

### 3HE13854AA-C

Alcatel-Lucent Nokia® 3HE13854AA Compatible TAA 2x100GBase-SR4 QSFP28-DD Transceiver (MMF, 850nm, 100m, MPO-24, DOM)

#### Features:

- SFF-8665 Compliance
- MPO Connector
- Multi-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



#### Applications:

- 2x100GBase Ethernet
- Access and Enterprise

#### Product Description

This Alcatel-Lucent Nokia® 3HE13854AA compatible QSFP28-DD transceiver provides 2x100GBase-SR4 throughput up to 100m over multi-mode fiber (MMF) using a wavelength of 850nm via an MPO-24 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.

ProLabs' 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 Ratings

| Parameter                   | Symbol          | Min. | Typ.  | Max.                  | Unit | Notes |
|-----------------------------|-----------------|------|-------|-----------------------|------|-------|
| Maximum Supply Voltage      | V <sub>CC</sub> | -0.5 |       | 3.6                   | V    |       |
| Storage Temperature         | T <sub>S</sub>  | -40  |       | +85                   | °C   |       |
| Relative Humidity - Storage | RH              | 5    |       | 85                    | %    | 1     |
| Operating Case Temperature  | T <sub>C</sub>  | 0    |       | 70                    | °C   |       |
| Data Rate                   | DR              |      | 2x100 |                       | Gbps |       |
| Distance                    |                 |      |       | 70 (OM3)<br>100 (OM4) | M    |       |

#### Notes:

1. Non-condensing

### Electrical Characteristics

| Parameter  | Symbol                 | Min. | Typ. | Max. | Unit | Notes |
|--|------------------------|------|------|------|------|-------|
| Module Supply Voltage  | V <sub>CC</sub>        | 3.13 | 3.3  | 3.47 | V    |       |
| Module Supply Current (Tx and Rx)                              | I <sub>IN</sub>        |      |      | 1440 | mA   |       |
| Power Consumption  | P <sub>D</sub>         |      |      | 5    | W    |       |
| Transmitter  |                        |      |      |      |      |       |
| Data Input Differential Peak-to Peak Voltage Swing             | V <sub>in,pp</sub>     | 20   |      | 950  | mVpp | 1     |
| LOS Assert Threshold   | V <sub>in,pp</sub> LOS | 120  |      |      | mVpp | 2     |
| Receiver   |                        |      |      |      |      |       |
| Data Output Differential Peak-to Peak Voltage Swing, each lane | ΔV <sub>DO</sub> pp    | 300  |      | 800  | mVpp | 3     |

#### Notes:

1. AC coupled internally.
2. Tx Data Input Differential Peak-to-Peak Voltage Swing
3. AC coupled with 100ohm differential output impedance.

## Optical Characteristics

| Parameter  | Symbol          | Min.                        | Typ.     | Max. | Unit. | Notes |
|--|-----------------|-----------------------------|----------|------|-------|-------|
| Transmitter  |                 |                             |          |      |       |       |
| Signaling rate, each lane                                      |                 |                             | 25.78125 |      | GBd   |       |
| Center Wavelength  | $\lambda$       | 840                         |          | 860  | nm    |       |
| Spectral Width – RMS   | $\Delta\lambda$ |                             |          | 0.6  | nm    |       |
| Transmitter and dispersion eye closure (TDEC), each lane (max) |                 |                             |          | 4.3  | dB    |       |
| Output Optical Power: Average each lane                        | PO_AVE          | -8.4                        |          | 2.4  | dBm   |       |
| Output Optical Modulation Amplitude, each lane                 |                 | -6.4                        |          | 3    | dBm   | 1     |
| Extinction Ratio   | ER              | 2                           |          |      | dB    |       |
| Output Optical Power: Disabled                                 | PO_OFF          |                             |          | -30  | dBm   |       |
| Eye Mask   |                 | Compliant with IEEE 802.3bm |          |      |       |       |
| Receiver   |                 |                             |          |      |       |       |
| Signaling rate, each lane                                      |                 |                             | 25.78125 |      | GBd   |       |
| Center wavelength, each lane                                   | $\lambda$       | 840                         |          | 860  | nm    |       |
| Damage Threshold   |                 | 3.4                         |          |      | dBm   |       |
| Receiver Power (OMA), each lane                                |                 |                             |          | 3    | dBm   |       |
| Maximum Average power at receiver input, each lane             |                 | -10.3                       |          | 2.4  | dBm   |       |
| Receiver Reflectance   |                 |                             |          | -12  | dB    |       |
| Stressed receiver sensitivity (OMA)                            |                 |                             |          | -5.2 | dBm   | 2     |
| LOS Assert   |                 | -19                         |          |      | dB    |       |
| LOS De-Assert  |                 |                             |          | -11  | dB    |       |
| LOS Hysteresis   |                 | 0.5                         |          |      | dB    |       |

