

QDD-400G-ZR-C

Juniper Networks® QDD-400G-ZR-S Compatible TAA 400GBase-ZR QSFP-DD Transceiver (SMF, Coherent, LC, DOM, ZR)

Features:

- Hot pluggable QSFP-DD footprint (Type 2A)
- Supports 425Gbps Data Rate
- 8x 26.5625GBd PAM4 Serial Electrical Interface (400GAUI-8, RS (544/514) FEC)
- Duplex LC connector
- Tunable C-band Transmitter
- Coherent Receivers
- C-FEC (15%) with 10.7dB Net Coding Gain
- Up to 120km Point-to-Point Transmission on Single Mode Fibre
- Operating case temperature: -5C to 80C
- Power Dissipation < 18.3W
- Single +3.3V Power Supply
- RoHS Compliant



Applications:

- 400GBase Ethernet
- Access and Enterprise

Product Description

This Juniper Networks® QDD-400G-ZR compatible QSFP-DD transceiver provides 400GBase-ZR throughput up to N/A over single-mode fiber (SMF) using a wavelength of 1528.77nm to 1567.13nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Juniper Networks® 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."



Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|------------------------------------|--------|-------|----------|-------|------|-------|
| Power Supply Voltage | VCC | 3.135 | 3.3 | 3.465 | V | |
| Storage Temperature | Ts | -40 | | 85 | °C | |
| Case Operating Temperature | Top | -5 | | 80 | °C | |
| Relative Humidity (non-condensing) | RH | | | 85 | % | |
| Optical Receiver Overload | | | | 1 | dBm | 1 |
| Supported Host Signal Types | | | 425 | | Gbps | 2 |
| Line Baud Rate | | | 59.84375 | | GBd | 3 |

Notes:

1. The optical input to the receiver should not exceed this value. Transmitters must never be directly connected to receivers before ensuring that proper optical attenuation is used
2. As per IEEE 802.3bs-2017
3. 400G DP-16QAM, C-FEC

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------|--------|-------|------|-------|------|-------|
| Power Supply Voltage | Vcc | 3.135 | 3.3 | 3.465 | V | |
| Power Supply Current | Icc | | | 6 | A | |
| Power Consumption | PD | | 15.8 | 18.3 | W | |
| Power Consumption | PD | | | 1.5 | W | 1 |

Notes:

1. Low power mode

Optical Characteristics

| Parameter | Symbol | Minimum | Typical | Maximum | Unit | Notes |
|-------------------------------------|-----------------|------------------|-------------|------------------|----------|-------|
| Transmitter | | | | | | |
| Average Output Power | P _o | -10 | -8.5 | -6 | dBm | 1, 2 |
| Laser Linewidth | | | | 300 | kHz | |
| Transmitter VOA Dynamic Range | | 10 | | | dB | 3 |
| Output Power Stability | | -1 | | 1 | dB | |
| In-Band OSNR | | 40 | | | dB/0.1nm | |
| Out-of-Band OSNR | | 35 | | | dB/0.1nm | |
| Frequency Range | | 191.275 | | 196.125 | THz | 4 |
| Centre Frequency | | $\nu_T - 1.5$ | ν_T | $\nu_T + 1.5$ | GHz | 5 |
| Channel Spacing | | 6.25 | | | GHz | |
| Centre Wavelength Range | $T\lambda$ | 1528.58 | | 1567.34 | nm | |
| Centre Wavelength | $T\lambda$ | $\lambda_T - 15$ | λ_T | $\lambda_T + 15$ | pm | |
| Receiver | | | | | | |
| Receiver Operating Wavelength | $R\lambda$ | 1528.58 | | 1567.34 | nm | |
| Receiver Sensitivity | S | | | -20 | dBm | 6 |
| Receiver Overload | P _{OL} | 1 | | | dBm | 7 |
| Receiver Input Power Range | | -12 | | 1 | dBm | 8 |
| Extended Receiver Input Power Range | | -15 | | 1 | dBm | 9 |
| Acquisition Range | | -3.6 | | 3.6 | GHz | 10 |
| Upstream Tx Linewidth | | | | 500 | kHz | |
| OSNR Tolerance | | | 24 | 26 | dB | 11 |
| Crosstalk Tolerance | | | | 7 | dB | 12 |
| Chromatic Dispersion Tolerance | | | | 2400 | ps/nm | 13 |

Notes:

1. Output power coupled into a 9/125 μm single mode fibre
2. The output power is settable in steps of 0.1 dB within the specified wavelength range
3. With Tx VOA attenuation set to minimum
4. Per ITU-T G.694.1 DWDM grid definition
5. Applies also to LO
6. Minimum input power needed to achieve post-FEC BER $\leq 10^{-15}$, 400G DP-16QAM, OSNR > 35dB
7. The optical input to the receiver should not exceed this value. Transmitters must never be directly connected to receivers before ensuring that proper optical attenuation is used
8. An input power in this range guarantees optimum OSNR performance
9. With ≤ 1 dB OSNR tolerance degradation
10. Frequency offset between received carrier and LO
11. At optimum input power range

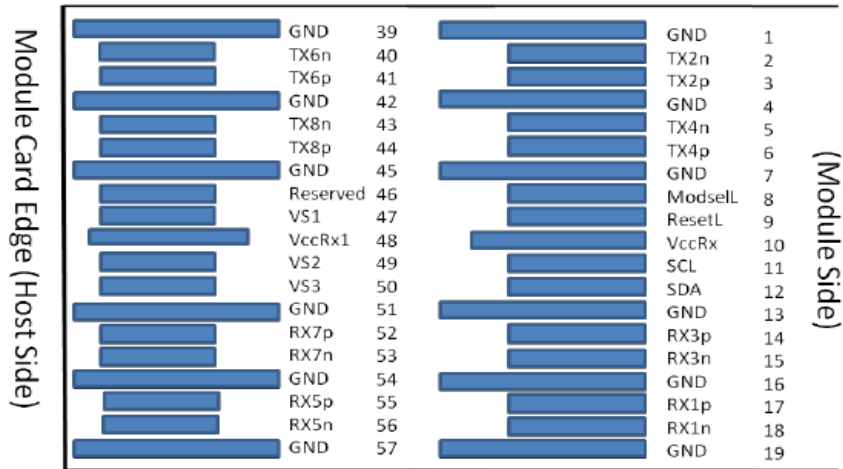
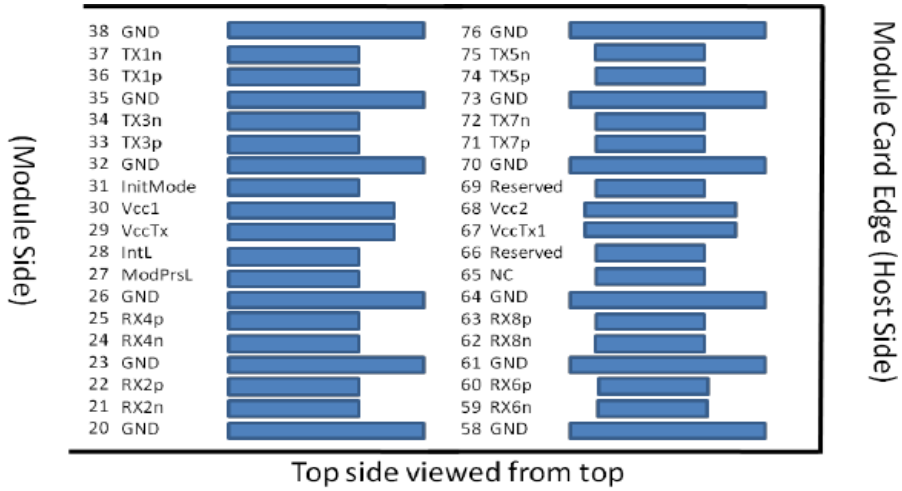
12. Ratio of accumulated crosstalk channels to signal power
13. Less than 0.5dB receiver sensitivity penalty compared to OSNR>35dB

Pin Descriptions

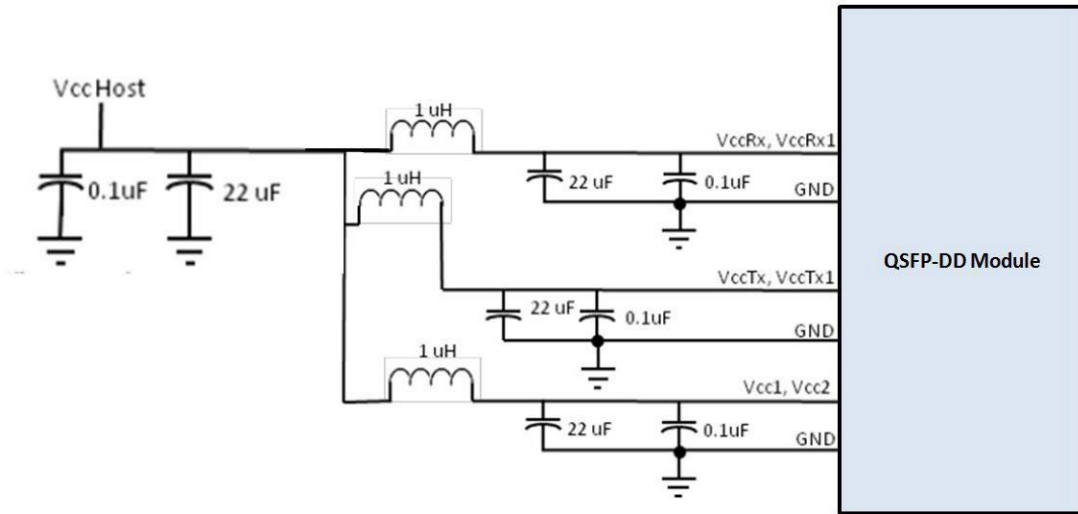
| Pin | Logic | Symbol | Name/Descriptions | Plug Sequence |
|-----|-------------|----------|---|---------------|
| 1 | | GND | Ground | 1B |
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | 3B |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data Input | 3B |
| 4 | | GND | Ground | 1B |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | 3B |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data Input | 3B |
| 7 | | GND | Ground | 1B |
| 8 | LVTTTL-I | ModSelL | Module Select | 3B |
| 9 | LVTTTL-I | ResetL | Module Reset | 3B |
| 10 | | VccRx | +3.3V Power Supply Receiver | 2B |
| 11 | LVC MOS-I/O | SCL | 2-wire serial interface clock | 3B |
| 12 | LVC MOS-I/O | SDA | 2-wire serial interface data | 3B |
| 13 | | GND | Ground | 1B |
| 14 | CML-O | Rx3p | Receiver Non-Inverted Data Output | 3B |
| 15 | CML-O | Rx3n | Receiver Inverted Data Output | 3B |
| 16 | | GND | Ground | 1B |
| 17 | CML-O | Rx1p | Receiver Non-Inverted Data Output | 3B |
| 18 | CML-O | Rx1n | Receiver Inverted Data Output | 3B |
| 19 | | GND | Ground | 1B |
| 20 | | GND | Ground | 1B |
| 21 | CML-O | Rx2n | Receiver Inverted Data Output | 3B |
| 22 | CML-O | Rx2p | Receiver Non-Inverted Data Output | 3B |
| 23 | | GND | Ground | 1B |
| 24 | CML-O | Rx4n | Receiver Inverted Data Output | 3B |
| 25 | CML-O | Rx4p | Receiver Non-Inverted Data Output | 3B |
| 26 | | GND | Ground | 1B |
| 27 | LVTTTL-O | ModPrsL | Module Present | 3B |
| 28 | LVTTTL-O | IntL | Interrupt | 3B |
| 29 | | VccTx | +3.3V Power supply transmitter | 2B |
| 30 | | Vcc1 | +3.3V Power supply | 2B |
| 31 | LVTTTL-I | InitMode | Initialization mode; In legacy QSFP applications, the InitMode pad is called LPMODE | 3B |
| 32 | | GND | Ground | 1B |
| 33 | CML-I | Tx3p | Transmitter Non-Inverted Data Input | 3B |
| 34 | CML-I | Tx3n | Transmitter Inverted Data Input | 3B |
| 35 | | GND | Ground | 1B |
| 36 | CML-I | Tx1p | Transmitter Non-Inverted Data Input | 3B |

