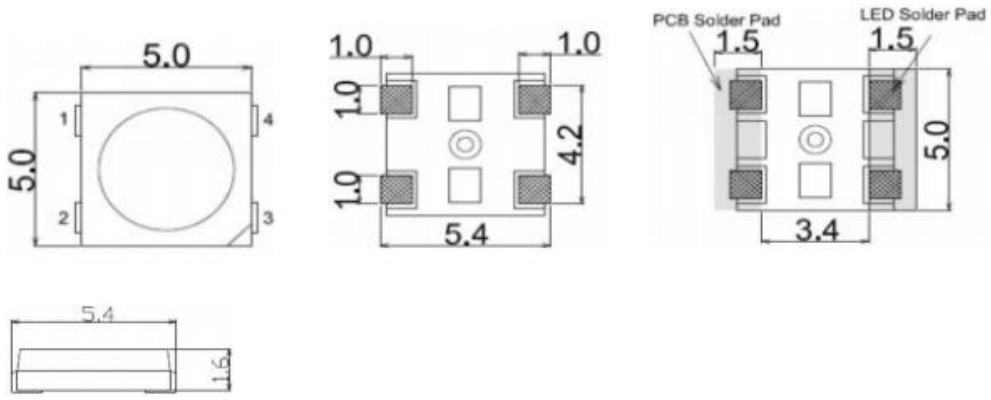
※ Characterization

SK6812 White

- Power input voltage: 3.5-7.5V
- OUT W/W/W Constant current value: 12mA
- Top SMD internal integration of high-quality external control single-wire serial cascade constant current IC.
- The control circuit and chip are integrated in SMD 5050 components, constituting a complete external control pixel, uniform color temperature and high consistency.
- Built-in data shaping circuit, any pixel receives the signal after waveform shaping and then output, to ensure that the line waveform distortion will not add up.
- Default power-on does not light up
- Gray scale adjustment circuit (256 levels adjustable)
- Data shaping: after receiving the data of this unit, the subsequent data will be shaped and output automatically.
- Single line data transmission, unlimited cascade; high compatibility of data protocols; data sending rate of 800Kbps.

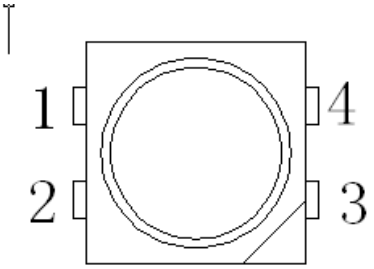
※ Structural Dimension Drawing



Notes: All dimensions are in millimeters; if not otherwise noted, tolerance ranges of ±0.2mm are normally used.

※ LED Pinout

SK6812 White



※ LED Pin Function

Pin Number	Symbol	Pin Name	Function Description
1	VDD	Power	Power supply pin positive
2	DOU	Data Output	Signal Data Output
3	GND	GND	Ground
4	DIN	Data Input	Signal Data Input

※ Maximum Rating（if not specified, TA=25℃）

Symbol	Parameter	Range	Unit
Vin	Logic Supply Voltage	3.0~7.5	V
Vds	Output Port Withstand Voltage	9	V
V1	Logic Input Voltage	-0.5~5.5	V
Lol1	Output Current	12	MA
Topt	Operating Temperature	-40~80	°C
Tstg	Storage Temperature	-40~80	°C
Vesd	ESD Withstand Voltage	4K	V

※ Electrical Parameters（if not specified, TA=25℃）

Symbol	Parameter	Minimum	Typical	Maximum	Unit
Vin	Input Voltage	3.5	5	7.5	V
Vds	Output Port Withstanding Voltage			9	V
Lol1	Output Current		12		MA
Vih	High Level Input Voltage	0.7VDD			V
Vil	Low Level Input			0.3VDD	V
Fpwm	PWM Frequency		4		KHZ
IDD	Static Power Consumption		0.3		MA

