

## QSFP28-OTU4-CWDM4-N2-AO

Alcatel-Lucent Nokia® Compatible TAA 100GbE/OTU-4/128G FC CWDM4 QSFP28 Transceiver (SMF, 1270nm to 1330nm, 2km, LC, DOM)

### Features

- Compliant with IEEE Std 802.3ba, 100G Ethernet/128G FC/112G OTU4
- Duplex LC Connector
- Compliant with QSFP28 MSA
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Single-mode Fiber
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



### Applications

- OTU4

### Product Description

This Alcatel-Lucent Nokia® QSFP28 transceiver provides 100GBase/OTU4-CWDM4 throughput up to 2km over single-mode fiber (SMF) using wavelengths between 1270nm to 1330nm via an LC connector. 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. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

AddOn'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 international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."



## Absolute Maximum Rating

| Parameter                  | Symbol          | Min. | Typ.  | Max. | Unit |
|----------------------------|-----------------|------|-------|------|------|
| Storage Temperature        | T <sub>S</sub>  | -40  |       | 85   | °C   |
| Relative Humidity          | RH              | 5    |       | 95   | %    |
| Maximum Supply Voltage     | V <sub>CC</sub> | -0.5 |       | 4.0  | V    |
| Operating Case Temperature | T <sub>C</sub>  | 0    |       | 70   | °C   |
| Data Rate Per Channel      |                 |      | 28.05 |      | Gb/s |

## Electrical Characteristics

| Parameter                                  | Symbol               | Min. | Typ. | Max. | Unit              | Notes |
|--|----------------------|------|------|------|-------------------|-------|
| Supply Voltage                             | V <sub>CC</sub>      | -0.5 |      | 4.0  | V                 |       |
| Module Supply Current                      | I <sub>CC</sub>      |      |      | 1100 | mA                |       |
| Power Dissipation                          | P <sub>D</sub>       |      |      | 3500 | mW                |       |
| Transmitter                                |                      |      |      |      |                   |       |
| Single-Ended Input Voltage Tolerance       | Z <sub>IN</sub>      | -0.3 |      | 4.0  | V                 |       |
| Input Differential Impedance               | V <sub>IN,P-P</sub>  |      | 100  |      | Ω                 |       |
| Differential Data Input Swing              |                      | 190  |      | 700  | mV <sub>p-p</sub> |       |
| AC Common Mode Input Voltage Tolerance     |                      | 15   |      |      | mV                |       |
| Differential Input Voltage Swing Threshold |                      | 50   |      |      | mV <sub>p-p</sub> |       |
| Receiver                                   |                      |      |      |      |                   |       |
| Single-Ended Output Voltage                |                      | -0.3 |      | 4.0  | V                 |       |
| Output Differential Impedance              | Z <sub>O</sub>       | 90   | 100  | 110  | Ω                 |       |
| Differential Data Output Swing             | V <sub>OUT,P-P</sub> | 300  |      | 850  | mV <sub>p-p</sub> |       |
| AC Common Mode Output Voltage              |                      |      |      | 7.5  | mV                |       |

## Optical Characteristics

| Parameter                         | Symbol                             | Min.   | Typ. | Max.   | Unit | Notes |
|-----------------------------------|------------------------------------|--------|------|--------|------|-------|
| Transmitter                       |                                    |        |      |        |      |       |
| Launch Optical Power per lane     | P <sub>o</sub>                     | -4.5   |      | +2.5   | dBm  | 1     |
| Total Launch Optical Power        | P <sub>o</sub>                     |        |      | +8.5   | dBm  | 1     |
| Center Wavelength Range           | L1                                 | 1264.5 | 1271 | 1277.5 | nm   |       |
|                                   | L2                                 | 1284.5 | 1291 | 1297.5 | nm   |       |
|                                   | L3                                 | 1304.5 | 1311 | 1317.5 | nm   |       |
|                                   | L4                                 | 1324.5 | 1331 | 1337.5 | nm   |       |
| Extinction Ratio                  | EX                                 | 3.5    |      |        | dB   | 2     |
| Spectral Width (-20dB)            | Δλ                                 |        |      | 1      | nm   |       |
| Side Mode Suppression Ratio       | SMSR                               | 30     |      |        | dB   |       |
| Optical Return Loss Tolerance     | ORLT                               |        |      | 20     | dB   |       |
| Pout @TX-Disable Asserted         | P <sub>off</sub>                   |        |      | -30    | dBm  | 1     |
| Eye Mask {X1, X2, X3, Y1, Y2, Y3} | {0.31, 0.4, 0.45, 0.34, 0.38, 0.4} |        |      |        |      |       |
| Receiver                          |                                    |        |      |        |      |       |
| Center Wavelength                 | L1                                 | 1264.5 | 1271 | 1277.5 | nm   |       |
|                                   | L2                                 | 1284.5 | 1291 | 1297.5 | nm   |       |
|                                   | L3                                 | 1304.5 | 1311 | 1317.5 | nm   |       |
|                                   | L4                                 | 1324.5 | 1331 | 1337.5 | nm   |       |
| Sensitivity per Channel           | S                                  |        |      | -9     | dBm  | 3     |
| Overload (each channel)           | P <sub>OL</sub>                    | 2.5    |      |        | dBm  | 3     |
| Damage Threshold (each channel)   | P <sub>damage</sub>                | 3.5    |      |        | dBm  |       |
| Optical Return Loss               | ORL                                | 26     |      |        | dB   |       |
| LOS De-Assert                     | LOSD                               |        |      | -12.0  | dBm  |       |
| LOS Assert                        | LOSA                               | -24    |      |        | dBm  |       |
| LOS Hysteresis                    |                                    | 0.5    |      |        | dB   |       |

