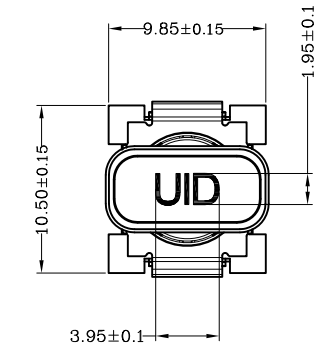
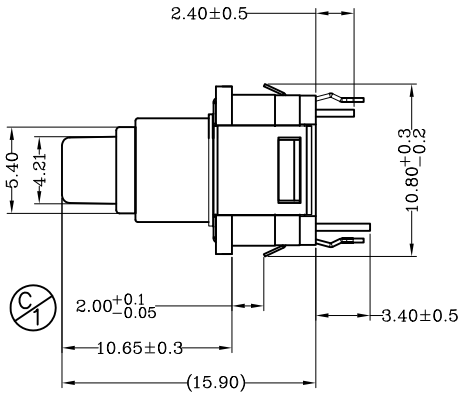
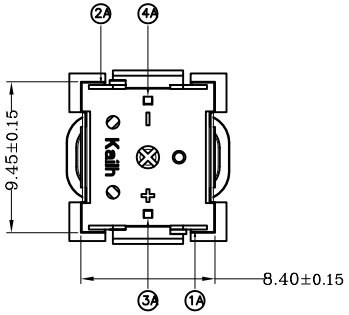
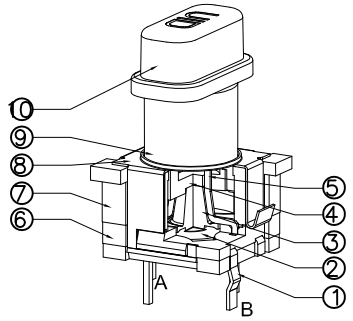
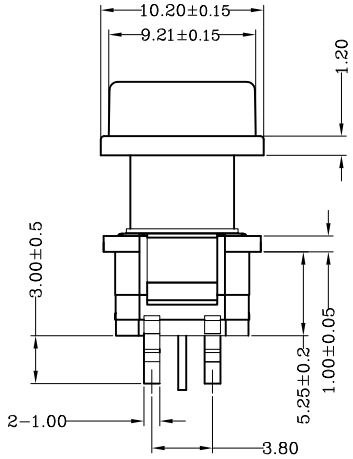
ABIDE BY WEEE & ROHS

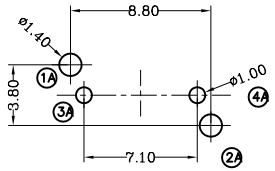




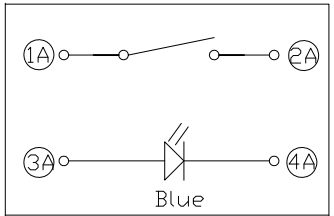








Recommend PCB layout



circuit diagram

■ Specification :

- 1.Rated voltage: DC.12V 50mA;
- 2.Contact Resistance: 100mΩ(Max);
- 3.Insulation resistance: 100MΩ(Min)
- 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

最大額定(Absolute Maximum Ratings)…(Ta=25℃)			
Parameter	Symbol	Rating	Unit
Power Dissipation	Pd	105	mW
Forward Current	I_F	30	mW
Peak Forward Current	I_{FP}	150	mW
Reverse Voltage	V_R	5	V
Operating Temperature	Topr	-40℃~85℃	
Storage Temperature	Tstg	-40℃~85℃	
Soldering Temperature	Tsol	260℃(for 5 seconds)	
1Condition for IFP is pulse of 1/10 duty and 0.1msec width.			

