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LC8808 LED SERIES
SPECIFICIFATION
INTEGRATED LIGHT SOURCE INTELLIGENT CONTROL SMD LED

Document No.: SPC/ LC8808 LED

Model No.: LC8808

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



1. General description

The LC8808 is a three-channel LED driver IC driven by a 12V power supply with high-precision constant-current output .It integrates MCU digital interfaces, data latches, and LED driver circuits. The peripheral grayscale control of the chip is used to realize the individual grayscale and cascade control of the chip to realize the color dot matrix lighting control of the outdoor large screen. Excellent product performance and reliable quality

2. Feature

Using high-voltage CMOS technology

Output absolute current accuracy $\pm 2\%$, RGB relative accuracy $\pm 1\%$

High efficiency, low power consumption, long transmission distance without discoloration

Default output constant current value is 9mA, suitable for built-in lamp beads

Not lit by default

Gray adjustment circuit (256 levels of adjustable gray)

Single-wire serial cascade interface (DIN.DOUT)

Built-in high precision and high stability oscillator

Data shaping: After receiving the data of this unit, automatically shaping and outputting subsequent data

Data sending rate: 800Kbps

3. Product Naming

LC8808 mean white surface ,9mA/channel ,capacitor integrated in 5050 (standard version)

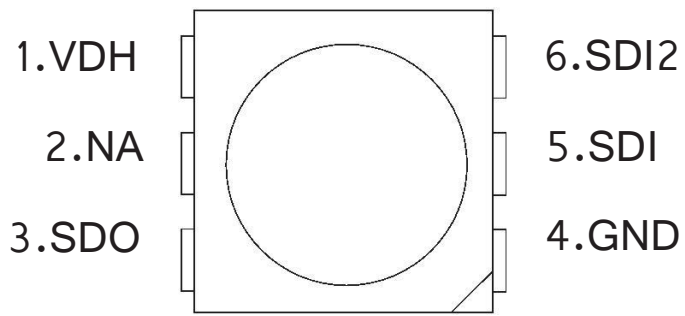
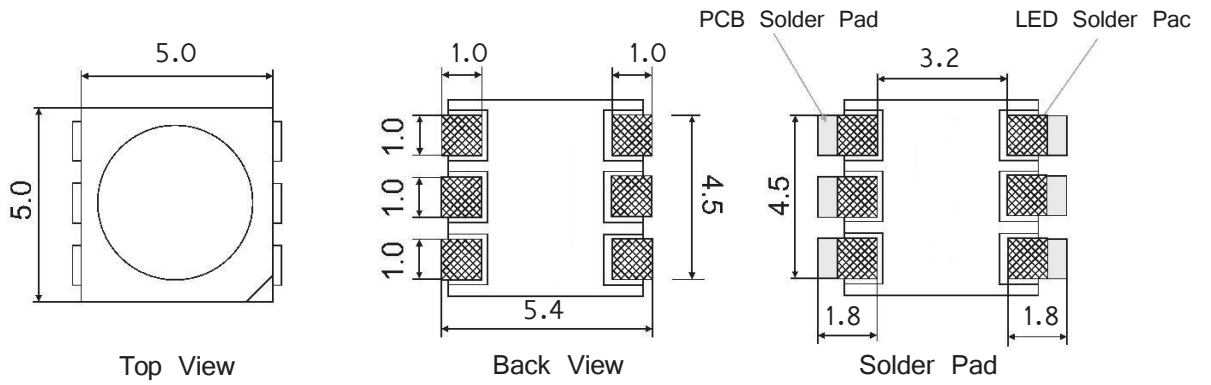
LC8808-B mean black surface ,9mA /channel ,capacitor integrated in 5050 (standard version)

LC8808B mean white surface ,9mA/channel, without capacitor intergrated in 5050

LC8808B-B mean black surface ,9mA/channel, without capacitor intergrated in 5050

4. Mechanical Dimensions:

Mechanical Dimensions:mm



Notes:

1. All dimensions are in millimeters.
2. Tolerance is $\pm 0.1\text{mm}$ unless otherwise noted

5. Pin Configuration:

NO.	Symbol	Function description
1	VDH	12V Power supply
2	NA	Empty
3	SDO	Series data output
4	GND	Ground
5	SDI	Series data input
6	SDI2	Redundant Series data input

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

Parameter	Symbol	Range	Unit
Power supply voltage	VDD	-0.4V~+14	V
Logic input voltage	V _{IN}	-0.5~VDD+0.5	V
R/G/B output current	I _{OUT}	9	mA
Working temperature	T _{opt}	-40~+85	°C
Storage temperature	T _{stg}	-50~+150	°C
ESD pressure	V _{ESD}	2K	V

