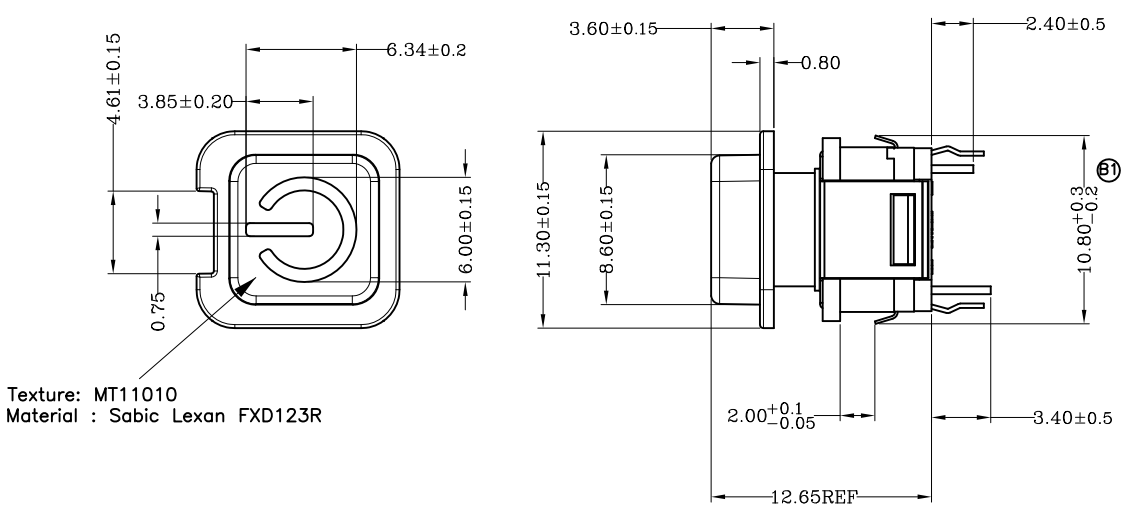
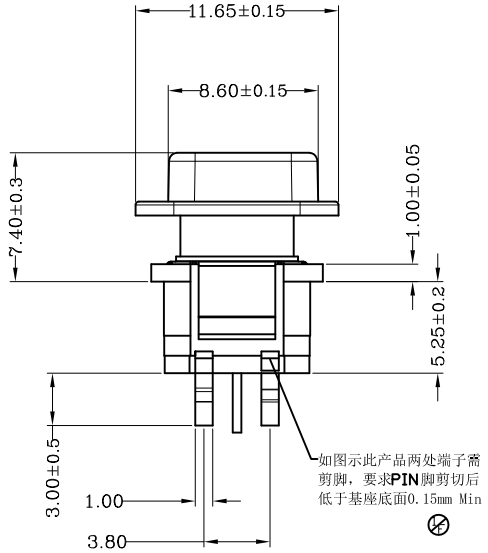
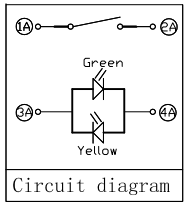
ABIDE BY WEEE & ROHS







Circuit diagram

■ Specification :
- 1.Rated voltage: DC.12V 50mA;
- 2.Contact Resistance: 100mΩ(Max);
- 3.Insulation resistance: 100MΩ(Min) DC250V;
- 4.Dielectric strength: AC250V(50-60Hz)for 1 minute;
- 5.Operation force:650±100gf;
- 6.Life Test :25,000 Cycles(min);
- 7.Travel closure:1.20±0.25mm;
- 8.Operation Type:Touch Restore;

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

ECN NO.	REV.	DATE.	DESCRIPTION.	CHANGE.	CHECK.	APPRO.
ECN-2305-027	F	2023.05.19	Non-functional pins are 0.15mm below base base after shearing	QK		
ECN-2205-05	E	2022.05.05	The size of 4.74mm was chenanged .	QK		
ECN-2204-04	D	2022.04.01	Changed the operating force of the product from 450gf to 650gf.	QK		
ECN-2007-13	C	2020.07.20	Shell dimension change to 2.0 from 1.9	JIN		
ECN-1901-01	B	2019.01.03	Adjusting dimensional tolerance	ZhangHuiJun		
——	A	——	NEW	——	——	——

