10GBASE-T Copper Transceiver

10G-S-T

Product Features

√ Support 10Gbase-T / 5Gbase-T / 2.5Gbase-T / 1000base-T

√ Hot-pluggable SFP footprint

√ Case temperature range (0℃ to +65℃)

√ RoHS Complient and lead-free

√ Single +3.3V power supply

√ Compact RJ-45 connector assembly

Applications

√ 10 Gigabit Ethernet over Cat 6a cable

General

SFP+-10GBASE-T Copper Small Form Pluggable (SFP) transceivers are based on the SFP Multi Source Agreement (MSA). They are compatible with the 10Gbase-T / 5Gbase-T / 2.5Gbase-T / 1000base-T standards as specified in IEEE Std 802.3. SFP+-10GBASE-T uses the SFP's RX_LOS pin for link indication. If pull up SFP's TX_DISABLE pin, PHY IC be reset.

Cable Lengths

Standard	Cable	Reach	Host Port
10Gbase-T	CAT6A	30m	XFI
5Gbase-T/2.5Gbase-t	CAT5E	50m	5GBase-R/2.5GBase-X
1000base-T	CAT5E	100m	1000base-FX

Product Selection

Part Number	Product Feature
10G-S-T	10Gbase-T / 5Gbase-T / 2.5Gbase-T / 1000base-T

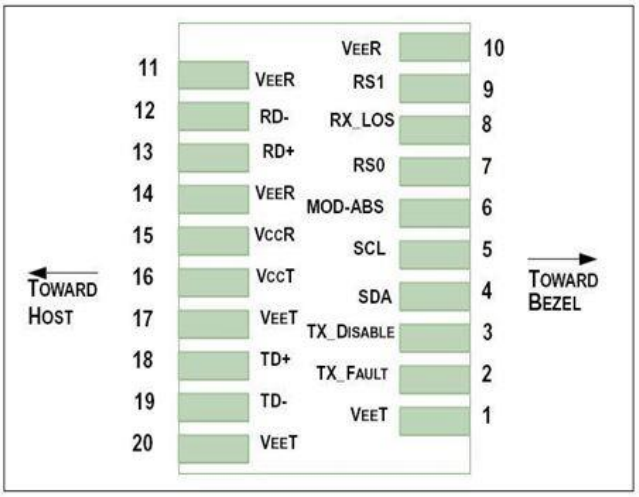
Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX Fault	Transmitter Fault.	2
3	TX Disable	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	1
10	VeeR	Receiver Ground (Common with Transmitter Ground)	1
11	VeeR	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	VeeR	Receiver Ground (Common with Transmitter Ground)	1
15	VccR	Receiver Power Supply	
16	VccT	Transmitter Power Supply	
17	VeeT	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	VeeT	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TX Fault is an open collector/drain output, which should be pulled up with a 4.7k - 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on TDIS>2.0V or open, enabled on TDIS<0.8.
4. Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.

6. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



Pin-out of Connector Block on Host Board

■ +3.3V Volt Electrical Power Interface

The SFP+-10GBASE-T has an input voltage range of 3.3 V +/- 5%. The 4V maximum voltage is not allowed for continuous operation

Parameter	Symbol	Min	Typ	Max	Unit	Notes/Conditions
Supply Current	Icc		700	900	mA	3.0W max power over full range of voltage and temperature. See caution note below
Power Supply Voltage	Vcc	3.13	3.30	3.47	V	Referenced to GND
Maximum Voltage	Vmax			4	V	
Surge Current	Isurge		TBD		mA	Hot plug above steady state current. See caution note below

Caution:

Power consumption and surge current are higher than the specified values in the SFP MSA.

■ Low-Speed Signals

MOD_DEF(1) (SCL) and MOD_DEF(2) (SDA), are open drain CMOS signals (see section VII, “Serial Communication Protocol”). Both MOD_DEF(1) and MOD_DEF(2) must be pulled up to host_Vcc.

Parameter	Symbol	Min	Max	Unit	Notes/Conditions
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	Vcc -0.5	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	2.0	Vcc +0.3	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector

■ High-Speed Electrical Interface

All high-speed signals are AC-coupled internally.

High-Speed Electrical Interface Transmission Line-SFP						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Notes/Conditions**
Line Frequency	fL	-	125	-	MHz	5-level encoding, per IEEE 802.3.
Tx Output Impedance			100		Ohm	Differential, for all Frequencies between 1MHz and 125MHz
Rx Input Impedance	-		100		Ohm	Differential, for all Frequencies between 1MHz and 125MHz

High-Speed Electrical Interface Host-SFP						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Notes/Conditions**
Single ended data input swing	Vinsing	250		1200	mV	Single ended
Single ended data output swing	Voutsing	350		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

■ General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Data Rate	BR	1	-	10	Gb/sec	1

Notes:

1. IEEE 802.3 compatible. Clock tolerance is +/- 50 ppm

■ Environmental Specifications

Automatic crossover detection is enabled. External crossover cable is not required.

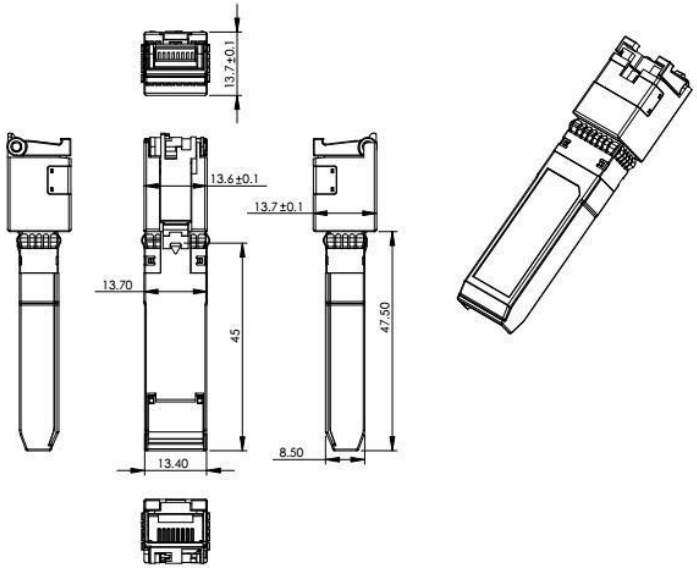
Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Operating Temperature	Top	0	-	+65	℃	Case temperature
Storage Temperature	Tsto	-40		+85	℃	Ambient temperature

■ Serial Communication Protocol

Fiberend series' SFPs support the 2-wire serial communication protocol outlined in the SFP MSA. These SFPs use an MCU, can be accessed with address of A0h.

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
I ^{2}C Clock Rate		0		200,000	Hz	

■ Mechanical Specifications (Unit:mm)



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