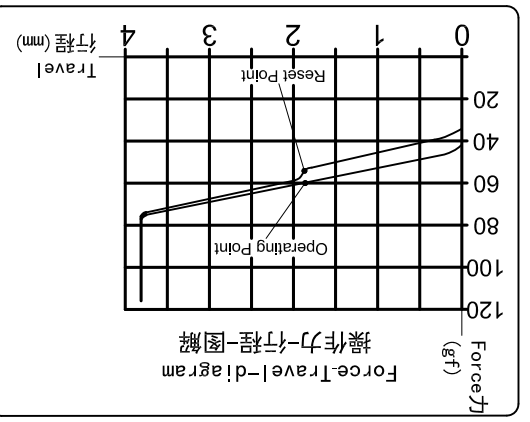
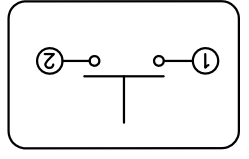
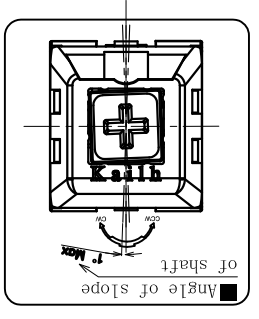
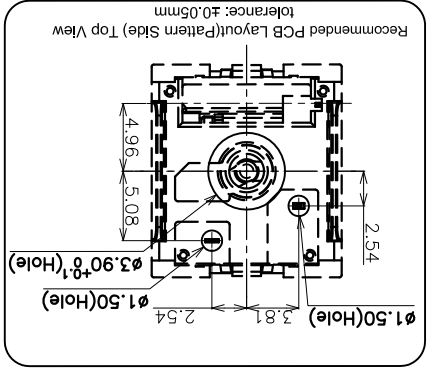
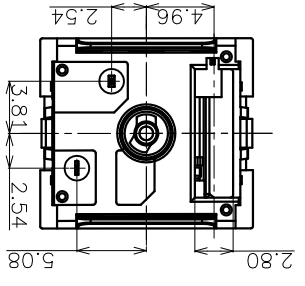
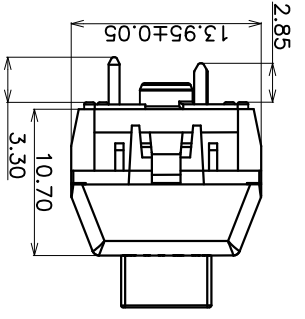
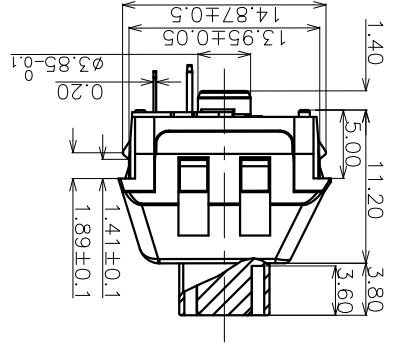
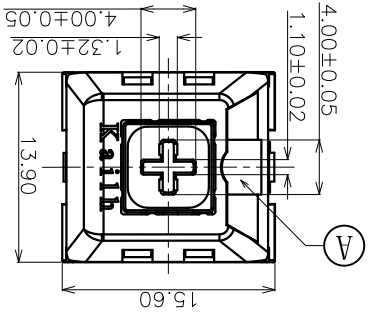


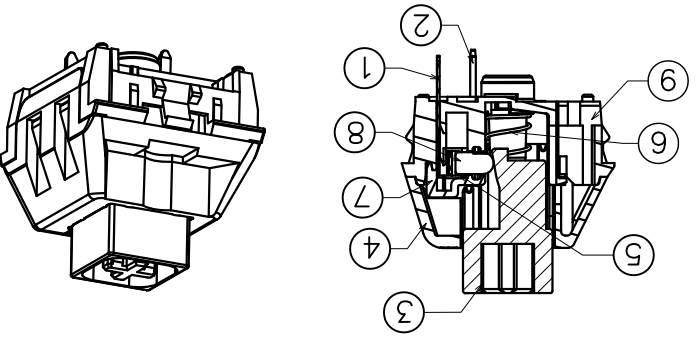
Black shaft



Specification :

