RGB SMD LED, PLCC-4

Features

- PLCC-4 package.
- White package.
- Optical indicator.
- Colorless clear window.
- Black face.
- Ideal for backlight and light pipe application.
- Wide viewing angle.
- Suitable for automatic placement equipment.
- Available on tape and reel (8mm Tape).
- The product itself will remain within RoHS compliant Version.

Applications

- Backlight in dashboards and switches.
- Telecommunication: Indicator and backlight in telephone and fax.
- Indicator and backlight for audio and video equipment.
- Indicator and backlight in office and family equipment.
- Flat backlight for LCD's, switches and symbols.
- Light pipe application.
- General use.

Descriptions:

- Due to the package design, the LED has wide viewing angle and optimized light coupling by inter reflector. This feature makes the SMT TOP LED ideal for light pipe application. The low current requirement makes this device ideal for portabl equipment or any other application where power is at a premium.

Part No.	Emitting Color		Lens Color
RND 135-00252	R	Red	Water Clear
	G	Pure Green	
	B	Blue	

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RND components

Absolute Maximum Ratings at Ta=25℃

Parameters		Symbol	Max.	Unit
Power Dissipation	R	PD	60	mW
	G		90	
	B		90	
Peak Forward Current (Per Chip) [(a)]		IFP	100	mA
Forward Current (Per Chip) [(b)]	R	IF	25	mA
	G		25	
	B		25	
Reverse Voltage (Per Chip)		VR	5	V
Electrostatic Discharge (HBM)	R	ESD	2000	V
	G		400	
	B		400	
Operating Temperature Range		Topr	-40℃ to +85℃	
Storage Temperature Range		Tstg	-40℃ to +100℃	
Lead Soldering Temperature [4mm (.157") From Body]		Tsld	250℃ for 5 Seconds	

Notes:

a. Derate linearly as shown in derating curve.

b. Duty Factor = 10%, Frequency = 1 kHz.

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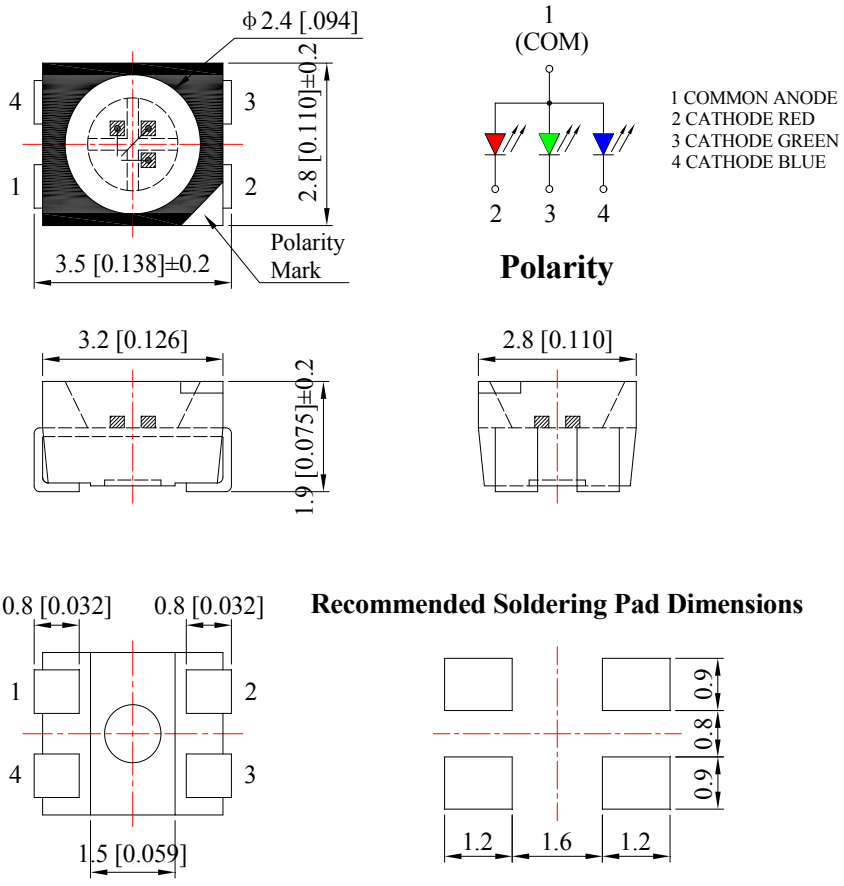
Package Dimensions



Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25 mm (.010″) unless otherwise noted.
3. Protruded resin under flange is 1.00mm (.039″) max.

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RND components

Electrical Optical Characteristics at Ta=25℃

Parameters	Symbol	Emitting Color	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity[a]	IV	R	200	400	---	mcd	IF=20mA
		G	800	1200	---		
		B	150	300	---		
Viewing Angle [b]	$2\theta_{1/2}$	R	---	120	---	Deg	IF=20mA
		G	---	120	---		
		B	---	120	---		
Peak Emission Wavelength	λp	R	---	632	---	nm	IF=20mA
		G	---	520	---		
		B	---	468	---		
Dominant Wavelength[c]	λd	R	---	624	---	nm	IF=20mA
		G	---	525	---		
		B	---	470	---		
Spectral Line Half-Width	△λ	R	---	20	---	nm	IF=20mA
		G	---	35	---		
		B	---	25	---		
Forward Voltage	VF	R	1.60	2.00	2.40	V	IF=20mA
		G	2.80	3.20	3.60		
		B	2.80	3.20	3.60		
Reverse Current	IR	R	---	---	10	μA	V_R=5V
		G					
		B					

Notes:

a. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.

b. $2\theta_{1/2}$ is the o-axis angle where the luminous intensity is 1⁄2 the peak intensity.

c. The dominant wavelength (λd) is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

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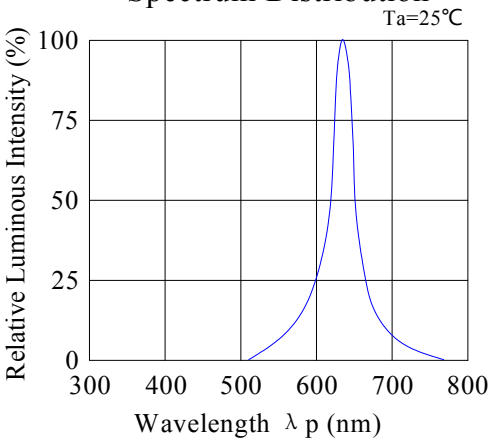
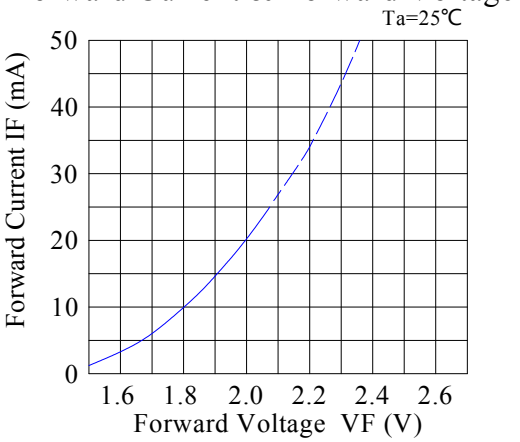
Typical Electrical / Optical Characteristics Curves
(25℃ Ambient Temperature Unless Otherwise Noted)
Red:

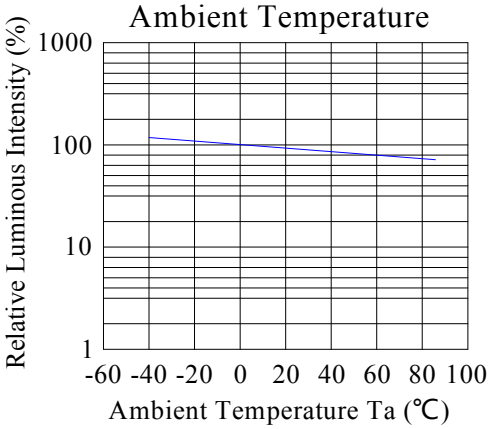
Spectrum Distribution



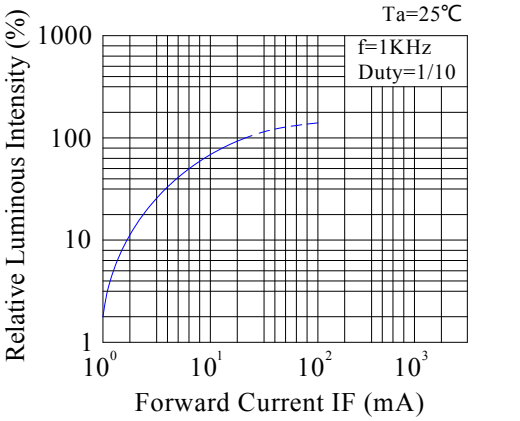
Forward Current & Forward Voltage



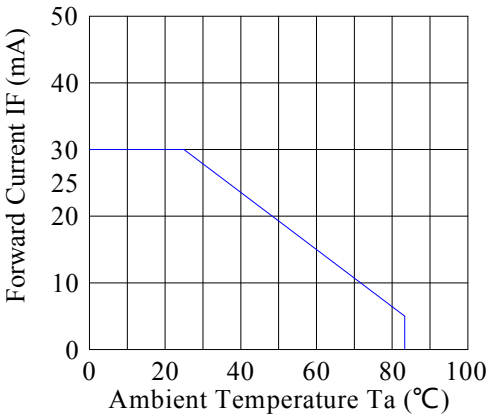
Luminous Intensity & Ambient Temperature



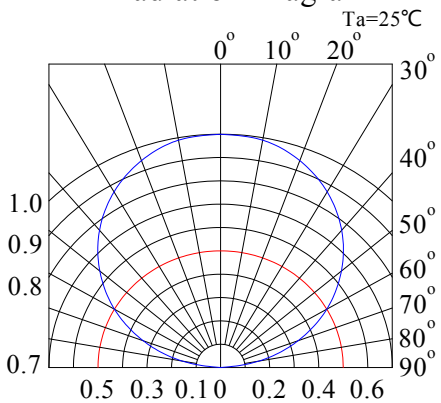
Luminous Intensity & Forward Current



Forward Current Derating Curve



Radiation Diagram



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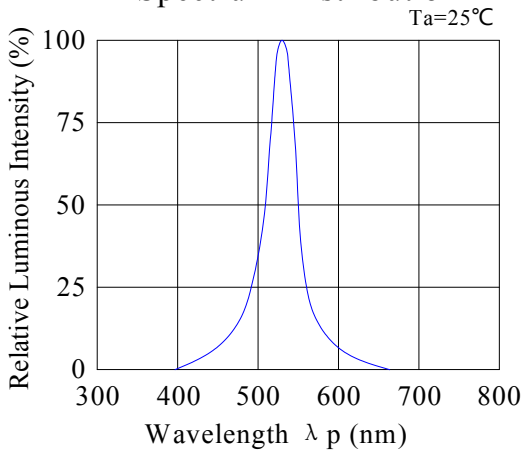
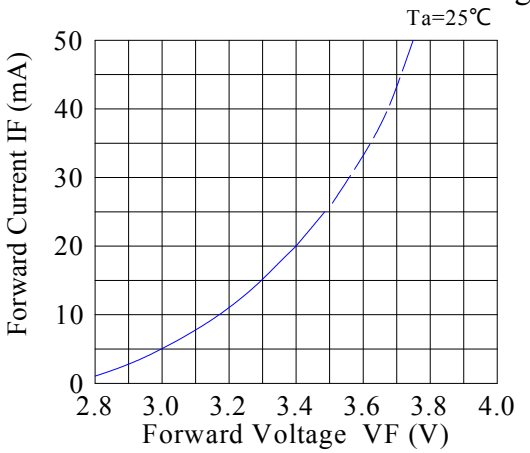
Green

