

# CLA1A-WKB: PLCC4 1 IN 1 SMD LED



#### **PRODUCT DESCRIPTION**

SMD LEDs is packaged in the industry • standard package. These LEDs have high reliability performance and are • designed to work under a wide range of environmental conditions. This high reliability feature makes

them ideally suited to be used under illumination application conditions.

Its wide viewing angle makes these LEDs ideally suited for channel letter, or general backlighting and illumina-tion . applications. The flat top emitting surface . makes it easy for these LEDs to mate with light pipes.

## **FEATURES**

- Size (mm): 3.2 X 2.8
- Color Temperatures: Cool White : Min . (4600K) / Typical (5500K)
- Luminous Intensity (mcd) CLA1A-WKB:(1400-3550)
- CRI: Typical CRI for Cool White is 72
- Lead Free

.

RoHS Compliant

## **APPLICATIONS**

Channel Letter

Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27709 USA / +1.919.313.5330 / www.cree-led.com

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

Items	Symbol	Absolute Maximum Rating	Unit
Forward Current	I <sub>F</sub>	35	mA
Peak Forward Current Note 1	I <sub>FP</sub>	100	mA
Reverse Voltage	V <sub>R</sub>	5	V
Power Dissipation	P <sub>D</sub>	147	mW
Operation Temperature	T <sub>opr</sub>	-40 ~ +100	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +100	°C
Junction Temperature	TJ	110	°C
Junction/Ambient	R <sub>THJA</sub>	350	°C/W
Junction/Solder Point	R <sub>THJS</sub>	200	°C/W

#### Note:

1. Pulse width  $\leq 0.1$  msec, duty  $\leq 1/10$ .

## **TYPICAL ELECTRICAL & OPTICAL CHARACTERISTICS (T**<sub>A</sub> = 25°C)

Characteristics	Symbol	Condition	Unit	Minimum	Typical	Maximum
Forward Voltage	V <sub>F</sub>	l <sub>F</sub> = 30 mA	V		3.6	4.2
Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 5 V	μA			10
Luminous Flux	Φ <sub>v</sub>	I <sub>F</sub> = 30 mA	lm		7000	
Luminous Intensity	I <sub>v</sub>	I <sub>F</sub> = 30 mA	mcd	1400	2600	
Chromoticity Coordinates	х	I <sub>F</sub> = 30 mA			0.3325	
Chromaticity Coordinates	у	I <sub>F</sub> = 30 mA			0.3411	

\* Continuous reverse voltage can cause LED damage.



## **INTENSITY BIN LIMIT**

Cool White (30 mA) - CLA1A-WKB				
Bin Code	Min.(mcd) Max.(mcd)			
Wb	1400	1800		
Xa	1800	2240		
Xb	2240	2800		
Ya	2800	3550		

\* Tolerance of measurement of luminous intensity is ±10%

## **VOLTAGE BIN LIMIT**

Cool White (30 mA) - CLA1A-WKB				
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		
2d	4.0	4.2		

\* Tolerance of measurement of voltage is ±0.05V

## **COLOR BIN LIMIT**

#### Cool White (30 mA) - CLA1A-WKB

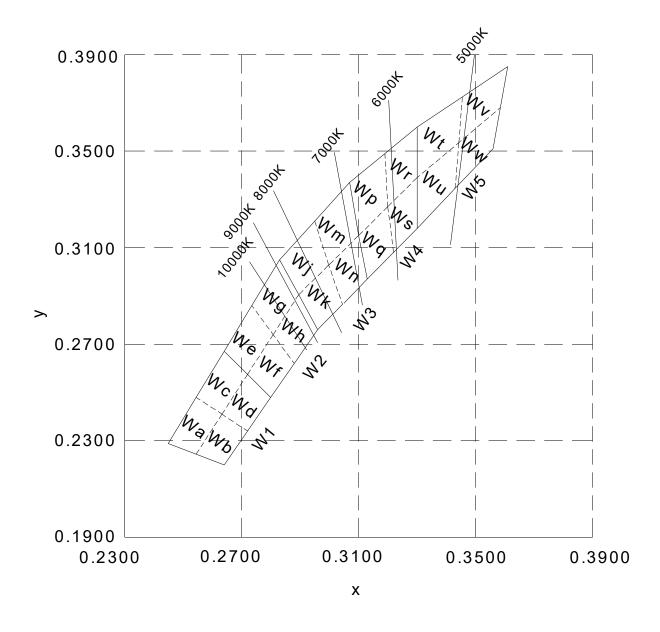
Bin Code	Sub-bin	x	у
		0.2545	0.2480
	Wa	0.2633	0.2410
	vva	0.2545	0.2245
		0.2450	0.2290
		0.2633	0.2410
	Wb	0.2720	0.2340
	VVD	0.2640	0.2200
W1		0.2545	0.2245
VV I		0.2545	0.2480
	Wc	0.2640	0.2670
	VVC	0.2720	0.2575
		0.2633	0.2410
		0.2633	0.2410
	Wd	0.2720	0.2575
		0.2800	0.2480
		0.2720	0.2340
		0.2640	0.2670
	We	0.2735	0.2860
	we	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
	14/2	0.2830	0.3050
	Wg	0.2895	0.2905
		0.2808	0.2740
		0.2808	0.2740
	14/1-	0.2895	0.2905
	Wh	0.2960	0.2760
		0.2880	0.2620

