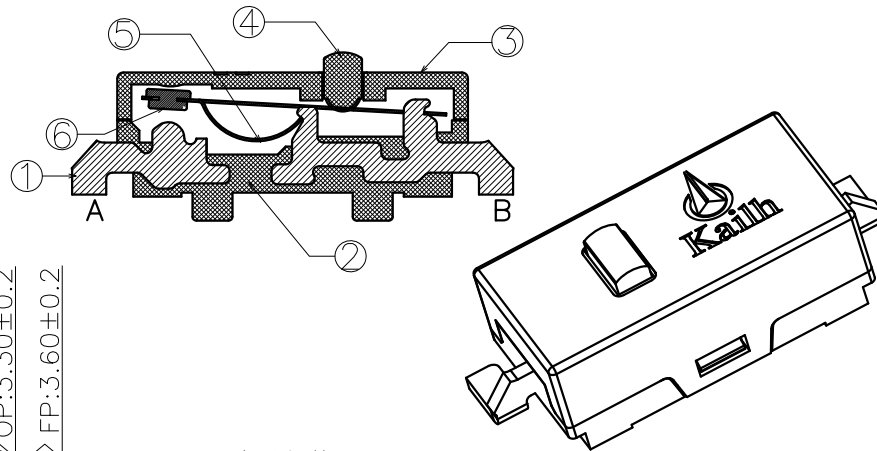
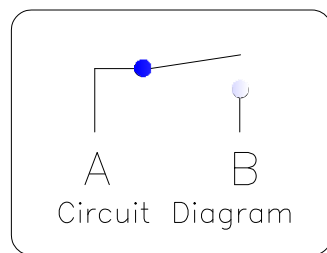
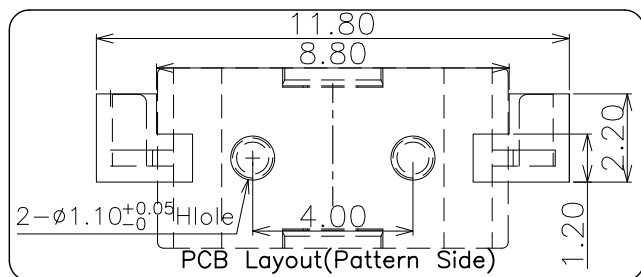
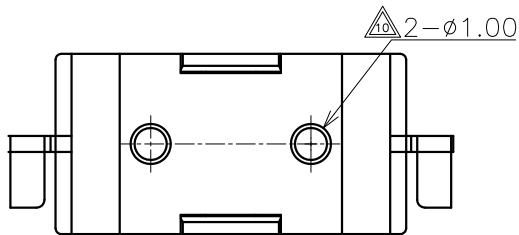
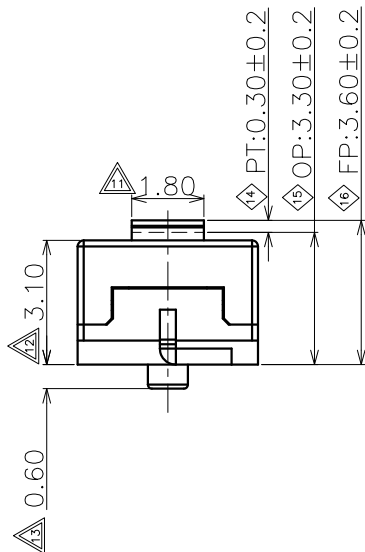
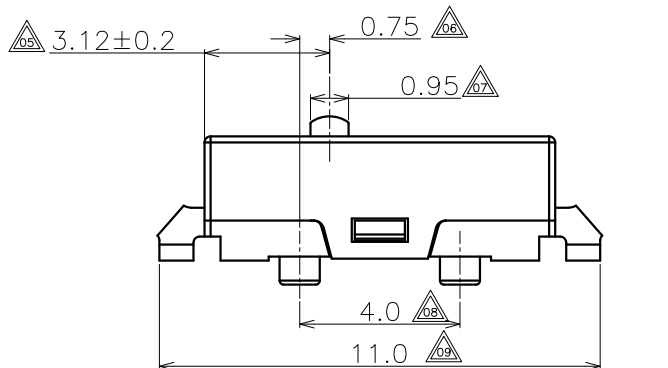
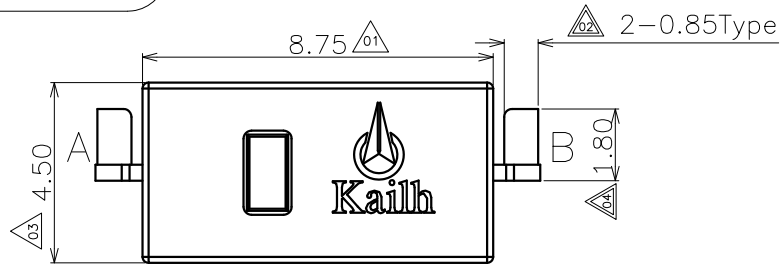


