



## SSND001AJ015000

MSA Compliant 1G/10GBase-N2/C+ SFP+ OLT Transceiver (SMF, 1577nmTx/1270nmRx and 1490nmTx/1310nmRx, 20km, SC, DOM, -40 to 85C)

### Product Description

This MSA Compatible TAA compliant 1G/10GBase-N2/C+ SFP+ OLT transceiver provides 1G/10GBase-N2/C+ throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1577nmTx/1270nmRx and 1490nmTx/1310nmRx via a SC connector. It can operate at temperatures between -40 and 85C. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

### Features:

- Hot Pluggable SFP+
- 4 Lambda
- 3.3V DC Power Supply
- 2x10 SFP+ Electrical Interface
- ITU-T G.9807.1 Class N1/N2 compliant
- SC receptacle optical connector
- ITU-T G.984.2 Class B+/C+ compliant
- ITU-T G.987.2 Class N1/N2a compliant
- RoHS compliant and Lead Free
- Industrial Temperature -40 to 85 Celsius



### Applications:

- PON
- Broadband Access

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*For your product safety, please read the following information carefully before any manipulation of the transceiver:*



#### ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



#### LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

*The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.*

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### Absolute Maximum Ratings

| Parameter                   | Symbol           | Min. | Max. | Unit |
|-----------------------------|------------------|------|------|------|
| Maximum Supply Voltage      | VCC3             | 0    | 3.6  | V    |
| Storage Ambient Temperature | T <sub>stg</sub> | -40  | +85  | °C   |
| Operating Case Temperature  | T <sub>c</sub>   | -40  | +85  | °C   |
| Relative Humidity Storage   | RH <sub>s</sub>  | 5    | 90   | %    |
| Relative Humidity Operating | RH <sub>o</sub>  | 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_Dis   | 0    | V <sub>CC3</sub> +0.5 | V    | LVTTL |
| Burst Mode SIGNAL Detect      | Rx_SD    | 0    | V <sub>CC3</sub> +0.5 | V    | LVTTL |
| Rx_Reset                      | Rx_Reset | 0    | V <sub>CC3</sub> +0.5 | V    | 1     |
| Digital Rx_RSSI_Trigger Input | TRI      | 0    | V <sub>CC3</sub> +0.5 | V    | 1     |
| I <sup>2</sup> C Serial Data  | SDA      | 0    | V <sub>CC3</sub> +0.5 | V    | 2     |
| I <sup>2</sup> C Serial Clock | SCL      | 0    | V <sub>CC3</sub> +0.5 | V    | 1     |

