Manual of Smart LED

NMD approval		
Approval	Audit	Confirmation
KEVIN ZHU	TONI WU	ZHENLEIWU

***Before using our products, please search our official website to check the version of the specification. The version of the product specification will be updated in time. Please refer to the latest information on the official website ;**

***The copyright and the final interpretation right of the product belong to Shenzhen Normand Electronic Co., Ltd. if you have special specifications, please contact our engineers ;**

***Website : http://www.normandled.com**

Change History

Date	Rev. No.	Changes/Reason of changes	Signature
2021.04.19	01	Initial Document	吴振雷

CONTENTS

1、Purpose 4
2、description 4
3、Shipment and storage of TOP SMD/EC SMD.....4-6
4、Definition of humidity card.....6
5、Save materials from unused reels.....6-8
6、Moisture-proof control of finished materials 8-10
7、Design requirements for general use.....10
8、Points to note.....11
9、Welding conditions for TOP LED CHIP leds.....12-13
10、 Heat generation and design requirements.....13
11、Anti-static and surge protection of IC devices.....13
12、Installation and protection of application finished products.....14
13、In the news.....14

1. Purpose

In order to improve the understanding of our product features, and quickly master the basic operation of the product, the manual will help you to safe, standard, reasonable use and maintenance of the company's products, in order to avoid as far as possible because of the artificial cause of product damage, so that it can better serve the production. In addition, we will provide you with perfect technical support and pre-sale and after-sale services according to your needs.

2. Description

In general, leds are used in the same way as other leds. In order to make customers better use of NORMAND LED products, please read this manual carefully before using our electronic component LED products, understanding the use of selected LED conditions and related limit parameters, in the field of practical application of its reliability and overall system design level, operation, use conditions are closely related, the user manual can not cover all the problems that the customer may encounter during the use of the manual. Some of the contents are covered but may not provide detailed explanation. We apologize for any inconvenience caused. In addition, this manual is not regularly updated, during the relevant information changes will not be subject to notice.

3、Shipment and storage of TOP SMD/EC SMD

Surface Mount Devices (SMDs) are usually humidity sensitive components, where moisture in the atmosphere permeates the packaging material through diffusion. SMD components are soldered to the circuit board by reflow soldering at temperatures between 150 °C and 260 °C, the moisture seeping into the LED can be damaged or destroyed by steam pressure due to the rapid expansion at high temperature, which leads to the reliability failure of the material such as inner glue crack, delamination or gold line damage。

3.1 Top SMDEC SMD shipment

This series of LED products with a moisture-proof anti-static aluminum foil bag packaging, handling process should avoid extrusion, puncture packaging bag situation, at the same time need to do a good job in the necessary electrostatic protection measures. Therefore, the LED anti-static aluminum foil bag has air leakage or damage, please directly stop using, the packaging product for photoelectric performance testing and high-temperature dehumidification action before use. During the process of mounting and transferring materials of TOP SMD/EC SMD, as well as in the process of shipping and installing the finished products, attention should be paid to the prevention of external force acting directly or indirectly on the LED lamp body. This process may cause external force to damage the LED and cause the phenomenon of dead light, therefore, it is necessary to do a good job of semi-finished products, finished products during the handling of external force protection.

3.2Top SMDEC SMD storage in front of Kaifeng

3.2.1 to avoid the reliability failure caused by hygroscopicity, storage and moisture-proof measures should be taken before welding of LED products. If the bag is not opened, the storage time of TOP SMD COMPONENT IS & Lt; 30 °c/60% rh for 3 months (Note: The initial calculation time is based on the label date and should be used when the package is properly sealed and free of air leakage and the humidity indicator card is not pink. For different moisture-proof grade materials or packaging storage time has certain differences, the specific storage time to specifications or packaging bag tips) , eC SMD components have a shelf life of 6 months. It is recommended that the moisture-proof bags should not be opened at random before SMT assembly (if sampling is needed, the small packages in the same batch will be provided by our company for sampling inspection) , if it is unavoidable, components must be immediately and properly sealed with desiccant and a new humidity indicator and stored in a moisture-proof cabinet (& LT; 30 °c/60% rh) .

