

深圳市色彩光电有限公司  
**Shenzhen led Color Opto Electronic Co.,ltd**

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Factory Address 1:5th floor Dadong Ming Science and Technology Park Yuequn road  
Changzhen Viliage Guangming New District Shenzhen

Factory Address 2:2th floor Changxing Technology Industrial Park Chanzhen Viliage  
Guangming New District Shenzhen

Tel:+86-0755-27350605

Fax:+86-0755-23245913

## LC8823 LED SERIES

### SPECIFICATION

## INTEGRATED LIGHT SOURCE INTELLIGENT CONTROL (Double line transmission) OF CHIP-ON-TOP SMD TYPE LED

**Document No.: SPC/LC8823LED**

**Model No.: LC8823**

**Description: 5.5x5.0x1.6mm Intelligent control SMD LED**



**INTEGRATED LIGHT SOURCE INTELLIGENT CONTROL  
(Double line transmission) OF CHIP-ON-TOP SMD TYPE LED**

**Model No.: LC8823**

**1. Product Overview :**

LC8823 is a two-wire transmission channel three RGB ) driving intelligent control circuit and the light emitting circuit in one of the LED light source control. Products containing a signal decoding module, data buffer, a built-in constant current circuit and RC oscillator; CMOS, low voltage, low power consumption; 256 level grayscale PWM adjustment and 32 brightness adjustment; use the double output, Data and synchronization of the CLK signal, connected in series each wafer output action synchronization.

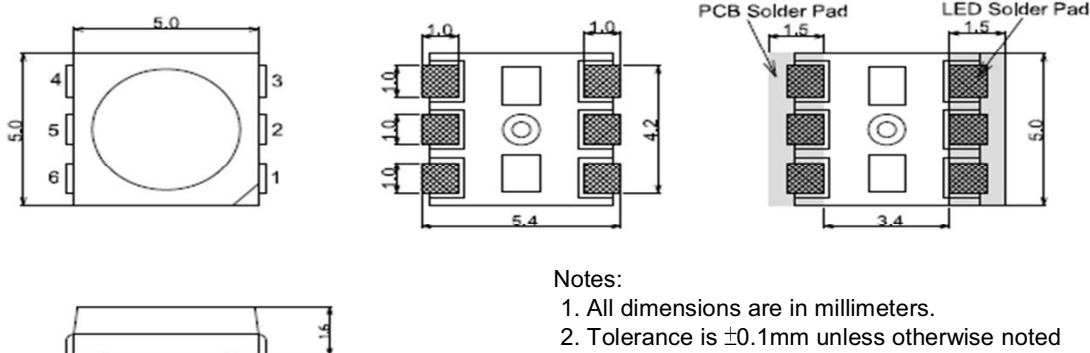
**2. Main Application Field:**

- Full color LED string light, LED full color module, LED super hard and soft lights, LED guardrail tube, LED appearance / scene lighting
- LED point light, LED pixel screen, LED shaped screen, a variety of electronic products, electrical equipment etc..

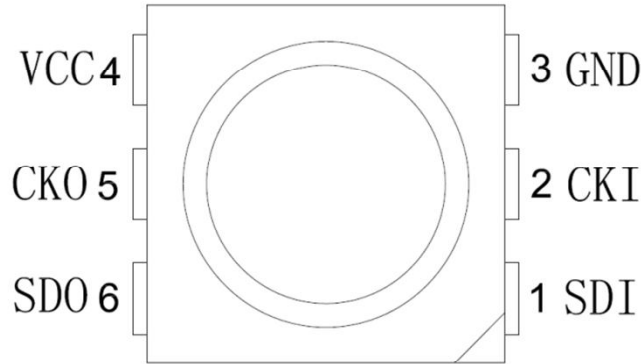
**3. Description:**

- Top SMD internal integrated high quality external control line serial cascade constant current IC; 5V application; default on electric lights;
- Control circuit and the RGB chip in SMD 5050 components, to form a complete control of pixel, color mixing uniformity and consistency;
- The two-wire synchronous control.
- The three RGB output control, 8Bit (256) color; 5Bit (32) to adjust the brightness;
- The three constant current drive, self detection function specific signal
- The maximum frequency of 27KHZ serial data input
- The double data transmission, built-in support uninterrupted oscillation PWM output, can maintain a static image.
- Zero power when no light and no data input

