

### SFPP-10G-DW17-ZR-C

Juniper Networks® SFPP-10G-DW17-ZR Compatible TAA 10GBase-DWDM SFP+ Transceiver C-Band 100GHz (SMF, 1563.86nm, 80km, LC, DOM)

#### Features:

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Temperature-stabilized EML transmitter and APD receiver
- 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, Metro and Enterprise

#### Product Description

This Juniper Networks® SFPP-10G-DW17-ZR compatible SFP+ transceiver provides 10GBase-DWDM throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1563.86nm 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.")



### Wavelength Guide (100GHz ITU-T Channels)

| ITU Channel # | Frequency (THz) | Center Wavelength (nm) |
|---------------|-----------------|------------------------|
| 17            | 191.7           | 1563.86                |
| 18            | 191.8           | 1563.05                |
| 19            | 191.9           | 1562.23                |
| 20            | 192.0           | 1561.42                |
| 21            | 192.1           | 1560.61                |
| 22            | 192.2           | 1559.79                |
| 23            | 192.3           | 1558.98                |
| 24            | 192.4           | 1558.17                |
| 25            | 192.5           | 1557.36                |
| 26            | 192.6           | 1556.55                |
| 27            | 192.7           | 1555.75                |
| 28            | 192.8           | 1554.94                |
| 29            | 192.9           | 1554.13                |
| 30            | 193.0           | 1553.33                |
| 31            | 193.1           | 1552.52                |
| 32            | 193.2           | 1551.72                |
| 33            | 193.3           | 1550.92                |
| 34            | 193.4           | 1550.12                |
| 35            | 193.5           | 1549.32                |
| 36            | 193.6           | 1548.51                |
| 37            | 193.7           | 1547.72                |
| 38            | 193.8           | 1546.92                |
| 39            | 193.9           | 1546.12                |
| 40            | 194.0           | 1545.32                |
| 41            | 194.1           | 1544.53                |
| 42            | 194.2           | 1543.73                |
| 43            | 194.3           | 1542.94                |
| 44            | 194.4           | 1542.14                |
| 45            | 194.5           | 1541.35                |
| 46            | 194.6           | 1540.56                |
| 47            | 194.7           | 1539.77                |
| 48            | 194.8           | 1538.98                |
| 49            | 194.9           | 1538.19                |
| 50            | 195.0           | 1537.40                |
| 51            | 195.1           | 1536.61                |

|    |       |         |
|----|-------|---------|
| 52 | 195.2 | 1535.82 |
| 53 | 195.3 | 1535.04 |
| 54 | 195.4 | 1534.25 |
| 55 | 195.5 | 1533.47 |
| 56 | 195.6 | 1532.68 |
| 57 | 195.7 | 1531.90 |
| 58 | 195.8 | 1531.12 |
| 59 | 195.9 | 1530.33 |
| 60 | 196.0 | 1529.55 |

### Absolute Maximum Ratings

| Parameter                   | Symbol | Min. | Typ.    | Max. | Unit | Notes |
|-----------------------------|--------|------|---------|------|------|-------|
| Storage Temperature         | Tstg   | -40  |         | +85  | °C   | 1     |
| Maximum Supply Voltage      | Vcc    | -0.5 |         | 3.6  | V    |       |
| Operating Relative Humidity | RH     |      |         | 95   | %    |       |
| Power Budget                |        | 23   |         |      | dB   |       |
| Data Rate                   |        |      | 10.3125 |      | Gbps |       |

### Notes:

- Exceeding any one of these values may destroy the device permanently.

### Electrical Characteristics

| Parameter                     |      | Symbol | Min. | Typ. | Max.    | Unit  | Notes |
|-------------------------------|------|--------|------|------|---------|-------|-------|
| <b>Transmitter</b>            |      |        |      |      |         |       |       |
| CML Differential Inputs       |      | VIN    | 150  |      | 1200    | mVp-p | 1     |
| Input AC Common-Mode Voltage  |      |        |      |      | 25      | mV    | 2     |
| Input Differential Impedance  |      | ZIN    | 85   | 100  | 115     | Ω     | 3     |
| Tx_Disable                    | High |        | 2    |      | Vcc     | V     |       |
|                               | Low  |        |      |      | 0.8     |       |       |
| Tx_Fault                      | High |        | 2    |      | Vcc+0.3 | V     | 4     |
|                               | Low  |        |      |      | 0.5     |       | 5     |
| <b>Receiver</b>               |      |        |      |      |         |       |       |
| CML Differential Outputs      |      | VOUT   | 350  |      | 700     | mVp-p | 1     |
| Output Differential Impedance |      | ZOUT   | 85   | 100  | 115     | Ω     |       |
| Rx_LOS                        | High |        | 2    |      | Vcc+0.3 |       | 4     |

