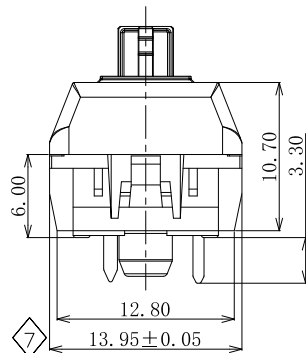
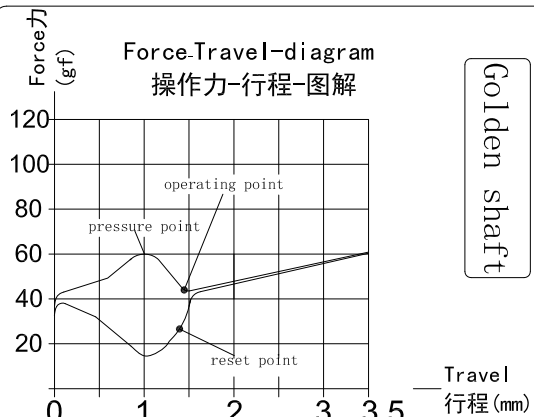
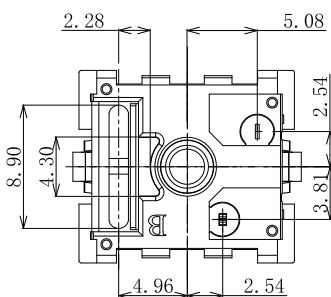
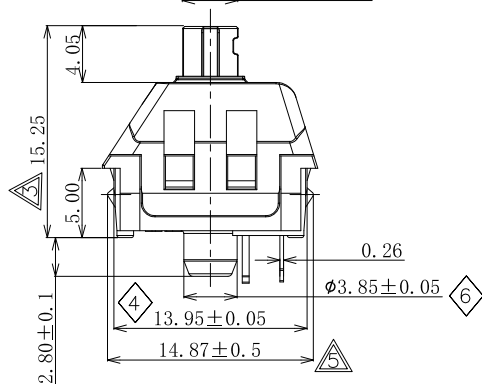
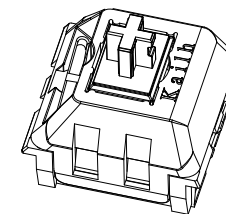
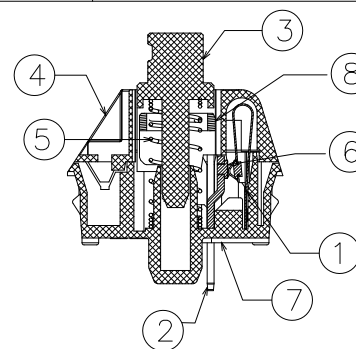
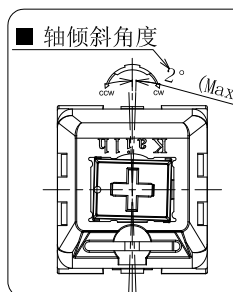
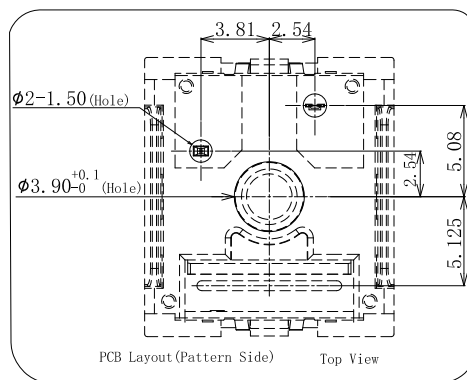
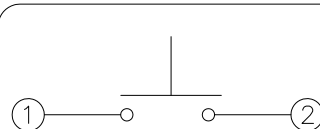


