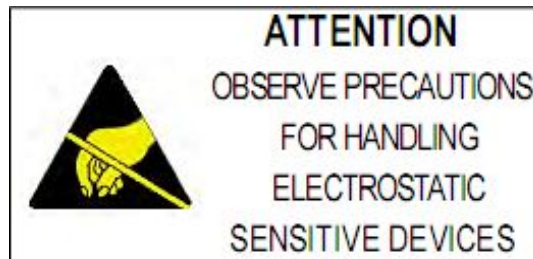


RoHS

SPECIFICATION

SL-2835WF0W02HSA-0.2W 22-24-26lm-80Ra

Color Tolerance < 5 SDCM



NINGBO SOL-LED LIGHTING CO.,LTD.

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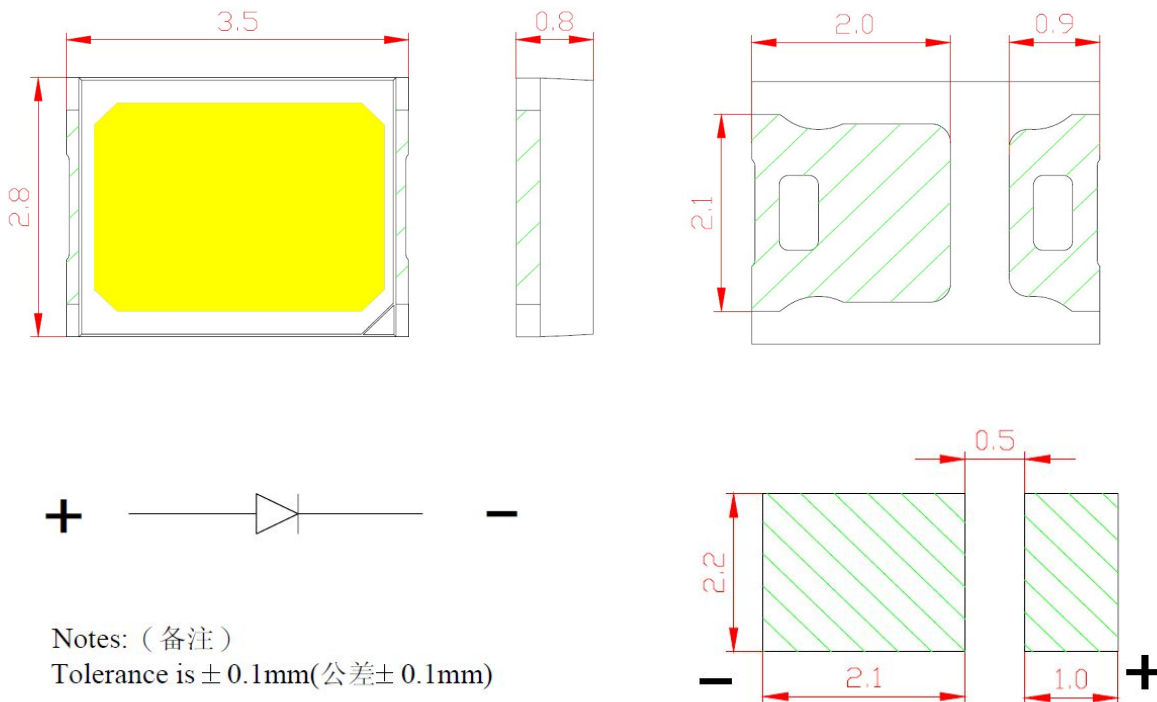
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1. Features

- Lighting Color : White
 - Lead Frame Type LED Package : 2.8×3.5×0.8 mm (L×W×H)
 - View Angle: 120°
 - Chip Material : InGaN
 - Soldering Methods : Reflow Soldering
 - Oldering Temperature: 260for10sec℃
 - Operating Temperature:-40~+95℃
 - Resin(Mold):Silicone
 - Taping : 10 mm conductive black carrier tape & antistatic clear cover tape
- 4,000 pcs/reel, Φ178 mm Reel

