**EX-SFP-10GE-ZR-54.13-100-I-OPC**

Juniper Networks® Compatible TAA 10GBase-DWDM SFP+ Transceiver C-Band 100GHz (SMF, 1554.13nm, 100km, LC, DOM, -40 to 85C)

**Features**

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Temperature-stabilized EML transmitter and APD receiver
- Single-mode Fiber
- Industrial Temperature -40 to 85 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® SFP+ transceiver provides 10GBase-DWDM throughput up to 100km over single-mode fiber (SMF) using a wavelength of 1554.13nm 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.

OptioConnect'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 internaltional trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")

**Rev. 062425**

**Wavelength Guide (100GHz ITU-T Channel)**

| Channel # | Frequency (THz) | Center Wavelength (nm) |
|---|---|---|
| **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 |
| **33** | 193.3 | 1551.72 |
| **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 |
| **61** | 196.1 | 1528.77 |

### Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| **Storage Temperature** | Tstg | -40 | | 85 | °C |
| **Operating Case Temperature** | Tc | -40 | 25 | 85 | °C |
| **Supply Voltage** | Vcc | -0.5 | | 4.0 | V |
| **Relative Humidity** | RH | 5 | | 95 | % |
| **Data Rate** | | | 10.3125 | | Gbps |

### Electrical Characteristics

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|---|
| **Supply Voltage** | | Vcc | 3.135 | 3.3 | 3.465 | V | |
| **Module Supply Current** | | Icc | | | 550 | mA | |
| **Power Dissipation** | | $P_{DISS}$ | | | 1.8 | W | |
| **Transmitter** | | | | | | | |
| **Input Differential Impedance** | | ZIN | | 100 | | Ω | |
| **Differential Data Input Swing** | | VIN,pp | 180 | | 700 | mVp-p | |
| **Tx_Fault** | **Transmitter Fault** | VOH | 2.0 | | Host_Vcc | V | |
| | **Normal Operation** | VOL | 0 | | 0.8 | V | |
| **Tx_Disable** | **Transmitter Disable** | VIH | 2.0 | | Host_Vcc | V | |
| | **Transmitter Enable** | VIL | 0 | | 0.8 | V | |
| **Receiver** | | | | | | | |
| **Output Differential Impedance** | | ZOUT | | 100 | | Ω | |
| **Differential Data Output Swing** | | VOUT,pp | 300 | | 850 | mVp-p | 1 |
| **Data Output Rise/Fall Time** | | Tr/Tf | 28 | | | ps | 2 |
| **Rx_LOS** | **Loss of Signal (LOS)** | VOH | 2.0 | | Host_Vcc | V | 3 |
| | **Normal Operation** | VOL | 0 | | 0.8 | V | 3 |

**Notes:**

1. Internally AC coupled but requires an external 100Ω differential load termination.
2. 20–80%.
3. LOS is an open collector output that should be pulled up with 4.7kΩ on the host board.

**Optical Characteristics**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | |
| **Launch Optical Power** | Po | +1.0 | | +4.0 | dBm | 1 |
| **Center Wavelength Range** | λC | 1528.77 | | 1562.23 | nm | |
| **Center Wavelength Spacing** | | | 100 | | GHz | |
| **Center Wavelength Tolerance** | ΔλC | -100 | | 100 | pm | |
| **Extinction Ratio** | ER | 9.0 | | | dB | 2 |
| **Side-Mode Suppression Ratio** | SMSR | 30 | | | dB | |
| **Spectral Width（-20dB）** | | | | 1 | nm | |
| **Transmitter and Dispersion Penalty** | TDP | | | 4.0 | dB | |
| **Relative Intensity Noise** | RIN | | | -128 | dB/Hz | |
| **Optical Return Loss Tolerance** | ORLT | | | 21 | dB | |
| **Pout @Tx_Disable Asserted** | Poff | | | -30 | dBm | 1 |
| **Eye Diagram** | IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-ZR Compatible | | | | | |
| **Receiver** | | | | | | |
| **Center Wavelength** | λC | 1528 | | 1565 | nm | |
| **Receiver Sensitivity (Pavg)** | S | | | -26 | dBm | 3 |
| **Receiver Overload (Pavg)** | $P_{OL}$ | -7.0 | | | dBm | 3 |
| **Optical Return Loss** | ORL | | | -27 | dB | |
| **OSNR** | | 27 | | | dB | 4 |
| **Maximum OSNR Path Penalty** | | | | 4 | dB | 4 |
| **Dispersion Limited Distance** | | | | 100 | km | |
| **LOS De-Assert** | LOSD | | | -26 | dBm | |
| **LOS Assert** | LOSA | -35 | | | dBm | |
| **LOS Hysteresis** | | 0.5 | | | dB | |