Electrical and optical characteristics(Ta=25℃)							
Parameter	Symbol	Condition	Min	Typ	Max	Finished lamp	Unit
Forward Voltage	V_F	IF=20mA	2.8		3.5		V
Luminous Intensity	IV	I_F=20mA	188		700	198-470	mcd
Reverse Current	I_R	V_R=5V			10		UA
Peak Wave Length	λp	I_F=20mA					nm
Dominant Wave Length	λd	I_F=20mA	465		470	465-470	nm
Spectral Line Half-width	Δλ	I_F=20mA		30			nm
Viewing Angle	$2\theta_{1/2}$	I_F=20mA		90			deg

ITEM	PART NAME	TER'NO.	QTY.	MATERIAL	FINISHING	REMARK
10	KNOB	——	1pcs	PC	Transparent	——
9	Keystoke	——	1pcs	PC	Transparent	——
8	Shell	——	1pcs	Stainless Steel	——	——
7	Cover	——	1pcs	PA10T	Black	——
6	Base	——	1pcs	PA10T	Black	——
5	LED	——	1pcs	ø2.8mm Super Bright Blue LED		——
4	Pad	——	1pcs	LCP	Black	——
3	Rubber pad	——	1pcs	Rubber	Gray	——
2	Contact	——	1pcs	Stainless Steel	Plating Au(4u")	——
1	Terminal	A.B	2pcs	Brass	Plating Au(3u")	——

ECN NO.	REV.	DATE.	DESCRIPTION.	CHANGE.	CHECK.	APPRO.
ECN-2007-13	C	2020.07.20	Dimension 1.9 changed to 2.0 ⑥1	JIN		
ECN-1501-02	B	2015.1.13	Adjust dimensional tolerance	ZHJ		
——	A	——	NEW	——	——	——

APPROVALS		DATE
DRAWN	ZHJ	2014.10.09
CHECKED		
APPROVALS		

东莞市凯华电子有限公司
KAIHUA ELECTRONICS CO.,LTD

TOLERANCES ARE: 30<L ±0.30; 10<L≦30 ±0.20; 5<L≦10 ±0.15; L≦5 ±0.10; ANGLE ±2°

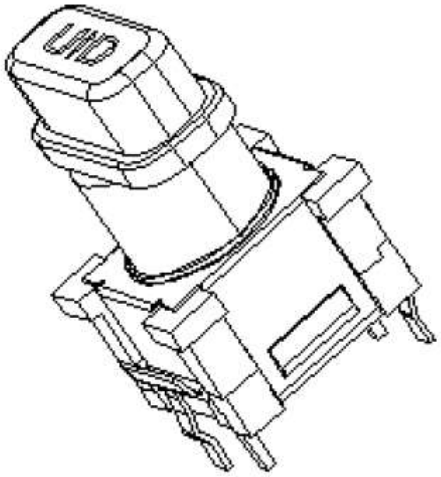
TITLE:	LA9313 LAMP SWITCH	
PART NO:	CLA931301D17B	
UNIT: mm	SCALE: 1:1	PROJ:
DRAWING NO.	KHA-LA9313-022EN	SHEET: 1OF1

凯华电子 Kailh KAIHUA ELECTRONICS

Document Number:

KH-PS1707-37

Product Specification



P/N: **CLA931301D17B**

Title : **Lamp Switch**

Rev.	ECN	Release and Revision Description:	Prepared By /Date:	Checked By/Date:	Approved By/Date:
A	— —	New releasing	HQC 2017/05/20	LPH 2017/05/20	ZJJ 2017/05/20
B	------	Increase vibration resistance	QK 2023.03.01	LPH2023.03.01	ZJJ 2023.03.01

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

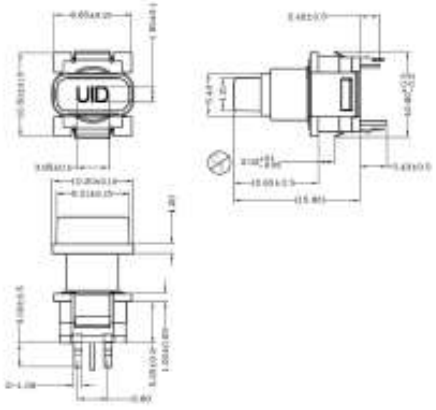
Normal Condition:

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；

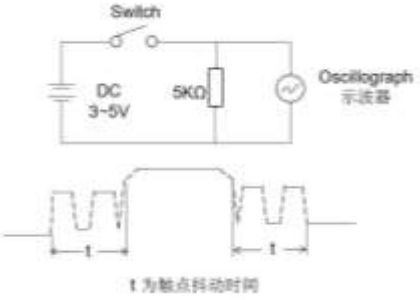
4. Rated Performance Requirements:

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

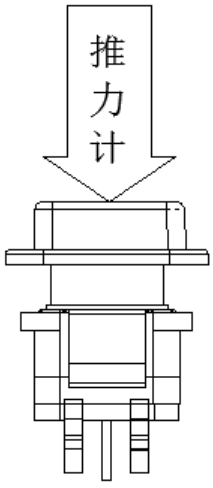
5. Profile Dimensions :

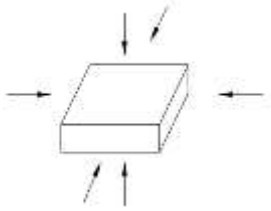


6. Electrical Performance:

Item	Description	Test Condition	Requirement
6.1	Contact Resistance	Static load: (Operation force)x2, which is applied on the center of Switch stem. Be measured when the switch contact stabilization. Measurement tool: Contact resistance Meter. (1KHz, 20mV,5~50mA) 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. (1) Between terminals. (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. (1) Between terminals. (2) Between terminal and Body.	No evidence of breakdown.
6.4	Bouncing	Operation speed：3~4 times/s Oscilloscope Switch Bouncing Test Circuit. 	Before Life cycle: On:5ms MAX Off: 5ms MAX After Life cycle: On:10ms MAX 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: (1) Acceleration: 80g accelerated speed (2) Cycles of test:3 cycles each in 6 directions, for a total of 18 cycles. . 	Shall meet No.6，7.1，7.2
7.6	Life Test	(1) 1 Weight:800gf (2) Operation speed：60cycles/min (3) Push force：Maximum value of operation force. (4) Cycles：25,000 times Min	Contact resistance: 500Ω Max Bouncing：10ms Max Operation force and tactile force：Variation rate within ±30%

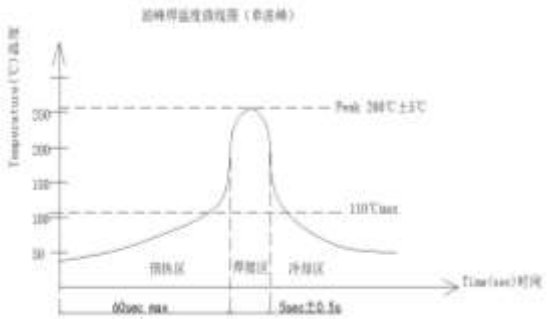
8. Environmental Performance:

Item	Description	Test Cond ion	Requirement
8.1	Cold test	(1) Temperature : - 20±2℃ (2) Duration of test: 96h (3) Take off a drop water (4) Standard conditions after test : 1	Contact resistance: 200mΩ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2
8.2	Heat test	(1) Temperature : 80±2℃ (2) Duration of test: 96h (3) Take off a drop water (4) Standard conditions after test : 1h	Contact resistance: 200mΩ Max Shall meet : No. 6.2 to 6.4 No. 7.1 to 7.2

<table>
<tr>
<td>8.3</td>
<td>Temperature cycle</td>
<td>(1) Test cycles: 5 cycles
(2) Standard condition after test:1h

<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>80±5℃</td><td>1</td></tr>
</table>
</td>
<td>Contact resistance:
200mΩ Max
Shall meet :
No. 6.2 to 6.4
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.
(PWB: T=1.6mm)

Soldering temperature: 260±5℃
Soldering time: 5±0.5s

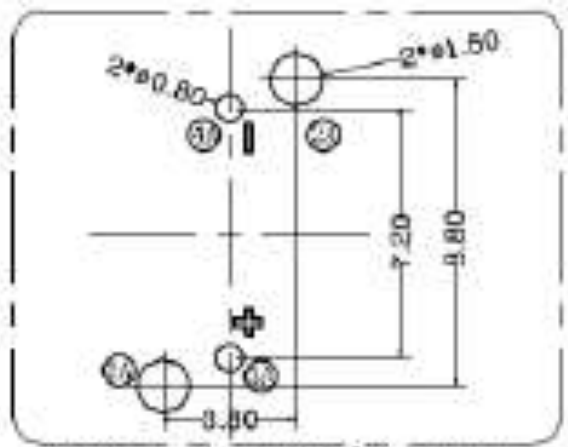
  </td>
<td>Appearance:
No abnormality.</td>
</tr>
<tr>
<td>8.5</td>
<td>Solder ability</td>
<td>Lead-tin soldering：
Soldering temperature: 245±5℃
Soldering time: 5±0.5s

