

Optosa's 1000BASE-T Copper SFP is a high performance, cost effective module compliant with the Gigabit Ethernet and 10/100/1000BASE-T standards as specified in IEEE 802. 3-2002 and IEEE 802.3ab, which supporting 10/100/1000Mbps data- rate up to 100 meters reach over unshielded twisted-pair category 5 cable. The SFP-1G-T supports 10/100/1000 Mbps full duplex data-links with 5-level Pulse Amplitude Modulation (PAM) signals. All four pairs in the cable are used with symbol rate at 250Mbps on each pair. SFP-1G-T provides standard serial ID information compliant with SFP MSA, which can be accessed with address of A0h via the 2-wire serial CMOS EEPROM protocol. The physical IC can also be accessed via 2-wire serial bus at address Ach.

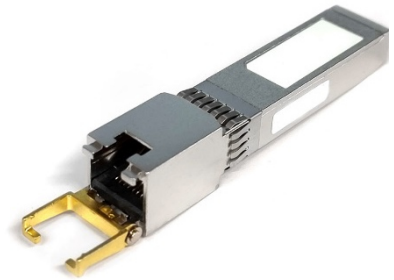
The SFP-T can be used for Cisco GLC-T, GLC-TE, Extreme 10070H, Aruba J8177D, Junier EX-SFP-1GE-TX and for many more OEMs like D-Link, H3C, Palo Alto, Meraki, Netgear, Arista.

RoHS Compliance

Optosa is fully committed to environment protection and sustainable development and has set in place a comprehensive program for removing polluting and hazardous substances from all of its products. The relevant evidence of RoHS compliance is held as part of our controlled documentation for each of our compliant products. RoHS compliance parts are available to order, please refer to the ordering information section for further details.

Product Features

- 1.25Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- 10/100/1000 BASE-T operation in host systems with SGMII interface
- Compliant with SFP MSA
- Compliant with IEEE Std 802.3TM-2002
- RoHS Compliant Products



Applications

- 1.25 Gigabit Ethernet over Cat 5 cable

Ordering Information

Part Number	Description
SFP-1G-T	1000BASE-T, SFP Copper RJ-45 Connector 100m using Cat 5 cable

Absolute Maximum Rating

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	°C	
Operating Case Temperature	TOP	0	70	°C	C-Temp

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
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	Referenced to GND
Surge Current	Isurge		30		mA	Hot plug above steady state current. See caution note

General Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Rate	BR	10		1,000	Mb/s	IEEE 802.3 compatible.
Cable Length	L			100	m	Category 5 UTP. BER <10-12

Notes:

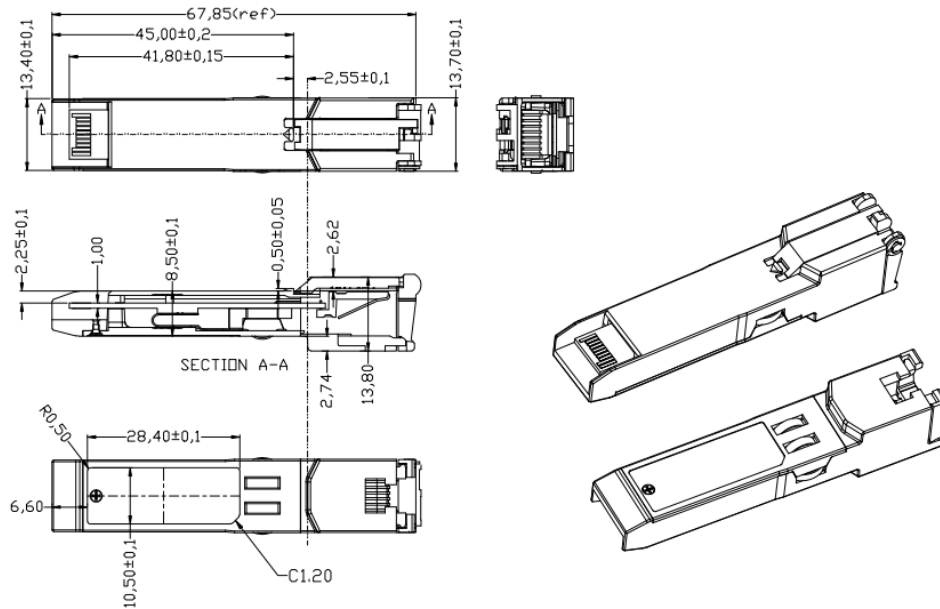
1. Clock tolerance is +/- 50 ppm.
2. Automatic crossover detection is enabled. External crossover cable is not required.
3. 10/100/1000 BASE-T operation requires the host system to have an SGMII interface with no clocks, With a SERDES that does not support SGMII, the module will operate at 1000BASE-T only.

