

**Technical Data Sheet**  
**Full Color Top View LEDs**

67-23/R6GHBHC-B01/2T

**Features**

- P-LCC-4 package.
- White package.
- Optical indicator.
- Colorless clear window.
- Pb free
- The product itself will remain within RoHS compliant version..



**Descriptions**

- The 67-23 series is available in soft orange, green, blue and yellow. Due to the package design, the LED has wide viewing angle and optimized light coupling by inter reflector. This feature makes the 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**

- Automotive: backlighting in dashboard and switch.
- Telecommunication: indicator and backlighting in telephone and fax.
- Flat backlight for LCD's, switches and symbols.
- Light pipe application.
- General use.

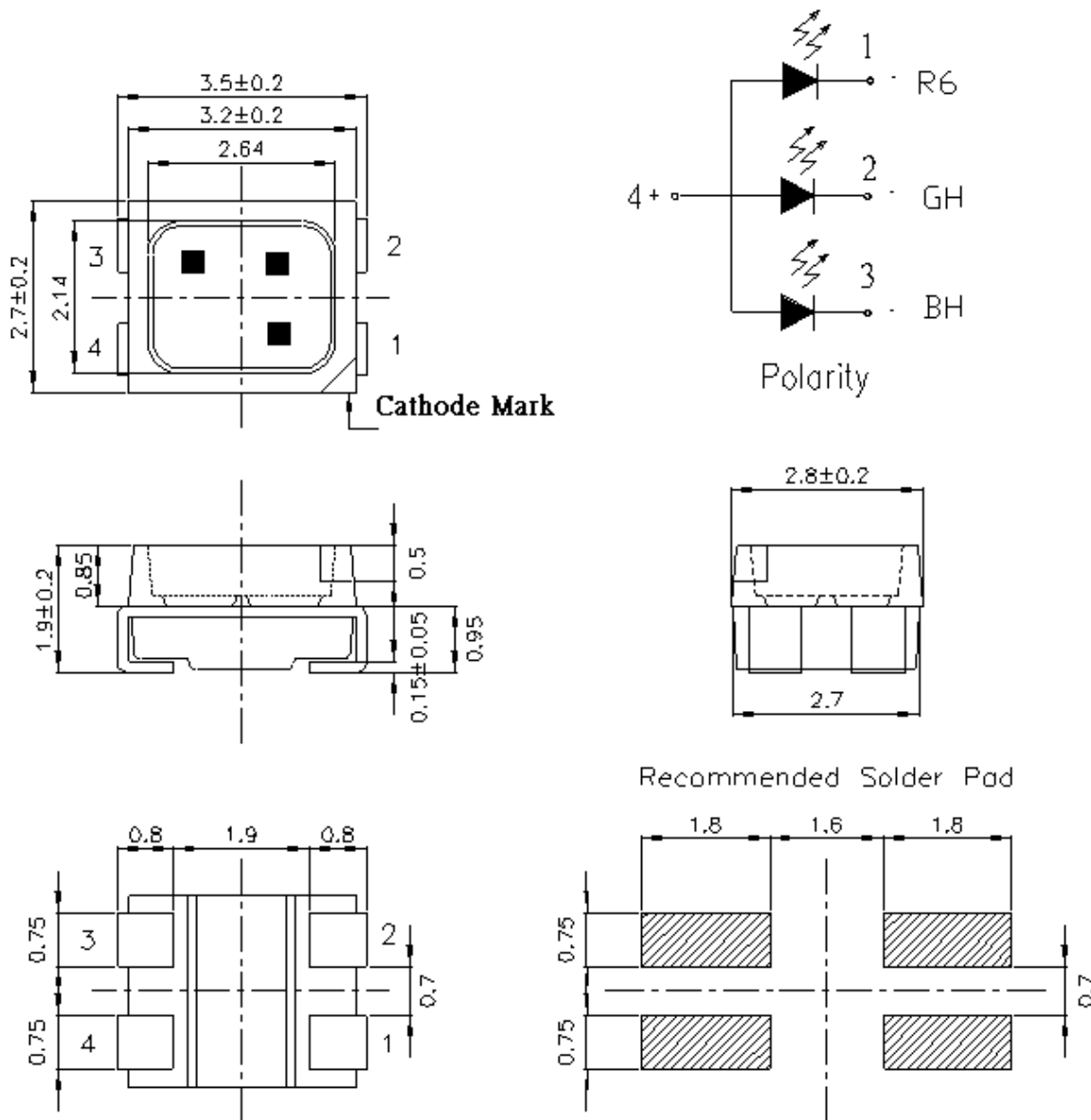
**Device Selection Guide**

Chip			Lens Color
Type	Material	Emitted Color	
R6	AlGaInP	Brilliant Red	Water Clear
GH	InGaN	Brilliant Green	
BH	InGaN	Blue	