Lead free soldering：
Soldering temperature: 255±5℃
Soldering time: 5±0.5s</td>
<td>At least 90% of surface area of immersed portion shall be covered by solder.
.</td>
</tr>
<tr>
<td>8.6</td>
<td>Humidity test</td>
<td>(1) Temperature : 60±2℃
(2) relative humidity: 90~95% R.H.
(3) Duration of test: 96h
(4) Take off a drop water
(5) Standard conditions after test: 1h</td>
<td>Contact resistance:
200mΩ Max
Shall meet :
No. 6.2 to 6.4
No. 7.1 to 7.2</td>
</tr>
</table>

8.7	Salt Spray	Apply the following environment to test : (1) Temperature : 35±5℃ (2) Salt water density: 5±1% (3) Duration: 24hours (4) After test, the salt deposit shall be removed by running water.	Appearance: No corrosion spot, no crack, no base plate naked. Contact Resistance: 200 mΩ Max
8.8	Withstand K_2S	Apply the following environment to test: (1) Temperature: Natural (2) K_2S Density: 2%； (3) Duration: 2 minute.	Appearance: No corrosion spot, no crack, no base plate naked. Contact Resistance: 200 mΩ Max
8.9	Vibration tes	1) Amplitude: 1.5 mm 2) Sweep rate: 10-55-10HZ for 1 minute 3) Sweep method: Logarithmic frequency sweep rate 4) Vibration direction : X, Y, Z(3 directions) 5) Time : Each direction 2 hours (Total 6 hours)	Shall meet No.6，7.1，7.2

9. Recommended PCB Layout

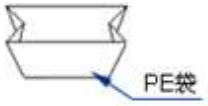
(Top View) (Single face board T=1.6mm)

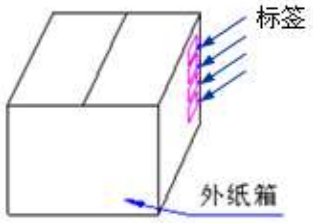


Recommended PCB Layout
(Pattern Side)Tolerance:±0.05mm

10. Packaging

Packaging type: PE Bag, 500Pcs/Bag, 5000Pcs/Outer Carton.





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℃ 260±5℃
Time of immersion	5±0.5s 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

LED SPECIFICATION

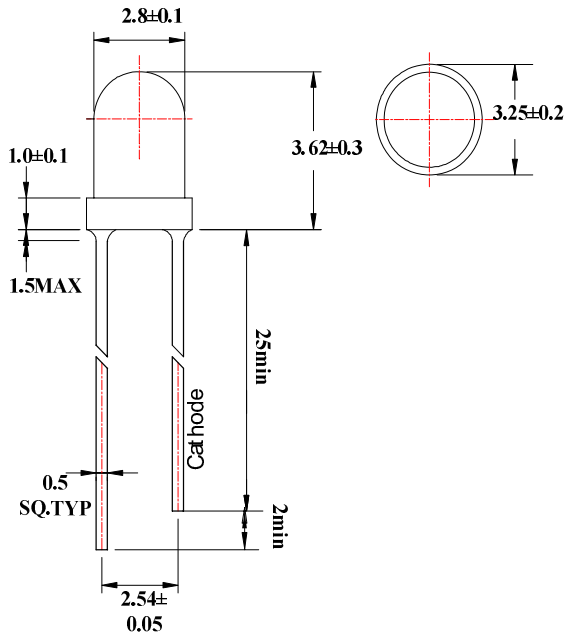
特点(Features):

1. 芯片材料(Chip material): SiC
2. 发光颜色(Emitted color): Blue
3. 透镜外表(Lens Appearance Water Clear
4. 低耗能(Low power consumption)
5. 高效率(High efficiency.)
6. 低电流(Low current requirement).