※ Switch Description（if not otherwise specified, TA=25℃）

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Data Transfer Rate	F DIN	-	800	1100	KHz
Transmission delay time	t PLZ	-	-	500	ns

※ Dynamic Parameter（Ta=25℃）

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Test Conditions
Data Transfer Speed	fDIN	---	800	---	KHZ	Duty cycle 67% (Data 1)
DOUT transmission delay	T_{PLH}	---	---	500	ns	DIN→DOUT
	T_{PHL}	---	---	500	ns	
I_{out} Rise Time	T_r	---	100	---	ns	V_{DS}=1.5V

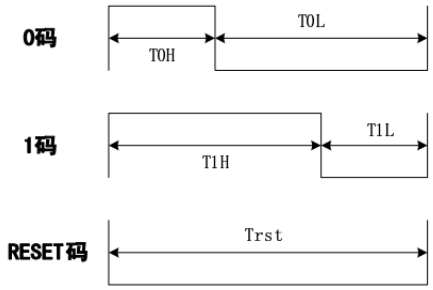
※ Code Description

SK6812 White

The chip uses a unipolar zeroing code that must have a low level for every code element. Each code element of this protocol starts high, and the time width of the high level determines whether the code is a "0" or a "1".

※ Timing Waveform

1.Input code type



2.Code time

Timetable Name		Minimum	Typical	Maximum	Unit
T	Code Period	0.89			μs
T0H	0 Code, High Level Time	0.2	0.295	0.35	μs
T0L	0 Code, Low Level Time	0.55	0.595	1.2	μs
T1H	1 Code, High Level Time	0.55	0.595	1.2	μs
T1L	1 Code, Low Level Time	0.2	0.295	0.35	μs
TRST	Reset Code, Low Level Time	80			μs

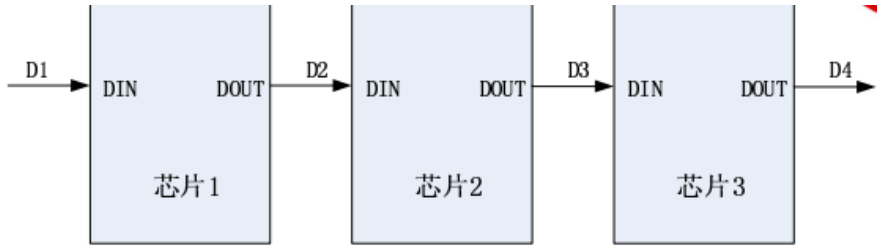
Note 1: When writing a program, the minimum required code element period is 0.9us；

Note 2: The high level time of 0 code and 1 code should be in accordance with the above table, and the low level time of 0 code and 1 code should be less than 15us；

