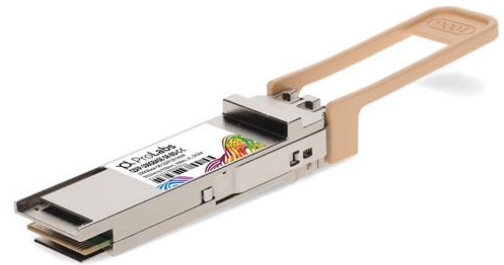


QSFP-100GBASE-SR-BD-C-C

Cisco® Compatible TAA Compliant 100GBase-SR Bidi QSFP28 Transceiver (MMF, 844nm to 918nm, 100m, LC, DOM)

Features:

- QSFP28 MSA compliant
- Supports 100GE aggregate bit rates
- Supports KP4 FEC @ 100G data rate
- Two independent full-duplex channels
- Up to 100m OM4 MMF transmission
- Operating case temperature: 10 to 70 C @ 100G
- Single 3.3V power supply
- Maximum power consumption 4W
- LC optical connector
- RoHS compliant and lead-free



Applications:

- 100GBase Ethernet
- Access and Enterprise

Product Description

This Cisco® QSFP28 transceiver provides 100GBase-SR BX throughput up to 100m over OM4 multi-mode fiber (MMF) using a wavelength of 844nm to 918nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Cisco® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Max. | Unit | Notes |
|-----------------------------|-----------------|------|------|----------------------|-------|
| Maximum Supply Voltage | V _{CC} | -0.5 | 3.6 | V | |
| Storage Temperature | T _S | -40 | 85 | °C | |
| Operating Case Temperature | T _{OP} | 10 | 70 | °C | |
| Operating Relative Humidity | RH | 0 | 85 | % | |
| Damage Threshold | TH _d | 5 | | dBm | |
| Data Rate Accuracy | | -100 | 100 | ppm | |
| Pre-FEC Bit Error Ratio | | | | 2.4x10 ⁻⁴ | |
| Post-FEC Bit Error Ratio | | | | 1x10 ⁻¹² | 1 |
| Link Distance | OM3 | D1 | 70 | m | 2 |
| | OM4 | D2 | 100 | m | 2 |
| | OM5 | D3 | 150 | m | 2 |

Notes:

1. FEC provided by host system.
2. FEC required on host system to support maximum distance.

Electrical Characteristics

| Parameter | Test Point | Min. | Typ. | Max. | Unit | Notes |
|--|------------|-------------------------------------|------|--------------------------------|------|---------|
| Power Supply Voltage | Vcc | 3.135 | 3.3 | 3.465 | V | |
| Control Input Voltage High | | 2 | | Vcc | V | |
| Control Input Voltage Low | | 0 | | 0.8 | V | |
| Power Consumption | | | | 4 | W | |
| Supply Current | Icc | | | 1.21 | A | |
| Transmitter | | | | | | |
| Overload Differential Voltage pk-pk | TP1a | 900 | | | mV | |
| Common Mode Voltage (Vcm) | TP1 | -350 | | 2850 | mV | 1 |
| Differential Termination Resistance Mismatch | TP1 | | | 10 | % | At 1MHz |
| Differential Return Loss (SDD11) | TP1 | | | See CEI-28G-VSR Equation 13-19 | dB | |
| Common Mode to Differential conversion and Differential to Common Mode conversion (SDC11, SCD11) | TP1 | | | See CEI-28G-VSR Equation 13-20 | dB | |
| Stresses Input Test | TP1a | See CEI-28G-VSR Section 13.3.11.2.1 | | | | |
| Receiver | | | | | | |
| Differential Voltage, pk-pk | TP4 | | | 900 | mV | |
| Common Mode Voltage (Vcm) | TP4 | -350 | | 2850 | mV | 1 |
| Common Mode Noise, RMS | TP4 | | | 17.5 | mV | |
| Differential Termination Resistance Mismatch | TP4 | | | 10 | % | At 1MHz |
| Differential Return Loss (SDD22) | TP4 | | | See CEI-28G-VSR Equation 13-19 | dB | |
| Common Mode to Differential conversion and Differential to Common Mode conversion (SDC22, SCD22) | TP4 | | | See CEI-28G-VSR Equation 13-21 | dB | |
| Common Mode Return Loss (SCC22) | TP4 | | | -2 | dB | 2 |
| Transition Time, 20 to 80% | TP4 | 9.5 | | | ps | |
| Vertical Eye Closure (VEC) | TP4 | | | 5.5 | dB | |
| Eye Width at 10 ⁻¹⁵ probability (EW15) | TP4 | 0.57 | | | UI | |
| Eye Height at 10 ⁻¹⁵ probability (EH15) | TP4 | 228 | | | mV | |

