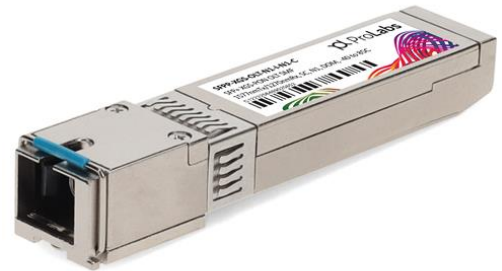


SFP+ XGS-OLT-N1-I-N1-C

Alcatel-Lucent Nokia® Compatible TAA Compliant 10GBase-N1 XGS-PON OLT SFP+ Transceiver (SMF, 1577nmTx/1270nmRx, 20km, SC, DOM, -40 to 85C)

Features:

- Dual Wavelength Bidirectional Transceiver
- 1577nm CW Mode EML Transmitter
- 1270nm Burst Mode APD/TIA Receiver
- Single fiber needed
- 2x10 SFP+ Die Cast Housing
- SC/UPC Optical Interface
- 3.3V DC Power Supply
- Industrial Temperature -40 to 85 Celsius
- RoHS compliant and Lead Free



Applications:

- XGS-PON OLT
- Access and Enterprise

Product Description

This Alcatel-Lucent Nokia® compatible SFP+ transceiver provides 10GBase-N1 throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1577nmTx/1270nmRx via a SC connector. It is also capable of withstanding rugged environments and can operate at temperatures between -40C to +85C. It is guaranteed to be 100% compatible with Alcatel-Lucent Nokia® transceivers. 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. | Max. | Unit |
|-------------------------------|--------|------|------|------|
| Maximum Supply Voltage | Vcc | 0 | 3.6 | V |
| Storage Ambient Temperature | Tstg | -40 | 85 | °C |
| Operating Case Temperature | Tc | -40 | 85 | °C |
| Relative Humidity - Storage | RHstg | 5 | 90 | % |
| Relative Humidity - Operating | RHop | 5 | 85 | % |

Note:

Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.

Absolute Maximum Ratings: Control Function Logic Levels

| Parameter | Symbol | Min. | Max. | Unit | Notes |
|-------------------------------|-------------|------|---------|------|--------|
| Tx_Disable | Tx_Disable | 0 | Vcc+0.5 | V | LVTTTL |
| Transmitter Fault | Tx_Fault | 0 | Vcc+0.5 | V | LVTTTL |
| Burst-Mode Signal Detect | Rx_SD | 0 | Vcc+0.5 | V | LVTTTL |
| Receive Reset | Rx_Reset | 0 | Vcc+0.5 | V | LVTTTL |
| Receive Data Rate Select | Rate_Select | 0 | Vcc+0.5 | V | LVTTTL |
| Digital RSSI Trigger Input | TRI | 0 | Vcc+0.5 | V | LVTTTL |
| 2-Wire Serial Interface Data | SDA | 0 | Vcc+0.5 | V | LVTTTL |
| 2-Wire Serial Interface Clock | SCL | 0 | Vcc+0.5 | V | LVTTTL |
| SCL Frequency | tSCL | | 400 | KHz | |
| Data Hold Time | tHD:DAT | 120 | | ns | |

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|--------|----------|------|-------|------|-------|
| Power Supply Voltage | Vcc | 3.135 | 3.30 | 3.465 | V | |
| Power Supply Current | Icc | | 500 | 750 | mA | |
| Transmitter | | | | | | |
| Tx Differential Input Amplitude | VIN | 120 | | 820 | mV | |
| Tx Differential Input Impedence | ZIN | 90 | 100 | 110 | Ω | |
| Tx_Disable = High (Transmitter Off/Disabled) | VIH | 0.7*Vcc3 | | Vcc3 | V | 1 |
| Tx_Disable = Low (Transmitter On/Enabled) | VIL | 0 | | 0.8 | V | 1 |
| Tx_Fault = High (Fault) | VOH | 2.4 | | Vcc3 | V | 2 |
| Tx_Fault = Low (Normal) | VOL | 0 | | 0.4 | V | 2 |
| Receiver | | | | | | |
| Rx Differential Output Impedence | ZOUT | 90 | 100 | 110 | Ω | |
| Rx_Data Differential Output Voltage Amplitude | VOUT | 300 | | 800 | mV | LVCML |
| Rx_SD = High | VOH | 2.4 | | Vcc3 | V | 2 |
| Rx_SD = Low | VOL | 0 | | 0.4 | V | 2 |
| Rx_Reset = High | VIH | 2.0 | | Vcc3 | V | 1 |
| Rx_Reset = Low | VIL | 0 | | 0.8 | V | 1 |
| Rate_Select = High | VIH | 2.0 | | Vcc3 | V | 1 |
| Rate_Select = Low | VIL | 0 | | 0.8 | V | 1 |
| TRI = High | VIH | 0.7*Vcc | | Vcc3 | V | 1 |
| TRI = Low | VIL | 0 | | 0.8 | V | 1 |