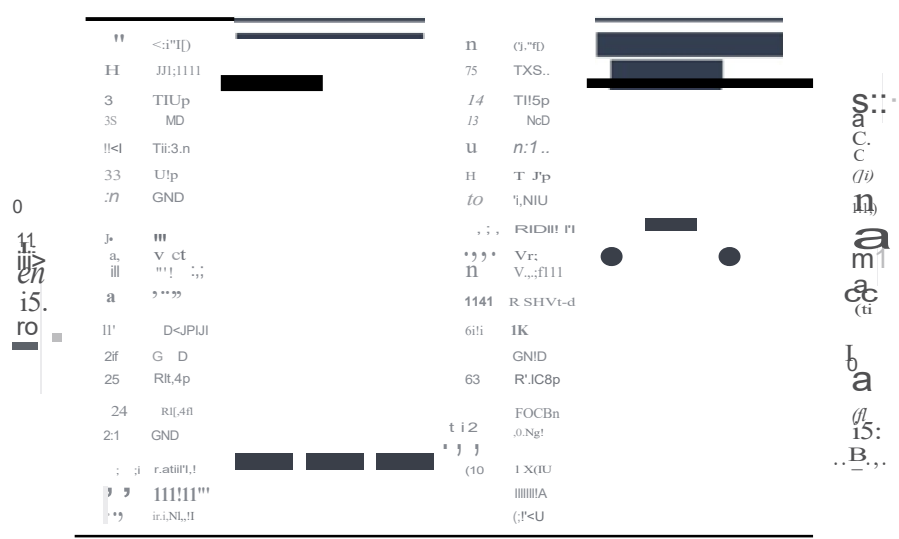
### Notes:

1. Even if the TDP<0.9dB, the OMA (min) must exceed this value
2. Measured with 25.78125-Gbps of PRBS-31 at 5x10<sup>-5</sup> BER.

