10GBASE-T SFP+ Copper RJ45 30 m Transceiver

SFP+ Series

- **Hot-pluggable SFP footprint**
- **Supports 10GBASE-T / 5GBASE-T / 2.5GBASE-T / 1000BASE-T**
- **10 Gigabit Ethernet over Cat6a/Cat7 cable**
- **Compact RJ45 connector assembly**
- **Single +3.3 V power supply**
- **Commercial Temperature Range: 0 °C to +70°C**
- **RoHS compliant and lead-free**

Ascent's SFPP-AT-CO-02 10GBASE-T SFP+ copper transceivers are based on the SFP Multi-Source Agreement (MSA). These 10GBASE SFP+ series modules offer a wide variety of 10 Gigabit Ethernet connectivity options for data center, enterprise wiring closet, and service provider transport applications.

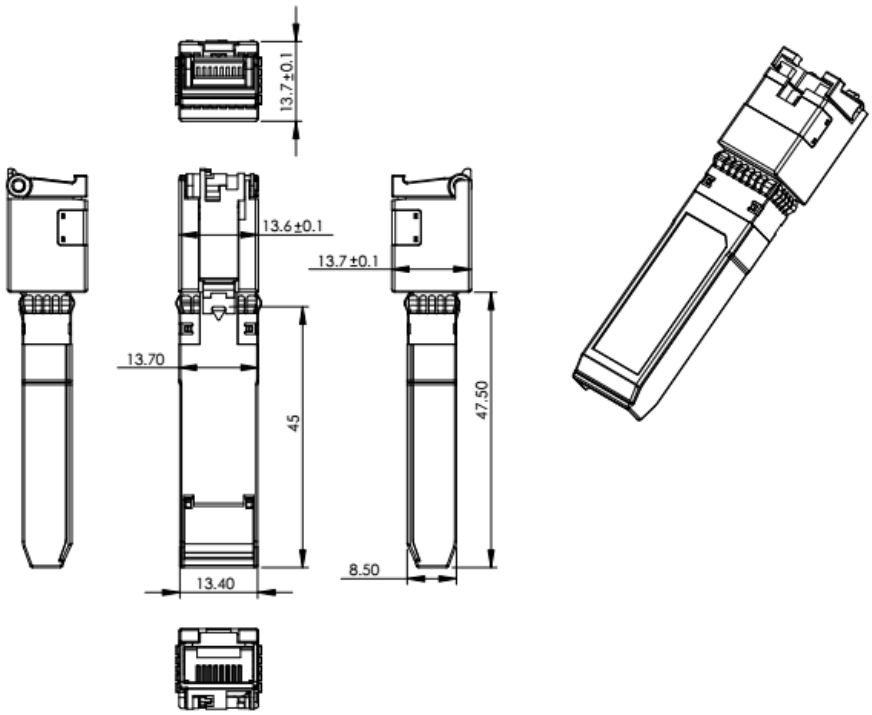
The 10GBASE-T SFP+ copper transceivers are compatible with the 10GBASE-T / 5GBASE-T / 2.5GBASE-T / 1000BASE-T standards as specified in IEEE Std 802.3. 10GBASE-T SFP+ copper transceivers use the SFP's RX_LOS pin for link indication. If pull up SFP's TX_DISABLE pin, PHY IC will be reset.

Ascent SFP+ modules offer the industry's smallest 10G form factor for greatest density per chassis. These are hot-swappable input/output device that plugs into an Ethernet SFP+ port of a switch and no need to power down if installing or replacing. Supports "pay-as-you-populate" model for investment protection and ease of technology migration. Digital optical monitoring capability for strong diagnostic capabilities. Optical interoperability with 10GBASE XENPAK, 10GBASE X2, and 10GBASE XFP interfaces on the same link.

Key Features

- Up to 10 Gb/s bi-directional data links
- Hot-pluggable SFP+ footprint
- Low power dissipation (max. 3W)
- Compact RJ-45 connector assembly
- Fully metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Single +3.3V power supply
- Supports Links up to 30m using Cat 6a/7 Cable
- Case operating temperature: 0 °C to +70 °C

Outline Dimensions



Units in mm

Pin Assignment

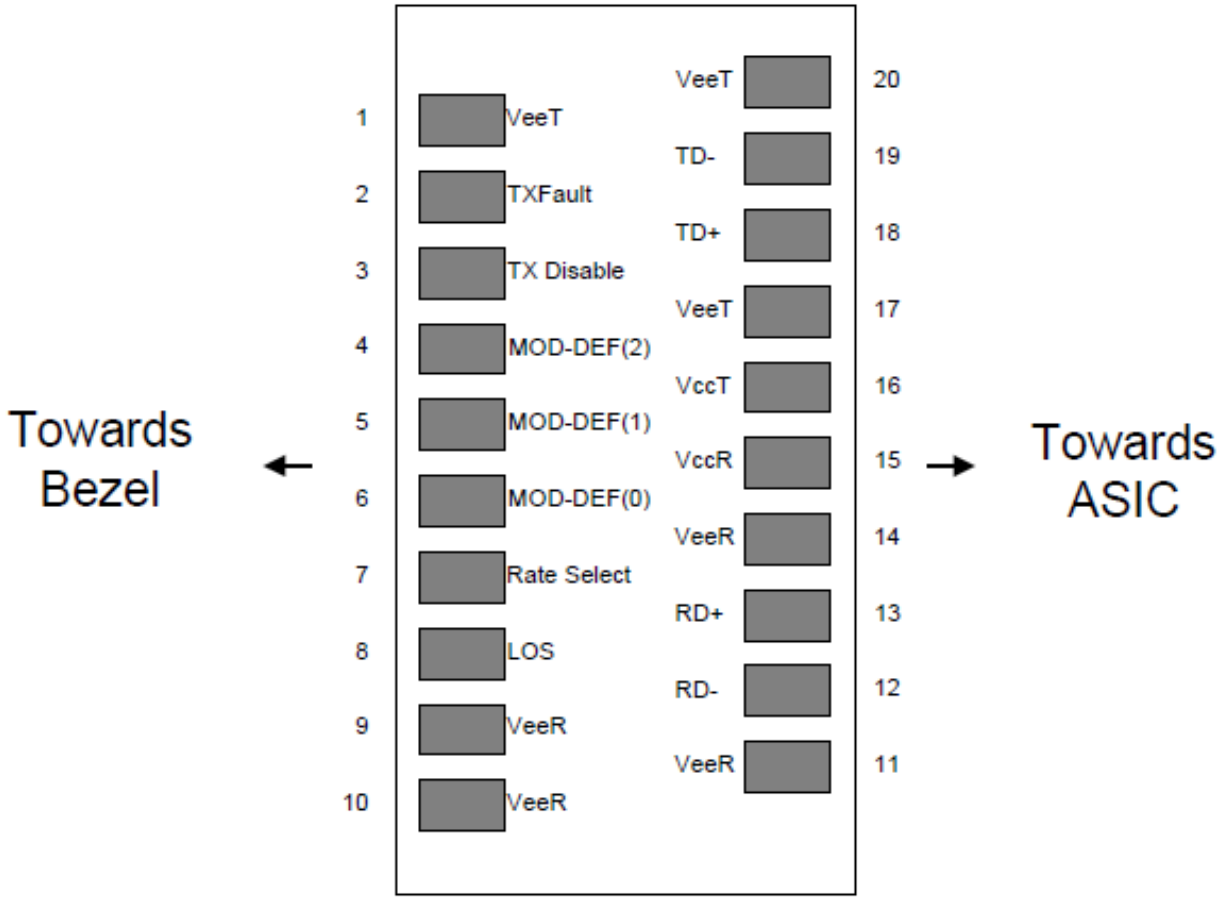


Diagram of Host Board Connector Block Pin Numbers and Names

Pin	Symbol	Name/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

Notes:

1. Circuit ground is connected to chassis ground

2. PHY disabled on TDIS > 2.0 V or open, enabled on TDIS < 0.8 V

3. Should be pulled up with 4.7kΩ to 10kΩs on host board to a voltage between 2.0 V and 3.6 V. MOD_DEF(0) pulls line low to indicate module is plugged in.

4. LVTTL compatible with a maximum voltage of 2.5 V.

Specifications

+3.3V Volt Electrical Power Interface

SFPP-AT-CO-02 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	Note
Supply Current	Is		700	900	mA	1
Input Voltage	Vcc	3.13	3.3	3.47	V	
Maximum Voltage	Vmax			4	V	
Surge Current	Isurge		TBD		mA	

Notes:

1. 3.0W max power over full range of voltage and temperature. See caution note below.

2. Referenced to GND.

3. 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, Electronic Characteristics

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	Note
SFP Output LOW	VOL	0	0.5	V	1
SFP Output HIGH	VOH	host_Vcc -0.5	host_Vcc + 0.3	V	1
SFP Input LOW	VIL	0	0.8	V	2
SFP Input HIGH	VIH	2	Vcc + 0.3	V	2

Notes:

1. 4.7 kΩ to 10 kΩ pull-up to host_Vcc, measured at host side of connector.

2. 4.7 kΩ to 10 kΩ 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	Note
Line Frequency	fL		125		MHz	1
Tx Output Impedance	Zout, TX		100		Ω	2
Rx Input Impedance	Zin, RX		100		Ω	2

High-Speed Electrical Interface, Host-SFP

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Single ended data input swing	Vinsing	250		1200	mV	3
Single ended data output swing	Voutsing	350		800	mV	3
Tx Input Impedance	Zin		50		Ω	3
Rx Output Impedance	Zout		50		Ω	3

Notes:

1. 5-level encoding, per IEEE 802.3.
2. Differential, for all frequencies between 1 MHz and 125 MHz.
3. Single-ended.

General Specifications

Clock tolerance is +/- 50 ppm

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Data Rate	BR	1		10	Gb/sec	1
Cable Length	L			30	m	2

Notes:

1. IEEE 802.3 compatible. By default, the SFPP-AT-CO-02 is a full duplex device in preferred master mode.
2. Category6A/7 UTP. BER.

Environmental Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0		70	°C	
Storage Temperature	Tsto	-40		85	°C	Ambient temperature

Serial Communication Protocol

SFPP-AT-CO-02 support the 2-wire serial communication protocol outlined in the SFP MSA. These SFPs use an MCU, can be accessed with address of A0h.

Serial Bus Timing Requirements

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
I 2C Clock Rate		0		200, 000	Hz	

Ordering Information

Product Name	Product Description
SFPP-AT-CO-02	SFP+ Plug-in, 10 Gbps Copper Transceiver, RJ-45, 10GBASE-T over Cat6a/Cat7 cable, 30 m

Contact Information

Ascent Communication Technology Ltd

AUSTRALIA
140 William Street, Melbourne
Victoria 3000, AUSTRALIA
Phone: +61-3-8691 2902

CHINA
Unit 1933, 600 Luban Road
200023, Shanghai CHINA
Phone: +86-21-60232616

EUROPE
Pfarrer-Bensheimer-Strasse 7a
55129 Mainz, GERMANY
Phone: +49 (0) 6136 926 3246

HONG KONG SAR
Unit 9, 12th Floor, Wing Tuck Commercial Centre
177 Wing Lok Street, Sheung Wan, HONG KONG
Phone: +852-2851 4722

USA
2710 Thomes Ave
Cheyenne, WY 82001, USA
Phone: +1-203 816 5188

VIETNAM
15 /F TTC Building, Duy Tan Street
Cau Giay Dist., Hanoi, VIETNAM
Phone: +84 243 795 5917

WEB: www.ascentcomtec.com

EMAIL: sales@ascentcomtec.com

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