**4. Mechanical Dimensions:**



### 5. PIN configuration



Item	Symbol	Pin Name	Function description
1	SDI	Data Input	control signal Input data
2	CKI	CLK Input	control signal Input Clock data
3	GND	Ground	The signal and power supply and grounding
4	VCC	Power	power supply pin
5	CKO	CLK Output	control signal output Clock data
6	SDO	Data Input	control signal output data

### 6. General Information

# LC8823

**LC8823** : The default is RGB chips with IC integration

**7. Absolute Maximum Ratings (Ta=25°C, VSS=0V) :**

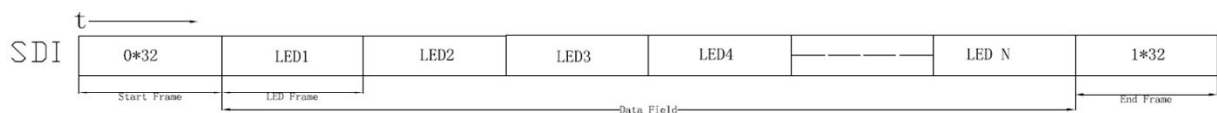
Parameter	Symbol	Range	Unit
Power supply voltage	VDD	-0.5~ +5.5	V
Logic input voltage	V <sub>IN</sub>	-0.3~ VDD+0.3	V
Working temperature	T <sub>opt</sub>	0~+70	°C
Storage temperature	T <sub>stg</sub>	-50~+125	°C
ESD pressure	V <sub>ESD</sub>	4K	V

**8. The electrical parameters (unless otherwise specified, TA=-20 ~ +70 °C, VDD=4.5 ~ 5.5V, VSS=0V):**

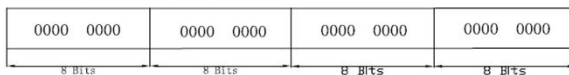
Parmeter	Symbol	Min	Typical	Max	Unit	Test conditions
The chip supply voltage	VDD	---	5.0	5.3	V	---
R/G/B port pressure	VDS,MAX	---	---	17	V	---
The biggest LED output current	I <sub>max</sub>		17		mA	---
The clock high level width	TCLKH	---	---	>30	ns	---
The clock low level width	TCLKL	---	---	>30	ns	---
Data set up time	TSETUP	---	---	>10	ns	---
The frequency of PWM	FPWM	---	2.7	---	KHZ	
Static power consumption	IDD	---	1	---	mA	---

**9. Feature Descriptions:**

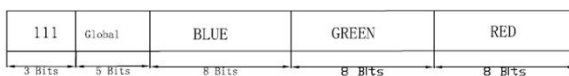
(1) Series data structure



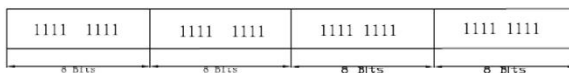
Start Frame 32 Bits



LED Frame 32 Bits



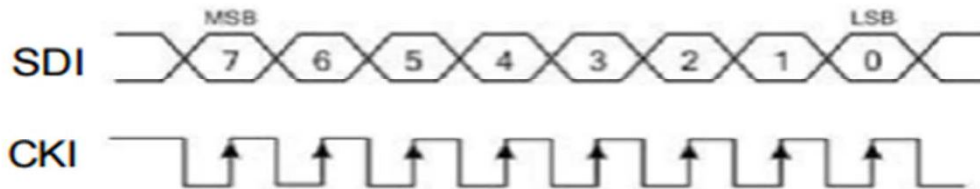
End Frame 32 Bits



(2) 256 level gray level:

Data	Duty Cycle
MSB.....LSB	
0000 0000	0/256
0000 0001	1/256
0000 0010	2/256
-	-
-	-
-	-
-	-
1111 1101	253/256
1111 1110	254/256
1111 1111	255/256

(3) PWM input / output signal relationship:



(4) 5-Bit (level 32) brightness adjustment (simultaneous control of OUTR\OUTG\OUTB three port current):

