



## 承認書

### Specification For Approval

Customer: (客戶)

Description: (產品描述) SMD5050灯珠RGB 0.6W

Part number: (產品型號) TJ-S5050UG6W5TLCBRG-A5

Date: (日期)

Approved By: (客戶承認)

Prepared By: (我司承認)

Approval	Check	Design	Sales

核准

審核

製作

業務

Customer Service Hotline: **400-676-8616**

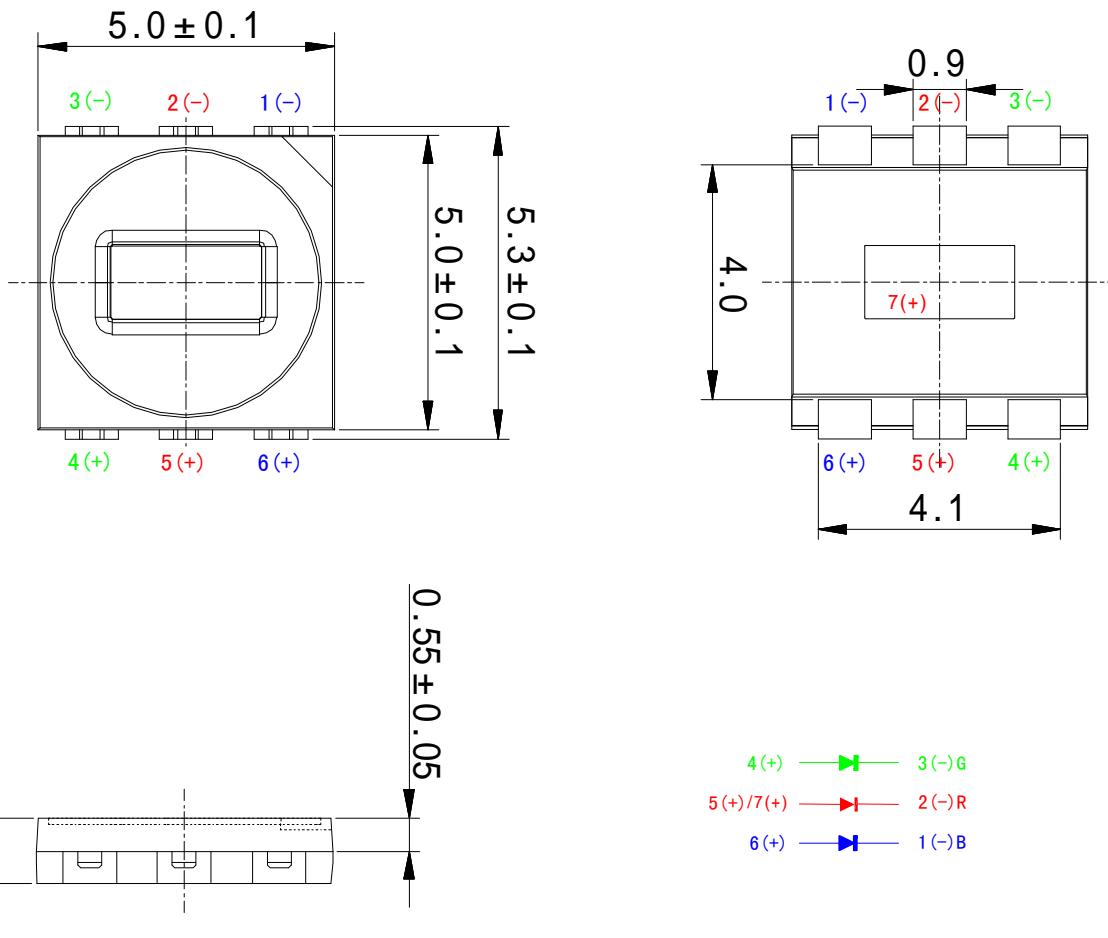
TEL: 0769-8662 5999 0769-8200 2226

E-MIAL :dg@togialed.com

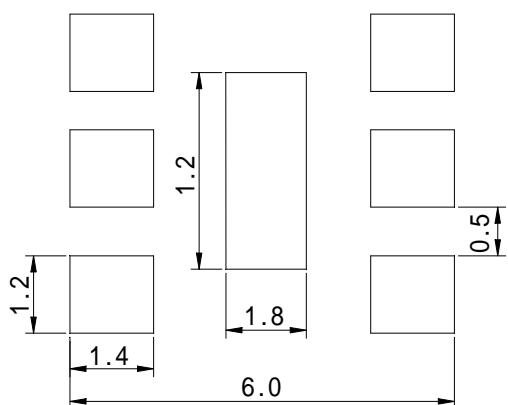
FAX: 0769-8200 2227

WEB: www.togialed.com

■ Outline Dimension:



■ PAD Lay Out PCB



ATTENTION  
OBSERVE PRECAUTIONS  
FOR HANDLING  
ELECTROSTATIC  
SENSITIVE DEVICES

Notes:

1. All dimensions are in millimeters.
2. Tolerance is  $\pm 0.2$  unless otherwise noted.
3. Specifications are subject to change without notice.

