



## SFP-10GB-BXU45-100-N-SKY

Alcatel-Lucent Nokia® Compatible 10GBase-BX SFP+ Transceiver (SMF, 1490nmTx/1550nmRx, 100km, LC, DOM)

### Product Description

This Alcatel-Lucent Nokia® compatible SFP+ transceiver provides 10GBase-BX throughput up to 100km over single-mode fiber (SMF) using a wavelength of 1490nmTx/1550nmRx via an LC connector. This bidirectional unit must be used with another transceiver or network appliance of complimenting wavelengths. It is guaranteed to be 100% compatible with the equivalent Alcatel-Lucent Nokia® 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. 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:

- Power Consumption of 2W
- Hot-Pluggable
- Supports 9.95 to 11.3Gbps Bit Rates
- Cooled EML Transmitter, APD Photo-Detector
- SMF Links up to 100km
- LC Connector
- Operating Temperature: 0 to 70 Celsius
- 3.3V Power Supply
- RoHS Compliant and Lead-Free



### Applications:

- 10GBase Ethernet

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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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## Absolute Maximum Ratings

| Parameter                  | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------------|--------|------|------|------|------|-------|
| Maximum Supply Voltage     | Vcc    | -0.5 |      | 4    | V    |       |
| Storage Temperature        | Tstg   | -40  |      | 85   | °C   |       |
| Operating Case Temperature | Tc     | 0    |      | 70   | °C   |       |
| Relative Humidity          | RH     | 0    |      | 85   | %    |       |

## Electrical Characteristics

| Parameter                                         | Symbol                    | Min.  | Typ. | Max.     | Unit | Notes |
|---------------------------------------------------|---------------------------|-------|------|----------|------|-------|
| Power Supply Voltage                              | Vcc                       | 3.135 | 3.3  | 3.465    | V    |       |
| Power Supply Current                              | Icc                       |       |      | 600      | mA   |       |
| Power Consumption                                 | P                         |       |      | 2        | W    |       |
| Transmitter                                       |                           |       |      |          |      |       |
| Input Differential Impedance                      | RIN                       |       | 100  |          | Ω    | 1     |
| Tx Input Single-Ended DC Voltage Tolerance (VeeT) | V                         | -0.3  |      | 4        | V    |       |
| Differential Data Input Swing                     | VIN,pp                    | 180   |      | 700      | mV   | 2     |
| Transmit Disable Voltage                          | VD                        | 2     |      | Vcc      | V    | 3     |
| Transmit Enable Voltage                           | VEN                       | Vee   |      | Vee+0.8  | V    |       |
| Receiver                                          |                           |       |      |          |      |       |
| Single-Ended Output Voltage Tolerance             | V                         | -0.3  |      | 4        | V    |       |
| Rx Output Differential Voltage                    | VOU <sub>T</sub> ,pp      | 300   |      | 850      | mV   |       |
| Rx Output Rise and Fall Time                      | Tr/Tf                     | 30    |      |          | ps   | 4     |
| LOS Fault                                         | V <sub>LOS Fault</sub>    | 2     |      | Host_Vcc | V    | 5     |
| LOS Normal                                        | V <sub>LOS Normal</sub>   | Vee   |      | Vee+0.5  | V    | 5     |
| Timing Characteristics                            |                           |       |      |          |      |       |
| Tx_Disable Assert Time                            | t <sub>off</sub>          |       |      | 10       | us   |       |
| Tx_Disable Negate Time                            | t <sub>on</sub>           |       |      | 1        | ms   |       |
| Time to Initialize Include Reset of Tx_Fault      | t <sub>int</sub>          |       |      | 300      | ms   |       |
| Tx_Fault from Fault to Assertion                  | t <sub>fault</sub>        |       |      | 100      | us   |       |
| Tx_Disable Time to Start Reset                    | t <sub>reset</sub>        | 10    |      |          | us   |       |
| Receiver Loss of Signal Assert Time               | T <sub>A</sub> ,Rx_LOS    |       |      | 100      | us   |       |
| Receiver Loss of Signal De-Assert Time            | T <sub>d</sub> ,Rx_LOS    |       |      | 100      | us   |       |
| Rate Select Change Time                           | t <sub>ratesel</sub>      |       |      | 10       | us   |       |
| Serial ID Clock Time                              | t <sub>serial-clock</sub> |       |      | 100      | kHz  |       |

