

## **SFP-10GB-50DW59-80-OPC**

MSA and TAA 10GBase-DWDM SFP+ Transceiver C-Band 50GHz (SMF, 1530.33nm, 80km, LC, DOM)

### **Features**

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



### **Applications:**

- 10x Gigabit Ethernet over DWDM
- 8x/10x Fibre Channel
- Access and Enterprise

### **Product Description**

This MSA compliant SFP+ transceiver provides 10GBase-DWDM throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1530.33nm via an LC connector. It can operate at temperatures between 0 and 70C. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure 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.

## Wavelength Guide

| Channel # | Center Wavelength (nm) | Channel # | Center Wavelength (nm) |
|-----------|------------------------|-----------|------------------------|
| 18        | 1563.05                | 40        | 1545.32                |
| 19        | 1562.23                | 41        | 1544.53                |
| 20        | 1561.42                | 42        | 1543.73                |
| 21        | 1560.61                | 43        | 1542.94                |
| 22        | 1559.79                | 44        | 1542.14                |
| 23        | 1558.98                | 45        | 1541.35                |
| 24        | 1558.17                | 46        | 1540.56                |
| 25        | 1557.36                | 47        | 1539.77                |
| 26        | 1556.55                | 48        | 1538.98                |
| 27        | 1555.75                | 49        | 1538.19                |
| 28        | 1554.94                | 50        | 1537.40                |
| 29        | 1554.13                | 51        | 1536.61                |
| 30        | 1553.33                | 52        | 1535.82                |
| 31        | 1552.52                | 53        | 1535.04                |
| 32        | 1551.72                | 54        | 1534.25                |
| 33        | 1550.92                | 55        | 1533.47                |
| 34        | 1550.12                | 56        | 1532.68                |
| 35        | 1549.32                | 57        | 1531.90                |
| 36        | 1548.51                | 58        | 1531.12                |
| 37        | 1547.72                | 59        | 1530.33                |
| 38        | 1546.92                | 60        | 1529.55                |
| 39        | 1546.12                | 61        | 1528.77                |

## Absolute Maximum Ratings

| Parameter              | Symbol | Min. | Typ.    | Max.              | Unit | Notes |
|------------------------|--------|------|---------|-------------------|------|-------|
| Storage Temperature    | Tstg   | -40  |         | 85                | °C   |       |
| Operating Temperature  | Tc     | 0    |         | 70                | °C   |       |
| Supply Current         | Icc    |      | 450     | 500               | mA   | 1     |
| Data Rate              | DR     | 1.2  | 10.3125 | 11.3              | Gbps | 2     |
| Maximum Supply Voltage | Vcc    | -0.5 |         | 4.0               | V    | 1     |
| Bit Error Rate         | BER    |      |         | 10 <sup>-12</sup> |      |       |

### Notes:

1. For electrical power interface.
2. IEEE 802.3ae.

## Electrical Characteristics

| Parameter                           | Symbol  | Min. | Typ. | Max.     | Unit | Notes |
|-------------------------------------|---------|------|------|----------|------|-------|
| Power Supply Voltage                | Vcc     | 3.14 | 3.3  | 3.46     | V    |       |
| Transmitter                         |         |      |      |          |      |       |
| Input Differential Impedance        | RIN     |      | 100  |          |      |       |
| Differential Data Input Swing       | VIN,pp  | 300  |      | 850      | mV   |       |
| Transmit Disable Voltage            | VD      | 2    |      | Vcc      | V    |       |
| Transmit Enable Voltage             | VEN     | Vee  |      | Vee+0.8  | V    |       |
| Receiver                            |         |      |      |          |      |       |
| Differential Data Output Swing      | VOUT,pp | 300  |      | 850      | mV   |       |
| Data Output Rise/Fall Time (20-80%) | Tr/Tf   | 28   |      |          | ps   |       |
| LOS Fault                           | Vlosa   | 2    |      | Host_Vcc | V    |       |
| LOS Normal                          | Vlosd   | Vee  |      | Vee+0.5  | V    |       |

