

Professional high-speed optical transceiver

OPN-S1H-03RI 10 Gb/s / 30 m / SFP+ RJ-45 COPPER TRANSCEIVER

PRODUCT FEATURES

- Support 10GBASE-T / on line port
- Support 10Gbase-R on host port
- Up to 30m reach over Cat 6a cable
 - Compliant with SFP MSA
- Compatible with IEEE 802.3 10GBASE-T
 - Hot-pluggable SFP Footprint
- Compact RJ-45 Connector Assembly
 - Single +3.3 V Power Supply
 - Support LOS pin Function
 - Support TX Disable pin Function
 - RoHS Compliant
- -50 to 85°C Operation: OPN-S1H-03RI

APPLICATIONS

- 10Gbps Ethernet over Category 6a Cable

PRODUCT DESCRIPTION

OPN-S1H-03RI Copper SFP transceiver acts as physical layer interface function for 10GBASE-T Ethernet with Cat6a/Cat7 twisted-pair cable.

OPN-S1H-03RI Copper SFP transceiver features simple application in data center network at 10Gb/s. It really enables a new dimension of flexibility for Network Equipment designers, and for data center facility planner to optimize capital expense.

ORDER INFORMATION

P/No.	Type	Bit Rate (Gb/s)	10GBASE	Distance (m)	Package	Temp. (°C)	RoHS Compliant
OPN-S1H-03RI	Transceiver	10	T	30	SFP+	-50 to 85	Yes

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Tstg	-50	85	°C	
Operating Case Temperature	Topr	-50	85	°C	OPN-S1H-03RI
Maximum Voltage	Vmax		4	V	

Note: The 4V maximum voltage is not allowed for continuous operation.

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Units / Notes
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Case Temperature	Topr	-50		85	°C / OPN-S1H-03RI
Power Supply Current	Icc		570	820	mA / OPN-S1H-03RI

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

Cable Length

Line Port	Cable	Reach	Host Port
10GBASE-T	Cat6a/Cat7	30 m	10GBASE-R

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Low-Speed Signals, Electronic Characteristics					
Parameter	Symbol	Min	Max	Unit	Units / Notes
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 host side of connector
SFP Input HIGH	VIH	2	Vcc + 0.3	V	4.7k to 10k pull-up to Vcc, measured at host side of connector

Note: 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.

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 125 MHz
Rx Input Impedance	Zin, RX		100		Ohm / Differential, for all frequencies between 1MHz and 125 MHz
Host-SFP					
Parameter	Symbol	Min	Typ	Max	Units / Notes
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	T _r , T _f		175		psec / 20% - 80%
Tx Input Impedance	Zin		50		Ohm / Single ended
Rx Output Impedance	Zout		50		Ohm / Single ended

Note: All high-speed signals are AC-Coupled internally.

General Specifications					
Parameter	Symbol	Min	Typ	Max	Units / Notes
Data Rate	BR		10		Gb/sec, IEEE 802.3 compatible. *

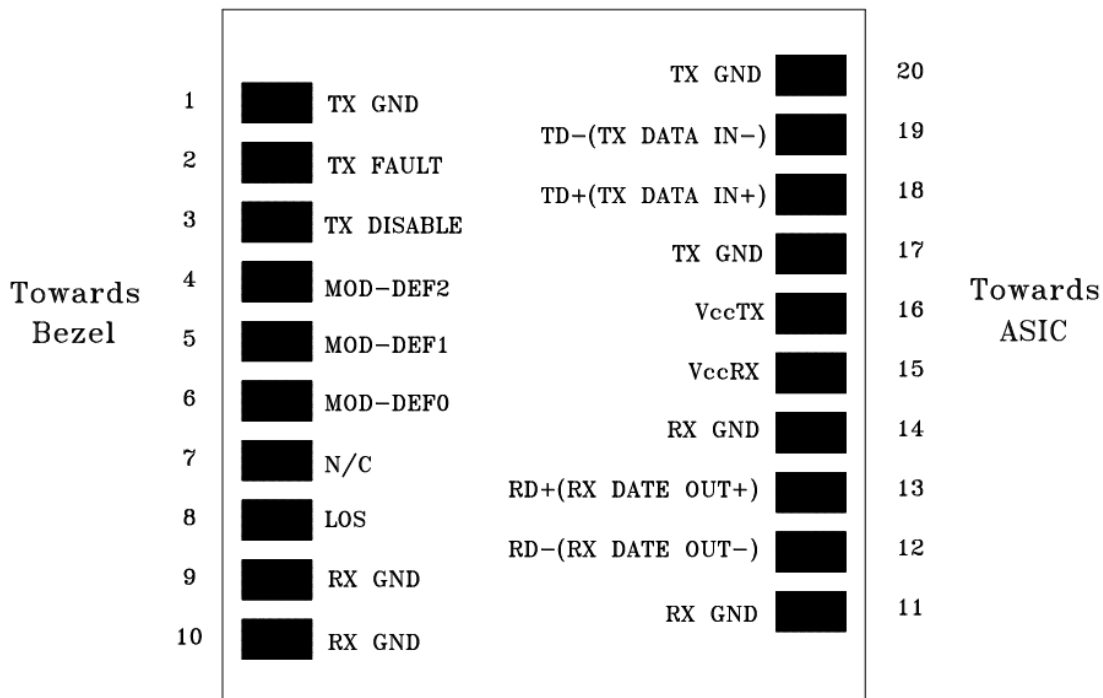
*Clock tolerance is +/- 50 ppm

Serial Communication Protocol					
Parameter	Symbol	Min	Typ	Max	Units / Notes
I2C Clock Rate		0		200,000	Hz