#### Notes:

1. Signal Ended LVTTL input
2. Single Ended LVTTL I/O

## Electrical Characteristics

| Parameter                                              | Symbol             | Min.                   | Typ.                   | Max.                   | Unit | Notes  |
|--------------------------------------------------------|--------------------|------------------------|------------------------|------------------------|------|--------|
| Power Supply Voltage                                   | V <sub>CC3</sub>   | 3.135                  | 3.30                   | 3.465                  | V    |        |
| Power Supply Current                                   | I <sub>CC3</sub>   |                        | 750                    |                        | mA   |        |
| Power Consumption                                      | P                  |                        |                        | 3.5                    | W    |        |
| <b>Transmitter</b>                                     |                    |                        |                        |                        |      |        |
| Tx Differential Input Impedence                        | Z <sub>IN</sub>    | 90                     | 100                    | 110                    | Ω    |        |
| 10Gb/s Tx Differential Input Amplitude                 | V <sub>IN10</sub>  | 120                    |                        | 800                    | mV   |        |
| 2.5Gb/s Tx Differential Input Amplitude                | V <sub>IN1</sub>   | 120                    |                        | 800                    | mV   |        |
| Tx_Dis = HIGH (Transmitter OFF / DISABLED)             | V <sub>TDH</sub>   | 0.7*V <sub>CC3</sub>   |                        | V <sub>CC3</sub>       | V    | 1      |
| Tx_Dis = LOW (Transmitter ON / ENABLED)                | V <sub>TDL</sub>   | 0                      |                        | 0.8                    | V    | 1      |
| <b>Receiver</b>                                        |                    |                        |                        |                        |      |        |
| Rx Differential Output Impedence                       | Z <sub>OUT</sub>   | 90                     | 100                    | 110                    | Ω    |        |
| 10Gb/s Rx_Data Differential Output Voltage Amplitude   | V <sub>OUT10</sub> | 300                    |                        | 850                    | mV   | LVCML  |
| 10Gb/s Output HIGH Voltage                             | V <sub>OH10</sub>  | V <sub>CC3</sub> -20   | V <sub>CC3</sub> -5    | V <sub>CC3</sub>       | mV   | LVCML  |
| 10Gb/s Output LOW Voltage                              | V <sub>OL10</sub>  | V <sub>CC3</sub> -400  | V <sub>CC3</sub> -350  | V <sub>CC3</sub> -300  | mV   | LVCML  |
| 1.25Gb/s Rx_Data Differential Output Voltage Amplitude | V <sub>OUT1</sub>  | 600                    |                        | 1600                   | mV   | LVPECL |
| 1.25Gb/s Output HIGH Voltage                           | V <sub>OH1</sub>   | V <sub>CC3</sub> -1085 | V <sub>CC3</sub> -955  | V <sub>CC3</sub> -880  | mV   | LVPECL |
| 1.25Gb/s Output LOW Voltage                            | V <sub>OL1</sub>   | V <sub>CC3</sub> -1850 | V <sub>CC3</sub> -1705 | V <sub>CC3</sub> -1555 | mV   | LVPECL |
| Rx_SD = HIGH (Receiver ON)                             | V <sub>OH</sub>    | 2.0                    |                        | V <sub>CC3</sub>       | V    | 2      |
| Rx_SD = LOW (Receiver OFF)                             | V <sub>OL</sub>    | 0                      |                        | 0.8                    | V    | 2      |
| Ratesel/Reset=HIGH                                     | V <sub>IH</sub>    | 1.9                    |                        | V <sub>CC3</sub>       | V    | 3      |
| Ratesel/Reset=Middle                                   | V <sub>IM</sub>    | 1.2                    |                        | 1.6                    | V    | 3      |
| Ratesel/Reset=LOW                                      | V <sub>IL</sub>    | 0                      |                        | 0.9                    | V    | 3      |
| TRI=HIGH                                               | V <sub>IH</sub>    | 0.7*V <sub>CC3</sub>   |                        | V <sub>CC3</sub>       | V    | 1      |
| TRI=LOW                                                | V <sub>IL</sub>    | 0                      |                        | 0.8                    | V    | 1      |

### Notes:

1. LVTTL (Control INPUT)
2. LVTTL (Monitor OUTPUT)
3. Tri-level (Control INPUT)

### 9.95328Gb/s Transmitter Optical Characteristics

| Parameter                   | Symbol                                        | Min.          | Typ. | Max. | Unit | Notes |
|-----------------------------|-----------------------------------------------|---------------|------|------|------|-------|
| Laser Type                  |                                               | 1577nm CW EML |      |      |      |       |
| Downstream Signal Rate      |                                               | 9.95328       |      |      | Gb/s |       |
| Average Launch Power        | $P_{OUT10}$                                   | 4             |      | 7    | dBm  |       |
| Optical Center Wavelength   | $\lambda_{10}$                                | 1575          |      | 1580 | nm   |       |
| Spectral Width              | $\Delta\lambda_{10}$                          |               |      | 1.0  | nm   |       |
| Side Mode Suppression Ratio | $SMSR_{10}$                                   | 30            |      |      | dB   |       |
| Extinction Ratio            | $ER_{10}$                                     | 8.2           |      |      | dB   |       |
| Output Eye Diagram          | Compliant with ITU-T G.987.2 & ITU-T G.9807.1 |               |      |      |      |       |

