

# Cree® 5mm Round LED

## C503B-RBN/ABN

### Data Sheet

Round LEDs offer superior light output for excellent readability in sunlight and dependable performance. It provides extremely stable light output over long periods of time.

These lamps are made with an advanced optical grade epoxy offering superior high temperature and high moisture resistance performance in outdoor signal and sign applications.



#### FEATURES

- Size (mm): 5
- Color and Typical Dominant Wavelength (nm):  
Red (624)  
Amber (591)
- Luminous Intensity (mcd)  
Red (3000-12000)  
Amber (3000-12000)
- Viewing angle: 23 degree
- Lead-Free
- RoHS Compliant

#### APPLICATIONS

- Electronic Signs & Signals (ESS)
- Motorway Signs
- Variable Message Sign (VMS)
- Advertising Signs
- Petrol Signs
- Amusement

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ )

Items	Symbol	Absolute Maximum Rating	Unit
		Red/Amber	
Forward Current	$I_F$	50 <sup>Note1</sup>	mA
Peak Forward Current <sup>Note2</sup>	$I_{FP}$	200	mA
Reverse Voltage	$V_R$	5	V
Power Dissipation	$P_D$	130	mW
Operation Temperature	$T_{opr}$	-40 ~ +95	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-40 ~ +100	$^\circ\text{C}$
Lead Soldering Temperature	$T_{sol}$	Max. 260 $^\circ\text{C}$ for 3 sec. max. (3 mm from the base of the epoxy bulb)	
Electrostatic Discharge Classification (MIL-STD-883E)	ESD	Class 2	

### Note:

1. For long term performance the drive currents between 10mA and 30mA are recommended. Please contact CREE sales representative for more information on recommended drive conditions.
2. Pulse width  $\leq 0.1$  msec, duty  $\leq 1/10$ .

## Typical Electrical & Optical Characteristics ( $T_A = 25^\circ\text{C}$ )

Characteristics	Color	Symbol	Condition	Unit	Minimum	Typical	Maximum
Forward Voltage	Red/Amber	$V_F$	$I_F = 20$ mA	V		2.1	2.6
Reverse Current	Red/Amber	$I_R$	$V_R = 5$ V	$\mu\text{A}$			100
Dominant Wavelength	Red	$\lambda_D$	$I_F = 20$ mA	nm	618	624	630
	Amber	$\lambda_D$	$I_F = 20$ mA	nm	584	591	596
Luminous Intensity	Red	$I_v$	$I_F = 20$ mA	mcd	3000	5000	
	Amber	$I_v$	$I_F = 20$ mA	mcd	3000	5000	
50% Power Angle	Red/Amber	$2\theta_{1/2}$	$I_F = 20$ mA	deg		23	

## Intensity Bin Limit ( $I_F = 20 \text{ mA}$ )

Red

Bin Code	Min.(mcd)	Max.(mcd)
W0	3000	4180
X0	4180	5860
Y0	5860	8200
Z0	8200	12000

Amber

Bin Code	Min.(mcd)	Max.(mcd)
W0	3000	4180
X0	4180	5860
Y0	5860	8200
Z0	8200	12000

- Tolerance of measurement of luminous intensity is  $\pm 15\%$

## Color Bin Limit ( $I_F = 20 \text{ mA}$ )

Red

Bin Code	Min.(nm)	Max.(nm)
RA	618	630

Amber

Bin Code	Min.(nm)	Max.(nm)
A2	584	587
A3	587	590
A4	590	593
A5	593	596

- Tolerance of measurement of dominant wavelength is  $\pm 1 \text{ nm}$

## Order Code Table\*

Color	Kit Number	Viewing Angle	Luminous Intensity (mcd)		Dominant Wavelength				Package
			Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
Red	C503B-RBN-CW0Z0AA1	23	3000	12000	RA	618	RA	630	Bulk
Red	C503B-RBN-CW0X0AA1	23	3000	5860	RA	618	RA	630	Bulk
Red	C503B-RBN-CX0Y0AA1	23	4180	8200	RA	618	RA	630	Bulk
Red	C503B-RBN-CW0Z0AA2	23	3000	12000	RA	618	RA	630	Ammo
Red	C503B-RBN-CW0X0AA2	23	3000	5860	RA	618	RA	630	Ammo
Red	C503B-RBN-CX0Y0AA2	23	4180	8200	RA	618	RA	630	Ammo

