

## 1AB474800005-AO

Alcatel-Lucent Nokia® 1AB474800005 Compatible TAA 100GbE/OTU-4/128G FC Multi-Rate SR4 QSFP28 Transceiver (MMF, 850nm, 100m, MPO, DOM)

### Features

- Supports 103.1Gbps and 112.2Gbps Aggregate Bit Rates
- Up to 70m Transmission on MMF OM3, and 100m Transmission on MMF OM4
- Single 3.3V Power Supply and Power Dissipation < 3.5W
- Class 1 FDA and IEC60825-1 Laser Safety Compliant
- I2C Interface with Integrated Digital Diagnostic Monitoring
- Hot-Pluggable QSFP28 Footprint
- RoHS6 Compliant
- Operating Temperature: 0C to +70C



### Applications

- 100GBase Ethernet
- Access and Enterprise

### Product Description

This Alcatel-Lucent Nokia® 1AB474800005 compatible QSFP28 transceiver provides 100GBase/OTU4-SR4 throughput up to 100m over OM4 multi-mode fiber (MMF) using a wavelength of 850nm via an MPO 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."



## Regulatory Compliance

| Product Certificate | Certificate Number | Applicable Standard           |
|---------------------|--------------------|-------------------------------|
| TUV                 | R50135086          | EN 60950-1:2006+A11+A1+A12+A2 |
|                     |                    | EN 60825-1:2014               |
|                     |                    | EN 60825-2:2004+A1+A2         |
| UL                  | E317337            | UL 60950-1                    |
|                     |                    | CSA C22.2 No. 60950-1-07      |
| EMC CE              | AE 50384190 0001   | EN 55032:2012                 |
|                     |                    | EN 55032:2015                 |
|                     |                    | EN 55024:2010                 |
|                     |                    | EN 55024:2010+A1              |
| FCC                 | WTF14F0514417E     | 47 CFR PART 15 OCT., 2013     |
| FDA                 | /                  | CDRH 1040.10                  |
| ROHS                | /                  | 2011/65/EU                    |

## Absolute Maximum Ratings

| Parameter                   | Symbol          | Min. | Typ. | Max. | Unit |
|-----------------------------|-----------------|------|------|------|------|
| Supply Voltage              | V <sub>cc</sub> | -0.5 |      | 3.6  | V    |
| Storage Temperature         | T <sub>s</sub>  | -40  |      | +85  | °C   |
| Case Operating Temperature  | T <sub>c</sub>  | 0    |      | 70   | °C   |
| Operating Relative Humidity | RH              | 5    |      | 85   | %    |

### Notes:

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

## Electrical Characteristics

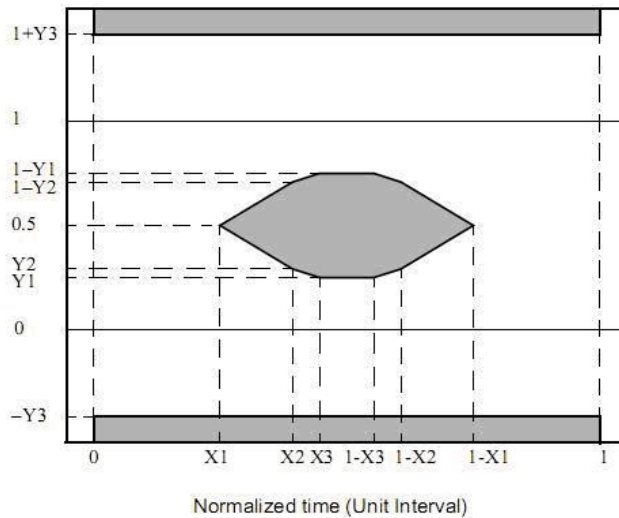
| Parameter                       | Symbol                         | Min.  | Typ. | Max.  | Unit | Notes                            |
|---------------------------------|--------------------------------|-------|------|-------|------|----------------------------------|
| Power Supply Voltage            | V <sub>cc</sub>                | 3.135 | 3.3  | 3.465 | V    |                                  |
| Power Consumption               | P                              |       |      | 3.5   | W    |                                  |
| <b>Transmitter</b>              |                                |       |      |       |      |                                  |
| Input Amplitude (Differential)  | V <sub>in</sub>                | 150   |      | 1050  | mVpp | AC coupled inputs                |
| Input Impedance (Differential)  | Z <sub>in</sub>                | 85    | 100  | 115   | ohms | R <sub>in</sub> > 100 kohms @ DC |
| <b>Receiver</b>                 |                                |       |      |       |      |                                  |
| Output Amplitude (Differential) | V <sub>out</sub>               | 200   |      | 1100  | mVpp | AC coupled outputs               |
| Output Impedance (Differential) | Z <sub>out</sub>               | 85    | 100  | 115   | ohms |                                  |
| Output Rise/Fall Time           | t <sub>r</sub> /t <sub>f</sub> |       | 12   |       | ps   | 20%~80%                          |