### 2.48832Gb/s Transmitter Optical Characteristics

| Parameter                   | Symbol                       | Min.                | Typ. | Max. | Unit | Notes      |
|-----------------------------|------------------------------|---------------------|------|------|------|------------|
| Laser Type                  |                              | 1490nm CW DFB Laser |      |      |      |            |
| Downstream Signal Rate      |                              | 2.48832             |      |      | Gb/s |            |
| Average Launch Power        | $P_{OUT2}$                   | 3                   |      | 7    | dBm  |            |
| Optical Rise and Fall Time  | $T_r / T_f$                  |                     |      | 200  | ps   | 20% to 80% |
| Optical Center Wavelength   | $\lambda_1$                  | 1480                | 1490 | 1500 | nm   |            |
| Spectral Width              | $\Delta\lambda_1$            |                     |      | 1.0  | nm   |            |
| Side Mode Suppression Ratio | $SMSR_1$                     | 30                  |      |      | dB   |            |
| Extinction Ratio            | $ER_1$                       | 8.2                 |      |      | dB   |            |
| Output Eye Diagram          | Compliant with ITU-T G.984.2 |                     |      |      |      |            |

### 9.95328/2.48832Gb/s Receiver Optical Characteristics

| Parameter                         | Symbol        | Min.                    | Typ. | Max.  | Unit | Notes |
|-----------------------------------|---------------|-------------------------|------|-------|------|-------|
| Receiver Type                     |               | 1270nm APD/TIA Receiver |      |       |      |       |
| Upstream Signal Rate              |               | 9.95328/2.48832         |      |       | Gb/s |       |
| Optical Center Wavelength         | $\lambda$     | 1260                    | 1270 | 1280  | nm   |       |
| XGS-PON Receiver Sensitivity      | $P_{IN}$      |                         |      | -28   | dBm  | 1     |
| XG-PON Receiver Sensitivity       | $P_{IN}$      |                         |      | -29.5 | dBm  | 2     |
| XGS-PON Receiver Optical Overload | $P_{IN}(SAT)$ | -7                      |      |       | dBm  | 3     |
| XG-PON Receiver Optical Overload  | $P_{IN}(SAT)$ | -9                      |      |       | dBm  | 3     |
| Damaged Input Optical Power       | $P_d$         |                         |      | -5    | dBm  |       |
| Rx_SD Assert                      | $P_A$         | -45                     |      | -29.5 | dBm  |       |
| Rx_SD De Assert                   | $P_D$         | -45                     |      | -29.5 | dBm  |       |
| Rx_SD Hysteresis                  | PHy           | 0                       |      | 7     | dBm  |       |

#### Notes:

1. BER@ $10^{-3}$  \*: Test Condition: PRBS:  $2^{31}-1$ , ER=8.2 dB
2. BER@ $10^{-4}$  \*: Test Condition: PRBS:  $2^{23}-1$ , ER=8.2 dB
3. Test Condition: BER@ $10^{-10}$ , PRBS  $2^{23}-1$ , ER=10dB

### 1.24416Gb/s Receiver Optical Characteristics

| Parameter                   | Symbol        | Min.                          | Typ. | Max. | Unit | Notes |
|-----------------------------|---------------|-------------------------------|------|------|------|-------|
| Receiver Type               |               | 1310nm Burst APD/TIA Receiver |      |      |      |       |
| Upstream Signal Rate        |               | 1.24416                       |      |      | Gb/s |       |
| Optical Center Wavelength   | $\lambda$     | 1290                          | 1310 | 1330 | nm   |       |
| Receiver Sensitivity        | $P_{IN}$      |                               |      | -30  | dBm  | 1     |
| Receiver Optical Overload   | $P_{IN}(SAT)$ | -7                            |      |      | dBm  |       |
| Damaged Input Optical Power | $P_d$         |                               |      | -5   | dBm  |       |
| Receiver Settling Time      | Trx           |                               |      | 51.2 | ns   |       |
| Rx_SD Assert                | $P_A$         | -45                           |      | -30  | dBm  |       |
| Rx_SD De Assert             | $P_D$         | -45                           |      | -30  | dBm  |       |
| Rx_SD Hysteresis            | PHy           | 0                             |      | 7    | dB   |       |

