

# S1010RGBC-002C

1.0 × 1.0mm, Common Anode RGB LED

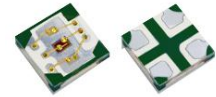
Surface Mount Chip LED Indicator

## Technical Data Sheet

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### Features:

- Multi-color type
- Optical indicator.
- Wide viewing angle.
- Suitable for automatic placement equipment.
- Suitable for vapor-phase reflow, infrared reflow and wave solder processes.
- The product itself will remain within RoHS compliant Version.



### Descriptions:

- The S1010 series is available in soft red, orange, yellow, green, blue and white. 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 portable equipment or any other application where power is at a premium.

### Applications:

- Indoor signage display applications
- Indoor decorating and entertainment design
- Flat backlight for LCD, switch and symbol
- Indicator and backlighting for all consumer electronics

Part No.	Emitting Color		Lens Color
S1010RGBC-002C	R	Red	Water Clear
	G	Pure Green	
	B	Blue	

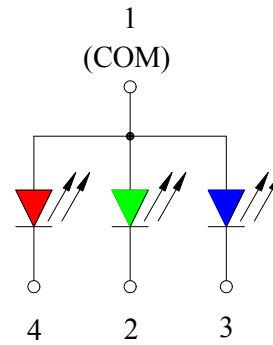
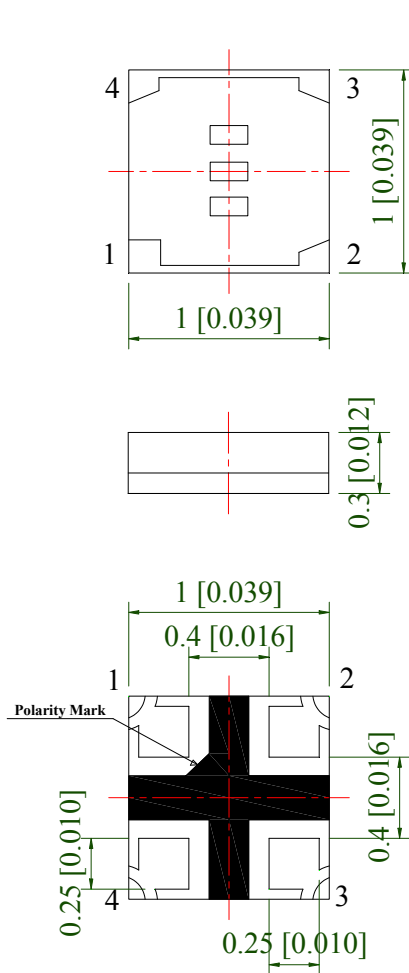
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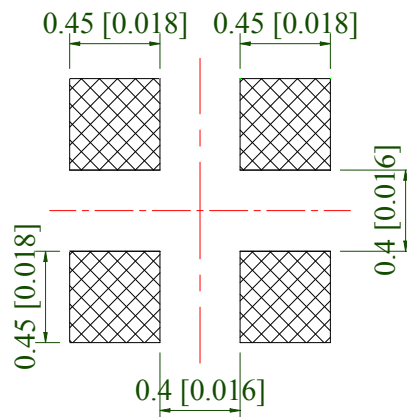
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### Package Dimension:



Polarity

### Recommended Soldering Pad Dimensions



### Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.1$  mm (.0039") unless otherwise noted.

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## Technical Data Sheet

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

Parameters	Symbol	Max.	Unit
Power Dissipation	R	46	mW
	G	56	
	B	56	
Peak Forward Current (Per Chip) <sup>(a)</sup>	IFP	50	mA
Forward Current (Per Chip) <sup>(b)</sup>	R	20	mA
	G	20	
	B	20	
Reverse Voltage (Per Chip)	VR	5	V
Electrostatic Discharge (HBM)	R	2000	V
	G	1000	
	B	1000	
Operating Temperature Range	Topr	-40°C to +85°C	
Storage Temperature Range	Tstg	-40°C to +85°C	
Lead Soldering Temperature [4mm (.157") From Body]	Tsld	250°C for 5 Seconds	

Notes:

- a. Duty Factor = 10%, Frequency = 1 kHz
- b. Derate linearly as shown in derating curve.

