



Product Specification

1. Scope(范围)

1.1 Contents(内容)

This specification covers the requirements for product performance and test methods of connector of USB 2.0 Type-C.

该标准涵盖本公司生产的 USB 2.0 Type-C 连接器的功能要求及测试方法。

All Tests are to be performed per the procedures stated in this specification. All inspections shall be conducted using the inspection plan for this type product and the corresponding drawing.

所以测试均依据本标准规定的流程进行。所有的检测均应依据此类产品的测试计划及相应图纸执行。

2. Requirements 要求:

2.1 Rating 额定条件

A. Voltage rating (额定电压): 10 V DC/AC (RMS. max) 电压: 直流/交流电10伏

B. Current rating (额定电流):

5Amps Max for total Vbus pins (Pin A4,B4,A9,B9); 1.25Amps Max 0.25 Amps MIN. for all other contact: 电流: Vbus电流5A, GND电流1.25A, 其他PIN 0.25A

C. Operation Temperature Range(操作温度范围): -40℃ to +85℃.

D. Storage Temperature Range(储存温度范围): -5℃ to +85℃.

E. Storage humidity Range: (储存湿度操作温度范围): 15%~70%.

3. Test Condition(测试条件):

Unless otherwise specified, all tests and measurements are to be performed at the following conditions:

除特殊规定外, 所有测试及量测需符合一下条件

3.1 Temperature: 15℃ to 35℃ 温度: 15℃ to 35℃

3.2 Relative Humidity: 25% to 85% 湿度: 25% to 85%

3.3 Shelf Life(保质期): 12 months

3.4 Pressure: 86 to 106 Kpa 气压: 86 to 106 Kpa



Product Specification

Lean USB Type-C 2.0/3.0/3.1 Series

4. .Test Methods and Requirements (测试方法及要求):

Table I: Performance requirements 测试要求

Items 测试项目	Test Methods 测试条件	Requirements 规格
4.1. Examination of product (产品外观)		
4.1.1 Visual examination 产品外观	Visually, functionally inspected per applicable product drawing. Use magnifier or microscope if necessary. 目视检查产品与图面一致, 必要时使用放大镜或显微镜。 Dimension inspection should use proper instruments. 尺寸测量使用恰当的测量设备.EIA-364-18	Visual inspection samples shall be free from defect such as damage, deformation, blister and burrs that are detrimental to the function and appearance. 样品无变形, 塑胶起泡等影响测试的不良
4.2.Electrical Performance (电气性能)		
4.2.1 Dielectric withstanding Voltage 耐电压	Apply 500V RMS 60Hz for 1 minute between adjacent terminals and terminals, ground and/or shell of the unmated connector. 施加交流 500V (有效值) 60Hz 电压于相邻两端子及端子与地, 外壳之间 1 分钟. EIA-364-20 method B	No voltage breakdown, Current leakage<1mA 无电压击穿, 漏电流<1mA
4.2.2 Insulation resistance 绝缘电阻	Apply 500V DC for 2 minute between adjacent terminals and between terminals to ground and shell of the unmated connector. 施加 500V DC 的电压于相邻两端子及端子与地、外壳之间 2 分钟. EIA-364-21	Insulation resistance $\geq$ 1000 M Ω 绝缘电阻不小于 1000M Ω



Product Specification

4.2.3	Low level contact resistance 接触电阻	Subject mated connectors in condition of open circuit voltage 20mV DC max., 100mA max. Except wire conductor resistance; 配对的连接器, 在回路施加直 流最大为 20mV DC 100mA 低电流 进行测试, 导线电阻除外; EIA-364-23	The initial: 30mΩ MAX 初始值: 最大 30mΩ
4.2.4	Temperature Rise 温升	Plug mated, measure the temperature rise of contact at the current VBUS PIN 5.0A D+/D-/CC/SUB PIN 0.25A 配对的连接器, 测试电流的温度上 升情况 EIA-364-70 method 1	Temperature rise: 30℃ Max. 上升温度: 最大 30℃
4.3 Mechanical Characteristics: (机械性能)			
4.3.1	Insertion force 插入力	Mate and un-mate connectors at a rate of 25.4mm/min. recorder after mate and un-mate 3 times. 以每分钟 25.4mm/min 的速度重复 插拔连接器, 插拔 3 次后记录数据 EIA-364-13	5N~20N



Product Specification

Lean USB Type-C 2.0/3.0/3.1 Series

4.3.2	Withdrawal force 拔出力	Mate and un-mate connectors at a rate of 12.5mm/min.The initial connector extraction force Shall be within the range of 8Nto20N Measured after a preconditioning of Five insertion /extraction cycles,after An additional twenty-five insertion / Extraction cycles, the extraction force shall be measured again . 以 12.5mm/min 的速度重复插拔连接器, 插拔 5 次后记录数据 (记录第 6 次的数据) 再连续插拔25次后记录数据 (记录第32次的数据) EIA-364-13	Within the range of 8N to 20N Within 33% of the initial reading, 拔出力8N~20N 再插拔25次后相比初次插拔力量不超过 33%
4.3.3	Durability 耐久测试	Mate and un-mating up to 10000 cycles repeatedly at cycle rate of 500 ±50 cycles per hour by machine. 以最大每小时 500 次的速度重复插拔 10000 次 EIA-364-09	After durability test: No physical damage Insertion force: 5N~20N Withdrawal force:6N~20N 耐久测试后 无物理损伤, 满足外观检查内容。 插入力: 5N~20N; 拔出力: 6N~20N
4.3.4	Solder ability 可焊性	Dip solder tails into the molten solder at 260±5℃ for 5±0.5 seconds. 将焊脚置于260±5℃的熔锡中5±0.5秒 EIA-364-52	Solder coverage 95% Min 粘锡面积不小于 95%

