

### **SFP-25GB-DW48-10-I-C**

MSA and TAA 25GBase-DWDM SFP28 Transceiver C-Band 100GHz (SMF, 1538.98nm, 10km, LC, DOM, -40 to 85C)

#### **Features:**

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Industrial Temperature -40 to 85 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- 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 1538.98nm 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.

ProLabs' 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 Channels)

| Channel | Wavelength(nm) | Frequency(THZ) | Channel | Wavelength(nm) | Frequency(THZ) |
|---------|----------------|----------------|---------|----------------|----------------|
| D21     | 1560.61        | 192.1          | D41     | 1544.53        | 194.1          |
| D22     | 1559.79        | 192.2          | D42     | 1543.73        | 194.2          |
| D23     | 1558.98        | 192.3          | D43     | 1542.94        | 194.3          |
| D24     | 1558.17        | 192.4          | D44     | 1542.14        | 194.4          |
| D25     | 1557.36        | 192.5          | D45     | 1541.35        | 194.5          |
| D26     | 1556.55        | 192.6          | D46     | 1540.56        | 194.6          |
| D27     | 1555.75        | 192.7          | D47     | 1539.77        | 194.7          |
| D28     | 1554.94        | 192.8          | D48     | 1538.98        | 194.8          |
| D29     | 1554.13        | 192.9          | D49     | 1538.19        | 194.9          |
| D30     | 1553.33        | 193.0          | D50     | 1537.4         | 195.0          |
| D31     | 1552.52        | 193.1          | D51     | 1536.61        | 195.1          |
| D32     | 1551.72        | 193.2          | D52     | 1535.82        | 195.2          |
| D33     | 1550.92        | 193.3          | D53     | 1535.04        | 195.3          |
| D34     | 1550.12        | 193.4          | D54     | 1534.25        | 195.4          |
| D35     | 1549.32        | 193.5          | D55     | 1533.47        | 195.5          |
| D36     | 1548.51        | 193.6          | D56     | 1532.68        | 195.6          |
| D37     | 1547.72        | 193.7          | D57     | 1531.9         | 195.7          |
| D38     | 1546.92        | 193.8          | D58     | 1531.12        | 195.8          |
| D39     | 1546.12        | 193.9          | D59     | 1530.33        | 195.9          |
| D40     | 1545.32        | 194.0          | D60     | 1529.55        | 196.0          |

## Absolute Maximum Ratings

| Parameter                  | Symbol | Min.  | Typ. | Max.  | Unit | Notes |
|----------------------------|--------|-------|------|-------|------|-------|
| Maximum Supply Voltage     | Vcc    | -0.3  |      | 4.0   | V    |       |
| Storage Temperature        | TS     | -40   |      | 85    | °C   |       |
| Operating Case Temperature | Tc     | -40   |      | 85    | °C   |       |
| Relative Humidity          | RH     | 0     |      | 85    | %    |       |
| Data Rate                  | BR     | 24.33 |      | 25.78 | Gbps |       |

## Electrical Characteristics

| Parameter                          | Symbol                    | Min.            | Typ. | Max.                 | Unit  | Notes |
|------------------------------------|---------------------------|-----------------|------|----------------------|-------|-------|
| Supply Voltage                     | V <sub>CC</sub>           | 3.13            |      | 3.47                 |       |       |
| Power Dissipation                  | PD                        |                 |      | 2.0                  | W     |       |
| Transmitter                        |                           |                 |      |                      |       |       |
| Data Input Swing Differential      | V <sub>IN</sub>           | 190             |      | 1000                 | mV    |       |
| Differential line input Impedance  | R <sub>IN</sub>           | 80              | 100  | 120                  | Ohm   |       |
| Transmitter Fault Output-High      | V <sub>FaultH</sub>       | 2               |      | V <sub>CC</sub> +0.3 | V     |       |
| Transmitter Fault Output-Low       | V <sub>FaultL</sub>       | V <sub>EE</sub> |      | V <sub>EE</sub> +0.8 | V     |       |
| Transmitter Disable Voltage-High   | V <sub>DisH</sub>         | 2               |      | V <sub>CC</sub> +0.3 | V     |       |
| Transmitter Disable Voltage- low   | V <sub>DisL</sub>         | V <sub>EE</sub> |      | V <sub>EE</sub> +0.8 | V     |       |
| Receiver                           |                           |                 |      |                      |       |       |
| Differential line Output Impedance | R <sub>OUT</sub>          | 80              | 100  | 120                  | Ohm   |       |
| Differential Data Output Voltage   | V <sub>DR</sub>           | 350             |      | 850                  | mVp-p |       |
| LOS Output Voltage-High            | V <sub>LOSH</sub>         | 2               |      | V <sub>CC</sub> +0.3 | V     |       |
| LOS Output Voltage-Low             | V <sub>LOSL</sub>         | V <sub>EE</sub> |      | V <sub>EE</sub> +0.8 | V     |       |
| Others                             |                           |                 |      |                      |       |       |
| Cold-Start time                    | T <sub>start-cooled</sub> |                 |      | 35                   | s     |       |

