

### SFP-1GB-DW4150-80-I-AO

MSA and TAA 1000Base-DWDM SFP Transceiver 100GHz (SMF, 1544.53nm to 1537.40nm, 80km, LC, DOM, -40 to 85C)

#### Features

- Supports 9.95 to 11.3Gbps or 1.25Gbps Bit Rates Automatically Adaptive (With CDR)
- 100GHz ITU-Based Channel Spacing (C-Band)
- Up to 40km Link Length @9.95 to 11.3Gbps or Up to 80km Link Length @1.25Gbps
- APD Receiver with Limiting Amplifier
- Duplex LC Connector
- Monolithic EML Tunable TOSA
- Positive Power Supply Lines: 3.3V
- Low Power Consumption: 2.7w
- RoHS Compliant and Lead-Free
- Operating Temperature: -40 to 85 Celsius



#### Applications

- Gigabit Ethernet over CWDM
- 10x Gigabit Ethernet over DWDM
- Access, Metro and Enterprise

#### Product Description

This Industry Standard SFP transceiver provides 1000Base-DWDM throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1544.53nm to 1537.40nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Industry Standard transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. 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.

AddOn'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."



## ITU Channel Wavelength Guide

| ITU Channel | Frequency (THz) | Center Wavelength (nm) | ITU Channel | Frequency (THz) | Center Wavelength (nm) |
|-------------|-----------------|------------------------|-------------|-----------------|------------------------|
| 11          | 191.1           | 1568.11                | 36          | 193.6           | 1548.51                |
| 12          | 191.2           | 1567.95                | 37          | 193.7           | 1547.72                |
| 13          | 191.3           | 1567.13                | 38          | 193.8           | 1546.92                |
| 14          | 191.4           | 1566.31                | 39          | 193.9           | 1546.12                |
| 15          | 191.5           | 1565.50                | 40          | 194.0           | 1545.32                |
| 16          | 191.6           | 1564.68                | 41          | 194.1           | 1544.53                |
| 17          | 191.7           | 1563.86                | 42          | 194.2           | 1543.73                |
| 18          | 191.8           | 1563.05                | 43          | 194.3           | 1542.94                |
| 19          | 191.9           | 1562.23                | 44          | 194.4           | 1542.14                |
| 20          | 192.0           | 1561.42                | 45          | 194.5           | 1541.35                |
| 21          | 192.1           | 1560.61                | 46          | 194.6           | 1540.56                |
| 22          | 192.2           | 1559.79                | 47          | 194.7           | 1539.77                |
| 23          | 192.3           | 1558.98                | 48          | 194.8           | 1538.98                |
| 24          | 192.4           | 1558.17                | 49          | 194.9           | 1538.19                |
| 25          | 192.5           | 1557.36                | 50          | 195.0           | 1537.4                 |
| 26          | 192.6           | 1556.55                | 51          | 195.1           | 1536.61                |
| 27          | 192.7           | 1555.75                | 52          | 195.2           | 1535.82                |
| 28          | 192.8           | 1554.94                | 53          | 195.3           | 1535.04                |
| 29          | 192.9           | 1554.13                | 54          | 195.4           | 1534.25                |
| 30          | 193.0           | 1553.33                | 55          | 195.5           | 1533.47                |
| 31          | 193.1           | 1552.52                | 56          | 195.6           | 1532.68                |
| 32          | 193.2           | 1551.72                | 57          | 195.7           | 1531.9                 |
| 33          | 193.3           | 1550.92                | 58          | 195.8           | 1531.12                |
| 34          | 193.4           | 1550.12                | 59          | 195.9           | 1530.33                |
| 35          | 193.5           | 1549.32                | 60          | 196.0           | 1529.55                |

## Absolute Maximum Ratings

| Parameter                   | Symbol | Min. | Typ. | Max. | Unit | Notes |
|-----------------------------|--------|------|------|------|------|-------|
| Maximum Supply Voltage      | Vcc    | 0    |      | 3.6  | V    |       |
| Storage Temperature         | Tstg   | -40  |      | 85   | °C   |       |
| Operating Case Temperature  | Tc     | -40  |      | 85   | °C   |       |
| Operating Relative Humidity | RH     | 5    |      | 85   | %    |       |
| Storage Relative Humidity   | RH     | 5    |      | 95   | %    |       |
| Power Consumption           |        |      |      | 2.7  | W    |       |

