

QSFP-100GB-130914-20-E-C

MSA and TAA 100GBase-OWDM QSFP28 Transceiver O-Band Channel OW309 50GHz (SMF, 1309.14nm, 20km, LC, DOM, -5 to +80C)

Features:

- Hot-pluggable QSFP28 form factor
- Compliant with QSFP28 MSA
- Supports 106.25Gb/s (PAM4)
- Duplex LC receptacles
- High Sensitivity APD Receiver
- OWDM 8 Wavelengths
- Single +3.3V power supply
- Aligned with IEEE 802.3bs and 100G Lambda MSA
- I2C management interface
- Operating temperature: -5 to +80 Celsius
- RoHS Compliant and Lead-Free



Applications:

- 100GBase Ethernet
- Access and Enterprise

Product Description

This MSA Compliant QSFP28 transceiver provides 100GBase-OWDM throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1309.14nm via an LC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. 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. | Max. | Unit |
|-------------------------------------|--------|------|------|------|
| Maximum Supply Voltage | Vcc | 0 | 3.6 | V |
| Storage Temperature | Tstg | -40 | 85 | °C |
| Operating Case Temperature | Tc | -5 | 80 | °C |
| Relative Humidity (No Condensation) | RH | 0 | 85 | % |
| Damage Threshold | THd | 0 | | dBm |
| Link Distance Through Mux | D | | 20 | km |
| Link Distance Back-to-Back | D | | 40 | km |

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|--------|-------------------|---|---|------|--------|
| Supply Voltage | Vcc | 3.135 | 3.3 | 3.465 | V | |
| Supply Current | Icc | | | 1.8 | A | |
| Power Consumption | | | 4.7 at -5°C 4.4 at 25°C 5.2 at 80°C | 5.0 at -5°C 4.8 at 25°C 5.5 at 80°C | W | |
| Transmitter High-Speed Electrical Characteristics | | | | | | |
| Signaling Rate | Rate | 25.78125 ± 100ppm | | | Gbps | |
| Input Differential Impedance | ZIN | | 100 | | Ω | |
| Differential Input Voltage Per Lane | | | | 900 | mV | |
| Input Impedance Mismatch | | | | 10 | % | |
| Input High Voltage | VIH | 2 | | Vcc+0.3 | V | |
| Input Low Voltage | VIL | -0.3 | | 0.8 | V | |
| Receiver High-Speed Electrical Characteristics | | | | | | |
| Signaling Rate | Rate | 25.78125 ± 100ppm | | | Gbps | |
| Common-Mode Voltage | Vcm | -350 | | 2850 | mV | |
| Common-Mode Noise (RMS) | | | | 17.5 | mV | 20-80% |
| Differential Termination Resistance Mismatch (At 1MHz) | | | | 10 | % | |
| Differential Return Loss (SDD22) | | | | Per CEI-28G-VSR | dB | |
| Common-Mode to Differential Conversion and Differential to Common-Mode Conversion (SDC22, SCD22) | | | | Per CEI-28G-VSR | dB | |
| Common-Mode Return Loss (SCC22): From 250MHz to 30GHz | | | | -2 | | |

| | | | | | | |
|---|------|------|--|-----|----|--|
| Transition Time (20-80%) | | 9.5 | | | ps | |
| Vertical Eye Closure | VEC | | | 6.5 | dB | |
| Eye Width at 10 ⁻¹⁵ Probability | EW15 | 0.57 | | | UI | |
| Eye Height at 10 ⁻¹⁵ Probability | EH15 | 228 | | | mV | |

Optical Characteristics (EOL)

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|-----------|--------|-----------------|---------|---------|-------|-------|
| Transmitter | | | | | | | |
| Data Rate Per Lane | | | 53.125 ± 100ppm | | | Gbps | |
| Modulation Format | | | PAM4 | | | | |
| Wavelength | | λ | 1308.74 | 1309.14 | 1309.54 | nm | |
| Side-Mode Suppression Ratio | | SMSR | 30 | | | dB | |
| Average Launch Power | | Pavg | 0 | | 3.4 | dBm | 1 |
| Outer Optical Modulation Amplitude (OMA _{outer}) | TDP<1.4dB | POMA | 3.0 | | 6.4 | dBm | |
| | TDP>1.4dB | | 1.6+TDP | | 6.4 | dBm | |
| Transmitter and Dispersion Penalty | | TDP | | | 3.4 | dB | |
| TECQ | | TECQ | | | 3.9 | dB | |
| TDP-TECQ (Maximum) | | | | | 2.5 | dB | |
| Extinction Ratio | | ER | 5.0 | | | dB | |
| Optical Return Loss Tolerance | | ORLT | | | 15.6 | dB | |
| Transmitter Reflectance | | RL | | | -26 | dB | 2 |
| Average Launch Power Off Transmitter | | Poff | | | -15 | dBm | |
| RIN _{15.6OMA} | | RIN | | | -136 | dB/Hz | |
| Receiver | | | | | | | |
| Data Rate Per Lane | | | 53.125 ± 100ppm | | | Gbps | |
| Modulation Format | | | PAM | | | | |
| Lane Wavelength | | λ | 1295.04~1311.96 | | | nm | |
| Damage Threshold | | THd | 0 | | | dBm | 3 |
| Average Receive Power | | | -15.7 | | -3 | dBm | 4 |
| Receive Power (OMA _{outer}) | | | | | -2.6 | dBm | |
| Receiver Reflectance | | RL | | | -26 | dB | |
| Receiver Sensitivity (OMA _{outer}) | | | | | | dBm | 5, 6 |
| Stressed Receiver Sensitivity (OMA _{outer}) Per Lane (Maximum) | | SRS | | | -11.6 | dBm | |
| Transmitter Reflectance | | RL | | | -26 | dB | |
| LOS Assert | | LOSA | -30 | | -19.5 | dBm | |

| | | | | | | |
|---|------|-----|--|-------|-----|--|
| LOS De-Assert | LOSD | | | -16.5 | dBm | |
| LOS Hysteresis | LOSH | 0.5 | | | dB | |
| Conditions of Stress Receiver Sensitivity Test | | | | | | |
| Stressed Eye Closure for PAM4 (SECQ) Lane Under Test | | | | 3.4 | dB | |
| SECQ – $10 \cdot \log_{10} (C_{eq})$ Lane Under Test | | | | 3.4 | dB | |

