

Product Specification [产品规格书]:	Document No	PS-6401-01
Subject [主题]:	Date Issued	2023/06/07
6401 Series Connector Specification	Date Revised	2023/12/22
	Version	A1

This specification is referred to the 6401 series wire to board connector

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## 【1.适用范围 Scope】

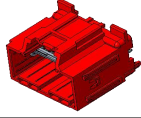
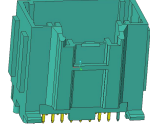
此种规格包括 6401 Series 连接器规格说明.

This specification includes the 6401 Series connector specification.

## 【2.规格与料号 Spec and Part number】

规格内容 Specification	产品料号 Production No.	产品图示 Picture of Product
胶壳/Housing	6401AM-AXXX-PTXX	
	6401AM-B10XX-PTXX	
	6401AM-C14X-PTXX	
端子/Contact	2204TXF-HY2B	
	6401TXF-120-HY2B	
	6401TXF-250-HY2B	
卧式针座 Horizontal type Wafer	6401WR-AXXX-SSSN1XT	
	6401WR-B10X-SSSN1XT	
	6401WR-C14X-SSSN1XT	

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立式针座 vertical type Wafer	6401WV-AXXX-SSN1XT	
	6401WV-B10X-SSN1XT	
	6401WV-C14X-SSN1XT	

## 【3.材质与表面处理 Disposal of Material and surface】

规格内容 Specification	材质 Materials	表面处理 Disposal of Surface
端子/Terminal	High conductivity coppe	Top planting: Sn 40~120u"(1~3um)
二次锁扣/TPA	PBT	UL 94V-0
胶壳/Housing	PBT	UL 94V-0
CPA	PA66	UL 94V-0
针座/ Wafer	Plastic :SPS	UL 94V-0
	1.50&2.80mmPIN:High conductivity copper	Top planting: Sn 100~180u"(2.5~4.5um) ; Under Ni 50~100u"(1.25~2.5um) overall
	0.64mmPIN: Brass	
	后塞/Back plug:SPS	UL 94V-0

(上述参数请以工程图为准/Please Refer to the Project drawing for the above Specification)

## 【4. 额定等级 Ratings and applicable wires】

项目【Item】	规格【Standard】	
额定电压 Rated Voltage (Max.)	250V Max.	[AC/DC]
额定电流 Rated Current (Max.)	3A Max. (0.64mm) 20A Max. (1.2mm) 30A Max. (2.5mm)	
使用温度范围 Ambient temperature Range	-40°C~+125°C	

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### 【5.测试方法及要求 Test Methods and Requirements】

#### 5-1. 外观检查 Examination of product.

测试内容 Item	规格要求 Specification requirements	参考标准 Reference standard
产品外观检查 Visual Inspection	借助 10 倍放大镜对每一个试验样品进行检查，详细记录所有制造或材料的瑕疵，如：裂缝、变色、毛刺等。 Inspect each sample with a 10x magnification, recording all defects in all process or material defects such as cracks, discoloration, flash, etc.	USCAR-2 Rev.7 5.1.8

