



## 1.25G SFP-10/100/1000T Transceiver

### Hot Pluggable, RJ-45, Active Copper SFP, SERDES only

**Part Number:** FSFP-CJ-T11-X1-1W1



### Overview

FSFP-CJ-T11-X1-1W1 Small Form Factor Pluggable SFP Copper transceivers are compliant with the current SFP Multi-Source Agreement ( MSA ) Specification. The high performance designed is integrated full duplex data link at 1.25Gbps over four pair Category 5 UTP cable up to 100m links. User can be accessed SFP serial ID information with address of A0h via the 2-wire serial bus I2C protocol. This module works in host system with only SERDES mode.

### Applications

- Gigabit Ethernet 10/100/1000BASE-T
- Fast Ethernet 10/100BASE-TX

### Features

- Compliant with IEEE802.3-2002 and 802.3ab
- Compliant with SFP MSA
- Hot Pluggable
- Auto-detect MDI/MDI-X
- 10/100/1000BASE-T auto-negotiation on RJ-45 side
- 100BASE or 1000BASE operation in host system with SERDES interface
- RJ-45 connector
- Single +3.3V power supply
- Link length up to 100m with four-pair Cat.5 UTP cable
- RoHS Compliant

### Absolute Maximum Ratings

| Parameters                | Symbol          | Min. | Max. | Unit |
|---------------------------|-----------------|------|------|------|
| Storage Temperature       | T <sub>st</sub> | -40  | +85  | °C   |
| Storage Relative Humidity | RH              | 5    | 95   | %    |
| Supply Voltage            | V <sub>cc</sub> | -0.5 | +4.0 | V    |



## Recommended Operating Conditions

| Parameters                                 | Symbol          | Min.  | Typ. | Max.  | Unit |
|--|-----------------|-------|------|-------|------|
| Case Operating Temp. (FSFP-CJ-T11-X1-1W1)  | T <sub>OP</sub> | 0     | -    | +70   | °C   |
| Case Operating Temp. (FSFP-CJ-T11-X1i-1W1) | T <sub>OP</sub> | -40   | -    | +85   | °C   |
| Supply Voltage                             | V <sub>CC</sub> | +3.13 | +3.3 | +3.47 | V    |
| Supply Current                             | I <sub>CC</sub> |       | 170  | 300   | mA   |
| Power Consumption                          | P               |       |      | 1     | W    |

## General Specifications

| Parameters            | Symbol | Min. | Typ. | Max. | Unit | Note |
|-----------------------|--------|------|------|------|------|------|
| Data Rate (Host side) | DR     | 100  |      | 1000 | Mb/s |      |
| Data Rate (RJ45 side) | DR     | 10   |      | 1000 | Mb/s |      |
| Cable Length          | L      |      |      | 100  | M    | 1    |

**Note1:** Cat.5 UTP, BER<10<sup>-12</sup>

## High-Speed Electrical Interface, Cable to SFP

| Parameters          | Symbol              | Min. | Typ. | Max. | Unit | Note |
|---------------------|---------------------|------|------|------|------|------|
| Line Frequency      | F <sub>L</sub>      |      | 125  |      | MHz  | 1    |
| Tx Output Impedance | Z <sub>OUT.TX</sub> |      | 100  |      | Ohm  | 2    |
| Rx Input Impedance  | Z <sub>IN.RX</sub>  |      | 100  |      | Ohm  | 2    |

**Note1:** 4D-PAM-5 encoding per IEEE802.3: 2002.

**Note2:** Differential for frequencies ranging from 1MHz to 125MHz.

## High-Speed Electrical Interface, Host to SFP

| Parameters                    | Symbol                                | Min. | Typ. | Max. | Unit | Note |
|-------------------------------|---------------------------------------|------|------|------|------|------|
| TD+, TD- Input Voltage Swing  | V <sub>IN+</sub> / V <sub>IN-</sub>   | 250  |      | 1200 | mV   | 1    |
| RD+, RD- Output Voltage Swing | V <sub>OUT+</sub> / V <sub>OUT-</sub> | 350  |      | 800  | mV   | 1    |
| Rise / Fall Time (20~80%)     | T <sub>r</sub> / T <sub>f</sub>       |      | 175  |      | ps   |      |
| Tx Input Impedance            | Z <sub>IN</sub>                       |      | 50   |      | Ohm  | 1    |
| Rx Output Impedance           | Z <sub>OUT</sub>                      |      | 50   |      | Ohm  | 1    |