#### Notes:

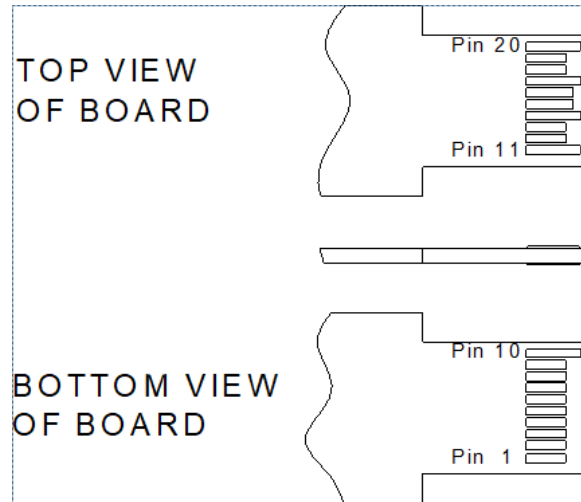
1. Test Condition: BER@ $10^{-10}$ , PRBS  $2^{23}-1$ , ER=10dB

## Pin Descriptions

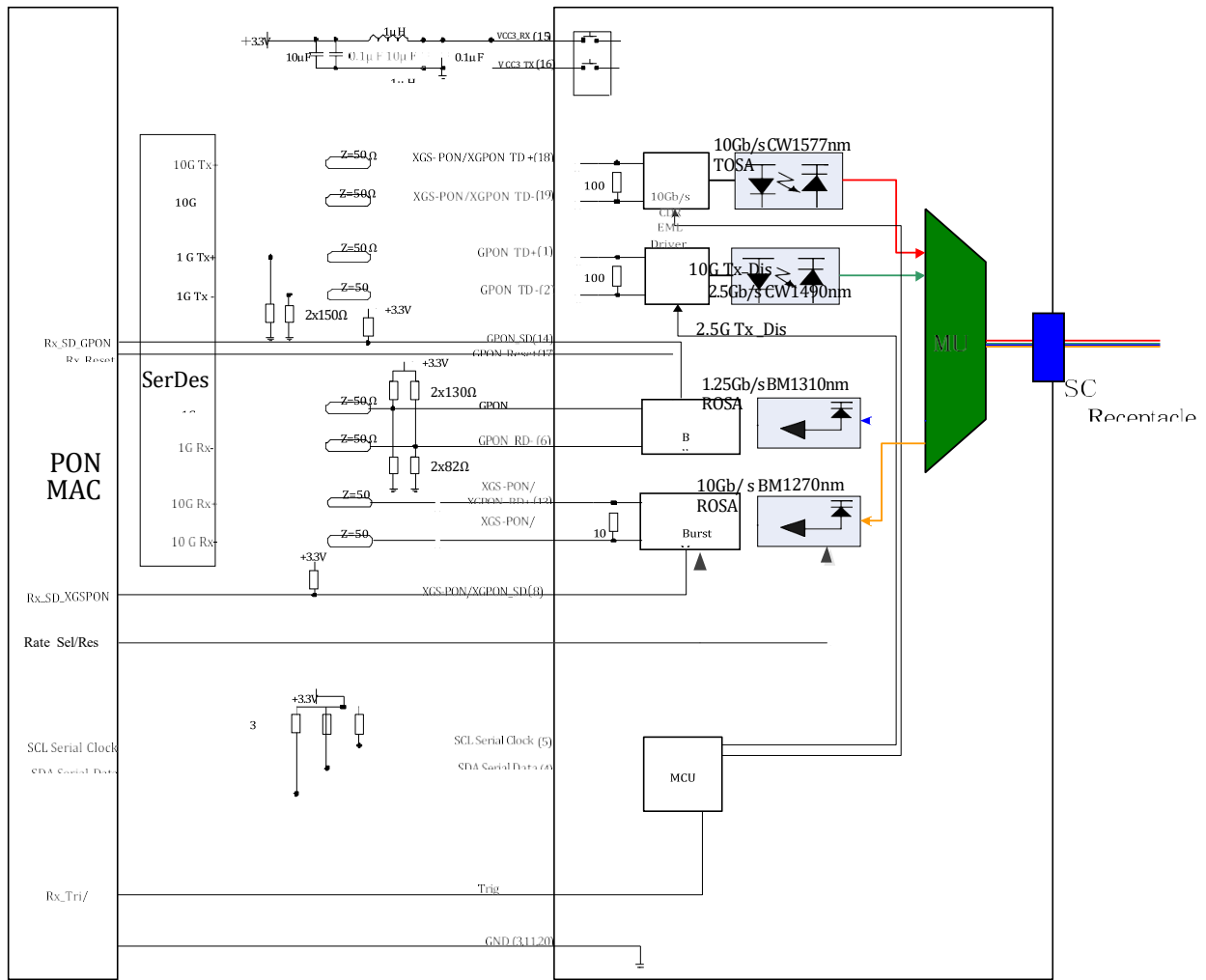
| Pin | Symbol        | Name/Descriptions                                                                                                                                                                                                                              | Ref. |
|-----|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 1   | GPON_TD+      | Transmit Non-Inverted 2.48832Gb/s Data Input; AC coupled inside the module.                                                                                                                                                                    |      |
| 2   | GPON_TD-      | Transmit Inverted 2.48832Gb/s Data Input; AC coupled inside the module.                                                                                                                                                                        |      |
| 3   | GND           | Module Ground.                                                                                                                                                                                                                                 |      |
| 4   | SDA           | 2-Wire Serial Interface Data Line, with the pull-up resistance: 4.7kΩ~10kΩ.                                                                                                                                                                    |      |
| 5   | SCL           | 2-Wire Serial Interface Clock, with the pull-up resistance: 4.7kΩ~10kΩ.                                                                                                                                                                        |      |
| 6   | GPON_RD-      | Receive Burst Mode Inverted 1.2488Gb/s Data Output; DC coupled inside the module.                                                                                                                                                              | 1    |
| 7   | Ratesel/Reset | Three-level input combining “Rate Select” and “Reset” information. Set high level to reset TIA/LA. Middle level indicates 2.5G data rate. Low level indicates 10G data rate.                                                                   |      |
| 8   | XGS-PON_SD    | Receiver Signal Detect Indicator for XGS-PON/XGPON Receiver, when Low, indicates insufficient optical input power to the module; when High, means in normal.                                                                                   |      |
| 9   | Trig/Txdis    | Two signals multiplex, which selected by the register. Receiver signal strength indication trigger for Digital RSSI. As TXdisable, when Low level, the transceiver port work in normal; when High level, both 10Gb/s and 2.5Gb/s are disabled. |      |