### Notes:

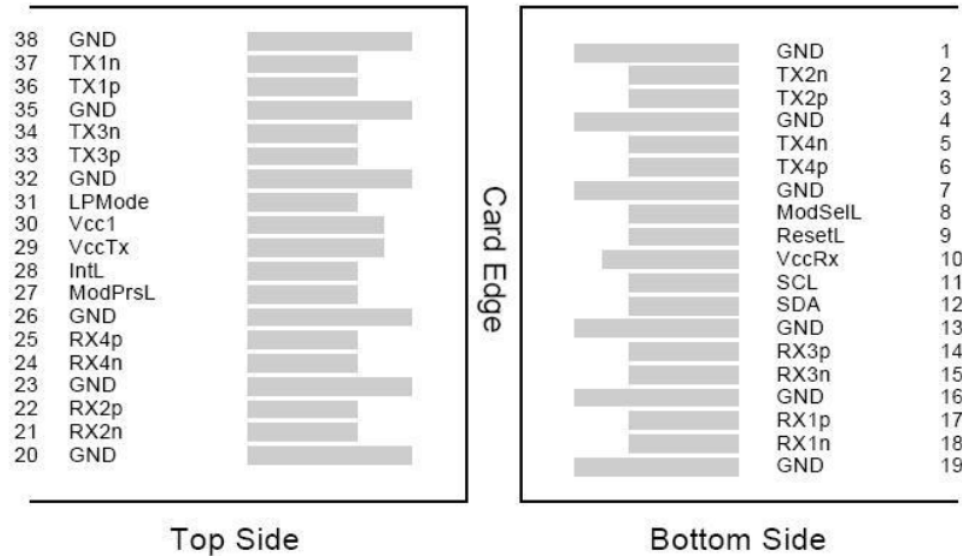
1. The optical power is launched into SMF
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @28.05Gbps
3. Measured with PRBS 2<sup>31</sup>-1 test pattern, 28.05Gb/s, BER 1E-6