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**Package Outline Dimensions**



**Notes:** All dimensions are in millimeters.

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#### Absolute Maximum Ratings (Ta=25 )

Parameter	Symbol	Rating		Unit
Reverse Voltage	V <sub>R</sub>	5		V
Forward Current	I <sub>F</sub>	R6	25	mA
		GH	25	
		BH	25	
Peak Forward Current(Duty 1/10 @ 1KHz)	I <sub>FP</sub>	R6	100	mA
		GH	100	
		BH	100	
Power Dissipation	P <sub>d</sub>	R6	120	mW
		GH	110	
		BH	110	
Electrostatic Discharge(HBM)	ESD	R6	2000	V
		GH	1000	
		BH	1000	
Operating Temperature	T <sub>opr</sub>	-40 ~ +85		
Storage Temperature	T <sub>stg</sub>	-40~ +100		
Soldering Temperature	T <sub>sol</sub>	Reflow Soldering : 260 for 10 sec.		
		Hand Soldering : 350 for 3 sec.		

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#### Electro-Optical Characteristics (Ta=25 °C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition	
Luminous Intensity	I <sub>v</sub>	R6	57	-----	112	mcd	I <sub>F</sub> =10mA
		GH	225	-----	565		
		BH	72	-----	180		
Viewing Angle	2 1/2	-----	120	-----	deg	I <sub>F</sub> =10mA	
Peak Wavelength	p	R6	-----	632	-----	nm	I <sub>F</sub> =10mA
		GH	-----	518	-----		
		BH	-----	468	-----		
Dominant Wavelength	d	R6	619	-----	628	nm	I <sub>F</sub> =10mA
		GH	530	-----	540		
		BH	466	-----	474		
Spectrum Radiation Bandwidth		R6	-----	20	-----	nm	I <sub>F</sub> =10mA
		GH	-----	35	-----		
		BH	-----	35	-----		
Forward Voltage	V <sub>F</sub>	R6	-----	2.0	2.4	V	I <sub>F</sub> =10mA
		GH	-----	3.5	3.9		
		BH	-----	3.5	3.9		
Reverse Current	I <sub>R</sub>	R6	-----	-----	10	μA	V <sub>R</sub> =5V
		GH	-----	-----	50		
		BH	-----	-----	50		

#### Notes:

1. Tolerance of Luminous Intensity : ±10%
2. Tolerance of Dominant Wavelength ±0.1V

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#### Bin Range of Luminous Intensity

Symbol		Bin Code	Min.	Max.	Unit	Condition
Iv	R6	P2	57	72	mcd	I <sub>F</sub> = 10mA
		Q1	72	90		
		Q2	90	112		
	GH	S2	225	285		
		T1	285	360		
		T2	360	450		
		U1	450	565		
	BH	Q1	72	90		
		Q2	90	112		
		R1	112	140		
		R2	140	180		

#### Bin Range of Dominant Wavelength

Symbol	Bin Code	Min.	Max.	Unit	Condition
R6	***	619	628	nm	I <sub>F</sub> = 10mA
GH	1	530	535		
	2	535	540		
BH	***	466	474		

#### Notes:

1. Tolerance of Luminous Intensity : ±10%
2. Tolerance of Dominant Wavelength ±0.1V

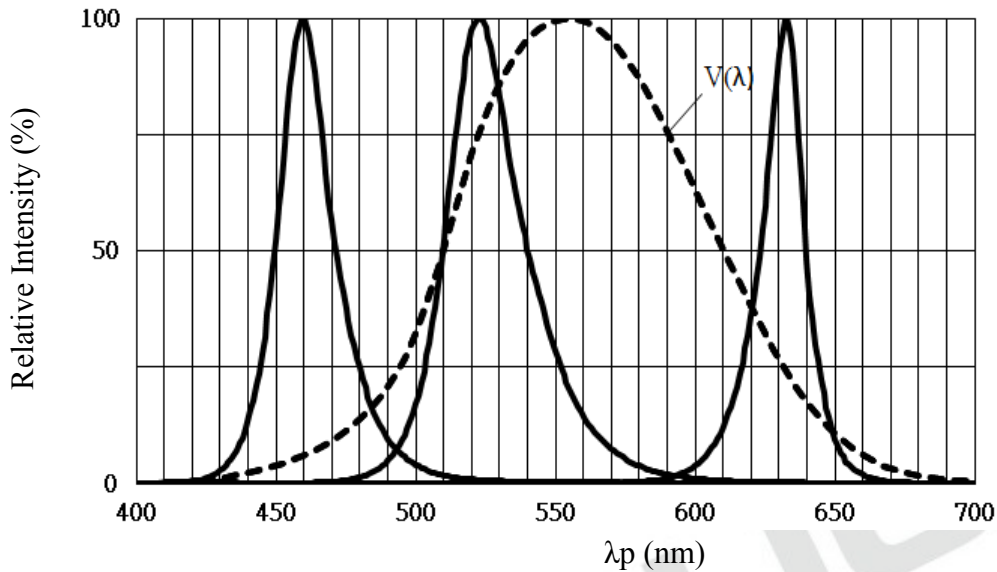
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### Full Color Top View LEDs