### ■ Absolute Maximum Ratings (Ta = 25 °C)

Items	Symbol	Absolute maximum Rating	Unit
Power Dissipation	P <sub>D</sub>	492	mW
Forward Current(DC)	I <sub>F</sub>	60	mA
Peak Forward Current	I <sub>FP</sub>	100	mA
Operation Temperature	Topr	- 20 ~ + 80	°C
Storage Temperature	T <sub>stg</sub>	- 30 ~ + 85	°C
Lead Soldering Temperature	T <sub>sol</sub>	Max.260°C for 5 sec Max. (3min from the base of the epoxy bulb)	

1. Duty Factor =10%, Frequency=1kHz.
2. Derate linearly as shown in derating curve.

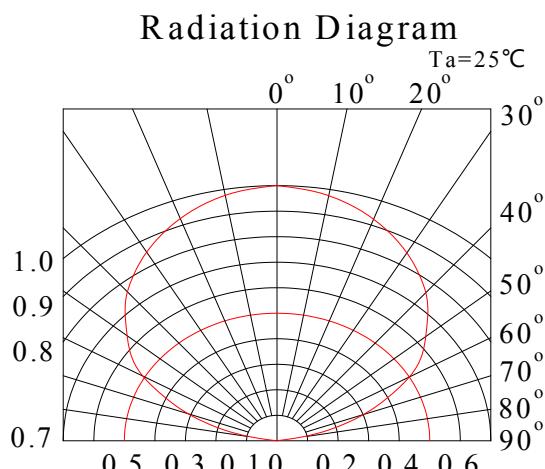
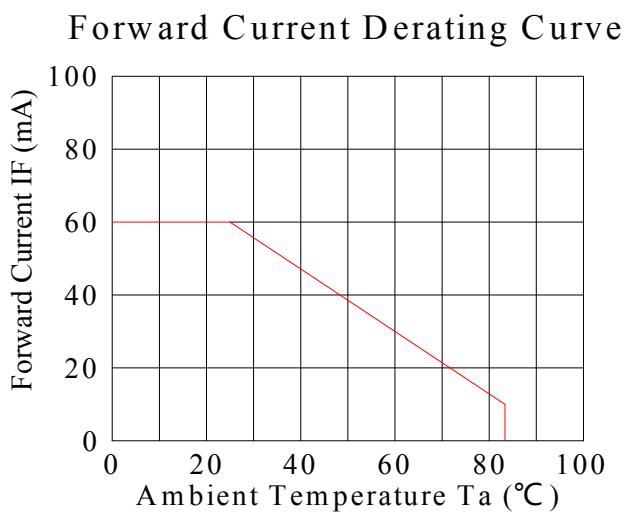
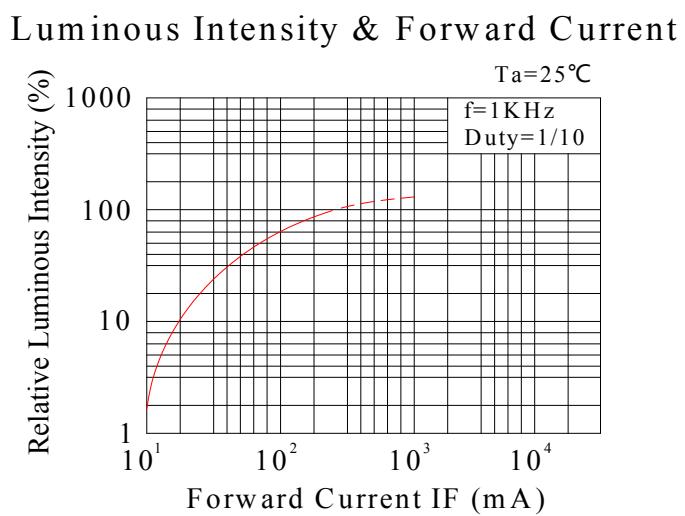
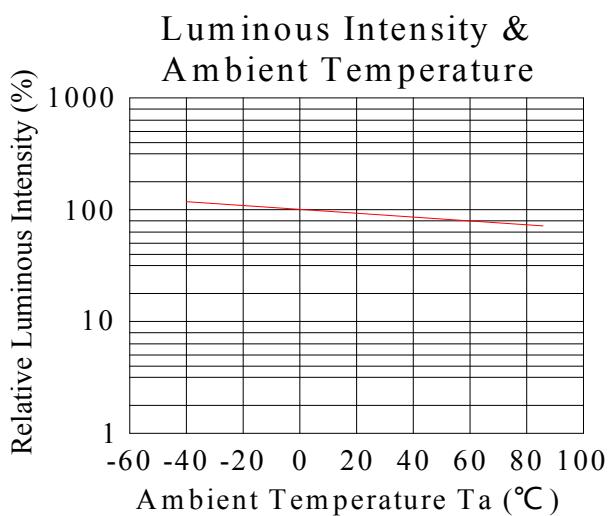
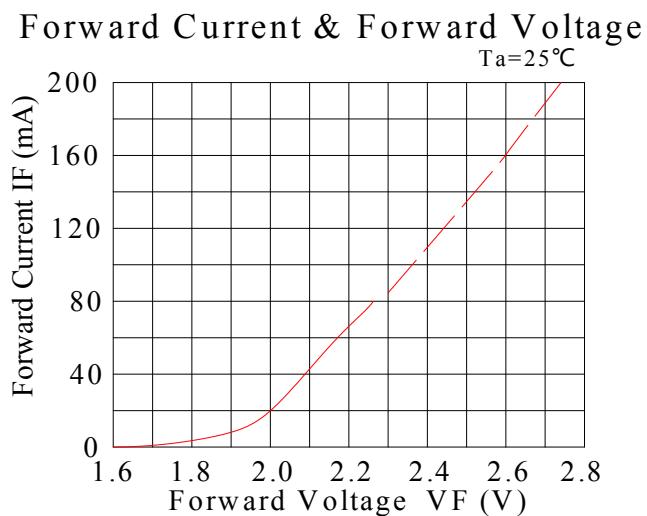
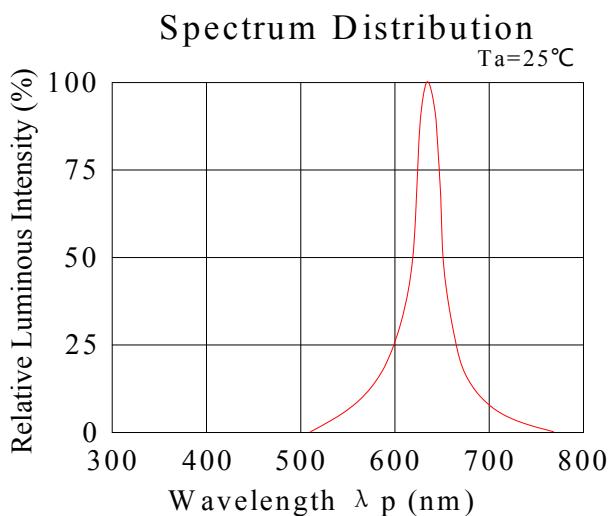
### ■ Typical Electrical & Optical Characteristics(Ta=25°)

