

## SFP-25GB-DW23-10-AO

MSA and TAA 25GBase-DWDM SFP28 Transceiver C-Band 100GHz (SMF, 1558.98nm, 10km, LC, DOM)

### Features

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



### Applications

- 25GBase-LR Ethernet
- Access, Metro and Enterprise

### Product Description

This MSA Compliant SFP28 transceiver provides 25GBase-DWDM throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1558.98nm 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.

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."



### Wavelength Guide (100GHz ITU Channels)

| Channel | Wavelength (nm) | Frequency (THZ) | Channel | Wavelength (nm) | Frequency (THZ) |
|---------|-----------------|-----------------|---------|-----------------|-----------------|
| 15      | 1565.50         | 191.5           | 39      | 1546.12         | 193.9           |
| 16      | 1564.68         | 191.6           | 40      | 1545.32         | 194.0           |
| 17      | 1563.86         | 191.7           | 41      | 1544.53         | 194.1           |
| 18      | 1563.05         | 191.8           | 42      | 1543.73         | 194.2           |
| 19      | 1562.23         | 191.9           | 43      | 1542.94         | 194.3           |
| 20      | 1561.42         | 192.0           | 44      | 1542.14         | 194.4           |
| 21      | 1560.61         | 192.1           | 45      | 1541.35         | 194.5           |
| 22      | 1559.79         | 192.2           | 46      | 1540.56         | 194.6           |
| 23      | 1558.98         | 192.3           | 47      | 1539.77         | 194.7           |
| 24      | 1558.17         | 192.4           | 48      | 1538.98         | 194.8           |
| 25      | 1557.36         | 192.5           | 49      | 1538.19         | 194.9           |
| 26      | 1556.55         | 192.6           | 50      | 1537.40         | 195.0           |
| 27      | 1555.75         | 192.7           | 51      | 1536.61         | 195.1           |
| 28      | 1554.94         | 192.8           | 52      | 1535.82         | 195.2           |
| 29      | 1554.13         | 192.9           | 53      | 1535.04         | 195.3           |
| 30      | 1553.33         | 193.0           | 54      | 1534.25         | 195.4           |
| 31      | 1552.52         | 193.1           | 55      | 1533.47         | 195.5           |
| 32      | 1551.72         | 193.2           | 56      | 1532.68         | 195.6           |
| 33      | 1550.92         | 193.3           | 57      | 1531.90         | 195.7           |
| 34      | 1550.12         | 193.4           | 58      | 1531.12         | 195.8           |
| 35      | 1549.32         | 193.5           | 59      | 1530.33         | 195.9           |
| 36      | 1548.51         | 193.6           | 60      | 1529.55         | 196.0           |
| 37      | 1547.72         | 193.7           | 61      | 1528.77         | 196.1           |
| 38      | 1546.92         | 193.8           |         |                 |                 |

### Absolute Maximum Ratings

| Parameter                  | Symbol | Min. | Typ.  | Max. | Unit | Notes |
|----------------------------|--------|------|-------|------|------|-------|
| Maximum Supply Voltage     | Vcc    | -0.5 |       | 3.6  | V    |       |
| Storage Temperature        | Tstg   | -40  |       | 85   | °C   |       |
| Operating Case Temperature | Tc     | 0    |       | 70   | °C   |       |
| Relative Humidity          | RH     | 5    |       | 85   | %    |       |
| Data Rate                  | BR     |      | 25.78 |      | Gbps |       |