## Golden shaft





## ■ SWITCH FUNCTION



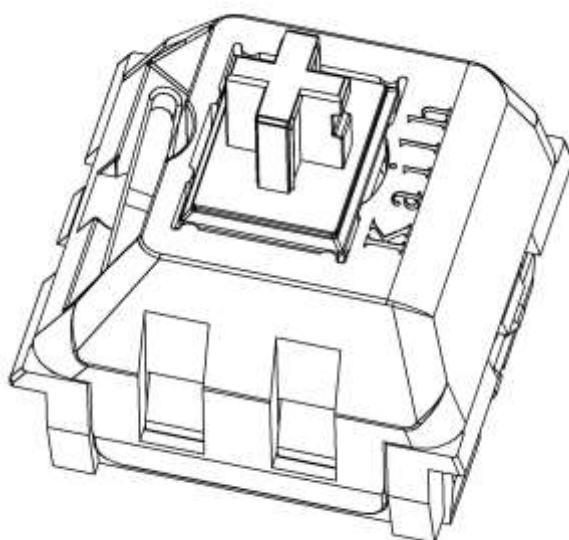
- 1. Rating :12V AC/DC max. 2V DC min.  
10mA AC/DC max. 10  $\mu$ A DC min.
- 2. Contact Resistance : 200m $\Omega$  Max
- 3. Insulation Resistance :100M $\Omega$  Min  
(DC500V)
- 4. Withstand Voltage :AC100V (50–60Hz)  
for 1 minute
- 5. Bounce Time:  $\leq$ 5msec (at 16 in/sec.  
actuation speed)
- 6. Resilience Force  $\geq$ 12gf
- 7. Operation Force :50 $\pm$ 10gf
- 8. Tactile Force:60 $\pm$ 10gf
- 9. Pre travel:1.4 $\pm$ 0.5mm
- 10. Total travel:3.5 $\pm$ 0.4mm
- 11. Operating Life :70,000,000 Cycles(min).

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

|      |               |         |      |                 |                    |        |
|------|---------------|---------|------|-----------------|--------------------|--------|
| ⑧    | Keystroke-2   | _____   | 1    | POM             | Nature             | _____  |
| ⑦    | Base          | _____   | 1    | PA66            | White              | _____  |
| ⑥    | contact       | _____   | 2    | Composite gold  | _____              | _____  |
| ⑤    | Spring        | _____   | 1    | Stainless Steel | _____              | _____  |
| ④    | Cover         | _____   | 1    | PC              | _____              | _____  |
| ③    | Keystroke     | _____   | 1    | POM             | Golden             | _____  |
| ②    | static plate  | _____   | 1    | Brass           | Sn over Ni-plating | _____  |
| ①    | movable plate | _____   | 1    | Copper Alloy    | _____              | _____  |
| ITEM | PART NAME     | TER'NO. | QTY. | MATERIAL        | FINISHING          | REMARK |

|                                                                                                                                                                                                            |             |                          |             |                                                                                                                                |                                                                                             |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|--|
| APPROVALS                                                                                                                                                                                                  |             | DATE                     |             |  DONGGUAN CITY KAIHUA ELECTRONICS CO.,LTD |                                                                                             |  |
| DRAWN                                                                                                                                                                                                      | YI JIN PING | 2017.04.13               |             |  Kailh                                    |                                                                                             |  |
| CHECKED                                                                                                                                                                                                    |             |                          |             | TITLE:                                                                                                                         | PG1511 Keystroke Switch(Golden shaft)                                                       |  |
| APPROVALS                                                                                                                                                                                                  |             |                          |             | PART NO.                                                                                                                       | CPG151101D211                                                                               |  |
| TOLERANCES ARE<br><div><div>30&lt;L</div><div>±0.30</div></div> <div><div>10&lt;L≤30</div><div>±0.20</div></div> <div><div>5&lt;L≤10</div><div>±0.15</div></div> <div><div>L≤5</div><div>±0.10</div></div> |             | ANGLE<br><br><br><br>±2' | UNIT: mm    | SCALE: 1:1                                                                                                                     | PROJ:  |  |
|                                                                                                                                                                                                            |             |                          | DRAWING NO. | KHA-PG1511-165EN                                                                                                               | SHEET 1 OF 1                                                                                |  |
|                                                                                                                                                                                                            |             |                          |             |                                                                                                                                |                                                                                             |  |
|                                                                                                                                                                                                            |             |                          |             |                                                                                                                                |                                                                                             |  |