Notes:

1. Average launch power (minimum) 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. Transmitter Reflectance is defined looking into the transmitter.
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.
4. Average receive power (minimum) 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. Receiver Sensitivity (OMA_{outer}) (maximum) is informative and is defined for a transmitter with a value of SECQ up to 3.4dB for 100G ER1 O-Band WDM.
6. Measured with a conformance test signal at TP3 (see 3.11) for the BER specified in IEEE Std 802.3.

Pin Descriptions

| Pin | Symbol | Name/Descriptions | Notes |
|-----|---------|---|-------|
| 1 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 2 | Tx2- | Transmitter Inverted Data Input. | |
| 3 | Tx2+ | Transmitter Non-Inverted Data Output. | |
| 4 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 5 | Tx4- | Transmitter Inverted Data Input. | |
| 6 | Tx4+ | Transmitter Non-Inverted Data Output. | |
| 7 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 8 | ModSelL | Module Select. | 2 |
| 9 | ResetL | Module Reset. | 2 |
| 10 | VccRx | +3.3V Power Supply Receiver. | |
| 11 | SCL | 2-Wire Serial Interface Clock. | 2 |
| 12 | SDA | 2-Wire Serial Interface Data. | 2 |
| 13 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 14 | Rx3+ | Receiver Non-Inverted Data Output. | |
| 15 | Rx3- | Receiver Inverted Data Output. | |
| 16 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 17 | Rx1+ | Receiver Non-Inverted Data Output. | |
| 18 | Rx1- | Receiver Inverted Data Output. | |
| 19 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 20 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 21 | Rx2- | Receiver Inverted Data Output. | |
| 22 | Rx2+ | Receiver Non-Inverted Data Output. | |
| 23 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 24 | Rx4- | Receiver Inverted Data Output. | 1 |
| 25 | Rx4+ | Receiver Non-Inverted Data Output. | |
| 26 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 27 | ModPrsl | Module Present. | |
| 28 | IntL | Interrupt. | 2 |
| 29 | VccTx | +3.3V Power Supply Transmitter. | |
| 30 | Vcc1 | +3.3V Power Supply. | |
| 31 | LPMode | Low-Power Mode. | 2 |
| 32 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 33 | Tx3+ | Transmitter Non-Inverted Data Input. | |
| 34 | Tx3- | Transmitter Inverted Data Output. | |

| | | | |
|-----------|------|---|---|
| 35 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |
| 36 | Tx1+ | Transmitter Non-Inverted Data Input. | |
| 37 | Tx1- | Transmitter Inverted Data Output. | |
| 38 | GND | Transmitter Ground (Common with Receiver Ground). | 1 |

Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that, on the host board, requires a 4.7kΩ to 10kΩ pull-up resistor to Host_Vcc.

Electrical Pin-Out Details



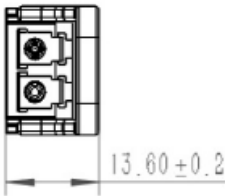
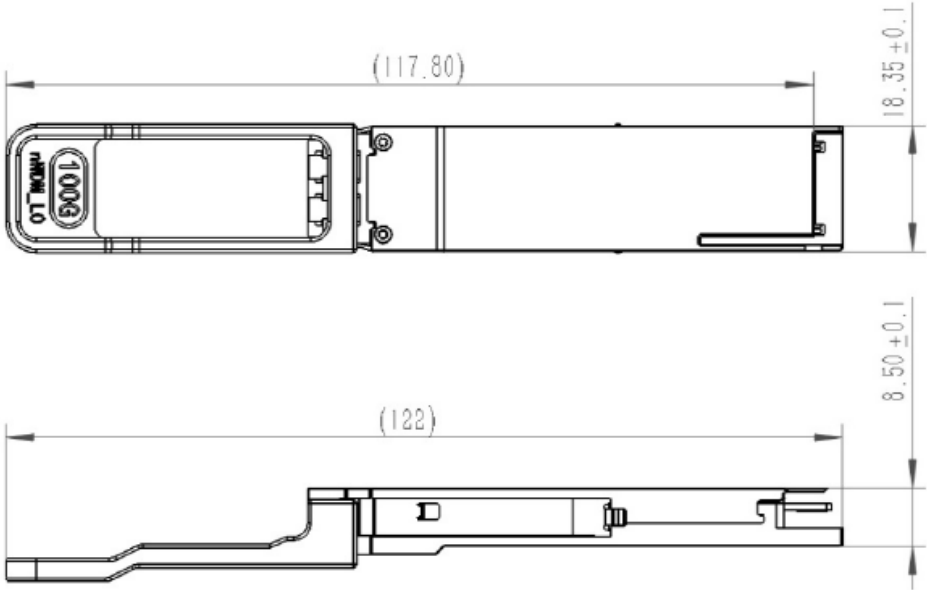
Recommended Host Board Power Supply Filter Network



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.



Contact Information

ProLabs US

Email: sales@prolabs.com

Telephone: 952-852-0252

ProLabs UK

Email: salesupport@prolabs.com

Telephone: +44 1285 719 600