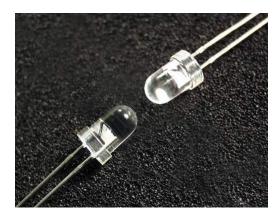


C503B-Rxx, C503B-Axx: 5-mm Round Red & Amber LEDs



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-RAS/RAN:(8200 32900)
 C503B-RBS/RBN:(3000 12000)
 C503B-RCS/RCN:(3000 12000)
 C503B-AAS/AAN:(5860 23500)
 C503B-ABS/ABN:(3000 12000)
 C503B-ACS/ACN:(4180 12000)
- Viewing angles:

15°: C503B-RAS/RAN/AAS/AAN 23°: C503B-RBS/RBN/ABS/ABN 30°: C503B-RCS/RCN/ACS/ACN

- · Lead Free
- · RoHS Compliant

APPLICATIONS

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



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

Items	Symbol	Absolute Maximum Rating	Unit		
Forward Current	I _F	50 Note1	mA		
Peak Forward Current Note2	I _{FP}	200	mA		
Reverse Voltage	V_R	5	V		
Power Dissipation	$P_{_{D}}$	130	mW		
Operation Temperature	T _{opr}	-40 ~ +100	°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)			
Electrostatic Discharge Classification (MIL-STD-883E)	ESD	Cla	ss 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 ≤ 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 _F	I _F = 20 mA	V		2.1	2.6
Reverse Current		Red/Amber	I _R	V _R = 5 V	μA			100
Deminent Wayalangth		Red	$\lambda_{_{D}}$	I _F = 20 mA	nm	618	624	630
Dominant Wavelength	Amber		$\lambda_{_{\mathrm{D}}}$	I _F = 20 mA	nm	584	591	596
		C503B-RAS/RAN (15 degree)	I _v	I _F = 20 mA	mcd	8200	15000	
	Red	C503B-RBS/RBN (23 degree)	I _v	I _F = 20 mA	mcd	3000	5000	
Lucation and Justice attention		C503B-RCS/RCN (30 degree)	I _v	I _F = 20 mA	mcd	3000	5100	
Luminous Intensity		C503B-AAS/AAN (15 degree)	I _v	I _F = 20 mA	mcd	5860	13000	
	Amber	C503B-ABS/ABN (23 degree)	I _v	I _F = 20 mA	mcd	3000	5000	
		C503B-ACS/ACN (30 degree)	l _v	I _F = 20 mA	mcd	4180	6000	
	C503B-RAS/RAN/AAS/AAN		201/2	I _F = 20 mA	deg		15	
50% Power Angle	(C503B-RBS/RBN/ABS/ABN	201/2	I _F = 20 mA	deg		23	
	C	:503B-RCS/RCN/ACS/ACN	201/2	I _F = 20 mA	deg		30	

^{*} Continuous reverse voltage can cause LED damage.



INTENSITY BIN LIMIT

Red

15° (2	15° (20 mA) - C503B-RAS/RAN			23° (20 mA) - C503B-RBS/RBN			30° (20 mA) - C503B-RCS/RCN			
Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)		
Z0	8200	12000	W0	3000	4180	W0	3000	4180		
A0	12000	16800	X0	4180	5860	X0	4180	5860		
В0	16800	23500	Y0	5860	8200	Y0	5860	8200		
C0	23500	32900	Z0	8200	12000	Z0	8200	12000		

Amber

15° (20 mA) - C503B-AAS/AAN		23° (20 mA) - C503B-ABS/ABN			30° (20 mA) - C503B-ACS/ACN			
Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)	Bin Code	Min.(mcd)	Max.(mcd)
Y0	5860	8200	W0	3000	4180	X0	4180	5860
Z0	8200	12000	X0	4180	5860	Y0	5860	8200
A0	12000	16800	Y0	5860	8200	Z0	8200	12000
В0	16800	23500	Z0	8200	12000			

^{*} Tolerance of measurement of luminous intensity is ±15%

COLOR BIN LIMIT

	Red (20 mA) - C503B-Rxx		Amber (20 mA) - C503B-Axx				
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		

^{*} Tolerance of measurement of dominant wavelength is ±1 nm.