**Notes:**

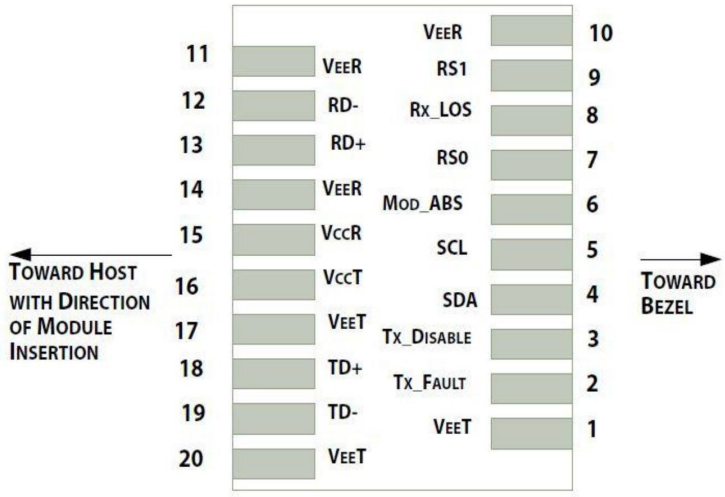
1. The optical power is launched into 9/125μm SMF.
2. Measured with a PRBS $2^{31}$-1 test pattern @10.3125Gbps.
3. Measured with PRBS $2^{31}$-1 test pattern, @10.3125Gbps, and BER<$10^{-12}$.
4. Receiver power @-7~-18dBm, @10.3125Gbps, and BER<$10^{-12}$.

**Pin Descriptions**

| Pin | Symbol | Name/Description | Notes |
|---|---|---|---|
| **1** | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |
| **2** | Tx_Fault | Transmitter Fault. LVTTL-O. | 2 |
| **3** | Tx_Disable | Transmitter Disable. Laser output disabled on “high” or “open.” LVTT-I. | 3 |
| **4** | SDA | 2-Wire Serial Interface Data (Same as MOD-DEF2 in INF-8074i). LVTTL-I/O. | |
| **5** | SCL | 2-Wire Serial Interface Clock (Same as MOD-DEF2 in INF-8074i). LVTTL-I. | |
| **6** | MOD_ABS | Module Absent. Connect to the VeeT or VeeR in the module. | 4 |
| **7** | RS0 | Rate Select 0. Not Used. | 5 |
| **8** | LOS | Loss of Signal Indication. “Logic 0” indicates normal operation. LVTTL-O. | 2 |
| **9** | RS1 | Rate Select 1. Not Used. | 5 |
| **10** | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| **11** | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| **12** | RD- | Receiver Inverted Data Out. AC Coupled. CML-O. | |
| **13** | RD+ | Receiver Non-Inverted Data Out. AC Coupled. CML-O. | |
| **14** | VeeR | Receiver Ground (Common with Transmitter Ground). | 1 |
| **15** | VccR | Receiver Power Supply. | |
| **16** | VccT | Transmitter Power Supply. | |
| **17** | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |
| **18** | TD+ | Transmitter Non-Inverted Data In. AC Coupled. CML-I. | |
| **19** | TD- | Transmitter Inverted Data In. AC Coupled. CML-O. | |
| **20** | VeeT | Transmitter Ground (Common with Receiver Ground). | 1 |

