V4509RGBC-01M

4.5x0.9mm, Multi-color Package

Right Angle Lens PLCC-6 LED Indicator

Technical Data Sheet

Features:

- White package.
- Optical indicator.
- Colorless clear window.
- Ideal for backlight and light pipe application.
- Inter reflector.
- Wide viewing angle.
- Suitable for vapor-phase reflow, infrared reflow and wave solder processes.
- Computable with automatic placement equipment.
- Available on tape and reel (12mm Tape).
- The product itself will remain within RoHS compliant Version.

Descriptions:

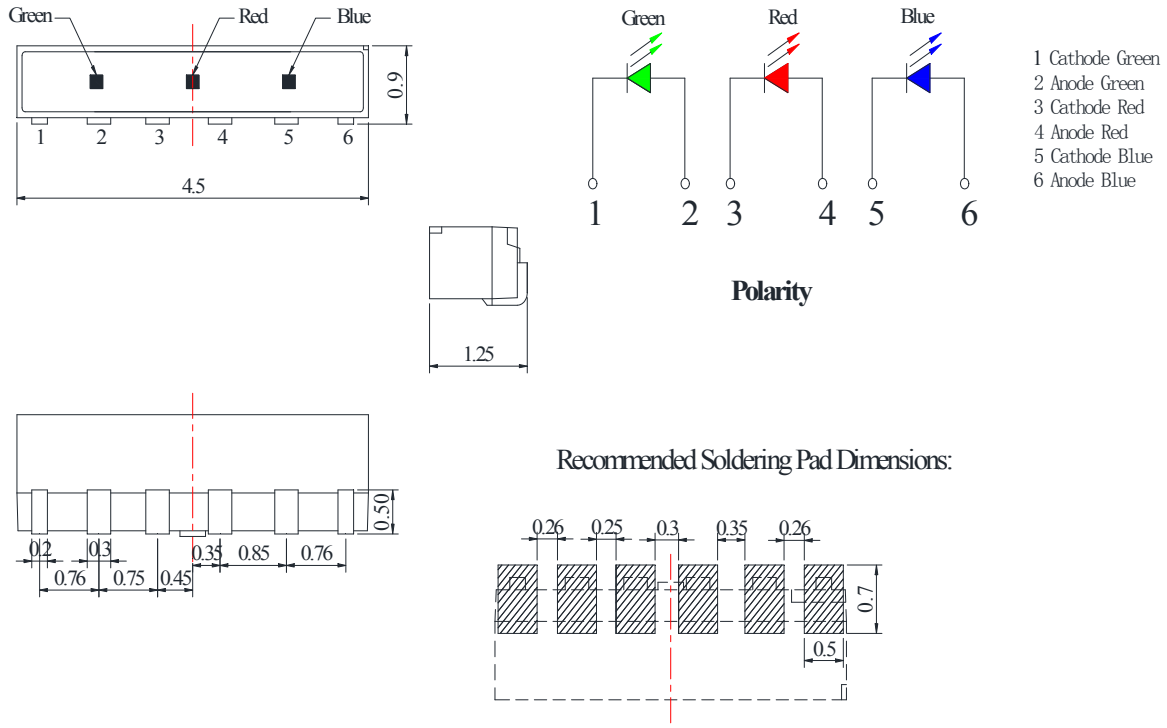
- The V4509 SMD LED is much smaller than lead frame type components, thus enable smaller board size, higher packing density, reduced storage space and finally smaller equipment to be obtained.
- Besides, lightweight makes them ideal for miniature applications, etc.

Applications:

- Backlighting in dashboard and switch.
- Telecommunication: Indicator and backlighting in telephone and fax.
- Flat backlight for LCD, switch and symbol.
- General use.

Part No.	Emitting Color		Lens Color
V4509RGBC-01M	R	Red	Water Clear
	G	Green	
	B	Blue	

Package Dimension:



Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is ± 0.25 mm (.010″) unless otherwise noted.