# 产品检验图面



## 产品规格:

- 1. 额定值: 直流30伏 0.1安
- 2. 接触阻抗: 100毫欧 最大
- 3. 绝缘阻抗: 100兆欧 最小 (DC250V)
- 4. 耐高压: 交流500伏 (50-60赫兹) 持续1分钟
- 5. 操作力: 60 ± 15gf
- 6. 回弹力: 30gf (最小)
- 7. 动作位置: 3.30 ± 0.2mm
- 8. 机械寿命: 300万次以上
- 9. 环保要求: 此产品必需符合凯华环境有害物质管制标准

## NOTE:

- ◇: 重点管控尺寸, 一般1到3个, 最多不超过5个, 每次进料及生产均需量测
  - △: 次重点管控尺寸, 序列号排列不得超过17个, 每次进料及生产时均需量测
  - △: 一般尺寸, 个数不限, 每次模具变动时才需量测
- 版次定义: 新开发而未转量产之产品图面版次为A<sub>0</sub>、A<sub>1</sub>、A<sub>2</sub>……  
已转量产之产品图面版次为A、B、C……

| ⑥  | 银点 | BWMI1267-09000   | 1    | 纯银           |             |       |    |
|----|----|------------------|------|--------------|-------------|-------|----|
| ⑤  | 簧片 | BZMI87XX-03007   | 1    | C17200-XHM   |             |       |    |
| ④  | 导芯 | BSMI87XX-05001   | 1    | PA10T+G/F30% | 黑色          |       |    |
| ③  | 盖子 | BSMI87XX-04002   | 1    | PA10T+G/F30% | 黑色          |       |    |
| ②  | 底座 | BZMI87XX-02005S0 | 1    | PA10T+G/F30% | 黑色          |       |    |
| ①  | 端子 | BWMI87XX-01001   | A B  | 1            | H65Y (0.4t) | 镀银    |    |
| 序号 | 零件 | 物料料号             | 端子编号 | 用量           | 材料          | 镀层/颜色 | 备注 |

|        |         |            |   |                  |           |
|--------|---------|------------|---|------------------|-----------|
| 承认     |         | 日期         | 东莞市凯华电子有限公司<br>DONGGUAN CITY KAIHUA ELECTRONICS CO.,LTD |                  |           |
| 设计     | 石习军     | 2012/02/11 |   |                  |           |
| 审核     |         |            | 名称  | M18731 微动开关(贴片式) |           |
| 核准     |         |            | 料号  | CM1873101S01     |           |
| 未注尺寸公差 | 30<L    | ±0.30      | 单位: mm  | 比例: 1:1          | 视角        |
|        | 10<L≤30 | ±0.20      |   |                  |           |
|        | 5<L≤10  | ±0.15      | 图号  | KHA-M18731-001   | 页次 1 OF 1 |
|        | L≤5     | ±0.10      |   |                  |           |

|        |    |    |     |    |    |    |    |
|--------|----|----|-----|----|----|----|----|
| 工程变更单号 | 版次 | 日期 | NEW | 说明 | 修改 | 审核 | 核准 |
|        | A  |    |     |    |    |    |    |



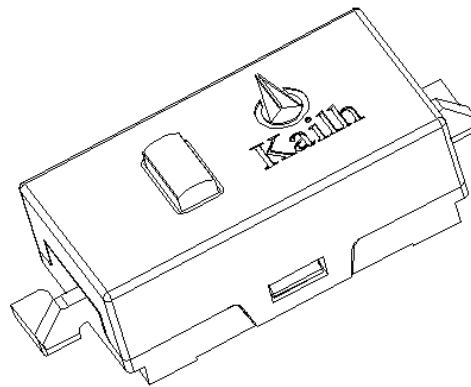
**凱華電子**  
KAIHUA EEELETRONICS

Document Number:

**KH-PS1610-47**

# 产品规格书

## Product Specification



P/N:

**CM1873101S01**

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                | 石习军/2012/02/11    | 石习军/2012/02/11   | 万文学/2012/02/11    |
| <b>B</b> | --  | Revise format 修订格式                | 张林/2016/10/27     | 张林/2016/10/27    | 易平/2016/10/27     |
|          |     |                                   |                   |                  |                   |
|          |     |                                   |                   |                  |                   |
|          |     |                                   |                   |                  |                   |
|          |     |                                   |                   |                  |                   |



|                      |                           |            |               |
|----------------------|---------------------------|------------|---------------|
| P/N:<br>CMI873101S01 | DOC. No.:<br>KH-PS1610-47 | Rev.:<br>B | Page:<br>2/10 |
|----------------------|---------------------------|------------|---------------|

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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,sterio 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。

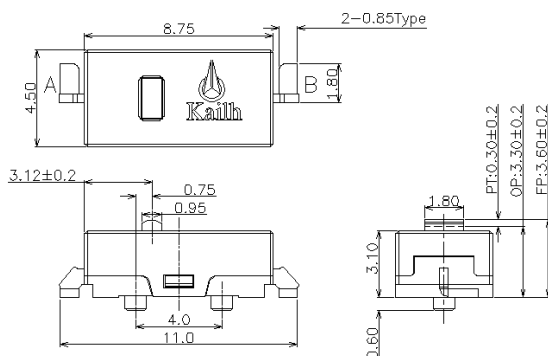
**3. Technology Parameters/技术参数**

|                                       |                |
|---------------------------------------|----------------|
| 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:     | -40℃~+80℃;     |
| 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:                  | 60±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:       | 3,000,000 Cycles (No lead). |

**5. Profile Dimensions /外形尺寸**





# 凱華電子

KAIHUA EEELETRONICS

## Product Specification

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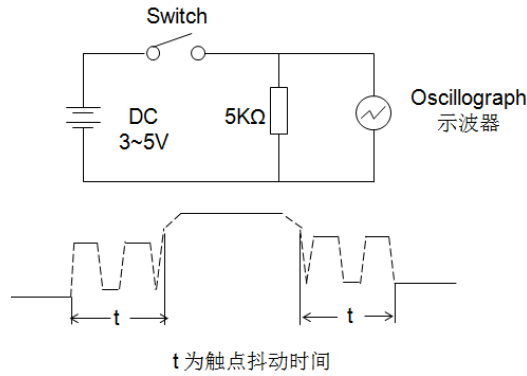
4/10

