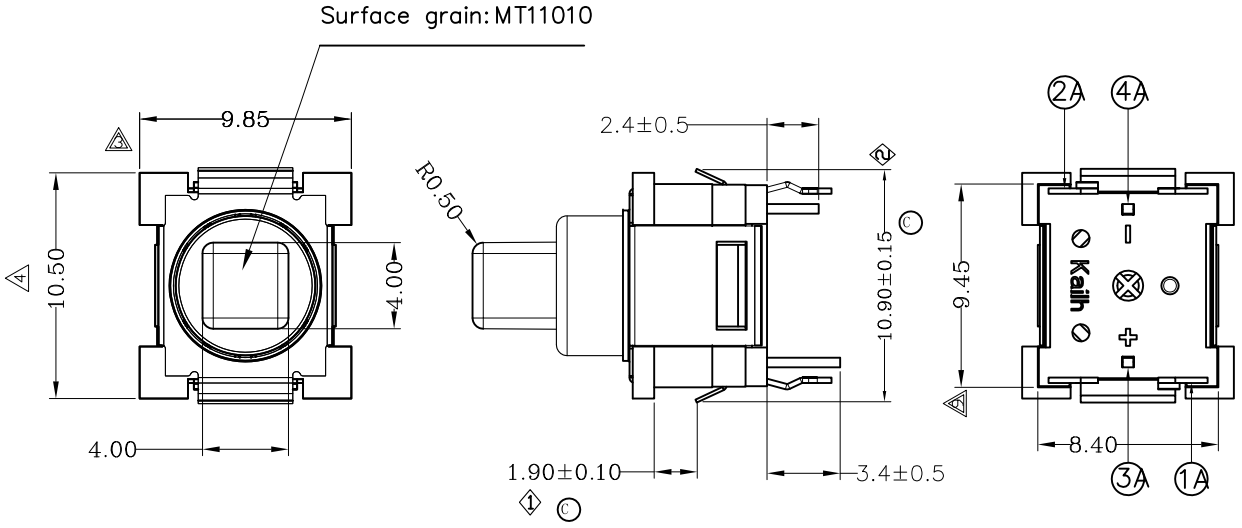
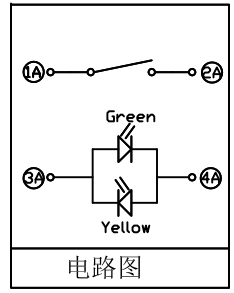
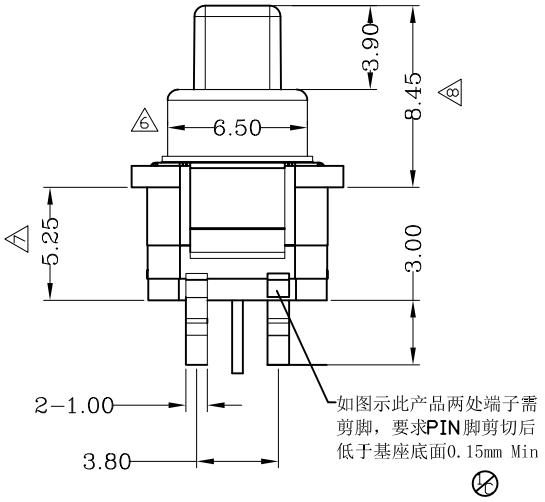
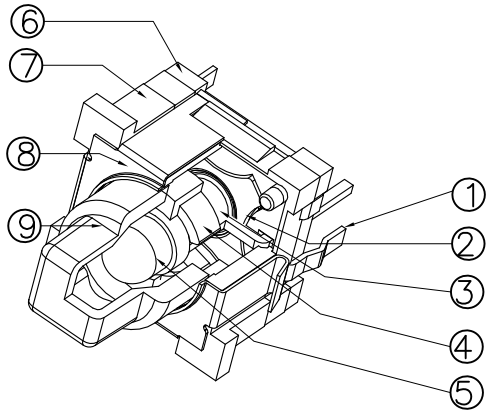
ABIDE BY ROHS