应用(Applications):

1. 电视机(TV set)
2. 监视器(Monitor)
3. 电话(Telephone)
4. 计算机(Computer)
5. 电路板(Circuit board)

● Package dimensions:



Notes:

1. All dimensions are in millimeters
2. Tolerance is ±0.25mm (0.01") unless otherwise specified.
3. Lead spacing is measured where the leads emerge from the package.
4. Specifications are subject to change without notice.

● **最大额定**(Absolute Maximum Ratings)…(Ta=25℃)

Parameter	Symbol	Rating	Unit
功率消耗(Power Dissipation)	Pd	105	mW
顺向电流(Forward Current)	I_F	30	mA
峰值电流(Peak Forward Current*[1])	I_{FP}	150	mA
逆向电压(Reverse Voltage)	V_R	5	V
操作溫度(Operating Temperature)	Topr	-40℃~85℃	
保存溫度(Storage Temperature)	Tstg	-40℃~85℃	
焊接溫度(Soldering Temperature)	Tsol	260℃(for 5 seconds)	

*1Condition for IFP is pulse of 1/10 duty and 0.1msec width.

● Electrical and optical characteristics(Ta=25℃)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	I_F=20mA	2.8		3.6	V
Luminous Intensity	Iv	I_F=20mA	400		500	mcd
Reverse Current	I_R	V_R=5V	-		10	μA
Dominant Wave Length	λd	I_F=20mA	465		470	nm
Spectral Line Half-width	Δ λ	I_F=20mA	-		10	nm
Viewing Angle	$2\theta_{1/2}$	I_F=20mA		30		deg

● Typical Electro-Optical Characteristics Curves

Fig.1 Relative intensity Vs. Wavelength@20mATa=25℃)

