

Product Specification 【产品规格书】	Document No.	PS-2039B-01
Product Name 【产品名称】： 2.00mm Pitch 2039 Series Connector	Date Issued	2020/01/03
	Date Revised	2023/12/02
	Version	D

This specification is only referred to the 2039 series connector

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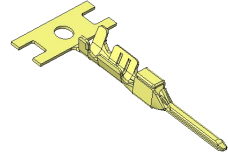
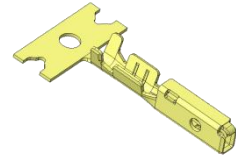
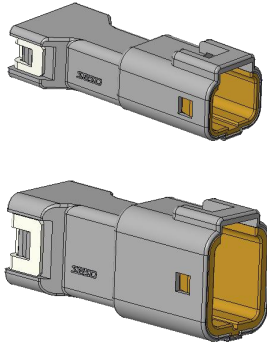
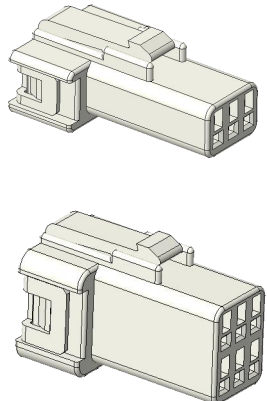
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【1.适用范围 Scope】

此规格包括 2.00mm Pitch 2039 Series 连接器规格说明。

This Specification includes the 2.00mm Pitch 2039 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
公端子 Male Terminal	2039TM-PXXX-X	
母端子 Female Terminal	2039TF-HXXX-X	
母胶壳 Female Housing	2039AF-XXB-PTXX 2039AF-2*XXB-PTXX	
公胶壳 Male Housing	2039AM-XXB-PTXX 2039AM-2*XXB-PTXX	

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规格内容 Specification	材质 Materials	颜色/表面处理 Color/Surface treatment
公端子 Male Terminal	磷青铜/Phosphor bronze	Under plate : Ni 40~120u"(1~3um) overall; Top plating: Sn 80~200u"(2~5um) overall
母端子 Female Terminal	高导电铜/High conductivity copper	Under plate : Ni 40~120u"(1~3um) overall; Top plating: Sn 80~200u"(2~5um) overall
母端连接器 Female The connector	母胶壳 Female Housing	PBT-GF15(UL 94V-0)
	护套 Jacket	PBT-GF15(UL 94V-0)
	后盖 Rear cover	PA66(UL 94V-0)
	胶塞 Rubber plug	硅树脂 Silicone
	胶圈 rubber ring	硅树脂 Silicone
公端连接器 Male The connector	公胶壳 Male Housing	PBT-GF15(UL 94V-0)
	后盖 Rear cover	PA66(UL 94V-0)
	胶塞 Rubber plug	硅树脂 Silicone

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

(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	100V	[AC/DC]
额定电流 Rated Current	3A (0.35mm ²)	
使用温度范围 Ambient Temperature Range	-40°C ~ +105°C	
适用线径 Applicable wire insulation O.D	22 AWG (0.35mm ²) Insulation O.D. 1.30~1.40mm	

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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.8 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.8 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.8 5.3.1
5-2-3 电压降 Voltage Drop	在环境后 $\leq 50mV$ Final $\leq 50mV$	USCAR-2 Rev.8 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） 温升：55 $^{\circ}C$ 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 Temperature Rise: 55 $^{\circ}C$	USCAR-2 Rev.8 5.3.3

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测试内容 Item	规格要求 Specification requirements	参考标准 Reference standard
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°C 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°C at any time during the test for any terminal 4.Dry circuit resistance is less than or equal 25mΩ	USCAR-2 Rev.8 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.8 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.8 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.8 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-Connector Mating/Unmating/Retention Forces (non-assist)	组装所有适配组件，以 50mm/min 的均匀速度配合连接器，插入力 ≤75 N 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 ≤75N Completely assemble all connector halves using all applicable components, mating the connectors at a uniform rate 50mm/min, Mating Force ≤75N Disengage the mating connectors that primary lock completely disengaged/disabled at a uniform rate not to exceed 50mm/min. Unmating Force ≤75N	USCAR-2 Rev.8 5.4.2 LV214-1 TG7 (Table 5)