## Product Specification



P/N: \_\_\_\_\_

**CPG151101D211**

Title :

**PG1511 Keyboard Switch**

| Rev. | ECN | Release and Revision Description: | Prepared By /Date:       | Checked By/Date:          | Approved By/Date:    |
|------|-----|-----------------------------------|--------------------------|---------------------------|----------------------|
| A    | — — | New releasing                     | YIJINGPING<br>2017-04-20 | HUYUANGFENG<br>2017-04-20 | YIPING<br>2017-04-20 |
|      |     |                                   |                          |                           |                      |
|      |     |                                   |                          |                           |                      |
|      |     |                                   |                          |                           |                      |
|      |     |                                   |                          |                           |                      |

### Content

|                                            |     |
|--------------------------------------------|-----|
| 1. Scope: .....                            | 3   |
| 2. Product Application : .....             | 3   |
| 3. Technology Parameters: .....            | 3   |
| 4. Ratings: .....                          | 3   |
| 5. Profile Dimensions: .....               | 3   |
| 6. Electrical Performance: .....           | 4   |
| 7. Mechanical Performance: .....           | 5~6 |
| 8. Environmental Performance: .....        | 7~9 |
| 9. Recommended PCB Layout: .....           | 9   |
| 10. Loading Parameter Specification: ..... | 10  |
| 11. Packaging: .....                       | 10  |
| 12. Precaution: .....                      | 11  |

## 1. Scope:

This Product Specification covers the requirement of Mechanical Keyboard switch on product performance, test methods and quality assurance provisions.

## 2. Product Application:

Mainly applied on computer keyboards, cash registers, industrial equipment and Man-Machine interface.

## 3. Technology Parameters:

|                                                                                            |                |
|--------------------------------------------------------------------------------------------|----------------|
| Ambient Humidity:                                                                          | 45~85% R.H.;   |
| Operating Temperature Range:                                                               | -10℃~+70℃;     |
| Storage Temperature Range:                                                                 | -20℃~+70℃;     |
| Suggested storage period :                                                                 | about 6 months |
| Require the tin part on the switch terminals should keep good after storage guarantee date |                |

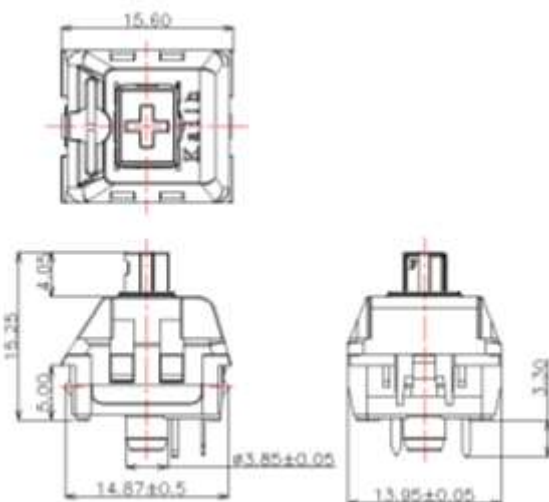
Normal Condition:

|                                  |                                       |
|----------------------------------|---------------------------------------|
| Ambient temperature:             | 20±2℃                                 |
| Relative humidity:               | 65%±5% R.H.;                          |
| Air pressure :                   | 86~101KPa;                            |
| Solder Ability :                 | Tim-lead soldering : 245℃±5℃ 5s±0.5s; |
|                                  | Lead-free welding : 255℃±5℃ 5s±0.5s;  |
| Withstand Soldering Temperature: | Wave soldering: 260±5℃ 5±0.5s;        |

