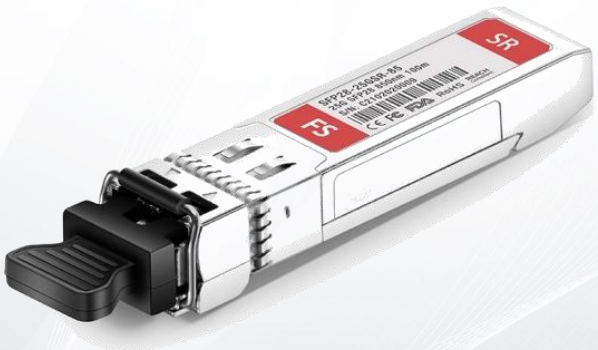
# 25G SFP28 850nm 100m DOM Transceiver

SFP28-25GSR-85




## Application

- 25GBASE-SR Ethernet

## Standards

- SFF-8472
- SFF-8024
- SFF-8431
- SFF-8432

## Features

- Supports 25.78Gb/s Bit Rate
- Hot-pluggable SFP+ Footprint
- 850nm VCSEL Laser and PIN Photo-detector
- Internal CDR on Transmitter and Receiver Channel
- RoHS-10 Compliant
- Link Lengths at 25.78G 100m Over OM4 MMF
- LC Duplex Connector
- Low Power Consumption < 1W
- 0℃ to 70℃ Operating Temperature Range
- Single +3.3V±5% Power Supply
- Programmable TX Input Equalizer
- Programmable RX Pre-emphasis
- Digital Monitoring SFF-8472 Compliant

## Description

The 25G SR short-wavelength transceiver is designed for use in 25.78Gb/s data rate over multimode fiber. The transceiver is compliant with SFF-8431, and the mechanical SFP+ 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 |
|---|---|---|---|---|
| **Supply Voltage** | Vcc | -0.3 | +4.0 | V |
| **Storage Temperature** | Ts | -40 | +85 | ℃ |
| **Operating Humidity** | RH | 0 | +85 | % |

## II. General Specifications

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| **Bit Rate** | BR | | 25.78 | | Gbps |
| **Bit Error Ratio** | BER | | | $5*10^{E-5}$ | |
| **Max. Supported Link Length** | $L_{MAX}$ | | | 100 | m |

## III. Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| **Operating Temperature** | Tc | 0 | | +70 | ℃ |
| **Power Supply Voltage** | Vcc | 3.14 | 3.3 | 3.46 | V |
| **Bit Rate** | BR | | 25.78 | | Gbps |
| **Max. Supported Link Length** | $L_{MAX}$ | | | 100 | m |

## IV. Electrical Characteristics

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

**Notes:**

1. Differential between TD+ / TD–.

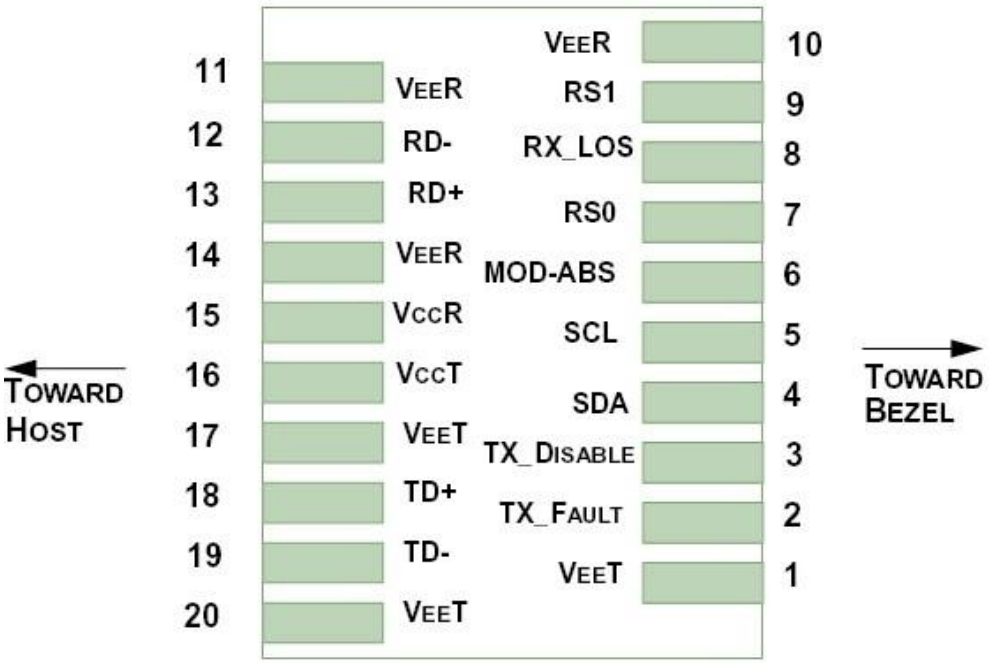
## V. Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| **Nominal Wavelength** | λ | 840 | | 860 | nm | |
| **Spectral Width** | Δλ | | | 0.6 | nm | |
| **Optical Modulation Amplitude** | POMA | -6.4 | | 3 | dBm | |
| **Optical Output Power** | Pav | -8.4 | | 2.4 | dBm | |
| **Extinction Ratio** | ER | 2 | | | dB | |
| **Transmitter and Dispersion Penalty** | TDP | | | 5 | dB | |
| **Average Launch Power of OFF Transmitter** | $P_{OFF}$ | | | -30 | dBm | |
| **Receiver** | | | | | | |
| **Center Wavelength** | λ | 840 | | 860 | nm | |
| **Average Receiver Power** | $P_{AVG}$ | -10.3 | | 2.4 | dBm | 1 |
| **Stressed Receiver Sensitivity (OMA)** | $R_{SENSE}$ | | | -5.2 | dBm | 2 |
| **Receiver Reflectance** | $R_{REFL}$ | | | -12 | dB | |
| **Assert LOS** | $LOS_A$ | -30 | | | dBm | |
| **De-Assert LOS** | $LOS_D$ | | | -13 | dBm | |
| **LOS Hysteresis** | | 0.5 | | | dB | |

