



BA1

Bullstar AC Series

110 V 60 Hz
1.5 W AC LEDs

TECHNICAL DATASHEET

INTRODUCTION

Octa Light high power AC LEDs represent an optimized solution for applications requiring no external power supply but direct AC input grid voltage. The BA1 series are optimized to bring high performance and quality of light needed for today's wide range of lighting applications, such as general, decorative, indoor, outdoor, Industrial or commercial lighting etc. The BA1 AC series are intended for 110 V AC 50/60Hz direct operation without the need of any external converting power supply. The sunk current can be regulated with an external resistor in order to reach a specific consumption and lighting output.

In addition to delivering specified Correlated Color Temperature and Color Rendering combinations, the BA1 series emitters deliver excellent efficacy, lifetime and reliability. This document contains the performance data needed to design LED based applications.

Octa Light BA1 Series Features:

- No power supply - Direct AC LEDs
- Intended for 100V - 130V 50/60 Hz AC operation
- Max continuous average forward current up to 30 mA, max consumed power 3.3W
- Specified CCT & CRI combinations
- ANSI compliant Quarter binning
- LM80 Qualified
- Reflow process compatibility
- Optimized optical performance for higher light output compared to market competitors

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PRODUCT SELECTION

Table 2.1

Product Selection for Octa Light BA1 Series LEDs- High lm/W range

Example nomenclatures for BA1 LEDs series with highest lm/W combinations

	Nominal CCT	Part Number	Minimum CRI	Typical CRI	Minimal Luminous Flux (lm) @15mA	Typical Luminous Flux (lm) @ 15mA	Forward voltage range (50Hz or 60 Hz)
Warm White	2700K	OCTL-BA1-WWL-F80C -J70	70	75	120	125	AC 95-108V
	3000K	OCTL- BA1-WWL-F70A- J70	70	75	120	125	AC 95-108V
	3500K	OCTL- BA1-WWL-F60A- J70	70	75	120	125	AC 95-108V
Neutral White	4000K	OCTL- BA1-NWM-F50A - J70	70	75	130	135	AC 95-108V
	4500K	OCTL- BA1-NWM-F40A - J70	70	75	130	135	AC 95-108V
Cool White	5000K	OCTL- BA1 -CWN-F30A - J70	70	75	140	145	AC 95-108V
	5700K	OCTL- BA1-CWN-F20A - J70	70	75	140	145	AC 95-108V
	6500K	OCTL- BA1-CWN-F10A - J70	70	75	140	145	AC 95-108V

Table 2.2

Product Selection for Octa Light BA1 Series LEDs- High CRI range

Example nomenclatures for BA1 LEDs series with high lm/W and High CRI combinations

	Nominal CCT	Part Number	Minimum CRI	Typical CRI	Minimal Luminous Flux(lm) @15mA	Typical Luminous Flux (lm) @ 15mA	Forward voltage range (50Hz or 60 Hz)
Warm White	2700K	OCTL-BA1-WWK-F80C -J80	80	85	110	115	AC 95-108V
	3000 K	OCTL- BA1-WWK-F70A- J80	80	85	110	115	AC 95-108V
	3500 K	OCTL- BA1-WWK-F60A- J80	80	85	110	115	AC 95-108V
Neutral White	4000K	OCTL- BA1 -NWL-F50A - J80	80	85	120	125	AC 95-108V
	4500K	OCTL- BA1 -NWL-F40A- J80	80	85	120	125	AC 95-108V
Cool White	5000K	OCTL- BA1 -CWM-F30A- J80	80	85	130	135	AC 95-108V
	5700K	OCTL- BA1-CWM-F20A - J80	80	85	130	135	AC 95-108V
	6500K	OCTL- BA1-CWM-F10A -J80	80	85	130	135	AC 95-108V

Notes:

1. Octa Light maintains a tolerance of $\pm 5\%$ on forward voltage measurements.
2. All binning are at 25C temperature

ELECTRICAL CHARACTERISTICS

Characteristics at $I_f = 15 \text{ mA}$ and thermal pad temperature 25°C:

Table 3.

