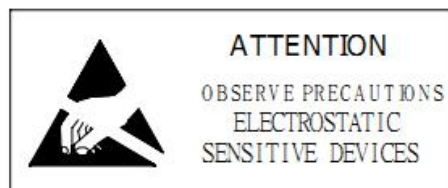


TOP LED:Z509FRGBWD-14 (5mm Through-hole LED-RGB)

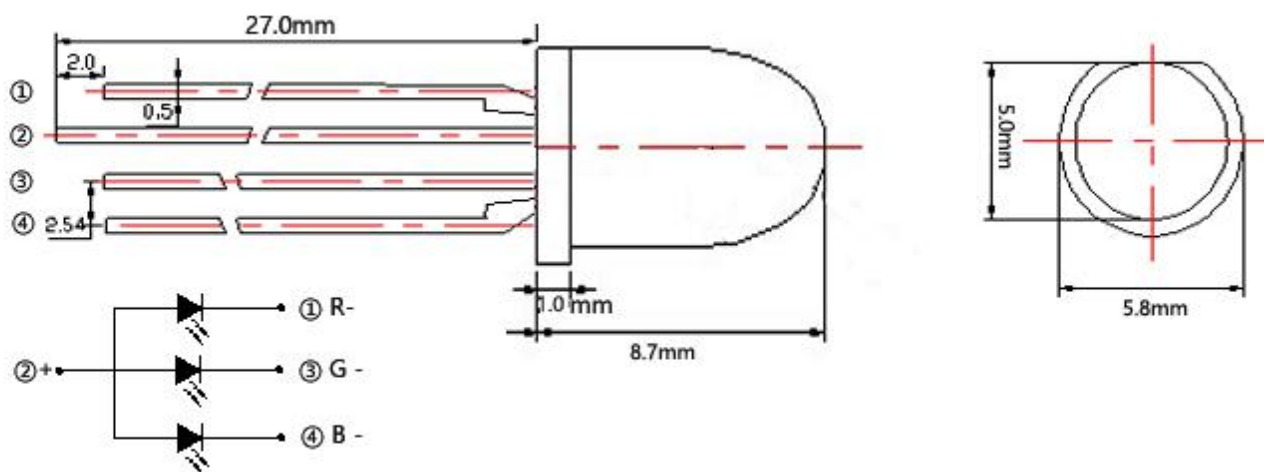


CUSTOMER APPROVED SIGNATURES	SALES APPROVED	APPROVED BY	CHECKED BY	PREPARED BY

1. Features

- Color :Red+Green+Blue LED
- Lens: White diffused
- High Luminous LEDs
- Low forward voltage
- Meet ROHS, Green Product
- Compatible With Infrared Reflow Solder And Wave Solder Process

2. Package Profile & Soldering PAD Suggested



- Notes:
1. All dimensions are in millimeters ;
 2. Tolerance is ± 0.10 mm unless otherwise noted.
 3. RGB common anode.



3. Absolute Maximum Ratings At Ta=25°C

Parameter	Symbol	Rating			Unit
		Red	Green	Blue	
Power Dissipation	Pd	60	100	100	mW
Pulse Forward Current	IFP	100	100	100	mA
Forward Current	IF	30	30	30	mA
Reverse Voltage	VR	5			V
Junction Temperature	Tj	100			°C
Operating Temperature	Topr	-40 ~ +80			°C
Storage Temperature Range	Tstg	-40 ~ +100			°C
Soldering Temperature	Tsol	260			°C
Electro-Static-Discharge(HBM)	ESD	1000			V
Warranty	Time	5			Years
Antistatic bag	Piece	1000			Back

*Pulse Forward Current Condition:Duty 1% and Pulse Width=10us.

