

# 10GBASE-T SFP+ Copper RJ-45 30m Industrial Transceiver

SFP-10G-T-I



## Application

- 10GBASE-T 10G Ethernet

## Features

- Hot-pluggable SFP footprint
- Support 10GBASE-T / 5GBASE-T / 2.5GBASE-T
- Compact RJ-45 connector assembly
- Industrial Temperature Range: -40 to 85° C
- Single +3.3V power supply
- 10 Gigabit Ethernet over Cat6a/Cat7 cable
- RoHS compliant and lead-free

## Description

10GBASE-T / 2.5GBASE-T standards as specified in IEEE Std 802.3. 10GBASE-T SFP+ copper transceivers use the SFP's RX\_LOS pin for link indication. If pull up SFP's TX\_DISABLE pin, PHY GBASE-T SFP+ copper transceivers are based on the SFP Multi-Source Agreement (MSA). They are compatible with the 10GBASE-T / IC will be reset.

## Product Specifications

### I.General Specifications

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
<b>Bit Rate</b>	BR	1		10	Gb/sec	IEEE 802.3 compatible. See Notes 1 below

**Note:**

1. Clock tolerance is +/- 50 ppm

### II. Environmental Specifications

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
<b>Operating Temperature</b>	Top	-40		85	° C	Case temperature
<b>Storage Temperature</b>	Tsto	-40		85	° C	Ambient temperature

**Note:**

1. Automatic crossover detection is enabled. External crossover cable is not require

### III. Transmission Distances

Standard	Cable	Reach	Host Port
10GBASE-T	Cat6a/Cat7	30m	XFI
5GBASE-T/2.5GBASE-T	Cat5e	50m	5GBASE-R/2.5GBASE-X

### IV. Electrical Characteristics

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

#### Low-Speed Signals, Electronic Characteristics

Parameter	Symbol	Min	Max	Unit	Notes/Conditions
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	mV	4.7k to 10k pull-up to Vcc, measured at SFP side of connector

## V. +3.3V Volt Electrical Power Interface

The SFP-10G-T has an input voltage range of 3.3 V +/- 5%. The 4V maximum voltage is not allowed for continuous operation.

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
Supply Current	I <sub>s</sub>		700	900	mA	3.0W max power over full range of voltage and temperature. See caution note below.
Input Voltage	V <sub>cc</sub>	3.13	3.3	3.47	V	Referenced to GND
Maximum Voltage	V <sub>max</sub>			4	V	1
Surge Current	I <sub>surge</sub>		TBD		mA	Hot plug above steady state current. See caution note below.

Caution: Power consumption and surge current are higher than the specified values in the SFP MSA.

## VI. High-Speed Electrical Interface

All high-speed signals are AC-coupled internally.

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
-----------	--------	-----	------	-----	------	------------------

### High-Speed Electrical Interface, Transmission Line-SFP

Line Frequency	fL		125		MHz	5-level encoding, per IEEE 802.3
Tx Output Impedance	Zout,TX		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz
Rx Input Impedance	Zin,RX		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz

### High-Speed Electrical Interface, Host-SFP

Single ended data input swing	Vinsing	250		1200	mV	Single ended
Single ended data output swing	Voutsing	350		800	mV	Single ended
Rise/Fall Time	Tr,Tf		175		psec	20%-80%
Tx Input Impedance	Zin		50		Ohm	Single ended
Rx Output Impedance	Zout		50		Ohm	Single ended

## VII. Serial Communication Protocol

All FS.COM SFPs support the 2-wire serial communication protocol outlined in the SFP MSA. These SFPs use an MCU, can be accessed with address of A0h.