3.2.2 the TOP SMD lamp beads exceed the effective storage time by 3 months but not by 6 months, the EC SMD lamp beads exceed the effective storage time by 6 months but not by 9 months, and vacuum dehumidification is required before use, remove the bag and bake at 70 °c/48 H or above before use. If not for SMT operations, dehumidification finished products must be vacuum packaging processing. If the operation can not be carried out by the customer, please return to oscorp processing.

3.2.3 TOP SMD LAMP BEADS EXCEED PACKAGE DATE BY 6 months, EC SMD lamp beads exceed package date by 9 months, please return to OSC for processing. Products not returned in time will not be processed by us.

3.2.4 please return to Osk for air leakage, perforation or breakage of moisture-proof bags.

3.3 control after bag unpacking

After opening the bag, immediately check the humidity indicator card in the moisture indicator area (in 1 minute to complete the humidity card confirmation) whether to turn red to confirm whether the moisture bag is excessive. According to the color of the moisture-proof beads, the bag material can be worked on line, and after opening the package material should be strictly controlled within the maximum temperature and humidity and operating time allowed in Table 1, as long as the material is exposed to the environment described in Table 1, it is necessary to accumulate its use time in the workshop. After opening the package and sticking the material on the PCB board, reflow soldering should be completed within 0.5 hours. It is not recommended to stick the material on the PCB, and do not reflow soldering in the workshop for a long time In order to prevent the material from absorbing the moisture in the solder paste, as long as the SMD is exposed to the surrounding environment, it is necessary to accumulate its workshop use time, except baking time.

Chart 1:Definition of material’ s MSL prescribed by IPC/JEDECJ-STD-020E

Moisture proof	Workshop lifespan after open the packaging	
	Time	condition
LEVEL1	unlimited	≦30℃/85 % RH
LEVEL2	1 year	≦30℃/60 % RH
LEVEL2a	4 Weeks	≦30℃/60 % RH
LEVEL3	168 Hours	≦30℃/60 % RH
LEVEL4	72 Hours	≦30℃/60 % RH
LEVEL5	48 Hours	≦30℃/60 % RH
LEVEL5a	24 Hours	≦30℃/60 % RH
LEVEL6	Take off and use immediately	≦30℃/60 % RH

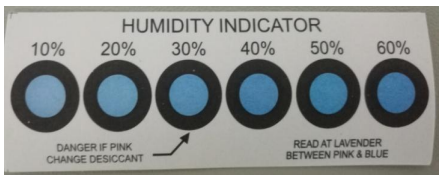
4. .Definition of humidity card

Open the package after the TOP SMD LED bag inside the humidity card color instructions are as follows:

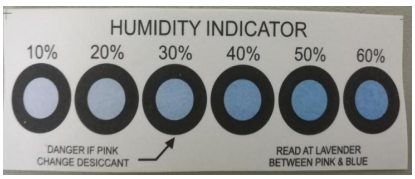
A. If the moisture card 10% of the moisture-proof beads into pink, other files for the blue, this situation, LED can be used directly;

B. If the humidity card moisture-proof beads 10%, 20% at all become pink, in fact, the file is blue, this situation, the need for low-temperature components dehumidification;

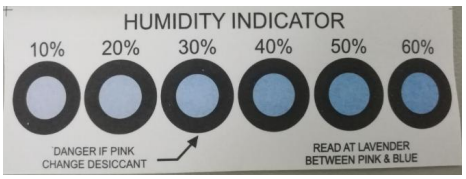
C. If the humidity card moisture-proof beads 10%, 20%, 30% more than three are turned pink, in this case, the customer needs to return the material to our company for high humidity dehumidification, re-packaging before use;



Humidity indicator DO not change color



Humidity indicator tums pink in 10% 20%



Humidity indicator tums pink in 10% 20% 30%

5. Save materials from unused reels

If a volume of SMDs material is not used up in one go and the temperature and humidity of the workshop are within the specified conditions (& Lt; 30 °c/60% rh) , the exposure time of the SMDs element to air does not exceed the "table 1" standard, the remainder may be saved if a volume of SMD material is not used up at one time, if the temperature and humidity of the workshop are within the limited conditions (& Lt; 30 ° c/60% rh) , the remaining materials should be sealed with desiccant, otherwise, the materials must be dried with low humidity, the time can be calculated again after the re-packaging of the dehumidified materials, and the SMD elements assembled can be protected from moisture

5.1 sealed with desiccant;

5.2 if not sealed with desiccant, stored in a 5% RH drying box. The calculation method of the workshop life is as follows: the time of SMD element exposed to air after packaging and unpackaging until reflow soldering. If the unused material is preserved in the above way, the service life of the workshop can be suspended and the accumulated time is used as the basis for calculation. If the life of the workshop has exceeded the time specified in Table 1, the calculation can start again after the components have been baked and dehumidified. Such as before, has found the moisture-proof anti-static aluminum foil bag open, damaged, perforated can be returned to the original factory for dehumidification.。

The bag is pleated and perforated with aluminum foil

Use transparent adhesive tape to seal the foil bag after opening

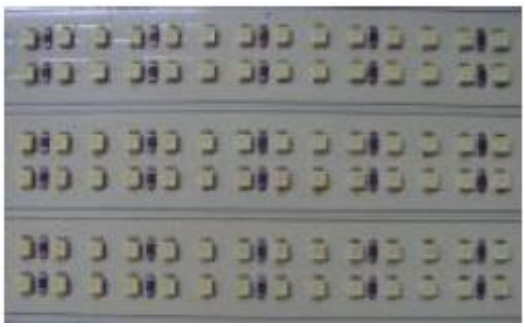
The aluminum foil bag is sealed with staples

SMD products that are not used up after packaging and unpacking should be kept in a sealed and dry environment. Avoid using transparent tape and staples for simple sealing. If the product is not strictly sealed moisture preservation, then re-use must be carried out before high temperature dehumidification.

5.5.3 moisture-proof control of SMD components assembled on PCB.

Paste on the PCB material, should be in 0.5 hours to complete the reflow soldering, do not recommend the material paste on the PCB, long time stagnant in the workshop do not reflow soldering, so as not to absorb moisture in the solder paste caused by harmful hidden dangers;

If the humidity sensitive SMD is assembled to PCB without reflow or high temperature process, no special treatment requirements will be made. If reflow or any other high temperature process (including rework) is required, the time interval should be within 4 hours (the workshop environment humidity 60% , temperature less than 30 °c) .



Because the solder paste contains a lot of water, in order to avoid the moisture through the bracket pin into the interior of the lamp, resulting in reflow soldering LED failure, therefore, after surface mounting of TOP SMD, it should be avoided to stay in the air for too long (within 0.5 h after mounting to reflow soldering) and the reflow soldering times should not exceed 2 times at most, the time interval should be controlled within 4H (the humidity of workshop is 60% , the temperature is less than 30 °c)) .

6.Moisture-proof control of finished materials

6.1.1a. After the components have been assembled to the PCB board no longer need to go through the high temperature process or reflow process, it will not be special treatment;

b. It is suggested that the necessary dehumidification work should be done before the products need to be protected by pouring, dripping or coating. The products should be baked in the oven at 70 °C ± 5 °C for not less than 48 hours, in order to eliminate the product in the detection, aging process exposed to the moisture absorption in the air (specific dehumidification baking parameter reference 6.1.2) ;

c. For products that require secondary SMT process or high temperature, they should be subjected to the necessary moisture treatment before secondary welding, after exposure to (<30 ° C / 60% RH) , The maximum length of not more than 4H, Connaught second high temperature process separated by a long time, then a welding material must be necessary dehumidification work (70 ℃ ± 5 ℃ oven baking no less than 48 hours), and then pumping Vacuum storage; or the first product stored in the oven or with a desiccant container, the second high-temperature process before doing dehumidification work (70 ℃ ± 5 ℃ in the oven baking no less than 48 hours) , To ensure that products in the high temperature before the process is not damp (Specific desiccant baking parameters refer to 6.1.2 items); ;

Low-temperature baking conditions: 70 ° C ± 5 ° C baking not less than 48 hours high temperature baking conditions: 130 ° C ± 5 ° C baking not less than 6 hours (lamp beads must be split into particles)

6.1.2 The relationship between ambient humidity and dehumidification time for low temperature/high temperature dehumidification:

Ambient humidity	Oven temperature	baking time	Baking method
40%	70C°	24H	Remove from the static bag and bake with the reel to dehumidify.
50%	70C°	48H	
>60%	70C°	Ineffective dehumidification baking	
40%	130C°	6H	**Lamp beads must be dismantled into granules to bake and dehumidify**
50%	130C°	12H	

6.1.3 dehumidification methods for SMD components

(1) baking conditions at low temperature: Bake at 70 ° C ± 5 ° C for not less than 48 hours; lay the Pan Flat (non-overlapping) for 48 hours before use.

(2) high temperature baking conditions: Baking at 130 ° C ± 5 ° C for not less than 6 hours (the lamp beads must be broken into pieces) , and the cooling process after baking must be carried out in a dry environment行 ， To avoid a sudden drop in temperature。

TIPS: The baking process should be carried out product grade marking and distinction, to avoid mixing file phenomenon. After high temperature baking, the material should be placed in a dry environment (such as gradually cooling in the oven) and cooled for 1 hour before using. At the same time, it should be noted that because the material tray, carrying belt and covering belt can not bear high temperature, only after removing the carrying belt, remove the LED components and place them in a high-temperature oven. Such as customers do high-temperature baking dehumidification, because they can not re-tape packaging, and is limited to hand-paste。

Low temperature

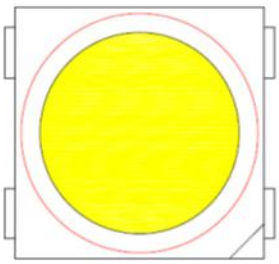
For Cryogenic Dehumidification, the package must be removed and the reels placed in the oven

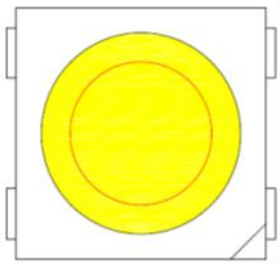
High temperature dehumi

Because the package material can not bear the high temperature environment, so the high temperature dehumidification must remove the package, and then put the LED device into the plate to bake, at the same time, the dehumidification process should pay attention to the different parameters of materials placed separately to prevent mixing

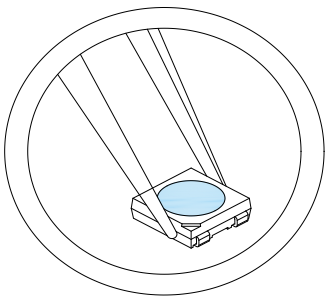
7. Design requirements for general use

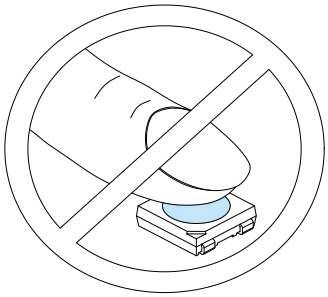
. SMT SUCTION NOZZLE REQUIREMENTS: (Red Circle refers to the suction nozzle diameter)

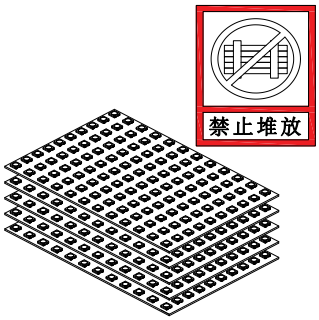




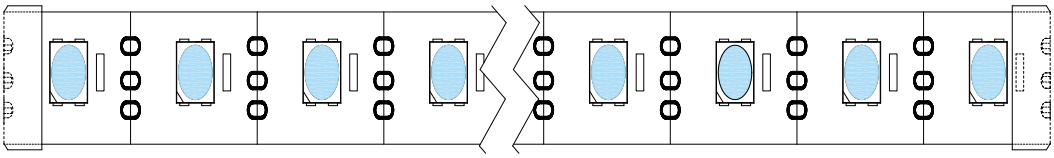
. Material Access: With tweezers material, can not press the colloid or sharp objects to touch the COLLOID, material can not stack ;







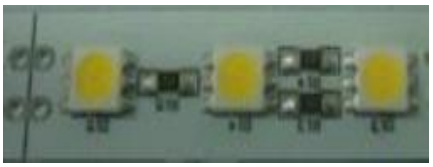
. When the product is in PCB wiring design, for Flexible Board and board below 0.5 t, the direction of solder pad should be perpendicular to the extension direction of PCB, so as to reduce the stress effect on LED pin during PCB bending, resulting in the potential failure of LED products due to stress stretching; (pictured below)



✔

The arrangement of SMD IN SOFT PCB

✔



✘

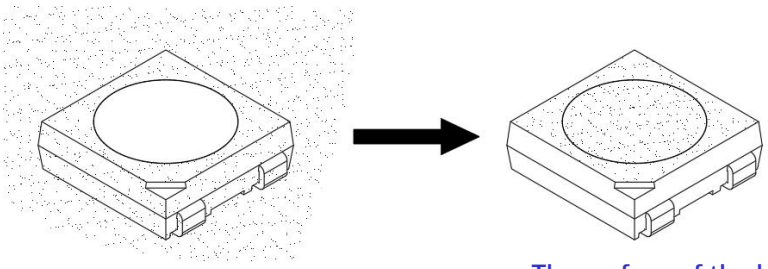
. Top LED components, if applied to hard PCB, should also give priority to the vertical arrangement . As the application of product design needs to consider the needs of beauty, light curve, etc. , therefore, some applications will also be used in the horizontal arrangement, then production assembly, finished product installation process on the degree of rigid PCB warpage must be controlled.

Generally, the maximum warpage degree is not more than ± 10 ° angle. The thicker the PCB, the smaller the warpage angle

8. Points to note

1. The surface of LED is encapsulated by silicon resin, which can protect LED optical system and anti-aging performance. However, Silicone Resin soft, easy to stick to dust, therefore, to maintain a clean working environment. Of course, there is a certain amount of dust in the surface of LED, will not affect the brightness, but we should still avoid dust fall to the surface of LED. Priority is given to those who open the package. LED-mounted components should be stored in clean containers..

Silicone-encapsulated LED, dust-proof place



No Dust Protection

The surface of the lamp bead is dirty

2. When the surface of the LED needs to be cleaned, if using a solution such as trichloroethene or acetone, the surface of the LED will dissolve and so on. Do not clean the LED with a soluble solution. Use a solution of ISOPROPYL group. Make sure it will dissolve the LED before using any cleaning solution.

3. Please do not use ultrasonic cleaning LED, if the product must use ultrasonic, then it is necessary to evaluate the impact of some of the LED parameters, such as ultrasonic power, baking time and assembly conditions, must be tested before cleaning, to See if it affects the leds。

Do not clean LED lamp beads with soluble solution

Do not use ultrasonic cleaning methods LED

9.Welding conditions for TOP LED CHIP leds

9.1. a.Welding: soldering iron; reflow soldering

B. After the material, immediately observe the humidity card indicators meet the requirements, if not meet the requirements according to point "4" requirements, the humidity less than 60% is recommended within 12 hours. In order to avoid the adverse effects of environmental humidity, it is suggested that high temperature (or low temperature) dehumidification should be adopted before the next use if the storage time is longer than 24 hours. Failure to comply with the requirements of the product after unpacking may result in:

①.The separation of material colloid results in the deviation of white light coordinate and luminous flux, which may result in the death of light。

②.The material colloid produces the crack glue, causes the material to produce the dead light。

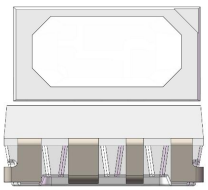
c．Temperature and time requirements for each welding mode：

(1)Soldering iron：

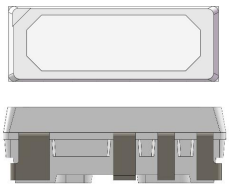
1.The temperature of TOP LED soldering iron is 300 °C and the soldering time is 2s. The welding position should be at least 0.15 mm from white shell or colloid. The power of electric iron should be lower than 30w.

2. The PPA glue Shell of the SIDE series SMD products is thinner, and the lamp body is easy to be damaged by manual welding；4020、3512、4818、EC3210 ……

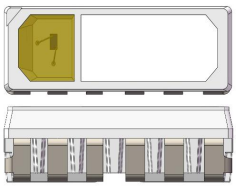
4020



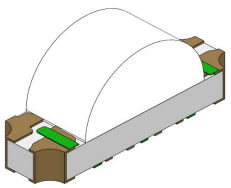
3512



4818

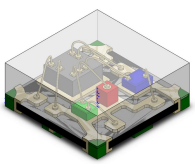


EC3210

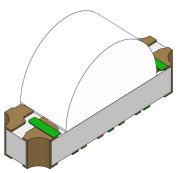


3. Because the size of the CHIP LED is small, it is difficult to control the consistency of the welding temperature and the soldering time when the CHIP is welded by hand. Don't press the LED colloid heavily in the manual welding operation, otherwise it is easy to damage the structure of the lamp and may cause the lamp not to be bright seriously, therefore, as far as possible use reflow soldering machine for work. (see below)

EC1515



EC3210



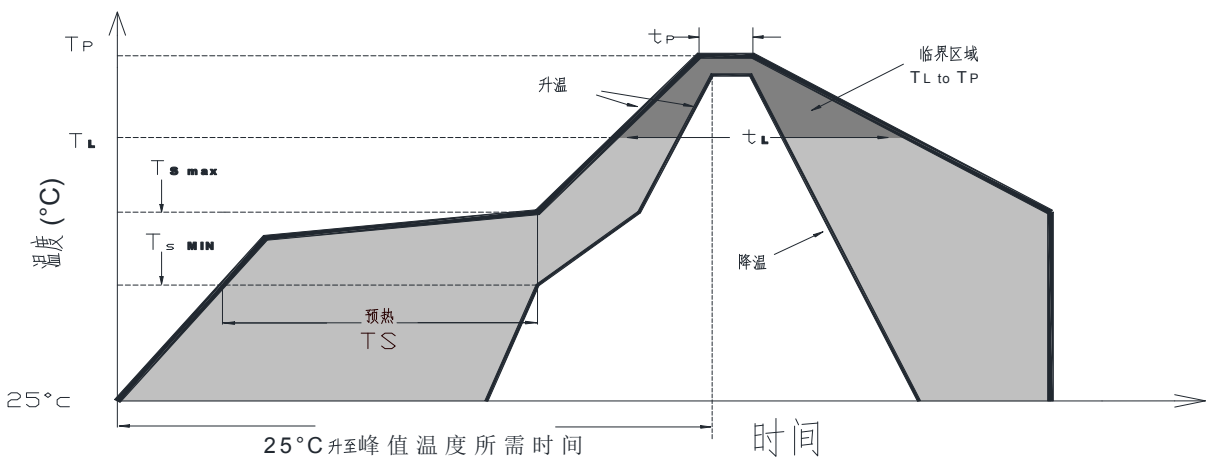
COLLOIDdetachment

After the CHIP LED is welded, when the temperature of the lamp body does not drop to normal temperature, the external force may cause the resin glue to fall off

9.2. Reflow Soldering Characteristics

In testing, Normand has found S50 LEDs to be compatible with JEDEC J-STD-020E,using the parameter listed below. As a general guideline Normand recommends that users follow the recommended soldering profile provided by the manufacturer of solder paste used.