### Optical Characteristics 100GBASE-SR4 Ethernet Operation

| Parameter   | Symbol         | Min.                      | Typ.  | Max.  | Unit | Notes |
|---|----------------|---------------------------|-------|-------|------|-------|
| <b>Transmitter</b>  |                |                           |       |       |      |       |
| Signaling Speed per Lane                                    | BRAVE          |                           | 25.78 |       | Gbps |       |
| Center Wavelength   | $\lambda_C$    | 840                       | 850   | 860   | nm   |       |
| Average Launch Power, Each Lane                             | $P_{out}/lane$ | -8.4                      |       | 2.4   | dBm  | 1     |
| Optical modulation amplitude                                | $P_{oma}$      |                           |       | 3     | dBm  |       |
| Extinction Ratio  | ER             | 3                         |       |       | dB   |       |
| Transmitter eye mask definition<br>{X1, X2, X3, Y1, Y2, Y3} |                | IEEE 802.3bm 100Gbase-SR4 |       |       |      | 2     |
| <b>Receiver</b>   |                |                           |       |       |      |       |
| Signaling Speed per Lane                                    | BRAVE          | 25.78                     |       | 28.05 | Gbps |       |
| Center Wavelength   | $\lambda_C$    | 840                       | 850   | 860   | nm   |       |
| Average Receive Power per Lane                              | $R_{pow}$      | -10.3                     |       | 2.4   | dBm  |       |
| Stressed Receive Sensitivity in OMA per Lane                | $P_{min}$      |                           |       | -5.2  | dBm  | 3     |
| Receive Sensitivity in OMA per Lane                         | $P_{min}$      |                           |       | -8    | dBm  | 3     |
| LOS Assert  | LOSA           | -20                       |       |       | dBm  |       |
| LOS De-Assert   | LOSD           |                           |       | -12   | dBm  |       |
| LOS Hysteresis  |                | 0.5                       |       |       | dB   |       |

**Notes:**

1. Output is coupled into a 50/125 $\mu$ m multi-mode fiber.
2. Filtered, measured with a PRBS  $2^{31}-1$  test pattern @25.78Gbps.
3. Receive sensitivity measured at BER less than  $5E-5$ , with a  $2^{31}-1$  PRBS @25.78Gbps.



## Optical Characteristics OTU4 and 128G Fiber Channel Operation

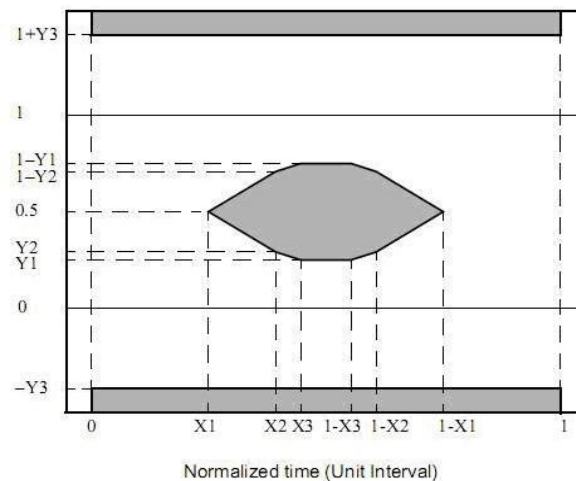
| Parameter   | Symbol      | Min.    | Typ. | Max.  | Unit | Notes |   |
|---|-------------|---------|------|-------|------|-------|---|
| <b>Transmitter</b>  |             |         |      |       |      |       |   |
| Signaling Speed per Lane                                    | BRAVE       | 27.95   |      | 28.05 | Gbps | 1     |   |
| Center Wavelength   | $\lambda_C$ | 840     | 850  | 860   | nm   |       |   |
| Average Launch Power, Each Lane                             | Pout/lane   | -2.5    |      | 2.4   | dBm  | 2     |   |
| Optical modulation amplitude                                | Poma        |         |      | 3     | dBm  |       |   |
| Extinction Ratio  | ER          | 3       |      |       | dB   |       |   |
| Transmitter eye mask definition<br>{X1, X2, X3, Y1, Y2, Y3} |             | FC-PI-6 |      |       |      |       | 3 |
| <b>Receiver</b>   |             |         |      |       |      |       |   |
| Signaling Speed per Lane                                    | BRAVE       | 27.95   |      | 28.05 | Gbps |       |   |
| Center Wavelength   | $\lambda_C$ | 840     | 850  | 860   | nm   |       |   |
| Average Receive Power per Lane                              | Rpow        | -10.2   |      | 2.4   | dBm  |       |   |
| Receive Sensitivity in OMA per Lane                         | Pmin        |         |      | -6    | dBm  | 4     |   |
| LOS Assert  | LOSA        | -20     |      |       | dBm  |       |   |
| LOS De-Assert   | LOSD        |         |      | -12   | dBm  |       |   |
| LOS Hysteresis  |             | 0.5     |      |       | dB   |       |   |

### Notes:

1. This module will work at 103.1Gbps (25.78Gbpsx4) in default. To work at 112.2Gbps (28.05Gbpsx4), Page 00 bytes 87-88 (Rx and Tx Rate Select) need to be written with 0xFF to enable rate select (refer to SFF-8636), which will lose to default when powered off.

| Page 00 Byte 87 | Page 00 Byte 88 | Data Rate           |
|-----------------|-----------------|---------------------|
| 0xAA            | 0xAA            | 103.1Gbps (Default) |
| 0xFF            | 0xFF            | 112.2Gbps           |

2. Output is coupled into a 50/125 $\mu$ m multi-mode fiber.
3. Filtered, measured with a PRBS  $2^{31}-1$  test pattern @28.05Gbps.
4. Receive sensitivity measured at BER less than  $1E-6$ , with a  $2^{31}-1$  PRBS @28.05Gbps.



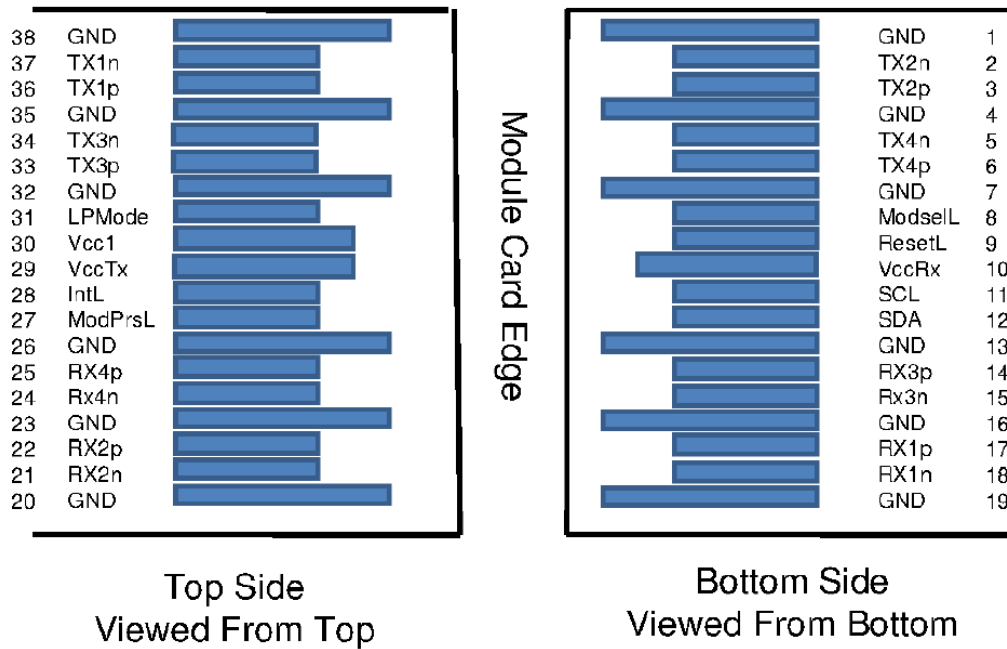
## Pin Descriptions

| Pin | Logic       | Symbol  | Name/Descriptions                   | Ref. |
|-----|-------------|---------|-------------------------------------|------|
| 1   |             | GND     | Ground                              | 1    |
| 2   | CML-I       | Tx2n    | Transmitter Inverted Data Input     |      |
| 3   | CML-I       | Tx2p    | Transmitter Non-Inverted Data Input |      |
| 4   |             | GND     | Ground                              | 1    |
| 5   | CML-I       | Tx4n    | Transmitter Inverted Data Input     |      |
| 6   | CML-I       | Tx4p    | Transmitter Non-Inverted Data Input |      |
| 7   |             | GND     | Ground                              | 1    |
| 8   | LVTTL-I     | ModSelL | Module Select                       |      |
| 9   | LVTTL-I     | ResetL  | Module Reset                        |      |
| 10  |             | VccRx   | +3.3V Power Supply Receiver         | 2    |
| 11  | LVCMOS- I/O | SCL     | 2-wire serial interface clock       |      |
| 12  | LVCMOS- I/O | SDA     | 2-wire serial interface data        |      |
| 13  |             | GND     | Ground                              | 1    |
| 14  | CML-O       | Rx3p    | Receiver Non-Inverted Data Output   |      |
| 15  | CML-O       | Rx3n    | Receiver Inverted Data Output       |      |
| 16  |             | GND     | Ground                              | 1    |