**Notes:**

1. Connected directly to the Tx data input pins. AC coupling from pins into laser driver IC.
2. Per SFF-8431 Rev. 3.0.
3. Into 100 $\Omega$  differential termination.
4. 20-80%.
5. LOS is an open collector output. Should be pulled up with 4.7k to 10k $\Omega$  on the host board. Normal operation is "logic 0." Loss of signal is "logic 1." Maximum pull-up voltage is 5.5V.

**Optical Characteristics**

| Parameter                      | Symbol          | Min. | Typ. | Max. | Unit  | Notes |
|--------------------------------|-----------------|------|------|------|-------|-------|
| <b>Transmitter</b>             |                 |      |      |      |       |       |
| Center Wavelength              | $\lambda_C$     |      | 1490 |      | nm    |       |
| Spectral Width                 | $\Delta\lambda$ |      |      | 0.3  | nm    |       |
| Average Optical Power          | Pavg            | 1    |      | 5    | nm    | 1     |
| Optical Power OMA              | POMA            | -1.2 |      |      | dBm   |       |
| Laser Off Power                | Poff            |      |      | -30  | dBm   |       |
| Extinction Ratio               | ER              | 8.2  |      |      | dB    |       |
| Transmitter Dispersion Penalty | TDP             |      |      | 3.0  | dB    | 2     |
| Relative Intensity Noise       | RIN             |      |      | -128 | dB/Hz | 3     |
| Optical Return Loss Tolerance  |                 | 21   |      |      | dB    |       |
| <b>Receiver</b>                |                 |      |      |      |       |       |
| Optical Center Wavelength      | $\lambda_C$     |      | 1550 |      | nm    |       |
| Receiver Sensitivity           | Rx_sen          |      |      | -26  | dBm   | 4     |
| Receiver Reflectance           | Rrx             |      |      | -26  | dB    |       |
| Receiver Overload              | Sat             | -7   |      |      | dBm   | 5     |
| LOS Assert                     | LOSA            | -37  |      |      | dBm   |       |
| LOS De-Assert                  | LOSD            |      |      | -27  | dBm   |       |
| LOS Hysteresis                 | LOSH            | 0.5  |      |      | dB    |       |

**Notes:**

1. Average power figures are informative only, per IEEE802.3ae.
2. TWDP figure requires the host board to be SFF-8431 compliant. TWDP is calculated using the Matlab code provided in Clause 68.6.6.2 of IEEE802.3ae.
3. 12dB reflection.
4. Conditions of stressed receiver tests per IEEE802.3ae. CSRS testing requires the host board to be SFF-8431 compliant.
5. Receiver overload specified in OMA and under the worst comprehensive stressed conditions.

