

# Product Specification

Number: L-KLS7-TS1204-XX-XXX

Name: Tactile Switches

Customer: \_\_\_\_\_

Date: 2024-12-23

Customer Signature:



**NINGBO KLS ELECTRONIC CO; LTD**

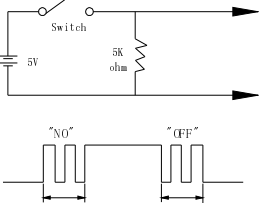
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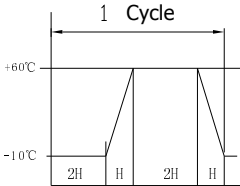
**ADD : NO. 8-1, RONGXIA RD. XIAPU SHANQIAN  
INDUSTRIAL ZONE BEILUN NINGBO ZHEJIANG.**

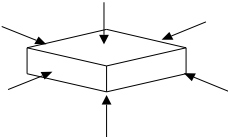
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| <div>一、GENERAL SPECIFICATION 基本说明</div> <div>1.Scope 范围 This specification covers the requirements for single key switches which have no key.<br/>(TACT SWITCHES: MECHANICAL CONTACT).此规范含盖单推柄和无推柄的轻触开关要求。</div> <div>2.Operating Temperature Range 使用温度范围: -40 to 85 °C。</div> <div>二、TYPE OF ACTUATION 动作类型: <u>Tactile feedback</u> 轻触返回</div> <div>三、MAXIMUM RATING 最大额定值: DC <u>12</u> V, <u>50</u> mA</div> <div>四、TEST ITEM 测试项目</div> <table><tr><th>Characteristic<br/>特 性</th><th>Item<br/>项次</th><th>Test Breed<br/>测试种类</th><th>Test Condition<br/>测试条件</th><th>Test Requirements<br/>测试要求</th></tr><tr><td>Appearance<br/>外观</td><td>1</td><td>Visual Check<br/>目视检查</td><td><b>Without any external force applied and test prior to the visual way to test.</b><br/>在未施加任何外力及试验前，以目视方式测试</td><td><b>Not affect the product appearance of products</b><br/><b>Bad function defects.</b><br/>产品的外观不能有影响产品功能之不良缺点</td></tr><tr><td rowspan="3">Electrical Performance<br/>电气特性</td><td>2</td><td>Contact Resistance<br/>接触阻抗</td><td><b>Applying a static load twice the actuating force to the center of the stem, measurements shall be made with a 1 kHz small-current contact resistance meter.</b><br/>用两倍的动作为静负载施加于按钮的中心，并用 1 千赫小电流接触电阻仪测量。</td><td><b><u>100 mΩ</u>Max.</b><br/>接触阻抗不得高于 100mΩ</td></tr><tr><td>3</td><td>Insulation Resistance<br/>绝缘阻抗</td><td><b>Measurements shall be made following application of DC 100 V potential across terminals and across terminals and frame for one minute.</b><br/>在端子之间，端子与外壳之间施加 DC100V 一分钟。</td><td><b><u>100 MΩ</u>Min</b><br/>绝缘阻抗不得低于 100MΩ</td></tr><tr><td>4</td><td>Dielectric Withstanding Voltage<br/>电气耐压</td><td><b>AC250V (50Hz or 60Hz) shall be applied across terminals and across terminals and frame for one minute.</b><br/>在端子与端子之间，端子与外壳之间施加 AC250V(50Hz or 60Hz)。</td><td><b>There shall be no breakdown</b><br/>没有击穿</td></tr></table> |             |                                         |                                                                                                                                                                                                             |                                                                                                             | Characteristic<br>特 性 | Item<br>项次 | Test Breed<br>测试种类 | Test Condition<br>测试条件 | Test Requirements<br>测试要求 | Appearance<br>外观 | 1 | Visual Check<br>目视检查 | <b>Without any external force applied and test prior to the visual way to test.</b><br>在未施加任何外力及试验前，以目视方式测试 | <b>Not affect the product appearance of products</b><br><b>Bad function defects.</b><br>产品的外观不能有影响产品功能之不良缺点 | Electrical Performance<br>电气特性 | 2 | Contact Resistance<br>接触阻抗 | <b>Applying a static load twice the actuating force to the center of the stem, measurements shall be made with a 1 kHz small-current contact resistance meter.</b><br>用两倍的动作为静负载施加于按钮的中心，并用 1 千赫小电流接触电阻仪测量。 | <b><u>100 mΩ</u>Max.</b><br>接触阻抗不得高于 100mΩ | 3 | Insulation Resistance<br>绝缘阻抗 | <b>Measurements shall be made following application of DC 100 V potential across terminals and across terminals and frame for one minute.</b><br>在端子之间，端子与外壳之间施加 DC100V 一分钟。 | <b><u>100 MΩ</u>Min</b><br>绝缘阻抗不得低于 100MΩ | 4 | Dielectric Withstanding Voltage<br>电气耐压 | <b>AC250V (50Hz or 60Hz) shall be applied across terminals and across terminals and frame for one minute.</b><br>在端子与端子之间，端子与外壳之间施加 AC250V(50Hz or 60Hz)。 | <b>There shall be no breakdown</b><br>没有击穿 |
| Characteristic<br>特 性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Item<br>项次  | Test Breed<br>测试种类                      | Test Condition<br>测试条件                                                                                                                                                                                      | Test Requirements<br>测试要求                                                                                   |                       |            |                    |                        |                           |                  |   |                      |                                                                                                             |                                                                                                             |                                |   |                            |                                                                                                                                                                                                             |                                            |   |                               |                                                                                                                                                                              |                                           |   |                                         |                                                                                                                                                           |                                            |