Color	Part Name	Forward Voltage Vf (V) @ 15 mA			$\Delta Vf/\Delta T_j$ (mV/°C), at $I_m=50 \mu A$	Power factor (with external Resistor)	Rth j-c (°C/W)
		Min.	Typical	Max.			
Cool white	OCTL-BA1-CWK -F10C	95	100	108	- 54 mV/°C	0.85	9
	OCTL-BA1-CWK -F20C	95	100	108	- 54 mV/°C	0.85	9
	OCTL-BA1-CWK -F30C	95	100	108	- 54 mV/°C	0.85	9
Neutral white	OCTL-BA1-NWJ -F40C	95	100	108	- 54 mV/°C	0.85	9
	OCTL-BA1-NWI - F50C	95	100	108	- 54 mV/°C	0.85	9
Warm white	OCTL-BA1-WWH -F60C	95	100	108	- 54 mV/°C	0.85	9
	OCTL-BA1-WWH -F70C	95	100	108	- 54 mV/°C	0.85	9
	OCTL-BA1-WWH -F80C	95	100	108	- 54 mV/°C	0.85	9



Notes:

1. Octa Light PLC maintains a tolerance of ±5% on forward voltage measurements.
2. Based on order codes, Octa Light PLC can deliver a specific Vf binning range as follows:
 - a. Vf Range 100 -130 V @ 15mA - type A, see column X8 in BA1/BA2 coding guidelines
 - b. Vf Range 200 -230 V @ 15mA - type B, see column X8 in BA1/BA2 coding guidelines

ABSOLUTE MAXIMUM RATINGS

Table 4

Absolute maximum ratings at thermal pad temperature 25 °C

Parameter	Symbol	Max rate
RMS (root mean square) current	$I_{f_{RMS}}$	50 mA
Maximum Pulsed current (20 mS pulse width, 10% duty cycle)	$I_{f_{peak}}$	100 mA
Maximal Led junction temperature	T_{jmax}	115 C
ESD sensitivity	V	Class 2 *
Operating Case temperature @ 15mA	T_{cmax}	-40 + 120
Soldering temperature	$T_{soldermax}$	260 C
Storage temperature	T_{store}	-40C to +80 C
Allowable Reflow cycles	/	3 times
Manual soldering time at 260°C(Max)	-	8 Sec.

* ESD sensitivity CLASS II, human body model, ANSI/ESDA/JEDEC J5-001-2012

THERMAL AND OPTICAL CHARACTERISTICS

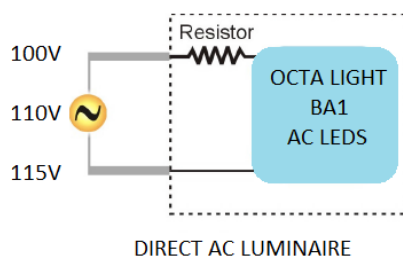
Table 5

Absolute maximum ratings for thermal pad temperature 25 °C

Parameter	Symbol	Typical
Thermal resistance, junction to solder point	C/W	9
Viewing Angle Lambertian Distribution (FWHM)	Degrees	110 Focused *
Color Shift Versus angle Δx and Δy at 80 degree viewing angle, CIE 1931 Optical distribution type A	$\Delta x, \Delta y$	0.04, 0.06

* See optical advantage sheet for more detailed information about distribution angle

APPLICATION INSTRUCTIONS



Notes: ready tables with standard resistors values are available upon request



CURRENT-VOLTAGE CHARACTERISTICS

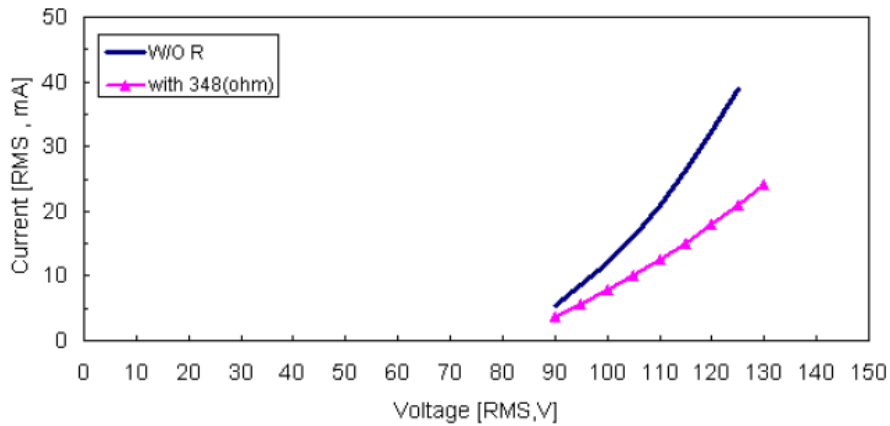


Fig. 1 - Current-Voltage characteristics without and with External resistor (348 Ω) @ 110V AC

