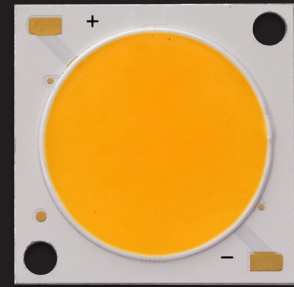


# Bridgelux® E22 LED Array

Product Data Sheet DS444

# Introduction

## E Series



The E Series LED array products deliver high quality of light in a compact and cost-effective solid-state lighting package. These chip-on-board (COB) arrays are available in multiple performance and electrical configuration options, simplifying the design-in process. These high flux density light sources are designed to support a wide range of highly competitive directional luminaires and replacement lamps for commercial and residential applications.

Lighting system designs incorporating these LED arrays deliver increased system level efficacy. Typical applications include, but are not limited to, replacement lamps, task, accent, spot, track, downlight, wide area, security, and wall pack.

### Features

- Wide range of performance from 5250 to 8470 lm with CCT options from 2700K – 6500K
- Compact, high flux density light source
- Uniform, high quality illumination
- Streamlined thermal path
- ENERGY STAR® / ANSI compliant color binning structure with 3 and 5 SDCM options
- Higher energy efficiency than incandescent, halogen and CFL lamps
- Industry standard DC voltage operation
- Instant light with unlimited dimming
- RoHS and REACH compliant

### Benefits

- Supports many general lighting applications
- Enables tight beam control when used with secondary optics
- Clean white light without pixilation
- Low thermal resistance
- Uniform, consistent white light
- Lower operating costs
- Aligns with industry standard drivers to reduce system costs
- Easy to use with daylight and motion detectors to enable increased energy savings
- Environmentally friendly

