DATA SHEET

MODULETEK – SFP-GE-T-xxxx-C10
1000BASE-T SFP (Small Form Pluggable) Copper Transceiver
1.25 Gigabit Ethernet

SFP-GE-T-xxxx-C10 Overview

ModuleTek's SFP-GE-T-xxxx-C10 Copper SFP transceivers are high performance integrated duplex data link for bi-directional communication over CAT 5 unshielded twisted pair copper cable. The transceiver module is compliant with the SFP Multi-Source Agreement (MSA) and 1000BASE-T standards as specified in IEEE 802.3. With the hot pluggability, the module offers a flexible and easy way to be installed into SFP MSA compliant ports at any time without the interruption of the host equipment operating online.

Product Features

- Up to 1.25Gb/s bi-directional data links
- Compliant with IEEE 802.3z, IEEE 802.3u, IEEE 802.3ab
- Compliant with SFP MSA
- Hot-pluggable SFP footprint
- Support 10/100/1000BASE-T operation in host systems with SGMII interface
- RJ-45 connector
- Auto-sense MDI/MDIX
- Single power supply 3.3V
- RoHS Compliance
- Commercial Temperature Range: 0℃ to 70℃

Applications

- 1.25 Gigabit Ethernet

Ordering Information

Part Number	Description	Operating Temperature Range
SFP-GE-T-AUTO-C10	1000BASE-T SFP Copper RJ-45 Connector 100m Auto Negotiation default mode, commercial temperature	0℃ to 70℃
SFP-GE-T-FULL-C10	1000BASE-T SFP Copper RJ-45 Connector 100m not support Auto Negotiation default mode, commercial temperature	0℃ to 70℃
SFP-GE-T-SGMII-C10	1000BASE-T SFP Copper RJ-45 Connector 100m SGMII default mode, commercial temperature	0℃ to 70℃

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Host Compatible Selection

Part Number	Link Indicator on RX_LOS Pin	Compatible with 1000BASE-X auto-negotiation
SFP-GE-T-AUTO-C10	NO	YES
SFP-GE-T-FULL-C10	YES	NO
SFP-GE-T-SGMII-C10	NO	YES

General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate[1]	DR	10		1000	Mb/sec	2
Cable Length	CL			100	m	3
Bit Error Rate	BER			10		
Operating Temperature	T_{OP}	0		70	℃	4
Storage Temperature	T_{STO}	– 40		85	℃	5
Supply Current	I_S		320	375	mA	6
Input Voltage	V_{CC}	3.14	3.3	3.46	V	7
Maximum Voltage	V_{MAX}			4	V	6

Notes:

1. 10/100/1000M operation requires the host system to have an SGMII interface with no clock. With a SERDES interface, this transceiver will operate at 1000M only.
2. IEEE 802.3 compatible
3. Category 5 UTP
4. Case temperature
5. Ambient temperature
6. For electrical power interface
7. Referenced to GND. For electrical power interface

High Speed Electrical Interface Host-SFP

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Single ended Input swing	V_{IN}	250		1200	mV	1
Single ended output swing	V_{OUT}	275		800	mV	1
Rise Time (20% - 80%)	T_R		175		ps	
Fall Time (20% - 80%)	T_F		175		ps	
Tx Input impedance	Z_{IN}		50		ohm	1
Rx Output impedance	Z_{OUT}		50		ohm	1

Notes:

1. Single ended

High Speed Electrical Interface Transmission Line-SFP

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.