|              |     |     |     |  |     |   |   |
|--------------|-----|-----|-----|--|-----|---|---|
|              | Low |     |     |  | 0.8 |   | 5 |
| MOD_DEF(0.2) |     | VOH | 2.5 |  |     | V |   |
|              |     | VOL |     |  | 0.5 |   | 6 |

**Notes:**

1. AC coupled inputs.
2. RMS.
3.  $R_{IN} > 100k\Omega$  @DC.
4.  $I_o = 400\mu A$ ; Host\_Vcc.
5.  $I_o = -4.0mA$ .
6. With serial ID.

**Optical Characteristics**

| Parameter                        | Symbol          | Min.            | Typ.      | Max.            | Unit  | Notes |
|----------------------------------|-----------------|-----------------|-----------|-----------------|-------|-------|
| <b>Transmitter</b>               |                 |                 |           |                 |       |       |
| Operating Wavelength             | $\lambda$       | $\lambda - 0.1$ |           | $\lambda + 0.1$ | nm    |       |
| Spectral Width (-20dB)           | $\Delta\lambda$ |                 |           | 1               | nm    |       |
| Average Output Power             | POUT            |                 |           | 4               | dBm   | 1     |
| Extinction Ratio                 | ER              | 7.5             |           |                 | dB    |       |
| Average Power of Off Transmitter | Poff            |                 |           | -30             | dBm   |       |
| Relative Intensity Noise         | RIN             |                 |           | -128            | dB/Hz |       |
| Side-Mode Suppression Ratio      | SMSR            | 30              |           |                 | dB    |       |
| Transmitter Dispersion Penalty   | TDP             |                 |           | 3.0             | dB    |       |
| Tx_Disable Assert Time           | T_off           |                 |           | 10              | us    |       |
| <b>Receiver</b>                  |                 |                 |           |                 |       |       |
| Center Wavelength                | $\lambda_C$     | 1260            | $\lambda$ | 1600            | nm    |       |
| Receiver Sensitivity             | Pmin            |                 |           | -23             | dBm   | 2     |
| Receiver Overload                | Pmax            | -7              |           |                 | dBm   |       |
| LOS De-Assert                    | LOSD            |                 |           | -24             | dBm   |       |
| LOS Assert                       | LOSA            | -40             |           |                 | dBm   |       |
| LOS Hysteresis                   | LOSH            | 0.5             |           |                 | dB    |       |

**Notes:**

1. Output is coupled into a 9/125 $\mu m$  SMF.
2. Measured with worst ER, BER less than  $1E^{-12}$ , and PRBS  $2^{31}-1$  @10.3125Gbps.

## Pin Descriptions

| Pin | Symbol     | Name/Description              | Plug Seq. | Notes                                  |
|-----|------------|-------------------------------|-----------|----------------------------------------|
| 1   | VeeT       | Transmitter Ground.           | 1         | 5                                      |
| 2   | Tx_Fault   | Transmitter Fault Indication. | 3         | 1                                      |
| 3   | Tx_Disable | Transmitter Disable.          | 3         | 2, module disables on “high” or “open” |
| 4   | SDA        | Transmitter Disable.          | 3         | 3, 2-wire serial ID interface          |
| 5   | SCL        | Module Definition 2.          | 3         | 3, 2-wire serial ID interface          |
| 6   | MOD_ABS    | Module Definition 1.          | 3         | 3                                      |
| 7   | RS0        | Rx Rate Select (LVTTL).       | 3         | NC                                     |
| 8   | LOS        | Loss of Signal.               | 3         | 4                                      |
| 9   | RS1        | Tx Rate Select (LVTTL).       | 1         | NC                                     |
| 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         | 6                                      |
| 14  | VeeR       | Receiver Ground.              | 1         | 5                                      |
| 15  | VccR       | Receiver Power.               | 2         | 7, 3.3V ± 5%                           |
| 16  | VccT       | Transmitter Power.            | 2         | 7, 3.3V ± 5%                           |
| 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 that should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. Pull-up voltage is between 2.0V 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 <0.8V.
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 4.7kΩ to 10kΩ resistor. It states are:  
Low (0V-0.8V): Transmitter On  
(>0.8V, <2.0V): Undefined  
High (2.0V-3.465V): Transmitter Disabled  
Open: Transmitter Disabled.
3. Modulation absent. Connected to the VeeT or VeeR in the module.
4. LOS (Loss of Signal) is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor. Pull-up voltage between 2.0V and VccT/R+0.3V. When “high,” this output indicates that 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 <0.8V.
5. VeeR and VeeT may be internally connected within the SFP module.
6. RD-/+. These are the differential receiver outputs. They are AC-coupled, 100 differential lines that should be