Absolute Maximum Ratings at Ta=25℃

Parameters	Symbol	Emitting Color	Max.	Unit
Power Dissipation	PD	Red	42	mW
		Green	62	
		Blue	62	
Peak Forward Current[(a)]	IFP	Red	30	mA
		Green	60	
		Blue	60	
Continuous Forward Current[(b)]	IF	Red	20	mA
		Green	20	
		Blue	20	
Reverse Voltage	VR		5	V
Electrostatic Discharge (HBM)	ESD	Red	2000	V
		Green	400	
		Blue	400	
Operating Temperature Range	Topr		-40℃ to +80℃	
Storage Temperature Range	Tstg		-40℃ to +85℃	
Soldering Temperature	Tsld		260℃ for 5 Seconds	

Notes:

a. Derate linearly as shown in derating curve.

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

Electrical Optical Characteristics at Ta=25℃

Parameters	Symbol	Emitting Color	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity[a]	IV	Red	100	150	---	mcd	IF=5mA
		Green	400	600	---		
		Blue	80	150	---		
Viewing Angle[b]	2θ1/2	Red	---	120	---	Deg	IF=5mA
		Green	---	120	---		
		Blue	---	120	---		
Peak Emission Wavelength	λp	Red	---	632	---	nm	IF=5mA
		Green	---	520	---		
		Blue	---	468	---		
Dominant Wavelength[C]	λd	Red	---	624	---	nm	IF=5mA
		Green	---	525	---		
		Blue	---	470	---		
Spectral Line Half-Width	△λ	Red	---	20	---	nm	IF=5mA
		Green	---	35	---		
		Blue	---	25	---		
Forward Voltage	VF	Red	1.60	1.80	2.10	V	IF=5mA
		Green	2.60	2.80	3.10		
		Blue	2.60	2.80	3.10		
Reverse Current	IR	Red	---	---	10	μA	VR=5V
		Green			50		
		Blue			50		

Notes:

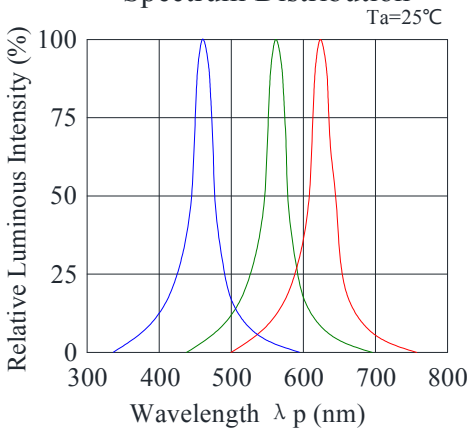
a. ALuminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.

b. 2θ1/2 is the o -axis angle where the luminous intensity is 1⁄2 the peak intensity

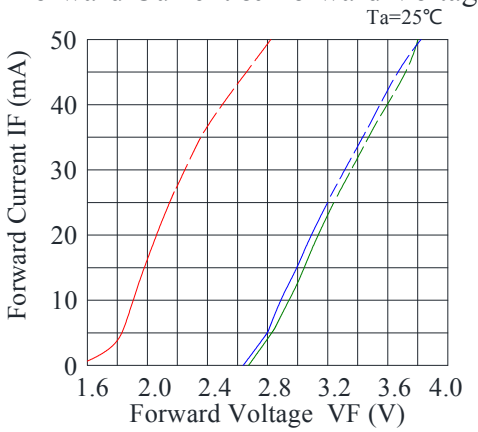
c. The dominant wavelength (λd) is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

