

QSFP-100G-LR4-S-4WDM-40-I-C

Cisco® QSFP-100G-LR4-S-4WDM-40-I Compatible TAA 100GBase-4WDM-40 QSFP28 Transceiver (SMF, 1295nm to 1309nm, 40km, LC, DOM, -40 to 85C)

Features:

- QSFP28 MSA compliant
- Supports 103Gbps
- Single 3.3V Power Supply and Power dissipation < 5W
- Up to 40km over SMF with FEC on host
- Operating case temperature: -40C to 85C
- Four 25Gbps Cooled DFB-based LAN-WDM lasers on transmitter side
- APD and TIA array on the receiver side
- 4x25G electrical interface
- Duplex LC receptacles
- I2C interface with integrated Digital Diagnostic Monitoring
- RoHS compliant



Applications:

- 100GBase Ethernet
- Access and Enterprise

Product Description

This Cisco® QSFP-100G-LR4-S-4WDM-40-I compatible QSFP28 transceiver provides 100GBase-4WDM-40 throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1295nm to 1309nm 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's 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 |
|-----------------------------|--------|------|------|------|
| Maximum Supply Voltage | Vcc | -0.5 | 3.6 | V |
| Storage Temperature | TS | -40 | 85 | °C |
| Operating Case Temperature | Tc | -40 | 85 | °C |
| Operating Relative Humidity | RH | 5 | 85 | % |

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|--------|--------------------------|------|-------|-------|-------|
| Power Supply Voltage | Vcc | 3.135 | 3.3 | 3.465 | V | |
| Power Dissipation | PD | | | 5 | W | |
| Transmitter | | | | | | |
| Differential data input swing per lane | | | | 900 | mVp-p | |
| Input Impedance (Differential) | Zin | | | 10 | % | |
| Stressed Input Parameters | | | | | | |
| Eye width | | 0.46 | | | UI | |
| Applied pk-pk sinusoidal jitter | | IEEE 802.3bm Table 88-13 | | | | |
| Eye height | | 95 | | | mv | |
| DC common mode voltage | | -350 | | 2850 | mv | |
| Receiver | | | | | | |
| Differential output amplitude | | 200 | | 900 | mVp-p | |
| Output Impedance (Differential) | Zout | | | 10 | % | |
| Eye width | | 0.57 | | | UI | |
| Eye height differential | | 228 | | | mv | |
| Vertical eye closure | | | | 5.5 | dB | |

Optical Characteristics

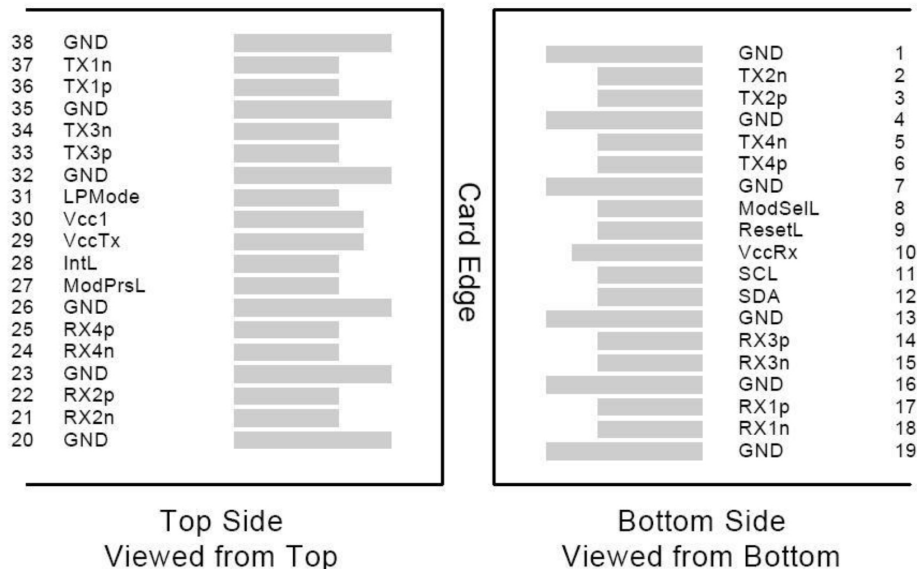
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|---------------------|------------------------------------|---------|---------|------|-------|
| Transmitter | | | | | | |
| Signaling Speed per Lane | BRAVE | | 25.78 | | Gbps | |
| Data Rate Variation | | -100 | | +100 | ppm | |
| Lane_0 Center Wavelength | λ_{C0} | 1294.53 | 1295.56 | 1296.59 | nm | |
| Lane_1 Center Wavelength | λ_{C1} | 1299.02 | 1300.05 | 1301.09 | nm | |
| Lane_2 Center Wavelength | λ_{C2} | 1303.54 | 1304.58 | 1305.63 | nm | |
| Lane_3 Center Wavelength | λ_{C3} | 1308.09 | 1309.14 | 1310.19 | nm | |
| Total Average Launch Power | PT | | | 12.5 | dBm | |
| Average Launch Power per Lane | Peach | -2.5 | | 6.5 | dBm | 1 |
| Optical Modulation Amplitude (OMA) each Lane (max) | OMAm _{ax} | | | 6.5 | dBm | |
| Optical Modulation Amplitude (OMA), each lane (min) | OMAm _{in} | 0.5 | | | dBm | 2 |
| Launch power in OMA minus TDP, each lane (min) | OMA-TDP | -0.5 | | | dBm | |
| Average launch Power of OFF Transmitter per Lane | | | | -30 | dBm | |
| Side-mode suppression ratio | SMSR _{min} | 30 | | | dB | |
| Difference in Launch Power Between Any Two Lanes (OMA) | | | | 4 | dB | |
| Optical Return Loss Tolerance | | 20 | | | dB | |
| Transmitter Reflectance | | | | -26 | dB | 3 |
| Extinction Ratio | ER | 4.5 | | | dB | 4 |
| Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3} | | {0.25, 0.4, 0.45, 0.25, 0.28, 0.4} | | | | 4 |
| Receiver | | | | | | |
| Signaling Speed per Lane | BRAVE | | 25.78 | | Gbps | |
| Data Rate Variation | | -100 | | +100 | ppm | |
| Receiver Overload per Lane | Psat | -3 | | | dBm | |
| Lane_0 Center Wavelength | λ_{C0} | 1294.53 | 1295.56 | 1296.59 | nm | |
| Lane_1 Center Wavelength | λ_{C1} | 1299.02 | 1300.05 | 1301.09 | nm | |
| Lane_2 Center Wavelength | λ_{C2} | 1303.54 | 1304.58 | 1305.63 | nm | |
| Lane_3 Center Wavelength | λ_{C3} | 1308.09 | 1309.14 | 1310.19 | nm | |
| Average Receive Power per Lane | Rxpow | -20.5 | | -3.5 | dBm | 5 |
| Damage threshold per lane (min) | Pdamage | | | -2.5 | dBm | 6 |
| Receive Sensitivity in (OMA) per Lane | Rxsens | | | -18.5 | dBm | 7 |
| Stressed Receiver Sensitivity (OMA) per Lane | RXSRS | | | -16 | dBm | 8 |
| Optical Return Loss | ORL | | | -26 | dB | |
| LOS Assert | LOSA | -30 | | | dBm | |

| | | | | | | |
|--|------|-----|-----------------------------------|-----|-----|---|
| LOS De-Assert | LOSD | | | -21 | dBm | |
| LOS Hysteresis | | 0.5 | | | dB | |
| Conditions of Receiver Sensitivity Test | | | | | | |
| Vertical Eye Closure Penalty per lane | | | 2.5 | | dB | 9 |
| Stressed Eye J2 Jitter per lane | | | 0.33 | | UI | 9 |
| Stressed Eye J4 Jitter per lane | | | 0.48 | | UI | 9 |
| SRS eye mask definition {X1, X2, X3, Y1, Y2, Y3} | | | {0.39, 0.5, 0.5, 0.39, 0.39, 0.4} | | | 9 |

Notes:

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Even if the TDP < 1.0dB, the OMA (min) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.
4. Eye mask hit ratio is 5E-5.
5. 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.
6. The receiver shall be able to tolerate, without damage, continuous exposure to an optical signal having this average power level.
7. Receiver sensitivity (OMA), each lane (max) at 5E-5 BER is a normative specification.
8. Measured with conformance test signal at TP3 for BER = 5*10⁻⁵.
9. Vertical eye closure penalty, stressed eye J2 Jitter, stressed eye J4 Jitter, and SRS eye mask definition are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Electrical Pin-out Details