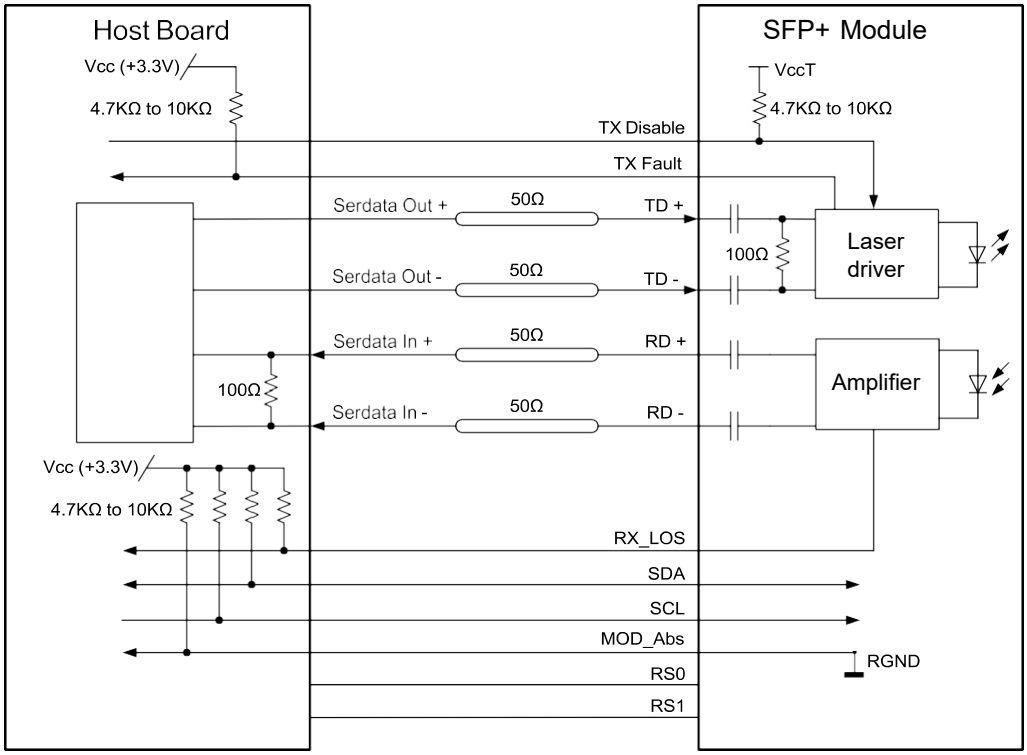
**Notes:**

1. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
2. This contact is an open collector/drain output and should be pulled up to the Host_Vcc with resistor in the range 4.7kΩ to 10kΩ. Pull-ups can be connected to one or several power supplies; however, the hostboard design shall ensure that no module contract has voltage exceeding module VccT/R+0.5V.
3. Tx_Disable is an input contact with a 4.7kΩ to 10kΩ pull-up resistor to VccT inside the module.
4. MOD_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull the contract up to Host_Vcc with a resistor in the range from 4.7kΩ to 10kΩ. MOD_ABS is asserted “high” when the SFP+ module is physically absent from a host slot.
5. Internally pulled down per SFF-8431.



