

## Specification

LC/UPC Receptacle XFP

Optical Transceiver Module

10 Gigabit Ethernet

10GBASE-ZR



## Ordering Information

**TAS-XxUL5-QA6**



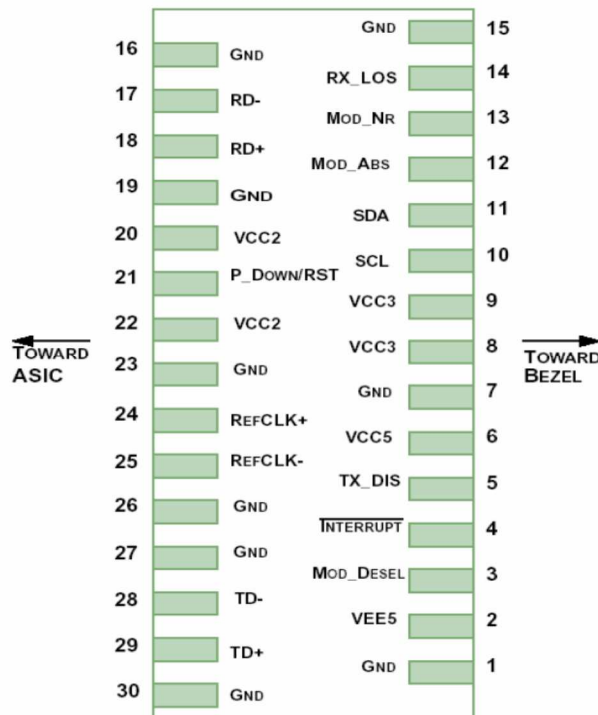
Operating Case Temperature

| Model Name    | Voltage | Category  | Device type | Interface   | Temperature  | Distance |
|---------------|---------|-----------|-------------|-------------|--------------|----------|
| TAS-X1UL5-QA6 | 3.3V    | With DDMI | 1550 nm EML | AC-AC / TTL | 0°C ~ +70°C  | 80 km    |
| TAS-X5UL5-QA6 |         |           |             |             | -5°C ~ +70°C |          |

## **Features**

- **STM64 or 10GBase ZR/ZW application**
- **Supports Data rate 9.95 ~ 11.3 Gbps**
- **Up to 80km transmission distance over SMF**
- **1550nm EML Laser transmitter**
- **1550nm receiver with APD-TIA**
- **2-wire interface for integrated digital diagnostic Monitoring**
- **Operation case temperature 0~70°C and -5~70°C for commercial**
- **Single +3.3V power supply**
- **XFP MAS package with LC/UPC receptacle optical interface**
- **RoHS-10 compliance**

## Pin Assignment and Pin Description



## Pin Definitions

| PIN | Logic     | Symbol    | Name/Description  | Note |
|-----|-----------|-----------|---|------|
| 1   |           | GND       | Ground  | 1    |
| 2   |           | VEE5      | Optional -5.2V power supply, not in use   | 3    |
| 3   | LVTLL-I   | Mod_DeSel | Module Deselect; when held low allows module to respond 2-wire serial interface                 |      |
| 4   | LVTLL-O   | Interrupt | Indicates presence of an important condition which can be read over the 2-wire serial interface | 2    |
| 5   | LVTLL-I   | TX_DIS    | Transmitter Disable; turn off transmitter laser output  |      |
| 6   |           | VCC5      | +5V power supply, not in use  | 3    |
| 7   |           | GND       | Ground  | 1    |
| 8   |           | VCC3      | +3.3V power supply  |      |
| 9   |           | VCC3      | +3.3V power supply  |      |
| 10  | LVTTL-I/O | SCL       | 2-wire serial interface clock   | 2    |
| 11  | LVTTL-I/O | SDA       | 2-wire serial interface data  | 2    |
| 12  | LVTTL-O   | Mod_Abs   | Indicates module is not present. ground in the module   | 2    |

|    |         |            |  |   |
|----|---------|------------|--|---|
| 13 | LVTTL-O | Mod_NR     | Module not ready, indicating module operational fault  | 2 |
| 14 | LVTTL-O | RX_LOS     | Receiver loss of signal indicator  | 2 |
| 15 |         | GND        | Ground   | 1 |
| 16 |         | GND        | Ground   | 1 |
| 17 | CML-O   | RD-        | Receiver Inverted Data Output  |   |
| 18 | CML-O   | RD+        | Receiver Non-Inverted Data Output  |   |
| 19 |         | GND        | Ground   | 1 |
| 20 |         | VCC2       | +1.8V power supply, not in use   | 3 |
| 21 | LVTTL-I | P_Down/RST | Power down; when high, requires the module to limit power consumption to 1.5w or below ,2-wire serial interface must be functional in the low power mode |   |
|    |         |            | Reset; the falling edge initiates a complete reset of the module including the 2-wire Serial interface, equivalent to a power cycle                      |   |
| 22 |         | VCC2       | +1.8V power supply, not in use   | 3 |
| 23 |         | GND        | Ground   | 1 |
| 24 | PECL-I  | RefCLK+    | Reference clock non-inverted input, ac coupled on the host board, not in use   | 3 |
| 25 | PECL-I  | RefCLK-    | Reference clock inverted input, ac coupled on the host board, not in use   | 3 |
| 26 |         | GND        | Ground   | 1 |
| 27 |         | GND        | Ground   | 1 |
| 28 | CML-I   | TD-        | Transmitter inverted data input  |   |
| 29 | CML-I   | TD+        | Transmitter non-inverted data input  |   |
| 30 |         | GND        | Ground   | 1 |

**Notes:**

1. Module ground pins GND are isolated from the module case and chassis ground within the module.
2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.
3. Not connected internally.

## Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

| Parameters                 | Symbol          | Min. | Max. | Unit |
|----------------------------|-----------------|------|------|------|
| Power Supply Voltage       | V <sub>CC</sub> | 3.15 | 3.45 | V    |
| Power Dissipation          |                 |      | 2.5  | W    |
| Storage Temperature        | T <sub>c</sub>  | -40  | 85   | °C   |
| Operating Case Temperature | T <sub>c</sub>  | 0    | 70   | °C   |
|                            |                 | -5   | 70   |      |

## Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

| Parameter  | Symbol      | Min.                 | Typ. | Max  | Unit | Notes |
|--|-------------|----------------------|------|------|------|-------|
| Operating Reach, SMF   |             |                      |      | 80   | Km   |       |
| <b>Transmitter</b>   |             |                      |      |      |      |       |
| Center Wavelength  | $\lambda_t$ | 1530                 | 1550 | 1570 | nm   |       |
| Spectral Width (-20dB)   |             |                      |      | 1    | nm   |       |
| Side Mode Suppression Ratio (SMSR)                                 |             | 30                   |      |      | dB   |       |
| Average Optical Power  | $P_{avg}$   | 0                    |      | 4    | dBm  |       |
| Transmitter and dispersion penalty (max)                           | TDP         |                      |      | 2    | dB   | 3     |
| Optical Return Loss Tolerance                                      |             | -12                  |      |      | dB   |       |
| Average launch power of Off transmitter                            | $P_{off}$   |                      |      | -45  | dBm  |       |
| Extinction Ratio   | ER          | 9                    |      |      | dB   |       |
| Transmitter Mask (PRBS2 <sup>31</sup> -1@9.95G)                    |             | Compliant With ITU-T |      |      |      |       |
| <b>Receiver</b>  |             |                      |      |      |      |       |
| Center Wavelength  | $\lambda_r$ | 1270                 | 1550 | 1610 | nm   |       |
| Sensitivity (PRBS2 <sup>31</sup> -1@9.95G, BER<10 <sup>-12</sup> ) |             |                      |      | -24  | dBm  |       |
| Overload (PRBS2 <sup>31</sup> -1@9.95G, BER<10 <sup>-12</sup> )    |             | -7                   |      |      | dBm  |       |
| Los Assert   | LosA        | -40                  |      |      | dBm  |       |
| Los Dessert  | LosD        |                      |      | -25  | dBm  |       |
| Los Hysteresis   | LosH        | 0.5                  |      |      | dB   |       |

### Note:

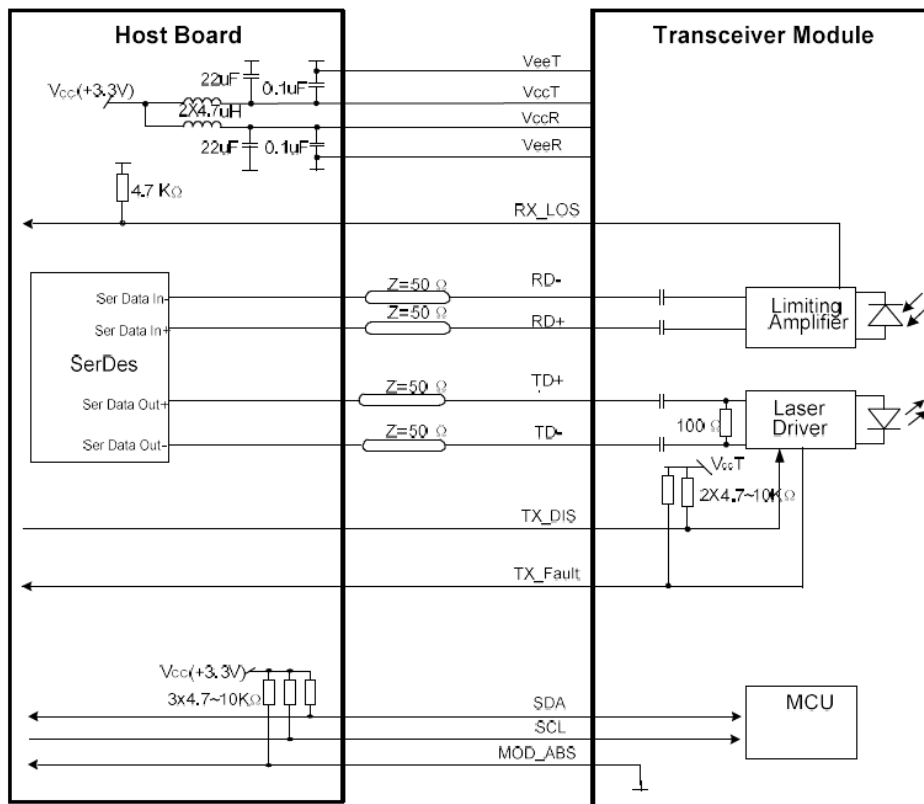
1. Average optical power shall be measured using the methods specified in TIA/EIA-455-95.
2. Receiver sensitivity is informative. Stressed receiver sensitivity shall be measured with conformance test signal for BER =  $1 \times 10^{-12}$ .
3. Path penalty is intended as the power penalty of the interface between back-to-back and the maximum applied dispersion.