*Soldering Condition:Soldering condition must be completed with 3 seconds at 260°C

4. Electrical Optical Characteristics At Ta=25°C

Parameter		Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage	Red	VF	1.9	2.0	2.4	V	IF=20mA
	Green		2.8	3.0	3.4		
	Blue		2.8	3.0	3.4		
Luminous Intensity	Red	IV	8000		12000	mcd	IF=20mA
	Green		12000		16000		
	Blue		4000		6500		
Peak Wavelength	Red	λ_P		633		nm	IF=20mA
	Green			525			
	Blue			460			
Dominant Wavelength	Red	λ_D	620		630	nm	IF=20mA
	Green		518		525		
	Blue		460		470		
Half Width		$\Delta\lambda$		15		nm	IF=20mA
Viewing Half Angle		$2\theta_{1/2}$		± 20		deg	IF=20mA
Reverse Current		IR			5	μA	VR=5V
Rise Time		tr		10		ns	IF=20mA
Fall Time		tf		10		ns	IF=20mA

*Luminous Intensity is measured by ZWL600.

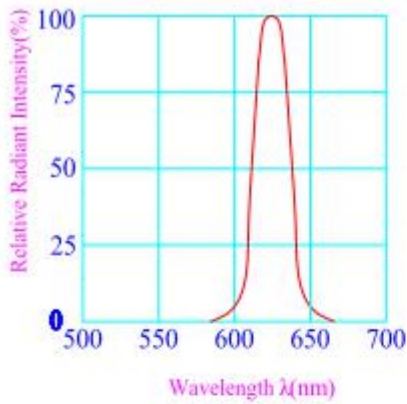
* $\theta_{1/2}$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

* λ_P is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

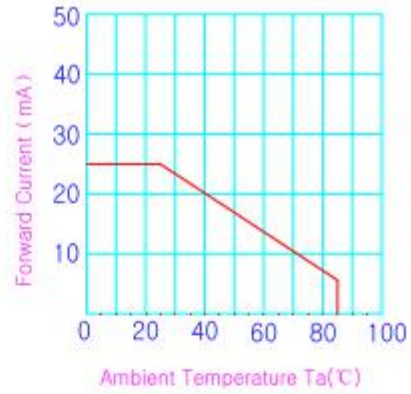
5. Typical Electrical-Optical Characteristics Curves (Red+Green+Blue)

Red:

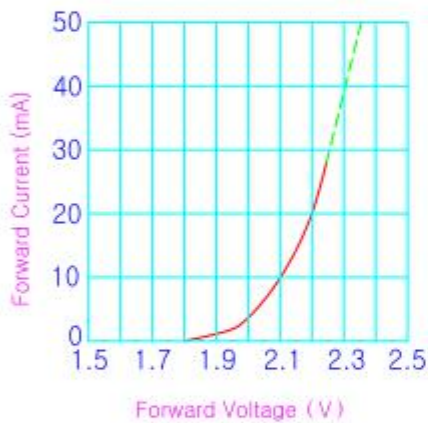
Relative Intensity Vs. Wavelength (Ta=25°C)