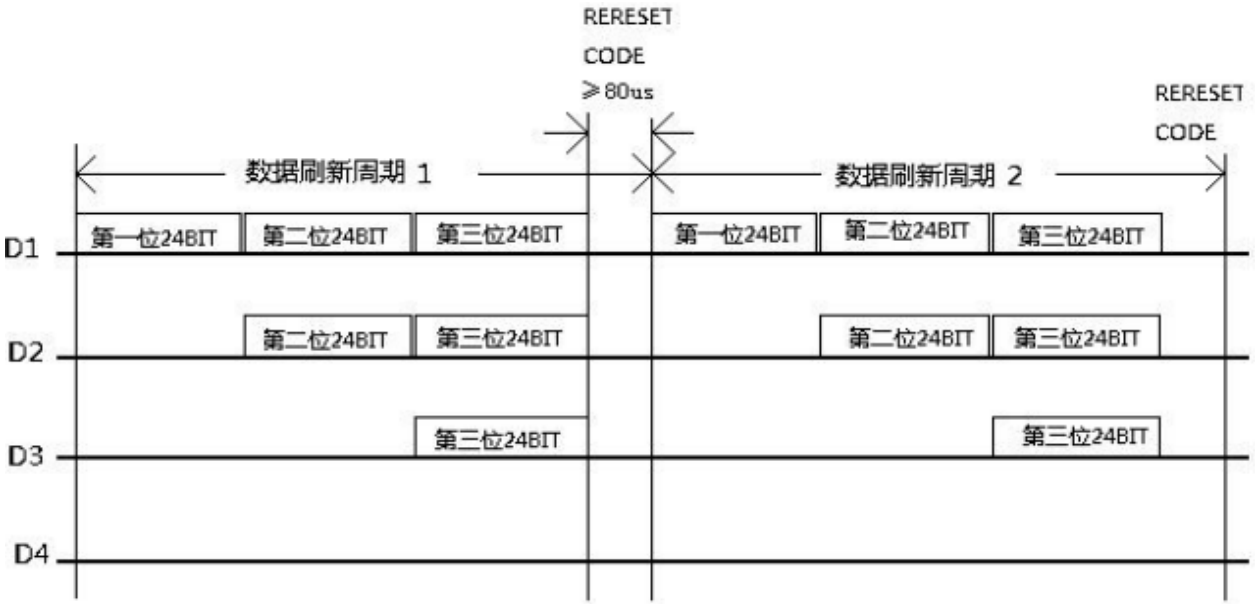
3. Protocol data format

Trst 1st chip 24bits data + 2nd chip 24bits data + ... + Nth chip 24bits data + Trst 24bit grayscale data Structure: high bit

※ Connection Method



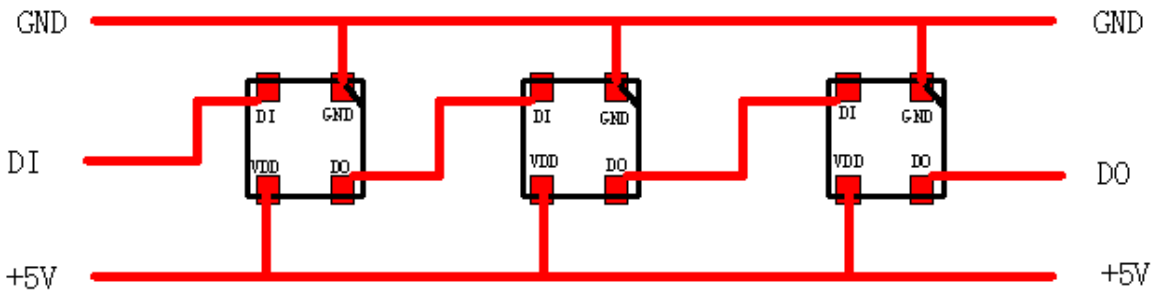
※ Data Transfer Method



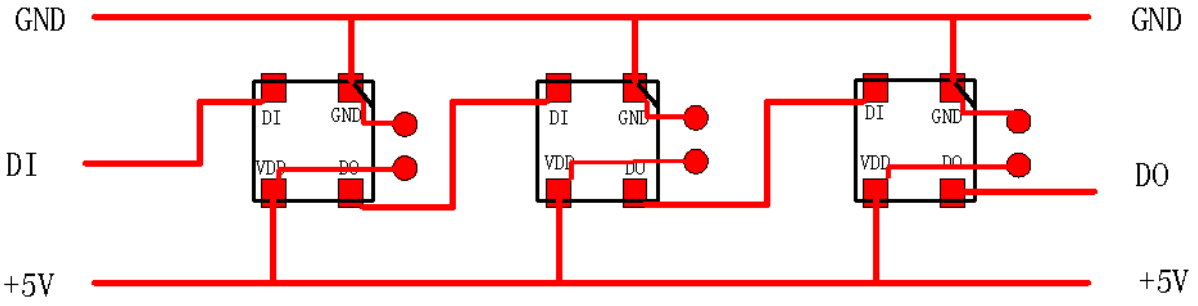
Note: D1 is the data sent from the MCU side, and D2, D3 and D4 are the data automatically shaped and forwarded by the cascade circuit.