2. Outline Dimensions



3. Applications

- Interior and exterior illuminations

4. Maximum Ratings

Item	Symbol	Rating	Unit
Forward Current	If	75	mA
Peak Pulse Forward Current	Ifp	120	mA
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +100	°C
Junction Temperature	Tj	110	°C
Soldering Temperature	JEDEC-J-STD-020		
ESD Classification	Class 3A (JESD22-A114-B)		

- ※ The stresses beyond those listed under absolute maximum ratings may cause permanent damages to the device . These or any other conditions beyond those indicated under recommended operating conditions are not implied. The exposure to the absolute maximum rated conditions may affect device reliability.
- ※ LEDs are not designed to be driven in reverse voltage.

5. Electrical - Optical Characteristics

IF=60mA (Ta=25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	Vf	If=60 [mA]	2.9	3.1	3.4	V
Luminous Flux	Φv	If=60 [mA]	22.0	24	26	lm
Color		If=60 [mA]	5700K			-
Viewing Angle	2Θ1/2	If=60 [mA]	-	120	-	deg
Color Rendering Index (Ra)	-	If=60 [mA]	70	-	-	-
Thermal Resistance, Junction to Solder Point	Rth j-s	If=60 [mA]	-	15	-	°C/W
Typical Temperature Coefficient of Forward Voltage*1	ΔVf / ΔTj	If=60 [mA]	-1.5	-	-3.0	mV/°C

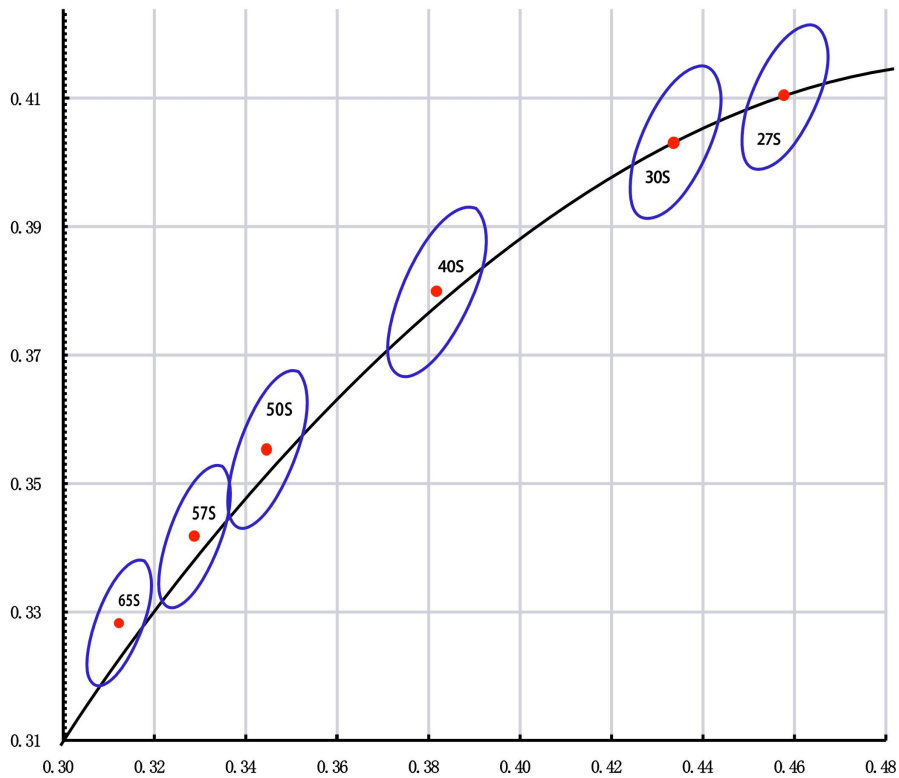
*1) Measured at Ta between 25°C and 85°C.

- ※ These values are measured by the SOL-LED optical spectrum analyzer within the following tolerances.

