



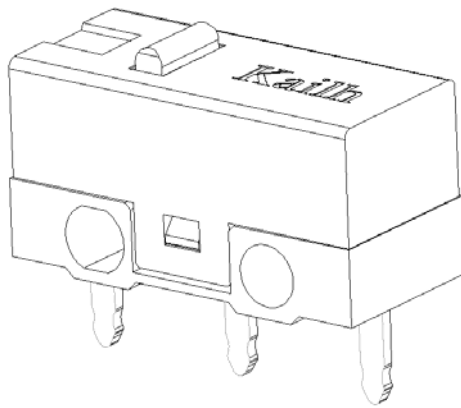
**凱華電子**  
KAIHUA EEELETRONICS

Document Number:

**KH-PS1609-03**

# 产品规格书

## Product Specification



P/N:

**CM126603D09**

Title :

**Micro Switch**

Rev.	ECN	Release and Revision Description:	Prepared By/Date:	Checked By/Date:	Approved By/Date:
<b>A</b>	--	New releasing 初版发行	张林/2016/05/27	张林/2016/05/27	马忠军/2016/05/27
<b>B</b>	--	Revise format 修订格式	张林/2016/09/01	张林/2016/09/01	易平/2016/09/01



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**1. Scope/范围:**

This Product Specification covers the requirement of Micro switch on product performance, test methods and quality assurance provisions.

本规格书内容涵盖微动开关产品的要求，包括性能指标、测试方法及质量保证方面等。

**2. Product Application/产品应用:**

The Switch is applied in all types of computer,mouse,cameras,VCR, stereo and home appliances. Please let us know before using any of the products in the application not described above.

该开关适用于所有类型的电脑/鼠标/照相机/录相机/音响和家用电器,如果用于本文中未提及的领域请在使用前告知。

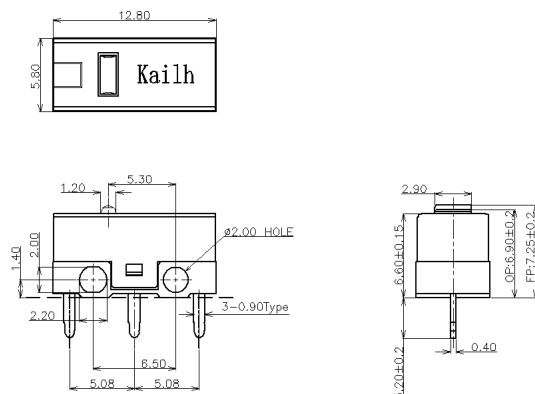
**3. Technology Parameters/技术参数**

Ambient Humidity 工作湿度:	45~85% R.H.;
Operating Temperature Range 使用温度范围:	-10℃~+70℃;
Storage Temperature Range 保存温度范围:	-20℃~+70℃;
Normal Condition:	
Ambient temperature 环境温度:	20±5℃
Relative humidity 相对湿度:	65±5%R.H.;
Air pressure 气压:	86~101KPa;
Contact Resistance 接触阻抗:	100 mΩ Max;
Operation Force 操作力:	65±15gf;
Solder Ability 可焊性:	245±5℃,3±0.5s;
Withstand Soldering Temperature 耐焊接热:	260±5℃,3±0.5s;

**4. Ratings/额定性能要求**

Rating 额定负荷:	DC30V / 0.1A;
Insulation Resistance 绝缘电阻:	≥100MΩ/ DC 250V;
Withstand Voltage 耐电压:	500V AC 1 Minute;
Mechanical Life 机械寿命:	30,000,000 Cycles (No lead).