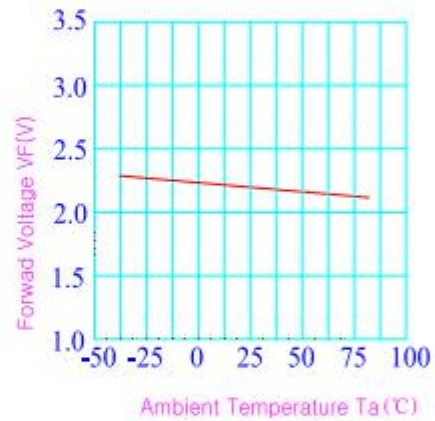
Forward Current Vs. Ambient Temperature



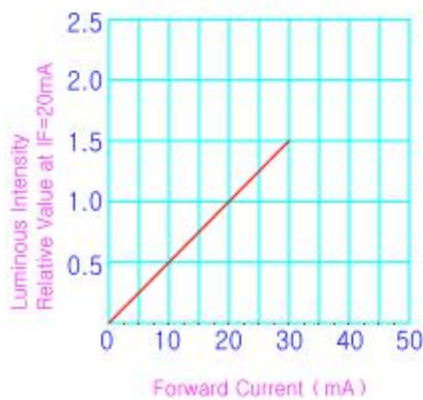
Forward Current Vs. Forward Voltage



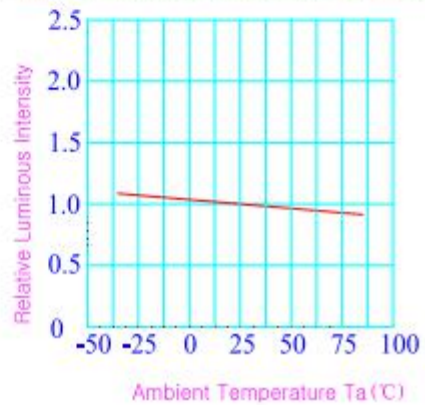
Forward Voltage Vs. Ambient Temperature



Luminous Intensity Vs. Forward Current

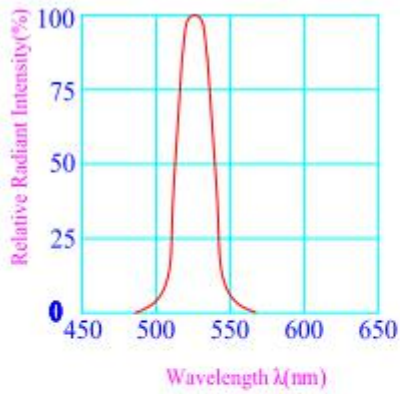


Luminous Intensity Vs. Ambient Temperature

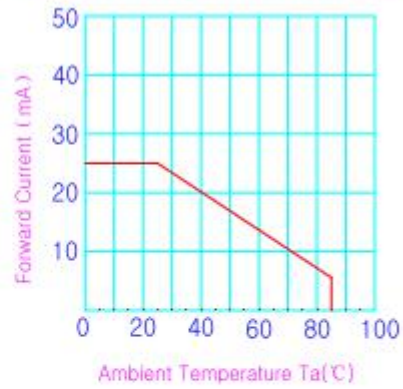


Green:

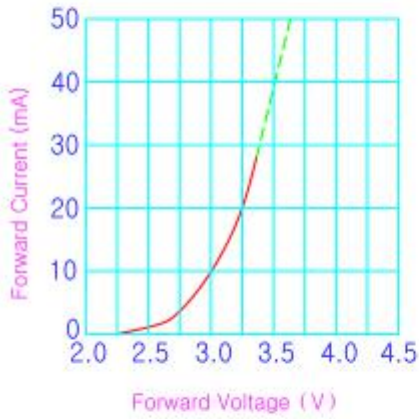
Relative Intensity Vs. Wavelength (Ta=25°C)