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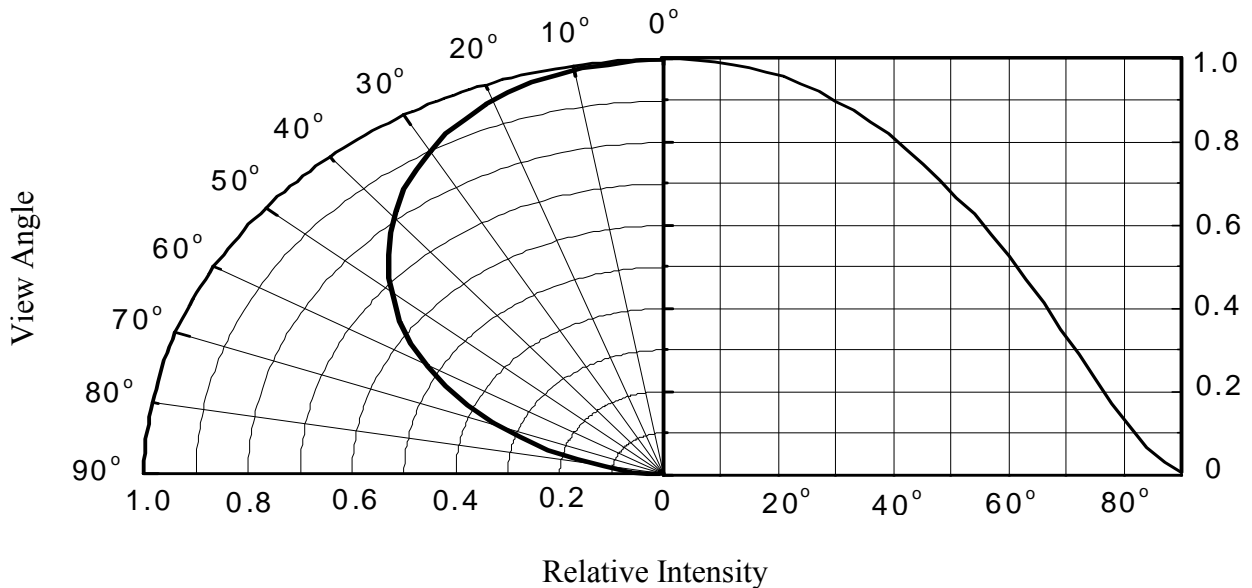
#### Typical Electro-Optical Characteristics Curves

##### Typical Curve of Spectral Distribution



Note:  $V(\lambda)$  = Standard eye response curve

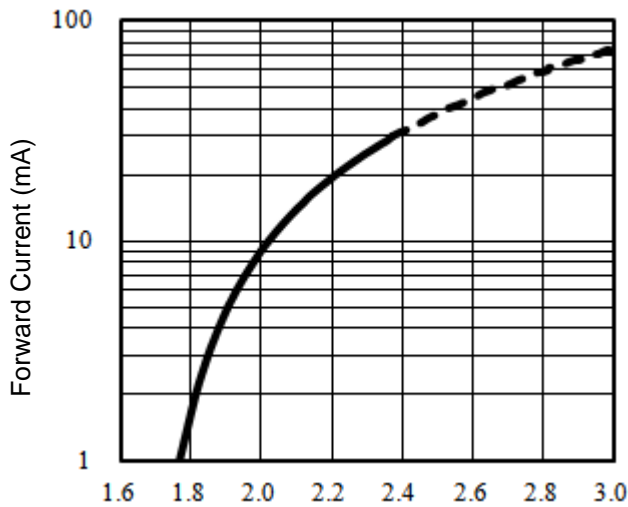
##### Diagram Characteristics of Radiation