## PIN Descriptions

| PIN | Logic       | Symbol   | Description   | Plug Sequence |
|-----|-------------|----------|---|---------------|
| 1   |             | GND      | Ground  | 1B            |
| 2   | CML-I       | Tx2n     | Transmitter Inverted Data Input   | 3B            |
| 3   | CML-I       | Tx2p     | Transmitter Non-Inverted Data Input   | 3B            |
| 4   |             | GND      | Ground  | 1B            |
| 5   | CML-I       | Tx4n     | Transmitter Inverted Data Input   | 3B            |
| 6   | CML-I       | Tx4p     | Transmitter Non-Inverted Data Input   | 3B            |
| 7   |             | GND      | Ground  | 1B            |
| 8   | LVTTL-I     | ModSelL  | Module Select   | 3B            |
| 9   | LVTTL-I     | ResetL   | Module Reset  | 3B            |
| 10  |             | VccRx    | +3.3V Power Supply Receiver   | 2B            |
| 11  | LVC MOS-I/O | SCL      | 2-wire serial interface clock   | 3B            |
| 12  | LVC MOS-I/O | SDA      | 2-wire serial interface data  | 3B            |
| 13  |             | GND      | Ground  | 1B            |
| 14  | CML-O       | Rx3p     | Receiver Non-Inverted Data Output   | 3B            |
| 15  | CML-O       | Rx3n     | Receiver Inverted Data Output   | 3B            |
| 16  |             | GND      | Ground  | 1B            |
| 17  | CML-O       | Rx1p     | Receiver Non-Inverted Data Output   | 3B            |
| 18  | CML-O       | Rx1n     | Receiver Inverted Data Output   | 3B            |
| 19  |             | GND      | Ground  | 1B            |
| 20  |             | GND      | Ground  | 1B            |
| 21  | CML-O       | Rx2n     | Receiver Inverted Data Output   | 3B            |
| 22  | CML-O       | Rx2p     | Receiver Non-Inverted Data Output   | 3B            |
| 23  |             | GND      | Ground  | 1B            |
| 24  | CML-O       | Rx4n     | Receiver Inverted Data Output   | 3B            |
| 25  | CML-O       | Rx4p     | Receiver Non-Inverted Data Output   | 3B            |
| 26  |             | GND      | Ground  | 1B            |
| 27  | LVTTL-O     | ModPrsL  | Module Present  | 3B            |
| 28  | LVTTL-O     | IntL     | Interrupt   | 3B            |
| 29  |             | VccTx    | +3.3V Power supply transmitter  | 2B            |
| 30  |             | Vcc1     | +3.3V Power supply  | 2B            |
| 31  | LVTTL-I     | InitMode | Initialization mode; In legacy QSFP applications, the InitMode pad is called LPMODE | 3B            |
| 32  |             | GND      | Ground  | 1B            |
| 33  | CML-I       | Tx3p     | Transmitter Non-Inverted Data Input   | 3B            |
| 34  | CML-I       | Tx3n     | Transmitter Inverted Data Input   | 3B            |
| 35  |             | GND      | Ground  | 1B            |
| 36  | CML-I       | Tx1p     | Transmitter Non-Inverted Data Input   | 3B            |
| 37  | CML-I       | Tx1n     | Transmitter Inverted Data Input   | 3B            |

|    |       |          |                                     |    |
|----|-------|----------|-------------------------------------|----|
| 38 |       | GND      | Ground                              | 1B |
| 39 |       | GND      | Ground                              | 1A |
| 40 | CML-I | Tx6n     | Transmitter Inverted Data Input     | 3A |
| 41 | CML-I | Tx6p     | Transmitter Non-Inverted Data Input | 3A |
| 42 |       | GND      | Ground                              | 1A |
| 43 | CML-I | Tx8n     | Transmitter Inverted Data Input     | 3A |
| 44 | CML-I | Tx8p     | Transmitter Non-Inverted Data Input | 3A |
| 45 |       | GND      | Ground                              | 1A |
| 46 |       | Reserved | For future use                      | 3A |
| 47 |       | VS1      | Module Vendor Specific 1            | 3A |
| 48 |       | VccRx1   | 3.3V Power Supply                   | 2A |
| 49 |       | VS2      | Module Vendor Specific 2            | 3A |
| 50 |       | VS3      | Module Vendor Specific 3            | 3A |
| 51 |       | GND      | Ground                              | 1A |
| 52 | CML-O | Rx7p     | Receiver Non-Inverted Data Output   | 3A |
| 53 | CML-O | Rx7n     | Receiver Inverted Data Output       | 3A |
| 54 |       | GND      | Ground                              | 1A |
| 55 | CML-O | Rx5p     | Receiver Non-Inverted Data Output   | 3A |
| 56 | CML-O | Rx5n     | Receiver Inverted Data Output       | 3A |
| 57 |       | GND      | Ground                              | 1A |
| 58 |       | GND      | Ground                              | 1A |
| 59 | CML-O | Rx6n     | Receiver Inverted Data Output       | 3A |
| 60 | CML-O | Rx6p     | Receiver Non-Inverted Data Output   | 3A |
| 61 |       | GND      | Ground                              | 1A |
| 62 | CML-O | Rx8n     | Receiver Inverted Data Output       | 3A |
| 63 | CML-O | Rx8p     | Receiver Non-Inverted Data Output   | 3A |
| 64 |       | GND      | Ground                              | 1A |
| 65 |       | NC       | No Connect                          | 3A |
| 66 |       | Reserved | For future use                      | 3A |
| 67 |       | VccTx1   | 3.3V Power Supply                   | 2A |
| 68 |       | Vcc2     | 3.3V Power Supply                   | 2A |
| 69 |       | Reserved | For Future Use                      | 3A |
| 70 |       | GND      | Ground                              | 1A |
| 71 | CML-I | Tx7p     | Transmitter Non-Inverted Data Input | 3A |
| 72 | CML-I | Tx7n     | Transmitter Inverted Data Input     | 3A |
| 73 |       | GND      | Ground                              | 1A |
| 74 | CML-I | Tx5p     | Transmitter Non-Inverted Data Input | 3A |
| 75 | CML-I | Tx5n     | Transmitter Inverted Data Input     | 3A |
| 76 |       | GND      | Ground                              | 1A |