Items	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	VF (I <sub>F</sub> =60mA)	GB	2.8	---	3.4	V
		R	1.8	---	2.4	V
Reverse Current	I <sub>R</sub>	VR =5V	---	---	5	µ A
Dominant Wavelength	λ d (I <sub>F</sub> =60mA)	R	620	---	630	nm
		G	520	---	530	nm
		B	460	---	470	nm
Luminous Intensity	I <sub>V</sub> ( I <sub>F</sub> =60mA)	R	6	---	10	LM
		G	12	---	20	LM
		B	3	---	6	LM
View Angle	2 θ 1/2	I <sub>F</sub> =60mA	---	120	---	Deg

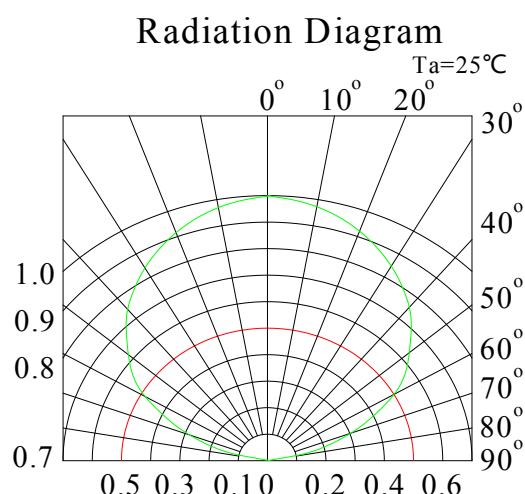