Luminous Flux (Φv) : ±7%, Forward Voltage (Vf) : ±0.1V, Color Value : ±0.005, CRI Value : ±2,

- ※ Although all LEDs are tested by SOL-LED equipments, some values may vary slightly depending on the conditions of The test equipments.

6. Bin Structure



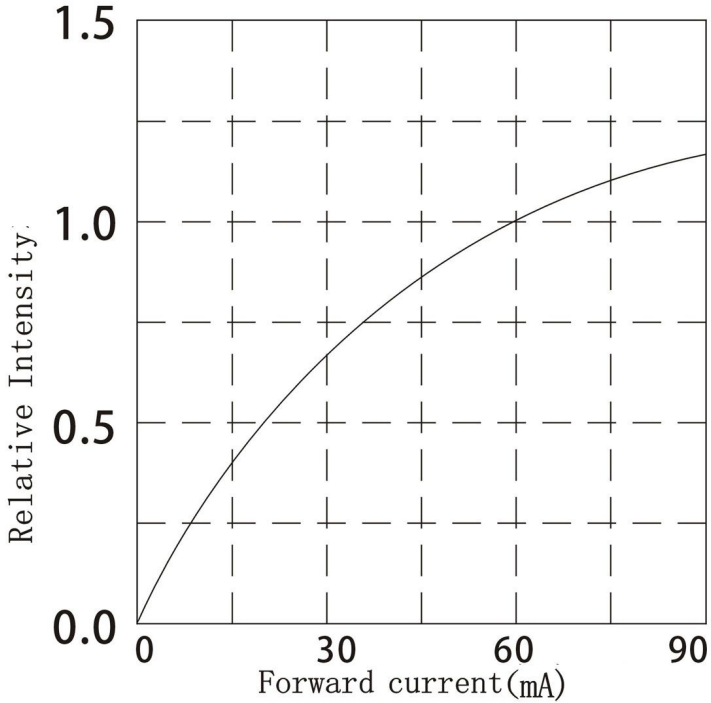
Color Tolerance < 5 SDCM

7. Colo Coordinate Comparison(BIN) Of 2600-7000K

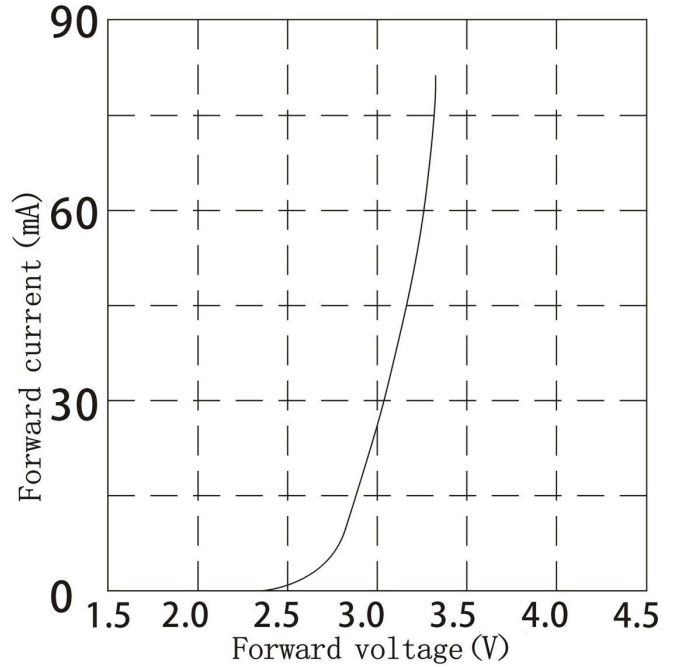
Color Rank	Color Rank Code	Chromaticity Coordinat	X1	X2	X3	X4
			Y1	Y2	Y3	Y4
2725K ± 80K	27S	X	0.4450	0.4606	0.4706	0.4550
		Y	0.4032	0.4244	0.4170	0.3958
3045K ± 100K	30S	X	0.4201	0.4367	0.4475	0.4309
		Y	0.3960	0.4183	0.4100	0.3877
3985K ± 150K	40S	X	0.3671	0.3857	0.3965	0.3779
		Y	0.3711	0.3963	0.3884	0.3631
5800K ± 200K	57S	X	0.3220	0.3209	0.3285	0.3289
		Y	0.3280	0.3425	0.3494	0.3341
6520 ± 300K	65S	X	0.3024	0.3141	0.3222	0.3105
		Y	0.3212	0.3402	0.3353	0.3162

