



## SPC37B23101DC2I

Juniper Networks® Compatible 10GBase-CWDM SFP+ Transceiver (SMF, 1370nm, 80km, LC, DOM, -40 to 85C)

### Product Description

This Juniper Networks® compatible SFP+ transceiver provides 10GBase-CWDM throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1370nm 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. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

### Features:

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Industrial Temperature -40 to 85 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



### Applications:

- 10x Gigabit Ethernet over CWDM
- Access, Metro and Enterprise
- 8x/10x Fibre Channel
- Mobile Fronthaul CPRI/OBSAI

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*For your product safety, please read the following information carefully before any manipulation of the transceiver:*



#### **ESD**

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



#### **LASER SAFETY**

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

*The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.*

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## CWDM Wavelengths

| Wavelengths | Min.   | Typ. | Max.   |
|-------------|--------|------|--------|
| 27          | 1264.5 | 1271 | 1277.5 |
| 29          | 1284.5 | 1291 | 1297.5 |
| 31          | 1304.5 | 1311 | 1317.5 |
| 33          | 1324.5 | 1331 | 1337.5 |
| 35          | 1344.5 | 1351 | 1357.5 |
| 37          | 1364.5 | 1371 | 1377.5 |
| 39          | 1384.5 | 1391 | 1397.5 |
| 41          | 1404.5 | 1411 | 1417.5 |
| 43          | 1424.5 | 1431 | 1437.5 |
| 45          | 1444.5 | 1451 | 1457.5 |

### Absolute Maximum Ratings

| Parameter                          | Symbol | Min. | Typ. | Max.    | Unit | Notes |
|------------------------------------|--------|------|------|---------|------|-------|
| Data Rate                          |        |      |      | 10.3125 | Gbps |       |
| Link Budget                        |        | 24   |      |         | dB   |       |
| Operating Case Temperature         | Tc     | -40  |      | 85      | °C   |       |
| Storage Temperature                | Tstg   | -40  |      | 85      | °C   |       |
| Maximum Voltage                    | Vcc    | -0.5 |      | 3.6     | V    |       |
| Relative Humidity (Non-Condensing) | RH     | 5    |      | 85      | %    |       |

**Notes:**

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

## Electrical Characteristics

| Parameter                     |      | Symbol | Min. | Typ. | Max.    | Unit  | Notes |
|-------------------------------|------|--------|------|------|---------|-------|-------|
| Supply Voltage                |      | Vcc    | 3.13 | 3.3  | 3.47    | V     |       |
| Supply Current                |      | Icc    |      |      | 450     | mA    |       |
| Transmitter                   |      |        |      |      |         |       |       |
| Differential Data Input Swing |      | VIN    | 150  |      | 1200    | mVp-p | 1     |
| Differential Input Impedance  |      | ZIN    | 85   | 100  | 115     | Ω     | 2     |
| Tx_Disable                    | High |        | 2    |      | Vcc     | V     |       |
|                               | Low  |        | 0    |      | 0.8     |       |       |
| Tx_Fault                      | High |        | 2    |      | Vcc+0.3 | V     | 3     |
|                               | Low  |        | 0    |      | 0.8     |       | 4     |
| Receiver                      |      |        |      |      |         |       |       |

|                               |      |      |     |     |                      |          |   |
|-------------------------------|------|------|-----|-----|----------------------|----------|---|
| Differential CML Outputs      |      | VOUT | 350 |     | 700                  | mVp-p    | 1 |
| Differential Output Impedance |      | ZOUT | 85  | 100 | 115                  | $\Omega$ |   |
| Rx_LOS                        | High |      | 2   |     | V <sub>cc</sub> +0.3 | V        | 3 |
|                               | Low  |      | 0   |     | 0.8                  |          | 4 |
| MOD_DEF (0.2)                 |      | VOH  | 2.5 |     |                      | V        | 5 |
|                               |      | VOL  | 0   |     | 0.5                  |          |   |

**Notes:**

1. AC coupled inputs.
2. RIN > 100k $\Omega$  @ DC.
3. I<sub>o</sub> = 400 $\mu$ A; Host\_V<sub>cc</sub>.
4. I<sub>o</sub> = -4.0mA.
5. With serial ID.