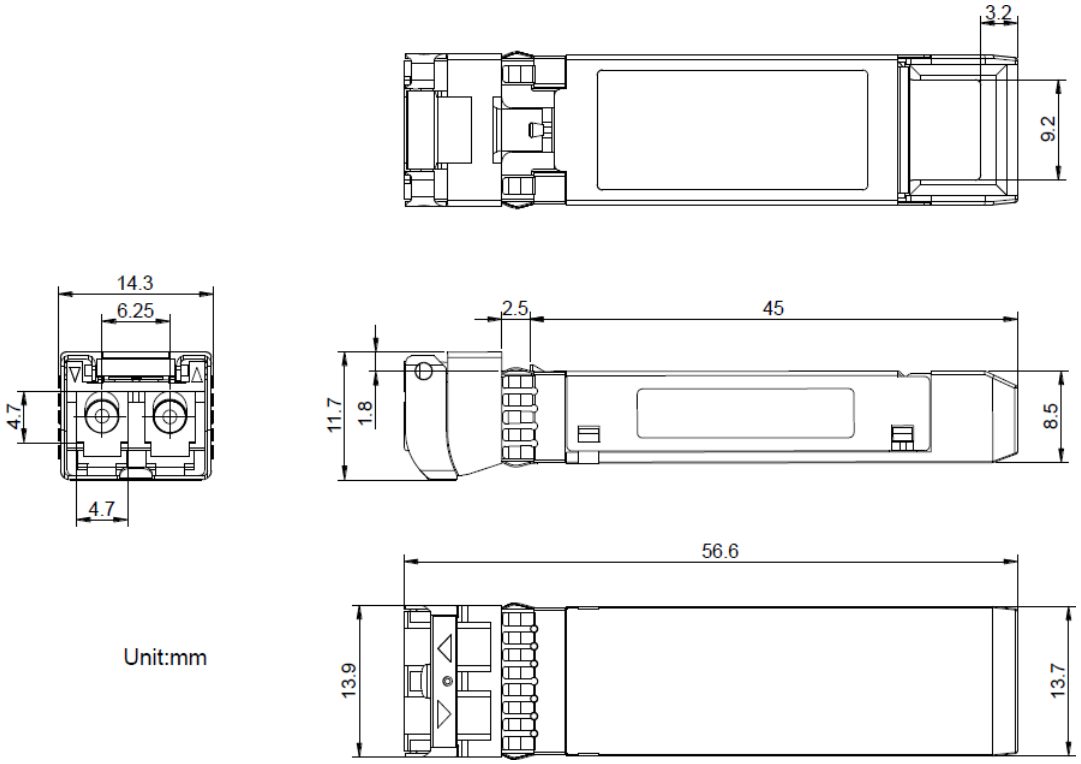

Pin-Out of Connector Block on the Host Board

**Recommended Application Interface Block Diagram**



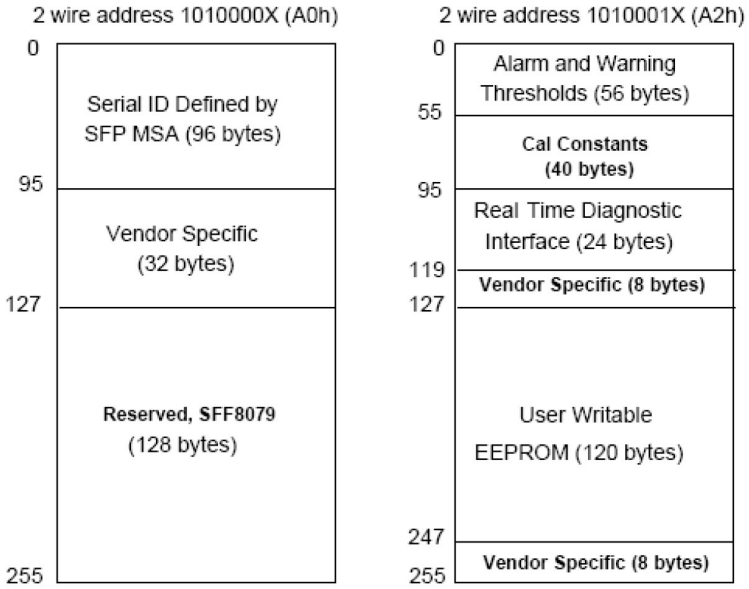
**Mechanical Specifications**

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).




**EEPROM Information**

EEPROM memory map-specific data field description is as below:



**OptioConnect**
**Innovation for the Future of High-Speed Networking**

**Who We Are**
OptioConnect is reshaping the landscape of communication and high-speed networking through intelligent technology. With a core focus on cutting edge technology, we deliver smarter fiber optic solutions for enterprise networks, data centers, and next-gen telecom infrastructures.

**What We Do**
At OptioConnect, we fuse advanced engineering with intelligent automation to drive the future of networking. Our AI-integrated solutions are designed to optimize performance and streamline operations with:

- Superior Performance
- Network and traffic optimization
- Intelligent energy management
- Seamless OEM compatibility
- Scalable cost-efficiency

**Smarter Networks by Design**
Innovation isn't just a goal—it's our process. We embed AI and machine learning across our R&D and product lines, enabling adaptive performance, automated tuning, and faster deployment cycles. The result? Networks that don't just work—they learn, evolve, and outperform.

**Our Team**
Our engineers, data scientists, and network architects bring decades of experience and a future-focused mindset. We provide hands-on support with intelligent insights that turn complex challenges into simple solutions.

**Our Mission**
To deliver AI-enhanced connectivity that reduces cost, increases speed, and maximizes efficiency—empowering our partners to operate at the forefront of a rapidly evolving digital world.

**Let's Connect**
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www.optioconnect.com | info@optioconnect.com