

## **R5050EW-W2H-2C4B-F**

5.0x5.0mm, White LEDs  
Surface Mount EMC LEDs



### **Technical Data Sheet**

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#### **Features:**

- EMC package.
- White package.
- Inter reflector.
- Wide viewing angle.
- Suitable for automatic placement equipment.
- Suitable for vapor-phase reflow, Infrared reflow and wave solder processes.
- Available on tape and reel .
- The product itself will remain within RoHS compliant Version.

#### **Descriptions:**

- The white LED which was fabricated using a blue LED and a phosphor, and the phosphor is excited by blue light and emits yellow fluorescence the mixture of blue light and yellow light results in white emission.

#### **Applications:**

- Indicator and backlight in office and family equipment.
- Flat backlight for LCD's, switches and symbols.
- Light pipe application.
- General use.

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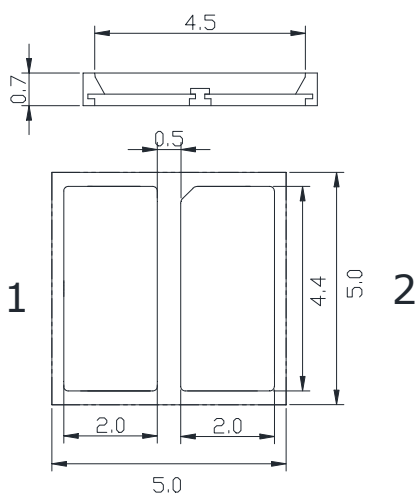
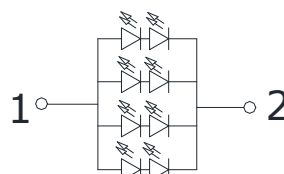
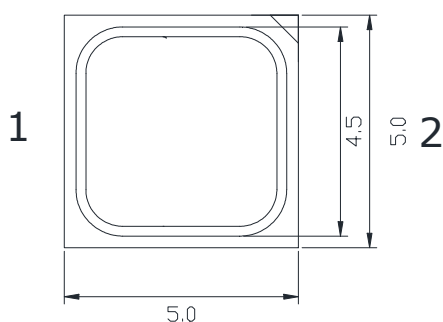
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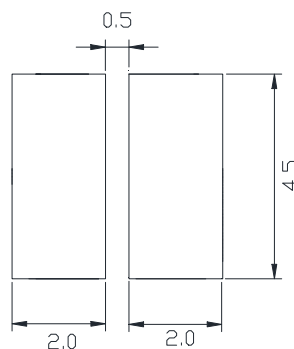
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Part No.	Emitting Color	Lens Color
R5050EW-W2H-2C4B-F	White	Yellow Diffused

#### Package Dimension:



#### Recommended Soldering Pad Dimensions



#### Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.25$  mm (.010") unless otherwise noted.

Spec No.: R5050E

Issue No.: G-Rev-4

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#### Absolute Maximum Ratings at Ta=25°C

Parameters	Symbol	Max	Unit
Power Dissipation	Pd	7000	mW
Peak Forward Current <sup>(a)</sup>	IFP	1500	mA
DC Forward Current	IF	1000	mA
Reverse Voltage	VR	5	V
Electrostatic Discharge (HBM)	ESD	1000	V
LED Junction Temperature	Tj	115	°C
Operating Temperature Range	Topr	-40°C to +85°C	
Storage Temperature Range	Tstg	-40°C to +85°C	
Soldering Temperature	Tsld	260°C for 5 Seconds	

Notes:

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

#### Electrical Optical Characteristics at Ta=25°C

Parameters	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Luminous Flux <sup>(a)</sup>	Φv	190	230	---	Lm	IF=180mA
	Φv	620	720	---	Lm	IF=640mA
	Φv	750	850	---	Lm	IF=800mA
Viewing Angle	2θ1/2	---	120	---	Deg	IF=180mA
Chromaticity Coordinates <sup>(b)</sup>	x	---	0.315	---		IF=180mA
	y	---	0.325	---		
Color Temperature	CCT	---	6500	---	K	IF=180mA
Color Rendering Index	CRI	70	---	---	Ra	IF=180mA
Forward Voltage <sup>(c)</sup>	VF	5.2	5.8	6.6	V	IF=180mA
	VF	5.4	6.0	6.8	V	IF=640mA
	VF	5.6	6.2	7.0	V	IF=800mA
Reverse Current	IR	---	---	10	μA	VR=5V

Notes:

a. Luminous flux measurement tolerance: ±10%.

