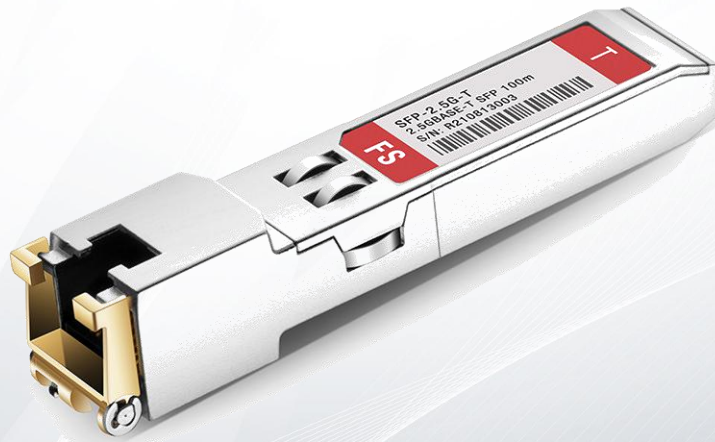


2.5GBASE-T SFP Copper RJ-45 100m Transceiver

SFP-2.5G-T



Application

- 2.5G Ethernet over Cat5e Cable
- Switch to Switch Interface
- AP/Router Interface

Features

- Support 2.5Gbase-T / 1000base-T/ 100base-T on Line Port 10km with 9/125 μ m SMF
- Support 2.5Gbase-X on Host Port
- Hot-pluggable SFP Footprint
- Compact RJ-45 Connector Assembly
- RoHS Compliant and Lead-free
- Single +3.3V Power Supply
- 2.5 Gigabit Ethernet over Cat5e Cable
- Ambient Operating Temperature:
 - 0°C to +70°C
 - Power Dissipation < 2W

Description

The SFP-2.5G-T Copper Small Form Pluggable (SFP) transceivers are based on the SFP Multi Source Agreement (MSA). They are compatible with the 2.5Gbase-T / 1000base-T/100base-T standards as specified in IEEE Std 802.3. SFP-2.5G-T uses the SFP's RX_LOS(must be pulled up on host) pin for link indication. If pull up or open SFP's TX_DISABLE pin, PHY IC be reset.

Product Specifications

I. General Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes/Conditions
Data Rate	BR	1		2.5	Gb/sec	IEEE 802.3 compatible. See Notes 1, 2 below

Note:

1. Clock tolerance is +/- 50 ppm

II. Environmental Specifications

Automatic crossover detection is enabled. External crossover cable is not required

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes/Conditions
Operating Temperature	Top	0		70	°C	Case temperature
Storage Temperature	Tsto	-40		85	°C	Ambient temperature

III. Cable Length

Line Port	Host Port	Cable	Reach
2.5Gbase-T	2.5Gbase-X	CAT5e	100m
1000base-T	2.5Gbase-X	CAT5e	100m
100base-T	2.5Gbase-X	CAT5e	100m

In the ingress direction, the entire packet is fully buffered prior to being transmitted out of Host port at 2.5Gbps. In the egress direction, the 2.5Gbps packet is buffered since the line port at a slow speed, the egress packet should be throttled to match the lower speed by extending the IPG between packet. flow control can be enabled on the host side MAC to limit the flow of packets.

IV. Electrical Characteristics

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

+3.3V Volt Electrical Power Interface

Supply Current	I _{cc}			450	mA	
Input Voltage	V _{cc}	3.13	3.3	3.47	V	Referenced to GND
Maximum Voltage	V _{max}			4	V	
Surge Current	I _{surge}		TBD		mA	Hot plug above steady state current. See caution note below

Low-Speed Signals, Electronic Characteristics

SFP Output LOW	V _{OL}	0		0.5	V	4.7k to 10k pull-up to host_V _{cc} , measured at host side of connector
SFP Output HIGH	V _{OH}	host_V _{cc} - 0.5		host_V _{cc} + 0.3	V	4.7k to 10k pull-up to host_V _{cc} , measured at host side of connector
SFP Input LOW	V _{IL}	0		0.8	V	4.7k to 10k pull-up to V _{cc} , measured at SFP side of connector
SFP Input HIGH	V _{IH}	2		V _{cc} + 0.3	V	4.7k to 10k pull-up to V _{cc} , measured at SFP side of connector