电路图




Specification :

1. Rating : DC12V 50mA
2. Contact Resistance : 100mΩ Max
3. Insulation Resistance : 100M ΩMin
4. Withstand Voltage : AC250V (50-60Hz)For 1 minute
5. Operation Force : 450±100gf
6. Life Test : 25,000 Cycles
7. Total Travel : 1.20±0.25mm
8. Operation Type: Touch Restore

| ITEM | PART NAME | TER'NO. | QTY. | MATERIAL | FINISHING | REMARK |
|---|---|---|---|---|---|---|
| 9 | Keystoke | ——— | 1pcs | PC | Transparent | ——— |
| 8 | Shell | ——— | 1pcs | SUS301HV | ——— | ——— |
| 7 | Cover | ——— | 1pcs | PA10T | Black | ——— |
| 6 | Base | ——— | 1pcs | PA10T | Black | ——— |
| 5 | LED | ——— | 1pcs | ø2.8mm Yellow&Green LED | | ——— |
| 4 | Pad | ——— | 1pcs | LCP | Gray | ——— |
| 3 | Rubber pad | ——— | 1pcs | Rubber | Gray | ——— |
| 2 | Contact | ——— | 1pcs | SUS301HV | Plating Au(4u") | ——— |
| 1 | Terminal | A.B | 2pcs | Brass | Plating Au(3u") | ——— |

| APPROVALS | | DATE | 东莞市凯华电子有限公司 KAIHUA ELECTRONICS CO.,LTD |
|---|---|---|---|
| DRAWN | Zhanghuijun | 2014.12.1 | |
| CHECKED | | | TITLE: LA9313-1 LAMP SWITCH |
| APPROVALS | | | PART NO. CLA931301D27 |
| TOLERANCES ARE: 30<L ±0.30; 10<L≤30 ±0.20; 5<L≤10 ±0.15; L≤5 ±0.10; ANGLE ±2° | | | UNIT: mm / SCALE:1:1 / PROJ: / DRAWING NO. KHA-LA9313-015 / SHEET 1 OF 1 |

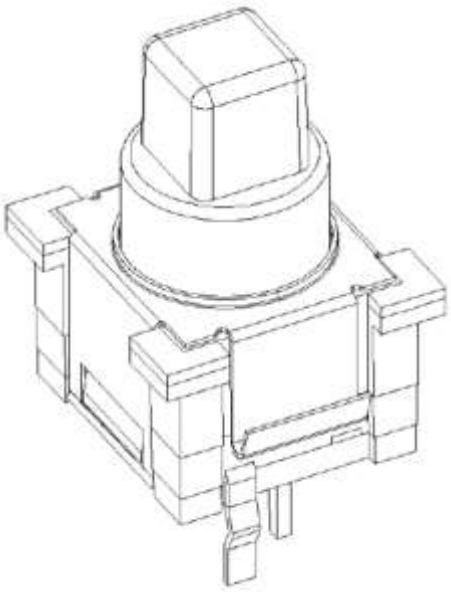
| ECN NO. | REV. | DATE. | DESCRIPTION. | CHANGE. | CHECK. | APPRO. |
|---|---|---|---|---|---|---|
| ECN-2305-027 | D | 2023.05.20 | Non-functional pins are 0.15mm below base base after shearing | QK | | |
| | C | 2020.7.20 | dimension 1.9 change to 2.0 | Jin | | |
| ——— | A | 2014.10.10 | NEW | ——— | ——— | ——— |

凯华电子 Kailh KAIHUA ELECTRONICS

Document Number:

KH-PS2305-20

# Product Specification



| P/N: CLA931301D27 | | | Title : Lamp Switch | | |
|---|---|---|---|---|---|
| Rev. | ECN | Release and Revision Description: | Prepared By /Date: | Checked By/Date: | Approved By/Date: |
| A | — — | New releasing | HQC 2023/05/20 | LPH 2023/05/20 | ZJJ 2023/05/20 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

# Content

## 1. Scope:

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

## 2. Product Application:

The Switch is applied in all types of electrical appliances. Please let us know before using any of the products in the application not described abovev.

