

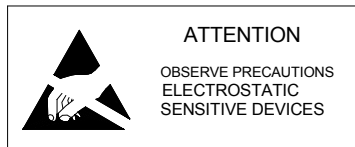
MODEL No : 5050

ENGINEERING NO.:

Description:

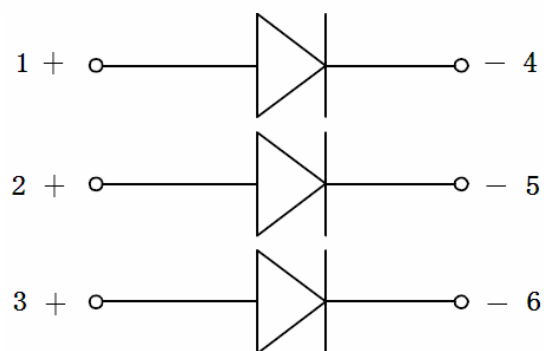
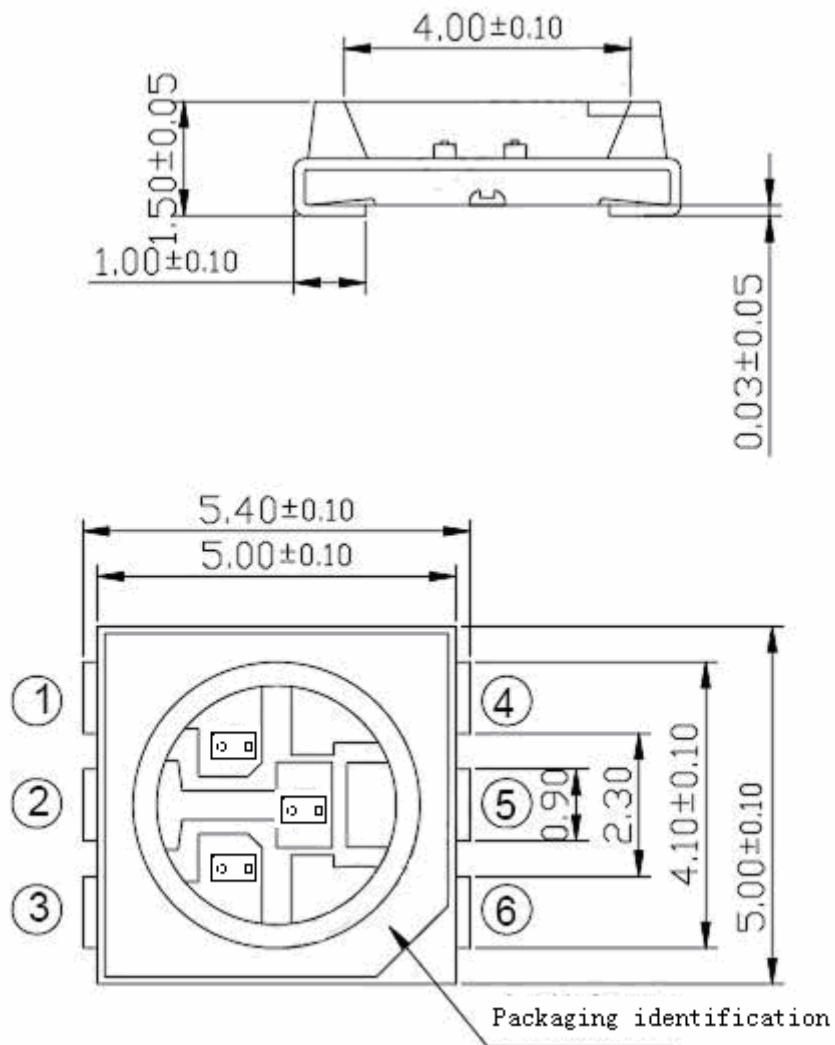
- 120 Degree 5.0*5.0mm SMD-LED in White Color
- Yellow opaque colloid
- Black without surface

Die Manufacturers: EPISTAR
 Die size: 9*26
 Wafer material: InGaN



Make	Examination	Approval
Confirmed By Customer		
Purchasing Department	Quality department	Engineering Department

Product size chart:



- NOTES:**
1. All dimensions are in millimeters (inches);
 2. Tolerances are 0.2mm unless otherwise noted.

