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10GBASE-T SFP+ Transceiver
Hot Pluggable, RJ-45, Active Copper SFP+, 30M

Part Number: FSPP-HJ-T12-Y3-AQ1

Overview

The FSPP-HJ-T12-Y3-AQ1 Small Form Factor Pluggable SFP+ Copper transceivers are compliant with the current SFP+ Multi-Source Agreement (MSA) Specification. The High performance designed is integrated full duplex data link at 10Gbps over four pair Category 6a/7 cable up to 30m links. It is specifically designed for high speed communication links that require 10 Gigabit Ethernet over copper cable.

Applications

- 1G / 2.5G / 5G / 10GBASE-T Application

Features

- Compliant with IEEE 802.3an, 802.3ab and 802.3z
- Compliant with SFF-8431, 8432 SFP+ MSA
- Support 10GBASE-T/ 5GBASE-T/ 2.5GBASE-T/ 1000BASE-T/ 100BASE-TX
- Hot Pluggable
- Auto-negotiates with other 10GBASE-T PHYs
- Auto-detect MDI/MDI-X
- Support RX_LOS function
- I2C 2-wire interface for serial ID
- RJ-45 connector
- Single +3.3V power supply
- 10G link length up to 30m with Cat.6a/7, 2.5G/5G link length up to 50m with Cat.5E, 100M/1G link length up to 100m with Cat.5E
- RoHS Compliant

Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Storage Temperature	T_{ST}	-40	+85	°C
Storage Relative Humidity	RH	5	95	%
Supply Voltage	V_{CC}	-0.5	+4.0	V

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Recommended Operating Conditions

Parameters	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temp. (FSPP-HJ-T12-Y3-AQ1)	T_{OP}	0	-	+70	°C
Case Operating Temp. (FSPP-HJ-T12-Y3i-AQ1)	T_{OP}	-40	-	+85	°C
Supply Voltage	V_{CC}	+3.13	+3.3	+3.47	V
Maximum Voltage	Vmax			4	V
Data Rate	DR		10.3125		Gb/s
Bit Error Rate	BER			10^{-12}	
Supply Current	I_{CC}			1000	mA
Surge Current	Isurge			30	mA
Power Consumption	P			3.5	W

Note1: Power consumption and surge current are higher than the specified values in the SFP MSA.

High-Speed Electrical Interface, Host to SFP+

V_{CC} = 3.13V to 3.47V,

T_{OP} = 0 °C to 70 °C(FSPP-HJ-T12-Y3-AQ1); **T_{OP} = -40 °C to 85 °C**(FSPP-HJ-T12-Y3i-AQ1)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
TD+, TD- Input Voltage Swing	V_{IN+} / V_{IN-}	250		1200	mV	1
RD+, RD- Output Voltage Swing	V_{out+} / V_{out-}	350		800	mV	1
Rise/Fall Time (20%~80%)	Tr/Tf		175		ps	
Tx Input Impedance	Zin		50		Ohm	1
Rx Output Impedance	Zout		50		Ohm	1

Note1: Single ended.