Pin Descriptions

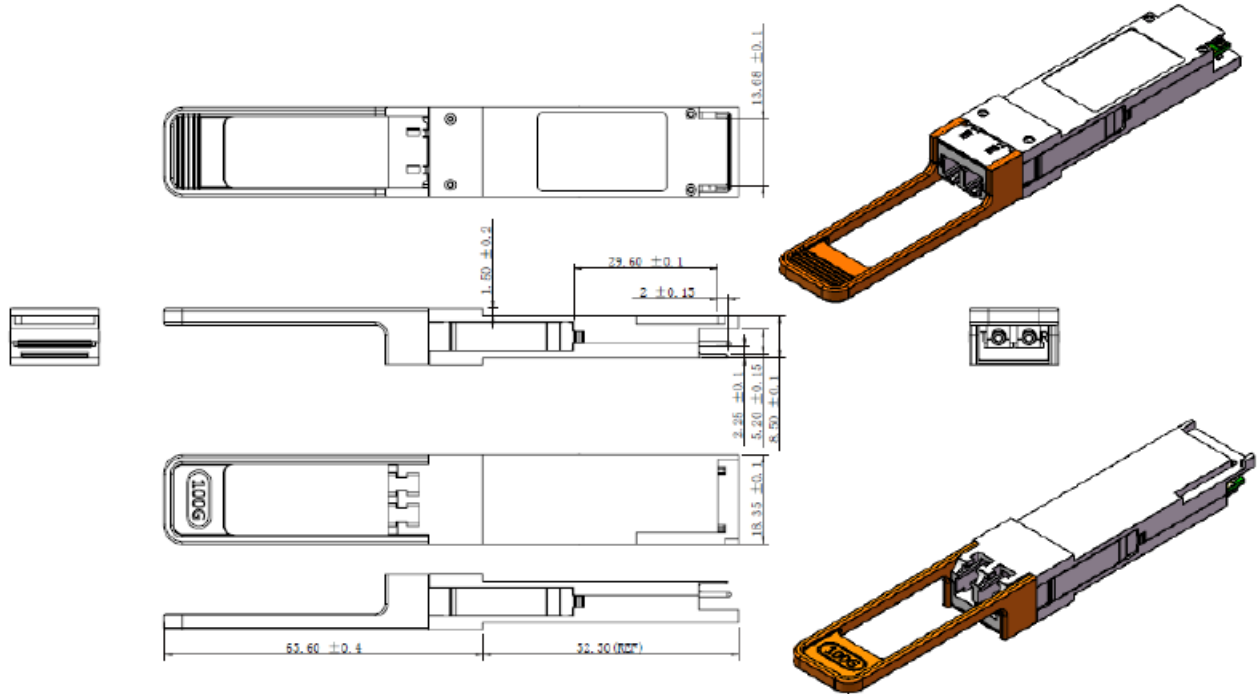
| Pin | Logic | Symbol | Name/Descriptions | Plug Sequence | Ref. |
|-----|-------------|---------|--------------------------------------|---------------|------|
| 1 | | GND | Ground | 1 | 1 |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | 3 | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data Input | 3 | |
| 4 | | GND | Ground | 1 | 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | 3 | |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data output | 3 | |
| 7 | | GND | Ground | 1 | 1 |
| 8 | LVTTTL-I | ModSelL | Module Select | 3 | |
| 9 | LVTTTL-I | ResetL | Module Reset | 3 | |
| 10 | | VccRx | +3.3V Power Supply Receiver | 2 | 2 |
| 11 | LVCMOS- I/O | SCL | 2-Wire Serial Interface Clock | 3 | |
| 12 | LVCMOS- I/O | SDA | 2-Wire Serial Interface Data | 3 | |
| 13 | | GND | Ground | 1 | 1 |
| 14 | CML-O | Rx3p | Receiver Non-Inverted Data Output | 3 | |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output | 3 | |
| 16 | | GND | Ground | 1 | 1 |
| 17 | CML-O | Rx1p | Receiver Non-Inverted Data Output | 3 | |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output | 3 | |
| 19 | | GND | Ground | 1 | 1 |
| 20 | | GND | Ground | 1 | 1 |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output | 3 | |
| 22 | CML-O | Rx2p | Receiver Non-Inverted Data Output | 3 | |
| 23 | | GND | Ground | 1 | 1 |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output | 3 | |
| 25 | CML-O | Rx4p | Receiver Non-Inverted Data Output | 3 | |
| 26 | | GND | Ground | 1 | 1 |
| 27 | LVTTTL-O | ModPrsL | Module Present | 3 | |
| 28 | LVTTTL-O | IntL | Interrupt | 3 | |
| 29 | | VccTx | +3.3V Power Supply Transmitter | 2 | 2 |
| 30 | | Vccl | +3.3V Power Supply | 2 | 2 |
| 31 | LVTTTL-I | LPMode | Low Power Mode | 3 | |
| 32 | | GND | Ground | 1 | 1 |
| 33 | CML-I | Tx3p | Transmitter Non-Inverted Data Input | 3 | |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Input | 3 | |
| 35 | | GND | Ground | 1 | 1 |

| | | | | | |
|----|-------|------|-------------------------------------|---|---|
| 36 | CML-I | Tx1p | Transmitter Non-Inverted Data Input | 3 | |
| 37 | CML-I | Tx1n | Transmitter Inverted Data Input | 3 | |
| 38 | | GND | Ground | 1 | 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. Vcc Rx Vcc1 and Vcc Tx may be internally connected within the QSFP28 Module in any combination. The connector pins are each rated for a maximum current of 1000mA.

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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