| | | | | |
|----|-------|----------|-------------------------------------|----|
| 37 | CML-I | Tx1n | Transmitter Inverted Data Input | 3B |
| 38 | | GND | Ground | 1B |
| 39 | | GND | Ground | 1A |
| 40 | CML-I | Tx6n | Transmitter Inverted Data Input | 3A |
| 41 | CML-I | Tx6p | Transmitter Non-Inverted Data Input | 3A |
| 42 | | GND | Ground | 1A |
| 43 | CML-I | Tx8n | Transmitter Inverted Data Input | 3A |
| 44 | CML-I | Tx8p | Transmitter Non-Inverted Data Input | 3A |
| 45 | | GND | Ground | 1A |
| 46 | | Reserved | For future use | 3A |
| 47 | | VS1 | Module Vendor Specific 1 | 3A |
| 48 | | VccRx1 | 3.3V Power Supply | 2A |
| 49 | | VS2 | Module Vendor Specific 2 | 3A |
| 50 | | VS3 | Module Vendor Specific 3 | 3A |
| 51 | | GND | Ground | 1A |
| 52 | CML-O | Rx7p | Receiver Non-Inverted Data Output | 3A |
| 53 | CML-O | Rx7n | Receiver Inverted Data Output | 3A |
| 54 | | GND | Ground | 1A |
| 55 | CML-O | Rx5p | Receiver Non-Inverted Data Output | 3A |
| 56 | CML-O | Rx5n | Receiver Inverted Data Output | 3A |
| 57 | | GND | Ground | 1A |
| 58 | | GND | Ground | 1A |
| 59 | CML-O | Rx6n | Receiver Inverted Data Output | 3A |
| 60 | CML-O | Rx6p | Receiver Non-Inverted Data Output | 3A |
| 61 | | GND | Ground | 1A |
| 62 | CML-O | Rx8n | Receiver Inverted Data Output | 3A |
| 63 | CML-O | Rx8p | Receiver Non-Inverted Data Output | 3A |
| 67 | | GND | Ground | 1A |
| 68 | | NC | No Connect | 3A |
| 69 | | Reserved | For future use | 3A |
| 70 | | VccTx1 | 3.3V Power Supply | 2A |
| 71 | | Vcc2 | 3.3V Power Supply | 2A |
| 72 | | Reserved | For Future Use | 3A |
| 73 | | GND | Ground | 1A |
| 74 | CML-I | Tx7p | Transmitter Non-Inverted Data Input | 3A |
| 75 | CML-I | Tx7n | Transmitter Inverted Data Input | 3A |
| 76 | | GND | Ground | 1A |

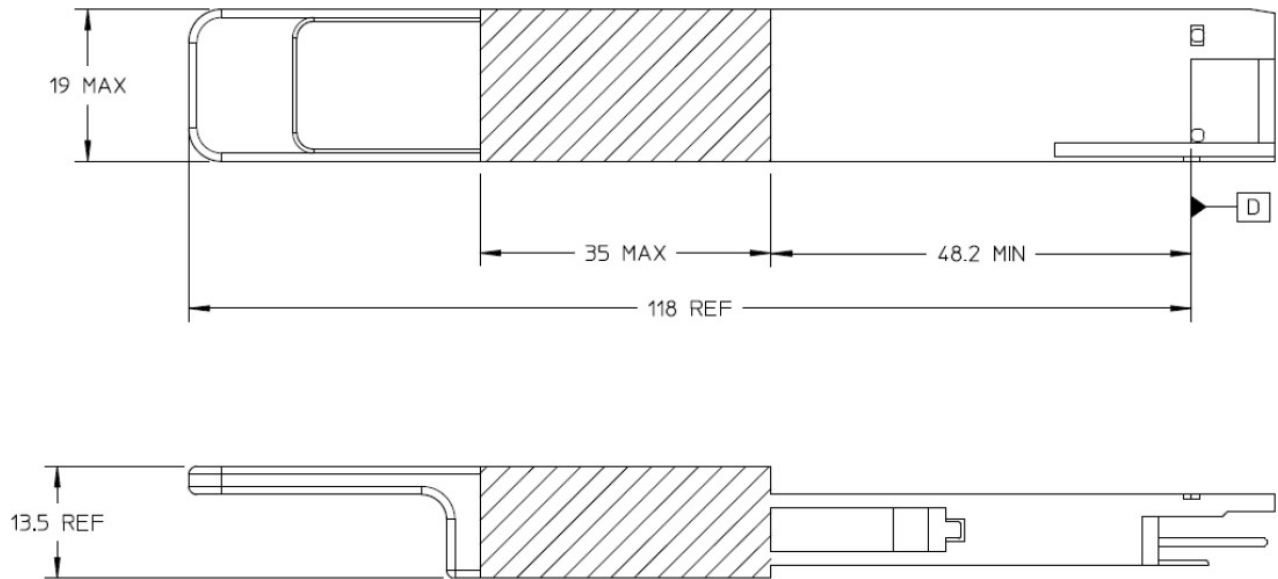
Electrical Pad Layout



Recommended Power Supply Filter



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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