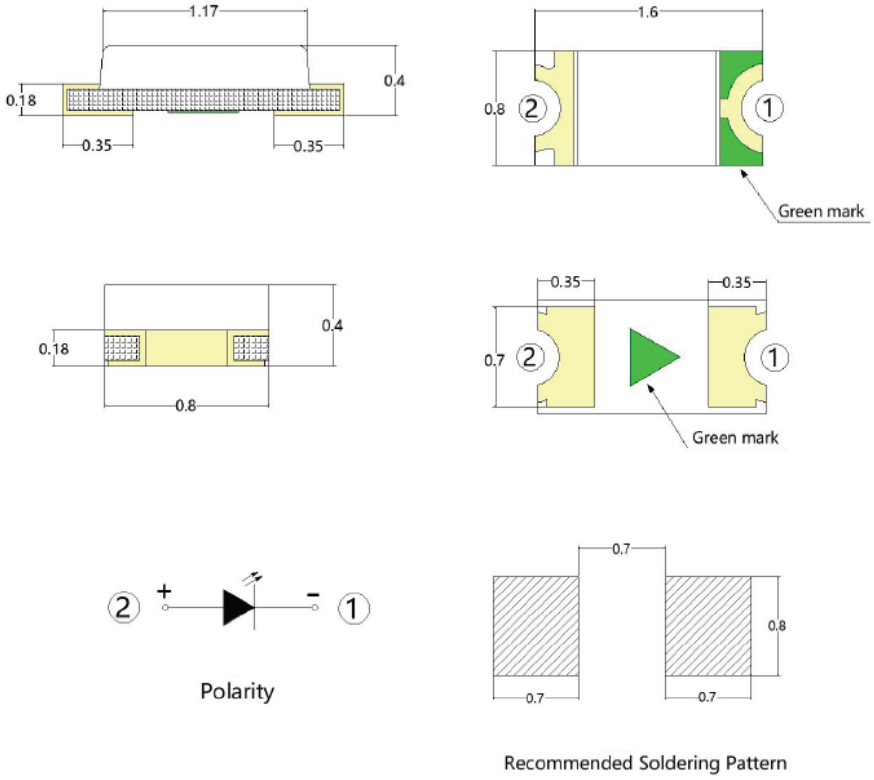
0603 White Surface Mount LEDs (1608)

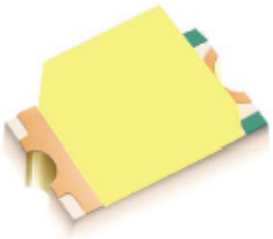
P/N: LLS-0603UWC-04

·Package Dimensions



NOTES:

1. All dimensions are in millimeter [unit].
2. Tolerance is±0.1mm (0.004") unless other specified.
3. Specifications are subject to change without notice.
4. ***The model drawing is for reference only***.



·Features

- Dimensions: 1.6*0.8*0.4mm
- Luminous color and colloid: **white / yellow colloid**
- Environmental Protection Products Complied with ROHS Directive
- Moisture sensitivity level（MSL）:3 levels
- EIA standard packaging
- Suitable for SMT automatic production
- Suitable for reflow soldering process

·Application

- Medical equipment: endoscope、ox meter
- Automotive electronics: backlight key light、indicator light
- Industrial products: electronic instrument panel、industrial equipment
- Smart home: white appliances, nixie tube LED
- Communication products: mobile phone button lamp, router

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·Absolute Maximum Ratings (Ta=25℃)

Item	Symbol	Maximum	Unit
Power Dissipation	P_d	75	mW
Continuous Forward Current	I_{Fmax}	20	mA
Peak Forward Current (1/10 Duty Cycle 0.1ms Pulse Width)	I_{FP}	80	mA
Reverse Voltage	V_R	5	V
Antistatic ability	ESD	2000	V
Operating Temperature Range	T_{opr}	-40 to +85	℃
Storage Temperature Range	T_{stg}	-40 to +85	℃
Lead Solder Temperature	Tsol	260℃≤6S	℃/s

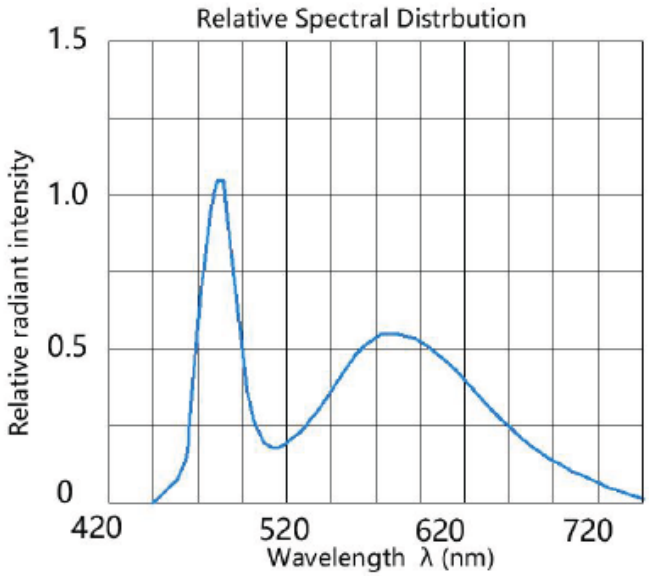
Note: Pulse width≤0.1ms, Duty≤1/10

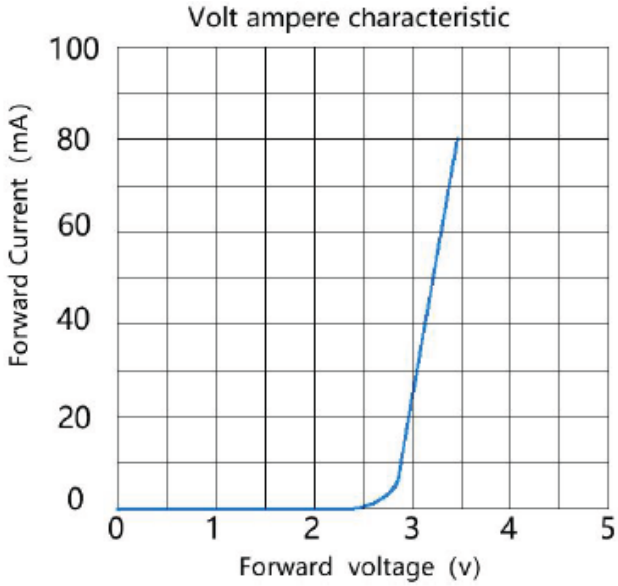
·Electrical/Optical Characteristics (Ta=25℃)

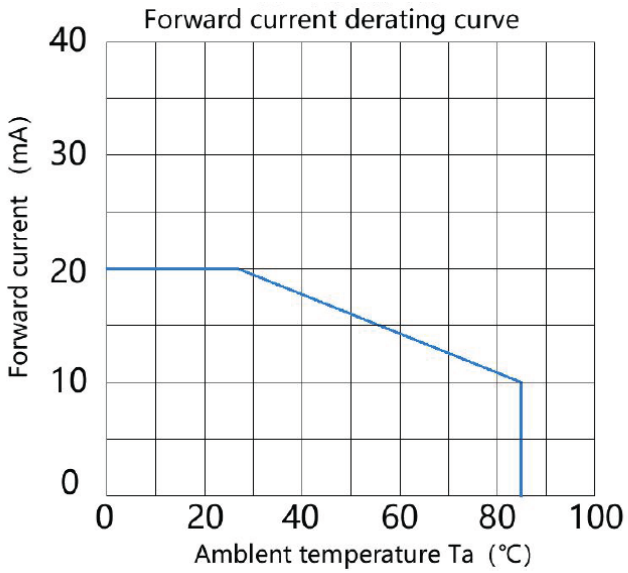
Item	Symbol	Condition	Min.	Typ.	Max	Unit
Forward Voltage	V_F	I_F=20mA	2.6	2.8	3.4	V
Luminous Intensity	I_V	I_F=20mA	400	630	1000	mcd
Color temperature	*CCT*	IF=20mA	10000	--	33000	K
Coordinate value	*X*	IF=20mA	0.2434	--	0.2752	K
	Y	IF=20mA	0.2173	--	0.2843	
Viewing Angle	$2\theta_{1/2}$	I_F=20mA	---	120	---	Deg
Reverse Current	IR	V_R =9V	---	---	1	uA

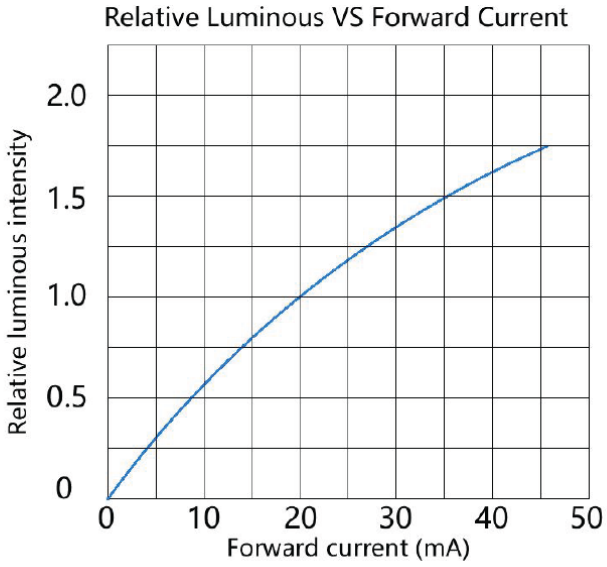
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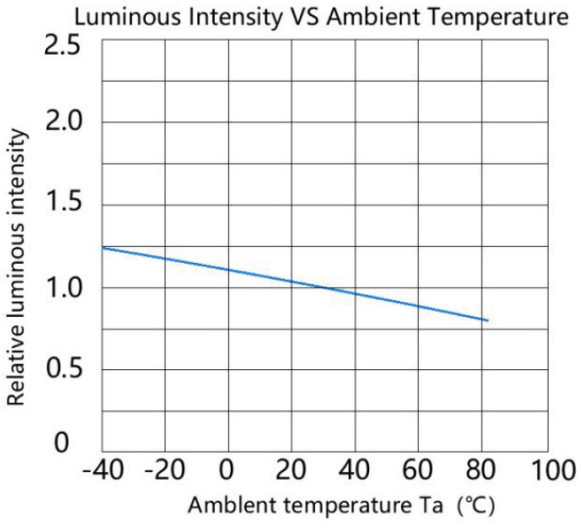
·Typical Electro-Optical Characteristics Curves

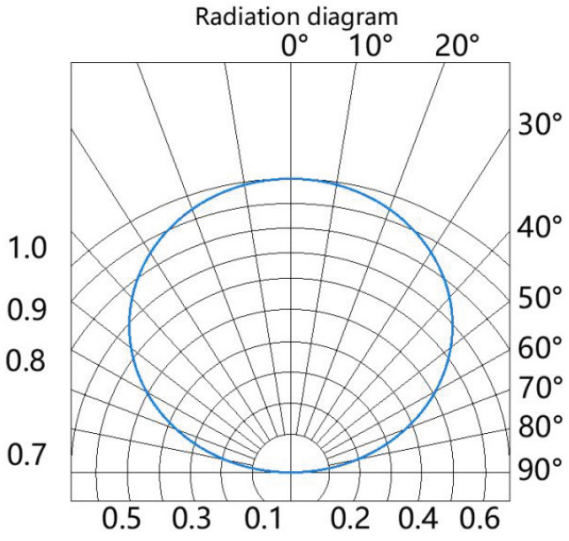












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Brightness grading:

Bin code	Min	Max	Unit	Test condition
#1	400	450	mcd	IF=20mA
#2	450	500		
#3	500	550		
#4	550	600		
#5	600	700		
#6	700	800		
#7	800	900		
#8	900	1000		

Voltage grading:

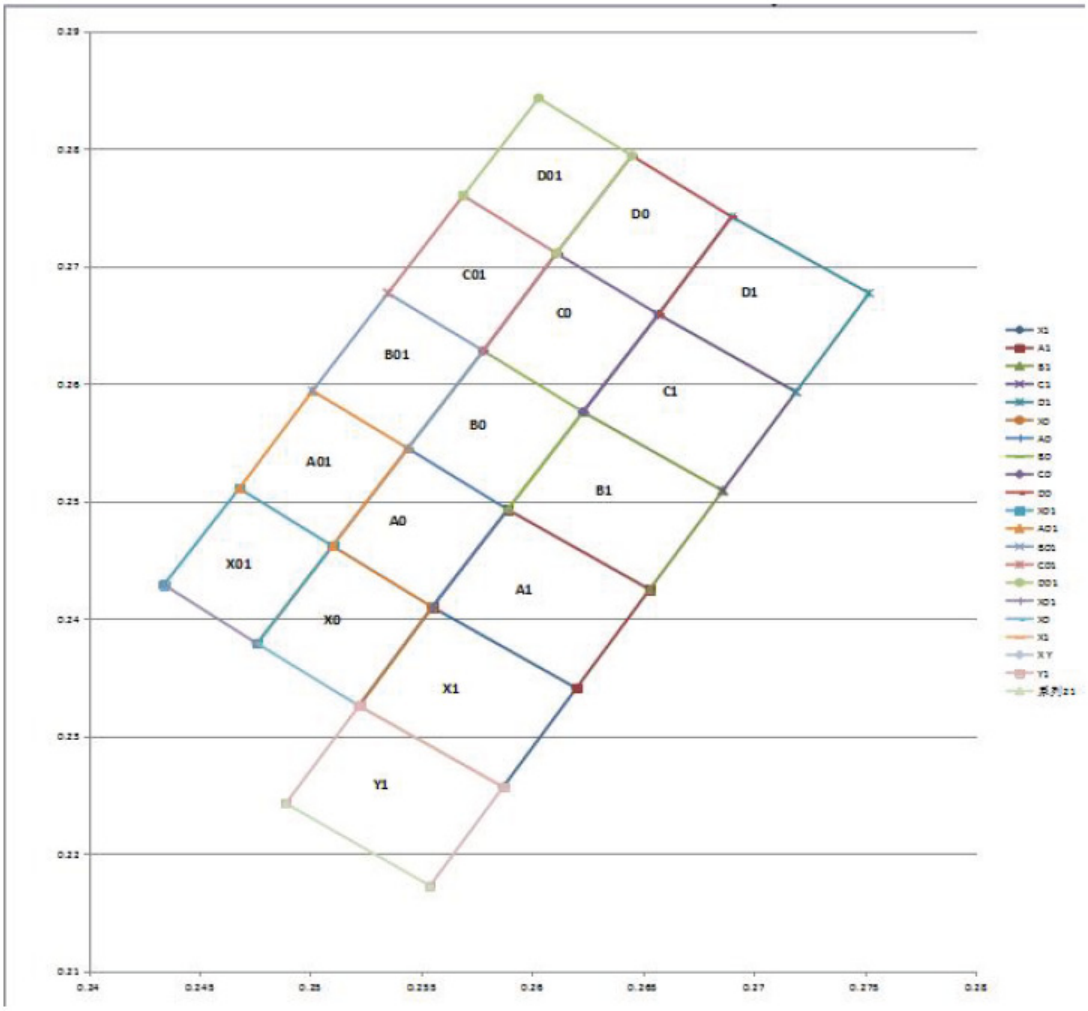
Bin code	Min	Max	Unit	Test condition
#1	2.6	2.7	V	IF=20mA
#2	2.7	2.8		
#3	2.8	2.9		
#4	2.9	3.0		
#5	3.0	3.1		
#6	3.1	3.2		
#7	3.2	3.3		
#8	3.3	3.4		

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·Color Zone code:

Color Bin	A1, A0, B1, B0, C1, X1

·Color gradeing:

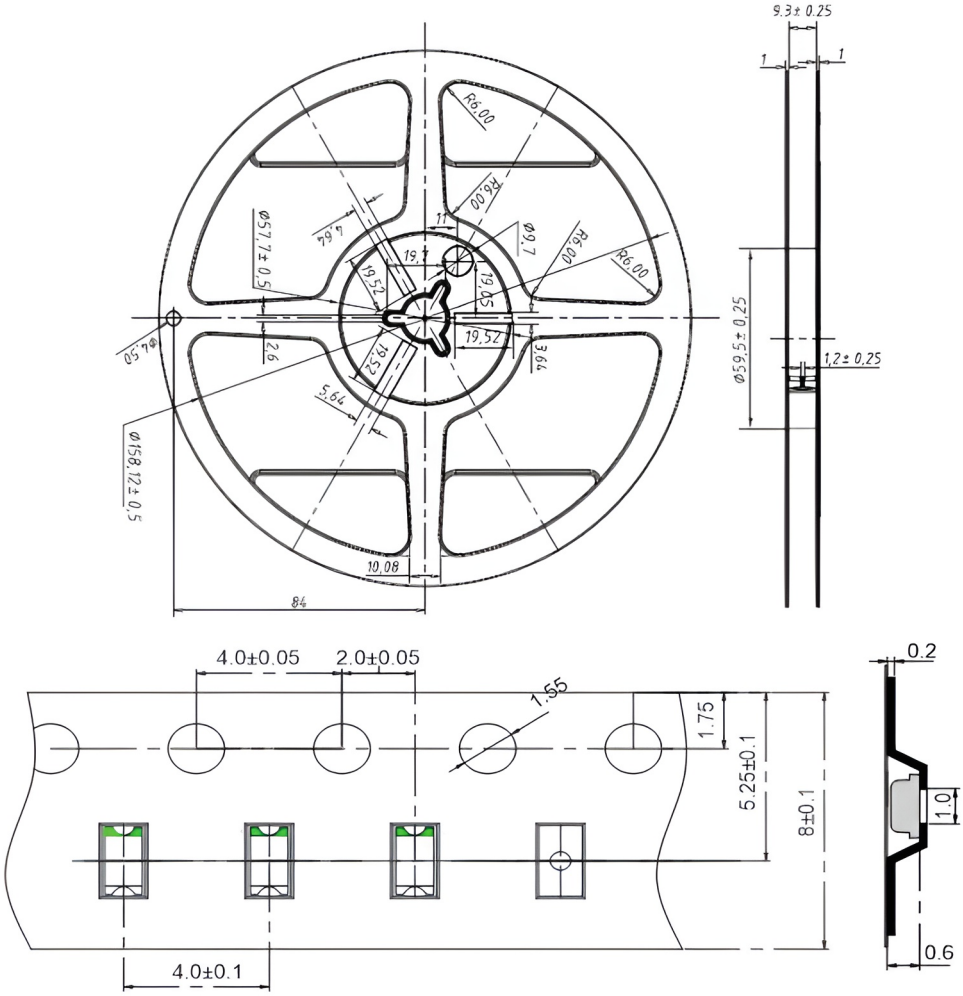


Color Bin	X1	Y1	X2	Y2	X3	Y3	X4	Y4
X1	0.2522	0.2326	0.2555	0.241	0.262	0.2341	0.2587	0.2257
A1	0.2555	0.241	0.2589	0.2493	0.2653	0.2425	0.262	0.2341
B1	0.2589	0.2493	0.2623	0.2576	0.2686	0.2509	0.2653	0.2425
C1	0.2623	0.2576	0.2657	0.2659	0.2719	0.2593	0.2686	0.2509
A0	0.251	0.2462	0.2544	0.2545	0.2589	0.2493	0.2555	0.241
B0	0.2544	0.2545	0.2578	0.2628	0.2623	0.2576	0.2589	0.2493

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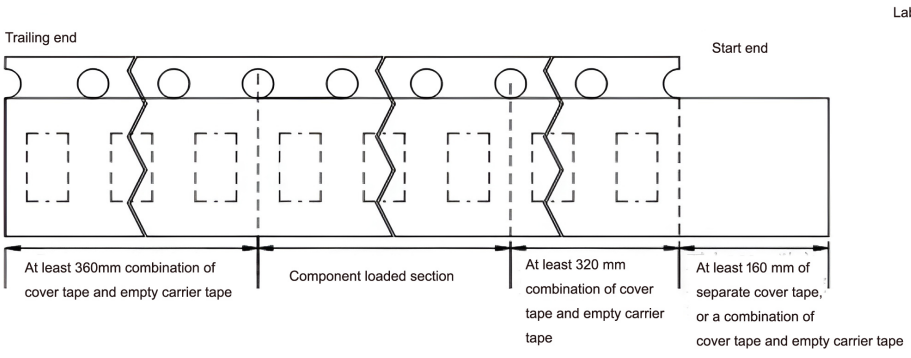
·Packaging

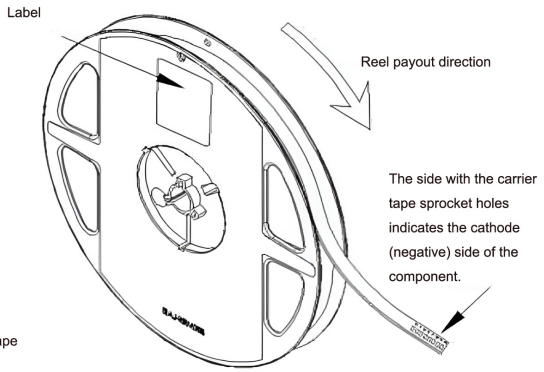
Belt and disk dimensions



1. Size unit is mm (mm).
2. The dimensional tolerance is ±0.1mm

·Disk and carrier belt direction of roll and hole dimensions





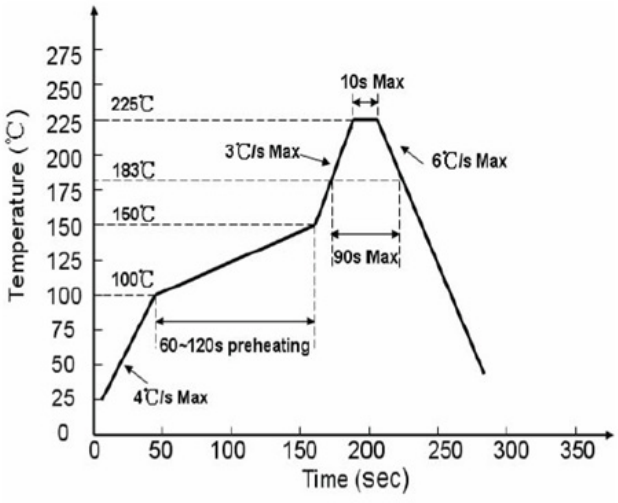
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·Guideline for soldering

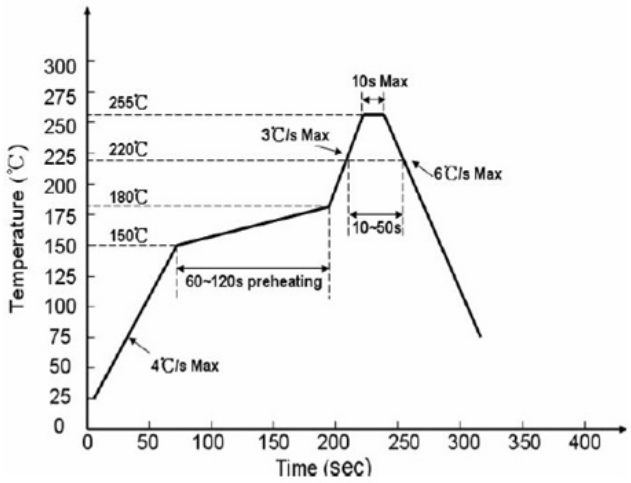
1. Hand Soldering

Manual welding is recommended only for repair and heavy industry situations. A soldering iron of less than 30W is recommended to be used in Hand Soldering. Please keep the temperature of the soldering iron under 300℃ while soldering. Each terminal of the LED is to go for less than 3 seconds and for one time only. Be careful because the damage of the product is often started at the time of the hand soldering.

2. Reflow Soldering: Use the conditions shown in the under Figure of Pb -Free Reflow Soldering



Lead process



lead free

Reflow soldering should not be done more than two times.
Stress on the LEDs should be avoided during heating in soldering process.
After soldering, do not deal with the product before its temperature drops down to room temperature.
The recommended maximum welding temperature for the product is 240±5 ℃/6s

· Cleaning

It is recommended that alcohol be used as a solvent for cleaning after soldering. Cleaning is to go under 30℃ for 3 minutes or 50℃ for 30 seconds. When using other solvents, it should be confirmed beforehand whether the solvents will dissolve the package and the resin or not.
Ultrasonic cleaning is also an effective way for cleaning. But the influence of Ultrasonic cleaning on LED depends on factors such as ultrasonic power. Generally, ultrasonic power should not be higher than 300W. Before cleaning, a pretest should be done to confirm whether any damage to LEDs will occur.

Note: This general guideline may not apply to all PCB designs and configurations of all soldering equipment. The technique in practice is influenced by many factors; it should specialize based on the PCB designs and configurations of the soldering equipment.

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·Storage

Moisture proof and anti-electrostatic package with moisture absorbent material is used, to keep moisture to a minimum. Before opening the package, the product should be kept at 30℃ or less and humidity less than 60% RH and be used within a year.

After opening the package, the product should be stored at 30℃ or less and humidity less than 10%RH and be soldered within 168 hours (7 days). It is recommended that the product be operated at the workshop condition of 30℃ or less and humidity less than 60%RH.

If the moisture absorbent material has fade away or the LEDs have exceeded the storage time, baking treatment should be performed based on the following condition:(60±5）℃ for 24 hours.

