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	Date revised	2024-08-08	checked by	Sangshen
Product Specification	Rev. No.	A0	Approved by	Wiily
Title : USB TYPE C 3.1				

1. SCOPE (适用范围)

This specification covers the performance, tests and quality requirements for the USB TYPE C Connector.(XKB Connection 本规范涵盖了 USB TYPE C 连接器的性能、测试和质量要求。)

2. PRODUCT DESCRIPTION (产品描述)

DESCRIPTION (描述)	Part Number (料号)
防水3.1TYPE-C连接器 母座16P IP67沉板	USB31-TYPEC-16X7C-1FS

3. APPLICABLE DOCUMENT (适用文件)

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.(XKB Connection下列文件构成本规范的一部分，在此规定的范围内。本规范要求与产品图纸有冲突时，以产品图纸为准。如果本规范的要求与参考文件发生冲突，应以本规范为准。)

- EIA 364 Test procedures for electrical connector (EIA364电子连接器的测试程序)
- UL 94-V0 Flammability standard (UL 94-V0 阻燃性标准)

4. REQUIREMENTS (要求)

4.1. Design and Structure (设计和结构)

Product shall be of the design, structure and physical dimensions specified on the applicable product drawing. (XKB Connection 产品的设计、结构和物理尺寸参考所适用的产品图纸)

4.2. Materials/ Finish (材料/表面处理)

Materials used in the structure of product shall be as specified on the applicable product drawing. (XKB Connection 产品结构中使用的材料参考所适用的产品图纸)

4.3. Ratings (额定功率)

Operating temperature range工作温度范围: $-30^{\circ}\text{C} \sim +85^{\circ}\text{C}$

Storage Temperature Range储存温度范围: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

Rated Voltage 额定电压: 5 Volts AC (RMS)

Rated Current 额定电流: Signal Pins: 0.25A ; VBUS&GND Pins : 3 A ;Other Pins : 1.25 A

USB Type-C Receptacle

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
GND	TX1+	TX1-	VBUS	CC1	D+	D-	SBU1	VBUS	RX2-	RX2+	GND
GND	RX1+	RX1-	VBUS	SBU2	D-	D+	CC2	VBUS	TX2-	TX2+	GND

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USB Type-C Plug											
A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1
GND	RX2+	RX2-	VBUS	SBU1	D-	D+	CC	VBUS	TX1-	TX1+	GND
GND	TX2+	TX2-	VBUS	VCONN			SBU2	VBUS	RX1-	RX1+	GND
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12

5. TEST STANDARD (测试标准)

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests are as follows (除另有说明外，用以进行测量和测试的标准环境条件范围如下)

5.1 Ambient temperature (环境温度) : 5℃ to 35℃

5.2 Relative humidity (相对湿度) : 45% to 85%

5.3 Air pressure (气压) : 86Kpa to 106Kpa

6. HOWEVER, IF DOUBTS ARISE CONCERNING JUDGMENTS. PERFORM UNDER THE FOLLOWING STANDARD CONDITIONS. (但是，如果对判决产生疑问，按照下列标准条件执行)

Temperature (温度) : 23±1℃.

Humidity (湿度) : 50%±2% RH.

Air Pressure (气压) : 86~106kPa

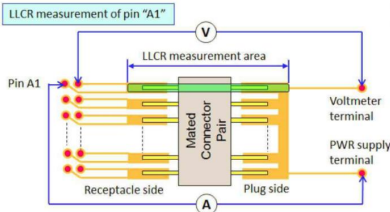
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7. PERFORMANCE AND TEST DESCRIPTION (性能和测试类型)

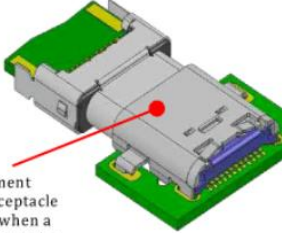
7.1 APPRARANCE (外观)

ITEM	DESCRIPTION (类型)	TEST CONDITION (测试条件)	REQUIREMENT (要求)
1	Appearance (外观)	Visual. (目视)	Should not have any flaw Scratch discoloration and crushed (无任何裂痕、刮伤、 污染和变形)