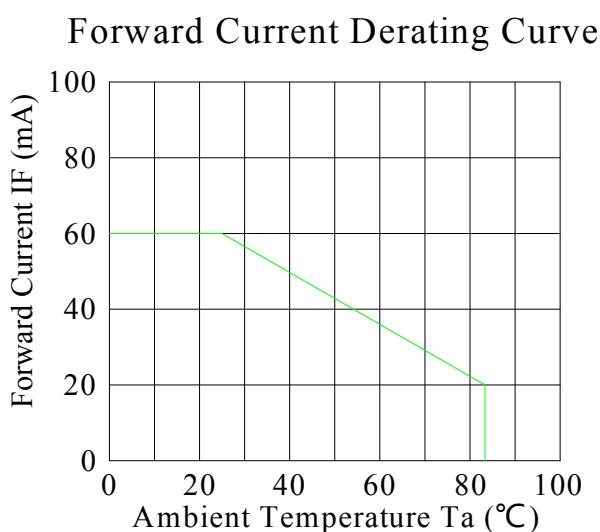
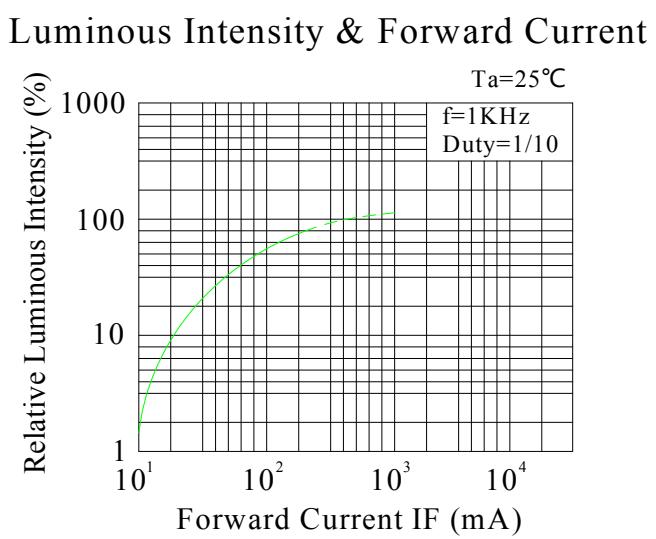
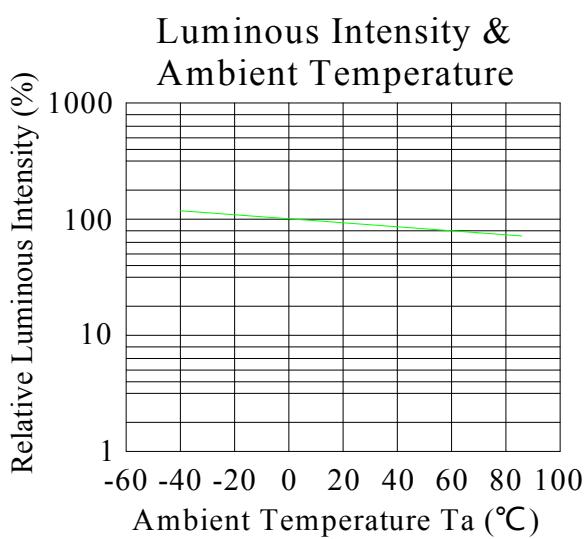
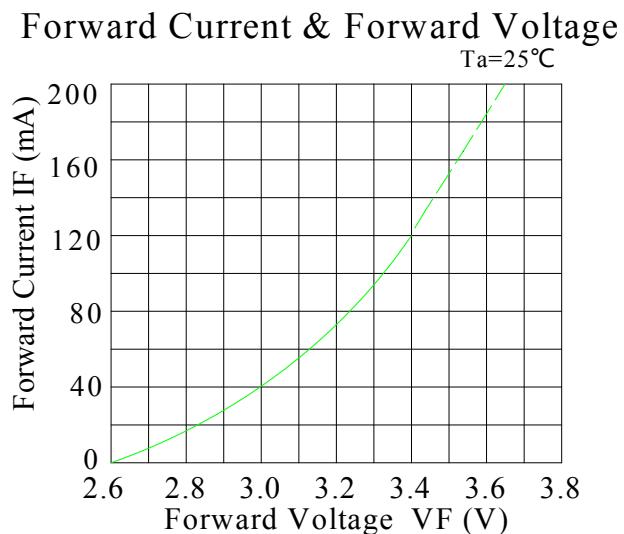
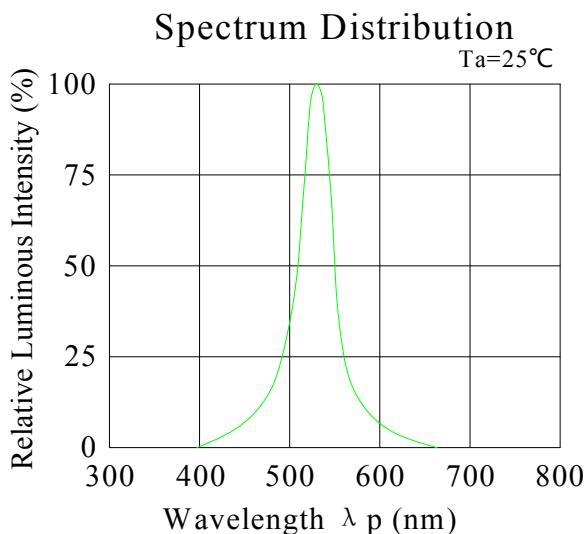
#### Notes:

1. Luminous Intensity measurement tolerance: ±10%.
2. Wavelength measurement tolerance: ±1nm.
3. Forward voltage measurement tolerance: ±0.1V.
4. Reverse voltage (VR) condition is applied to IR test only. The device is not designed for reverse operation.