Note: All our 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

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CONNECTION DIAGRAM



PIN	Signal Name	Description	PIN	Signal Name	Description
1	V _{EE} T	Transmitter Ground	11	V _{EE} R	Receiver Ground
2	TX_Fault	Not Implemented.	12	RD-	Inverted Received Data out
3	TX_Disable *	Logic "1" Input (or no connection) = TX off, Logic "0" = TX on.	13	RD+	Non-Inverted Received Data out
4	SDA **	Module Definition 2 - Data Line for Serial ID	14	V _{EE} R	Receiver Ground
5	SDL **	Module Definition 1 - Clock Line for Serial ID	15	V _{CC} R	Receiver Power
6	MOD-ABS **	Module Definition 0 - Tied to Vee in SFP	16	V _{CC} T	Transmitter Power
7	RS0	Not Implemented	17	V _{EE} T	Transmitter Ground
8	RX_LOS	Loss of Signal	18	TD+	Non-inverted Data In
9	V _{EE} R	Receiver Ground	19	TD-	Inverted Data In
10	V _{EE} R	Receiver Ground	20	V _{EE} T	Transmitter Ground

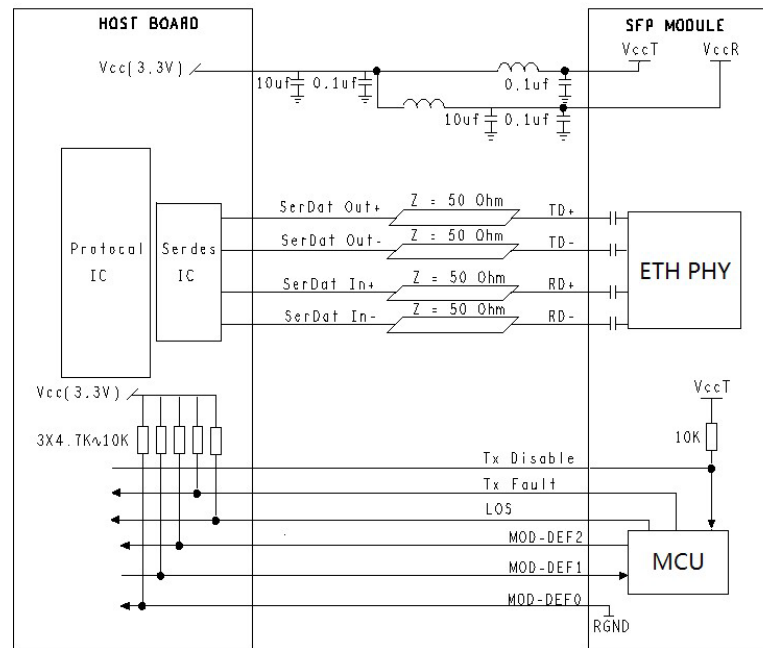
*PHY disabled on T_{DIS} > 2.0V or open, enabled on T_{DIS} < 0.8V

**Should be pulled up with 4.7k – 10k ohms on host board to a voltage between 2.0 V and 3.6 V.

MOD-ABS pulls line low to indicate module is plugged in.

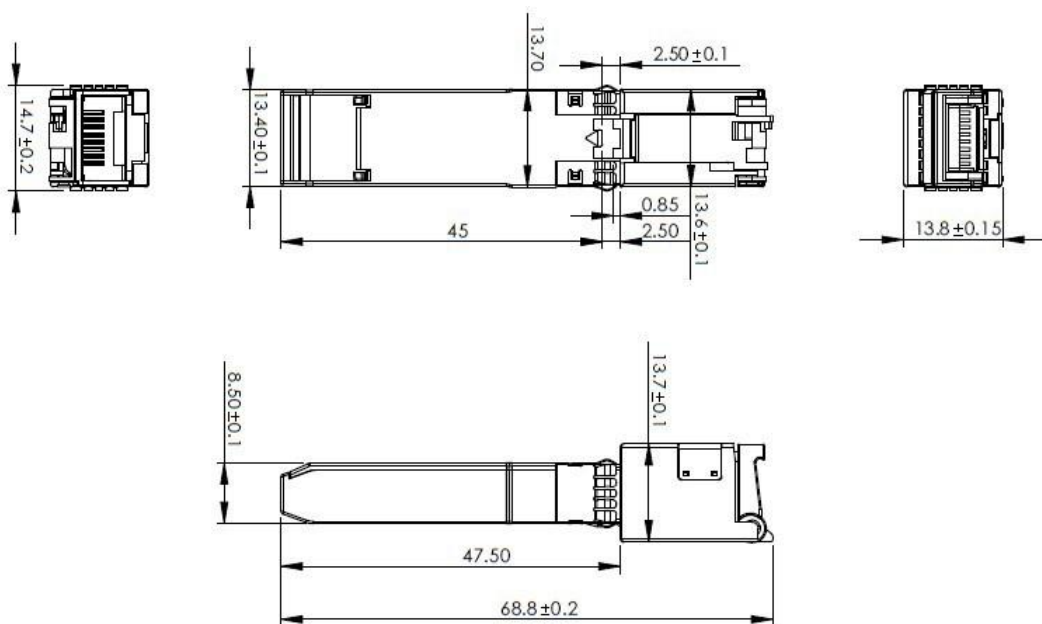
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RECOMMENDED APPLICATION CIRCUIT



PACKAGE DIAGRAM

Units in mm



Note: Specifications subject to change without notice.