PRODUCT SPECIFICATION

Part No.:	SFP-10G-AOCxM	
Description:	10G SFP+ Active Optical Cable, MMF 850nm 1-100m	
Release Date	Rev.	Revision Change Description
2016/08/12	A0	New Release
2020/12/28	A1	Template Update

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Features

- Hot-pluggable SFP+ cable ends
- Supports 10.3125Gbps bit rate
- Pre-terminated twin axial cable / fiber cable
- Operating environment temperature 0~ 70℃
- Low power consumption
- SFP+ housing with enhanced EMI shielding
- Single 3.3V power supply
- Available in lengths up to 20m

Application

- 10G Ethernet
- 10G Fiber Channel over Ethernet
- Applicable to 1X QDR / 1X DDR / 1x SDR Infiniband
- High capacity IO with SFP+ interface
- Data center and in-rack connection

Standard

- SFF-8431 SFP+ Electrical MSA
- SFF-8432 SFP+ Mechanical MSA
- RoHS compliant

Specification

Absolute Maximum Ratings				
Parameter	**Symbol**	**Min**	**Max**	**Unit**
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	RH	0	85	%
Supply Voltage	Vcc	-0.5	3.6	V

Recommended Operating Conditions					
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Operating Case Temperature	Tc	0		+70	°C
Supply Voltage	Vcc	3.14	3.3	3.46	V
Supply Current	Icc			250	mA
Bit Rate	BR		10.3125	11.3	Gbps

Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Transmitter Characteristics						
Input differential impedance	Rin		100		Ω	1
Differential data input swing	Vin,pp	180		700	mV	
Transmit Disable Voltage	VD	2		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+0.8	V	
Receiver Characteristics						
Differential data output swing	Vout,pp	300		850	mV	2,5
Data output rise time, fall time	tr	28			ps	3
LOS Fault	$V_{LOS\ fault}$	2		Vcc_{HOST}		4
LOS Normal	$V_{LOS\ norm}$	Vee		Vee+0.8		4

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Note1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC

Note2. Into 100Ω is differential termination.

Note3. 20 – 80%.Measured with Module Compliance Test Board and OMA test pattern.

Note4. LOS is an open collector output. Should be pulled up with 4.7kΩ – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1.

Note5.Host board designers using an EDC PHY IC should follow the IC manufacturer's recommended settings for interoperating the host-board EDC PHY with a limiting receiver.

Pin definition

The SFP+ modules are hot-pluggable. Hot pluggable refers to plugging in or unplugging a module while the host board is powered. The SFP+ host connector is a 0.8 mm pitch 20 position right angle improved connector specified by SFF-8431, or stacked connector with equivalent electrical performance. SFP+ module contacts mates with the host in the order of ground, power,

followed by signal as illustrated by Figure 1 and the contact sequence order listed in Table 1.