Notes:

1. Vcm is generated by the host. Specification includes effects of ground offset voltage.
2. From 250MHz to 30GHz

Optical Characteristics

| Parameter | Symbol | KP4 FEC Mode | | | Unit | Notes |
|---|-----------------------|--------------|------|---|-------|-------|
| | | Min. | Typ. | Max. | | |
| Transmitter | | | | | | |
| Center Wavelength Line0 | λ_C | 844 | | 863 | nm | |
| Center Wavelength Line1 | λ_C | 900 | | 918 | nm | |
| RMS Spectral Width | $\Delta\lambda_{rms}$ | | | $\lambda_1: 0.6$ $\lambda_2: 0.65$ | nm | |
| Average Launch Power, each Lane | P_{AVG} | -6.2 | | 4 | dBm | 1 |
| Optical Modulation Amplitude (OMA), each Lane | P_{OMA} | -4.2 | | 3 | dBm | |
| Launch power in OMA minus TDP, each lane | | -5.6 | | | dBm | |
| TDECQ, each lane | | | | 4.5 | dBm | |
| Extinction Ratio | ER | 3.0 | | | dB | |
| Transmitter transition time, each lane (max) | | | | 31 | ps | |
| RIN12 OMA | | | | -128 | dB/Hz | |
| Optical Return Loss Tolerance | TOL | | | 12 | dB | |
| Average Launch Power OFF Transmitter, each Lane | P_{off} | | | -30 | dBm | |
| Encircled Flux | | | | $\geq 86\%$ at $19\ \mu m$ $\leq 30\%$ at $4.5\ \mu m$ | | 2 |
| Signaling rate, each lane | | | | $26.5625 \pm 100ppm$ | Gbps | |
| Receiver | | | | | | |
| Center Wavelength Lane0 | λ_C | 844 | 850 | 863 | nm | |
| Center Wavelength Lane1 | λ_C | 900 | 910 | 918 | nm | |
| Damage Threshold, each Lane | TH_d | 5 | | | dBm | 3 |
| Average Receive Power, each lane | | -8.2 | | | dBm | 4 |
| Average power at receiver input, each lane (overload) | | | | 4 | dBm | |
| Receiver Reflectance | R_R | | | -12 | dB | |
| Stressed receiver sensitivity in OMA, Lane2 | | | | -3.5 | dBm | 5 |
| Receiver sensitivity (OMA outer), each lane | | | | Max(-6.6, SECQ-8) as per IEEE cl 150 | dBm | |
| LOS Assert | LOSA | -30 | | -14.2 | dBm | |
| LOS Deassert | LOSD | | | -11.2 | dBm | |
| LOS Hysteresis | LOSH | 0.5 | | | dB | |

Notes:

1. Even if the mTDEC < 0.9 db, the OMA (min) must exceed this value.
2. If measured into type A1a.2 50um fiber in accordance with IEC 61280-1-4.
3. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.

4. Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
5. Measured with conformance test signal at TP3 as per the following:

| | | |
|---|-----|-----|
| Stressed eye closure (SECq), each lane | 4.5 | dB |
| OMA of each aggressor, each lane | 3 | dBm |