**Notes:**

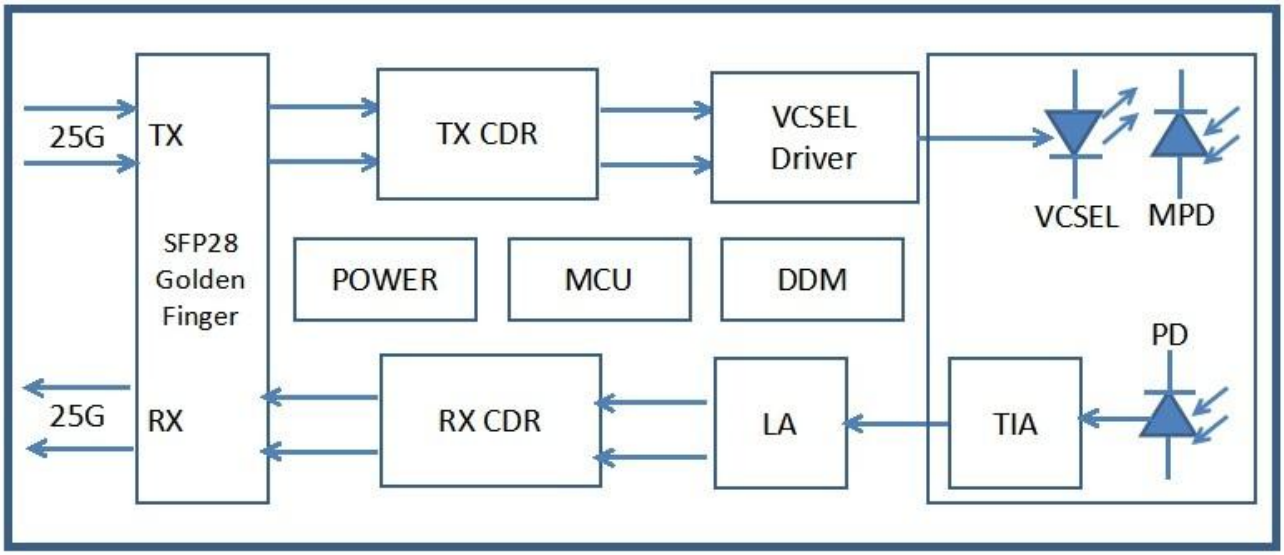
1. Sensitivity for 25.78G PRBS 231-1 and BER better than or equal to $5*10^{E-5}$.
2. The stressed sensitivity values in the table are for system level BER measurements which include the effects of CDR circuit.

## VI. Pin Assignment



| Pin Number | Symbol | Name | Description |
|---|---|---|---|
| **1,17,20** | VeeT | Transmitter Signal Ground | These pins should be connected to signal ground on the host board. |
| **2** | TX Fault | Transmitter Fault Out (OC) | Logic "1" Output = Transmitter Fault<br>Logic "0" Output = Normal Operation<br>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<br>Logic "0" Input = Laser on<br>This pin is internally pulled up to VccT with a 10 kΩ resistor. |
| **4** | SDA | Module Definition Identifiers | Serial ID with SFF 8472 Diagnostics<br>Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors. |
| **5** | SCL | | |
| **6** | MOD-ABS | | |
| **7** | RS0 | Receiver Rate Select (LVTTL)<br>Transmitter Rate Select (LVTTL) | NA |
| **9** | RS1 | | NA |
| **8** | LOS | Loss of Signal Out (OC) | This pin 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 Figure 3.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 Figure 3.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<br>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<br>with a differential 100Ω resistor. |

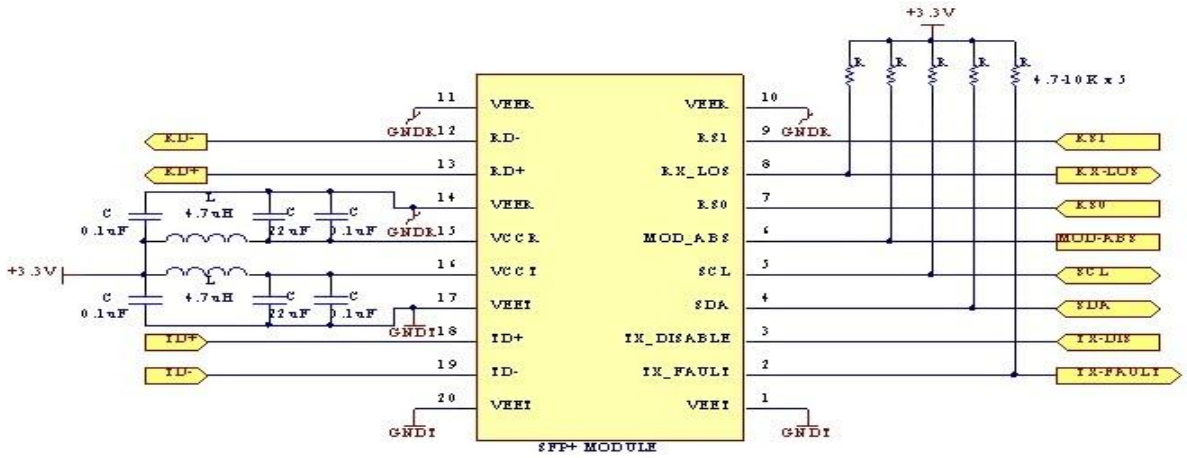
## VII. Optical Module Block Diagram



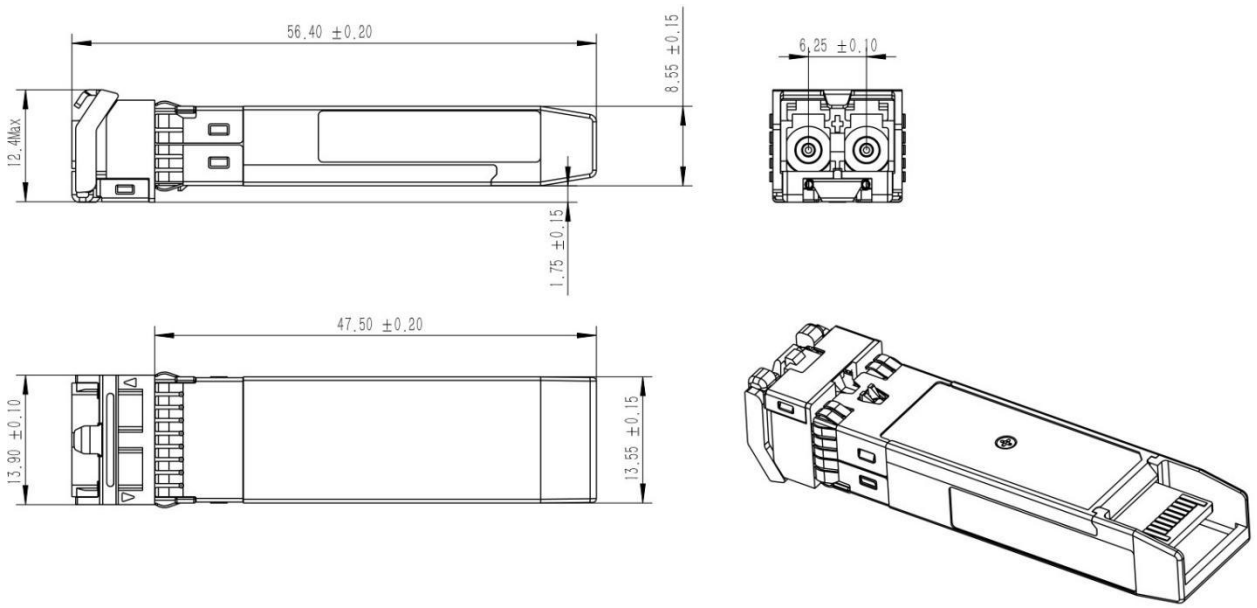

## VIII. Regulatory Compliance

| Feature | Test Method | Performance |
|---|---|---|
| **Electrostatic Discharge (ESD) to the Electrical Pins** | MIL-STD-883C Method 3015.7 | Class 1 (> 1500 Volts) |
| **Electrostatic Discharge (ESD) Immunity** | Variation of IEC 61000-4-2 | LV 4(Air discharge :15KV;Contact discharge:8 KV) |
| **Electromagnetic Interference (EMI)** | CISPR22 ITE Class B<br>EN55022 Class B<br>FCC Class B | Compliant with standards |
| **Immunity** | IEC61000-4-3 Class 2<br>EN55024 | Typically show no measurable effect from a 3V/m fieldswept from 80 to 1000MHz applied to the transceiver without a chassis enclosure |

