

3HE15379AB-C

Alcatel-Lucent Nokia® 3HE15379AB Compatible TAA 25GBase-BX SFP28 Transceiver (SMF, 1330nmTx/1270nmRx, 20km, LC, DOM, -40 to 85C)

Features:

- SFF-8402 and SFF-8472 Compliance
- Simplex LC Connector
- Single-mode Fiber
- Industrial Temperature -40 to 85 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



Applications:

- 25GBase Ethernet
- Access and Enterprise

Product Description

This Alcatel-Lucent Nokia® 3HE15379AB compatible SFP28 transceiver provides 25GBase-BX throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1330nmTx/1270nmRx 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.

ProLabs'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

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------------|--------|------|------|------|------|---------|
| Maximum Supply Voltage | Vcc | 0 | | 3.6 | V | +3.3V |
| Storage Temperature | TS | -40 | | 85 | °C | |
| Operating Case Temperature | Tc | -40 | 25 | 85 | °C | |
| Optical Receiver Input | Pmax | | | +5.5 | dBm | Average |

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------|--------|-------|------|--------|--------|------------------------|
| Power Supply Voltage | Vcc | 3.135 | 3.30 | 3.465 | V | |
| Power Supply Noise | Vrip | | | 2 3 | % % | DC – 1MHz 1 – 10MHz |
| Power Consumption | Pw | | | 1.5 | W | |

High Speed Electrical Characteristics

| Parameter | Test Point | Min. | Typ. | Max. | Unit | Notes/ Conditions |
|--|------------|------|------|--------|------|---|
| High Speed Electrical Input Characteristics | | | | | | |
| Overload differential voltage (peak-to-peak) | TP1a | 900 | | | mV | Calibrated at TP1a Note 3: Section 13.3.12 |
| Differential termination mismatch | TP1 | | | 10 | % | At 1 MHz, Note 3: Section 13.3.6 |
| Differential return loss (SDD11) | TP1 | | | Note 1 | dB | |
| Common mode to differential conversion and differential to common mode conversion (SDC11, SCD11) | TP1 | | | Note 2 | dB | |
| High Speed Electrical Output Characteristics | | | | | | |
| Differential voltage, pk-pk | TP4 | | | 900 | mV | |
| Common mode noise, RMS | TP4 | | | 17.5 | mV | Note 6: Section 13.3.5 |
| Differential termination mismatch | TP4 | | | 10 | % | At 1 MHz |
| Differential return loss (SDD22) | TP4 | | | Note 4 | dB | |
| Common mode to differential conversion and differential to common mode conversion (SDC22, SCD22) | TP4 | | | Note 5 | | |
| Transition Time, 20 to 80% | TP4 | 9.5 | | | ps | Note 6: Section 13.3.10 |
| Vertical Eye Closure (VEC) | | | | 5.5 | dB | Note 6: Section 13.3.11 |
| Eye width at 10-15 probability (EW15) | TP4 | 0.57 | | | UI | Note 6: Section 13.3.11 |
| Eye height at 10-15 probability (EH15) | TP4 | 228 | | | mV | Note 6: Section 13.3.11 |

Notes:

- SDD11, SDD22 < -11dB for $0.05 < f < f_b/7$ ($f_b=28\text{GHz}$)
SDD11, SDD22 < $-6.0+9.2*\log_{10}(2f/f_b)$ dB for $f_b/7 < f < f_b$ ($f_b=28\text{ GHz}$)
- SDC11, SCD11 < $-22+14*(f/f_b)$ dB for $0.05 < f < f_b/2$ ($f_b=28\text{ GHz}$)
SDC11, SCD11 < $-18+6*f/f_b$ dB for $f_b/2 < f < f_b$ ($f_b=28\text{ GHz}$)
- Ref OIF-CEI-28G-VSR as described in Implementation Agreement OIF-CEI-03.1
- SDD11, SDD22 < -11dB for $0.05 < f < f_b/7$ ($f_b=28\text{GHz}$)
SDD11, SDD22 < $-6.0+9.2*\log_{10}(2f/f_b)$ dB for $f_b/7 < f < f_b$ ($f_b=28\text{ GHz}$)
- SDC22, SCD22 < $-25+20*(f/f_b)$ dB for $0.05 < f < f_b/2$ ($f_b=28\text{ GHz}$)
SDC22, SCD22 < $-18+6*f/f_b$ dB for $f_b/2 < f < f_b$ ($f_b=28\text{ GHz}$)
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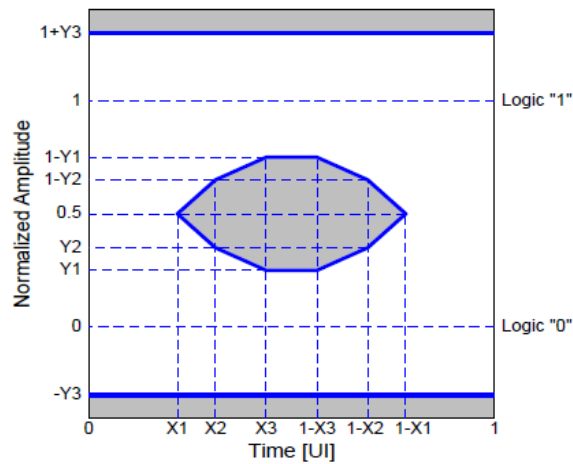
Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|----------------------|--------------|------|-------|------|-------|
| Transmitter | | | | | | |
| Data Rate | fDC | 25.78125 | | | Gbps | 1 |
| Signal speed variation from nominal | Δf_D | -100 | | +100 | ppm | |
| Transmitter center wavelength | λ_C | 1320 | 1330 | 1340 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Average launch power | P _{Tavg} | -2.2 | | +4.5 | dBm | |
| Optical output power in OMA | OMA | -1.2 | | +3.5 | dBm | |
| Launch power in OMA minus TDP | | -5 | | | dBm | |
| Transmitter and dispersion penalty (TDP) | TDP | | | 3.5 | dB | |
| Average launch power of OFF transmitter | P _{off} | | | -30 | dBm | |
| Extinction ratio | ER | 3.0 | | | dB | |
| Transmitter eye mask definition | | Figure Below | | | | |
| Receiver | | | | | | |
| Receiver center wavelength | λ_C | 1260 | 1270 | 1280 | nm | |
| Receiver sensitivity in OMA | P _{minOMA} | | | -14 | dBm | 2, 3 |
| Stressed receiver sensitivity in OMA | P _{minSOMA} | | | -11.5 | dBm | 2 |
| Average received power | P _{Ravg} | | | +2.2 | dBm | |

Notes:

1. Testing by Data Rate; NRZ at 25.78125 Gbps, Mark Ratio 50%, PRBS=2³¹-1
2. For BER 5x10⁻⁵
3. Receiver Sensitivity in OMA is a normative specification.

Mask of Optical Output Eye Diagram



| X1 | X2 | X3 | Y1 | Y2 | Y3 | Max Hit Ratio (Note) |
|------|-----|------|------|------|-----|----------------------|
| 0.31 | 0.4 | 0.45 | 0.34 | 0.38 | 0.4 | 5×10^{-5} |

Note: The acceptable ratio of samples inside to outside the hatched area (the “hit ratio”) must be met.

Low Speed Control Pin Logic Levels

| Parameter | Symbol | Min. | Max. | Unit | Conditions/Notes |
|------------------|----------|----------------|----------------|------|--|
| Host VCC Range | Host_VCC | 3.14 | 3.47 | V | with $\pm 5\%$ variation |
| TX_Fault, RX_LOS | VOL | 0.0 | 0.40 | V | Note 1 |
| | VIL | Host_VCC – 0.5 | Host_VCC + 0.3 | V | Note 1 |
| TX_Disable | VIL | -0.3 | 0.8 | V | Pulled up with 10k ohms to VccT in the module. |
| | VIH | 2.0 | VCC + 0.3 | V | |

Notes:

1. Rpullup (Rp) is the pull up resistor. Active bus termination may be used by the host in place of a pullup resistor. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module. Measured at the Host side of the connector.