APPROVALS		DATE
DRAWN	Zhanghuijun	2014.07.03
CHECKED		
APPROVALS		

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

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

TITLE:	LA9313 LAMP SWITCH
PART NO:	CLA931301D4O-HF
UNIT: mm	SCALE: 1:1 PROJ:
DRAWING NO.	KHA-LA9313-021EN
	SHEET: 1OF1

凯华电子 Kailh KAIHUA ELECTRONICS

Document Number:

KH-PS2404-07

Product Specification

P/N: CLA931301D49			Title : Lamp Switch		
Rev.	ECN	Release and Revision Description:	Prepared By /Date:	Checked By/Date:	Approved By/Date:
A	— —	New releasing	HQC 2024/05/20	LPH 2024/05/20	ZJJ 2024/05/20

Content

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4. Rated Performance Requirements: 3
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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

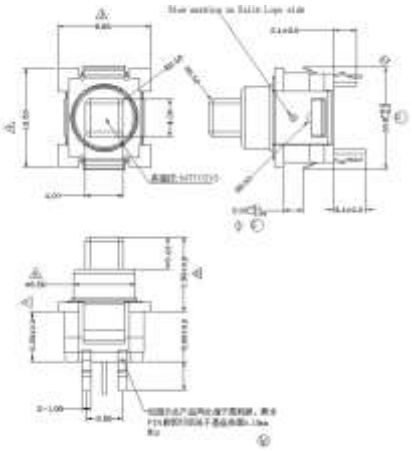
Normal Condition:

Ambient temperature：	20±5
Relative humidity：	65%±5% R.H.；
Air pressure ：	86~101KPa;
Contact Resistance：	100 mΩ Max；
Operation Force：	650±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；

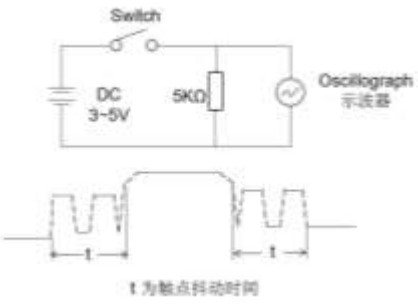
4. Rated Performance Requirements:

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

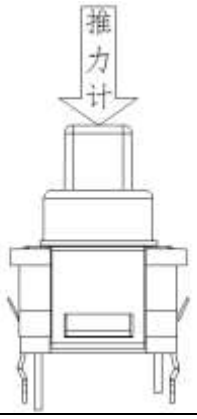
5. Profile Dimensions :

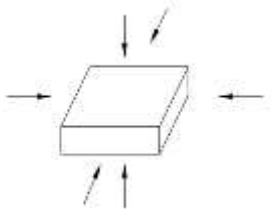


6. Electrical Performance:

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.	650±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:1000gf (2) Operation speed：60cycles/min (3) Push force：Maximum value of operation force. (4) Cycles：25,000 times Min	Contact resistance: 1000Ω Max Bouncing：10ms Max Operation force and tactile force：Variation rate within ±30%

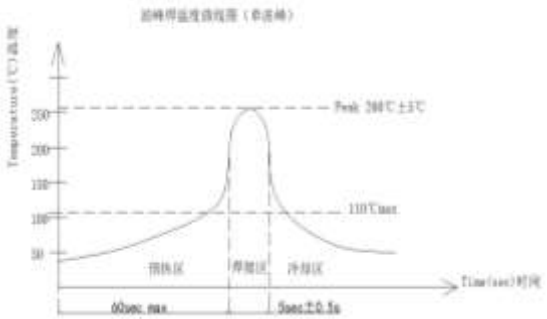
8. Environmental Performance:

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 : 70±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>70±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

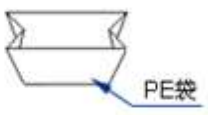
Lead free soldering：
Soldering temperature: 255±5℃
Soldering time: 5±0.5s</td>
<td>At least 90% of surface area of immersed portion shall be covered by solder.
.</td>
</tr>
<tr>
<td>8.6</td>
<td>Humidity test</td>
<td>(1) Temperature : 60±2℃
(2) relative humidity: 90~95% R.H.
(3) Duration of test: 96h
(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>

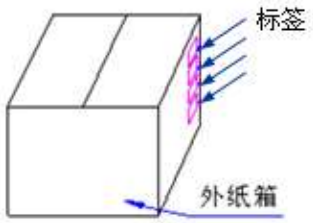
8.7	Salt Spray	Apply the following environment to test : (1) Temperature : 35±5℃ (2) Salt water density: 5±1% (3) Duration: 24hours (4) After test, the salt deposit shall be removed by running water.	Appearance: No corrosion spot, no crack, no base plate naked. Contact Resistance: 200 mΩ Max
8.8	Withstand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