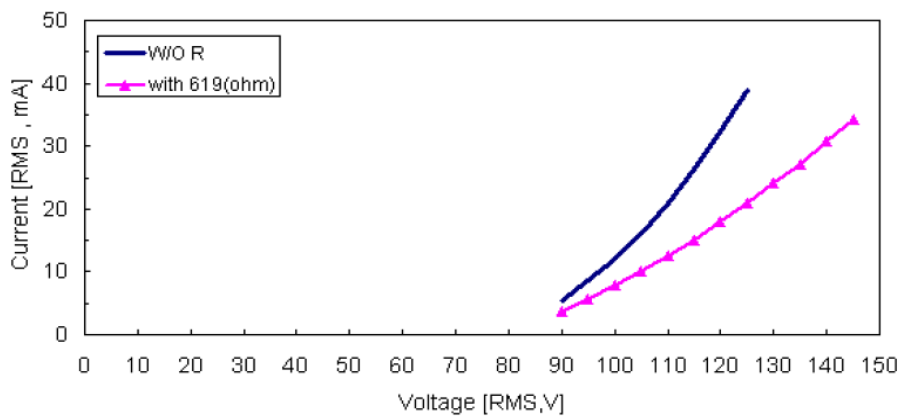


Fig. 2 - Current-Voltage characteristics without and with External resistor (619 Ω) @ 115V AC

LUMEN OUTPUT CHARACTERISTICS

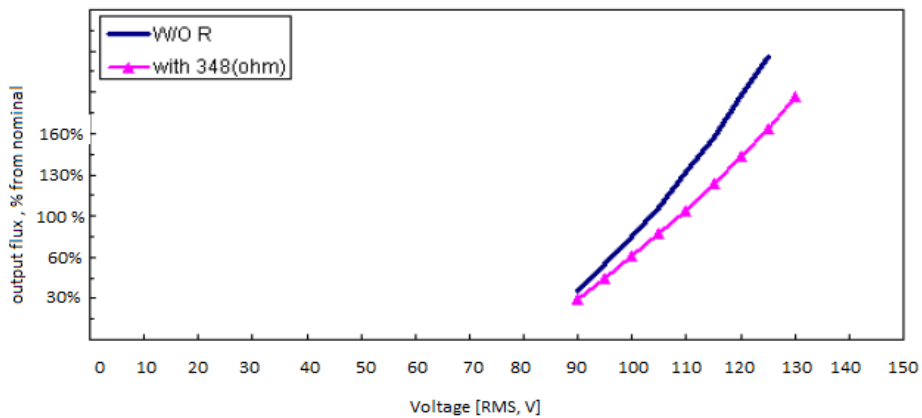
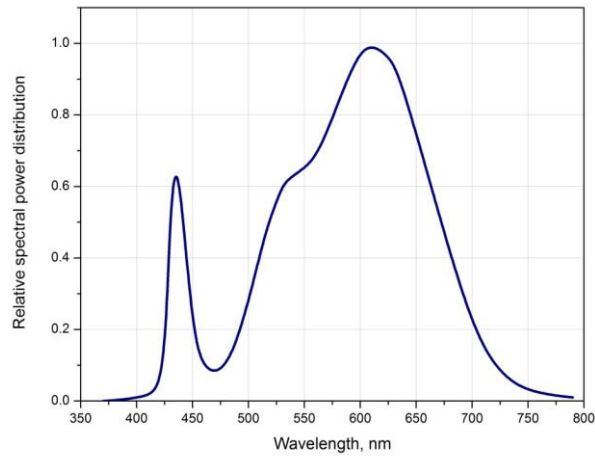


Fig. 3 - Lumen output change over AC voltage input, for fixed resistor Value 348 Ω

