10G SFP+ Passive Copper Twinax Cable (PCC)

Application

- 1/2/4/8G Fibre Channel
- 1x InfiniBand QDR, DDR, SDR
- 10G Gigabit Ethernet & 10 GbE high performance computer clusters
- Switched fabric I/O such as ultra high bandwidth switches and routers
- High density connections between networking equipment
- End of row/Middle of row switching architectures
- Data center cabling infrastructure
- Storage Area Networks (SAN) & Storage Servers

Features

- Support for multi-gigabit data rates up to 10.5Gbps
- 850nm VCSEL transmitter, PIN photo-detector receiver, up to 300m on OM3 MMF
- Wire AWG: AWG30, AWG24
- Cable type: Passive Copper Twinax Cable
- Available length (in meters): 1, 2, 3......
- Improved Pluggable Form Factor (IPF) compliant for enhanced EMI/EMC performance
- Commercial temperature range (COM): 0~ 70 ° C
- Low power consumption < 0.5W
- Power supply :+3.3V
- Small diameter cable design
- Compatible to SFP+ MSA
- Electrical interface compliant to SFF-8431

Description

The SFP+ passive cable assemblies are high performance, cost effective I/O solutions for 10G Ethernet and 10G Fiber Channel applications. SFP+ copper modules allow hardware manufactures to achieve high port density, configurability and utilization at a very low cast and reduced power budget. The high speed cable assemblies meet and exceed Gigabit Ethernet and Fiber Channel industry standard requirements for performance and reliability.

These assemblies are called "passive" copper cables because there isn't any signal conditioning circuitry (e.g. crosstalk or echo cancellation) contained within the SFP+ connector. Sometimes these assemblies are referred to as "DAC" or "Direct Attached Copper" cables. Inside the SFP+ MSA footprint optical cables can be used that require optical transceivers or Active Optical Cables (AOC) that contain the transceiver as part of the cable.

Products Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit
Operating Case Temperature	Tc	0	25	70	℃
Relative Humidity	RH	5		95	%
Supply Voltage		3.15	3.3	3.45	v
Data Rate Per Lane		1	10.5		Gbp/s

II. Performance Specification

Electrical	
Min. Dielectric Withstand Voltage	300 VDC
Insulation Resistance	1000 Mohms
Current Rating	0.5 Amp Min/Signal Contact
General	
Operating Temperature	0 to 70 ° C
Flammability Rating	UL 94 V-0
Green Features	RoHS, Lead-Free
Shield	Braid/Foil
Marking	Mfg Name, Part#, Date Code
Plug	
Backshell Material	Nickel-Plated Zinc Diecast
Contact Material	PCB with Gold-Plated Pads
Latch	Positive Latching w/Pull
Insertion Force	30N Max
Withdrawal Force	20N Max
Retention Force	90N Max
Durability	50 Cycles Min
Cable	
Conductor	Solid
Wire Gauge	AWG30, AWG28, AWG26, AWG24
Impedance	100 ± 5 ohms
Cable OD	AWG 30 :4.2mm
	AWG 28 :4.7mm
	AWG 26:5.2mm
	AWG 24: 6.0mm
Jacket Type	PVC
Bend Radius	5X Cable OD

III. Electrical Characteristics

Test Type	Test Item	24AWG	26AWG	28AWG	30AWG
Electrical Characteristics	Differential impedance	100±5Ω @ TDR	100±5Ω	100±5Ω	100±5Ω @ TDR
	Mutual capacitance	14pF/ft nominal	14pF/ft nominal	14pF/ft nominal	14pF/ft nominal
	Time delay	1.31ns/ft nominal, (4.3ns/m) nominal	1.35ns/ft nominal	1.35ns/ft nominal	1.35ns/ft nominal, (4.3ns/m) nominal
	Time delay skew (within pairs)	80ps/10m maximum	120ps/8.5m maximum	120ps/7m maximum	50ps/5.5m maximum
	Time delay skew (between pairs)	350ps/10m maximum	500ps/8.5m maximum	500ps/7m maximum	350ps/5.5m maximum
	Attenuation	10dB/10m maximum @ 1.25Ghz	10dB/8.5m maximum @ 1.25Ghz	10dB/7m maximum @ 1.25Ghz	8.4dB/5.5m maximum @ 1.25Ghz
	Conductor DC Resistance	0.026Ω /ft maximum @ 20°C	0.04Ω /ft maximum @ 20°C	0.06Ω/ft maximum @20°C	0.01Ω/ft maximum @20°C
Physical Characteristics	Conductors (two pair)	24AWG Solid, Silver plated copper	26AWG Solid, Silver plated copper	28AWG Solid, Silver plated copper	30AWG Solid, Silver plated copper
	Insulation	Foam polyolefin	Foam polyolefin	Foam polyolefin	Foam polyolefin
	Pair drain wire	26AWG Solid, Silver plated copper	28AWG Solid, Silver plated copper	30AWG Solid, Silver plated copper	30AWG Solid, Silver plated copper
	Overall cable shield	Aluminum/polyester tape, 125% coverage, Tin plated copper braid, 38AWG, 85% coverage	Aluminum/polyester tape, 125% coverage, Tin plated copper braid, 38AWG, 85% coverage	Aluminum/polyester tape, 125% coverage,Tin plated copper braid, 38AWG, 85% coverage	Aluminum/polyester tape, 125% coverage,Tin plated copper braid, 38AWG, 85% coverage
	Outer diameter	6.0mm	5.2mm	4.7mm	4.2mm