Color	Kit Number	Viewing Angle	Luminous Intensity (mcd)		Dominant Wavelength				Package
			Min.	Max.	Color Bin	Min. (nm)	Color Bin	Max. (nm)	
Amber	C503B-ABN-CW0Z0251	23	3000	12000	A2	584	A5	596	Bulk
Amber	C503B-ABN-CW0X0341	23	3000	5860	A3	587	A4	593	Bulk
Amber	C503B-ABN-CX0Y0341	23	4180	8200	A3	587	A4	593	Bulk
Amber	C503B-ABN-CW0Z0252	23	3000	12000	A2	584	A5	596	Ammo
Amber	C503B-ABN-CW0X0342	23	3000	5860	A3	587	A4	593	Ammo
Amber	C503B-ABN-CX0Y0342	23	4180	8200	A3	587	A4	593	Ammo

### Notes:

- The above Kit Numbers represent order codes which include multiple intensity bin and color bin codes. Only one intensity bin code and one color bin code will be shipped on each reel. And single intensity bin code, single color bin codes will not be orderable.

### Important Bins Notes:

- Please refer to the "Cree LED Lamp Reliability Test Standards" document for reliability test conditions.
- Please refer to the "Cree LED Lamp Soldering & Handling" document for information about how to use this LED product safely.

## Graphs

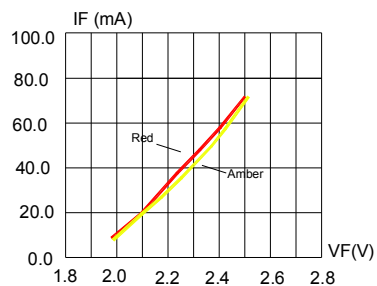


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

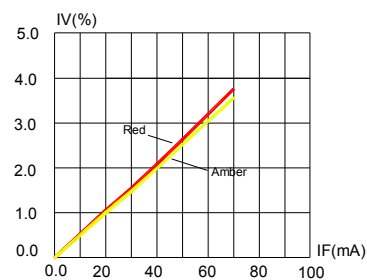


FIG.2 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

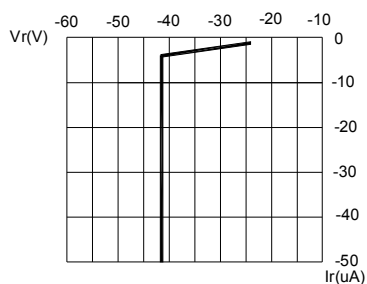


FIG.3 RED & AMBER REVERSE CURRENT VS. REVERSE VOLTAGE.

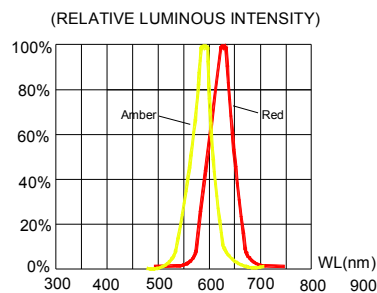


FIG.4 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.