No N N N0.2830 0.3010 0.2998 0.3028 0.2905 0.2905 0.2905 0.2905 0.2905 0.2905 0.2905 0.3045 0.2906 0.2906 0.2906 0.2906 0.2908 0.3028 0.30100 0.3200 0.3200 <br< th=""><th>Bin Code</th><th>Sub-bin</th><th>x</th><th>у</th></br<>	Bin Code	Sub-bin	x	у
Wj0.29980.30280.28950.29050.28950.29050.29080.20050.29080.30280.29060.27600.29060.27600.30450.33100.30060.31000.31000.31500.30460.30280.29980.30280.31000.31500.31300.29700.31300.29700.31300.29700.31450.30280.30450.30280.31300.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.31500.31000.32700.31000.33000.32000.32700.32000.32700.32000.32700.32000.32700.32000.32700.32000.32700.32000.32700.32000.32700.32000.32700.32000.32700.33000.33900.33000.33900.33000.3390			0.2830	0.3050
<ul> <li>Auguarian series and series and</li></ul>			0.2950	0.3210
NA0.28950.2908Wk0.29980.30280.30450.28650.29600.27600.29600.3210Mm0.29500.32100.30700.33700.31000.31500.29980.3028Mm0.29980.30280.31000.31500.31300.29700.31300.29700.30450.3028Mm0.30450.30450.30280.30450.31300.30450.32700.31000.31500.31000.31500.31000.31500.31000.31500.31000.3150Ma0.32000.31000.31500.31000.32700.31000.32000.32000.32000.32000.32700.32000.32700.32000.32700.32000.32700.32000.3270Ma0.32000.32000.3270Ma0.32000.32000.3270Ma0.32000.32000.3270Ma0.32000.32000.3270Ma0.32000.32000.3270Ma0.3200Ma0.3200Ma0.3300Ma0.3300Ma0.3300Ma0.3300Ma0.3300Ma0.3300Ma0.3300Ma0.3300		Wj	0.2998	0.3028
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W3         0.2950         0.3210           Wm         0.3070         0.3370           0.3100         0.3150           0.2998         0.3028           0.2998         0.3028           Nm         0.3100         0.3150           0.100         0.3150         0.3028           Mm         0.3100         0.3150           0.3130         0.2970         0.3130           0.3045         0.2865           0.3045         0.2865           0.3045         0.2865           0.300         0.3370           0.3145         0.3485           0.3100         0.3270           0.3100         0.3150           0.3100         0.3150           0.3100         0.3150           0.3100         0.3150           0.3100         0.3150           0.3100         0.3150           0.3100         0.3270           0.3130         0.2970           0.3130         0.3900           0.3130         0.3270           0.3130         0.3270           0.3200         0.3270           0.3300         0.3390           0.3300         <		VVK	0.3045	0.2865
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Num         0.2998         0.3028           Num         0.3100         0.3150           0.3130         0.2970         0.3130           0.3045         0.2865           0.3045         0.2865           0.3000         0.3370           0.3185         0.3485           0.3100         0.3150           0.3100         0.3150           0.3100         0.3150           0.3100         0.3150           0.3200         0.3270           0.3215         0.3075           0.3130         0.2970           0.3130         0.2970           0.3215         0.3075           0.3185         0.3485           0.3185         0.3485           0.3185         0.3485           0.3200         0.3270           0.3300         0.3600           0.3300         0.3485           0.3300         0.3390           0.3300         0.3390           0.3300         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3300		VVIII	0.3100	0.3150
Nn         0.3100         0.3150           0.3130         0.2970           0.3045         0.2865           0.3045         0.2865           0.300         0.3370           Np         0.3070         0.3370           0.3100         0.3185         0.3485           0.3100         0.3150         0.3270           0.3100         0.3150         0.3150           Mq         0.3100         0.3150           0.3100         0.3150         0.3270           0.3130         0.2970         0.3130           Mq         0.3200         0.3270           0.3130         0.2970         0.3130           0.3130         0.2970         0.3130           Mr         0.3185         0.3485           0.3300         0.3270         0.3270           Mr         0.3300         0.3390           0.3200         0.3270         0.3270           Ms         0.3200         0.3270           Ms         0.3200         0.3270           Ms         0.3300         0.3390			0.2998	0.3028
Wn         0.3130         0.2970           0.3045         0.2865           0.3045         0.2865           0.3045         0.3370           0.3185         0.3485           0.3100         0.3270           0.3100         0.3150           0.3100         0.3150           0.3130         0.3150           0.3100         0.3150           0.3130         0.3070           0.3130         0.3070           0.3130         0.3070           0.3130         0.3070           0.3130         0.3070           0.3130         0.3070           0.3130         0.3070           0.3130         0.3070           0.3130         0.3070           0.3130         0.3000           0.3300         0.3300           0.3300         0.3270           0.3200         0.3270           Wa         0.3300         0.3300           0.3300         0.3390         0.3390			0.2998	0.3028
0.3130         0.2970           0.3045         0.2865           0.3045         0.3370           0.3185         0.3485           0.3100         0.3270           0.3100         0.3150           0.3100         0.3150           0.3200         0.3270           0.3100         0.3150           0.3100         0.3150           0.3215         0.3075           0.3130         0.2970           0.3130         0.3270           0.3130         0.3270           0.3130         0.2970           0.3130         0.2970           0.3130         0.2970           0.3130         0.2970           0.3130         0.2970           0.3130         0.3270           0.3300         0.3300           0.3300         0.3390           0.3270         0.3270           0.3200         0.3270           Ws         0.3300         0.3390           0.3300         0.3390           0.3300         0.3390		Min	0.3100	0.3150
