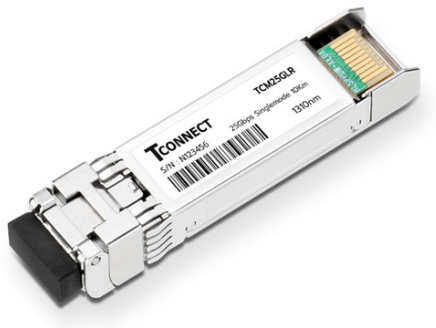
# 25G SFP28 1310nm 10KM LR

TCM25GLR




## Features

- 25Gb/s serial optical interface
- 1310nm DFB transmitter, PIN photo-detector
- 2-wire interface for management specifications compliant with SFF 8472 digital diagnostic monitoring interface for optical transceivers
- Operating case temperature: 0°C to 70°C
- Advanced firmware allow customer system encryption information to be stored in transceiver
- Cost effective SFP28 solution, enables higher port densities and greater bandwidth

## Overview

TCM25GLR 25G SFP28 transceivers, this 1310 nm DFB 25 Gigabit SFP28 transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 10km.

The SFP28 LR module electrical interface is compliant to SFI electrical specifications. The transmitter input and receiver output impedance is 100 Ohms differential. Data lines are internally AC coupled. The module provides differential termination and reduce differential to common mode conversion for quality signal termination and low EMI. SFI typically operates over 200 mm of improved FR4 material or up to about 150mmof standard FR4 with one connector.

## Applications

- High-speed storage area networks
- Computer cluster cross-connect
- Custom high-speed data pipes

## Ordering Information

| Part Number | Product Description |
|---|---|
| TCM25GLR | SFP28 25Gbps, 1310nm, SMF 10km, 0ºC ~ +70ºC |

## Absolute Maximum Rating

| Parameters | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| Power Supply Voltage | VCC | 0 | 3.6 | V |
| Storage Temperature | Tc | -40 | 85 | °C |
| Operating Case Temperature | Tc | 0 | 70 | °C |
| Relative Humidity | RH | 5 | 95 | % |
| Damage Threshold | Pmax | 5 | | dBm |

## Recommended Operating Condition

| Parameter | Symbol | Min. | Typical | Max | Unit |
|---|---|---|---|---|---|
| Power Supply Voltage | VCC | 3.135 | 3.3 | 3.465 | V |
| Power Supply Current | Icc | | | 450 | mA |
| Operating Case Temperature | TC | 0 | 25 | 70 | °C |

## Transceiver Optical Characteristics

| Parameter | Symbol | Minimum | Typical | Maximum | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| Center Wavelength | λt | 1290 | | 1330 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Average Optical Power | Pavg | -8.4 | - | 3 | dBm | 1 |
| Laser Off Power | Poff | - | - | -30 | dBm | |
| Extinction Ratio | ER | 3.5 | - | - | dB | |
| Transmitter Dispersion Penalty | TDP | - | - | - | dB | TBD |
| Relative Intensity Noise | Rin | - | - | - | dB/Hz | 12dB reflection |
| Optical Return Loss Tolerance | | - | - | - | dB | TBD |
| **Receiver** | | | | | | |
| Center Wavelength | λr | 1260 | | 1360 | nm | |
| Receiver Sensitivity in average power | Psens | - | - | -10.4 | dBm | 1 |
| Receiver Sensitivity in OMA | Psens | - | - | -8.6 | dBm | 2 |
| Stressed Sensitivity (OMA) | | - | - | -6.8 | dBm | 2 |
| Stressed eye jitter | | - | | | UIp-p | TBD |
| Receive electrical 3dB upper cutoff frequency | | | | | GHz | TBD |
| LOS Assert | LOSA | - | - | - | dBm | TBD |
| LOS Deassert | LOSD | - | - | - | dBm | TBD |
| LOS Hysteresis | LOSH | - | - | - | dB | TBD |
| Overload | Pin | - | - | 3.5 | dBm | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Receiver power damage | | | | 5 | dBm | |
| Receiver Reflectance | | - | - | -12 | dB | |

**Notes:**

1. Average optical power shall be measured using the methods specified in TIA/EIA-455-95.
2. Receiver sensitivity is informative. Stressed receiver sensitivity shall be measured with conformance test signal for BER =1x $10^{-12}$.
3. Vertical eye closure penalty and stressed eye jitter are the test conditions for measuring stressed receiver sensitivity. They are not the required characteristic of the receiver.