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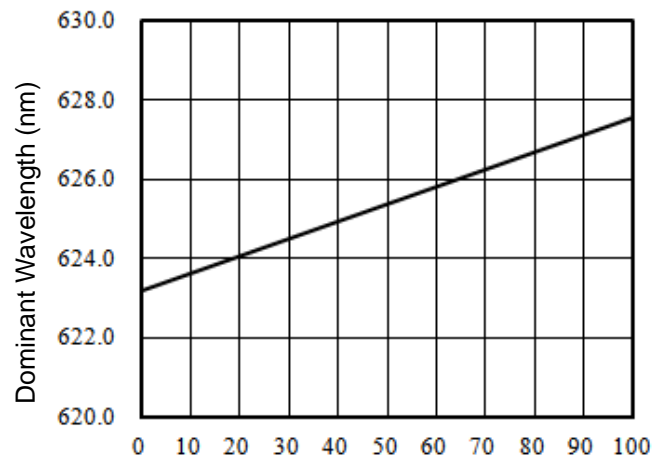
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Forward Current vs. Forward Voltage (Ta=25 °C)



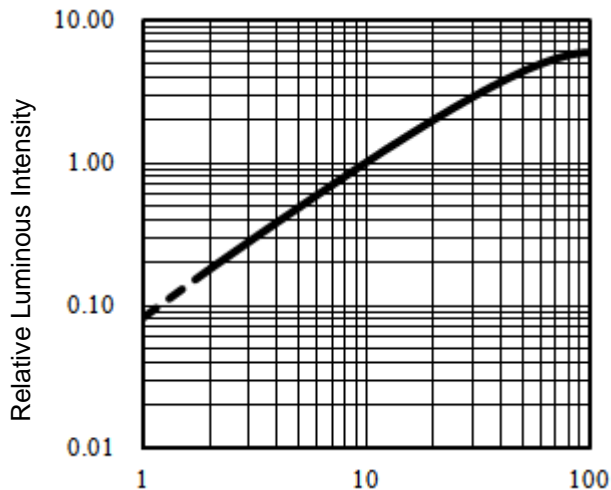
Forward Voltage (V)

Dominant Wavelength vs. Forward Current (Ta=25 °C)



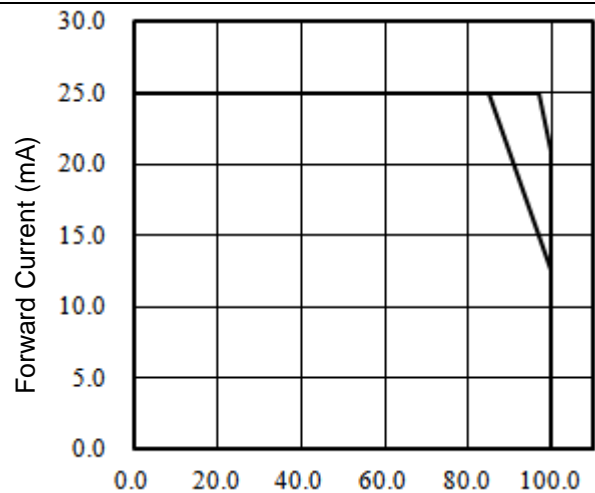
Forward Current (mA)

Relative Luminous Intensity vs. Forward Current (Ta=25 °C)



Forward Current (mA)

Max. Permissible Forwarded Current (Ta=25 °C)

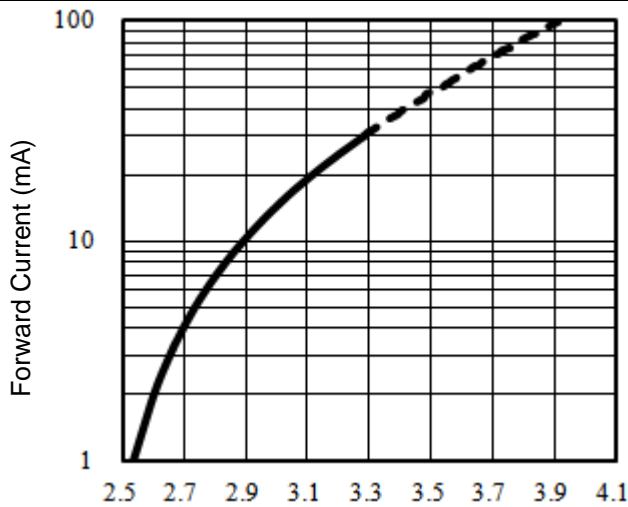


Temperature (°C)

