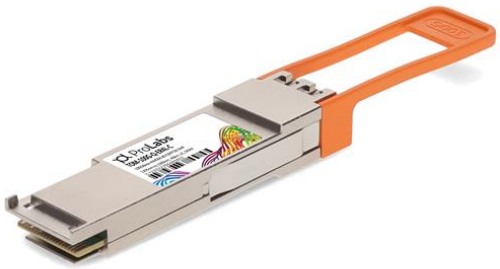
**TOM-100G-Q-ER4L-C**

Infinera® TOM-100G-Q-ER4L Compatible TAA 100GBase-4WDM-40 QSFP28 Transceiver (SMF, 1295nm to 1309nm, 40km w/FEC, LC, DOM)

**Features:**

- QSFP28 MSA compliant
- Supports 103Gbps
- Single 3.3V Power Supply and Power dissipation < 4.8W
- Up to 40km over SMF with FEC on host
- Operating case temperature: 0 to 70C
- Four 25Gbps DFB-based LAN-WDM transmitter
- PIN and TIA array on the receiver side
- 4x25G electrical interface
- Duplex LC receptacles
- I2C interface with integrated Digital Diagnostic Monitoring
- RoHS Compliant and Lead Free



**Applications:**

- 100GBase Ethernet
- Access and Enterprise

**Product Description**

This Infinera® 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 can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Infinera®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows 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.")

TAA COMPLIANT

**Rev. 020426**

## Absolute Maximum Ratings

| Parameter | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| **Maximum Supply Voltage** | Vcc | -0.5 | 3.6 | V |
| **Storage Temperature** | TS | -40 | +85 | ℃ |
| **Operating Case Temperature** | Tc | 0 | 70 | ℃ |
| **Operating Humidity** | RH | 5 | 85 | % |

## Electrical Characteristics

| Parameter | Test Point | 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 | $mv_{p-p}$ | |
| **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 | $mv_{p-p}$ | |
| **Output Impedance (Differential)** | Zout | | | 10 | % | |
| **Eye width** | | 0.57 | | | UI | |
| **Eye height differential** | | 228 | | | mv | |
| **Vertical eye closure** | | | | 5.5 | dB | |

