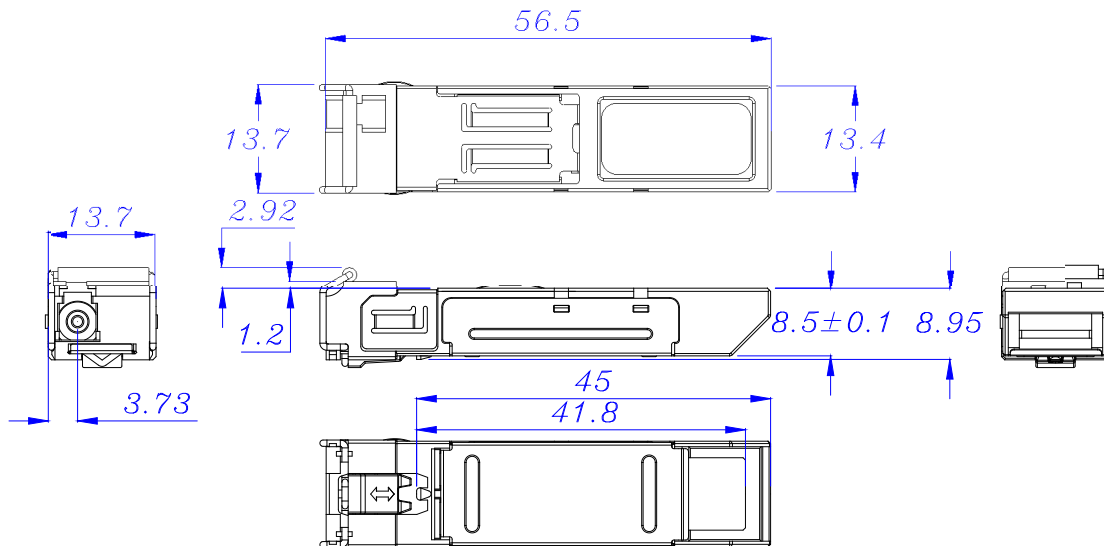


## RECOMMENDED CIRCUIT SCHEMATIC



## 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.