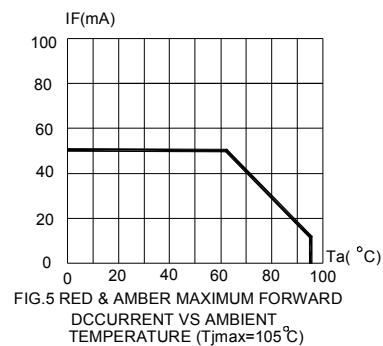


FIG.5 RED & AMBER MAXIMUM FORWARD DC CURRENT VS AMBIENT TEMPERATURE ( $T_{jmax}=105^{\circ}\text{C}$ )

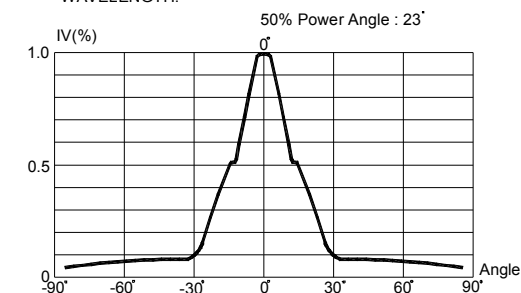


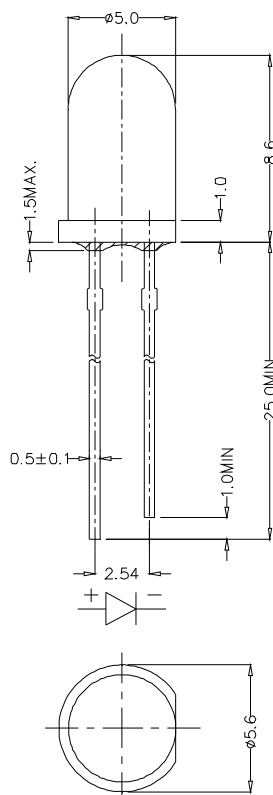
FIG.6 RED & AMBER FAR FIELD PATTERN

## Mechanical Dimensions

All dimensions are in mm. Tolerance is  $\pm 0.25$  mm unless otherwise noted.

An epoxy meniscus may extend about 1.5 mm down the leads.

Burr around bottom of epoxy may be 0.5 mm max.



## Notes

### RoHS Compliance

The levels of environmentally sensitive, persistent biologically toxic (PBT), persistent organic pollutants (POP), or otherwise restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as amended through April 21, 2006.