| Appearance<br>外观                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1           | Visual Check<br>目视检查                    | <b>Without any external force applied and test prior to the visual way to test.</b><br>在未施加任何外力及试验前，以目视方式测试                                                                                                 | <b>Not affect the product appearance of products</b><br><b>Bad function defects.</b><br>产品的外观不能有影响产品功能之不良缺点 |                       |            |                    |                        |                           |                  |   |                      |                                                                                                             |                                                                                                             |                                |   |                            |                                                                                                                                                                                                             |                                            |   |                               |                                                                                                                                                                              |                                           |   |                                         |                                                                                                                                                           |                                            |
| Electrical Performance<br>电气特性                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2           | Contact Resistance<br>接触阻抗              | <b>Applying a static load twice the actuating force to the center of the stem, measurements shall be made with a 1 kHz small-current contact resistance meter.</b><br>用两倍的动作为静负载施加于按钮的中心，并用 1 千赫小电流接触电阻仪测量。 | <b><u>100 mΩ</u>Max.</b><br>接触阻抗不得高于 100mΩ                                                                  |                       |            |                    |                        |                           |                  |   |                      |                                                                                                             |                                                                                                             |                                |   |                            |                                                                                                                                                                                                             |                                            |   |                               |                                                                                                                                                                              |                                           |   |                                         |                                                                                                                                                           |                                            |
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| <div>KLS</div> <div>electronic</div>  | Part name   | Tactile Switches          | Date                                                                                                                                                                                                                                                                                                    | 2024-12-23                                         |
|---------------------------------------|-------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|                                       | Part number | L-KLS7-TS1204-XX-XXX      | Edition                                                                                                                                                                                                                                                                                                 | V1                                                 |
|                                       | Department  |                           | Page                                                                                                                                                                                                                                                                                                    | 3 / 9                                              |
|                                       |             |                           |                                                                                                                                                                                                                                                                                                         |                                                    |
| Characteristic<br>特 性                 | Item<br>项次  | Test Breed<br>测试种类        | Test Condition<br>测试条件                                                                                                                                                                                                                                                                                  | Test Requirements<br>测试要求                          |
| Electrical<br>Performance<br>电气<br>特性 | 5           | Bounce<br>抖动              | <p><b>Lightly striking the center of the stem at a rate encountered in normal use ( 3 to 4 operations per sec ), Bounce shall be tested at “ON” and “OFF”.</b></p> <p>在正常使用中(以每秒 3-4 次周期)轻轻地在手柄中心加力，在通与断瞬间测试抖动。</p>  | <p><b><u>5 m sec max .</u></b></p> <p>最大为 5 毫秒</p> |
|                                       | 6           | Actuating<br>Force<br>动作力 | <p><b>Placing the switch such that the direction of switch operation is vertical and then gradually increasing the load applied to the center of the stem, the maximum load required for the stem to come to a stop shall be measured.</b></p> <p>以开关的动作方向为垂直放置开关，向推柄中心逐渐增加负荷直到推柄停止时所测量的最大负荷。</p>       | See specifications figure<br>见规格图                  |
| Mechanical<br>机械<br>特性                | 7           | Travel<br>行程              | <p><b>Placing the switch such that the direction of switch operation is vertical and then gradually increasing the load applied to the center of the stem, the maximum distance required for the stem to come to a stop shall be measured.</b></p> <p>以开关的动作方向为垂直放置开关，向推柄中心逐渐增加负荷直到推柄停止时所测量的距离。</p>     | See specifications figure<br>见规格图                  |