| 10  | GPON_RD+      | Receive Burst Mode Non-Inverted 1.2488Gb/s Data Output; DC coupled inside the module.                                                                                                                                                          | 1    |
| 11  | GND           | Module Ground.                                                                                                                                                                                                                                 |      |
| 12  | XGS-PON_RD-   | Receive Burst Mode Inverted 9.953 or 2.48832Gb/s Data Output. DC coupled inside the module.                                                                                                                                                    |      |
| 13  | XGS-PON_RD+   | Receive Burst Mode Non-Inverted 9.953 or 2.48832Gb/s Data Output. DC coupled inside the module.                                                                                                                                                |      |
| 14  | GPON_SD       | Receiver Signal Detect Indicator for G-PON Receiver. When Low, indicates insufficient optical input power to the module. When High, means in normal.                                                                                           |      |
| 15  | VCC3_RX       | +3.3V power supply for RX. Tolerance: 3.3V±5%.                                                                                                                                                                                                 |      |
| 16  | VCC3_TX       | +3.3V power supply for TX. Tolerance: 3.3V±5%.                                                                                                                                                                                                 |      |
| 17  | GPON_Reset    | Burst Mode Receiver Reset for GPON Receiver. When HIGH, indicates the receiver is OFF/being reset.                                                                                                                                             |      |
| 18  | XGS-PON_TD+   | Transmit Non-Inverted 9.95328Gb/s Data Input; AC coupled inside the module.                                                                                                                                                                    |      |
| 19  | XGS-PON/_TD-  | Transmit Inverted 9.95328Gb/s Data Input; AC coupled inside the module.                                                                                                                                                                        |      |
| 20  | GND           | Module Ground.                                                                                                                                                                                                                                 |      |