	Viewing		Luminous Int	tensity (mcd)		Dominant \	Wavelength			
Color	Angle	Order Code	Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max.(nm)	Package	Standoff
		C503B-RAS-CZ0C0AA1	8200	32900	RA	618	RA	630	Bulk	Yes
		C503B-RAS-CA0C0AA1	12000	32900	RA	618	RA	630	Bulk	Yes
		C503B-RAS-CA0B0AA1	12000	23500	RA	618	RA	630	Bulk	Yes
		C503B-RAN-CZ0C0AA1	8200	32900	RA	618	RA	630	Bulk	No
		C503B-RAN-CA0C0AA1	12000	32900	RA	618	RA	630	Bulk	No
	15°	C503B-RAN-CA0B0AA1	12000	23500	RA	618	RA	630	Bulk	No
	15	C503B-RAS-CZ0C0AA2	8200	32900	RA	618	RA	630	Ammo	Yes
		C503B-RAS-CA0C0AA2	12000	32900	RA	618	RA	630	Ammo	Yes
		C503B-RAS-CA0B0AA2	12000	23500	RA	618	RA	630	Ammo	Yes
		C503B-RAN-CZ0C0AA2	8200	32900	RA	618	RA	630	Ammo	No
		C503B-RAN-CA0C0AA2	12000	32900	RA	618	RA	630	Ammo	No
Red		C503B-RAN-CA0B0AA2	12000	23500	RA	618	RA	630	Ammo	No
Red		C503B-RBS-CW0Z0AA1	3000	12000	RA	618	RA	630	Bulk	Yes
		C503B-RBS-CX0Y0AA1	4180	8200	RA	618	RA	630	Bulk	Yes
		C503B-RBS-CY0Z0AA1	5860	12000	RA	618	RA	630	Bulk	Yes
		C503B-RBN-CW0Z0AA1	3000	12000	RA	618	RA	630	Bulk	No
		C503B-RBN-CX0Y0AA1	4180	8200	RA	618	RA	630	Bulk	No
	23°	C503B-RBN-CY0Z0AA1	5860	12000	RA	618	RA	630	Bulk	No
	23	C503B-RBS-CW0Z0AA2	3000	12000	RA	618	RA	630	Ammo	Yes
		C503B-RBS-CX0Y0AA2	4180	8200	RA	618	RA	630	Ammo	Yes
		C503B-RBS-CY0Z0AA2	5860	12000	RA	618	RA	630	Ammo	Yes
		C503B-RBN-CW0Z0AA2	3000	12000	RA	618	RA	630	Ammo	No
		C503B-RBN-CX0Y0AA2	4180	8200	RA	618	RA	630	Ammo	No
		C503B-RBN-CY0Z0AA2	5860	12000	RA	618	RA	630	Ammo	No

- 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.



	Viewing	Order Code	Luminous Int	tensity (mcd)	Dominant Wavelength					
Color	Angle		Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max.(nm)	Package	Standoff
		C503B-RCS-CW0Z0AA1	3000	12000	RA	618	RA	630	Bulk	Yes
		C503B-RCS-CW0X0AA1	3000	5860	RA	618	RA	630	Bulk	Yes
		C503B-RCS-CX0Y0AA1	4180	8200	RA	618	RA	630	Bulk	Yes
		C503B-RCN-CW0Z0AA1	3000	12000	RA	618	RA	630	Bulk	No
		C503B-RCN-CW0X0AA1	3000	5860	RA	618	RA	630	Bulk	No
Red	30°	C503B-RCN-CX0Y0AA1	4180	8200	RA	618	RA	630	Bulk	No
Red	30	C503B-RCS-CW0Z0AA2	3000	12000	RA	618	RA	630	Ammo	Yes
		C503B-RCS-CW0X0AA2	3000	5860	RA	618	RA	630	Ammo	Yes
		C503B-RCS-CX0Y0AA2	4180	8200	RA	618	RA	630	Ammo	Yes
		C503B-RCN-CW0Z0AA2	3000	12000	RA	618	RA	630	Ammo	No
		C503B-RCN-CW0X0AA2	3000	5860	RA	618	RA	630	Ammo	No
		C503B-RCN-CX0Y0AA2	4180	8200	RA	618	RA	630	Ammo	No

- 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.