7.2 ELECTRICAL (电气)

ITEM	DESCRIPTION (类型)	TEST CONDITION (测试条件)	REQUIREMENT (要求)
1	Low Level Contact Resistance (接触电阻)	EIA 364-23B Subject the mated specimen to 20mV maximum open circuit voltage and 100mA maximum current. (将公母对 插后, 在回路施加直流最大 20mV 100mA 的 电流。) 	40 mΩ (Max) initial for VBUS, GND and all other contacts. Maximum change (delta) of +10 mΩ after environmental stresses. (初始包括信号, 接地所有的触点 40mΩ 最大, 测试后最大 10 mΩ变 化量)
2	Dielectric Withstanding Voltage (耐电压)	EIA 364-21 No breakdown shall occur when 100 Volts AC (RMS) is applied between adjacent contacts of unmated and mated connectors. (对插与未对插的连接器, 在相邻端子之 间施加 100V AC 1mA 的电流 1 分钟)	No Breakdown (没有损坏)

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3	Insulation Resistance (绝缘电阻)	EIA 364-21 After 100 VDC for 1 min, Measure the insulation resistance between the adjacent contacts of mated and unmated connector assemblies (对插与未对插的连接器, 在相邻端子之间施加 100V DC 1mA 的电流 1 分钟)	100M Ω MIN.
4	Contact Current Rating (额定电流)	EIA 364-70 Applied 3A to collective Vbus pins and 1.25A to Vconn pin through the corresponding GND pins. Applied individually 0.25A Min. to all the other contacts. 全体 Vbus 端子共加载 3A 电流, GND pins 各加载 1.25A 电流, 其他端子各加载最少 0.25A 电流。	Temperature rise shall not exceed 30°C. 温度升高不超过30°C.  Measurement Point: Receptacle shell top when a receptacle with a conductive shell is used

7.3 MECHANICAL (机械)

ITEM	DESCRIPTION (类型)	TEST CONDITION (测试条件)	REQUIREMENT (要求)
1	Insertion Force (插入力)	EIA 364-13 The insertion force test shall be done at a maximum rate of 12.5 mm (0.492") per minute. (以最高每分钟 12.5mm (0.492") 的速度测试)	5 ~ 20 N
2	Extraction Force (拔出力)	EIA 364-13 The extraction force test shall be done at a maximum rate of 12.5 mm (0.492") per minute. (以最高每分钟 12.5mm (0.492") 的速度测试)	Initial 初始值: 8N-20N After Durability 耐久后: 6N-20N

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3	Durability (耐久)	EIA 364-09 Measured up to 10,000 cycles repeatedly at the rated of 500±50 cycles per hour.Reverse 180 degree to insert and extract after each 1,000 cycles . 每小时插拨500±50次，重复插拨10,000次以上。每插拨1,000次翻转180度正反插.	After 10,000 cycles: 6N~20N Contact resistance: 50mΩ Max. Final Appearance : No breakdown 10,000 次之后: 6N~20N 接触阻抗:测试完成后最大50 毫欧, 外观无损伤.
4	Wrenching Strength (扭转力度测试)	Perpendicular forces are applied to the plug in four directions (i.e., left, right, up, and down). (垂直力作用于PLUG的四个方向(即, 左, 右, 上, 下)) A metal fixture with opening and tongue representative of a receptacle shall be Used. (必须使用金属治具固定装置) A new plug is required for each of the four test directions. The plug shall disengage from the test fixture or demonstrate mechanical failure (i.e., the force applied during the test procedure peaks and drops off) when a moment of 2.0 Nm is applied to the plug in the up and down directions and a moment 3.5 Nm is applied to the plug in the left and right directions. (四个测试方向都需要一个新的插头。插头应从测试夹具上脱离或显示机械故障(即测试过程中施加的力峰值和下降), 当2.0 Nm 的力矩作用于插头的上下方向, 并且3.5 Nm 的力矩作用于插头的左右方向)	A single plug shall be used for this test. Some mechanical deformation may occur. The plug shall be mated with the continuity test fixture after the test forces have been applied to verify no damage has occurred that causes discontinuity or shorting. The dielectric withstanding voltage test shall be conducted after the continuity test to verify plug compliance. (插头与测试夹具配合, 一次测试只能使用一个插头。会发生机械变形。在施加测试力以验证不可发生导致不连续或短路的损坏之后。耐压测试须在连续性测试后进行, 以确保插头符合要求)
5	4-Axis Continuity Test 四轴向测试	A plug when inserted at a distance of 15mm from the edge of the receptacle. Apply 20N force(left, right direction) and 8N force(up, down direction) at least 10 seconds each direction. 在距离母座15mm处的公头上施加力,上下8N,左右20N 4个方向, 每个方向10秒.	Electric function is OK.No mechanism damage.The housing of connector cannot be damage or scratched, no crack on soldering tail after cross-section 电气性能ok.无机械损伤.连接器的塑胶不能被损坏或擦坏.切片后端子焊脚无裂纹;