TX_Fault is a module output pin that when High, indicates that the module transmitter has detected a fault condition related to laser operation or safety. The TX_Fault output pin is an open drain/collector and must be pulled up to the Host_Vcc with 4.7k-10k Ω on the host board

TX_Disable is a module input pin. When TX_Disable is asserted High or left open, the SFP+ module transmitter output must be turned off. The TX_Disable pin is pulled up to VccT with 10k Ω in the SFP+ module. The TX_Disable pin works for TX_fault_Reset as well.

Mod_ABS is pulled up to Host_Vcc with 4.7k-10k Ω on the host board and connected to VeeT or VeeR in the SFP+ module. Mod_ABS is then asserted “High” when the SFP+ module is physically absent from a host slot. In the SFP MSA (INF8074i) this pin had the same function but is called MOD_DEF0.

RX_LOS when high indicates an optical signal level below that specified in the relevant standard. The RX_LOS pin is an open drain/collector output and must be pulled up to host Vcc with a 4.7k-10k Ω on the host board. RX_LOS assert min and de-assert max are defined in the relevant standard.

CDR Control for Bypass Mode

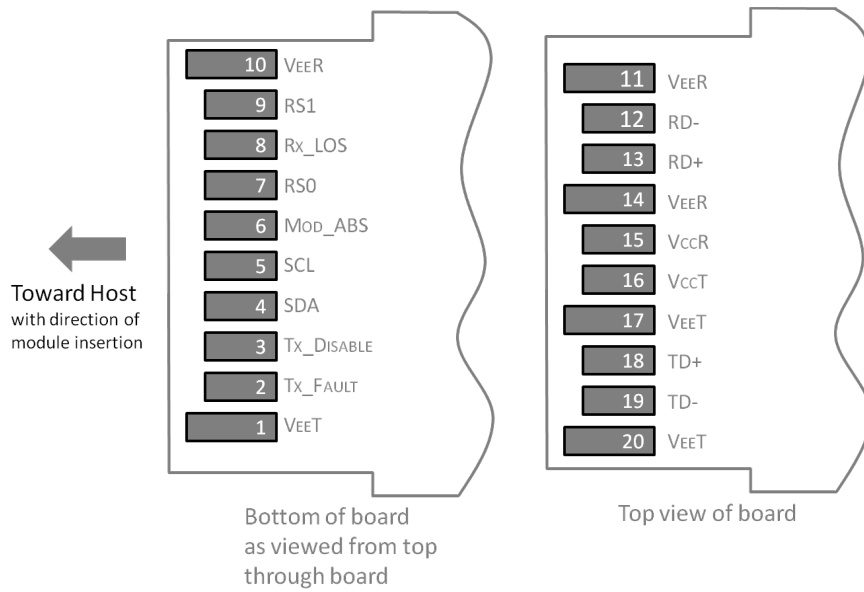
- Default value for “Soft RS0” and “Soft RS1” is ‘0’
- Hard pin#7 for RS0 and hard pin#9 for RS1 are terminated to Ground through 30kohm.

| | Hard: Pin #7 | Soft: A2h, Byte 110 bit 3 | Mode of Operation |
|-----|--------------|---------------------------|-------------------|
| RSO | 0 | 0 | CDRR bypass mode |
| | 0 | 1 | CDRR engaged mode |
| | 1 | 0 | CDRR engaged mode |
| | 1 | 1 | CDRR engaged mode |

| | Hard: Pin #9 | Soft: A2h, Byte 118 bit 3 | Mode of Operation |
|-----|--------------|---------------------------|-------------------|
| RS1 | 0 | 0 | CDRT bypass mode |
| | 0 | 1 | CDRT engaged mode |
| | 1 | 0 | CDRT engaged mode |
| | 1 | 1 | CDRT engaged mode |