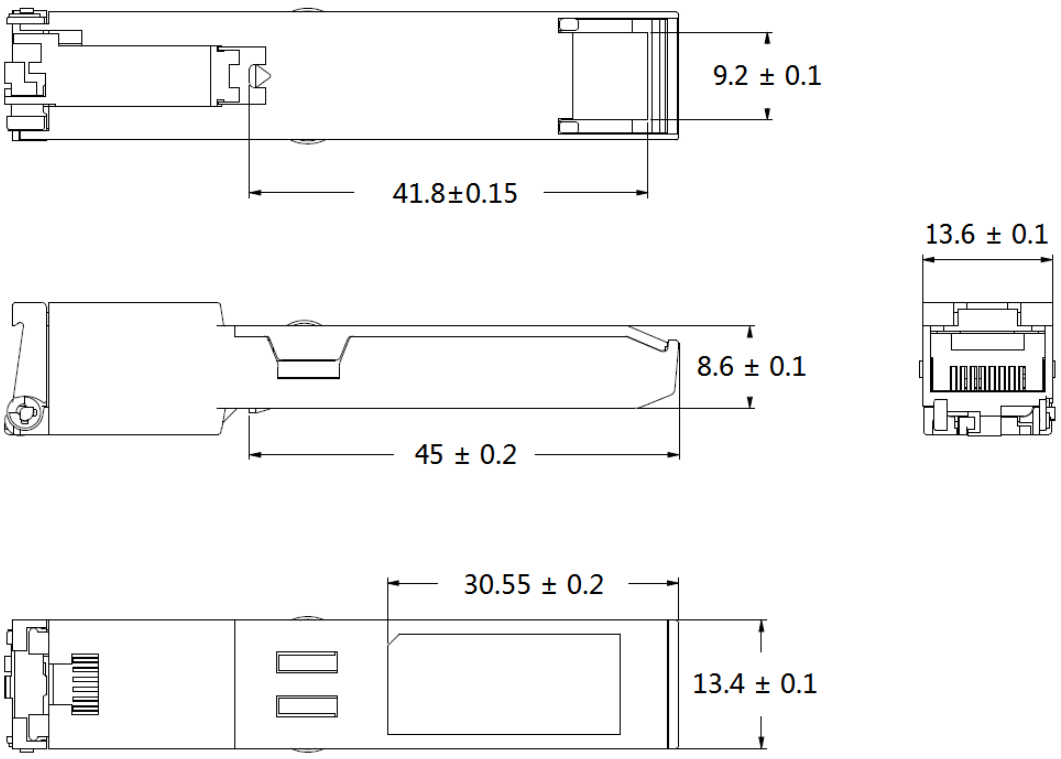
Low Speed Electrical Signal

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

Notes:

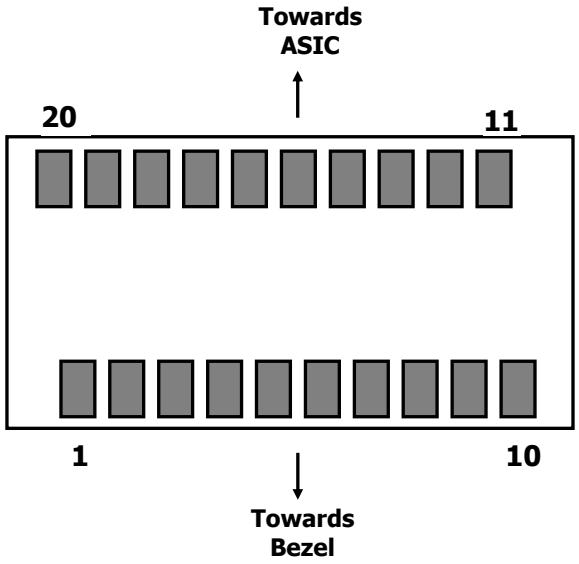
1. External 4.7-10k ohm pull-up resistor required

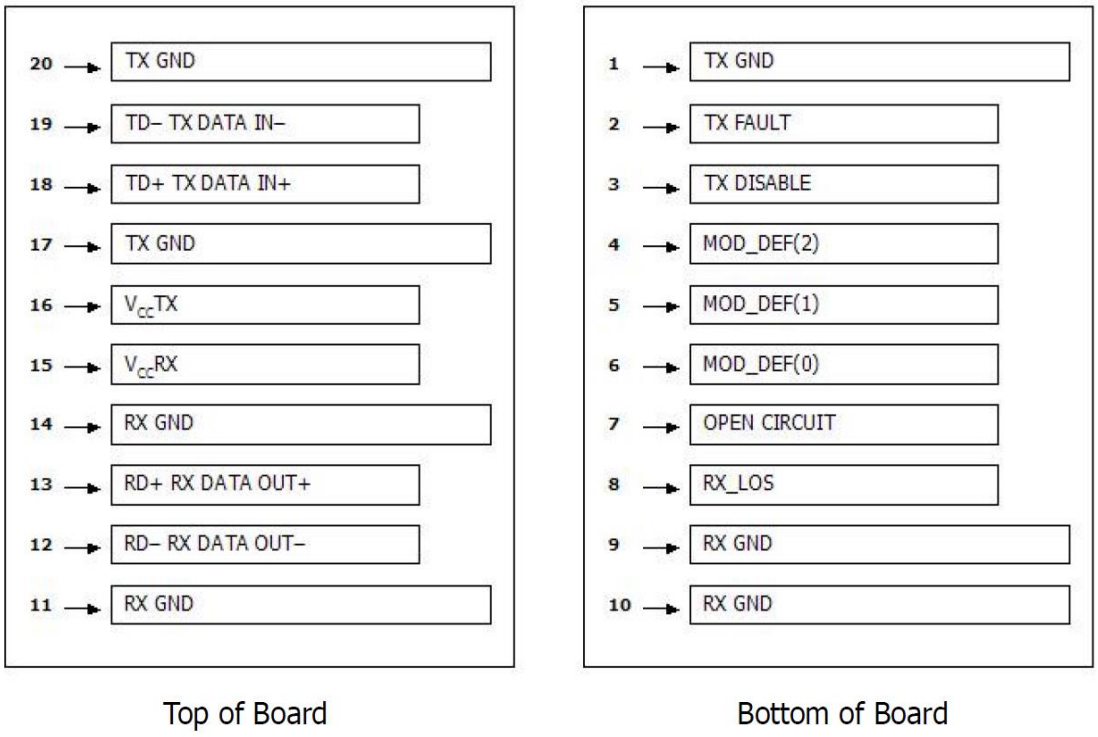
Dimensions



UNIT: mm

Electrical Pad Layout





Top of Board

Bottom of Board

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)	Module 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	RX_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: TX_DISABLE >2V or open, Enabled: TX_DISABLE <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, 2005.
2. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.
3. Marvell Corporation – Alaska Ultra 88E1111 Integrated 10/100/1000 Gigabit Ethernet Transceiver.