



## SFP-25G-LR-DE-BX-U-SKY

Dell® SFP-25G-LR-DE-BX-U Compatible 25GBase-BX SFP28 Transceiver (SMF, 1270nmTx/1330nmRx, 10km, LC, DOM)

### Product Description

This Dell® SFP-25G-LR-DE-BX-U compatible SFP28 transceiver provides 25GBase-BX throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1270nmTx/1330nmRx via an LC connector. This bidirectional unit must be used with another transceiver or network appliance of complementing wavelengths. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Dell®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows 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-8402 and SFF-8472 Compliance
- Simplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



### Applications:

- 25GBase Ethernet
- Access and Enterprise

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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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## Regulatory Compliance

- Electromagnetic Interference (EMI) compatible with standards: FCC Part 15 Class B, EN 55022:2010, Class B
- Electromagnetic susceptibility (EMS) compatible with standards: EN 55024:2010
- Laser Eye Safety compatible with Class I laser product FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

## Absolute Maximum Ratings

| Parameter                           | Symbol           | Min. | Max. | Unit |
|-------------------------------------|------------------|------|------|------|
| Maximum Supply Voltage              | V <sub>CC</sub>  | -0.5 | 3.6  | V    |
| Storage Temperature                 | T <sub>S</sub>   | -40  | 85   | °C   |
| Operating Case Temperature          | T <sub>C</sub>   | 0    | 70   | °C   |
| Operating Humidity (non-condensing) | RH               | 5    | 95   | %    |
| Receiver Power                      | R <sub>MAX</sub> |      | -12  | dBm  |
| Maximum Bitrate                     | B <sub>max</sub> |      | 28   | Gbps |

## Electrical Characteristics (TOP=25°C, V<sub>CC</sub>=3.3Volts)

| Parameter                      | Symbol              | Min.  | Typ. | Max.                 | Unit | Notes |
|--------------------------------|---------------------|-------|------|----------------------|------|-------|
| Power Supply Voltage           | V <sub>CC</sub>     | 3.135 | 3.30 | 3.465                | V    |       |
| Power Supply Current @ 3.3V    | I <sub>CC</sub>     |       |      | 350                  | mA   |       |
| Power Consumption              | P <sub>DISS</sub>   |       |      | 1.5                  | W    |       |
| Transmitter                    |                     |       |      |                      |      |       |
| Differential data input swing  | V <sub>in,pp</sub>  | 180   |      | 700                  | mV   |       |
| Transmitter Enable Voltage     | V <sub>EN</sub>     | -0.3  |      | 0.8                  | V    |       |
| Transmitter Disable Voltage    | V <sub>D</sub>      | 2.0   |      | V <sub>CC</sub> +0.3 | V    |       |
| Receiver                       |                     |       |      |                      |      |       |
| Differential data output swing | V <sub>out,pp</sub> | 450   |      | 1050                 | mV   |       |
| LOS Low Voltage                | V <sub>Lout</sub>   |       |      | 0.4                  | V    |       |
| LOS High Voltage               | V <sub>Hout</sub>   | 2.0   |      |                      | V    |       |

## Optical Characteristics

| Parameter                              | Symbol                    | Min. | Typ. | Max. | Unit | Notes                |
|----------------------------------------|---------------------------|------|------|------|------|----------------------|
| Transmitter                            |                           |      |      |      |      |                      |
| Support Data Rate                      |                           |      |      | 28   | Gbps |                      |
| Peak Wavelength                        | $\lambda_p$               | 1260 | 1270 | 1280 | nm   |                      |
| Spectral Width (-20dB)                 |                           |      |      | 1    | nm   |                      |
| Side Mode Suppression Ratio            | SMSR                      | 30   |      |      | dB   |                      |
| Average Optical Output Power           | Po                        | -5   |      | 2    | dBm  |                      |
| Optical Extinction Ratio               | ER                        | 3.5  |      |      | dB   |                      |
| Transmitter and Dispersion Penalty     | TDP                       |      |      | 3    | dB   |                      |
| Output Power with Transmitter Disabled | Poff                      |      |      | -30  | dBm  |                      |
| Optical Return Loss Tolerance          |                           |      |      | -12  | dB   |                      |
| Output Eye Diagram                     | Compliant with IEEE 802.3 |      |      |      |      | 1                    |
| Receiver                               |                           |      |      |      |      |                      |
| Support data rate                      |                           |      |      | 28   | Gbps |                      |
| Operate Wavelength                     |                           | 1320 | 1330 | 1340 | nm   |                      |
| Receiver Sensitivity @25Gbps           | Sen                       |      |      | -12  | dBm  | 2                    |
| Saturation                             | Psat                      | 2    |      |      | dBm  | 2                    |
| LOS Asserted                           | T_loss_on                 | -30  |      |      | dBm  | High level:<br>Alarm |
| LOS De-Asserted                        | T_loss_off                |      |      | -13  | dBm  |                      |
| LOS Hysteresis                         | T_loss_Hs                 | 0.5  |      | 5.0  | dB   |                      |