## Optical Characteristics

| Parameter                       | Symbol          | Min.             | Typ.        | Max.             | Unit  | Notes |
|---------------------------------|-----------------|------------------|-------------|------------------|-------|-------|
| Transmitter                     |                 |                  |             |                  |       |       |
| Output Optical Power            | Ptx             | 0                |             | 4                | dBm   | 1     |
| Optical Center Wavelength       | $\lambda_C$     | $\lambda_C-0.05$ | $\lambda_C$ | $\lambda_C+0.05$ |       | 2     |
| Extinction Ratio                | ER              | 9                |             |                  | dB    |       |
| Spectral Width (-20dB)          | $\Delta\lambda$ |                  |             | 0.6              | nm    |       |
| Side Mode Suppression Ratio     | SMSR            | 30               |             |                  | dB    |       |
| Relative Intensity Noise        | RIN             |                  |             | -128             | dB/Hz |       |
| Transmitter Dispersion Penalty  | TDP             |                  |             | 3.2              | dB    |       |
| Launch Power of Off Transmitter | Poff            |                  |             | -30              | dBm   | 1     |
| Receiver                        |                 |                  |             |                  |       |       |
| Optical Center Wavelength       | $\lambda_C$     | 1260             |             | 1620             | nm    |       |
| Average Receive Power           | Prx             | -24              |             | -7               | dBm   |       |
| Receiver Sensitivity @10.3Gbps  | S               |                  |             | -24              | dBm   | 3     |
| Receiver Reflectance            | RR              |                  |             | -27              | dB    |       |
| LOS Assert                      | LOSA            | -35              |             |                  | dBm   |       |
| LOS De-Assert                   | LOSD            |                  |             | -27              | dBm   |       |
| LOS Hysteresis                  | LOSH            | 0.5              |             |                  | dB    |       |

### Notes:

1. Average.
2.  $\lambda$  = specified ITU grid wavelength.
3. Measured with the PRBS 2<sup>31</sup>-1 test mode and BER<10<sup>-12</sup>.