#### 5-2. 电气的性能 Electrical Performance.

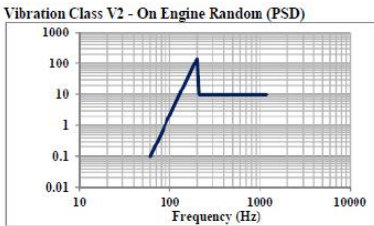
项 目 【Item】	条 件 【Test Condition】	规 格 【Requirement】
5-2-1 电路连贯性监控 Circuit Continuity Monitoring	电流的连续性监控不能间断超过 1us; 不允许任何端子电阻超过 7 欧的时间大于 1us 的情况发生 There must be no loss of electrical continuity for more than 1 microsecond There must be no instance in which the resistance of any terminal pair exceeds 7.0 $\Omega$ for more than 1 microsecond	USCAR-2 Rev.7 5.1.9
5-2-2 干电路电阻 Dry Circuit Resistance	在环境前/后 0.64mm 端子 $\leq 20m\Omega$ 在环境前/后 1.20mm 端子 $\leq 10m\Omega$ 在环境前/后 2.50mm 端子 $\leq 5m\Omega$ Initial/Final 0.64mm Terminal $\leq 20m\Omega$ Initial/Final 1.20mm Terminal $\leq 10m\Omega$ Initial/Final 2.50mm Terminal $\leq 5m\Omega$	USCAR-2 Rev.7 5.3.1
5-2-3 电压降 Voltage Drop	配对连接器:应用 5 安培/ 1.0 mm <sup>2</sup> 电流 Mate connectors: apply a 5 ampere/ 1.0 mm <sup>2</sup> current	USCAR-2 Rev.7 5.3.2
5-2-4 最大试验电流能力 Maximum test current capacity	在无风的封闭场所内搭建一个电路 温度: 23 $\pm$ 5 $^{\circ}$ C(室温) 时间: 等待 15 分钟 (电流在输出时, 电路的温度达到稳定) Create a circuit in a draft free environment Temperature :23 $\pm$ 5 $^{\circ}$ C(room temperature) Time: Wait at least 15 minutes for the circuit temperature to reach Steady State	USCAR-2 Rev.7 5.3.3
5-2-5 电流循环 Current Cycling	1.测试电流为最大试验电流 90%, 通电 45 分钟, 断电 15 分钟, 完成 1008 个循环 2.任何端子温升不超过 55 $^{\circ}$ C 3.干电路电阻 $\leq 20m\Omega$ 1.Test current is 90% of the maximum test current , 45 minutes of power on , 15 minutes of power off , and 1008 cycles are completed. 2.The temperature rise must not exceed 55 $^{\circ}$ C at any time during the test for any terminal 3.Dry circuit resistance is less than or equal 20m $\Omega$	USCAR-2 Rev.7 5.3.4
5-2-6 绝缘电阻 Insulation Resistance	将试验样品的所有接端交错连接成两组, 再施加 500 VDC 电压测量绝缘电阻。绝缘电阻 >20 M $\Omega$ Apply 500 VDC voltage (desiccation bound) between all contacts connected together and a metal foil surrounding the housing. In addition, apply the voltage a different test sample to every two adjacent contacts. Insulation resistance >20 M $\Omega$	USCAR-2 Rev.7 5.5.1

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## 5-3. 机械的性能 Mechanical Performance.

项 目 【Item】	条 件 【Test Condition】	规 格 【Requirement】
5-3-1 连接器/端子循环 Connector and/or Terminal Cycling	完成每一对端子和连接器 10 次插拔 Completely mate and un-mate each connector or terminal pair 10 times	USCAR-2 Rev.7 5.1.7
5-3-2 端子到端子啮合/分 离力 Terminal to Terminal Engage/Disengage Force	以不超过 50mm/min 的均匀速度插入对配端子, 接触面无破损, 未暴露基材 Engage the mating terminals at a uniform rate not to exceed 50 mm/min No base material should be exposed	USCAR-2 Rev.7 5.2.1
5-3-3 连接器至连接器的配 合/分离力 (无机械辅 助) Connector-Connect or Mating Unmating & Retention Forces ) (non-assist)	连接器的一次自锁机构是完全分离/松开的, 拔出力 $\leq 75$ N。 Unmating Force $\leq 75$ N with the primary connector lock completely disengaged/disabled 连接器的一次自锁机构是完全啮合的, 拔出力 $\geq 110$ N。 Retention Force $\geq 110$ N with the primary connector lock fully engaged.	USCAR-2 Rev.7 5.4.2
5-3-4 端子至连接器插入/ 保持力 Terminal-Connector Insertion/Retention Force	端子以不超过 50mm/min 的均匀速度插入连接器 端子插入力 $\leq 30$ N 端子以不超过 50mm/min 的均匀速度拉出连接器, 0.64mm 端子保持力(一次锁) $\geq 30$ N, 1.20mm 端子保持力(一次锁) $\geq 50$ N, 2.50mm 端子保持力(一次锁) $\geq 60$ N 0.64mm 端子保持力(一次锁+二次锁) $\geq 75$ N 1.20&2.50mm 端子保持力(一次锁+二次锁) $\geq 90$ N The terminal straight into the connector at a uniform rate not to exceed 50 mm/min The Insertion Force $\leq 30$ N; Pull the terminal straight back from the connector at a uniform rate not to exceed 50mm/min, until pullout occurs. 0.64mm The Retention Force (Primary) $\geq 30$ N 1.20mm The Retention Force (Primary) $\geq 50$ N 2.50mm The Retention Force (Primary) $\geq 60$ N 0.64mm The Retention Force (Primary + Secondary Lock) $\geq 75$ N 1.20&2.50mm The Retention Force (Primary + Secondary Lock) $\geq 90$ N	USCAR-2 Rev.7 5.4.1
5-3-5 极性特征有效性 Polarization Feature Effectiveness	以错误的方向将公连接器插入母连接器, 公母端子间不通电 Insert the male connector into the female connector in the wrong direction, and the male and female terminals are not electrical contact	USCAR-2 Rev.7 5.4.4
5-3-6 混合组件的啮合分离 力 Miscellaneous Component Engage/Disengage Force	啮合力 $< 60$ N; engaging force $< 60$ N; 分离力 $> 25$ N Separation force $> 25$ N	USCAR-2 Rev.7 5.4.5