7.4 ENVIRONMENTAL (环境)

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ITEM	DESCRIPTION (类型)	TEST CONDITION (测试条件)	REQUIREMENT (要求)
1	Temperature Life (温度寿命)	EIA 364-17, Method A. 105°C without applied voltage for 120 hours. (不加电压 105° C, 120 小时) 105°C without applied voltage for 72 hours when used as preconditioning. (预处理不加电压105° C, 72小时)	Low level contact resistance meets spec before and after the Temperature Life test. (接触电阻在温度寿命试验前后符合规格要求)
2	Vibration (振动)	EIA 364-28 Test Condition VII, Test Letter D Frequency (频率) : 10~55~10Hz Direction (方向) : X, Y, Z axis Amplitude (振幅) : 1.52mm Duration: 1 hours in each direction (每个方向各振动 1 小时)	No evidence of physical damages and no discontinuity longer than 1 microsecond. Low level contact resistance meets spec before and after the Vibration test. (没有物理损伤, 断讯超过 1 微秒。接触电阻符合规格振动前后测试)
3	Cyclic Temperature and Humidity (周期性温度和湿度)	EIA-364-31 Cycle the connector between 25 °C ±3° C at 80 % ±3% RH and 65 °C ±3 °C at 50 % ±3% RH. Ramp times should be 0.5 hour and dwell times should be 1.0 hour. Dwell times start when the temperature and humidity have stabilized within the specified levels. (在湿度 80% ± 3% RH 温度 25 ° C ± 3 ° C 和湿度 50% ± 3% RH 温度 65 ° C ± 3 ° C 之间循环。上升时间应该是 0.5 小时, 停留时间应该是 1 小时。停留时间开始时, 温度和湿度已经稳定在规定的水平。)	Perform 24 such cycles. (进行 24 次这样的循环)

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4	Thermal Shock (热冲击)	EIA 364-32 Test Condition I The object of this test is to determine the resistance of a USB connector to exposure at extremes of high and low temperatures and to the shock of alternate exposures to these extremes, simulating the worst case conditions for storage, transportation and application. (10 Cycles -55°C and +85°C. The USB connectors under test must be mated. There shall be no evidence of damage.) (测试条件I 这个测试的目的是测定USB连接器在极端高温和极端低温下的耐受性, 以及在极端高温和极端低温下交替暴露的冲击性, 模拟储存、运输和应用的最坏情况条件。(10个循环 -55 ° C 和 + 85 ° C , 被测USB连接器必须配对。不应有任何损坏的证据。))	No evidence of any physical damage. Low level contact resistance meets spec before and after the Thermal Shock test. (没有任何物理损伤, 测试前后接触电阻符合规格。)
5	Mixed Flowing Gas (混合流动气体)	EIA 364-65, Class II A Samples should be placed in an environmentally controlled 'test chamber' that is monitored by a gas analyzing system for controlled concentrations of the specified gas mixture. Test coupons shall also be used and the weight gain reported. Test duration is 7 days. (样品放置在一个环境控制的试验箱, 由一个气体分析系统监测指定气体混合物的控制浓度, 还应使用试片, 并报告重量增加。 测试时间是 7 天。)	Low level contact resistance meets spec before and after the Mixed Flowing Gas test. (试验前后接触电阻符合规定)
6	Solder ability (可焊性)	EIA 364-52 Immerse the solder pin of the connector in solder bath at 245±5°C for 3±0.5sec. After dipped the pin in the flux 5sec. (将端子脚浸入助焊剂中 5 秒, 然后将端子脚浸入 245±5°C 的锡炉中 3±0.5 秒)	Solder wetting: 95% of immersed area must show voids, Pin holes. (锡附着面积应超过浸入表面积的 95%以上)