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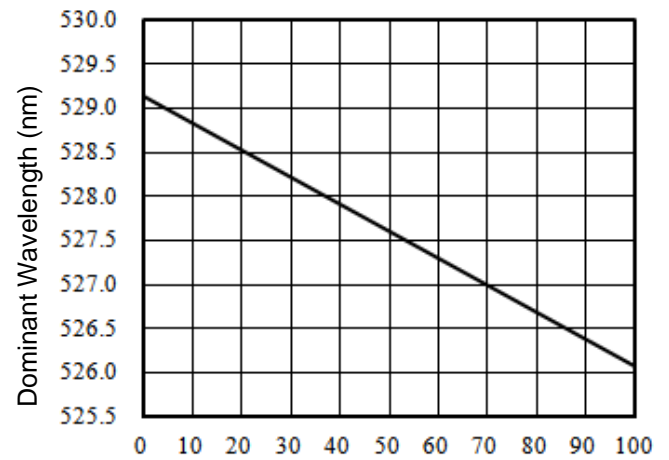
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Forward Current vs. Forward Voltage (Ta=25 °C)



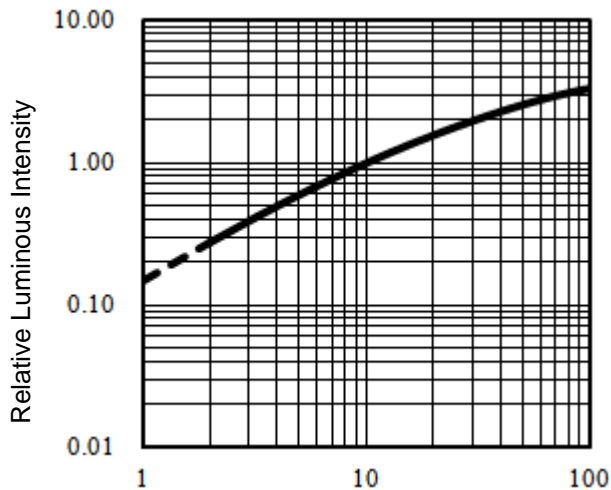
Forward Voltage (V)

Dominant Wavelength vs. Forward Current (Ta=25 °C)



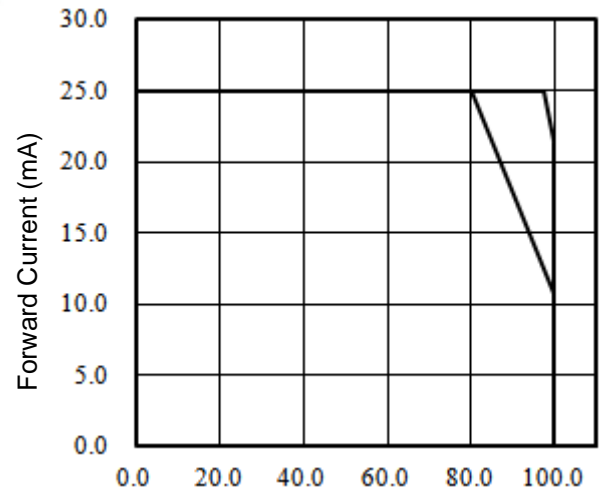
Forward Current (mA)

Relative Luminous Intensity vs. Forward Current (Ta=25 °C)



Forward Current (mA)

Max. Permissible Forwarded Current (Ta=25 °C)



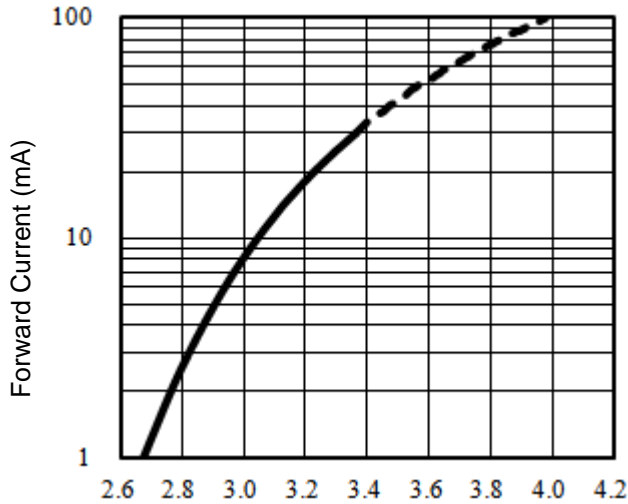
Temperature (°C)