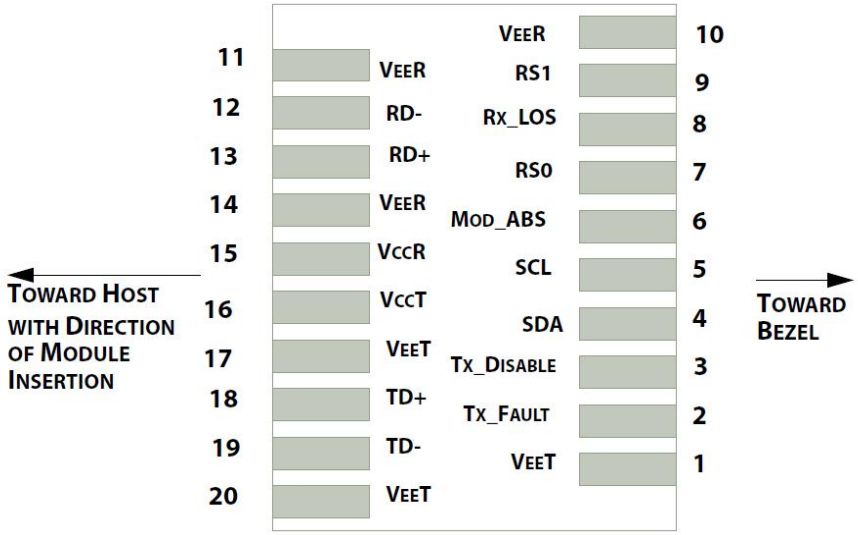


Figure 1 SFP+ Pad assignment Top View

Table 1

Pin	Symbol	Name/Description	Power Seq.	Ref.
1	VeeT	Transmitter Ground	1st	1
2	TX_Fault	Transmitter Fault	3rd	2
3	TX_Disable	Transmitter Disable	3rd	3
4	SDA	2-Wire Serial Interface Data Line	3rd	4
5	SCL	2-Wire Serial Interface Data Line	3rd	4
6	Mod_ABS	Module Absent, Connect to VeeT or VeeR in Module	3rd	5
7	RS0	No connection required	3rd	6
8	RX_LOS	Receiver Loss of Signal indication	3rd	7
9	RS1	No connection required	3rd	8
10	VeeR	Receiver Ground	1st	1
11	VeeR	Receiver Ground	1st	1
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O	3rd	9
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	3rd	9
14	VeeR	Receiver Ground	1st	1
15	VccR	Receiver Power Supply	2nd	10
16	VccT	Transmitter Power Supply	2nd	10
17	VeeT	Transmitter Ground	1st	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I	3rd	11
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML-I	3rd	11
20	VeeT	Transmitter Ground	1st	1

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SFP+ Module PIN Definition

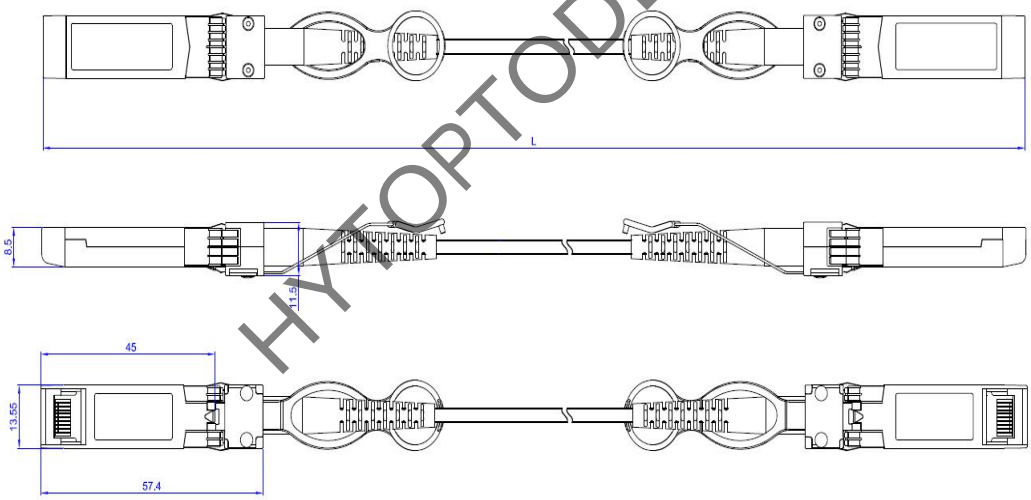
Power Seq.: Pin engagement sequence during hot plugging.

Notes:

1. The module signal ground contacts.
2. This pin is an open drain/collector and should be pulled up to Vcc-host in the host with a 4.7k~10k Ohm resistor.
3. This pin should be pulled up to Vcct with a 4.7k~10k Ohm resistor in modules.
4. SDA&SCL (IIC) are needed pull up 4.7k~10k Ohm resistors on host board.
5. Mod_ABS is connected to VeeT or VeeR in the SFP+ module.
6. Rate Select 0,no connection required.
7. Module RX_Los of signal indication need pull up 4.7k~10k Ohm resistor on host board.
8. Rate Select 1,no connection required.
9. RD -/+: These are the differential receiver outputs. They are CML AC-coupled with 100 Ohm terminal resistor matching internal.
10. VccR and VccT are the receiver and transmitter power supplies.
11. TD-/+: These are the differential transmitter inputs. They are CML AC-coupled with 100 Ohm terminal resistor matching internal.

Mechanical Drawing

Dimensions are in millimeters. All dimensions are ±0.2mm unless otherwise specified. (unit: mm)



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ESD

This transceiver is specified as ESD threshold 500V for Signal pads and 2kV for all others electrical input pads, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Regulatory Compliance

Feature	Test	Method
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000Vfor other pins.)
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B FCC Class B CENELEC EN55022 VCCI Class 1	Comply with standard
Immunity	IEC61000-4-3	Comply with standard
Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1,2	Compatible with Class I laser Product

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Ordering information

Part Number	Product Description
SFP-10G-AOCxM	10G SFP+ to SFP+ Active Optical Cable 1-100m

Notes:

Where "x" denotes cable length in meters. Examples are as follows:

x = 3 for 3m, x = 10 for 10m, x = 50 for 50m, x = 1 A for 100m.