High-Speed Electrical Interface, Transmission Line-SFP

Tx Output Impedance	Z _{out,TX}		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz
Rx Input Impedance	Z _{in,RX}		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz

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

High-Speed Electrical Interface, Host-SFP

Tx Output Impedance	Z _{out,TX}		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz
Rx Input Impedance	Z _{in,RX}		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz
Maximum Voltage	V _{max}			4	V	
Surge Current	I _{surge}		TBD		mA	Hot plug above steady state current. See caution note below

*The SFP-2.5GBASE-T has an input voltage range of 3.3 V +/- 5%. The 4V maximum voltage is not allowed for continuous operation.

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

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.

All high-speed signals are AC-coupled internally

V. Serial Communication Protocol

All 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 and A2h.

Serial Bus Timing, Requirements

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes/Conditions
I²C Clock Rate		0		200,000	Hz	

VI. Pin Description

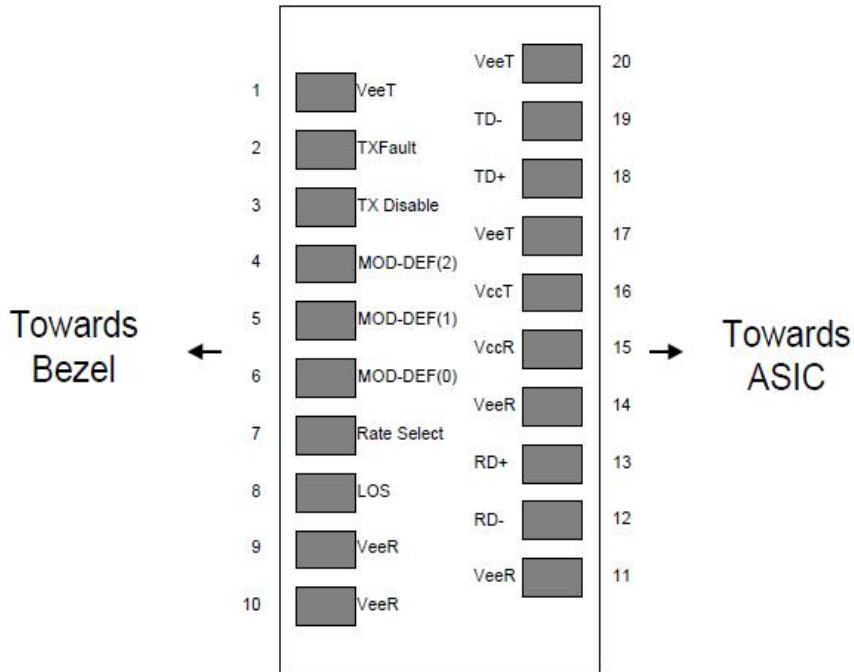


Figure 1. Diagram of Host Board Connector Block Pin Numbers and Names

Pin	Symbol	Name/Description	Ref.
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault. Not Supported.	
3	TxDIS	High: Reset PHY Chipset; Low: Normal	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

Pin	Symbol	Name/Description	Ref.
7	Rate Select	No Connection Required	
8	LOS	High Indicates no Linked on Copper. Low Indicates Linked on Copper.	
9	VEER	Receiver Ground (Common with Transmitter Ground)	1
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	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	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	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	VEET	Transmitter Ground (Common with Receiver Ground)	1

Notes:

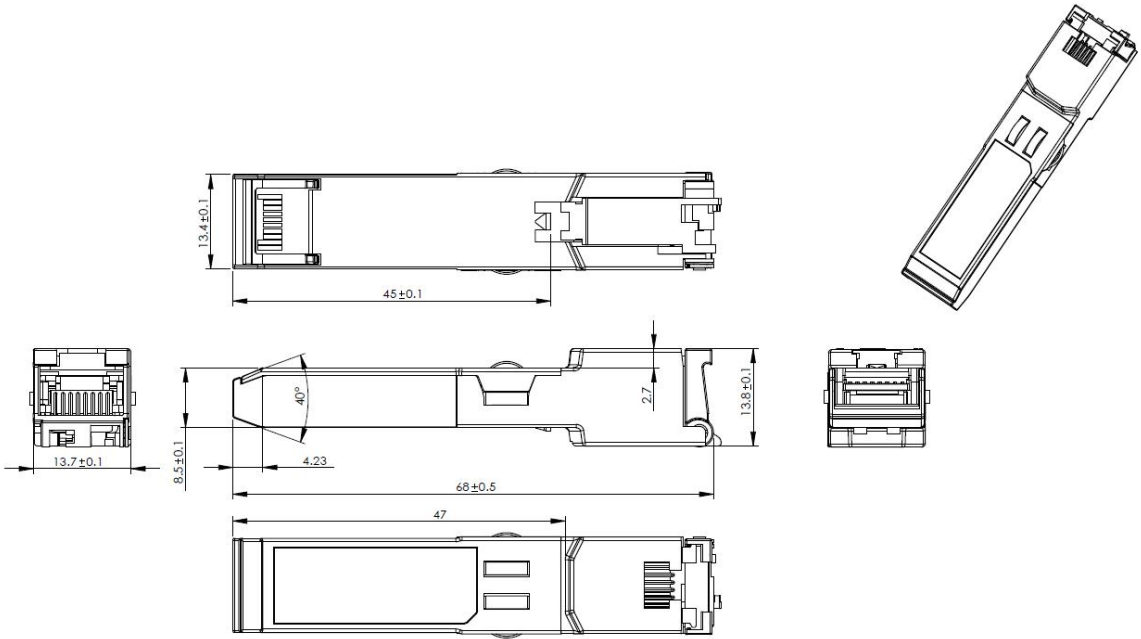
1. Circuit ground is connected to chassis ground.
2. PHY disabled on TDIS > 2.0V or open, enabled on TDIS < 0.8V.
3. Should be pulled up with 4.7k - 10k Ohms on host board to a voltage between 2.0 V and 3.6 V. MOD_DEF(0) pulls line low to indicate module is plugged in.

VII. EEPROM INFORMATION(A0)

Addr	Field Size(Bytes)	Name of Field	HEX	Description
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	MOD4
2	1	Connector	07	LC
3-10	8	Transceiver	00 00 00 00 00 00 00 00	Transmitter Code
11	1	Encoding	05	SONET SCRAMBLED
12	1	BR, Nominal	19	2500M bps
13	1	Reserved	00	
14	1	Length (9um)-km	00	
15	1	Length (9um)	00	
16	1	Length (50um)	08	80
17	1	Length (62.5um)	03	30
18	1	Length (copper)	00	
19	1	Reserved	1E	30
20-35	16	Vendor Name	20 20 2020202020 2020 20 20 20 20 20 20	

Addr	Field Size(Bytes)	Name of Field	HEX	Description
36	1	Reserved	00	
37-39	3	Vendor OUI	00 00 00	
40-55	16	Vendor PN	XX XX XX XX XX XX XXXX XX XX XX XX XX XX XX	ASC II
56-59	4	Vendor rev	31 2E 30 20	V1.0
60-61	2	Wavelength	03 52	850nm
62	1	Reserved	00	
63	1	CC BASE	XX	Check sum of byte 0~62
64-65	2	Options	00 1A	LOS, TX_DISABLE, TX_FAULT
66	1	BR, Max	00	
67	1	BR, Min	00	
68-83	16	Vendor SN	00 00 00 00 00 00 00 0000 00 00 00 00 00 00 00	Unspecified
84-91	8	Vendor Date Code	XX XX XX 20	Year, Month, Day
92-94	3	Reserved	00	
95	1	CC_EXT	XX	Check sum of byte 64~94
96-255	160	Vendor Specific		