## 3. Technology Parameters:

| | |
|---|---|
| Ambient Humidity: | 45~85% R.H.; |
| Operating Temperature Range: | -10℃～+70℃; |
| Storage Temperature Range: | -20℃～+80℃; |
| Suggested storage period : | about 6 months |

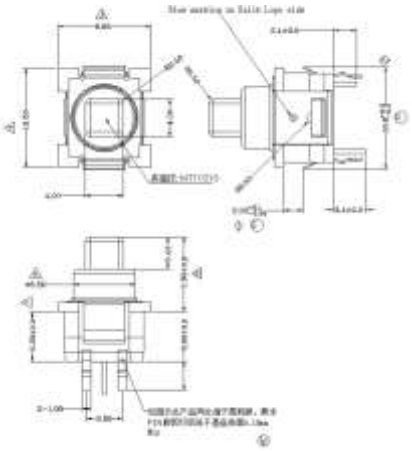
Normal Condition:

| | |
|---|---|
| Ambient temperature: | 20±5 |
| Relative humidity: | 65%±5% R.H.; |
| Air pressure : | 86~101KPa; |
| Contact Resistance: | 100 mΩ Max; |
| Operation Force: | 450±100gf |
| 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; |

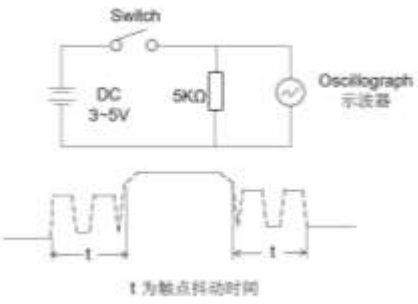
## 4. Rated Performance Requirements:

| | |
|---|---|
| Rating: | DC12V / 50mA |
| Insulation Resistance: | ≥100MΩ/DC 250V; |
| Withstand Voltage: | 250V AC 1 Minute; |
| Mechanical Life: | 25,000 Cycles. |

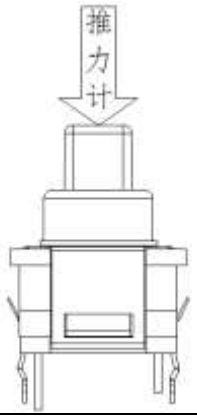
## 5. Profile Dimensions :

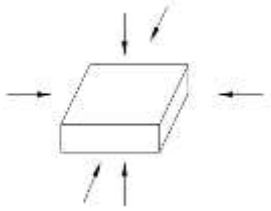


## 6. Electrical Performance:

| Item | Description | Test Condition | Requirement |
|---|---|---|---|
| 6.1 | Contact Resistance | Static load: (Operation force)x2, which is applied on the center of Switch stem.<br>Be measured when the switch contact stabilization.<br><br>Measurement tool: Contact resistance Meter. (1KHz, 20mV,5~50mA)<br><br>Measured at low current (100mA or less). | 100mΩ Max |
| 6.2 | Insulation Resistance | Apply a Voltage of DC 250 V for 1 minute, according to the below method.<br>(1) Between terminals.<br>(2) Between terminal and Body. | 100MΩ Min |
| 6.3 | Dielectric withstanding voltage | Apply a Voltage of AC250 V (50~60Hz) for 1 minute, according to the below method.<br>(1) Between terminals.<br>(2) Between terminal and Body. | No evidence of breakdown. |
| 6.4 | Bouncing | Operation speed：3~4 times/s<br>Oscilloscope<br>Switch Bouncing Test Circuit.<br>  | Before Life cycle:<br>On:5ms MAX<br>Off: 5ms MAX<br><br>After Life cycle:<br>On:10ms MAX<br>Off 10ms MAX |

