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1. SCOPE (适用范围)

This specification covers the performance, tests and quality requirements for the **USB 2.0 Connector**.(本规范涵盖了**USB 2.0**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)
USB 2.0	U221-041N-1BR69-F5

3. APPLICABLE DOCUMENT (适用文件)

XKB Connection 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. (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)

Contact Number	Signal Name	Typical Wiring Assignment
1	VBUS	Red
2	D-	White
3	D+	Green
4	GND	Black
Shell	Shield	Drain Wire

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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)

XKB Connectivity Item (项目)	Standard (标准)	
Rated Voltage (Maximum) 额定电压	24V	DC
Rated Current (Maximum) 额定电流	3A	
Operating temperature range 工作温度范围	-40 ~ +85 From -40 to +85 degree centigrade	

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 APPRARANANCE (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 364-23 When measured at 20 mV maximum open circuit at 100 mA Mated test contacts must be in a connector housing. Measurements to include Power,Ground,D+ and D- contacts of connector. (在开路最大电流100mA 电压20 mV最大下测量, 测量对插触点上的电阻必须是组装外壳后的连接器。测量包括电源, 接地, 信号PIN)	Iniital:30 mΩ maximum. 20 mΩ maximum change for post test LLCR. (初始: 30 mΩ 最大测试后: 20 mΩ 最大变化量)
2	Insulation Resistance (绝缘电阻)	EIA 364-21 Apply 250 volts DC between adjacent terminal or ground. (分别在相邻端子或壳体之间施加250V DC 1mA的电流持续1分钟)	1000 MΩ minimum.
3	Dielectric Withstanding Voltage (耐电压)	EIA 364-20 Apply 300 Volts AC(RMS) between adjacent terminal or ground. Leakage current: 0.5mA Max. (分别在相邻端子或壳体之间施加 300V AC 1mA 的电流持续1分钟, 最大漏电电流0.5mA)	No Breakdown (没有损坏)

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4	Contact Current Rating (温升)	EIA 364-70 — Method B 3A at 250V AC minimum when measured at an ambient temperature of 25 .with power applied to the contacts ,the T must not exceed +30 at any point in the USB connector under test. (相对温度为25℃, 250VAC, 最小为3A。接通电压, 测试中端子任一点的温度不超过+30℃。)	T=30°C(Max.) 温度上升不超过30℃
5	Contact Capacitance (接触电容)	EIA 364-30 2 pF maximum unmated per contact. (每PIN 2pF 最大)	2 pF maximum

7.3 MECHANICAL (机械)

ITEM	DESCRIPTION (类型)	TEST CONDITION (测试条件)	REQUIREMENT (要求)
1	Insertion Force (插入力)	EIA364-13 Insertion and withdrawal speed : 25mm/minute. (将母座焊接在PCB板上, 然后将公座以每分钟25mm的速度沿轴向插入母座测量其插入力)	34N maximum
2	Extraction Force (拔出力)	EIA364-13 Insertion and withdrawal speed : 25mm/minute. (将母座焊接在PCB板上, 然后将公座以每分钟25mm的速度沿轴向从母座拔出测量其拔出力)	10-34N minimum.
3	Durability (寿命测试)	EIA 364-09 Measure contact and shell resistance after Following.Cycle rate of 500 cycles per hour if done automatically and 200 if manual cycle. Automatic cycling : 1500 cycles (将公座及母座焊接在PCB上, 然后以机器插拔500次/小时, 手动插拔200次/小时的速度沿轴向插拔1500次)	Meets requirements of product appearance. No physical damage. (符合产品外观要求, 无实物损坏)


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4	Random Vibration (任意振动)	EIA 364-28 No discontinuities of 1 μs or longer duration when mated USB connectors are subjected to 5.35 GRMS. 15 minutes in each of three mutually perpendicular planes. (匹配USB公端, 中断不得大于或等于 1 μ s, 承受5.35 GRMS, 朝各个相正交的方向各振动15分钟)	Appearance (外观) : No Damage (没有损坏) Discontinuity (断讯) : 1 μsec maximum. (不能超过1微秒)
5	Mechanical Shock (机械冲击)	EIA 364-27 No discontinuities of 1 μs or longer duration when mated USB connectors are subjected to 11 ms duration 30 Gs half-sine shock pulses. Three shocks in each direction applied along three mutually perpendicular planes for 18 shocks. (将对插后的连接器固定于冲击实验机上, 中断不得大于或等于 1 μ s, 施加 11 ms持续30 Gs 半正弦脉冲波, 沿3个互相垂直达的方向每个方向三次冲击共18次冲击)	Appearance (外观) : No Damage (没有损坏) Discontinuity (断讯) : 1 μsec maximum. (不能超过1微秒)
6	Cable Pull-Out (电缆拉出)	After the application of a steady state axial load of 40 N for one minute. (将产品固定后施加40N的轴向力, 一分钟)	Meets requirements of product appearance. No physical damage. (符合产品外观要求, 无实物损坏)