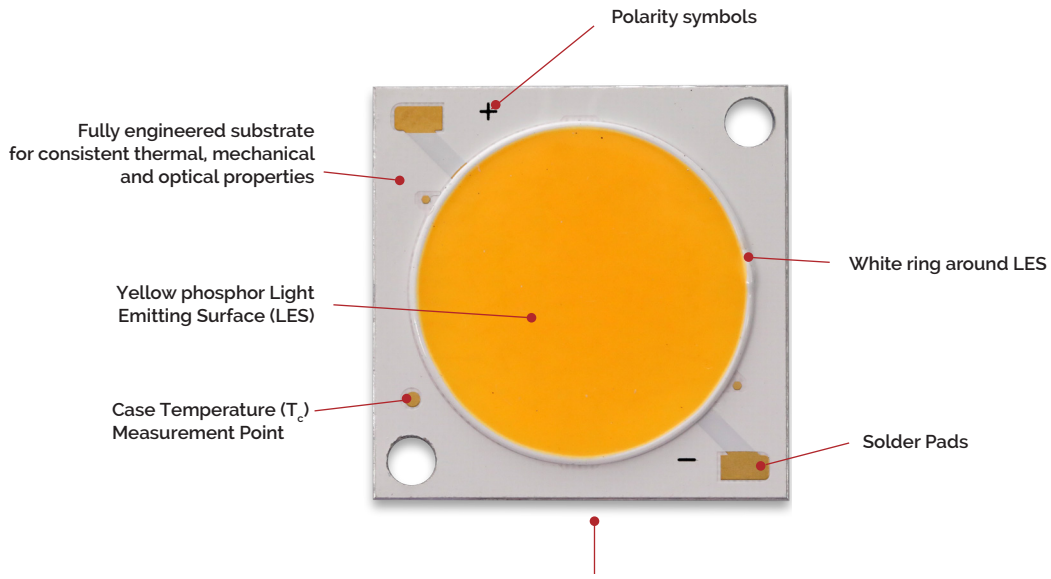


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# Product Feature Map

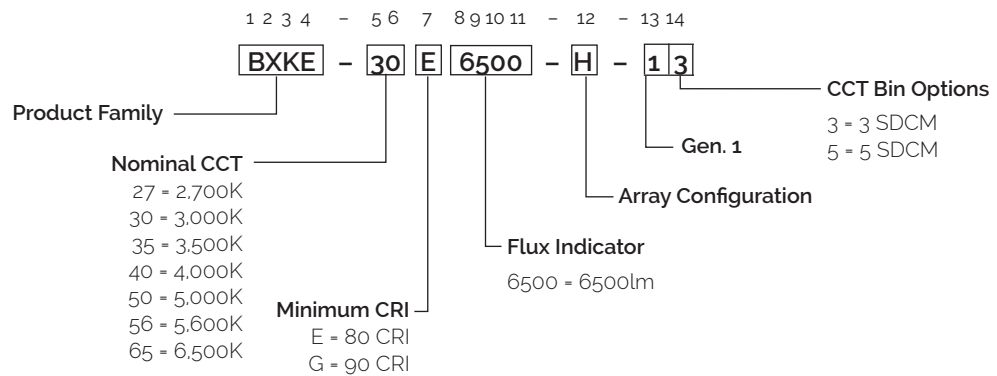
Bridgelux arrays are fully engineered devices that provide consistent thermal and optical performance on an engineered mechanical platform. The E Series arrays incorporate several features to simplify design integration and assembly.



Note: Part number and lot codes are scribed on back of array

## Product Nomenclature

The part number designation for Bridgelux E Series LED arrays is explained as follows:



# Product Selection Guide

The following product configurations are available:

**Table 1:** Selection Guide, Pulsed Measurement Data ( $T_j = 25^\circ\text{C}$ )

Part Number	Nominal CCT <sup>1</sup> (K)	CRI <sup>2</sup>	Nominal Drive Current <sup>3</sup> (mA)	Typical Pulsed Flux <sup>4,5,6</sup> $T_j = 25^\circ\text{C}$ (lm)	Minimum Pulsed Flux <sup>6,7</sup> $T_j = 25^\circ\text{C}$ (lm)	Typical $V_f$ (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXKE-27E6500-H-1x	2700K	80	1440	6313	5489	38.7	55.7	113
BXKE-27G6500-H-1x	2700K	90	1440	5251	4566	38.7	55.7	94
BXKE-30E6500-H-1x	3000K	80	1440	6576	5718	38.7	55.7	118
BXKE-30G6500-H-1x	3000K	90	1440	5458	4746	38.7	55.7	98
BXKE-35E6500-H-1x	3500K	80	1440	6773	5890	38.7	55.7	122
BXKE-35G6500-H-1x	3500K	90	1440	5622	4890	38.7	55.7	101
BXKE-40E6500-H-1x	4000K	80	1440	6839	5947	38.7	55.7	123
BXKE-40G6500-H-1x	4000K	90	1440	5676	4938	38.7	55.7	102
BXKE-50E6500-H-1x	5000K	80	1440	7047	6128	38.7	55.7	126
BXKE-50G6500-H-1x	5000K	90	1440	6016	5114	38.7	55.7	108
BXKE-56E6500-H-1x	5600K	80	1440	7299	6347	38.7	55.7	131
BXKE-65E6500-H-1x	6500K	80	1440	7412	6927	38.7	55.7	133

Notes for Table 1:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. CRI values are minimums. Minimum Rg value for 80 CRI products is 0, the minimum Rg values for 90 CRI products is 50.
3. Drive current is referred to as nominal drive current.
4. Products tested under pulsed condition (10ms pulse width) at nominal test current where  $T_j$  (junction temperature) -  $T_c$  (case temperature) =  $25^\circ\text{C}$ .
5. Typical performance values are provided as a reference only and are not a guarantee of performance.
6. Bridgelux maintains a  $\pm 7\%$  tolerance on flux measurements.
7. Minimum flux values at the nominal test current are guaranteed by 100% test.

