ModuleTek

DATA SHEET

MODULETEK: SFP-GE-T-C-D12

1000BASE-T SFP (Small Form Pluggable) Copper Transceiver
1.25 Gigabit Ethernet

Overview

ModuleTek's SFP-GE-T is a small, hot-swappable RJ45 electrical port module, compliant with Gigabit Ethernet standards and SFP Multi-Source Agreement (MSA) standards, supporting 1000M transmission rate. CAT5 class network cable transmission distance of up to 100 meters, good electromagnetic compatibility, compatible with various brands of hosts, widely used in data centers and enterprise networks. Access to the PHY chip registers is via the I2C interface. It supports 1000BASE-X auto-negotiation, supports the LINK status via the RX_LOS pin. Meet the certification requirements such as RoHS.

Product Features

- Up to 1.25Gb/s bi-directional data links
- Compliant with IEEE 802.3
- Compliant with SFP MSA
- Hot-pluggable SFP footprint
- RJ-45 connector
- Auto-sense MDI/MDIX
- Single power supply 3.3V
- RoHS Compliant
- Operating temperature range (Case Temperature):
  Commercial Level：0°C to 70°C

Applications

1.25 Gigabit Ethernet

Ordering Information

Part Number	Product ID	Description	Operating Temperature Range
SFP-GE-T-C-D12	M225105	1000BASE-T SFP Copper RJ-45 Connector 100m Auto Negotiation default mode	0°C to 70°C

Notes:
1. The product with write protection
2. Module based on Marvell 88E1112 development
3. Operating Temperature Range is case temperature
4. The product enables RX_LOS function, which can be turned on or off according to customer needs
5. The product does not implement receiver suppression
6. Product ID is the short order number of our product standard model

For More Information Or To order The Above Products, Please Contact:

Email: sales@moduletek.com

ModuleTek Web: www.moduletek.com

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Cable Length	CL			100	m	2
Bit Error Rate	BER			10^{-12}		
Storage Temperature	T_{STO}	-40		85	°C	3
Supply Current	I_{CC}		370	420	mA	
Input Voltage	V_{CC}	3.14	3.3	3.46	V	
Maximum Voltage	V_{MAX}			4	V	
Power Consumption	P		1.22	1.40	W	

Notes:
1. Category 5 UTP
2. Ambient temperature

High Speed Electrical Interface Host-Side

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Differential Data Input Swing	V_{IN_PP}	200		2400	mV	
Differential Data Output Swing	V_{OUT_PP}	700	750	1000	mV	
Rise Time /Fall Time(20%-80%)	t_r/t_f		175		ps	
Tx Input Impedance	Z_{IN}		100		ohm	1
Rx Output Impedance	Z_{OUT}		100		ohm	1

High Speed Electrical Interface Transmission Line-Side

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Line Frequency	F_L		125		MHz	1
Tx Output Impedance Differential	Z_{OUT_TX}		100		Ohm	2
Rx Input Impedance Differential	Z_{IN_RX}		100		Ohm	2

Notes:
1. 5-level encoding
2. For all frequencies between 1MHz and 125MHz

Low Speed Electrical Signal

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
SFP Output Low	V_{OL}	0		0.5	V	1
SFP Output High	V_{OH}	Host_V_{CC}-0.5		Host_V_{CC}+0.3	V	1
SFP Input Low	V_{IL}	0		0.8	V	1
SFP Input High	V_{IH}	2		V_{CC}+0.3	V	1

Memory Map

			Address A0		
IIC Addr	**Size**	**Name**	**Description**	**Values (HEX)**	**Remarks**
0	1	Identifier	SFP or SFP+	03	
1	1	Ext. Identifier	GBIC/SFP function is defined by two-wire interface ID only	04	
2	1	Connector	RJ45 (Registered Jack)	22	
3-10	8	Transceiver	1000BASE-T	00 00 00 08 00 00 00 00	
11	1	Encoding	8B/10B	01	
12	1	BR, Nominal	Nominal signaling rate, units of 100 MBd	0D	
13	1	Rate Identifier	Type of rate select functionality	00	
14	1	Length(SMF,km)	This product does not support this function	00	
15	1	Length (SMF)	This product does not support this function	00	
16	1	Length (50um)	This product does not support this function	00	
17	1	Length (62.5um)	This product does not support this function	00	
18	1	Length (OM4 or copper cable)	copper or direct attach cable, units of m	64	
19	1	Length (OM3)	This product does not support this function	00	
20-35	16	Vendor name	Vendor name	Defined by vendor	
36	1	Transceiver	Code for electronic or optical compatibility	00	
37-39	3	Vendor OUI	SFP vendor IEEE company ID	Defined by vendor	
40-55	16	Vendor PN	Part number in Order information	Defined by vendor	
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)	Defined by vendor	
60-61	2	Wavelength	Laser wavelength (Passive/Active Cable Specification Compliance)	00 00	

