

400Gbps QSFP DD To 8x 50G SFP56

Passive Direct Attach Copper Breakout Cable Specification

1 Description :

400G QSFP DD passive cable assembly products, based on the 8X50G structure (PAM4 signal), adopt an optimized design to reduce crosstalk and insertion loss, have excellent signal integrity, and fully comply with the next generation of 400G Ethernet and InfiniBand EDR standards.

SFP56 is based on the same shape as SFP+, supports 50G PAM4 Ethernet standard, can provide 50Gb/s error-free transmission, and can be used in high-density 50G Ethernet switches and network interfaces to promote server connections in data centers. It uses today's popular SFP+ packaging form to upgrade 50G Ethernet connections for enterprises, providing a more cost-effective solution.

400G QSFP DD To 8x50G SFP56 supports the interconnection of two interface devices, with a single-channel transmission rate of 50Gbps (PAM4).

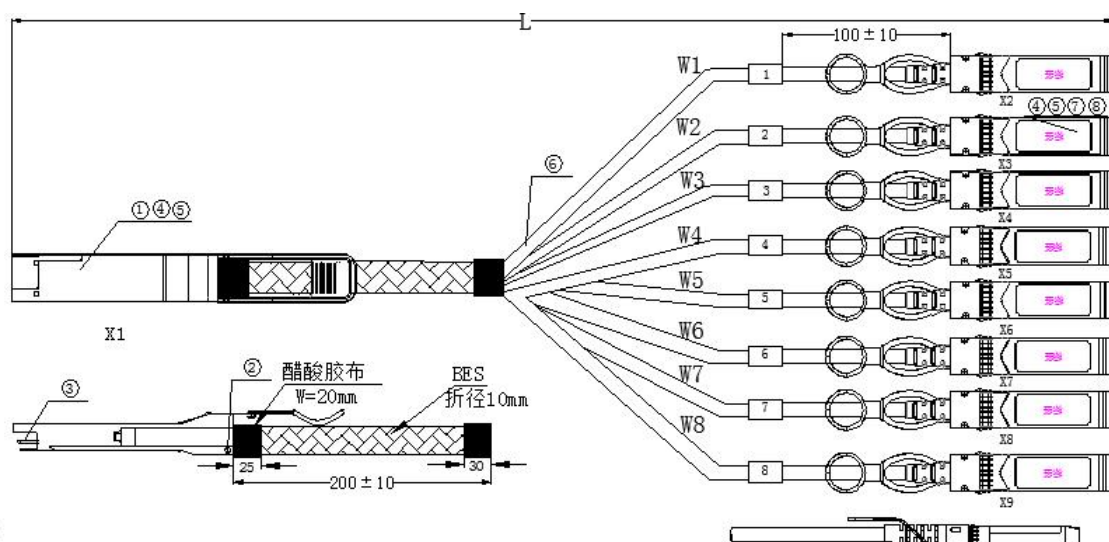
2 Product Features

- Comply with SFF-8636, SFF-8402
- Complies with Ethernet IEEE802.3bj/IEEE 802.3cd
- Compliant with QSFP DD MSA
- Support serial ID function through EEPROM
- Support hot swap, low crosstalk, low power consumption
- Support the maximum distance of 3 meters
- Operating temperature range: 0°C to 70°C
- RoHS compliant

3 Applications :

- 200g/400g Ethernet
- Infiniband EDR, HDR
- Switches, routers, hubs, data center

4 Outline drawing:



5 Wiring Diagram:

wire	Starting signal	Starting	End	End signal	wire	Starting signal	Starting	End	End signal
W1	RX1+	X1. 17	X2. 18	TX1+	W5	RX5+	X1. 55	X6. 18	TX5+
	RX1-	X1. 18	X2. 19	TX1-		RX5-	X1. 56	X6. 19	TX5-
	GND	X1. 19	X2. 20	GND		GND	X1. 57	X6. 20	GND
	TX1+	X1. 36	X2. 13	RX1+		TX5+	X1. 74	X6. 13	RX5+
	TX1-	X1. 37	X2. 12	RX1-		TX5-	X1. 75	X6. 12	RX5-
	GND	X1. 38	X2. 14	GND		GND	X1. 76	X6. 14	GND
W2	GND	X1. 20	X3. 20	GND	W6	GND	X1. 58	X7. 20	GND
	RX2-	X1. 21	X3. 19	TX2-		RX6-	X1. 59	X7. 19	TX6-
	RX2+	X1. 22	X3. 18	TX2+		RX6+	X1. 60	X7. 18	TX6+
	GND	X1. 1	X3. 14	GND		GND	X1. 39	X7. 14	GND
	TX2-	X1. 2	X3. 12	RX2-		TX6-	X1. 40	X7. 12	RX6-
	TX2+	X1. 3	X3. 13	RX2+		TX6+	X1. 41	X7. 13	RX6+
W3	RX3+	X1. 14	X4. 18	TX3+	W7	RX7+	X1. 52	X8. 18	TX7+
	RX3-	X1. 15	X4. 19	TX3-		RX7-	X1. 53	X8. 19	TX7-
	GND	X1. 16	X4. 20	GND		GND	X1. 54	X8. 20	GND
	TX3+	X1. 33	X4. 13	RX3+		TX7+	X1. 71	X8. 13	RX7+
	TX3-	X1. 34	X4. 12	RX3-		TX7-	X1. 72	X8. 12	RX7-
	GND	X1. 35	X4. 14	GND		GND	X1. 73	X8. 14	GND
W4	GND	X1. 23	X5. 20	GND	W8	GND	X1. 61	X9. 20	GND
	RX4-	X1. 24	X5. 19	TX4-		RX8-	X1. 62	X9. 19	TX8-
	RX4+	X1. 25	X5. 18	TX4+		RX8+	X1. 63	X9. 18	TX8+
	GND	X1. 4	X5. 14	GND		GND	X1. 42	X9. 14	GND
	TX4-	X1. 5	X5. 12	RX4-		TX8-	X1. 43	X9. 12	RX8-
	TX4+	X1. 6	X5. 13	RX4+		TX8+	X1. 44	X9. 13	RX8+

6 (Electrical Performance):

6.1 (Signal Integrity)

(ITEM)		(REQUIREMENT)	(TEST CONDITION)
(Differential Impedance)	Cable Impedance	105+5/-10Ω	Rise time of 25ps (20 % - 80 %).
	Paddle Card Impedance	100±10Ω	
	Cable Termination Impedance	100±15Ω	
[Differential (Input/Output)Return loss S _{DD11} /S _{DD22}]	$\text{Return_loss}(f) \geq \begin{cases} 16.5-2\sqrt{f} & 0.05 \leq f < 4.1 \\ 10.66-14\log_{10}(f/5.5) & 4.1 \leq f \leq 19 \end{cases}$ Where f is the frequency in GHz Return loss(f) is the return loss at frequency f	10MHz ≤ f ≤ 19GHz	

[Differential to common-mode (Input/Output)Return loss S_{CD11}/S_{CD22}]	$\text{Return_loss}(f) \geq \left\{ \begin{array}{ll} 22-(20/25.78)f & 0.01 \leq f < 12.89 \\ 15-(6/25.78)f & 12.89 \leq f \leq 19 \end{array} \right\}$ <p>Where f is the frequency in GHz $\text{Return_loss}(f)$ is the Differential to common-mode return loss at frequency f</p>	$10\text{MHz} \leq f \leq 19\text{GHz}$																																			
[Common-mode to Common-mode (Input/Output)Return loss S_{CC11}/S_{CC22}]	$\text{Return_loss}(f) \geq 2\text{dB} \quad 0.2 \leq f \leq 19$ <p>Where f is the frequency in GHz $\text{Return_loss}(f)$ is the common-mode to common-mode return loss at frequency f</p>	$10\text{MHz} \leq f \leq 19\text{GHz}$																																			
[Differential Insertion Loss (S_{DD21} Max.)]	<p>(Differential Insertion Loss Max. For TPa to TPb Excluding Test fixture)</p> <table border="1" data-bbox="478 806 1270 1388"> <thead> <tr> <th>F AWG</th> <th>1.25GHz</th> <th>2.5GHz</th> <th>5.0GHz</th> <th>7.0GHz</th> <th>10Ghz</th> <th>12.89Ghz</th> </tr> </thead> <tbody> <tr> <td>30(1m) Max.</td> <td>4.5dB</td> <td>5.4dB</td> <td>6.3dB</td> <td>7.5dB</td> <td>8.5dB</td> <td>10.5dB</td> </tr> <tr> <td>30/28(3m)Max.</td> <td>7.5dB</td> <td>9.5dB</td> <td>12.2dB</td> <td>14.8dB</td> <td>18.0dB</td> <td>21.5dB</td> </tr> <tr> <td>26(3m) Max.</td> <td>5.7dB</td> <td>7.2dB</td> <td>9.9 dB</td> <td>11.9dB</td> <td>14.1dB</td> <td>16.5dB</td> </tr> <tr> <td>26/25(5m)Max.</td> <td>7.8dB</td> <td>10.0dB</td> <td>13.5dB</td> <td>16.0dB</td> <td>19.0dB</td> <td>22.0dB</td> </tr> </tbody> </table>	F AWG	1.25GHz	2.5GHz	5.0GHz	7.0GHz	10Ghz	12.89Ghz	30(1m) Max.	4.5dB	5.4dB	6.3dB	7.5dB	8.5dB	10.5dB	30/28(3m)Max.	7.5dB	9.5dB	12.2dB	14.8dB	18.0dB	21.5dB	26(3m) Max.	5.7dB	7.2dB	9.9 dB	11.9dB	14.1dB	16.5dB	26/25(5m)Max.	7.8dB	10.0dB	13.5dB	16.0dB	19.0dB	22.0dB	$10\text{MHz} \leq f \leq 19\text{GHz}$
F AWG	1.25GHz	2.5GHz	5.0GHz	7.0GHz	10Ghz	12.89Ghz																															
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Differential to common-mode Conversion Loss-Differential Insertion Loss($S_{CD21}-S_{DD21}$)	$\text{Conversion_loss}(f) - \text{IL}(f) \geq \left\{ \begin{array}{ll} 10 & 0.01 \leq f < 12.89 \\ 27-(29/22)f & 12.89 \leq f < \end{array} \right\}$ <p>Where f is the frequency in GHz $\text{Conversion_loss}(f)$ is the cable assembly differential to common-mode conversion loss $\text{IL}(f)$ is the cable assembly insertion loss</p>	$10\text{MHz} \leq f \leq 19\text{GHz}$																																			
[MDNEXT(multiple disturber near-end crosstalk)]	$\geq 26\text{dB} @ 12.89\text{GHz}$	$10\text{MHz} \leq f \leq 19\text{GHz}$																																			

6.2 (Other Electrical Performance)

(ITEM)	(REQUIREMENT)	(TEST CONDITON)
[Low Level Contact Resistance]	70milliohms Max. From initial.	EIA-364-23:Apply a maximum voltage of 20mV And a current of 100 mA.
Insulation Resistance	10Mohm(Min.)	EIA364-21:AC 300V 1minute
[Dielectric Withstanding Voltage]	NO disruptive discharge.	EIA-364-20:Apply a voltage of 300 VDC for 1minute between adjacent terminals And between adjacent terminals and ground.

7 (Environment Performance)

(ITEM)	(REQUIREMENT)	(TEST CONDITON)
[Operating Temp. Range]	-20°C to +75°C	Cable operating temperature range.
[Storage Temp. Range (in packed condition)]	-40°C to +80°C	Cable storage temperature range in packed condition.
[Thermal Cycling Non-Powered]	No evidence of physical damage	EIA-364-32D, Method A, -25 to 90C, 100 cycles, 15 min. dwells
[Salt Spraying]	48 hours salt spraying after shell corrosive area less than 5%.	EIA-364-26
Mixed Flowing Gas	Pass electrical tests per 3.1 after stressing. (For connector only)	EIA-364-35 Class II,14 days.
Temp. Life	No evidence of physical damage	EIA-364-17C w/ RH, Damp heat 90°C at 85% RH for 500 hours then return to ambient
Cable Cold Bend	4H,No evidence of physical damage	Condition: -20°C±2°C, mandrel diameter is 6 times the cable diameter.

8 (Mechanical and Physical Characteristics)

(ITEM)	(REQUIREMENT)	(TEST CONDITON)
Vibration	Pass electrical tests per 3.1 after stressing.	Clamp & vibrate per EIA-364-28E, TC-VII, test condition letter – D, 15 minutes in X, Y & Z axis.
Cable Flex	No evidence of physical damage	Flex cable 180° for 20 cycles ($\pm 90^\circ$ from nominal position) at 12 cycles per minute with a 1.0kg load applied to the cable jacket. Flex in the boot area 90° in each direction from vertical. Per EIA-364-41C
Cable Plug Retention in Cage	90N Min. No evidence of physical damage	Force to be applied axially with no damage to cage. Per SFF 8661 Rev 2.1 Pull on cable jacket approximately 1 ft behind cable plug. No functional damage to cable plug below 90N. Per SFF-8432 Rev 5.0
Cable Retention in Plug	90N Min. No evidence of physical damage	Cable plug is fixtured with the bulk cable hanging vertically. A 90N axial load is applied (gradually) to the cable jacket and held for 1 minute. Per EIA-364-38B
Mechanical Shock	Pass electrical tests Per 3.1 after stressing.	Clamp and shock per EIA-364-27B, TC-G,3 times in 6 directions, 100g, 6ms.
Cable Plug Insertion	40N Max.(QSFP DD) 18N Max.(SFP28)	Per SFF8661 Rev 2.1 Per SFF-8432 Rev 5.0
Cable plug Extraction	30N Max. (QSFP DD) 12.5N Max. (SFP28)	Place axial load on de-latch to de-latch plug.Per SFF8661 Rev 2.1 Measure without the aid of any cage kick-out springs. Place axial load on de-latch to de-latch plug. Per SFF-8432 Rev 5.0
Durability	50 cycles,No evidence of physical damage	EIA-364-09, perform plug & unplug cycles: Plug and receptacle mate rate: 250times/hour. 50times for QSFP DD/SFP28 module (CONNECTOR TO PCB)