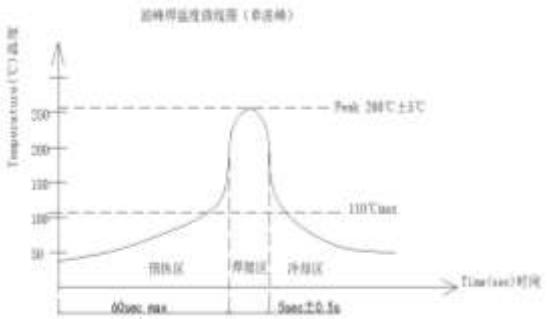
## 7. Mechanical Performance:

| It | Description | Tes Condition | Requirement |
|---|---|---|---|
| 7.1 | Operation force | Operate the keystoke of the switch and then increase press strength gradually, Measured maximum operation force while the travel of the switch is full. | 450±100gf |
| 7.2 | Travel | Operate the keystoke of the switch vertically, the travel distance of keystoke moving from its free position to maximum moving distance shall be measurement. | 1.20±0.25mm |
| 7.3 | Static Strength | A static load of 3kgf shall be applied in the direction of button operation for a period of 60 seconds.   | No damage (Electrical and mechanical） |
| 7.4 | Stem Pull Strength | Break by a pull force applied opposite to the direction of stem operation. | 500gf Min |

| | | | |
|---|---|---|---|
| 7.5 | Shock | Measured by according to the below condition:<br>(1) Acceleration: 80g accelerated speed<br>(2) Cycles of test:3 cycles each in 6 directions, for a total of 18 cycles.<br>.<br>  | Shall meet No.6，7.1，7.2 |
| 7.6 | Life Test | (1) 1 Weight:600gf<br>(2) Operation speed：60cycles/min<br>(3) Push force：Maximum value of operation force.<br>(4) Cycles：25,000 times Min | Contact resistance:<br>1000Ω Max<br>Bouncing：10ms Max<br><br>Operation force and tactile force：Variation rate within ±30% |

**8. Environmental Performance:**

| Item | Description | Test Cond ion | Requirement |
|---|---|---|---|
| 8.1 | Cold test | (1) Temperature : - 20±2℃<br>(2) Duration of test: 96h<br>(3) Take off a drop water<br>(4) Standard conditions after test : 1 | Contact resistance:<br>200mΩ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2 |
| 8.2 | Heat test | (1) Temperature : 70±2℃<br>(2) Duration of test: 96h<br>(3) Take off a drop water<br>(4) Standard conditions after test : 1h | Contact resistance:<br>200mΩ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2 |

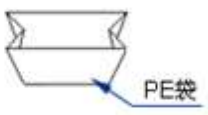
<table>
<tr>
<td>8.3</td>
<td>Temperature cycle</td>
<td>(1) Test cycles: 5 cycles<br>(2) Standard condition after test:1h<br><br>
<table>
<tr><th></th><th>Temperature</th><th>Duration of test</th></tr>
<tr><td rowspan="4">1 cycle</td><td>20±5℃</td><td>1h</td></tr>
<tr><td>-20±5℃</td><td>1h</td></tr>
<tr><td>20±5℃</td><td>h</td></tr>
<tr><td>70±5℃</td><td>1</td></tr>
</table>
</td>
<td>Contact resistance:<br>200mΩ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2</td>
</tr>
<tr>
<td>8.4</td>
<td>Soldering heat test</td>
<td>Soldering area: 1/2 of PWB thickness.<br>(PWB: T=1.6mm)<br><br>Soldering temperature: 260±5℃<br>Soldering time: 5±0.5s<br><br>  </td>
<td>Appearance:<br>No abnormality.</td>
</tr>
<tr>
<td>8.5</td>
<td>Solder ability</td>
<td>Lead-tin soldering：<br>Soldering temperature: 245±5℃<br>Soldering time: 5±0.5s<br><br>Lead free soldering：<br>Soldering temperature: 255±5℃<br>Soldering time: 5±0.5s</td>
<td>At least 90% of surface area of immersed portion shall be covered by solder.<br>.</td>
</tr>
<tr>
<td>8.6</td>
<td>Humidity test</td>
<td>(1) Temperature : 60±2℃<br>(2) relative humidity: 90~95% R.H.<br>(3) Duration of test: 96h<br>(4) Take off a drop water<br>(5) Standard conditions after test: 1h</td>
<td>Contact resistance:<br>200mΩ Max<br>Shall meet :<br>No. 6.2 to 6.4<br>No. 7.1 to 7.2</td>
</tr>
</table>