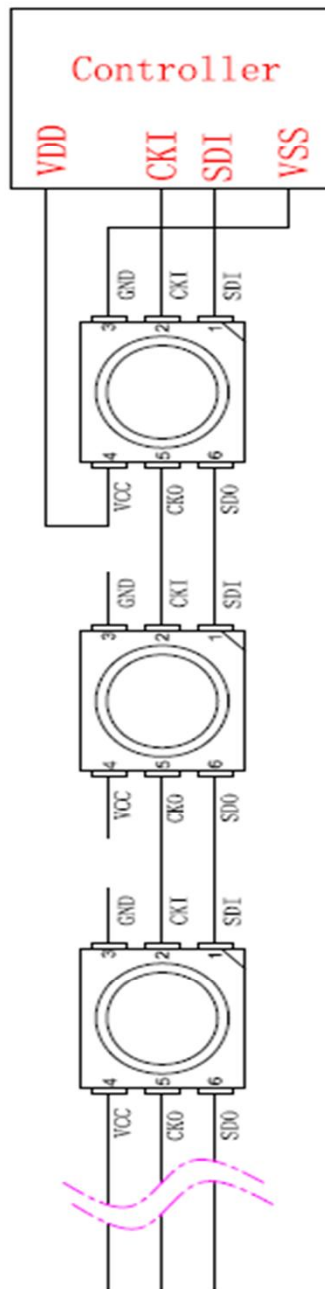
Data	Driving Current
MSB.....LSB	
00000	0/31
00001	1/31
00010	2/31
-	-
-	-
-	-
-	-
11101	29/31
11110	30/31
11111	31/31

(5) Refresh Rate :

Frame rate (=1/ (64+ (32\* points)) \*CKI (cycle) unit: frames per second )

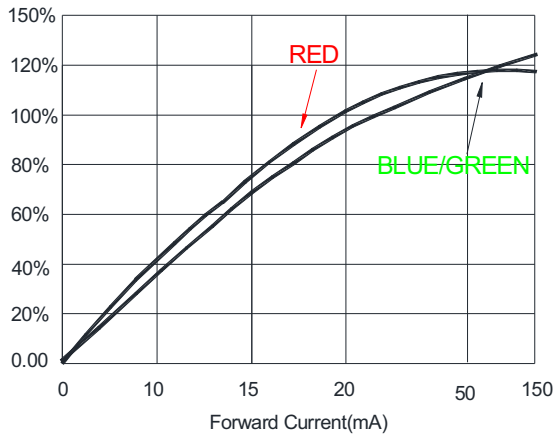
Such as: 1024 points, CKI frequency is 1MHZ, is =30 frames per second frame rate.

10. The typical application circuit:

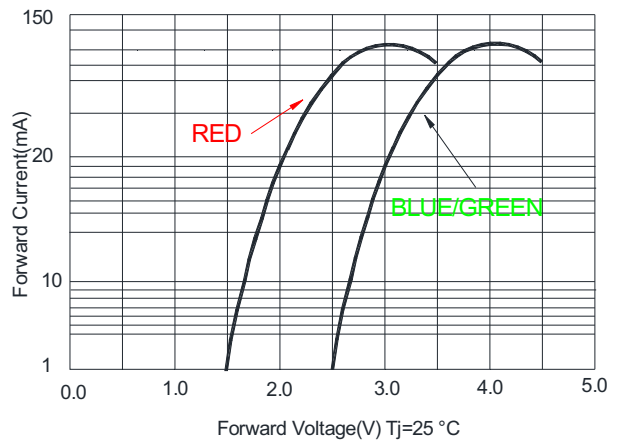


11. Standard LED Performance Graph:

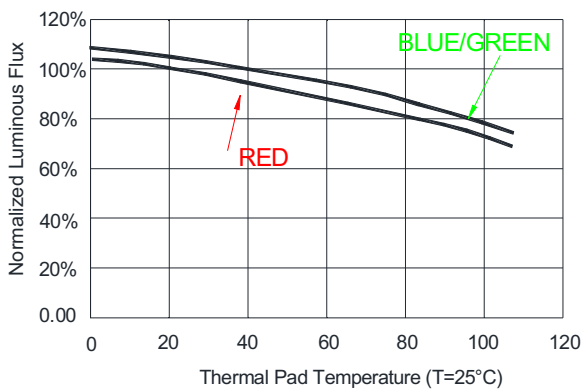
Typical Relative Luminous Flux vs. Forward Current