IIC Addr	Size	Name	Description	Values (HEX)	Remarks
62	1	Fibre Channel Speed 2	Transceiver's Fibre Channel speed capabilities	00	
63	1	CC BASE	Check code for Base ID Fields (addresses 0 to 62)	Variable	
64-65	2	Options	Indicates which optional transceiver signals are implemented	00 00	
66	1	BR, max	Upper bit rate margin	00	
67	1	BR, min	Lower bit rate margin	00	
68-83	16	Vendor SN	Serial number provided by vendor	Defined by vendor	
84-91	8	Date code	Year,Month,Day	Defined by vendor	
92	1	Diagnostic Monitoring Type	This product does not support this function	00	
93	1	Enhanced Options	This product does not support this function	00	
94	1	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with.	00	
95	1	CC EXT	Check code for the Extended ID Fields (addresses 64 to 94)	Variable	
96-127	32	Vendor Specific	Vendor Specific EEPROM	Defined by vendor	
128-255	128	Vendor Specific	Vendor Specific EEPROM	Defined by vendor	
Address A2 Low					
IIC Addr	**Size**	**Name**	**Description**	**Values (HEX)**	**Remarks**
0-94	95	Reserved	Reserved	FF	
95	1	Checksum	0-94 Byte Checksum	A1	
96-121	26	Reserved	Reserved	FF	
122	1	Security Level	Security Level： 00=Normal Mode 01=User Mode (Level 1) 02=Factory Mode (Level 2)	Variable	
123-126	4	Password Entry	Password Entry Area	00 00 00 00	
127	1	Table Selection	Page Select Byte	Variable	
Address A2 Page 00h/01h					
IIC Addr	**Size**	**Name**	**Description**	**Values (HEX)**	**Remarks**

| 128-255	128	Upper Memory Map	User Code Area	Defined by vendor	
Address A2 Page F0h					
IIC Addr	**Size**	**Name**	**Description**	**Values (HEX)**	**Remarks**
128-131	4	Password1 Long	Level 1 Password	00 00 10 11	
132	1	Working Mode	00=AUTO; 01=SGMII; 02=FULL;	00	
133	1	Always Enable Los	00=Disable; 01=Enable;	01	
134	1	Disable A0 WP	00=A0 With Write Protection；01=A0 Without Write Protection	00	
135	1	Disable A2T00T01 WP	00=A2 T00T01 With Write Protection；01=A2 T00T01 Without Write Protection	00	

Notes:
1.Password entry area default 00000000, read out as last written value
2.Module with write protection, enter the security level 1 writeable

User Mode

| Level 1 Default Password	Password Can Be Changed	Permissions
00 00 10 11	YES(A2 TF0)	1. Read And Write A0
		2. Read And Write A2 T00/T01
		3. Read And Write A2 TF0

Dimensions

Weight: 25g
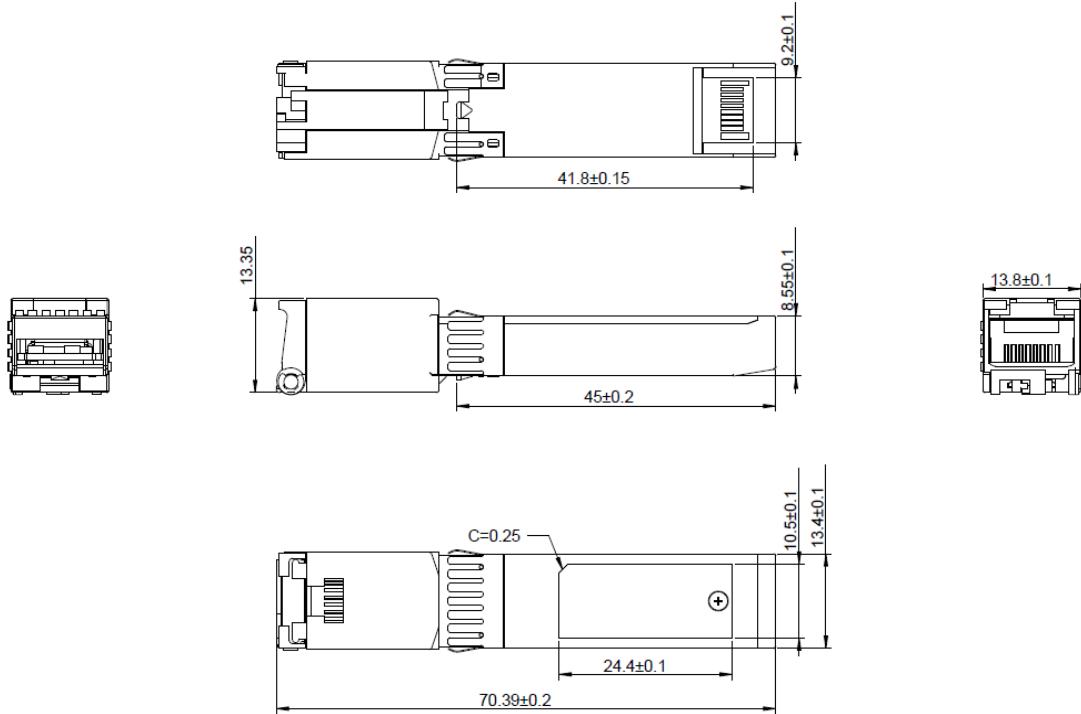
ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED
UNIT: mm