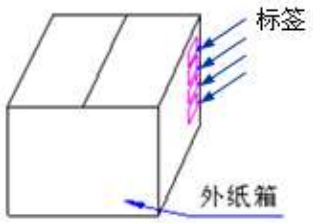
| | | | |
|---|---|---|---|
| 8.7 | Salt Spray | Apply the following environment to test :<br><br>(1) Temperature : 35±5℃<br>(2) Salt water density: 5±1%<br>(3) Duration: 24hours<br>(4) After test, the salt deposit shall be removed by running water. | Appearance:<br>No corrosion spot, no crack, no base plate naked.<br><br>Contact Resistance:<br>200 mΩ Max |
| 8.8 | Withstand $K_2S$ | Apply the following environment to test:<br><br>(1) Temperature: 35±5℃<br>(2) $K_2S$ Density: 2%；<br>(3) Duration: 2 minute. | Appearance:<br>No corrosion spot, no crack, no base plate naked.<br><br>Contact Resistance:<br>200 mΩ Max |

## 9. Packaging

**Operation Force Binning：In groups of 65-75gf、75-85gf、85-95gf**

| Packing Style | Quantity | Notes |
|---|---|---|
| PE bag | 1000PCS. | 1000Pcs/Bag, |
| Inner Carton | 10000PCS. | PE Bag:10 PCS |



## 10.Precautio

### 10.1 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±5℃<br>260±5℃ |
| Time of immersion | 5±0.5s<br>5±0.5s |
| Number of soldering | 2times 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℃±5℃ with 3±0.5s.

### 10.2 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.

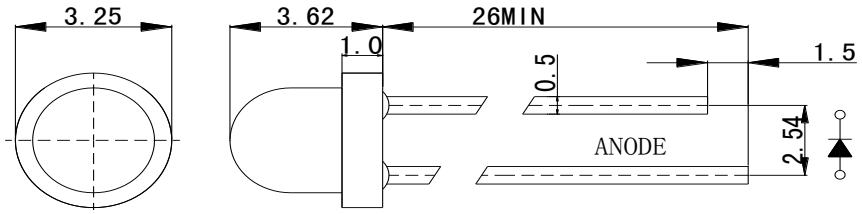
(5) This Product Specification is considered as the technical agreement on product between the receiving customer and Kailh. Any information on Product Catalogue which is in conflict with or different from the corresponding information of this document is considered as invalid.

(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

## ■ Dimensional drawing/尺寸圖

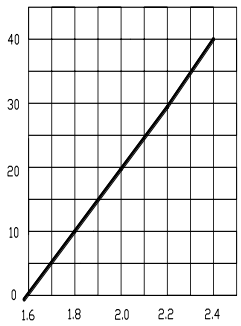



All dimensions are in millimeter/圖中所有尺寸均以毫米爲單位
Tolerance is ±0.25㎜(0.10″)unless otherwise noted/若無特別標注，圖中尺寸公差爲±0.25㎜