### Electrical Characteristics

| Parameter                      | Symbol | Min.  | Typ. | Max.  | Unit     | Notes |
|--------------------------------|--------|-------|------|-------|----------|-------|
| Power Supply Voltage           | Vcc    | 3.135 | 3.3  | 3.465 | V        |       |
| Transmitter                    |        |       |      |       |          |       |
| Differential Data Input Swing  | VIN    | 170   |      | 700   | mV       |       |
| Input Differential Impedance   | ZIN    |       | 100  |       | $\Omega$ |       |
| Transmitter Disable Voltage    | VDIS   | 2.0   |      | Vcc   | V        |       |
| Transmitter Enable Voltage     | VEN    | 0     |      | 0.8   | V        |       |
| Receiver                       |        |       |      |       |          |       |
| Differential Data Output Swing | VOUT   | 300   |      | 850   | mV       |       |
| Output Differential Impedance  | ZOUT   |       | 100  |       | $\Omega$ |       |
| LOS Assert Voltage             | VLOSA  | 2.0   |      | Vcc   | V        |       |
| LOS De-Assert Voltage          | VLOSD  | 0     |      | 0.8   | V        |       |

### Timing Characteristics

| Parameter                  | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------------|--------|------|------|------|------|-------|
| Module Initialize Time     | Tinit  |      |      | 20   | s    |       |
| Module Channel Switch Time | Tsel   |      |      | 200  | ms   |       |

## Optical Characteristics

| Parameter                        | Symbol      | Min.                               | Typ. | Max.  | Unit  | Notes |
|----------------------------------|-------------|------------------------------------|------|-------|-------|-------|
| Transmitter (10G & 1.25G)        |             |                                    |      |       |       |       |
| Average Output Power             | PAVE        | -2                                 |      | 3     | dBm   | 1     |
| Optical Wavelength               | $\lambda$   | As Per ITU-T 694.1, 100GHz Spacing |      |       | nm    | 2     |
| Center Frequency Spacing         | $\Delta\nu$ | 100                                |      |       | GHz   |       |
| Center Frequency Stability       | -           | -12.5                              |      | +12.5 | GHz   |       |
| Side Mode Suppression Ratio      | SMSR        | 30                                 |      |       | dB    |       |
| Average Output Power (Laser Off) | Poff        |                                    |      | -30   | dBm   |       |
| Extinction Ratio                 | ER          | 8.2                                |      |       | dB    | 3     |
| Dispersion Penalty               | DP          |                                    |      | 2     | dB    |       |
| Relative Intensity Noise         | RIN         |                                    |      | -128  | dB/Hz |       |
| Optical Return Loss Tolerance    | ORLT        | 21                                 |      |       | dB    |       |
| Receiver (10G)                   |             |                                    |      |       |       |       |
| Optical Center Wavelength        |             | 1260                               |      | 1600  | nm    |       |
| Received Sensitivity             | RSENS       |                                    |      | -23   | dBm   | 4     |
| Optical Power Overload           | POL         |                                    |      | -7    | dBm   |       |
| Receiver Reflectance             | RFL         |                                    |      | -27   | dB    |       |
| Rx_LOS of Signal Assert          | LOSA        | -40                                |      |       | dBm   |       |
| Rx_LOS of Signal De-Assert       | LOSD        |                                    |      | -25   | dBm   |       |
| Rx_LOS of Signal Hysteresis      | LOSH        | 0.5                                |      | 6     | dB    |       |
| Receiver (1.25G)                 |             |                                    |      |       |       |       |
| Optical Center Wavelength        |             | 1260                               |      | 1600  | nm    |       |
| Received Sensitivity             | RSENS       |                                    |      | -28   | dBm   | 5     |
| Optical Power Overload           | POL         |                                    |      | -7    | dBm   |       |
| Receiver Reflectance             | RFL         |                                    |      | -27   | dB    |       |
| Rx_LOS of Signal Assert          | LOSA        | -40                                |      |       | dBm   |       |
| Rx_LOS of Signal De-Assert       | LOSD        |                                    |      | -30   | dBm   |       |
| Rx_LOS of Signal Hysteresis      | LOSH        | 0.5                                |      | 6     | dB    |       |