terminated with 100 (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 400mV and 2000mV differential (200mV–1000mV single-ended) when properly terminated.

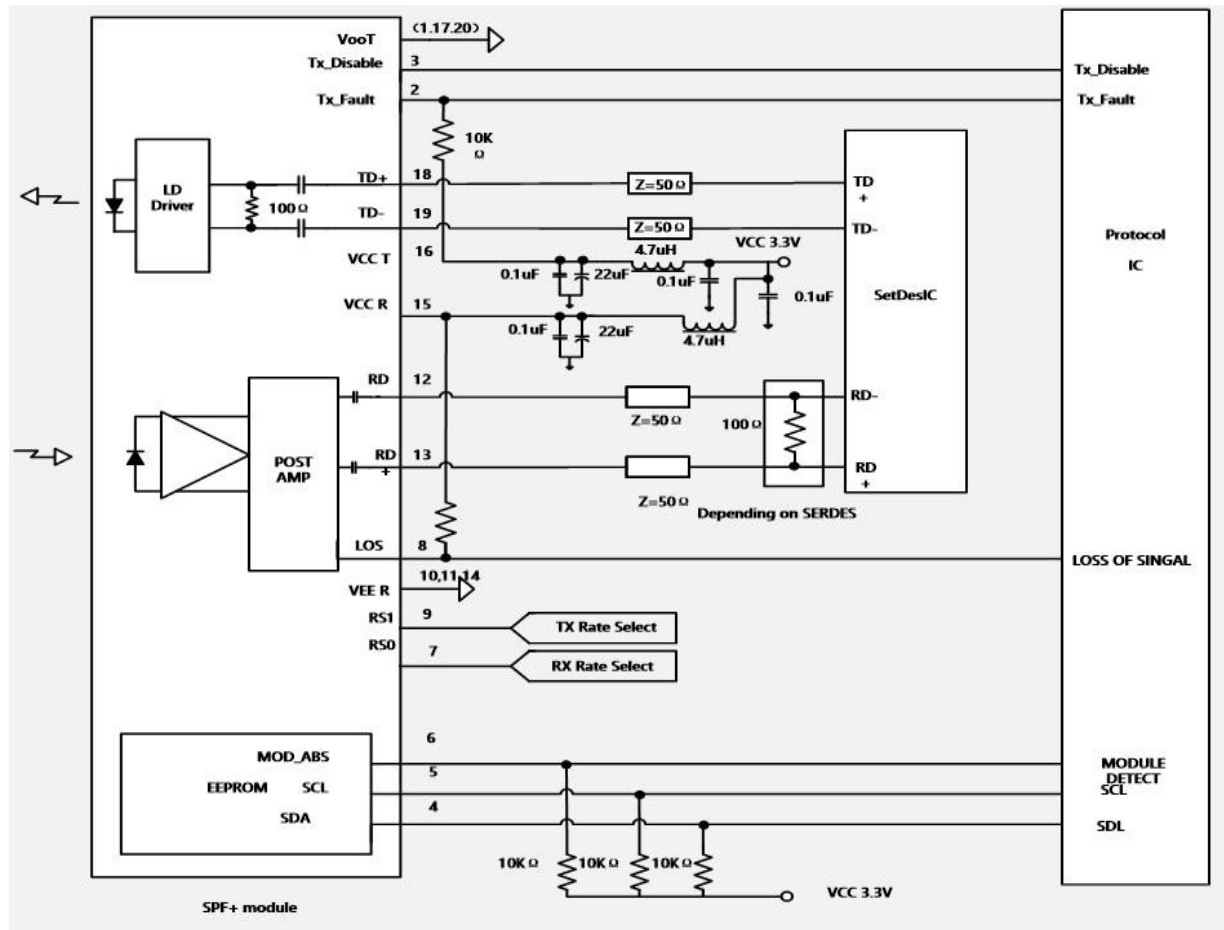
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V±5% at the SFP connector pin. Maximum supply current is 545mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1Ω should be used to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot-plugging of the SFP transceiver module will result in an in-rush 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 100Ω differential termination inside the module.