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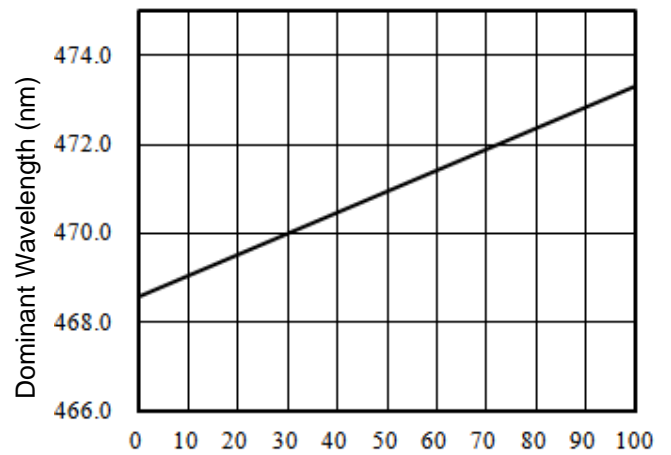
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Forward Current vs. Forward Voltage (Ta=25 °C)



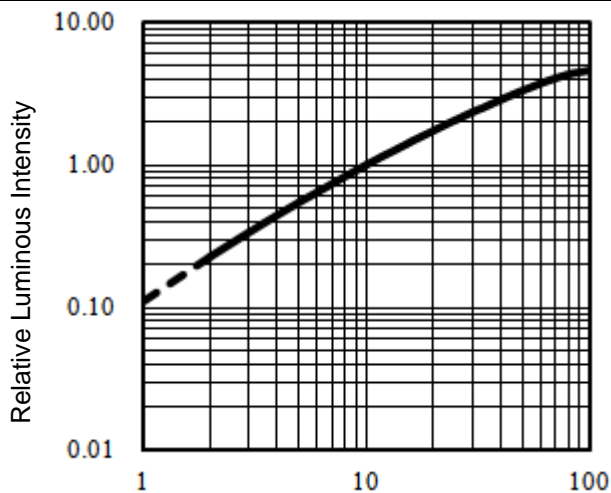
Forward Voltage (V)

Dominant Wavelength vs. Forward Current (Ta=25 °C)



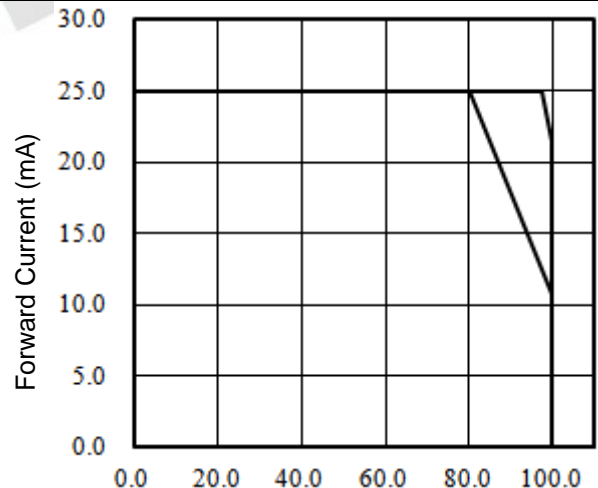
Forward Current (mA)

Relative Luminous Intensity vs. Forward Current (Ta=25 °C)



Forward Current (mA)

Max. Permissible Forwarded Current (Ta=25 °C)



Temperature (°C)

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### Full Color Top View LEDs

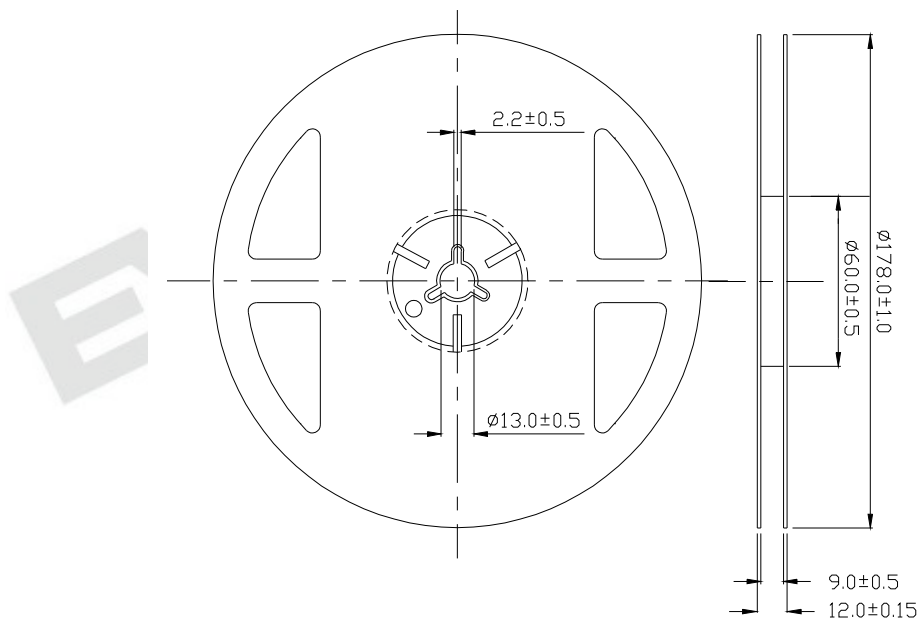
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#### Label Explanation