IV. Pin Designation

Pin	Logic	Symbol	Name/Description	Notes
1		VeeT	Transmitter Ground	
2	LV-TTL-O	TX_Fault	N/A	1
3	LV-TTL-I	TX_DIS	Transmitter Disable	
4	LV-TTL-I/O	SDA	Tow Wire Serial Data 5 LV	
5	LV-TTL-I	SCL	Tow Wire Serial Clock	
6		MOD_DEF0	Module present, connect to VeeT	
7	LV-TTL-I	RS0	N/A	1
8	LV-TTL-O	LOS	LOS of Signal	
9	LV-TTL-I	RS1	N/A	1
10		VeeR	Receiver Ground	
11		VeeR	Receiver Ground	
12	CML-O	RD-	Receiver Data Inverted	
13	CML-O	RD+	Receiver Data Non-Inverted	
14		VeeR	Receiver Ground	
15		VccR	Receiver Supply 3.3V	
16		VccT	Transmitter Supply 3.3V	
17		VeeT	Transmitter Ground	
18	CML-I	TD+	Transmitter Data Non-Inverted	
19	CML-I	TD-	Transmitter Data Inverted	
20		VeeT	Transmitter Ground	

V. Low Speed Electrical Hardware Pins

In addition to the 2-wire serial interface, the SFP+ module has the following low speed pins for control and status:

(1) TX_Fault

TX_Fault is a module output pin that when High, indicates that the module transmitter has detected a fault condition related to laser operation or safety. The TX_Fault output pin is an open drain/collector and must be pulled up to the Host_Vcc with 4.7k-10k ohms on the host board.

(2) TX_Disable

TX_Disable is a module input pin. When TX_Disable is asserted High or Left open, the SFP+ module transmitter output must be turned off. The TX_DIS pin must be pulled up to VccT in the SFP+ module.

(3) RS0/RS1

RS0 and RS1 are module input rate select pins and are pulled low to VeeT with a > 30kΩ resistor in the module. RS0 is an input hardware pin which optionally selects the optical receive data path rate coverage for an SFP+ module. RS1 is an input hardware pin which optionally selects the optical transmit path data rate coverage for an SFP+ module.

(4) MOD_ABS

Mod_ABS is pulled up to Host_Vcc with 4.7k-10k ohms on the host board and connected to VeeT or VeeR in the SFP+ module. MOD_ABS is then asserted "High" when the SFP+ module is physically absent from a host slot. In the SFP MSA (INF8074i) this pin had the same function but is called MOD_DEF0.

(5) SCL/SDA

SCL is the 2-wire interface clock and SDA is the 2-wire interface data line. SCL and SDA are pulled up to a voltage in the range of 3.14V to 3.46V on the host.

(6) RX_LOS

RX_LOS when High indicated an optical signal level below that specified in the relevant standard. The RX_LOS pin is an open drain/collector output and must be pulled up to host Vcc with a 4.7k-10k ohms on the host board. RX_LOS assert min and de-assert max are defined in the relevant standard.

VI. Electrical Design

The electrical design of the passive SFP+ direct attach copper cable assembly is fully compliant to the SFF-8431 SFP+ MSA. The electrical design incorporates a PCB and wire management design to minimize crosstalk, insertion loss, and return loss.