**Note1:** Single ended.

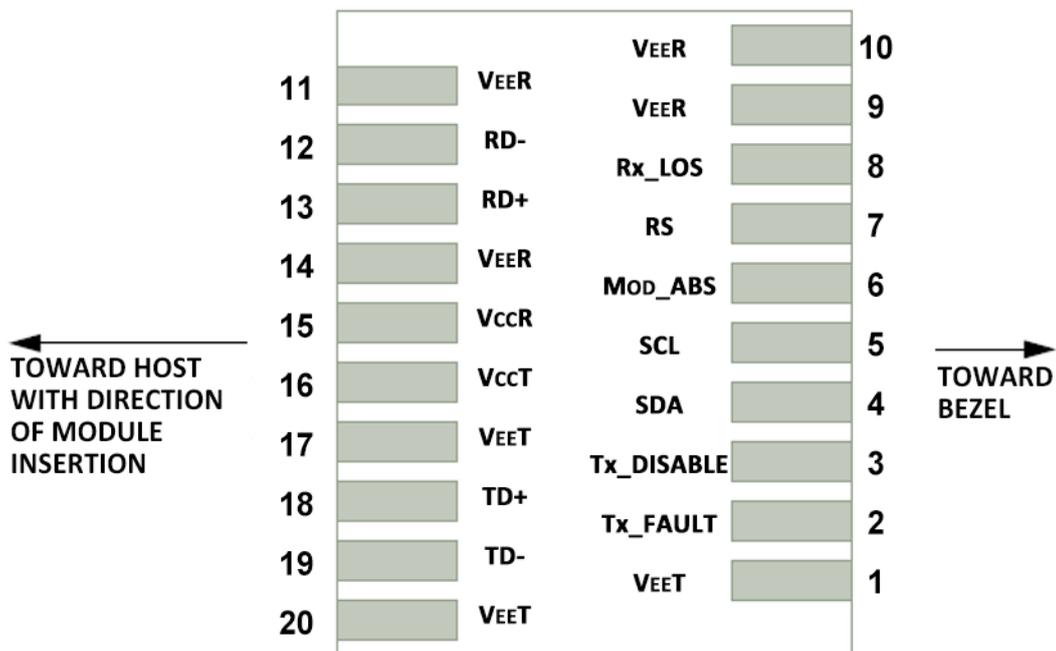


## Low-Speed Signals

MOD\_DEF(1) (SCL) and MOD\_DEF(2) (SDA), are open drain CMOS signals (see section VII, “Serial Communication Protocol”). Both MOD\_DEF(1) and MOD\_DEF(2) must be pulled up to Host\_Vcc.

| Parameters      | Symbol | Min.          | Max.          | Unit | Note  |
|-----------------|--------|---------------|---------------|------|---|
| SFP Output LOW  | VoL    | 0             | 0.5           | V    | 4.7k to 10k pull-up to Host_Vcc, measured at host side of connector |
| SFP Output HIGH | VoH    | Host_Vcc -0.5 | Host_Vcc +0.3 | V    | 4.7k to 10k pull-up to Host_Vcc, measured at host side of connector |
| SFP Input LOW   | ViL    | 0             | 0.8           | V    | 4.7k to 10k pull-up to Vcc, measured at SFP side of connector       |
| SFP Input HIGH  | ViH    | 2             | Vcc+0.3       | V    | 4.7k to 10k pull-up to Vcc, measured at SFP side of connector       |

## Pin Assignment



Host PCB SFP Pad Assignment Top View



## Pin Description

| Pin | Name       | Function / Description   |
|-----|------------|--|
| 1   | VEET       | Transmitter Ground   |
| 2   | Tx_FAULT   | Transmitter Fault Indication (1)                                     |
| 3   | Tx_DISABLE | Transmitter Disable – Turns off transmitter laser output (2)         |
| 4   | SDA        | 2-wire Serial Interface Data Line (SDA: Serial Data Signal) (3)      |
| 5   | SCL        | 2-wire Serial Interface Clock (SCL: Serial Clock Signal) (3)         |
| 6   | MOD_ABS    | Module Absent, connected to VEET or VEER in the module (3)           |
| 7   | RS         | Rate Select, optional (5)  |
| 8   | Rx_LOS     | Receiver Loss of Signal Indication (4)                               |
| 9   | VEER       | Receiver Ground  |
| 10  | VEER       | Receiver Ground  |
| 11  | VEER       | Receiver Ground  |
| 12  | RD-        | Receiver Inverted Data output, Differential LVPECL, AC coupled       |
| 13  | RD+        | Receiver Non-Inverted Data output, Differential LVPECL, AC coupled   |
| 14  | VEER       | Receiver Ground  |
| 15  | VccR       | Receiver 3.3V Power Supply   |
| 16  | VccT       | Transmitter 3.3V Power Supply  |
| 17  | VEET       | Transmitter Ground   |
| 18  | TD+        | Transmitter Non-Inverted Data Input, Differential LVPECL, AC coupled |
| 19  | TD-        | Transmitter Inverted Data Input, Differential LVPECL, AC coupled     |
| 20  | VEET       | Transmitter Ground   |

**Note1:** TX Fault is not used and is always tied to ground through a 100 ohm resistor.

**Note2:** TX Disable as described in the MSA is not applicable to the 1000BASE-T module, but is used for convenience as an input to reset the internal PHY IC. This pin is pulled up within the module with a 4.7KΩ resistor.