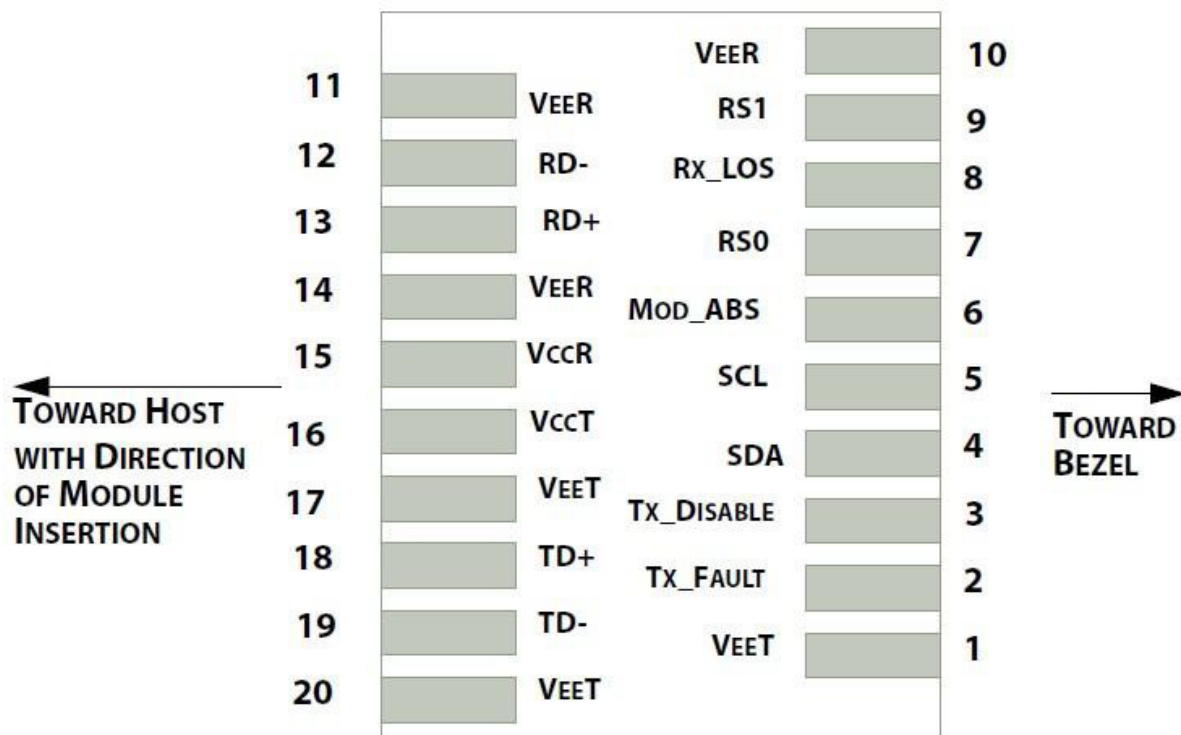
## Pin Descriptions

| Pin | Symbol     | Name/Description                                                                                                                             | Notes |
|-----|------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1   | VeeT       | Module Ground.                                                                                                                               | 1     |
| 2   | Tx_Fault   | Module Transmitter Fault.                                                                                                                    | 2     |
| 3   | Tx_Disable | Transmitter Disable. Turns off transmitter laser output.                                                                                     | 3     |
| 4   | SDL        | 2-Wire Serial Interface Data.                                                                                                                |       |
| 5   | SCL        | 2-Wire Serial Interface Clock.                                                                                                               |       |
| 6   | MOD_ABS    | Module Absent. Connect to VeeR or VeeT in the module.                                                                                        | 2     |
| 7   | RS0        | Rate Select 0. Optionally controls the SFP+ receiver. When “high,” input data rate is >4.5Gbps. When “low,” input data rate is <=4.5Gbps.    |       |
| 8   | LOS        | Receiver Loss of Signal Indication.                                                                                                          | 4     |
| 9   | RS1        | Rate Select 0. Optionally controls the SFP+ transmitter. When “high,” input data rate is >4.5Gbps. When “low,” input data rate is <=4.5Gbps. |       |
| 10  | VeeR       | Module Ground.                                                                                                                               | 1     |
| 11  | VeeR       | Module Ground.                                                                                                                               | 1     |
| 12  | RD-        | Receiver Inverted Data Output.                                                                                                               |       |
| 13  | RD+        | Receiver Non-Inverted Data Output.                                                                                                           |       |
| 14  | VeeR       | Module Ground.                                                                                                                               | 1     |
| 15  | VccR       | 3.3V Receiver Power Supply.                                                                                                                  |       |
| 16  | VccT       | 3.3V Transmitter Power Supply.                                                                                                               |       |
| 17  | VeeT       | Module Ground.                                                                                                                               | 1     |
| 18  | TD+        | Transmitter Inverted Data Output.                                                                                                            |       |
| 19  | TD-        | Transmitter Non-Inverted Data Output.                                                                                                        |       |
| 20  | VeeT       | Module Ground.                                                                                                                               | 1     |