## Notes:

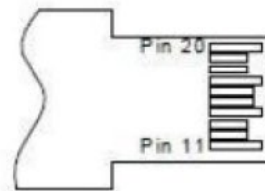
1. The optical power is launched into SMF.
2. See details in ITU Channel Wavelength Guide.
3. Measured with PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps or 2<sup>7</sup>-1 test pattern @1.25Gbps.
4. Measured with worst ER=8.2dB, BER less than 1E<sup>-12</sup>, and PRBS 2<sup>31</sup>-1 @10.3125Gbps.
5. Measured with worst ER=8.2dB, BER less than 1E<sup>-12</sup>, and PRBS 2<sup>7</sup>-1 @1.25Gbps.

## Pin Descriptions

| Pin | Symbol     | Name/Description                                                 | Notes |
|-----|------------|------------------------------------------------------------------|-------|
| 1   | VeeT       | Transmitter Ground. Common with Receiver Ground.                 |       |
| 2   | Tx_Fault   | Transmitter Fault.                                               |       |
| 3   | Tx_Disable | Transmitter Disable. Laser output disabled on “high” or “open.”  |       |
| 4   | SDA        | 2-Wire Serial Interface Data.                                    |       |
| 5   | SCL        | 2-Wire Serial Interface Clock.                                   |       |
| 6   | MOD_ABS    | Module Absent. Grounded within the Module.                       |       |
| 7   | RS0        | Rate Select 0.                                                   |       |
| 8   | LOS        | Loss of Signal Indication. “Logic 0” indicates normal operation. |       |
| 9   | RS1        | No Connection Required.                                          |       |
| 10  | VeeR       | Receiver Ground. Common with Transmitter Ground.                 |       |
| 11  | VeeR       | Receiver Ground. Common with Transmitter Ground.                 |       |
| 12  | RD-        | Receiver Inverted Data Out. AC Coupled.                          |       |
| 13  | RD+        | Receiver Non-Inverted Data Out. AC Coupled.                      |       |
| 14  | VeeR       | Receiver Ground. Common with Transmitter Ground.                 |       |
| 15  | VccR       | Receiver Power Supply.                                           |       |
| 16  | VccT       | Transmitter Power Supply.                                        |       |
| 17  | VeeT       | Transmitter Ground. Common with Receiver Ground.                 |       |
| 18  | TD+        | Transmitter Non-Inverted Data In. AC Coupled.                    |       |
| 19  | TD-        | Transmitter Inverted Data In. AC Coupled.                        |       |
| 20  | VeeT       | Transmitter Ground. Common with Receiver Ground.                 |       |

