



## Q2B32010C02FGPB

Alcatel-Lucent Nokia® Compatible 100GBase-BX PAM4 QSFP28 Transceiver (SMF, 1331nmTx/1271nmRx, 10km w/FEC, LC, DOM, -40 to 85C)

### Product Description

This Alcatel-Lucent Nokia® Compatible QSFP28 transceiver provides 100GBase-BX throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1331nmTx/1271nmRx via an LC connector. This bidirectional unit must be used with another transceiver or network appliance of complimenting wavelengths. It is also capable of withstanding rugged environments and can operate at temperatures between -40 to 85C. 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

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

### Features:

- Compliant with 100G Lambda MSA 100G-LR Specifications
- Single 3.3V Power Supply
- Compliant with SFF-8636
- Bidi LC Connectors
- Industrial Temperature -40 to 85 Celsius
- Single-mode Fiber
- Metal with Lower EMI
- Hot Pluggable
- RoHS Compliant and Lead Free
- Excellent ESD Protection



### Applications:

- 100GBase Ethernet
- Datacenter

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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                           | V <sub>cc</sub>  | 0    |        | 3.6                  | V    |       |
| Data Input Voltage                               |                  | -0.3 |        | 3.6                  | V    |       |
| Control Input Voltage                            |                  | -0.3 |        | 4                    | V    |       |
| Storage Temperature                              | T <sub>stg</sub> | -40  |        | 85                   | °C   |       |
| Operating Case Temperature                       | T <sub>c</sub>   | 0    |        | 70                   | °C   |       |
| Relative Humidity                                | RH               | 5    |        | 85                   | %    |       |
| Data Rate                                        | BR               |      | 53.125 |                      | GBd  |       |
| Bit Error Rate                                   | BER              |      |        | 2.4x10 <sup>-4</sup> |      | 1     |
| Supported Link Length on 9/125um SMF, 53.125 GBd | L                |      | 10     |                      | km   | 2     |

## Notes:

1. Tested with a PRBS31Q test pattern for 53.125 GBd operation.
2. Distances are based on FC-PI-6 Rev. 3.1 and IEEE 802.3 standards, with FEC.

## Electrical Characteristics

| Parameter                      | Symbol                 | Min.  | Typ. | Max.  | Unit  | Notes |
|--------------------------------|------------------------|-------|------|-------|-------|-------|
| Power Supply Voltage           | V <sub>cc</sub>        | 3.135 | 3.3  | 3.465 | V     |       |
| Module Supply Current          | I <sub>cc</sub>        |       |      | 1212  | mA    |       |
| Power Dissipation              | P <sub>DISS</sub>      |       |      | 4000  | mW    |       |
| Transmitter                    |                        |       |      |       |       |       |
| Differential Data Input Swing  | V <sub>IN</sub> , p-p  | 90    | 100  | 110   | mVp-p |       |
| Differential Input Impedance   | Z <sub>IN</sub>        | 90    | 100  | 110   | Ω     |       |
| Receiver                       |                        |       |      |       |       |       |
| Differential Data Output Swing | V <sub>OUT</sub> , p-p | 300   |      | 900   | mVp-p |       |
| Differential Output Impedance  | Z <sub>OUT</sub>       | 90    | 100  | 110   | Ω     |       |

## Optical Characteristics

| Parameter                                               | Symbol      | Min.   | Typ. | Max.   | Unit  | Notes |
|---------------------------------------------------------|-------------|--------|------|--------|-------|-------|
| <b>Transmitter</b>                                      |             |        |      |        |       |       |
| Center Wavelength                                       | $\lambda_C$ | 1324.5 | 1331 | 1337.5 | nm    |       |
| Extinction Ratio                                        | ER          | 3.5    |      |        | dB    |       |
| Launch Optical Power (Average)                          | Po          | -1.4   |      | 4.5    | dBm   | 1     |
| Launch Optical Power (OMA)                              | Poma        | 0.7    |      | 4.7    | dBm   |       |
| Transmitter and dispersion penalty eye closure for PAM4 | TDECQ       |        |      | 3.4    | dB    |       |
| RIN17.1OMA (max)                                        | RIN         |        |      | -136   | dB/Hz |       |
| Optical Return Loss Tolerance                           | ORLT        |        |      | 15.6   | dB    |       |
| Pout @TX-Disable Asserted                               | Poff        |        |      | -30    | dBm   |       |
| <b>Receiver</b>                                         |             |        |      |        |       |       |
| Center Wavelength                                       | $\lambda_C$ | 1264.5 | 1271 | 1277.5 | nm    |       |
| Receiver Sensitivity (OMA)                              | RxSENS      |        |      | -6.1   | dBm   | 2     |
| Receiver Overload (Pavg)                                | POL         | 4.5    |      |        | dBm   |       |
| Receiver reflectance                                    |             |        |      | -26    | dB    |       |
| LOS De-Assert                                           | LOSD        |        |      | -12    | dBm   |       |
| LOS Assert                                              | LOSA        | -18    |      |        | dBm   |       |
| LOS Hysteresis                                          |             | 0.5    |      |        | dB    |       |