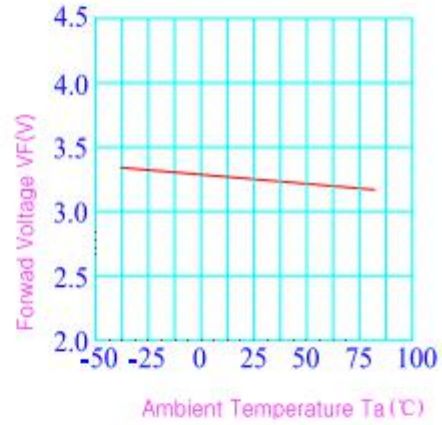
Forward Current Vs. Ambient Temperature



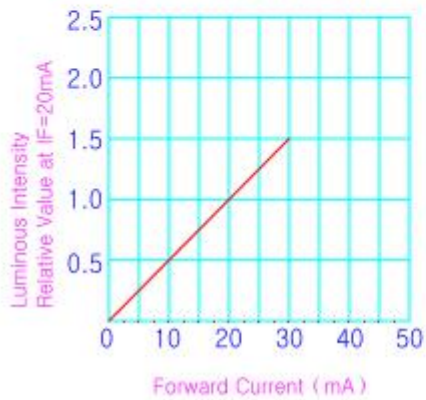
Forward Current Vs. Forward Voltage



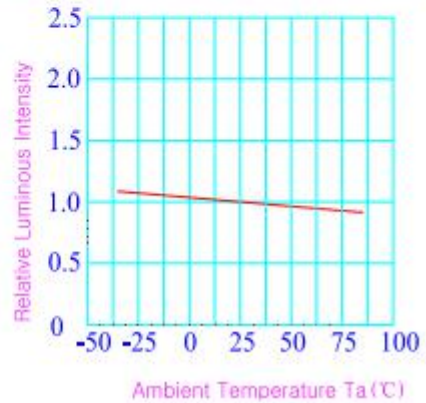
Forward Voltage Vs. Ambient Temperature



Luminous Intensity Vs. Forward Current

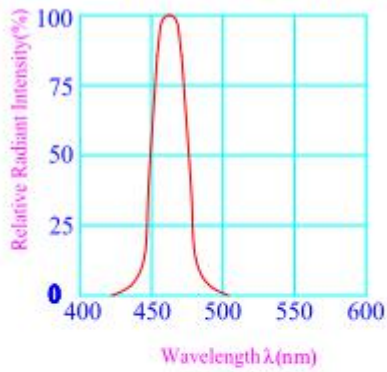


Luminous Intensity Vs. Ambient Temperature

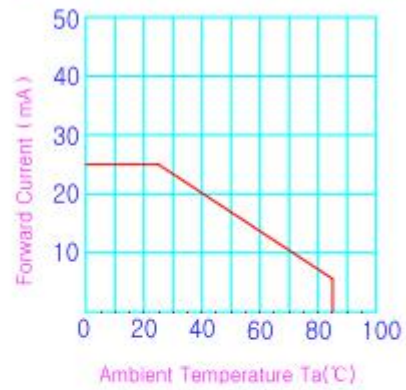


Blue:

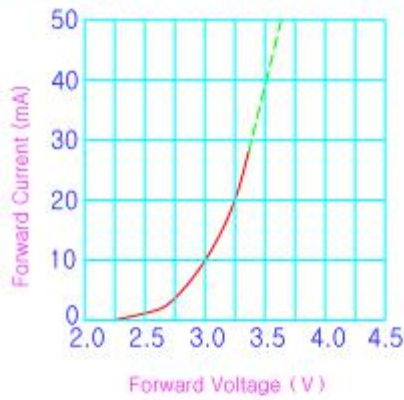
Relative Intensity Vs. Wavelength (Ta=25°C)



