RGB LED, 5 mm

RND components

Features

- Uniform light output
- Low power consumption
- I.C. compatible
- Long life solid state reliability
- Compliance with EU REACH
- The product itself will remain within RoHS compliant Version

Applications

- TV set
- Monitor
- Telephone
- Computer
- Circuit board, etc

Descriptions

- The Super Bright Red source color devices are made with AlGaInP on GaAs substrate Light Emitting Diod
- The Pure Green source color devices are made with InGaN on Sapphire substrate Light Emitting Diode
- The Blue source color devices are made with InGaN on Sapphire substrate Light Emitting Diode

Abosulute Maximum Ratings at Ta 25℃

Parameters		Symbol	Max.	Unit
Power Dissipation	Red	Pd	60	mW
	Pure Green		90	
	Blue		90	
Peak Forward Current (a)		IFP	100	mA
DC Forward Current (b)	Red	IF	25	mA
	Pure Green		25	
	Blue		25	
Reverse Voltage		VR	5	V
Operating Temperature Range		Topr	-40℃ to +85℃	
Storage Temperature Range		Tstg	-40℃ to +100℃	
Soldering Temperature		Tsld	260℃ for 5 Seconds	

Notes:

a. Derate linearly as shown in derating curve.

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

Device Selection Guide

Part No.	Emitting Color	Lens Color
RND 135-00191	Super Bright Red	Water Clear
	Pure Green	
	Blue	

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Electrical Optical Characteristics at Ta 25℃

Parameters	Symbol	Emitting Color	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity [a]	Iv	Red	1600	3200	---	mcd	IF=20mA
		Pure Green	2000	4000	---		
		Blue	1000	2000	---		
Viewing Angle [b]	$2\theta_{1/2}$	Red	---	25	---	deg.	IF=20mA
		Pure Green	---	25	---		
		Blue	---	25	---		
Peak Emission Wavelength	λp	Red	---	632	---	nm	IF=20mA
		Pure Green	---	520	---		
		Blue	---	468	---		
Dominant Wavelength [c]	λd	Red	---	624	---	nm	IF=20mA
		Pure Green		525			
		Blue	---	470	---		
Spectral Line Half-Width	△λ	Red	---	20	---	nm	IF=20mA
		Pure Green	---	20	---		
		Blue	---	25	---		
Forward Voltage	VF	Red	1.6	2.0	2.4	V	IF=20mA
		Pure Green	2.6	3.2	3.6		
		Blue	2.6	3.2	3.6		
Reverse Current	IR	Red	---	---	10	μA	VR=5V
		Pure Green	---	---	10		
		Blue	---	---	10		

