

DATA SHEET

MODULETEK: SFP-FE-T-x-D12

100BASE-T SFP (Small Form Pluggable) Copper Transceiver

Overview

ModuleTek's SFP-FE-T copper SFP transceivers are based on Fast Ethernet IEEE 802.3 standard and 100BASE-T standard and provide a quick and reliable interface for the FE application. In addition, they comply with the Small Form Factor Pluggable Multi-Source Agreement (MSA)

Product Features

- Up to 125Mb/s bi-directional data links
- Compliant with SFP MSA
- Hot-pluggable SFP footprint
- Support 100BASE-T full duplex default operating mode
- Support 100BASE-T operation in host systems
- Auto-sense MDI/MDIX
- Single power supply 3.3V
- RoHS Compliant



Applications

- 125 Mb/s Fast Ethernet

Ordering Information

Part Number	Product ID	Description	Operating Temperature Range
SFP-FE-T-C-D12	M294402	100BASE-T SFP Copper RJ-45 Connector 100m, commercial temperature	0°C to 70°C
SFP-FE-T-I-D12	M108902	100BASE-T SFP Copper RJ-45 Connector 100m, industrial temperature	-40°C to 85°C
Notes: 1.The product with write protection. 2.Product ID is the short order number of our product standard model.			
For More Information: ModuleTek Limited Web: www.moduletek.com Email: sales@moduletek.com			

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR		100		Mb/sec	
Cable Length	CL			100	m	1
Bit Error Rate	BER			10 ⁻¹²		
Operating Temperature	T _C	0		70	°C	2
		-40		85	°C	3
Storage Temperature	T _{STO}	-40		85	°C	4
Supply Current	I _{CC}		190	300	mA	5
Input Voltage	V _{CC}	3.14	3.30	3.46	V	6
Maximum Voltage	V _{MAX}			4	V	5
Surge Current	V _{surge}			30	V	7

Notes:

- Category 5 UTP
- Case temperature, commercial temperature
- Case temperature, industrial temperature
- Ambient temperature
- For electrical power interface
- Referenced to GND. For electrical power interface
- Hot Plug above steady state current. For electrical power interface

I2C 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	Code for electronic or optical compatibility	00 00 00 20 00 00 00 00	
11	1	Encoding	4B/5B	02	
12	1	BR, Nominal	Nominal Bit Rate 100Mb/s	01	
13	1	Rate Identifier	Type of rate select functionality	00	
14	1	Length(SMF,km)	Link length supported for single mode fiber, units of km	00	
15	1	Length (SMF)	Link length supported for single mode fiber, units of 100 m	00	
16	1	Length (50um)	Link length supported for 50 um OM2 fiber, units of 10 m	00	
17	1	Length (62.5um)	Link length supported for 62.5 um OM1 fiber, units of 10 m	00	
18	1	Length (OM4 or copper cable)	100m	64	
19	1	Length (OM3)	Link length supported for 50 um OM3 fiber, units of 10 m	00	
20-35	16	Vendor name	MODULETEK	4D 4F 44 55 4C 45 54 45 4B 20 20 20 20 20 20 20	
36	1	Transceiver	Code for electronic or optical compatibility	00	
37-39	3	Vendor OUI	SFP vendor IEEE company ID	00 00 00	
40-55	16	Vendor PN	Part number in Order information	-	
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)	-	

60-61	2	Wavelength	Laser wavelength (Passive/Active Cable Specification Compliance)	00 00	
62	1	Unallocated		00	
63	1	CC BASE	Check code for Base ID Fields (addresses 0 to 62)	-	
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	Programmed by Factory	
84-91	8	Date code	Year,Month,Day	Programmed by Factory	
92	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver	00	
93	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver	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)	-	
96-127	32	Vendor Specific	Vendor Specific EEPROM	-	
128-255	128	Vendor Specific	Vendor Specific EEPROM	-	
Address A2 Low (Commercial Temperature Version)					
IIC Addr	Size	Name	Description	Values (HEX)	Remarks
0-1	2	Temp High Alarm	75°C	4B 00	
2-3	2	Temp Low Alarm	-5°C	FB 00	
4-5	2	Temp High Warning	70°C	46 00	
6-7	2	Temp Low Warning	0°C	00 00	
8-9	2	Vcc High Alarm	3.63V	8D CC	
10-11	2	Vcc Low Alarm	2.97V	74 04	
12-13	2	Vcc High Warning	3.46V	87 28	

