

400G QSFP-DD to 4x100G QSFP56 Passive Direct Attach Copper Breakout Cable

QDD-400G-4QPCxxx



Application

- 400G to 4x100G Ethernet

Standards

- SFF 8665
- QSFP-DD MSA
- SFF8436
- CMIS Rev 4.0
- IEEE 802.3cd

Features

- Recognizable, PVC Jacket
- Single 3.3V Power Supply
- <0.1W Low Power Consumption
- Hot Pluggable
- RoHS2 Compliant
- Operating Case Temperature Range: 0°C to +70°C

Product Specifications

I. Objectives

The objective is to provide 400G QSFP-DD to 4xQSFP56 cable assemblies. All materials and compounds used, meet the material restrictions of RoHS, (European Directive 2002/95/EC on the Restrictions of Hazardous Substances) as proposed by the RoHS Technical Adaptation Committee.

II. Scope

This specification is applicable to 400G QSFP-DD to 4xQSFP56 external connector system which provides a high speed cable to board interconnect.

FS's Quad Small Form-factor Double Density Pluggable solution achieving 400G transmission (hereafter referred to as QSFP-DD) is designed for high-density applications. The hot-pluggable transceiver integrates 8 transmitting and 8 receiving channels.

FS's QSFP-DD to 4xQSFP56 cable assemblies are high performance, high bandwidth and cost effective interconnect solutions which support 400G standards with different data rate applications.

No.	Part Number	Type	Length	AWG	Tolerance
1	Q-4Q56PC005	DAC	0.5 meter	30AWG	+0.05/-0 meter
2	Q-4Q56PC01	DAC	1 meter	30AWG	+0.05/-0 meter
3	Q-4Q56PC015	DAC	1.5 meter	28AWG	+0.05/-0 meter
4	Q-4Q56PC02	DAC	2 meter	28AWG	+0.05/-0 meter
5	Q-4Q56PC025	DAC	2.5 meter	28AWG	+0.05/-0 meter
6	Q-4Q56PC03	DAC	3 meter	28AWG	+0.05/-0 meter

III. Electrical Characteristics

The following documents are forming a part of this specification to the extent specified.

QSFP-DD MSA Rev. 5.0 QSFP-DD hardware Specification

CMIS Rev 4.0: Common Management Interface Specification

IEEE 802.3cd IEEE Standard for Ethernet Amendment

SFF8436: QSFP+ 10Gb/s 4X pluggable transceiver

SFF8665: QSFP+ 28Gb/s 4X pluggable transceiver solution (QSFP28)

SFF8679: QSFP+ 4X base electrical specification

SFF8636: Common Management Interface

IV. Electrical Characteristics

Operating Voltage: 3.135V~3.465V

OperatingTemperature : 0°C to +70°C

StorageTemperature : -40°Cto +85°C

Humidity Operating: 85% MAX.

QSFP-DD Module Insertion/Removal cycles: 50 cycles

QSFP Module Insertion/Removal cycles: 50 cycles

V. Electrical Characteristics

Design and construction

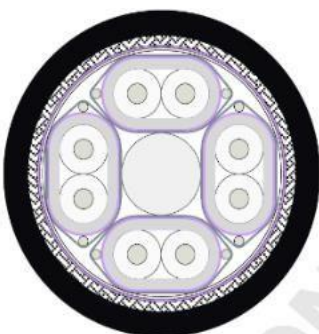
Connector

QSFP-DD connector meets QSFP-DD MSA Specification. QSFP connector meets SFF8661 Specification.



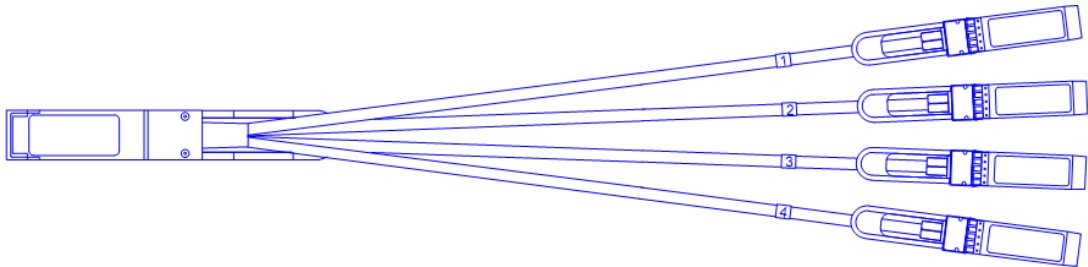
Cable

Cable type is a 100 ohm twinax cable which consists of 4 parallel pairs. Printing on the cable is defined in the respective cable specification. Each pair consists of two signal conductors and two drains wire wrapped in a shield.