## Notes:

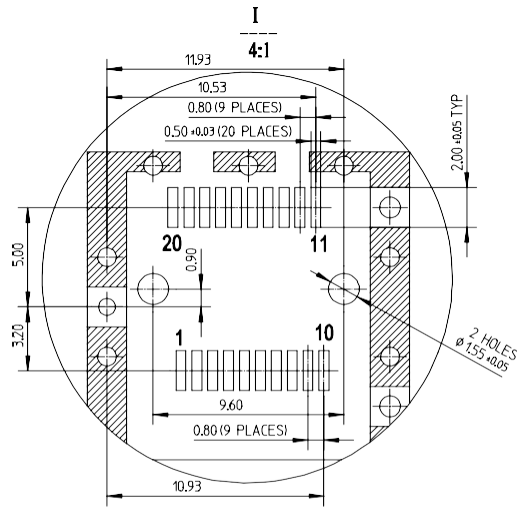
1. When GPON\_RD+/- set as LVPECL, and the module without the pull-down resistances. The differential signal amplitude must be satisfied with the Electrical Characteristics.



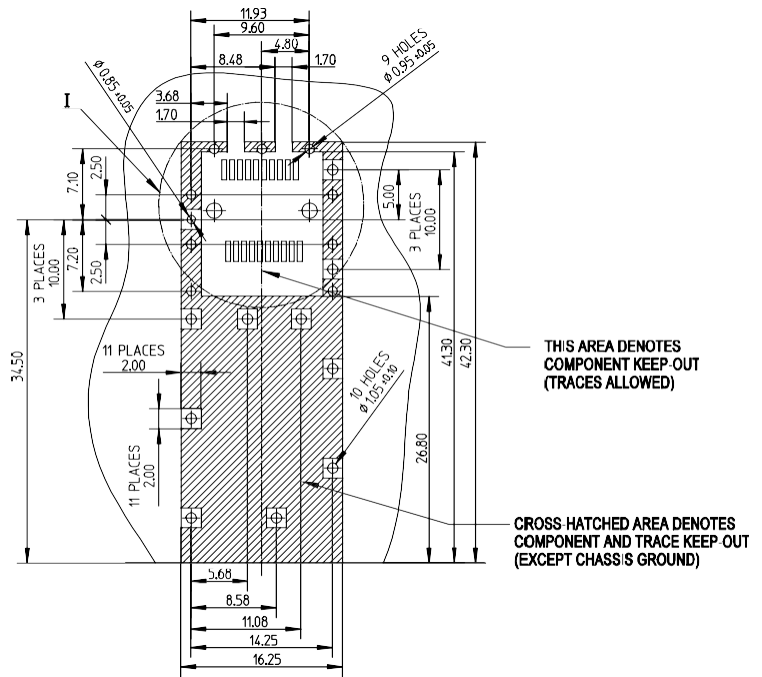
## Electrical Interface



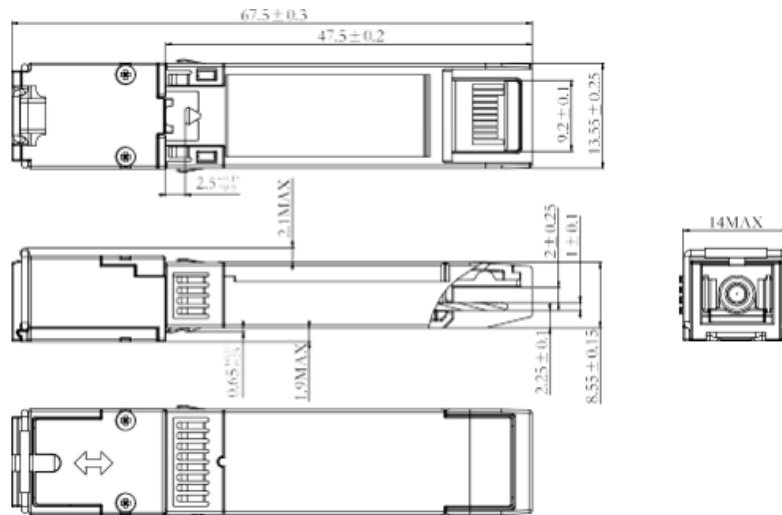
## SFP+ Connector Dimensions



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