High-Speed Electrical Interface, Cable to SFP+

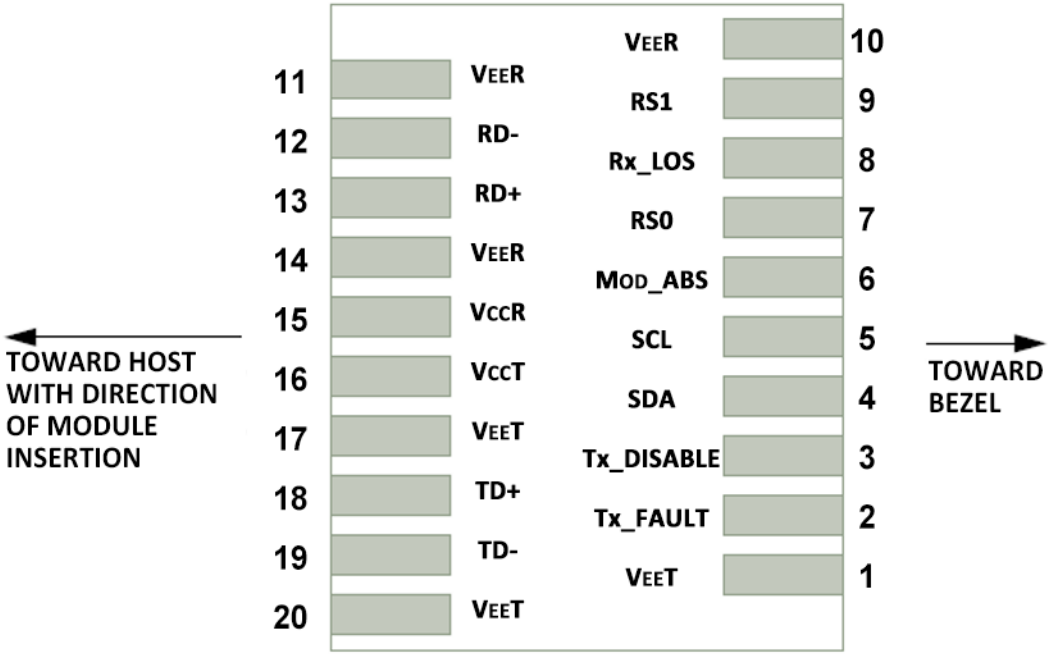
V_{CC} = 3.13V to 3.47V,

T_{OP} = 0 °C to 70 °C(FSPP-HJ-T12-Y3-AQ1); **T_{OP} = -40 °C to 85 °C**(FSPP-HJ-T12-Y3i-AQ1)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Tx Output Impedance	Zout,TX		100		Ohm	1
Rx Output Impedance	Zin,RX		100		Ohm	1

Note1: Differential for frequencies ranging from 125MHz to 10.3125GHz.

Pin Assignment



Host PCB SFP+ Pad Assignment Top View

Pin Description

Pin	Name	Function / Description
1	VEET	Transmitter Ground
2	Tx_FAULT	Transmitter Fault Indication (1)
3	Tx_DISABLE	Transmitter Disable – Turns off transmitter laser output (4)
4	SDA	2-wire Serial Interface Data Line (SDA: Serial Data Signal) (2)
5	SCL	2-wire Serial Interface Clock (SCL: Serial Clock Signal) (2)
6	MOD_ABS	Module Absent, connected to VEET or VEER in the module (2)
7	RS0	Rate Select 0, optional (4)
8	Rx_LOS	Receiver Loss of Signal Indication (3)
9	RS1	Rate Select 1, optional (4)
10	VEER	Receiver Ground
11	VEER	Receiver Ground
12	RD-	Receiver Inverted Data output, AC coupled

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13	RD+	Receiver Non-Inverted Data output, AC coupled
14	VEER	Receiver Ground
15	VCCR	Receiver 3.3V Power Supply
16	VCCT	Transmitter 3.3V Power Supply
17	VEET	Transmitter Ground
18	TD+	Transmitter Non-Inverted Data Input, AC coupled
19	TD-	Transmitter Inverted Data Input, AC coupled
20	VEET	Transmitter Ground

Note1: Tx Fault is not used and is always tied to ground through a 100 ohm resistor.

Note2: These are the module definition pins. They should be pulled up with a 4.7K~10KΩ resistor on the host board to supply less than VccT+0.3V or VccR+0.3V. MOD_ABS is grounded by the module to indicate that the module is present.

Note3: Rx_LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7K~10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

Note4: Tied to ground through a 30K ohm resistor.