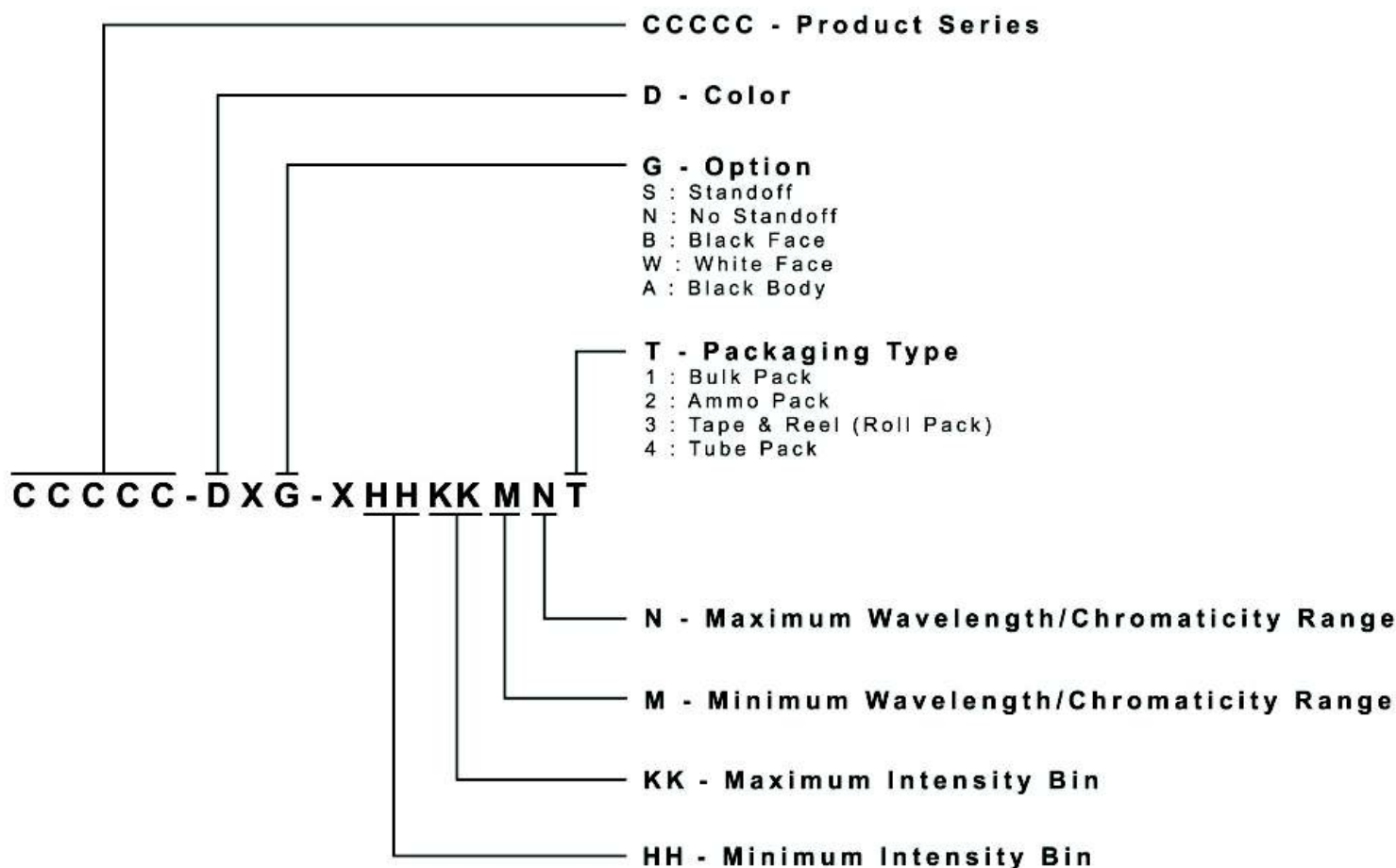
### Vision Advisory Claim

Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.

## Kit Number System

Cree LED lamps are tested and sorted into performance bins. A bin is specified by ranges of color, forward voltage, and brightness. Sorted LEDs are packaged for shipping in various convenient options. Please refer to the "Cree LED Lamp Packaging Standard" document for more information about shipping and packaging options.

Cree LEDs are sold by order codes in combinations of bins called kits. Order codes are configured in the following manner:

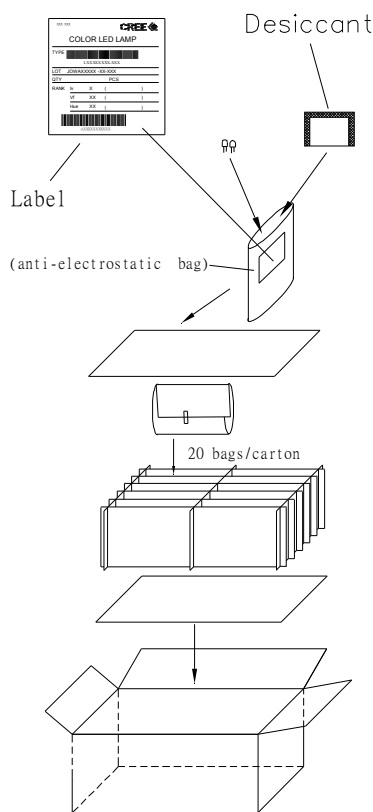


## Package

### Features:

- The LEDs are packed in cardboard boxes after packaging in normal or anti-electrostatic bags.
- Cardboard boxes will be used to protect the LEDs from mechanical shock during transportation.
- The boxes are not water resistant, and they must be kept away from water and moisture.
- The Bulk Pack types of packaging.
- Max 500 pcs per bulk and Max 2500 pcs per ammo.

### Bulk Pack Packaging Type:



### Ammo Pack Packaging Type:

