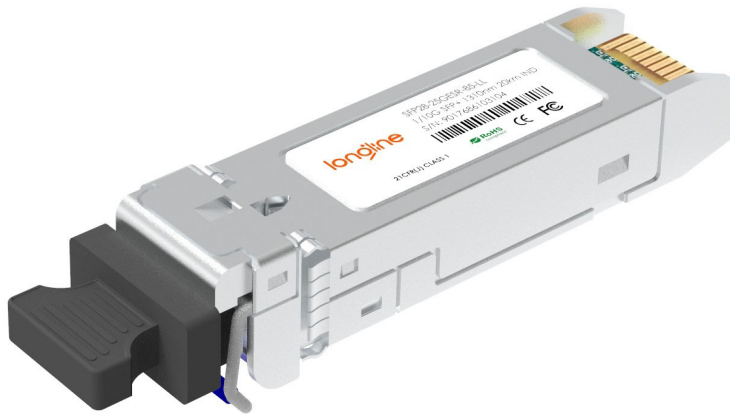*longline*

# 25G SFP28 850nm 300m DOM Transceiver

SFP28-25GESR-85-LL



## Application

- Data Center Interconnect
- 25G BASE-ESR Ethernet

## Features

- Supports 25.78Gb/s Bit Rate
- Hot-pluggable SFP28 Footprint
- 850nm VCSEL Laser and PIN Photo-detector
- Internal CDR on Transmitter and Receiver Channel

- Link Lengths at 25.78G 400m over OM4 MMF
- Link Lengths at 25.78G 300m over OM3 MMF
- LC Duplex Connector
- Low Power Consumption< 1W
- RoHS-10 Compliant (lead-free)

- 0℃ to 70℃ Operating Temperature Range
- Single +3.3V±5% Power Supply
- Programmable TX Input Equalizer
- Programmable RX

## Description

The 25G ESR 300M short-wavelength transceiver is designed for using in 25.78Gb/s data rate over multimode fiber. The transceiver is compliant with SFF-8431, and the mechanical SFP28 plug is compatible with SFF-8432. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

## Product Specifications

## I. Absolute Maximum Ratings

| Parameter | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| Storage Temperature Range | Ts | -40 | 85 | ℃ |
| Relative Humidity | RH | 0 | 85 | % |
| Supply Voltage | $V_{CC}$ | -0.3 | 4.0 | V |

## II. Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Operating Case Temperature | $T_{OPR}$ | 0 | | 70 | ℃ |
| Power Supply Voltage | $V_{CC}$ | 3.14 | 3.3 | 3.46 | V |
| Bit Rate | BR | | 25.78 | | Gb/s |
| Bit Error Ratio | BER | | | $5*10^{E-5}$ | |
| Max Supported Link Length | L | | | 300@OM3 400@OM4 | m |

## III. Electrical Characteristics

| Parameter | Symbol | Unit | Min. | Typ. | Max. | Note |
|---|---|---|---|---|---|---|
| **Supply Voltage** | $V_{CC}$ | V | 3.14 | 3.3 | 3.46 | |
| **Supply Current** | Icc | mA | | | 230 | |
| **Transmitter** | | | | | | |
| **Input Differential Impedance** | $R_{IN}$ | Ω | 80 | 100 | 120 | 1 |
| **Single Ended Data Input Swing** | $V_{IN}$ | mVp-p | 90 | | 500 | |
| **Transmit Disable Voltage** | $V_{DIS}$ | V | 2 | | $V_{CCHOST}$ | |
| **Transmit Enable Voltage** | $V_{EN}$ | V | $V_{EE}$ | | $V_{EE}+0.8$ | |
| **Transmit Fault Assert Voltage** | $V_{FA}$ | V | 2 | | $V_{CCHOST}$ | |
| **Transmit Fault De-Assert Voltage** | $V_{FDA}$ | V | $V_{EE}$ | | $V_{EE}+0.8$ | |
| **Receiver** | | | | | | |
| **Single Ended Data Output Swing** | $V_{OD}$ | mVp-p | 200 | | 500 | |
| **LOS Fault** | $V_{LOSFT}$ | V | 2 | | $V_{CCHOST}$ | |
| **LOS Normal** | $V_{LOSNR}$ | V | $V_{EE}$ | | $V_{EE}+0.8$ | |

Note:
1. Differential between TD+ / TD−

## IV. Optical Characteristics

| Parameter | Symbol | Unit | Min. | Typ. | Max. | Note |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| **Nominal Wavelength** | $\lambda$ | nm | 840 | | 860 | |
| **Spectral Width** | Dl | nm | | | 0.5 | |
| **Optical Modulation Amplitude** | $P_{OMA}$ | dBm | -4.3 | | 3 | |
| **Optical Output Power** | Pav | dBm | -6.4 | | 2.4 | |
| **Extinction Ratio** | ER | dB | 2 | | | |
| **Transmitterand Dispersion Penalty** | TDP | dB | | | 5 | |
| **Average Launch Power of OFF Transmitter** | $P_{OFF}$ | dBm | | | -30 | |
| **Receiver** | | | | | | |
| **Center Wavelength** | $\lambda$ | nm | 840 | | 860 | |
| **Average Receiver Power** | PAVG | dBm | -10.3 | | 2.4 | 1 |
| **Stressed Receiver Sensitivity (OMA)** | $R_{SENSE}$ | dBm | | | -5.2 | 2 |
| **Receiver Reflectance** | $R_{REFL}$ | dB | | | -12 | |
| **Assert LOS** | $LOS_A$ | dBm | -30 | | | |
| **De-Assert LOS** | $LOS_D$ | dBm | | | -13 | |
| **LOS Hysteresis** | | dB | 0.5 | | | |

Notes:
1. Sensitivity for 25.78G PRBS 231-1 and BER better than or equal to 5*10[E-5].
2. The stressed sensitivity value in the table is for system level BER measurements which include the effects of CDR circuit.
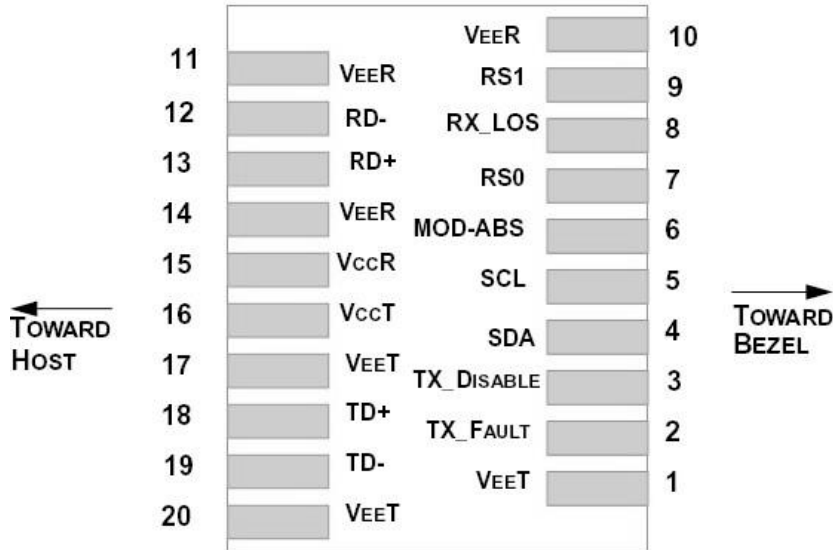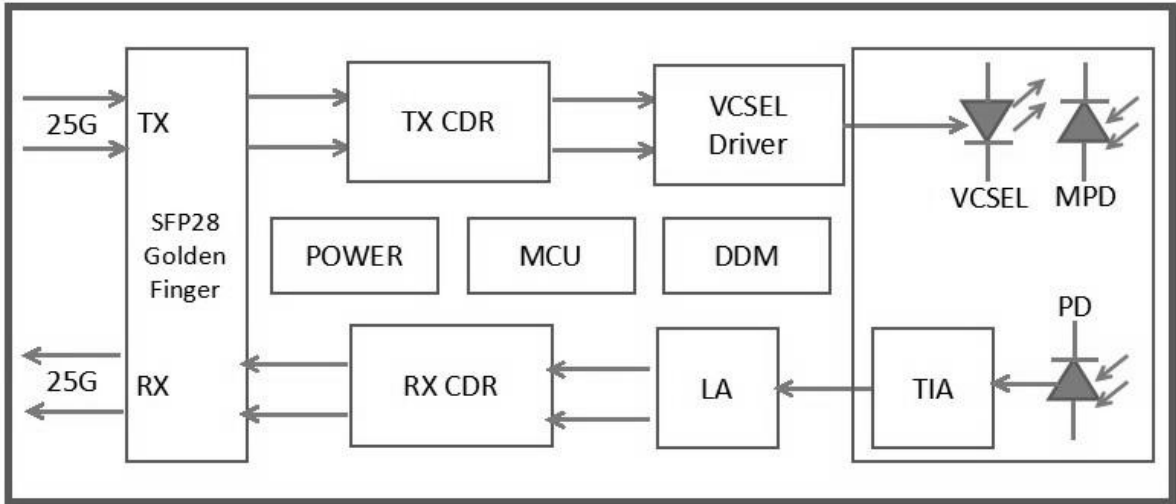
## IV. Pin Function Definitions



Figure1. Pin Definitions of the Module High Speed Inputs/Outputs

## V. Transceiver Pin Descriptions

| Pin No. | Symbol | Name | Definition |
|---------|--------|------|------------|
| **1,17,20** | VeeT | Transmitter Signal Ground | Thesepins should be connected to signal ground on the host board. |
| **2** | TX Fault | Transmitter Fault Out (OC) | Logic "1" Output = Transmitter Fault Logic"0"Output= Normal Operation This pin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor. |
| **3** | TX Disable | Transmitter Disable In (LVTTL) | Logic"1"Input(or no connection)=Laser off Logic"0"Input=Laser on This pin is internally pulled up to VccT with a 10kΩ resistor. |
| **4** | SDA | Module Definition Identifiers | SerialID with SFF8472 Diagnostics Module Definition pins should be pulled up to Host Vcc with 10kΩ resistors. |
| **5** | SCL | | |
| **6** | MOD-ABS | | |

| Pin No. | Symbol | Name | Definition |
|---|---|---|---|
| 7 | RS0 | Receiver Rate Select (LVTTL) Transmitter Rate Select (LVTTL) | NA |
| 9 | RS1 | | |
| 8 | LOS | Loss of Signal Out (OC) | Thispin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor. |
| 10,11,14 | VeeR | Receiver Signal Ground | These pins should be connected to signal ground on the host board. |
| 12 | RD- | Receiver Negative DATA Out (CML) | Light on = Logic "0" Output Receiver DATA output is internally AC coupled and series terminated with a 50Ω resistor. |
| 13 | RD+ | Receiver Positive DATA Out (CML) | Light on = Logic "1" Output Receiver DATA output is internally AC coupled and series terminated with a 50Ω resistor. |
| 15 | VccR | Receiver Power Supply | This pin should be connected to a filtered +3.3V power supply on the host board. See Figure3. Recommended power supply filter |
| 16 | VccT | Transmitter Power Supply | This pin should be connected to a filtered +3.3V power supply on the host board. See Figure3. Recommended power supply filter |
| 18 | TD+ | Transmitter Positive DATA In (CML) | Logic "1" Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100Ω resistor. |
| 19 | TD- | Transmitter Negative DATA In(CML) | Logic"0"Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100Ω resistor. |

## VI. Block Diagram



## VII. Diagram Mechanial Drawing