Number         0.3070         0.3370           Nump         0.3185         0.3485           0.3200         0.3270           0.3100         0.3150           0.3100         0.3150           Mump         0.3100         0.3150           0.3200         0.3270         0.3150           Mump         0.3100         0.3150           0.3215         0.3075         0.3130           0.3130         0.2970         0.3130           Mump         0.3185         0.3485           0.3130         0.2970         0.3130           Mump         0.3185         0.3485           0.3100         0.3270         0.3270           Mump         0.3200         0.3270           0.3200         0.3270         0.3270           Mump         0.3200         0.3270           Mump         0.3200         0.3270           Mump         0.3300         0.3390           Mump         0.3300         0.3390		VVII	0.3130	0.2970
Np         0.3185         0.3485           0.3200         0.3270           0.3100         0.3150           0.3100         0.3150           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3215         0.3075           0.31300         0.2970           0.31300         0.3485           0.31300         0.3400           0.33000         0.3300           0.33000         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3300         0.3270           0.3300         0.3390			0.3045	0.2865
Wp         0.3200         0.3270           0.3100         0.3150           0.3100         0.3150           Mq         0.3200         0.3270           0.3200         0.3270         0.3270           Mq         0.3215         0.3075           0.3130         0.2970         0.3185           Mr         0.3300         0.3600           0.3300         0.3390         0.3390           Mr         0.3200         0.3270           0.3300         0.3270         0.3270           Mr         0.3200         0.3270           0.3300         0.3270         0.3270           Mr         0.3200         0.3270           Mr         0.3200         0.3270           Mr         0.3200         0.3270			0.3070	0.3370
W4         0.3200         0.3270           W4         0.3100         0.3150           W4         0.3200         0.3270           W4         0.3200         0.3270           W1         0.3215         0.3075           0.3130         0.2970           0.3185         0.3485           0.3300         0.3600           0.3300         0.3300           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3300         0.3270           W5         0.3300         0.3270		Wp	0.3185	0.3485
W4         0.3100         0.3150           W4         0.3200         0.3270           0.3215         0.3075           0.3130         0.2970           0.3130         0.2970           W1         0.3185         0.3485           0.3300         0.3600         0.3390           0.3200         0.3270         0.3270           W8         0.3200         0.3270           W8         0.3300         0.3390		۷۷Þ	0.3200	0.3270
Wq         0.3200         0.3270           0.3130         0.2970           0.3130         0.2970           Wr         0.3185         0.3485           0.3300         0.3600           0.3300         0.3600           0.3200         0.3270           0.3200         0.3270           Wr         0.3200         0.3270           0.3200         0.3270           Ws         0.3200         0.3270           0.3300         0.3270			0.3100	0.3150
Wq         0.3215         0.3075           W4         0.3130         0.2970           W4         0.3185         0.3485           Wr         0.3300         0.3600           0.3300         0.3390         0.3270           0.3200         0.3270         0.3270           Ws         0.3300         0.3390           0.3300         0.3390         0.3390			0.3100	0.3150
W4         0.3215         0.3075           W4         0.3130         0.2970           Wr         0.3185         0.3485           0.3300         0.3600           0.3300         0.3390           0.3200         0.3270           0.3200         0.3270           Ws         0.3300         0.3390           0.3300         0.3270           0.3300         0.3270		Wa	0.3200	0.3270
W4         0.3185         0.3485           Wr         0.3300         0.3600           0.3300         0.3390         0.3270           0.3200         0.3270         0.3270           Ws         0.3300         0.3390           0.3300         0.3270         0.3270		٧٧٩	0.3215	0.3075
Wr         0.3185         0.3485           0.3300         0.3600           0.3300         0.3390           0.3200         0.3270           Ws         0.3300         0.3390           0.3300         0.3270           0.3300         0.3390           0.3300         0.3390	W/A		0.3130	0.2970
Wr         0.3300         0.3390           0.3200         0.3270           0.3200         0.3270           Ws         0.3300         0.3390           0.3300         0.3390           0.3300         0.3180	***		0.3185	0.3485
0.3300         0.3390           0.3200         0.3270           0.3200         0.3270           0.3200         0.3270           0.3300         0.3390           0.3300         0.3390           0.3300         0.3180	14	\\/r	0.3300	0.3600
Ws         0.3200         0.3270           0.3300         0.3390           0.3300         0.3180		VVF	0.3300	0.3390
Ws         0.3300         0.3390           0.3300         0.3180			0.3200	0.3270
Ws 0.3300 0.3180		0.3200	0.3270	
0.3300 0.3180		10/0	0.3300	0.3390
0.3215 0.3075			0.3300	0.3180
			0.3215	0.3075