Notes:

1. LVTTTL (Control Input).
2. LVTTTL (Monitor Output).

2-Wire Serial Interface Logic

| Parameter | Symbol | State | Logic | Min. | Max. | Unit |
|-------------------------------|--------|-------|--------|---------|------|------|
| 2-Wire Serial Interface Data | SDA | High | LVTTTL | 0.7*Vcc | Vcc | V |
| | SDA | Low | LVTTTL | 0 | 0.8 | V |
| 2-Wire Serial Interface Clock | SCL | High | LVTTTL | 0.7*Vcc | Vcc | V |
| | SCL | Low | LVTTTL | 0 | 0.8 | V |

Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|---|-----------------|--------------------|------|-------|------|----------------|
| Transmitter | | | | | | |
| Transmitter Type | | CW Mode EML | | | | |
| Coupling Mode | | AC | | | | |
| Transmitter Signal Rate | Rate | 9.953 | | | Gbps | |
| Average Launch Power | Pavg | 2 | | 5 | dBm | N1 |
| Tolerance to the Transmitter Incident Light Power | | -15 | | | dB | |
| Optical Center Wavelength | λ_C | 1575 | 1577 | 1580 | nm | |
| Spectral Width | $\Delta\lambda$ | | | 1 | nm | |
| Side-Mode Suppression Mode | SMSR | 30 | | | dB | |
| Extinction Ratio | ER | 8.2 | | | dB | |
| Receiver | | | | | | |
| Receiver Type | | Burst-Mode APD/TIA | | | | |
| Optical Center Wavelength | λ_C | 1260 | 1270 | 1280 | nm | |
| Damage Optical Power | | -3 | | | dBm | |
| Receiver Sensitivity | S | | | -26 | dBm | @9.953Gbps, N1 |
| | S | | | -27.5 | dBm | @2.488Gbps, N1 |
| Receiver Optical Overload | PIN(SAT) | -5 | | | dBm | @9.953Gbps, N1 |
| | PIN(SAT) | -7 | | | dBm | @2.488Gbps, N1 |
| Reflectance of Rx | RL | | | -20 | dB | @1260-1360nm |
| Dynamic Range | DR | 15 | | | dB | |
| Immunity from Continuous Identical Digits | CID | 72 | | | Bits | |

Notes:

Sensitivity and Overload Test Conditions:

- 1.9.953Gbps: BER@ 10^{-3} , PRBS $2^{31}-1$, and ER=6.0dB.
- 2.2.488Gbps: BER@ 10^{-4} , PRBS $2^{23}-1$, and ER=8.2dB.