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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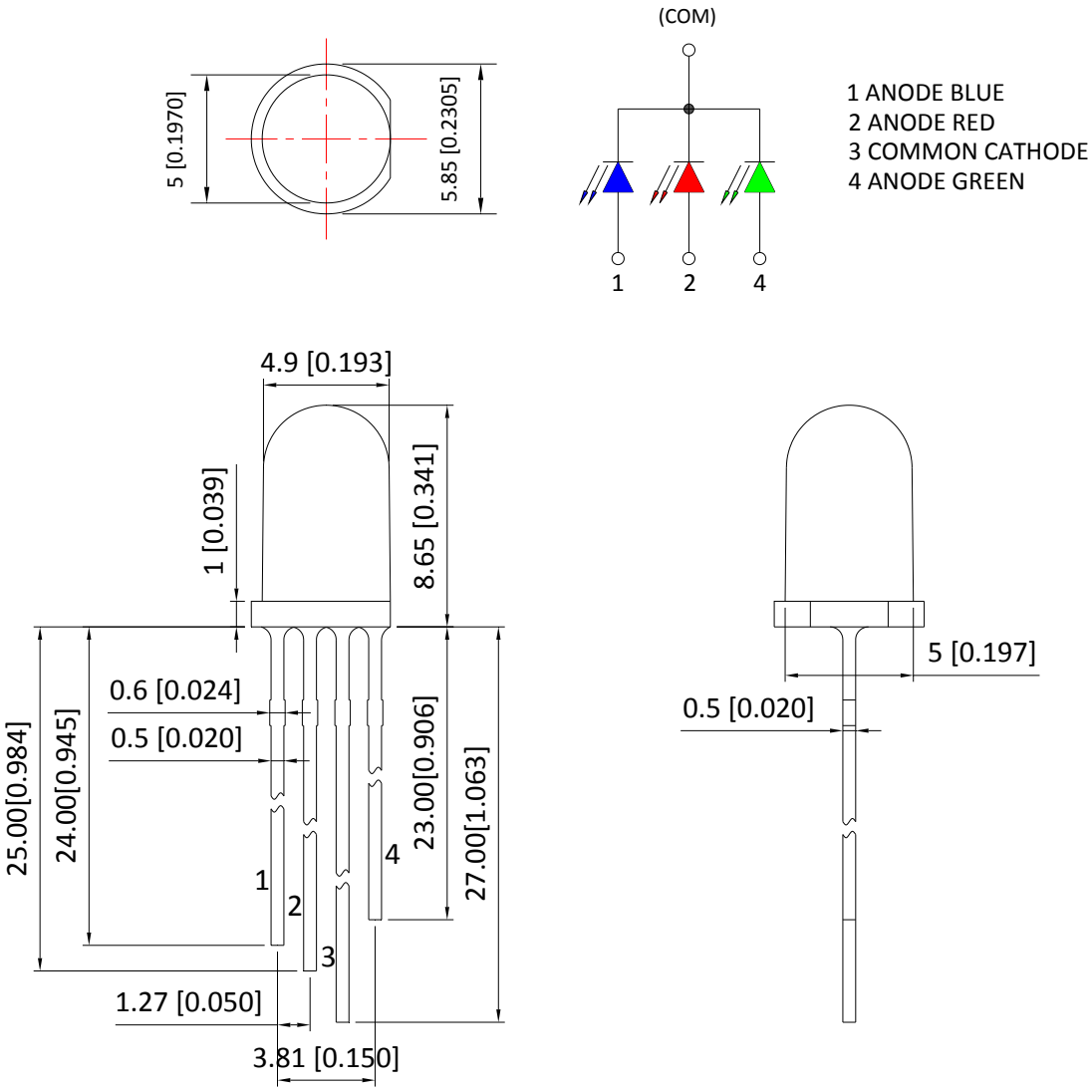
Package Dimensions



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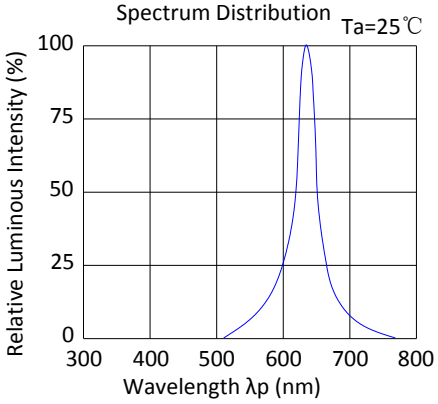
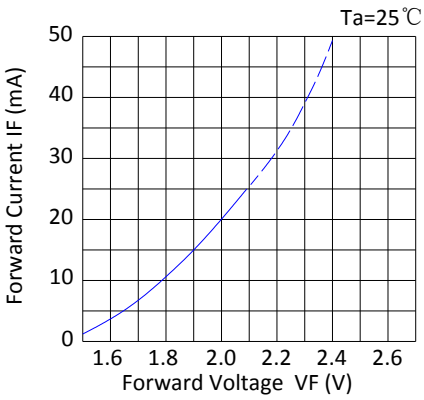
Typical Electrical / Optical Characteristics Curves
(25℃ Ambient Temperature Unless Otherwise Noted)

Red:

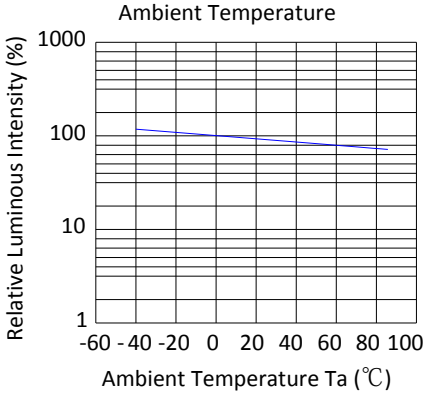
Spectrum Distribution



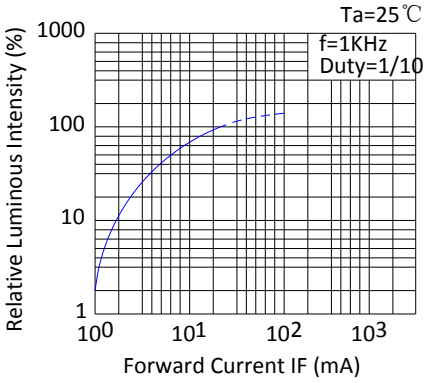
Forward Current & Forward Voltage



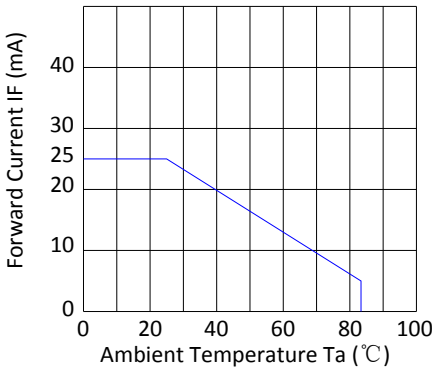
Luminous Intensity & Ambient Temperature



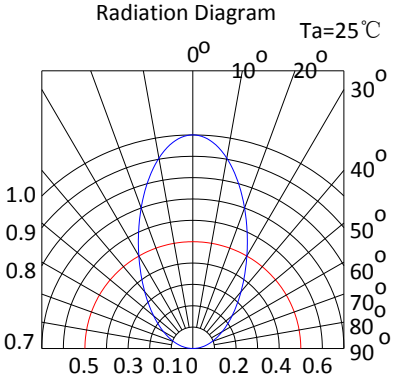
Luminous Intensity & Forward Current



Forward Current Derating Curve



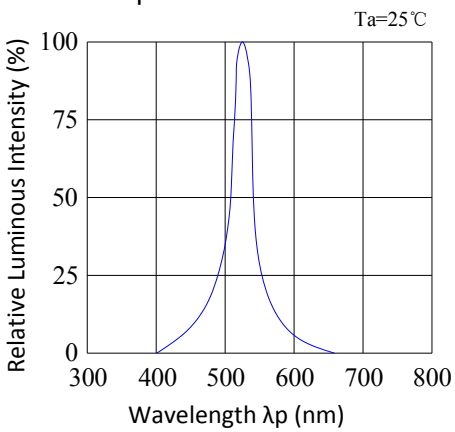
Radiation Diagram



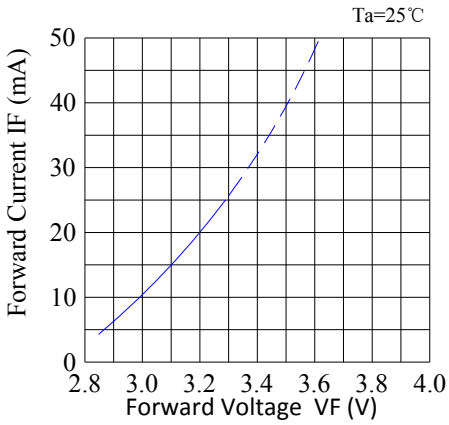
RGB LED, 5 mm

Green:

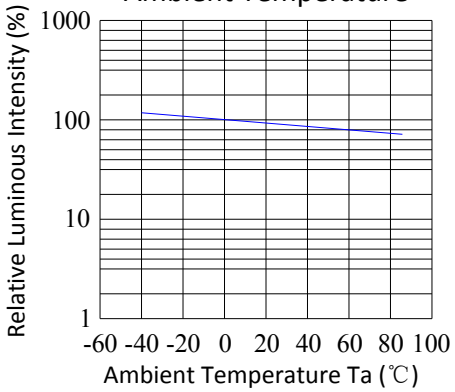
Spectrum Distribution



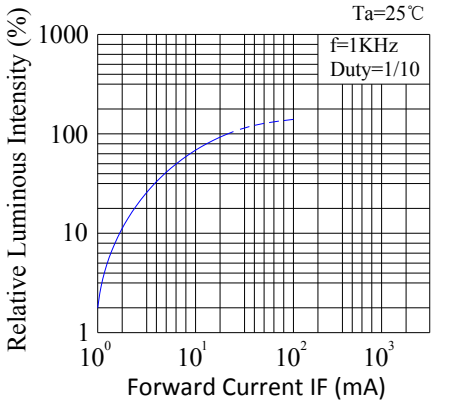
Forward Current & Forward Voltage



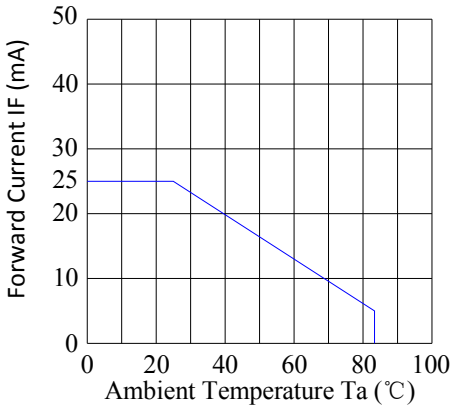
Luminous Intensity & Ambient Temperature



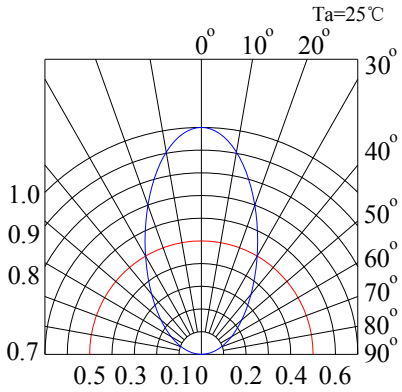
Luminous Intensity & Forward Current



Forward Current Derating Curve



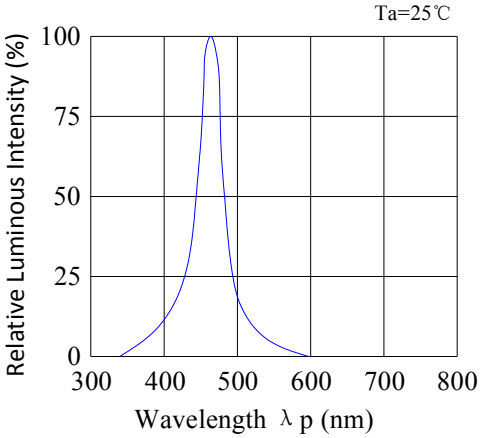
Radiation Diagram



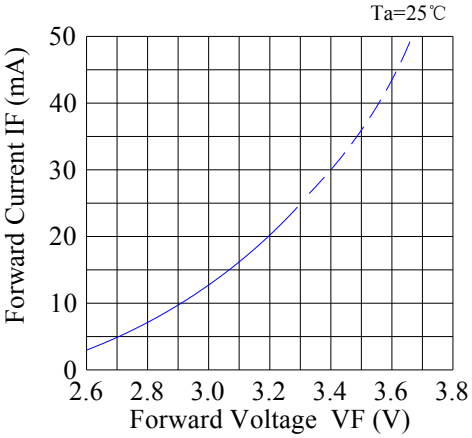
RGB LED, 5 mm

Blue:

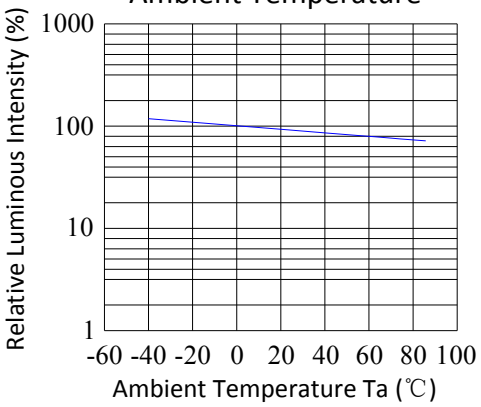
Spectrum Distribution



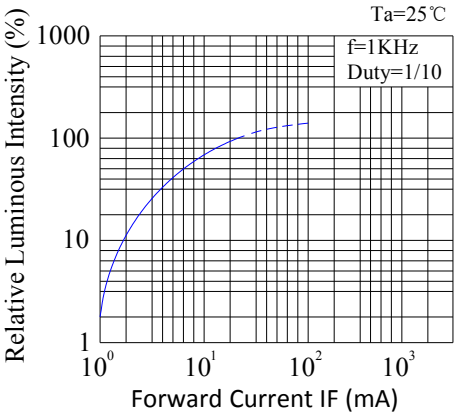
Forward Current & Forward Voltage



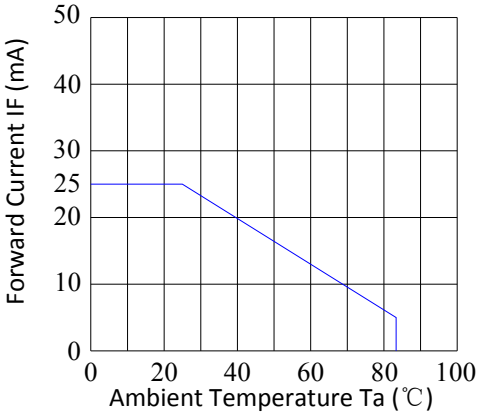
Luminous Intensity & Ambient Temperature



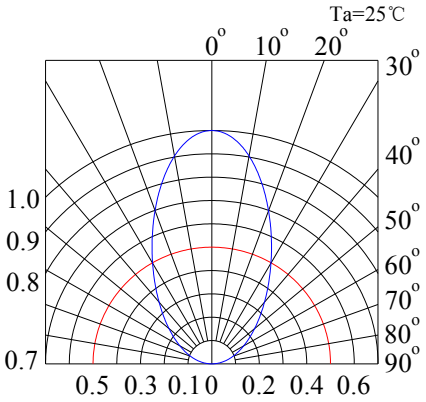
Luminous Intensity & Forward Current



Forward Current Derating Curve



Radiation Diagram



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Cautions

1. **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 The LEDs should be stored at 30°C or less and 70%RH or less after being shipped from RND and the storage life limits are 3 months. If the LEDs are stored for 3 months or more, they can be stored for a year in a sealed container with a nitrogen atmosphere and moisture absorbent material.

2.2 Please avoid rapid transitions in ambient temperature, especially, in high humidity environments where condensation can occur.

3. **Cleaning**

Use alcohol-based cleaning solvents such as isopropyl alcohol to clean the LEDs if necessary.

4. **Lead Forming & Assembly**

During lead forming, the leads should be bent at a point at least 1.6mm from the base of LED lens. Do not use the base of the lead frame as a fulcrum during forming. Lead forming must be done before soldering, at normal temperature. During assembly on PCB, use minimum clinch force possible to avoid excessive mechanical stress.

5. **Soldering**

When soldering, for Lamp without stopper type and must be leave a minimum of 3mm clearance from the base of the lens to the soldering point. Do not apply any external stress to the lead frame during soldering while the LED is at high temperature.

Recommended soldering conditions:

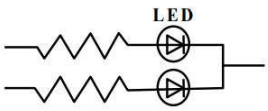
Soldering Iron		**Wave Soldering**	
Temperature Soldering Time	300℃ Max. 3 sec. Max. (one time only)	Pre-heat Pre-heat Time Solder Wave Soldering Time	100℃ Max. 60 sec. Max. 260℃ Max. 5 sec. Max.

Note: Excessive soldering temperature and / or time might result in deformation of the LED lens or catastrophic failure of the LED.

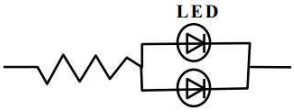
6. **Drive Method**

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.

7. **Repairing**

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

8. **ESD (Electrostatic Discharge)**

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

8.1. Use a conductive wrist band or anti- electrostatic glove when handling these LEDs.

8.2. All devices, equipment, and machinery must be properly grounded.

8.3. Work tables, storage racks, etc. should be properly grounded.

8.4. Use ion blower to neutralize the static charge which might have built up on surface of the LEDs plastic lens as a result of friction between LEDs during storage and handing.

ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or "no light up" at low currents.

To verify for ESD damage, check for "light up" 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.

9. **Others**

9.1 The information included in this document reflects representative usage scenarios and is intended for technical reference only.

9.2 The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.

9.3 When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, RND will not be responsible for any subsequent issues.

9.4 The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications). Consult RND Sales in advance for information on applications in which exceptional reliability is required, particularly when the failure or malfunction of the LEDs may directly jeopardize life or health, such as in aviation, transportation, traffic control equipment, medical and life support systems and safety devices.

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RND 135-00191