b. Wavelength measurement tolerance: ±1nm

c. Forward voltage measurement tolerance: ±0.1V

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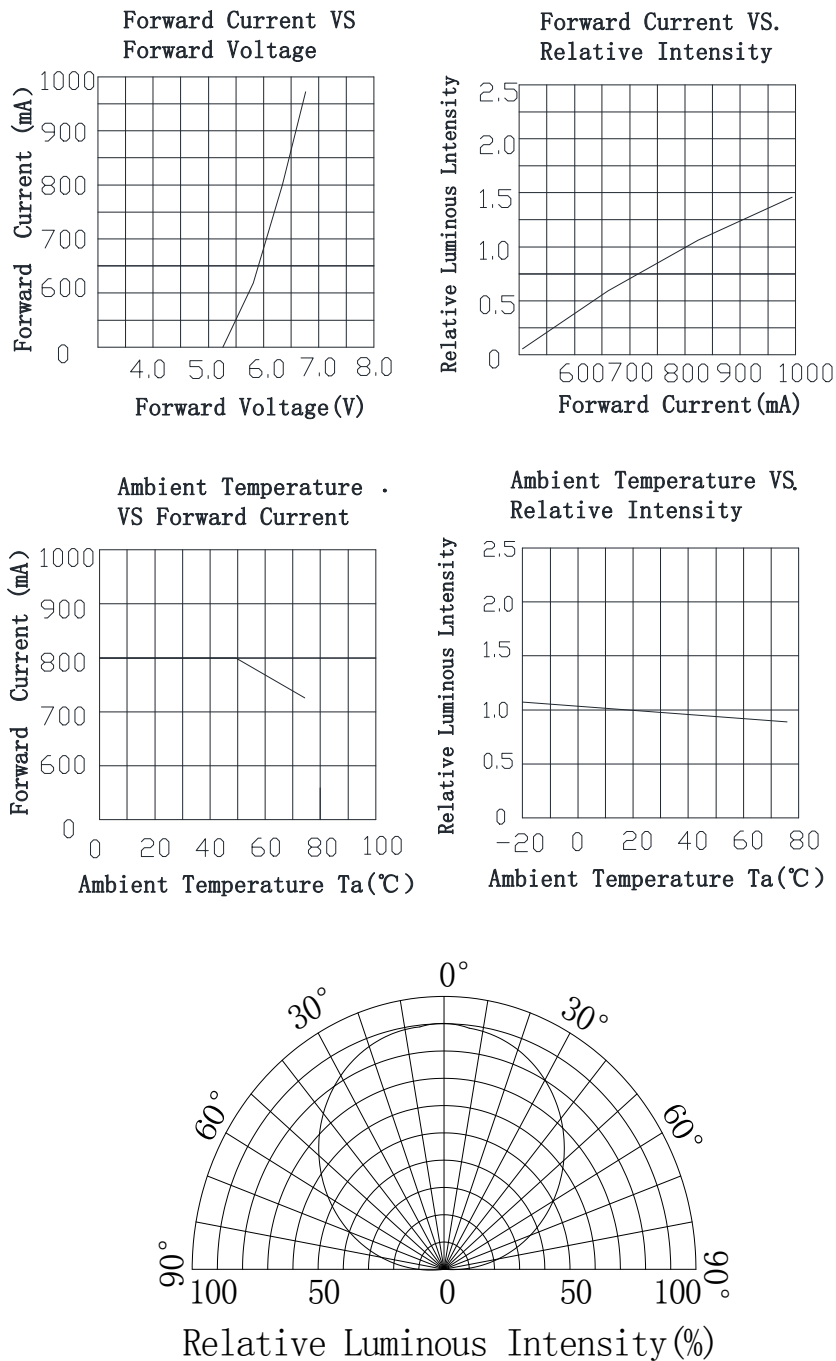
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### Technical Data Sheet

#### Typical Electrical / Optical Characteristics Curves

(25°C Ambient Temperature Unless Otherwise Noted)