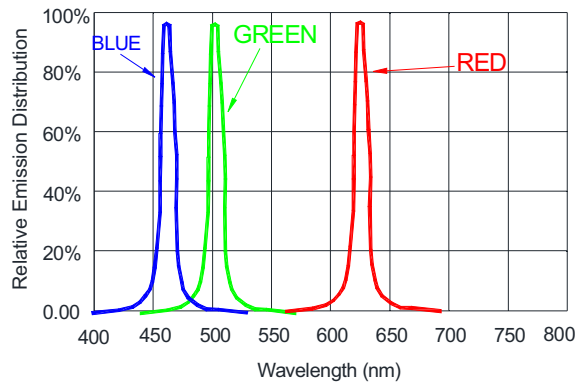
Forward Voltage vs. Forward Current



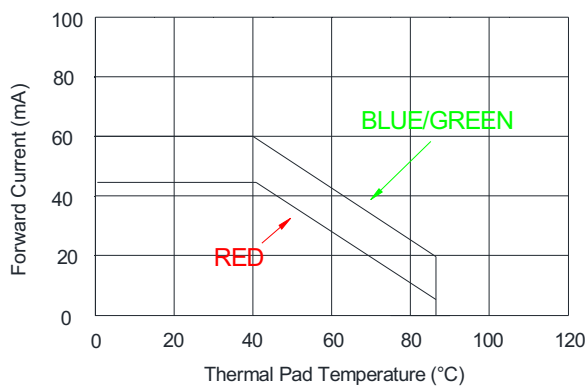
Thermal Pad Temperature vs. Relative Light Output



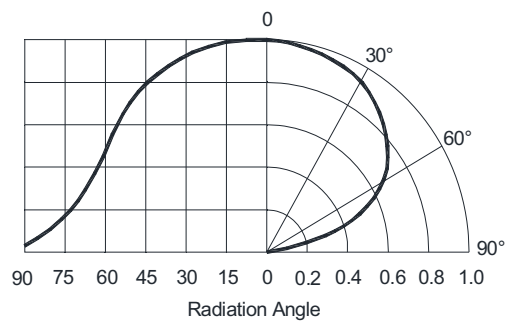
Wavelength Characteristics



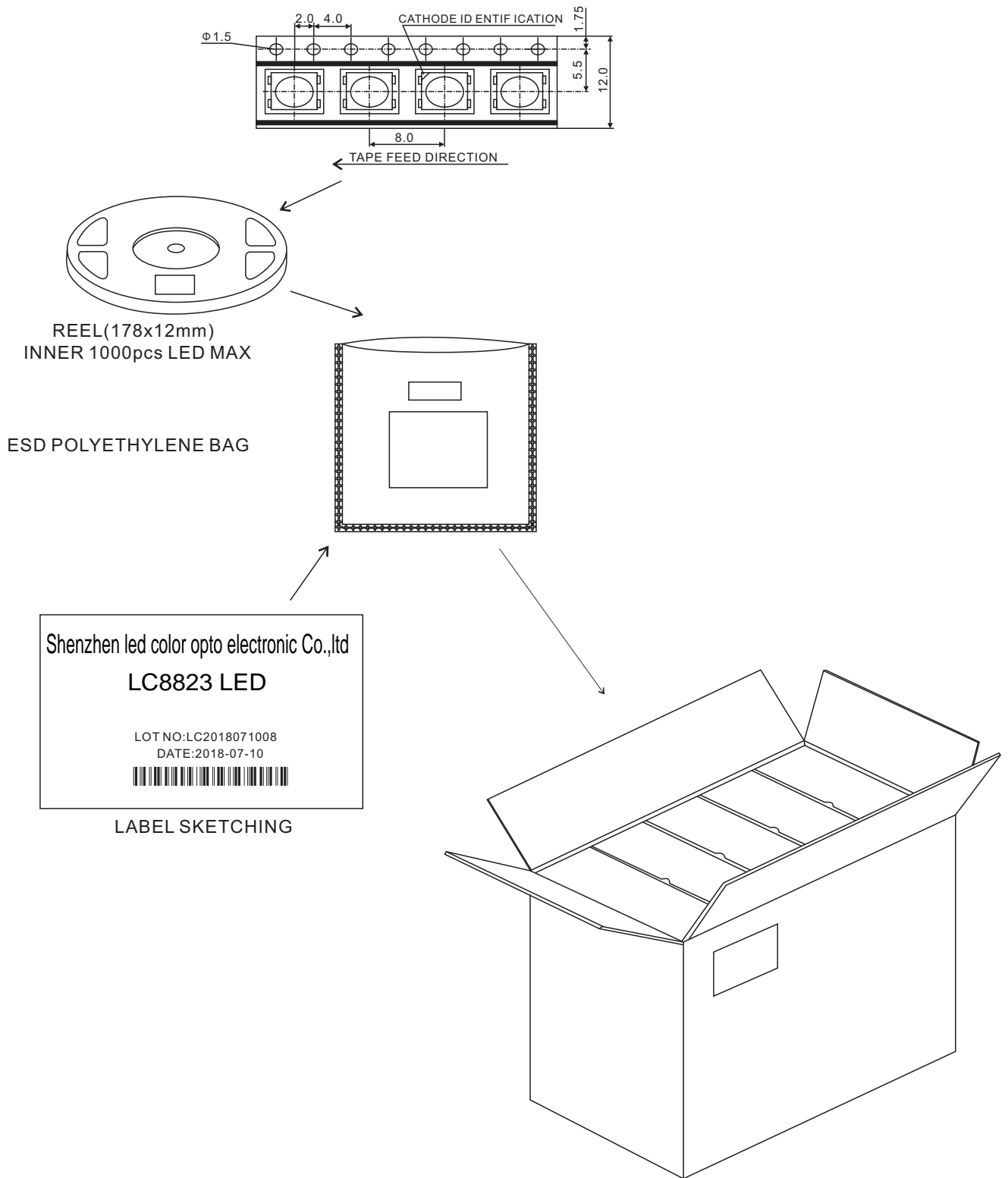
Thermal Pad Temperature vs. Forward Current