## IX. Typical Application Circuit




## X. Diagram Mechanial Drawing

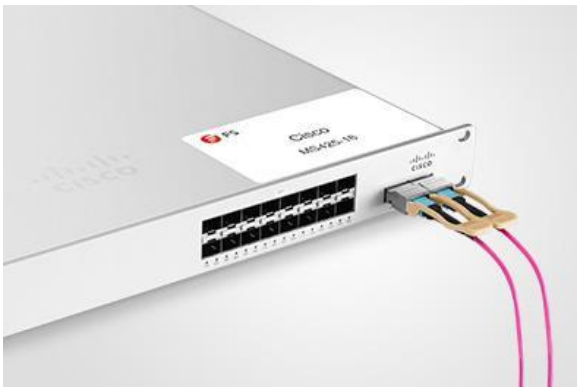


## Test Center

## I. Compatibility Testing

Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.

Cisco Catalyst C9500-24Y4C



Cisco MS425-16

Brocade VDX 6940-144S

Dell EMC Networking Z9100-ON

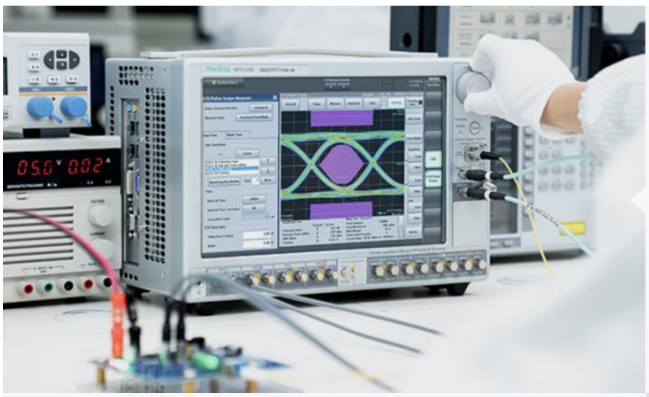
Force⑩tm S60-44T

HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the Test Bed PDF. It will be updated in real time as we expand our portfolio.

## II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



### 1. TX/RX Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure the input and output signal quality.

- Eye Pattern Measurements: Jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve

### 2. Reliability and Stability Testing

Subject the transceivers to dramatic changes in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0 °C to 70 °C
- Extended: -5 °C to 85 °C
- Industrial: -40 °C to 85 °C


### 3. Transfer Rate and Protocol Testing

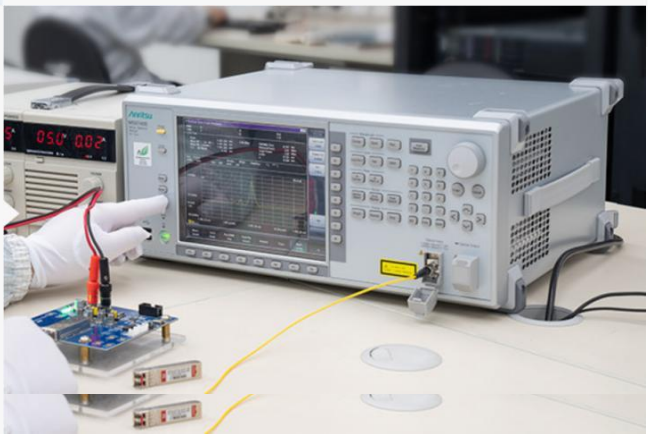
Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI

### 4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



## Order Information

| Part Number | Description |
|---|---|
| SFP28-25GSR-85 | 25G SFP28 850nm 100m DOM Transceiver |
| SFP28-25GLR-31 | 25G SFP28 1310nm 10km DOM Transceiver |
| SFP28-25GER-31 | 25G SFP28 1310nm 30km DOM Transceiver |
| SFP28-25GER-31 | 25G SFP28 1310nm 40km DOM Transceiver |
| SFP28-25GSR-85-I | 25G SFP28 850nm 100m Industrial DOM Transceiver |
| SFP28-25GLR-31-I | 25G SFP28 1310nm 10km Industrial DOM Transceiver |
| SFP28-25GER-31-I | 25G SFP28 1310nm 30km Industrial DOM Transceiver |
| SFP28-25GER-31-I | 25G SFP28 1310nm 40km Industrial DOM Transceiver |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