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

Parameters	Symbol	Emitting Color	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity <sup>(a)</sup>	IV	R	25	40	---	mcd	IF=2mA
		G	100	150	---		
		B	16	25	---		
Viewing Angle	2θ <sub>1/2</sub>	R	---	120	---	Deg	IF=2mA
		G	---	120	---		
		B	---	120	---		
Peak Emission Wavelength	λ <sub>p</sub>	R	---	632	---	nm	IF=2mA
		G	---	520	---		
		B	---	468	---		
Dominant Wavelength <sup>(b)</sup>	λ <sub>d</sub>	R	---	625	---	nm	IF=2mA
		G	---	525	---		
		B	---	470	---		
Spectral Line Half-Width	Δλ	R	---	20	---	nm	IF=2mA
		G	---	35	---		
		B	---	25	---		
Forward Voltage <sup>(c)</sup>	VF	R	1.70	---	2.10	V	IF=2mA
		G	2.20	---	2.80		
		B	2.20	---	2.80		
Reverse Current	IR	R	---	---	10	μA	V <sub>R</sub> =5V
		G	---	---	10		
		B	---	---	10		

#### Notes:

- Luminous Intensity measurement tolerance: ±10%.
- Wavelength measurement tolerance: ±1nm
- Forward voltage measurement tolerance: ±0.1V

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### Forward Voltage Rank Combination (IF=2mA)

Rank		Min.	Max.	Unit
Red	□	1.7	2.1	V
Green	D	2.2	2.5	
	E	2.5	2.8	
Blue	D	2.2	2.5	
	E	2.5	2.8	

### Luminous Intensity Rank Combination (IF=2mA)

Rank		Min.	Max.	Unit
Red	D	25	32	mcd
	E	32	40	
	F	40	50	
Green	J	100	125	
	K	125	160	
	L	160	200	
Blue	B	16	20	
	C	20	25	
	D	25	32	

### Dominant wavelength Rank Combination (IF=2mA)

Rank		Min.	Max.	Unit
Red	S	615	620	nm
	T	620	625	
Green	W	525	527.5	
	X	527.5	530	
	Y	530	532.5	
	Z	532.5	535	
Blue	G	465	467.5	
	H	467.5	470	
	I	470	472.5	
	J	472.5	475	