Typical Radiation Pattern 120°



**12. Packaging Standard:**



The reel pack is applied in SMD LED. The LEDs are packed in cardboard boxes after packaging in normal or anti-electrostatic bags. cardboard boxes will be used to protect the LEDs from mechanical shocks during transportation. The boxes are not water resistant and therefore must be kept away from water and moisture.



## **13. Attention**

### **13.1 Dust & Cleaning**

The LED use silicone glue to package the 5050 Surface, silicone surface can protect optical properties and improved anti-aging properties. However, silicone is a softer material and prone to attract dust. While a minimal amount of dust and debris on the LED will not cause significant reduction in illumination. We still need to avoid dust falling on the LED surface. After open the bags it must be used immediately.

When you use trichloroethylene or acetone to clean, sometimes the LED surface will dissolve.

Avoid using organic solvent, it is recommended that isopropyl be used as a solvent for cleaning the LEDs. When using other solvents, it should be confirmed beforehand whether the solvents will dissolve the package and the resin or not.

Do not clean the LEDs by the ultrasonic. When it is absolutely necessary, the influence as ultrasonic cleaning on the LEDs depends on factors such as ultrasonic power. Baking time and assembled condition.

Before cleaning, a pre-test should be done to confirm whether any damage to the LEDs will occur.

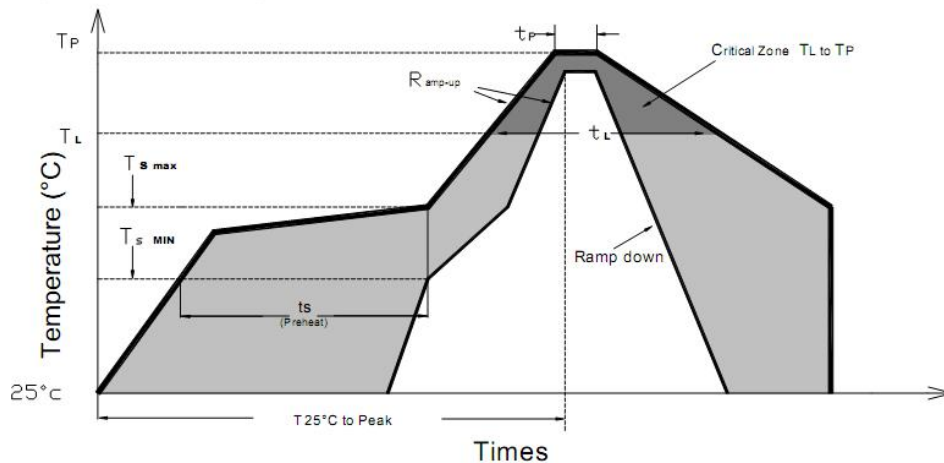
### **13.2 Dehumidification**

LED COLOR smart led are moisture sensitive components, In IPC/JEDEC J-STD-020 MSL Level is 6. **No Matter the Package bag is open or not ,The LED must do dehumidification in the oven for 24 hours at 70 degree before use and used within 2 hours, otherwise it need to be dehumidified again**

### **13.3 Reflow Soldering Characteristics**

In our Test, LED Color confirm those smart led are compatible with JEDEC J-STD-020C, Customers are required to follow the soldering temperature profile recommended by the solder paste manufacturer used.