- Low (0 – 0.8 V): Transceiver on; Between (0.8 V and 2.0 V): Undefined
- High (2.0 – 3.465 V): Transceiver in reset state
- Open: Transceiver in reset state

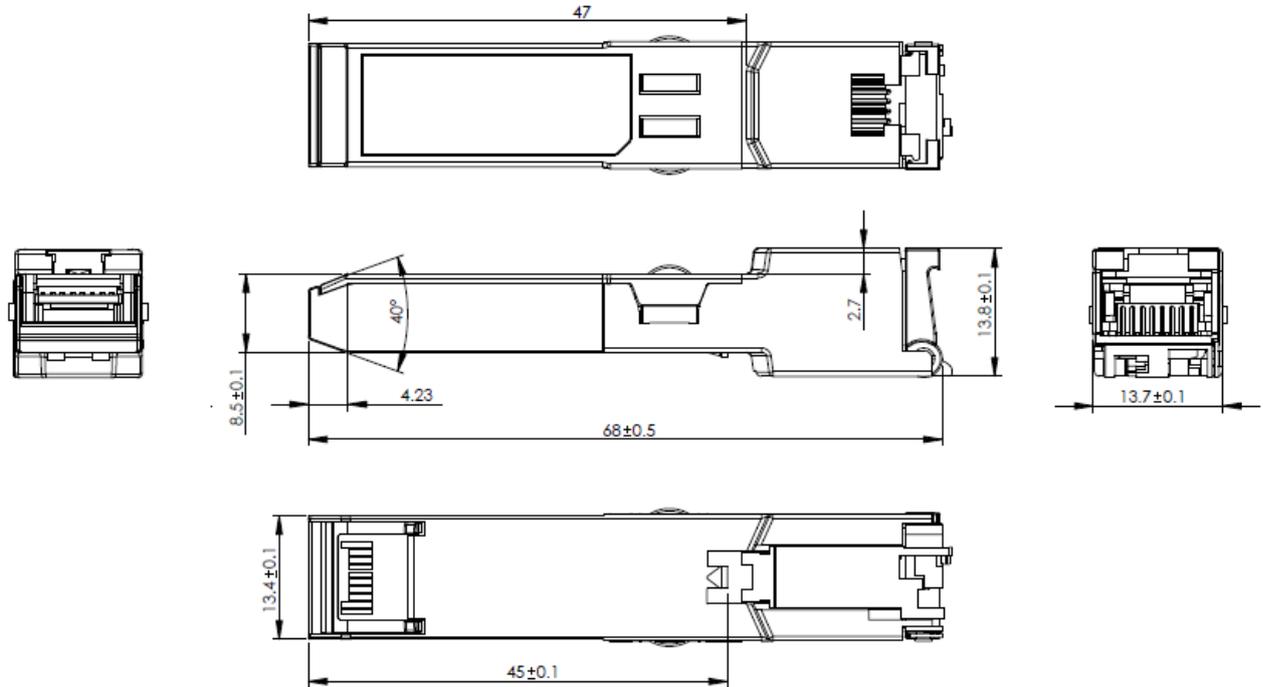
**Note3:** These are the module definition pins. They should be pulled up with a 4.7K~10KΩ resistor on the host board to supply less than VccT+0.3V or VccR+0.3V. MOD\_ABS is grounded by the module to indicate that the module is present.

**Note4:** Rx\_LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7K~10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

**Note5:** No connect on this module.



## Mechanical Dimensions



(All Dimensions are ±0.20mm Unless Otherwise Specified, Unit: mm)

## Ordering Information

| Part No.            | Host Port Speed | Host Port Interface | Auto-Negotiation on RJ-45 side | Link Indicator on Rx_LOS pin | Temp.    |
|---------------------|-----------------|---------------------|--------------------------------|------------------------------|----------|
| FSFP-CJ-T11-X1-1W1  | 100M            | SERDES              | Yes<br>(10/100/1000T)          | Yes                          | 0~70°C   |
| FSFP-CJ-T11-X1i-1W1 | 1000M           |                     |                                |                              | -40~85°C |

**Note:** The Copper SFP will auto negotiate 100M or 1000M SERDES mode with the Host.