14-15	2	Vcc Low Warning	3.13V	7A 44	
16-17	2	Bias High Alarm	Bias High Alarm	00 00	
18-19	2	Bias Low Alarm	Bias Low Alarm	00 00	
20-21	2	Bias High Warning	Bias High Warning	00 00	
22-23	2	Bias Low Warning	Bias Low Warning	00 00	
24-25	2	TxPower High Alarm	TxPower High Alarm	00 00	
26-27	2	TxPower Low Alarm	TxPower Low Alarm	00 00	
28-29	2	TxPower High Warning	TxPower High Warning	00 00	
30-31	2	TxPower Low Warning	TxPower Low Warning	00 00	
32-33	2	RxPower High Alarm	RxPower High Alarm	00 00	
34-35	2	RxPower Low Alarm	RxPower Low Alarm	00 00	
36-37	2	RxPower High Warning	RxPower High Warning	00 00	
38-39	2	RxPower Low Warning	RxPower Low Warning	00 00	
40-55	16	Reserved	Reserved	00	
56-59	4	Ext RxPwr 4	Ext RxPwr 4	00 00 00 00	
60-63	4	Ext RxPwr 3	Ext RxPwr 3	00 00 00 00	
64-67	4	Ext RxPwr 2	Ext RxPwr 2	00 00 00 00	
68-71	4	Ext RxPwr 1	Ext RxPwr 1	00 00 00 00	
72-75	4	Ext RxPwr 0	Ext RxPwr 0	00 00 00 00	
76-77	2	Ext Bias Slope	Ext Bias Slope	00 00	
78-79	2	Ext Bias Offset	Ext Bias Offset	00 00	
80-81	2	Ext TxPower Slope	Ext TxPower Slope	00 00	
82-83	2	Ext TxPower Offset	Ext TxPower Offset	00 00	
84-85	2	Ext Temp Slope	Ext Temp Slope	01 00	
86-87	2	Ext Temp Offset	Ext Temp Offset	00 00	
88-89	2	Ext Vcc Slope	Ext Vcc Slope	01 00	
90-91	2	Ext Vcc Offset	Ext Vcc Offset	00 00	
92-94	3	Reserved	Reserved	00	
95	1	Checksum	0-94 Byte Checksum	30	
96-97	2	Temperature	Temperature	-	

98-99	2	Vcc	Vcc	-	
100-101	2	Bias Current	Bias Current	00 00	
102-103	2	Tx Power	Tx Power	00 00	
104-105	2	Rx Power	Rx Power	00 00	
106-109	4	Reserved	Reserved	00 00 00 00	
110	1	Optional Status/Control Bits	02		
111	1	Reserved	Reserved	00	
112-113	2	Alarm Flags	Alarm Flags	00 00	
114-115	2	Reserved	Reserved	00 00	
116-117	2	Warning Flags	Warning Flags	00 00	
118-121	4	Reserved	Reserved	00 00 00 00	
122	1	Security Level	Security Level: 00=Normal Mode; 01=User Mode (Level 1); 02=Factory Mode (Level 2);	00	
123-126	4	Password Entry	Password Entry Area	00 00 00 00	
127	1	Table Selection	Page Select Byte	00	
Address A2 Low (Industrial Temperature Version)					
IIC Addr	Size	Name	Description	Values (HEX)	Remarks
0-1	2	Temp High Alarm	90°C	5A 00	
2-3	2	Temp Low Alarm	-45°C	D3 00	
4-5	2	Temp High Warning	85°C	55 00	
6-7	2	Temp Low Warning	-40°C	D8 00	
8-9	2	Vcc High Alarm	3.63V	8D CC	
10-11	2	Vcc Low Alarm	2.97V	74 04	
12-13	2	Vcc High Warning	3.46V	87 28	
14-15	2	Vcc Low Warning	3.13V	7A 44	
16-17	2	Bias High Alarm	Bias High Alarm	00 00	
18-19	2	Bias Low Alarm	Bias Low Alarm	00 00	
20-21	2	Bias High Warning	Bias High Warning	00 00	
22-23	2	Bias Low Warning	Bias Low Warning	00 00	
24-25	2	TxPower High Alarm	TxPower High Alarm	00 00	
26-27	2	TxPower Low Alarm	TxPower Low Alarm	00 00	