**Optical Characteristics**

| Parameter                        | Symbol           | Min.              | Typ. | Max.              | Unit  | Notes |
|----------------------------------|------------------|-------------------|------|-------------------|-------|-------|
| <b>Transmitter</b>               |                  |                   |      |                   |       |       |
| Center Wavelength                | $\lambda_C$      | $\lambda_C - 6.5$ |      | $\lambda_C + 6.5$ | nm    |       |
| Spectral Width (-20dB)           | $\Delta\lambda$  |                   |      | 1                 | nm    |       |
| Average Output Power             | POUT             | 2                 |      | 7                 | dBm   | 1     |
| Extinction Ratio                 | ER               | 3.5               |      |                   | dB    |       |
| Average Power of Off Transmitter | P <sub>off</sub> |                   |      | -30               | dB    |       |
| Side-Mode Suppression Ratio      | SMSR             | 30                |      |                   | dB    |       |
| Relative Intensity Noise         | RIN              |                   |      | -128              | dB/Hz |       |
| <b>Receiver</b>                  |                  |                   |      |                   |       |       |
| Optical Center Wavelength        | $\lambda_C$      | 1260              |      | 1620              | nm    |       |
| Receiver Sensitivity             | P <sub>min</sub> |                   |      | -22               | dBm   | 2     |
| Receiver Overload                | P <sub>max</sub> | -7                |      |                   | dBm   |       |
| LOS De-Assert                    | LOSD             |                   |      | -23               | dBm   |       |
| LOS Assert                       | LOSA             | -36               |      |                   | dBm   |       |
| LOS Hysteresis                   | LOSH             | 0.5               |      |                   | dB    |       |

**Notes:**

1. Output power is coupled into a 9/125 $\mu$ m SMF.
2. Minimum average optical power, measured at BER less than 1E<sup>-12</sup>. The measure pattern is PRBS 2<sup>31</sup>-1.