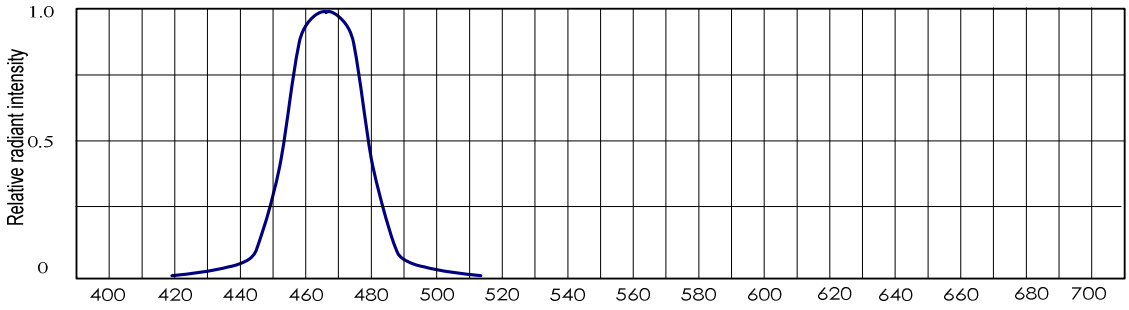


Fig.2 Forward current Vs. Forward voltage

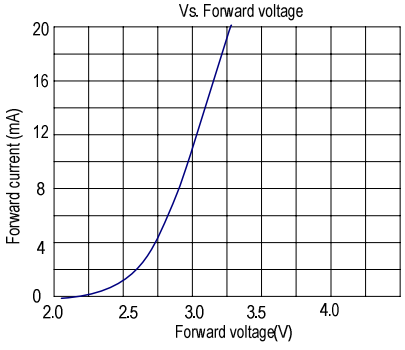


Fig.3 Relative luminous intensity Vs. Forward current

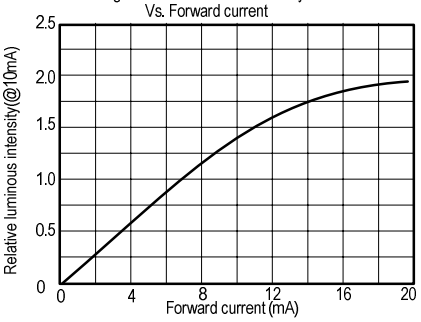


Fig.6 Radiation diagram

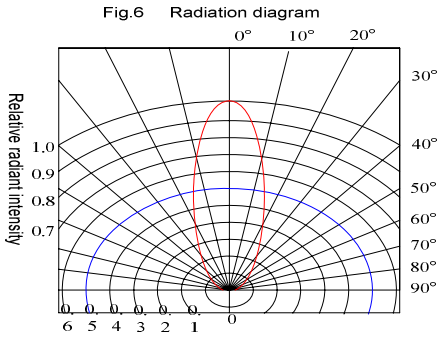


Fig.5 Forward current derating curve Vs. Ambient temperature

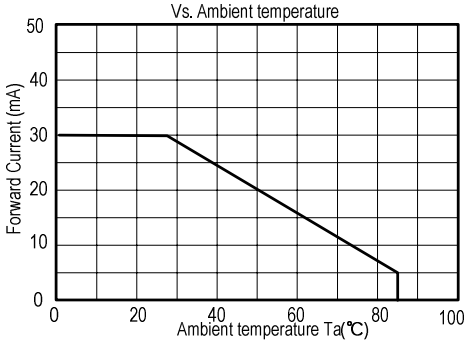
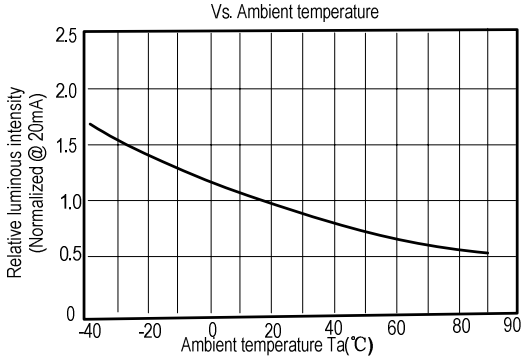


Fig.4 Relative luminous intensity Vs. Ambient temperature



● Reliability Test

Classification	Test Item	Reference Standard	Test Conditions
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS-C-7021 :B-1	Connect with a power If=20mA Ta=Under room temperature Test time=1,000hrs
	High Temperature	MIL-STD-202:103B JIS-C-7021 :B-11	Ta=+65℃±5℃ RH=90%-95%
	High Humidity Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	Test time=240hrs
	High	MIL-STD-883:1008	High Ta=+85℃±5℃
	Temperature Storage	JIS-C-7021 :B-10	Test time=1,000hrs
	Low Temperature Storage	JIS-C-7021 :B-12	Low Ta=-35℃±5℃ Test time=1,000hrs
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS-C-7021 :A-4	-35℃ ~ +25℃ ~ +85℃ ~ +25℃ 60min 20min 60min 20min Test Time=5cycle
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	35℃±5℃ ~+85℃±5℃ 20min 20min
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS-C-7021 :A-1	Preheating：140℃-160℃,within 2 minutes. Operation heating： 260℃(Max.), within 5seconds. (Max.)

Judgment criteria of failure for the reliability

Measuring items	Symbol	Measuring conditions
Forward voltage	VF (V)	IF=20mA
Reverse current	IR(uA)	VR=5V
Luminous intensity	Iv (mcd)	IF=20mA

Notes:

1. U means the upper limit of specified characteristics. S means initial value.
2. Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

● Notes for designing:

Care must be taken to provide the current limiting resistor in the circuit so as to drive the TOPTEN LEDs within the rated figures. Also, caution should be taken not to overload TOPTEN LEDs with instantaneous voltage at the turning ON and OFF of the circuit.

When using the pulse drive care must be taken to keep the average current within the rated figures. Also, the circuit should be designed so as be subjected to reverse voltage when turning off the TOPTEN LEDs.

● Storage:

In order to avoid the absorption of moisture, it is recommended to solder TOPTEN LEDs as soon as possible after unpacking the sealed envelope.

If the envelope is still packed, to store it in the environment as following:

(1) Temperature : 5℃-30℃(41℉)Humidity : RH 60% Max.

(2) After this bag is opened, devices that will be applied to infrared reflow, vapor-phase reflow, or equivalent soldering process must be:

a. Completed within 24 hours.

b. Stored at less than 30% RH.

(3) Devices require baking before mounting, if:

(2) a or (2) b is not met.

(4) If baking is required, devices must be baked under below conditions:

12 hours at 60℃±3℃.

● Package and Label of Products:

(1) Package: Products are packed in one bag of 1000PCS (one taping reel) and a label is attached on each bag.

(2) Label: