

25G SFP28 1270nm-TX/1330nm-RX 20km DOM LC SMF Transceiver

SFP28-25G-BX20



Application

- 25GBASE-LR
- CPRI option 10 / eCPRI

Features

- Up to 20 km Transmission Distance
- LC Single Connector
- Low Power Consumption <1.2W
- -40°C to 85°C Operating Case Temperature Range
- Single 3.3V ± 5% Power Supply
- Compliant with SFF-8472

Standards

- SFF-8472
- SFF-8402
- SFF-8432
- SFF-8431
- CEI-28G-VSR

Description

The SFP28-25G-BX20 is designed to transmit and receiver optical data up to 20km over single mode fiber. The transceiver is compliant with SFF-8472, SFF-8402, SFF- 8432 and applicable portions of SFF-8431. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Product Specifications

I. Ordering Information

| Form Factor | Data Rate (Gb/s) | Laser | Average Power (dBm) | Detector | OMA Sensitivity 5E-5 (dBm) | Top (°C) | Reach (km) |
|-------------|------------------|------------|---------------------|----------|----------------------------|----------|------------|
| SFP28 | 25.78125 | 1270nm DFB | 0~6 | PIN | <-14 | -40~85 | 20 |

II. Absolute Maximum Ratings

| Parameter | Symbol | Unit | Min. | Max. |
|---------------------------|-----------------|------|------|------|
| Storage Temperature Range | T _s | °C | -40 | 85 |
| Relative Humidity | RH | % | 0 | 85 |
| Supply Voltage | V _{CC} | V | -0.3 | 3.6 |

III. Recommended Operating Conditions

| Parameter | Symbol | Unit | Min. | Typ. | Max. |
|----------------------------------|-----------------|------|----------|----------|-------|
| Operating Case Temperature Range | T _c | °C | -40 | | 85 |
| Power Supply Voltage | V _{CC} | V | 3.135 | 3.3 | 3.465 |
| Bit Rate | BR | Gb/s | 24.33024 | 25.78125 | |
| Max. Supported Link Length | L | km | 10 | 20 | |

IV. Electrical Characteristics

| Parameter | Symbol | Unit | Min. | Typ. | Max. | Note |
|---|-------------|----------|----------|------|--------------|-------|
| Supply Voltage | V_{CC} | V | 3.14 | 3.3 | 3.46 | |
| Supply Current | I_{CC} | mA | | | 360 | @3.3V |
| Transmitter | | | | | | |
| Input Differential Impedance | R_{IN} | Ω | | 100 | | |
| Single Ended Data Input Swing | V_{IN} | mVp-p | 90 | | 450 | |
| 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 | 2.2 | | V_{CCHOST} | |
| Transmit Fault De-Assert Voltage | V_{FDA} | V | V_{EE} | | $V_{EE}+0.4$ | |
| Receiver | | | | | | |
| Single Ended Data Output Swing | V_{OD} | mVp-p | 200 | | 450 | |
| LOS Fault | V_{LOSFT} | V | 2.2 | | V_{CCHOST} | |
| LOS Normal | V_{LOSNR} | V | V_{EE} | | $V_{EE}+0.4$ | |