### 6. Electrical Performance/电气性能

| Item<br>项目 | Description<br>项目描述                    | Test Condition 测试条件  | Requirement 规格要求   |
|------------|--|--|--|
| 6.1        | Contact Resistance<br>接触电阻             | <p>Static load: (Operation force)x2, which is applied on the center of Switch stem.<br/>静态负载: 动作力的 2 倍, 施加在手柄中心.</p> <p>Measurement tool: Contact resistance Meter.<br/>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.<br/>Measured at low current (100mA or less).</p> | <p>100m<math>\Omega</math> Max<br/>100m<math>\Omega</math> 以下</p>  |
| 6.2        | Insulation Resistance<br>绝缘电阻          | <p>Apply a Voltage of DC250 V for 1 minute, according to the below method.<br/>(1) Between terminals.<br/>(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:<br/>(1) 端子与端子之间.<br/>(2) 端子与外壳之间.</p>   | <p>100M<math>\Omega</math> Min<br/>100 兆欧以上</p>  |
| 6.3        | Dielectric withstanding voltage<br>耐电压 | <p>Apply a Voltage of AC500 V (50~60Hz) for 1 minute, according to the below method.<br/>(1) Between terminals.<br/>(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:<br/>(1) 端子与端子之间.<br/>(2) 端子与外壳之间.</p>   | <p>No evidence of breakdown<br/>无瞬断、击穿等破坏.</p>   |
| 6.4        | Bouncing<br>触点抖动                       | <p>Operation speed: 3~4 times/s<br/>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"<br/>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<br/>Switch Bouncing Test Circuit 抖动测定回路.</p>  | <p>Before Life cycle:<br/>On: 5ms MAX,5 毫秒以下<br/>Off: 5ms MAX,5 毫秒以下</p> <p>After Life cycle:<br/>On: 10ms MAX,10 毫秒以下<br/>Off: 10ms MAX,10 毫秒以下</p> |

" Confidential "

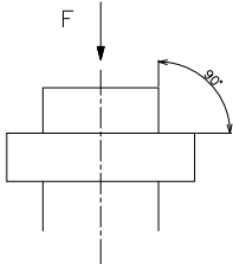
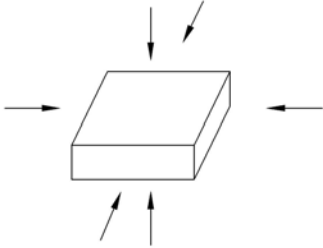
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**7. Mechanical Performance/机械性能**

| Item<br>项目 | Description<br>项目描述       | Test Condition 测试条件  | Requirement 规格要求       |
|------------|---------------------------|--|------------------------|
| 7.1        | Load curve<br>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.<br/>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<br>见第 10 页 |
| 7.2        | Loading parameter<br>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.<br/>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<br>见第 10 页 |



|     |                                     |  |   |
|-----|-------------------------------------|--|---|
| 7.3 | <b>Static Strength</b><br>静止强度      | <p>A static load of 3 Kgf shall be applied in the direction of button operation for a period of 60 seconds.<br/>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)<br/>电气和机械性能正常.</p> <p>Contact resistance<br/>接触电阻: 100mΩ Max</p> <p>Contact force 接触力:<br/>20gf Min</p>  |
| 7.4 | <b>Stem Pull Strength</b><br>手柄拉拔强度 | <p>Break by a pull force applied opposite to the direction of stem operation.<br/>在推柄动作方向反向垂直施加拉力, 使其破坏的程度.</p>  | 500gf Min   |
| 7.5 | <b>Shock</b><br>机械冲击                | <p>Measured by according to the below condition:<br/>(1) Acceleration: 80g 加速度<br/>(2) Cycles of test: 3 cycles each in 6 directions, for a total of 18 cycles.<br/>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.<br/>满足 6, 7.1, 7.2 要求.</p>  |
| 7.6 | <b>Life Test</b><br>寿命测试            | <p>(1) 0.1A 30VDC resistance load<br/>0.1A 30VDC 阻性负载<br/>(2) Operation speed: 2~3cycles/s<br/>操作速度: 2~3 次/秒<br/>(3) Actuation force:150 gf<br/>动作力: 150gf<br/>(4) Cycles: 3,000,000 times Min<br/>操作次数: 300 万次以上</p>  | <p>Contact resistance:10 Ω max<br/>接触电阻 10 Ω 以下<br/>Bounce: 10ms max<br/>触点抖动: 10 毫秒以下<br/>Actuation force: ± 30% initial force<br/>动作力的变化范围: ± 30%以内<br/>No 6.2 to 6.4 and 7.1 to 7.2 shall be satisfied<br/>满足 6.2 到 6.4 项、7.1 到 7.2 项.</p> |



