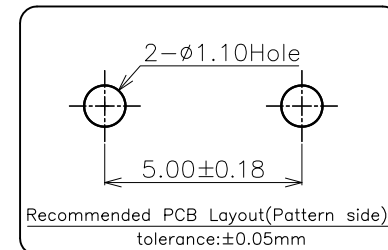
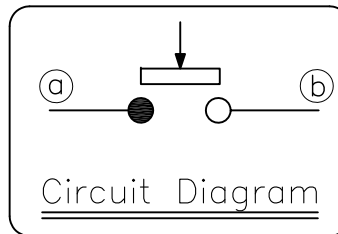
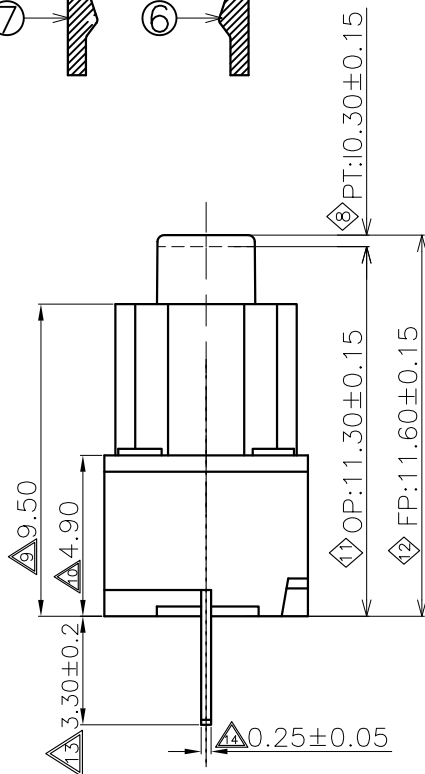
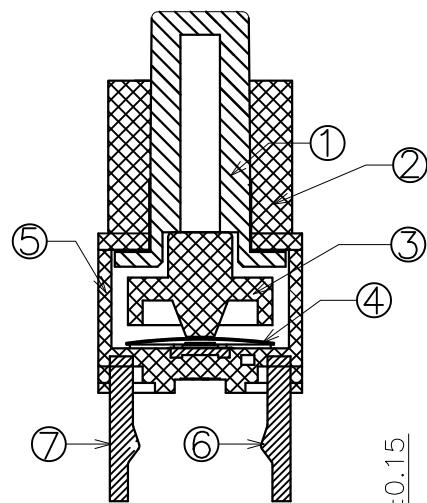
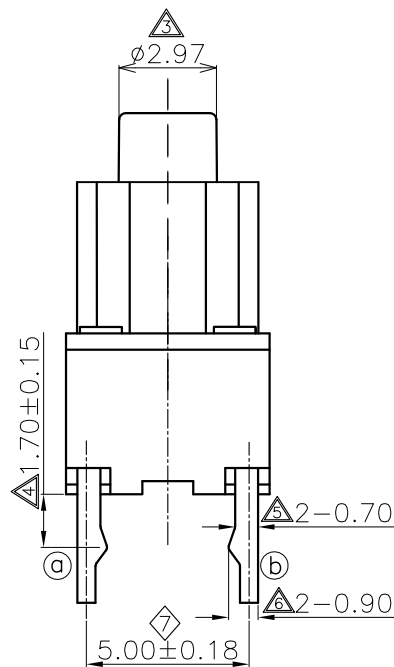
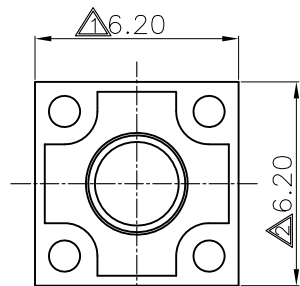


# 成品检验图面



## 产品规格:

- 1. 额定值: 直流12伏 50毫安
- 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250伏 (50-60赫兹)持续 1 分钟
- 5. 操作力: 70 ± 15gf
- 6. 操作点位置: 11.30 ± 0.15mm
- 7. 机械寿命: 100万次以上

## 备注:

◇: 表示重点管控尺寸, 一般为功能尺寸, 首检及巡检时需量测。  
 △: 表示次重点管控尺寸, 一般为装配尺寸, 首检时需量测。  
 1) 重点及次重点管控尺寸中的序号不可重复, 需依次往后增加。若其中有某个尺寸在变更或其它状况下, 尺寸消失或不要求管控时, 原序号不可再用。有其它尺寸需要增加管控时, 序号往后增加。  
 2) 版次定义: 新开发而未转量产之产品图面版次为A1, A2, A3...  
 已转量产之产品图面版次为A, B, C...