8. Typical Characteristic Curves

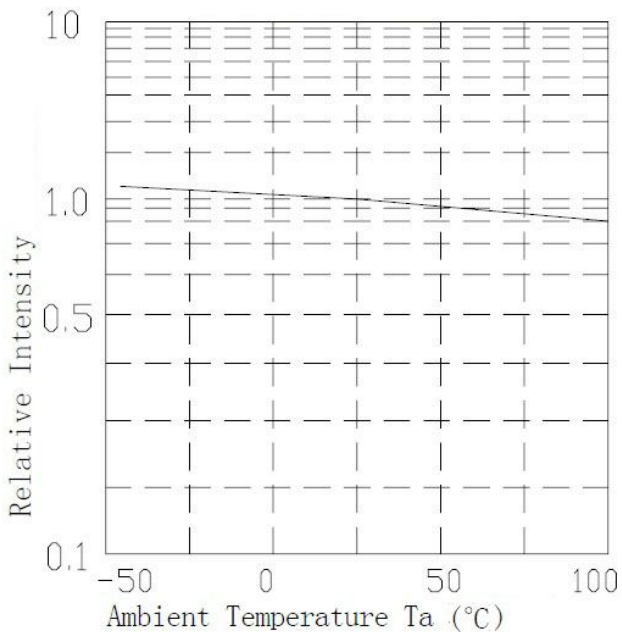
Forward Current vs. Relative Intensity $T_a=25^\circ\text{C}$



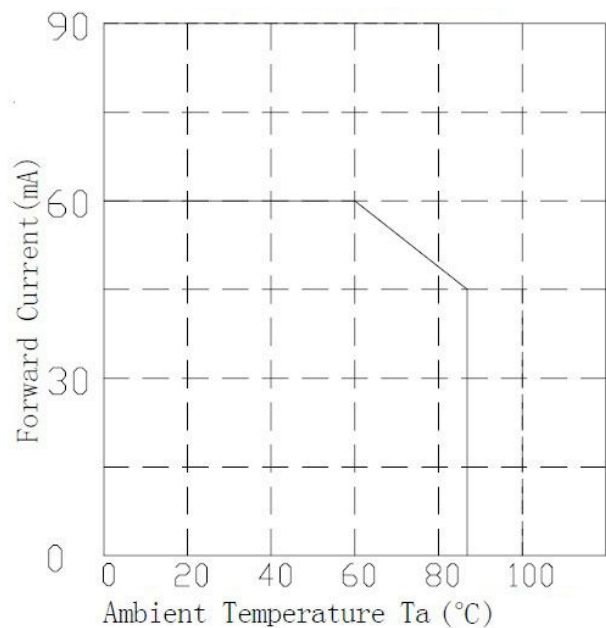
Forward Voltage vs. Forward Current $T_a=25^\circ\text{C}$