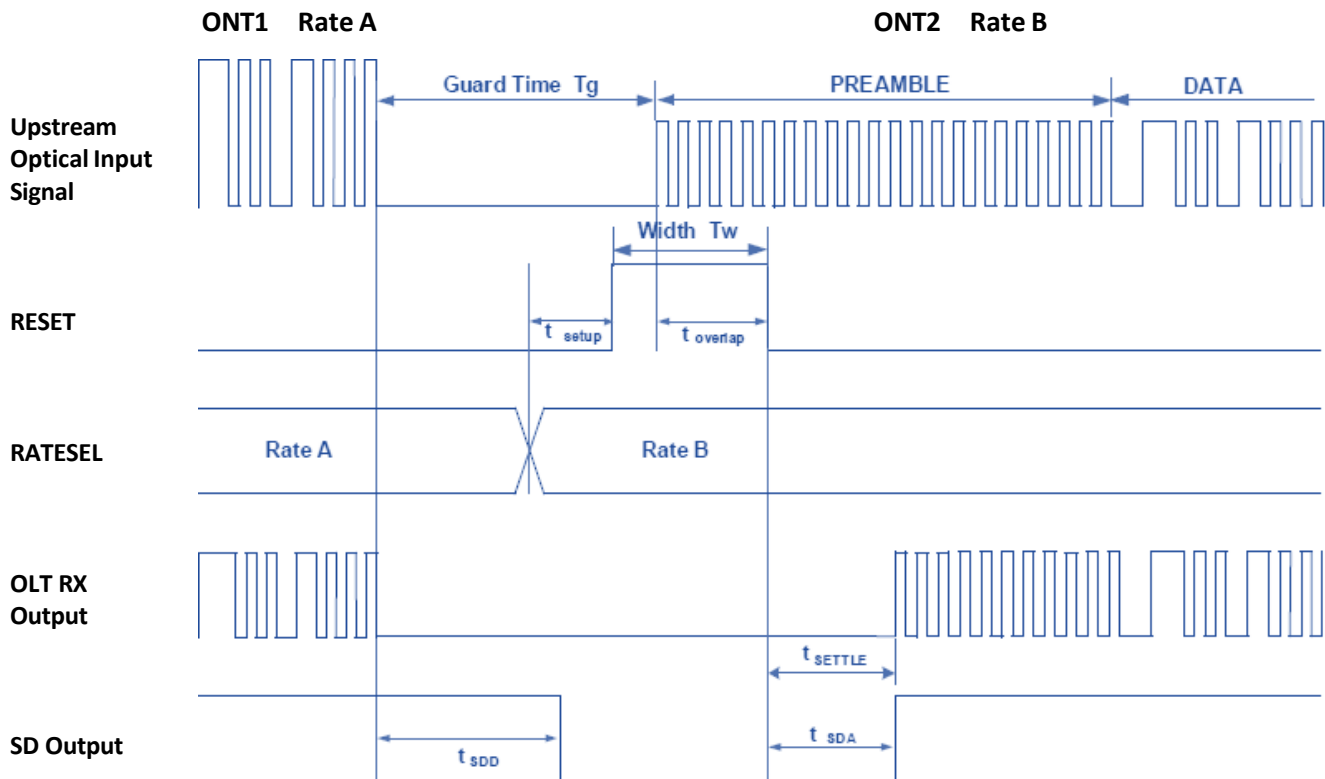
Upstream Timing

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--|-----------|------|------|------|------|-------|
| Burst Receiver Settling Time | T_SETTLE | | | 100 | ns | |
| Burst Signal Detect Assert | T_SDA | | 25 | 100 | ns | |
| Burst Signal Detect De-Assert | T_SDD | | 100 | | ns | 1 |
| Guard Time | Tg | 51.4 | | | ns | |
| Reset Pulse Width | Tw | 25 | | | ns | |
| Reset Time Overlapping Preamble | T_overlap | 0 | | | ns | 2 |
| Setup Time of Rate Level for Following Burst | T_setup | 5 | | | ns | |

Notes:

1. Auto reset function is applied. Signal detect de-assert time is about 100ns forced by auto reset and will short to about 20ns with external Reset pulse.
2. Reset pulse is required to be partially inside the preamble.