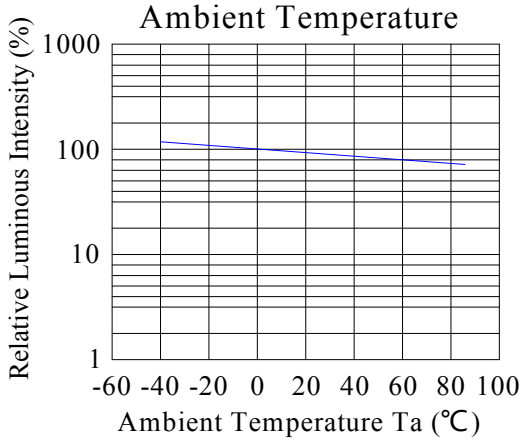
Spectrum Distribution



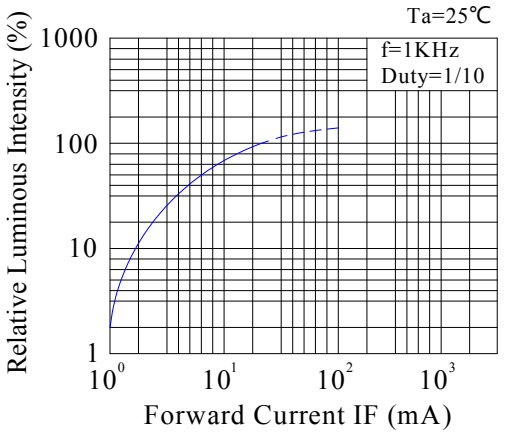
Forward Current & Forward Voltage



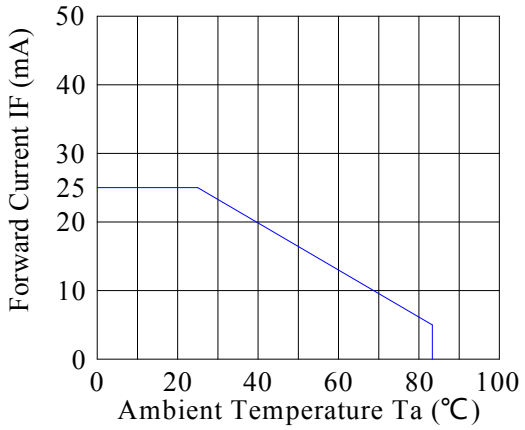
Luminous Intensity & Ambient Temperature



