

SFP-10G-T-F

10GBase-T SFP+ Transceiver

Hot Pluggable, RJ-45, +3.3V, Cat 6a/7 Cable, 30m

FEATURES

- Up to 10Gbps bi-directional data links
- RJ45 Max link distance 30 meters using cat 6a/7 cable
- Fully metallic enclosure for low EMI
- Compact RJ-45 Connector assembly
- Hot-pluggable SFP footprint
- Low power dissipation
- 3 Operating Temperature Range Options:
 - 0°C to 70°C
 - -20°C to 85°C
 - -40°C to 85°C
- RoHS compliant and Lead Free
- Access to physical layer IC via 2-wire serial bus

APPLICATIONS

- 10 Gigabit Ethernet over Cat 6a/7 cable
- 5000BASE-T over Cat 5e cable
- 2500BASE-T over Cat 5e cable
- 1.25 Gigabit Ethernet over Cat 5e cable
- 100M Ethernet over Cat 5e cable
- 10M Ethernet over Cat 5e cable

DESCRIPTION

The SFP-10G-T-F is Copper Small Form plug-gable (SFP) transceiver, which is based on the SFP multi-sourcing agreement (MSA). It complies with a wide variety of host-side interfaces including USXGMII, XFI, RXAUI, 2500BASE-X, 5GBASE-X, and SGMII to support full backward compatibility with lower speed legacy Ethernet rates including 1Gbps, 100Mbps and 10Mbps.

+3.3V ELECTRICAL POWER INTERFACE

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

Parameter	Symbol	Min	Typical	Max	unit	Notes/Conditions
Supply Current	Is	-	-	750	mA	3.0W max power over full range of voltage and temperature. See caution note below
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	Reference to GND
Maximum Voltage	Vmax	-	-	4	V	
Surge Current	Isurge	-	-	30	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 ELECTRICAL CHARACTERISTICS

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	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

All high-speed signals are AC-coupled internally.

Parameter	Symbol	Min	Typical	Max	Unit	Notes/Conditions
TRANSMISSION LINE-SFP						
Line Frequency	fL	10	125	1000	MHZ	5-level encoding, per IEEE 802.3
Tx Output Impedance	Zout,TX	-	100	-	Ohm	Differential, for all frequencies between 1MHz and 125MHz
Rx Input Impedance	Zin,RX	-	100	-	Ohm	Differential, for all frequencies between 1MHz and 125MHz
HOST-SFP						
Single ended data input swing	Vinsing	250	-	1200	mV	Single ended
Single ended data output swing	Voutsing	350	-	850	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	Typical	Max	Unit	Notes/Conditions
Data Rate	BR	10	-	10000	Mbps	IEEE 802.3 compatible. See Notes 2 through 4 below
Reach Length	L	-	-	30	M	Category 5 UTP BER<10 ⁻¹²
Storage Temperature	Ts	-40	-	85	°C	Ambient Temperature

Note:

1. Clock tolerance is +/- 50 ppm
2. By default, the SFP-10G-T-F is a full duplex device in preferred master mode
3. Automatic crossover detection is enabled. External crossover cable is not required
4. Multi-BASE-T operation requires the host system to have an SGMII interface with no clocks, and the module PHY to be configured per Applications Note AN-2036. With a SERDES that does not support SGMII, the module will operate at single rate only.

PIN DESCRIPTION

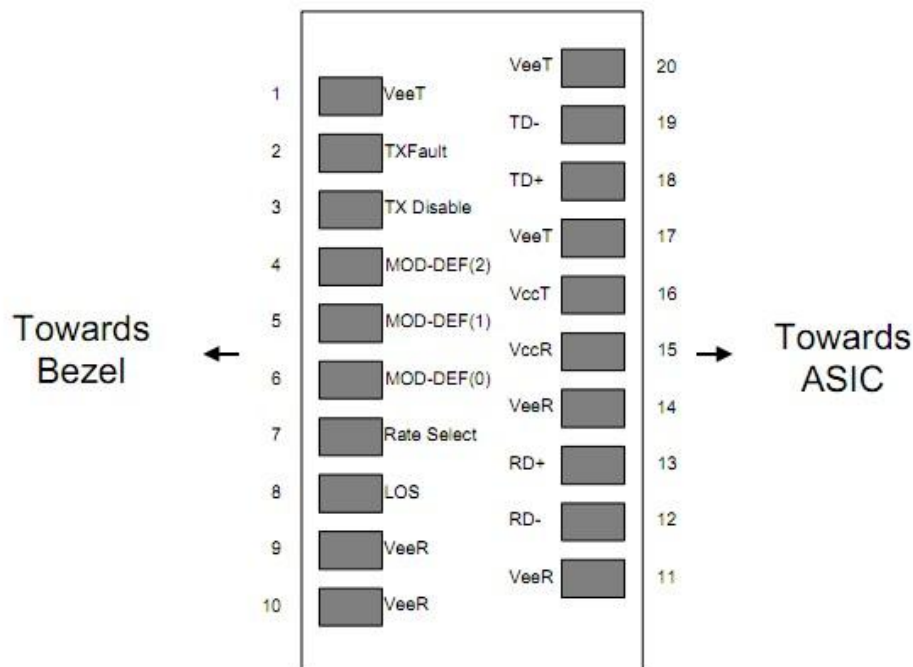


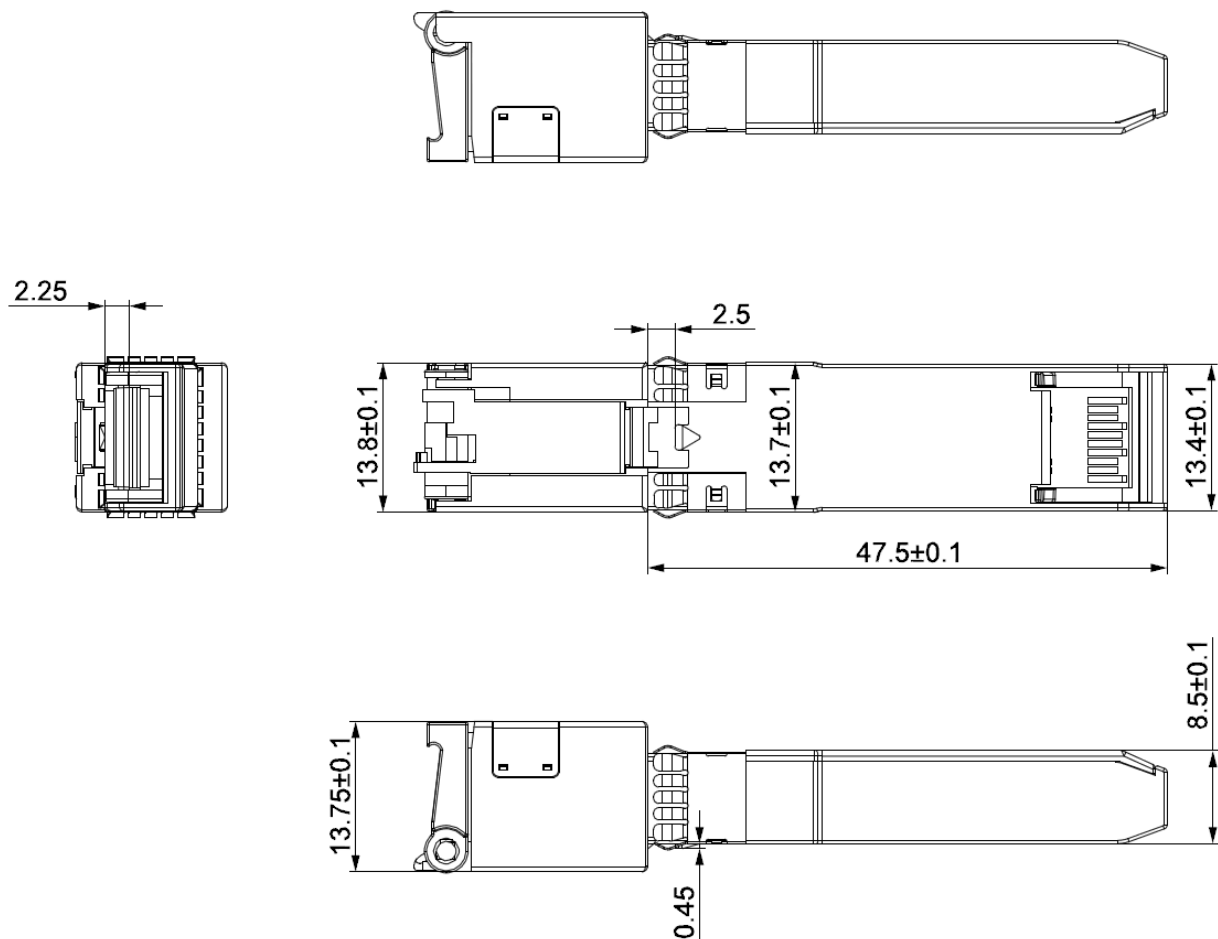
Diagram of Host Board Connector Block Pin Numbers and Names

Pin	Symbol	Description	Note
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault. Not supported.	
3	TDIS	Transmitter Disable. Laser output 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	LOS	High indicates no linked. low indicates linked.	4
9	VEER	Receiver Ground (Common with Transmitter Ground)	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

Note:

1. Circuit ground is connected to chassis ground.
2. PHY disabled on TDIS>2.0V or open, enabled on TDIS<0.8V.
3. Should be pulled up with 4.7k - 10k Ohms on host board to a voltage between 2.0V and 3.6V.
MOD_DEF(0) pulls line low to indicate module is plugged in.
4. LVTTTL compatible with a maximum voltage of 2.5V.

MECHANICAL DIMENSIONS (UNIT: mm)



SERIAL COMMUNICATION PROTOCOL

SFP-10G-T-F supports the 2-wire serial communication protocol outlined in the SFP MSA. The physical layer IC can also be accessed via the 2-wire serial bus at address Ach.

Parameter	Symbol	Min.	Typical	Max	Units	Notes/Conditions
IC Clock Rate		0	-	100000	Hz	

Serial Bus Timing Requirements

REGULATORY COMPLIANCE

ATGBICS transceivers are Class 1 Laser Products comply with FDA regulations. Meet Class 1 eye safety requirements of EN 60825 and the electrical safety requirements of EN 60950.