### Notes:

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. Measured with PRBS31Q test pattern, 53.125GBd, BER<2.4×10<sup>-4</sup>.

## Pin Descriptions

| Pin | Logic       | Symbol  | Name/Descriptions                     | Notes |
|-----|-------------|---------|---------------------------------------|-------|
| 1   |             | GND     | Module Ground.                        | 1     |
| 2   | CML-I       | Tx2-    | Transmitter Inverted Data Input.      |       |
| 3   | CML-I       | Tx2+    | Transmitter Non-Inverted Data Output. |       |
| 4   |             | GND     | Module Ground.                        | 1     |
| 5   | CML-I       | Tx4-    | Transmitter Inverted Data Input.      |       |
| 6   | CML-I       | Tx4+    | Transmitter Non-Inverted Data Output. |       |
| 7   |             | GND     | Module Ground.                        | 1     |
| 8   | LVTLL-I     | ModSelL | Module Select.                        |       |
| 9   | LVTLL-I     | ResetL  | Module Reset.                         |       |
| 10  |             | VccRx   | +3.3V Receiver Power Supply.          | 2     |
| 11  | LVC MOS-I/O | SCL     | 2-Wire Serial Interface Clock.        |       |
| 12  | LVC MOS-I/O | SDA     | 2-Wire Serial Interface Data.         |       |
| 13  |             | GND     | Module Ground.                        |       |
| 14  | CML-O       | Rx3+    | Receiver Non-Inverted Data Output.    |       |
| 15  | CML-O       | Rx3-    | Receiver Inverted Data Output.        |       |
| 16  |             | GND     | Module Ground.                        | 1     |
| 17  | CML-O       | Rx1+    | Receiver Non-Inverted Data Output.    |       |
| 18  | CML-O       | Rx1-    | Receiver Inverted Data Output.        |       |
| 19  |             | GND     | Module Ground.                        | 1     |
| 20  |             | GND     | Module Ground.                        | 1     |
| 21  | CML-O       | Rx2-    | Receiver Inverted Data Output.        |       |
| 22  | CML-O       | Rx2+    | Receiver Non-Inverted Data Output.    |       |
| 23  |             | GND     | Module Ground.                        | 1     |
| 24  | CML-O       | Rx4-    | Receiver Inverted Data Output.        | 1     |
| 25  | CML-O       | Rx4+    | Receiver Non-Inverted Data Output.    |       |
| 26  |             | GND     | Module Ground.                        | 1     |
| 27  | LVTTL-O     | ModPrsL | Module Present.                       |       |
| 28  | LVTTL-O     | IntL    | Interrupt.                            |       |
| 29  |             | VccTx   | +3.3V Transmitter Power Supply.       | 2     |
| 30  |             | Vcc1    | +3.3V Power Supply.                   | 2     |
| 31  | LVTTL-I     | LPMode  | Low-Power Mode.                       |       |
| 32  |             | GND     | Module Ground.                        | 1     |
| 33  | CML-I       | Tx3+    | Transmitter Non-Inverted Data Input.  |       |
| 34  | CML-I       | Tx3-    | Transmitter Inverted Data Output.     |       |
| 35  |             | GND     | Module Ground.                        | 1     |

|    |       |      |                                      |   |
|----|-------|------|--------------------------------------|---|
| 36 | CML-I | Tx1+ | Transmitter Non-Inverted Data Input. |   |
| 37 | CML-I | Tx1- | Transmitter Inverted Data Output.    |   |
| 38 |       | GND  | Module Ground.                       | 1 |

#### Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 module, and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. VccRx, Vcc1, and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. Recommended host board power supply filtering is shown below. VccRx, Vcc1, and VccTx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

#### Electrical Pin-Out Details



Block Diagram



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.

