



深圳市得力龙电子有限公司

## 承认书

### SPECIFICATION FOR APPROVAL

客户名称: \_\_\_\_\_

CUSTOMR:

产品名称: \_\_\_\_\_ 轻触开关

APPLICATION:

产品编号: \_\_\_\_\_ TS0641-0501B

SERIES NUMBER:

订货编号: \_\_\_\_\_

ORDER NUMBER:

客户承认签核 (CUSTOMER APPROVAL)

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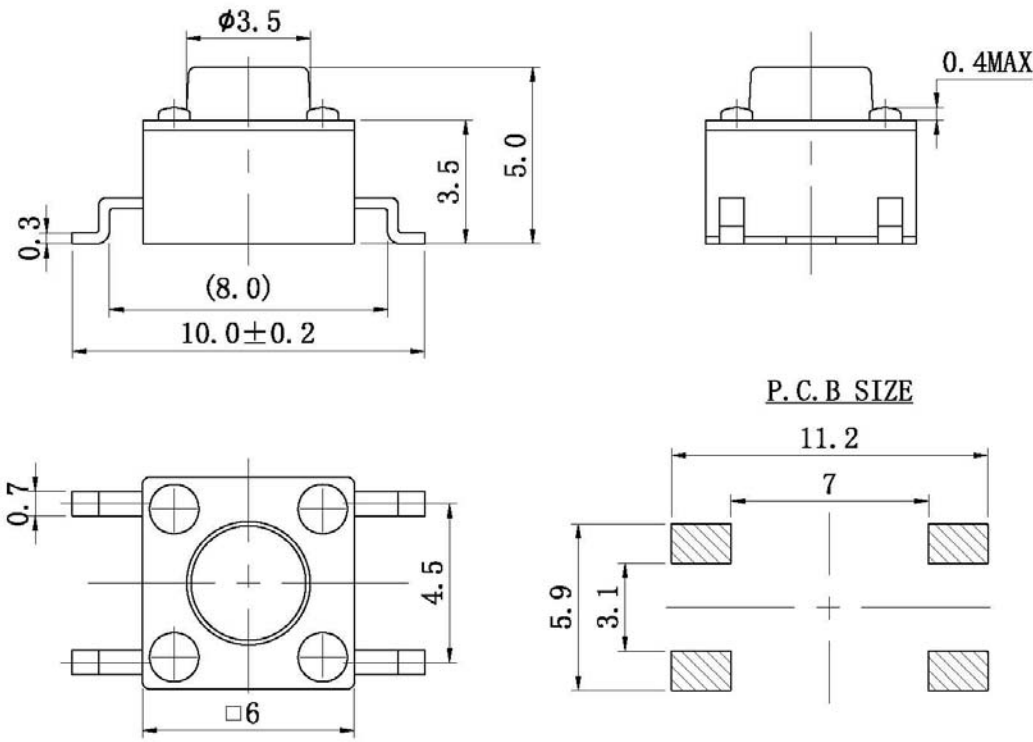
内部签核 (SIGNATURE)

核准 (APPROVAL)	审核 (CHECK)	制作 (CONFIRM)
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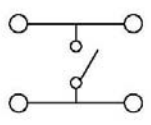
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# APPROVAL SPECIFICATIONS

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CIRCUIT



SPECIFICATIONS:

- 1、Rating: DC12V 50mA
- 2、Contact Resistance: 50mΩ MAX.
- 3、Insulation Resistance: 100MΩ MIN.
- 4、Withstand Voltage: AC 250V for 1 minute
- 5、Travel: 0.25±0.1mm
- 6、Operating Force: 160±50gf
- 7、Life: 500,000 Cycles MIN.