## Electrical Pin-Out Details

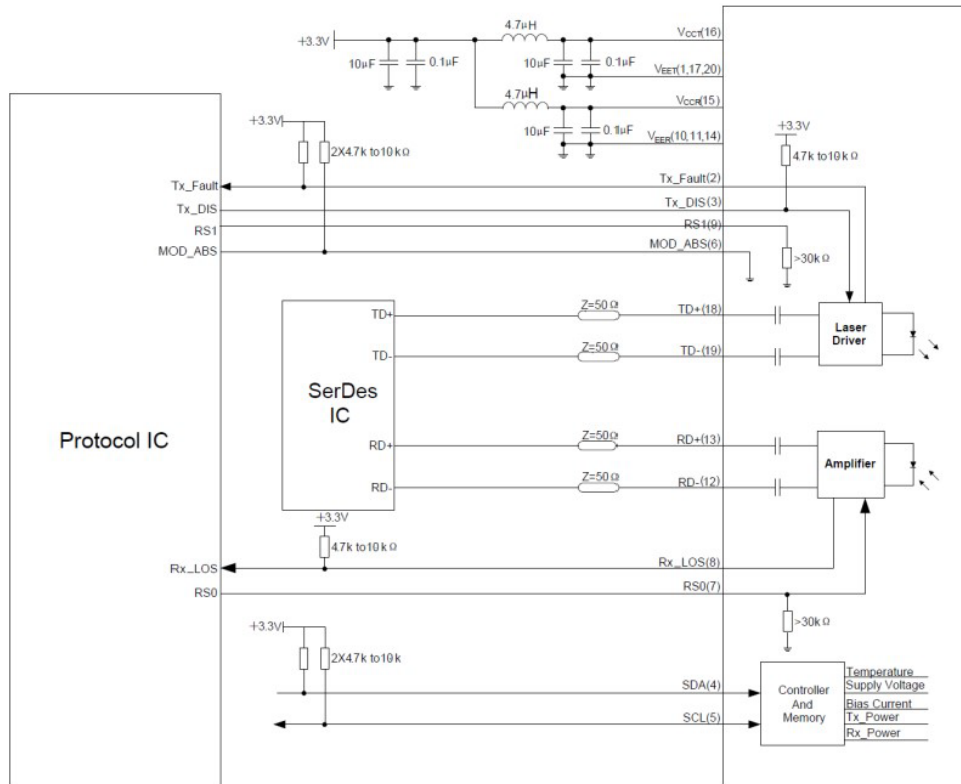
TOP VIEW  
OF BOARD



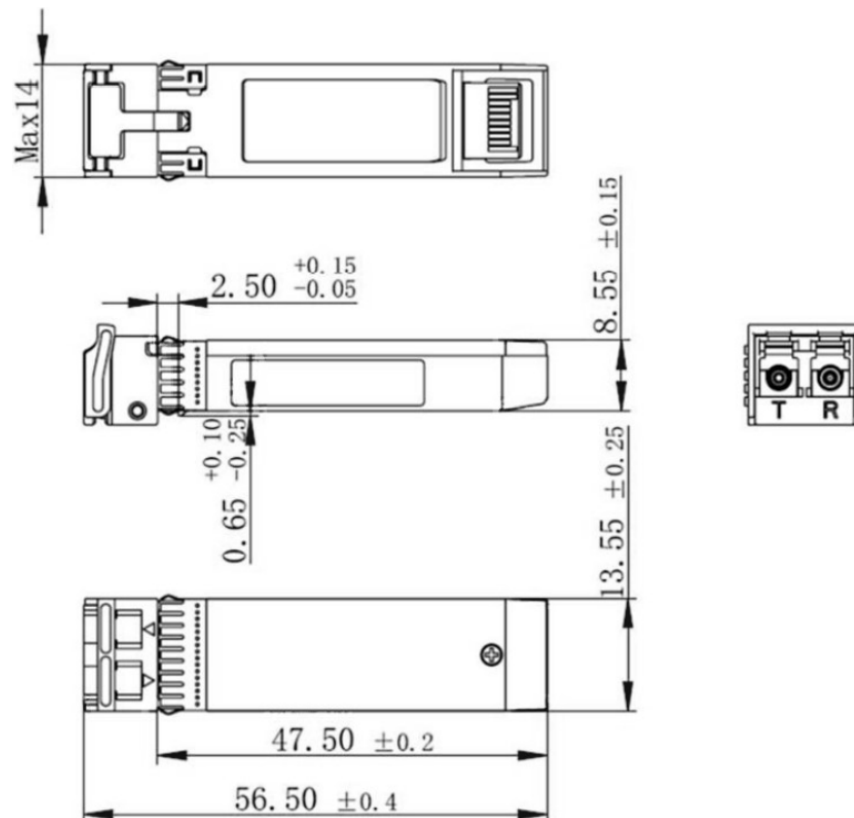
BOTTOM VIEW  
OF BOARD



## Recommended Interface Circuit



## Mechanical Specifications



## About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



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