Please note that this general guideline may not apply to all PCB design and reflow soldering equipment configurations.



Profile Feature	Lead-Based Solder	Lead-Free Solder
Average Ramp-Up Rate (Ts max to Tp)	3 °C/second max.	
Preheat: Temperature Min (Ts min)	100°C	150°C
Preheat: Temperature Min (Ts max)	150°C	200°C
Preheat: Time (ts min to ts max)	60-120 seconds	60-180 seconds
Time Maintained Above: Temperature (TL)	183 °C	217 °C
Time Maintained Above: Time (tL)	60-150 seconds	60-150 seconds
Peak/Classification Temperature (TP)	215 °C	238 °C
Time Within 5°C of Actual Peak Temperature (tp)	<10 seconds	<10 seconds
Ramp-Down Rate	6 °C/second max	6 °C/second max
Time 25 °C to Peak Temperature	<6 minutes max	<6 minutes max

Note: All temperatures refer to topside of the package, measured on the package body surface.

### 13.4. Anti-static and surge protection for IC devices

Static electricity and surges can damage the LED products of IC devices, so appropriate protective measures must be taken;

The signal input and output ports of IC devices must be connected in series with protective resistors to prevent product failure due to surge or electrostatic shock ports;

In order to protect the LED products of IC devices, whenever you encounter LEDs, wear anti-static straps, anti-static straps and anti-static gloves.

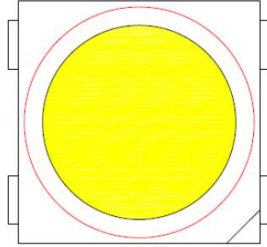
All devices and equipment must be grounded

It is recommended that each product be tested before shipment for relevant electrical tests to select defective products due to static electricity.

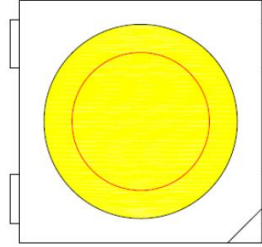
In the design of the circuit, consideration should be given to eliminating the surge to the LED

### 13.5 Other requirements

SMT nozzle requirements: (red circle refers to the inside diameter of the nozzle)



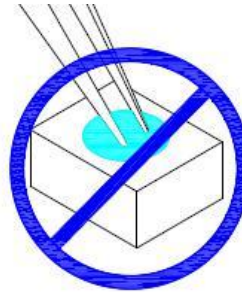
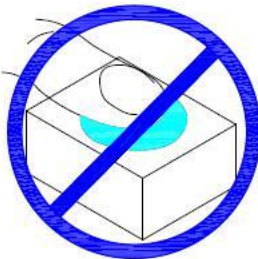
OK (the inside diameter of the nozzle is larger than the light-emitting area of the lamp)



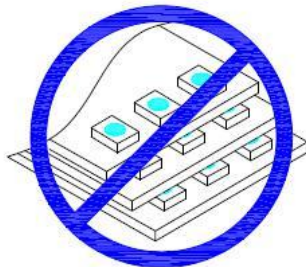
NG (the inside diameter of the nozzle is smaller than the lighting area of the lamp)

Pressing the colloid surface will affect the reliability of LED because the LED is advanced silicone-gel. And therefore precautions should be taken to avoid the strong pressure on the component. It's proper to make the LED be used in safe condition when using a suction nozzle. Silicon packing with soft and elastic, it greatly reduces thermal stresses and unable to bear external mechanical forces. Therefore, preventive measures should be taken in process of manually handling.

① Clip the LED from its side. Neither directly touch the gel surface with the hand or sharp instrument, it may damage its internal circuit.



② Not to be double stacked, it may damage its internal circuit.



- ③ Can not be stored in or applied in the acidic sites of PH<7.



**Modify Records**

<b>Item NO.</b>	<b>Rev. No.</b>	<b>Modify Content Summary</b>	<b>Signature</b>	<b>Date</b>
<b>LC8823 RGB</b>	<b>02</b>	<b>Initial Document</b>	<b>Andy Zhu</b>	<b>2018-07-09</b>