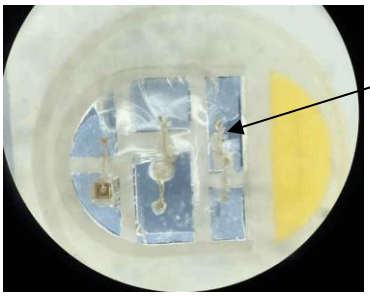
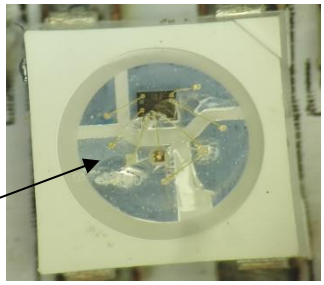
SMD Products Using Guide

1.1 Surface mount devices (SMDs) usually belong to the moisture sensitive components, moisture from the atmosphere by diffusion penetration into packaging materials. When the SMD components welded on the circuit board is it through the process of temperature is 150 ℃ ~ 245 ℃ of reflow soldering, under high temperature condition, the rapid expansion of infiltration of moisture to produce enough steam pressure damage or destroy the LED components, thus appeared within the material plastic crack, delamination or gold wire damage such as reliability failure problem.



Plastic cracking caused by moisture infiltration and S5050RGBW rainbow phenomenon

For reflow soldering temperature crack and the rainbow phenomenon SK6812



1.1.1 This series of LED products use coating has moisture-proof anti-static aluminum foil bag, handling should be avoided in the process of extrusion, packing bags of pierced happens, at the same time to prepare the necessary electrostatic protective measures. Above line homework before LED packaging already exists leakage or damaged, please stop using directly, the performance test of photoelectric packaging products with high-temperature dehumidification action again after use.

1.1.2 LED the SMT process, material, and application in the process of the finished product delivery, installation, attention should be paid to prevent external force directly or indirectly ACTS on the LED lamp body, which could lead to the external force damage LED, die modulation phenomenon occurs, therefore, need to be semi-finished products, finished product handling the work of the external force protection way.

1.1.3 In order to avoid the reliability of the failure problem caused by moisture absorption, need to be stored in moisture proof measures LED products before welding. If moisture bag is not opened, the TOP of the SMD components save time for < 30 ℃ / 60% RH for 2 months (note: start computing time to label date as a benchmark, good in packing bag packaging is required and no leakage phenomenon without use. According to different moisture level of materials, concrete save time with specification or bags prompt accurate). Suggest don't open moisture proof bag before assembly (except for incoming sampling), such as inevitable, with desiccant components must be immediately sealed packaging, and save the moistureproof ark (< 30 ℃ / 60% RH).

1.1.4 Such as feed, moisture-proof anti-static aluminum foil bag unpacking, have been found damaged, perforation can be promptly returned to the original factory for high-temperature dehumidification actions;
If a roll of SMDs material in the packaging once opened, not a one-time use up and workshop temperature and humidity in the qualification (< 30 ℃ / 60% RH), the remainder can be saved

under the following conditions:
(1) 70 ℃, 24 h after baking dehumidification vacuum sealed packaging.
(2) if the product fail to be strictly sealed container, please contact the original supplier, returned to the exchange or high-temperature dehumidification;

Should avoid to use transparent tape, stitching needle for simple sealing.

Aluminum foil bag fold and perforation

Using cellophane tape to seal bag

Sealed with stitching needle

1.1.5 SMD and PCB assembly does not need again after reflow soldering or after high temperature process, will not make special processing requirements. If need to go through after SMT reflow soldering or any other high temperature process (including rework), due to the solder paste contains a large number of moisture, note before reflow soldering action is required to ensure that the LED products are exposed to the air time control within 2 hours.

1.1.6 Moisture sensitivity

SMD LED series adopts moisture-proof anti-static aluminum foil bag packaging, this design aims to extend the storage life. If after opening the package, this period of time before welding, SMD series, LED exposed to damp environment, so in the process of welding, the LED damage may occur. The derating table below to determine the SMD series, LED can be exposed in the column of humidity and temperature conditions for the longest time (unit: day). If the LED the exposure time of excess of time specified in the table below, must be in accordance with the baking conditions listed below.

The temperature	The biggest percentage relative humidity						
	30%	40%	50%	60%	70%	80%	90%
35℃	-	-	1H	0.5H	-	-	-
30℃	-	3H	2H	1H	0.5H	-	-
25℃	-	4H	3H	2H	1H	-	-
20℃	6H	5H	4H	3H	2H	1H	0.5H

1.1.7 SMD components dehumidification methods: place the tray tile (not overlap) the oven to 70 ℃, bake for rear can use 24 hours a day.

Low-temperature dehumidifier must remove the bags, and then put tray in the oven

1.2 Transportation process, pay attention to product packaging heads, moisture-proof, waterproof, avoid extrusion, collision damage to packing. (the environment clean, low humidity)

2. Electrostatic protection

LED is electrostatic sensitive device, although LED products has excellent antistatic ability, but every experience, the impact of electrostatic discharge, will cause a certain degree of damage to the LED, so in the process of using LED products, electrostatic protective measures need to be, for example, equipment and reliable grounding, wear anti-static gloves, anti-static bracelet, etc.

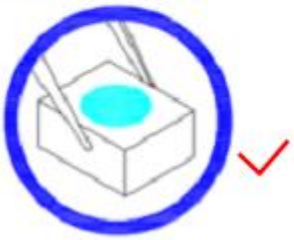
3. Led series-parallel use instructions

In the circuit design of application products, depending on the driving voltage can choose different series-parallel combination, should fully understand the LED electrical and thermal properties, in order to ensure the reliability of LED products. For lower single lamp in the series circuit fault occurs, the use of whole line brings risks, avoid branch series excessive number of led. Single light parallel applications, such as adopting constant voltage power supply mode, should be practical to evaluate the difference of the volt ampere curve of each LED light produced by the strong impact of sync change, and adopt some measures to balance the current value between single lamp.

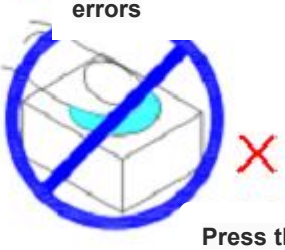
4. Different ways of welding requirements

4.1 Manual welding requirements

a. **Take right way**



b. **Take wrong way and put way after assembly errors**



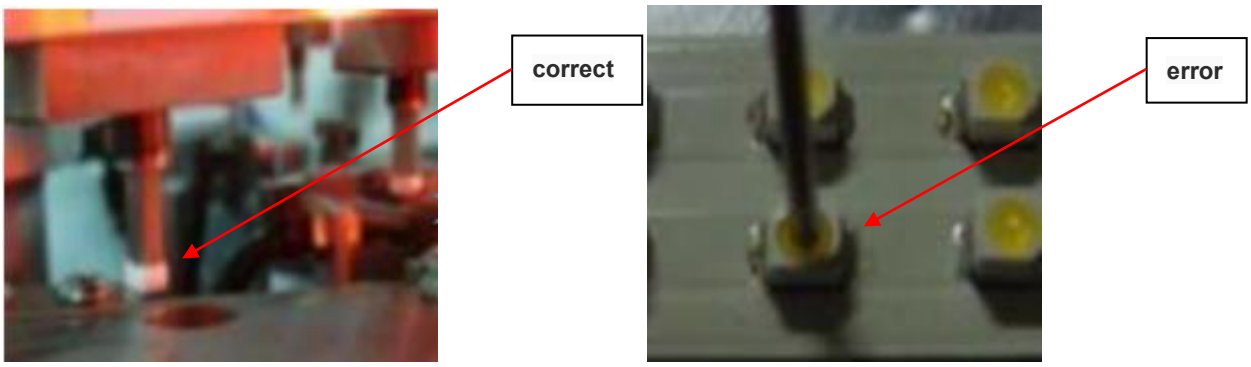
Press the colloid

Heap pressure material

It is recommended to use electric power less than 60 w, control the solder iron t not exceed 350 ℃, every time the welding electric stay for no more than 3 seconds on the bracket pin, such as the need to repeatedly, when welding the interval time not less than 3 seconds, avoid long time high temperature cause damage to the LED; During the welding process, do not touch or squeeze the LED lamp bead surface, avoid internal damage to the LED, at the same time, please pay attention to avoid the soldering iron to LED surface colloid and PPA, burns and other injuries.

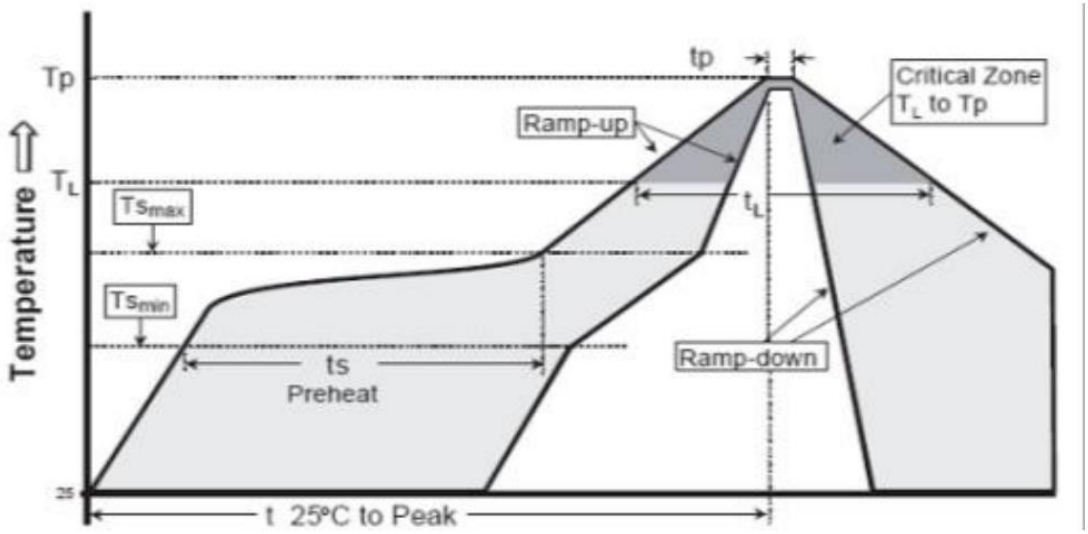
4.2 Reflow soldering requirements

4.2.1 To avoid the sealing colloid viscosity suction nozzle SMT table caused by the poor, such as material to absorb, cast materials phenomenon. According to this, the user can according to SMD product specification suitable size of suction nozzle (when the suction nozzle can suck encapsulation colloid outside along the normal or PPA for LED internal force minimum), which can effectively prevent or reduce the resulting a series of bad problem.



4.2.2 Reflow soldering related parameters setting, please refer to the below and the following table and advise clients according to the adoption of material properties on the basis of soldering materials suppliers to make the necessary adjustments. It is recommended to use thousand live, alpha, henkel loctite brand solder paste, etc. (note: this guidelines may not apply to all PCB design and reflow soldering equipment configuration)

Reflow soldering temperature curve



Temperature curve characteristics	Leaded solder	Lead-free solder
The average speed (Ts_{max} 至 Tp)	Max3℃/s	Max 3℃/s
Preheating: minimum temperature (Ts_{min})	100℃	150℃
Preheating: highest temperature (Ts_{max})	150℃	200℃
Preheating: time(ts_{min} 至 ts_{max})	60-120 s	60-180 s
Maintain the high temperature time：temperature (T_L)	183 ℃	217 ℃
Maintain the high temperature time： time(t_L)	60-150 s	60-150 s
Peak temperature/classification (T_P)	215 ℃	<245 ℃
In the actual peak temperature (tp) time of 5 ℃	<10 s	<10 s
Cooling speed	Max 6℃/s	Max 6℃/s
Time needed for 25 ℃ temperature rose to a peak	Max 6min	Max 6min

Reflow soldering temperature set general requirements（Temperature range of 8）：

Preheating zone		Constant temperature zone			Backflow zone		Cool the area
1 piece	2 piece	3 piece	4 piece	5 piece	6 piece	7 piece	8 piece
135℃	145℃	165℃	185℃	215℃	230℃	242℃	220℃
Make the element preheating, remove the moisture in the solder paste, solvent		Make the product in before reflow solder completely dry, flux activation, remove metal oxide in flux			Comprehensive thermalization remelting; The temperature will reach the peak temperature		Solder with the decreasing temperature solidification

※Transportation speed: 65 cm/min (the above is only for the suggestion, will be subject to the actual molten tin, with differences between each manufacturer of reflow furnace temperature, the solder paste is different; usually suggest solder paste alloy ingredients: Sn96.5 / Ag3.0 / Cu0.5).

4.2.3 Reflow soldering considerations

(1) advice to brush the thickness of the solder paste stencil≦0.12mm.

(2) as the reflow soldering process, there are welding bad, can only use constant temperature electric soldering iron for repair, can't use the heating machine maintenance, so as not to damage the LED.

(3) after reflow process, should be carried out after cooling to room temperature is to subsequent electric test and homework, avoid operation under the thermal state, so as not to damage the LED.

(4) if you cannot provide the relative humidity is lower than 60% of the store environment, before the reflow soldering, SMD series, LED to bake.

5. Cleaning method

Avoid using an unknown chemical liquid or acidic solvent for cleaning fluid, before using solvents (such as water washing board), please confirm whether its chemical composition of epoxy resin, organic silicon, silicon resin, such as stents silver coating caused by corrosion, and the resulting LED characteristic change or function damage.

Usually recommend using ethanol as solvent SMD leds clean, with a clean cloth glued ethanol will first light on the surface of the body surface impurities gently wipe clean after (to prevent excessive abrasion encapsulation colloid or destroy the lamp body internal structure), placed under normal temperature natural drying, begin to use again, at the same time we should pay attention to avoid LED invasion into in ethanol solution.

6. Heat management

(1) in the design of heat management must be considered when using led.

(2) the environment temperature is LED to the use of the high temperature, or it will shorten the service life and even failure.

7. Work in low temperature

Minimum operating temperature of the SMD components - 20 ℃. For maximum service life, we suggest to avoid applying these SMD components to below 0 ℃ temperature of lamps and lanterns to open and close the application of more than 10000 cycles.

8. Silver color possibility

SMD LED series containing silver plated parts, after exposure to such as sulfur, chlorine or other halogen compounds under oxidizing substances, with the passage of time, will lose luster (black). Lead oxide will reduce the ability to achieve good welding effect, thus affect the LED light output. Exposure to oxidizing substances under the conditions may include access to the manufacturing process of LED materials used in or near LED ambient air during storage.

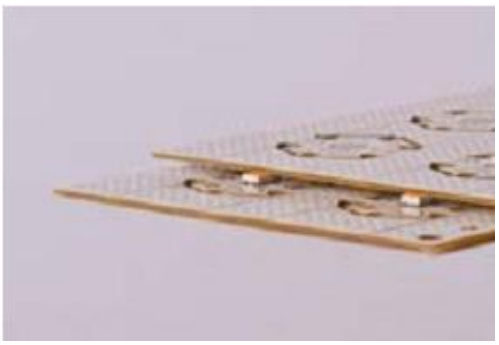
To reduce the possibility of SMD series, LED color, we suggest the customer as far as possible not to be LED under exposure to oxidizing substances, including storage, manufacturing and product during the test. Potential sources of oxidizing substances including paper, air filter, some cleaning chemicals, cardboard boxes and esd rubber mat.

9. Storage and processing components

Don't stack contains SMD series, LED PCB or components. If you want to pile up with SMD series, LED PCB or components, PCB or should retain at least 2 cm gap between components.

Do not use bubble on the top of the SMD series, LED directly packaging materials. Force can damage the LED from bubble packaging materials.

错误



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