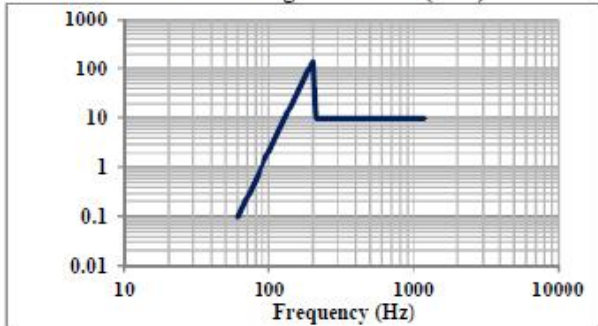
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	<p>注：组装所有适配组件，以 50mm/min 的均匀速度卡扣保持力（不含端子）不依 5.4.2.4 要求的>110N 标准。该项标准依 LV214-1 TG7 执行（下表）。</p> <p>Note: All adaptive components shall be assembled, and the retaining force of the buckle (excluding terminals) shall not comply with 5.4.2.4 at a uniform speed of 50mm/min. 110 n. This standard is implemented according to LV214-1 TG7 (Table below).</p> <p style="text-align: center;">Table 5 – Positive-locking contact housing holding forces</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="3">Contact size in mm</th> <th colspan="3">Positive-locking contact housing holding forces</th> </tr> <tr> <th colspan="3">Number of pins</th> </tr> <tr> <th>1 to 2 pins</th> <th>3 to 6 pins</th> <th>> 6 pins</th> </tr> </thead> <tbody> <tr> <td>0.5</td> <td>> 40 N</td> <td>> 50 N</td> <td>> 60 N</td> </tr> <tr> <td>0.63 to 1.2</td> <td>> 60 N</td> <td>> 80 N</td> <td>> 100 N</td> </tr> <tr> <td>> 1.2 to 2.8</td> <td>> 80 N</td> <td>> 100 N</td> <td>> 100 N</td> </tr> <tr> <td>> 2.8 to 6.3</td> <td>> 100 N</td> <td>> 100 N</td> <td>> 100 N</td> </tr> <tr> <td>> 6.3</td> <td>> 150 N</td> <td>> 150 N</td> <td>> 150 N</td> </tr> </tbody> </table>	Contact size in mm	Positive-locking contact housing holding forces			Number of pins			1 to 2 pins	3 to 6 pins	> 6 pins	0.5	> 40 N	> 50 N	> 60 N	0.63 to 1.2	> 60 N	> 80 N	> 100 N	> 1.2 to 2.8	> 80 N	> 100 N	> 100 N	> 2.8 to 6.3	> 100 N	> 100 N	> 100 N	> 6.3	> 150 N	> 150 N	> 150 N	
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> 6.3	> 150 N	> 150 N	> 150 N																													

5-3-4	<p>端子至连接器插入/保持力 Terminal-Connector Insertion/Retention Force</p> <p>端子以不超过 50mm/min 的均匀速度插入连接器 端子插入力 ≤ 15N 端子以不超过 50mm/min 的均匀速度拉出连接器 端子保持力 ≥ 30N</p> <p>The terminal straight into the connector at a uniform rate not to exceed 50 mm/min Insertion Force ≤ 15N Pull the terminal straight back from the connector at a uniform rate not to exceed 50mm/min, until pullout occurs. Retention Force ≥ 30N</p>	USCAR-2 Rev.8 5.4.1
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5-3-5	<p>端子弯曲阻力 Terminal Bend Resistance</p> <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.8 5.2.2
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5-3-6	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.8
5-3-6	震动/机械冲击 Vibration/Mechanical Shock	冲击: 1.加速度 35g、脉宽 5~10ms、半正弦 2.每轴 10/次、3 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 ,3 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. Vibration Class V2 - On Engine Random (PSD) 	USCAR-2 Rev.8 5.4.6
5-3-7	连接器到连接器可听见的咔嚓声 Connector-to-Connector Audible Click	需要 16 对样本(两组, 每组 8 个)。样品是有生产意图的。连接器腔不应是填充终端。如适用, 包括所有 tpa、密封件、填充物和辅助件。 1. 测量并记录测试环境中环境声音的 dB (A)级。环境噪声水平必须在 30 ~ 50 dB (A)之间。 2. 将声音测量设备或麦克风放置在距离连接 600mm±50mm 处。 3.用手配合第 1 组的连接器,测量锁啮合时产生的声音分贝 (A)级。做当连接器接合时, 不要将其偏向或远离门锁。 4. 使用 2 组连接器重复步骤 1 到步骤 3, 后保湿调理。 部分被付诸实践在 40°C 下, 将干燥的模塑部件暴露在 95 至 98%的相对湿度下 6 小时, 以限制水分含量(最少), 然后在 30 分钟内完成测试。 16 sample pairs are required (two groups of eight). Samples are to be production intent. The connector cavities shall not be populated with terminals. Include all TPAs, seals, stuffers and auxiliary pieces as applicable. 1. Measure and record the dB (A) level of the ambient sound within the test environment. The ambient noise level must be between 30 and 50 dB (A).	USCAR-2 Rev.8 5.4.7

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2. Locate the sound measuring device or microphone 600 mm \pm 50 mm from the connector.
3. Mate the connectors in group 1 by hand and measure the dB (A) level of the sound generated as the lock engages. Do not bias the connectors toward or away from the latch as they are engaged.
4. Repeat steps 1 through 3 using the group 2 connectors, post moisture conditioning. Parts are brought to their practical limit of moisture content by exposing "dry as molded parts" to 95 to 98% Relative Humidity at 40 °C for 6 hours (minimum), then completing the test within 30 minutes.

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 25m Ω ; 电压降 \leq 50mV 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 25m Ω ; Voltage Drop \leq 50mV	USCAR-2 Rev.8 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 25m Ω ;电压降 \leq 50mV 绝缘电阻>100 M Ω 端子插入力 \leq 15N 端子保持力 \geq 30N Time: No leakage within 5 hours of greenhouse Temperature range :-40°C to 105°C Humidity :(80-100)% Dry Circuit Resistance \leq 25m Ω ; Voltage Drop \leq 50mV Insulation resistance>100 M Ω Insertion Force \leq 15N Retention Force \geq 30N	USCAR-2 Rev.8 5.6.2

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5-4-3	高温暴露 High Temperature Exposure	时间：1008H，温度：105℃ 干电路电阻 $\leq 25\text{m}\Omega$ ；电压降 $\leq 50\text{mV}$ 端子插入力 $\leq 15\text{N}$ 端子保持力 $\geq 30\text{N}$ Time: 1008H, Temperature :105℃ Dry Circuit Resistance $\leq 25\text{m}\Omega$; Voltage Drop $\leq 50\text{mV}$ Insertion Force $\leq 15\text{N}$ Retention Force $\geq 30\text{N}$	USCAR-2 Rev.8 5.6.3
5-4-4	浸泡 Submersion	密封连接器系统中“呼吸”的加速模拟，当它被加热和突然冷却浸泡在一个较冷的液体。使用盐水作为液体，以便于检测连接器的任何泄漏。 This test is an accelerated simulation of the "breathing" that may occur in a sealed connector system when it is heated and suddenly cooled by submersion in a cooler liquid. Salt water is used as the liquid to facilitate detection of any akage into the connector.	USCAR-2 Rev.8 5.6.5

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【7.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			
		端子至端子的啮合/分离力	端子弯曲阻力	端子至连接器的插入/保持力	连接器至连接器的配合/分离力	极化特征	咔嚓声
USCAR-2	序列 ID	A	B	C	D	E	F
	测试样品	10	10	10	15	10	16
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
5.2.1	端子至端子的啮合/分离力	2					
5.2.2	端子弯曲阻力		2				
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)				2		
5.4.4	极化特征效果					2	
5.4.7	连接器到连接器可听见的咔嚓声						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	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	10
5.1.8	外观检查	1、7	1、7	1、8	1、7	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、5	3、5	3、5	3、5	
5.3.2	电压降	6	6	6	6	
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			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	
5.6.4	浸泡				4	

注释:

- (1) 环境温度等级 T2: -40°C to 105°C。
- (2) 密封等级 S2
- (3) 振动等级 V2
- (4) 本产品适用于线缆选用 AWG 22 (0.35mm²) 。