| 17  | CML-O       | Rx1p    | Receiver Non-Inverted Data Output   |      |
| 18  | CML-O       | Rx1n    | Receiver Inverted Data Output       |      |
| 19  |             | GND     | Ground                              | 1    |
| 20  |             | GND     | Ground                              | 1    |
| 21  | CML-O       | Rx2n    | Receiver Inverted Data Output       |      |
| 22  | CML-O       | Rx2p    | Receiver Non-Inverted Data Output   |      |
| 23  |             | GND     | Ground                              | 1    |
| 24  | CML-O       | Rx4n    | Receiver Inverted Data Output       |      |
| 25  | CML-O       | Rx4p    | Receiver Non-Inverted Data Output   |      |
| 26  |             | GND     | Ground                              | 1    |
| 27  | LVTTL-O     | ModPrsL | Module Present                      |      |
| 28  | LVTTL-O     | IntL    | Interrupt                           |      |
| 29  |             | VccTx   | +3.3V Power supply transmitter      | 2    |
| 30  |             | Vcc1    | +3.3V Power supply                  | 2    |
| 31  | LVTTL-I     | LPMode  | Low Power Mode                      |      |
| 32  |             | GND     | Ground                              | 1    |
| 33  | CML-I       | Tx3p    | Transmitter Non-Inverted Data Input |      |
| 34  | CML-I       | Tx3n    | Transmitter Inverted Data Input     |      |
| 35  |             | GND     | Ground                              | 1    |
| 36  | CML-I       | Tx1p    | Transmitter Non-Inverted Data Input |      |
| 37  | CML-I       | Tx1n    | Transmitter Inverted Data Input     |      |
| 38  |             | GND     | Ground                              | 1    |

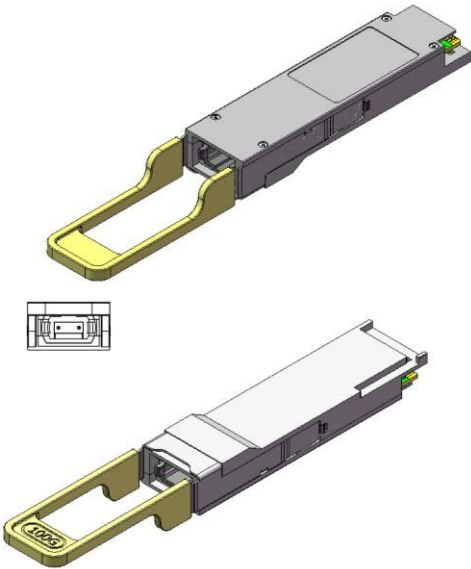
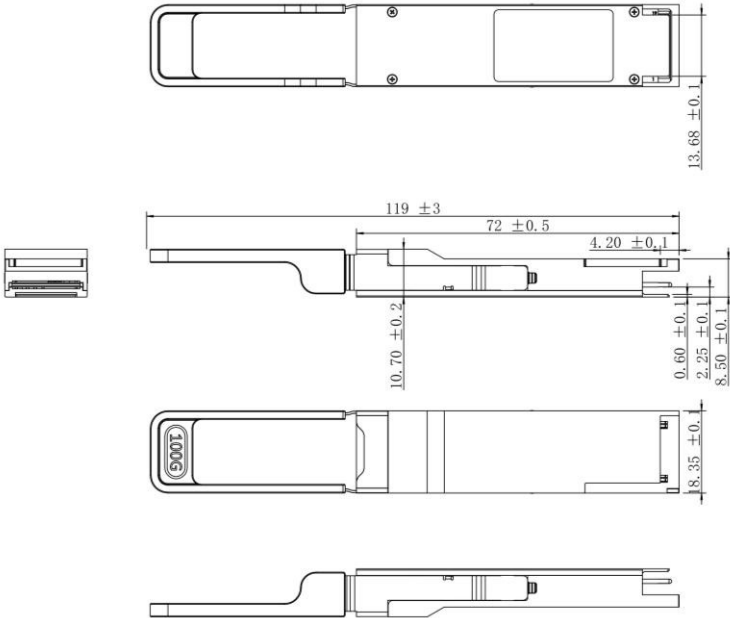
**Notes:**

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. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 Module in any combination. The connector pins are each rated for a maximum current of 500mA.

**Electrical Pin-out Details**



**Mechanical Specifications**



Unit:mm

## **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 engrained 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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