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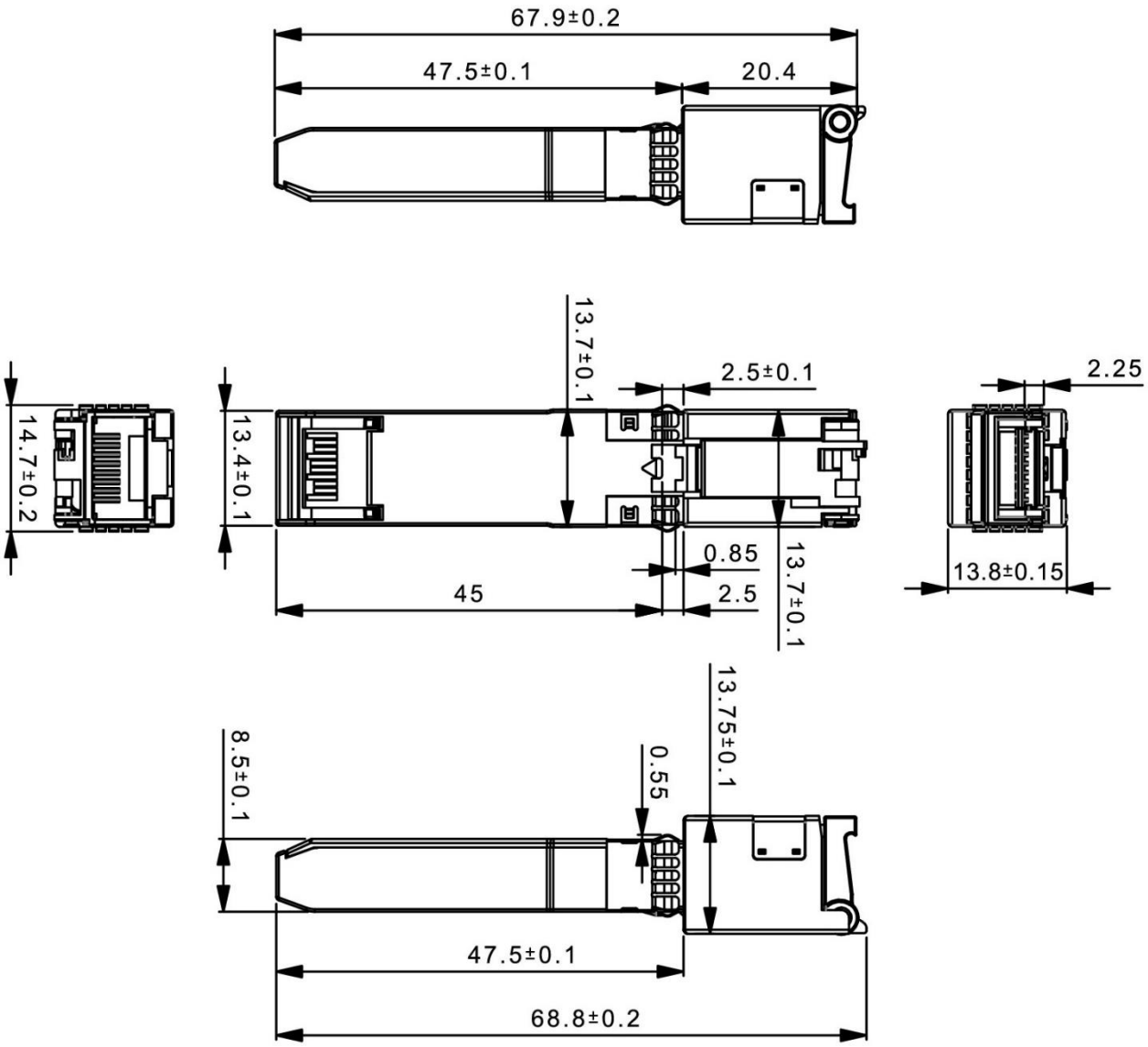
Mechanical Dimensions



(All Dimensions are ±0.20mm Unless Otherwise Specified, Unit: mm)

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Ordering Information

Part No.	Host Port	Line Port Speed (RJ45) & Link Distance	Temp.
FSPP-HJ-T12-Y3-AQ1	XFI	10GBASE-T @Cat.6a/7 cable, 30 meters 5GBASE-T @Cat.5E cable, 50 meters 2.5GBASE-T @Cat.5E cable, 50 meters 1000BASE-T @Cat.5E cable, 100 meters 100BASE-TX @Cat.5E cable, 100 meters	0~70°C
FSPP-HJ-T12-Y3i-AQ1			-40~85°C