**5. Profile Dimensions /外形尺寸**





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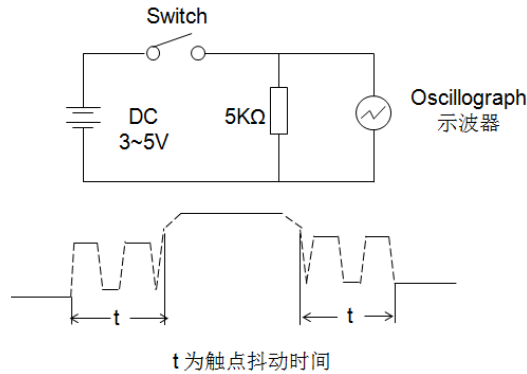
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### 6. Electrical Performance/电气性能

Item 项目	Description 项目描述	Test Condition 测试条件	Requirement 规格要求
6.1	Contact Resistance 接触电阻	<p>Static load: (Operation force)x2, which is applied on the center of Switch stem. 静态负载: 动作力的 2 倍, 施加在手柄中心.</p> <p>Measurement tool: Contact resistance Meter. 测量工具: 微电流接触电阻计(1KHz, 20mV,5~50mA)</p> <p>在低电流 (<math>\leq 100\text{mA}</math>) 条件下测试. Measured at low current (100mA or less).</p>	<p>100m<math>\Omega</math> Max 100m<math>\Omega</math> 以下</p>
6.2	Insulation Resistance 绝缘电阻	<p>Apply a Voltage of DC250 V for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body.</p> <p>输入 250V DC 电压 1 分钟, 按如下接触方法测试: (1) 端子与端子之间. (2) 端子与外壳之间.</p>	<p>100M<math>\Omega</math> Min 100 兆欧以上</p>
6.3	Dielectric withstanding voltage 耐电压	<p>Apply a Voltage of AC500 V (50~60Hz) for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body.</p> <p>输入 500V AC 电压 1 分钟, 按如下接触方法测试: (1) 端子与端子之间. (2) 端子与外壳之间.</p>	<p>No evidence of breakdown 无瞬断、击穿等破坏.</p>
6.4	Bouncing 触点抖动	<p>Operation speed: 3~4 times/s 操作速度: 每秒 3~4 次</p> <p>Slightly push the center of stem by 3~4 times/s, to test the bounce at "ON" and "OFF" 以每秒 3~4 次的速度, 轻轻在手柄中心加力, 在"导通"与"瞬断"间测试.</p> <p>Oscillo scope 示波器 Switch Bouncing Test Circuit 抖动测定回路.</p>	<p>Before Life cycle: On: 5ms MAX,5 毫秒以下 Off: 5ms MAX,5 毫秒以下</p> <p>After Life cycle: On: 10ms MAX,10 毫秒以下 Off: 10ms MAX,10 毫秒以下</p>

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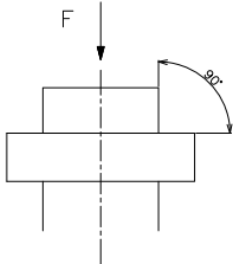
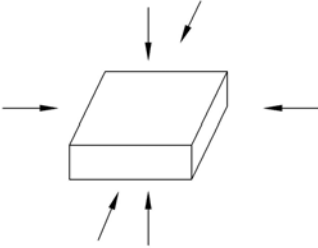
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**7. Mechanical Performance/机械性能**

Item 项目	Description 项目描述	Test Condition 测试条件	Requirement 规格要求
7.1	Load curve 荷重曲线	<p>Place the vertical direction of switch operation and gradually increase the load applied to the center of the stem until it stop. 开关的动作方向为垂直放置，向手柄中心逐渐施加负荷直到停止。</p>	See page 10 见第 10 页
7.2	Loading parameter 荷重参数	<p>Place the vertical direction of switch operation and gradually increase the load applied to the center of the stem until it stop. 开关的动作方向为垂直放置，向手柄中心逐渐施加负荷直到停止。</p>	See page 10 见第 10 页



