

APPROVAL SHEET

To :

Customer P/N :

UDE P/N : 11000-00008-WW

Description : 100Gbps QSFP28 Passive High
Speed Cable Specification
L=1000MM



Spec No.

Update Date
2019/5/16

Revision
A

Approved	Checked	Prepared



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1. 产品描述(Description) :

- 1.1 100G QSFP28 无源电缆组件产品, 基于4X25G或者4X28G的结构，
该产品可以很好满足下一代100G交换机，服务器，路由器等
产品应用的需求。
- 1.2 QSFP28 电缆组件采用优化的设计降低串扰和插损，具有优异的信号
完整性，完全符合下一代100G以太网和InfiniBand EDR标准。

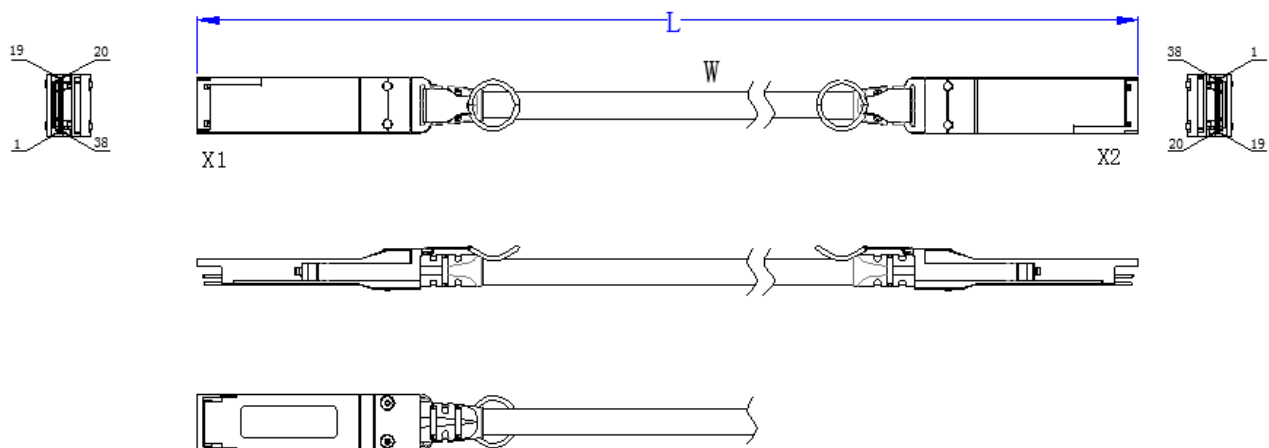
2. 产品特性(Product Features)

- 2.1 產品符合SFF-8636
- 2.2 符合以太網IEEE802.3bj
- 2.3 支持I2C 二線串接口，便於控制
- 2.4 支持熱插拔
- 2.5 低串擾
- 2.6 低功耗

3. 产品应用(Applications):

- 3.1 10G/40G /100g以太網
- 3.2 Infiniband SDR, DDR, QDR, FDR, EDR
- 3.3 交換機
- 3.4 路由器
- 3.5 數據中心、云服務器

4. 外形图(Outline drawing):



5. 接线图(Wiring Diagram) :

X1	X2	REMARKS	X1	X2	REMARKS
18(RX1-)	37(TX1-)	pair	37(TX1-)	18(RX1-)	pair
17(RX1+)	36(TX1+)		36(TX1+)	17(RX1+)	
15(RX3-)	34(TX3-)	pair	34(TX3-)	15(RX3-)	pair
14(RX3+)	33(TX3+)		33(TX3+)	14(RX3+)	
6 (TX4+)	25(RX4+)	pair	25(RX4+)	6 (TX4+)	pair
5 (TX4-)	24(RX4-)		24(RX4-)	5 (TX4-)	
3 (TX2+)	22(RX2+)	pair	22(RX2+)	3 (TX2+)	pair
2 (TX2-)	21(RX2-)		21(RX2-)	2 (TX2-)	
1, 4, 7, 13, 16, 19, 20, 23, 26, 32, 35, 38	1, 4, 7, 13, 16, 19, 20, 23, 26, 32, 35, 38	GND	8, 9, 10, 11, 12, 27, 28, 29, 30, 31	8, 9, 10, 11, 12, 27, 28, 29, 30, 31	EEPROM point at both ends

6. 电气性能 (Electrical Performance) :

6.1 信号完整性 (Signal Integrity)

