

## TS-SFP-T-B

### 10/100/1000BASE-T Copper SFP Transceiver

#### Features

- Support 10/100/1000BASE-T Operation in Host Systems
- For 100m Reach over Cat 5 UTP Cable
- Hot-Pluggable SFP Footprint
- Fully Metallic Enclosure for Low EMI
- Low Power Dissipation (1.05W Typical)
- Compact RJ-45 Connector Assembly
- Access to Physical Layer IC via 2-Wire Serial Bus
- Detailed Product Information in EEPROM
- Compliant with SFP MSA
- Compliant with IEEE Std 802.3-2002
- Operating case temperature range of 0°C to +70°C (Standard) or -40°C to +85°C (Industrial)



#### Applications

- LAN 10/100/1000Base-T
- Gigabit Ethernet over Cat 5 Cable
- Switch to Switch Interface
- Router/Server interface

#### Description

TONGSION's TS-SFP-T-B 10/100/1000BASE-T Copper Small Form Pluggable (SFP), which is based on the SFP Multi Source Agreement (MSA). It is compliant with the Gigabit Ethernet standard as specified in IEEE STD 802.3 and can fully satisfy the 10/100/1000BASE-T application.

#### Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C

**Recommended Operating Conditions**

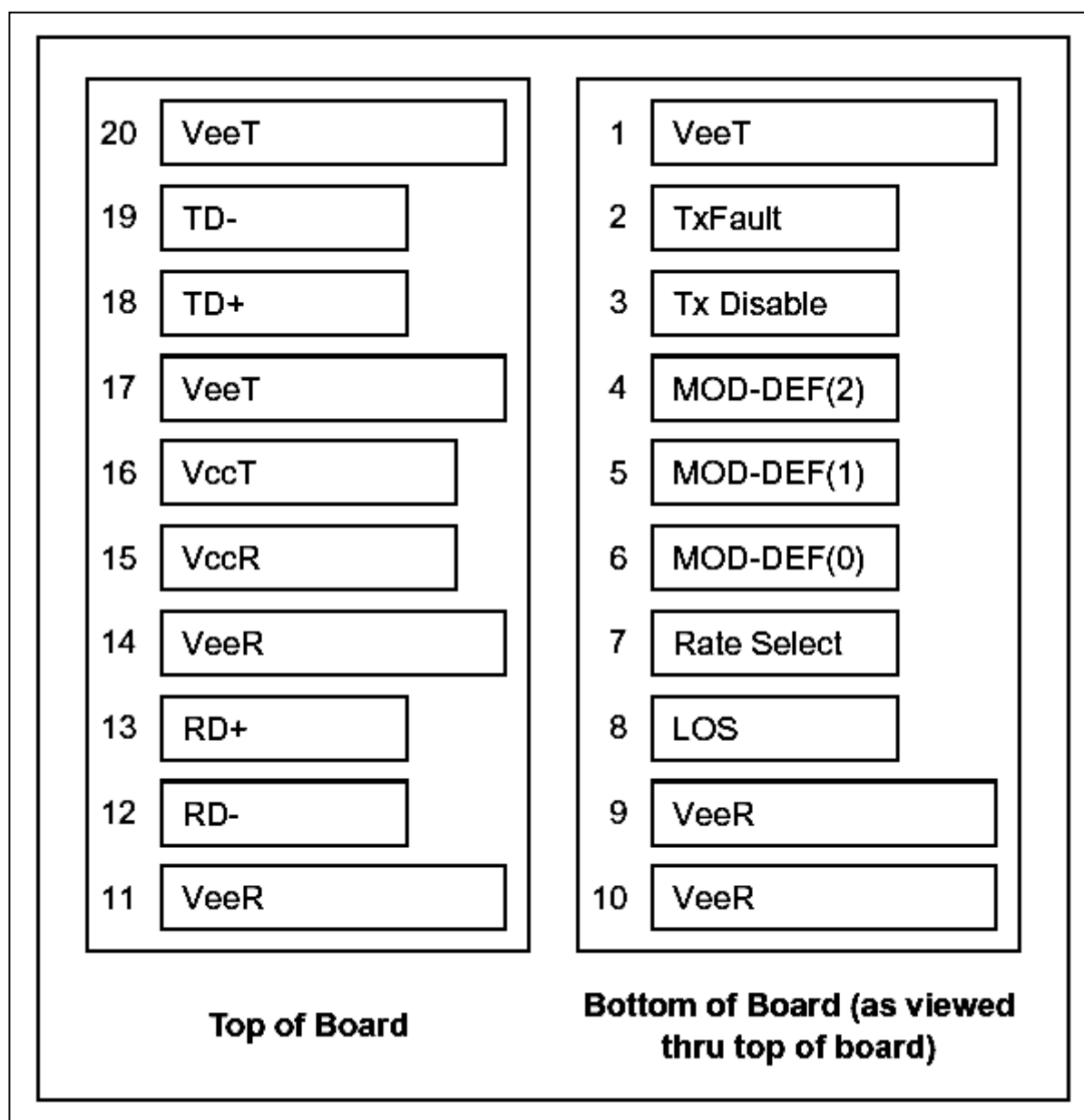
Parameter	Symbol	Min	Typical	Max	Unit	
Operating Case Temperature	Standard	Tc	0		+70	°C
	Industrial		-40		+85	°C
Supply Voltage	Vcc	3.14	3.3	3.46	V	