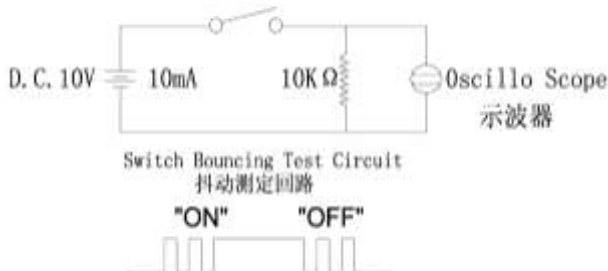
## 4. Ratings:

|                        |                                |
|------------------------|--------------------------------|
| Rating:                | 12V AC/DC max. 2V DC min.      |
|                        | 10mA AC/DC max. 10 μ A DC min; |
| Insulation Resistance: | ≥100MΩ/DC 100V;                |
| Withstand Voltage:     | 100V AC 1 Minute;              |
| Mechanical Life:       | 70,000,000 Cycles.             |

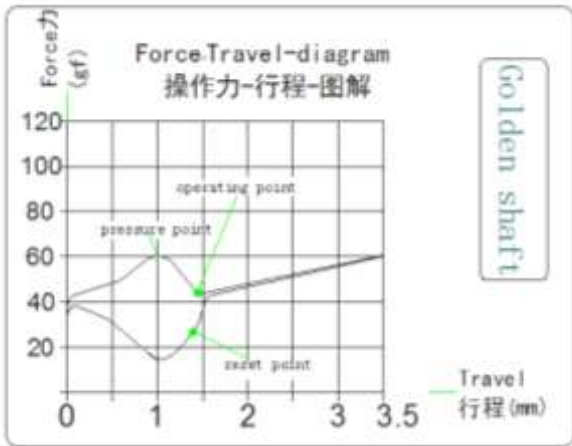
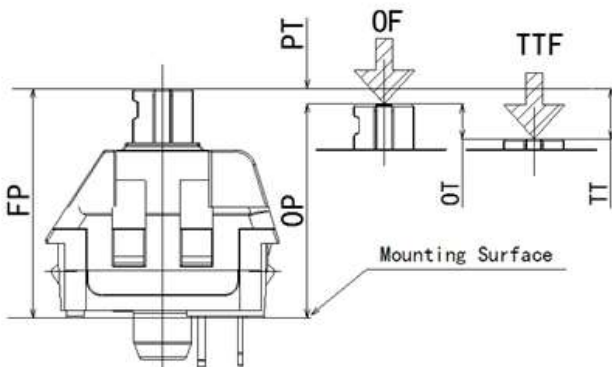
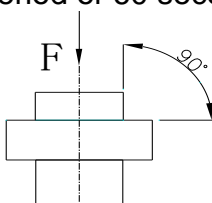
## 5. Profile Dimensions :

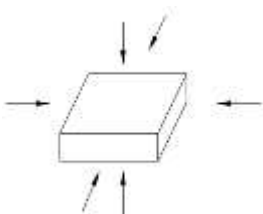


### 6. Electrical Performance:

| Item | Description                     | Test Condition                                                                                                                                                                                                                                                             | Requirement                                                                                                            |
|------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 6.1  | Contact Resistance              | <p>Static load: (Operation force)x2, which is applied on the center of Switch stem.<br/>Be measured when the switch contact stabilization.</p> <p>Measurement tool: Contact resistance Meter.<br/>(1KHz, 20mV, 5~50mA)</p> <p>Measured at low current (100mA or less).</p> | 200mΩ Max                                                                                                              |
| 6.2  | Insulation Resistance           | <p>Apply a Voltage of DC 500 V for 1 minute, according to the below method.</p> <p>(1) Between terminals.<br/>(2) Between terminal and Body.</p>                                                                                                                           | 100MΩ Min                                                                                                              |
| 6.3  | Dielectric withstanding voltage | <p>Apply a Voltage of AC100 V (50~60Hz) for 1 minute, according to the below method.</p> <p>(1) Between terminals.<br/>(2) Between terminal and Body.</p>                                                                                                                  | No evidence of breakdown.                                                                                              |
| 6.4  | Bouncing                        | <p>Operation speed: 3~4 times/s<br/>Oscilloscope<br/>Switch Bouncing Test Circuit.</p>  <p>Switch Bouncing Test Circuit<br/>抖动测定回路</p> <p>"ON" "OFF"</p>                               | <p>Before Life cycle:<br/>On: 5ms MAX<br/>Off: 5ms MAX</p> <p>After Life cycle:<br/>On: 10ms MAX<br/>Off: 10ms MAX</p> |

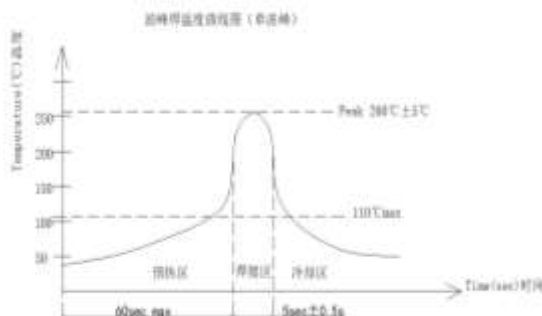
## 7. Mechanical Performance:

| It  | Description       | Test Condition                                                                                                                                                                                                                | Requirement                                  |
|-----|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 7.1 | Load Curve        | <p>Place the vertical direction of switch operation and gradually increase the load applied to the center of the stem until it stop.</p>   | See page 10                                  |
| 7.2 | Loading parameter | <p>Place the vertical direction of switch operation and gradually increase the load applied to the center of the stem until it stop.</p>  | See page 10                                  |
| 7.3 | Static Strength   | <p>A static load of 3kgf shall be applied in the direction of button operation for a period of 60 seconds.</p>                             | No damage<br>(Electrical)<br>And mechanical) |

|     |                    |                                                                                                                                                                                                                                                                            |                                                                                                                                   |
|-----|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 7.4 | Stem Pull Strength | Break by a pull force applied opposite to the direction of stem operation.                                                                                                                                                                                                 | 5kgf Min                                                                                                                          |
| 7.5 | Shock              | <p>Measured by according to the below condition:</p> <p>(1) Acceleration: 80g accelerated speed</p> <p>(2) Cycles of test: 3 cycles each in 6 directions, for a total of 18 cycles.</p>  | Shall meet No.6, 7.1, 7.2.                                                                                                        |
| 7.6 | Life Test          | <p>1) D.C.12V 10mA resistance load</p> <p>2) Operation speed : 5-6 times / s</p> <p>3) Push force : 150gf</p> <p>4) Operation number: 70,000,000cycles</p>                                                                                                                 | <p>Contact resistance: 1 Ω Max</p> <p>Bouncing: 10ms Max</p> <p>Operation force and tactile force: Variation rate within ±30%</p> |

### 8. Environmental Performance:

| Item | Description | Test Condition                                                                                                                                   | Requirement                                                                                    |
|------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 8.1  | Cold test   | <p>(1) Temperature : - 20±2℃</p> <p>(2) Duration of test: 48h</p> <p>(3) Take off a drop water</p> <p>(4) Standard conditions after test : 1</p> | <p>Contact resistance: 200m Ω Max</p> <p>Shall meet : No. 6.2 to 6.4</p> <p>No. 7.1 to 7.2</p> |

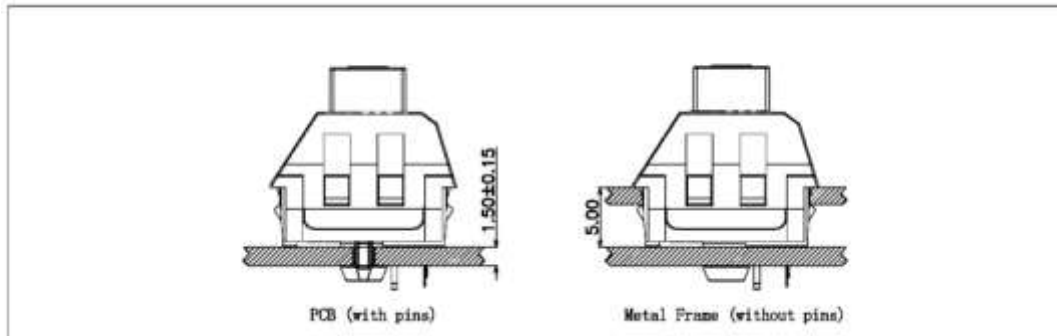
|         |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                    |             |                  |         |                          |    |                           |    |                          |   |                          |   |                                                                                                    |
|---------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-------------|------------------|---------|--------------------------|----|---------------------------|----|--------------------------|---|--------------------------|---|----------------------------------------------------------------------------------------------------|
| 8.2     | Heat test                 | (1) Temperature : $70\pm2^{\circ}\text{C}$<br>(2) Duration of test: 48h<br>(3) Take off a drop water<br>(4) Standard conditions after test : 1h                                                                                                                                                                                                                                                                                                | Contact resistance:<br>$200\text{m}\Omega$ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2 |             |                  |         |                          |    |                           |    |                          |   |                          |   |                                                                                                    |
| 8.3     | Temperature cycle         | (1) Test cycles: 5 cycles<br>(2) Standard condition after test:1h<br><table><tr><td></td><td>Temperature</td><td>Duration of test</td></tr><tr><td rowspan="4">1 cycle</td><td><math>20\pm5^{\circ}\text{C}</math></td><td>1h</td></tr><tr><td><math>-20\pm5^{\circ}\text{C}</math></td><td>1h</td></tr><tr><td><math>20\pm5^{\circ}\text{C}</math></td><td>h</td></tr><tr><td><math>70\pm5^{\circ}\text{C}</math></td><td>1</td></tr></table> |                                                                                                    | Temperature | Duration of test | 1 cycle | $20\pm5^{\circ}\text{C}$ | 1h | $-20\pm5^{\circ}\text{C}$ | 1h | $20\pm5^{\circ}\text{C}$ | h | $70\pm5^{\circ}\text{C}$ | 1 | Contact resistance:<br>$200\text{m}\Omega$ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2 |
|         | Temperature               | Duration of test                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                    |             |                  |         |                          |    |                           |    |                          |   |                          |   |                                                                                                    |
| 1 cycle | $20\pm5^{\circ}\text{C}$  | 1h                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                    |             |                  |         |                          |    |                           |    |                          |   |                          |   |                                                                                                    |
|         | $-20\pm5^{\circ}\text{C}$ | 1h                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                    |             |                  |         |                          |    |                           |    |                          |   |                          |   |                                                                                                    |
|         | $20\pm5^{\circ}\text{C}$  | h                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                    |             |                  |         |                          |    |                           |    |                          |   |                          |   |                                                                                                    |
|         | $70\pm5^{\circ}\text{C}$  | 1                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                    |             |                  |         |                          |    |                           |    |                          |   |                          |   |                                                                                                    |
| 8.4     | Soldering heat test       | Soldering area: 1/2 of PWB thickness.<br>(PWB: T=1.6mm)<br><br>Soldering temperature: $260\pm5^{\circ}\text{C}$<br>Soldering time: $5\pm0.5\text{s}$<br><br>                                                                                                                                                                                                | Appearance:<br>No abnormality.                                                                     |             |                  |         |                          |    |                           |    |                          |   |                          |   |                                                                                                    |
| 8.5     | Solder ability            | Lead-tin soldering:<br>Soldering temperature: $245\pm5^{\circ}\text{C}$<br>Soldering time: $5\pm0.5\text{s}$<br><br>Lead free soldering:<br>Soldering temperature: $255\pm5^{\circ}\text{C}$<br>Soldering time: $5\pm0.5\text{s}$                                                                                                                                                                                                              | At least 90% of surface area of immersed portion shall be covered by solder.<br>.                  |             |                  |         |                          |    |                           |    |                          |   |                          |   |                                                                                                    |



