

160-9402-900-4WDM-20-I-PRO

Ciena® 160-9402-900-4WDM-20-I Compatible TAA Compliant 100GBase-4WDM-20 QSFP28 Transceiver (SMF, 1295nm to 1309nm, 20km, -40 to 85C, LC)

Features

- QSFP28 MSA compliant
- Single 3.3V Power Supply and Power dissipation < 4.8W
- Supports 103Gbps
- Operating case temperature: -40C to 85C
- Four 25Gbps DFB-based LAN-WDM transmitter
- Up to 20km over SMF
- 4x25G electrical interface
- PIN and TIA array on the receiver side
- I2C interface with integrated Digital Diagnostic Monitoring
- Duplex LC receptacles
- RoHS compliant



Applications:

- 100GBase Ethernet
- Access and Enterprise

Product Description

This Ciena® 160-9402-900-4WDM-20-I compatible QSFP28 transceiver provides 100GBase-4WDM-20 throughput up to 20km 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 Ciena® 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.

Proline'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.



Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|-------------------------------------|--------|------|---------|------|------|
| Maximum Supply Voltage | Vcc | -0.5 | | 3.6 | V |
| Storage Temperature | TS | -40 | | +85 | °C |
| Operating Case Temperature | Tc | -40 | 25 | 85 | °C |
| Operating Relative Humidity | RH | 5 | | 85 | % |
| Receiver Damage Threshold, per Lane | Rxdmg | 5.5 | | | dBm |

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|--------|--------------------------|------|-------|-------|---------|
| Power Supply Voltage | Vcc | 3.135 | 3.3 | 3.465 | V | |
| Power Dissipation | PD | | | 4.8 | 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 | % | |
| Output Rise/Fall Time | tr/tf | 12 | | | ps | 20%~80% |
| Eye width | | 0.57 | | | UI | |
| Eye height differential | | 228 | | | mv | |
| Vertical eye closure | | | | 5.5 | dB | |

Optical Characteristics

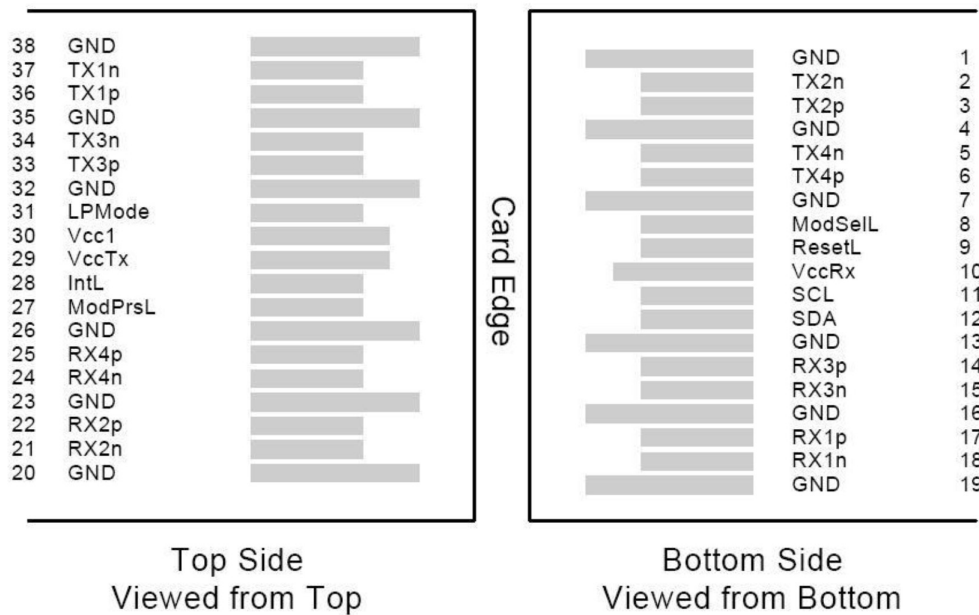
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|----------------|------------------------------------|---------|---------|-------|-------|
| Transmitter | | | | | | |
| Signaling Speed per Lane | BRAVE | | 25.78 | | Gbps | |
| Data Rate Variation | | -100 | | +100 | ppm | |
| Lane_0 Center 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 Output Power | Po | | | 10.5 | dBm | |
| Average Launch Power per Lane | Peach | -4.3 | | 4.5 | dBm | 1 |
| Optical Modulation Amplitude (OMA) each Lane | TxOMA | -1.3 | | 4.5 | dBm | |
| Difference in launch power between any two lanes (OMA) | | | | 5 | dBm | |
| Launch power in OMA minus TDP, each lane | | -2.3 | | | dBm | |
| Transmitter and dispersion penalty (TDP), each lane | | | | 2.8 | dB | |
| Extinction Ratio | ER | 4 | | | dB | |
| Side-mode suppression ratio | SMSRmin | 30 | | | dB | |
| Average launch power of OFF transmitter per lane | | | | -30 | dBm | |
| Relative Intensity Noise | RIN | | | -130 | dB/hz | |
| Transmitter Reflectance | | | | -26 | dB | |
| Optical Return Loss Tolerance | | | | 20 | dB | |
| Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3} | | {0.25, 0.4, 0.45, 0.25, 0.28, 0.4} | | | | 2 |
| Receiver | | | | | | |
| Signaling Speed per Lane | BRAVE | | 25.78 | | Gbps | |
| Data Rate Variation | | -100 | | +100 | ppm | |
| Damage threshold per Lane | Rxdmg | 5.5 | | | 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 | -14.5 | | 4.5 | dBm | 3 |
| Receive Power (OMA) per Lane | RxOMA | | | 4.5 | dBm | |
| Receive Sensitivity in OMA per Lane | Rxsens | | | -12.5 | dBm | |
| Stressed Receiver Sensitivity (OMA) per Lane | RXSRS | | | -10 | dBm | 4 |
| Optical Return Loss | ORL | | | -26 | dB | |
| LOS Assert | LOSA | -25 | | | dBm | |

| | | | | | | |
|--|------|-----|------|-----|-----|---|
| LOS De-Assert | LOSD | | | -15 | dBm | |
| LOS Hysteresis | | 0.5 | | | dB | |
| Conditions of Receiver Sensitivity Test | | | | | | |
| Vertical Eye Closure Penalty | VECP | | 2.5 | | dB | 5 |
| Stressed Eye J2 Jitter | J2 | | 0.33 | | UI | 5 |
| Stressed Eye J9 Jitter | J9 | | 0.48 | | UI | 5 |

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. Hit ratio 5×10^{-5} .
3. 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.
4. Measured with conformance test signal at TP3 for BER = 10–12.
5. Vertical eye closure penalty, stressed eye J2 Jitter, and stressed eye J9 Jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Electrical Pin-out Details



Pin Descriptions

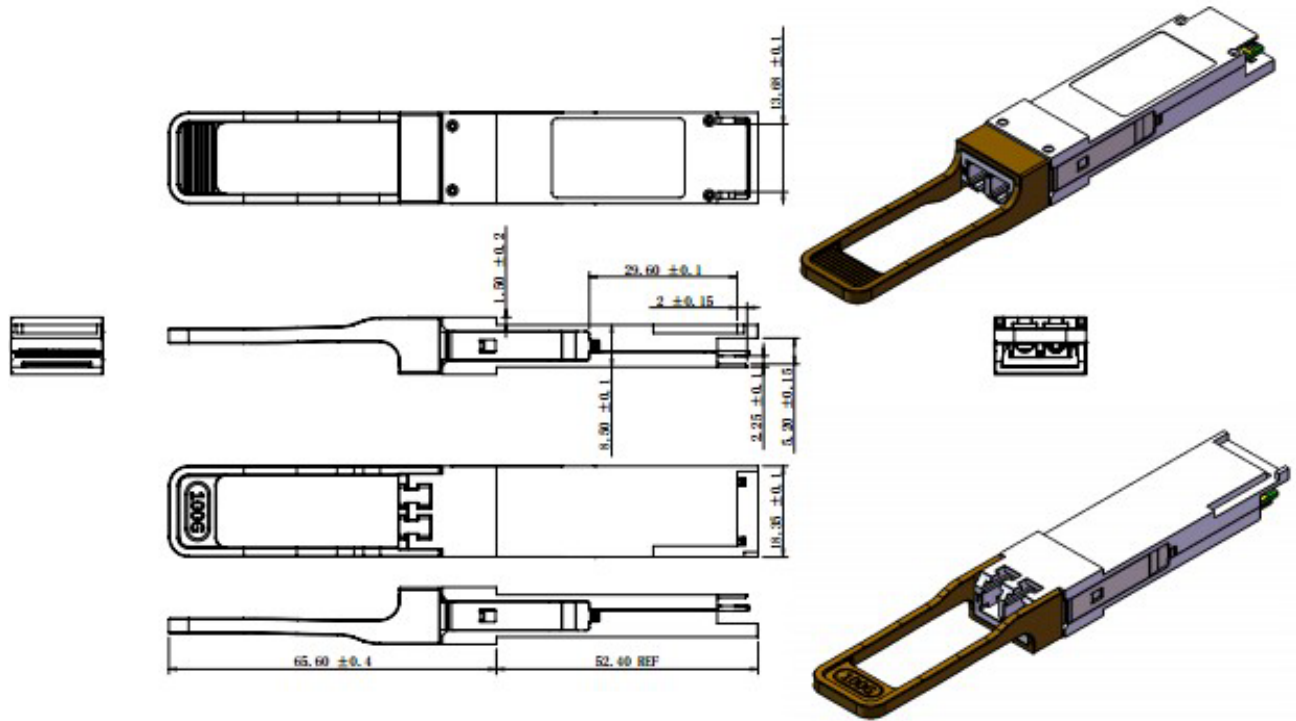
| Pin | Logic | Symbol | Name/Descriptions | Plug Sequence | Ref. |
|-----|-------------|---------|--------------------------------------|---------------|------|
| 1 | | GND | Ground | 1 | 1 |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | 3 | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data output | 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. Requirements defined for the host side of the Host Edge Card Connector are listed in Table 6. Recommended host board power supply filtering is shown in Figures 3 and 4. 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 500Ma.

Mechanical Specifications



About Us:

Proline Options is one of North America's leading providers of transceivers and high speed cabling. With a reputation for quality, tested products that cover the connectivity spectrum, Proline Options has a solution for you regardless of the specification.

At Proline Options, every product is tested in its intended application - never batch or spec tested only. We run bandwidth, distance and IOS network tests. We have documented an impressive 0.03% failure rate over the last 10 years. To continue this rate of success we invest millions annually in our own on-site testing lab.



Tel: 855.933.3223

Email: sales@prolineoptions.com

Email: techsupport@prolineoptions.com

Web: <https://www.prolineoptions.com>