### Notes:

1. At least 1000 waveforms acquired, with minimum 5% margin against 802.3 mask
2. Test at 25.78125Gb/s, PRBS 2<sup>31</sup>-1, BER of 5E-5, NRZ and including back to back

## Pin Descriptions

| Pin | Symbol     | Name/Descriptions                                                                | Ref.                               |
|-----|------------|----------------------------------------------------------------------------------|------------------------------------|
| 1   | VeeT       | Transmitter Ground                                                               |                                    |
| 2   | TX Fault   | Transmitter Fault Indication                                                     | 1                                  |
| 3   | TX Disable | Transmitter Disable                                                              | 2, Module disables on high or open |
| 4   | SDA        | 2-wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)                |                                    |
| 5   | SCL        | 2 Wire Serial Interface Data Line (Same as MOD-DEF1 as defined in the INF-8074i) |                                    |
| 6   | MOD-ABS    | Module Absent, Connected to VeeT or VeeR in the module.                          | 3                                  |
| 7   | RS0        | SFP+ RX Rate Select, optional                                                    | Rate Select 0, Not used. 9         |
| 8   | LOS        | Loss of Signal                                                                   | 4                                  |
| 9   | RS1        | SFP+ TX Rate Select, optional                                                    | Rate Select 1, Not used. 9         |
| 10  | VeeR       | Receiver Ground                                                                  | 5                                  |
| 11  | VeeR       | Receiver Ground                                                                  | 5                                  |
| 12  | RD-        | Inv. Received Data Out                                                           | 6                                  |
| 13  | RD+        | Received Data Out                                                                | 6                                  |
| 14  | VeeR       | Receiver Ground                                                                  | 5                                  |
| 15  | VccR       | Receiver Power                                                                   | 7, 3.3V 5%                         |
| 16  | VccT       | Transmitter Power                                                                | 7, 3.3V 5%                         |
| 17  | VeeT       | Transmitter Ground                                                               | 5                                  |
| 18  | TD+        | Transmit Data In                                                                 | 8                                  |
| 19  | TD-        | Inv. Transmit Data In                                                            | 8                                  |
| 20  | VeeT       | Transmitter Ground                                                               | 5                                  |

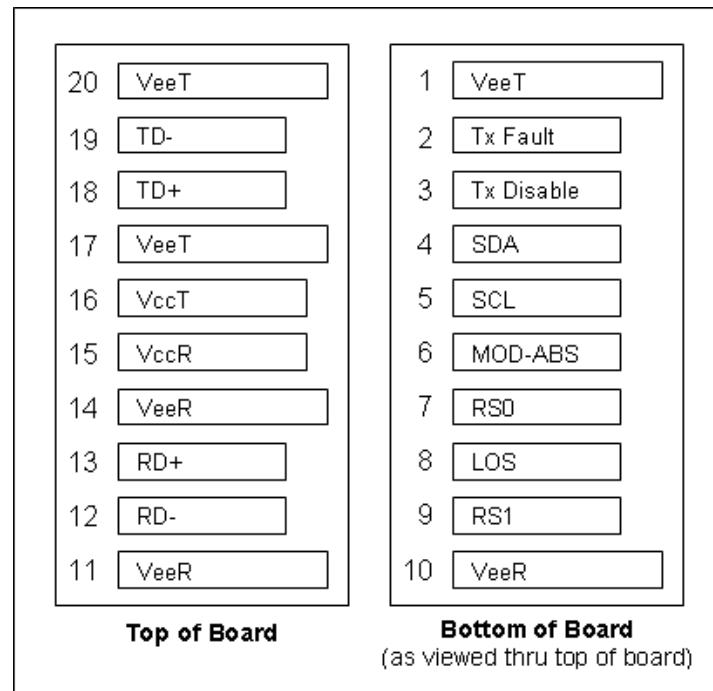
## Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

1. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K–10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT +0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.4V.
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 4.7–10 KΩ resistor. Its states are:  
Low (-0.3–0.8V): Transmitter on (>0.8, < 2.0V): Undefined  
High (2.0–VccT+0.3V): Transmitter Disabled Open: Transmitter Disabled
3. Mod-ABS shall be pulled up with a 4. 7K–10KΩ resistor on the host board. The pull -up voltage shall VccT or VccR.
4. LOS (Loss of Signal) is an open collector/ drain output, which should be pulled up with a 4.7K–10KΩ resistor. Pull up voltage between 2.0V and VccR+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low

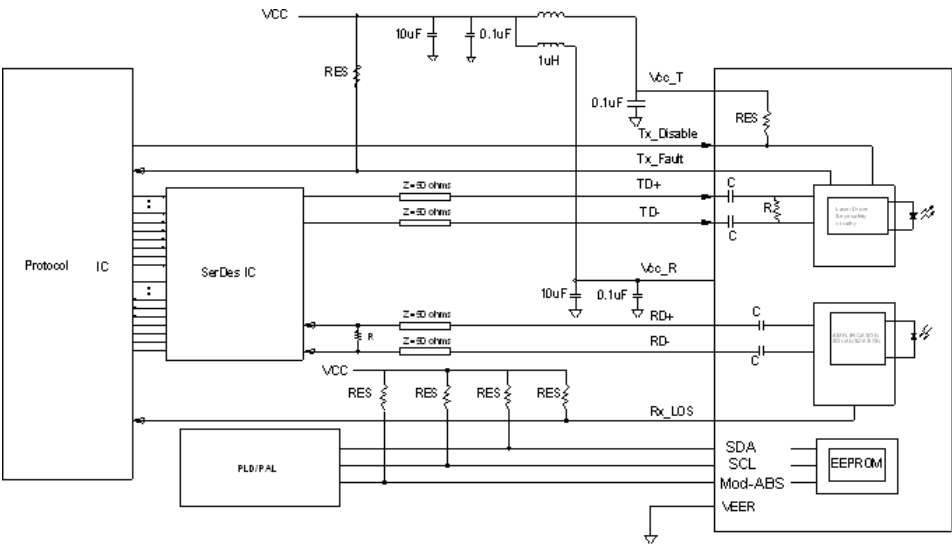
indicates normal operation. In the low state, the output will be pulled to  $< 0.4V$ .

5. VeeR and VeeT may be internally connected within the SFP module.
6. RD-/+: These are the differential receiver outputs. They are AC coupled  $100\Omega$  differential lines which should be terminated with  $100\Omega$  (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
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 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than  $1\Omega$  should be used in order 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 inrush current of no more than 30 mA 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  $100\Omega$  differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.
9. Internally pulled down per SFF-8431 Rev 4.1.



Pin-out of connector Block on Host board

Recommended Circuit Schematic



NOTE: 4.7K ohms<RES<10K ohms

Digital Diagnostic Functions

Digital diagnostics monitoring function is available on this module. A 2-wire serial interface provides user to contact with module. It is compliant to SFF-8472 Rev10.2 with internal calibration mode.

| Parameter                             | Symbol    | Min. | Max. | Unit | Notes |
|---------------------------------------|-----------|------|------|------|-------|
| Temperature monitor absolute error    | DMI_Temp  | -3   | +3   |      |       |
| Supply voltage monitor absolute error | DMI_VCC   | -3%  | +3%  | V    |       |
| TX power monitor absolute error       | DMI_RX    | -3   | +3   | dB   |       |
| RX power monitor absolute error       | DMI_RX    | -3   | +3   | dB   |       |
| Bias current monitor                  | DMI_Ibias | -10% | +10% | mA   |       |

**Mechanical Specifications**

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



# 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.