**Electrical Characteristics**

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
<b>+3.3 Volt Electrical Power Interface</b>						
Supply Current	Icc		300	350	mA	
Input Voltage	Vcc	3.13	3.3	3.47	V	
Surge Current	I <sub>surge</sub>			30	mA	
<b>Low-Speed Signals, Electronic Characteristics</b>						
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
<b>High-Speed Electrical Interface, Transmission Line-SFP</b>						
Line Frequency	fL		125		MHz	5-level encoding, per IEEE 802.3
Tx Output impedance	Z <sub>out</sub> , TX		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz
Rx Input Impedance	Z <sub>in</sub> , RX		100		Ohm	Differential, for all frequencies between 1MHz and 125MHz
<b>High-Speed Electrical Interface, Host-SFP</b>						
Single ended data input swing	V <sub>in</sub>	250		1200	mV	Single ended
Single ended data output swing	V <sub>out</sub>	350		800	mV	Single ended
Rise/Fall Time	T <sub>r</sub> , T <sub>f</sub>		175		psec	20%-80%
Tx Input Impedance	Z <sub>in</sub>		50		Ohm	Single ended
Rx Output Impedance	Z <sub>out</sub>		50		Ohm	Single ended

**General specifications**

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Data rate		10		1000	Mbps	
Distance				100	m	Category 5 UTP. BER<10 <sup>-12</sup>

**SFP Transceiver Electrical Pad Layout**


**Pin Descriptions**

Pin	Signal Name	Description	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Not used
3	TX Disable	Transmitter Disable	3	1
4	MOD_DEF(2)	Module Definition 2	3	2
5	MOD_DEF(1)	Module Definition 1	3	2
6	MOD_DEF(0)	Module Definition 0	3	2
7	Rate Select	Not Connect	3	
8	LOS	Loss of Signal	3	Not used
9	VeeR	Receiver ground	1	
10	VeeR	Receiver ground	1	
11	VeeR	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	
13	RD+	Received Data Out	3	
14	VeeR	Receiver ground	1	
15	VccR	Receiver Power Supply	2	
16	VccT	Transmitter Power Supply	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	
19	TD-	Inv. Transmit Data In	3	
20	VeeT	Transmitter Ground	1	