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

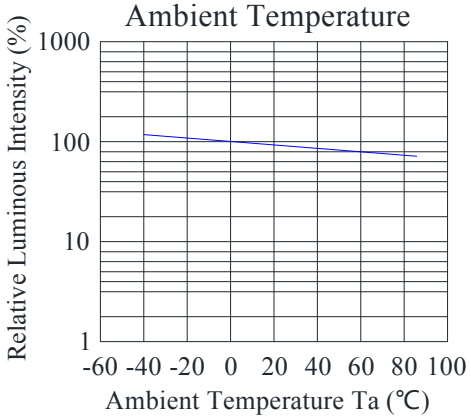
Spectrum Distribution



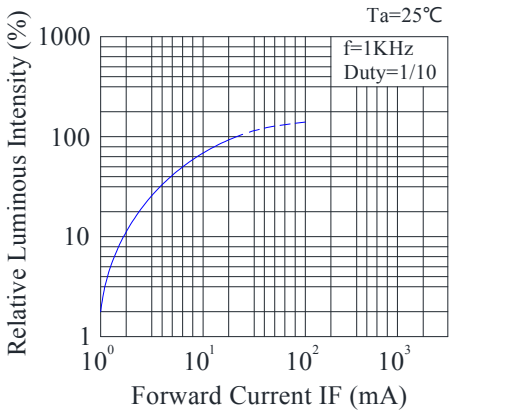
Forward Current & Forward Voltage



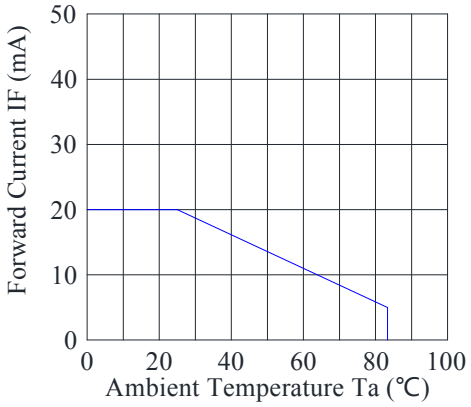
Luminous Intensity & Ambient Temperature