- 1. Rating: 12 VAC/DC max. 2 VDC min. 10mA AC/DC max. 10 μA DC min.
- 2. Contact Resistance: 200mΩ Max
- 3. Insulation Resistance: 100MΩ Min. (DC100V)
- 4. Withstand Voltage: AC100V(50~60Hz) for 1 minute
- 5. Operation Force: 60±10gf
- 6. Return Force: ≥15gf
- 7. Conduction travel: 1.80±0.3mm
- 8. Total travel: 3.60±0.3mm
- 9. Electrical Life: 80,000,000 Cycles(min).
- 10. Degree of protection: IP56(excluding the terminals)

<Feel is allowed to have difference before and after life test>



ECN NO.	REV.	DATE.	DESCRIPTION.	CHANGE.	CHECK.	APPRO.
ECN-1801-02	C	2018.01.03	MODIFIED COVER SHAPE WITH STAMPED A POSITION	L.Zhang		
	B	2017.02.08	MODIFIED KEYSTROKE WITH STAMPED A POSITION	L.Zhang		
	A	2016.12.12	NEW	L.Zhang		

ITEM	PART NAME	TER. NO	QTY.	MATERIAL	FINISHING	REMARK
①	Movable Plate	---	1	Copper Alloy	Nature	---
②	Static Plate	---	1	Brass	Plating Ni	---
③	Keystroke	---	1	POM	Black	---
④	Cover	---	1	PC	Nature	---
⑤	Contact	---	2	Composite gold	---	---
⑥	Spring	---	1	Stainless Steel	Nature	---
⑦	Protecting Cover	---	1	PA66	Nature	---
⑧	Slider	---	1	POM	Green	---
⑨	Base	---	1	PA66	White	---

APPROVALS	DATE	DRAWN	CHECKED	TITLE:	PART NO.	SCALE:	DRAWING NO.
L.Zhang	2016.12.12	L.Zhang		PG1511F Keystroke Switch(Black shaft)	CPG1511F01S05	1:1	KHM-PG1511F-005EN

TOLERANCES ARE	ANGLE	UNIT:	DRAWING NO.	KHM-PG1511F-005EN	SHEET	1 OF 1
30<L 10<L≤30 5<L≤10	±20 ±0.30 ±0.15	mm				

A

B

C

D

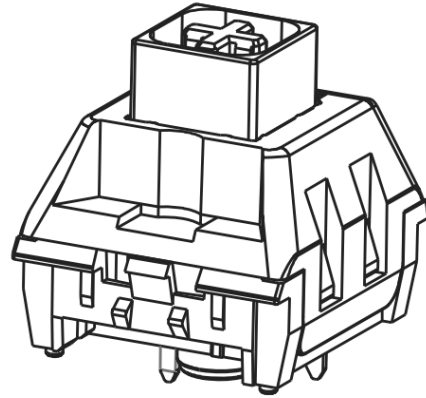
A

B

C

D

# Product Specification



Black Shaft

P/N: <b>CPG1511F01S05</b>			Title : <b>CPG1511F Keyboard Switch</b>		
Rev.	ECN	Release and Revision Description:	Prepared By /Date:	Checked By/Date:	Approved By/Date:
A	— —	New releasing 初版发行	张林/2016.12.12	张林/2017.01.05	易平/2017.01.05
B	— —	修改导芯	张林/2017.02.08	张林/2017.02.08	易平/2017.02.08
C	— —	修改盖子外形	张林/2018.01.03	易平/2018.01.03	王锋/2018.01.03