Pin Descriptions

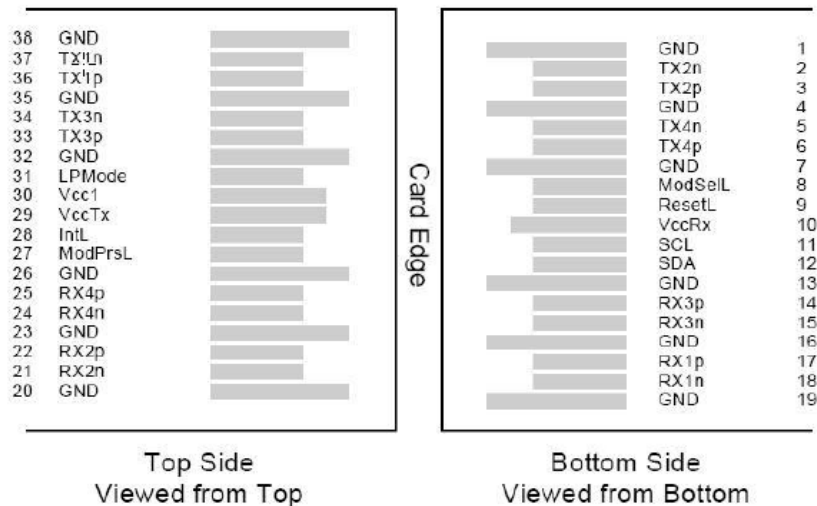
| Pin | Logic | Symbol | Name/Descriptions | Notes |
|-----|-------------|---------|--------------------------------------|-------|
| 1 | | GND | Ground | 1 |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data output | |
| 4 | | GND | Ground | 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data output | |
| 7 | | GND | Ground | 1 |
| 8 | LVTLL-I | ModSelL | Module Select | |
| 9 | LVTLL-I | ResetL | Module Reset | |
| 10 | | VccRx | +3.3V Power Supply Receiver | 2 |
| 11 | LVC MOS-I/O | SCL | 2-Wire Serial Interface Clock | |
| 12 | LVC MOS-I/O | SDA | 2-Wire Serial Interface Data | |
| 13 | | GND | Ground | |
| 14 | CML-O | Rx3p | Receiver Non-Inverted Data Output | |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output | |
| 16 | | GND | Ground | 1 |
| 17 | CML-O | Rx1p | Receiver Non-Inverted Data Output | |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output | |
| 19 | | GND | Ground | 1 |
| 20 | | GND | Ground | 1 |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output | |
| 22 | CML-O | Rx2p | Receiver Non-Inverted Data Output | |
| 23 | | GND | Ground | 1 |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output | 1 |
| 25 | CML-O | Rx4p | Receiver Non-Inverted Data Output | |
| 26 | | GND | Ground | 1 |
| 27 | LVTTL-O | ModPrsL | Module Present | |
| 28 | LVTTL-O | IntL | Interrupt | |

| | | | | |
|----|---------|--------|-------------------------------------|---|
| 29 | | VccTx | +3.3 V Power Supply transmitter | 2 |
| 30 | | Vcc1 | +3.3 V Power Supply | 2 |
| 31 | LVTTL-I | LPMode | Low Power Mode | |
| 32 | | GND | Ground | 1 |
| 33 | CML-I | Tx3p | Transmitter Non-Inverted Data Input | |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Output | |
| 35 | | GND | Ground | 1 |
| 36 | CML-I | Tx1p | Transmitter Non-Inverted Data Input | |
| 37 | CML-I | Tx1n | Transmitter Inverted Data Output | |
| 38 | | GND | Ground | 1 |

Notes:

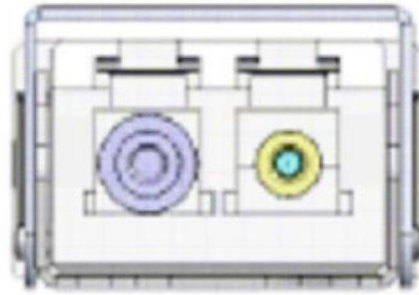
1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. VccRx, Vcc1 and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 4 below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

Electrical Pin-Out Details

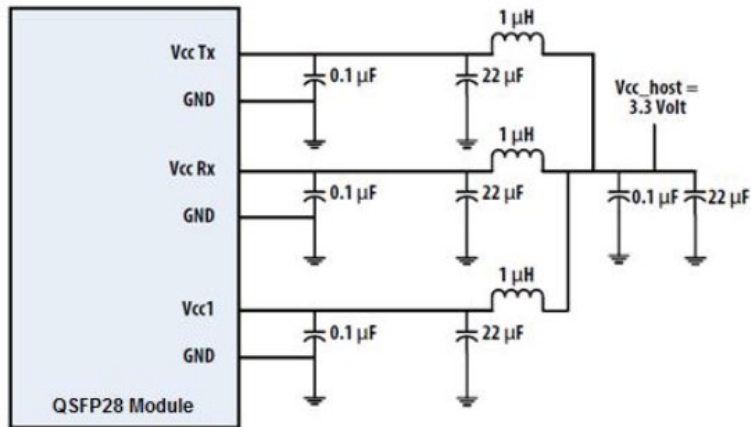


Optical Interface Lanes and Assignments

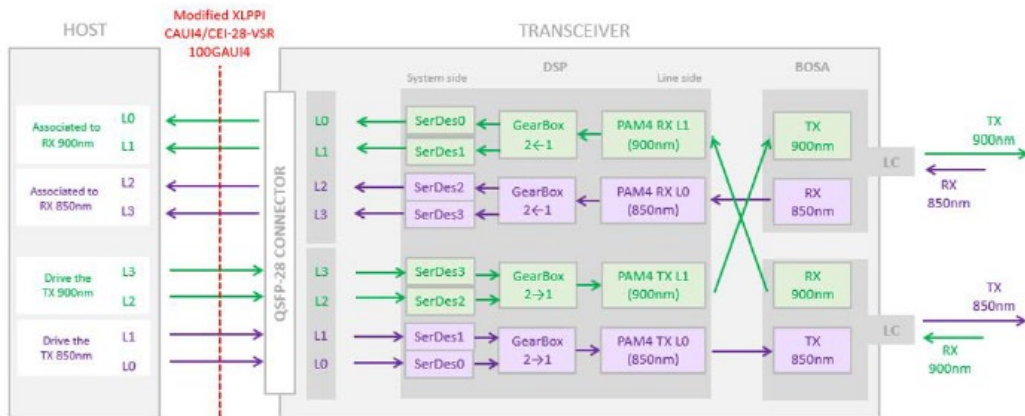
The orientation of the multi-mode fiber facets of the optical connector



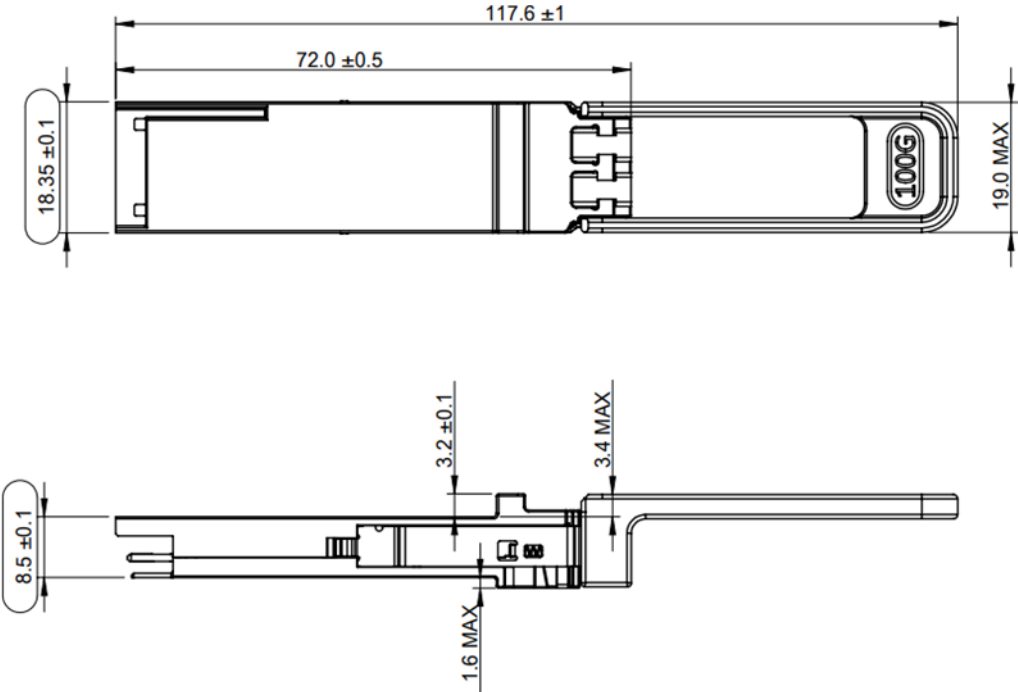
Recommended Power Supply Filter



Transceiver Block Diagram



Mechanical Specifications



About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.

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