High-Speed Electrical Signals

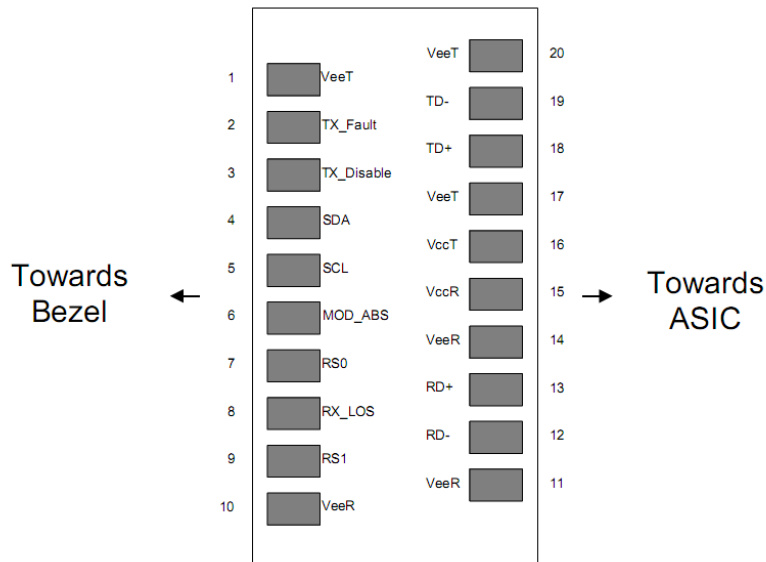
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Line Frequency	fL		125		MHz	5-level encoding, per IEEE 802.3
Tx Output Impedance	Zout,TX		100		Ohm	Differential
Rx Input Impedance	Zin,RX		100		Ohm	Differential
Single ended data input swing	Vinsing	250		1200	mV	Single ended
Single ended data output swing	Voutsing	350	100	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
Single ended data input swing	Vinsing	250		1200	mV	Single ended

Mechanical Dimensions

Units: nm



Pin Assignment and Description



Pin Assignment

Pin	Signal Name	Description	Plug Seq.	Notes
1	VEET	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	
3	TX DISABLE	Transmitter Disable	3	
4	SDA	SDA Serial Data Signal	3	

5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	
9	RS1	Not Connected	3	
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	

Note:

- TX Fault is not used and is always tied to ground through a 100 ohm resistor.
- 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 ASIC. This pin is pulled up within the module with a 4.7 KW 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

- Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7-10 KW resistor on the host board to a supply less than VCCT + 0.3 V or VCCR + 0.3 V.

Mod Def 0 is tied to ground through a 100 ohm resistor to indicate that the module is present.

Mod-Def 1 is clock line of two wire serial interface for optional serial ID

Mod-Def 2 is data line of two wire serial interface for optional serial ID

- RD-/+: These are the differential receiver outputs. They are ac coupled 100 ohm differential lines which should be terminated with 100 ohm differential at the user SerDes. The ac coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000 mV differential (185–1000 mV single ended) when properly terminated. These levels are compatible with CML and LVPECL voltage swings.

- VCCR and VCCT are the receiver and transmitter power supplies. They are defined as 3.3 V \pm 5% at the SFP connector pin. The maximum supply current is about 300mA and the associated in-rush current will typically be no more than 30 mA above steady state after 500 nanoseconds.

- TD-/+: These are the differential transmitter inputs. They are ac coupled differential lines with 100 W differential termination inside the module. The ac coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500–2400 mV (250–1200 mV single ended), though it is recommended that values between 500 and 1200 mV differential (250–00 mV single ended) be used for best EMI performance. These levels are compatible with CML and LVPECL voltage swings.