## Optical Characteristics

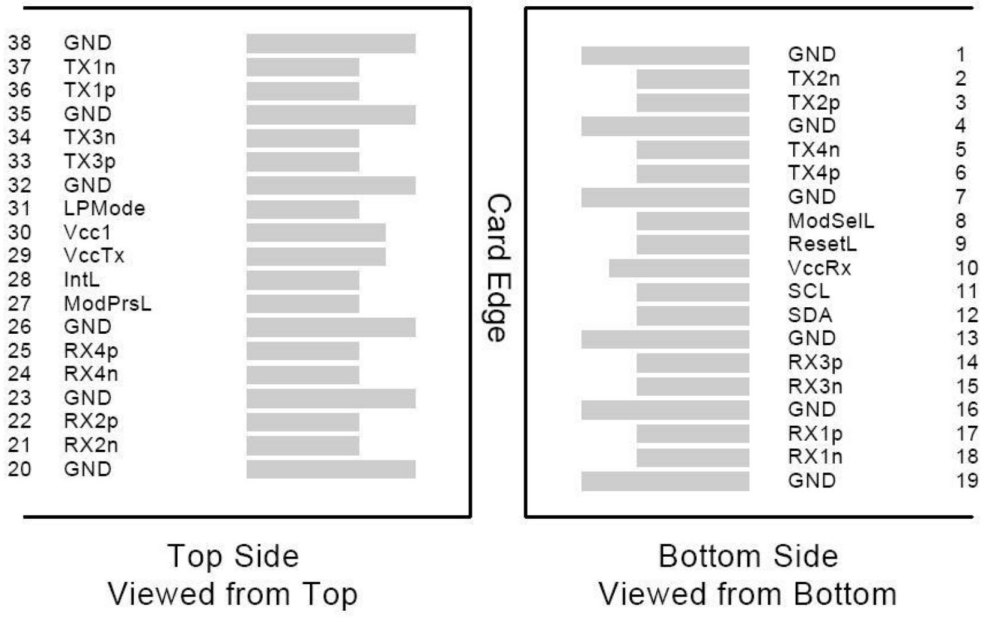
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| **Signaling Speed per Lane** | $BR_{AVE}$ | | 25.78 | | Gbps | |
| **Data Rate Variation** | | -100 | | +100 | ppm | |
| **Lane_0 Center Wavelength** | $\lambda_{C0}$ | 1294.53 | 1295.56 | 1296.59 | nm | |
| **Lane_1 Center Wavelength** | $\lambda_{C1}$ | 1299.02 | 1300.05 | 1301.09 | nm | |
| **Lane_2 Center Wavelength** | $\lambda_{C2}$ | 1303.54 | 1304.58 | 1305.63 | nm | |
| **Lane_3 Center Wavelength** | $\lambda_{C3}$ | 1308.09 | 1309.14 | 1310.19 | nm | |
| **Total Average Output Power** | Po | | | 12.5 | dBm | |
| **Average Launch Power per Lane** | Peach | -2.5 | | 6.5 | dBm | 1 |
| **Average launch power of OFF transmitter per lane** | | | | -30 | dBm | |
| **Side-mode suppression ratio** | $SMSR_{min}$ | 30 | | | dB | |
| **Optical modulation amplitude** | Poma | 0.5 | | 6.5 | dBm | 2 |
| **Difference in launch power between any two lanes (OMA)** | | | | 4 | dB | |
| **Optical Return Loss Tolerance** | | 20 | | | dB | |
| **Transmitter reflectance** | | | | -26 | | 3 |
| **Extinction Ratio** | ER | 4.5 | | | dB | 4 |
| **Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}** | | {0.31, 0.4, 0.45, 0.34, 0.38, 0.4} | | | | 4 |
| **Receiver** | | | | | | |
| **Signaling Speed per Lane** | $BR_{AVE}$ | | 25.78 | | Gbps | |
| **Data Rate Variation** | | -100 | | +100 | ppm | |
| **Damage threshold per Lane** | Rdam | -2.5 | | | dBm | |
| **Lane_0 Center Wavelength** | $\lambda_{C0}$ | 1294.53 | 1295.56 | 1296.59 | nm | |
| **Lane_1 Center Wavelength** | $\lambda_{C1}$ | 1299.02 | 1300.05 | 1301.09 | nm | |
| **Lane_2 Center Wavelength** | $\lambda_{C2}$ | 1303.54 | 1304.58 | 1305.63 | nm | |
| **Lane_3 Center Wavelength** | $\lambda_{C3}$ | 1308.09 | 1309.14 | 1310.19 | nm | |
| **Average Receive Power per Lane** | Rxpow | -20.5 | | -3.5 | dBm | 5 |
| **Receive Sensitivity in OMA per Lane** | Rxsens | | | -18.5 | dBm | 6 |
| **Stressed Receiver Sensitivity (OMA) per Lane** | $RX_{SRS}$ | | | -16 | dBm | 7 |
| **Optical Return Loss** | ORL | | | -26 | dB | |
| **LOS Assert** | LOSA | -30 | | | dBm | |
| **LOS De-Assert** | LOSD | | | -20 | dBm | |
| **LOS Hysteresis** | | 0.5 | | | dB | |
| **Conditions of Receiver Sensitivity Test (Note 8)** | | | | | | |
| **Vertical Eye Closure Penalty** | VECP | | 2.5 | | dB | |
| **Stressed Eye J2 Jitter** | | | 0.33 | | UI | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Stressed Eye J4 Jitter** | | | 0.48 | | UI | |
| **SRS Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}** | | {0.39, 0.5, 0.5, 0.39, 0.39, 0.4} | | | | |

**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 launch 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. Receiver sensitivity (OMA), each lane (max) at 5E-5 BER is a normative specification.
7. Measured with conformance test signal at TP3 for BER = $5*10^{-5}$.
8. 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**