9. Packaging

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

Packing Style 包装类型	Quantity 数量	Notes 说明
PE bag PE 袋	1000PCS.	1000Pcs/Bag,
外纸箱 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℃ 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

●最大額定(Absolute Maximum Ratings)…(Ta=25℃)

Parameter	Symbol	Rating	Unit
功率消耗(Power Dissipation)	Pd	50	mW
顺向电流(Forward Current)	I_F	20	mA
峰值电流(Peak Forward Current*[1])	I_{FP}	100	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	Y G	1.8 1.8		2.4 2.4	V
Luminous Intensity	Iv	I_F=20mA	Y G	300 30	500 50	- -	mcd
Reverse Current	I_R	V_R=5V	Y G			5 5	μA
Peak Wave Length	λp	I_F=20mA	Y G	/ /	590.0 575.0	/ /	nm
Dominant Wave Length	λd	I_F=20mA	Y G	588 565		600 575	nm
Spectral Line Half-width	Δλ	I_F=20mA	Y G	/ /	10.0 10.0	/ /	nm
Viewing Angle	$2\theta_{1/2}$	I_F=20mA			20.0		deg

● Typical Electro-Optical Characteristics Curves

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

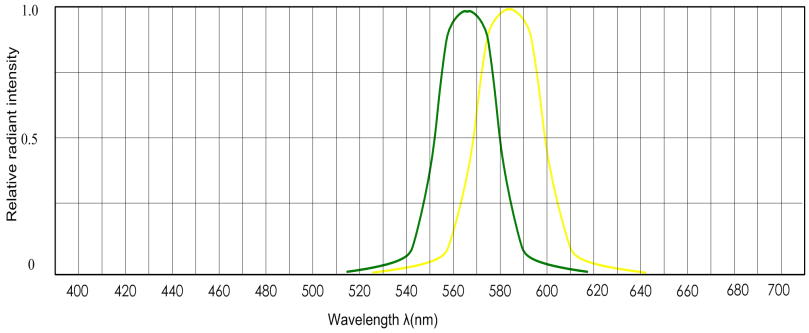


Fig.2 Forward current
Vs. Forward voltage

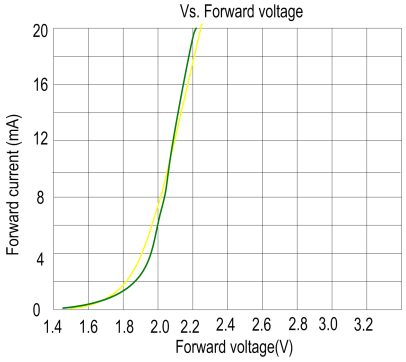


Fig.3 Relative luminous intensity
Vs. Forward current

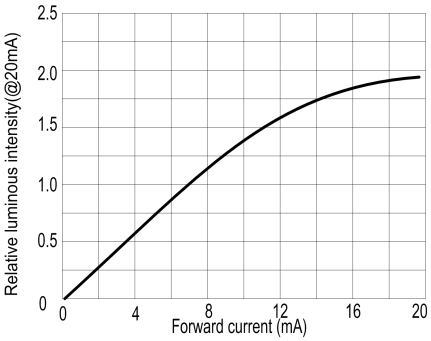


Fig.4 Relative luminous intensity
Vs. Ambient temperature

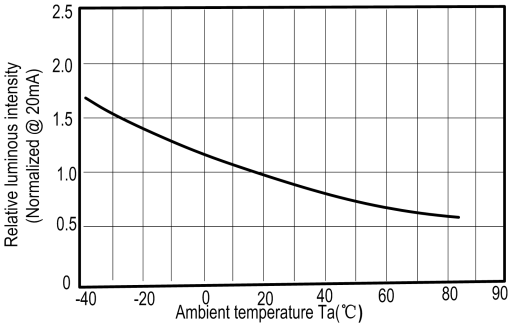


Fig.5 Forward current derating curve
Vs. Ambient temperature

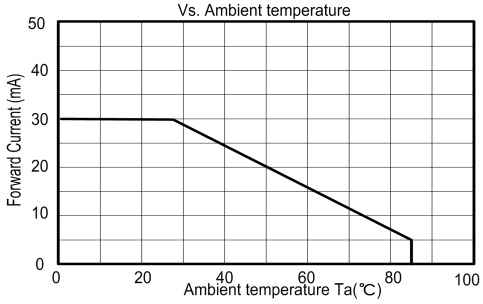
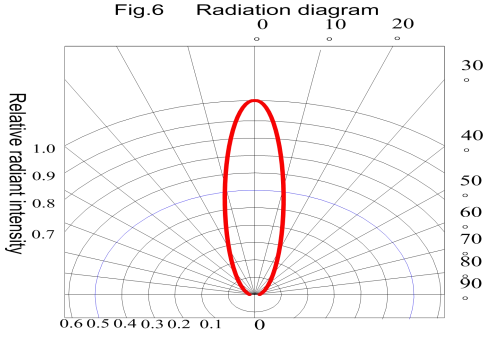


Fig.6 Radiation diagram



● Reliability Test

Classification	Classification	Reference Standard	Test Conditions	Result
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	0/40
	High Temperature Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	High Ta=+85℃±5℃ Test time=240hrs	0/40
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS-C-7021 :B-11	Ta=+65℃±5℃ RH=90%-95% Test time=240hrs	0/40