Relative Intensity vs. Ambient temperature



Ambient Temperature vs. Forward Current



9. Reliability Test Items and Conditions

9-1. Criteria for Judging Damages

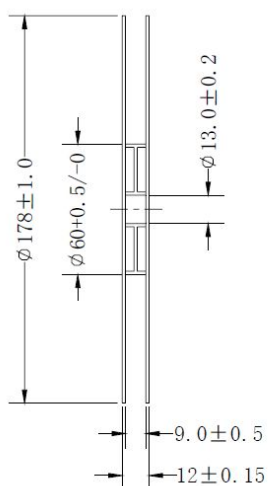
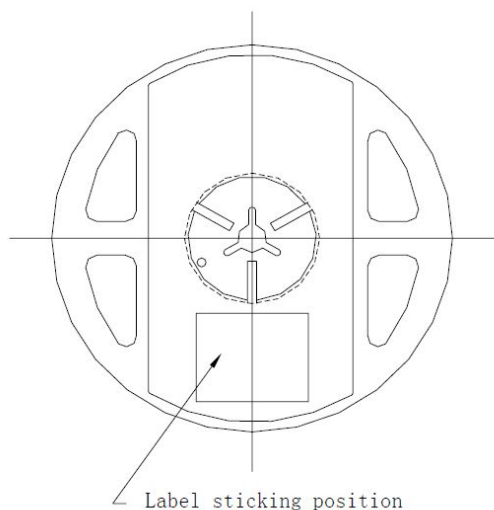
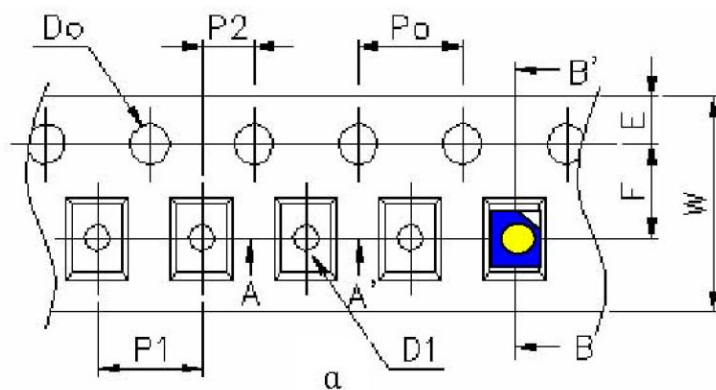
Items	Symbols	Test Conditions	Limits	
			Min.	Max.
Forward Voltage	V _f	I _f = 60mA	-	Initial Value 1.1
Luminous Flux	Φ _V	I _f = 60mA	Initial Value 0.7	-

9-2. Reliability Test

No	Test Items	Test Conditions	Test Hours /Cycles
1	Room Temperature Operating Life (RTOL)	T _a =25℃, I _f = 60mA	1,000 hours
2	Temperature Humidity Operating Life (WHTOL)	T _a =60℃, RH=90%, I _f = 60mA	1,000 hours
3	High Temperature Operating Life (HTOL)	T _a =85℃, I _f = 60mA	1,000 hours
4	Low Temperature Operating Life (LTOL)	T _a =-30℃, I _f = 60mA	1,000 hours
5	High Temperature Storage (HTSL)	T _a =100℃	1,000 hours
6	Low Temperature Storage (LTSL)	T _a =-40℃	1,000 hours
7	Temperature Humidity Storage (WHTSL)	T _a =85℃, RH=85%	1,000 hours
8	Thermal Shock (TMSK)	100℃ ~ -40℃ Dwell : 15 min., Transfer : 10 sec.	200 cycles
9	Moisture Sensitivity Level	T _{sld} =260℃ (Pre treatment 60℃, 60%, 168 hours)	3 times