## Optical Characteristics

| Parameter  | Symbol                | Min.    | Typ. | Max.    | Unit  | Notes |
|--|-----------------------|---------|------|---------|-------|-------|
| <b>Transmitter</b>   |                       |         |      |         |       |       |
| Wavelength   | $\lambda$             | 1529.55 |      | 1560.61 | nm    |       |
| Center Wavelength Spacing                                    |                       | 100     |      |         | GHz   |       |
| Average Launched Power                                       | P <sub>O</sub>        | -1      |      | 5       | dBm   |       |
| Extinction Ratio   | ER                    | 6       |      |         | dB    |       |
| Average Launched Power (Laser Off)                           | P <sub>off</sub>      |         |      | -30     | dBm   |       |
| Side-Mode Suppression Ratio                                  | SMSR                  | 30      |      |         | dB    |       |
| Relative Intensity Noise                                     | RIN <sub>20 OMA</sub> |         |      | -130    | dB/Hz |       |
| <b>Receiver</b>  |                       |         |      |         |       |       |
| Center Wavelength  | $\lambda_{IN}$        | 1260    |      | 1620    | nm    |       |
| Receiver Overload  | P <sub>overload</sub> | 2       |      |         | dBm   |       |
| Receiver Sensitivity @5E-5 BOL                               | P <sub>sen BOL</sub>  |         |      | -15     | dBm   |       |
| Receiver Sensitivity @5E-5 EOL                               | P <sub>sen EOL</sub>  |         |      | -14.5   | dBm   | 1     |
| Receiver Sensitivity @5E-5 EOL after 10km fiber transmission | P <sub>sen1 EOL</sub> |         |      | -9.0    | dBm   | 1     |
| Los Of Signal Assert   | P <sub>A</sub>        | -30     |      |         | dBm   |       |
| Los Of Signal De-assert                                      | P <sub>D</sub>        |         |      | -16     | dBm   |       |
| LOS -Hysteresis  | P <sub>Hys</sub>      | 0.5     |      | 6       | dB    |       |

### Notes:

1. Measured at 5E-5, ER>4dB, PRBS 2<sup>31</sup> -1

## Pin Descriptions

| Pin | Symbol  | Name/Descriptions  | Ref. |
|-----|---------|--|------|
| 1   | VEET    | Transmitter Ground   | 1    |
| 2   | TFAULT  | Transmitter Fault  | 2    |
| 3   | TDIS    | Transmitter Disable. Laser output disabled on high or open.    | 3    |
| 4   | SDA     | 2-wire Serial Interface Data Line                              | 2    |
| 5   | SCL     | 2-wire Serial Interface Clock Line                             | 2    |
| 6   | MOD_ABS | Module Absent. Grounded within the module                      | 2    |
| 7   | NA      | Not Used   |      |
| 8   | RX_LOS  | Loss of Signal indication. Logic 0 indicates normal operation. | 4    |
| 9   | NA      | No Used  |      |
| 10  | VEER    | Receiver Ground  | 1    |
| 11  | VEER    | Receiver Ground  | 1    |
| 12  | RD-     | Receiver Inverted DATA out. AC Coupled.                        |      |
| 13  | RD+     | Receiver Non-inverted DATA out. AC Coupled.                    |      |
| 14  | VEER    | Receiver Ground  | 1    |
| 15  | VCCR    | Receiver Power Supply  | 5    |
| 16  | VCCT    | Transmitter Power Supply                                       | 5    |
| 17  | VEET    | Transmitter Ground   | 1    |
| 18  | TD+     | Transmitter Non-Inverted DATA in. AC Coupled.                  |      |
| 19  | TD-     | Transmitter Inverted DATA in. AC Coupled.                      |      |
| 20  | VEET    | Transmitter Ground   | 1    |

## Notes:

1. Circuit ground is internally isolated from chassis ground.
2. T<sub>FAULT</sub> is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to V<sub>cc</sub> + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on T<sub>DIS</sub> >2.0V or open, enabled on T<sub>DIS</sub> <0.8V.
4. LOS is open collector output. Should be pulled up with 4.7k – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
5. Internally connected



Pin-out of connector Block on Host board

### Block Diagram of Transceiver



Recommended Interface Circuit



Mechanical Specifications



## About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



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