## Electrical Characteristics

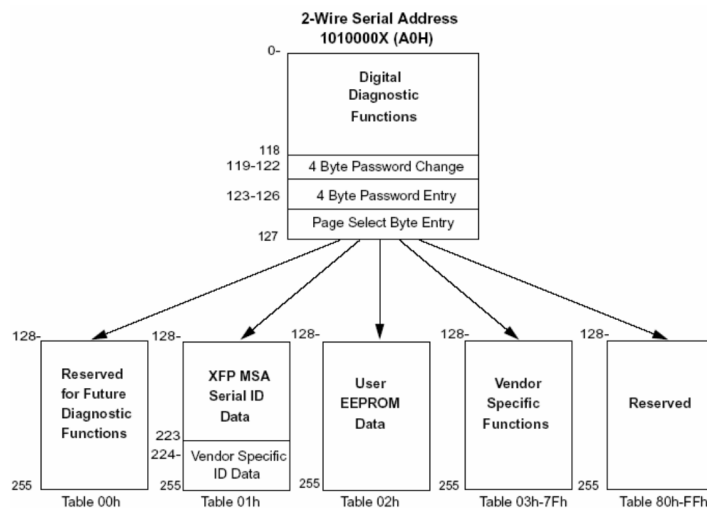
The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

| Parameter                         | Symbol            | Min.  | Typical | Max                  | Unit     | Notes |
|-----------------------------------|-------------------|-------|---------|----------------------|----------|-------|
| Data Rate                         |                   | 9.953 | 9.953   | 11.3                 | Gbps     |       |
| Data Input Swing Differential/TX  |                   | 120   |         | 820                  | mV       |       |
| Data Output Swing Differential/RX |                   | 380   |         | 850                  | mV       |       |
| Date Differential Impedance       |                   | 90    | 100     | 110                  | $\Omega$ |       |
| Output High                       |                   | 2.4   |         | V <sub>cc</sub>      | V        |       |
| Output Low                        |                   | 0     |         | 0.4                  | V        |       |
| Input High                        |                   | 2     |         | V <sub>cc</sub> +0.3 | V        |       |
| Input Low                         |                   | 0     |         | 0.8                  | V        |       |
| LOS Assert Time                   | T <sub>LOSA</sub> |       |         | 100                  | us       |       |
| LOS De-assert Time                | T <sub>LOSD</sub> |       |         | 100                  | us       |       |

**Typical Interface Circuit**

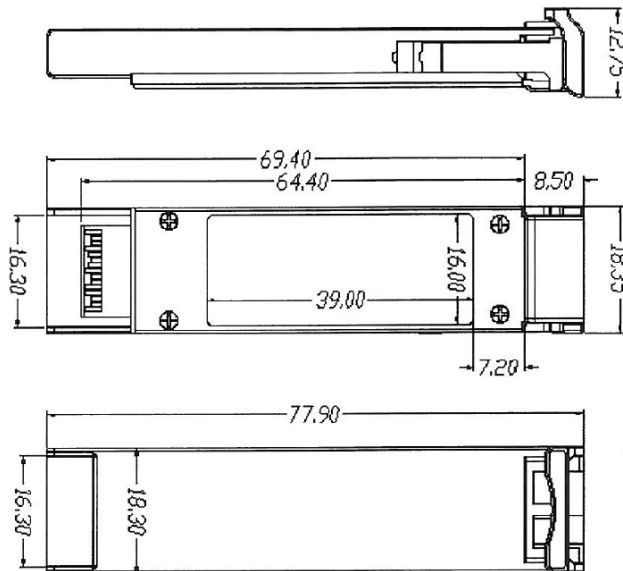


**EEPROM Memory Map**





## Mechanical Dimensions



## ESD

This transceiver is specified as ESD threshold 2kV for all electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

## LASER Safety

This is a Class 1 Laser Product according to IEC/EN60825-1:2014 (Third Edition).. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007)

## Revision History

| Date       | Version | Description     |
|------------|---------|-----------------|
| 03/12/2018 | 1.0     | Initial release |

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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

moschip.ru

moschip.ru\_4

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