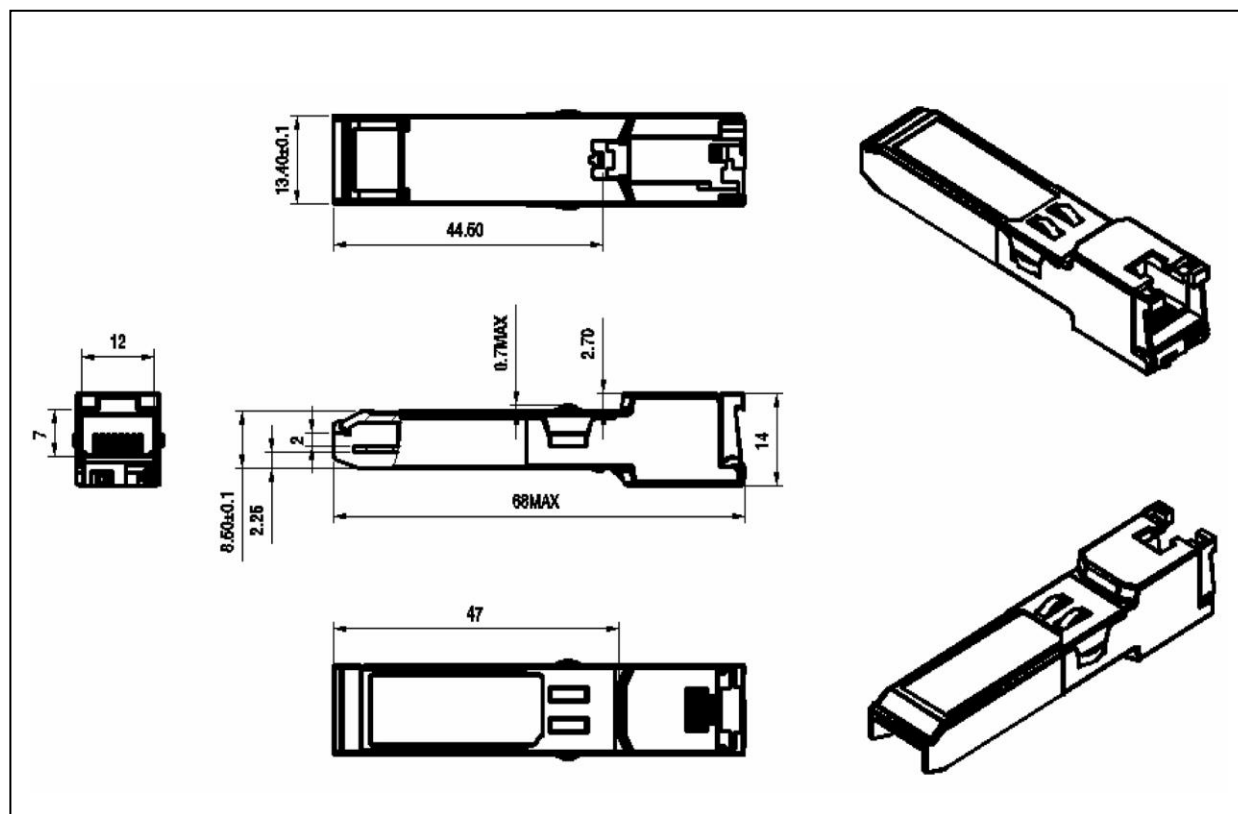
**Notes:**

1. PHY disabled on TDIS > 2.0V or open, enabled on TDIS < 0.8V, used to reset the module.
2. Should be pulled up with 4.7k ~ 10k Ohm on host board to a voltage between 2.0V and 3.6V. MOD\_DEF(0) pulls line low to indicate module is plugged in.

**Serial Communication Protocol**

TONGSION Copper SFPs support the 2-wire serial communication protocol outlined in the SFP MSA. These SFP use a 128 byte EEPROM with an address of A0H. The 10/100/1000BASE-T physical layer IC can also be accessed via the 2-wire serial bus at address ACH.

### Mechanical Dimensions



### Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>500 V) Isolation with the case
Electromagnetic Interference (EMI)	FCC Part 15 Class B	Compatible with standards
Component Recognition	UL and CUL	UL file E317337
Green Products	2002/95/EC 2005/618/EC	RoHS6

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**Ordering information**

Part Number	Product Description
TS-SFP-T-B	10/100/1000Mbps, RJ45, 100m, 0°C~+70°C
TS-SFP-T-BI	10/100/1000Mbps, RJ45, 100m, -40°C~+85°C

**References**

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.

**Important Notice**

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**Contact:**

[sales@tongsion.com](mailto:sales@tongsion.com)

<http://www.tongsion.com>