7.3	<p><b>Static Strength</b> 静止强度</p>	<p>A static load of 3 Kgf shall be applied in the direction of button operation for a period of 60 seconds. 在手柄动作方向施加 3kgf 的静负荷 60 秒, 然后测试参数.</p> 	<p>No damage (Electrical and mechanical) 电气和机械性能正常.</p> <p>Contact resistance 接触电阻: 100mΩ Max</p> <p>Contact force 接触力: 20gf Min</p>
7.4	<p><b>Stem Pull Strength</b> 手柄拉拔强度</p>	<p>Break by a pull force applied opposite to the direction of stem operation. 在推柄动作方向反向垂直施加拉力, 使其破坏的程度.</p>	<p>500gf Min</p>
7.5	<p><b>Shock</b> 机械冲击</p>	<p>Measured by according to the below condition: (1) Acceleration: 80g 加速度 (2) Cycles of test: 3 cycles each in 6 directions, for a total of 18 cycles. 试验次数: 每个方向 3 次, 6 个方向共 18 次.</p> 	<p>Shall meet No.6, 7.1, 7.2. 满足 6, 7.1, 7.2 要求.</p>
7.6	<p><b>Life Test</b> 寿命测试</p>	<p>(1) 50mA 12VDC resistance load 50mA 12VDC 阻性负载 (2) Operation speed: 2~3cycles/sec. 操作速度: 2~3 次/秒 (3) Actuation force:150 gf 动作力: 150gf (4) Cycles: 30,000,000 times Min 操作次数: 3000 万次以上</p>	<p>Contact resistance:10 Ω max 接触电阻 10 Ω 以下 Bounce:10m sec max 触点抖动: 10 毫秒以下 Actuation force: ± 30% initial force 动作力的变化范围: ± 30%以内 No 6.2 to 6.4 and 7.1 to 7.2 shall be satisfied 满足 6.2 到 6.4 项、7.1 到 7.2 项.</p>



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### 8. Environmental Performance/环境性能

Item 项目	Description 项目描述	Test Condition 测试条件	Requirement 规格要求												
8.1	Cold test 耐寒性	(1) Temperature : $-20 \pm 2^{\circ}\text{C}$ 温度: $-20 \pm 2^{\circ}\text{C}$ (2) Duration of test: 96h 持续时间: 96 小时 (3) Take off a drop water 去掉水珠 (4) Standard conditions after test : 1h 试验后的放置条件: 1 小时	Contact resistance: 200m $\Omega$ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 200m $\Omega$ 以下满足: No. 6.2 to 6.4 No. 7.1 to 7.2												
8.2	Heat test 耐热性	(1) Temperature : $70 \pm 2^{\circ}\text{C}$ 温度: $70 \pm 2^{\circ}\text{C}$ (2) Duration of test: 96h 持续时间: 96 小时 (3) Take off a drop water 去掉水珠 (4) Standard conditions after test : 1h 试验后的放置条件: 1 小时	Contact resistance: 200m $\Omega$ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 200m $\Omega$ 以下满足: No. 6.2 to 6.4 No. 7.1 to 7.2												
8.3	Temperature cycle 温度循环	(1) Test cycles: 5 cycles 试验周期: 5 个周期 (2) Standard condition after test: 1h 试验后的放置条件: 1 小时 <table border="1" data-bbox="448 1344 1054 1536"> <thead> <tr> <th></th> <th>Temperature 温度</th> <th>Duration of test 持续时间</th> </tr> </thead> <tbody> <tr> <td rowspan="4">1 cycle 一次循环</td> <td><math>20 \pm 5^{\circ}\text{C}</math></td> <td>1h</td> </tr> <tr> <td><math>-20 \pm 2^{\circ}\text{C}</math></td> <td>1h</td> </tr> <tr> <td><math>20 \pm 5^{\circ}\text{C}</math></td> <td>1h</td> </tr> <tr> <td><math>70 \pm 5^{\circ}\text{C}</math></td> <td>1h</td> </tr> </tbody> </table>		Temperature 温度	Duration of test 持续时间	1 cycle 一次循环	$20 \pm 5^{\circ}\text{C}$	1h	$-20 \pm 2^{\circ}\text{C}$	1h	$20 \pm 5^{\circ}\text{C}$	1h	$70 \pm 5^{\circ}\text{C}$	1h	Contact resistance: 200m $\Omega$ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 200m $\Omega$ 以下满足: No. 6.2 to 6.4 No. 7.1 to 7.2
	Temperature 温度	Duration of test 持续时间													
1 cycle 一次循环	$20 \pm 5^{\circ}\text{C}$	1h													
	$-20 \pm 2^{\circ}\text{C}$	1h													
	$20 \pm 5^{\circ}\text{C}$	1h													
	$70 \pm 5^{\circ}\text{C}$	1h													
8.4	Soldering heat test 耐焊接热	Soldering area: T/2 of PWB thickness. (PWB: T=1.6mm) 焊接面积: 印刷基板的 1/2 厚度处 Soldering temperature: $260 \pm 5^{\circ}\text{C}$ Soldering time: $3 \pm 0.5\text{s}$ 焊接温度: $260 \pm 5^{\circ}\text{C}$ 焊接时间: $3 \pm 0.5$ 秒	Appearance: No abnormality. 外观无异常												