⑥	BWMI62XX-01005	端子	a b	1	H65Y	镀银	
⑤	BZMI62XX-02011CL	基座		1	PA66+GF·30%	黑色	
④	BWMI62XX-03001	弹片		1	SUS301-EH	单面覆银	
③	BSMI62XX-03010	橡胶垫		1	硅胶	白色	
②	BSMI62XX-04009	盖子		1	PBT+GF·30%	黑色	
①	BSMI62XX-05047	导芯		1	PBT+GF·15%	浅灰色	

序号	物料料号	零件名称	端子编号	用量	材 料	镀层/颜色	备注
承 认		日期		 <b>东莞市凯华电子有限公司</b> DONGGUAN CITY KAIHUA ELECTRONICS CO.,LTD			
设 计		2017.12.19					
审 核							
核 准							
			名 称	11.60方型微动开关			
			料 号	CM1621101D06			
未注尺寸公差			30<L ±0.30	角度	单位: mm	比例: 1:1	视角
			10<L ≤30 ±0.20	±2'	图 号	KAI-MI6211-003	页次 1 OF 1
			5<L ≤10 ±0.15				
			L ≤5 ±0.10				

工程变更单号	版次	日期	NEW	说明	修改	审核	核准
	A						



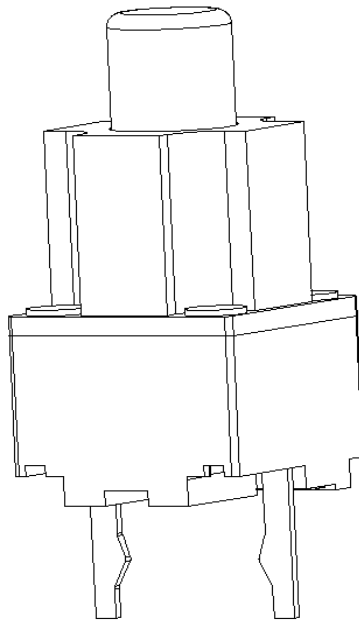
**凱華電子**  
KAIHUA EEELETRONICS

Document Number:

KH-PS1712-11

# 产品规格书

## Product Specification



P/N: <b>CMI621101D06</b>			Title : <b>Micro Switch</b>		
Rev.	ECN	Release and Revision Description:	Prepared By/Date:	Checked By/Date:	Approved By/Date:
<b>A</b>	—	New releasing 初版发行	陈耿/2017/10/30	易平/2017/10/30	王锋/2017/10/30



P/N:	DOC. No.:	Rev.:	Page:
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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. Please let us know before using any of the products in the application not described above.

该微动开关产品适用于所有类型的电脑鼠标，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℃~+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:	70±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:	DC12V / 50mA;
Insulation Resistance 绝缘电阻:	≥100MΩ/ DC 250V;
Withstand Voltage 耐电压:	AC 250V 1 Minute;
Mechanical Life 机械寿命:	1,000,000 Cycles .

**5. Profile Dimensions /外形尺寸:**

详见图纸规格:

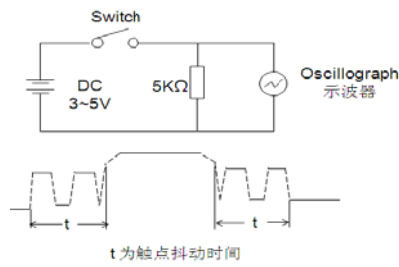


**6. Electrical Performance/电气性能:**

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 (≤100mA) 条件下测试. Measured at low current (100mA or less).</p>	<p>100mΩ Max 100mΩ 以下</p>
6.2	Insulation Resistance 绝缘电阻	<p>Apply a Voltage of DC 250 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>100MΩ Min 100 兆欧以上</p>
6.3	Dielectric withstanding voltage 耐电压	<p>Apply a Voltage of AC 250 V (50~60Hz) for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body.</p> <p>输入 250V 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>



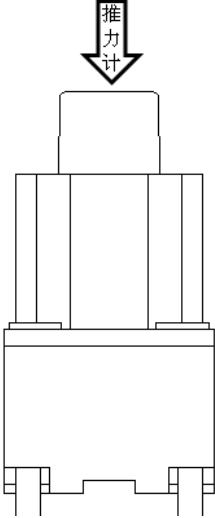
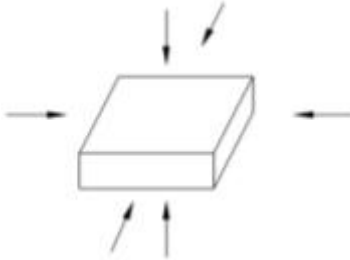
触点抖动用图:



**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	The 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	Movement Characteristic 动作特征	<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	Static Strength 静止强度	<p>A static load of 0.5 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 0.5kgf 的静负荷 60 秒, 然后测试参数.</p> 	No damage (Electrical and mechanical) 电气和机械性能正常.
7.4	Stem Pull Strength 手柄拉拔强度	<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>	500gf Min
7.5	Shock 机械冲击	<p>Measured by according to the below condition: (1) Acceleration: 80g 加速度: 80g (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> 	Shall meet No.6, 7.1, 7.2. 满足 6, 7.1, 7.2 要求.



7.6	Life Test 寿命测试	<p>(1) Weight:150gf 砝码: 150gf</p> <p>(2) Operation speed: 2~3cycles/s 操作速度: 2~3 次/秒</p> <p>(3) Push force: Maximum value of operation force. 按压力: 操作力规格值的上限.</p> <p>(4) Cycles: 1,000,000 times Min 操作次数: 100 万次以上</p>	<p>Contact resistance: 10000 mΩ Max 接触电阻: 10000 毫欧以下</p> <p>Bouncing: 10ms Max 触点抖动: 10 毫秒以下</p> <p>Operation force: Variation rate within ±30%</p> <p>操作力的变化范围在 初始值的±30%以内.</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	<p>(1) Temperature : - 20±2℃ 温度: - 20±2℃</p> <p>(2) Duration of test: 96h 持续时间: 96 小时</p> <p>(3) Take off a drop water 去掉水珠</p> <p>(4) Standard conditions after test : 1h 试验后的放置条件: 1 小时</p>	<p>Contact resistance: 200mΩ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 200mΩ 以下</p> <p>满足: No. 6.2 to 6.4 No. 7.1 to 7.2</p>
8.2	Heat test 耐热性	<p>(1) Temperature : 80±2℃ 温度: 80±2℃</p> <p>(2) Duration of test: 96h 持续时间: 96 小时</p> <p>(3) Take off a drop water 去掉水珠</p> <p>(4) Standard conditions after test : 1h 试验后的放置条件: 1 小时</p>	<p>Contact resistance: 200mΩ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 200mΩ 以下</p> <p>满足: No. 6.2 to 6.4 No. 7.1 to 7.2</p>

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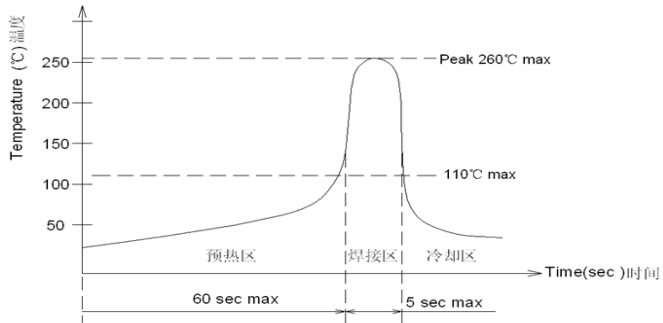


**凱華電子**

KAIHUA EEELETRONICS

**Product Specification**

<b>P/N:</b> CMI621101D06	<b>DOC. No.:</b> KH-PS1712-11	<b>Rev.:</b> A	<b>Page:</b> 8/11
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8.3	Temperature cycle 温度循环	<p>(1) Test cycles: 5 cycles 试验周期: 5 个周期</p> <p>(2) Standard condition after test:1h 试验后的放置条件: 1 小时</p> <table border="1" data-bbox="464 490 1066 680"> <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>20±5°C</td> <td>1h</td> </tr> <tr> <td>-20±2°C</td> <td>1h</td> </tr> <tr> <td>20±5°C</td> <td>1h</td> </tr> <tr> <td>80±5°C</td> <td>1h</td> </tr> </tbody> </table>		Temperature 温度	Duration of test 持续时间	1 cycle 一次循环	20±5°C	1h	-20±2°C	1h	20±5°C	1h	80±5°C	1h	<p>Contact resistance: 200mΩ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 200mΩ 以下 满足: No. 6.2 to 6.4 No. 7.1 to 7.2</p>
	Temperature 温度	Duration of test 持续时间													
1 cycle 一次循环	20±5°C	1h													
	-20±2°C	1h													
	20±5°C	1h													
	80±5°C	1h													
8.4	Soldering heat test 耐焊接热	<p>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</p> <p>Soldering temperature: 260±5°C 焊接温度: 260±5°C</p> <p>Soldering time: 3±0.5s 焊接时间: 3±0.5 秒</p>	<p>Appearance: No abnormality. 外观无异常</p>												
8.5	Solderability 可焊性	<p>1. Hand soldering 手工焊接: Please practice according to below condition: (1) Soldering Temperature : 350±5°C 焊接温度: 350±5°C (2) Continual soldering time: 3±0.5s 连续焊接时间: 3±0.5 秒 (3) Capacity of soldering iron: ≤20w 电烙铁功率: 20 瓦以下</p> <p>2. Automatic PIP soldering 自动波峰焊接: For the product of T/H, according to below condition: 波峰焊温度曲线图(单波峰)</p> 	<p>At least 95% of surface area of immersed portion shall be covered by solder. 侵焊面积大于 95% 以上。</p>												