Product application and electrical parameters:

Product application:

1、 Indicators	4、 Fluorescent lamp
2、 Indoor lighting	5、 LCD Back Lights
3、 Automobile's Applications	6、 Illuminations

Absolute maximum ratings at Ta=25°C

Items	Symbol	Absolute maximum Rating	Unit
Forward DC current	I_F	3*30	mA
Peak Forward	I_{FP}	3*100	mA
Reverse Voltage	V_R	10	V
Power Dissipation	P_D	3*110	mW
ESD (HBM)	ESD	>2000	V
Operating temperature range	T_{opr}	-40 ~ +85	°C
Storage temperature range	T_{stg}	-40 ~ +100	°C

*pulse width $\leq 0.1\text{msec}$ duty $\leq 1/10$

Characteristics at Ta=25°C

Items	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward voltage	V_F	$I_F = 3*20\text{mA}$	2.8	2.9	3.0	V
Reverse Current	I_R	$V_R = 10\text{V}$	---	---	1	μA
Chromaticity Coordinates	X	$I_F = 3*20\text{mA}$	0.263	---	0.516	**
	Y	$I_F = 3*20\text{mA}$	0.25	---	0.415	**
Correlated Color Temperature	CCT	$I_F = 3*20\text{mA}$	2100	---	20500	K
Luminous flux	Φ_A	$I_F = 3*20\text{mA}$	18	---	30	LM
Color Render Index	Ra	$I_F = 3*20\text{mA}$	70	---	---	**
Lifespan	hrs				65.000	hrs

Range:

Items	H23G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	18-21	2200-2300
Chromaticity Coordinates	(X,Y)			
Symbol	H22G-T0	H22G-T1	H22G-B0	H22G-B1
Items	H24G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	19-22	2300-2500
Chromaticity Coordinates	(X,Y)			
Symbol	H24G-T0	H24G-T1	H24G-B0	H24G-B1

Range:

Items	H26G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	21-24	2580-2725
Chromaticity Coordinates	(X,Y)			
Symbol	H26G-T0	H26G-T1	H26G-B0	H26G-B1
Items	H28G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	22-25	2725-2870
Chromaticity Coordinates	(X,Y)			
Symbol	H28G-T0	H28G-T1	H28G-B0	H28G-B1
Items	H29G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	22-25	2870-3045
Chromaticity Coordinates	(X,Y)			
Symbol	H29G-T0	H29G-T1	H29G-B0	H29G-B1
Items	H31G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	23-26	3045-3220
Chromaticity Coordinates	(X,Y)			
Symbol	H31G-T0	H31G-T1	H31G-B0	H31G-B1
Items	H34G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	22-25	3220-3465
Chromaticity Coordinates	(X,Y)			
Symbol	H34G-T0	H34G-T1	H34G-B0	H34G-B1
Items	H36G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	25.5-28.5	3465-3710
Chromaticity Coordinates	(X,Y)			
Symbol	H36G-T0	H36G-T1	H36G-B0	H36G-B1

Range:

Items	H38G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	25-28	3710-3985
Chromaticity Coordinates	(X,Y)			
Symbol	H38G-T0	H38G-T1	H38G-B0	H38G-B1
Items	H41G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	26-29	3985-4260
Chromaticity Coordinates	(X,Y)			
Symbol	H41G-T0	H41G-T1	H41G-B0	H41G-B1
Items	H44G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	24-27	4260-4503
Chromaticity Coordinates	(X,Y)			
Symbol	H44G-T0	H44G-T1	H44G-B0	H44G-B1
Items	H46G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	24-27	4503-4745
Chromaticity Coordinates	(X,Y)			
Symbol	H46G-T0	H46G-T1	H46G-B0	H46G-B1
Items	H52G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	25-28	5028-5310
Chromaticity Coordinates	(X,Y)			
Symbol	H52G-T0	H52G-T1	H52G-B0	H52G-B1
Correlated Color Temperature	5028-5170	5170-5310	5028-5170	5170-5310
Items	H55G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	25-28	5310-5665
Chromaticity Coordinates	(X,Y)			
Symbol	H55G-T0	H55G-T1	H55G-B0	H55G-B1
Correlated Color Temperature	5310-5480	5480-5665	5310-5480	5480-5665

Range:

Items	H58G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	25-28	5665-6020
Chromaticity Coordinates	(X,Y)			
Symbol	H58G-T0	H58G-T1	H58G-B0	H58G-B1
Correlated Color Temperature	5665-5840	5840-6020	5665-5840	5840-6020
Items	H62G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	24.5-27.5	6020-6530
Chromaticity Coordinates	(X,Y)			
Symbol	H62G-T0	H62G-T1	H62G-B0	H62G-B1
Correlated Color Temperature	6020-6270	6270-6530	6020-6270	6270-6530
Items	H68G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	24.5-27.5	6530-7040
Chromaticity Coordinates	(X,Y)			
Symbol	H68G-T0	H68G-T1	H68G-B0	H68G-B1
Correlated Color Temperature	6530-6780	6780-7040	6530-6780	6780-7040
Items	H73G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	24.5-27.5	7040-7600
Chromaticity Coordinates	(X,Y)			
Symbol	H73G-T0	H73G-T1	H73G-B0	H73G-B1
Correlated Color Temperature	7040-7320	7320-7600	7040-7320	7320-7600
Items	H79G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	24-27	7600-8000
Chromaticity Coordinates	(X,Y)			
Symbol	H79G-T0	H79G-T1	H79G-B0	H79G-B1
Correlated Color Temperature	7600-7800	7800-8000	7600-7800	7800-8000

Range:

Items	H86G			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	24-27	8000-9000
Chromaticity Coordinates	(X,Y)			
Symbol	H86G-T0	H86G-T1	H86G-B0	H86G-B1
Correlated Color Temperature	8000-8500	8500-9000	8000-8500	8500-9000
Items	HWG			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	22.5-25.5	9000-10800
Chromaticity Coordinates	(X,Y)			
Symbol	HWG-T0	HWG-T1	HWG-B0	HWG-B1
Correlated Color Temperature	9000-9800	9800-10800	9000-9800	9800-10800
Items	HWE			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	22.5-25.5	10800-14000K
Chromaticity Coordinates	(X,Y)			
Symbol	HWE-T0	HWE-T1	HWE-B0	HWE-B1
Correlated Color Temperature	10800-12400	12400-14000	10800-12400	12400-14000
Items	HWC			
	VF		Luminous flux (LM)	CCT(K)
Range	2.8-2.9	2.9-3.0	20-23	14000-20500
Chromaticity Coordinates	(X,Y)			
Symbol	HWC-T0	HWC-T1	HWC-B0	HWC-B1
Correlated Color Temperature	14000-18000	18000-20500	14000-18000	18000-20500

Important Notes:

- 1) All ranks will be included per delivery, rank ratio will be determined by Runlite.
- 2) Tolerance of measurement of luminous intensity is $\pm 10\%$.
- 3) Tolerance of measurement of dominant wavelength is $\pm 1\text{nm}$.
- 4) Color Coordinates Measurement allowance is ± 0.005 .
- 5) Tolerance of measurement of Vf is $\pm 0.05\text{ V}$.
- 6) products to be opened as soon as possible after the finish, the product shall not be corrosive gases in the environment of storage and use of the unused light to be sealed, otherwise it will absorb moisture adverse.
- 7) If the chip is made of InGaN, use should be noted that ESD, static electricity would be required to wear a ring and anti-static gloves, equipment and apparatus shall be grounded.
- 8) Other considerations with reference to "SMD application notes."
- 9) conditions beyond the scope of this product allows the use of any consequences of output, the company is not liable.
- 10) We have been in continuous efforts to improve the performance of SMD products, specifications are subject to change without notice.