10. Packing of Products

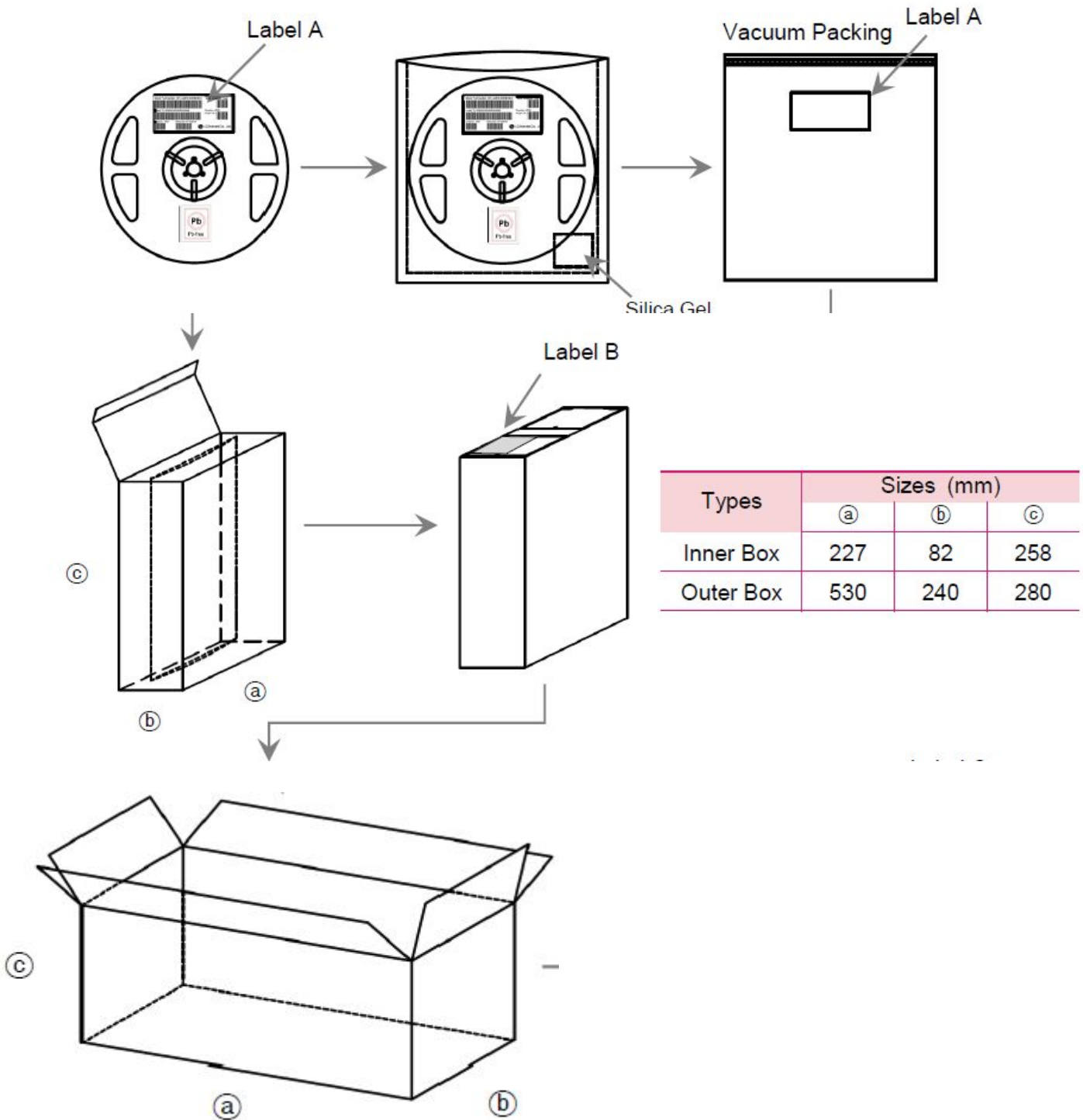
10-1. Taping Outline Dimensions



Note: Diameter of Plastic Roll is 178mm and 4000pcs/Roll

10-2. Packing Structure

Reeled products (4000 pcs per bag) are packed in a sealed-off and moisture-proof aluminum bag with desiccants (silica gel). Four aluminum bags (12,000 pcs total per box) are packed in an inner box and six inner boxes are packed in an outer box (72,000 pcs per box).



11. Cautions on Use

11-1. Moisture-Proof Package

- The moisture in the SMD package may vaporize and expand during soldering.
- The moisture can damage the optical characteristics of the LEDs due to the encapsulation.