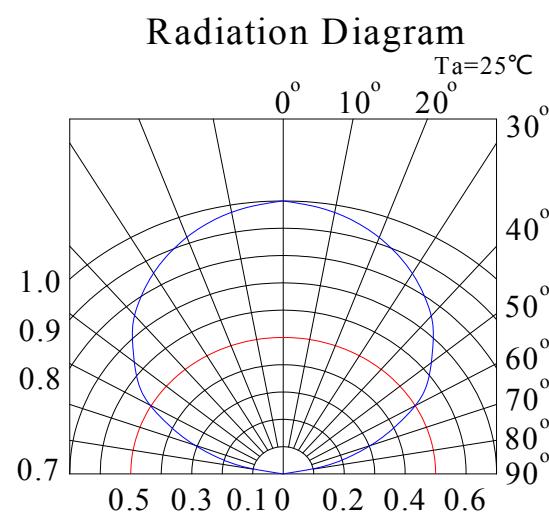
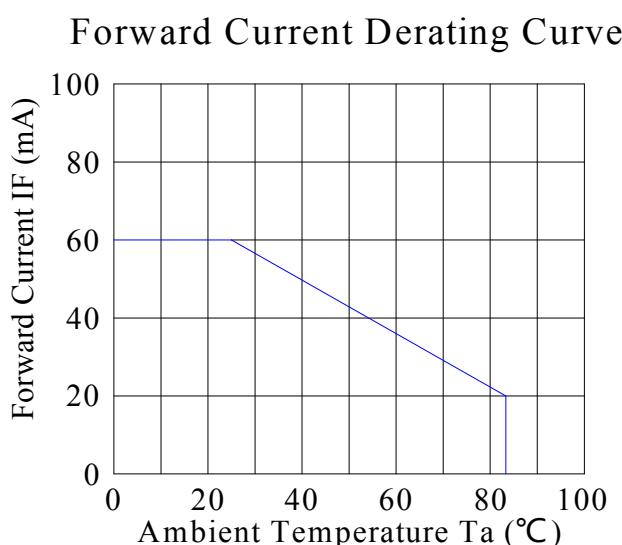
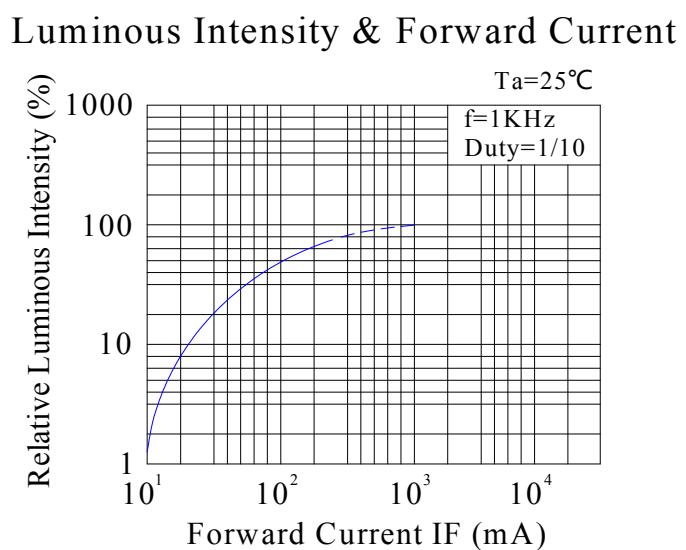
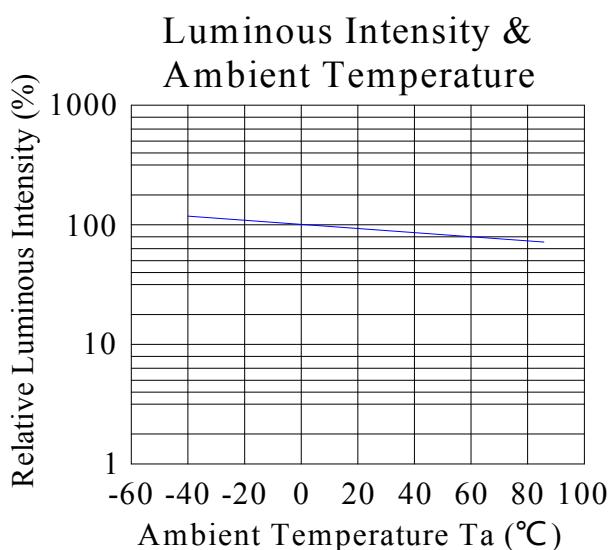
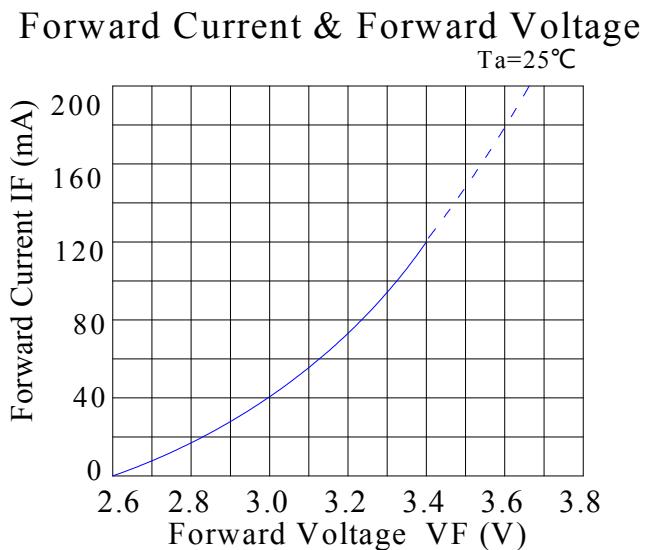
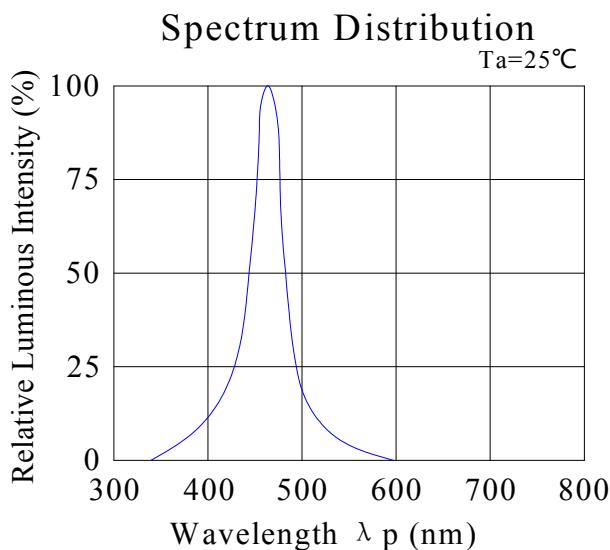
**Typical Electrical/Optical Characteristics Curves (R):**