## Mechanical Specifications

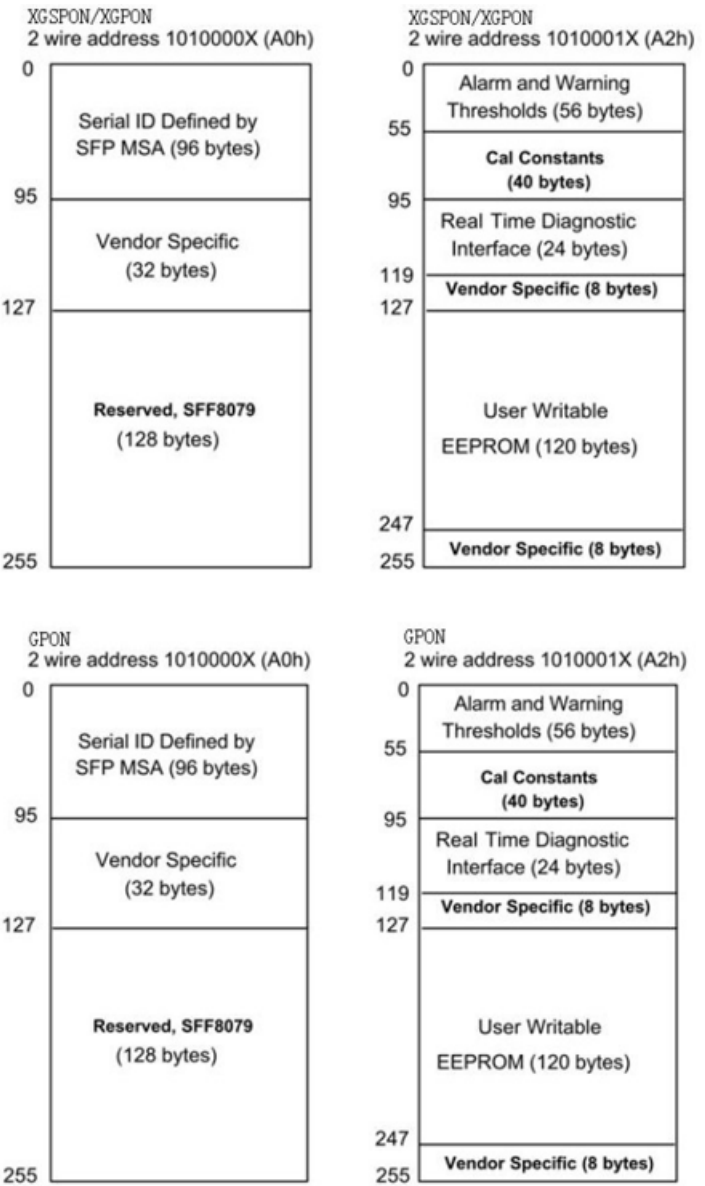


- NOTES:**
1. TOLERANCE: ± 0.1MM;
  2. OTHERS ACCORDING WITH SFP-8074I/SFP-8432 OR CUSTOMER SPEC;
  3. LIGHT PORT ACCORDING WITH FIBER CONNECTOR SPEC.



EEPROM Information

EEPROM memory map specific data field description is as below:



# About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