## Electrical Characteristics

| Parameter                     |         | Symbol           | Min. | Typ. | Max.                 | Unit  | Notes |
|-------------------------------|---------|------------------|------|------|----------------------|-------|-------|
| Power Supply Voltage          |         | V <sub>cc</sub>  | 3.15 | 3.3  | 3.45                 | V     |       |
| Power Supply Current          |         | I <sub>cc</sub>  |      |      | 606                  | mA    |       |
| Transmitter                   |         |                  |      |      |                      |       |       |
| Differential CML Inputs       |         | V <sub>in</sub>  | 40   |      | 1000                 | mVp-p | 1     |
| Differential Input Impedance  |         | Z <sub>in</sub>  |      | 100  |                      | Ω     | 2     |
| Tx_Dis                        | Disable |                  | 2    |      | V <sub>cc</sub> +0.3 | V     |       |
|                               | Enable  |                  | 0    |      | 0.8                  |       |       |
| Tx-Fault                      | Fault   |                  | 2    |      | V <sub>cc</sub> +0.3 | V     |       |
|                               | Normal  |                  | 0    |      | 0.8                  |       |       |
| Receiver                      |         |                  |      |      |                      |       |       |
| Differential CML Outputs      |         | V <sub>out</sub> | 450  |      | 1050                 | mVp-p | 3     |
| Differential Output Impedance |         | Z <sub>out</sub> | 85   | 100  | 115                  | Ω     |       |
| RXD_LOS                       | LOS     |                  | 2    |      | V <sub>cc</sub> +0.3 | V     |       |
|                               | Normal  |                  | 0    |      | 0.8                  |       |       |

### Notes:

1. AC coupled input. CML logic. Internally AC coupled.
2. R<sub>IN</sub>>100kΩ @ DC.
3. AC coupled output. CML logic. Internally AC coupled.

## Optical Characteristics

| Parameter                               | Symbol           | Min.    | Typ. | Max.    | Unit | Notes |
|-----------------------------------------|------------------|---------|------|---------|------|-------|
| Transmitter                             |                  |         |      |         |      |       |
| Wavelength                              | $\lambda$        | 1528.77 |      | 1565.50 | nm   |       |
| Center Wavelength Spacing               |                  |         | 100  |         | GHz  |       |
|                                         |                  |         | 0.8  |         | nm   |       |
| Side Mode Suppression Ratio             | SMSR             | 30      |      |         | dB   |       |
| Average Output Power                    | P <sub>out</sub> | -3      |      | 2       | dBm  | 1     |
| Extinction Ratio                        | ER               | 3       |      |         | dB   |       |
| Receiver                                |                  |         |      |         |      |       |
| Receiver Sensitivity @25.78Gbps         | P <sub>min</sub> |         |      | -10     | dBm  | 2     |
| Receiver Overload                       | P <sub>max</sub> | 2       |      |         | dBm  |       |
| LOS De-Assert                           | LOSD             |         |      | -17     | dBm  |       |
| LOS Assert                              | LOSA             | -30     |      |         | dBm  |       |
| LOS Hysteresis                          | H <sub>y</sub>   | 0.5     |      |         | dB   |       |
| Optical Signal to Noise Ratio Tolerance | OSNR             | 33      |      |         | dB   |       |

### Notes:

1. Output is coupled into a 9/125μm single-mode fiber.
2. Minimum average optical power measured at the BER less than  $5E^{-5}$ . The measure pattern is PRBS  $2^{31}-1$ .