**Typical Electrical/Optical Characteristics Curves (G):**



**Typical Electrical/Optical Characteristics Curves (B):**



### Test items and results of reliability

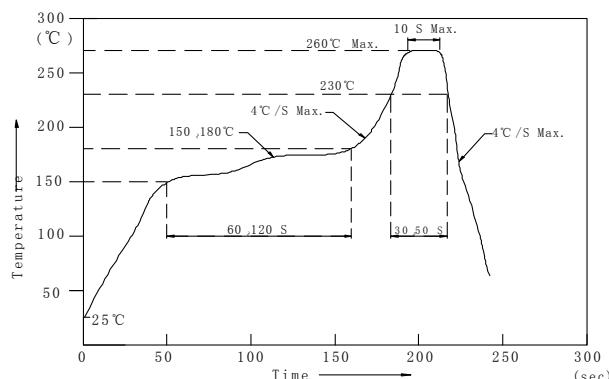
Type	Test Item	Test Conditions	Note	Number of Damaged
Environmental Sequence	Temperature Cycle	-20°C 30min ↑ ↓ 80°C 30min	100 cycle	0/22
	Thermal Shock	-20°C 15min ↑ ↓ 80°C 15min	100 cycle	0/22
	High Humidity Heat Cycle	30°C ⇄ 65°C 90%RH 24hrs/1cycle	10 cycle	0/22
	High Temperature Storage	Ta=80°C	1000 hrs	0/22
	Humidity Heat Storage	Ta=60°C RH=90%	1000 hrs	0/22
	Low Temperature Storage	Ta=-30°C	1000 hrs	0/22
Operation Sequence	Life Test	Ta=25°C IF=60mA	1000 hrs	0/22
	High Humidity Heat Life Test	60°C RH=90% IF=10mA	500 hrs	0/22
	Low Temperature Life Test	Ta=-20°C IF=60mA	1000 hrs	0/22

#### Note:

If the customer needs to conduct a high-temperature and high-humidity lighting test, please use a DC regulated power supply and directly light up the LED beads according to the test current level. Our company cannot evaluate the effectiveness of other lighting methods.

## Reflow Profile

### ■ Reflow Temp/Time



### Notes:

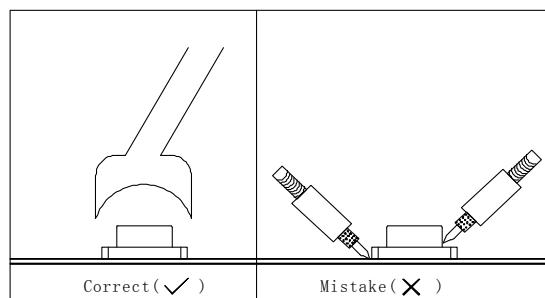
1. We recommend the reflow temperature 245°C( $\pm 5^\circ\text{C}$ ). the maximum soldering temperature should be limited to 260°C.
2. Don't cause stress to the epoxy resin while it is exposed to high temperature.
3. Number of reflow process shall be 2 times or less.

### ■ Soldering iron

Basic spec is  $\leq 5\text{sec}$  when 260°C. If temperature is higher, time should be shorter ( $+10^\circ\text{C} \rightarrow -1\text{sec}$ ). Power dissipation of iron should be smaller than 20W, and temperatures should be controllable .Surface temperature of the device should be under 230°C .