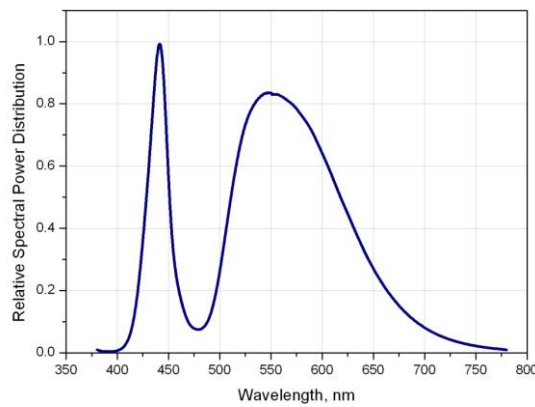


RELATIVE SPECTRAL POWER DISTRIBUTION CHARACTERISTICS

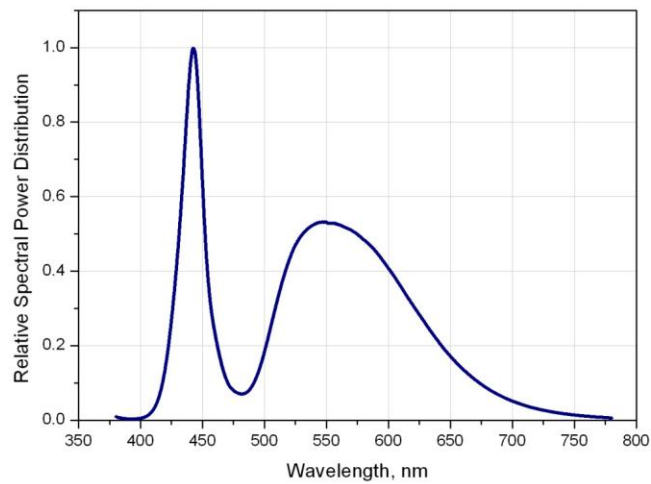
Warm White LED Relative spectral power distribution at 350mA test current



Neutral White LED Relative spectral power distribution at 350mA test current



Cool White LED Relative spectral power distribution at 350mA test current





LIGHT OUTPUT CHARACTERISTICS OVER TEMPERATURE

Normalized Luminous Flux at 25°C, $I_f = 15mA$ and Std Dev.