## Transmitter Electrical Characteristics

| Parameter | Symbol | Minimum | Typical | Maximum | Unit | Notes |
|---|---|---|---|---|---|---|
| Data Rate | | - | 25.78 | - | Gbps | |
| Power Consumption | | - | 1200 | 1500 | mW | |
| Single Ended Output Voltage Tolerance | | -0.3 | - | 4 | V | |
| C common mode voltage tolerance | | 15 | - | - | mV | |
| Tx Input Diff Voltage | VI | 180 | | 700 | mV | |
| Tx Fault | VoL | -0.3 | | 0.4 | V | At 0.7mA |
| Data Dependent Input Jitter | DDJ | | | 0.1 | UI | |
| Data Input Total Jitter | TJ | - | - | - | UI | TBD |

## Receiver Electrical Characteristics

| Parameter | Symbol | Minimum | Typical | Maximum | Unit | Notes |
|---|---|---|---|---|---|---|
| Single Ended Output Voltage Tolerance | | -0.3 | - | 4 | V | |
| Rx Output Diff Voltage | Vo | 300 | | 900 | mV | |
| Rx Output Rise and Fall Time | Tr/Tf | 9.5 | | | ps | 20% to 80% |
| Total Jitter | TJ | - | - | - | UI | TBD |
| Deterministic Jitter | DJ | - | - | - | UI | TBD |

## Pin Definition

| Pin | Symbol | Name/Description | Note |
|---|---|---|---|
| 1 | VEET | Transmitter Ground | 1 |
| 2 | TX_Fault | Transmitter Fault (LVTTL-O) - High indicates a fault condition | |
| 3 | TX_Disable | Transmitter Disable (LVTTL-I) – High or open disables the transmitter | |
| 4 | SDA | Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2) | 2 |
| 5 | SCL | Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1) | 2 |
| 6 | MOD_ABS | Module Absent (Output), connected to VeeT or VeeR in the module | |
| 7 | RS0 | Rate Select 0 – Not used, Presents high input impedance | |
| 8 | RX_LOS | Receiver Loss of Signal (LVTTL-O) | |

| | | | |
|---|---|---|---|
| 9 | RS1 | Rate Select 1 – Not used, Presents high input impedance | |
| 10 | VeeR | Receiver Ground | 1 |
| 11 | VeeR | Receiver Ground | 1 |
| 12 | RD- | Inverse Received Data out (CML-O), AC Coupled | |
| 13 | RD+ | Received Data out (CML-O), AC Coupled | |
| 14 | VeeR | Receiver Ground | 1 |
| 15 | VccR | Receiver Power - +3.3V | |
| 16 | VccT | Transmitter Power - +3.3 V | |
| 17 | VEET | Transmitter Ground | 1 |
| 18 | TD+ | Transmitter Data In (CML-I), AC Coupled | |
| 19 | TD- | Inverse Transmitter Data In (CML-I), AC Coupled | |
| 20 | VEET | Transmitter Ground | 1 |

**Notes:**

1. Module ground pins GND are isolated from the module case.
2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

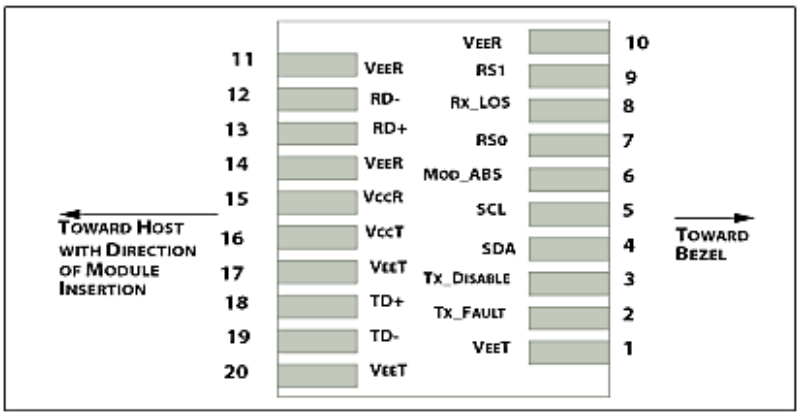



Figure 1: Interface to Host PCB

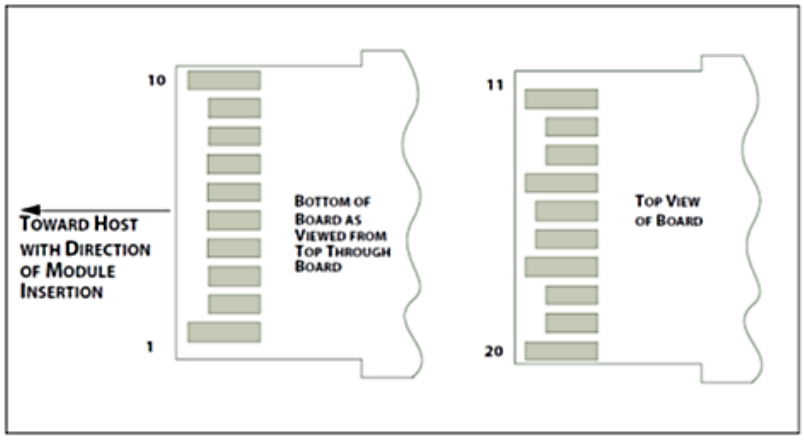



Figure 2: Module Contact Assignment

## Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales staff.