General tolerance: ±0.1mm

NO.	NAME	MATERIAL	NATIONALITY	QTY.	SURFACE
1	TERMINAL	Brass	CHINA	1	Silver plating
2	CASE	PPA	CHINA	1	Black
3	CONTACT	SUS	KOREA	1	Contact side silver plating
4	COVER	SPCC	CHINA	1	CuSn plating
5	STEM	PPA	CHINA	1	Black

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## 1、 General characteristics

一般特性

### 1.2 Application

适用范围

**This specification is applied to the requirements for TACTILE SWITCH (MECHANICAL CONTACT)**

此规格书适用于机械式轻触开关的相关要求

### 1.3 Operating Temperature Range

使用温度范围

**-20℃～70℃ (Normal humidity, normal air pressure)**

—20℃～70℃(在标准大气压、标准湿度条件下)

### 1.4 Storage Temperature Range

储存温度范围

**-30℃～80℃ (Normal humidity, normal air pressure)**

—30℃～80℃(在标准大气压、标准湿度条件下)

### 1.5 Test Conditions

测试条件

**Unless otherwise specified, tests and measurement shall be made in the following standard conditions:**

如果没有特别说明，测试和测量应在以下标准条件下进行：

**Normal temperature.....5℃～35℃**

常温.....5℃～35℃

**Normal humidity.....relative humidity 45%～85%**

标准湿度.....相对湿度 45%～85%

**Normal air pressure.....86Kpa～106Kpa**

标准大气压.....86KPa～106Kpa

**If any doubt arise from the judgment, tests shall be conducted at the following conditions:**

对判定结果有争议时，测试和测量应在以下条件下进行：

**Temperature.....20℃±2℃**

温度.....20℃±2℃

**Relative humidity.....65%±5%**

相对湿度.....65%±5%

**Air pressure.....86KPa～106Kpa**

环境气压.....86KPa～106Kpa

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## 2、 Detailed specification

详细说明

### 2.1 Appearance: There should be no defects that affect the serviceability of product.

外观：应无影响、降低产品性能的缺陷；

### 2.2 Style and dimension: shall conform to the assemble drawings.

结构尺寸和安装尺寸：应符合装配图要求；

### 2.3 Type of actuating: Tactile feedback.

操作形式：有触觉反馈的操作；

### 2.4 Contact arrangement: 1 pole, 1 throw. (Details of contact arrangement are given in the assembly drawings.)

开关结构：单回路单输出(具体的触点结构在装配图中已绘出)；

### 2.5 Ratings: 12V DC, 50mA (Effective value)

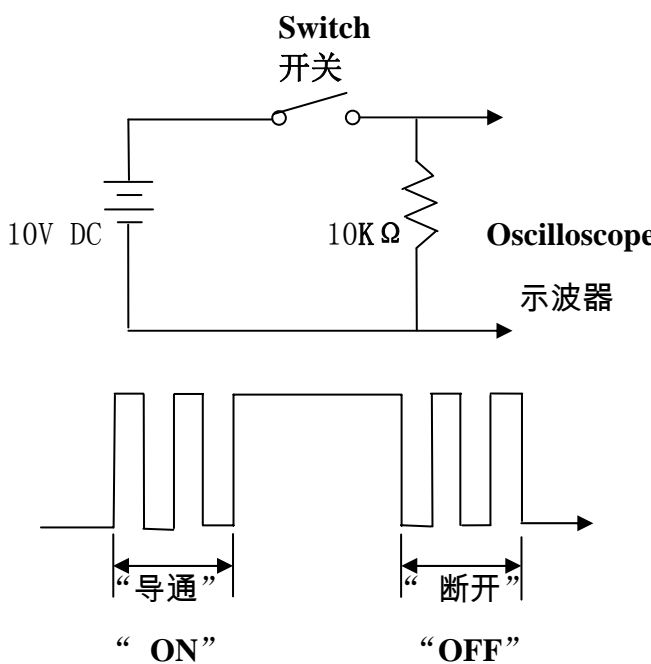
开关工作额定值：DC 12V , 50mA ( 有效值 )

## 3、 Electrical specification

电气性能：

ITEM 项目		TEST CONDITIONS 试 验 条 件	REQUIREMENTS 要求
3.1	Contact Resistance 接触电阻	Applying a static load of 2 times operating force to the center of the stem, measurements shall be made by 5V DC 10mA or more than 1KHZ AC small-current contact resistance meter. 在以 5V 10mA 的直流电源或不低于 1KHz 的交流电源的电路中，以一个等于 2 倍按力的静负荷施加于按键中心	$\leq 50m \ \Omega$
3.2	Insulation Resistance 绝缘电阻	Measurement shall be made following application of 100V DC potential, across terminals, and across terminals and cover, for one minute. 在端子之间施加 DC 100V /1min.的条件下,测量端子之间以及端子与盖板间的电阻值	$\geq 100M \ \Omega$
3.3	Dielectric voltage proof 介质耐压	250V AC (50HZ or 60HZ) shall be applied across terminals, for one minute. 在端子之间施加 250V AC (50HZ 或 60HZ) /1min.	No dielectric breakdown shall occur. 无击穿现象