|  | Part name   | Tactile Switches                      | Date                                                                                                                                                                                                                                                                                         | 2024-12-23                                                                                                       |
|-----------------------------------------------------------------------------------|-------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
|                                                                                   | Part number | L-KLS7-TS1204-XX-XXX                  | Edition                                                                                                                                                                                                                                                                                      | V1                                                                                                               |
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|                                                                                   |             |                                       |                                                                                                                                                                                                                                                                                              |                                                                                                                  |
| Characteristic<br>特 性                                                             | Item<br>项次  | Test Breed<br>测试种类                    | Test Condition<br>测试条件                                                                                                                                                                                                                                                                       | Test Requirements<br>测试要求                                                                                        |
| Mechanical<br>机械<br>特性                                                            | 8           | Return Force<br>返弹力                   | The sample switch is installed such that the direction of switch operation is vertical and, upon depression of the stem in its center the whole travel distance, the force of the stem to return to its free position shall be measured. 以开关的动作方向垂直放置开关，在已有行程的推柄中心向上减小压力，推柄回到自由位置时所测量到的力。    | 30gfMin                                                                                                          |
|                                                                                   | 9           | Stop Strength<br>静止强度                 | Placing the switch such that the direction of switch operation is vertical, a static load of <del>3</del> kgf shall be applied in the direction of stem operation for a period of <del>60</del> seconds. 开关的动作方向为垂直放置开关，在推柄动作方向施加 3 KG 的静负荷，60 秒时间。                                          | There shall be no sign of damage mechanically and electrically<br>无机械的和电气的损伤迹象                                   |
|                                                                                   | 10          | Stem Strength<br>推柄强度                 | The action direction of the switch is the bearing force measured when the switch is placed vertically and the pull force is applied from the opposite direction of the action direction of the push handle. 开关的动作方向为垂直放置开关从推柄动作方向反方向施加拉力所测量到的承受力。                                            | 1.5 kgf MIN                                                                                                      |
| Environmental<br>环 境                                                              | 11          | Resistance to Low Temperatures<br>耐低温 | Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made:<br>样品按下列条件进行耐低温试验，测试前在正常温度和湿度条例上放置 1 小时<br>(1) Temperature 温度: -45±2℃<br>(2) Time 时间: 96 hours<br>(3) Water drops shall be removed 擦除水珠 | Contact resistance: 200 m ohm max.<br>Insulation resistance 10 M ohm min.<br>1.接触电阻最大 200 mΩ.<br>2.绝缘电阻最小 10 MΩ. |

| <div>KLS<br/>electronic</div> | Part name   | Tactile Switches               | Date                                                                                                                                                                                                                                                                                                                                                                                | 2024-12-23                                                                                                                                                                                              |
|-------------------------------|-------------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | Part number | L-KLS7-TS1204-XX-XXX           | Edition                                                                                                                                                                                                                                                                                                                                                                             | V1                                                                                                                                                                                                      |
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|                               |             |                                |                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                         |
| Characteristic<br>特 性         | Item<br>项次  | Test Breed<br>测试种类             | Test Condition<br>测试条件                                                                                                                                                                                                                                                                                                                                                              | Test Requirements<br>测试要求                                                                                                                                                                               |
| Environmental<br>环 境          | 12          | Heat<br>Resistance<br>耐热       | <b>Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made.</b> 样品按下<br>列条件进行耐热试验，测试前在正<br>常温度和湿度条件下放置 1 小时<br><b>(1) Temperature</b> 温度: 85±2℃<br><b>(2) Time</b> 时间: 96 hours                                                                                                         | <b>Item 2~5</b><br><b>Item 6</b><br><b>Item 7</b>                                                                                                                                                       |
|                               | 13          | Moisture<br>Resistance<br>耐潮湿  | <b>Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made:</b> 样品按下<br>列条件进行耐潮湿试验，测试前在<br>正常温度和湿度条件下放置 1 小<br>时<br><b>(1)Temperature</b> 温度: 40±2℃<br><b>(2)Relative humidity</b> 相对湿度: 90<br>to 95%<br><b>(3)Time</b> 时间: 96 hours<br><b>(4)Water drops shall be removed</b> 擦<br>除水珠 | <b>Contact resistance:</b><br><b>200 m ohm max.</b><br><b>Insulation resistance</b><br><b>10 M ohm min.</b><br>1.接触电阻最大 200 mΩ.<br>2.绝缘电阻最小 10 MΩ.<br><b>Item 2~5</b><br><b>Item 6</b><br><b>Item 7</b> |
|                               | 14          | Temperature<br>Cycling<br>温度循环 | <b>Following the test set forth below the sample shall be left in normal temperature and humidity conditions for one hour before measurements are made.</b> 样品按下<br>列条件进行温度循环试验，测试前在正常<br>温度和湿度条件下放置 1 小时<br><b>During this test, water drops shall be removed.</b> 在试验期间，擦除水珠。<br>             | <b>Item 2~5</b><br><b>Item 6</b><br><b>Item 7</b>                                                                                                                                                       |