| Parameter | Symbol | Min. | Max | Unit | Notes |
|---|---|---|---|---|---|
| Temperature monitor absolute error | DMI_Temp | -3 | 3 | degC | Over operating temp |
| Laser power monitor absolute error | DMI_TX | -3 | 3 | dB | |
| RX power monitor absolute error | DMI_RX | -3 | 3 | dB | -1dBm to -15dBm range |
| Supply voltage monitor absolute error | DMI_VCC | -0.1 | 0.1 | V | Full operating range |
| Bias current monitor | DMI_Ibias | -10% | 10% | mA | |

## Transceiver Block Diagram

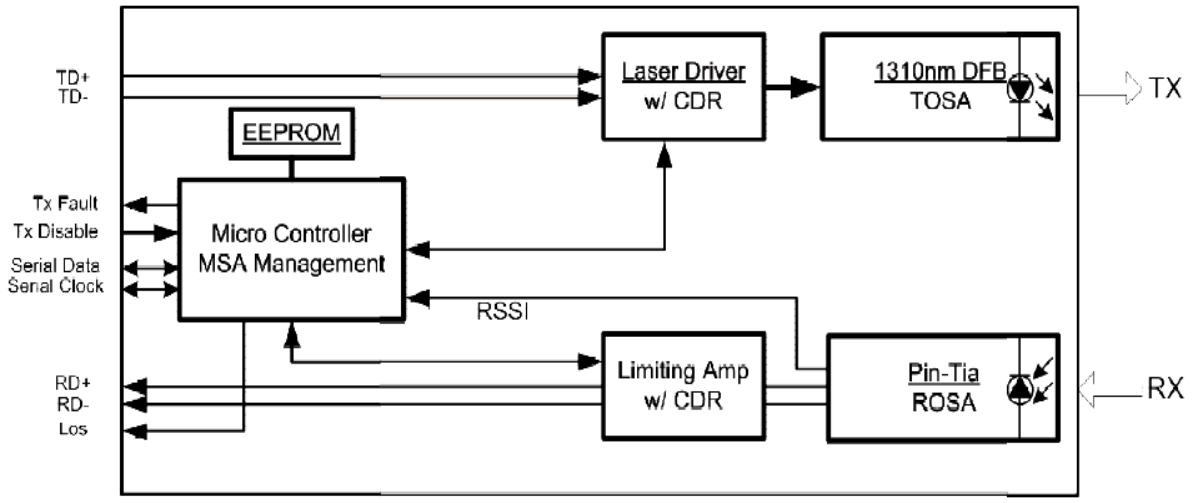



Figure 3: Transceiver Block Diagram

## Mechanical Specifications

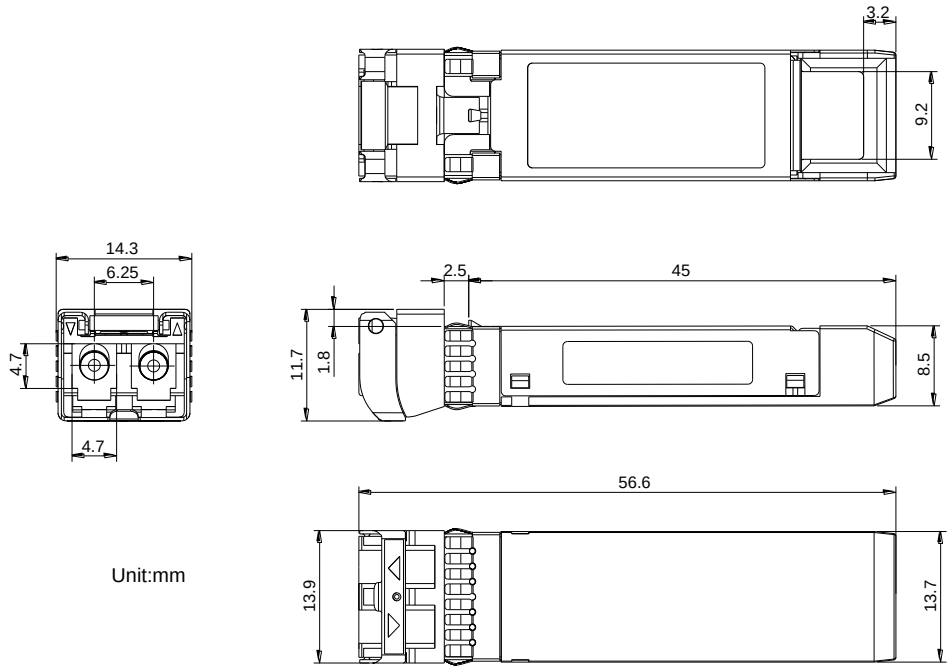



Figure4. Mechanical Specifications

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