	Low Temperature Storage	JIS-C-7021 :B-12	Low Ta= -40℃±5℃ Test time=1,000hrs	0/40
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS-C-7021 :A-4	-40℃/60min ~+25℃/20min ~ +85℃/60min ~ +25℃/20min Test Time=5cycle	0/40
	Composite Temperature/ Humidity Cycle Test	IEC60068-2-38	**Temp(°C) Humidity(RH) Soak time(hr)** 25~65 93+/-3% 1.5~2.5 65 93+/-3% 3 65~25 80~96% 1.5~2.5 25~65 93+/-3% 1.5~2.5 65 93+/-3% 3 65~25 80~96% 1.5~2.5 25 93+/-3% 1~2 25~-10 NA 0.5 -10 NA 3 -10~25 NA 1.5 25 93+/-3% 1.5 Number of cycles: 10 (Short term reliability) Number of cycles: 21 (Long term reliability)	0/40
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	-40℃±5℃/30min ~+85℃±5℃/30min Test Time=25cycle	0/40
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS-C-7021 :A-1	Preheating：140℃-160℃,within 2 minutes. Operation heating： 270℃(Max.), within 10seconds. (Max.)	0/40

● Judgment criteria of failure for the reliability

Measuring items	Symbol	Measuring conditions	Judgement criteia for failure
Forward voltage	VF (V)	IF=20mA	Over UX1.2
Reverse current	IR(uA)	VR=5V	Over UX1.2
Luminous intensity	Iv (mcd)	IF=20mA	Below SX0.5

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 QXY LEDs within the rated figures. Also, caution should be taken not to overload QXY 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 QXY LEDs.

● Storage:

In order to avoid the absorption of moisture, it is recommended to solder QXY 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.

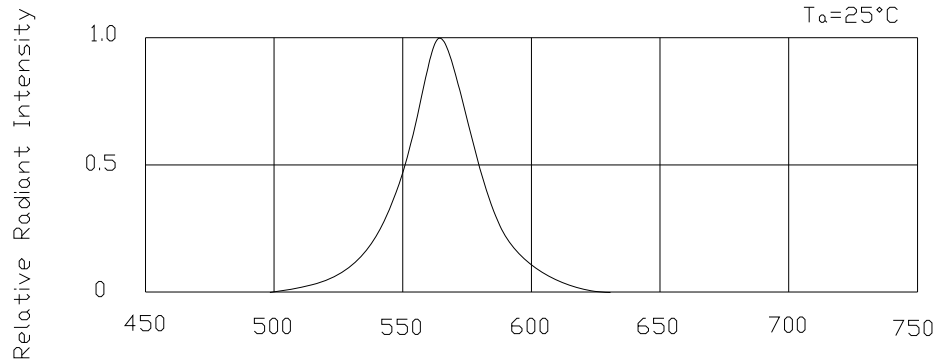
(3) Devices require baking before mounting, if:

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

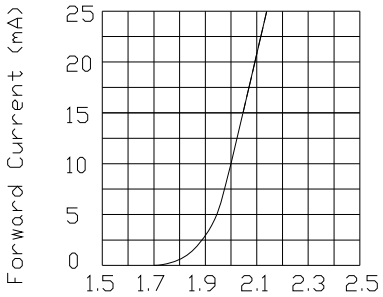
(4) If baking is required, devices must be baked under below conditions:

12 hours at 60℃±3℃.

