

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



## Application

- 400G to 4x100G Ethernet

## Standards

- SFF 8665
- QSFP-DD MSA
- IEEE802.3bj
- IEEE802.3cd

## Features

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

## Description

FS's QSFP-DD cable assemblies are designed to accommodate standard and ganged connector configurations in demanding high-density requirements. FS's QSFP-DD to 4xQSFP cable assemblies are high performance, high bandwidth and cost effective interconnect solutions which support 400G standards with different data rate applications.

## I. General Requirements

Item	Description	Parameter	Requirement
G1	Connection Testing(Capacitance Measurement)	$C_{Tx_y-Rx_y}(300\mu s@3V)$	100nF $\pm$ 10%
G2	Short Circuit Cesting	$R_{Xy-yxy}(500\mu s@25VDC)$	$\geq 1M\Omega$
G3	Memory Map(EEProm)	N/A	

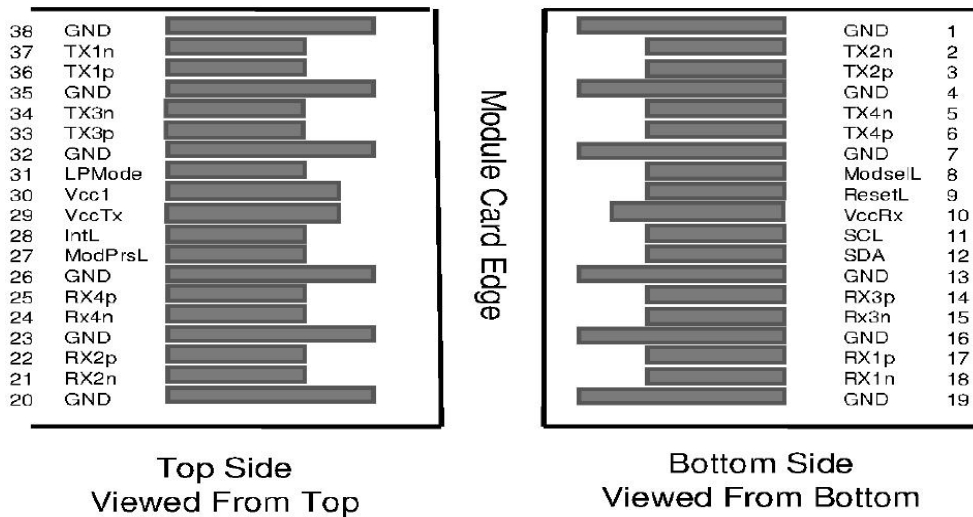
## II. Signal Integrity Requirements

Item	Description	Parameter	Requirement
S1	Insertion Loss@ 13.28 GHz	$S_{DD12}$ $S_{DD21}$	1m, 2m, Xm: $IL_{max} \leq 17.16dB$ Xm(maximum length)=TBD
S2	Differential Return Loss(up to 19 GHz)	$S_{DD11}$ $S_{DD22}$	
S3	Differential to Common Mode Conversion (up to 19 GHz)	$S_{CD12}-S_{DD12}$ $S_{CD21}-S_{DD21}$	$return\ loss(f) \geq \begin{cases} 16.5 - 2\sqrt{f} & 0.05 \leq f < 4.1 \\ 10.66 - 14\log_{10}(f/5.5) & 4.1 \leq f \leq 19 \end{cases} (dB)$ $ConversionLoss(f) - IL(f) \geq \begin{cases} 10 & 0.01 \leq f < 12.89 \\ 27 - (29/22)f & 12.89 \leq f < 15.7 \\ 6.3 & 15.7 \leq f \leq 19 \end{cases} (dB)$

### III. Product Length

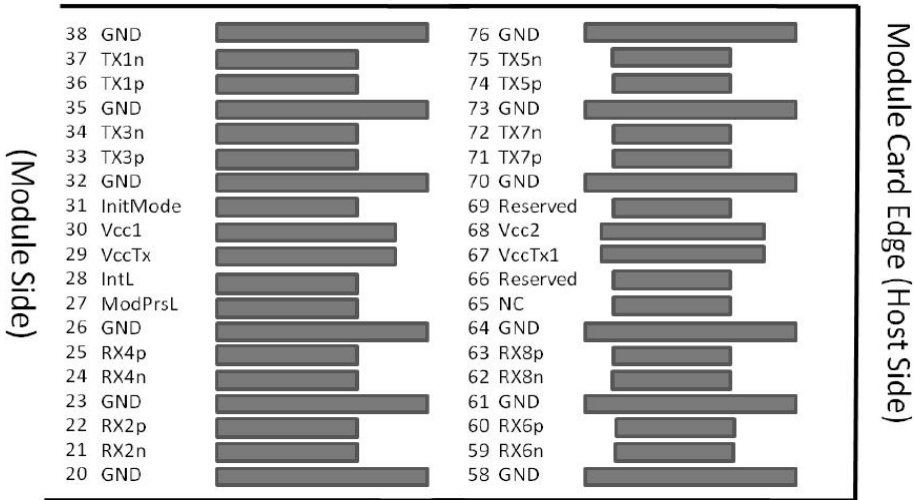
Total Assembly Length	AWG Size	Note
1000 +/- 30mm	AWG 30	The length includes plugs
1500 +/- 30mm	AWG 28	
2000 +/- 30mm	AWG 28	
2500 +/- 30mm	AWG 28	
3000 +/- 30mm	AWG 28	