CAT: Luminous Intensity Rank  
 HUE: Dom. Wavelength Rank  
 REF: Forward Voltage Rank



#### Reel Dimensions

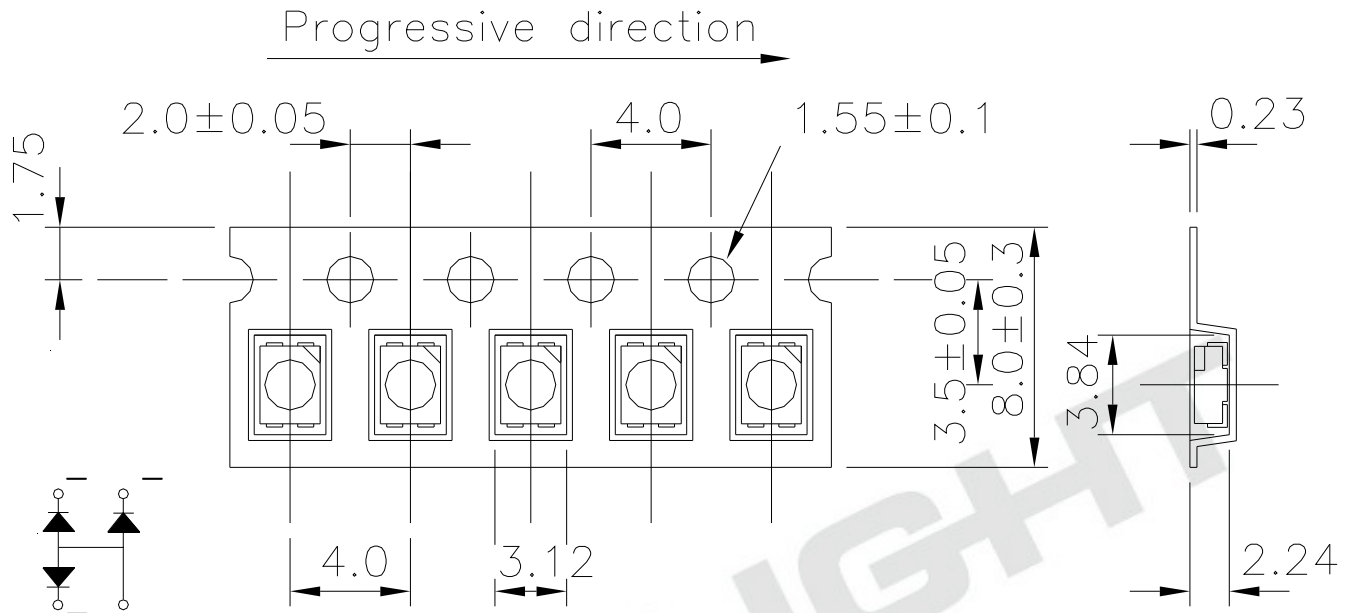


**Note:** Tolerances Unless Dimension  $\pm 0.1\text{mm}$  ,Unit = mm

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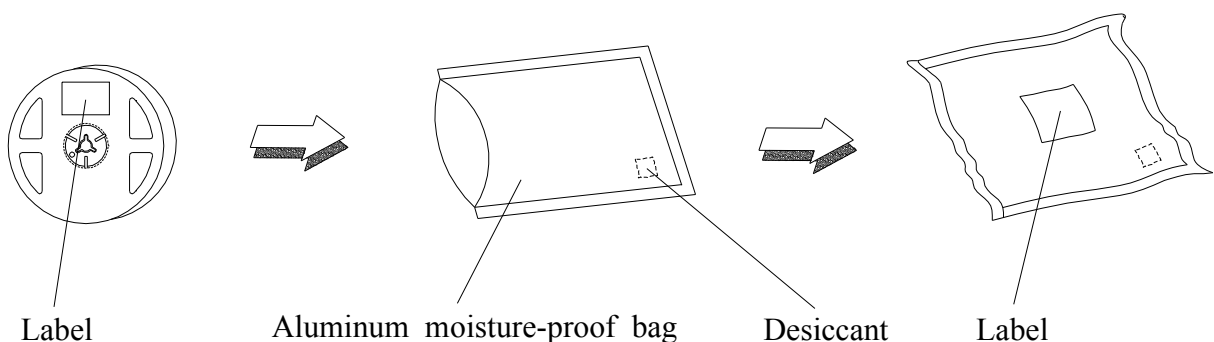
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**Carrier Tape Dimensions: Loaded Quantity 2000 pcs Per Reel.**