## Pin Descriptions

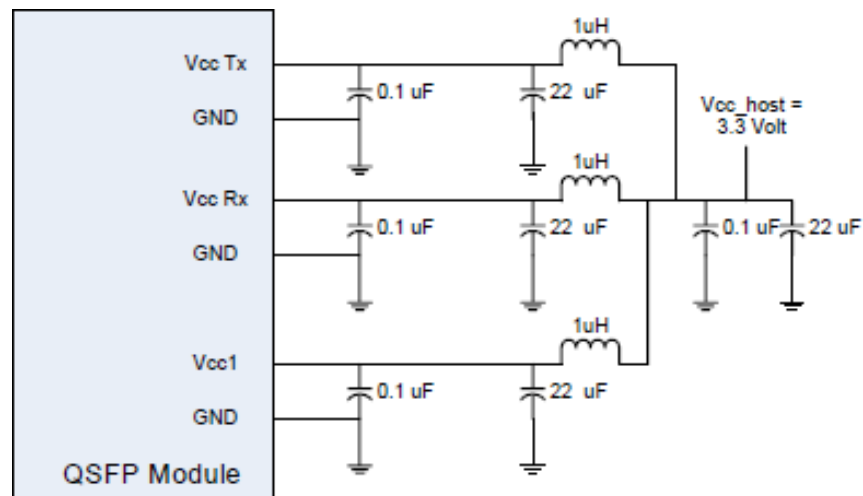
| Pin | Symbol  | Name/Descriptions                                | Ref. |
|-----|---------|--|------|
| 1   | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 2   | Tx2-    | Transmitter Inverted Data Input                  |      |
| 3   | Tx2+    | Transmitter Non-Inverted Data output             |      |
| 4   | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 5   | Tx4-    | Transmitter Inverted Data Input                  |      |
| 6   | Tx4+    | Transmitter Non-Inverted Data output             |      |
| 7   | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 8   | ModSelL | Module Select                                    | 2    |
| 9   | ResetL  | Module Reset                                     | 2    |
| 10  | VccRx   | 3.3V Power Supply Receiver                       |      |
| 11  | SCL     | 2-Wire serial Interface Clock                    | 2    |
| 12  | SDA     | 2-Wire serial Interface Data                     | 2    |
| 13  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 14  | Rx3+    | Receiver Non-Inverted Data Output                |      |
| 15  | Rx3-    | Receiver Inverted Data Output                    |      |
| 16  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 17  | Rx1+    | Receiver Non-Inverted Data Output                |      |
| 18  | Rx1-    | Receiver Inverted Data Output                    |      |
| 19  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 20  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 21  | Rx2-    | Receiver Inverted Data Output                    |      |
| 22  | Rx2+    | Receiver Non-Inverted Data Output                |      |
| 23  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 24  | Rx4-    | Receiver Inverted Data Output                    | 1    |
| 25  | Rx4+    | Receiver Non-Inverted Data Output                |      |
| 26  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 27  | ModPrsL | Module Present                                   |      |
| 28  | IntL    | Interrupt  | 2    |
| 29  | VccTx   | 3.3V power supply transmitter                    |      |
| 30  | Vcc1    | 3.3V power supply                                |      |
| 31  | LPMode  | Low Power Mode                                   | 2    |
| 32  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 33  | Tx3+    | Transmitter Non-Inverted Data Input              |      |
| 34  | Tx3-    | Transmitter Inverted Data Output                 |      |
| 35  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |
| 36  | Tx1+    | Transmitter Non-Inverted Data Input              |      |
| 37  | Tx1-    | Transmitter Inverted Data Output                 |      |
| 38  | GND     | Transmitter Ground (Common with Receiver Ground) | 1    |

**Notes:**

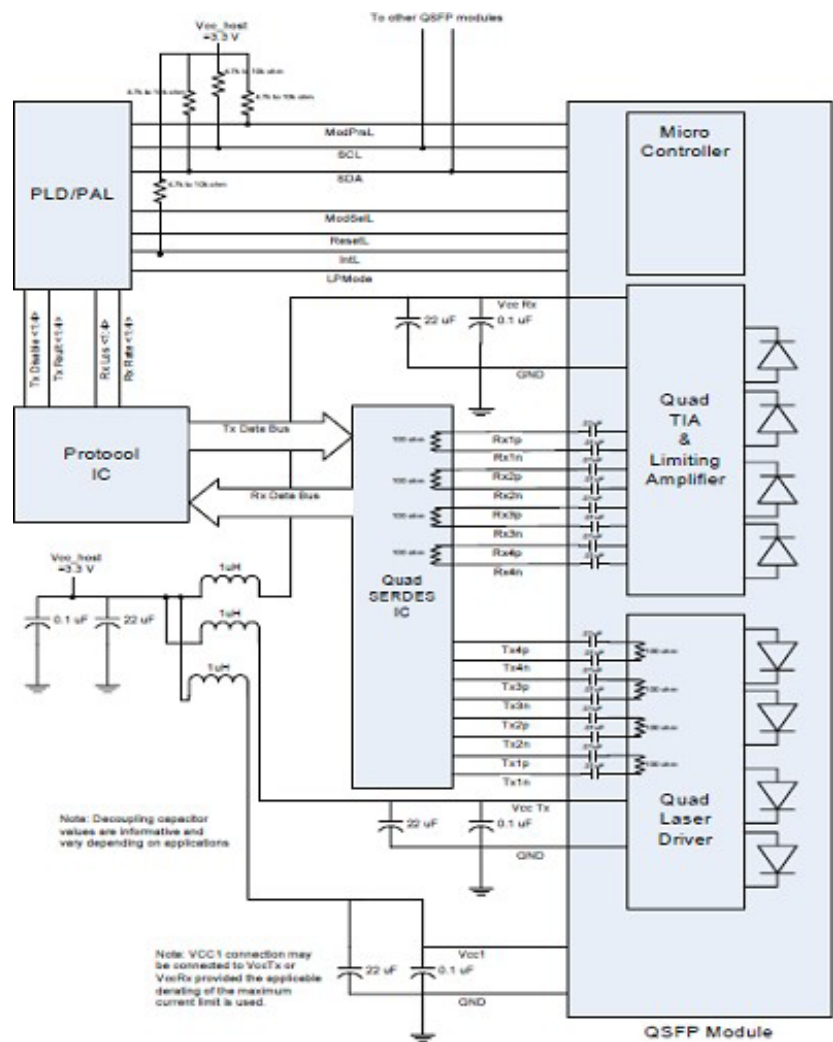
1. The module signal grounds are isolated from the module case
2. This is an open collector/drain output that on the host board requires a 4.7K $\Omega$  to 10K $\Omega$  pull-up resistor to VccHost



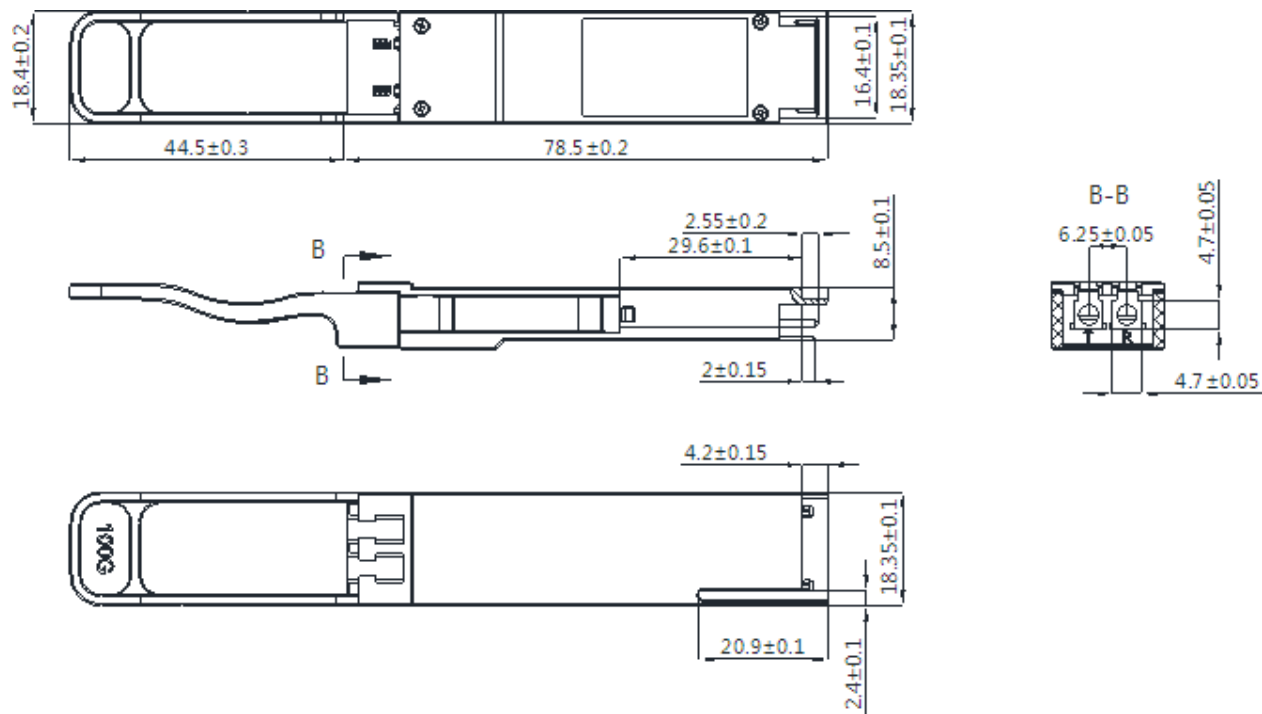
Host PCB QSFP28 pad assignment top view

**Recommended Host Board Power Supply Filter Network**

Recommended Application Block Diagram



Mechanical Specifications



## About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



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