Reducing these frequency domain characteristics result in improved WDP measurements. Because of the common use of EDC(Electronic Dispersion Compensation) with passive SFP+ cable assemblies WDP measurements are a requirement instead of time domain measurements such as eye patterns.
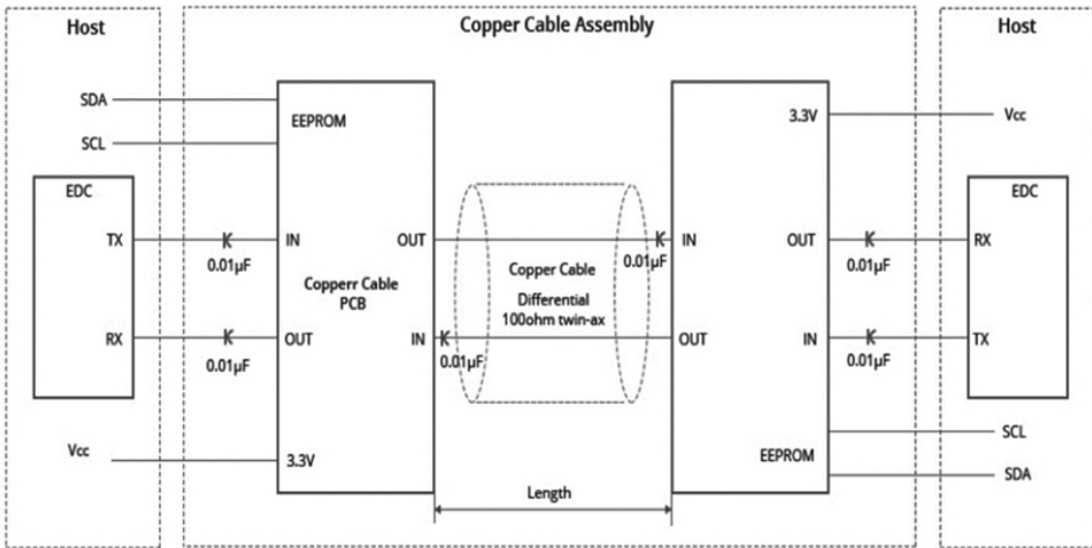
VII. Mechanical Dimensionsimensions
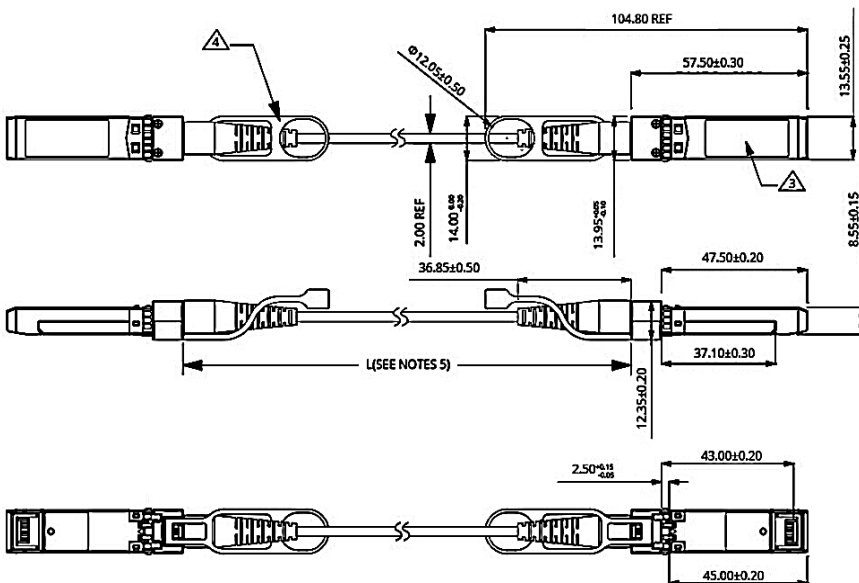
Notes:
- Unit: mm
- Tolerance: φ0.1mm if not shown
- Label specification
- Latch color: black
- Tolerance of cable length

L	TOLERANCE
L ≤ 5M	±5CM
L > 5M	±1%

VIII. Installation

Caution:

Follow accepted ESD practices when handling SFP+ connectors to prevent damage to the internal components within the connector. ESD (electrostatic discharge) is the sudden flow of electricity between two objects at different voltage potentials caused by contact. The basis of any ESD protection strategy is to ground or bring all elements in the ESD protected area to the same potential. An ESD wrist strap should be used for everything in the ESD protected area including personnel, tools, cabinets and components.

A. Installing SFP+ Modules

Follow these steps to install a FS.COM SFP+ cable assembly:

Step 1.   Remove the protective ESD cap from the connector.

Step 2.   Slide the SFP+ cable end into the slot until it locks into position (see figure 1).

There is an audible click when the connector is properly seated.

Figure 1. Installing an
SFP+ Module

Figure 2. Disconnecting
Latch Mechanism

Figure 3. Removing
Modules

Caution :

The latching mechanism locks the SFP+ connector into place when cables are connected. Do not pull on the cable in an attempt to remove the SFP+ connector.

B. Removing SFP+ Modules

Follow these steps to remove a FS.COM SFP+ cable assembly:

Step 1.   Pull on the SFP+ latch pull lanyard. See figure 2.

Step 2.   Grasp the SFP+ connector on both sides and remove it from the system. See figure 3.

Step 3.   If possible, replace the ESD protective cap or put the SFP+ into an ESD protected bag.