### ■ Rework

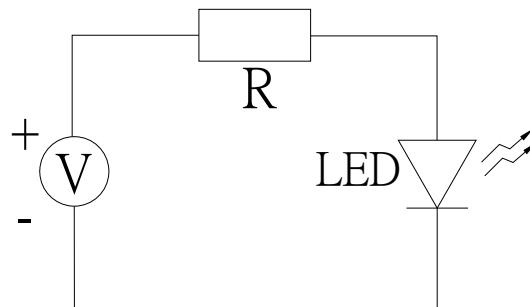
1. Customer must finish rework within 5 sec under 260°C.
2. The head of iron can not touch copper foil
3. Twin-head type is preferred.



- Avoid rubbing or scraping the resin by any object, during high temperature, for example reflow solder etc.

## Test circuit and handling precautions

### ■ Test circuit



### 1. Handling precautions

- 1.1 When designing a circuit, it is essential to ensure that the current flowing through the LED does not exceed the specified maximum value.
- 1.2 LED is a nonlinear component, and when used at a constant voltage, it requires the series connection of an appropriate resistor to prevent minor voltage variations from causing significant current changes, which could lead to product malfunction.
- 1.3 When using LEDs in parallel, it is necessary to connect an appropriate resistor in series with each LED to avoid voltage differences between LEDs, which can lead to uneven current distribution and brightness variations.

### 2. Storage

- 2.1 It is recommended to store the products in the following conditions:

Humidity: 60% R.H. Max.

Temperature : 5°C~30°C (41°F~86°F)

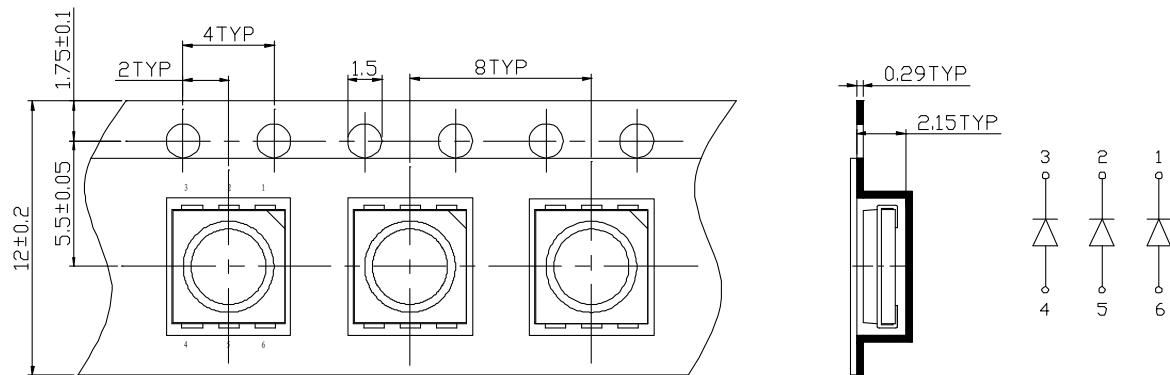
- 2.2 Shelf life in sealed bag: 1 month at <5°C~30°C and <30% R.H. after the package is Opened, the products should be used within a week or they should be keeping to stored at  $\leq 20$  R.H. with zip-lock sealed.

### 3. Baking

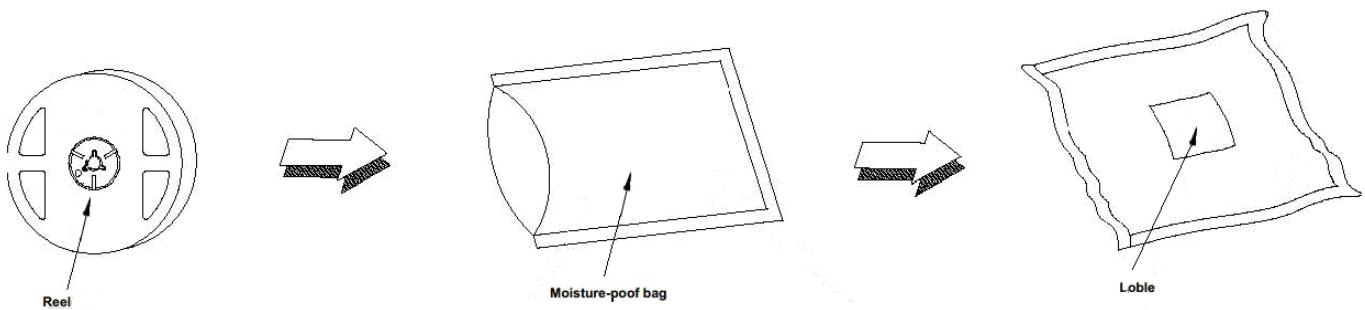
It is recommended to baking before soldering when the pack is unsealed after 24hrs. The Conditions are as followings:

- 3.1  $60 \pm 3^\circ\text{C}$  x(12~24hrs) and <5%RH, taped reel type
- 3.2  $100 \pm 3^\circ\text{C}$  x(45min~1hr), bulk type
- 3.3  $130 \pm 3^\circ\text{C}$  x(15~30min), bulk type