V. Optical Characteristics

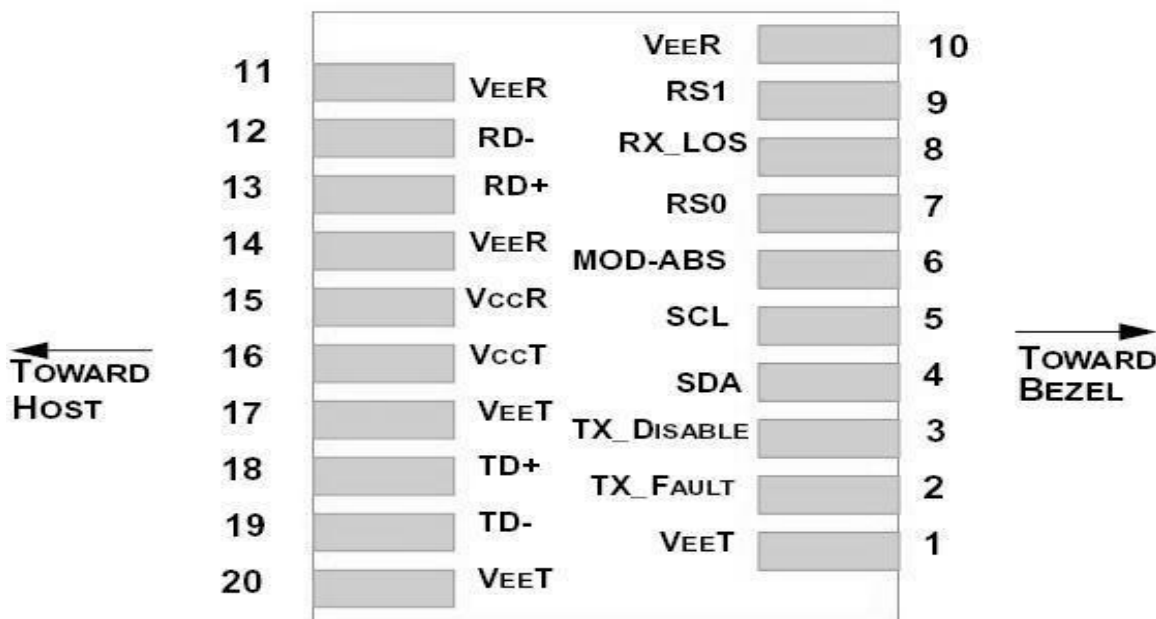
(tested under recommended operating conditions, unless otherwise noted)

| Parameter | Symbol | Unit | Min. | Typ. | Max. | Note |
|--|-----------|-------|------|------|------|----------|
| Transmitter | | | | | | |
| Center Wavelength Range | λ | nm | 1260 | | 1280 | Upstream |
| Spectral Width -20dB | | nm | | | 1 | |
| Side Mode Suppression Ratio | SMSR | dB | 30 | | | |
| Average Launch Power | P_{AVG} | dBm | 0 | | 6 | |
| OMA Launch Power | P_{OMA} | dBm | -2 | | | |
| Transmitter and Dispersion Penalty 25G BER=5E-5 | TDP | dB | | | 4 | |
| Average Launch Power of OFF Transmitter | P_{OFF} | dBm | | | -30 | |
| Extinction Ratio | ER | dB | 3.5 | | | |
| RIN20 OMA | R_{IN} | dB/Hz | | | -130 | |
| Optical Return Loss Tolerance | | dB | | | 20 | |
| Mask Margin | | % | 5 | | | 1 |

Note 1: Template: {0.31, 0.40, 0.45, 0.34, 0.38, 0.40}, Hit Ratio: 5E-5

| Parameter | Symbol | Unit | Min. | Typ. | Max. | Note |
|--|-----------|------|------|------|------|----------|
| Receiver | | | | | | |
| Center Wavelength | λ | nm | 1320 | 1330 | 1340 | Upstream |
| Overload | | dBm | 2.5 | | | |
| OMA Receiver Sensitivity Up to 25G 5E-5 | POMA | dBm | | | -14 | |
| Assert LOS | LOSA | dBm | -30 | | | |
| De-Assert LOS | LOSD | dBm | | | -17 | |
| LOS Hysteresis | | dB | 0.5 | | | |

VI. Pin Function Definitions



VII. Transceiver Pin Descriptions

| Pin No. | Symbol | Logic | Description |
|---------|------------|---------------------|---|
| 1,17,20 | VeeT | | Connected to signal ground on the host board. |
| 2 | TX Fault | LVTTTL Output | Module transmitter fault output |
| 3 | TX Disable | LVTTTL Input | Module transmitter disable control |
| 4 | SDA | LVTTTL Input/Output | 2-wire serial interface data |
| 5 | SCL | LVTTTL Input/Output | 2-wire serial interface clock |
| 6 | MOD-ABS | | Module absent (connected to Module ground) |
| 7 | RS0 | LVTTTL Input | Rate select 0 (Rx): Low=CDR Bypass; High=CDR Select |