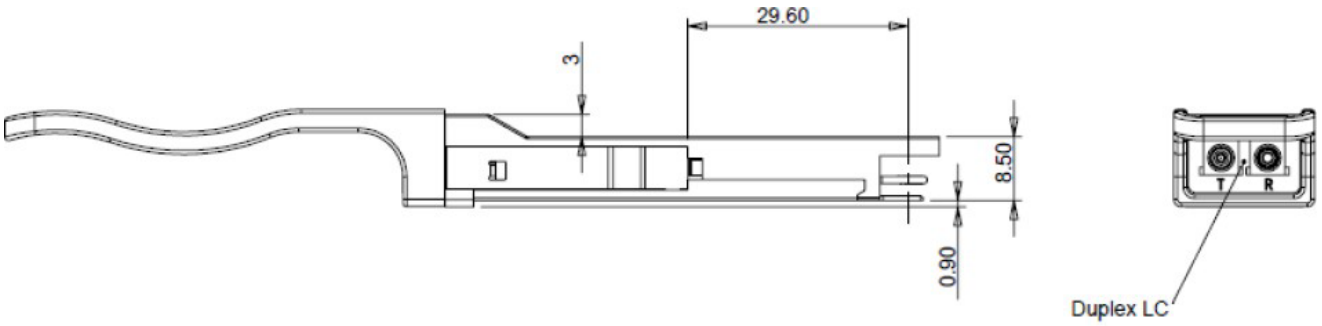
| Pin | Symbol | Name/Descriptions | Ref. |
|---|---|---|---|
| **1** | GND | Ground | 1 |
| **2** | Tx2n | Transmitter Inverted Data Input | |
| **3** | Tx2p | Transmitter Non-Inverted Data output | |
| **4** | GND | Ground | 1 |
| **5** | Tx4n | Transmitter Inverted Data Input | |
| **6** | Tx4p | Transmitter Non-Inverted Data output | |
| **7** | GND | Ground | 1 |
| **8** | ModSelL | Module Select | |
| **9** | ResetL | Module Reset | |
| **10** | VccRx | +3.3V Power Supply Receiver | 2 |
| **11** | SCL | 2-Wire Serial Interface Clock | 1 |
| **12** | SDA | 2-Wire Serial Interface Data | |
| **13** | GND | Ground | |
| **14** | Rx3p | Receiver Non-Inverted Data output | |
| **15** | Rx3n | Receiver Inverted Data output | |
| **16** | GND | Ground | 1 |
| **17** | Rx1p | Receiver Non-Inverted Data output | |
| **18** | Rx1n | Receiver Inverted Data output | |
| **19** | GND | Ground | 1 |
| **20** | GND | Ground | 1 |
| **21** | Rx2n | Receiver Inverted Data output | |
| **22** | Rx2p | Receiver Non-Inverted Data output | |
| **23** | GND | Ground | 1 |
| **24** | Rx4n | Receiver Inverted Data output | 1 |
| **25** | Rx4p | Receiver non-Inverted Data output | |
| **26** | GND | Ground | 1 |
| **27** | ModPrsL | Module Present | |
| **28** | IntL | Interrupt | |
| **29** | VccTx | +3.3V Power Supply Transmitter | 2 |
| **30** | Vccl | +3.3V Power Supply | 2 |
| **31** | LPMode | Low Power Mode | |
| **32** | GND | Ground | 1 |
| **33** | Tx3p | Transmitter Non-Inverted Data input | |
| **34** | Tx3n | Transmitter Inverted Data output | |
| **35** | GND | Ground | 1 |
| **36** | Tx1p | Transmitter Non-Inverted Data input | |
| **37** | Tx1n | Transmitter Inverted Data output | |
| **38** | GND | Ground | 1 |

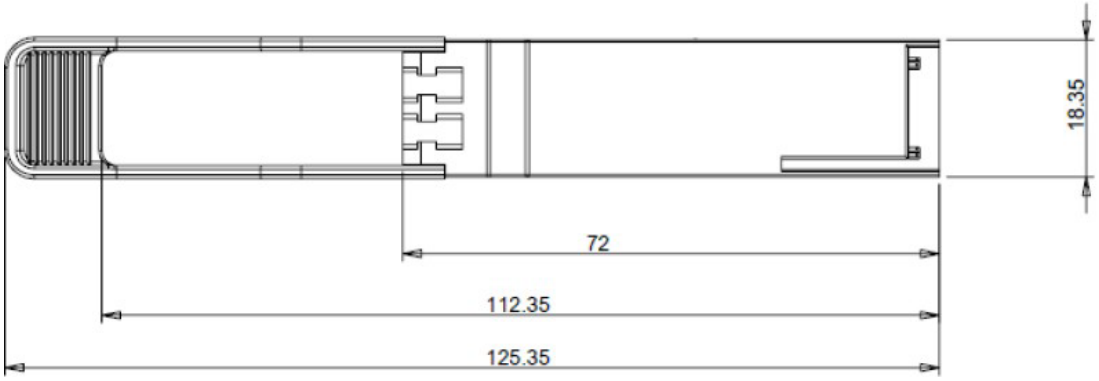
**Notes:**

1. GND is the symbol for signal and supply (power) common for QSPF28 modules. All are common within the QSPF28 module and all module voltages are referenced to this potential unless otherwise noted. Connected these directly to the host board signal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. VccRx, Vcc1 and VccTx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

**Mechanical Specifications**

Measurement unit: mm



**About ProLabs**

Our extensive experience comes as standard. For over 20 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 more than 100 optical switching and transport platforms.

**A 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 1.6T 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.

**The Trusted Partner**

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. 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.

**Contact Information**

ProLabs US

Email: sales@prolabs.com
Telephone: 952-852-0252

ProLabs UK

Email: salessupport@prolabs.com
Telephone: +44 1285 719 600