

QSFP-100GB-DW51-PRO

MSA and TAA Compliant 100GBase-DWDM 100GHz PAM4 QSFP28 Single Lambda Transceiver w/EDFA/DCM (SMF, 1536.61nm, 80km, DOM, 0 to 70C, LC)

Features

- SFF-8636 MSA Compliance
- 100GHz DWDM ITU Grid
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- PAM4 optical signal with integrated FEC
- Single-mode Fiber
- Metal with Lower EMI
- Hot Pluggable
- RoHS Compliant and Lead Free
- Excellent ESD Protection



Applications:

- 100GBase Ethernet
- Access, Metro and Enterprise

Product Description

This MSA Compliant QSFP28 transceiver provides 100GBase-DWDM throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1536.61nm 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.

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.



Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

Wavelength Guide (100GHz ITU-T Channel)

| Channel # | Frequency (GHz) | Center Wavelength (nm) | Channel # | Frequency (GHz) | Center Wavelength (nm) |
|-----------|-----------------|------------------------|-----------|-----------------|------------------------|
| 21 | 192.1 | 1560.61 | 41 | 194.1 | 1544.53 |
| 22 | 192.2 | 1559.79 | 42 | 194.2 | 1543.73 |
| 23 | 192.3 | 1558.98 | 43 | 194.3 | 1542.94 |
| 24 | 192.4 | 1558.17 | 44 | 194.4 | 1542.14 |
| 25 | 192.5 | 1557.36 | 45 | 194.5 | 1541.35 |
| 26 | 192.6 | 1556.55 | 46 | 194.6 | 1540.56 |
| 27 | 192.7 | 1555.75 | 47 | 194.7 | 1539.77 |
| 28 | 192.8 | 1554.94 | 48 | 194.8 | 1538.98 |
| 29 | 192.9 | 1554.13 | 49 | 194.9 | 1538.19 |
| 30 | 193.0 | 1553.33 | 50 | 195.0 | 1537.40 |
| 31 | 193.1 | 1552.52 | 51 | 195.1 | 1536.61 |
| 32 | 193.2 | 1551.72 | 52 | 195.2 | 1535.82 |
| 33 | 193.3 | 1550.92 | 53 | 195.3 | 1535.04 |
| 34 | 193.4 | 1550.12 | 54 | 195.4 | 1534.25 |
| 35 | 193.5 | 1549.32 | 55 | 195.5 | 1533.47 |
| 36 | 193.6 | 1548.51 | 56 | 195.6 | 1532.68 |
| 37 | 193.7 | 1547.72 | 57 | 195.7 | 1531.90 |
| 38 | 193.8 | 1546.92 | 58 | 195.8 | 1531.12 |
| 39 | 193.9 | 1546.12 | 59 | 195.9 | 1530.33 |
| 40 | 194.0 | 1545.32 | 60 | 196.0 | 1529.55 |

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|------------------------------------|--------------------|------|---------|------|------|
| Storage Temperature (case) | T _s | -40 | | 85 | °C |
| Operating Case Temperature | T _{op} | 0 | 25 | 70 | V |
| Supply Voltage | V _{cc} | 0 | | 3.6 | V |
| Relative Humidity (non-condensing) | RH | 5 | | 85 | % |
| Optical Receiver Damage Threshold | R _x dmg | 5 | | | dBm |
| ESD Sensitivity | | 500 | | | V |

Electrical Characteristics

The host 4x25.78 Gbps electrical interface complies with the CAUI-4 standard.

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---------------------------------|-------------------|----------------------|----------|----------------------|------|----------------------------|
| Data Rate per Lane (host side) | BR _{avg} | | 25.78125 | | Gbps | |
| Data Rate Variation | | -100 | | 100 | ppm | |
| Power Supply Voltage | V _{CC} | 3.135 | 3.3 | 3.47 | V | |
| Power Consumption | PD | | 4.7 | 5.5 | W | |
| Transmitter | | | | | | |
| Input Swing (Differential) | V _{in} | | | 900 | mVpp | AC coupled |
| Input Impedance (Differential) | Z _{in} | 90 | 100 | 110 | Ohm | |
| Receiver | | | | | | |
| Output Swing (Differential) | V _{out} | | | 900 | mVpp | AC coupled |
| Output Impedance (Differential) | Z _{out} | 90 | 100 | 110 | Ohm | |
| Low Speed Signals | | | | | | |
| LPMode, Reset, ModSel | V _{IL} | -0.3 | | 0.8 | V | |
| | V _{IH} | 2 | | V _{CC} +0.3 | V | |
| ModPrs, Int | V _{OL} | 0 | | 0.4 | V | IOL = 2.0mA |
| | V _{OH} | V _{CC} -0.5 | | V _{CC} +0.3 | V | |
| SCL, SDA | V _{IL} | -0.3 | | 0.3*V _{CC} | V | |
| | V _{IH} | 0.7*V _{CC} | | V _{CC} +0.5 | V | |
| SCL, SDA | V _{OL} | 0 | | 0.4 | V | IOL _{max} = 3.0mA |
| | V _{OH} | V _{CC} -0.5 | | V _{CC} +0.3 | V | |

Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|--------------------|-----------------|-----------|-----------------|-------|-------|
| Data Rate | BR | 103.125 | | | Gbps | 1 |
| Data Rate Variation | | -100 | | 100 | ppm | |
| Transmitter | | | | | | |
| Central Wavelength | λ_C | 1527 | λ | 1567 | nm | |
| Central Wavelength Stability | | $\lambda_C-0.1$ | | $\lambda_C+0.1$ | nm | |
| Average Output Optical Power | P _O | -2 | -0.5 | 2 | dBm | 5 |
| Optical Extinction Ratio (outer) | ER | 6 | | | dB | |
| Optical Output Power, TX: OFF | P _{off} | | | -30 | dBm | |
| TX Reflectance | | | | -26 | dB | |
| Receiver | | | | | | |
| Operating Wavelength | | 1527 | | 1567 | nm | |
| RX Sensitivity, Avg Power | RX _{sens} | | -9 | -8 | dBm | 2, 5 |
| RX Overload, Avg Power | RX _{sat} | 4 | | | dBm | 2 |
| RX Damage Threshold | RX _{dmg} | 4 | | | dBm | |
| RX Sensitivity, Avg Power at OSNR 32dB/0.1nm | | | | -7 | dBm | 3, 5 |
| Dispersion Tolerance | | -30 | | +30 | ps/nm | 4, 5 |
| RX Reflectance | | | | -26 | dB | |
| LOS Assert | LOSA | -15 | | | dBm | |
| LOS De-Assert | LOSD | | | -10.5 | dBm | |
| LOS Hysteresis | | | 1 | | dB | |

Notes:

1. The raw data rate is minimum 103.125 Gbps, when FEC code is added, the actual optical signal data rate is higher.
2. Rx average power sensitivity and overload are for post-FEC BER < 1E-15 with integrated FEC without dispersion and noise load at BOL.
3. Rx average power sensitivity at OSNR 32dB is for post-FEC BER < 1E-15 with integrated FEC without dispersion at OSNR 32dB/0.1nm at BOL. A 100GHz spacing DWDM filter with enough bandwidth should be used to remove the extra noises of the optical signal with noises for the RX test.
4. Dispersion tolerance is for dispersion values that cause Rx OSNR penalty less than 2 dB when compared with no dispersion at RX power -6 dBm and PRBS15 signal at BER 2e-3 at the operating data rate at BOL. A 100GHz spacing DWDM filter with enough bandwidth should be used to remove the extra noises of the optical signal with noises for the RX BER test.
5. The Average output optical power, RX sensitivity, RX sensitivity at OSNR 32dB/0.1nm, and Dispersion tolerance parameters are specified for beginning of life (BOL) over the operating temperature with clean fiber connectors.

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 Input | 3 | |
| 4 | | GND | Ground | 1 | 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | 3 | |
| 6 | CML-I | Tx4p | Transmitter Non-Inverted Data Input | 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 | LVCNOS- I/O | SCL | 2-wire serial interface clock | 3 | |
| 12 | LVCNOS- 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/RX_LOS | Interrupt | 3 | 3 |
| 29 | | VccTx | +3.3V Power supply transmitter | 2 | 2 |
| 30 | | Vcc1 | +3.3V Power supply | 2 | 2 |
| 31 | LVTTTL-I | LPMODE/TX_DIS | Low Power Mode | 3 | 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.
2. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently

Electrical Pin-out Details



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.



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