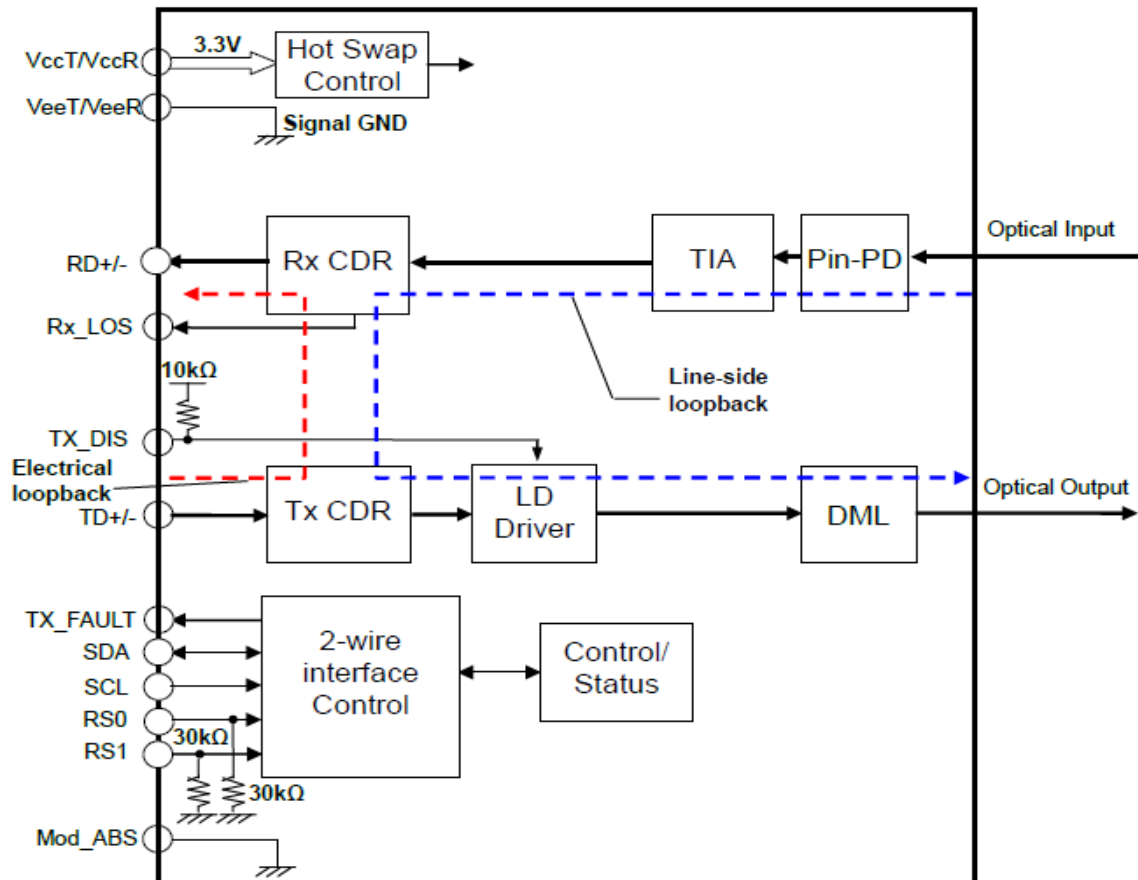
Pin Description

| PIN | Logic | Symbol | Description |
|-----|------------|------------|---|
| 1 | | VEET | Module transmitter ground |
| 2 | LVTTTL-O | TX_FAULT | Module transmitter fault |
| 3 | LVTTTL-I | TX_DISABLE | Transmitter disable |
| 4 | LVTTTL-I/O | SDA | 2-wire serial interface data line |
| 5 | LVTTTL-I/O | SCL | 2-wire serial interface clock |
| 6 | | MOD_ABS | Module absent (connected to VEET or VEER) |
| 7 | LVTTTL-I | RS0 | Rate select 0 (Rx) “L”:Bypass, “H”:CDR |
| 8 | LVTTTL-O | RX_LOS | Receiver loss of signal |
| 9 | LVTTTL-I | RS1 | Rate select 1 (Tx) “L”:Bypass, “H”:CDR |
| 10 | | VEER | Module receiver ground |
| 11 | | VEER | Module receiver ground |
| 12 | CML-O | RD- | Receiver inverted data output |
| 13 | CML-O | RD+ | Receiver non-inverted data output |
| 14 | | VEER | Module receiver ground |
| 15 | | VCCR | Module receiver 3.3 V supply |
| 16 | | VCCT | Module transmitter 3.3 V supply |
| 17 | | VEET | Module transmitter ground |
| 18 | CML-I | TD+ | Transmitter non-inverted data input |
| 19 | CML-I | TD- | Transmitter inverted data input |
| 20 | | VEET | Module transmitter ground |