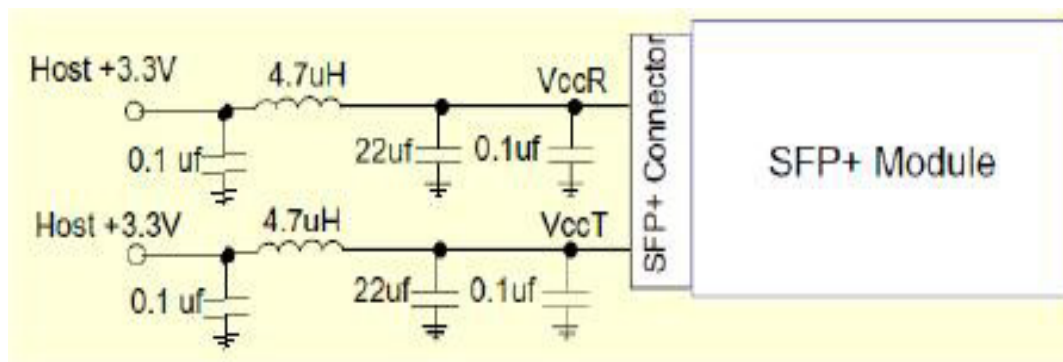
### Notes:

1. The module ground pins shall be isolated from the module case.
2. This pin is an open collector/drain output pin and shall be pulled up with 4.7kΩ to 10kΩ to the Host\_Vcc on the host board.
3. This pin shall be pulled up with 4.7kΩ to 10kΩ to the VccT in the module.
4. This pin is an open collector/drain output pin and shall be pulled up with 4.7kΩ to 10kΩ to the Host\_Vcc on the host board.