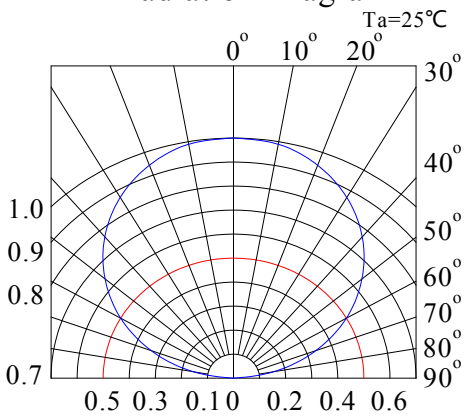
Luminous Intensity & Forward Current



Forward Current Derating Curve



Radiation Diagram



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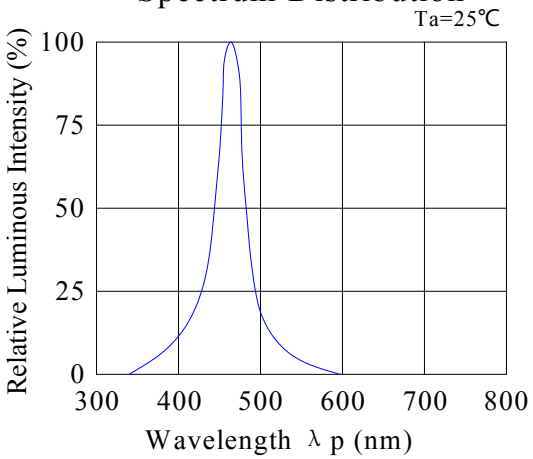
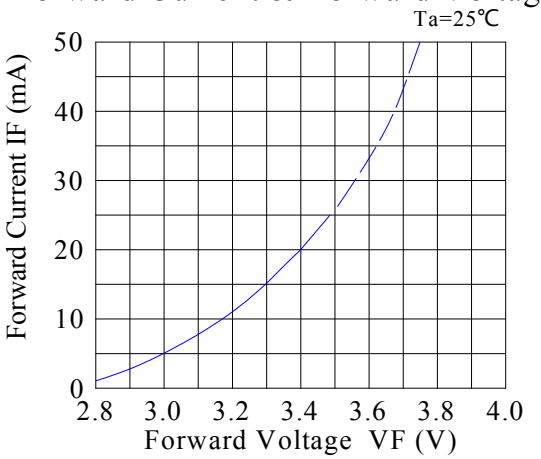
Blue

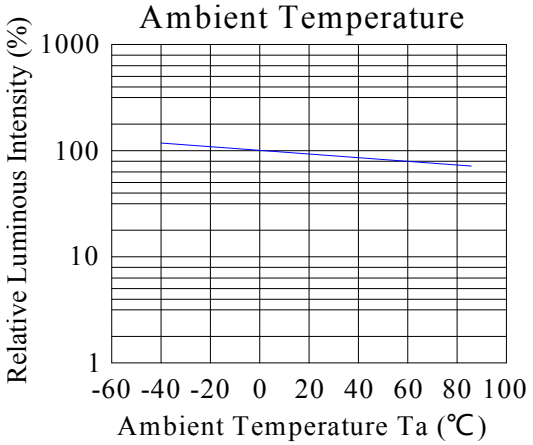
Spectrum Distribution



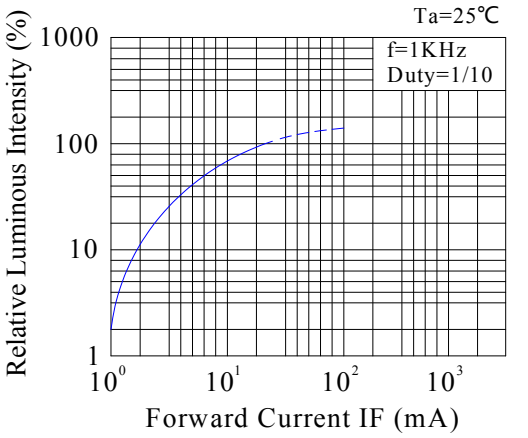
Forward Current & Forward Voltage



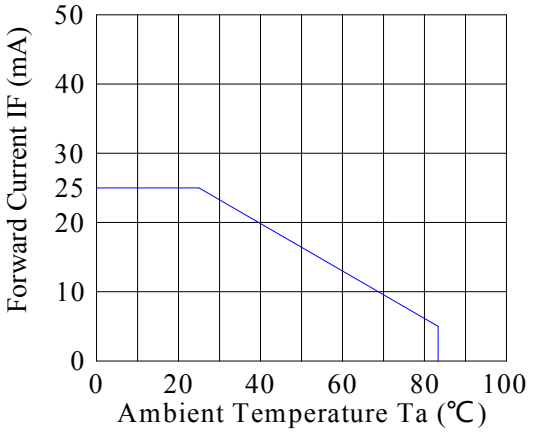
Luminous Intensity & Ambient Temperature



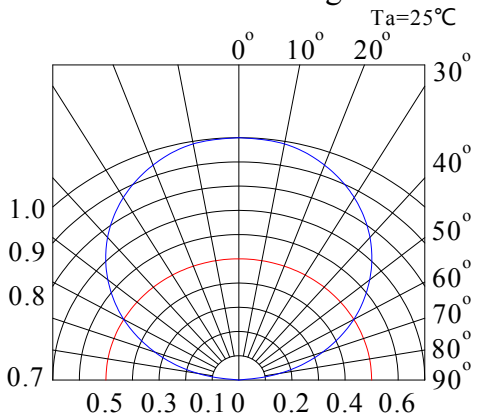
Luminous Intensity & Forward Current



Forward Current Derating Curve



Radiation Diagram



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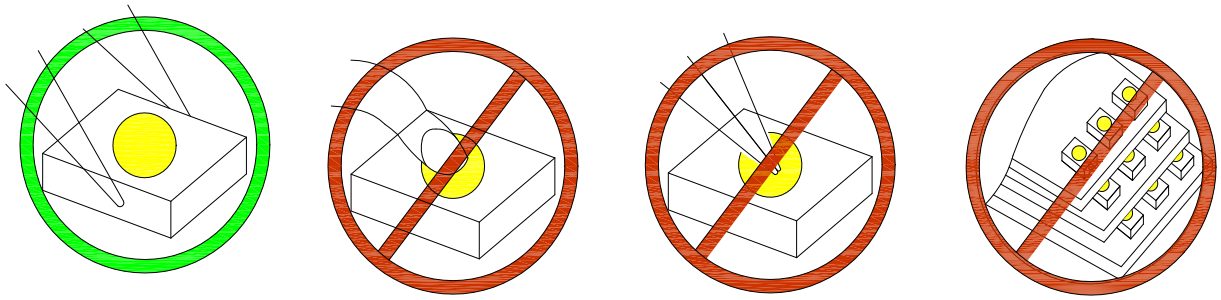
CAUTIONS

1. Handling Precautions:

1.1. Handle the component along the side surfaces by using forceps or appropriate tools.

1.2. Do not directly touch or handle the silicone lens surface. It may damage the internal circuitry.

1.3. Do not stack together assembled PCBs containing exposed LEDs. Impact may scratch the silicone lens or damage the internal circuitry.



Compare to epoxy encapsulant that is hard and brittle, silicone is softer and flexible. Although its characteristic significantly reduces thermal stress, it is more susceptible to damage by external mechanical force.

As a result, special handling precautions need to be observed during assembly using silicone encapsulated LED products. Failure to comply might lead to damage and premature failure of the LED.