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ITEM 项目		TEST CONDITIONS 试 验 条 件			REQUIREMENTS 要求
3.4	Contact Bounce 触点跳动	<p>Lightly striking the center of the stem at a rate encountered in normal use (3 to 4 times per second), and bounce shall be tested at “ON” and “OFF” 按照正常使用时的力度轻按按键中心( 每秒 3~4 次 ), 在导通和断开过程中测试开关反弹特性</p> <div><p>Switch 开关</p><p>10V DC</p><p>10K <math>\Omega</math></p><p>Oscilloscope 示波器</p><p>“导通”</p><p>“ON”</p><p>“断开”</p><p>“OFF”</p></div>			ON-3msec.max. OFF-8msec.max.
4、Mechanical specification 机械性能：					
4.1	Operating Force 按力	<p>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 switch to come to a stop shall be measured. 开关垂直于操作方向放置，在开关按键顶端中心逐渐施力，测量开关导通所需的最大力度。</p>			160±50gf
4.2	Full Travel 最大行程	<p>Placing the switch such that the direction of switch operation is vertical and then applying static load of 2times operating force to the center of the stem; the travel distance for the switch to come to a stop shall be measured. 开关垂直操作方向放置，以一个等于 2 倍按力的静负荷施加在开关按键顶端中心，测量顶端移动的距离。</p>			0.25±0.1mm

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ITEM 项目		TEST CONDITIONS 试 验 条 件			REQUIREMENTS 要求
4.3	Return Force 回弹力	<p>The sample switch is installed such that the direction of switch operation is vertical and upon depressing the stem in its center to the whole travel distance, the force of the stem to return to its free position shall be measured.</p> <p>开关垂直于操作方向放置,在开关按键顶端中心下降至全行程后,测量顶端向自由位置转换的力度。</p>			40gf.min.
4.4	Stop Strength 停止强度	<p>Placing the switch such that the direction of switch operation is vertical, and then a static load of 30N shall be applied in the direction of stem operation for a period of 1 min.</p> <p>开关垂直于操作方向放置,从操作方向向按键施加 30N 的静负荷持续 1min。</p>			<p>There shall be no sign of damage mechanically and electrically.</p> <p>无机械和电气损坏</p>
4.5	Stem Strength 手柄拔出强度	<p>Placing the switch such that the direction of switch operation is vertical, and then the maximum force to withstand a pull applied opposite to the direction of stem operation shall be measured.</p> <p>开关垂直于操作方向放置,从操作方向的反方向对按键放加拉力,测量按键被拔出的最大拉力。</p>			20N.min.
4.6	Soldering heat Resistance 耐焊接热	<p>Following the test set forth below the sample shall be left in normal temperature and humidity conditions for 1 h before measurement are made:</p> <p>样品应放在常温及标准湿度的环境中 1 小时后,根据下面的测试要求进行测试:</p> <p>1) Solder temperature : <math>280 \pm 5^{\circ}\text{C}</math> 焊接温度: <math>280 \pm 5^{\circ}\text{C}</math></p> <p>2) Immersion time: <math>30\text{s} \pm 10\text{s}</math> 浸入时间: <math>30\text{s} \pm 10\text{s}</math></p>			<p>There shall be no sign of damage mechanically and electrically.</p> <p>无机械和电气损坏</p>
4.7	Solderability 可焊性	<p>Measurements shall be made following the test set forth below:</p> <p>在以下设定条件下进行测量:</p> <p>1) Solder temperature : <math>245 \pm 5^{\circ}\text{C}</math> 焊接温度: <math>245 \pm 5^{\circ}\text{C}</math></p> <p>2) Immersion time: <math>2\text{s} \pm 0.5\text{s}</math> 浸入时间: <math>2\text{s} \pm 0.5\text{s}</math></p> <p>The other steps please refer to 《GB 5095.6-86》 TEST 12a</p> <p>对于其它步骤参考 《GB 5095.6—86》 试验 12a</p>			<p>Except for the edge, the coating should cover a minimum 90%</p> <p>除边缘外涂层应均匀覆盖 90%以上</p>