Upstream Timing Diagram

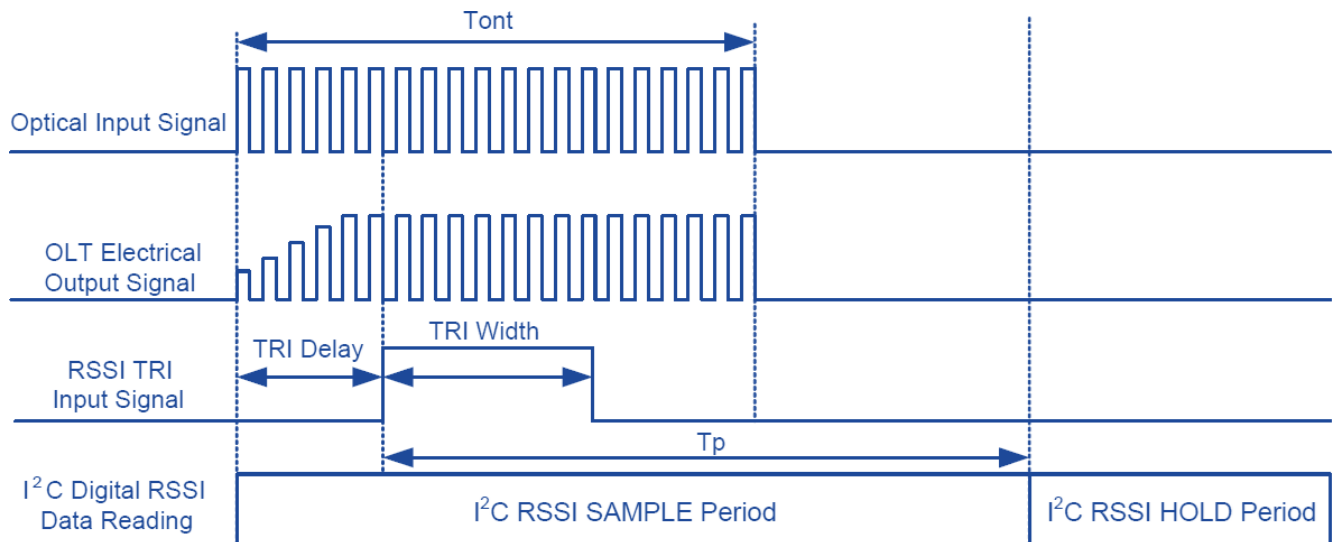


Digital RSSI Sample/Hold Timing

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------------|------------------------------|------|------|------------------------------------|------|-------|
| I ² C Read Time | T _p | 500 | | | μs | |
| Optical Input Signal Width | T _{ont} | 300 | | | ns | |
| RSSI Monitor Range | P _{mon} | -30 | | -7 | dBm | |
| RSSI Precision | Prssi | -3 | +/-2 | 3 | dB | |
| RSSI Trigger Delay | T _{tri} (TRI Delay) | 0 | 300 | | ns | |
| RSSI Trigger Width | T _{i2c} (TRI Width) | 500 | | T _{ont} -T _{tri} | ns | |

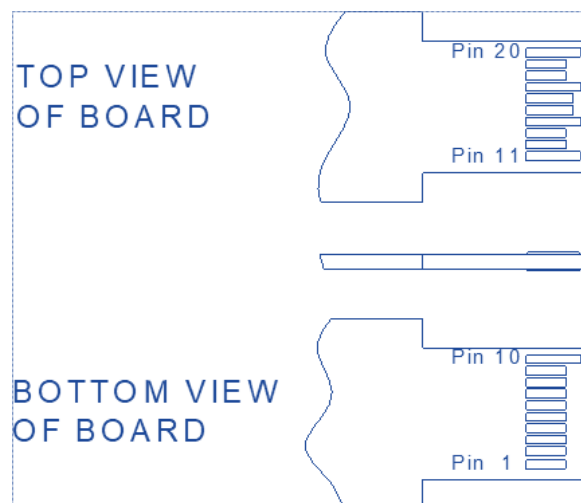
Note: T_{tri}+T_{i2c}<T_{ont}.