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
-----------	--------	-----	------	-----	------	------------------

### Serial Bus Timing, Requirements

I <sup>2</sup> C Clock Rate		0		200,000	Hz	
-----------------------------	--	---	--	---------	----	--

### VIII. Pin Description

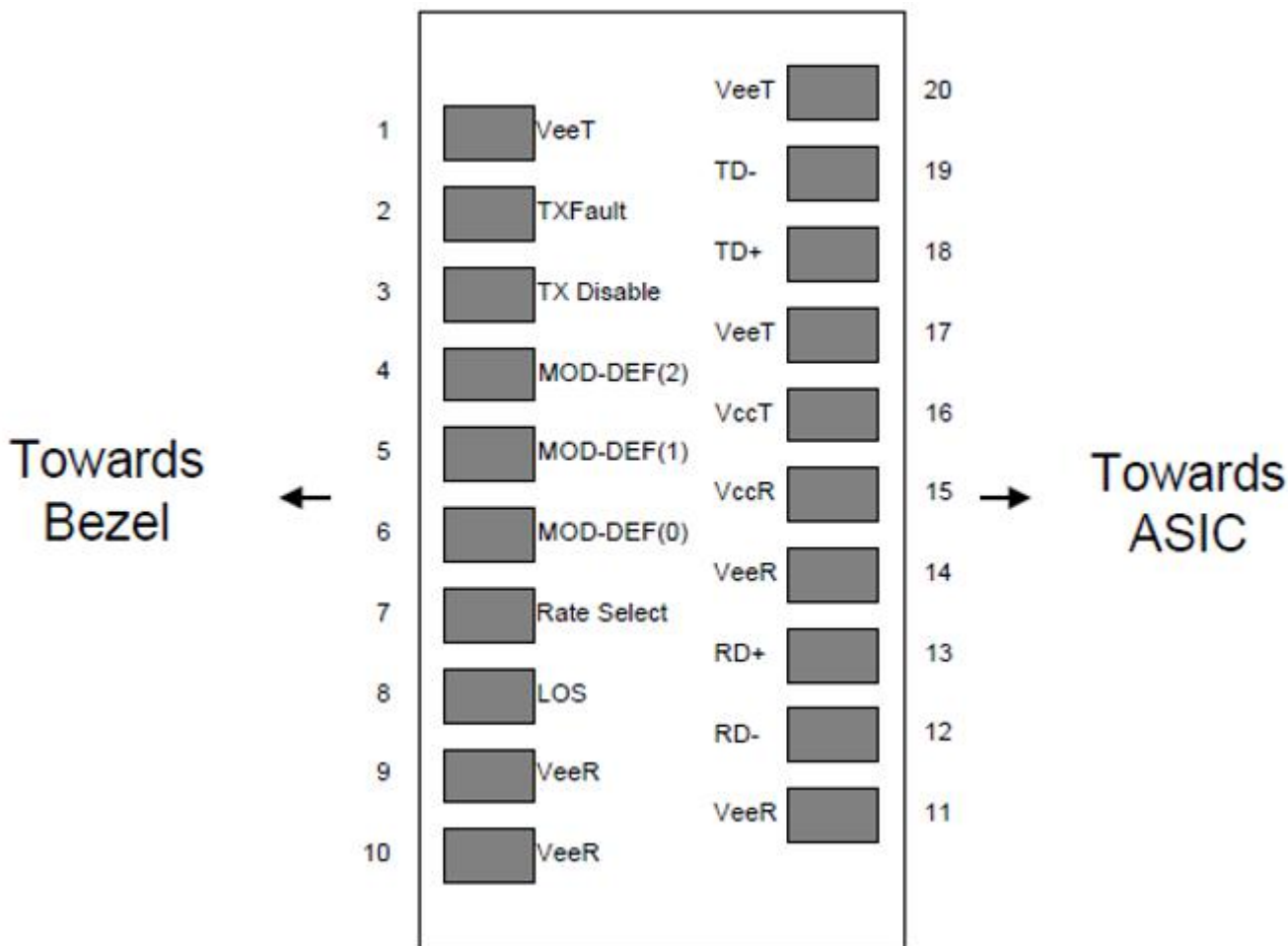


Figure 1. Diagram of Host Board Connector Block Pin Numbers and Names.