7. RGB LED photoelectric parameters

Color	LC8808 RGB LED Series		
	Wavelength	MCD	Lumen
Red	620-623nm	800-900mcd	2.5-3lm
Green	517.5-520nm	1600-1800mcd	5.0-6.0lm
Blue	467.5-470nm	500-600mcd	1.5-2lm

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

Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The chip supply Voltage	V _{IN}	10.8	12	13.2	V	---
R/G/B output current	I _{OUT}	8.82	9	9.18	mA	---
The Signal Input flip threshold	V _{IH}	4	---	---	V	VDD=5.0V
	V _{IL}	---	---	1	V	
Static power consumptionThe frequency of PWM	FPWM	---	8	---	KHZ	-----
	IDD	---	2	---	mA	

9 The dynamic parameters (Ta=25 °C):

Parameter	Symbol	Min	Typical	Max	Unit	Test conditions
The speed of data transmission	FDIN	---	800	---	KHZ	The duty ratio of 67% (data 1)
DOUT transmission delay	TPLH	---	---	500	ns	DIN→DOUT
	TPHL	---	---	500	ns	
OUT Rise/Drop Time	Tr	---	100	---	ns	VDS=1.5 IOU=13mA
	Tr	---	100	---	ns	

10 function description

The chip adopts single-line communication mode and uses a return-to-zero code to transmit signals. After the power-on reset, the chip receives the number from the DIN terminal. According to the data, after receiving 24 bits, the DOUT port starts to forward data and provides input data for the next chip. DOUT port before forwarding Keep pulling low. At this point, the chip will not receive new data, and the three PWM output ports of the chips OUTR, OUTG, and OUTB are received according to the 24 bit data, the corresponding signal with different duty cycle is issued, and the signal period is 4 ms. If the input signal to the DIN terminal is the RESET signal, The chip sends the received data to the display, and the chip will re-receive the new data after the signal is finished. After receiving the first 24 bits of data, The data is forwarded through the DOUT port. The original output of the OUTR, OUTG, and OUTB pins remains unchanged before the chip receives the RESET code. Change, when receiving a low level RESET code above 80 μ s, the chip will output the 24-bit PWM data pulse width just received to OUTR, On the OUTG, OUTB pins.

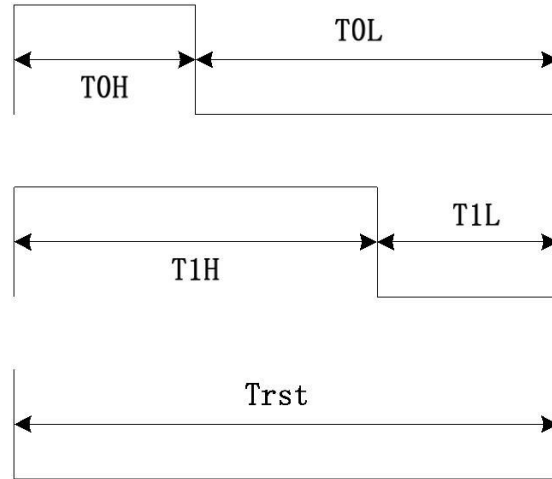
The chip adopts automatic shaping and forwarding technology, so that the number of cascaded chips is not limited by signal transmission, and only the speed of the screen is limited. For example, we design a 1024 cascade, which has a screen time of $1024 \times 0.4 \times 2 = 0.8192\text{ms}$ (the data latency of the chip is 0.4 μ s), there will be no flickering.

11. The data transmission time (TH+TL=1.25μs ± 600ns)

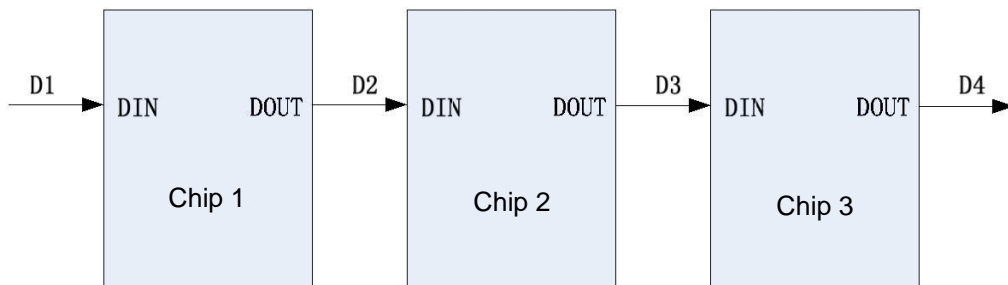
T0H	0 code, high level time	0.3μs	±0.05μs
T0L	0 code, low level time	0.9μs	±0.05μs
T1H	1 code, high level time	0.9μs	±0.05μs
T1L	1 code, low level time	0.3μs	±0.05μs
Trst	Reset code, low level time	80μs	±0.05μs

11. Timing waveform:

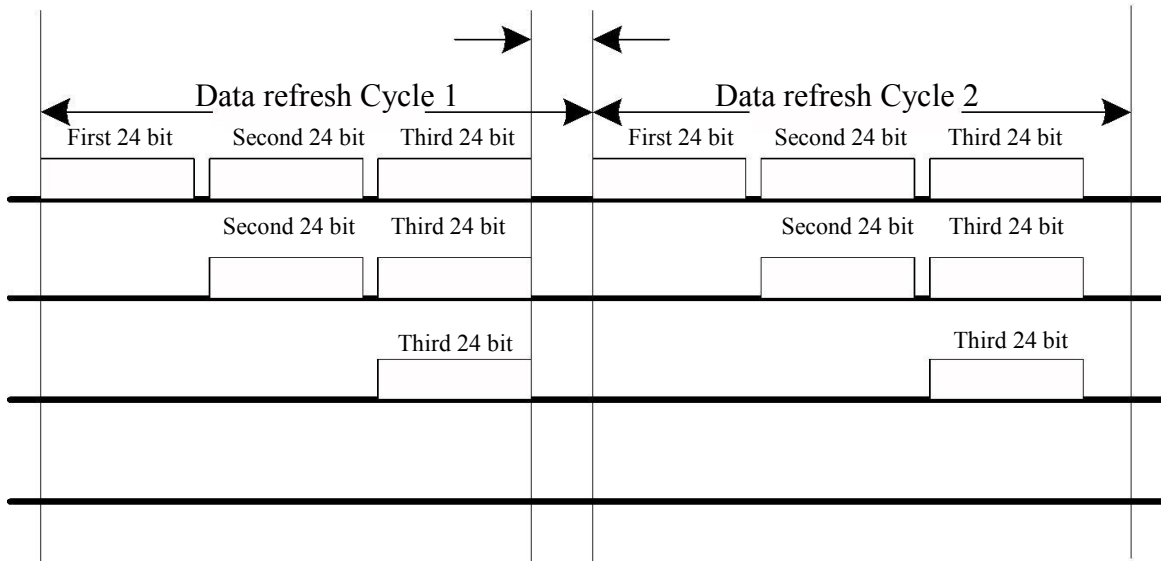
1) Input Code



2) Connect Mode



12. The method of data transmission:



Note: the D1 sends data for MCU, D2, D3, D4 for data forwarding automatic shaping cascade circuit

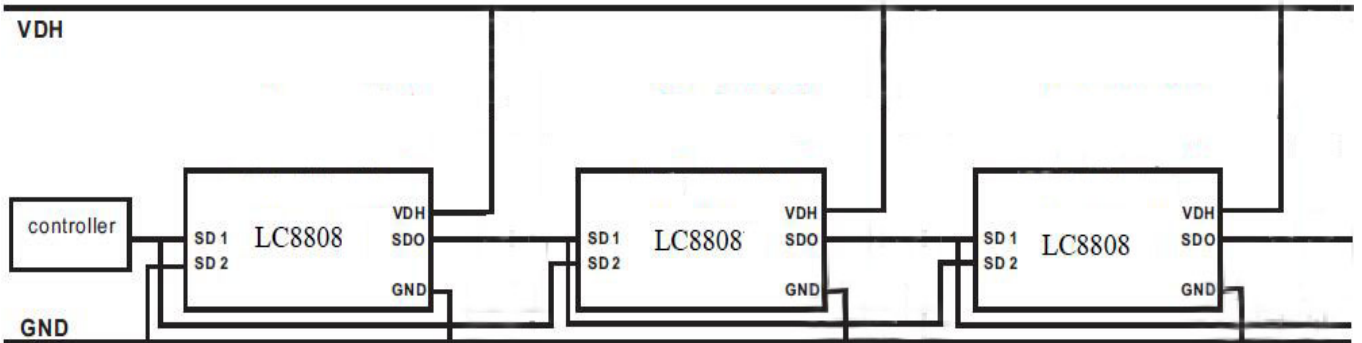
14. The 24bit data Structure

R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4
G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0

