



Fibre Optic Active

## Copper SFP Transceiver

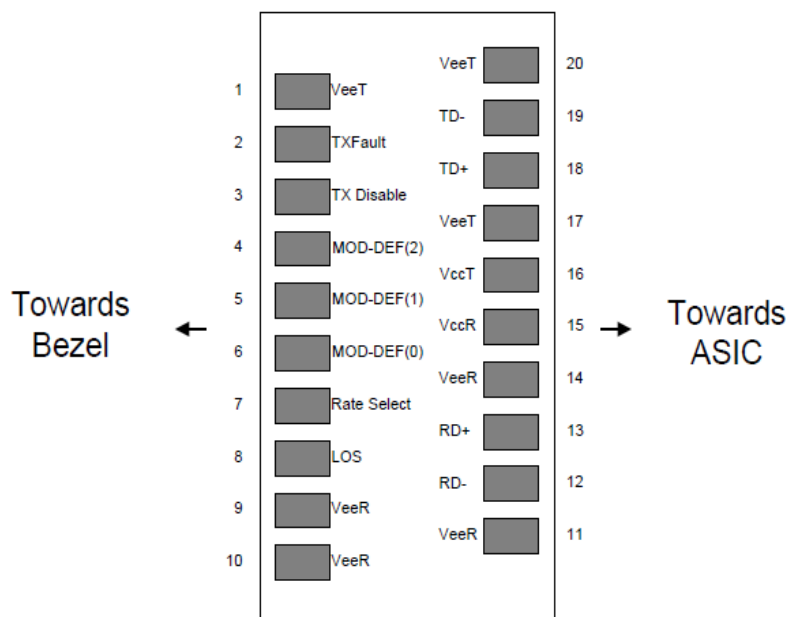
Small Form-Factor Pluggable (SFP) Copper Transceivers are compact transceivers used to interface networking devices to copper networking cables in telecom and data applications.



### Features & Benefits

- Up to 1.25 Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- Low power dissipation(1.05W typical)
- Compact RJ-45 connector assembly
- Fully metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Single +3.3V power supply
- 10/100/1000 BASE-T operation in host systems with SGMII interface
- 1.25 Gigabit Ethernet over Cat 5 cable
- Case operating temperature :  
Commercial: 0°C to +70°C  
Extended: -10°C to +80°C  
Industrial: -40°C to +85°C

### SFP to Host Connector Pin Out





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### Pin Description

Pin	Symbol	Name/Description	Ref.
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault. Not supported.	
3	TDIS	Transmitter Disable. Not supported.	
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	2
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	2
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	2
7	Rate Select	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	3
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:

Circuit ground is connected to chassis ground

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 The module is plugged in.

LVTTTL compatible with a maximum voltage of 2.5V. Not supported on T12-02-2.

### Technical Specifications

#### Volt Electrical Power Interface

Parameters	Symbol	Min	Type	Max	Unit	Notes/Conditions
Supply Current	Is		320	375	mA	1.2W max power over full range of voltage and temperature. See caution note below
Input Voltage	Vcc	3.13	3.3	3.47	V	Reference to GND
Maximum Voltage	Vmax			4	V	
Surge Current	Isurge			30	mA	Hot plug above steady state current. See caution note below.



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### Low Speed Electrical Interface

Parameters	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	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector

### High Speed Electrical Interface

Parameters	Symbol	Min	Type	Max	Unit	Notes/Conditions
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

Parameters	Symbol	Min	Type	Max	Unit	Notes/Conditions
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	T <sub>r</sub> , T <sub>f</sub>		175		psec	20%-80%
Tx Input Impedance	Zin		50		Ohm	Single ended
Rx Output Impedance	Zout		50		Ohm	Single ended

### General Specifications

Parameters	Symbol	Min	Type	Max	Unit	Notes/Conditions
Data Rate	BR	10		1000	Mb/sec	IEEE 802.3 compatible. See notes 2 through 4 below
Cable Length	L			100	m	Category 5 UTP. BER

### Notes:

Clock tolerance is +/- 50 ppm

By default, 10/100/1000 BASE-T is a full duplex device in preferred master mode

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

10/100/1000 BASE-T operation requires the host system to have an SGMII interface with no clocks.

### Serial Bus Timing Requirements

Parameters	Symbol	Min	Type	Max	Unit	Notes/Conditions
I <sup>2</sup> C Clock Rate		0		100,000	Hz	



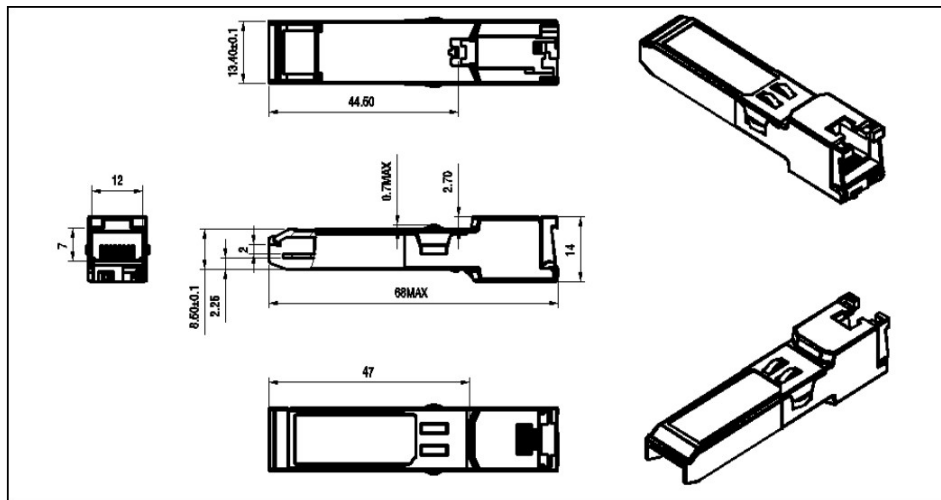
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## Copper SFP Transceiver

### Environmental Specifications

Parameters	Symbol	Min	Type	Max	Unit	Notes/Conditions
Case Operating Temperature	Tcase	0		70	°C	T12-02-2
		-10		80	°C	T12-02-2E
		-40		85	°C	T12-02-2A
Storage Temperature	Tsto	-40		85	°C	Ambient temperature

### Technical Drawings



### Ordering Information

Using the available configurations amend/create a part number using the formula below.

Transceiver Type		Transmission Distance	
Copper SFP / 1.25Gbps	<b>CSFP1.25</b>	100km	<b>100</b>
<b>CSFP1.25</b>	<b>UTP5e</b>	<b>100</b>	<b>CIS</b>
Copper Type		Coding	
Unshielded Twisted Pair CAT5e	<b>UTP5e</b>	Cisco	<b>CIS</b>
Unshielded Twisted Pair CAT6	<b>UTP6</b>	HP	<b>HP</b>
Unshielded Twisted Pair CAT6a	<b>UTP6a</b>	Juniper	<b>JNP</b>
Foil Twisted Pair CAT5e	<b>UTP5e</b>	Dell	<b>DEL</b>
Foil Twisted Pair CAT6	<b>UTP6</b>		
Foil Twisted Pair CAT6a	<b>UTP6a</b>		

Example: **CSFP1.25UTP5e100CIS** – Copper SFP Transceiver 1.25Gbps UTP5e 100km Distance Cisco