Bin Code	Sub-bin	x	у
		0.3300	0.3600
	Wt	0.3455	0.3725
	VVL	0.3443	0.3535
		0.3300	0.3390
		0.3300	0.3390
	/5 Wv	0.3443	0.3535
		0.3430	0.3345
W5		0.3300	0.3180
VV J		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
	V V VV	0.3560	0.3510
		0.3430	0.3345

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

## **CIE CHROMATICITY DIAGRAM**



## **ORDER CODE TABLE**

Color	Kit Number	Luminous Int	tensity (mcd)	Color Bin Code
Color	Kit Number	Min.	Max.	Color Bin Code
	CLA1A-WKB-CWbYa153	1400	3550	W1,W2,W3,W4,W5
0	CLA1A-WKB-CWbYa343	1400	3550	W3,W4
Cool White	CLA1A-WKB-CXaYa153	1800	3550	W1,W2,W3,W4,W5
	CLA1A-WKB-CXaYa453	1800	3550	W4,W5

#### Notes:

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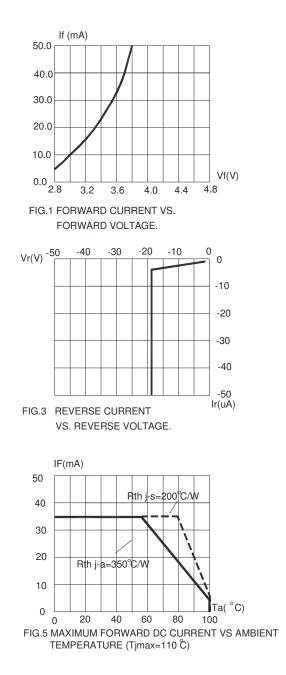
The above kit numbers represent order codes that include multiple intensity-bin and color-bin codes. Only one intensity-bin code and one color-bin code will be shipped on each bulk. Single intensity-bin code and single color-bin codes will not be orderable.