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项 目 【Item】		条 件 【Test Condition】	规 格 【Requirement】
5-3-7	震动/机械冲击 Vibration/Mechanical Shock	<p>冲击: 1.加速度 35g、脉宽 5~10ms、半正弦 2.每轴 10/次、6 个轴向 振动: 三个相互垂直的轴中各进行 8 小时振动测试, 使用 60-1200HZ 12.1grms 没有任何端子对的电阻在 1 微秒内超过 7.0Ω 的情况发生 Shock :1. Acceleration 35 g, Duration 5~10 ms,Half Sine Wave 2.Each axis 10/times ,6 axes. Vibration :8 hours of vibration test in each of the three vertical axes, using 60-1200 HZ 12.1grms Does not occur when the resistance of any terminal pair exceeds 7.0Ω within 1 microsecond.</p> 	USCAR-2 Rev.7 5.4.6
5-3-8	端板 Pin 针保持力 Header Pin Retention	<p>0.64mm 保持力 <math>\geq 15N</math>;1.20&amp;2.50mm 保持力 <math>\geq 50N</math> 0.64mm <b>The</b> Retention force <math>\geq 15 N</math> 1.20&amp;2.50mm <b>The</b> Retention force <math>\geq 50 N</math></p>	USCAR-2 Rev.7 5.7.1
5-3-9	连接器安装特征机械强度 Connector Mounting Feature Mechanical Strength	<p>断开安装特征或将连接器与安装部件分离所需的最小力 The minimum force required to break the mounting feature or separate the connector from the mounting feature</p>	USCAR-2 Rev.7 5.4.11

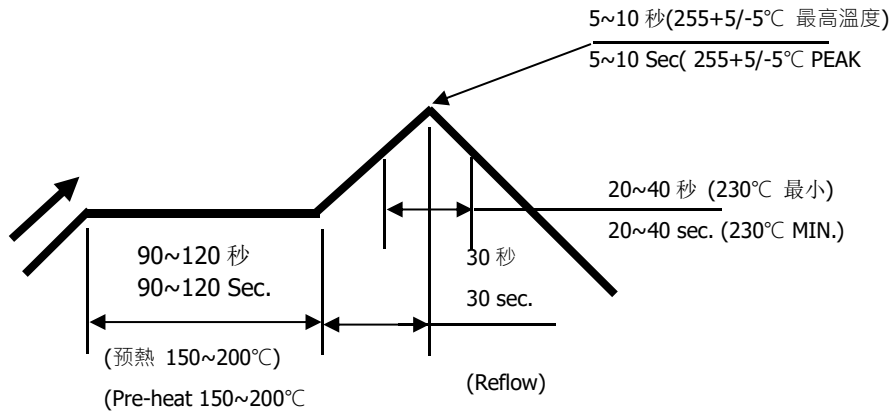
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#### 5-4. 环境性能及其它 Environmental Performance and Others.