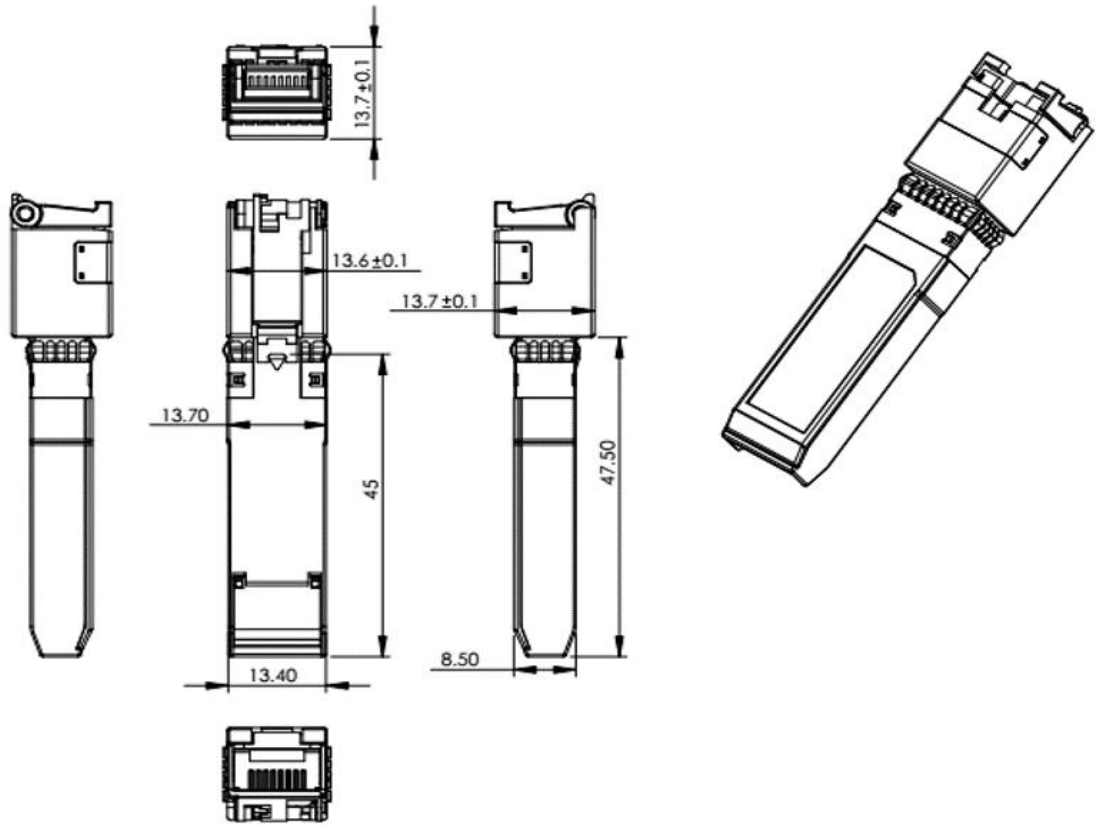
Pin	Symbol	Name/Description	Ref.
1	$V_{EET}$	Transmitter Ground(Common with Receiver Ground)	1
2	$T_{FAULT}$	Transmitter Fault. Not supported.	
3	$T_{DIS}$	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3

5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	
8	LOS	High indicates no linked. low indicates linked.	4
9	V <sub>EER</sub>	Receiver Ground(Common with Transmitter Ground)	1
10	V <sub>EER</sub>	Receiver Ground(Common with Transmitter Ground)	1
11	V <sub>EER</sub>	Receiver Ground(Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled.	
14	V <sub>EER</sub>	Receiver Ground(Common with Transmitter Ground)	1
15	V <sub>CCR</sub>	Receiver Power Supply	
16	V <sub>CCT</sub>	Transmitter Power Supply	
17	V <sub>EET</sub>	Transmitter Ground(Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V <sub>EET</sub>	Transmitter Ground(Common with Receiver Ground)	1

**Notes:**

- 1.Circuit ground is connected to chassis ground
- 2.PHY disabled on TDIS > 2.0V or open, enabled on TDIS < 0.8V
- 3.Should be pulled up with 4.7k - 10k Ohms on host board to a voltage between 2.0 V and 3.6 V. MOD\_DEF(0) pulls line low to indicate module is plugged in.
- 4.LVTTL compatible with a maximum voltage of 2.5V.

## IX. Mechanical Specifications





## Test Center

FS.COM transceivers are tested to ensure connectivity and compatibility in our test center before shipped out. FS.COM test center is supported by a variety of mainstream original brand switches and groups of professional staff, helping our customers make the most efficient use of our products in their systems, network designs and deployments.

