

SFP-10GB-DWXX-80-I-C
10GBASE-DWDM 100GHz SFP+ SMF
XXXX.XXNM, 80KM, DOM, RGD
Duplex LC Connector



SFP-10GB-DWXX-80-I-C

MSA and TAA Compliant 10GBase-DWDM 100GHz SFP+ Transceiver (SMF, XXXX.XXnm, 80km, LC, DOM, Rugged)

Features

- Electrical interface specifications per SFF-8431
- Management interface specifications per SFF-8431 and SFF-8472
- SFP+ MSA package with duplex LC connector
- DWDM-rated EML Transmitter
- Up to 10.3Gb/s bi-directional data links
- 100GHz ITU Grid, C-Band
- Single +3.3V power supply
- Class 1 laser safety certified
- Commercial Temperature (-40°C to +85°C)
- Up to 80km on 9/125µm SMF
- RoHS Compliant



Applications:

- 10GBase-DWDM
- 10G Fibre Channel

Product Description

This MSA compliant SFP+ transceiver provides 10GBase-DWDM throughput up to 80km over single-mode fiber (SMF) using a DWDM wavelength via an LC connector. It is also capable of withstanding rugged environments and can operate at temperatures between -40°C to +85°C. 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' SFP+ 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)

| ITU Channel # | Frequency (THZ) | Center Wavelength (nm) |
|---------------|-----------------|------------------------|
| 61 | 196.1 | 1528.77 |
| 60 | 196.0 | 1529.55 |
| 59 | 195.9 | 1530.33 |
| 58 | 195.8 | 1531.12 |
| 57 | 195.7 | 1531.90 |
| 56 | 195.6 | 1532.68 |
| 55 | 195.5 | 1533.47 |
| 54 | 195.4 | 1534.25 |
| 53 | 195.3 | 1535.04 |
| 52 | 195.2 | 1535.82 |
| 51 | 195.1 | 1536.61 |
| 50 | 195.0 | 1537.40 |
| 49 | 194.9 | 1538.19 |
| 48 | 194.8 | 1538.98 |
| 47 | 194.7 | 1539.77 |
| 46 | 194.6 | 1540.56 |
| 45 | 194.5 | 1541.35 |
| 44 | 194.4 | 1542.14 |
| 43 | 194.3 | 1542.94 |
| 42 | 194.2 | 1543.73 |
| 41 | 194.1 | 1544.53 |
| 40 | 194.0 | 1545.32 |
| 39 | 193.9 | 1546.12 |
| 38 | 193.8 | 1546.92 |
| 37 | 193.7 | 1547.72 |
| 36 | 193.6 | 1548.51 |
| 35 | 193.5 | 1549.32 |
| 34 | 193.4 | 1550.12 |
| 33 | 193.3 | 1550.92 |
| 32 | 193.2 | 1551.72 |
| 31 | 193.1 | 1552.52 |
| 30 | 193.0 | 1553.33 |
| 29 | 192.9 | 1554.13 |
| 28 | 192.8 | 1554.94 |
| 27 | 192.7 | 1555.75 |
| 26 | 192.6 | 1556.55 |

| | | |
|----|-------|---------|
| 25 | 192.5 | 1557.36 |
| 24 | 192.4 | 1558.17 |
| 23 | 192.3 | 1558.98 |
| 22 | 192.2 | 1559.79 |
| 21 | 192.1 | 1560.61 |
| 20 | 192.0 | 1561.42 |
| 19 | 191.9 | 1562.23 |
| 18 | 191.8 | 1563.05 |
| 17 | 191.7 | 1563.86 |

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Max. | Unit |
|----------------------------|------------------|------|------|------|
| Maximum Supply Voltage | V _{CC} | -0.5 | 4.0 | V |
| Storage Temperature | TS | -40 | +85 | °C |
| Operating Case Temperature | T _C | -40 | +85 | °C |
| Operating Humidity | RH | 5 | 85 | % |
| Receiver Power | R _{MAX} | | -1 | dBm |
| Maximum Bitrate | B _{max} | | 11.3 | Gbps |