28-29	2	TxPower High Warning	TxPower High Warning	00 00	
30-31	2	TxPower Low Warning	TxPower Low Warning	00 00	
32-33	2	RxPower High Alarm	RxPower High Alarm	00 00	
34-35	2	RxPower Low Alarm	RxPower Low Alarm	00 00	
36-37	2	RxPower High Warning	RxPower High Warning	00 00	
38-39	2	RxPower Low Warning	RxPower Low Warning	00 00	
40-55	16	Reserved	Reserved	00	
56-59	4	Ext RxPwr 4	Ext RxPwr 4	00 00 00 00	
60-63	4	Ext RxPwr 3	Ext RxPwr 3	00 00 00 00	
64-67	4	Ext RxPwr 2	Ext RxPwr 2	00 00 00 00	
68-71	4	Ext RxPwr 1	Ext RxPwr 1	00 00 00 00	
72-75	4	Ext RxPwr 0	Ext RxPwr 0	00 00 00 00	
76-77	2	Ext Bias Slope	Ext Bias Slope	00 00	
78-79	2	Ext Bias Offset	Ext Bias Offset	00 00	
80-81	2	Ext TxPower Slope	Ext TxPower Slope	00 00	
82-83	2	Ext TxPower Offset	Ext TxPower Offset	00 00	
84-85	2	Ext Temp Slope	Ext Temp Slope	01 00	
86-87	2	Ext Temp Offset	Ext Temp Offset	00 00	
88-89	2	Ext Vcc Slope	Ext Vcc Slope	01 00	
90-91	2	Ext Vcc Offset	Ext Vcc Offset	00 00	
92-94	3	Reserved	Reserved	00	
95	1	Checksum	0-94 Byte Checksum	30	
96-97	2	Temperature	Temperature	-	
98-99	2	Vcc	Vcc	-	
100-101	2	Bias Current	Bias Current	00 00	
102-103	2	Tx Power	Tx Power	00 00	
104-105	2	Rx Power	Rx Power	00 00	
106-109	4	Reserved	Reserved	00 00 00 00	
110	1	Optional Status/Control Bits	02		
111	1	Reserved	Reserved	00	
112-113	2	Alarm Flags	Alarm Flags	00 00	

114-115	2	Reserved	Reserved	00 00	
116-117	2	Warning Flags	Warning Flags	00 00	
118-121	4	Reserved	Reserved	00 00 00 00	
122	1	Security Level	Security Level : 00=Normal Mode ; 01=User Mode (Level 1) ; 02=Factory Mode (Level 2) ;	00	
123-126	4	Password Entry	Password Entry Area	00 00 00 00	
127	1	Table Selection	Page Select Byte	00	
Address A2 Page 00h					
IIC Addr	Size	Name	Description	Values (HEX)	Remarks
128-255	128	Upper Memory Map	User Code Area	-	
Address A2 Page 8Ah					
IIC Addr	Size	Name	Description	Values (HEX)	Remarks
128-131	4	Firmware Version Number[4]	Firmware Version Number	-	
132-135	4	Total Running Time In Second	Total Running Time In Second	-	
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	Disable A0 WP	00=A0 With Write Protection ; 01=A0 Without Write Protection	00	
133	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

User Mode

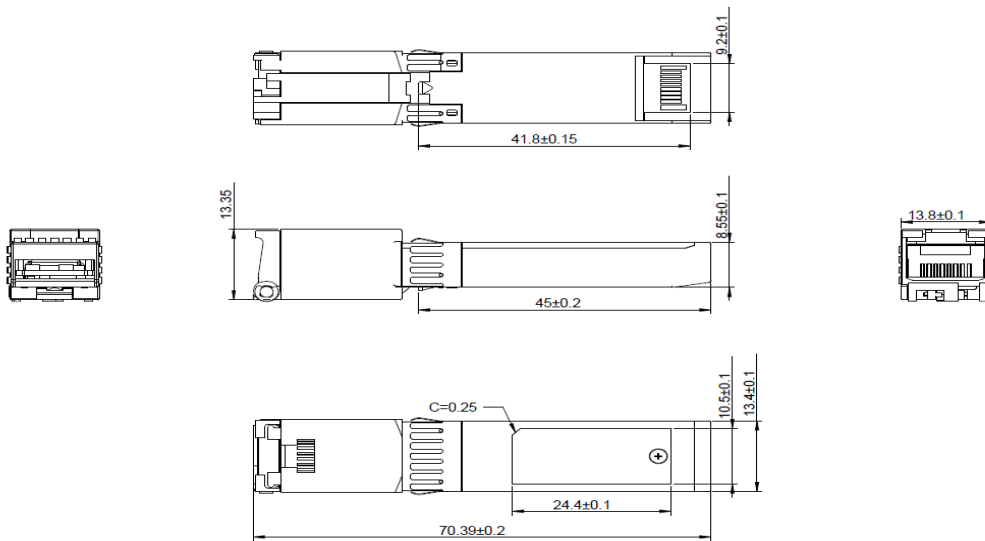
Level 1 Default Password	Password Can Be Changed	Permissions
00 00 10 11	YES(A2 TF0)	1、 Read And Write A0、 A2 T00/T01
		2、 Read A2 T8A
		3、 Read And Write A2 TF0

Notes:

1.detail in I2C memory map

Dimensions

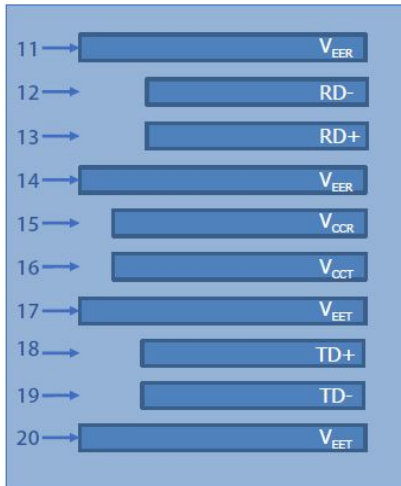
Weight: 25.0g



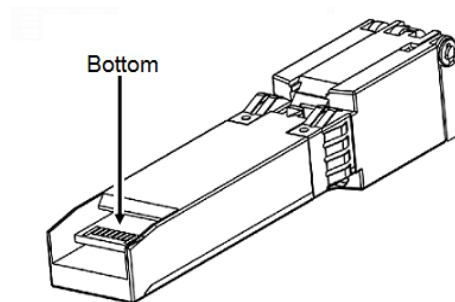
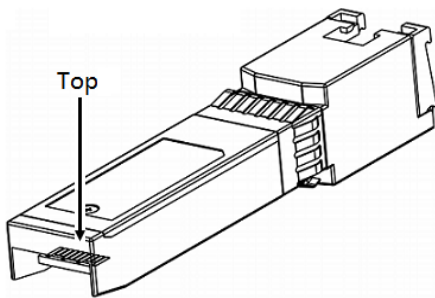
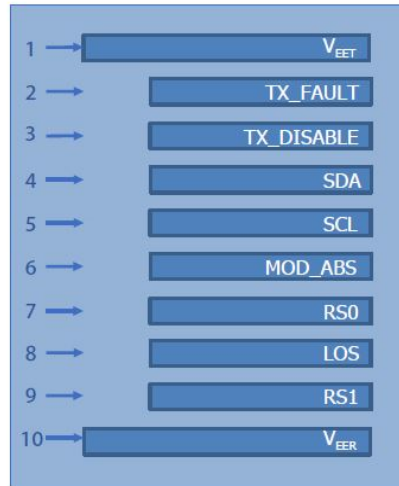
ALL DIMENSIONS ARE ± 0.2 mm UNLESS OTHERWISE SPECIFIED
UNIT: mm

Electrical Pad Layout

Top view



Bottom view



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	2
4	MOD_DEF(2)	Module Definition 2. Data line for serial ID	3
5	MOD_DEF(1)	2Module Definition 1. Clock line for serial ID	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module	3
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 connected to chassis ground
2. Disabled: T_{DIS}>2V or open, Enabled: T_{DIS}<0.8V
3. Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V

References

1. IEEE standard 802.3. IEEE Standard Department, 2002.
2. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.