The original switches could be found nowhere but at FS.COM test center, eg: Juniper MX960 & EX 4300 series, Cisco Nexus 9396PX & Cisco ASR 9000 Series, HP 5900 Series & HP 5406R ZL2 V3(J9996A), Arista 7050S-64, Brocade ICX7750-26Q & ICX6610-48, Avaya VSP 7000 MDA 2, etc.



Cisco ASR 9000 Series(A9K-MPA-1X40GE)



ARISTA 7050S-64(DCS-7050S-64)



Juniper MX960



Brocade ICX 7750-26Q



Extreme Networks X670V VIM-40G4X



Mellanox M3601Q



Dell N4032F



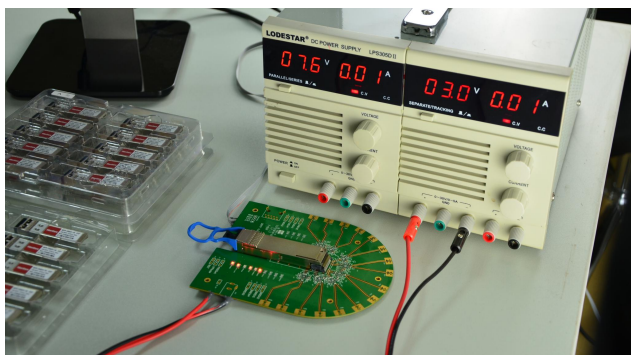
HP 5406R ZL2 V3(J9996A)



AVAYA 7024XLS(7002QQ-MDA)

## Test Assured Program

FS.COM truly understands the value of compatibility and interoperability to each optics. Every module FS.COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to facilities—professionally trained staff, advanced test facilities and comprehensive original-brand switches, to ensure our customers to receive the optics with superior quality.



Our smart data system allows effective product management and quality control according to the unique serial number, properly tracing the order, shipment and every part.

Our in-house coding facility programs all of our parts to standard OEM specs for compatibility on all major vendors and systems such as Cisco, Juniper, Brocade, HP, Dell, Arista and so on.



With a comprehensive line of original-brand switches, we can recreate an environment and test each optics in practical application to ensure quality and distance.

The last test assured step to ensure our products to be shipped with perfect package.

## Order Information

Part Number	Description
SFP-10GSR-85	10GBASE-SR SFP+ 850nm 300m DOM Transceiver
SFP-10GLRM-31	10GBASE-LRM SFP+ 1310nm 220m DOM Transceiver
SFP-10GLR-31	10GBASE-LR SFP+ 1310nm 10km DOM Transceiver
SFP-10GER-55	10GBASE-ER SFP+ 1550nm 40km DOM Transceiver
SFP-10GZR-55	10GBASE-ZR SFP+ 1550nm 80km DOM Transceiver
SFP-10GZRC-55	10GBASE-ZR SFP+ 1550nm 100km DOM Transceiver
SFP-10GSR-85	Dual-Rate 1000BASE-SX and 10GBASE-SR SFP+ 850nm 300m DOM Transceiver
SFP-10GLR-31	Dual-Rate 1000BASE-LX and 10GBASE-LR SFP+ 1310nm 10km DOM Transceiver
SFP-10G-T	10GBASE-T SFP+ Copper RJ-45 30m Transceiver
SFP-10GSR-85-I	10GBASE-SR SFP+ 850nm 300m Industrial DOM Transceiver
SFP-10GLR-31-I	10GBASE-LR SFP+ 1310nm 10km Industrial DOM Transceiver
SFP-10GER-31-I	10GBASE-ER SFP+ 1550nm 40km Industrial DOM Transceiver
SFP-10G-T-I	10GBASE-T SFP+ Copper RJ-45 30m Industrial Transceiver

### Notes:

1. 10G SFP+ transceiver module is individually tested on corresponding equipment such as Cisco, Arista, Juniper, Dell, Brocade and other brands, and passes the monitoring of FS.COM intelligent quality control system.



 <https://www.fs.com>



The information in this document is subject to change without notice. FS has made all efforts to ensure the accuracy of the information, but all information in this document does not constitute any kind of warranty.