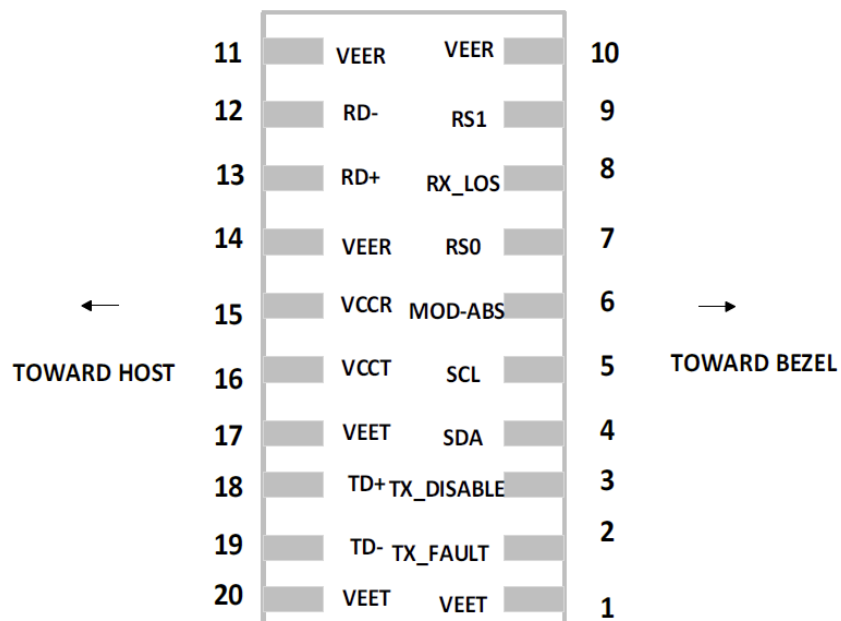
## Pin Descriptions

| 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. Module disables on “high” or “open.” | 3         | 2     |
| 4   | SDA        | Module Definition 2. 2-wire serial ID interface.          | 3         | 3     |
| 5   | SCL        | Module Definition 1. 2-wire serial ID interface.          | 3         | 3     |
| 6   | MOD_ABS    | Module Absent.                                            | 3         | 3     |
| 7   | RS0        | Rx Rate Select (LVTTTL). NC (pin not used).               | 3         |       |
| 8   | LOS        | Loss of Signal.                                           | 3         | 4     |
| 9   | RS1        | Tx Rate Select (LVTTTL). NC (pin not used).               | 1         |       |
| 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       | 3.3V±5% Receiver Power.                                   | 2         | 7     |
| 16  | VccT       | 3.3V±5% Transmitter Power.                                | 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     |

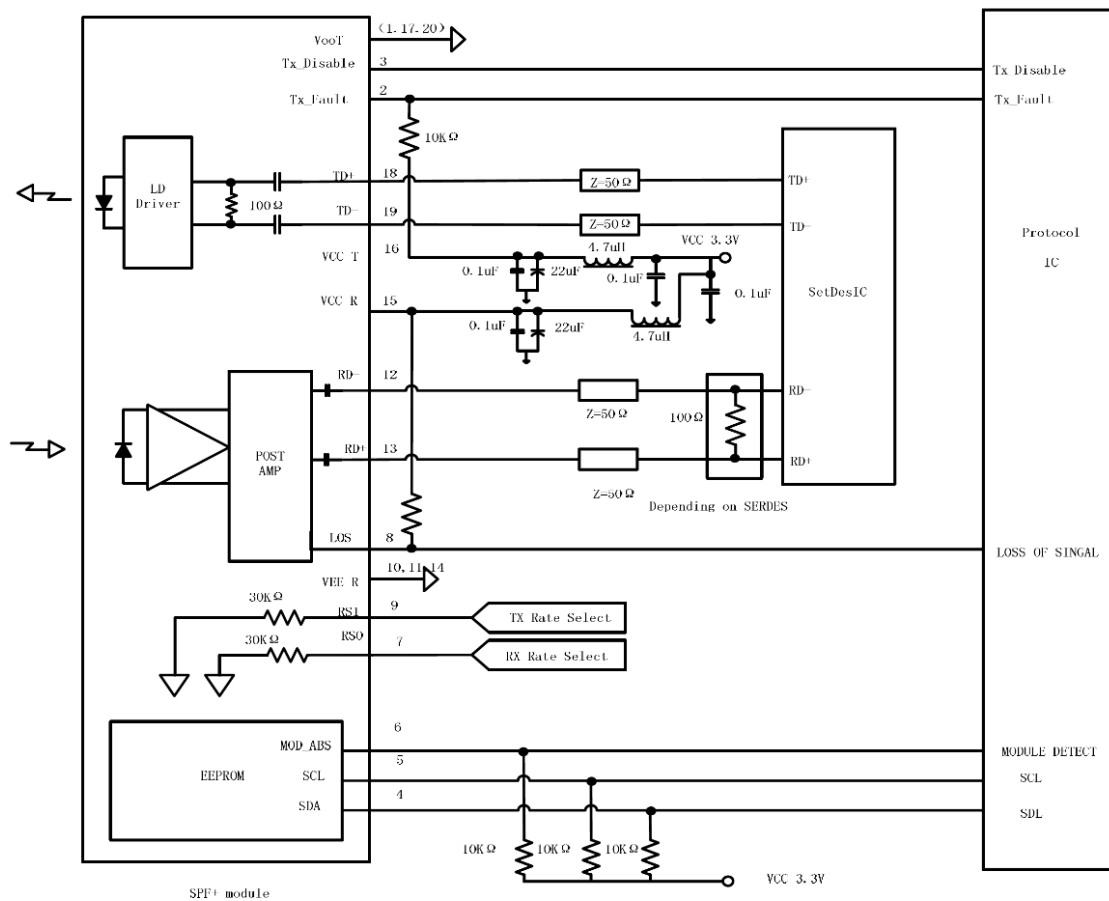
## Notes

1. Tx\_Fault is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. When “high,” 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. Its 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. 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, 100Ω differential lines that should be terminated with 100Ω (differential) at the user SERDES.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V±5% at the SFP connector pin.
8. TD-/+. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module.