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7	Thermal disturbance (热扰动)	Cycle the connector or socket between 15 °C ± 3 °C and 85 °C ± 3 °C, as measured on the part. Ramps should be a minimum of 2 °C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes). Humidity is not controlled. Perform 10 such cycles. (在15 °C ± 3 °C 和85 °C ± 3 °C 之间循环连接器。上升是每分钟至少2摄氏度, 停留时间应确保触点达到极端温度(至少5分钟)。湿度不受控制。进行10次这样的循环)	No evidence of any physical damage. Low level contact resistance meets spec before and after the test. (没有任何物理损伤, 测试前后接触电阻符合规格。)
8	Salt Spray (盐雾)	EIA 364-26 Connectors to 35+/-2°C. Humidity:85%(R.H). PH value:6.5~7.2 and 5+/-1% salt condition for 48hours. After test, rinse the sample with water and recondition the room temperature for 1 hour test CR and IR. (将连接器放置在 35±2℃, 温度为 85% PH 值 6.5~7.2 和 5%浓度的实验箱内测试 48 小时, 测试后用水清洗样品, 放置室温 1 小时测试接触阻抗与绝缘阻抗)	Appearance: No Damage (外观无损坏) No functional failures allowed. (不可有功能故障)
9	Resistance to Soldering heat (焊锡耐热性)	The contact of terminal shall be tested resistance to soldering heat in the following conditions. After Resistance to soldering heat test Contact Resistance. (端子应在下列条件下做耐吃锡性试验, 焊锡耐热性后试接触阻抗) In case of solder iron (2 time) 电烙铁(两次) Temperature 温度:350°C+/-5°C Time 时间: 5s+/-1s	Should not have any flaw scratch and crack. (无任何裂痕、刮伤和破裂)
10	IR-reflow (回流焊)	MIL-STD-202G method 210F Peak temperature time 260°C Max,10 sec or more. (峰值温度时间最高 260℃, 10 秒或以上) Duration : 2 cycles (过炉 2 次) Lead-Free Solder (无铅锡膏): Sn96.5Ag3Cu0.5 Refer to section 9 (请参阅第 9 条)	Should not have any flaw scratch and crack (无任何裂痕、刮伤和破裂) No visual damage to insulator. (绝缘体不得有严重变形)

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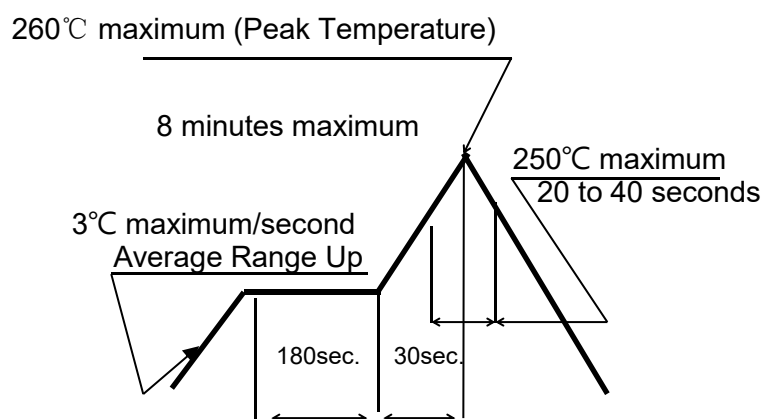
18	Salt Spray (盐雾)											4
19	Reflow Soldering Heat Resistance (焊锡耐热性)											3
20	IR-reflow (回流焊)	2	2			2	2	2	2	2	2	
	Number of Samples Required (所需样本数目)	35										

9. SOLDERING 焊接：

9.1. Wave soldering (波峰焊) : DIP Suggestions solder temperature at 260°C (500°F) max.5 seconds . DIP 型推荐焊接焊锡温度为 260°C (500°F) 最多 5 秒

9.2. Hand soldering (手焊) : Use a soldering iron of 30 watts controlled at 350°C approximately 5 seconds. while applying solder.
使用 30W 烙铁控制温度在 350°C,焊接时长约 5 秒

9.3. Reflow soldering profile(回炉焊):When the maximum temperature of the reflow furnace is 260 °C and the temperature is 260 °c. 10 seconds MAX. (reference) SMT 型回焊炉最高温度为 260°C，温度为 260°C时，最长时间不超过 10 秒（如图）



(Preheat Temperature预热温度: 150~200°C Maximum.)

Temperature Condition Graph.温度状态图

(Temperature on Board Pattern Side)

Requirement要求: No physical damaged or plastic melting.: 无物理损伤或塑料熔化

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