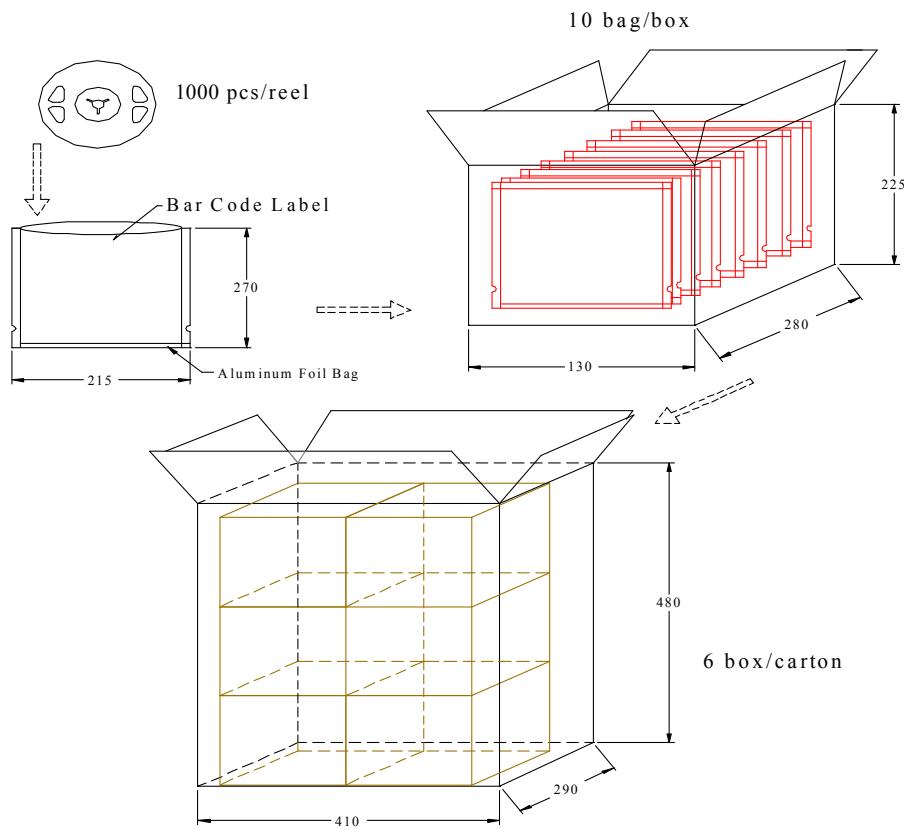
● Tapping and packaging specifications(Units: mm)



Label Aluminum moisture-proof bag Desiccant Label



● Package Method unit: mm



Design consideration:

1. When designing the circuit, it is essential to ensure that the current passing through the LED does not exceed the specified maximum value.
2. When designing the circuit, it is necessary to ensure that when the LED is in operation, the reverse voltage applied to the circuit must be lower than 5V.
3. LED is a nonlinear component. When operating at a constant voltage, an appropriate resistor needs to be connected in series to prevent small voltage fluctuations from causing significant current fluctuations, which could lead to the failure of the product's functionality.
4. When LEDs are used in parallel, an appropriate resistor must be connected in series with each LED to prevent voltage differences between the LEDs from causing uneven current and resulting in brightness variations.

5. Prevention of Reverse Avalanche Breakdown in High-Voltage AC Circuit with Resistance Series Connection:

In simple component design scenarios, it is common to encounter situations where 220VAC/120VAC mains power is directly connected in series with resistors to drive LEDs. In reality, each second, the LED products will experience reverse avalanche breakdown dozens of times, causing certain damage to the LED products. Although they seem to be operating normally, the LED products will thus have a reduced lifespan. Therefore, when designing control circuit boards in such cases, it is recommended to at least series-connect a 1N4007 diode or parallel-connect a diode in reverse polarity, or parallel-connect a voltage stabilizing tube for protection; or you can choose LED products with built-in zener diodes.

6. Prevention of high voltage intrusion during the overall machine withstand voltage test:

For PCBA boards with fewer components, during the production process of electrical appliances that are equipped with metal casings, when conducting a 1800VAC withstand voltage test, high voltage may have the opportunity to intrude through the weak points of the metal casing or the wiring of the LED, causing the LED to be broken and fail. For such products, if they are blue light, emerald green or white light LED products, it is recommended to choose LED products with zener diodes when designing.

7. Transient reverse voltage design avoidance:

When transistors are used for scanning or when dedicated chips such as TM1628 are involved in scanning, the LEDs are always in a high-resistance state during the non-operational phase. In Some circuits are driven solely by the MCU port scanning. During the inactive stage, a reverse 5V voltage is applied to achieve this. The LED chip generates a 8V voltage difference from +3V to -5V. Such frequent transient reverse voltage shock may cause cumulative damage to the blue and white light chips. When designing the program, if it is difficult to switch to high resistance, it is recommended to consider connecting a 4148 diode in series to the common scanning terminal.

8. When using LEDs in high-temperature and high-humidity environments, it is strictly prohibited to apply reverse voltage to prevent metal migration, which could lead to leakage or short circuit.