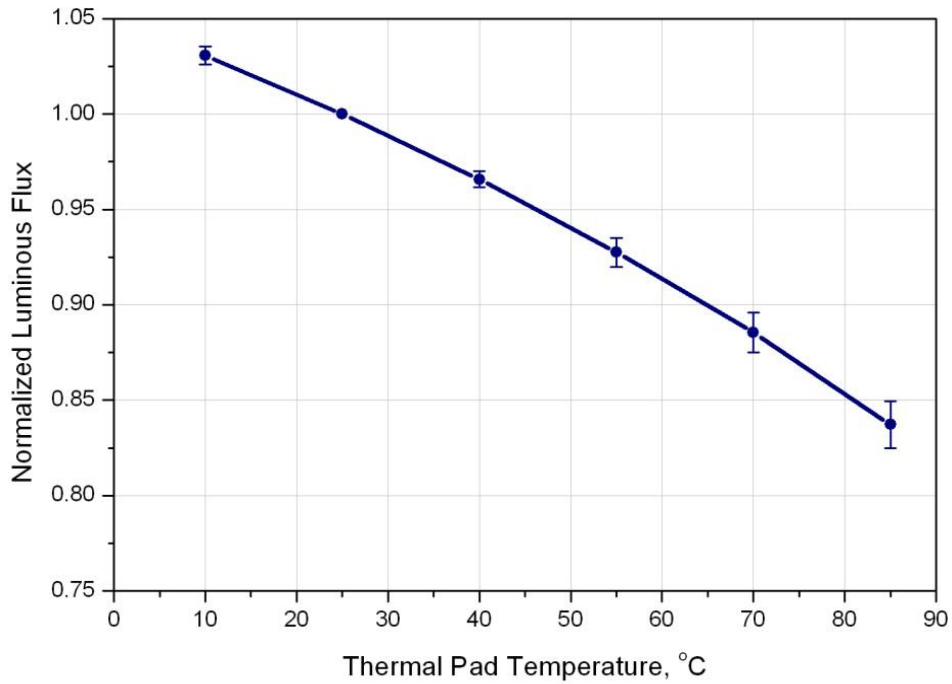


Figure 7. Relative Light output Vs. Thermal pad temperature

Typical Color vs. Viewing Angle

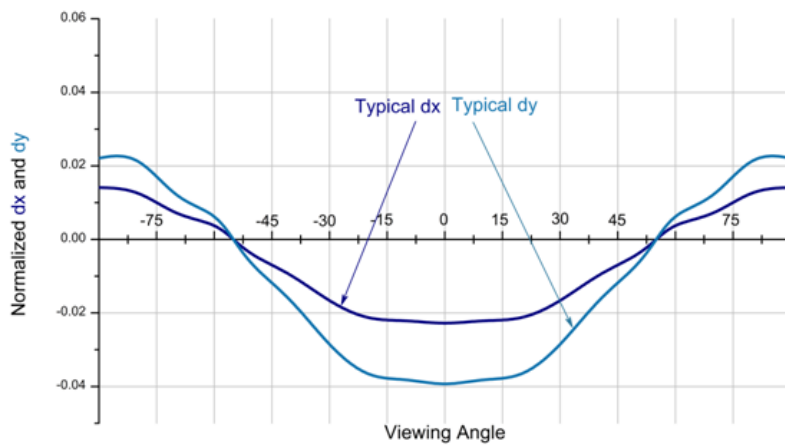


Figure 8. Maximal Color Shifting over viewing angle, normalized for 55 deg.