※ Wiring Application Diagram

1：Capacitorless Resistor Diagram



2：Add Capacitor Wiring Diagram



Capacitors conventional 104 chip capacitors.

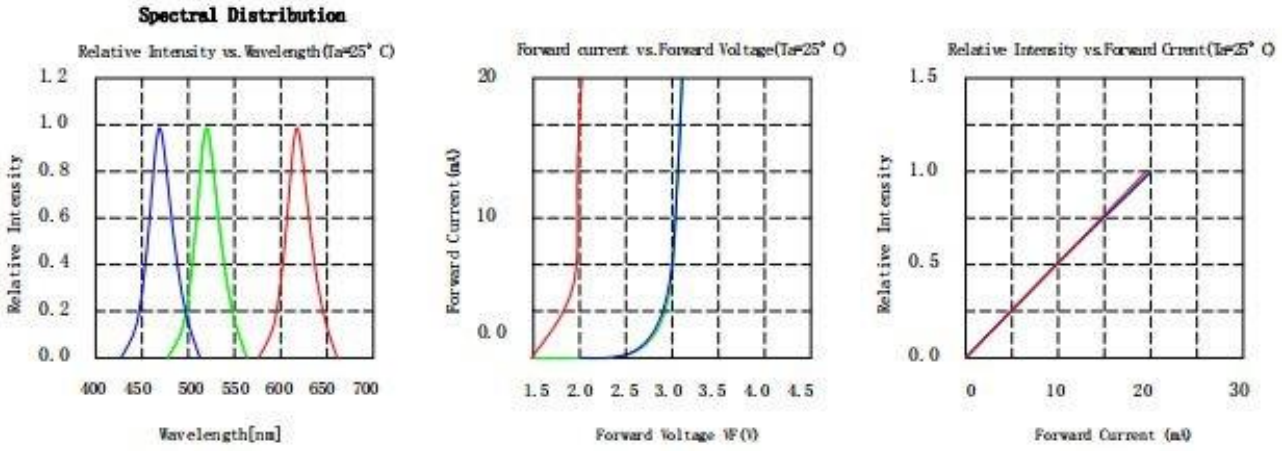
Note: red for the line with the pad, capacitors play a role in filtering, patch according to the lamp bead notch position paste. If the line needs to be changed, according to the foot position adjustment.