**8. Environmental Performance/环境性能**

| Item<br>项目      | Description<br>项目描述         | Test Condition 测试条件   | Requirement 规格要求   |                   |                          |                 |                            |    |                             |    |                            |    |                            |    |  |
|-----------------|-----------------------------|---|--|-------------------|--------------------------|-----------------|----------------------------|----|-----------------------------|----|----------------------------|----|----------------------------|----|--|
| 8.1             | Cold test<br>耐寒性            | (1) Temperature : $-20 \pm 2^{\circ}\text{C}$<br>温度: $-20 \pm 2^{\circ}\text{C}$<br>(2) Duration of test: 96h<br>持续时间: 96 小时<br>(3) Take off a drop water 去掉水珠<br>(4) Standard conditions after test : 1h<br>试验后的放置条件: 1 小时   | Contact resistance:<br>200m $\Omega$ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2<br>接触电阻 200m $\Omega$ 以下满足:<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2 |                   |                          |                 |                            |    |                             |    |                            |    |                            |    |  |
| 8.2             | Heat test<br>耐热性            | (1) Temperature : $80 \pm 2^{\circ}\text{C}$<br>温度: $80 \pm 2^{\circ}\text{C}$<br>(2) Duration of test: 96h<br>持续时间: 96 小时<br>(3) Take off a drop water 去掉水珠<br>(4) Standard conditions after test : 1h<br>试验后的放置条件: 1 小时   | Contact resistance:<br>200m $\Omega$ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2<br>接触电阻 200m $\Omega$ 以下满足:<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2 |                   |                          |                 |                            |    |                             |    |                            |    |                            |    |  |
| 8.3             | Temperature cycle<br>温度循环   | (1) Test cycles: 5 cycles<br>试验周期: 5 个周期<br>(2) Standard condition after test:1h<br>试验后的放置条件: 1 小时<br><table border="1" data-bbox="448 1379 1054 1572"> <thead> <tr> <th></th> <th>Temperature<br/>温度</th> <th>Duration of test<br/>持续时间</th> </tr> </thead> <tbody> <tr> <td rowspan="4">1 cycle<br/>一次循环</td> <td><math>20 \pm 5^{\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>20 \pm 5^{\circ}\text{C}</math></td> <td>1h</td> </tr> <tr> <td><math>80 \pm 5^{\circ}\text{C}</math></td> <td>1h</td> </tr> </tbody> </table> |  | Temperature<br>温度 | Duration of test<br>持续时间 | 1 cycle<br>一次循环 | $20 \pm 5^{\circ}\text{C}$ | 1h | $-20 \pm 5^{\circ}\text{C}$ | 1h | $20 \pm 5^{\circ}\text{C}$ | 1h | $80 \pm 5^{\circ}\text{C}$ | 1h | Contact resistance:<br>200m $\Omega$ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2<br>接触电阻 200m $\Omega$ 以下满足:<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2 |
|                 | Temperature<br>温度           | Duration of test<br>持续时间  |  |                   |                          |                 |                            |    |                             |    |                            |    |                            |    |  |
| 1 cycle<br>一次循环 | $20 \pm 5^{\circ}\text{C}$  | 1h  |  |                   |                          |                 |                            |    |                             |    |                            |    |                            |    |  |
|                 | $-20 \pm 5^{\circ}\text{C}$ | 1h  |  |                   |                          |                 |                            |    |                             |    |                            |    |                            |    |  |
|                 | $20 \pm 5^{\circ}\text{C}$  | 1h  |  |                   |                          |                 |                            |    |                             |    |                            |    |                            |    |  |
|                 | $80 \pm 5^{\circ}\text{C}$  | 1h  |  |                   |                          |                 |                            |    |                             |    |                            |    |                            |    |  |
| 8.4             | Soldering heat test<br>耐焊接热 | Soldering area: T/2 of PWB thickness.<br>(PWB: T=1.6mm)<br>焊接面积: 印刷基板的 1/2 厚度处<br>Soldering temperature: $260 \pm 5^{\circ}\text{C}$<br>Soldering time: $3 \pm 0.5\text{s}$<br>焊接温度: $260 \pm 5^{\circ}\text{C}$<br>焊接时间: $3 \pm 0.5$ 秒   | Appearance:<br>No abnormality.<br>外观无异常  |                   |                          |                 |                            |    |                             |    |                            |    |                            |    |  |