EMISSION ANGLE CHARACTERISTICS

Typical Spatial Radiation Pattern

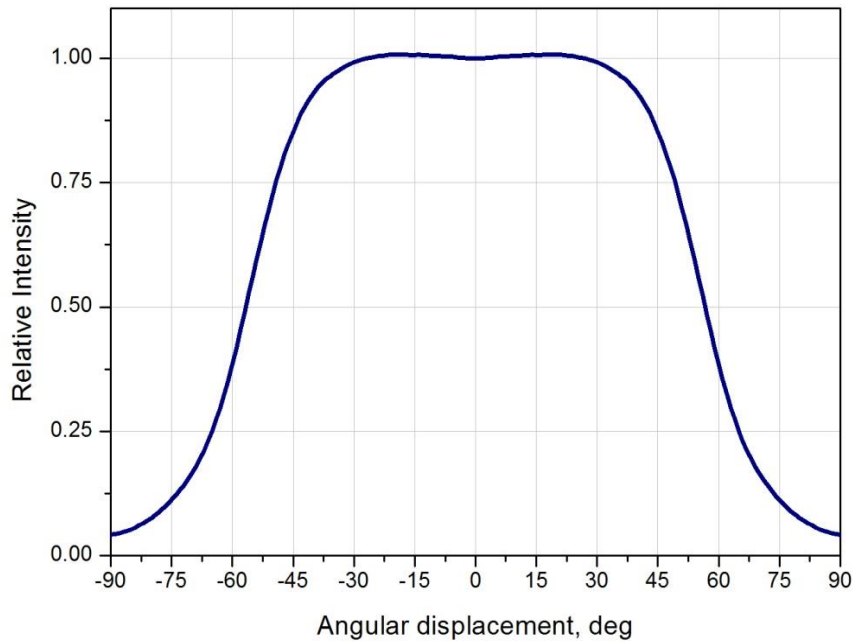


Figure 9. Typical representative spatial radiation pattern for 110° Focused

Typical Polar Radiation Pattern for Focus Optical Type

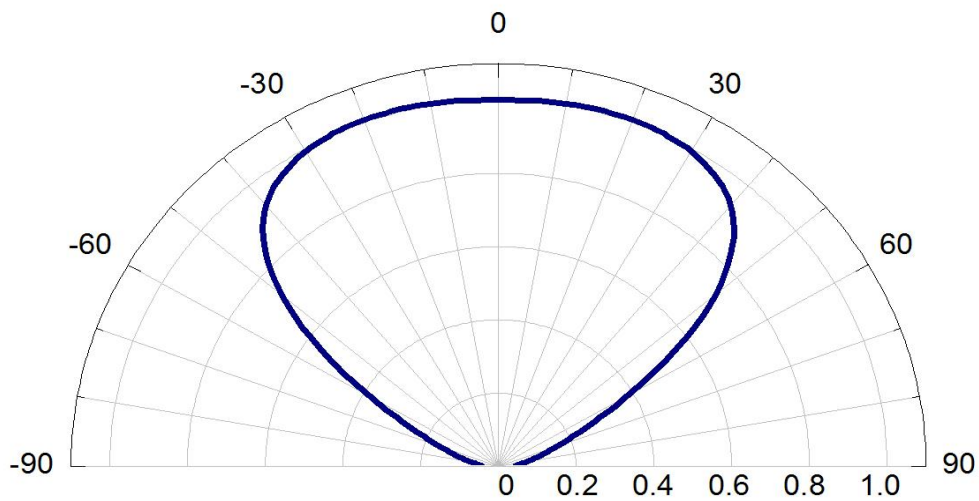
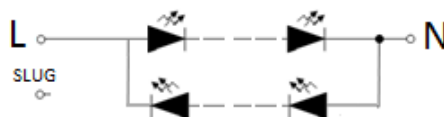
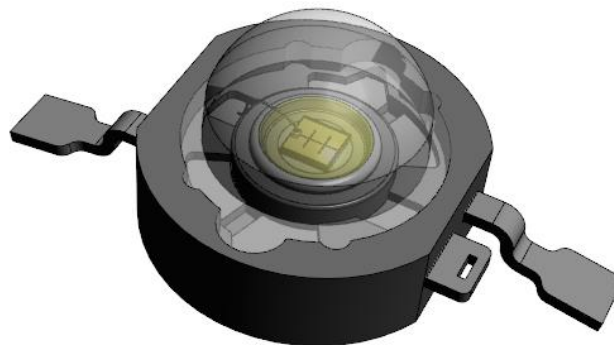
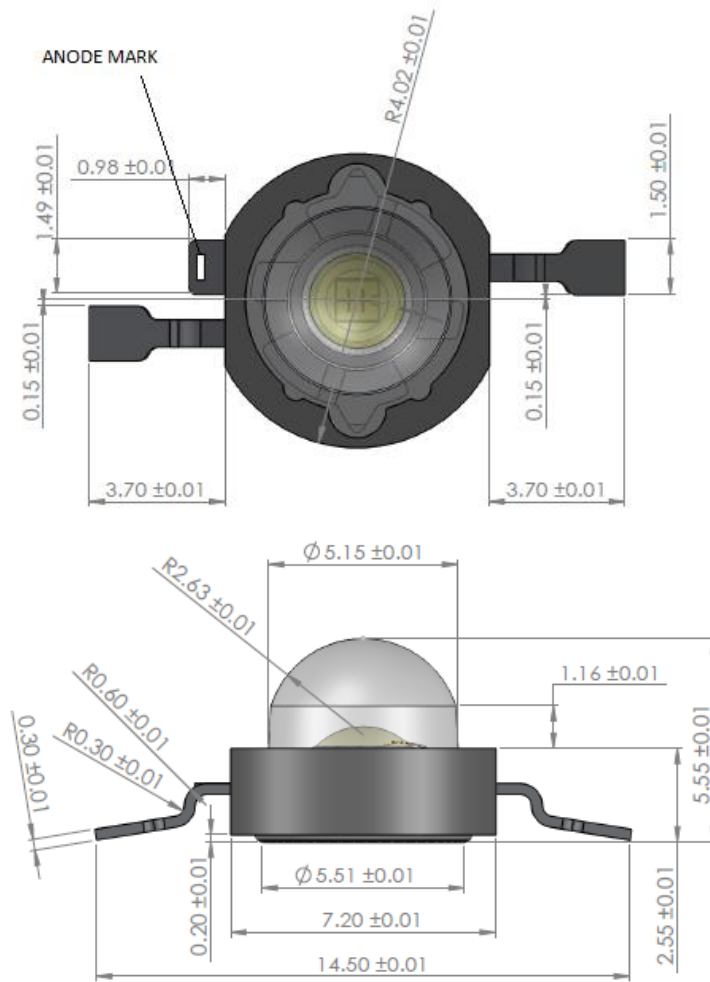