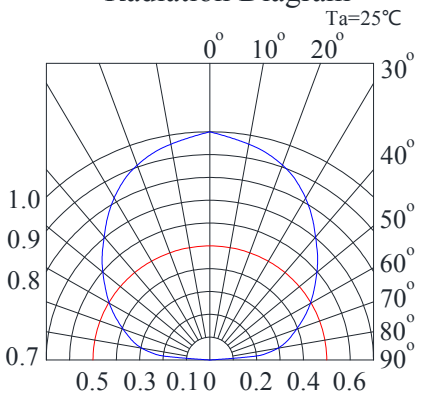
Luminous Intensity & Forward Current



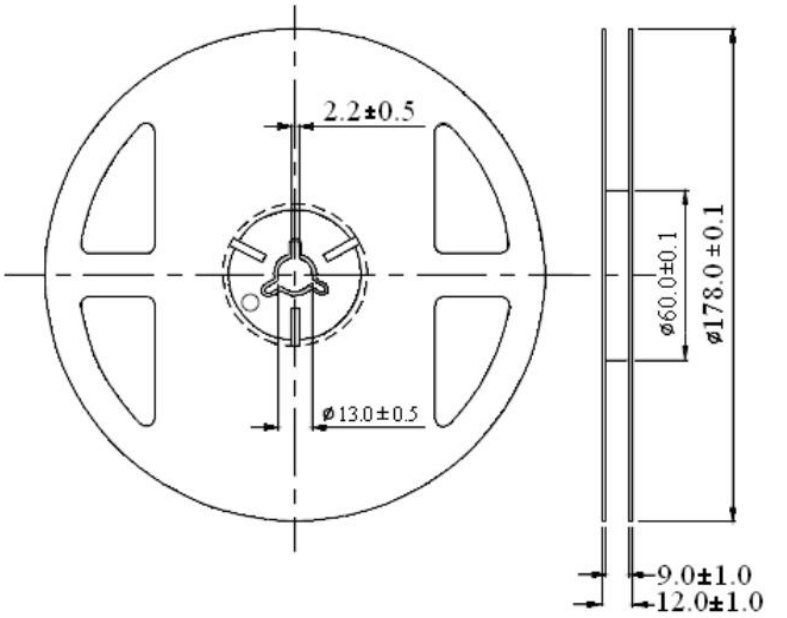
Forward Current Derating Curve



Radiation Diagram



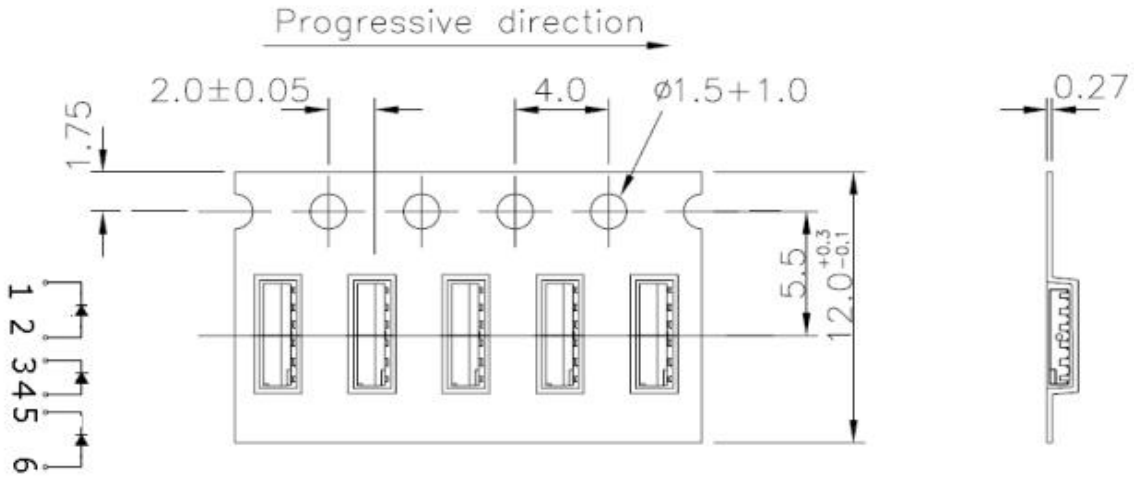
Reel Dimensions:



Unit: mm
Tolerance: ±0.25mm

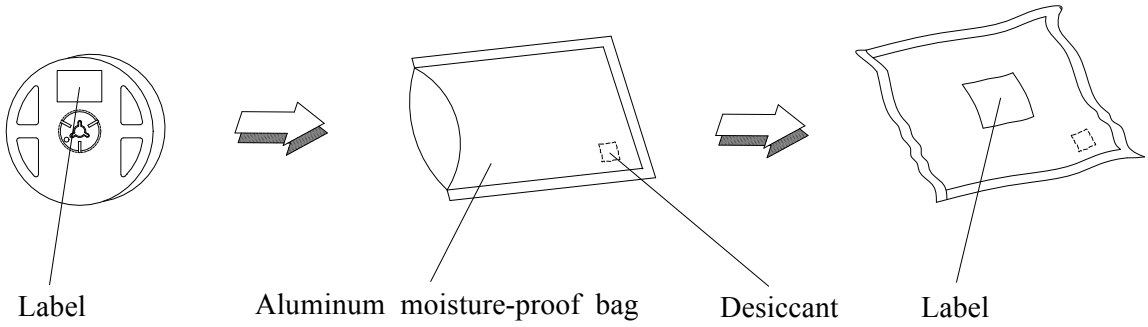
Carrier Tape Dimensions:

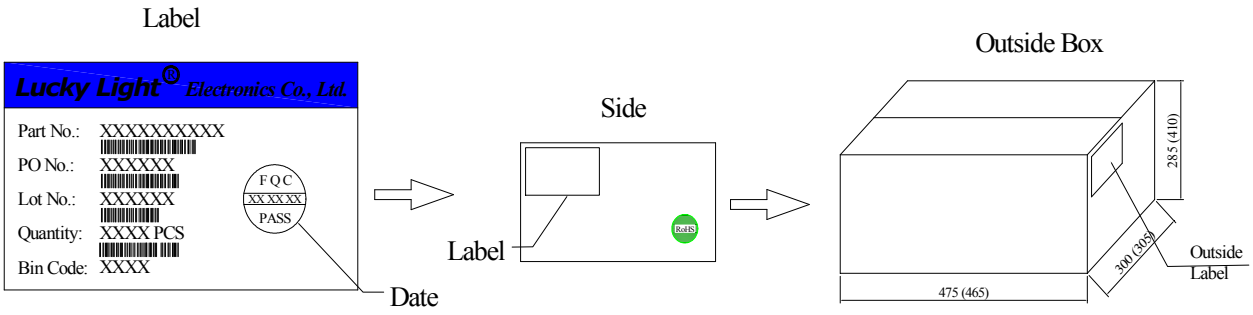
Loaded quantity 4000 pcs per reel.



