100Gbps QSFP28 To 4x 25G SFP28 Passive High Speed Cable Specification

The 100G QSFP28 passive cable based on 4X25G or 4X28G structure, can satisfy the next generation of 100G switches, servers, routers and other product applications.

QSFP28 cable module adopts optimized design to reduce crosstalk and insertion loss. It has excellent signal integrity and fully meets the next generation 100G Ethernet and InfiniBand EDR standards.

SFP28 is based on the same shape of SFP+ and supports 25G Ethernet standard. It can provide 25GB/s error-free transmission, and can be applied to high density 25G Ethernet switch and network interface to promote server connection in data center. It uses the popular SFP + package form, provides a more cost-effective solution for enterprises to upgrade 10G Ethernet connection.

100G QSFP28 to 4x25G SFP28 supports the interconnection of four interface devices with a single channel transmission rate of 25Gbps.

2 Product Features:

Compliant with SFF-8636, SFF-8402

Compliant with IEEE802.3bj

Supporting I2C two-wire serial interface for easy control

Supporting hot insertion

Low crosstalk

low power consumption

ROHS compliant

3 Applications :

10G/40G/100g Ethernet

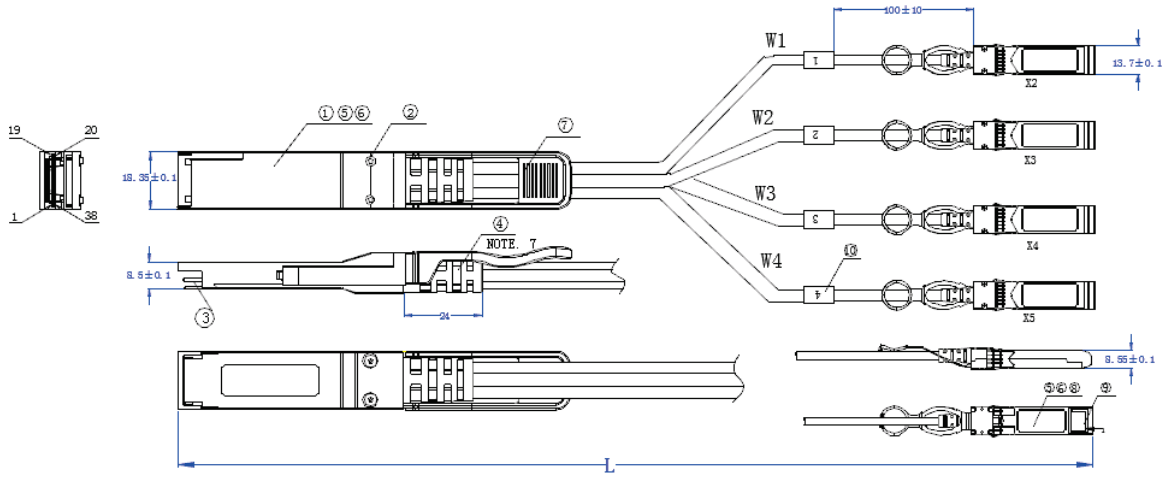
Infiniband: SDR, DDR, QDR,FDR,EDR

Switch

Router

Data Center, Cloud Server

4 Outline drawing:



5 Wiring Diagram:

wire	Starting signal	Starting	End	End signal
W1	RX1+	X1.17	X2.18	TX1+
	RX1−	X1.18	X2.19	TX1−
	GND	X1.19	X2.20	GND
	TX1+	X1.36	X2.13	RX1+
	TX1−	X1.37	X2.12	RX1−
	GND	X1.38	X2.14	GND
W2	GND	X1.20	X3.20	GND
	RX2−	X1.21	X3.19	TX2−
	RX2+	X1.22	X3.18	TX2+
	GND	X1.1	X3.14	GND
	TX2−	X1.2	X3.12	RX2−
	TX2+	X1.3	X3.13	RX2+

wire	Starting signal	Starting	End	End signal
W3	RX3+	X1.14	X4.18	TX3+
	RX3−	X1.15	X4.19	TX3−
	GND	X1.16	X4.20	GND
	TX3+	X1.33	X4.13	RX3+
	TX3−	X1.34	X4.12	RX3−
	GND	X1.35	X4.14	GND
W4	GND	X1.23	X5.20	GND
	RX4−	X1.24	X5.19	TX4−
	RX4+	X1.25	X5.18	TX4+
	GND	X1.4	X5.14	GND
	TX4−	X1.5	X5.12	RX4−
	TX4+	X1.6	X5.13	RX4+

6 Electrical Performance:

6.1 Signal Integrity

<table>
<tr><th colspan="2">ITEM</th><th>REQUIREMENT</th><th>TEST CONDITION</th></tr>
<tr><td rowspan="3">Differential Impedance</td><td>Cable Impedance</td><td>105+5/-10Ω</td><td rowspan="3">Rise time of 25ps (20 % - 80 %).</td></tr>
<tr><td>Paddle Card Impedance</td><td>100±10Ω</td></tr>
<tr><td>Cable Termination Impedance</td><td>100±15Ω</td></tr>
<tr><td colspan="2">[Differential (Input/Output)Return loss S_{DD11}/S_{DD22}]</td><td>Return_loss(f)$\geqslant$ $\begin{cases} 16.5-2\sqrt{f} & 0.05\leqslant f<4.1 \\ 10.66-14\log_{10}(f/5.5) & 4.1\leqslant f\leqslant 19 \end{cases}$
Where
f is the frequency in GHz
Return loss(f) is the return loss at frequency f</td><td>10MHz$\leqslant$f $\leqslant$19GHz</td></tr>
<tr><td colspan="2">[Differential to common-mode (Input/Output)Return loss S_{CD11}/S_{CD22}]</td><td>Return_loss(f)$\geqslant$ $\begin{cases} 22-(20/25.78)f & 0.01\leqslant f<12.89 \\ 15-(6/25.78)f & 12.89\leqslant f\leqslant 19 \end{cases}$
Where
f is the frequency in GHz
Return_loss(f) is the Differential to common-mode return loss at frequency f</td><td>10MHz$\leqslant$f $\leqslant$19GHz</td></tr>
<tr><td colspan="2">[Common-mode to Common-mode (Input/Output)Return loss S_{CC11}/S_{CC22}]</td><td>Return_loss(f)$\geqslant$2dB 0.2$\leqslant$f$\leqslant$19
Where
f is the frequency in GHz
Return_loss(f) is the common-mode to common-mode return loss at frequency f</td><td>10MHz$\leqslant$f $\leqslant$19GHz</td></tr>
<tr><td colspan="2">[Differential Insertion Loss (S_{DD21} Max.)]</td><td>(Differential InsertionLoss Max. For TPa to TPb Excluding Test fixture)
<table>
<tr><th>FAWG</th><th>1.25GHz</th><th>2.5GHz</th><th>5.0GHz</th><th>7.0GHz</th><th>10Ghz</th><th>12.89Ghz</th></tr>
<tr><td>30(1m)Max.</td><td>4.5dB</td><td>5.4dB</td><td>6.3dB</td><td>7.5dB</td><td>8.5dB</td><td>10.5dB</td></tr>
<tr><td>30/28(3m</td><td>7.5dB</td><td>9.5dB</td><td>12.2dB</td><td>14.8dB</td><td>18.0dB</td><td>21.5dB</td></tr>
</table></td><td>10MHz$\leqslant$f $\leqslant$19GHz</td></tr>
</table>

	)Max.							
	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	
Differential to common-mode Conversion Loss-Differential Insertion Loss(S_{CD21}-S_{DD21})	Conversion _loss(f) – IL(f)≥ $\begin{cases} 10 & 0.01 \leqslant f < \\ 12.89 & \\ 27-(29/22)f & 12.89 \leqslant f < 15.7 \end{cases}$ Where f is the frequency in GHz Conversion_loss(f) is the cable assembly differential to common-mode conversion loss IL(f) is the cable assembly insertion loss							10MHz≤f ≤19GHz
[MDNEXT(multiple disturber near-end crosstalk)]	≥26dB @12.89GHz							10MHz≤f ≤19GHz

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]	-0°C to +70°C	Cable operating temperature range.
[Storage Temp. Range (in packed condition)]	-40°C to +85°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℃ at 85% RH for 500 hours then return to ambient
Cable Cold Bend	4H,No evidence of physical damage	Condition: -20℃±2℃, 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.
Twist	No evidence of physical damage	Twist cable 180° (±90° from nominal position) for 100 cycles at 30 cycles per minute with a 0.5kg load applied to the cable jacket. Clamp position: 300mm
Cable Flex	No evidence of physical damage	Flex cable 180° for 20 cycles (±90° from nominal position) at 12 cycles per minute with a 1.0kg load applied to the cable jacket. Flex in the boot area 90º 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.(QSFP28) 18N Max.(SFP28)	Per SFF8661 Rev 2.1 Per SFF-8432 Rev 5.0
Cable plug Extraction	30N Max. (QSFP28) 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 QSFP28/SFP28 module (CONNECTOR TO PCB)

9 Package diagram:

The connectors at both ends are protected by protective sleeves and each PCS is separately packed in an antistatic bag.

<=2m : 200mm*300mm

>2m: 300mm*400mm