	Viewing		Luminous Int	tensity (mcd)		Dominant \	Wavelength			
Color	Angle	Order Code	Min.	Max.	Color Bin	Min.(nm)	Color Bin	Max.(nm)	Package	Standoff
		C503B-AAS-CY0B0251	5860	23500	A2	584	A5	596	Bulk	Yes
		C503B-AAS-CZ0B0341	8200	23500	А3	587	A4	593	Bulk	Yes
	15° -	C503B-AAS-CA0B0341	12000	23500	A3	587	A4	593	Bulk	Yes
		C503B-AAN-CY0B0251	5860	23500	A2	584	A5	596	Bulk	No
		C503B-AAN-CZ0B0341	8200	23500	А3	587	A4	593	Bulk	No
		C503B-AAN-CA0B0341	12000	23500	A3	587	A4	593	Bulk	No
		C503B-AAS-CY0B0252	5860	23500	A2	584	A5	596	Ammo	Yes
		C503B-AAS-CZ0B0342	8200	23500	А3	587	A4	593	Ammo	Yes
		C503B-AAS-CA0B0342	12000	23500	А3	587	A4	593	Ammo	Yes
		C503B-AAN-CY0B0252	5860	23500	A2	584	A5	596	Ammo	No
		C503B-AAN-CZ0B0342	8200	23500	А3	587	A4	593	Ammo	No
Amber		C503B-AAN-CA0B0342	12000	23500	A3	587	A4	593	Ammo	No
Allibei		C503B-ABS-CW0Z0251	3000	12000	A2	584	A5	596	Bulk	Yes
		C503B-ABS-CX0Y0341	4180	8200	A3	587	A4	593	Bulk	Yes
		C503B-ABS-CY0Z0341	5860	12000	А3	587	A4	593	Bulk	Yes
		C503B-ABN-CW0Z0251	3000	12000	A2	584	A5	596	Bulk	No
		C503B-ABN-CX0Y0341	4180	8200	А3	587	A4	593	Bulk	No
	23°	C503B-ABN-CY0Z0341	5860	12000	A3	587	A4	593	Bulk	No
	23	C503B-ABS-CW0Z0252	3000	12000	A2	584	A5	596	Ammo	Yes
		C503B-ABS-CX0Y0342	4180	8200	A3	587	A4	593	Ammo	Yes
		C503B-ABS-CY0Z0342	5860	12000	А3	587	A4	593	Ammo	Yes
		C503B-ABN-CW0Z0252	3000	12000	A2	584	A5	596	Ammo	No
		C503B-ABN-CX0Y0342	4180	8200	А3	587	A4	593	Ammo	No
		C503B-ABN-CY0Z0342	5860	12000	A3	587	A4	593	Ammo	No