Legacy QSFP28  
Pads

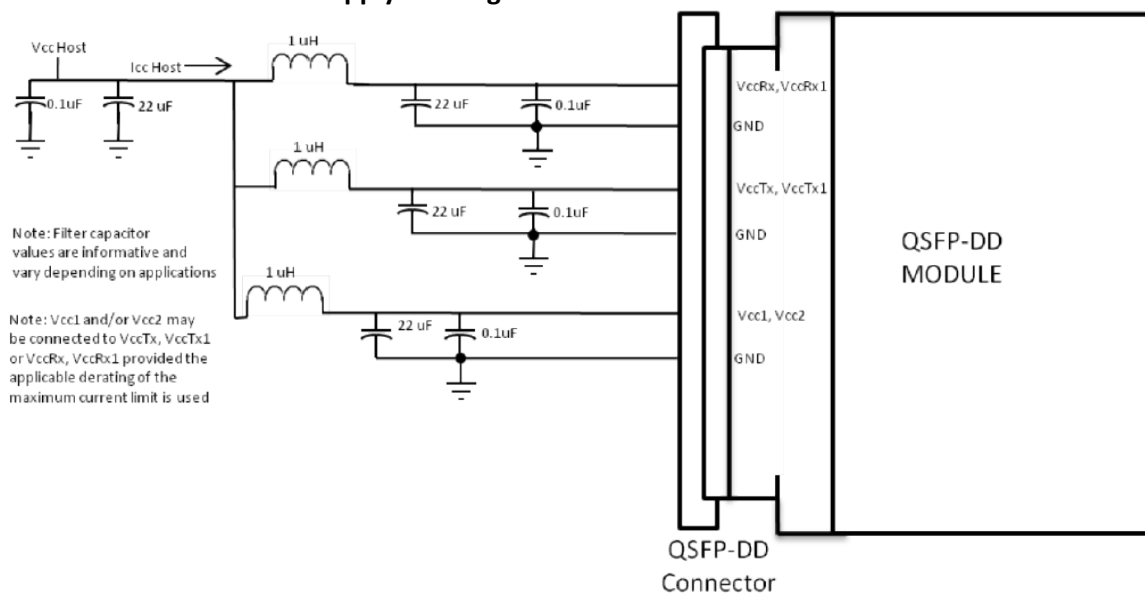
Additional  
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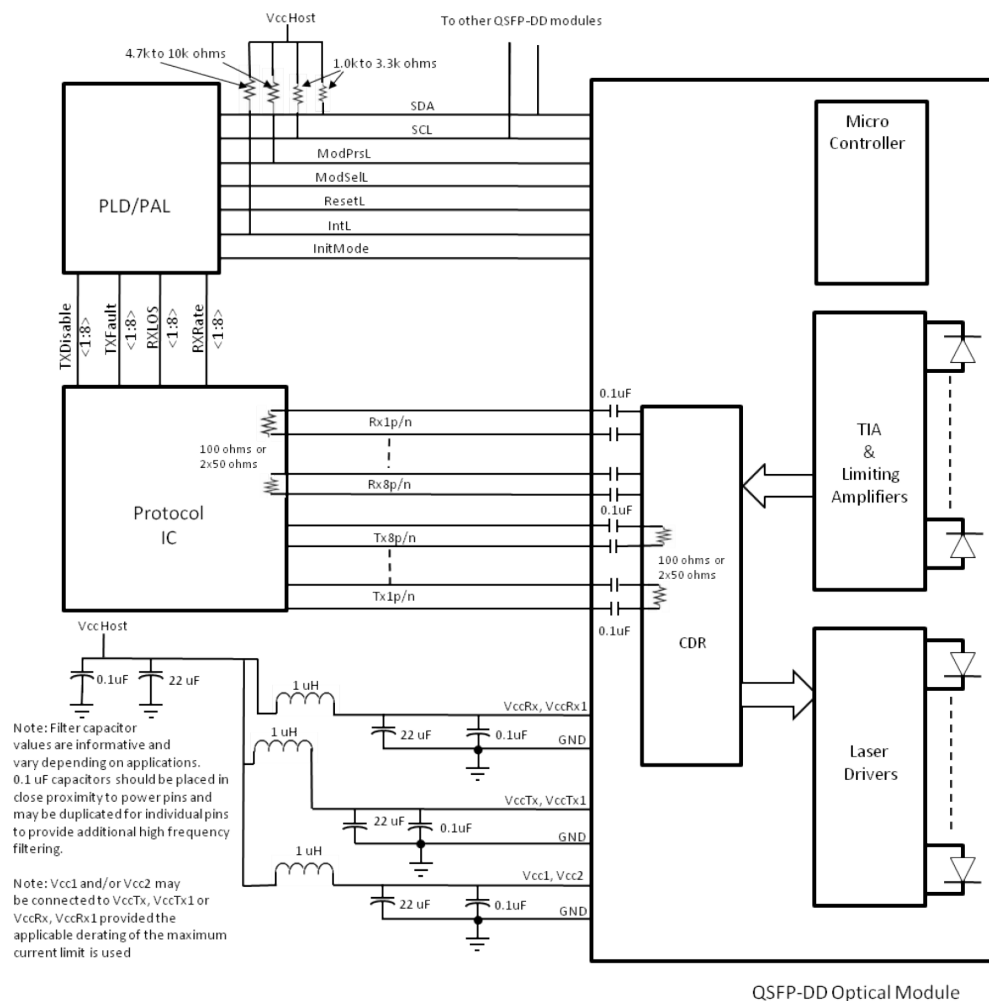
Additional  
QSFP-0D Pads