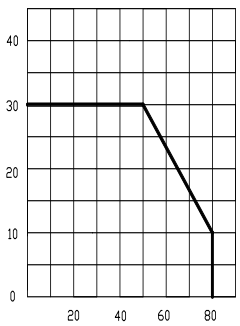
## ■Shape Specification /外觀要求

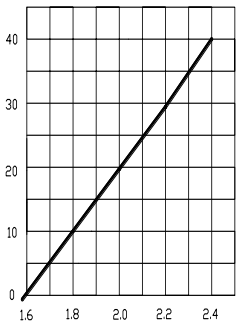
| No.<br>序號 | ITEM<br>項目 | SPEC OR DESCRIPTION<br>規格要求描述 |
|---|---|---|
| 1 | Lens<br>膠體 | ◆ No change color/不可有膠體變色<br>◆ No Disrepair/不可有破損<br>◆ Scratch/劃傷（length ≤2.0㎜, Width≤0.25㎜）<br>◆ macula/黑點、異物（≤0.25㎜ and ≤2EA in Encapsulation reverse）<br>◆ bubble/氣泡（≤0.3㎜ and ≤2EA Encapsulation reverse） |
| 2 | PIN<br>PIN 腳 | ◆ No bottom crook/PIN 尖不可有彎腳<br>◆ No oxidation/不可有氧化<br>◆ No electropolar reverse/不可有切反（極性反） |
| 3 | Configuration<br>結構 | ◆ No Encapsulation reverse/不可封反<br>◆ No PIN loosen/PIN 腳不可鬆動 |
| 4 | surface preparation<br>表面處理 | ◆ Cut needn't electroplate /切口處無需作電鍍 |
| 5 | Lens color<br>膠體顏色 | ◆ 透明 |

## ■Opto-Electronical Characteristics /光電特性

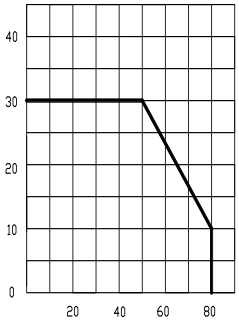


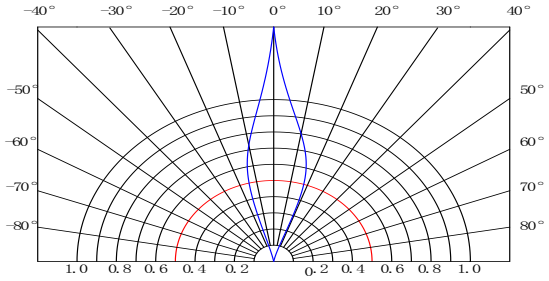

Forward Current vs.Forward Voltage
伏安特性




Maximum Forward Current vs. Ambient Temperature
環境溫度與電流的關係






Lighting Angle / 發光角度:

## ■Absolute maximum ratings/最大絕對額定值

| Parameter<br>參數 | Symbol<br>符號 | Value<br>數值 | Unit<br>單位 |
|---|---|---|---|
| Forward Current<br>正向電流 | If | 20 | mA |
| Reverse Voltage<br>反向電壓 | Vr | 5 | V |
| Operating Temperature<br>工作溫度 | Topr | -25～+85 | ℃ |
| Storage Temperature<br>儲存溫度 | Tstg | -35～+85 | ℃ |
| Soldering temperature<br>焊接溫度 | Tsol | 260±5℃（for5sec） | ℃ |
| Power Dissipation<br>功率消耗 | Pd | 60 | mW |
| Pulse Current<br>脈衝電流 | $I_{FP}$ | 100 | mA |