|  | Part name   | Tactile Switches               | Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2024-12-23                                                                                                                                                                      |
|-----------------------------------------------------------------------------------|-------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                   | Part number | L-KLS7-TS1204-XX-XXX           | Edition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | V1                                                                                                                                                                              |
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|                                                                                   |             |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                 |
| Characteristic<br>特 性                                                             | Item<br>项次  | Test Breed<br>测试种类             | Test Condition<br>测试条件                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Test Requirements<br>测试要求                                                                                                                                                       |
| Endurance<br>耐久性                                                                  | 15          | Operating Life<br>动作寿命         | Measurements shall be made following the test set forth below:<br>(1) DC 12V 50mA resistive load<br>阻性负载: DC 12V 50mA<br>(2) Rate of operation : 2 to 3 operations per second<br>动作频率: 2-3 次/每秒。<br>(3) Depression 动 作 力: 见规格图<br>(4) Cycles of operation<br>动作次数: 100,000 次。                                                                                                                                                                                                                                                                                               | 1-Contact resistance:<br>1000m Ω Max 接触电阻<br>2-Insulation resistance<br>100M Ω min.绝缘电阻<br>3-action force attenuation n rate was 30% of the initial value<br>动作力衰减率为初始值的 30%左右。 |
|                                                                                   | 16          | Vibration Resistance<br>耐振动    | Measurements shall be made following the test set forth below<br>按下列条件进行抗振动试验<br>(1)Range of oscillation<br>频率范围: 10~55 Hz<br>(2)Amplitude pk to pk :1.5mm<br>振幅:峰-峰 1.5mm<br>(3)Cycle of sweep : 10-55-10Hz in one minute<br>扫描周期:10-55-10-Hz 一分钟内。<br>(4)Mode of sweep : Logarithmically sweep or uniform sweep.<br>扫描方式:对数扫描或统一扫描。<br>(5)Direction of oscillation: Three mutually perpendicular directions, including the direction of stem travel.<br>振动方向:3 个相互垂直方向, 包括推柄行程方向<br>(6)Duration of testing :2 hours each ,for a total of 6hours.<br>持续时间:每方向 2 小时, 共 6 小时 | Item 2~5<br>Item 6<br>Item 7                                                                                                                                                    |
|                                                                                   | 17          | Impact Shock Resistance<br>抗冲击 | Measurements shall be made following the test set forth below:按下列条件进行冲击试验<br>(1) Acceleration 加速度: 80g<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<br>                                                                                                                                                                                                                                                                | Item 2~5<br>Item 6<br>Item 7                                                                                                                                                    |
|                                                                                   |             |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                 |

## 五、Reference welding condition 参考焊接条件

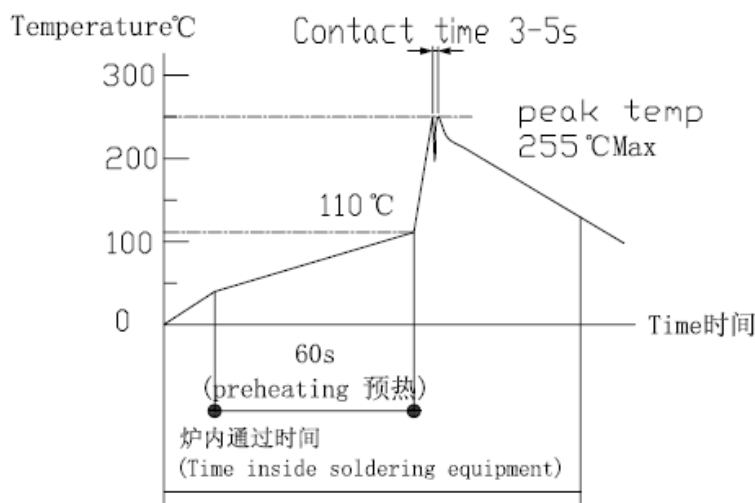
### 1. Wave soldering conditions 波峰焊条件

**Preheat: In the P.W.B (printed circuit board) to welding equipment, copper foil surface, about 60 seconds to reach 110 °C preheat temperature**

预热：在 P.W.B(印刷线路板)进入焊接设备，约 60 秒内铜箔表面达到 110℃ 预热温度

**Soldering heat: In the P.W.B zone (printed circuit board) to the welding temperature, peak temperature control at 255°C, 3 ~ 5 seconds**

焊接温度：在 P.W.B (印刷线路板)进入焊接区内，波峰峰值温度控制在 255℃，时间 3~5 秒。



### 2. Hand soldering 手工焊条件

(1) **Ferrochrome temperature: 350°C Max.** 烙铁温度:  $\leq 350^{\circ}\text{C}$

(2) **Continuous soldering time: 3~5S.** 续焊接时间: 3~5S

### 3. Explain 说明:

(1) **Suggest to use the solder that contained less than 0.2% flux, to avoid the failure of the the switch caused by the flux seep in to switch.**

建议选用含助焊剂 0.2% 以下的锡膏，并避免助焊剂进入开关内而导致开关失效。

(2) **When designing the press handle, please refer to the drawings provided. Do not press the switch directly with a sharp object. The press handle should be placed vertically at the center of the switch, and the shake of the press handle should be controlled within (+) 3 degrees.**

设计按压推柄时，请参考所提供的图纸，切勿以尖状物直接压开关，且压柄需垂直置于开关中心位置按压，并将压柄摇晃度控制在  $\pm 3^{\circ}$  以内。

(3) **When welding switch, special attention should be paid to controlling the temperature and time of welding part within 255°C、3~5 seconds. Otherwise, too high temperature and too long time will lead to damage or shorten the service life of switch.**

开关焊接加工时，应特别注意将焊接部分温度及时间控制在 255℃、3~5 秒内，否则过高的温度及过长的时间会导致开关的损坏或使用寿命减短。

(4) **Switches should be kept in OFF state during welding process to avoid switch damage. Repeated welding is not recommended.**

焊接加工时开关应保持 OFF 状态，以避免开关损坏，不建议重复焊接。

## 六、Salt Spray 盐雾

### (1) Test Condition 测试条件

**Salt spray: under normal conditions ( $35 \pm 1^{\circ}\text{C}$ ,  $5 \pm 1\%$ ), continuous spray test.**

盐雾：在正常条件下（温度为  $35 \pm 1^{\circ}\text{C}$ ， $5 \pm 1\%$  的盐水浓度，连续喷雾测试）。

### (2) Decision criteria 判定标准

**The time of copper products is more than 48 hours, and the time of iron products is more than 8 hours. After the test, there are no more than 10% of the surface of copper products, such as corrosion holes, oxidation, discoloration, rust spots, blisters, coating damage cracks (seams), peeling, peeling and other adverse phenomena.**

铜制品时间超过 48 小时，铁制品时间超过 8 小时，测试后表面无超过 10% 的蚀孔、氧化、变色、锈斑、起泡、镀层破损裂口（缝）、起皮、剥离等不良现象。

## 七、OTHER PRECAUTIONS 其他注意事项

### (1) Following the soldering process, do not try to clean the switch with a solvent or the like .

进行焊接过程中，不可以用溶剂或类似品清洗开关。

### (2) Safeguard the switch assembly against flux penetration from its topside.

防止助焊剂从开关的顶端渗入。

### (3) Storage condition 储存条件

**1. storage time: after delivery to ensure that the switch is in a closed state, please pay attention to the inventory time not more than 90 days**

储存时间：交货后保证开关处于封密状态,请注意库存时间不要超过 90 天以上

**2. storage temperature range:  $0^{\circ}\text{C} \sim 30^{\circ}\text{C}$  (in the standard atmospheric pressure, standard humidity conditions)**

储存温度范围： $0^{\circ}\text{C} \sim 30^{\circ}\text{C}$ （在标准大气压、标准湿度条件下）

**3. storage relative humidity: 10-70% (warehouse to be equipped with desiccant equipment)**

储存相对湿度：10-70%(仓库需配备除湿设备)

### (4) Avoid overtraveling during the life test to avoid affecting the accuracy of the test.

进行寿命测试时应避免过行程，以免影响测试的准确性。

### (5) Do not put the product in high temperature and humidity environment for a long time. High temperature and humidity will reduce the service life and reliability of the switch.