| Pin No. | Symbol | Logic | Description |
|----------|--------|---------------|--|
| 8 | LOS | LVTTTL Output | Receiver loss of signal |
| 9 | RS1 | LVTTTL Input | Rate select 1 (Tx): Low=CDR Bypass; High=CDR Select |
| 10,11,14 | VeeR | | Connected to signal ground on the host board. |
| 12 | RD- | CML Output | Receiver inverted data output, internally AC coupled and terminated. |
| 13 | RD+ | CML Output | Receiver non-inverted data output, internally AC coupled and terminated. |
| 15 | VccR | | Receiver Power 3.3V Supply |
| 16 | VccT | | Transmitter Power 3.3V Supply |
| 18 | TD+ | CML Input | Transmitter non-inverted data input, internally AC coupled and terminated. |
| 19 | TD- | CML Input | Transmitter inverted data Input, internally AC coupled and terminated. |

VIII. Software Control

1. CDR control (Volatile parameter. Reset to default value on boot)

| | Hard:Pin#7 | Soft:A2h, Byte 110d bit 3 | Mode of Operation | Rate | Note |
|------------|------------|------------------------------|-------------------|--|---------|
| RS0 | 0 | 0 | Rx CDR Bypass | Rx: 9.8304Gb/s, 10.1376Gb/s or 10.3125Gb/s | |
| | 0 | 1 | Rx CDR Select | Rx: 24.33024Gb/s or 25.78125Gb/s. Module auto detect data rate and CDR lock accordingly. | Default |
| | 1 | 0 | Rx CDR Select | | |
| | 1 | 1 | Rx CDR Select | | |

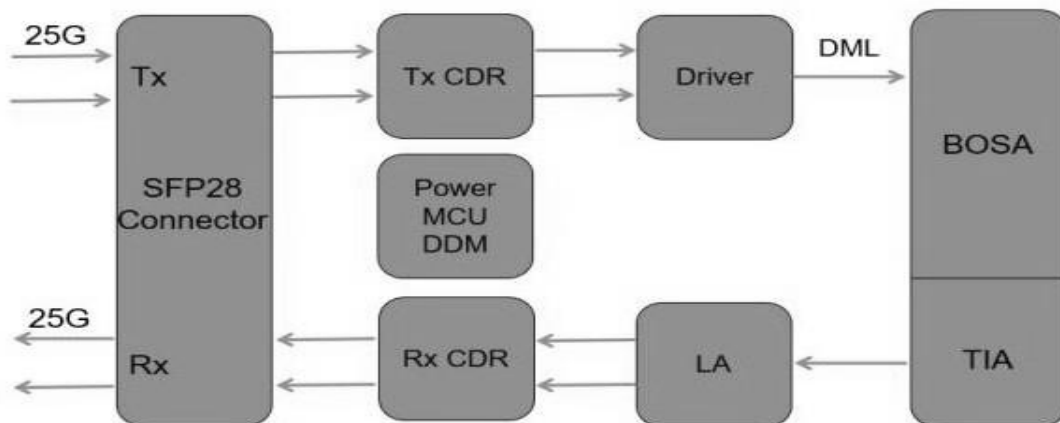
| | Hard: Pin#9 | Soft:A2h, Byte 118d bit 3 | Mode of Operation | Rate | Note |
|------------|-------------|------------------------------|-------------------|--|---------|
| RS1 | 0 | 0 | Tx CDR Bypass | Tx: 9.8304Gb/s, 10.1376Gb/s or 10.3125Gb/s | |
| | 0 | 1 | Tx CDR Select | Tx: 24.33024Gb/s or 25.78125Gb/s. Module auto detect data rate and CDR lock accordingly. | Default |
| | 1 | 0 | Tx CDR Select | | |
| | 1 | 1 | Tx CDR Select | | |

2. Input EQ and Output Emphasis (Volatile parameter. Reset to default value onboot)

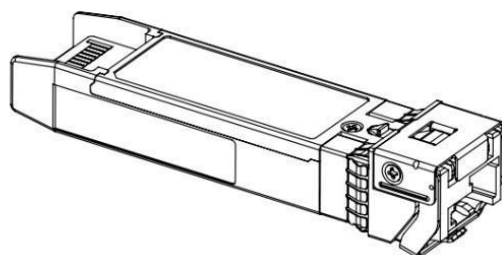
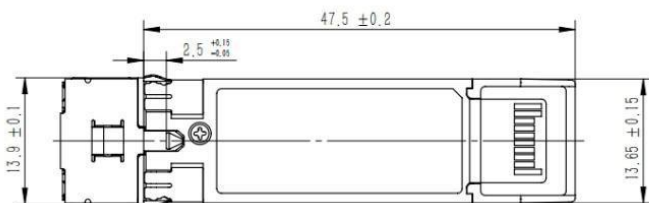
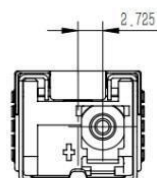
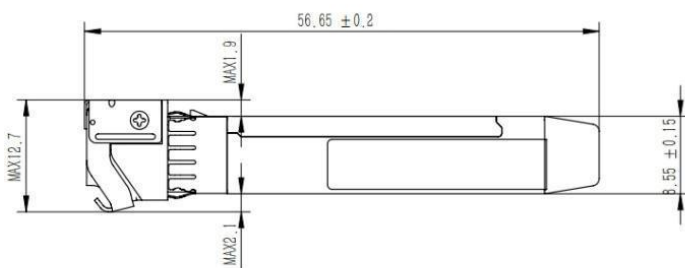
| | | | |
|----------|-----|-------------------------------------|----------------------------------|
| A2H,114d | 7-4 | Tx Input Equalization@Tx CDR Select | Input Equalization Level Control |
| | 3-0 | Tx Input Equalization@Tx CDR Bypass | Input Equalization Level Control |
| A2H,115d | 7-4 | RX Output Emphasis@Rx CDR Select | Output Emphasis Level Control |
| | 3-0 | RX Output Emphasis@Rx CDR Bypass | Output Emphasis Level Control |

| ADDRESS A2H BYTE 114d | | | | ADDRESS A2H BYTE 115d | | | |
|-----------------------|--------------------------------|-------|---------|-----------------------|--------------------------|-------------|---------|
| Code | Transmitter Input Equalization | | | Code | Receiver Output Emphasis | | |
| | Nominal | Units | Note | | Nominal | Units | Note |
| 11xx | Reserved | dB | | | | | |
| 1011 | Reserved | dB | | 1xxx | Vendor Specific | | |
| 1010 | 10 | dB | | 0111 | 7 | dB | |
| 1001 | 9 | dB | | 0110 | 6 | dB | |
| 1000 | 8 | dB | | 0101 | 5 | dB | |
| 0111 | 7 | dB | | 0100 | 4 | dB | |
| 0110 | 6 | dB | | 0011 | 3 | dB | |
| 0101 | 5 | dB | | 0010 | 2 | dB | |
| 0100 | 4 | dB | | 0001 | 1 | dB | Default |
| 0011 | 3 | dB | | 0000 | 0 | No Emphasis | |
| 0010 | 2 | dB | Default | | | | |
| 0001 | 1 | dB | | | | | |
| 0000 | 0 | NO EQ | | | | | |

IX. Principle Diagram



X. Package Outline



Unit: mm
 Unspecified Tolerance: ± 0.1 mm

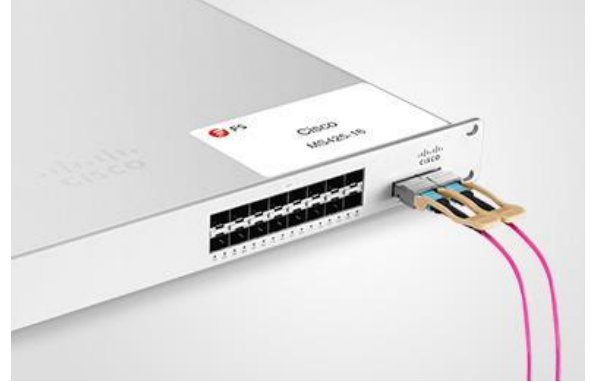
Test Center

I. Compatibility Testing

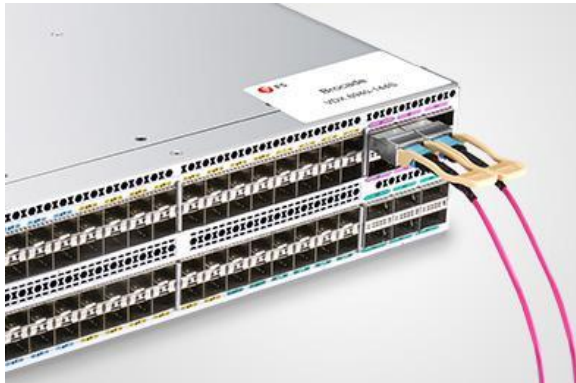
Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force10 S60-44T

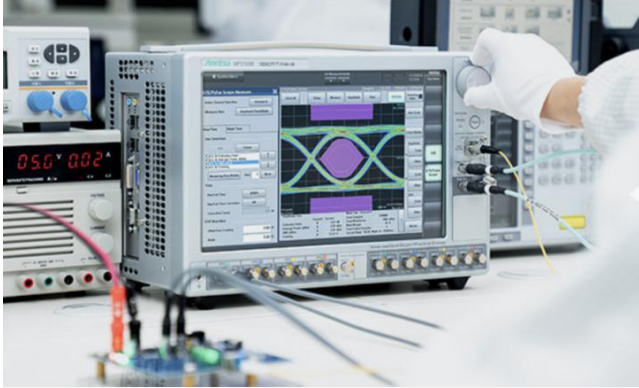


HUAWEI S6720-30L-HI-24S

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

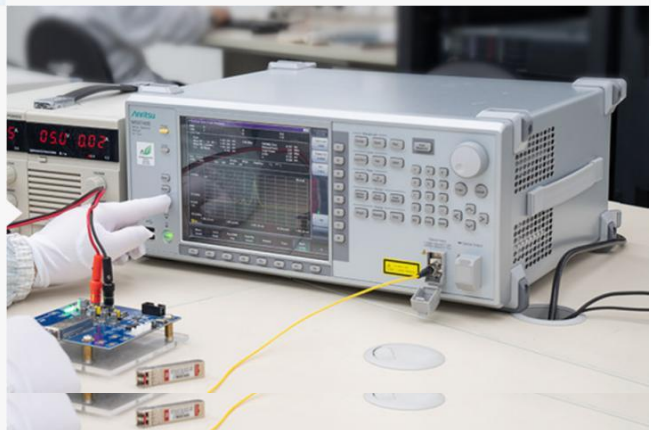
Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

- 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 |
|------------------|---|
| SFP28-25G-BX | 25G SFP28 1270nm-TX/1330nm-RX 10km DOM Transceiver |
| SFP28-25G-BX | 25G SFP28 1330nm-TX/1270nm-RX 10km DOM Transceiver |
| SFP28-25G-BX-I | 25G SFP28 1270nm-TX/1330nm-RX 10km Industrial DOM Transceiver |
| SFP28-25G-BX-I | 25G SFP28 1330nm-TX/1270nm-RX 10km Industrial DOM Transceiver |
| SFP28-25G-BX20 | 25G SFP28 1270nm-TX/1330nm-RX 20km DOM Transceiver |
| SFP28-25G-BX20 | 25G SFP28 1330nm-TX/1270nm-RX 20km DOM Transceiver |
| SFP28-25G-BX20-I | 25G SFP28 1270nm-TX/1330nm-RX 20km Industrial DOM Transceiver |
| SFP28-25G-BX20-I | 25G SFP28 1330nm-TX/1270nm-RX 20km Industrial DOM Transceiver |
| SFP28-25G-BX40 | 25G SFP28 1270nm-TX/1310nm-RX 40km DOM Transceiver |
| SFP28-25G-BX40 | 25G SFP28 1270nm-TX/1310nm-RX 40km DOM Transceiver |
| SFP28-25G-BX40-I | 25G SFP28 1270nm-TX/1310nm-RX 40km Industrial DOM Transceiver |
| SFP28-25G-BX40-I | 25G SFP28 1310nm-TX/1270nm-RX 40km Industrial DOM Transceiver |

Note:

25G SFP28 transceiver module is individually tested on corresponding equipment such as Cisco, Arista, Juniper, Dell, Brocade and other brands, and passes the monitoring of FS.COM intelligent quality control system.



 <https://www.fs.com>



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