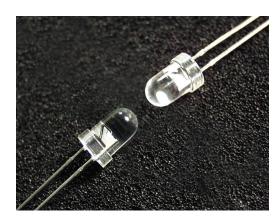


# C503C-WAS/WAN: 5-mm Round White LEDs



#### **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 lighting and illumination applications. This product utilizes an epoxy containing a UV inhibitor. It therefore provides a UV resistance and can be used in outdoor applications.

### **FEATURES**

- Size (mm): 5
- Color Temperatures:
  Cool White:
  Min . (4600K) / Typical (9000K)
- Luminous Intensity (mcd)
   C503C-WAS/WAN:
   (20150-46100)
- Viewing angles:
   15°: C503C-WAS/WAN
- Lead Free
- · RoHS Compliant

### **APPLICATIONS**

- Torch
- Channel Letter
- · Retail Display Lighting



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

Items	Symbol	Absolute Maximum Rating	Unit	
Forward Current	l <sub>F</sub>	30	mA	
Peak Forward Current Note 1	I <sub>FP</sub>	100	mA	
Reverse Voltage	$V_{_{\mathrm{R}}}$	5	V	
Power Dissipation	$P_{\scriptscriptstyle D}$	120	mW	
Operation Temperature	$T_{opr}$	-40 ~ <b>+</b> 95	°C	
Storage Temperature	$T_{stg}$	-40 ~ +100	°C	
Lead Soldering Temperature	$T_{sol}$	Max. 260°C for 3 sec. max. (3 mm from the base of the epoxy bulb)		

#### Note:

Pulse width ≤0.1 msec, duty ≤1/10.

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

Characteristics	Color	Symbol	Condition	Unit	Minimum	Typical	Maximum
Forward Voltage	WAS/WAN	V <sub>F</sub>	I <sub>F</sub> = 20 mA	V		3.2	4.0
Reverse Current	WAS/WAN	I <sub>R</sub>	V <sub>R</sub> = 5 V	μΑ			100
Luminous Intensity	WAS/WAN	I <sub>v</sub>	I <sub>F</sub> = 20 mA	mcd	20150	35000	
Chromaticity	NA A C (NA A NI	х	I <sub>F</sub> = 20 mA			0.2895	
Coordinates	WAS/WAN	у	I <sub>F</sub> = 20 mA			0.2905	
50% Power Angle	WAS/WAN	201/2	I <sub>F</sub> = 20 mA	deg		15	

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



## **INTENSITY BIN LIMIT**

Cool White (20 mA) - C503C-WAS/WAN						
Bin Code	Min.(mcd)	Max.(mcd)				
Bb	20150	23500				
Ca	23500	28200				
Cb	28200	32900				
Da	32900	39500				
Db	39500	46100				

\* Tolerance of measurement of luminous intensity is ±15%

## **VOLTAGE BIN LIMIT**

Cool White (20 mA) - C503C-WAS/WAN						
Bin Code	Min. (V)	Max. (V)				
27	2.8	3.0				
28	3.0	3.2				
29	3.2	3.4				
2a	3.4	3.6				
2b	3.6	3.8				
2c	3.8	4.0				

\* Tolerance of measurement of voltage is ±0.05V



## **COLOR BIN LIMIT**

## Cool White (20 mA) - C503C-WAS/WAN

JOOI WIII	116 (20 111	A) - 03030	, WAS, WA
Bin Code	Sub-bin	x	у
		0.2545	0.2480
	14/-	0.2633	0.2410
	Wa	0.2545	0.2245
		0.2450	0.2290
		0.2633	0.2410
	Wb	0.2720	0.2340
	dvv	0.2640	0.2200
W1		0.2545	0.2245
VVI		0.2545	0.2480
	14/0	0.2640	0.2670
	Wc	0.2720	0.2575
		0.2633	0.2410
		0.2633	0.2410
	Wd	0.2720	0.2575
		0.2800	0.2480
		0.2720	0.2340
		0.2640	0.2670
	We	0.2735	0.2860
	vve	0.2808	0.2740
		0.2720	0.2575
		0.2720	0.2575
	Wf	0.2808	0.2740
	VVI	0.2880	0.2620
W2		0.2800	0.2480
VVZ		0.2735	0.2860
	Wg	0.2830	0.3050
	vvg	0.2895	0.2905
		0.2808	0.2740
		0.2808	0.2740
	Wh	0.2895	0.2905
	vvn	0.2960	0.2760
		0.2880	0.2620

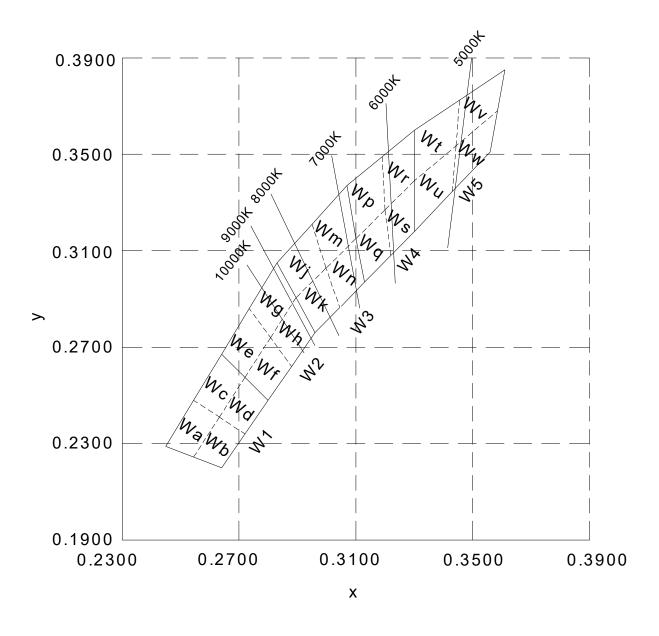
Bin Code	Sub-bin	х	у
		0.2830	0.3050
		0.2950	0.3210
	Wj	0.2998	0.3028
		0.2895	0.2905
		0.2895	0.2905
	Wk	0.2998	0.3028
	VVK	0.3045	0.2865
W3		0.2960	0.2760
VV3		0.2950	0.3210
	14/	0.3070	0.3370
	Wm	0.3100	0.3150
		0.2998	0.3028
		0.2998	0.3028
	Wn	0.3100	0.3150
		0.3130	0.2970
		0.3045	0.2865
		0.3070	0.3370
	\//m	0.3185	0.3485
	Wp	0.3200	0.3270
		0.3100	0.3150
		0.3100	0.3150
	\\/a	0.3200	0.3270
	Wq	0.3215	0.3075
W4		0.3130	0.2970
VV4		0.3185	0.3485
	Wr	0.3300	0.3600
	VVF	0.3300	0.3390
		0.3200	0.3270
		0.3200	0.3270
	\\/o	0.3300	0.3390
	Ws	0.3300	0.3180
		0.3215	0.3075

Bin Code	Sub-bin	х	у
	Wt	0.3300	0.3600
		0.3455	0.3725
	٧٧٤	0.3443	0.3535
		0.3300	0.3390
		0.3300	0.3390
	Wu	0.3443	0.3535
		0.3430	0.3345
W5		0.3300	0.3180
VVO	Wv	0.3455	0.3725
		0.3610	0.3850
		0.3585	0.3680
		0.3443	0.3535
		0.3443	0.3535
	Ww	0.3585	0.3680
	VVVV	0.3560	0.3510
		0.3430	0.3345

\* Tolerance of measurement of the color coordinates is ±0.01



## **CIE CHROMATICITY DIAGRAM**





#### **ORDER CODE TABLE**

0.1	Color Viewing Angle	W. N. I	Luminous Intensity (mcd)				o		
Color			Min.	Max.	Color Bin Code	Package	Standoff		
		C503C-WAS-CBbDb151	20150	46100	W1,W2,W3,W4,W5	Bulk	Yes		
		C503C-WAS-CBbDb231	20150	46100	W2,W3	Bulk	Yes		
		C503C-WAS-CCaDb231	23500	46100	W2,W3	Bulk	Yes		
		C503C-WAN-CBbDb151	20150	46100	W1,W2,W3,W4,W5	Bulk	No		
	Cool White 15°			C503C-WAN-CBbDb231	20150	46100	W2,W3	Bulk	No
Cool White		C503C-WAN-CCaDb231	23500	46100	W2,W3	Bulk	No		
Cool white		C503C-WAS-CBbDb152	20150	46100	W1,W2,W3,W4,W5	Ammo	Yes		
		C503C-WAS-CBbDb232	20150	46100	W2,W3	Ammo	Yes		
		C503C-WAS-CCaDb232	23500	46100	W2,W3	Ammo	Yes		
		C503C-WAN-CBbDb152	20150	46100	W1,W2,W3,W4,W5	Ammo	No		
		C503C-WAN-CBbDb232	20150	46100	W2,W3	Ammo	No		
		C503C-WAN-CCaDb232	23500	46100	W2,W3	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.

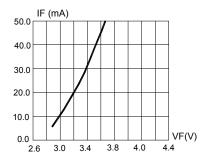


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

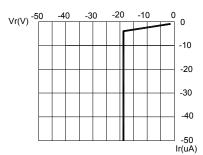
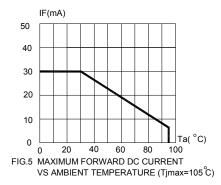


FIG.3 REVERSE CURRENT VS. REVERSE VOLTAGE.



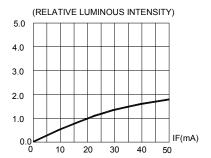


FIG.2 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

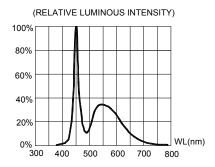
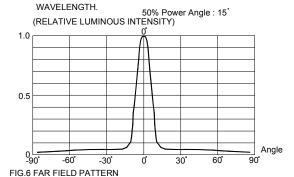


FIG.4 RELATIVE LUMINOUS INTENSITY VS.





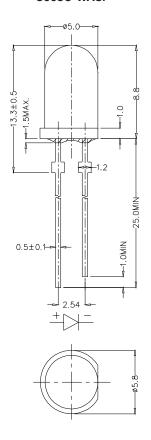
### **MECHANICAL DIMENSIONS**

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

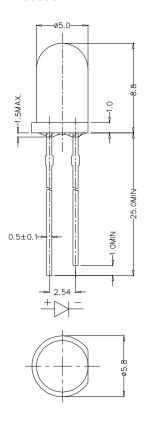
An epoxy meniscus may extend about 1.5 mm down the leads.

Burr around bottom of epoxy may be 0.5 mm max.

#### C503C-WAS:



## C503C-WAN:



## **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**

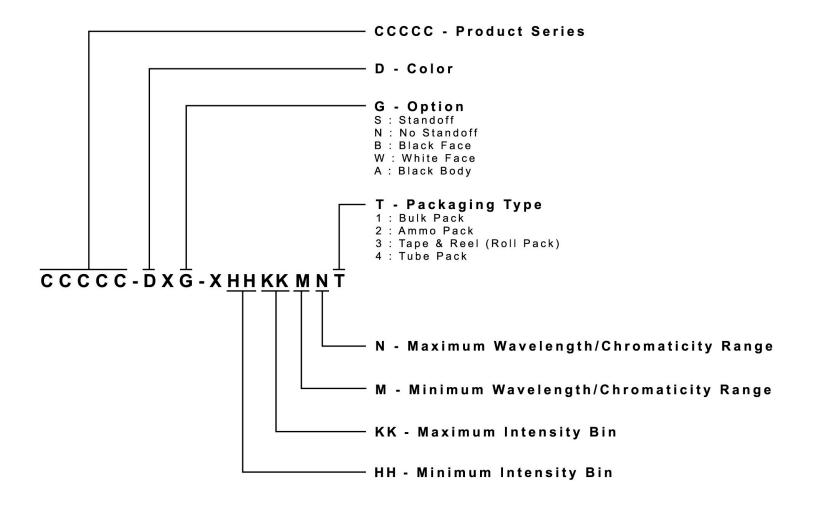
WARNING: Do not look at an exposed lamp in operation. Eye injury can result.



#### **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:



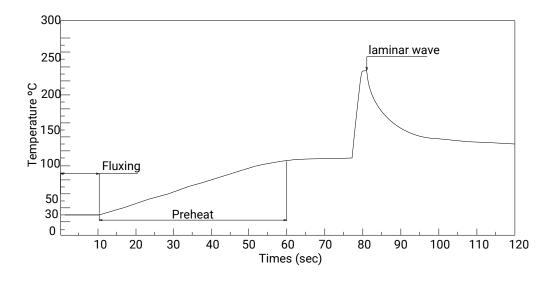


#### **SOLDERING GUIDELINES**

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	
Temperature 300 °C max	300 00 may	Preheat time	60 seconds max	
	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:



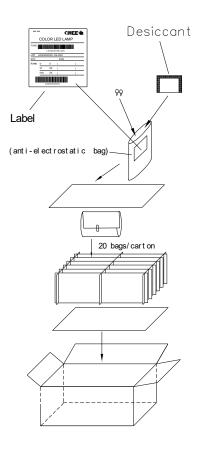
- · Do not apply any stress to the LED package, particularly when heated.
- · Only bottom preheat is suggested & should not preheat on top in order to reduce thermal stress experienced by the LEDs.
- · The LEDs must not be re used once they have been extracted from PCB.
- After soldering the LEDs, the 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:**