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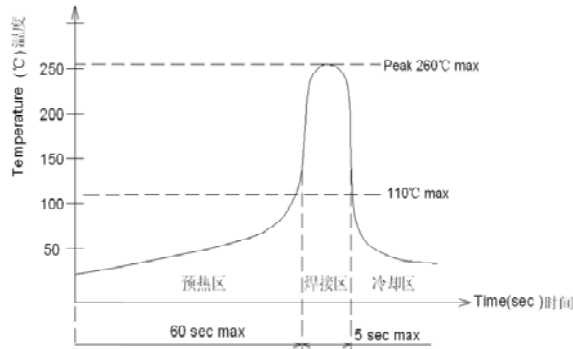


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8.5	Solderability 可焊性	<p>1. Hand soldering 手工焊接: Please practice according to below condition: (1) Soldering Temperature : <math>350 \pm 5^{\circ}\text{C}</math> 焊接温度: <math>350 \pm 5^{\circ}\text{C}</math> (2) Continual soldering time: <math>3 \pm 0.5\text{s}</math> 连续焊接时间: <math>3 \pm 0.5</math> 秒 (3) Capacity of soldering iron: <math>\leq 20\text{w}</math> 电烙铁功率: 20 瓦以下</p> <p>2. Automatic Reflow soldering 自动焊接: For the product of PIP, according to below condition:</p> 	<p>At least 95% of surface area of immersed portion shall be covered by solder. 浸焊面积大于 95% 以上.</p>
8.6	Humidity test 耐湿性	<p>(1) Temperature : <math>60 \pm 2^{\circ}\text{C}</math> 温度: <math>60 \pm 2^{\circ}\text{C}</math> (2) relative humidity: 90~95% R.H. 相对湿度: 90~95% R.H. (3) Duration of test: 96h 持续时间: 96 小时 (4) Take off a drop water 去掉水珠 (5) Standard conditions after test: 1h 试验后的放置条件: 1 小时</p>	<p>Contact resistance: <math>200\text{m}\Omega</math> Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 <math>200\text{m}\Omega</math> 以下 满足: No. 6.2 to 6.4 No. 7.1 to 7.2</p>
8.7	Salt Spray 盐雾测试	<p>Apply the following environment to test: 根据下列条件进行测试:</p> <p>(1) Temperature : <math>35 \pm 5^{\circ}\text{C}</math> 温度: <math>35 \pm 2^{\circ}\text{C}</math>; (2) Salt water density: <math>5 \pm 1\%</math> 盐水浓度: <math>5 \pm 1\%</math>; (3) Duration: 24 hours 持续时间: 24 小时; (4) After test, the salt deposit shall be removed by running water. 实验后将盐沉积物用水冲掉</p>	<p>Appearance: No corrosion spot, no crack, no base plate naked. 外观: 无腐蚀点, 无裂纹, 无裸露基材.</p> <p>Contact Resistance: <math>200\text{m}\Omega</math> Max 接触电阻: <math>200</math> 毫欧以下</p>