11-2. During Storage

Conditions		Temperature	Humidity	Time
Storage	before Opening Aluminum Bag	< 30 °C	< 50%RH	Within 1 Year from Delivery Date
	after Opening Aluminum Bag	< 30 °C	< 60%RH	≤ 672 hours
Baking		65 ± 5 °C	< 10%RH	10 ~ 24 hours

11-3. During Usage

- LED should avoid the direct contact with exposure to hazardous materials such as sulfur, chlorine, phthalate, etc..
- The silver-plated metal parts on LEDs can be rusted when exposed to corrosive gases.
- The silver-plated metal parts also can be affected not only by the corrosive gases emitted inside of the end-products but by the gases penetrated from outside environment.
- The corrosive atmosphere must be avoided during the use and storage.
- Extreme environments such as sudden ambient temperature changes or high humidity that can cause condensation must be avoided.

11-4. Cleaning

- Do not use brushes for cleaning or organic solvents (i.e. Acetone, TCE, etc..) for washing as they may damage the resin of the LEDs.
- IPA is the recommendable solvent for cleaning the LEDs under the following conditions.
Clearing condition : IPA, 25 °C max × 60sec max.
- Ultrasonic cleaning is not recommended.
- Pretests must be followed by the actual cleaning processes to avoid any possible damages

11-5. Heat Generation

- The thermal design of the end product must be seriously considered even from the beginning stage.
- The co-efficiency between the heat generation and the input power is affected by the thermal resistance of the circuit boards and the density of the LED placements together with other components.

11-6. Static Electricity

- Wristbands and anti-electrostatic gloves are strongly recommended and all devices, equipments and machineries must be properly grounded when handling the LEDs which are sensitive against static electricity and surge.
- Precautions are to be taken against surge voltage to the equipment that mounts the LEDs.
- Some unusual characteristics such as significant increase of current leakage, decrease of turn-on voltage, or no operation at a low current can be occurred by damaged LEDs.

11-7. Recommended Circuit

- The current through each LED must not exceed the absolute maximum rating when design the circuits.
- In general, there can be various forward voltages for LEDs. Different forward voltages in parallel via a single resistor can result different forward currents to each LED, which also can output different luminous flux values. In the worst case, the currents can exceed the absolute maximum ratings which can stress the LEDs. Matrix circuit with a single resistor for each LED is recommended to avoid the luminous flux fluctuations.

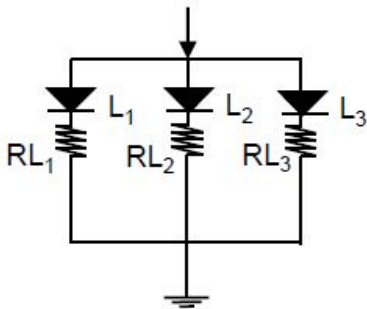


Fig.1 Recommended Circuit in Parallel Mode
: Separate resistor must be used for each LED.

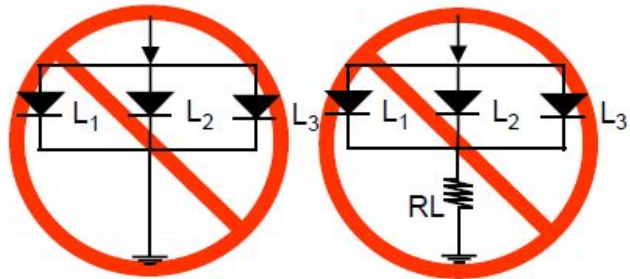
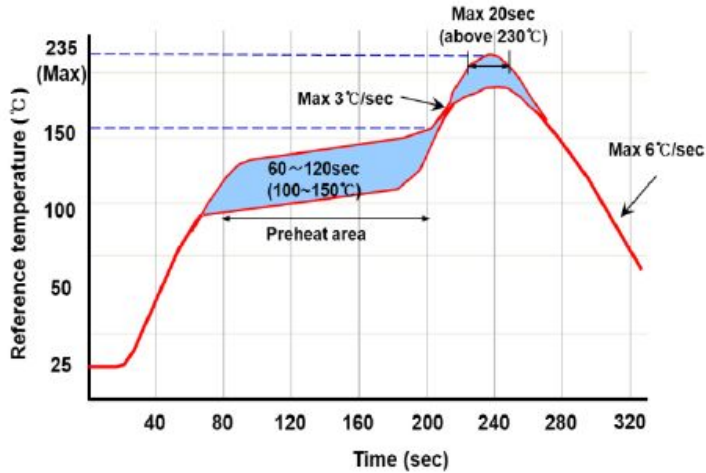