VIII. Mechanical Specifications



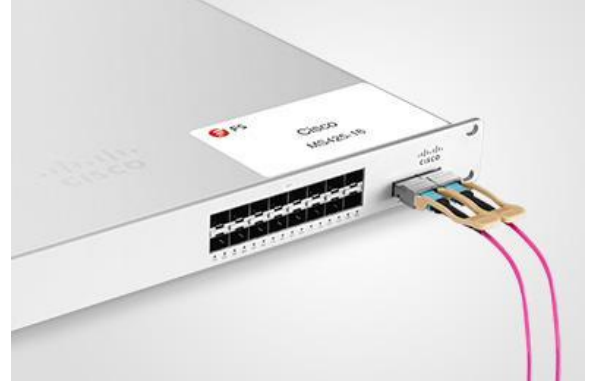
Test Center

I. Compatibility Testing

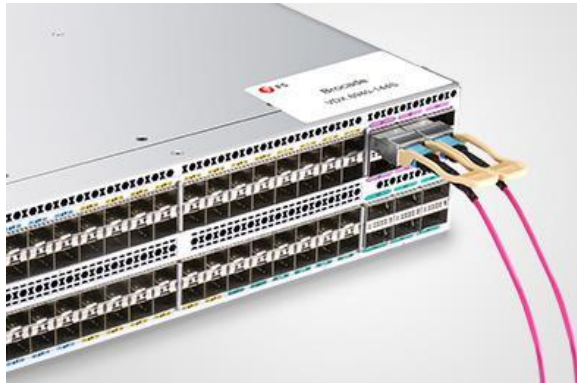
Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force@tm S60-44T

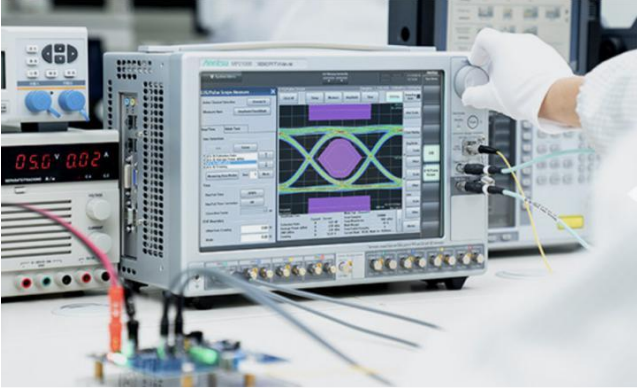


HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the Test Bed PDF. It will be updated in real time as we expand our portfolio.

II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.



1. TX/RX Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure the input and output signal quality.

- Eye Pattern Measurements: jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve

2. Reliability and Stability Testing

Subject the transceivers to dramatic changes in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0 °C to 70 °C
- Extended: -5 °C to 85 °C
- Industrial: -40 °C to 85 °C



3. Transfer Rate and Protocol Testing

Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

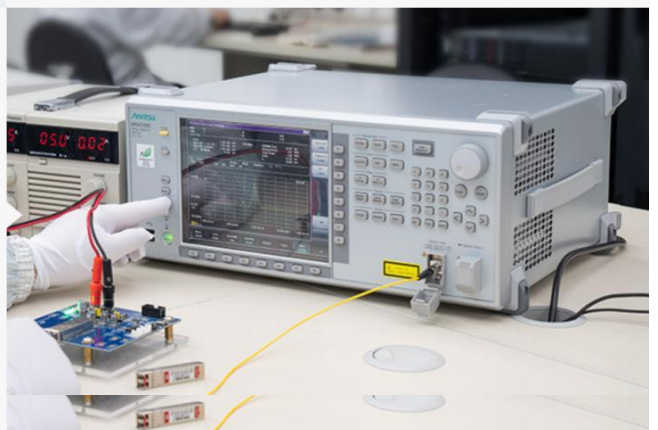
- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI



4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



Order Information

Part Number	Description
SFP-GB-T	SFP, 1000Base-T, 0 to70°C(COM), SERDES Interface
SFP-GB-T	SFP, 10/100/1000Base-T, 0 to70°C(COM), SERDES/SGMII Interface
SFP-2.5G-T	SFP, 2.5GBase-T, 0 to70°C(COM), XGMII Interface
SFP-10G-T	SFP+, 10GBase-T, 0 to70°C(COM), SERDES Interface

Note:

-T 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.