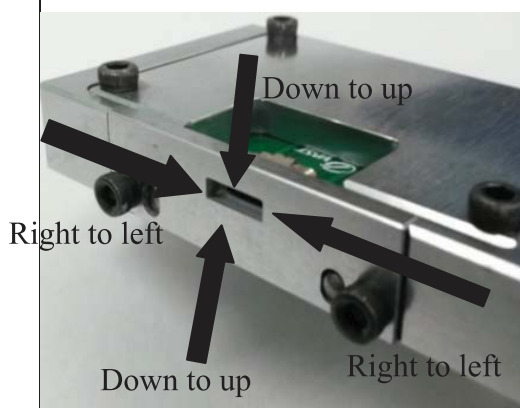


Product Specification

Lean USB Type-C 2.0/3.0/3.1 Series



Picture 6-1: Test setup
测试机构



Picture 6-2: Sample picture of reference mechanics and pressing directions
力量测试参考治具及测试方向

4.3.5

Wrenching
耐扭

Receptacle part (receptacle mounted to test board with support mechanics) shall be clamped in rigid manner to the test jig.

Plug is mated to receptacle. Signals are looped serial.

Perpendicular forces are applied to a plug at a distance of 15 mm from the edge of the receptacle (see picture 6-1 and 6-2). Pressing speed is 10 mm / min.

Continuity across all signals is monitored during the pressing.

Record the force when the signal continuity disappears. Recommended signal level: $U = 3, 9 \text{ V}$, $I = 40 \text{ mA}$.

将产品焊接在 PCB 板上并且插入公头夹具在测试治具上
公头需要和母座信号导通
在离母座口部 15mm 的地方以 10mm/分钟的速度垂直方向施加力量（参照图 6-1，6-2）

Minimum force when the signal continuity disappears: 50N.No damage in plug or receptacle: 0~25 N.

The plug can damage, but in such way that the receptacle does not sustain damage:

25~50 N.

50N 不出现讯断

0~25N 公头/母头无明显破损

25N~50N 公头需要损坏，母头无明显破损



Product Specification

Lean USB Type-C 2.0/3.0/3.1 Series

5.4 Environmental Characteristics: (环境测试)

4.4.1	Temperature life 温度寿命	Comply with method EIA 364-32B +85°C for 500 hours mated. 将配对好的连接器置于 85°C 环境 下 500 小时	No physical damage and shall meet requirement of subsequent Tests 外观无明显损伤 需满足后面的测试要求
4.4.2	Mechanical shock 机械冲击	Comply with method EIA 364-27 Subjected to 6ms duration 30Gs half-sine shock pulses 6 axes. 以 30g's, 半正弦波(6ms), 在产品 6 个方向冲击, EIA-364-27	Appearance: no damage Discontinuity 1.0 microsecond Max 产品外观无损伤 瞬断不超过 1 毫秒
4.4.3	Random Vibration 振动	Comply with method EIA 364-28 test condition V test letter A subjected mated connectors to 5.35GRMS. 15 minutes in each of three mutually perpendicular planes. 使产品在相互垂直的三个方向 5.35GRMS 的振动, 每个方向持续 15 分钟,	Appearance: no damage Discontinuity 1.0 microsecond Max 产品外观无损伤 瞬断不超过 1 毫秒
4.4.4	Mixed Flowing Gas 混合气体	Comply with method EIA364-65ClassII A The object of this 10-day (5 days unmated and 5 days mated) (Mated test contacts must be in a connector housing.)	40mΩ maximum (measured at 20 mV maximum open circuit at 100mA). 10mΩ maximum change for post test LLCR after 1 durability cycle. No physical damage.



