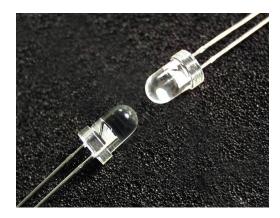


# C503B-Rxx-030, C503B-Axx-030: 5-mm Round Red & Amber LEDs



#### **PRODUCT DESCRIPTION**

Round LEDs offer superior light output • for excellent readability in sunlight and dependable performance. They provide • 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: Red (624nm) Amber (591nm)
- Luminous Intensity (mcd)
   C503B-RCS/RCN-030:(4180 8200)
   C503B-ACS/ACN-030:(5860 12000)
- Viewing angles: C503B-RCS/RCN/ACS/ACN-030 30 degree minimum
- · Lead Free
- RoHS Compliant

#### **APPLICATIONS**

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



## ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C)

Items	ltems Symbol		Unit			
		Red/Amber				
Forward Current	I <sub>F</sub>	50 Note1	mA			
Peak Forward Current Note2	I <sub>FP</sub>	200	mA			
Reverse Voltage	$V_{_{\mathrm{R}}}$	5	V			
Power Dissipation	$P_{_{D}}$	130	mW			
Operation Temperature	T <sub>opr</sub>	-40 ~ +100	°C			
Storage Temperature	$T_{stg}$	-40 ~ +100	°C			
Lead Soldering Temperature	T <sub>sol</sub>	Max. 260°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 LED sales representative for more information on recommended drive conditions.
- 2. Pulse width  $\leq 0.1$  msec, duty  $\leq 1/10$ .

## TYPICAL ELECTRICAL & OPTICAL CHARACTERISTICS ( $T_A = 25$ °C)

Characteristics	Color		Symbol	Condition	Unit	Minimum	Typical	Maximum
Forward Voltage		Red/Amber	V <sub>F</sub>	I <sub>F</sub> = 20 mA	V		2.1	2.6
Reverse Current		Red/Amber	I <sub>R</sub>	V <sub>R</sub> = 5 V	μΑ			100
Dominant Wavelength	Red		$\lambda_{_{D}}$	I <sub>F</sub> = 20 mA	nm	618	624	630
Dominant wavelength	Amber		$\lambda_{_{\mathrm{D}}}$	I <sub>F</sub> = 20 mA	nm	584	591	596
Luminous Intensity	Red	C503B-RCS/RCN-030	I <sub>v</sub>	I <sub>F</sub> = 20 mA	mcd	4180	6600	
Luminous Intensity	Amber	C503B-ACS/ACN-030	I <sub>v</sub>	I <sub>F</sub> = 20 mA	mcd	5860	6800	
50% Power Angle	C50	03B-RCS/RCN/ACS/ACN-030	201/2	I <sub>F</sub> = 20 mA	deg	30		

<sup>\*</sup> Continuous reverse voltage can cause LED damage.



### **INTENSITY BIN LIMIT**

#### Red

	30°min(20 mA) - C503B-RCS/RCN-030								
Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	
VO	4100	F060	Xa	4180	5020				
X0	4180	5860	Xb	5020	5860	YA	5860	6500	
YO	5860	0200	Ya	5860	7030	YB	6500	7200	
YU	3800	8200	Yb	7030	8200	YC	7200	8200	

#### **Amber**

30°min(20 mA) - C503B-RCS/RCN-030								
Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)
Y0	F060	0200	Ya	5860	7030	YA	5860	6500
YU	5860	8200	Yb	7030	8200	YB	6500	7200
Z0	0200	10000	Za	8200	10100	YC	7200	8200
20	8200 1	12000	Zb	10100	12000			

<sup>\*</sup> Tolerance of measurement of luminous intensity is ±15%

## **COLOR BIN LIMIT**

Re	d (20 mA) - C503B-Rxx	030	Amber (20 mA) - C503B-Axx-030				
Bin Code	Min.(nm)	Max.(nm)	Bin Code	Min.(nm)	Max.(nm)		
RA	618	630	A2	584	587		
			A3	587	590		
			A4	590	593		
			A5	593	596		

<sup>\*</sup> Tolerance of measurement of dominant wavelength is ±1 nm.



#### **ORDER CODE TABLE**

	Viewing		Luminous Intensity (mcd)		Dominant Wavelength					
Color	Angle	Order Code	Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max.(nm)	Package	Standoff
		C503B-RCS-CXaYCAA1-030	4180	8200	RA	618	RA	630	Bulk	Yes
		C503B-RCS-CXaYAAA1-030	4180	6500	RA	618	RA	630	Bulk	Yes
		C503B-RCS-CYAYBAA1-030	5860	6500	RA	618	RA	630	Bulk	Yes
		C503B-RCN-CXaYCAA1-030	4180	8200	RA	618	RA	630	Bulk	No
		C503B-RCN-CXaYAAA1-030	4180	6500	RA	618	RA	630	Bulk	No
Red	30°min	C503B-RCN-CYAYBAA1-030	5860	6500	RA	618	RA	630	Bulk	No
Red	30 111111	C503B-RCS-CXaYCAA2-030	4180	8200	RA	618	RA	630	Ammo	Yes
		C503B-RCS-CXaYAAA2-030	4180	6500	RA	618	RA	630	Ammo	Yes
		C503B-RCS-CYAYBAA2-030	5860	6500	RA	618	RA	630	Ammo	Yes
		C503B-RCN-CXaYCAA2-030	4180	8200	RA	618	RA	630	Ammo	No
		C503B-RCN-CXaYAAA2-030	4180	6500	RA	618	RA	630	Ammo	No
		C503B-RCN-CYAYBAA2-030	5860	6500	RA	618	RA	630	Ammo	No

#### Notes:

- The above kit numbers represent order codes that include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each bulk. Single intensity-bin code and single color-bin codes will not be orderable.
- · Please refer to the HB LED Lamp Reliability Test Standards document for reliability test conditions.
- Please refer to the HB LED Lamp Soldering & Handling document for information about how to use this LED product safely.



#### **ORDER CODE TABLE**

	Viewing		Luminous Int	tensity (mcd)	Dominant Wavelength					
Color	Angle	Order Code	Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max.(nm)	Package	Standoff
		C503B-ACS-CY0Z0251-030	5860	12000	A2	584	A5	596	Bulk	Yes
		C503B-ACS-CY0Z0341-030	5860	12000	А3	587	A4	593	Bulk	Yes
		C503B-ACN-CY0Z0251-030	5860	12000	A2	584	A5	596	Bulk	No
		C503B-ACN-CY0Z0341-030	5860	12000	А3	587	A4	593	Bulk	No
		C503B-ACS-CY0Z0252-030	5860	12000	A2	584	A5	596	Ammo	Yes
		C503B-ACS-CY0Z0342-030	5860	12000	А3	587	A4	593	Ammo	Yes
		C503B-ACN-CY0Z0252-030	5860	12000	A2	584	A5	596	Ammo	No
		C503B-ACN-CY0Z0342-030	5860	12000	АЗ	587	A4	593	Ammo	No
		C503B-ACS-CYAZa251-030	5860	10100	A2	584	A5	596	Bulk	Yes
		C503B-ACS-CYBZa251-030	6500	10100	A2	584	A5	596	Bulk	Yes
		C503B-ACS-CYAZa341-030	5860	10100	АЗ	587	A4	593	Bulk	Yes
A l	30°min	C503B-ACS-CYBZa341-030	6500	10100	АЗ	587	A4	593	Bulk	Yes
Amber	30 min	C503B-ACN-CYAZa251-030	5860	10100	A2	584	A5	596	Bulk	No
		C503B-ACN-CYBZa251-030	6500	10100	A2	584	A5	596	Bulk	No
		C503B-ACN-CYAZa341-030	5860	10100	АЗ	587	A4	593	Bulk	No
		C503B-ACN-CYBZa341-030	6500	10100	АЗ	587	A4	593	Bulk	No
		C503B-ACS-CYAZa252-030	5860	10100	A2	584	A5	596	Ammo	Yes
		C503B-ACS-CYBZa252-030	6500	10100	A2	584	A5	596	Ammo	Yes
		C503B-ACS-CYAZa342-030	5860	10100	АЗ	587	A4	593	Ammo	Yes
		C503B-ACS-CYBZa342-030	6500	10100	АЗ	587	A4	593	Ammo	Yes
		C503B-ACN-CYAZa252-030	5860	10100	A2	584	A5	596	Ammo	No
		C503B-ACN-CYBZa252-030	6500	10100	A2	584	A5	596	Ammo	No
		C503B-ACN-CYAZa342-030	5860	10100	А3	587	A4	593	Ammo	No
		C503B-ACN-CYBZa342-030	6500	10100	A3	587	A4	593	Ammo	No

#### Notes:

- The above kit numbers represent order codes that include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each bulk. Single intensity-bin code and single color-bin codes will not be orderable.
- Please refer to the HB LED Lamp Reliability Test Standards document for reliability test conditions.
- Please refer to the HB LED Lamp Soldering & Handling document for information about how to use this LED product safely.



#### **GRAPHS**

The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.

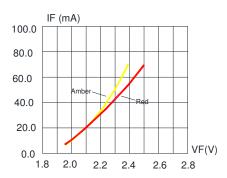


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

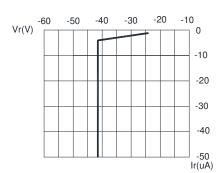
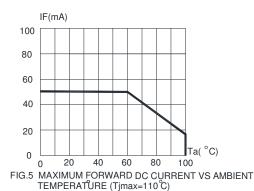


FIG.3 REVERSE CURRENT VS. REVERSE VOLTAGE.



(RELATIVE LUMINOUS INTENSITY)

5.0

4.0

3.0

2.0

1.0

0.0

2.0

4.0

Amber

IF(mA)

FIG.2 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

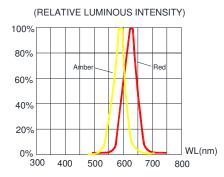


FIG.4 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.

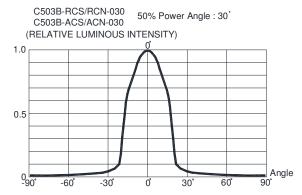


FIG.6 FAR FIELD PATTERN



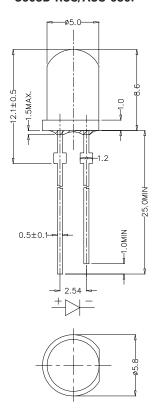
#### **MECHANICAL DIMENSIONS**

All dimensions are in mm. Tolerance is ±0.25 mm unless otherwise noted.

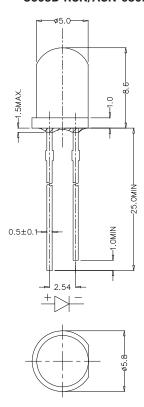
An epoxy meniscus may extend about 1.5 mm down the leads.

Burr around bottom of epoxy may be 0.5 mm max.

#### C503B-RCS/ACS-030:



#### C503B-RCN/ACN-030:



#### **NOTES**

#### **RoHS Compliance**

The levels of RoHS 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 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree LED representative or from the Product Ecology section of the Cree LED website.

#### **Vision Advisory**

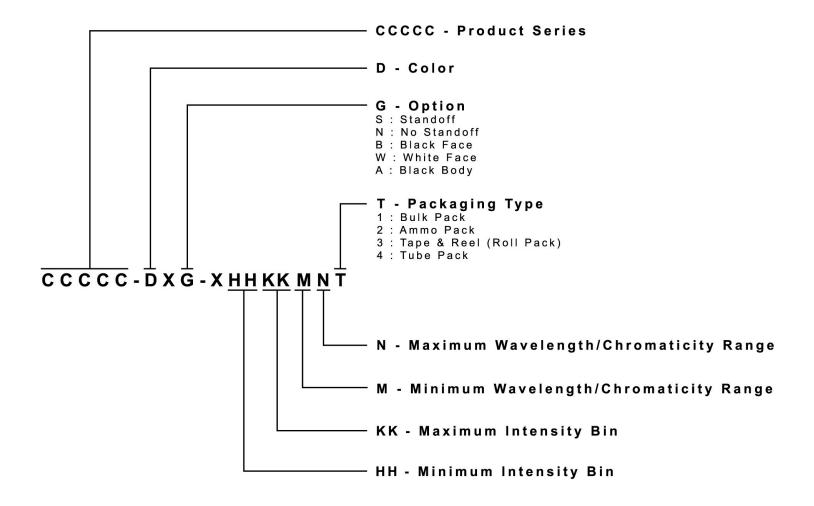
WARNING: Do not look at an exposed lamp in operation. Eye injury can result.



#### **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.

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



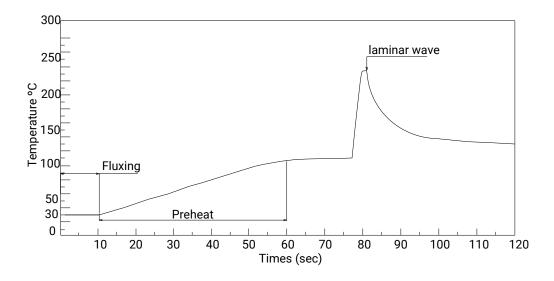


#### **SOLDERING GUIDELINES**

The LED soldering specification is shown below(suitable for both leaded solder & lead-free solder):

	Manual Soldering	Solder Dipping			
Soldering iron	35 W max	Preheat	110 °C max		
Tamanavatura	300 00 may	Preheat time	60 seconds max		
Temperature	300 °C max	Solder-bath temperature	260 °C Max		
Soldering time	3 seconds max	Dipping time	5 seconds max		
Position	Not less than 3 mm from the base of the package.	Position	Not less than 3 mm from the base of the package.		

- Manual soldering onto the PCB is not recommended because soldering time is uncontrollable.
- · The recommended wave soldering is as below:



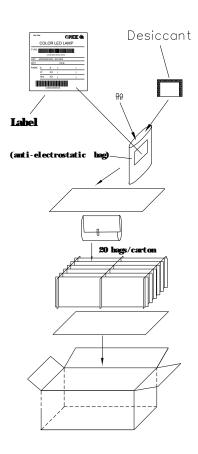
- · Do not apply any stress to the LED package, particularly when heated.
- · Only bottom preheat is suggested & should not preheat on top in order to reduce thermal stress experienced by the LEDs.
- The LEDs must not be re used once they have been extracted from PCB.
- After soldering the LEDs, the package should be protected from mechanical shock or vibration until the LEDs have reached 40 °C or below.
- Precautions must be taken as mechanical stress on the LEDs may be caused by PCB warpage or from the clinching and cutting of the LED leads.
- · When it is necessary to clam the LEDs during soldering, it is important to ensure no mechanical stress is exerted on the LEDs.
- · Cut the LED lead at normal room temperature. Lead cutting at high temperature may cause failure of the LEDs.
- · Please refer to the HB LED Lamp Soldering & Handling document for information about how to use this LED product safely.



#### **PACKAGING**

- · 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.
- Max 500 pcs per bulk and Max 2500 pcs per ammo.

### **Bulk Pack Packaging Type:**



## **Ammo Pack Packaging Type:**