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7.4 ENVIRONMENTAL (环境)

ITEM	DESCRIPTION (类型)	TEST CONDITION (测试条件)	REQUIREMENT (要求)
1	Thermal Shock (冷热冲击)	EIA 364-32 10 cycles of: a) -55°C for 30 minutes b) +85°C for 30 minutes (将连接器焊在PCB上后将其暴露在下列环境长件中循环10次: 置于-55° C± 3° C温度中30分钟, 再转换至+85° C± 2° C下30分钟, 再换至标准温度条件10-15分钟)	Appearance: No Damage (外观无损坏) No functional failures allowed. (不可有功能故障)
2	Humidity Life (耐湿性)	EIA 364-31 Test Condition A Method III 168 Hours minimum (seven complete cycles). (测试条件 A 方法 III , 至少168小时(7个工作日))	Appearance: No Damage (外观无损坏) No functional failures allowed. (不可有功能故障)
3	Solder ability (可焊性)	Immerse the solder pin of the connector in solder bath at 245±5 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)
4	Salt Spray (盐雾)	EIA 364-26 Connectors to 35+/-2 . Humidity:85%(R.H). PH value:6.5~7.2 and 5+/-1% salt condition for 24hours. 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°C, 湿度为85% PH值6.5~7.2和5%浓度的实验箱内测试24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)


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5	Resistance to Soldering heat (焊锡耐热性)	<p>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)</p> <p>In case of solder iron (2 time) 电烙铁(两次)</p> <p>Temperature温度: ≤350</p> <p>Time 时间: 5s+/-1s</p>	<p>Should not have any flaw scratch and crack.</p> <p>(无任何裂痕、刮伤和破裂)</p>
6	IR-reflow (回流焊)	<p>MIL-STD-202G method 210F</p> <p>Peak temperature time 260 Max, 10 sec or more. (峰值温度时间最高260℃, 10秒或以上)</p> <p>Duration : 2 cycles (过炉2次)</p> <p>Lead-Free Solder (无铅锡膏): Sn96.5Ag3Cu0.5</p> <p>Refer to section 9 (请参阅第9条)</p>	<p>Should not have any flaw scratch and crack (无任何裂痕、刮伤和破裂)</p> <p>No visual damage to insulator. (绝缘体不得有严重变形)</p>

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8. Product Qualification and TEST GROUP (产品验证和测试分组)

XKB Connectivity TEST ITEM (测试项目)		TEST GROUP (测试分组)						
		A	B	C	D	E	F	G
		TEST SEQUENCE						
1	Appearance (外观)	1,10	1,11	1,9	1,9	1,6	1,6	1,5
2	Low Level Contact Resistance (接触电阻)	3,9	3,10		3,7	3,5	2,5	2,4
3	Insulation Resistance (绝缘电阻)			3,7				
4	Dielectric Withstanding Voltage (耐电压)			4,8	4,8			
5	Contact Current Rating (温升)				5			
6	Contact Capacitance (接触电容)				6			
7	Insertion Force (插入力)	4,7	4,8					
8	Extraction Force (拔出力)	5,8	5,9					
9	Durability (寿命测试)	6						
10	Random Vibration (任意振动)		6					
11	Mechanical Shock (机械冲击)		7					
12	Cable Pull-Out (电缆拉出)							
13	Thermal Shock (冷热冲击)			5		4		
14	Humidity Life (耐湿性)			6				
15	Solder ability (可焊性)						3	
16	Salt Spray (盐雾)							3
17	Reflow Soldering Heat Resistance (焊锡耐热性)						4	
18	IR-reflow (回流焊)	2	2	2	2	2		
	Number of Samples Required (所需样本数目)	35						

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9. SOLDERING 焊接 :

- 9.1. Wave soldering (波峰焊) : DIP Suggestions solder temperature at 260 (500°F) max.5 seconds . DIP型推荐焊接焊锡温度为260 (500°F) 最多5秒
- 9.2. Hand soldering (手焊) : Use a soldering iron of 30 watts controlled at 350 approximately 5 seconds. while applying solder.
使用30W烙铁控制温度在350 ,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 , 温度为260 时 , 最长时间不超过10秒 (如图)

260 maximum (Peak Temperature)

8 minutes maximum

250 maximum
20 to 40 seconds

3 maximum/second
Average Range Up

180sec. 30sec.

(Preheat Temperature预热温度: 150~200 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

Rev.	Description	Date revised	Created/ Revised by
A0	New Release	2024/09/02	Shanzha