Typical Optical-Electronic Characteristic Curves

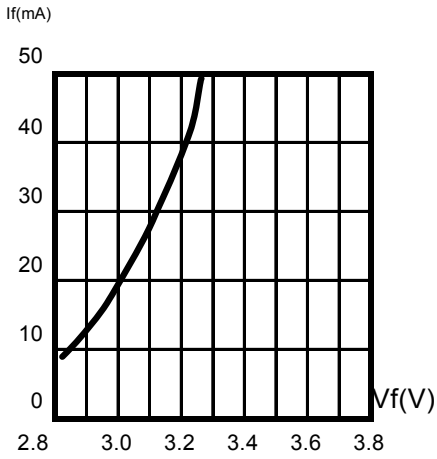


Fig.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

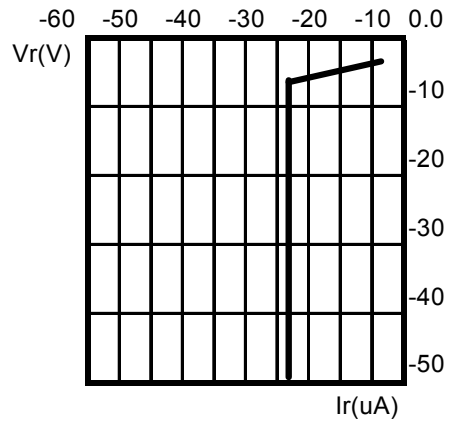


Fig.2 REVERSE CURRENT VS. REVERSE VOLTAGE.

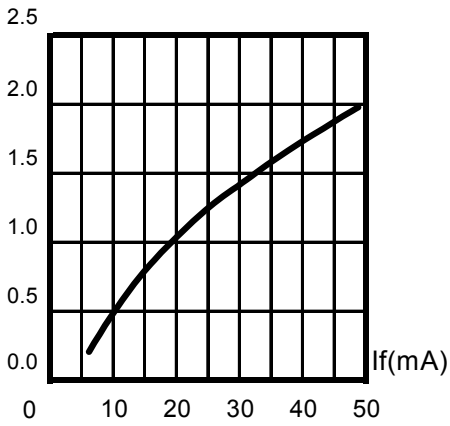


Fig.3 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT.

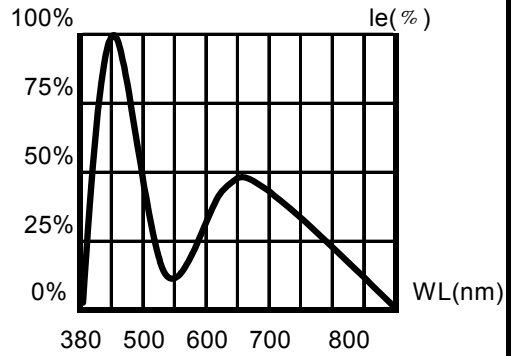


Fig.4 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.

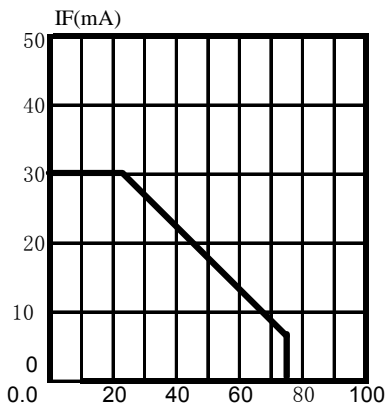


FIG.5 MAXIMUM FORWARD DC CURRENT VS AMBIENT TEMPERATURE ($T_{j\text{max}}=105^\circ\text{C}$)

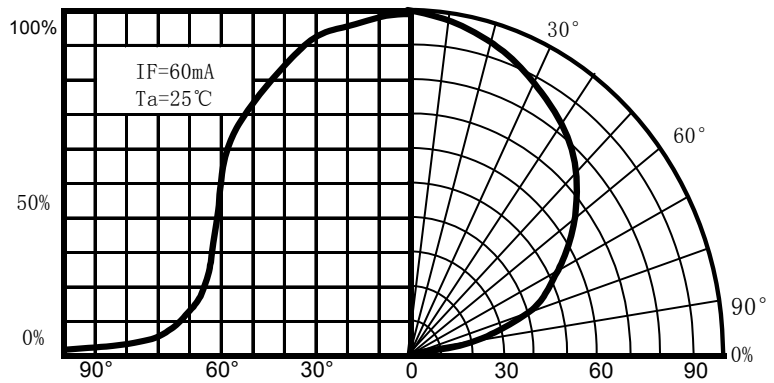


FIG.6 Relative Luminous Intensity us. Radiation

Tests and Results:

Type	Test item	Applicable standard	Test condition	Duration	Sampling number	Accept criteria
environment test	Temperature cycles	JEITA ED-4701 100 105	-40℃~25℃~100℃~25℃ 30min 5min 30min 5min	100cycles	100	0/100
	Thermal shock	MIL-STD-202G	-40℃~100℃ 30min 30min	300cycles	100	0/100
	High humidity heat cycles	JEITA ED-4701 200 203	30℃~65℃ RH=90% 24hrs/1 cycle	50cycles	100	0/100
	High temperature storage	JEITA ED-4701 200 201	Ta=100℃	1000hrs	100	0/100
	Low temperature storage	JEITA ED-4701 200 202	Ta=-40℃	1000hrs	100	0/100
	High temperature & high humidity storage	JEITA ED-4701 100 103	Ta=60℃ RH=90%	1000hrs	100	0/100
life test	Normal temperature life test	/	Ta=25℃ IF=3*20mA	1000hrs	100	0/100
	High temperature & high humidity life test	/	Ta=60℃ RH=90% IF=3*20mA	1000hrs	100	0/100
	Low temperature life test	/	Ta=-30℃ IF=3*20mA	1000hrs	100	0/100
	High temperature life test	/	Ta=85℃ IF=3*20mA	1000hrs	100	0/100
destructive experiment	Resistance to soldering heat (Reflow soldering)	JEITA ED-4701 300 301	Tsol=245℃,10sec Pretreatment:30℃ 70%RH 168hrs	2 times	20	0/20
	Solderability	/	Tsol=245℃±5℃,5sec using flux	one time	10	0/10
ESD	Electrostatic discharge test	JEITA ED-470 300 304	Human body model 1000V forward and reverse	each 3 times	10	0/10
physical experiment	Vibration	JEITA ED-4701 400 403	20G 20-2000HZ 4mins X,Y,Z 3directions	each 4cycles	10	0/10
	Drop	/	75CM	3 times	10	0/10

Failure Criteria:

Item	Symbol	Test condition	Criteria for Judgment
Forward Voltage	V _F	I _F =3*20mA	Initial Data±10%
Reverse Current	I _R	V _R =10V	≦ 1μA
Luminous Intensity	I _v	I _F =3*20mA	Single led degradation ≦ 50% and Average degradation ≦ 30%
Solderability	----	----	Over 90%
Vibration	----	I _F =3*20mA	No dead lamps or visual damage
Drop	----	I _F =3*20mA	No dead lamps or visual damage

Remark: RH:Environment humidity; Ta:Environment temperature;

T_{sol}:Tin temperature; I_F:Forward current; V_R:Reverse voltage.

Color classification:
Reference **ENERGY STAR**,

Application Notes:

Description:

LED SMD product is a surface patch package with silicone products, belong to the moisture sensitive element, the water in the air through the diffusion of infiltration Through the packaging material products, when the products through the reflow oven 150 °C - 260 °C, in the high temperature environment, the moisture that Penetrate into the SMD product PPA and inside the silica gel is rapidly expanding to produce steam pressure damage to the product, resulting the crack in SMD the surface of the product and inside the silicone glue, the gold line was cracked and other quality trouble.

Packaging and Transportation:

SMD products with anti moisture and anti-static aluminum foil bag vacuum packaging, handling process should avoid extrusion and puncture the situation of the packaging bag, At the same time, it is necessary to do the necessary ESD protection measures, if the on-line work before the LED packaging bag already exist be leaked or damaged, must Immediately stop using and return to our company to the photoelectric performance testing and baking and drying.

SMD products in the production process, transfer process and the application of finished products, the installation process should pay attention to prevent the external force directly or Indirect effect on LED beads surface, which may caused by LED dead, so must make semi-finished products and the external protection of the finished product.

Storage:

In order to avoid the problem of product reliability failure due to moisture absorption and moisture, we must do a good job in the storage of LED silicone products before welding. Shelf life in original sealed bag at storage condition of <30°C and <60%RH is 3 months, Baking is required whenever shelf life is expired, After bag opened, the SMT LED must be stored under the condition < 30°C and < 65%RH. Under this condition, SMT LED must be used (subject to reflow) within 8 hours after bag opening, and re-baking is required when exceeding 12 hours. For baking, place SMT-LED in oven at temperature 70°C±3°C and relative humidity <=10%RH, for 48 hours.