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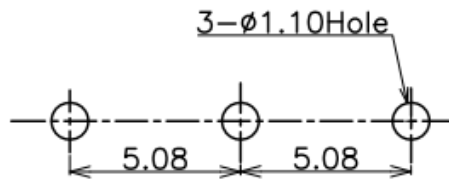


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8.8	Withstand K <sub>2</sub> S 硫化测试	<p>Apply the following environment to test: 根据下列条件进行测试</p> <p>(1) Temperature: 35±5℃ 温度: 35±5℃ (2) K<sub>2</sub>S Density: 2%;     硫化钾浓度: 2% (3) Duration: 2 minute.     持续时间: 2 分钟</p>	<p>Appearance: No corrosion spot, no crack, no base plate naked. 外观: 无腐蚀点, 无裂纹, 无裸露基材.</p> <p>Contact Resistance: 200 mΩ Max 接触电阻: 200 毫欧以下</p>
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**9. Recommended PCB Layout 推荐的 PCB 安装焊盘规格**

(Top View)  
(Single face board T=1.6mm)



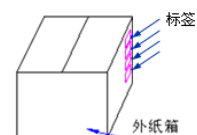
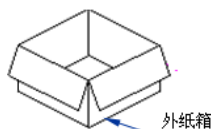
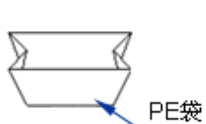
PCB Layout(Pattern Side)

**10. Loading Parameter (FP/OP/PT/OF/OT/MD/RF) Specification 荷重参数规格 :**

Parameter	Unit	Specification	Remark
FP	mm	7.25±0.2	
OP	mm	6.90±0.2	
PT	mm	0.35±0.2	
OF	gf	65±15	
OT	mm	0.2	Min
MD	mm	0.1	Max
RF	gf	20	Min

**11. Packaging 包装**

Packing Style 包装类型	Quantity 数量	Notes 说明
PE Bag 包装袋	1000PCS	1000PCS/BAG
Carton 纸箱	20000PCS.	PE Bag: 20PCS





**12. Precaution 注意事项**

**12.1 Immersion Soldering condition 浸焊条件**

ITEM 项目	CONDITION 条件
Preheat temperature 预热温度	110°C Max (Ambient temperature of soldering surface of P.W.B) 110°C 以下(印刷基板焊锡面周围的温度)
Preheat time 预热时间	60s, Max 60 秒以内
Area of flux 助焊剂面积	1/2 Max of PWB Thickness 印刷基板厚度的 1/2 以内
Temperature of solder 焊锡温度	260±5°C 260±5°C
Time of immersion 浸焊时间	3s±0.5s 3s±0.5s
Number of soldering 焊接次数	2time Max (But should down heat of the first soldering) 2 次以内
Printed wiring board 印刷基板	Single side copper-clad laminates 单面铜箔

- (1) After switches were soldered, please be careful not to clean switches with solvent  
开关浸焊后,注意不要用溶剂清洗.
- (2) Under the condition of using soldering iron, soldering temperature shall be 350°C±5°C with 3±0.5s.  
在使用烙铁的情况下,焊锡温度应在350°C±5°C,焊接时间3±0.5s秒.

**12.2 Notes 注意点**

- (1) Please be cautious not to give excessive static load or shock to switches.  
注意不要施加超负荷的压力或晃动开关.
- (2) Please be careful not to stack up P. W. B. after switches were soldered.  
开关焊接以后,印刷基板注意不要叠放.
- (3) Preservation under high temperature and high humidity or corrosive gas should be avoided Especially. When you need to preserve for a long period, do not open the carton.  
保管时尤其应注意避开高湿高温和有腐蚀性气体的环境. 如需长时间保存,请不要打开包装箱.
- (4) Products meet the ROHS & REACH environmental management substances control standards  
产品满足 **ROHS & REACH** 环境管理物质管制标准