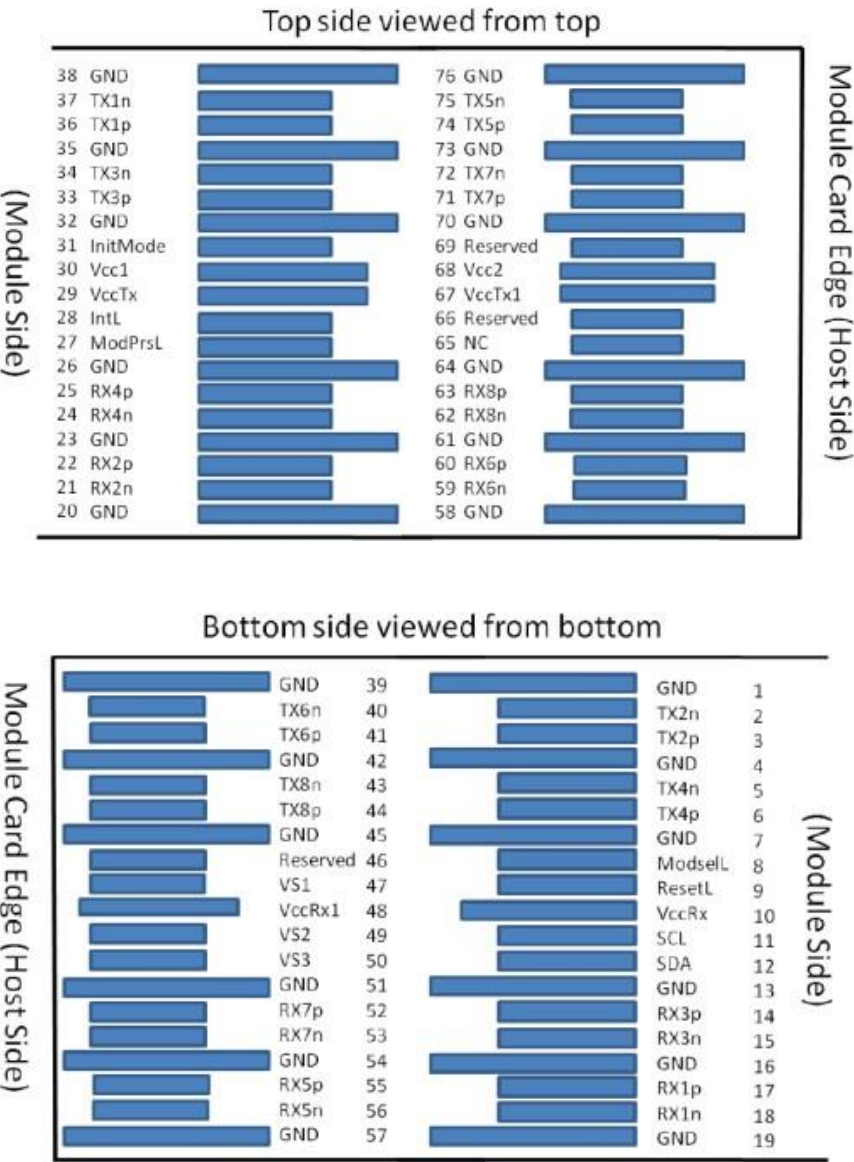


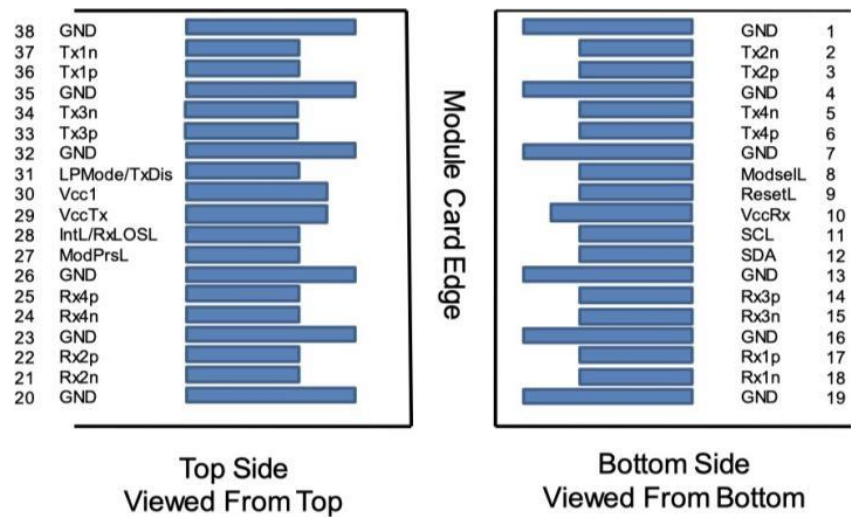
Cable Assembly

Cable Bulk shield is directly to be connected to the connector backshell to minimize EMI. Each cable assembly is labelled with a unique identification label. P1 side is QSFP- DD, P2 side is 4xQSFP.



Pin connection





Pin No.	P1 (QSFP-DD)		P2 (QSFP)	
	Pin	Signal	Pin	Signal
1	18	RX1n	37	TX1n(QSFP-1)
	17	RX1p	36	TX1p(QSFP-1)
2	36	TX1p	17	RX1p(QSFP-1)
	37	TX1n	18	RX1n(QSFP-1)
3	21	RX2n	2	TX2n(QSFP-1)
	22	RX2p	3	TX2p(QSFP-1)
4	3	TX2p	22	RX2p(QSFP-1)
	2	TX2n	21	RX2n(QSFP-1)
5	15	RX3n	37	TX1n(QSFP-2)
	14	RX3p	36	TX1p(QSFP-2)
6	33	TX3p	17	RX1p(QSFP-2)
	34	TX3n	18	RX1n(QSFP-2)
7	24	RX4n	2	TX2n(QSFP-2)
	25	RX4p	3	TX2p(QSFP-2)
8	6	TX4p	22	RX2p(QSFP-2)
	5	TX4n	21	RX2n(QSFP-2)

Pin No.	P1 (QSFP-DD)		P2 (QSFP)	
	Pin	Signal	Pin	Signal
9	56	RX5n	37	TX1n(QSFP-3)
	55	RX5p	36	TX1p(QSFP-3)
10	74	TX5p	17	RX1p(QSFP-3)
	75	TX5n	18	RX1n(QSFP-3)
11	59	RX6n	2	TX2n(QSFP-3)
	60	RX6p	3	TX2p(QSFP-3)
12	41	TX6p	22	RX2p(QSFP-3)
	40	TX6n	21	RX2n(QSFP-3)
13	53	RX7n	37	TX1n(QSFP-4)
	50	RX7p	36	TX1p(QSFP-4)
14	71	TX7p	17	RX1p(QSFP-4)
	72	TX7n	18	RX1n(QSFP-4)
15	62	RX8n	2	TX2n(QSFP-4)
	63	RX8p	3	TX2p(QSFP-4)
16	44	TX8p	22	RX2p(QSFP-4)
	43	TX8n	21	RX2n(QSFP-4)

VI. Electrical Performance Requirements

Pin No.	Test Items	Test Condition	Specification
6.2.1	Current		0.5A per Contact
6.2.2	Voltage		30 vDC per Contact
6.2.3	LLCR	EIA 364-23, 20mVdc, 100mA	Less Than 2 ohms.
6.2.4	Insulation Resistance	100 Vdc	10 Mohms Minimum between Adjacent Contacts
6.2.5	Dielectric Withstanding Voltage	300 VDC Minimum for 1 Minutes	No Defect or Breakdown between Adjacent Contacts
6.2.6	Temperature Rise	Measure the Temperature Rise at the Rated Current after 96 hours(45 minutes ON/15 minutes OFF per hour).	Temperature Rise: +30°C MAX.
6.2.7	Continuity	Verify the Continuous Electrical Path	No Open, Short, or High Resistance.

VII. SI Requirements

No.	Test Items	Specification	Notes
6.3.1	SDD21&SDD12	-17.16 dB Min. @13.28 GHz	From 0.01 GHz- 19GHz
6.3.2	SDD11&SDD22	-16.5+2*sqrt(f)dB Max. @0.05GHz~4.1GHz -10.66+14*log(f/5.5)dB Max.@4.1GHz~10GHz	From 0.01 GHz- 19GHz
6.3.3	SCD21-SDD21	-10 dB Max. @0.01 GHz~12.89 GHz-27+(29/22)*f dB Max. @12.89 GHz~15.7 GHz -6.3 dB Max. @15.7 GHz~19 GHz	From 0.01 GHz- 19GHz

VIII. Pin Function Definitions

No.	Test Items	Test Condition	Specification
1	Mating Forces	A rate of 10mm per minute	QSFP-DD<90N, QSFP<60N
2	Un-mating Forces	A rate of 10mm per minute	QSFP-DD<50N,QSFP<30N
3	Latch strength	Pull to separate module from cage Test with connector, cage & module (latch engaged)	Minimum of an 125N force
4	Bulk cable retention in module	Pull to separate bulk cable from module,Test with cable assembly only	Minimum of an 90N force
5	Wire Flex	Flex cable 180° for 10 cycles at X/Y axis, 20 times/minutes, with an 1kg suspended weight. Type C EIA 364-41, test condition I.	No microsecond discontinuities are allowed.
6	Durability	Perform 50 unplug/plug cycles	No evidence of physical damage
7	Cable Minimum Bend Radius	The cable is bent on time over the correct mandrel with 5 perpendicular, the Minimum bend Radius is 10x OD.	1.No physical damage 2.Verify continuity and SI

IX. Packing

The DAC products are packed each in a plastic bag. All connectors are covered with protective plastic caps. Depending on length and gauge size, different quantities can fit in the carton boxes. Bags and boxes are labeled.