Control before use

After opening the moisture proof bag, check the humidity card immediately to confirm whether the moisture in the moisture proof bag is too much. Strictly controlled at a temperature of less than 30°C, humidity is less than 60%RH in the environment, the use of time is 12 hours (the environment must be request, must control the use of time). If the use of time beyond the specified time to use, must be baked after the treatment of desiccant Normal use (dehumidifying conditions: 70°C ± 3°C. relative humidity is less than or equal to 10%RH, time:

48 hours). Due to the lack of storage conditions and other reasons, the proposed patch before the package at the temperature of $70^{\circ}\text{C} \pm 3^{\circ}\text{C}$; relative humidity The degree of less than 10%RH oven, open the packaging drying process after 12 hours of use.

Moisture recognition and treatment

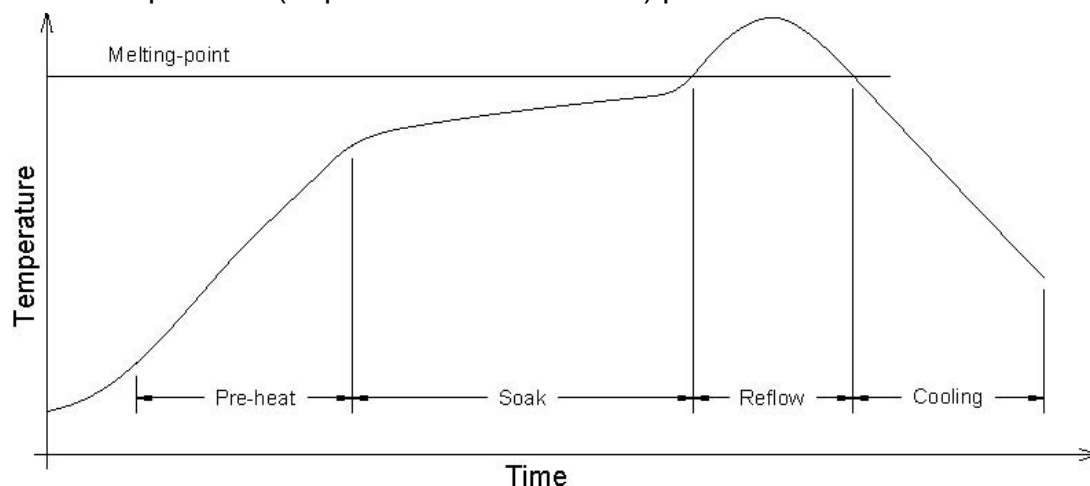
Open the humidity bag, the card color is changed and processing mode as follows:



- 1、 Humidity card moisture indicator diagram has not changed color, normal use.
- 2、 humidity card above moisture indicator 10% change color, the other file is blue, need to drying: $70^{\circ}\text{C} \pm 3^{\circ}\text{C}$; relative humidity is less than or equal to 10%RH, time: 12 hours (Open the bag after dehumidification).
- 3、 humidity card above moisture indicator 10%, 20% changes in color, the other file is blue, must be drying before the use ,conditions: $70^{\circ}\text{C} \pm 3^{\circ}\text{C}$; relative humidity is less than or equal to 10%RH, time: 24 hours (to open the bag after dehumidification).
- 4、 humidity card above moisture indicator 10%, 20%, 30% changed color, the other file is blue, the product must turn back in my department drying, re packaging can be used.

Reflow Soldering notes:

- 1、 The temperature (Top surface of SMD LED) profile is as below:



Attention to the difference in temperature of the use of leaded solder paste and lead-free solder paste, laboratory testing of our products can withstand the maximum temperature of the 260°C High temperature, suggested lead solder paste highest temperature $225^{\circ}\text{C} \pm 5^{\circ}\text{C}$, lead-free solder paste and highest temperature $250^{\circ}\text{C} \pm 5^{\circ}\text{C}$, the best use of the eight temperature Zone reflow oven,

set the seventh temperature zone for the highest temperature, the eighth temperature zone is set to cool area, because the LED package of silica gel in the highest The temperature will become soft, the maximum temperature exceeds the TG point of the silica gel will become soft, eighth temperature zone set for the purpose of cooling down Solidification buffering package of silica gel, rapid freeze LED package will lead to a sharp contraction of glue gold or tensile strain, resulting the quality hidden troublein.