Fig.2. Abnormal Circuit
Circuits to Avoid: The current through the LEDs may vary due to the variation in LED forward voltage.

- The driving circuits must be designed and operated by forward bias only so that the LEDs are not to be operated by the reverse voltages while turned off, which can damage the LEDs.
- Reverse voltage can damage the zener diode and cause destructions.
- Constant-current operation by driver IC controller is recommended.

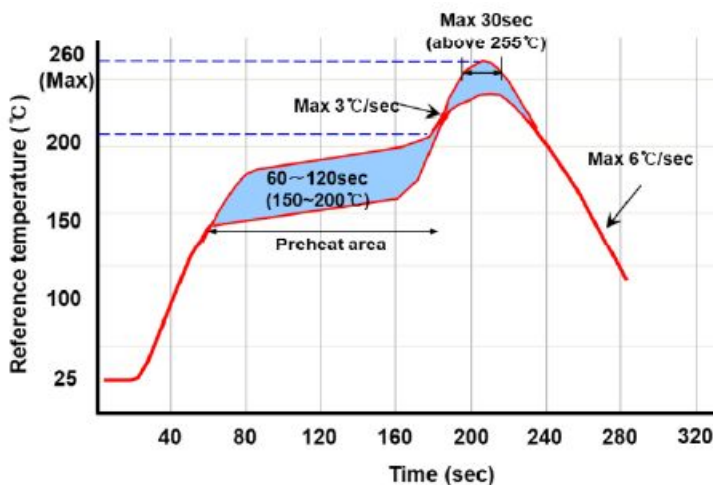
11-8. Soldering Conditions

- Reflow soldering method is recommended for LEDs assembly.
- SOL-LED does not guarantee the performance of the LEDs assembled by dip soldering method.
- Recommended Soldering Profile for Pb-Based Solder (according to JEDEC J-STD-020D)



Pb-Based Solder	
Pre-Heat	100~150°C
Pre-Heat time	60~120sec.
Peak Temperature	235°C max. (10sec. max.)
Time within 5°C of actual Peak Temperature	20sec. max.

- Recommended Soldering Profile for Pb-Free Solder (according to JEDEC J-STD-020D)



Pb-Free Solder	
Pre-Heat	150~200°C
Pre-Heat time	60~120sec.
Peak Temperature	260°C max. (10sec. max)
Time within 5°C of actual Peak Temperature	30sec. max.

- Reflow or hand soldering at the lowest possible temperature is desirable for the LEDs although the recommended soldering conditions are specified in the above diagrams.
- A rapid cooling process is not recommended for the LEDs from the peak temperature.
- The LEDs encapsulate silicone and have soft surfaces on the tops, which can easily be damaged by pressure. Precautions should be taken to avoid strong pressure on the encapsulated part when leveraging the pick and place machines. The pick up nozzles should not directly contact the silicone resin of the LEDs.
- Reflow soldering should not be done more than two times.

11-9. Soldering Iron

- The recommended Condition is less than 5 seconds at 260°C.
- The time must be shorter for the higher temperature. (+10°C → -1sec).
- The power dissipation of the soldering iron should be lower than 15W when the surface temperature of the device should be controlled at or under 230°C.

11-10. Eye Safety Guidelines

- Do not directly look at the light when the LEDs are on.
- Proceed with caution to avoid the risk of damage to the eyes when examining the LEDs with optical instruments.

11-11. Manual Handling

- Use Teflon-type tweezers to grab base of LED and do not touch the lens.

