Gigabit SFP to RJ45 Module

LanPOE

Model:
LP-SFP2RJ45

Type:
Transceiver Adapter

NDAA Compliant

Overview

This Gigabit SFP to RJ45 Module comprises 10/100/1000M Copper Small Form Pluggable (SFP) trans-ceivers conforming to the SFP Multi-Source Agreement (MSA). Fully compatible with Gigabit Ethernet and 10/100/1000BASE-T standards as per IEEE Std 802.3, these transceivers utilize SFP's RX_LOS pin for efficient link indication. Additionally, by pulling up the SFP's TX_DISABLE pin, it triggers an IC reset, ensuring enhanced flexibility and functionality within your networking configuration.

Features

- Up to 1.25 Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- Low power dissipation (1.05W typical)
- Compact RJ-45 connector assembly
- Fully metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Single +3.3V power supply
- 10/100/1000 BASE-T operation in host systems with 1000BASE-X interface
- 1.25 Gigabit Ethernet over Cat 5 cable
- Ambient Operating temperature: 0°C to +70°C

Typical Application

The Gigabit SFP to RJ45 Module finds its niche in diverse networking scenarios, excelling in short-range uplinks that bridge all-SFP distribution switches to all-copper edge switches. Its seamless integration and compatibility with Gigabit Ethernet and 10/100/1000BASE-T standards make it an ideal choice for networks requiring efficient, high-performance connectivity.

High-Speed Gigabit Data Transfer

- With support for up to 1.25 Gb/s bi-directional data links, this module ensures swift and efficient Gigabit Ethernet data transfer over Cat 5 cables, making it ideal for demanding network applications.

Seamless Plug-and-Play Integration

- Featuring a hot-pluggable SFP footprint and a compact RJ-45 connector assembly, it offers versatile and hassle-free connectivity options, simplifying integration into diverse networking setups.

Optimized Power Efficiency and Reliability

- Boasting low power dissipation (1.05W typical) and a fully metal enclosure for reduced EMI, this RoHS-compliant, lead-free module ensures not only energy efficiency but also reliable and environmentally conscious network operation.

Outline Drawing
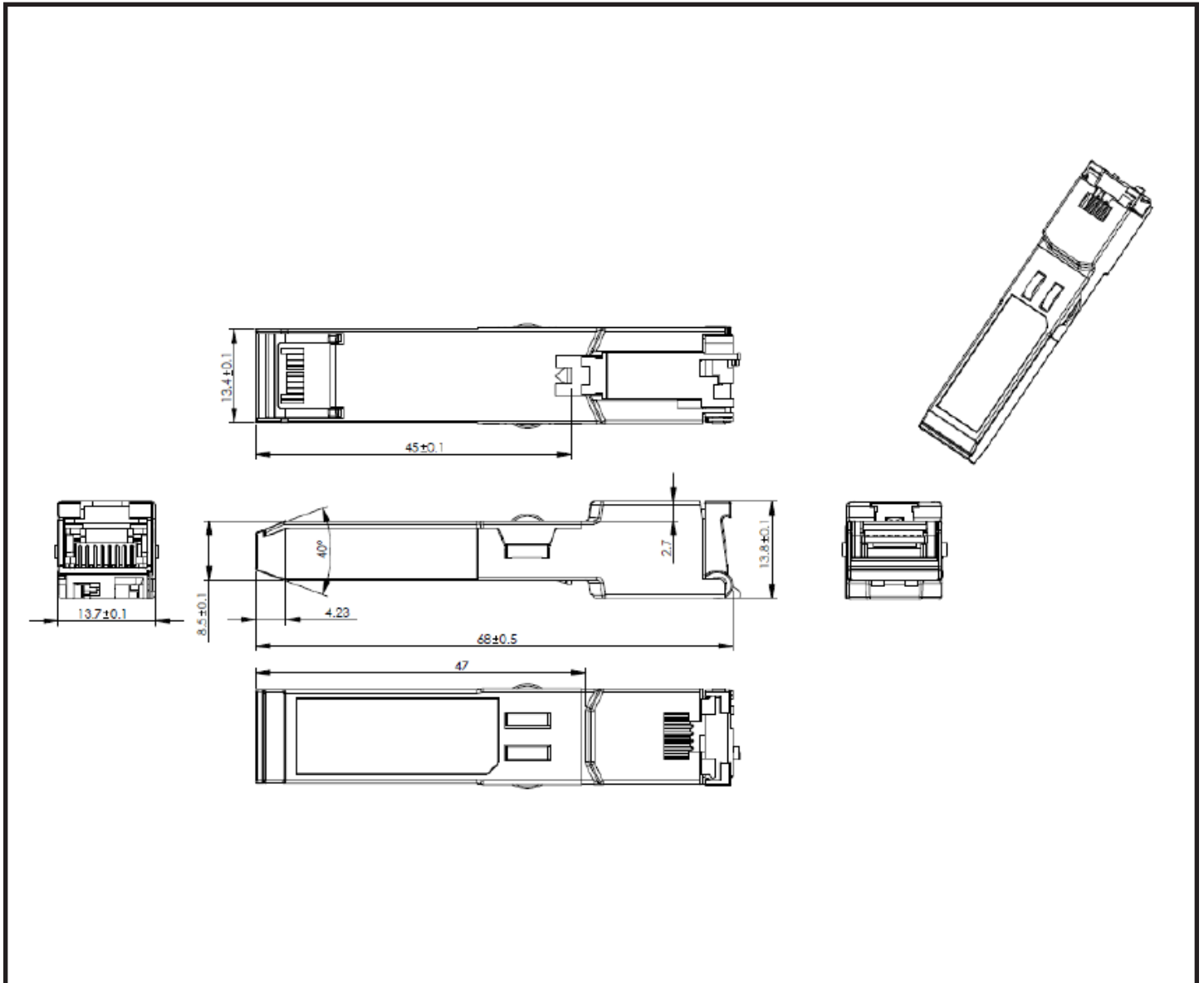
General Specifications

General						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max**	**Units**	**Notes**
Single ended data input swing	BR	10		1200	mV	IEEE 802.3 compatible. See Notes 2 through 4 below
Cable Length	L			100	m	Category 5 UTP. BER

Notes:
1. Clock tolerance is +/– 50 ppm
2. By default, the SFP–T–AUTO–SERDES is a full duplex device in preferred master mode
3. Automatic crossover detection is enabled. External crossover cable is not required

Environmental Specifications

General						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max**	**Units**	**Notes**
Operating Temperature	Top	0		70	°C	Case temperature
Storage Temperature	Tsto	–40		85	°C	Ambient temperature

SFP to Host Connector Pin Out

Pins	Symbol	Description	Ref
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault Indication	
3	TDIS	Transmitter Fault. Not supported.	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	Loss of Signal indication. Logic 0 indicates normal operation.	
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

(cont.) SFP to Host Connector Pin Out

Notes:

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 2.0 V and 3.6 V. MOD_DEF (0) pull-line low to indicate module is plugged in.
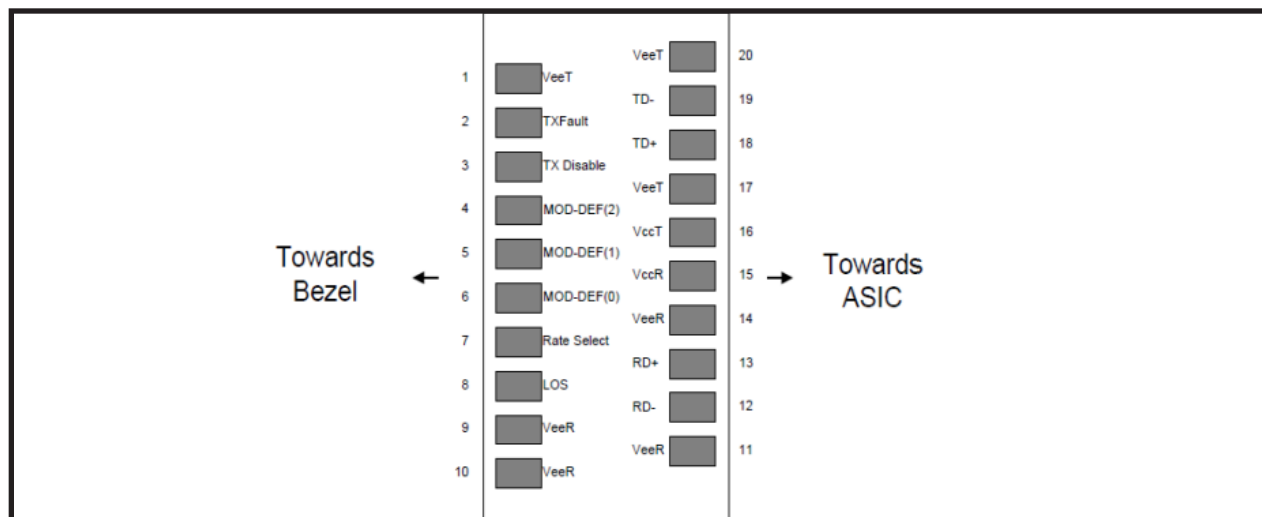
Figure 1. Diagram of host board connector block pin numbers and names

+3.3V Volt Electrical Power Interface

Parameter	Symbol	Min.	Typ.	Max	Units	Notes
Supply Current	Is	90	320	375	mA	1.2W max power over full range of voltage and temperature. See caution note below
Input Voltage	Vcc	3.13	3.3	3.47	V	Referenced to GND
Maximum Voltage	Vmax	2.0		4	V	
Surge Current	Isurge	0		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

- 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	Units	Notes
SFP Output LOW	VOL	0	375	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.

High–Speed Electrical Interface, Transmission Line–SFP						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max**	**Units**	**Notes**
Line Frequency	fL		125		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

High–Speed Electrical Interface, Host–SFP						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max**	**Units**	**Notes**
Single ended data input swing	fL	250	125	1200	mV	Single ended
Single ended data output swing	Voutsing	350	100	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

Serial Communication Protocol

- All 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.

Serial Bus Timing, Requirements					
Parameter	**Symbol**	**Min.**	**Typ.**	**Max**	**Units**
I 2C Clock Rate		0		200,000	Hz

Have a question?

For troubleshooting LanPoE Smart Networking Products, please reach out to our support team and provide detailed information for assistance.

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