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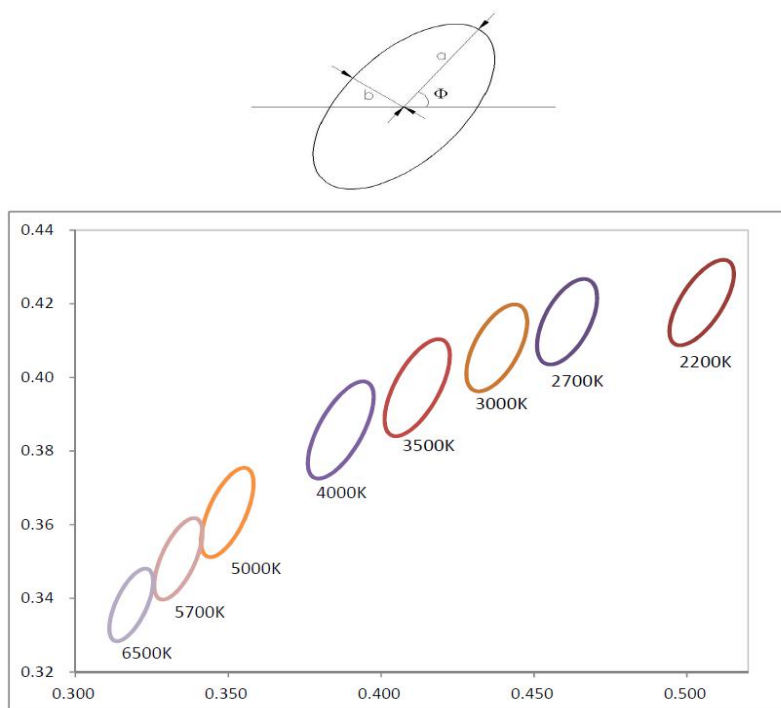
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#### CIE Chromaticity Diagram:



The color ranks have chromaticity ranges within 5-step MacAdam ellipse:

Color Rendering	Color Code	Center		Radius		Angle (deg)
		x	y	a	b	Φ
70	2200	0.5047	0.4182	0.014350	0.006300	49.16
	2700	0.4607	0.4130	0.013500	0.007000	53.42
	3000	0.4367	0.4059	0.013835	0.006835	53.13
	3500	0.4102	0.3951	0.015500	0.006835	54.00
	4000	0.3847	0.3836	0.015665	0.006665	53.43
	5000	0.3476	0.3592	0.013665	0.005850	59.37
	5700	0.3316	0.3456	0.01250	0.005335	59.05
	6500	0.3152	0.3321	0.011165	0.004835	58.34

#### Notes:

- \* Energy Star binning applied to all 2200~7000K.
- \* Tolerance of measurements of the chromaticity Coordinate is  $\pm 0.01$

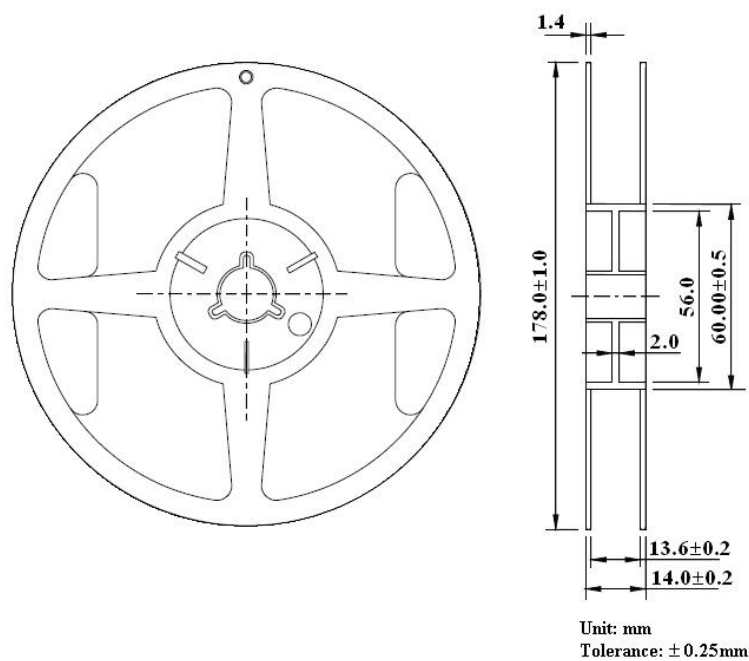
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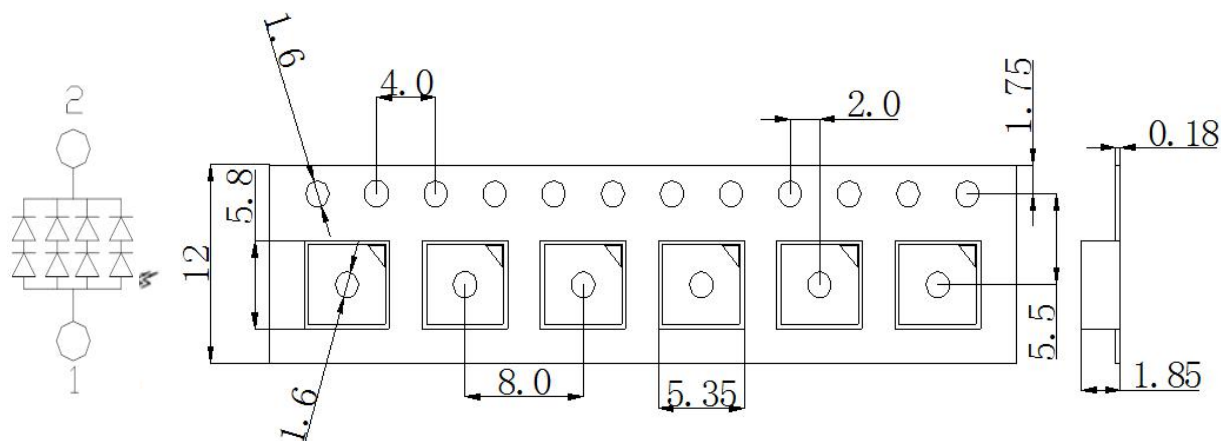
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#### Reel Dimensions:



#### Carrier Tape Dimensions:

Loaded quantity 2000 pcs per reel.



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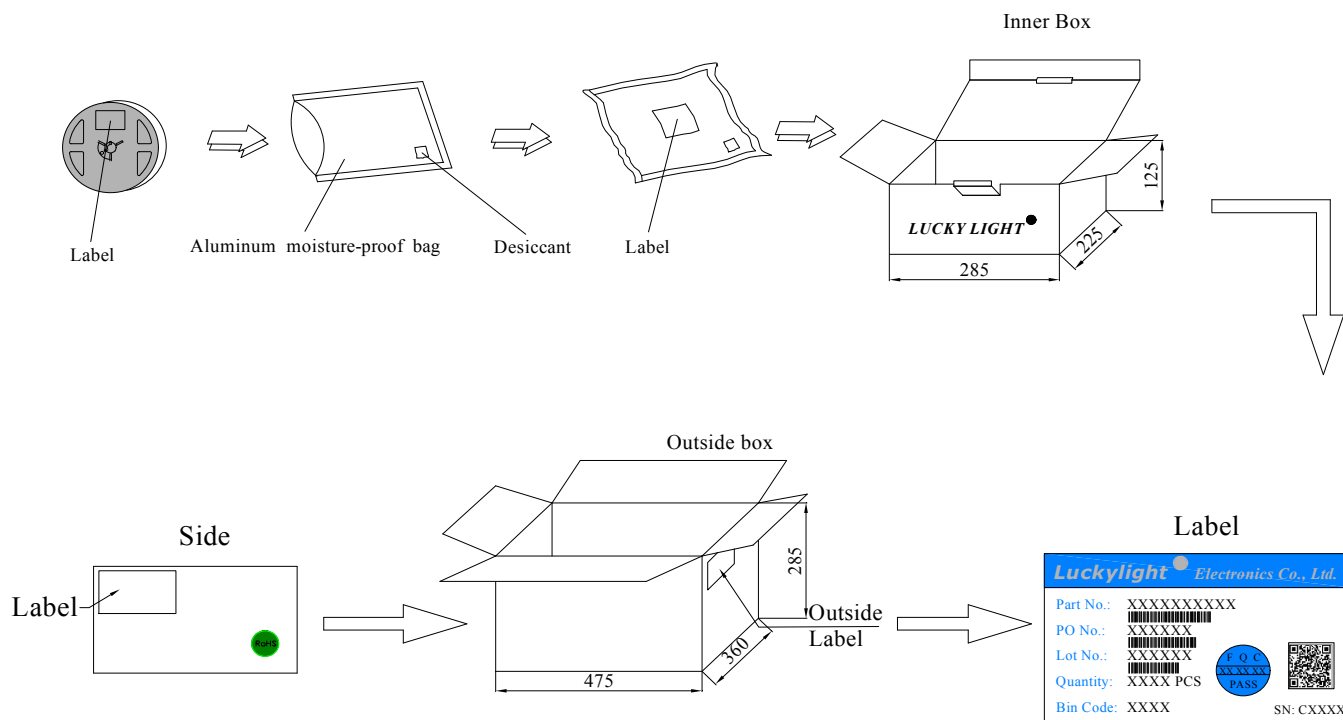
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#### Packing & Label Specifications:

Moisture Resistant Packaging:



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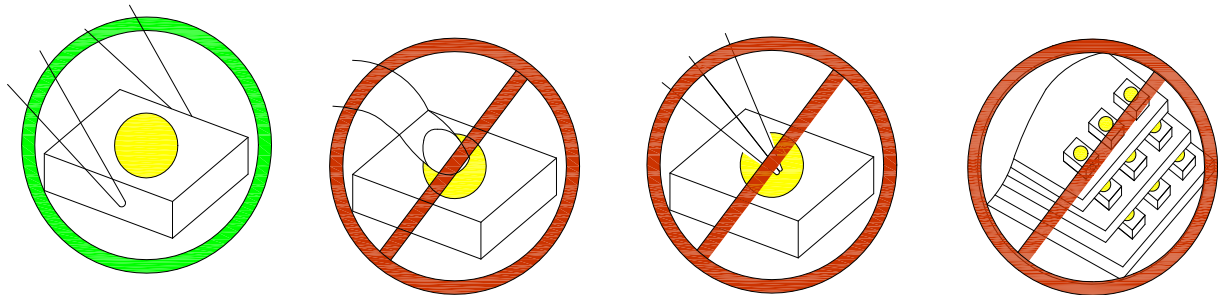
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**CAUTIONS****1. Handling Precautions:**

- 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.



- 1.4 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.

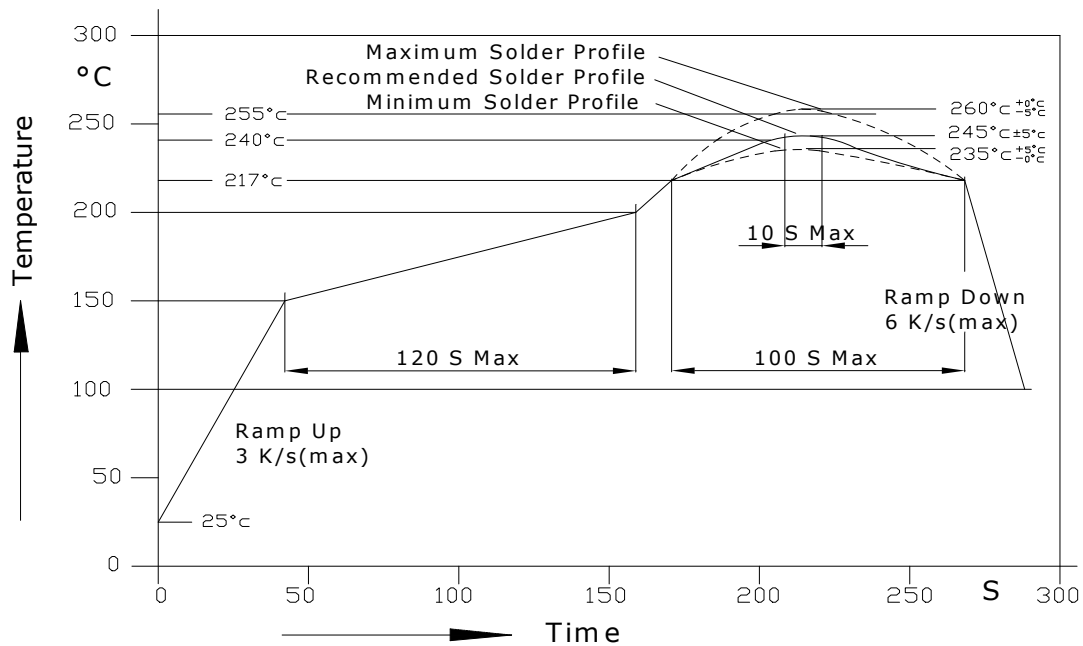
**2. Storage:**

- 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.



**Technical Data Sheet****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.
Pre-heat time	120 sec. Max.	Soldering time	3 sec. Max.
Peak 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.

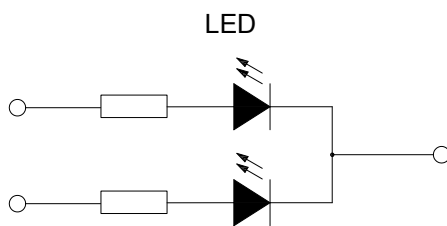
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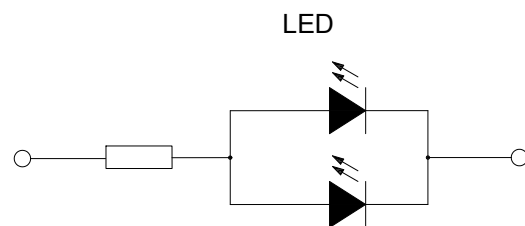
### 4. Drive Method:

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



Circuit model B



(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  $V_f$  of the suspect LEDs at low currents. The  $V_f$  of "good" LEDs should be  $>2.0V@0.1mA$  for InGaN product and  $>1.4V@0.1mA$  for AlInGaP product.

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