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



	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-CX0Z0251	4180	12000	A2	584	A5	596	Bulk	Yes
		C503B-ACS-CX0Z0341	4180	12000	А3	587	A4	593	Bulk	Yes
		C503B-ACS-CX0Y0251	4180	8200	A2	584	A5	596	Bulk	Yes
		C503B-ACS-CX0Y0341	4180	8200	АЗ	587	A4	593	Bulk	Yes
		C503B-ACS-CY0Z0251	5860	12000	A2	584	A5	596	Bulk	Yes
		C503B-ACS-CY0Z0341	5860	12000	А3	587	A4	593	Bulk	Yes
		C503B-ACN-CX0Z0251	4180	12000	A2	584	A5	596	Bulk	No
		C503B-ACN-CX0Z0341	4180	12000	АЗ	587	A4	593	Bulk	No
		C503B-ACN-CX0Y0251	4180	8200	A2	584	A5	596	Bulk	No
		C503B-ACN-CX0Y0341	4180	8200	А3	587	A4	593	Bulk	No
		C503B-ACN-CY0Z0251	5860	12000	A2	584	A5	596	Bulk	No
Amahar	30°	C503B-ACN-CY0Z0341	5860	12000	А3	587	A4	593	Bulk	No
Amber	30	C503B-ACS-CX0Z0252	4180	12000	A2	584	A5	596	Ammo	Yes
		C503B-ACS-CX0Z0342	4180	12000	А3	587	A4	593	Ammo	Yes
		C503B-ACS-CX0Y0252	4180	8200	A2	584	A5	596	Ammo	Yes
		C503B-ACS-CX0Y0342	4180	8200	А3	587	A4	593	Ammo	Yes
		C503B-ACS-CY0Z0252	5860	12000	A2	584	A5	596	Ammo	Yes
		C503B-ACS-CY0Z0342	5860	12000	АЗ	587	A4	593	Ammo	Yes
		C503B-ACN-CX0Z0252	4180	12000	A2	584	A5	596	Ammo	No
		C503B-ACN-CX0Z0342	4180	12000	А3	587	A4	593	Ammo	No
		C503B-ACN-CX0Y0252	4180	8200	A2	584	A5	596	Ammo	No
		C503B-ACN-CX0Y0342	4180	8200	А3	587	A4	593	Ammo	No
		C503B-ACN-CY0Z0252	5860	12000	A2	584	A5	596	Ammo	No
		C503B-ACN-CY0Z0342	5860	12000	А3	587	A4	593	Ammo	No

- 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.

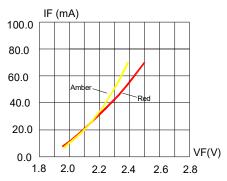


FIG.1 FORWARD CURRENT VS. FORWARD VOLTAGE.

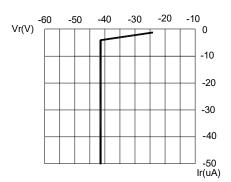


FIG.3 RED & AMBER REVERSE CURRENT VS. REVERSE VOLTAGE.

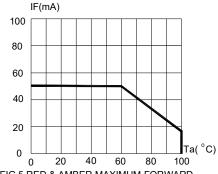


FIG.5 RED & AMBER MAXIMUM FORWARD DC CURRENT VS AMBIENT TEMPERATURE (Tjmax=110 $^{\circ}$ C)

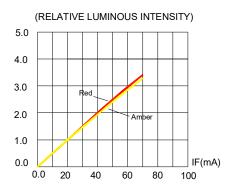


FIG.2 RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

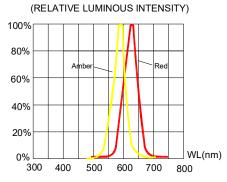
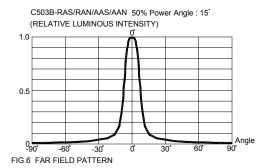


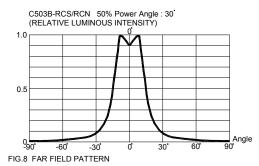
FIG.4 RELATIVE LUMINOUS INTENSITY VS. WAVELENGTH.

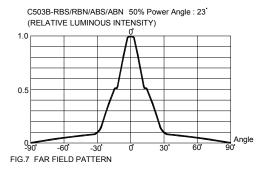


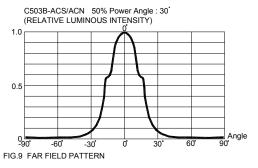
GRAPHS

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.









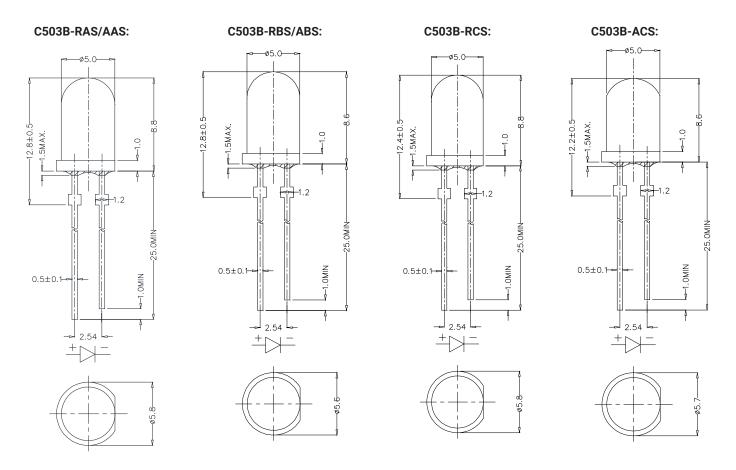


MECHANICAL DIMENSIONS

All dimensions are in mm. 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.