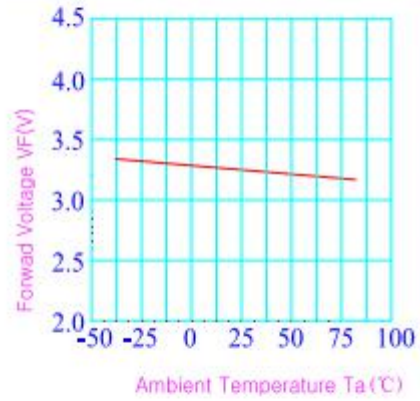
Forward Current Vs. Ambient Temperature



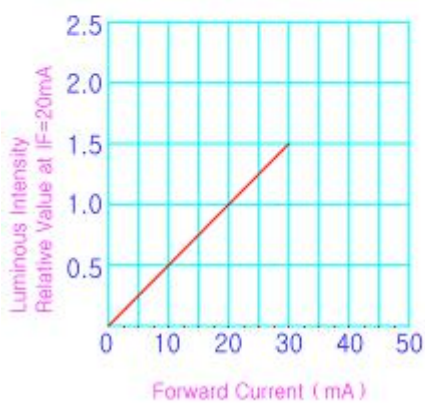
Forward Current Vs. Forward Voltage



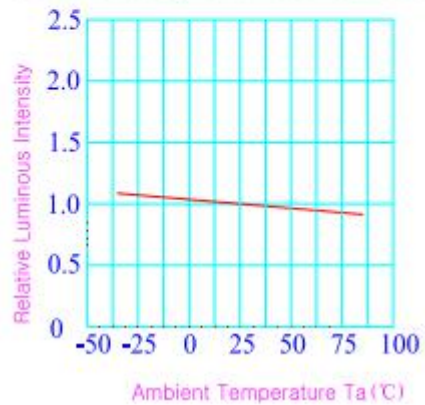
Forward Voltage Vs. Ambient Temperature



Luminous Intensity Vs. Forward Current



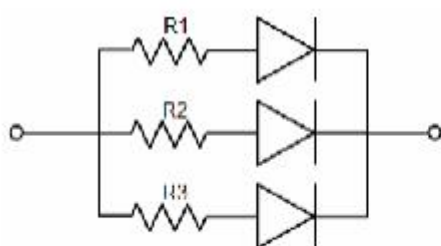
Luminous Intensity Vs. Ambient Temperature



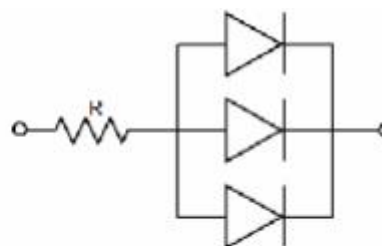
6. Cautions

Application

1. A LED is a current-operated device. The slight shift of voltage will cause big change of current, which will damage LEDs. Customer should use resistors in series for the Over-Current-Proof.
2. In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, it is recommended to use individual resistor separately, as shown in Circuit A below. The brightness of each LED shown in Circuit B might appear difference due to the differences in the I-V characteristics of those LEDs.



Circuit model A



Circuit model B

3. High temperature may reduce LEDs' intensity and other performances, so keeping it away from heat source to get good performance is necessary.

Storage

1. Before opening original package, it is recommended to store them in the following environment:

Temperature: 5°C~30°C	Humidity: 85%RH max.
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2. After opening original package, the storage ambient for the LEDs should be in 5~30°C temperature and 60% or less relative humidity.
3. In order to avoid moisture absorption, it is recommended that the LEDs that out of the original package should be stored in a sealed container with appropriate desiccant, or in desiccators with nitrogen ambient.
4. The LEDs should be used within 168hrs (7 days) after opening the package. Once been mounted, soldering should be quick.
5. If the moisture absorbent material (silica gel) has faded away or the LEDs stored out of original package for more than 168hrs (7 days), baking treatment should be performed using the conditions:
60°C at least 24 hours.

ESD (Electrostatic Discharge)-Protection

A LED (especially the Blue、 White and Green product) is an ESD sensitive component, and static electricity or power surge will damage the LED. ESD-damaged LEDs will exhibit abnormal characteristics such as high reverse leakage current, low forward voltage, or "no light-up" at low currents, etc.

Some advice as below should be noticed:

1. A conductive wrist strap or anti-electrostatic glove should be worn when handling these LEDs.
2. All devices, equipment, machinery, work tables and storage racks, etc. must be properly grounded.



3. Use anti-static package or boxes to carry and storage LEDs. And ordinary plastic package or boxes is forbidden to use.
4. Use ionizer to neutralize the static charge during handling or operating.
5. All surfaces and objects within 1 ft close to LEDs measure less than 100V.

Cleaning

Use alcohol-based cleaning solvents such as IPA (isopropyl alcohol) to clean LEDs if necessary.

Soldering

1. Soldering condition refer to the draft "Soldering Profile Suggested" on page 1.
2. Reflow soldering should not be done more than 2 times.
3. Manual soldering is only suggested on repair and rework. The maximum soldering temperature should not exceed 300°C within 3 sec. And the maximum capacity of soldering iron is 30W in power.
4. During the soldering process, do not touch the lens at high temperature.
5. After soldering, any mechanical force on the lens or any excessive vibration shall not be accepted to apply, also the circuit board shall not be bent as well.

Others

1. The LEDs described here are intended to be used for ordinary electronic equipment (such as office equipment, communication equipment and household applications).Consult BESTSMD's Sales in advance for the 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).
2. The light output from the high luminous intensity LEDs may cause injury to human eyes when viewed directly.
3. The appearance and specifications of the product may be modified for improvement without prior notice.