·Static Electricity

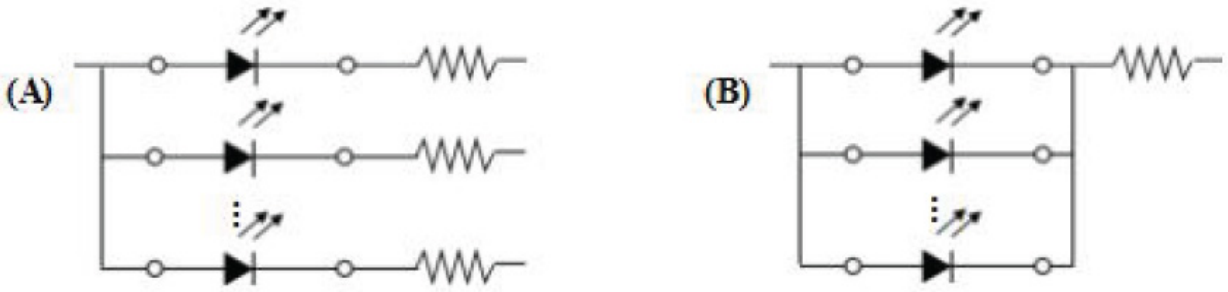
Static electricity or surge voltage damages the LEDs. Damaged LEDs will show some unusual characteristics such as the forward voltage becomes lower, or the LEDs do not light at the low current. Even not light.

All devices, equipment and machinery must be properly grounded. At the same time, it is recommended that wrist bands or anti-electrostatic gloves and anti-electrostatic containers be used when dealing with the LEDs.

·Design Consideration

In designing a circuit, the current through each LED must not exceed the absolute maximum rating specified for each LED. In the meanwhile, resistors for protection should be applied, otherwise slight voltage shift will cause big current change, burn out may happen.

It is recommended to use Circuit A which regulates the current flowing through each LED rather than Circuit B. When driving LEDs with a constant voltage in Circuit B, the current through the LEDs may vary due to the variation in Forward Voltage (VF) of the LEDs. In the worst case, some LED may be subjected to stresses more than the Absolute Maximum Rating.

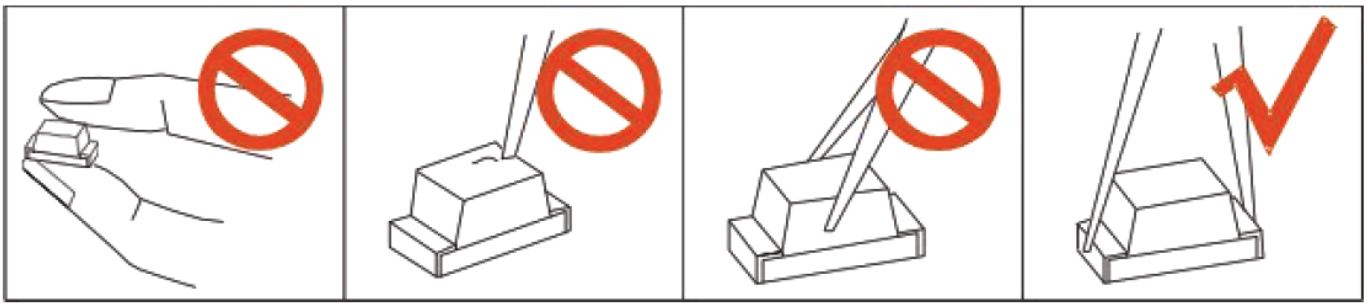


Thermal Design is paramount importance because heat generation may result in the Characteristics decline, such as brightness decreased, Color changed and so on. Please consider the heat generation of the LEDs when making the system design.

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·Others

When handling the product, touching the encapsulate with bare hands will not only contaminate its surface, But also affects its optical characteristics. Excessive force to encapsulate might result in catastrophic failure of the LEDs due to die breakage or wire deformation. For this reason, please do not put excessive stress on LEDs, especially when the LEDs are heated, such as during Reflow Soldering.



The epoxy resin of encapsulate is fragile, so please avoid scratch or friction over the epoxy resin surface. While handling the product with tweezers, do not hold by the epoxy resin, be careful.

·Safety Advice for Human Eyes

Viewing direct to the light emitting center of the LEDs, especially those of great Luminous Intensity, will cause great hazard to human eyes. Please be careful.

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