项目 (ITEM) ↴		要求 (REQUIREMENT) ↴	测试条件 (TEST CONDITION) ↴
差模阻抗 (Differential Impedance) ↴	Cable Impedance↴	105+5/-10Ω↴	Rise time of 25ps (20 % - 80 %)... ↴
	Paddle Card Impedance↴	100±10Ω↴	
	Cable Termination Impedance↴	100±15Ω↴	
差模回波损耗↴ [Differential (Input/Output)Return loss SDD11/SDD22]↴		$\text{Return loss}(f) \geq \left\{ \begin{array}{ll} 16.5-2\sqrt{f} & 0.05 \leq f < 4.1 \\ 10.66-14\log_{10}(f/5.5) & 4.1 \leq f \leq 19 \end{array} \right\}$ Where↴ f is the frequency in GHz↴ Return loss(f) is the return loss at frequency f↴	10MHz≤f ≤19GHz↴
差模转共模回波损耗 [Differential to common-mode (Input/Output)Return loss SCD11/SCD22]↴		$\text{Return loss}(f) \geq \left\{ \begin{array}{ll} 22-(20/25.78)\sqrt{f} & 0.01 \leq f < 12.89 \\ 15-(6/25.78)\sqrt{f} & 12.89 \leq f \leq 19 \end{array} \right\}$ Where↴ f is the frequency in GHz↴ Return loss(f) is the Differential to common-mode return loss at frequency f↴	10MHz≤f ≤19GHz↴
共模回波损耗 [Common-mode to Common-mode↴ (Input/Output)Return loss SCC11/SCC22]↴		$\text{Return loss}(f) \geq 2\text{dB} \quad 0.2 \leq f \leq 19$ Where↴ f is the frequency in GHz↴ Return loss(f) is the common-mode to common-mode return loss at frequency f↴	10MHz≤f ≤19GHz↴
差模插入损耗[Differential Insertion Loss (SDD21 Max.)]↴		(Differential Insertion Loss Max. For TPa to TPb Excluding Test fixture)↴	
		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	
插入损耗偏差[Insertion Loss Deviation]	$-0.176 \cdot f - 0.7 \leq ILD \leq 0.176 \cdot f + 0.7$							$50\text{MHz} \leq f \leq 19\text{GHz}$
Differential to common-mode Conversion Loss-Differential Insertion Loss($S_{CD21}-S_{DD21}$)	$\text{Conversion_loss}(f) - IL(f) \geq \begin{cases} 10 & 0.01 \leq f < 12.89 \\ 27 - (29/22)f & 12.89 \leq f < 15.7 \end{cases}$ 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							$10\text{MHz} \leq f \leq 19\text{GHz}$
近端串音 [MDNEXT(multiple disturber near-end crosstalk)]	$\geq 26\text{dB} @ 12.89\text{GHz}$							$10\text{MHz} \leq f \leq 19\text{GHz}$
对内延时差[Intra Skew]	15ps/m							$10\text{MHz} \leq f \leq 19\text{GHz}$

6.2 其他电气性能 (Other Electrical Performance)

项目 (ITEM)	要求 (REQUIREMENT)	测试条件 (TEST CONDITON)
低功率接触阻抗[Low Level Contact Resistance]	70milliohms Max. From initial.	EIA-364-23:Apply a maximum voltage of 20mV And a current of 100 mA.
绝缘阻抗 Insulation Resistance	10Mohm(Min.)	EIA364-21:AC 300V 1minute
耐电压 [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

7. 环境性能 (Environment Performance)

项目 (ITEM) ◊	要求 (REQUIREMENT) ◊	测试条件 (TEST CONDITON) ◊
工作温度[Operating Temp. Range]◊	-20°C to +75°C◊	Cable operating temperature range.◊
储存温度[Storage Temp. Range◊ (in packed condition)]◊	-40°C to +80°C◊	Cable storage temperature range◊ <u>in packed condition.</u> ◊
热循环[Thermal Cycling Non-Powered]◊	No evidence of physical damage◊	EIA-364-32D, Method A, -25 to 90C, 100 cycles, 15 min. dwells◊
盐雾测试[Salt Spraying]◊	48 hours salt spraying after shell◊ <u>corrosive area less than 5%.</u> ◊	EIA-364-26◊
混合气体测试◊ Mixed Flowing Gas◊	Pass electrical tests per 3.1 after ◊ <u>stressing.</u> (For connector only)◊	EIA-364-35 Class II, <u>14</u> days.◊
温度寿命◊ 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◊
冷弯测试◊ Cable Cold Bend◊	4H, No evidence of physical damage◊	Condition: -20°C±2°C, mandrel diameter is 6 times the cable diameter.◊

9. 机械和物理特性 (Mechanical and Physical Characteristics)

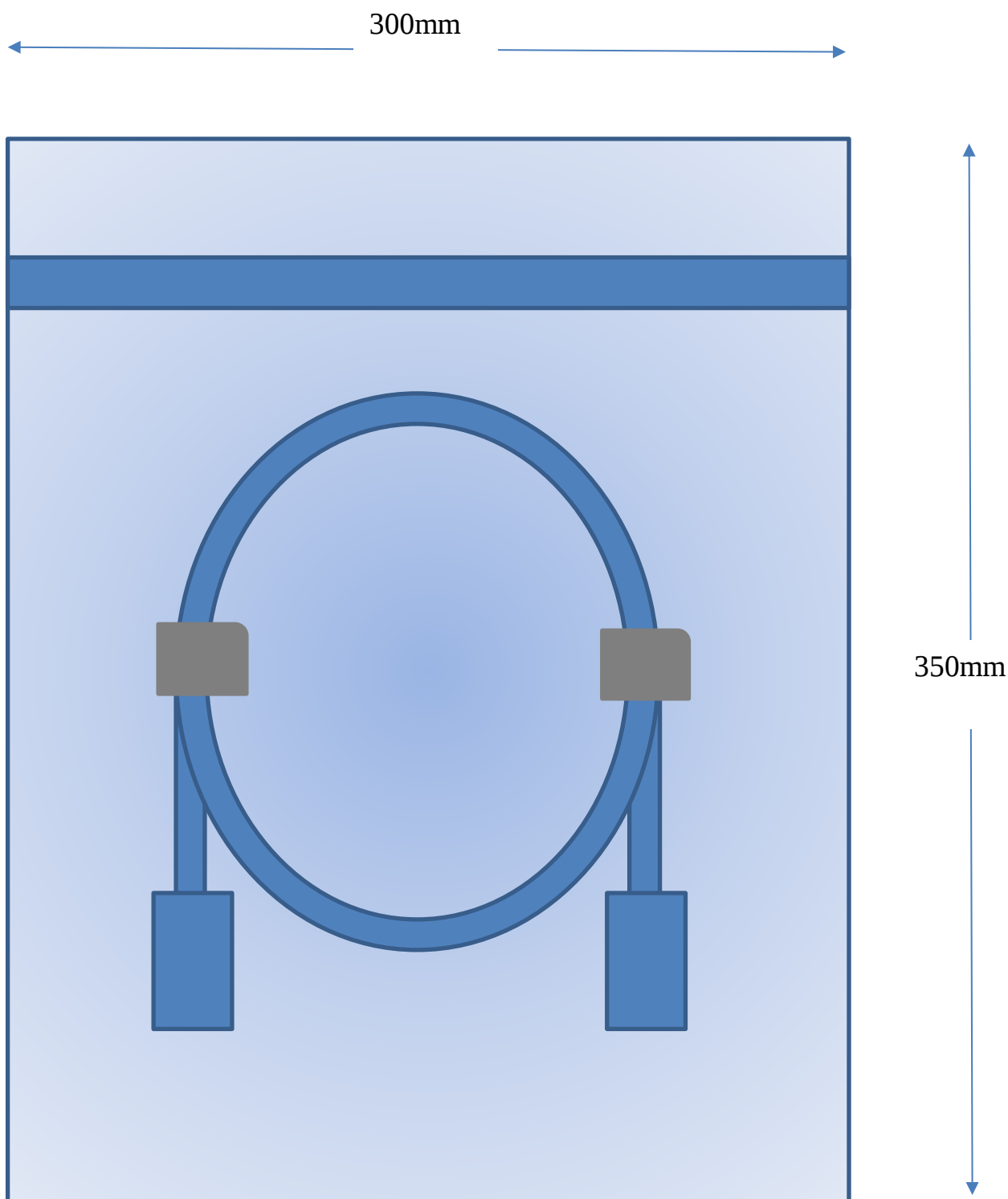
项目 (ITEM) ↴	要求 (REQUIREMENT) ↴	测试条件 (TEST CONDITON) ↴
机械振动↴ Vibration↴	Pass electrical tests ↴ per 3.1 after stressing.↴	Clamp & vibrate per EIA-364-28E,↴ TC-VII, test condition letter – D, 15 minutes in X, Y & Z axis.↴
扭转测试↴ Twist↴	No evidence of physical damage↴	Twist cable 180° (±90° from nominal position) for 100 cycles at 30 cycles per minute with a 0.5kg load applied to the cable jacket.↴ Clamp position: 300mm↴
弯曲测试↴ 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 90° in each direction from vertical. Per EIA-364-41C↴
插头保持力↴ 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↴
线缆保持力↴ Cable Retention in Plug↴	90N Min.↴ No evidence of physical damage↴	Cable plug is fixed 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↴
机械冲击↴ 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.↴
插入力↴ Cable Plug Insertion↴	40N Max.(QSFP28)↴	Per SFF8661 Rev 2.1↴
拔出力↴ Cable plug Extraction↴	30N Max. (QSFP28)↴	Place axial load on de-latch to de-latch plug. Per SFF8661 Rev 2.1↴ ↴
机械寿命↴ 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. 包裝示意图(Package diagram)

兩端連接器使用保護套保護，每PCS單獨裝入一防靜電袋中。

$\leq 2\text{m}$: 200mm*300mm

$> 2\text{m}$: 300mm*350mm



2. Revision History

[illegible]