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

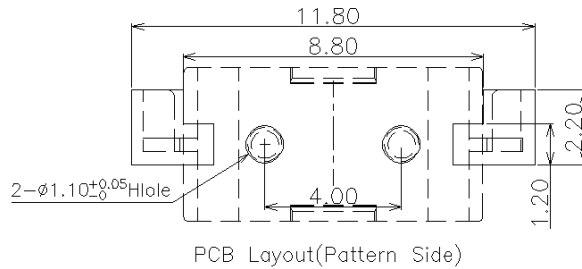


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|     |                                       |   |   |
|-----|---------------------------------------|---|---|
| 8.8 | Withstand<br>K <sub>2</sub> S<br>硫化测试 | <p>Apply the following environment to test:<br/>根据下列条件进行测试</p> <p>(1) Temperature: 35±5°C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

**9. Recommended PCB Layout 推荐的 PCB 安装焊盘规格**

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



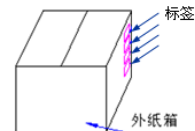
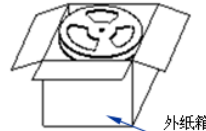
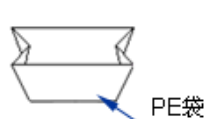
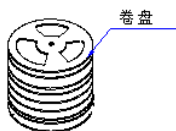
**10. Loading Parameter (FP/OP/PT/OF/OT/MD/RF) Specification 荷重参数规格:**

| Parameter | Unit | Specification | Remark |
|-----------|------|---------------|--------|
| FP        | mm   | 3.60±0.2      |        |
| OP        | mm   | 3.30±0.2      |        |
| PT        | mm   | 0.30±0.2      |        |
| OF        | gf   | 60±15         |        |
| OT        | mm   | 0.1           | Min    |
| MD        | mm   | 0.12          | Max    |
| RF        | gf   | 30            | Min    |

**11. Packaging 包装**

**11.1 Packaging model 1 包装样式 1**

| Packing Style 包装类型 | Quantity 数量 | Notes 说明      |
|--------------------|-------------|---------------|
| Reel 卷盘            | 2000PCS.    |               |
| PE Bag 包装袋         | 2000PCS     | Reel: 1 Reel  |
| Carton 纸箱          | 12000PCS.   | Reel: 6 Reels |

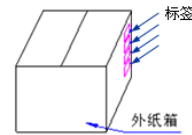
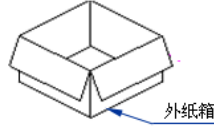
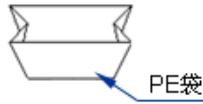




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**11.2 Packaging model 2 包装样式 2**

| Packing Style 包装类型 | Quantity 数量 | Notes 说明      |
|--------------------|-------------|---------------|
| PE Bag 包装袋         | 1000PCS     |               |
| Carton 纸箱          | 15000PCS.   | PE Bag: 15PCS |



**12. Precaution 注意事项**

**12.1 Immersion Soldering condition 浸焊条件**

| ITEM<br>项目                    | CONDITION<br>条件   |
|-------------------------------|---|
| Preheat temperature<br>预热温度   | 110°C Max (Ambient temperature of soldering surface of P.W.B)<br>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<br>助焊剂面积         | 1/2 Max of PWB Thickness<br>印刷基板厚度的 1/2 以内  |
| Temperature of solder<br>焊锡温度 | 260±5°C<br>260±5°C  |
| Time of immersion<br>浸焊时间     | 3s±0.5s<br>3s±0.5s  |
| Number of soldering<br>焊接次数   | 2 time Max (But should down heat of the first soldering)<br>2 次以内                       |
| Printed wiring board<br>印刷基板  | Single side copper-clad laminates<br>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±0.5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温高湿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