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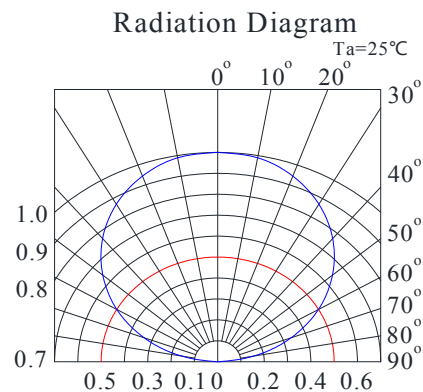
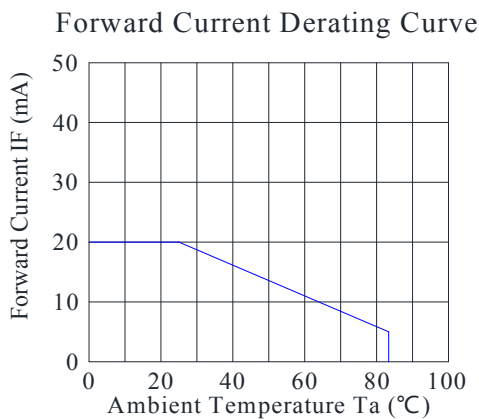
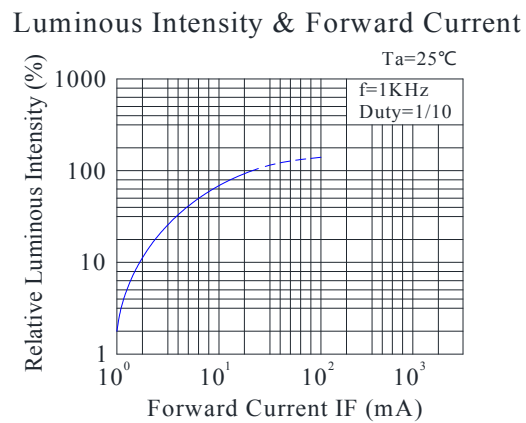
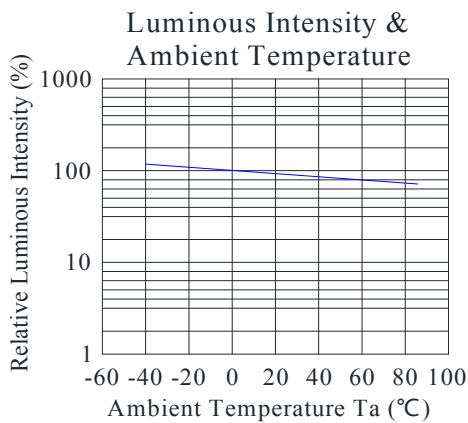
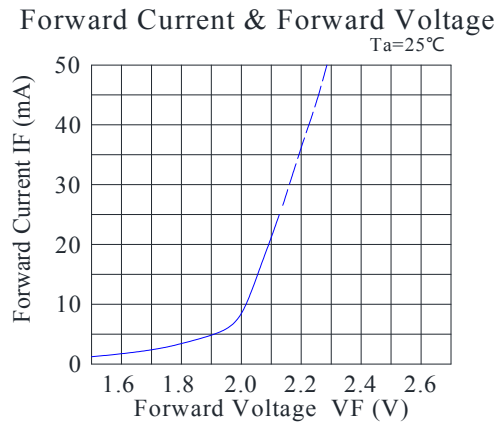
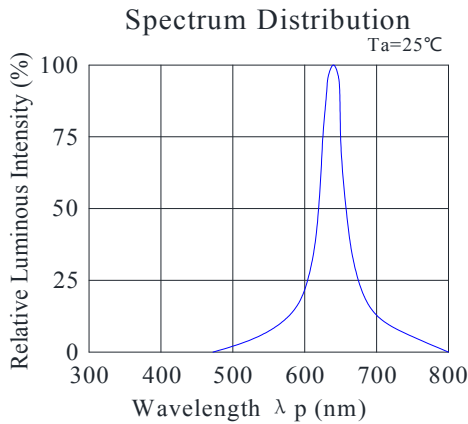
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### Typical Electrical / Optical Characteristics Curves (25°C Ambient Temperature Unless Otherwise Noted)

Red:



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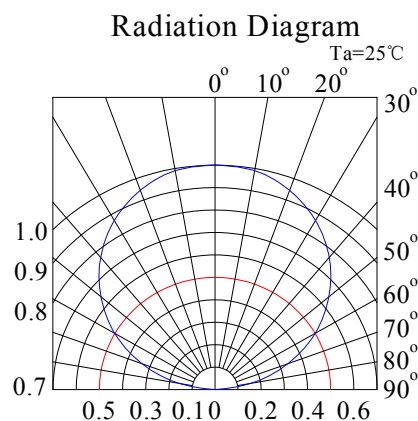
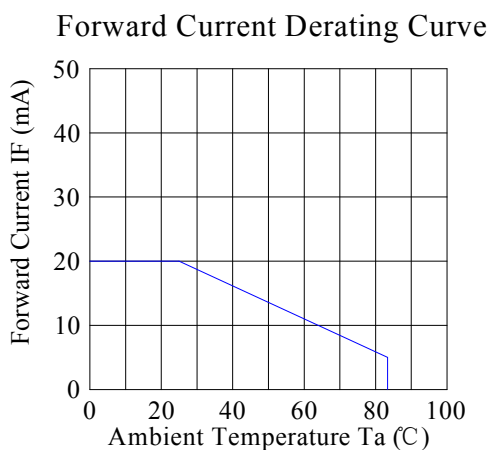
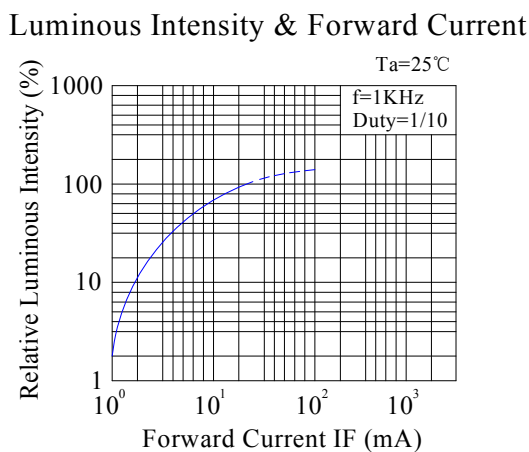
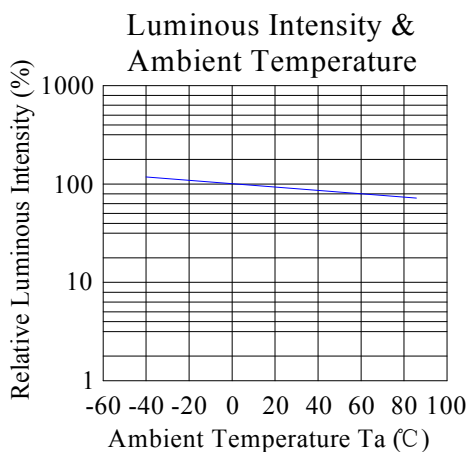
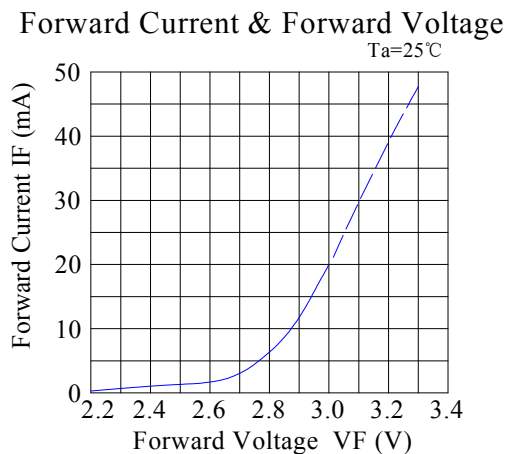
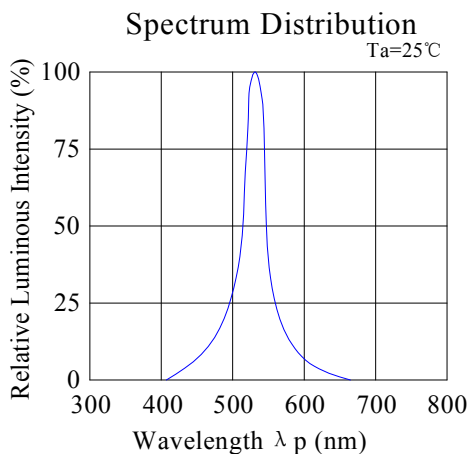
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Green:



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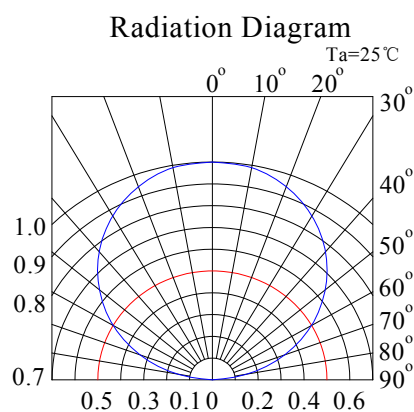
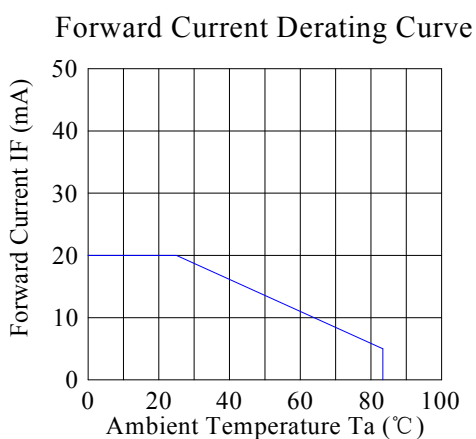
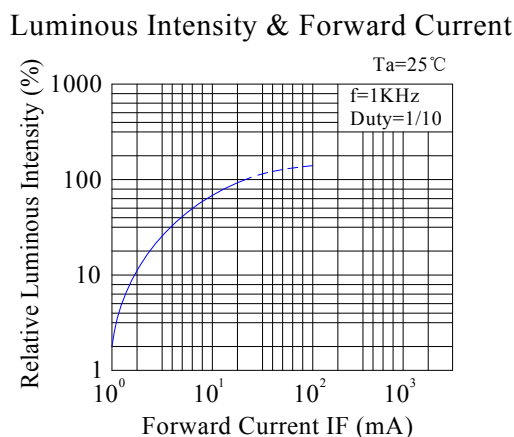
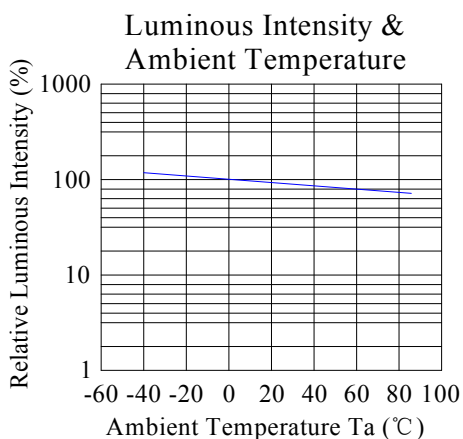
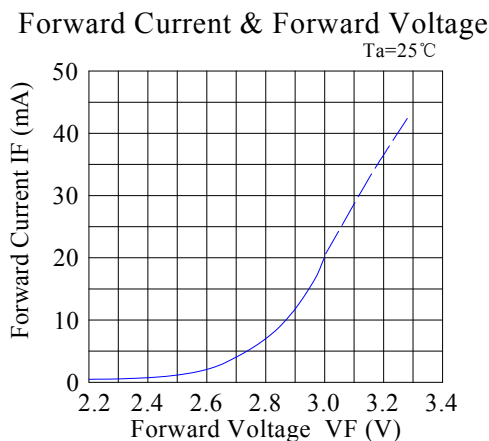
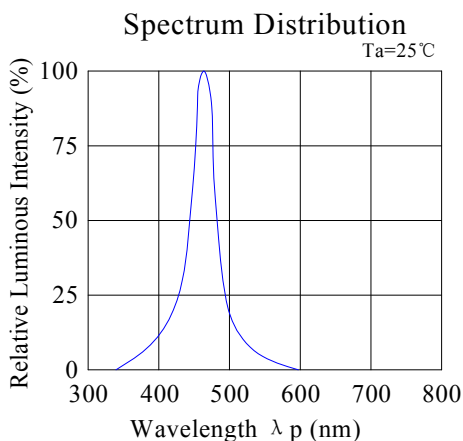
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Blue:





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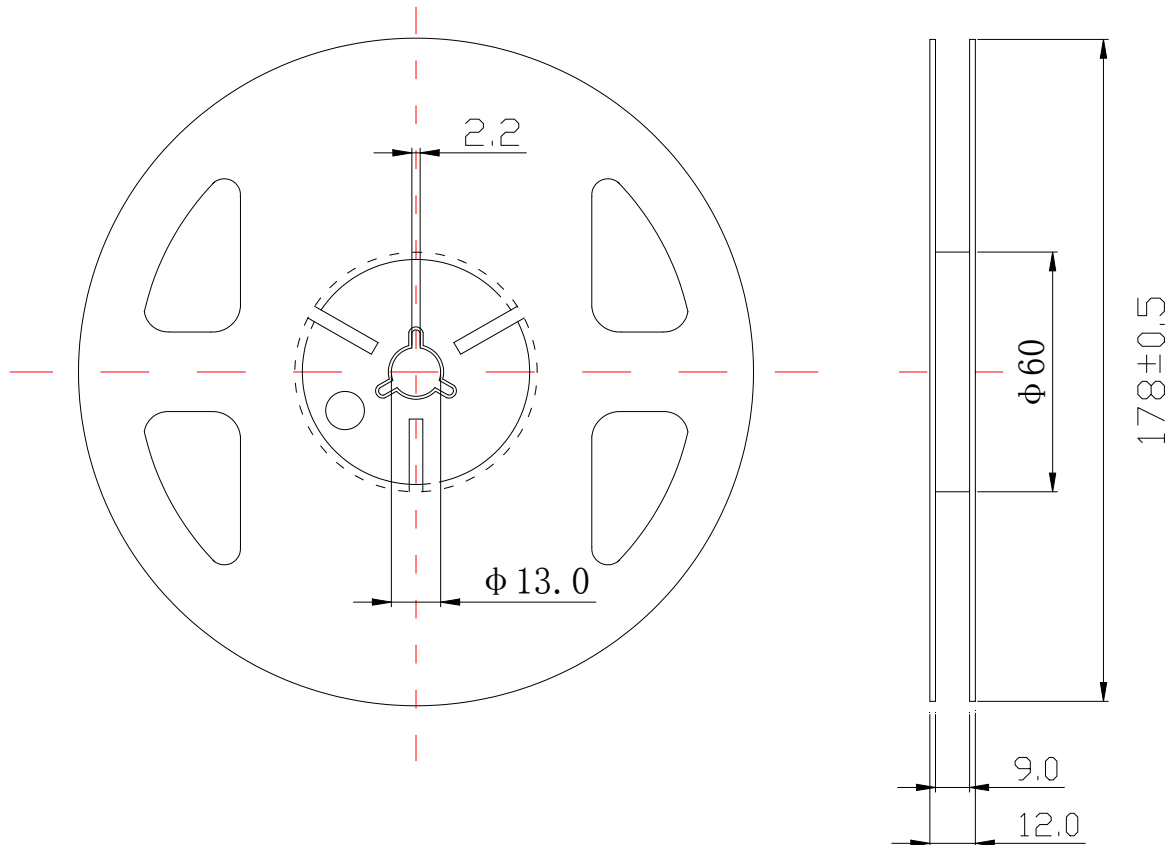
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### Reel Dimensions:



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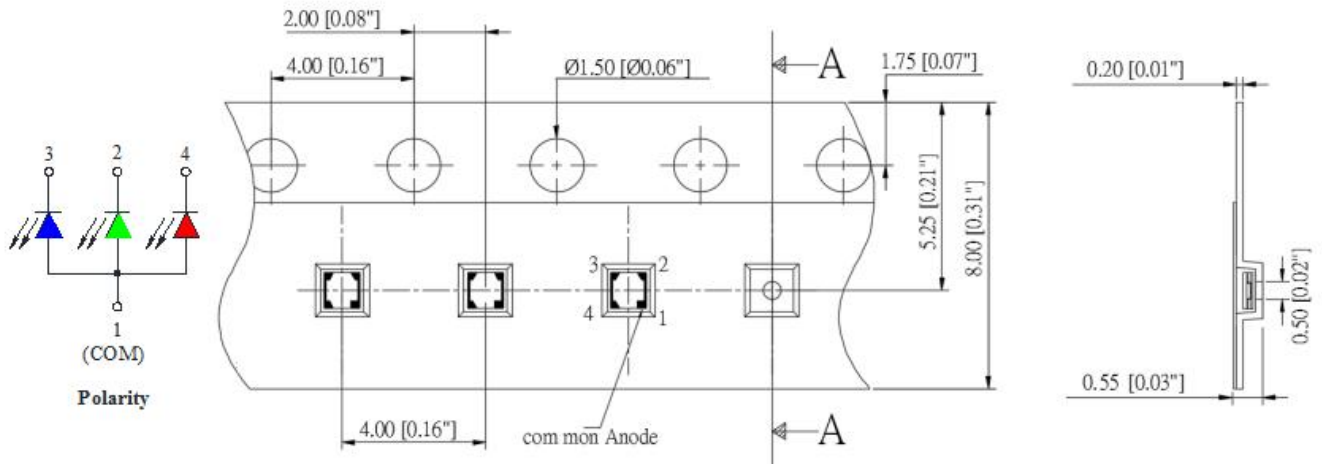
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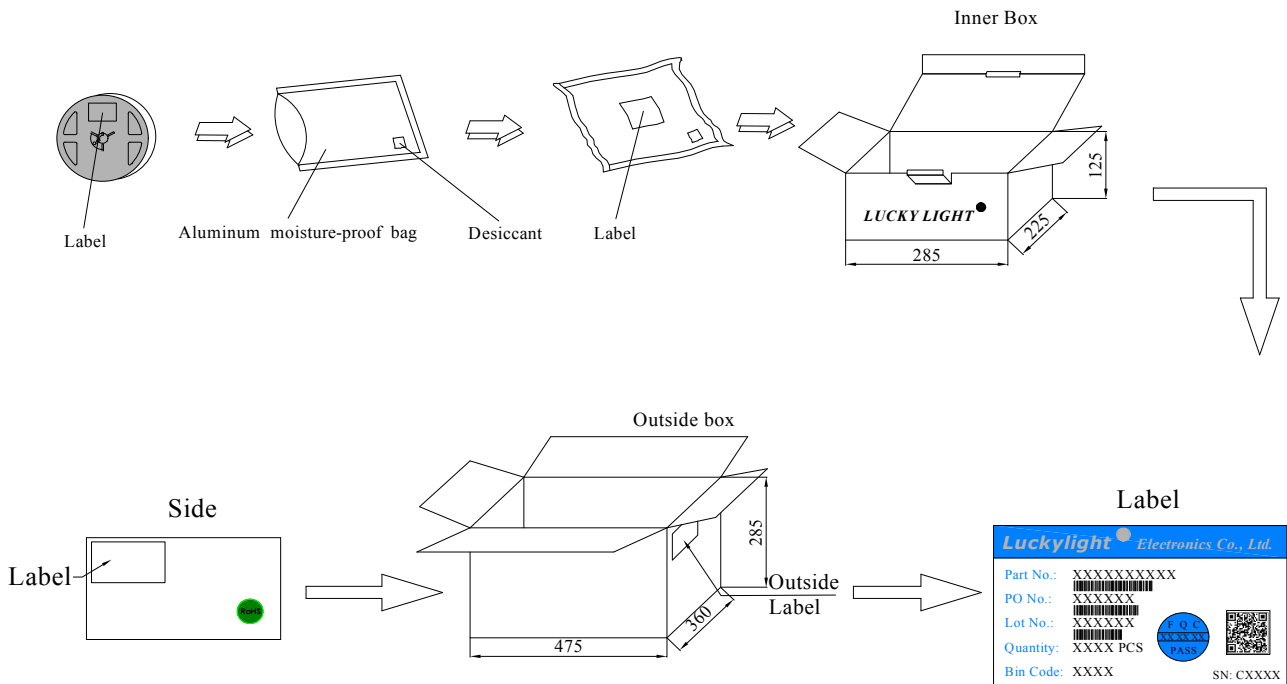
### Carrier Tape Dimensions:

Loaded quantity 4000 pcs per reel.



### Packing & Label Specifications:

Moisture Resistant Packaging:



Spec No.: S1010

Issue No.: G-Rev-5

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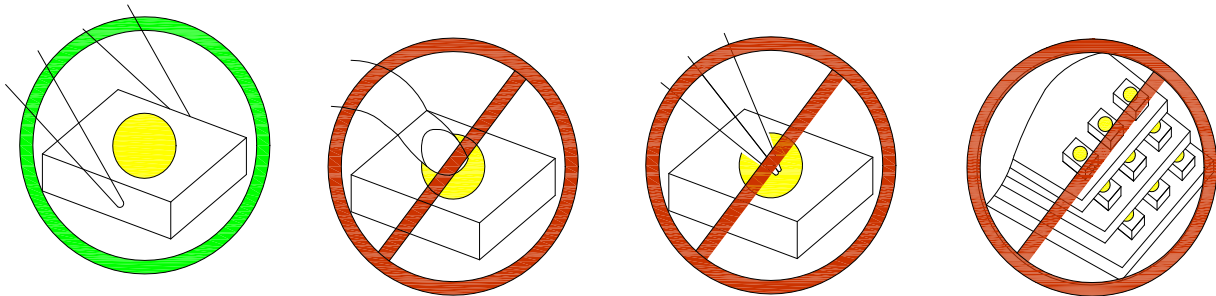
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### CAUTIONS

#### 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.



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 168 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

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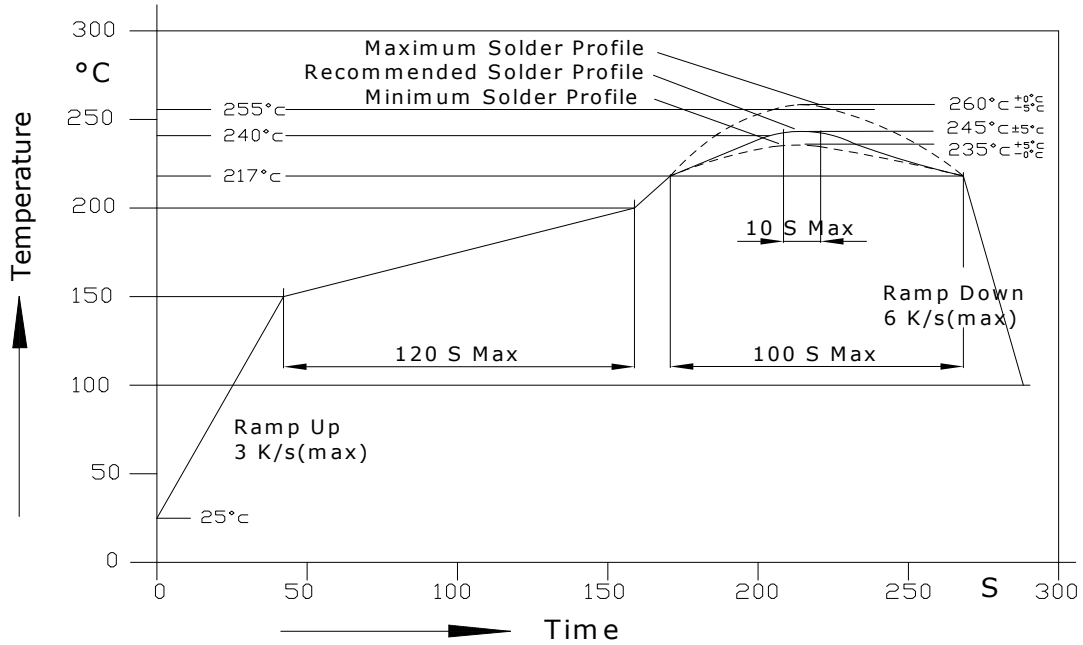
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**Technical Data Sheet**

**3.1. Pb-free solder temperature profile**



Reflow soldering should not be done more than two times.

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

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

3.4. 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	250°C Max.		(one time only)
Soldering time	10 sec. Max.(Max. two times)		

3.5. 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**

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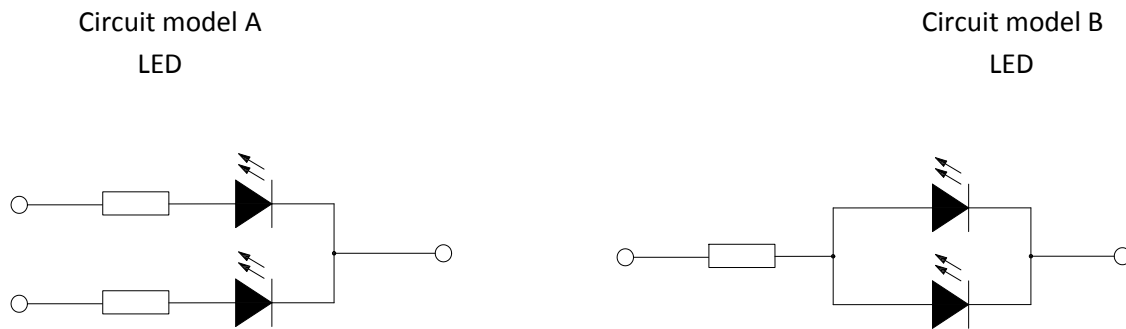
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4.1. An LED is a current-operated device. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended that a current limiting resistor be incorporated in the drive circuit, in series with each LED as shown in Circuit A below.



- 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.

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Issue No.: G-Rev-5

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