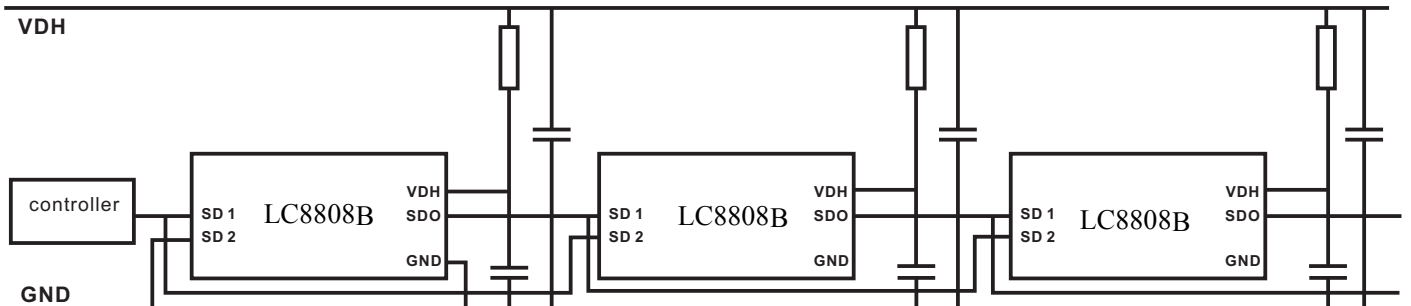
Note: high starting, in order to send data (R7 - R6 - B0)