## ■Opto-Electronical Specification/光電參數規格

| Parameter<br>參數 | Symbol<br>符號 | Min<br>最小值 | Typ<br>平均值 | Max<br>最大值 | Unit<br>單位 | Tolerance<br>误差值 | Test Conditinos<br>測試條件 |
|---|---|---|---|---|---|---|---|
| Forward Voltage<br>正向電壓 | Vf | G:1.8<br>Y:1.8 | -- | 2.4<br>2.4 | V | ± 0.05V | IF/正向電流=20mA<br>Test Temperature<br>測試溫度=25℃ |
| Luminous Intensity<br>發光強度 | IV | G:30<br>Y:100 | -- | 60<br>300 | mcd | ±2mcd | |
| Dominant Wavelength<br>波長 | λ d | G:568<br>Y:588 | -- | 575<br>595 | nm | ±2nm | |
| Chromatic current<br>光譜座標 | X | -- | -- | -- | / | ±0.005 | |
| | Y | -- | -- | -- | / | ±0.005 | |
| Luminous Flux<br>光通量 | Φ | -- | -- | -- | Lm | ±0.1 Lm | |
| Lighting Angle<br>發光角度 | θ | --- | 40 | --- | deg | ±2 | |
| Reverse Current<br>反向電流 | IR | -- | -- | 10 | μA | ±0.1μA | Vr=5V |

## ■Opto-Electronical Grading Specification /光电分级规格

| Forward Voltage<br>正向電壓 | Luminous Intensity<br>發光強度 | Dominant Wavelength<br>波長 | Chromatic current<br>光譜座標 | | Test Conditinos<br>測試條件 |
|---|---|---|---|---|---|
| | | | X | Y | |
| | | | / | / | IF/正向電流=20mA<br>Test Temperature<br>測試溫度=25℃ |

## ■Reliability Test Items/可靠度測試項目

| No. | Item<br>測度項目 | Condition<br>測試條件 | Time/Cycle<br>測試時間或週期 | Number of Damaged<br>不良數/測試數 |
|---|---|---|---|---|
| 1. | Soldering Heat Test<br>焊接試驗 | 260±5°C | 10 sec | 0/60 |
| 2 | Thermal Shock<br>熱衝擊 | 0°C (15sec) ~ 100 oC(15sec) | 20 cycle | 0/60 |
| 3 | High Temp. Storage<br>高溫儲存 | 100°C | 1000Hrs | 0/60 |
| 4 | Low Temp. Storage<br>低溫儲存 | -40°C | 1000Hrs | 0/60 |
| 5 | Temperature Cycle Test<br>高低溫循环 | -40°C ~ 80°C | 100 Cycles, 200 Hrs | 0/60 |
| 6 | High Temp. High Humidity Test<br>高溫高濕 | 60°C, 90 % RH | 1000 Hrs | 0/60 |
| 7 | Operation Life Test 1<br>常溫老化 | Room Temp., 20mA | 1000 Hrs | 0/60 |
| 8 | Operation Life Test 2<br>常溫老化 | Room Temp., 30mA | 500 Hrs | 0/60 |
| 9 | High Temp. Operation Life Test<br>高溫老化 | 85°C , 5mA | 1000 Hrs | 0/60 |
| 10 | Low Temp. Operation Life Test<br>低溫老化 | -30°C , 20mA | 1000 Hrs | 0/60 |

Judgment Criteria/判定標準：

| **Item<br>項目** | **Symbol** | **Test Conditions** | **Judgment Criteria** |
|---|---|---|---|
| **Forward Voltage<br>正向電壓** | **Vf** | **$I_F$ = 20 mA** | **Δ% < 10 %** |
| **Leakage Current<br>反向漏電流** | **Ir** | **Vr = 5V** | **< 10 uA** |
| **Luminous Intensity<br>發光強度** | **Iv** | **$I_F$ = 20 mA** | **Δ% <30 %** |
| **Luminous Flux<br>光通量** | **lm** | **$I_F$ = 20 mA** | Δ%<30 % |

## ■Caution/注意事項

1、 After open the package, the LED should be kept at 25℃, 65 % RH environment or less.

打開包裝後請在溫度 25±3 ℃ 濕度 65±5%的環境下使用。

2、The LED should be soldered within 48 hours ( 2 days ) after opening the package.