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.



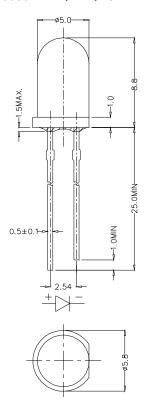
MECHANICAL DIMENSIONS

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

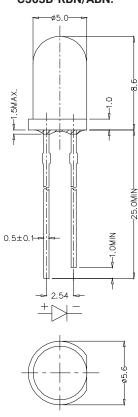
An epoxy meniscus may extend about 1.5 mm down the leads.

Burr around bottom of epoxy may be 0.5 mm max.

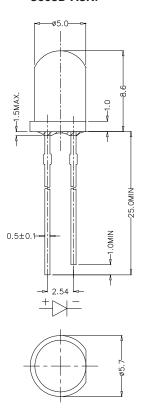
C503B-RAN/AAN/RCN:



C503B-RBN/ABN:



C503B-ACN:



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

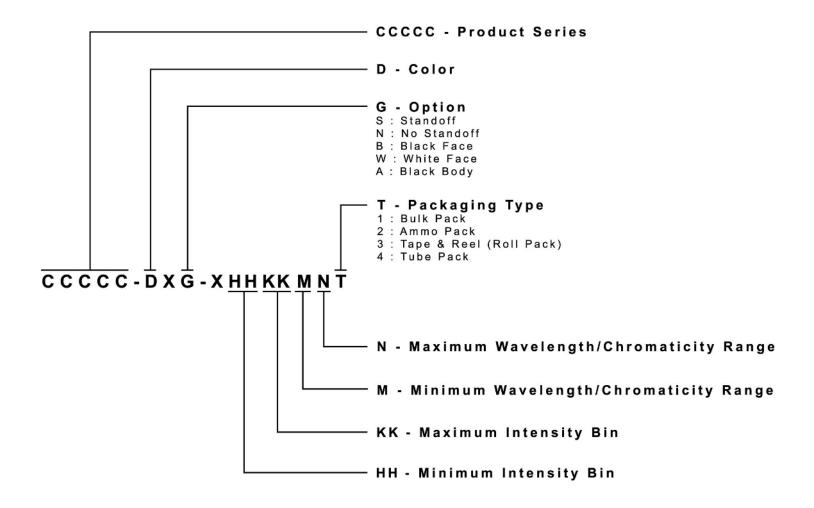
WARNING: Do not look at an exposed lamp in operation. Eye injury can result.



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:



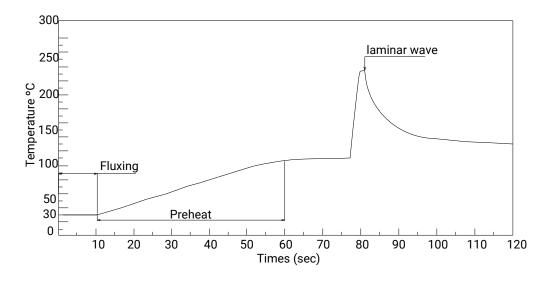


SOLDERING GUIDELINES

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		
T	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:



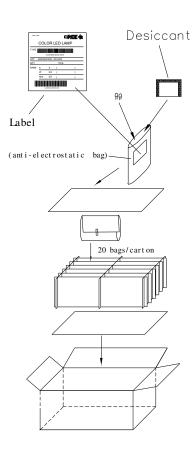
- · Do not apply any stress to the LED package, particularly when heated.
- · Only bottom preheat is suggested & should not preheat on top in order to reduce thermal stress experienced by the LEDs.
- · The LEDs must not be re used once they have been extracted from PCB.
- After soldering the LEDs, the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