|     |                            |                                                                                                                                                                                                                                                             |                                                                                                                    |
|-----|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 8.6 | Humidity test              | (1) Temperature : $60 \pm 2^{\circ}\text{C}$<br>(2) relative humidity: 90~95% R.H.<br>(3) Duration of test: 48h<br>(4) Take off a drop water<br>(5) Standard conditions after test: 1h                                                                      | Contact resistance:<br>200m $\Omega$ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2                       |
| 8.7 | Salt Spray                 | Apply the following environment to test(Only for contact test) :<br><br>(1) Temperature : $35 \pm 5^{\circ}\text{C}$<br>(2) Salt water density: $5 \pm 1\%$<br>(3) Duration: 12hours<br>(4) After test, the salt deposit shall be removed by running water. | Appearance:<br>No corrosion spot, no crack, no base plate naked.<br><br>Contact Resistance:<br>200 m $\Omega$ Max  |
| 8.8 | Withstand K <sub>2</sub> S | Apply the following environment to test:<br><br>(1) Temperature: $35 \pm 5^{\circ}\text{C}$<br>(2) K <sub>2</sub> S Density: 2%;<br>(3) Duration: 2 minute.                                                                                                 | Appearance:<br>No corrosion spot, no crack, no base plate naked.<br><br>Contact Resistance:<br>1000 m $\Omega$ Max |