Figure 10. Typical representative polar radiation pattern for 110° Focused



LED PACKAGE DIMENSIONS AND POLARITY



HV AC LED

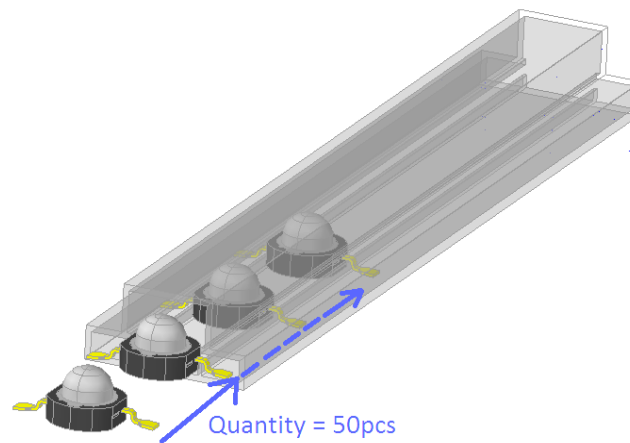
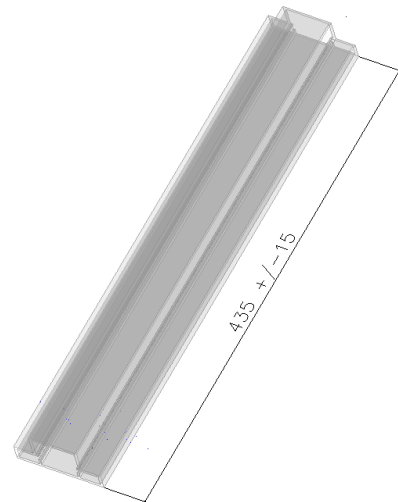
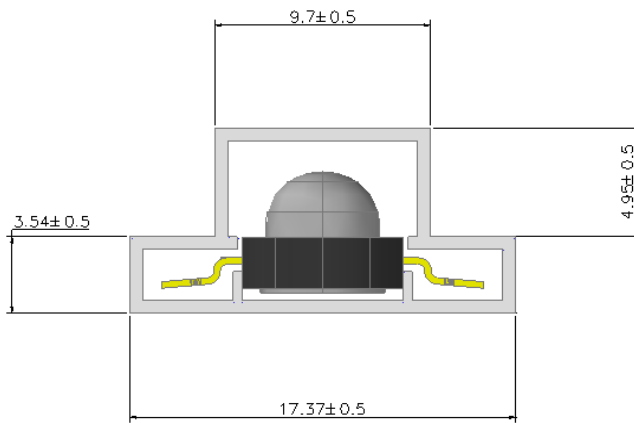
OCTA LIGHT BA1 PACKAGE DIMENSIONS AND POLARITY

Notes:

1. All dimensions are in mm
2. Drawings are not to scale
3. All pictures are for dimensional reference only



PACKAGING INFORMATION
TUBE DIMENSIONS



The label is placed on the back of each tube and contains product information and quantity of the LEDs inside.





COMPANY INFORMATION

Octa Light Bulgaria Plc. is the first Bulgarian Manufacturer of High Power Light Emitting Diodes for general lighting applications. The long year company experience in artificial lighting on LED basis has made possible the creation of the first European LED specially designed for reaching best performance in light output, optical efficacy and thermal management.

Octa Light Products help reduce CO₂ emissions and reduce the need for power plant expansion.

Thanks to its advanced optical properties, the Bullstar series enable never before possible applications in outdoor, indoor, industrial, architectural and general lighting when pure white light is necessary. The sophisticated optical properties allow strong package light concentration suitable for most general lighting applications without the need of any secondary optics.

Octa Light is a fully integrated supplier, offering core Light emitting devices in all three base colors - red, green, blue and white, as well as exotic colors as pink, cyan, yellow, purple and other on basis of client requirements. Octa Light Bulgaria Plc is entirely based within Europe, with R&D and manufacturing centers in Bulgaria. Founded in 2010, Octa Light commits to continuously rise the lumen efficiency of its products and to bring its light emitting diodes closer to mass usage within next years.

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