打開包裝後請在 48 小時內作焊接.

3、The LAMP LED is an ESD sensitive device. All the equipment and machine must be properly grounded.

LED 是靜電敏感器件，使用時所有設備、機構都需有適當的接地導電措施。

4、when make use of it,please use static-free container,operator showld ware antistatic clothes and rope-satic-ring also should make effective ground.

使用時請使用防靜電的盛裝容器，作業人員應穿著防靜電服裝及佩戴有繩之靜電環並作有效接地。

5、Damaged device will appear some symptoms,lower forward voltage,higher leak current,or even short curcuit

受靜電與突波破壞之 LED 的電性特性上，會有明顯的漏電流，或驅動電壓明顯變低，甚至是短路現象。

6、It’s unsuitable for circumfluence soldering

本產品不適合作回流焊接。

7、ferrochromium soldering :power keep no more than 40W,tip temperature should not pass 280℃,soldering time within 3 second, welding position and lens should keep 1.6mm distance at least

鉻鐵焊接時鉻鐵功率不要超過 40W，尖端溫度不要超過 280℃，焊接時間不要超過 3 秒，焊接位置最少與膠體保持 1.6mm 距離。

8、wave-soldering: temperature should not pass 265℃, soldering time within 5 second, welding position and lens should keep 1.6mm distance at least

波峰焊接時溫度不超過 265℃，焊接時間不要超過 5 秒，焊接位置最少與膠體保持 1.6mm 距離。

9、After soldering the LED should keep out off any shake or outer force before it come to normal tempreture

在焊接溫度回到正常以前，必須避免使 LED 受到任何震動或外力。

10、when shaped pin should used tong or by professional staff ,keep 2mm at least between lens and bend pin, the pin should been shaped before soldering..

引腳成形必須使用夾具或由專業人員來完成，離膠體最少 2mm 才能彎折引腳，並請在焊接前完成引腳成形。

11、the pin can’t not be press in high temperature, cut pin in room temperature because in high temperature LED may fail

高溫時，不可對引腳施壓，請在室溫時裁切引腳，高溫時裁切可能會造成 LED 失效。

12、after shape ,pin space should keep in line with the PCB board space

引腳成形後必須保證引腳間距和線路板上一致。

13、LED is one-way continuity, please check electrode before mount, if amount wrong ,the LED chip will damage or fail when LED applied voltage

單嚮導通性，安裝前確認極性，若裝反，在施加電壓時容易造成 LED 晶片損傷或失效。

14、ordinary our LED the long pin is anode ,shot pin is cathode, lens without gap is anode ,with gap is cathode.unless other special require and note

通常在無特別要求或提示下，我們提供的 LAMP LED 的長腳爲正極，短腳爲負極。膠體無缺口的一端爲正極，有缺口的一端爲負極。

15、please design the PCB board to keep a distance between LED and other emit heat component

線路設計時，請不要將 LED 與發熱元件靠得過近。

16、strongly recommend design the board according setting current other than setting voltage .if you are really need setting voltage type please consider there may cause influence arise by difference voltage of difference LED

電路設計上，建議以定電流設計，若爲定電壓設計，請考慮 LED 之間不同正向電壓所可能造成之影響。

17、the outer voltage change will bring the current index change .unsuitable design and current control,easy cause LED fail .for example excess current will cause LED life short or even burn down , too little electricity will cause lacking light

LED 之外加電壓變化，會造成電流指數級變化，不當之設計與電流控制，易造成 LED 失效，如電流過大引起壽命問題甚至燒毀，電流過小引起亮度不足。

18、If you need make difference BIN LED in the one module .please confirm whether it can meet the electric and optics characteristic require such as the current balance, emitting and brightness consistency.

不同 BIN 號之 LED 需安裝在同一個組件時，請先確認是否可滿足相關電氣及光學之特性要求，如電流是否均衡，光色、亮度的一致性等。