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7. Mechanical Performance/机械性能.....	5~6
8. Environmental Performance/环境性能.....	7~8
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11. Packaging/包装.....	10~11
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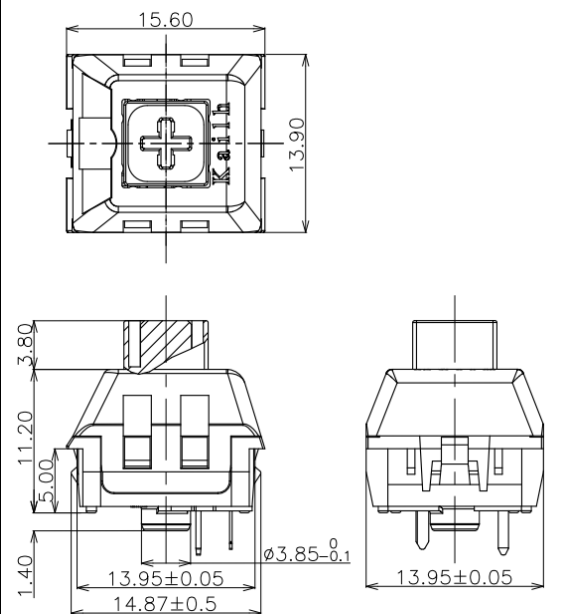
### 3. Technology Parameters/技术参数

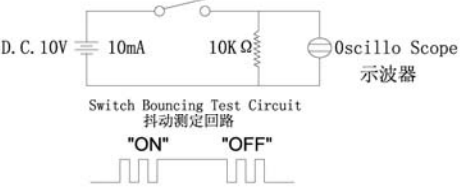
Ambient Humidity 工作湿度:	45~85% R.H.;
Operating Temperature Range 使用温度范围:	-10℃~+70℃;
Storage Temperature Range 保存温度范围:	-20℃~+70℃;
Suggested storage period 贮存期限:	about 6 months 最多 6 个月
Require the tin part on the switch terminals should keep good after storage guarantee date 要求贮存期后开关端子部分上锡仍然良好。	
Normal Condition:	
Ambient temperature 环境温度:	20±2℃
Relative humidity 相对湿度:	65%±5% R.H.;
Air pressure 气压:	86~101KPa;

### 4. Ratings/额定性能要求

Rating 额定负荷:	12V AC/DC max. 2V DC min. 10mA AC/DC max. 10 μ A DC min.;
Insulation Resistance 绝缘电阻:	≥100MΩ/DC 100V;
Withstand Voltage 耐电压:	100 AC 1 Minute;
Mechanical Life 机械寿命:	80,000,000 Cycles.

### 5. Profile Dimensions /外形尺寸

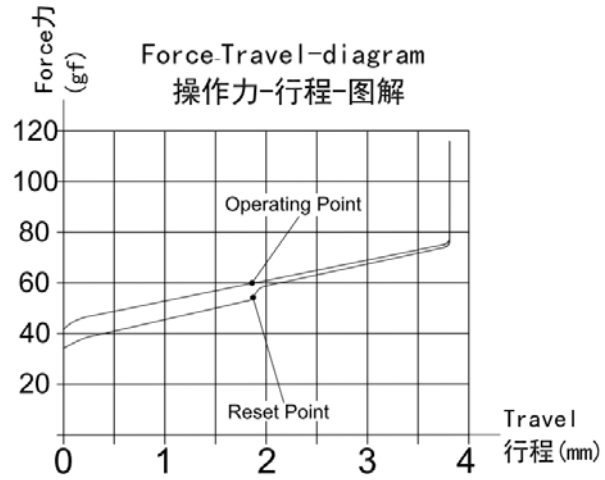


6.1	Contact Resistance 接触电阻	<p>开关接触稳定的重测.</p> <p>Measurement tool: Contact resistance Meter. 测量工具: 微电流接触电阻计(1KHz, 20mV,5~50mA)</p> <p>在低电流 (<math>\leq 100\text{mA}</math>) 条件下测试. Measured at low current (100mA or less).</p>	200m $\Omega$ Max 200m $\Omega$ 以下
6.2	Insulation Resistance 绝缘电阻	<p>Apply a Voltage of DC 100 V for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body.</p> <p>输入 100V 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>	100M $\Omega$ Min 100 兆欧以上
6.3	Dielectric withstanding voltage 耐电压	<p>Apply a Voltage of AC100 V (50~60Hz) for 1 minute, according to the below method. (1) Between terminals. (2) Between terminal and Body.</p> <p>输入 100V 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>	No evidence of breakdown 无瞬断、击穿等破坏.
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>Oscillo scope 示波器</p> <p>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>

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。

7.1

Load Curve  
 荷重曲线

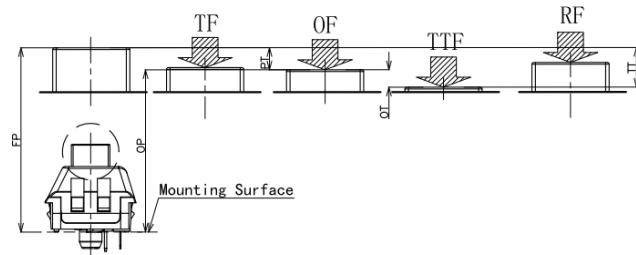


See page 11  
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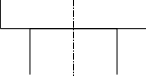
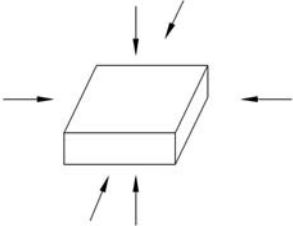
7.2

Loading parameter  
 荷重参数

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。



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 见第 11 页

			
7.4	Stem Pull Strength 手柄拉拔强度	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.	5kgf Min
7.5	Shock 机械冲击	<p>Measured by according to the below condition:</p> <p>(1) Acceleration: 80g 加速度</p> <p>(2) Cycles of test: 3 cycles each in 6 directions, for a total of 18 cycles. 试验次数: 每个方向 3 次, 6 个方向共 18 次.</p> 	<p>Shall meet No.6, 7.1, 7.2.</p> <p>满足 6, 7.1, 7.2 要求.</p>
7.6	Life Test 寿命测试	<p>1) D.C. 12V 10mA resistance load D.C 12V 10mA 电阻负荷</p> <p>2) Operation speed : 5-6 times / s 动作速度: 5-6 次/ 秒</p> <p>3) Push force : 150gf 按力: 150gf</p> <p>5) Push travel : 3.6mm 按压行程: 3.6mm</p> <p>6) Operation number: 80,000,000cycles 动作次数: 80, 000, 000 次</p>	<p>Contact resistance: 1Ω Max 接触电阻: 1 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% 操作力的变化范围在初始值的±30%以内.</p>

8.1	耐寒性	<p>(3) Take off a drop water 去掉水珠  (4) Standard conditions after test : 1h  试验后的放置条件: 1 小时</p>	<p>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>												
8.2	Heat test 耐热性	<p>(1) Temperature : 70±2℃  温度: 70±2℃  (2) Duration of test: 48h  持续时间: 48 小时  (3) Take off a drop water 去掉水珠  (4) Standard conditions after test : 1h  试验后的放置条件: 1 小时</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  满足:  No. 6.2 to 6.4  No. 7.1 to 7.2</p>												
8.3	Temperature cycle 温度循环	<p>(1) Test cycles: 5 cycles  试验周期: 5 个周期  (2) Standard condition after test:1h  试验后的放置条件: 1 小时</p> <table border="1" data-bbox="436 718 1041 901"> <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℃</td> <td>1h</td> </tr> <tr> <td>-20±5℃</td> <td>1h</td> </tr> <tr> <td>20±5℃</td> <td>1h</td> </tr> <tr> <td>70±5℃</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℃	1h	-20±5℃	1h	20±5℃	1h	70±5℃	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℃	1h													
	-20±5℃	1h													
	20±5℃	1h													
	70±5℃	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  Soldering temperature: 260±5℃  Soldering time: 3±0.5s  焊接温度: 260±5℃  焊接时间: 3±0.5 秒</p>	<p>Appearance:  No abnormality.  外观无异常</p>												

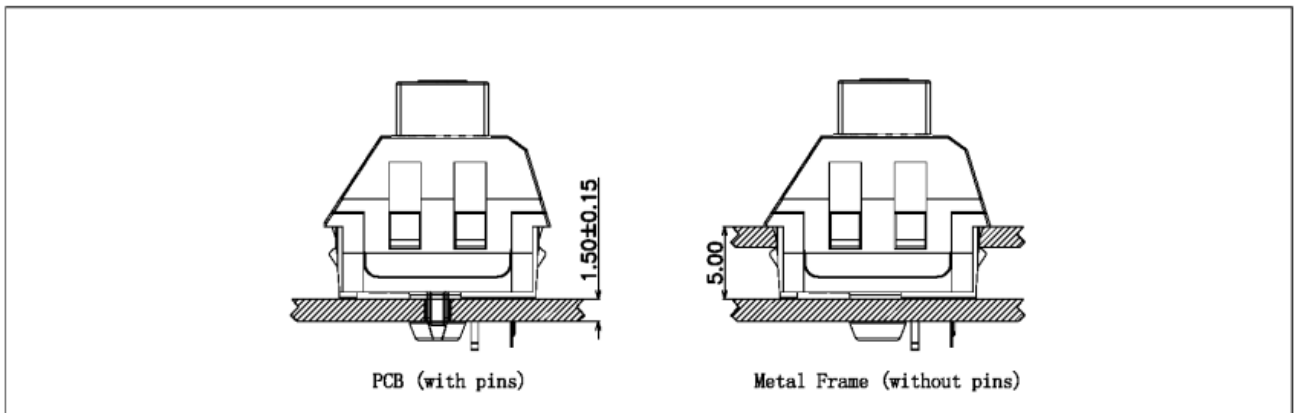


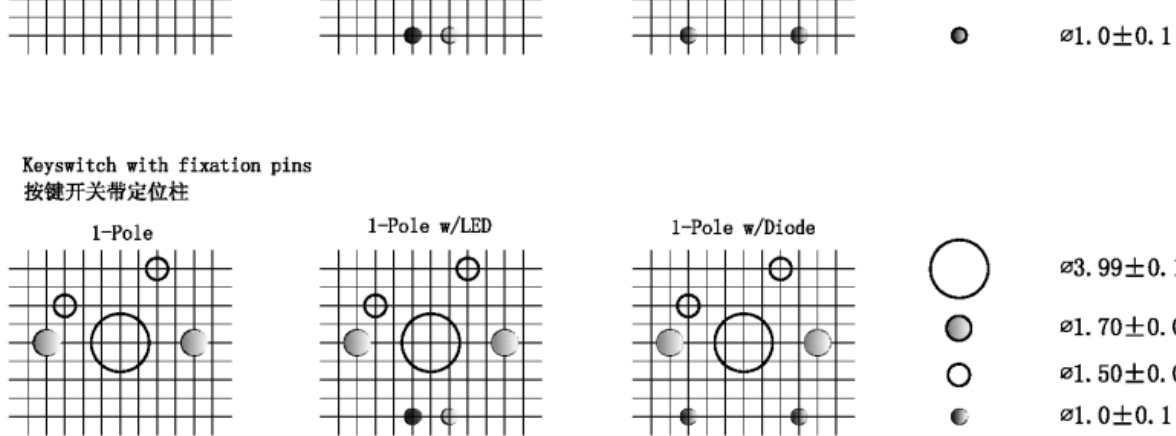
8.5	Solder ability 可焊性	<p>2. Automatic PIP soldering 自动插板焊接: For the product of T/H according to below condition:</p> <p style="text-align: center;"><b>波峰焊温度曲线图(单波峰)</b></p>	<p>At least 95% of surface area of immersed portion shall be covered by solder. 浸焊面积大于 90%以上.</p>
8.6	Humidity test 耐湿性	<p>(1) Temperature : <math>60 \pm 2^\circ\text{C}</math> 温度: <math>60 \pm 2^\circ\text{C}</math></p> <p>(2) relative humidity: 90~95% R.H. 相对湿度:90~95% R.H.</p> <p>(3) Duration of test: 48h 持续时间: 48 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: <math>200\text{m}\Omega</math> Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2 接触电阻 <math>200\text{m}\Omega</math> 以下 满足: No. 6.2 to 6.4 No. 7.1 to 7.2</p>
8.7	Salt Spray 盐雾测试	<p>Apply the following environment to test: 根据下列条件进行测试:</p> <p>(1) Temperature : <math>35 \pm 5^\circ\text{C}</math> 温度: <math>35 \pm 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: 12hours 持续时间: 12 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: <math>200\text{m}\Omega</math> Max 接触电阻: 200 毫欧以下</p>