Legacy QSIFP28  
Pads

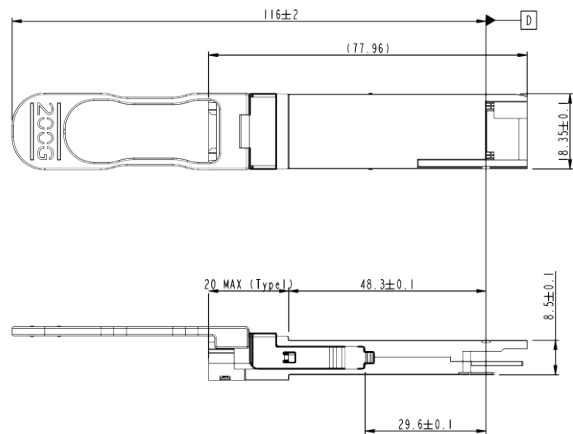
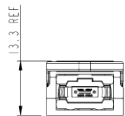
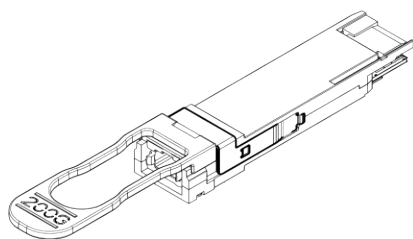
## Recommended Host Board Power Supply Filtering



### Recommended Interface Circuit



Mechanical Specifications





## About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



## Contact Information

ProLabs US

Email: [sales@prolabs.com](mailto:sales@prolabs.com)

Telephone: 952-852-0252

ProLabs UK

Email: [salesupport@prolabs.com](mailto:salesupport@prolabs.com)

Telephone: +44 1285 719 600