The reference temperature of reflow is as follows:

Items	Solder = Sn63-Pb37	Solder = Lead-free
Average ramp-up rate	4°C/s max	4°C/s max
Preheat temperature & Preheat time	100s max 100°C~150°C	100s max 150°C~200°C
Peak temperature	225°C	250°C
Time within 5°C of actual Peak Temperature	10s max	10s max
Ramp-down rate	6°C/s max	6°C/s max
/	Duration above 183°C is 80s max	Duration above 217°C is 80s max

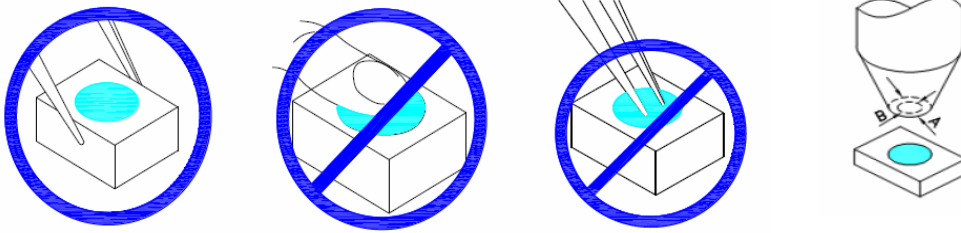
2、Electric soldering iron: Use the soldering iron must be less than 25W, soldering iron temperature must be kept below 315 °C, soldering time must not exceed 2 seconds. iron does not come into contact with epoxy resin, silicone, and PPA section. Once when welding, to let it cool down to temperatures below 40°C can packaging.

Reflow: reflow only once. Reflow process will not have any mechanical pressure exerted on the product and the pouring glue on the PPA. After welding products, only when the product when the temperature drops below 40°C can follow the process. If relatively low melting point solder, Tp can be Reduced.

3、Don't use unspecified chemical liquids to clean the SMT-LED; the chemical could harm the SMT-LED. When washing is necessary, please immerse the SMT-LED in alcohol at normal room temperature for less than 1 minute and dry at normal room temperature for 15 minutes before use. The influence of ultrasonic cleaning on the SMT-LED depending on factors such as ultrasonic power and the way SMT-LED are mounted. Ultrasonic cleaning shall be pre-qualified to ensure this will not cause damage to the SMT-LED.

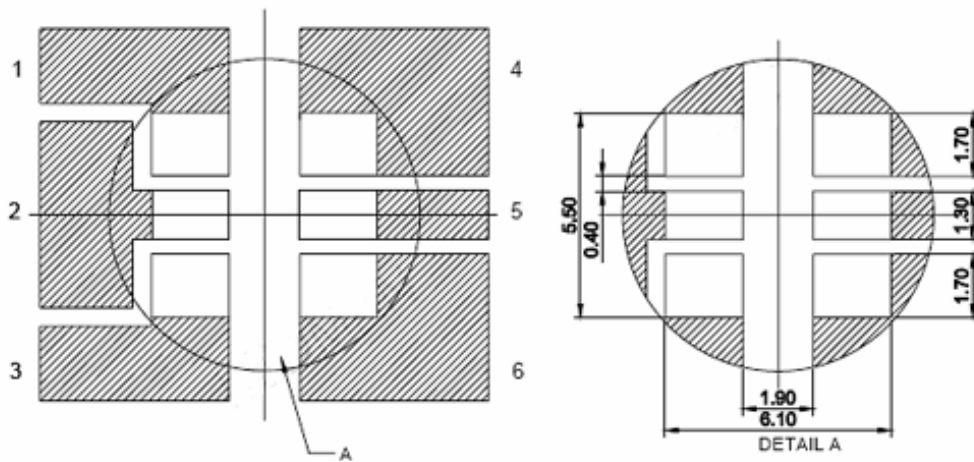
4、Electrostatic Discharge (ESD) or pulse current (EOS), may damage the SMD LED. Must wear a wrist strap, to wear anti-static shoes or gloves, can the SMD LED production. All mechanical equipment must be grounded.

5. Correct operation as shown below.



6. SMD product of heat treatment in SMD circuit design, careful consideration, the current should reduce the specific reference to the appropriate specifications of each product's current book - the temperature curve of the corresponding.

7. Recommended solder pad design for heat dissipation:



Note: Metal area at 1,2,3 should not be less than 20mm² each for sufficient heat dissipation.

Packaging

- ◆ The boxes are not water-resistant, and they must be kept away from water and moisture.
- ◆ 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 polyethylene bag back is applied in SMD LED.
- ◆ 1000+1(spare) pcs per reel.