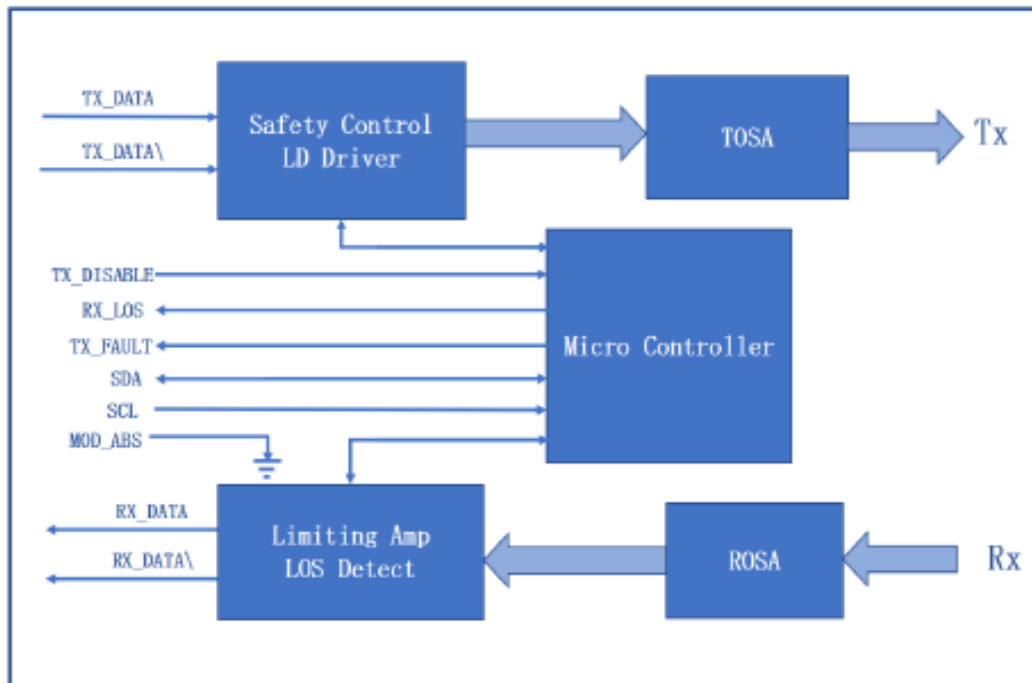
## Pin Descriptions

| Pin | Symbol     | Name/Description                                                 | Notes |
|-----|------------|------------------------------------------------------------------|-------|
| 1   | VeeT       | Transmitter Ground. Common with Receiver Ground.                 | 1     |
| 2   | Tx_Fault   | Transmitter Fault.                                               |       |
| 3   | Tx_Disable | Transmitter Disable. Laser output disables on "high" or "open."  | 2     |
| 4   | SDA        | 2-Wire Serial ID Interface Data Line.                            | 3     |
| 5   | SCL        | 2-Wire Serial ID Interface Clock Line.                           | 3     |
| 6   | MOD_ABS    | Module Absent. Grounded within the module.                       | 3     |
| 7   | RS0        | Rate Select 0. Not used.                                         |       |
| 8   | LOS        | Loss of Signal Indication. "Logic 0" indicates normal operation. | 4     |
| 9   | RS1        | Rate Select 1. Not used.                                         | 1     |
| 10  | VeeR       | Receiver Signal Ground. Common with Transmitter Ground.          | 1     |
| 11  | VeeR       | Receiver Signal Ground. Common with Transmitter Ground.          | 1     |
| 12  | RD-        | Inverse Received Data Out. AC Coupled.                           |       |
| 13  | RD+        | Non-Inverted Receiver Data Out. AC Coupled.                      |       |
| 14  | VeeR       | Receiver Signal Ground. Common with Transmitter Ground.          | 1     |
| 15  | VccR       | Receiver Power Supply.                                           |       |
| 16  | VccT       | Transmitter Power Supply.                                        |       |
| 17  | VeeT       | Transmitter Signal Ground. Common with Receiver Ground.          | 1     |
| 18  | TD+        | Transmitter Non-Inverted Data In. AC Coupled.                    |       |
| 19  | TD-        | Transmitter Inverted Data In. AC Coupled.                        |       |
| 20  | VeeT       | Transmitter Signal Ground.                                       | 1     |

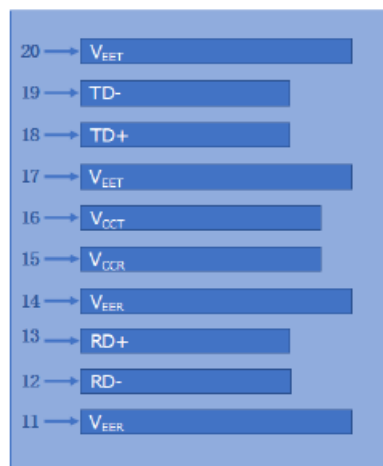
## Notes:

1. Circuit ground is isolated from the chassis ground.
2. Disabled: Tdis>2V or open. Enabled: Tdis<0.8V.
3. Should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 2V and 3.46V.
4. LOS is open collector output.

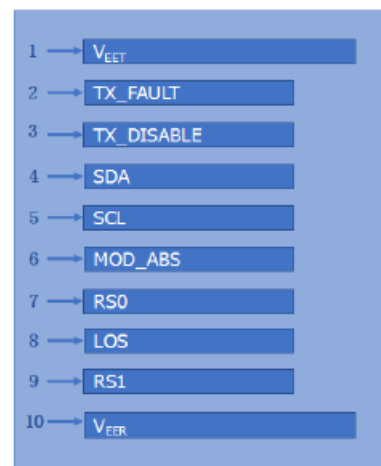
## Block Diagram of Transceiver



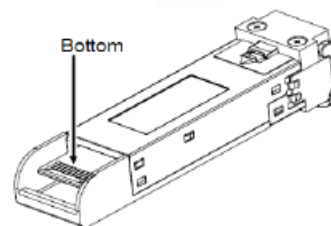
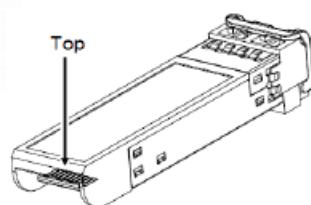
## Electrical Pad Layout



Top of Board



Bottom of Board



Mechanical Specifications