8.9	Protection against ingress water(IPX6) 防水	<p>The switches are placed in a position of normal use inside the test table. The test is carried out according to the second enclosure of IEC60529/GB4208.</p> <p>测试样品以正常使用位置在防尘箱中安装；按 IEC60529 或 GB4208 防护标准测试条件进行试验；</p>	<p>表面耐电压强度≥100V</p> <p>After test: Operating is normal. Water don't enter electric parts of the switch inside. Between terminals, terminal and surface of the crust, Dielectric withstand in voltage ≥100V</p> <p>动作正常； 水不能进入开关内带电部份 端子之间及端子与外壳 表面耐电压强度≥100V</p>
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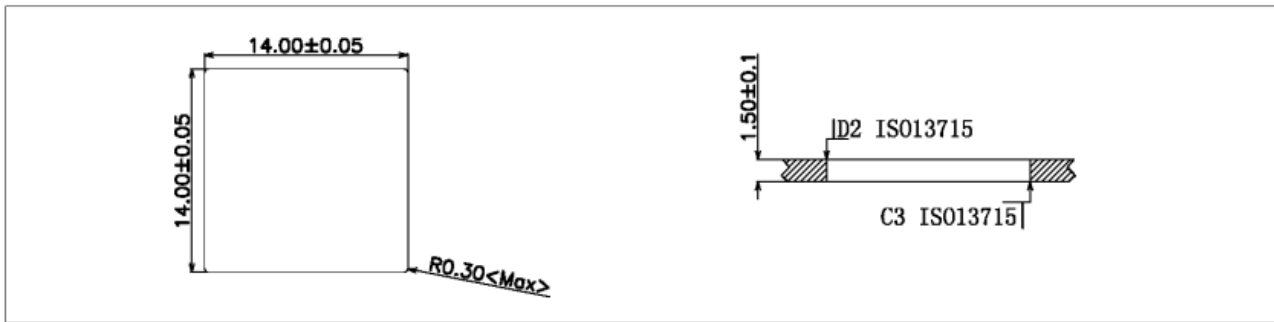
## 9. Recommended PCB Layout 推荐的 PCB 安装焊盘规格

### Mounting Options 安装选项





### Metal Frame Cutout Dimensions



### 10. Loading Parameter (TT/PT/OT /OF/TF/RF) Specification 荷重参数规格：

Parameter	Unit	Specification	Remark
TT(总行程)	mm	$3.60 \pm 0.3$	
PT(导通行程)	mm	$1.80 \pm 0.3$	
OT(过行程)	mm	1.30	Min.
OF(动作力)	gf	$60 \pm 10$	
RF(回弹力)	gf	15	Min.

### 11. Packaging 包装

**Packaging type: Tray, 1000Pcs/Tray, 4000Pcs/Carton.**

**包装方式: Tray 盘,1000Pcs/盘, 4000Pcs/箱.**

**12.1 Immersion Soldering condition 浸焊条件**

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

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