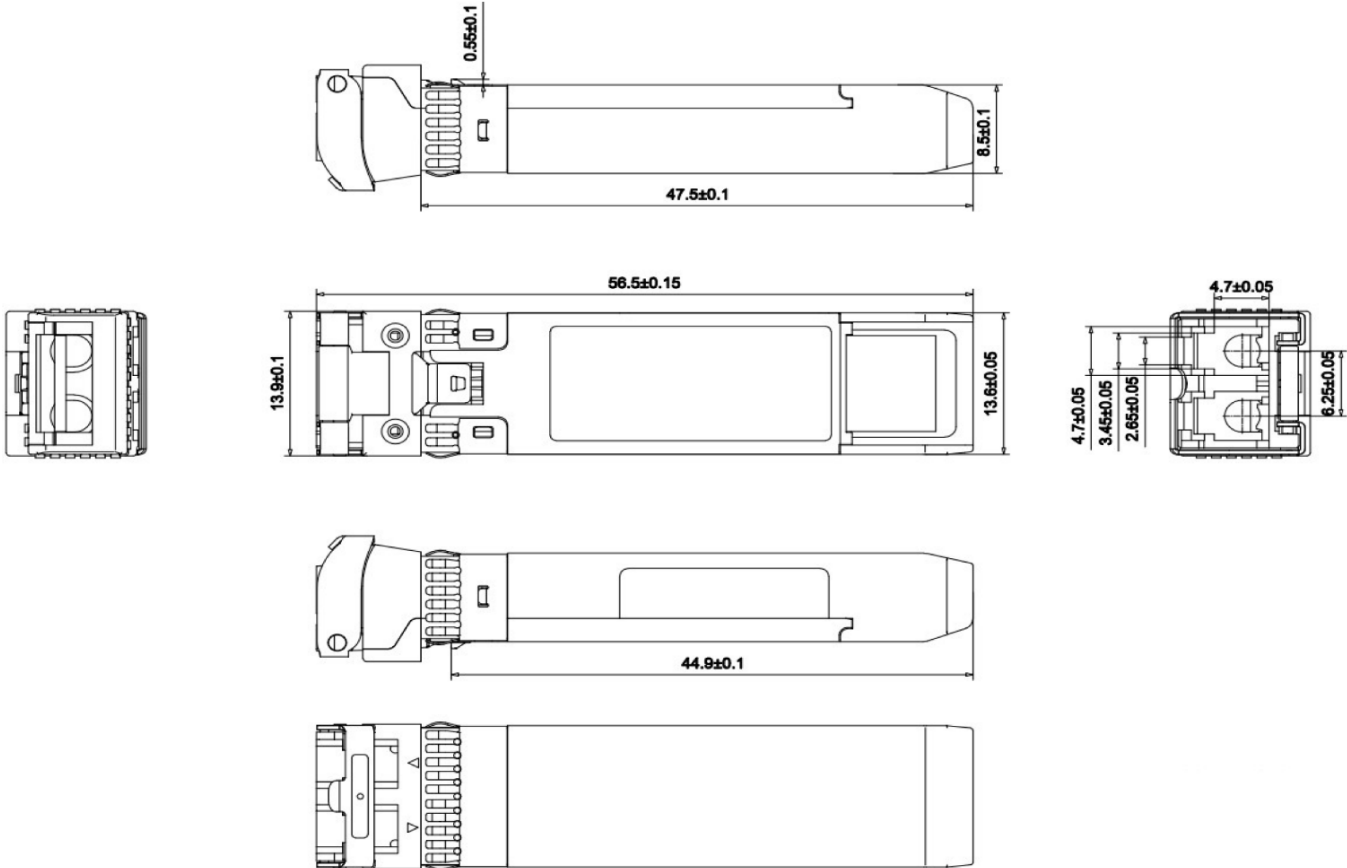
### Recommended Circuit Schematic



### Recommended Circuit Schematic



Mechanical Specifications



# About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