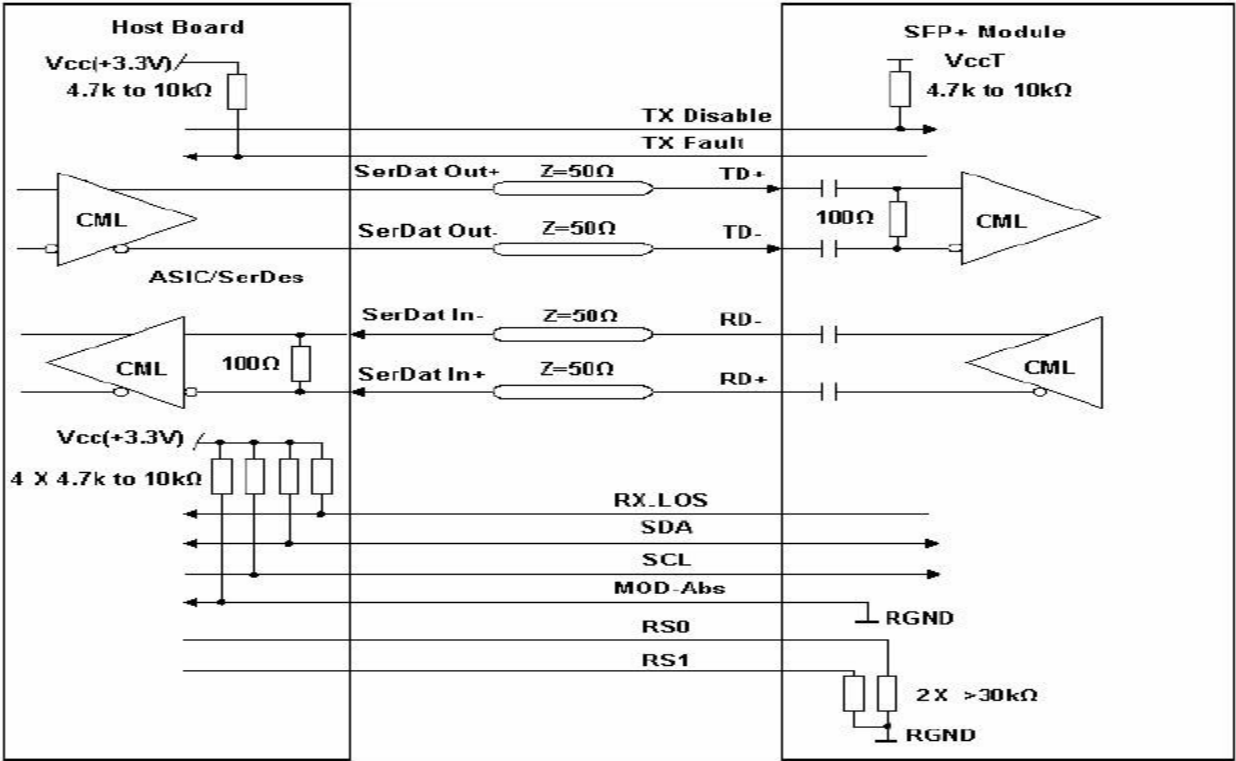
## Pin Assignments



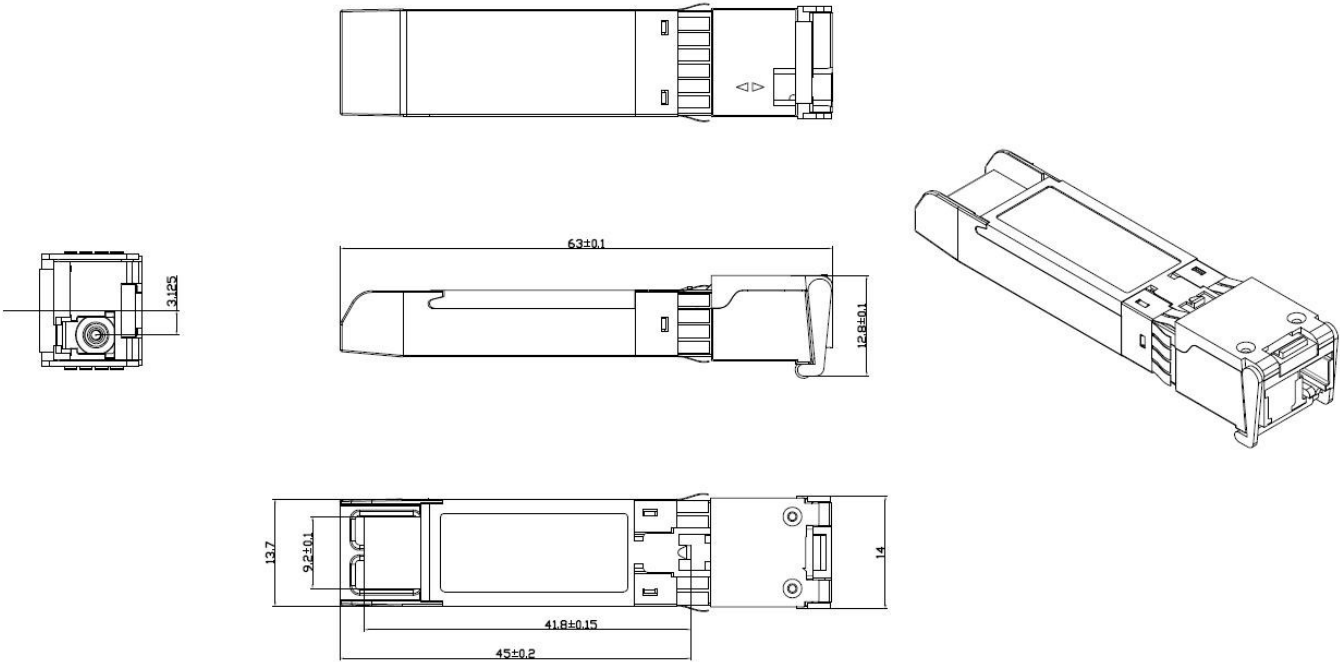
## Recommended Circuit



Recommended Host Board Power Supply Circuit



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.