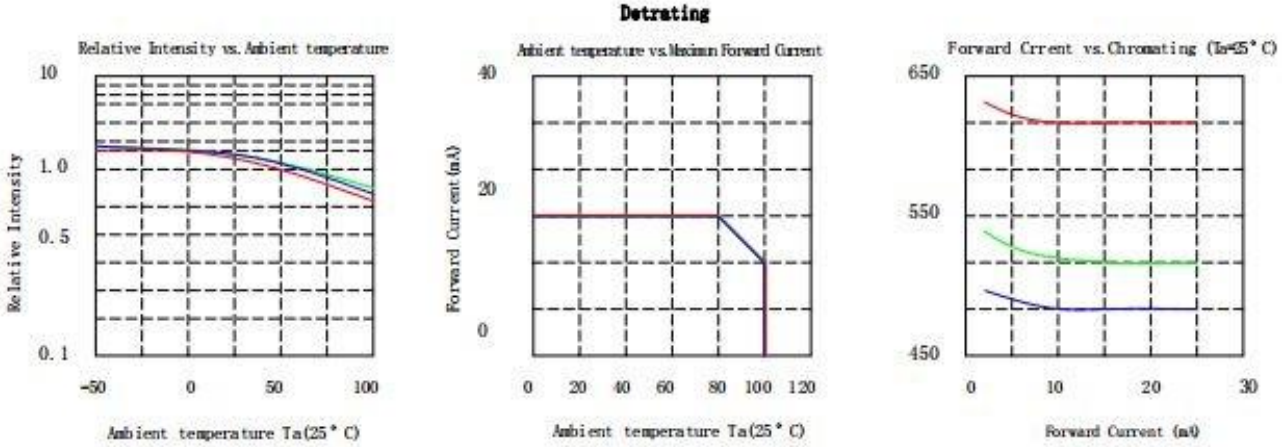
※ Optical Parameters

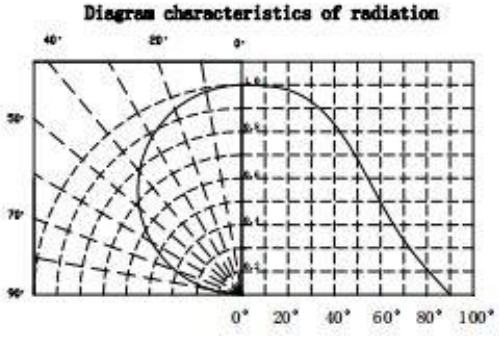
Item	Symbol	Minimum value	Typical value	Maximum value	Unit	Conditions
Luminous Brightness	Φ	9	-	14	LM	12mA
Color Temperature	F3000	2800	3000	3200	K	12mA
	F3500	3200	3500	3800	K	12mA
	F4000	3800	4000	4200	K	12mA
	F5000	4700	5000	5300	K	12mA
	F6500	6000	6500	7000	K	12mA
Color rendering	Ra	80	-	85	/	12mA

index						
Luminescence Angle	2θ1/2	-	120	-	Deg	12mA
Voltage	VF	2.7	2.8	3.0	V	12mA

※ Typical Optical Characteristics







※ Reliability

SK6812 White

1) Test Items and Judgment

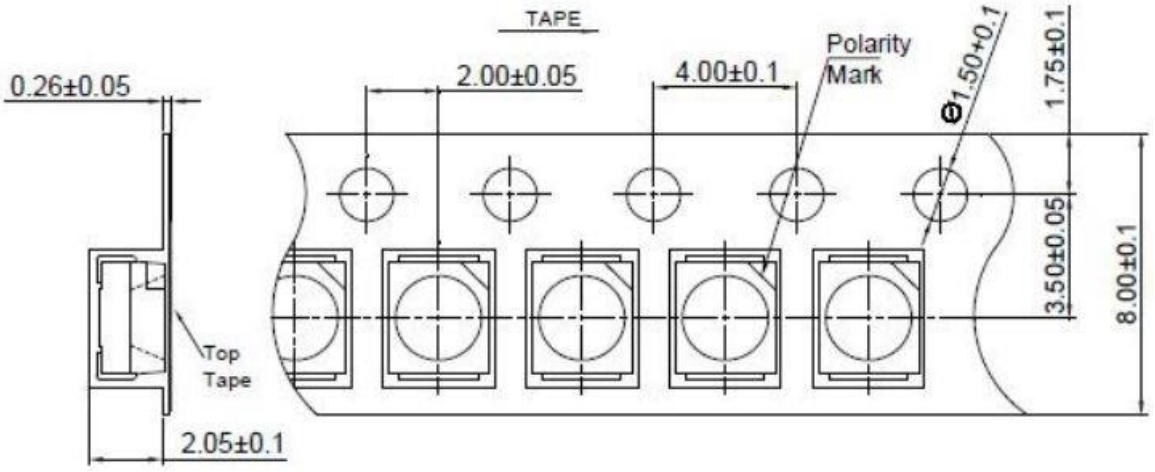
Type	Test Item	Reference Standard Ref.	Test Condition	Notes	Number of dead lights
Environmental Sequence	Reflow Heat Test	JESD22-B106	Tsld(Reflow temperature)=260℃，10sec	2 times	0/22
	Temperature Cycling	JESD22-A104	-40℃30min ↑↓5min 100℃ 30min	100 cycles	0/22
	Cold and Heat Shock	JESD22-A106	-40℃15min ↑↓5min 100℃ 15min	100 cycles	0/22
	High Temperature Storage	JESD22-A103	Ta=100℃	1000 hours	0/22
	Low Temperature Storage	JESD22-A119	Ta=-40℃	1000 hours	0/22
	Intermittent Lighting Test	JESD22-A105	On 5min -40℃＞15min ↑↓＜15min Off5min 100℃＞15min	1000 cycles	0/22
Sequence of operations	Aging Life Test	JESD22-A108	Ta=25℃ I_F =5V	1000 hours	0/22
	High temperature and high humidity aging test	JESD22-A101	60℃RH=90% I_F =5V	1000 hours	0/22

2) Failure judgment criteria

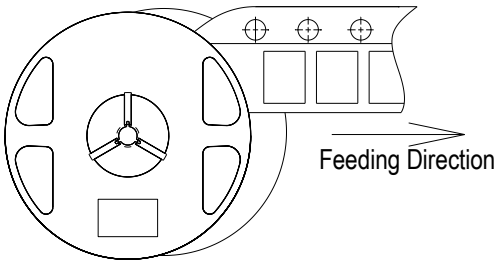
Item	Symbol	Test Conditions	Judgment Criteria	
			Minimum	Maximum

Luminous Intensity	I V	DC=5V, Specification Typical Current	Initial DataX0. 7	- - -
Resistance to soldering heat	--	DC=5V, Specification Typical Current	No dead lamp or visible damage	

※ Packaging Specification



● Tape transport direction



● Tape arrangement specifications

※ Precautions for use：

1.Storage

a.After the bag is sealed and stored in the conditions of temperature < 30 ℃, humidity < 60% RH, the shelf life is 2 months. When the shelf life is exceeded, re-baking is required.

b.Before opening the package, please check the bag for air leakage, if there is any air leakage, please re-bake before use.

c.After opening the package, please use it under the following conditions: temperature < 30℃, humidity below 60%RH; if the use time exceeds 24 hours, it must do the following baking treatment before use.

d.Baking conditions: products in the oven at a temperature of 65 ℃ ± 3 ℃; time: 12 hours.

e.Remove the product from the bag before baking. Do not open the oven door during baking.

2.Welding requirements

（1）.Manual soldering by soldering iron

a.When soldering manually, keep the temperature of the soldering iron below 315 degrees Celsius, and the soldering time is less than 3 seconds.

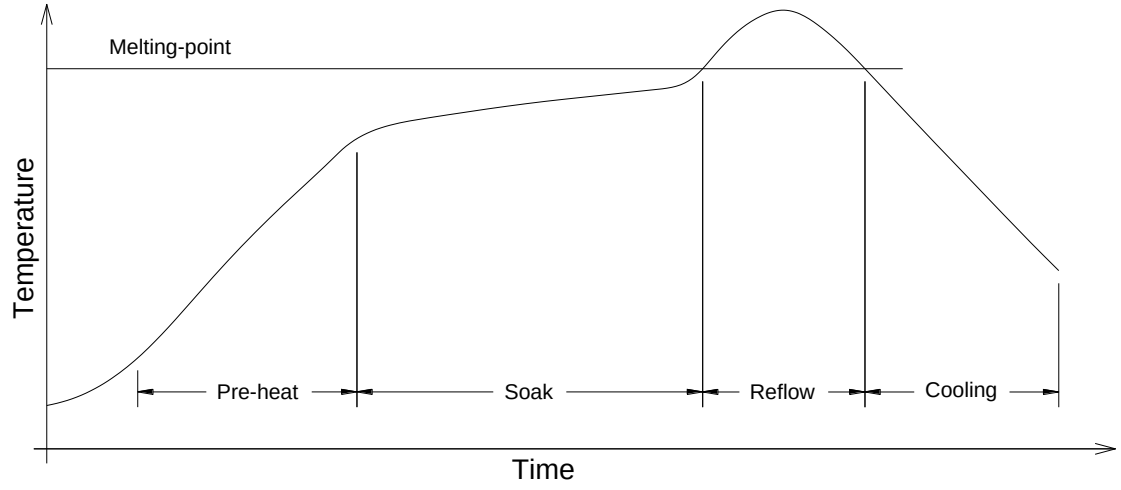
b.Manual soldering can only be performed once.