2. Storage

2.1. Do not open moisture proof bag before the products are ready to use.

2.2. Before opening the package, the LEDs should be kept at 30°C or less and 60%RH or less.

2.3. The LEDs should be used within a year.

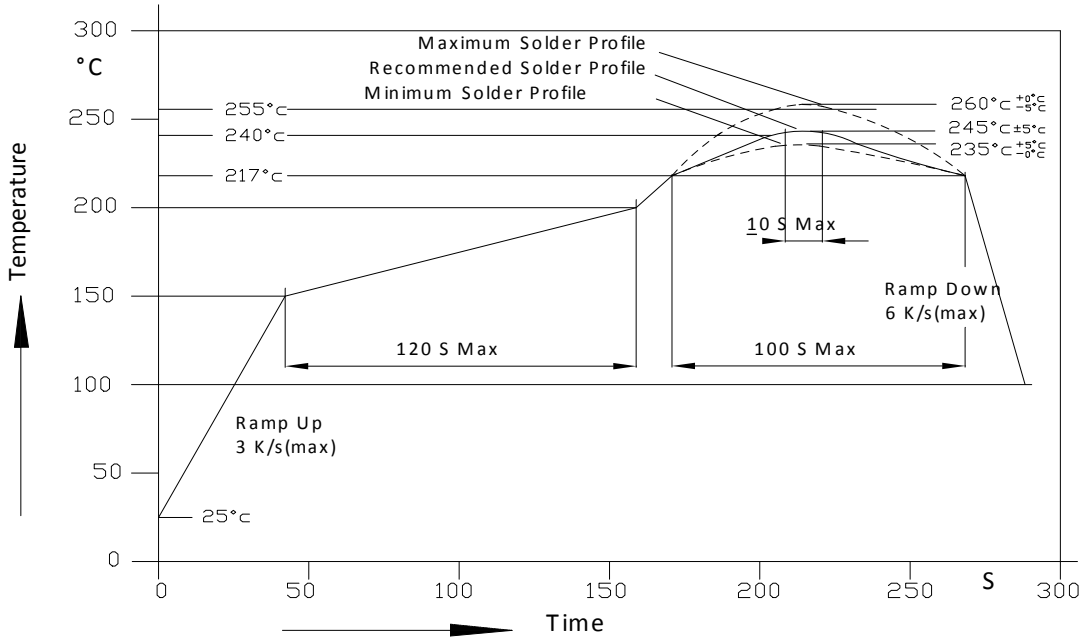
2.4. After opening the package, the LEDs should be kept at 30°C or less and 60%RH or less.

2.5. The LEDs should be used within 24 hours after opening the package.

2.6. If the moisture adsorbent material has fabled away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions. Baking treatment: 65±5°C for 24 hours.

3. Soldering Condition

3.1. Pb-free solder temperature profile



3.2. Reflow soldering should not be done more than two times.

3.3. When soldering, do not put stress on the LEDs during heating.

3.4. After soldering, do not warp the circuit board.

3.5. Recommended soldering conditions:

Reflow soldering		Soldering iron	
Pre-heat	150~200°C	Temperature	300°C Max. 3
Pre-heat time Peak	120 sec. Max.	Soldering time	sec. Max.
temperature	260°C Max.		(one time only)
Soldering time	10 sec. Max.(Max. two times)		

3.6. Because different board designs use different number and types of devices, solder pastes, reflow ovens, and circuit boards, no single temperature profile works for all possible combinations.
However, you can successfully mount your packages to the PCB by following the proper guidelines and PCB-specific characterization

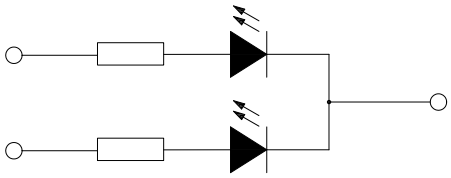
4. Drive Method

4.1. An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel

in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.

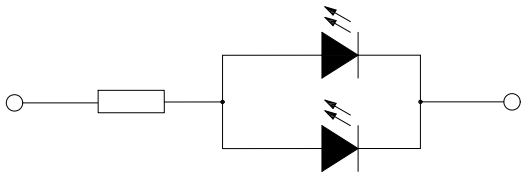
Circuit model A

LED



Circuit model B

LED



a. Recommended circuit.

b. The brightness of each LED might appear different due to the differences in the I-V characteristics of those LEDs.

5. ESD (Electrostatic Discharge):

Static Electricity or power surge will damage the LED. Suggestions to prevent ESD damage:

- Use of a conductive wrist band or anti-electrostatic glove when handling these LEDs.
- All devices, equipment, and machinery must be properly grounded.
- Work tables, storage racks, etc. should be properly grounded.
- Use ion blower to neutralize the static charge which might have built up on surface of the LED's plastic lens as a result of friction between LEDs during storage and handling.

ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or "no lightup" at low currents. To verify for ESD damage, check for "lightup" and Vf of the suspect LEDs at low currents. The Vf of "good" LEDs should be >2.0V@0.1mA for InGaN product and >1.4V@0.1mA for AlInGaP product.