### IV. Pin Definition

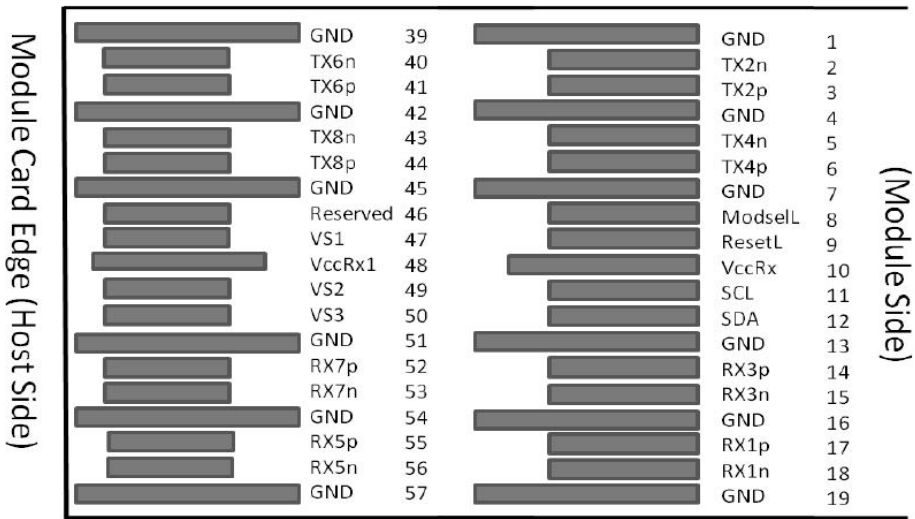


QSFP pin definition

Top side viewed from top



Bottom side viewed from bottom



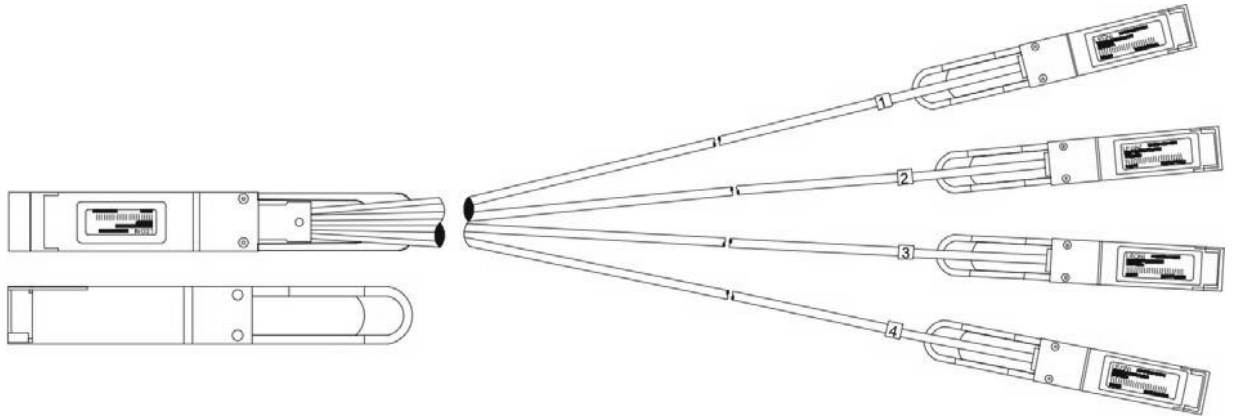
QSFP-DD pin definition

## V. Wire Connction

Parameter	P1 (QSFP-DD)		P2 (QSFP56)	
	Pin	Signal	Pin	Signal
<b>1</b>	18	RX1n	37	TX1n (QSFP-1)
	17	RX1p	36	TX1p (QSFP-1)
<b>2</b>	36	TX1p	17	RX1p (QSFP-1)
	37	TX1n	18	RX1n (QSFP-1)
<b>3</b>	21	RX2n	2	TX2n (QSFP-1)
	22	RX2p	3	TX2p (QSFP-1)
<b>4</b>	3	TX2p	22	RX2p (QSFP-1)
	2	TX2n	21	RX2n (QSFP-1)
<b>5</b>	15	RX3n	37	TX1n (QSFP-2)
	14	RX3p	36	TX1p (QSFP-2)
<b>6</b>	33	TX3p	17	RX1p (QSFP-2)
	34	TX3n	18	RX1n (QSFP-2)
<b>7</b>	24	RX4n	2	TX2n (QSFP-2)
	25	RX4p	3	TX2p (QSFP-2)
<b>8</b>	6	TX4p	22	RX2p (QSFP-2)
	5	TX4n	21	RX2n (QSFP-2)

Parameter	P1 (QSFP-DD)		P2 (QSFP56)	
	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)
	52	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. Mechanical Dimensions



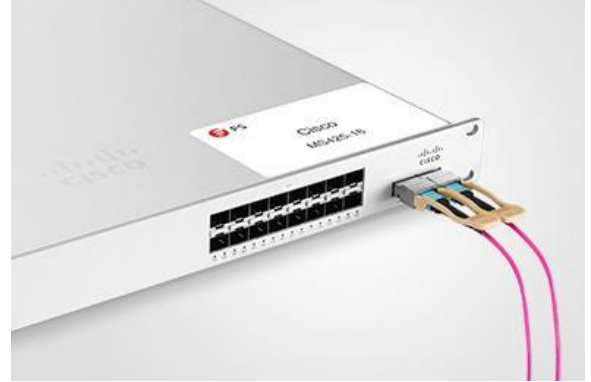
## Test Center

### I. Compatibility Testing

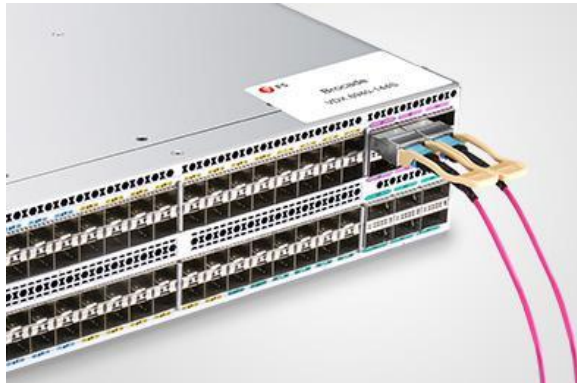
Each fiber optical transceiver has been tested in host device on site in FS Assured Program to ensure full compatibility with over 200 vendors.



Cisco Catalyst C9500-24Y4C



Cisco MS425-16



Brocade VDX 6940-144S



Dell EMC Networking Z9100-ON



Force@tm S60-44T



HUAWEI S6720-30L-HI-24S

Above is part of our test bed network equipment. For more information, please click the Test Bed PDF. It will be updated in real time as we expand our portfolio.



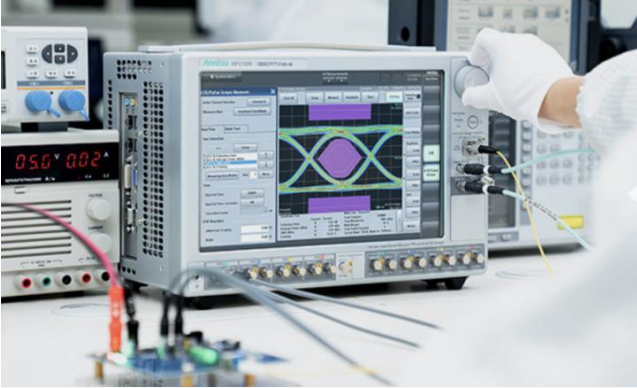
## II. Performance Testing

Each fiber optical transceiver has been fully tested in FS Assured Program equipped with world's most advanced analytical equipment to ensure that our transceivers work perfectly on your device.

### 1. TX/RX Signal Quality Testing

Equipped with the all-in-one tester integrated 4ch BERT & sampling oscilloscope, and variable optical attenuator to ensure the input and output signal quality.

- Eye Pattern Measurements: jitter, Mask Margin, etc
- Average Output Power
- OMA
- Extinction Ratio
- Receiver Sensitivity
- BER Curve



### 2. Reliability and Stability Testing

Subject the transceivers to dramatic changes in temperature on the thermal shock chamber to ensure reliability and stability of the transceivers.

- Commercial: 0 °C to 70 °C
- Extended: -5 °C to 85 °C
- Industrial: -40 °C to 85 °C



### 3. Transfer Rate and Protocol Testing

Test the actual transfer data rate and the transmission ability under different protocols with Network Master Pro.

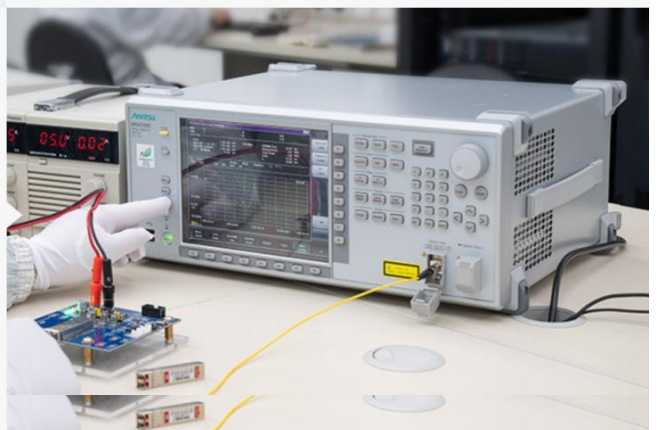
- Ethernet
- Fibre Channel
- SDH/SONET
- CPRI



### 4. Optical Spectrum Evaluation

Evaluate various important parameters with the Optical Spectrum Analyzer to meet the industry standards.

- Center Wavelength, Level
- OSNR
- SMSR
- Spectrum Width



## Order Information

Part Number	Length	AWG	Minimum Bend Results	Cable Color	Description
Q-4Q28PC005	0.5m	30	35mm	Black	Passive Copper Cable, up to 400Gb/s, QSFP56, 0.5m, 30 AWG
Q-4Q28PC01	1m	30	35mm	Black	Passive Copper Cable, up to 400Gb/s, QSFP56, 1m, 30 AWG
Q-4Q28PC015	1.5m	28	41mm	Black	Passive Copper Cable, up to 400Gb/s, QSFP56, 1.5m, 28 AWG
Q-4Q28PC02	2m	28	41mm	Black	Passive Copper Cable, up to 400Gb/s, QSFP56, 2m, 28 AWG
Q-4Q28PC025	2.5m	28	41mm	Black	Passive Copper Cable, up to 400Gb/s, QSFP56, 2.5m, 28 AWG
Q-4Q28PC03	3m	28	41mm	Black	Passive Copper Cable, up to 400Gb/s, QSFP56, 3m, 28 AWG



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