## Pin Descriptions

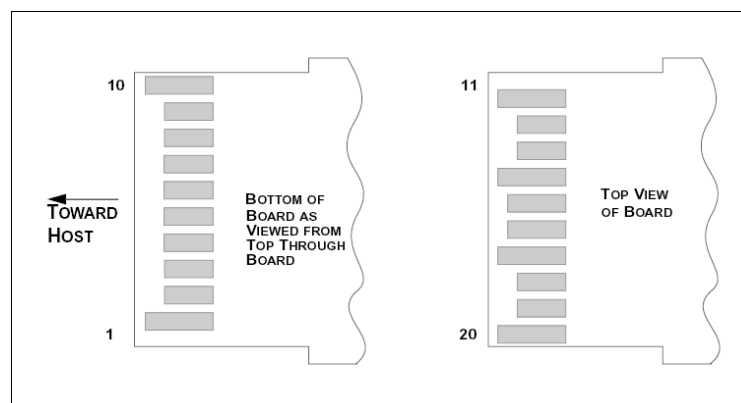
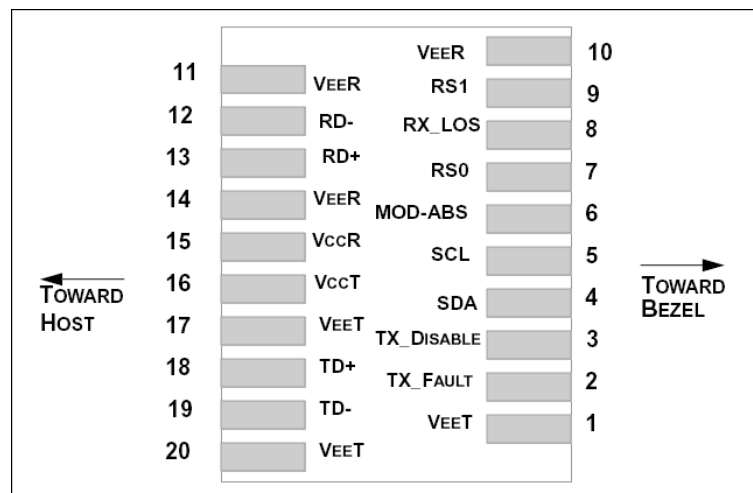
| Pin | Symbol     | Name/Descriptions                                         | Plug Sequence | Ref. |
|-----|------------|-----------------------------------------------------------|---------------|------|
| 1   | VeeT       | Transmitter Ground.                                       | 1             | 5    |
| 2   | TX_Fault   | Transmitter Fault Indication.                             | 3             | 1    |
| 3   | TX Disable | Transmitter Disable. Module disables on "high" or "open." | 3             | 2    |
| 4   | SDA        | Module Definition 2. 2-Wire Serial Interface Data.        | 3             | 3    |
| 5   | SCL        | Module Definition 1. 2-Wire Serial Interface Clock.       | 3             | 3    |
| 6   | MOD-ABS    | Module Definition 0.                                      | 3             | 3    |
| 7   | RS0        | RX Rate Select (LVTTTL).                                  | 3             | 9    |
| 8   | RX_LOS     | Loss of Signal.                                           | 3             | 4    |
| 9   | RS1        | TX Rate Select (LVTTTL).                                  | 1             | 9    |
| 10  | VeeR       | Receiver Ground.                                          | 1             | 5    |
| 11  | VeeR       | Receiver Ground.                                          | 1             | 5    |
| 12  | RD-        | Inverted Received Data Out.                               | 3             | 6    |
| 13  | RD+        | Received Data Out.                                        | 3             | 7    |
| 14  | VeeR       | Receiver Ground.                                          | 1             | 5    |
| 15  | VccR       | Receiver Power. $3.3 \pm 5\%$ .                           | 2             | 7    |
| 16  | VccT       | Transmitter Power. $3.3 \pm 5\%$ .                        | 2             | 7    |
| 17  | VeeT       | Transmitter Ground.                                       | 1             | 5    |
| 18  | TD+        | Transmit Data In.                                         | 3             | 8    |
| 19  | TD-        | Inverted Transmit Data In.                                | 3             | 8    |
| 20  | VeeT       | Transmitter Ground.                                       | 1             | 5    |

