

Product Specification 【产品规格书】	Document No.	PS-4016-01
Product Name 【产品名称】： 4.00mm Pitch 4016 Series Connector	Date Issued	2022/08/09
	Date Revised	/
	Version	A

This specification is only referred to the 4016 series connector

索引 【INDEX】

1. 适用范围 【Scope】
2. 产品型号描述 【Product Description】
3. 材质与表面处理 【Material and Surface treatment】
4. 额定等级 【Ratings and applicable wires】
5. 测试方法及要求 【Test Methods and Requirements】
 - 5-1. 外观检查 【Examination of product】
 - 5-2. 电气性能 【Electrical Performance.】
 - 5-3. 机械性能 【Mechanical Performance】
 - 5-4. 环境性能及特殊要求 【Environmental Performance and Special Requirments】
6. 测试组 【Test Group】

Product Specification 【产品规格书】	Document No.	PS-4016-01
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	Version	A

【1.适用范围 Scope】

此规格包括 4.00mm Pitch 4016 Series 连接器规格说明。

This Specification includes the 4.00mm Pitch 4016 Series Connector Specification.

【2.产品型号描述 Product Description】

产品名称 Part Name	产品料号 Part No.	产品图示 Picture
端子/Terminal	4016TM-HXXXX	
胶壳/Housing	4016HM-04X-PTBK	

【3.材质与表面处理 Material and surface treatment】

规格内容 Specification	材质 Materials	颜色/表面处理 Color/Surface treatment
端子/Terminal	高导电铜/High conductivity copper	Top plating: Sn (1~3um) overall
胶壳/Housing	PBT (UL 94V-0)	黑色 Black

(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 Specification	
额定电压 Rated Voltage	63V	[AC/DC]
额定电流 Rated Current	8A	
使用温度范围 Ambient Temperature Range	高导电铜/High conductivity copper: -40℃~+105℃	

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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
5-1-1 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. 电气性能 Electrical Performance.

测试内容 Item	规格要求 Specification requirements	参考标准 Reference standard
5-2-1 电路连贯性监控 Circuit Continuity Monitoring	电流的连续性监控中断不能超过 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 Ω for more than 1 microsecond	USCAR-2 Rev.7 5.1.9
5-2-2 干电路电阻 Dry Circuit Resistance	在环境后 $\leq 25m\Omega$ Final $\leq 25m\Omega$	USCAR-2 Rev.7 5.3.1
5-2-3 电压降 Voltage Drop	在环境后 $\leq 50mV$ Final $\leq 50mV$	USCAR-2 Rev.7 5.3.2

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	Version	A

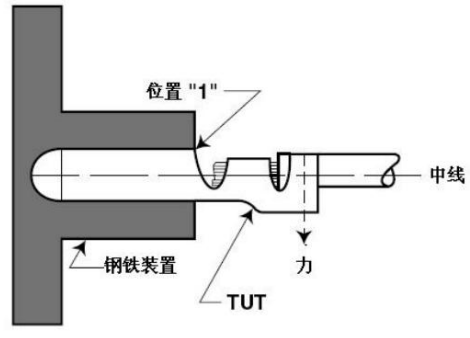
5-2-4	最大试验电流能力 Maximum test current capacity	在无风的封闭场所内搭建一个电路 温度：23±5℃(室温) 时间：等待 15 分钟（电流在输出时，电路的温度达到稳定） 温升：55℃ Create a circuit in a draft free environment Temperature :23±5℃(room temperature) Time: Wait at least 15 minutes for the circuit temperature to reach Steady State Temperature Rise: 55℃	USCAR-2 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（测试项 5-2-4） 2.完成 1008 个循环 3.任何端子温升不超过 55℃ 4.干电路电阻≤25mΩ 1.Test current is maximum test current capacity (Item:5-2-4) 2.Complete 1008 cycles 3.The temperature rise must not exceed 55℃ at any time during the test for any terminal 4.Dry circuit resistance is less than or equal 25mΩ	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>100 MΩ 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 >100 MΩ	USCAR-2 Rev.7 5.5.1

5-3. 机械的性能 Mechanical Performance.

测试内容 Item	规格要求 Specification requirements	参考标准 Reference standard
5-3-1 连接器/端子循环 Connector and/or Terminal Cycling	完成每一对连接器或端子 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-分离对配端子 注意接触面的任何磨损，不应暴露基材 Engage and disengage 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

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5-3-3	连接器至连接器的配合/分离力 (无机械辅助) Connector-Connector Mating/Unmating/Retention Forces (non-assist)	<p>组装所有适配组件，以 50mm/min 的均匀速度配合连接器，插入力 $\leq 75\text{ N}$</p> <p>以不超过 50mm/min 的均匀速度拔出配合的主锁被完全分离/禁用的连接器，拔出力 $\leq 75\text{ N}$</p> <p>Completely assemble all connector halves using all applicable components, mating the connectors at a uniform rate 50mm/min, Mating Force $\leq 75\text{ N}$</p> <p>Disengage the mating connectors that primary lock completely disengaged/disabled at a uniform rate not to exceed 50mm/min. Unmating Force $\leq 75\text{ N}$</p>	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	<p>端子以不超过 50mm/min 的均匀速度插入连接器 端子插入力 $\leq 15\text{ N}$</p> <p>端子以不超过 50mm/min 的均匀速度拉出连接器 端子保持力(一次锁+二次锁) $\geq 40\text{ N}$</p> <p>The terminal straight into the connector at a uniform rate not to exceed 50 mm/min Insertion Force $\leq 15\text{ N}$</p> <p>Pull the terminal straight back from the connector at a uniform rate not to exceed 50mm/min, until pullout occurs. Retention Force (Primary+Secondary Lock) $\geq 40\text{ N}$</p>	USCAR-2 Rev.7 5.4.1
5-3-5	端子弯曲阻力 Terminal Bend Resistance	<p>如图所示，对样品施加 4N 的力，然后分别测试 180 度、90 度方向，当力作用于端子上时，TUT 一定不能有撕裂现象。如果在试验过程中，TUT 是从原始位置弯曲，当变直后，一定不能有撕裂或开裂现象；</p> <p>As shown in the figure, apply a force of 4N to the sample, and then test the direction of 180 degrees and 90 degrees respectively. When the force is applied to the terminal, the TUT must not be torn. If the TUT is bent from its original position during the test, there must be no tearing or cracking when it becomes straight;</p>	USCAR-2 Rev.7 5.2.2



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	Date Revised	/
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测试内容 Item	规格要求 Specification requirements	参考标准 Reference standard
5-3-6 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 5-1000HZ 1.81grms 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 5-1000 HZ 1.81grms Does not occur when the resistance of any terminal pair exceeds 7.0Ω within 1 microsecon</p> <p>Vibration Class V1 - Chassis Random (PSD)</p> <p>The graph shows a log-log plot of Power Spectral Density (PSD) in g²/Hz versus Frequency in Hz. The y-axis ranges from 0.001 to 100, and the x-axis ranges from 1 to 1000. The curve starts at approximately 0.2 g²/Hz at 10 Hz, rises to a peak of about 20 g²/Hz at 20 Hz, then gradually decreases to about 0.2 g²/Hz at 100 Hz, with a small secondary peak of about 1 g²/Hz at 200 Hz, before continuing to decrease to about 0.005 g²/Hz at 1000 Hz.</p>	USCAR-2 Rev.7 5.4.6
5-3-7 跌落 Drop	<p>把连接器从 1m 的高度掉落到水平的混凝土表面 3 次（或按供应商和客户的要求），每次都要改变样品的方向。 样品需满足 USCAR-2 Rev.7 5.1.8（外观检查）的标准。 Drop the connector from a height of 1M onto the horizontal concrete surface 3 times (or as required by the supplier and customer), changing the orientation of the sample each time.Samples are required to meet USCAR-2 Rev.7 5.1.8 (Appearance Inspection) criteria.</p>	USCAR-2 Rev.7 5.4.8
5-3-8 腔体损坏性 Cavity Damage	<p>将其中一颗或多颗端子未插入到位，然后以 50mm/min 的速度将 TPA 插入到锁止位置 Refer to USCAR 2 version 7 5.4.9, insert one or more terminals out of position, and then insert the TPA into the locking position at a speed of 50mm/min</p>	USCAR-2 Rev.7 5.4.9

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5-3-9	端子与腔体极化性 Terminal/Cavity Polarization	端子以不超过 50mm/min 的均匀速度插入连接器 选择错误的端子方向进行试验, 每个错误的方向必须至少增加 90°,当从水平位置的错误方式是 90°的矩形时, 在这些位置没必要进行试验。允许对增量为 180° 的方向进行测量。接受标准参阅 USCAR-2 Rev.7 5.4.10.4 The terminal is inserted into the connector at a uniform speed of not more than 50mm/min Select the wrong terminal direction to test. Each wrong direction must be increased by at least 90°. When the wrong way from the horizontal position is a 90° rectangle, there is no need to test at these positions.A 180 degree increment is allowed The direction of the measurement.See USCAR-2 Rev.7 5.4.10.4 for acceptance criteria	USCAR-2 Rev.7 5.4.10
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5-4. 环境性能及特殊要求 Environmental Performance and Special Requirements

测试内容 Item	规格要求 Specification requirements	参考标准 Reference standard
5-4-1 热冲击 Thermal Shock	低温-40°C, 高温+105°C 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 $\leq 25\text{m}\Omega$; 电压降 $\leq 50\text{mV}$ Min.temperature:-40°C,Max.temperature:+105°C 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 Ω for more than 1 microsecond Dry Circuit Resistance $\leq 25\text{m}\Omega$; Voltage Drop $\leq 50\text{mV}$	USCAR-2 Rev.7 5.6.1
5-4-2 温度/湿度循环 Temperature/Humidity Cycling	温度变化幅度: -40°C to 105°C 时间: 温室内 5 小时内不能进行泄漏 湿度: (80-100)% 干电路电阻 $\leq 25\text{m}\Omega$;电压降 $\leq 50\text{mV}$ 绝缘电阻 $>100\text{M}\Omega$ 端子插入力 $\leq 15\text{N}$ 端子保持力(一次锁+二次锁) $\geq 40\text{N}$ Time: No leakage within 5 hours of greenhouse Temperature range :-40°C to 105°C Humidity :(80-100)% Dry Circuit Resistance $\leq 25\text{m}\Omega$; Voltage Drop $\leq 50\text{mV}$ Insulation resistance $>100\text{M}\Omega$ Insertion Force $\leq 15\text{N}$ Retention Force (Primary+Secondary Lock) $\geq 40\text{N}$	USCAR-2 Rev.7 5.6.2

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	Version	A

5-4-3	高温暴露 High Temperature Exposure	时间：1008H，温度：105℃ 干电路电阻 ≤25mΩ; 电压降 ≤50mV 端子插入力 ≤15N 端子保持力(一次锁+二次锁) ≥40N Time: 1008H, Temperature :105℃ Dry Circuit Resistance ≤25mΩ; Voltage Drop ≤50mV Insertion Force ≤15N Retention Force (Primary+Secondary Lock) ≥40N	USCAR-2 Rev.7 5.6.3
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【6.测试组 Test Group】

参考标准	流程图	端子机械测试		连接器机械测试			
		端子对端子连接/解除连接	端子弯曲阻力	端子-连接器插入/保持力	跌落	腔体损坏性	端子与腔体极化性
USCAR-2	序列 ID	A	B	C	D	E	F
	测试样品	10	10	10	10	10	10
5.1.7	连接器/端子循环						
5.1.8	外观检查	1、3	1、3	1、3	1、3	1、3	1、3
5.2.2	端子弯曲阻力		2				
5.4.8	跌落				2		
5.4.9	腔体损坏性					2	
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						
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 (无机械辅助)						
5.4.10	端子与腔体极化性						2

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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

流程图		连接器系统电性能测试顺序				
参考标准	测试序列	振动冲击	热冲击	温度/湿度循环	高温暴露	最大电流/电流循环
USCAR-2 或 EIA-364	序列 ID	G	H	I	J	K
	测试样品	10	10	10	10	5
5.1.8	外观检查	1、8	1、8	1、8	1、6	1、5
5.1.7	连接器/端子循环	2	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、6	3、6	3、5	3、4	
5.3.2	电压降	7	7	6	5	
5.3.3	最大电流/电流循环					3
5.3.4	1008h 电流循环					4
5.4.1	端子至连接器的插入/保持力			9	7	
5.4.6	振动/机械冲击	5				
5.5.1	绝缘电阻			7		
5.6.1	热冲击		5			
5.6.2	温度/湿度循环			4		
5.6.3	高温暴露				4	

注释:

- (1) 环境温度等级 T2: -40°C to 105°C。
- (2) 振动等级 V1