### Electrical Pin-Out Details

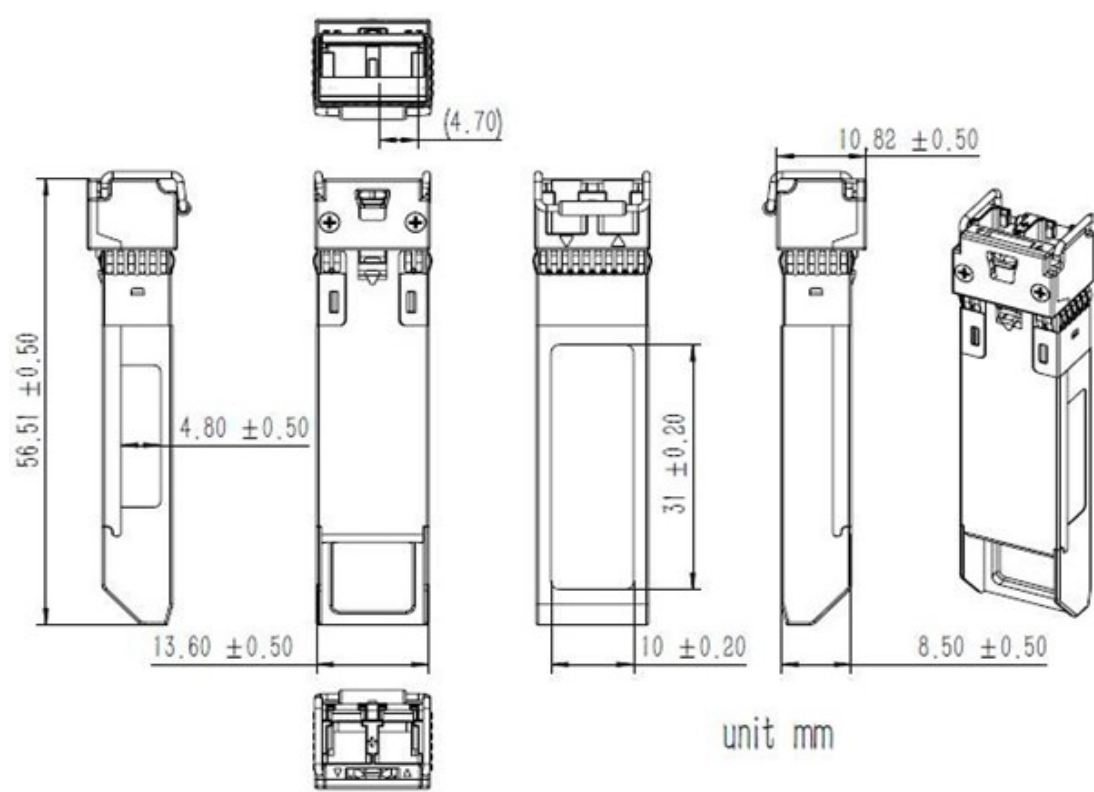
|    |                |         |    |
|----|----------------|---------|----|
| 11 | VEER           | VEER    | 10 |
| 12 | RD-            | RS1     | 9  |
| 13 | RD+            | RX_LOS  | 8  |
| 14 | VEER           | RS0     | 7  |
| 15 | VCCR           | MOD-ABS | 6  |
| 16 | VCCT           | SCL     | 5  |
| 17 | VEET           | SDA     | 4  |
| 18 | TD+ TX_DISABLE |         | 3  |
| 19 | TD- TX_FAULT   |         | 2  |
| 20 | VEET           | VEET    | 1  |

← TOWARD HOST
TOWARD BEZEL →

## Recommend Circuit Schematic



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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