Digital RSSI Sample/Hold Timing Diagram

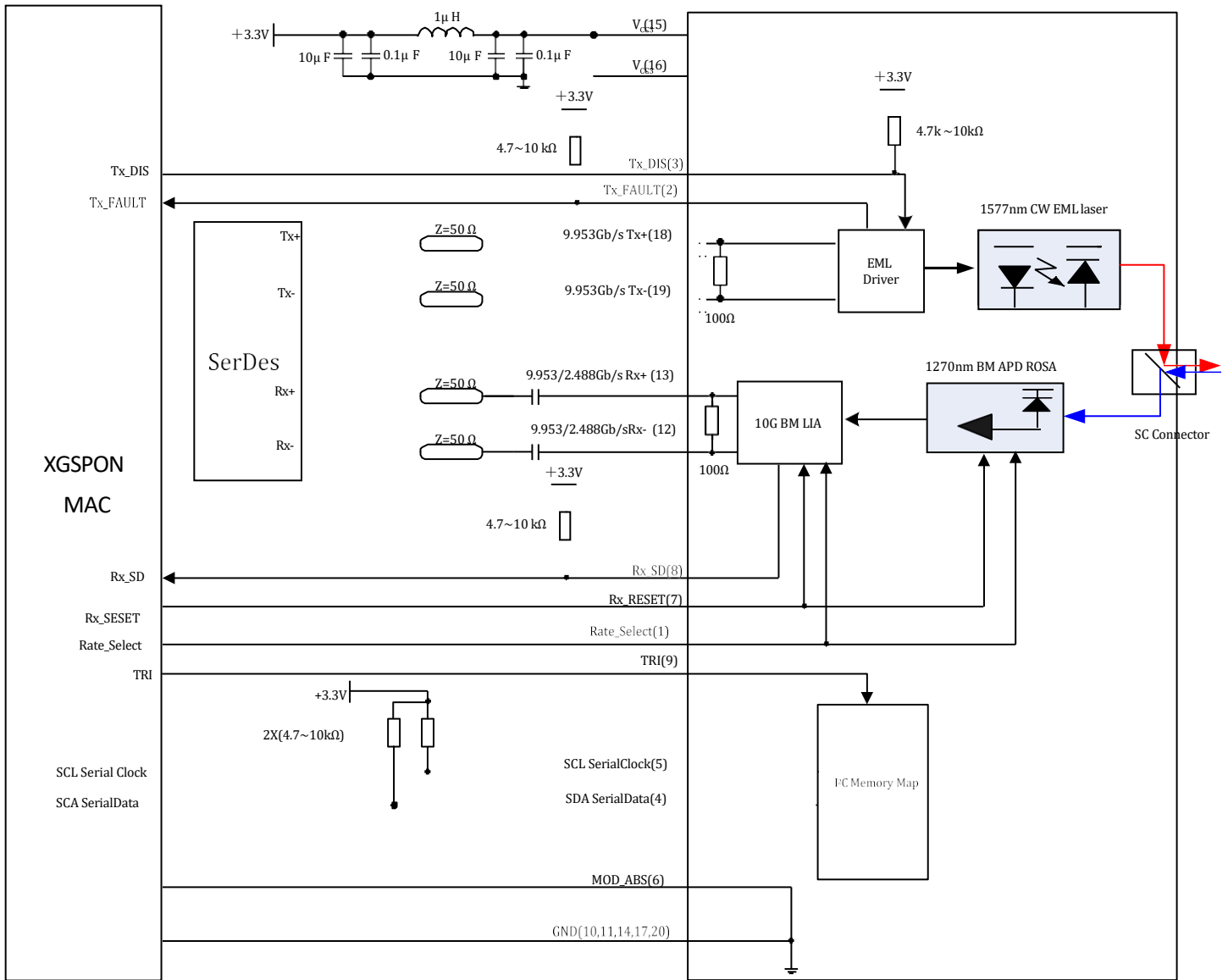


Pin Descriptions

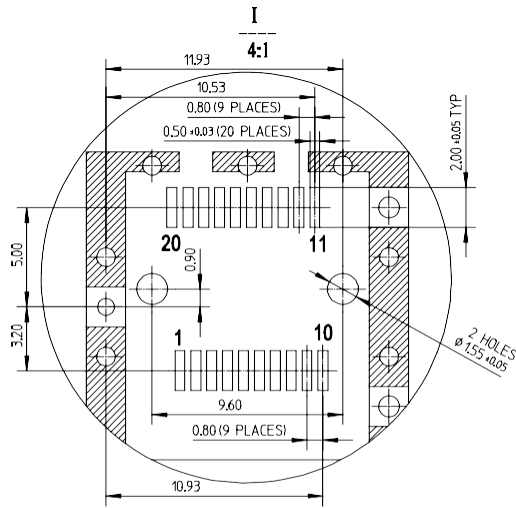
| Pin | Symbol | Name/Description | Note |
|-----|--------------|--|------|
| 1 | Rate_Select | Rate Select. Dedicated upstream speed indication. High=10G. Low=2.5G. | |
| 2 | Tx_Fault | Transmitter Fault. Low = Normal Operation. High = Fault Indication. | |
| 3 | Tx_Disable | Transmit Disable. Low = Normal Operation. High = Disables Module. | |
| 4 | SDA | 2-Wire Serial Interface Data. | |
| 5 | SCL | 2-Wire Serial Interface Clock. | |
| 6 | MOD_ABS | Module Absent pin. Grounded inside the module. | |
| 7 | Rx_Reset | Rx_Reset Pulse Input for TIA/LIA. | |
| 8 | Rx_SD | Rx Signal Detect. Assert "high" when Burst Packet is coming. | |
| 9 | RSSI_Trigger | Receiver Signal Strength Indication Trigger Input. | |
| 10 | GND | Module Ground. | |
| 11 | GND | Module Ground. | |
| 12 | RD- | Receiver Inverted. 9.953Gbps and 2.488Gbps Data Output. DC coupled inside the module. | |
| 13 | RD+ | Receiver Non-Inverted 9.953Gbps and 2.488Gbps Data Output. DC coupled inside the module. | |
| 14 | GND | Module Ground. | |
| 15 | Vcc | +3.3V DC Power Supply Input. | |
| 16 | Vcc | +3.3V DC Power Supply Input. | |
| 17 | GND | Module Ground. | |
| 18 | TD+ | Transmitter Non-Inverted 9.953Gbps Data Input. | |
| 19 | TD- | Transmitter Inverted 9.953Gbps Data Input. | |
| 20 | GND | Module Ground. | |