### Notes:

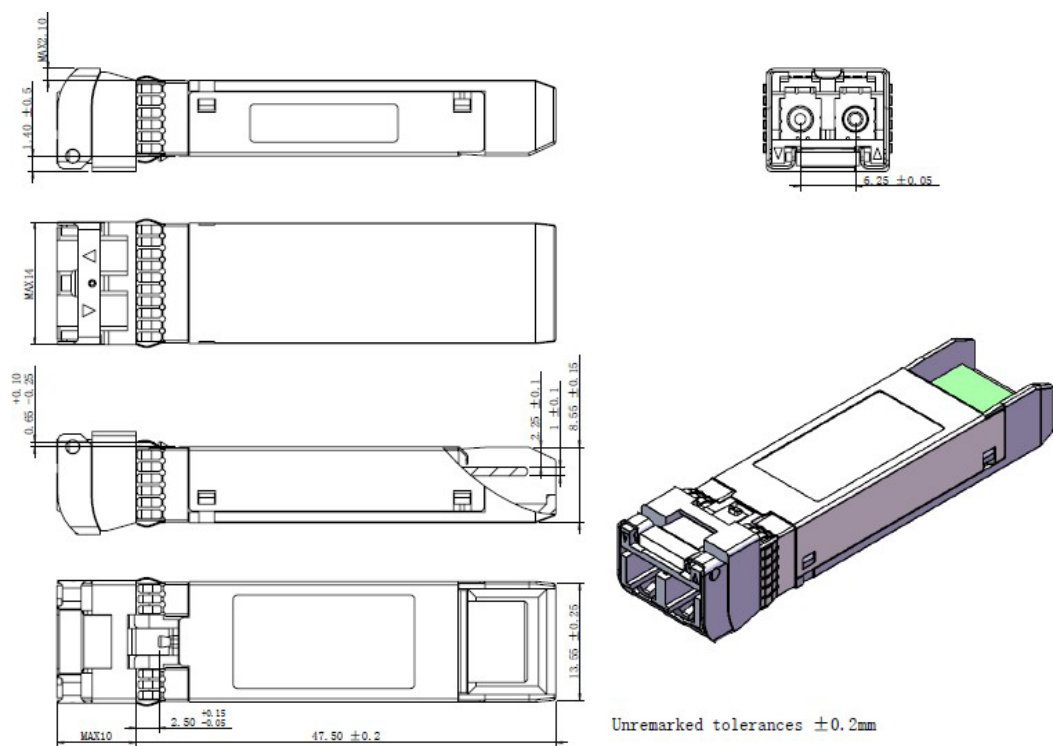
1. Tx\_Fault is an open collector/drain output which should be pulled up with a 4.7k $\Omega$  to 10k $\Omega$  resistor on the host board. Pull-up voltage is between 2.4V and VccT/R+0.3V. When "high," the output indicates a laser fault of some kind. "Low" indicates normal operation. In the "low" state, the output will be pulled to <0.4V..
2. Tx\_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k $\Omega$ –10k $\Omega$  resistor. Its states are:
  - Low (-0.3 – 0.8V): Transmitter On.
  - (>0.8, < 2.0V): Undefined.
  - High (2.0 – VccT/R+0.3V): Transmitter Disabled.
  - Open: Transmitter Disabled.
3. Module Absent. Connected to the VeeT or VeeR in the module.
4. LOS (Loss of Signal) is an open collector/drain output which should be pulled up with a 4.7k $\Omega$  to 10k $\Omega$  resistor. Pull-up is voltage between 2.4V and VccT/R+0.3V. When "high," this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). "Low" indicates normal operation. In the "low" state, the output will be pulled to <0.4V.

5. VeeR and VeeT may be internally connected within the SFP28 module.
6. RD-/+: these are the differential receiver outputs. They are AC coupled 100 (differential) lines which should be terminated with 100 $\Omega$  (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 225mV-525mV single-ended when properly terminated.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V $\pm$ 5% at the SFP+ connector pin. Maximum supply current is 606mA. Inductors with DC resistance of less than 1 $\Omega$  should be used in order to maintain the required voltage at the SFP28 input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot-plugging of the SFP28 transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
8. TD-/+: these are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential terminations inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 20mV-500mV single-ended, though it is recommended the values between 90mV-900mV single-ended be used for best EMI performance.
9. This pin has an internal 30k pull down to ground. This pin will not affect module performance.

### Transceiver Pad layout



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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