

### QSFP-100GB-129556-20-E-AR-C

Arista Networks® Compatible TAA 100GBase-OWDM QSFP28 Transceiver O-Band Channel OW295 50GHz (SMF, 1295.56nm, 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 Arista Networks® compatible QSFP28 transceiver provides 100GBase-OWDM throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1295.56nm via an LC connector. It can operate at temperatures between -5 and +80C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Arista Networks®. 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.")



## 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<br>4.4 at 25°C<br>5.2 at 80°C | 5.0 at -5°C<br>4.8 at 25°C<br>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 <sup>-15</sup> Probability  | EW15 | 0.57 |  |     | UI |  |
| Eye Height at 10 <sup>-15</sup> 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      | 1295.16         | 1295.56 | 1295.96 | nm    |       |
| Side-Mode Suppression Ratio                                              |           | SMSR   | 30              |         |         | dB    |       |
| Average Launch Power                                                     |           | Pavg   | 0               |         | 3.4     | dBm   | 1     |
| Outer Optical Modulation Amplitude (OMA <sub>outer</sub> )               | 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 <sub>15.6OMA</sub>                                                   |           | 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 <sub>outer</sub> )                                    |           |        |                 |         | -2.6    | dBm   |       |
| Receiver Reflectance                                                     |           | RL     |                 |         | -26     | dB    |       |
| Receiver Sensitivity (OMA <sub>outer</sub> )                             |           |        |                 |         |         | dBm   | 5, 6  |
| Stressed Receiver Sensitivity (OMA <sub>outer</sub> ) 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)<br>Lane Under Test |      |     |  | 3.4   | dB  |  |
| SECQ – $10 \cdot \log_{10}(\text{Ceq})$ 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<sub>outer</sub>) (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

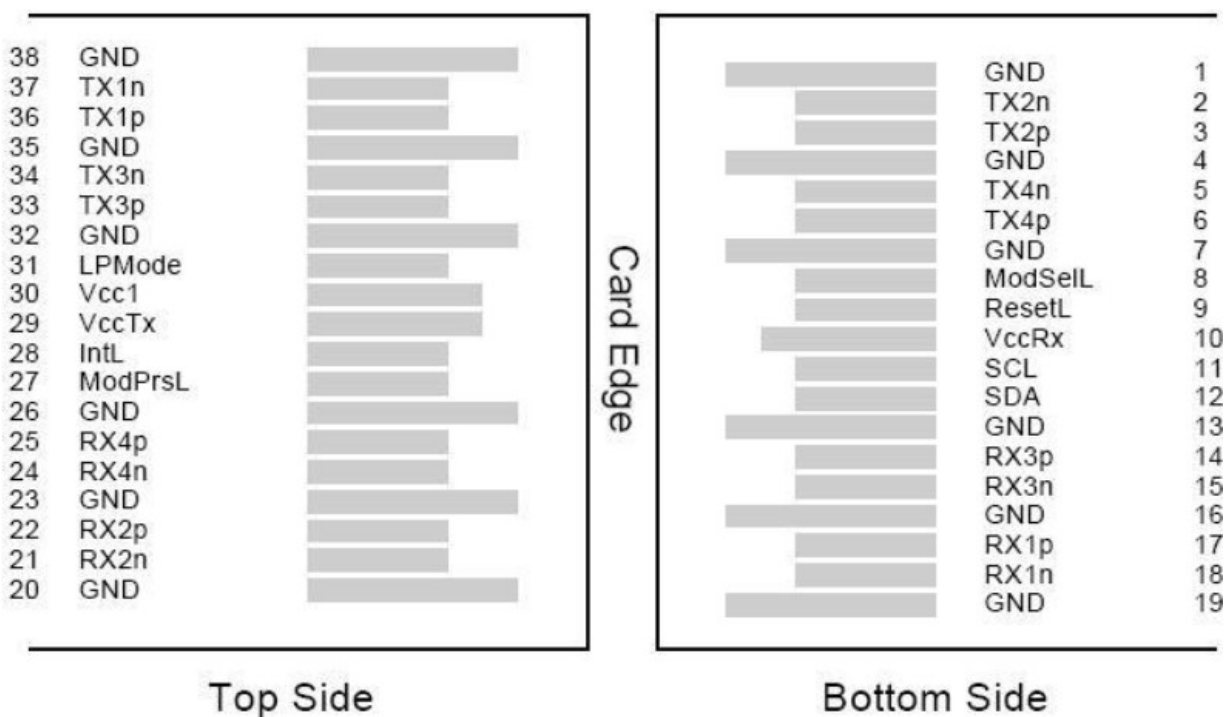
| Pin | Symbol  | Name/Descriptions                                 | Notes |
|-----|---------|---------------------------------------------------|-------|
| 1   | GND     | Transmitter Ground (Common with Receiver Ground). | 1     |
| 2   | Tx2-    | Transmitter Inverted Data Input.                  |       |
| 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.                 |       |

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

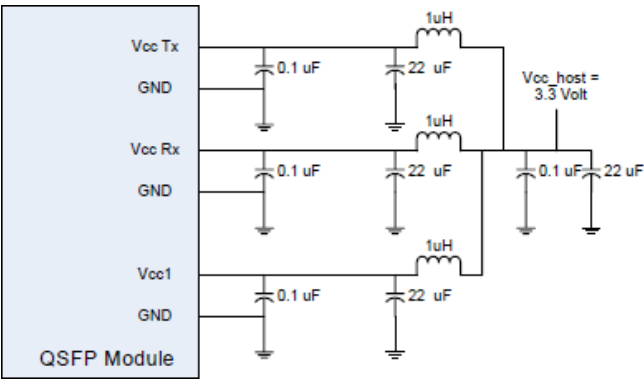
#### Notes:

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.

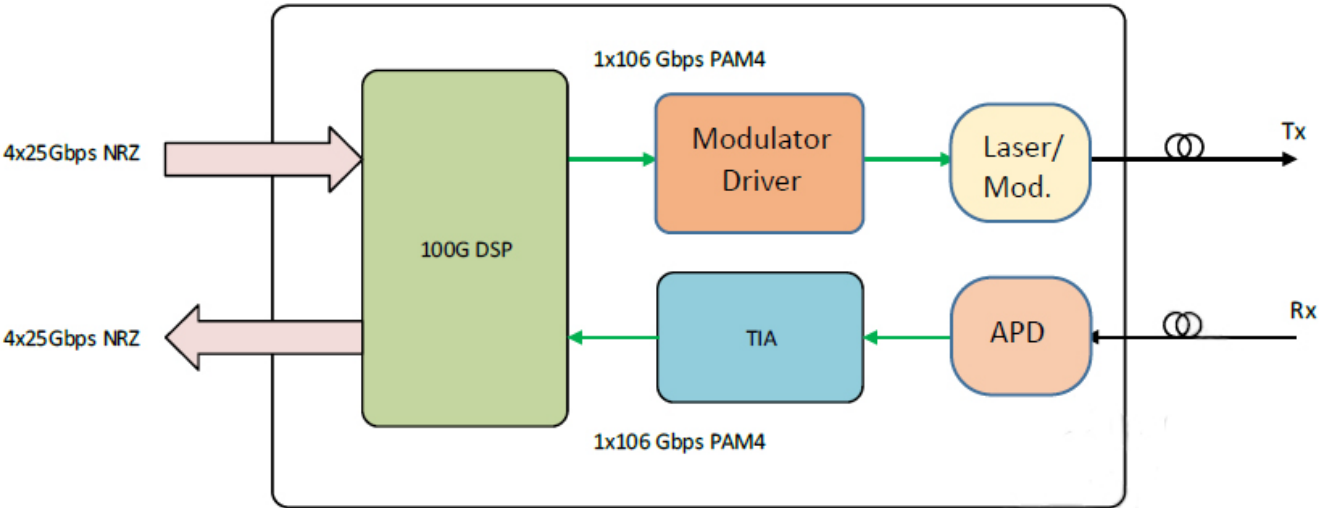
#### Electrical Pin-Out Details



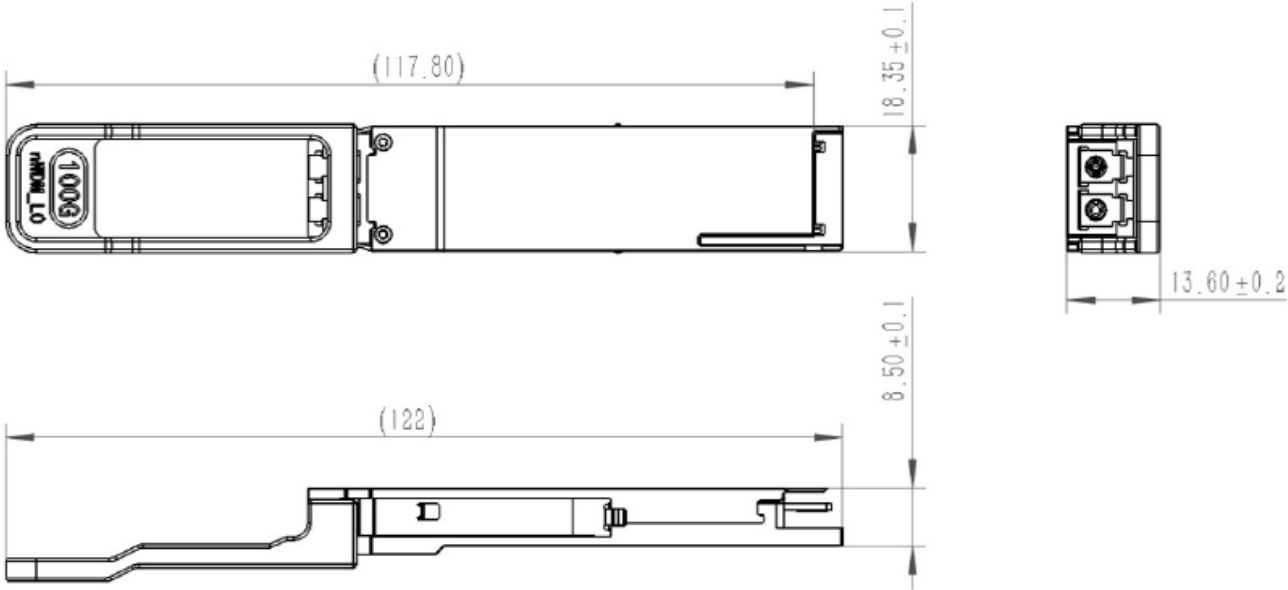
Recommended Host Board Power Supply Filter Network



Block Diagram



**Mechanical Specifications**





## About ProLabs

Our 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.



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