Note that this general guideline is offered as a starting point and may require adjustment for certain PCB designs and configurations of reflow soldering equipment.



Profile Feature	Lead-Based Solder	Lead-Free Solder
Average Ramp-Up Rate (Ts_{max} to Tp)	3℃/second max.	3℃/second max.
Preheat: Temperature Min (Ts_{min})	100℃	150℃
Preheat: Temperature Min (Ts_{max})	150℃	200℃
Preheat: Time (ts_{min} to ts_{max})	60-120 seconds	60-180 seconds
Time Maintained Above: Temperature (T_L)	183 ℃	217 ℃
Time Maintained Above: Time (t_L)	60-150 seconds	60-150 seconds
Peak/Classification Temperature (T_P)	215 ℃	240 ℃
Time Within 5℃ of Actual Peak Temperature (tp)	<10 seconds	<10 seconds
Ramp-Down Rate	6℃/second max.	6℃/second max.
Time 25 ℃ to Peak Temperature	<6 minutes max.	<6 minutes max.

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

Points to note:

Firstly, the temperature of each temperature zone of reflow soldering machine was measured by temperature measuring instrument. 2 The recommended temperature curve for lead free reflow soldering of TOP leds is shown in the figure above. No matter how you set it, the maximum temperature of 240 °c should not exceed 10 seconds and 220 °c should not exceed 60 seconds. 3 different types of SMDs (TOP, CHIP LED) product peak temperature setting should be different, generally the same type of the larger the stress release, the relative decline in high temperature resistance. For example: 5050 welding temperature should be lower than 3528 products.

10. Heat generation and design requirements

. For LED products, the design of heat dissipation is important. In system design, consider the heat generated by the LED, the thermal resistance of the PCB, the placement of the LED, the density and related composition, and the electrical power input to increase the temperature . . To avoid excessive heat generation, make sure that the LED operates within the maximum range of specifications required in the product specification. The highest ambient temperature should be considered when setting the driving current of the LED. The maximum working temperature of the product is not easy to exceed 60 ° C (that is, ≤60 ° C, refers to the working temperature of the product pin)

11. Anti-static and surge protection of IC devices

. Static Electricity and surges can harm LED products of IC devices, so precautions must be taken; The signal input and output ports of the IC devices must be connected in series with protective resistors in order to prevent the products from being invalidated by surge or electrostatic impact on the ports. In order to protect the LED products of IC devices, no matter what time and occasion, as long as contact with LED, must wear anti-static hand belt, anti-static foot belt and anti-static gloves. All installations and equipment shall be grounded. It is suggested that electrical test should be carried out on each product before shipment. In circuit design, consideration should be given to the possibility of eliminating the hazard of transients to leds.

12.Installation and protection of application finished products

A. Avoid LED application products in acidic, high sulfur concentration in the environment to use.

B. Because acidic materials have a certain degree of corrosion, such as LED packaging caused by colloid yellowing, in addition to TOP white light products used in the long acid environment, under the acid will be bleaching phenomenon. Therefore, the application of finished installation should avoid the use of acid glue: such as Acetate Silicone sealant (common glass glue) to stick fixed LED finished products.

C. Application of Product Assembly, waterproof treatment also to avoid contact with Ph 7 acid waterproof glue, acid hot welding solvent.

D. For outdoor LED application products, should do a good job of grounding protection to prevent leakage of electricity or lightning damage to the products.

13. In the news

1. We will not be responsible for any problem if we use it beyond the specification.

2. Led can be strong enough to harm the eyes of the light, to pay attention to prevention, can not be too long with the naked eye directly LED light.

3. Prior to mass use, you should communicate with us for more detailed specifications.

4. If there is any change in the shape and specification of LED products, please do not inform us in time.