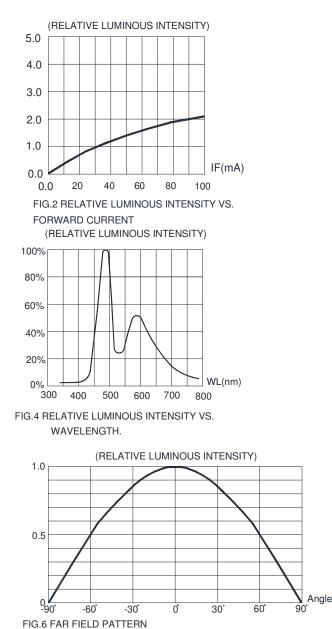
Please refer to the HB LED Lamp Reliability Test Standards document for reliability test conditions.

Please refer to the HB LED Lamp Soldering & Handling document for information about how to use this LED product safely.

## GRAPHS

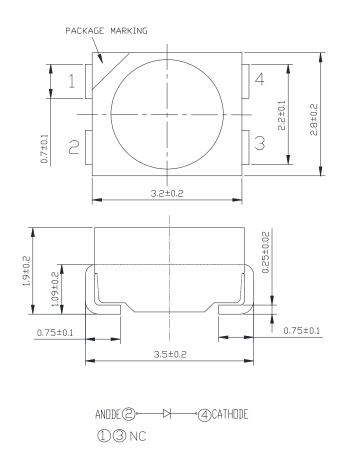
The data below are collected from statistical figures that do not necessarily correspond to the actual parameters of each single LED. Hence, these data will be changed without further notice.





## **MECHANICAL DIMENSIONS**

All dimensions are in mm.



## 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**

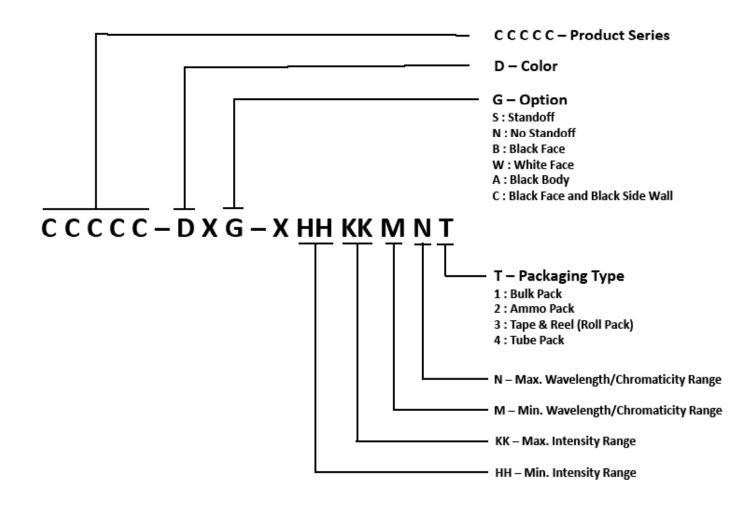
WARNING: Do not look at an exposed lamp in operation. Eye injury can result.

# 

## **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.

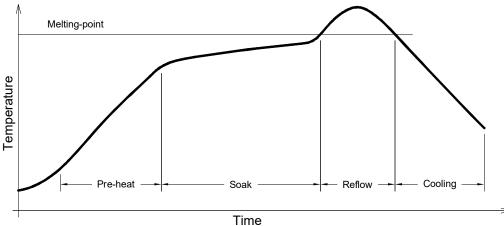
Cree LEDs are sold by order codes in combinations of bins called kits. Order codes are configured in the following manner:





## **REFLOW SOLDERING**

- The CLA1A-WKB is rated as a MSL 5a product. .
- The recommended floor life out of bag is 24hrs. •
- The temperature profile is as below. •

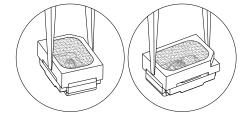




## Use only with CLA1A-WKB

Solder
Average ramp-up rate = 4°C/s max
Preheat temperature = 150°C ~200°C
Preheat time = 120s max
Ramp-down rate = 6°C/s max
Peak temperature = 250°C max
Time within 5°C of actual Peak Temperature = 10s max
Duration above 217°C is 60s max

- The packaging sizes of these SMD products are very small and the resin is still soft after solidification. Users are required to handle • with care. Never touch the resin surface of SMD products.
- · To avoid damaging the product's surface and interior device, it is recommended to choose a special nozzle to pick up the SMD products during the process of SMT production. If handling is necessary, take special care when picking up these products. The following method is necessary:
- 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.
- The reel pack is applied in SMD LED.
- Max 2000 pcs per reel.