Electrical Pad Layout

Top View of Board

11 →	V_{EER}
12 →	RD-
13 →	RD+
14 →	V_{EER}
15 →	V_{CCR}
16 →	V_{CCT}
17 →	V_{EET}
18 →	TD+
19 →	TD-
20 →	V_{EET}

Bottom View of Board

1 →	V_{EET}
2 →	TX_FAULT
3 →	TX_DISABLE
4 →	SDA
5 →	SCL
6 →	MOD_ABS
7 →	RS0
8 →	LOS
9 →	RS1
10 →	V_{EER}

Top
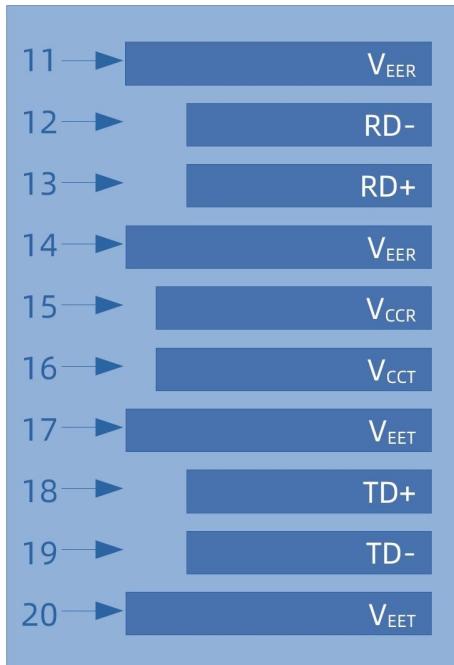
Bottom
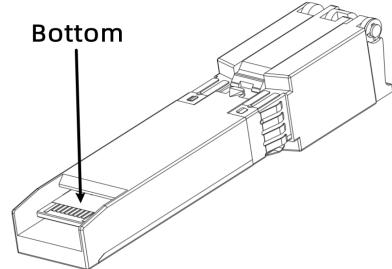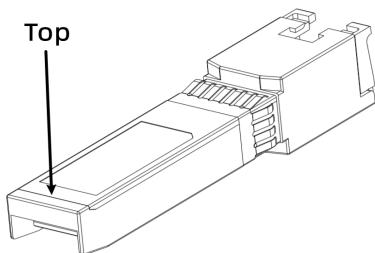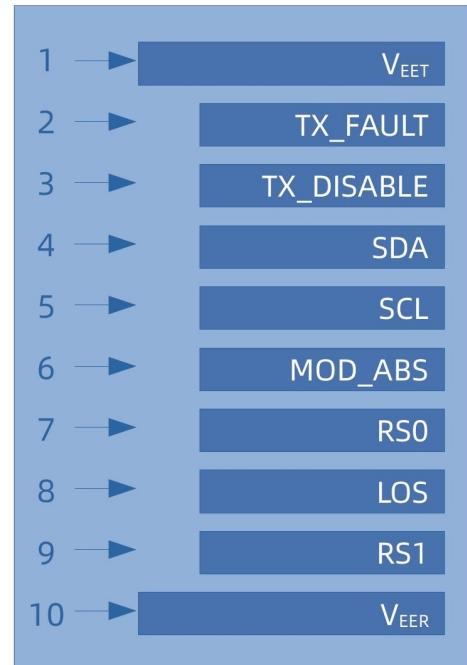
Pin Assignment

PIN #	Symbol	Description	Remarks
1	V_{EET}	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter Fault. Not supported	
3	TX_DISABLE	Transmitter Disable. PHY disabled on high or open	
4	MOD_DEF(2)	Module Definition 2. Data line for serial ID	
5	MOD_DEF(1)	Module Definition 1. Clock line for serial ID	
6	MOD_DEF(0)	Module Definition 0. Grounded within the module	
7	Rate Select	No connection required	
8	LOS	Loss of Signal	
9	V_{EER}	Receiver ground (common with transmitter ground)	1
10	V_{EER}	Receiver ground (common with transmitter ground)	1
11	V_{EER}	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	V_{EER}	Receiver ground (common with transmitter ground)	1
15	V_{CCR}	Receiver power supply	
16	V_{CCT}	Transmitter power supply	
17	V_{EET}	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	V_{EET}	Transmitter ground (common with receiver ground)	1

Notes:
1. Circuit ground is isolated from case

References

1. IEEE standard 802.3