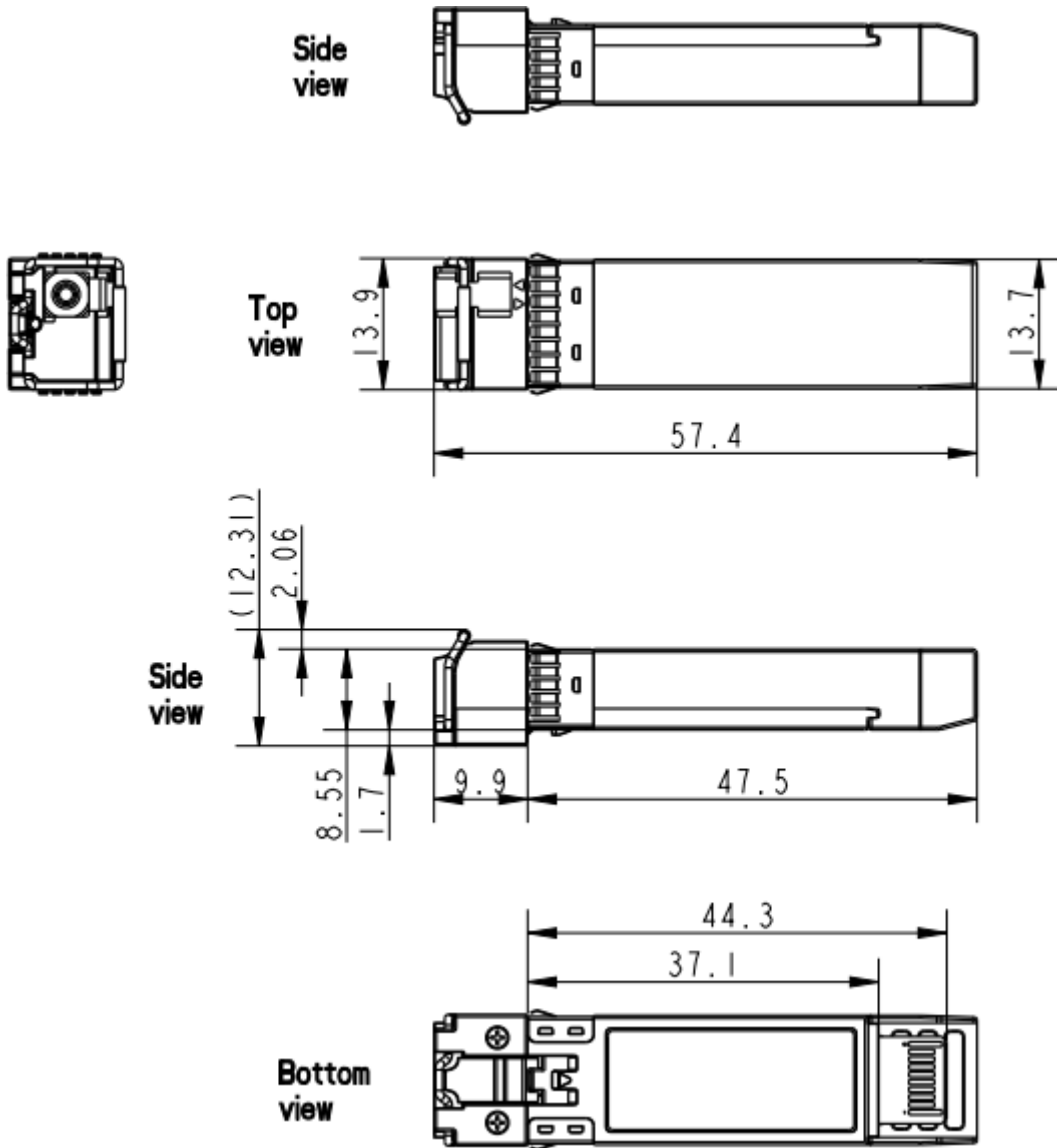
Pin-out of connector Block on Host board

Functional Block Diagram



Mechanical Specifications

Unit: mm



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.

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