Product Specification

Lean USB Type-C 2.0/3.0/3.1 Series

4.4.5	Salt spray 盐雾测试 IEC60068-2-11 Ka	Continuous spray at $35 \pm 2^{\circ} \text{C}$ R/H90-95% Salt NaCl mist 5% after test wash parts and return to room ambient for 1-2 hours. Mated condition STM4.3. 48Hours spray 氯化钠溶液浓度: $5 \pm 1\%$ 浸泡时间: 接触区域 48 小时 温度: $35 \pm 2^{\circ} \text{C}$ 测试后将产品清洗放置 1~2 小时	Without noticeable rust. Delta LLCR < 10mΩ. 外观: 无明显生锈
4.4.6	Thermal shock 温度冲击	Comply with method EIA 364-32, -55°C for 15 minutes and +85°C for 15 minutes for 10 cycles, mated. 将配对好的连接器置于以下环境循 环 10 次, -55°C 15 分钟 +85°C 15 分钟	No physical damage and shall meet requirements of subsequent tests. 外观无明显损伤 需满足后面的测试要求
4.4.7	Cyclic humidity 湿度循环	Comply with method EIA 364-31 25°C and 65°C at 95%RH, seven cycles, mated. Duration 96H 将公母连接器互配后置于以下环 境: 温度: $+40 \pm 2^{\circ} \text{C}$ 相对湿度: 95~100% 持续时间: 96h EIA-364-31	No physical damage and shall meet requirements of subsequent tests. 外观无明显损伤 需满足后面的测试要求
4.4.8	Resistance to Soldering Reflow Heat 耐回流焊热	Infrared reflow for 3 times. Reflow Condition see below Graph 回流焊3次, 回流焊温度曲线请参 考下图 EIA-364-56	No damage after reflow 回流后无损伤

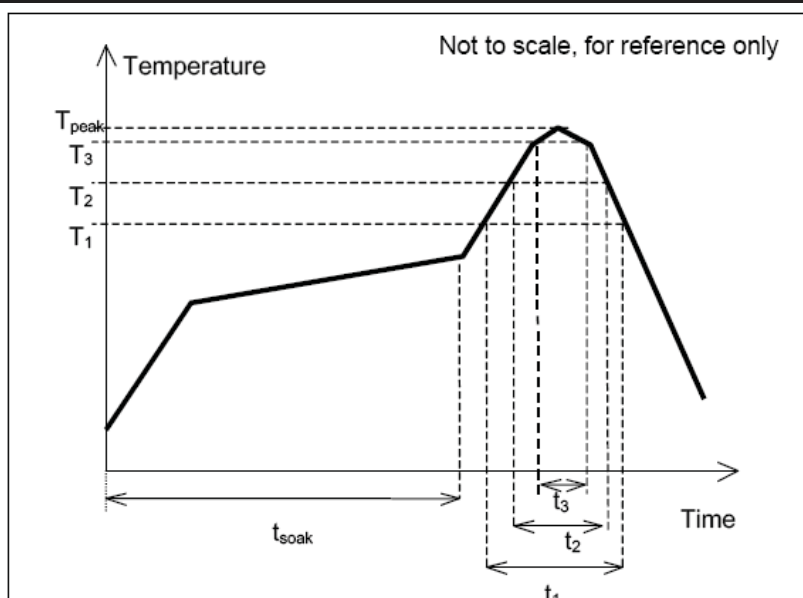


Product Specification

Lean USB Type-C 2.0/3.0/3.1 Series

Pb-free reflow profile requirements for soldering heat resistance

Parameter	Reference	Specification
Average temperature gradient in preheating		2.5°C/s
Soak time	t_{soak}	2-3 minutes
Time above 217°C	t_1	Max 60 s
Time above 230°C	t_2	Max 50 s
Time above 250°C	t_3	Max 10 s
Peak temperature in reflow	T_{peak}	255°C (-0/+5°C)
Temperature gradient in cooling		Max -5°C/s



5. Test Sequence 功能测试序列表

No.	Test, Measurement or Examination	A	B	C	D	E	F	G
4.1.1	Visual Examination 产品外观	1,10	1,3,5	1,4	1,4	1,9	1,6	1,8
4.2.1	Dielectric Withstanding Voltage 耐电压					4,8		
4.2.2	Insulation Resistance 绝缘电阻					3,7		
4.2.3	Low Level Signal Contact Resistance 接触电阻	4,8					3,5	3,5,7
4.2.4	Temperature Rise 温升测试				3			
4.3.1/	Insertion & withdrawal force 插入/拔出力	3,9						
4.3.3	Durability 耐久性	5						
4.3.4	Solder ability 可焊性		2					
4.3.5	Wrenching 耐扭			3				
4.4.1	Temperature life 温度寿命						4	



Product Specification

Lean USB Type-C 2.0/3.0/3.1 Series

4.4.2	Mechanical shock 机械冲击	6						
4.4.3	Vibration 振动	7						
4.4.4	Mixed Flowing Gas 混合气体							4,6
4.4.5	Salt spray 盐雾测试	4						
4.4.6	Thermal shock 温度冲击					5		
4.4.7	Cyclic humidity 湿度循环					6		
4.4.8	Resistance to Soldering Reflow Heat 耐回流焊热	2		2	2	2	2	2
Sample size	样本数	5	5	20	5	5	5	5

Note 备注

1. Shall meet visual requirements, show no physical damage, and meet requirement of additional tests as specified in the test sequence

依据表格顺序测试之后产品应无物理损伤，且符合序列中附加测试的要求

2. (a)Numbers indicate sequence in which tests are performed.

群组测中顺序应按照表格中的数字顺序进行。

(b)Discontinuities shall not take place in this test group, during tests.

群组测中顺序进行的测试不应出现中断。