## 9. Recommended PCB Layout

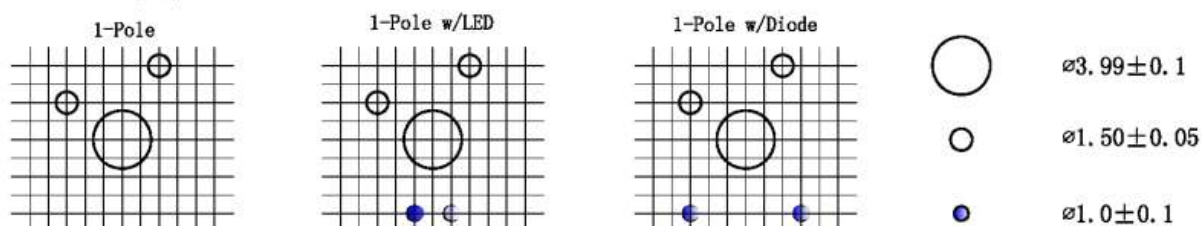
### Mounting Options 安装选项



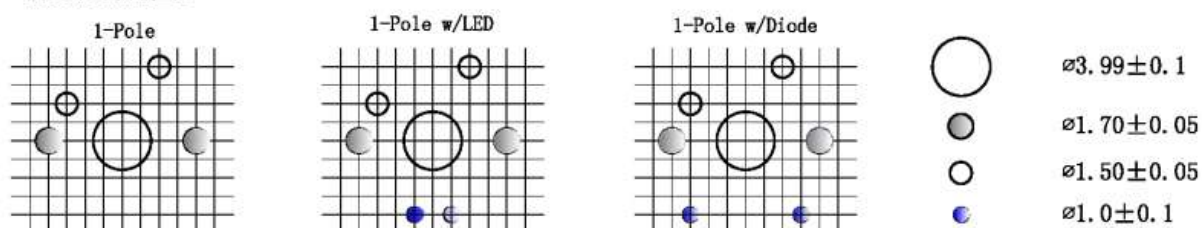
### Circuit Board Layouts 电路板布局

Grid line spacing = 1.27mm 网格线间距= 1.27毫米

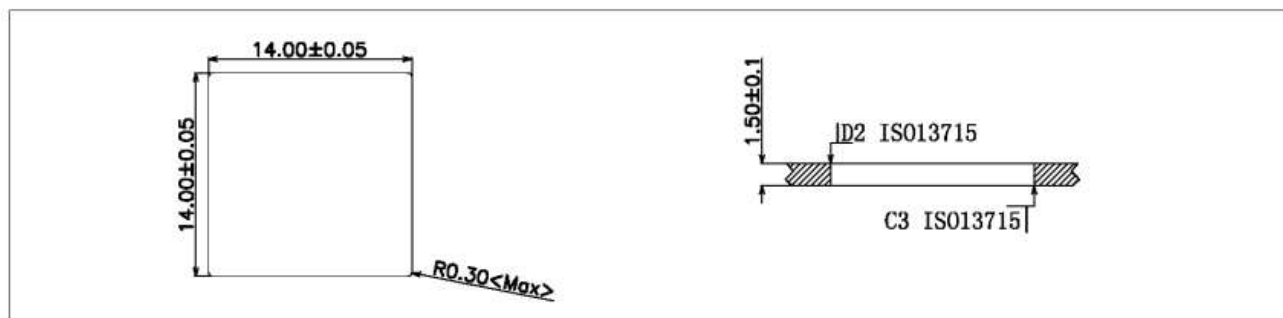
Keyswitch without fixation pins  
按键开关不带定位柱



Keyswitch with fixation pins  
按键开关带定位柱



### Metal Frame Cutout Dimensions

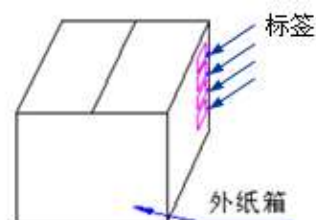
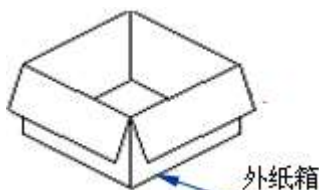


## 10.Loading Parameter (TT/PT/OT /OF/TF/RF) Specification :

| Parameter | Unit | Specification   | Remark |
|-----------|------|-----------------|--------|
| FP        | mm   | $15.25 \pm 0.2$ |        |
| OP        | mm   | $13.85 \pm 0.6$ |        |
| PT        | mm   | $1.40 \pm 0.40$ |        |
| OF        | gf   | $50 \pm 10$     |        |
| OT        | mm   | 1.7             | Min    |
| MD        | mm   | 0.6             | Max    |
| TT        | mm   | $3.5 \pm 0.4$   |        |

## 11. Packaging :

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



## 12.Precaution

### 12.1 Immersion Soldering condition

| ITEM                  | CONDITION                                                    |
|-----------------------|--------------------------------------------------------------|
| Preheat temperature   | 110℃ Max (Ambient temperature of soldering surface of P.W.B) |
| Preheat time          | 60s, Max                                                     |
| Area of flux          | 1/2 Max of PWB Thickness                                     |
| Temperature of solder | $260 \pm 5^{\circ}\text{C}$<br>$260 \pm 5^{\circ}\text{C}$   |
| Time of immersion     | $5 \pm 0.5\text{s}$<br>$5 \pm 0.5\text{s}$                   |
| Number of soldering   | 2time Max (But should down heat of the first soldering)      |
| Printed wiring board  | Single side copper-clad laminates                            |

- (1) After switches were soldered, please be careful not to clean switches with solvent
- (2) Under the condition of using soldering iron, soldering temperature shall be  $350^{\circ}\text{C} \pm 5^{\circ}\text{C}$  with  $3 \pm 0.5\text{s}$ .

### 12.2 Notes

- (1) Please be cautious not to give excessive static load or shock to switches.
- (2) Please be careful not to stack up P. W. B. after switches were soldered.
- (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.
- (4) The standard storage period is 3 months, with maximum up to 6months, preferably to be used as soon as possible. After opening the package, you should put the remaining switches in a plastic bag to prevent from damp and corrosive gas.
- (5) This Product Specification is considered as the technical agreement on product between the receiving customer and Kailh. Any information on Product Catalogue which is in conflict with or different from the corresponding information of this document is considered as invalid.
- (6) It will be considered that customer already confirmed and accepted this specification if customer issue purchase order to us directly.
- (7) If there is no order or no request for new specification after 1 year upon this specification is issued, the specification will be regarded as invalid.
- (8) Products meet the ROHS & REACH environmental management substances control standards