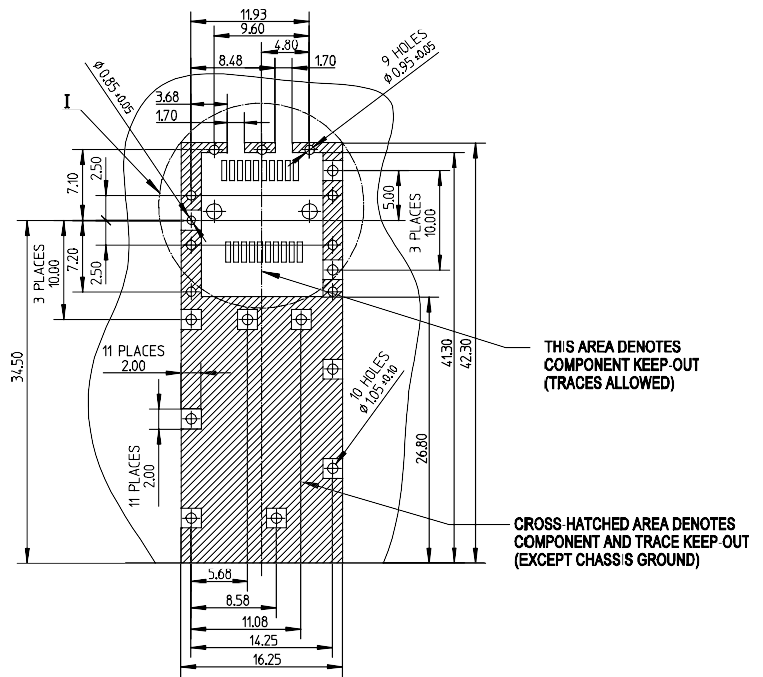
Electrical Interface



SFP+ Connector Dimensions



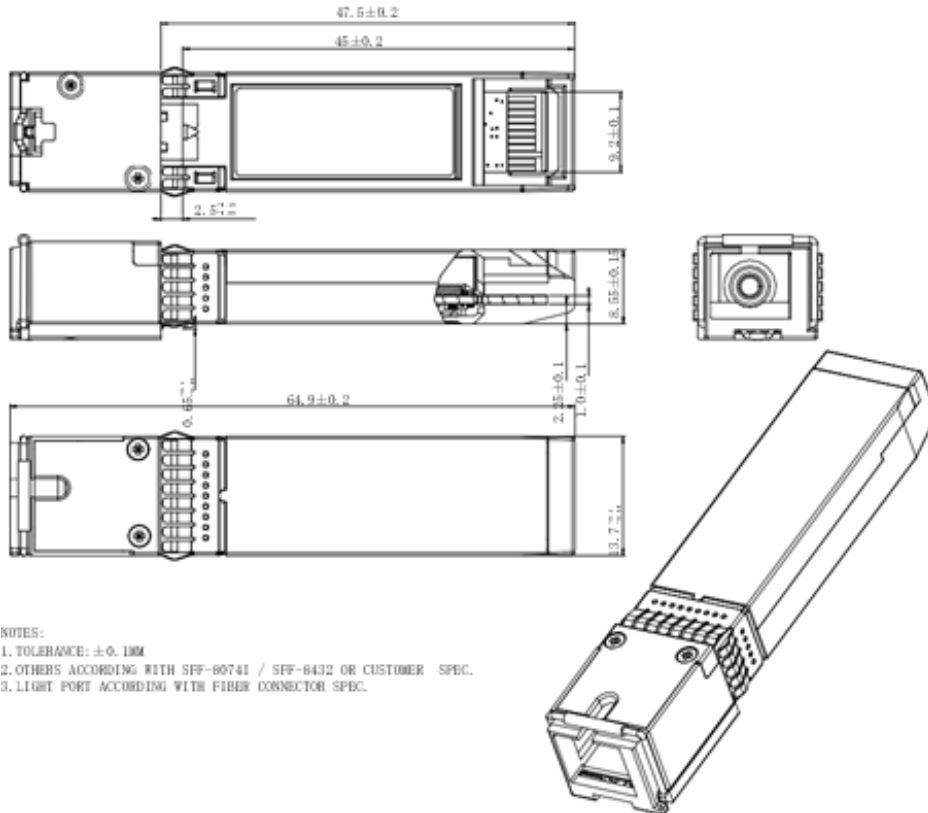
- Notes:**
1. Datum and basic dimensions established by customer
 2. Pads and vias are chassis ground, 11 places
 3. Thru holes, plating optional



THIS AREA DENOTES COMPONENT KEEP-OUT (TRACES ALLOWED)

CROSS-HATCHED AREA DENOTES COMPONENT AND TRACE KEEP-OUT (EXCEPT CHASSIS GROUND)

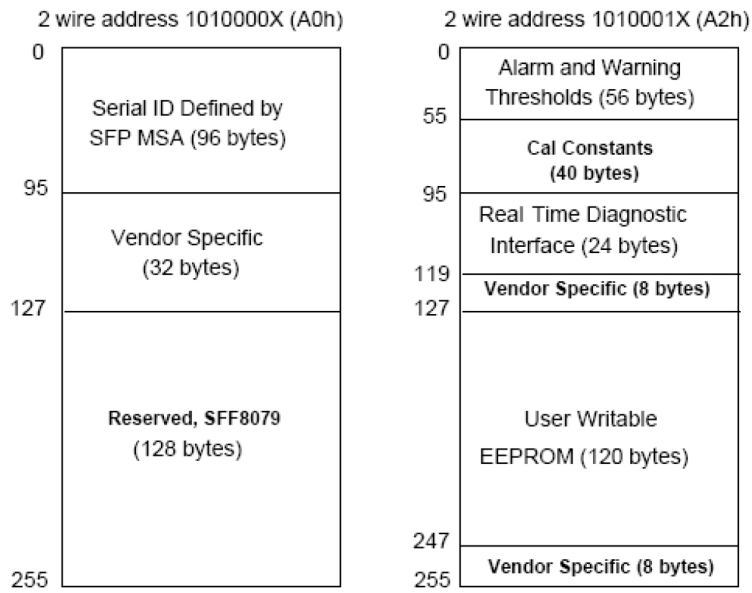
Mechanical Specifications



- NOTES:**
1. TOLERANCE: ± 0.1MM
 2. OTHERS ACCORDING WITH SFF-89741 / SFF-8432 OR CUSTOMER SPEC.
 3. LIGHT PORT ACCORDING WITH FIBER CONNECTOR SPEC.

EEPROM Information

EEPROM memory map-specific data field description is as below:



About ProLabs

Our extensive experience comes as standard. For over 20 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 more than 100 optical switching and transport platforms.

A 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 1.6T 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.

The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. 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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