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## Product Specification

<b>P/N:</b> CMI621101D06	<b>DOC. No.:</b> KH-PS1712-11	<b>Rev.:</b> A	<b>Page:</b> 9/11
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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></p> <p>(2) relative humidity: 90~95% R.H. 相对湿度: 90~95% R.H.</p> <p>(3) Duration of test: 96h 持续时间: 96 小时</p> <p>(4) Take off a drop water 去掉水珠</p> <p>(5) Standard conditions after test: 1h 试验后的放置条件: 1 小时</p>	<p>Contact resistance: 200m<math>\Omega</math> Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 200m<math>\Omega</math> 以下 满足: No. 6.2 to 6.4 No. 7.1 to 7.2</p>
8.7	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: <math>35 \pm 5^{\circ}\text{C}</math> 温度: <math>35 \pm 5^{\circ}\text{C}</math></p> <p>(2) K<sub>2</sub>S Density: 2%; 硫化钾浓度: 2%</p> <p>(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 m<math>\Omega</math> Max 接触电阻: 200 毫欧以下</p>
8.8	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 5^{\circ}\text{C}</math>;</p> <p>(2) Salt water density: <math>5 \pm 1\%</math> 盐水浓度: <math>5 \pm 1\%</math>;</p> <p>(3) Duration: 24 hours 持续时间: 24 小时;</p> <p>(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: 200 m<math>\Omega</math> Max 接触电阻: 200 毫欧以下</p>

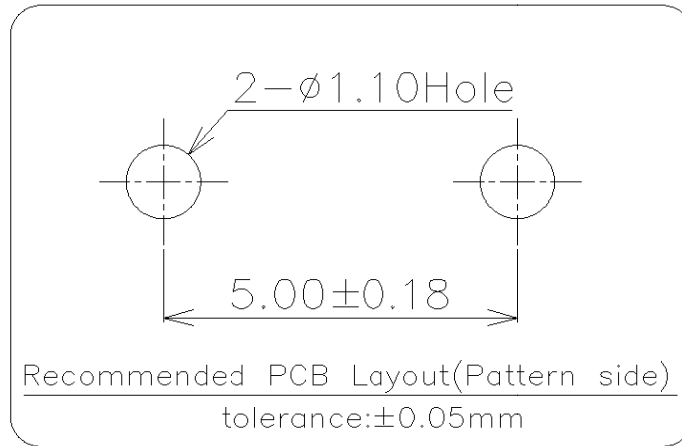
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**9. Recommended PCB Layout 推荐的 PCB 安装焊盘规格:**

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



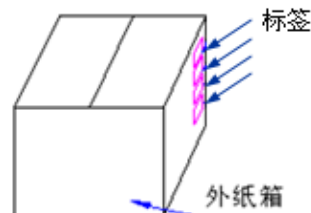
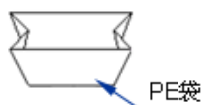
**10. Operation (FP/OP/PT/OT/MD/OF/RF) characteristic 动作特征:**

Parameter	Unit	Specification	Remark
FP	mm	11.60 $\pm$ 0.15	
OP	mm	11.25 $\pm$ 0.15	
PT	mm	0.35 $\pm$ 0.15	
OT	mm	0.2	min
MD	mm	0.25	max
OF	gf	70 $\pm$ 15	
RF	gf	35 $\pm$ 15	min

**11. Packaging 包装:**

Packaging type: 1000 PCS/Pe bag /20000 PCS/outer cartons .

包装方式: 1000Pcs/PE 袋/ 20000Pcs/外纸箱





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	Within 5s 5 秒以内
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  $350 \pm 5^{\circ}\text{C}$ , Welding time  $3 \pm 0.5\text{s}$ .

在使用烙铁的情况下,焊锡温度应在 $350 \pm 5^{\circ}\text{C}$ 以下,焊接时间 $3 \pm 0.5$ 秒以内.

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

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