Test Center

FS.COM transceivers are tested to ensure connectivity and compatibility in our test center before shipped out. FS.COM test center is supported by a variety of mainstream original brand switches and groups of professional staff, helping our customers make the most efficient use of our products in their systems, network designs and deployments.
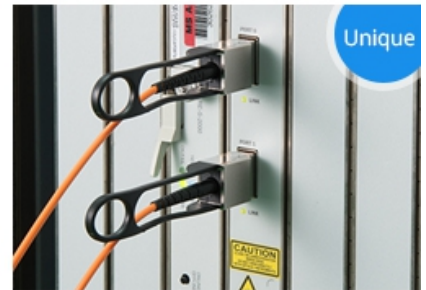
The original switches could be found nowhere but at FS.COM test center, eg: Juniper MX960 & EX 4300 series, Cisco Nexus 9396PX & Cisco ASR 9000 Series, HP 5900 Series & HP 5406R ZL2 V3(J9996A), Arista 7050S-64, Brocade ICX7750-26Q & ICX6610-48, Avaya VSP 7000 MDA 2, etc.

Cisco ASR 9000 Series(A9K-MPA-1X40GE)

ARISTA 7050S-64(DCS-7050S-64)

Juniper MX960

Brocade ICX 7750-26Q

Extreme Networks X670V VIM-40G4X

Mellanox M3601Q

Dell N4032F

HP 5406R ZL2 V3(J9996A)

AVAYA 7024XLS(7002QQ-MDA)

Test Assured Program

FS.COM truly understands the value of compatibility and interoperability to each optics. Every module FS.COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to facilities—professionally trained staff, advanced test facilities and comprehensive original-brand switches, to ensure our customers to receive the optics with superior quality.

Our smart data system allows effective product management and quality control according to the unique serial number, properly tracing the order, shipment and every part.
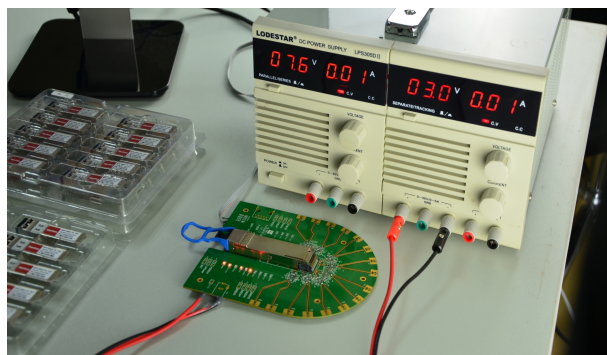
Our in-house coding facility programs all of our parts to standard OEM specs for compatibility on all major vendors and systems such as Cisco, Juniper, Brocade, HP, Dell, Arista and so on.

With a comprehensive line of original-brand switches, we can recreate an environment and test each optics in practical application to ensure quality and distance.

The last test assured step to ensure our products to be shipped with perfect package.

Order Information

Part Number	Data Rate	Length	Wire Gauge	Connector Type	Temp. Range	Cable Jacket
SFPP-PC005	Up to 10.5G	0.5m	AWG30	Passive Copper	0-70℃	PVC
SFPP-PC01	Up to 10.5G	1m	AWG30	Passive Copper	0-70℃	PVC
SFPP-PC015	Up to 10.5G	1.5m	AWG30	Passive Copper	0-70℃	PVC
SFPP-PC02	Up to 10.5G	2m	AWG30	Passive Copper	0-70℃	PVC
SFPP-PC025	Up to 10.5G	2.5m	AWG30	Passive Copper	0-70℃	PVC
SFPP-PC03	Up to 10.5G	3m	AWG30	Passive Copper	0-70℃	PVC
SFPP-PC04	Up to 10.5G	4m	AWG24	Passive Copper	0-70℃	PVC
SFPP-PC05	Up to 10.5G	5m	AWG24	Passive Copper	0-70℃	PVC
SFPP-PC06	Up to 10.5G	6m	AWG24	Passive Copper	0-70℃	PVC
SFPP-PC07	Up to 10.5G	7m	AWG24	Passive Copper	0-70℃	PVC

Notes:

1. 10G SFP+ Passive Copper Twinax Cable is individually tested on corresponding equipment such as Cisco, Arista, Juniper, Dell, Brocade and other brands, and passes the monitoring of FS.COM intelligent quality control system.

2. Customized 10GBASE SFP+ PCC are available in various lengths.

3. The Wire Gauge can be customized if it is required, like AWG24 and AWG30.

United Kingdom

Russia

Germany

United States

China

Singapore

Australia

🔒 https://www.fs.com ☆

The information in this document is subject to change without notice. FS has made all efforts to ensure the accuracy of the information, but all information in this document does not constitute any kind of warranty.