13. The typical application circuit:

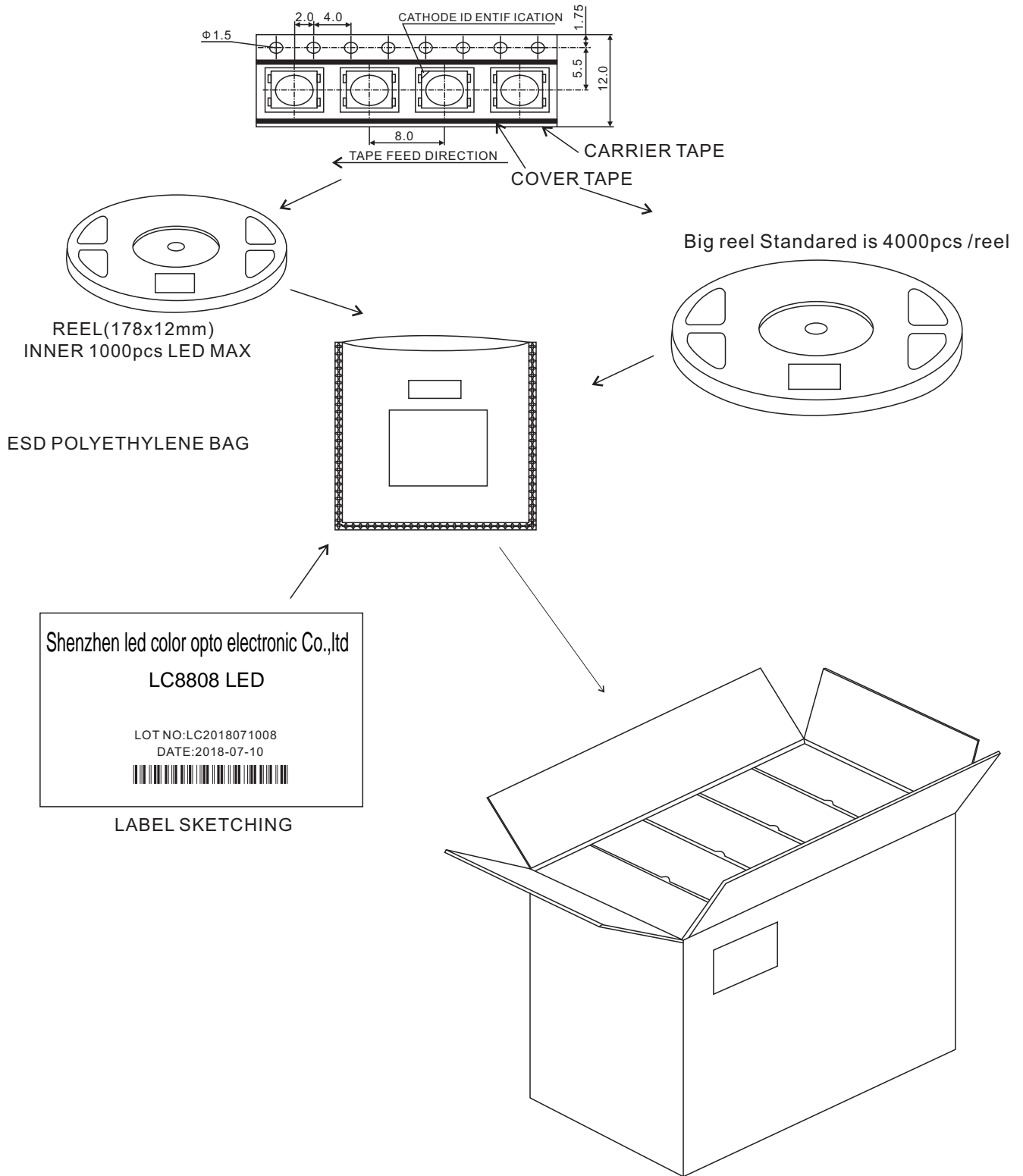
LC8808 LED



LC8808B LED



14. 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.

15. Attention

15.1 Dust & Cleaning

The LED use epoxy glue to package the 5050 Surface, epoxy surface can protect optical properties and improved anti-aging properties. However, epoxy 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.

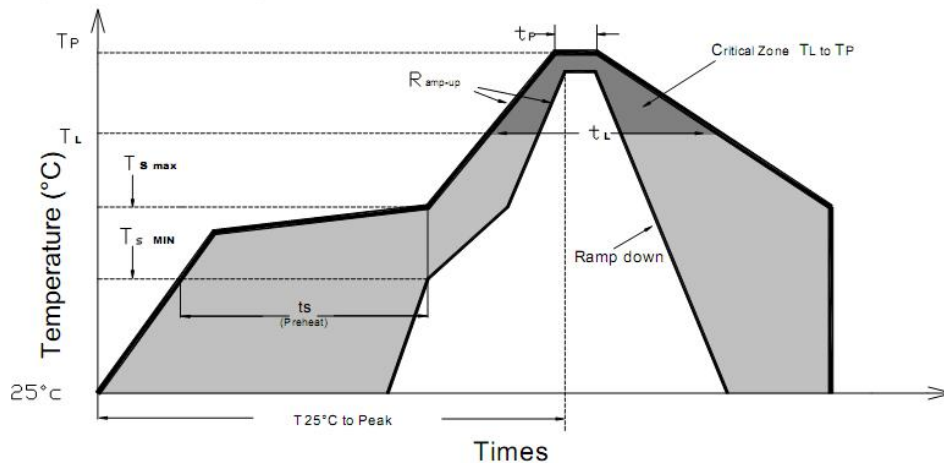
15.2 Dehumidification

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 4 hours, otherwise it need to be dehumidified again**

15.3 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.

15.4. 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.

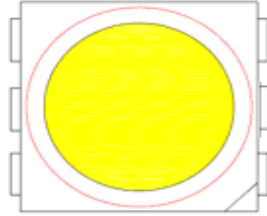
All devices and equipment must be grounded

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

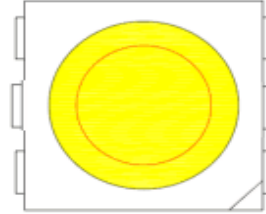
In the design of the circuit, consideration should be given to eliminating the surge to the LED

15.5 Other requirements

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



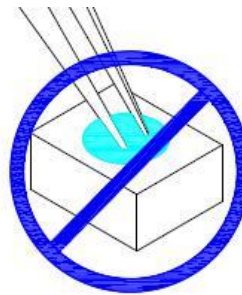
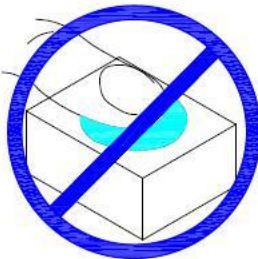
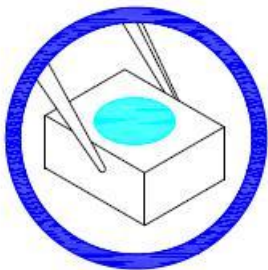
OK (the inside diameter of the nozzle is larger than the light-emitting area of the lamp)



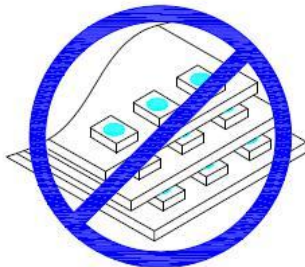
NG (the inside diameter of the nozzle is smaller than the lighting area of the lamp)

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

Item NO.	Rev. No.	Modify Content Summary	Signature	Date
LC8808 RGB	02	Initial Document	Andy Zhu	2018-07-09