请勿将产品长期置与高温高湿环境中，高温高湿会降低开关的使用寿命和可靠性。

### (6) Do not continuously apply voltage to the product when it is not working. Long term pressure will reduce the service life and reliability of the switch.

请勿在非工作时对产品持续施加电压，长期施压会降低开关的使用寿命和可靠性。

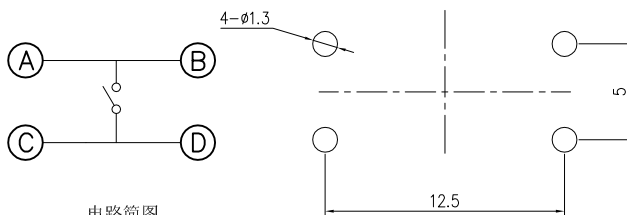
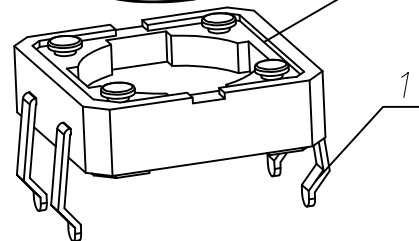
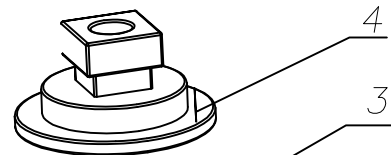
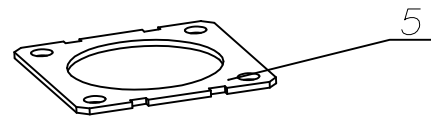
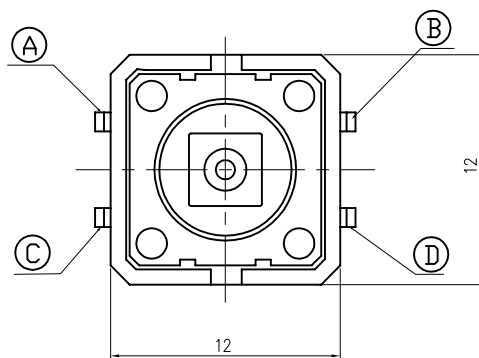
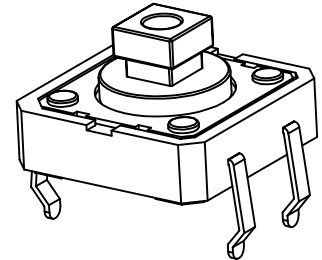
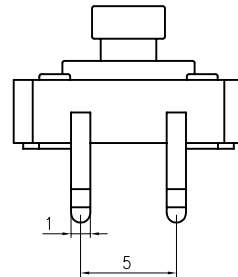
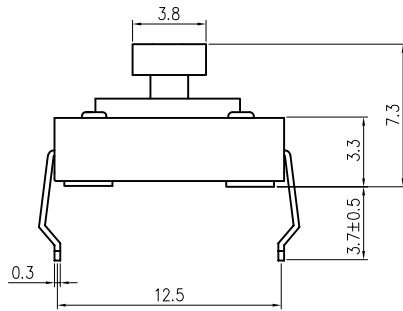
## ORDER INFORMATION

L-KLS7-TS1204 - XX - XXX

Series No. \_\_\_\_\_

Hight: 7.3mm \_\_\_\_\_

Operating Force :100/130/160/180/250/260/320gf



电路简图  
SCHEMATIC

印制线路板  
Recommended P.C.B layout

1. Rating:DC12V 50mA.
2. Travel:0.3±0.15mm.
3. Contact Resistance:100mΩ Max.
4. Life:100,000 Cycles Min.

| Operating Force |          |          |          |          |          |          |
|-----------------|----------|----------|----------|----------|----------|----------|
| 100±30gf        | 130±30gf | 160±30gf | 180±50gf | 250±50gf | 260±50gf | 320±80gf |

Insert: H62Y, 0.3t, silver-white, silver-plated.

Base: Nylon, black.

Spring piece: Silver-plated copper.

Cap head: Nylon, black/yellow/white.

Cover plate: H62T, silver-white, copper-tin plated.

|       |       |
|-------|-------|
| Angle | ±2°   |
| 6~    | ±0.5  |
| 3~6   | ±0.2  |
| ~ 3   | ±0.15 |