Packing & Label Specifications:

Moisture Resistant Packaging:





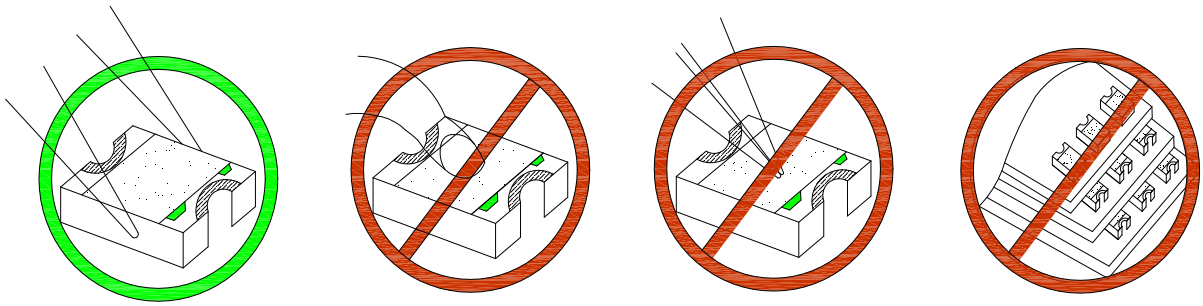
CAUTIONS

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.

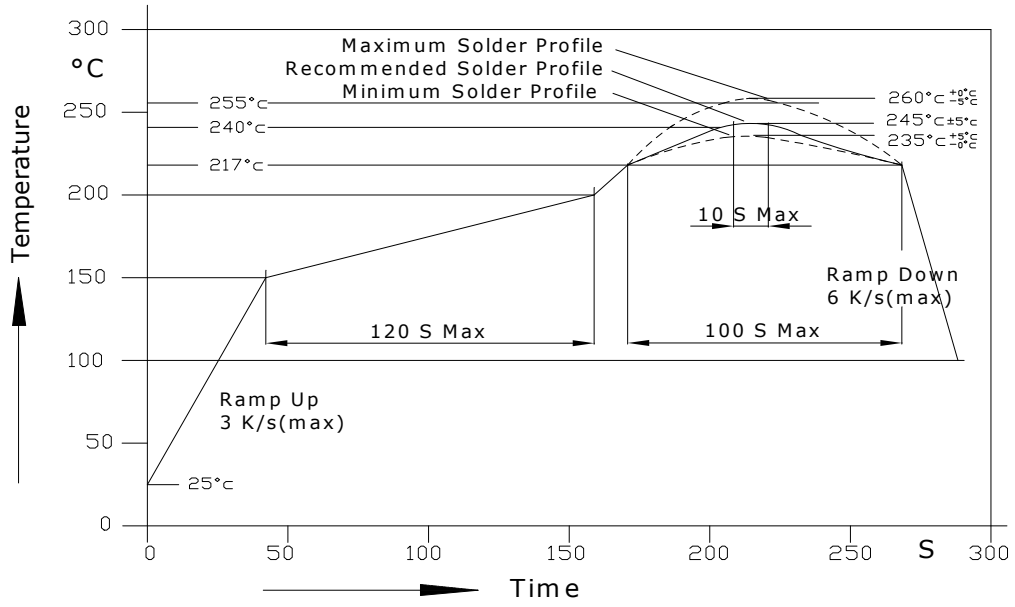
2.4. After opening the package, the LEDs should be kept at 30°C or less and 60%RH or less.

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.
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.

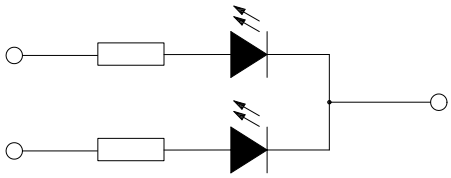
However, you can successfully mount your packages to the PCB by following the proper guidelines and PCB-specific

characterization.

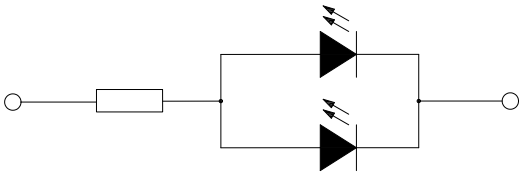
4. Drive Method

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.

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