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## 5、ENVIRONMENTAL SPECIFICATION

极限电气性能：

ITEM 项目		TEST CONDITIONS 试 验 条 件	REQUIREMENTS 要求												
5.1	Resistance to low temperature 低温测试	<p>Following the test set forth below the sample shall be left in normal temperature and humidity conditions for 1 h. before measurements are made: 根据下面的测试要求进行实验，将样品放置在常温及标准湿度的环境中 1 小时后对其进行测量：</p> <p>1) Temperature :-30±2℃ 温度：-30±2℃</p> <p>2) Time: 96h 时间：96h</p>	<p>Contact resistance: ≤200mΩ</p> <p>接触电阻：≤200mΩ</p> <p>Item 3;4.1;4.2;4.3 项目 3;4.1;4.2;4.3</p>												
5.2	Heat resistance 高温测试	<p>Following the test set forth below the sample shall be left in normal temperature and humidity conditions for 1 h. before measurements are made: 根据下面的测试要求进行实验，将样品放置在常温及标准湿度的环境中 1 小时后对其进行测量：</p> <p>1) Temperature: 80±2℃ 温度：80±2℃</p> <p>2) Time: 96h 时间：96h</p>	<p>Contact resistance: ≤200mΩ</p> <p>接触电阻：≤200mΩ</p> <p>Item 3;4.1;4.2;4.3 项目 3;4.1;4.2;4.3</p>												
5.3	Change of temperature 温度周期性测试	<p>After 5 cycles of following conditions, the sample shall be allowed to stand under normal temperature and humidity conditions for 1 h. and measurements shall be made. During the test waterdrops shall be removed. 根据下面的测试要求对开关进行 5 次循环的温度周期性实验 ,将样品放置在常温及标准湿度的环境中 1 小时后对开关进行测量,测量过程中样品应保持干燥：</p> <table><tr><td></td><td>Temperature</td><td>Time</td></tr><tr><td rowspan="4">1cycle</td><td>-10±2℃</td><td>2(hour)</td></tr><tr><td>-10～65℃</td><td>1</td></tr><tr><td>65±2℃</td><td>2</td></tr><tr><td>65～-10℃</td><td>1</td></tr></table>		Temperature	Time	1cycle	-10±2℃	2(hour)	-10～65℃	1	65±2℃	2	65～-10℃	1	<p>Contact resistance: ≤200mΩ</p> <p>接触电阻：≤200mΩ</p> <p>Item 3;4.1;4.2;4.3 项目 3;4.1;4.2;4.3</p>
	Temperature	Time													
1cycle	-10±2℃	2(hour)													
	-10～65℃	1													
	65±2℃	2													
	65～-10℃	1													

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ITEM 项目		TEST CONDITIONS 试 验 条 件			REQUIREMENTS 要求
5.4	Moisture resistance 湿温测试	<p>Following the test set forth below the sample shall be left in normal temperature and humidity conditions for 1h. before measurements are made: 根据下面的测试要求进行实验，将样品放置在常温及标准湿度的环境中 1 小时后对其进行测量：</p> <p>1) Temperature: 60±2℃ 温度：60±2℃</p> <p>2) Relative humidity: 90% to 95% 相对湿度：90% ~ 95%</p> <p>3) Time: 96h 时间：96h</p>			<p>Contact resistance: ≤ 200mΩ</p> <p>接触电阻：≤200mΩ</p> <p>Item 3;4.1;4.2;4.3 项目 3;4.1;4.2;4.3</p>
5.5	Sulfuration resistance 硫化试验	<p>Following the test set forth below the sample shall be left in normal temperature and humidity conditions for 1h. before measurements are made: 根据下面的试验条件进行实验，然后将样品放置在常温及标准湿度的环境中 1 小时后对其进行测量：</p> <p>1) H<sub>2</sub>S gas concentration: 3ppm±1ppm H<sub>2</sub>S 气体浓度：3ppm±1ppm</p> <p>2) Time: 72h 时间：72h</p> <p>3) Temperature: 40±2℃ (90~95%RH) 温度：40±2℃ ( 90 ~ 95%RH )</p>			<p>Contact resistance: ≤ 200mΩ</p> <p>接触电阻：≤200mΩ</p> <p>Item 3;4.1;4.2;4.3 项目 3;4.1;4.2;4.3</p>
5.6	Salt Mist 盐雾试验	<p>The switch shall be checked after following test: 在以下设定条件下进行实验:</p> <p>1) Temperature: 35℃±2℃ 温度：35℃±2℃</p> <p>2) Salt solution : 5±1%(solids by mass) 盐溶液浓度：5±1% ( 质量百分比 )</p> <p>3) Time: 8h±1 hour 时间：8h±1h</p> <p>After test, salt deposit shall be removed by running water. 实验后的盐沉积物用水冲洗掉。</p>			<p>No remarkable corrosion shall be recognized in metal part.</p> <p>金属件上没有腐蚀斑点</p>



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## 6、ENDURANCE SPECIFICATION

极限机械性能：

<b>ITEM</b> 项目		<b>TEST CONDITIONS</b> 试 验 条 件	<b>REQUIREMENTS</b> 要求
6.1	工作寿命 Operation life	<p>Measurement shall be made following the test set forth below: 根据下面的测试要求进行测试：</p> <ol style="list-style-type: none"> <li><b>DC 12V, 50 mA resistive load</b> DC 12V , 50mA 带负载</li> <li><b>Rate of operation: 120 times/s</b> 按动速率：120 次/秒</li> <li><b>Operating Force: 250~300 gf</b> 按力：250~300 gf</li> <li><b>Average fault-free life: 100,000 cycles</b> 平均无故障寿命：100,000 次</li> </ol>	<p><b>Contact resistance:</b> ≤200m Ω 接触电阻≤200mΩ</p> <p><b>Contact bounce:</b> ≤10ms 触点跳动≤10ms</p> <p><b>Operating Force:</b> initial value±30% 按力：初值的±30%</p> <p><b>Item 3;4.1;4.2;4.3</b> 项目 3;4.1;4.2;4.3</p>
6.2	振动 Vibration	<p>Measurement shall be made following the test set forth below: 根据以下给定条件进行测试：</p> <ol style="list-style-type: none"> <li><b>Vibration frequency range: 10Hz to 55Hz to 10Hz</b> 振动频率范围：10 ~ 55 ~ 10Hz</li> <li><b>Amplitude: 1.5mm</b> 振幅（峰 - 峰）：1.5mm</li> <li><b>Direction of vibration: Three mutually perpendicular direction including the direction of stem travel</b> 振动方向：包括手柄行程方向在内的三个相互垂直的方向</li> <li><b>Duration: Each 2hours.</b> 测试时间：每个方向 2hours .</li> </ol>	<p><b>Item 3;4.1;4.2;4.3</b> 项目 3;4.1;4.2;4.3</p>

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## 7. Soldering conditions:

焊接条件:

<b>ITEM</b> 项目	<b>RECOMMENDED CONDITIONS</b> 推荐条件
7.1 <b>Hand soldering</b> 手工焊接	<p><b>Please practice according to below conditions:</b> 请按以下条件进行焊接：</p> <p>1) <b>Soldering temperature: 350°C Max.</b> 焊锡温度：≤350°C</p> <p>2) <b>Continuous soldering time: 3 s Max.</b> 连续焊接时间：≤3 s</p>
7.2 <b>自动浸焊</b> Conditions for Auto-dip	<p><b>Temperature(°C)</b></p> <p>Max. 280 217 180 120</p> <p>30~40s 2min ± 0.3min 10s max 3~4min 焊接炉内通过的时间 Time inside soldering equipment</p> <p><b>Caution:</b> The condition mentioned above is a temperature on the PWB surface on which parts are mounted. There are cases where PWB temperature greatly differs from switch's surface temperature depending on PWB material , size , thickness , etc . Care , therefore , should be used not to allow switch's surface temperature to exceed 280°C. 说明：以上提及的条件是零部件上 PWB 表面的温度，由于 PWB 的材料，尺寸、厚度等不同 PWB 从开关表面获得的温度也会有很大的不同，因此，千万小心不要让开关表面的温度超过 280°C。</p>

## Note: 附加说明

- 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、Right after switches were soldered; please be careful not to load to on the knobs of switches. Please be careful not to pile up PCB. after switches were soldered.  
浸焊后，注意不要在顶部施加负荷，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。如需要长时间保存，请不要打开包装箱。