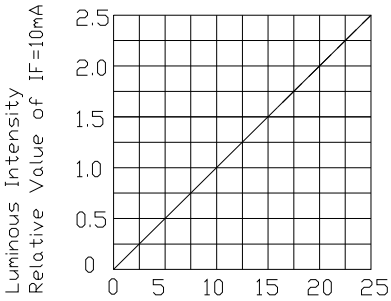
Optical Characteristic Curves (Yellow-Green)



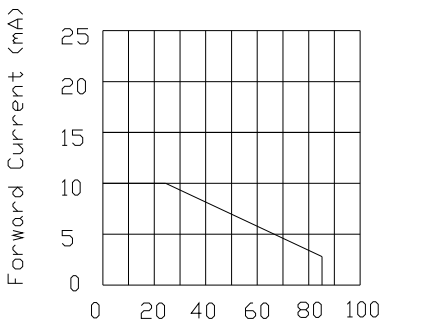
RELATIVE INTENSITY Vs.WAVELENGTH



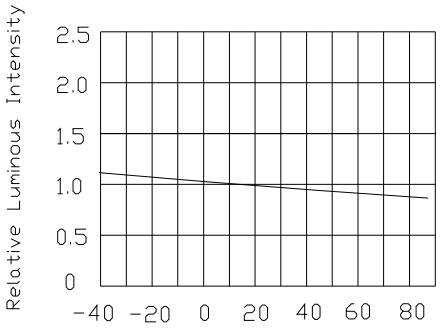
FORWARD CURRENT Vs.
FORWARD VOLTAGE



LUMINOUS INTENSITY Vs.
FORWARD CURRENT



FORWARD CURRENT
DERATING CURE



LUMINOUS INTENSITY Vs.
AMBIENT TEMPERATURE

Precautions in Use

1. Soldering Condition

a. When soldering, leave the minimum clearance between the bottom of the resin and the soldering point.

b. Do not solder closer than 3mm from the base of the epoxy bulb.

c. Maximum allowance soldering conditions are:
Dip Soldering: 260℃ max., 5 sec Max., 1 time.
Soldering iron: 350℃ max., 5 sec Max., 1 time

d. Contact between molten solder and the resin shall be avoided.

e. During soldering, do not put any stress on the lead frame, particularly when heated.

2. Lead frame Forming and Use

a. When forming leads, the leads shall be bent at a point at least 3mm from the base of epoxy bulb. Do not use the base of the lead frame as a fulcrum during lead forming.

b. Lead forming shall be done before soldering.

c. Do not apply any bending stress to the base of the lead. The stress to the base may damage the LED's characteristics or it may break the LED.

d. When mounting the LED onto a printed circuit board, the holes on the PCB shall be exactly aligned with the leads of the LED. If the LED is mounted with stress at the leads, it may cause deterioration of the epoxy resin and this may degrade the LED.

e. Avoid condition which may cause the LED to corrode, tarnish or discolor. This corrosion or discoloration may cause difficulty during soldering operation. It is recommended that the LED be used as soon as possible.

f. Avoid rapid transition in ambient temperature, especially in high humidity environment.

3. Static Electricity

a. The product is sensitive to static electricity charge, and user is required to handle it with care. Particularly, if a current and/or voltage which exceed the Absolute Maximum Rating of the Product is applied, the overflow in energy may cause damage to, or possibly result in electrical destruction of, the LED. The customer is requested to take adequate countermeasure against static electricity charge and surge when handling it.

b. Proper grounding, use of conductive mat, conductive working uniform and shoes, and conductive containers are effective against static electricity and surge.

c. Ground low-resistance area where the product contacts, such as metal surface of the work platform, with a conductive mat (surface resistance $10^6 \sim 10^9$ohm).

d. A tip of soldering iron is requested to be grounded. An ionizer shall also be installed where risk of static generation is high.

Notes:

1. The above specification and dimensions may be modified for product improvement. Inhere reserves the right to change the specification without notice.
2. When using this product, please observe the Absolute Maximum Ratings and the instructions in the specification sheets. Inhere assumes no responsibility for any damage resulting from use of the product that does not comply with the instructions.