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes | |
|----------------------------------|---------------------------------|-----------------|------|------|---------------------|-------|---|
| Module Supply Current | I _{CC} | | 300 | 450 | mA | | |
| Power Dissipation | P _D | | 1.0 | 1.5 | W | | |
| Transmitter | | | | | | | |
| Input Differential Impedance | Z _{IN} | | 100 | | Ω | | |
| Differential Data Input Swing | V _{IN, P-P} | 180 | | 700 | mV _{P-P} | | |
| TX_FAULT | Transmitter Fault | V _{OH} | 2.0 | | V _{CCHOST} | V | |
| | Normal Operation | V _{OL} | 0 | | 0.8 | V | |
| TX_DISABLE | Transmitter Disable | V _{IH} | 2.0 | | V _{CCHOST} | V | |
| | Transmitter Enable | V _{IL} | 0 | | 0.8 | V | |
| Receiver | | | | | | | |
| Output Differential Impedance | Z _O | | 100 | | Ω | | |
| Differential Data Output Swing | V _{OUT, P-P} | 300 | | 850 | mV _{P-P} | 1 | |
| Data Output Rise Time, Fall Time | t _r , t _f | 28 | | | ps | 2 | |
| RX_LOS | Loss of signal (LOS) | V _{OH} | 2.0 | | V _{CCHOST} | V | 3 |
| | Normal Operation | V _{OL} | 0 | | 0.8 | V | 3 |

Notes:

1. Internally AC coupled, but requires a external 100Ω differential load termination.

2. 20–80%.
3. LOS is an open collector output. Should be pulled up with 4.7K Ω on the host board.

Optical Characteristics

| Parameter | Symbol | Minimum | Typical | Maximum | Unit | Notes |
|--|---|---------|---------|---------|-------|-------|
| Transmitter | | | | | | |
| Launch Optical Power | P _o | +1.0 | | +4.0 | dBm | 1 |
| Center Wavelength Range | λ_c | 1528.77 | | 1563.86 | nm | |
| Center Wavelength Spacing | | | 100 | | GHz | |
| Center Wavelength Tolerance | $\Delta\lambda_c$ | -100 | | 100 | pm | |
| Extinction Ratio | EX | 9.0 | | | dB | 2 |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Spectral Width (-20dB) | | | | 1 | nm | |
| Transmitter and Dispersion Penalty | TDP | | | 4.0 | dB | |
| Relative Intensity Noise | RIN | | | -128 | dB/Hz | |
| Optical Return Loss Tolerance | ORLT | | | 21 | dB | |
| Pout @TX-Disable Asserted | P _{off} | | | -30 | dBm | 1 |
| Eye Diagram | IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-ZR compatible | | | | | |
| Receiver | | | | | | |
| Center Wavelength | λ_c | 1528 | | 1565 | nm | |
| Receiver Sensitivity (P _{avg}) | S | | | -26 | dBm | 3 |
| Receiver Overload (P _{avg}) | P _{OL} | -7.0 | | | dBm | 3 |
| Optical Return Loss | ORL | | | -27 | dB | |
| OSNR | | 27 | | | dB | 4 |
| Max OSNR Path Penalty | | | | 4 | dB | 4 |
| Dispersion Limited Distance | | | | 100 | Km | |
| LOS De-Assert | LOS _D | | | -26 | dBm | |
| LOS Assert | LOS _A | -35 | | | dBm | |
| LOS Hysteresis | | 0.5 | | | dB | |

Notes:

1. The optical power is launched into 9/125 μ m SMF.
2. Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps.
3. Measured with PRBS 2³¹-1 test pattern, 10.3125Gb/s, BER<10⁻¹².
4. Receiver power@ -7~-18dBm, 10.3125Gb/s, BER<10⁻¹².

Pin Descriptions

| Pin | Symbol | Name/Descriptions | Ref. |
|-----|------------|--|------|
| 1 | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |
| 2 | TX Fault | Transmitter Fault. LVTTTL-O | 2 |
| 3 | TX Disable | Transmitter Disable. Laser output disabled on high or open. LVTTTL-I. | 3 |
| 4 | SDA | 2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I/O. | |
| 5 | SCL | 2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I. | |
| 6 | MOD_ABS | Module Absent, Connect to VeeT or VeeR in Module. | 4 |
| 7 | RS0 | Rate Select 0. Not used | 5 |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation. LVTTTL-O. | 2 |
| 9 | RS1 | Rate Select 1. Not used | 5 |
| 10 | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| 11 | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| 12 | RD- | Receiver Inverted DATA out. AC Coupled. CML-O. | |
| 13 | RD+ | Receiver Non-inverted DATA out. AC Coupled. CML-O. | |
| 14 | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| 15 | VccR | Receiver Power Supply. | |
| 16 | VccT | Transmitter Power Supply. | |
| 17 | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |
| 18 | TD+ | Transmitter Non-Inverted DATA in. AC Coupled. CML-I. | |
| 19 | TD- | Transmitter Inverted DATA in. AC Coupled. CML-O. | |
| 20 | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |

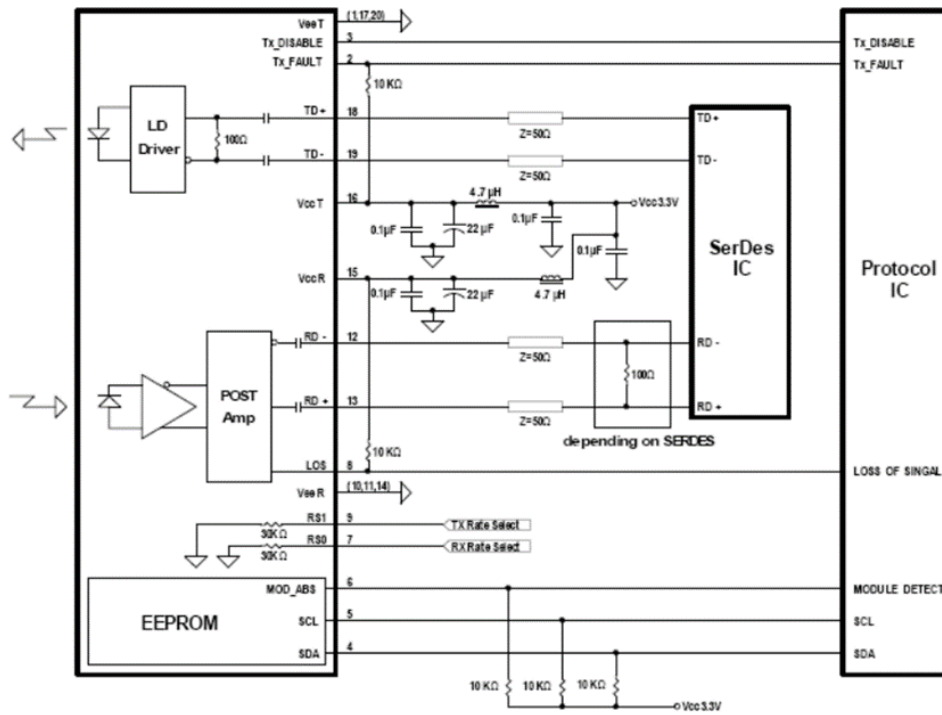
Notes:

1. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
2. This contact is an open collector/drain output and should be pulled up to the Vcc_Host with resistor in the range 4.7KΩ to 10KΩ. Pull ups can be connected to one or several power supplies, however the host board design shall ensure that no module contract has voltage exceeding module VccT/R +0.5.V.
3. Tx_Disable is an input contact with a 4.7KΩ to 10KΩ pull-up resistor to VccT inside module.
4. Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull the contract up to Vcc_Host with a resistor in the range from 4.7KΩ to 10KΩ. Mod_ABS is asserted "High" when the SFP+ module is physically absent from a host slot.
5. Internally pulled down per SFF-8431



Pin-out of connector Block on Host board

Recommended Circuit Schematic



Mechanical Specifications

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).



EEPROM Information

EEPROM memory map specific data field description is as below:

