

## OS-SP12-TG series

### 10/100/1000BASE-T Copper SFP Transceiver RoHS6 Compliant

#### 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
- Compact RJ-45 connector assembly
- Detailed product information in EEPROM
- Operating Temperature
- Standard: 0°C ~+70°C
- Industrial:-40°C ~+85°C
- Compliant with MSA SFP Specification
- Compliant with IEEE Std 802.3-2002



#### Applications

- LAN 10/100/1000Base-T
- Gigabit Ethernet over Cat5 Cable
- Router/Server Interface
- Switch to Switch Interface

#### Order Information

Part No.	Data Rate	Link Type	Distance	Connector	Temp.
OS-SP12-TG	10/100/1000Mbps	Cat5	100M	RJ45	Standard
OS-SP012-TGI	10/100/1000Mbps	Cat5	100M	RJ45	Industrial

#### Product Description

OS-SP12-TG/TGI 10/100/1000BASE-T Copper small form factor pluggable module are 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.

#### Regulatory Compliance

Feature	standard	Performance
TUV	R50135086	EN 60950-1:2006+A11+A1+A12 EN 60825-1:2007 EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1 CSA C22.2 No. 60950-1-07
EMC	CE	EN 55022:2010 EN 55024:2010

CB JPTUV	049251	IEC 60825-1 IEC 60950-1
FCC	WTF14F0514437E	47 CFR PART 15 OCT., 2013
FDA 1331340	000	CDRH 1040.10
ROHS	RHS01G006464	2011/65/EU

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max	Unit
Storage Temperature	TS	-40	+85	°C
Supply Voltage	VCC	-0.5	4.0	V

### Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	TC	0		+70	°C
		-40		+85	
Power Supply Voltage	Vcc	3.15	3.3	3.45	V

### Electrical Characteristics

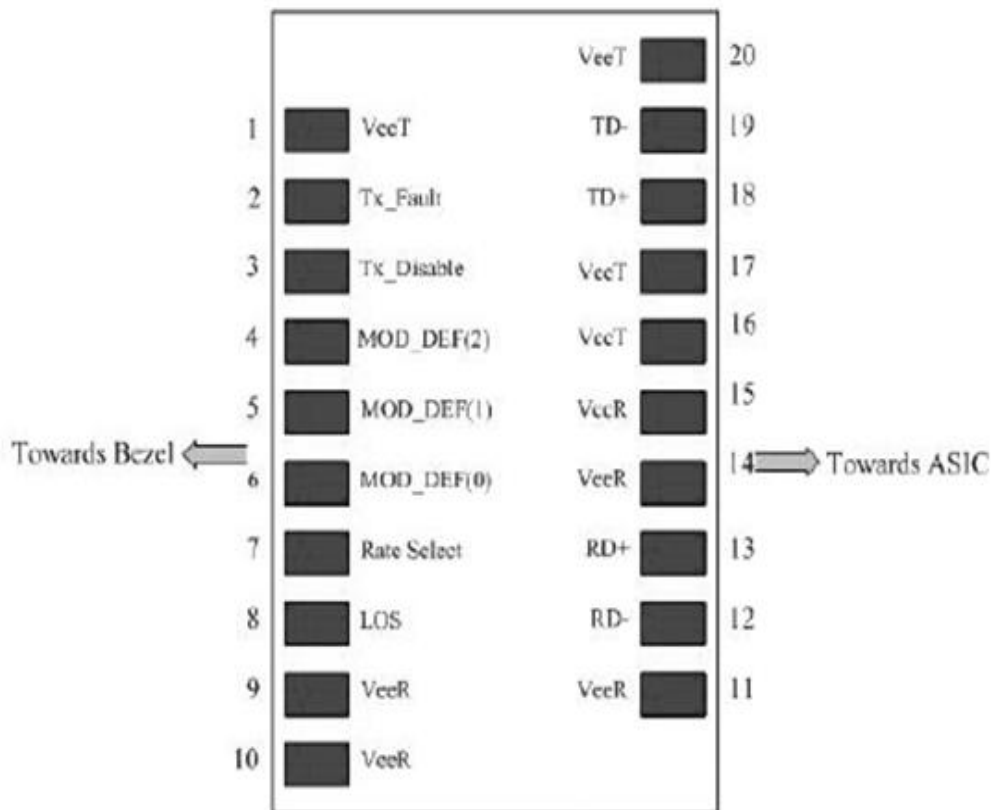
Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
+3.3 Volt Electrical Power Interface						
Supply Current	Icc		300	350	mA	
Input Voltage	Vcc	3.13	3.3	3.47	V	
Surge Current	Isurge			30	mA	
Low-Speed Signals, Electronic Characteristics						
SFP Output LOW	VOL	0		0.5	V	4.7k to 10k pull-up to host_Vcc, measured 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, Transmission Line-SFP*note1						
Line Baud Rates	fL		125		MHz	5level encoding per IEEE802.3
TX Output impedance	Zout, TX		100		Ohm	Differential, for all frequencies between 1MHz and 1250MHz
RX Input Impedance	Zin, RX		100		Ohm	Differential, for all frequencies between 1MHz and 1250MHz
High-Speed Electrical Interface, Host-SFP						
Single ended data input swing	Vin	250		1200	mV	Single ended

Single ended data output swing	Vout	350		800	mV	Single ended
Rise/Fall Time	Tr, Tf		175		nsec	20%-80%
TX Input Impedance	Zin		50		Ohm	Single ended
RX Output Impedance	Zout		50		Ohm	Single ended

## General specifications

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Distance				100	m	Category 5 UTP. BER <10-12
Data Rate		10		1000	Mbps	

## SFP Transceiver Electrical Pad Layout



Pin Num.	Name	Function	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-DEF2	Module Definition 2	3	2)
5	MOD-DEF1	Module Definition 1	3	2)
6	MOD-DEF0	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	

## Pin Function Definitions

15	VccR	Receiver Power	2	
16	VccT	Transmitter Power	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 2.0 V and 3.6 V. MOD\_DEF(0) pulls line low to indicate module is plugged in.

### EEPROM Serial ID Memory Contents

Accessing Serial ID Memory uses the 2 wire address 1010000X(A0H). Memory Contents of serial ID are shown in Table 1.

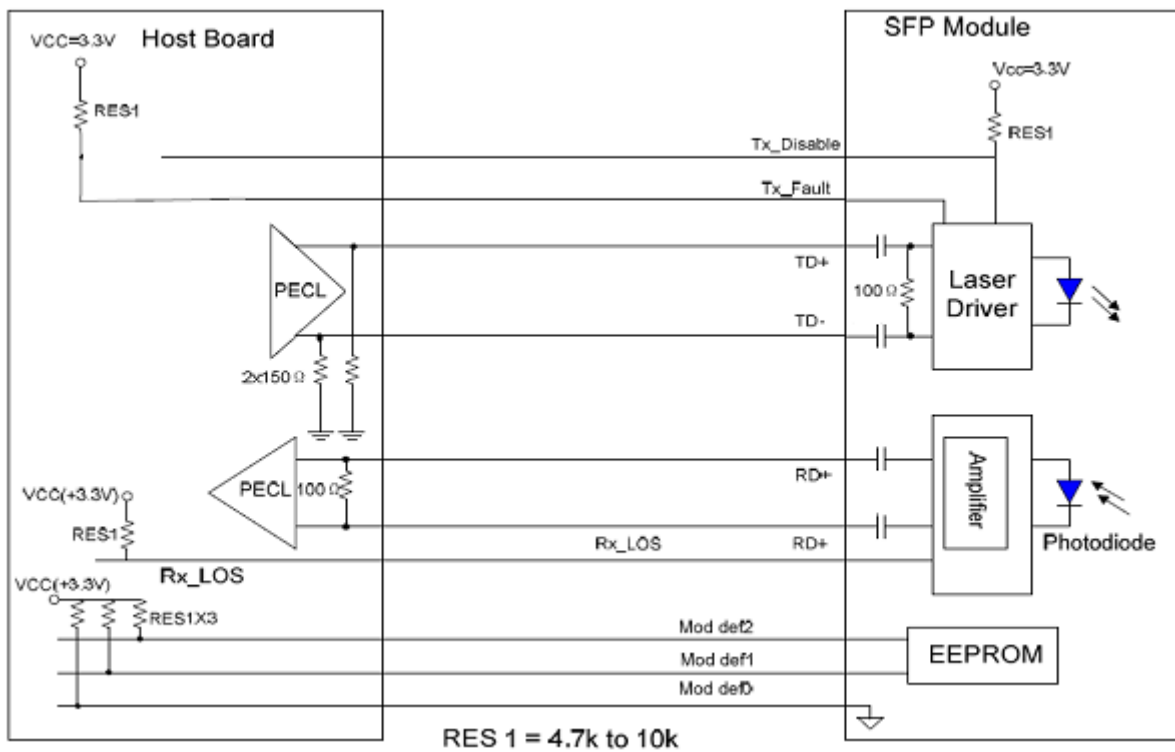
Table 1 Serial ID Memory Contents

Addr.	Size (Bytes)	Name of Field	Hex	Description
<b>BASE ID FIELDS</b>				
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	SFP function is defined by serial ID only
2	1	Connector	22	RJ-45
3-10	8	Transceiver	00 00 00 08 00 00 00 00	Transmitter Code
11	1	Encoding	01	
12	1	BR, Nominal	0D	
13	1	Reserved	00	
14	1	Length (9μm) km		Transceiver Transmit Distance
15	1	Length(9μm) 100m		
16	1	Length (50μm) 10m		
17	1	Length(62.5μm)10m		
18	1	Length (Copper)	64	100m
19	1	Reserved	00	
20-35	16	Vendor name	XX XX XX XX XX XX (note2)XX XX 20 20 20 20 20 20 20 20	Ousent(ASCII)
36	1	Reserved	00	
37-39	3	Vendor OUI	XX XX XX(note1)	
40-55	16	Vendor PN		Transceiver part number
56-59	4	Vendor rev	XX XX XX XX(note1)	
60-61	2	Wavelength	00	
62	1	Reserved	00	
63	1	CC_BASE	Check Sum (Variable)	Check Code for Base ID Fields
<b>EXTENDED ID FIELDS</b>				
64-65	2	Options	00 00	TX_DISABLE, TX_FAULT and Loss of Signal implemented
66	1	BR,max	00	

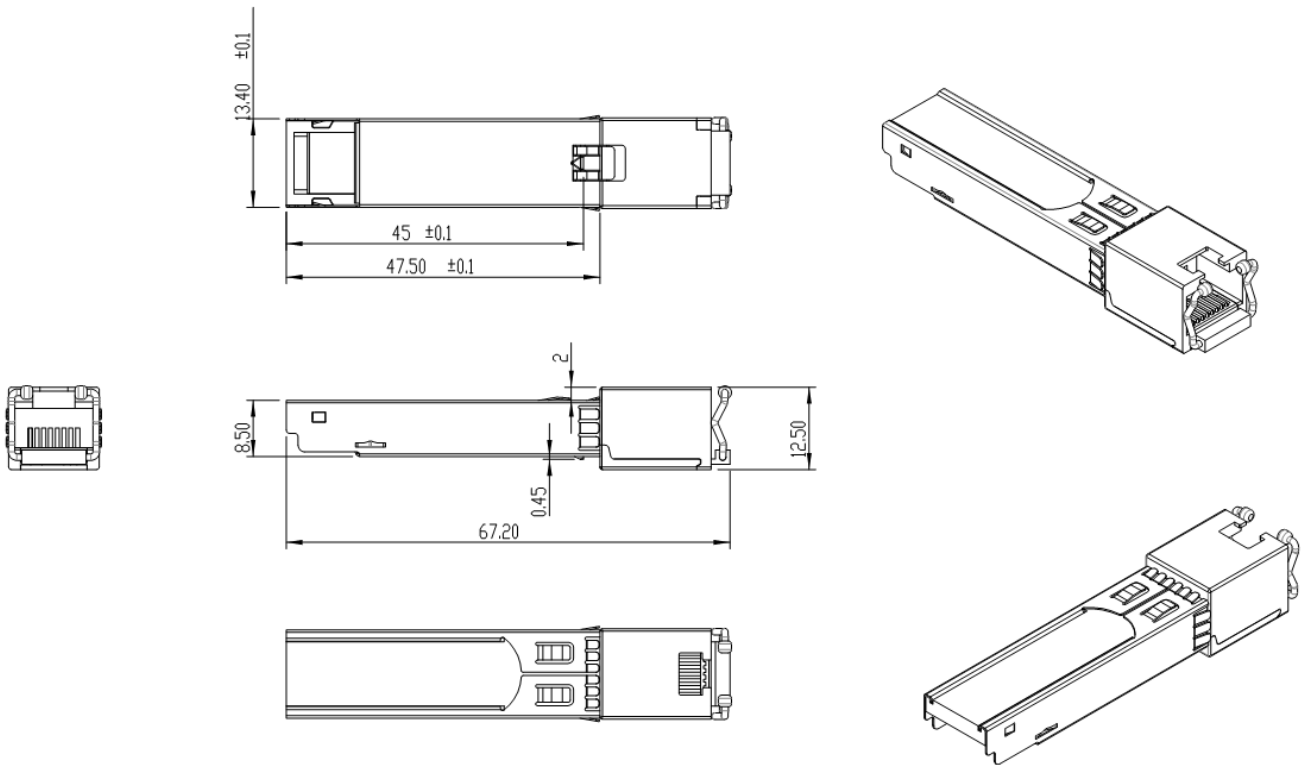
67	1	BR,min	00	
68-83	16	Vendor SN	XX XX XX XX XX XX XX XX 20 20 20 20 20 20 20 20(note1)	Serial Number of transceiver (ASCII). For Example "B000822"
84-91	8	Date code	XX XX XX XX XX XX (note1)	Manufactory date code. For Example "080405"
92	1	Diagnostic Monitoring Type	XX(note1)	Digital Diagnostic Monitoring Implemented
93	1	Enhanced Options	XX(note1)	Optional Flags
94	1	SFF_8472 Compliance	XX(note1)	01 for Diagnostics (Rev9.3SFF-8472).
95	1	CC_EXT	Check Sum (Variable)	Check sum for Extended ID Field.
VENDOR SPECIFIC ID FIELDS				
96-127	32	Vendor Specific	Read only	Depends on customer information
128-255	128	Reserved	Read only	

Note1: The "xx" byte should be filled in according to practical case. For more information, please refer to the related document of SFP Multi-Source Agreement(MSA).

### Recommend Circuit Schematic(待确认中)



### Mechanical Specifications



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