c.The soldering iron should not touch the gel.

d.Prefer double-ended soldering iron.

（2）. Reflow soldering

a.Temperature profile of reflow soldering:



（reference only）

Solder : Leaded Tin	**Solder : Lead-free tin**
Temperature rise slope = 4℃/s max.	Temperature rise slope = 4℃/s max.
Preheating temperature = 100℃ ～150℃	Preheating temperature = 150℃ ～200℃
Preheat time = 100s max.	Preheat time = 100s max.
Temperature decline slope of 6℃/s max.	Temperature decline slope of 6℃/s max.
Peak temperature = 230℃ max.	Peak temperature = 250℃ max.
Time at peak temperature ±5℃ cannot exceed 10s	Time at peak temperature ±5℃ cannot exceed 10s
Time over 183°C must not exceed 80s	Time over 183°C must not exceed 80s

b. Suggested pad heat dissipation design: refer to the pad design in the appearance drawing.

c. Do not modify the soldering surface after the soldering is completed, if you want to modify, please replace the removed LEDs with the same batch of the same grade of good products.

d. Reflow soldering should be done at one time, not in multiple passes.

e. During the reflow soldering process, the product should not be pressed or squeezed.

f. The finished product should be cooled to room temperature before packaging.

3.Cleaning

a.Don't use unknown chemical liquid to clean SMD LED: unknown chemical liquid may damage SMD LED. When it is necessary to clean, use cotton swabs with alcohol to clean SMD LED, clean it for less than 1 minute at normal room temperature and dry it naturally for 15 minutes before you start to use it.

b.Do not use a soluble solution to clean the LEDs, use an isopropyl solution, and check whether any cleaning solution will have a solubilizing effect on the LEDs before using it.

c.Please do not use ultrasonic method to clean the LED, if the product must use ultrasonic, then we must evaluate some parameters affecting the LED, such as ultrasonic power, baking time and assembly conditions, etc., before cleaning must be a trial run to confirm whether it will affect the LED.

4.Static electricity

a.These products are sensitive to static electricity and must be handled with care by the user. In particular, if the current and voltage, or exceed the absolute maximum rating or may cause electrical damage, customers are required to take appropriate measures to prevent static electricity and surge when holding the product.

b.Proper grounding of the product, the use of conductive mats, conductive overalls and shoes, conductive capacitors effectively prevent static electricity and surges.

c.The product is contacted at a place with low grounding resistance, such as a work platform with a metal surface, which should have a conductive pad (surface resistance 10^6-10^8 ohms).

d.The use of soldering iron soldering requirements of grounding. Ionized fans need to be installed in places where static electricity is high.

e.Electrostatic discharge (ESD) or pulsed current (EOS), may damage SMD LEDs.

f.Must wear electrostatic wrist, electrostatic shoes or anti-static gloves before SMD LED production.

g.All mechanical equipment must be grounded.

5. Heat treatment

SMD product heat treatment in the SMD circuit design carefully considered, the current should be appropriate to reduce the specific reference to the specifications of each product's current - temperature corresponding to the curve.

6. Selection of solder wire and solder paste

Do not use solder wire and solder paste containing sulfide or bromide, because sulfide or bromide will be plated with the stent surface of the silver layer of chemical reaction, resulting in the silver layer blackened, led bead attenuation will become larger.