项 目 【Item】	条 件 【Test Condition】	规 格 【Requirement】
5-4-1 热冲击 Thermal Shock	低温-40℃，高温+125℃ 低温保持 30 分钟，高温保持 30 分钟，高低温转换小于 30 秒，100 次循环， 不能有任何端子电阻超过 7 欧的时间大于 1us 的情况发生 干电路电阻 $\leq$ 20m $\Omega$ ；电压降 $\leq$ 50mV Min.temperature:-40℃,Max.temperature:+105℃ Cold soak for 30 min,Heat soak for 30 min,Transfer time<30s,Cycles 100 times,There must be no instance in which the resistance of any terminal pair exceeds 7.0 $\Omega$ for more than 1 microsecond Dry Circuit Resistance $\leq$ 20m $\Omega$ ; Voltage Drop $\leq$ 50mV	USCAR-2 Rev.7 5.6.1
5-4-2 温度/湿度循环 Temperature/Hu midity Cycling	温度变化幅度：-40℃ to 125℃ 时间：温室内 5 小时内不能进行泄漏 湿度：(80-100)% 干电路电阻 $\leq$ 20m $\Omega$ ；电压降 $\leq$ 50mV 绝缘电阻 > 100 M $\Omega$ Time: No leakage within 5 hours of greenhouse Temperature range :-40℃ to 125℃ Humidity :(80-100)% Dry Circuit Resistance $\leq$ 20m $\Omega$ ; Voltage Drop $\leq$ 50mV Insulation resistance > 100 M $\Omega$	USCAR-2 Rev.7 5.6.2
5-4-3 高温暴露 High Temperature Exposure	时间：1008H，温度：125℃ 干电路电阻 $\leq$ 25m $\Omega$ ；电压降 $\leq$ 50mV Time: 1008H, Temperature :125℃ Dry Circuit Resistance $\leq$ 25m $\Omega$ ; Voltage Drop $\leq$ 50mV	USCAR-2 Rev.7 5.6.3
5-4-4 焊锡耐热性 Resistance to Soldering Heat	焊接时间：5~10 秒。 焊接温度：255+5/-5℃。 Soldering time:5~10 sec solder. Temperature:255+5/-5℃.	EIA-364-56

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### 【6. SMT 回流条件 SMT REFLOW CONDITION】



温度条件曲线图/ 基板上温度

TEMPERATURE CONDITION GRAPH/ (TEMPERATURE ON BOARD PATTERN SIDE)

注记: 由于 P.C 板等焊接装置改变条件,所以请预先用自己的装置检查回流焊的条件.

Notes: Please check the reflow soldering condition by your own devices beforehand. Because the condition changes by the soldering devices, P.C. boards, and so on.



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## 【7.测试组 Test Group】

流程图		端子机械测试	电气性能	连接器机械测试				
参考标准	测试序列	端子至端子的啮合/分离力	最大电流/电流循环	端子至连接器的插入/保持力	混合部件的啮合/分离力	连接器至连接器的配合/分离力	极化特征	板端 Pin 针保持力
USCAR-2	序列 ID	A	B	C	D	E	F	G
	测试样品	10	10	10	10	15	10	10
5.1.7	连接器/端子循环		2					
5.1.8	外观检查	1、3	1、5	1、3	1、3	1、3	1、3	1、3
5.2.1	端子至端子的啮合/分离力	2						
5.3.3	最大试验电流能力		3					
5.3.4	电流循环		4					
5.4.1	端子至连接器的插入/保持力			2				
5.4.2	连接器至连接器的配合/分离力 (无机机械辅助)					2		
5.4.4	极化特征效果						2	
5.4.5	混合部件的啮合/分离力				2			
5.7.1	板端 Pin 针保持力							2

说明:

准备的样品应与适用于生产的说明一致, 应随机从当前生产中选择

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流程图		连接器系统电性能测试顺序				
参考标准	测试序列	冲击	热冲击	温度/湿度循环	高温暴露	焊锡耐热性
USCAR-2 或 EIA-364	序列 ID	H	I	J	K	L
	测试样品	10	10	10	10	5
5.1.8	外观检查	1、7	1、7	1、8	1、7	1、3
5.1.7	连接器/端子循环	2	2	2	2	
5.1.9	电路连贯性监控	4	4			
5.3.1	干式电路电阻	3、5	3、5	3、5	3、5	
5.3.2	电压降	6	6	6	6	
5.4.1	端子至连接器的插入/保持力			9	8	
5.4.6	振动/机械冲击	4				
5.5.1	绝缘电阻			7		
5.6.1	热冲击		4			
5.6.2	温度/湿度循环			4		
5.6.3	高温暴露				4	
EIA-364-56	焊锡耐热性					2

## 注释:

- (1) 环境温度等级 T3: -40°C to 125°C。
- (2) 振动等级 V2
- (3) 本产品适用于线缆选用 2.50mm 规格 12~24 AWG (AVSS 0.50~0.75mm<sup>2</sup>), Insulation O.D. 3.30mm(Max.)  
1.20mm 规格 14~24 AWG (AVSS 0.50~0.75mm<sup>2</sup>), Insulation O.D. 2.70mm(Max.)  
0.64mm 规格 20~22 AWG (AVSS 0.30~0.50mm<sup>2</sup>), Insulation O.D. 1.60mm(Max.)