EX-SFP-1GE-T

Hot Pluggable, RJ45, N/A, copper ethernet, 100m, Juniper Compatible

Part Number: EX-SFP-1GE-T

Quick Spec:

Manufacturer Compatibility:	Juniper
Form Factor:	SFP
TX Wavelength:	N/A
Reach:	100m
Cable Type:	copper ethernet
Rate Category:	1000Base
Interface Type:	T
Digital Optical Mon. (DOM):	False
Connector Type:	RJ45

Features

- Up to 1.25Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- Extended case temperature range (0°C to +85°C)
- Fully metallic enclosure for low EMI
- Low power dissipation (1.05 W typical)
- Compact RJ45 connector Applications assembly
- 1.25 Gigabit Ethernet over Cat 5
- Access to physical layer IC via 2-cable wire serial bus
- 10/100/1000 BASE-T operation in host systems with SGMII interface

FluxLight's EX-SFP-1GE-T 1000BASE-T Copper Small Form Pluggable (SFP) transceivers are based on the SFP Multi Source Agreement (MSA)1. They are compatible with the Gigabit Ethernet and 1000BASE-T standards as specified in IEEE Std 802.3z2 and IEEE Std 802.3ab3. The 1000BASE-T physical layer IC (PHY) can be accessed via I2C, allowing access to all PHY settings and features.

I. SFP to Host Connector Pin Out

Pin	Symbol	Name/Description	Note
1	VEET	Transmitter ground (common with receiver ground)	1
2	TFAULT	Transmitter Fault Not supported	
3	TDIS	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	LOS	Loss of Signal indication. Not supported	
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	

FluxLight, Inc.

Tel: 888-874-7574 Fax: 866-267-3045

E-mail: sales@fluxlight.com Http://www.fluxlight.com

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 > 2.0V 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) pulls line low to indicate module is plugged in

II. +3.3V Volt Electrical Power Interface

The EX-SFP-1GE-T has an input voltage range of 3.3 V +/- 5%. The 4 V maximum voltage is not allowed for continuous operation.

+3.3 Volt Electrical Power Interface

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Supply Current	Is		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			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

III. 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.

Low-Speed Signals, Electronic Characteristics

Parameter	Symbol	Min	Max	Units	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

IV. 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/Conditions
Line Frequency	fL		125		MHz	5-level encoding, per IEEE 802.3ab
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/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	Units	Notes/Conditions
Data Rate	BR	10		1,000	Mb/sec	IEEE 802.3 compatible. See Notes 2 through 4 below
Cable Length	L			100	m	Category 5 UTP. BER <10-12

Notes:

1. Clock tolerance is +/- 50 ppm
2. By default, the EX-SFP-1GE-T is a full duplex device in preferred master mode
3. Automatic crossover detection is enabled. External crossover cable is not required
4. 10/100/1000 BASE-T operation requires the host system to have an SGMII interface with no clocks. With a SERDES interface, the module will operate as 1000BASE-T only.

V. Environmental Specifications

The EX-SFP-1GE-T has an extended range from 0°C to +85°C case temperature as specified in the table below.

Environmental Specifications

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Operating Temperature	Top	0		85	°C	Case temperature
Storage	Tsto	-40		85	°C	Ambient temperature

Temperature						

VI. Serial Communication Protocol

All FluxLight SFPs support the 2-wire serial communication protocol outlined in the SFP MSA1. These SFPs use an Atmel AT24C01A 128 byte E2PROM with an address of A0h. For details on interfacing with the E2PROM, see the Atmel data sheet titled “AT24C01A/02/04/08/16 2-Wire Serial CMOS E2PROM.”4

The 1000BASE-T physical layer IC can also be accessed via the 2-wire serial bus at address ACh. For details interfacing with the PHY IC, see Marvell data sheet titled “Alaska Ultra 88E1111 Integrated Gigabit Ethernet Transceiver”5 (Marvell document number MV-S100649-00).

Serial Bus Timing Requirements

Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
I2C Clock Rate		0		100,000	Hz	