**Note:** Tolerances Unless Dimension  $\pm 0.1\text{mm}$ , Unit = mm

### Moisture Resistant Packaging



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#### Reliability Test Items and Conditions

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10%

No.	Items	Test Condition	Test Hours/Cycles	Sample Size	Ac/Re
1	Reflow Soldering	Temp. : 260 ±5 Min 10 sec.	6 min	22 PCS.	0/1
2	Temperature Cycle	H : +100 15min ↓ 5 min L : -40 15min	300 Cycles	22 PCS.	0/1
3	Thermal Shock	H : +100 5min ↓ 10 sec L : -10 5min	300 Cycles	22 PCS.	0/1
4	High Temperature Storage	Temp. : 100	1000 Hrs.	22 PCS.	0/1
5	Low Temperature Storage	Temp. : -40	1000 Hrs.	22 PCS.	0/1
6	DC Operating Life	I <sub>F</sub> = 20 mA	1000 Hrs.	22 PCS.	0/1
7	High Temperature / High Humidity	85 /85%RH	1000 Hrs.	22 PCS.	0/1

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#### Precautions For Use

##### 1. Over-current-proof

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change ( Burn out will happen ).

##### 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 or less and 90%RH or less.

2.3 After opening the package: The LED's floor life are 72 hours under 30 or less and 60% RH or less.

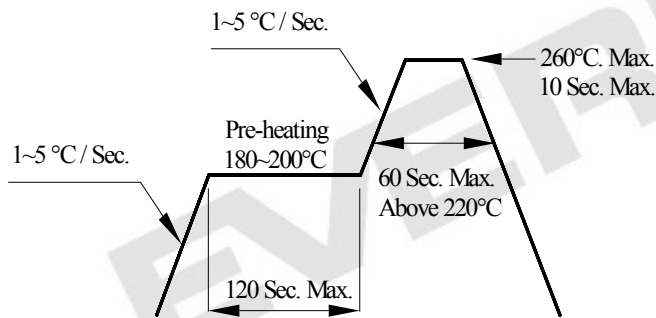
If unused LEDs remain, it should be stored in moisture proof packages.

2.4 If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.

Baking treatment :  $60\pm 5$  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.

##### 4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350 for 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

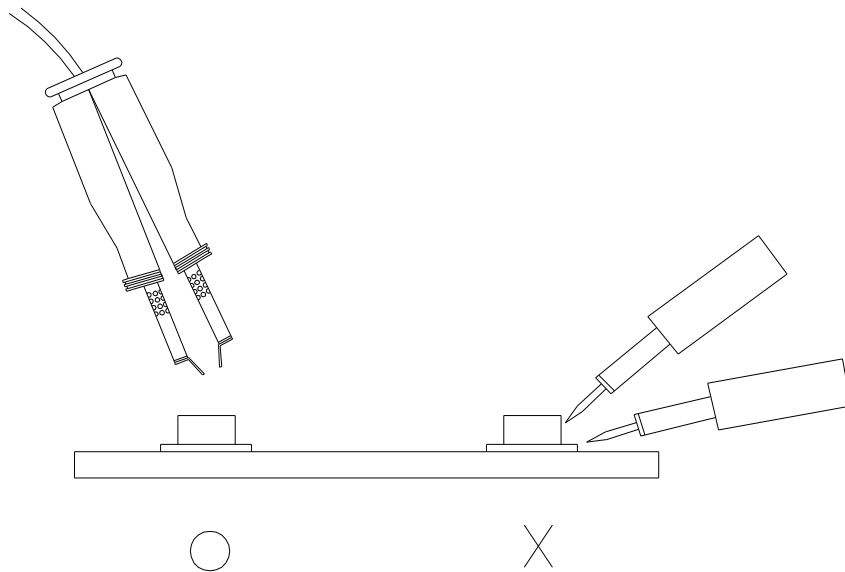
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#### 5. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.



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