

### **SFP-10GB-DW4150-40-I-J-C**

Juniper Networks® Compatible TAA 10GBase-DWDM SFP+ Transceiver 100GHz (SMF, 1544.53nm to 1537.40nm, 40km, LC, DOM, -40 to 85C)

#### **Features:**

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



#### **Applications:**

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

#### **Product Description**

This Juniper Networks® SFP+ transceiver provides 10GBase-DWDM throughput up to 40km 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 Juniper Networks® 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.

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."



## 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           | V <sub>CC</sub>   | 3.135 | 3.3  | 3.465           | V    |       |
| Transmitter                    |                   |       |      |                 |      |       |
| Differential Data Input Swing  | V <sub>IN</sub>   | 170   |      | 700             | mV   |       |
| Input Differential Impedance   | Z <sub>IN</sub>   |       | 100  |                 | Ω    |       |
| Transmitter Disable Voltage    | V <sub>DIS</sub>  | 2.0   |      | V <sub>CC</sub> | V    |       |
| Transmitter Enable Voltage     | V <sub>EN</sub>   | 0     |      | 0.8             | V    |       |
| Receiver                       |                   |       |      |                 |      |       |
| Differential Data Output Swing | V <sub>OUT</sub>  | 300   |      | 850             | mV   |       |
| Output Differential Impedance  | Z <sub>OUT</sub>  |       | 100  |                 | Ω    |       |
| LOS Assert Voltage             | V <sub>LOSA</sub> | 2.0   |      | V <sub>CC</sub> | V    |       |
| LOS De-Assert Voltage          | V <sub>LOSD</sub> | 0     |      | 0.8             | V    |       |

## Timing Characteristics

| Parameter                  | Symbol            | Min. | Typ. | Max. | Unit | Notes |
|----------------------------|-------------------|------|------|------|------|-------|
| Module Initialize Time     | T <sub>init</sub> |      |      | 20   | s    |       |
| Module Channel Switch Time | T <sub>sel</sub>  |      |      | 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:

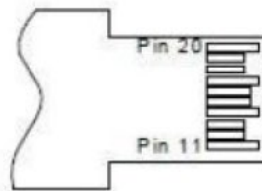
1. The optical power is launched into SMF.
2. See details in ITU Channel Wavelength Guide.
3. Measured with PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps or 2<sup>7</sup>-1 test pattern @1.25Gbps.
4. Measured with worst ER=8.2dB, BER less than 1E<sup>-12</sup>, and PRBS 2<sup>31</sup>-1 @10.3125Gbps.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

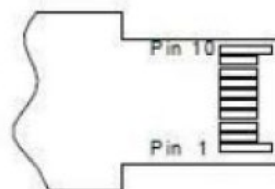
| Pin | Symbol     | Name/Description   | Notes |
|-----|------------|--|-------|
| 1   | VeeT       | Transmitter Ground. Common with Receiver Ground.                 |       |
| 2   | Tx_Fault   | Transmitter Fault.   |       |
| 3   | Tx_Disable | Transmitter Disable. Laser output disabled on “high” 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 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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