# Product Selection Guide

**Table 2:** Selection Guide, Pulsed Measurement Data ( $T_j = 85^\circ\text{C}$ )<sup>4,5</sup>

Part Number	Nominal CCT <sup>1</sup> (K)	CRI <sup>2</sup>	Nominal Drive Current <sup>3</sup> (mA)	Typical Pulsed Flux <sup>4,5</sup> $T_j = 85^\circ\text{C}$ (lm)	Minimum Pulsed Flux <sup>6</sup> $T_j = 85^\circ\text{C}$ (lm)	Typical $V_f$ (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXKE-27E6500-H-1x	2700	80	1440	5555	4831	373	53.7	103
BXKE-27G6500-H-1x	2700	90	1440	4621	4018	373	53.7	86
BXKE-30E6500-H-1x	3000	80	1440	5787	5032	373	53.7	108
BXKE-30G6500-H-1x	3000	90	1440	4803	4177	373	53.7	89
BXKE-35E6500-H-1x	3500	80	1440	5960	5183	373	53.7	111
BXKE-35G6500-H-1x	3500	90	1440	4947	4303	373	53.7	92
BXKE-40E6500-H-1x	4000	80	1440	6018	5233	373	53.7	112
BXKE-40G6500-H-1x	4000	90	1440	4995	4345	373	53.7	93
BXKE-50E6500-H-1x	5000	80	1440	6201	5392	373	53.7	115
BXKE-50G6500-H-1x	5000K	90	1440	5285	4492	373	53.7	99
BXKE-56E6500-H-1x	5600	80	1440	6423	5586	373	53.7	120
BXKE-65E6500-H-1x	6500	80	1440	6523	6096	373	53.7	121

Notes for Table 2:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. CRI values are minimums. Minimum R<sub>g</sub> value for 80 CRI products is 0, the minimum R<sub>g</sub> values for 90 CRI products is 50.
3. Drive current is referred to as nominal drive current.
4. Typical Pulsed performance values are provided as reference only and are not a guarantee of performance.
5. Typical performance is estimated based on operation under Pulsed with LED array mounted onto a heat sink with thermal interface material and the  $T_c = T_j$  temperature maintained at 85°C. Based on Bridgelux test setup, values may vary depending on the thermal design of the luminaire and/or the exposed environment to which the product is subjected.
6. Minimum flux values at elevated temperatures are provided for reference only and are not guaranteed by 100% production testing. Based on Bridgelux test setup, values may vary depending on the thermal design of the luminaire and/or the exposed environment to which the product is subjected.

# Performance at Commonly Used Drive Currents

Bridgelux E series LED arrays are tested to the specifications shown using the nominal drive currents in Table 1. Bridgelux E series Arrays may also be driven at other drive currents dependent on specific application design requirements. The performance at any drive current can be derived from the current vs. voltage characteristics shown in Figure 1 and the flux vs. current characteristics shown in Figure 2. The performance at commonly used drive currents is summarized in Table 3.

**Table 3:** Product Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current <sup>1</sup> (mA)	Typical V <sub>f</sub> T <sub>j</sub> = 25°C (V)	Typical Power T <sub>j</sub> = 25°C (W)	Typical Flux <sup>2</sup> T <sub>j</sub> = 25°C (lm)	Typical Pulsed Flux <sup>3</sup> T <sub>j</sub> = 85°C (lm)	Typical Efficacy T <sub>j</sub> = 25°C (lm/W)
BXKE-27E6500-H-1x	80	960	36.3	34.8	4446	3913	128
		1200	37.6	45.1	5399	4751	120
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>6313</b>	<b>5555</b>	<b>113</b>
		1680	39.9	67.0	7120	6266	106
		1920	41.0	78.7	7889	6942	100
BXKE-27G6500-H-1x	90	960	36.3	34.8	3698	3255	106
		1200	37.6	45.1	4491	3952	100
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>5251</b>	<b>4621</b>	<b>94</b>
		1680	39.9	67.0	5923	5212	88
		1920	41.0	78.7	6562	5775	83
BXKE-30E6500-H-1x	80	960	36.3	34.8	4631	4076	133
		1200	37.6	45.1	5624	4949	125
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>6576</b>	<b>5787</b>	<b>118</b>
		1680	39.9	67.0	7417	6527	111
		1920	41.0	78.7	8218	7232	104
BXKE-30G6500-H-1x	90	960	36.3	34.8	3844	3383	110
		1200	37.6	45.1	4668	4108	103
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>5458</b>	<b>4803</b>	<b>98</b>
		1680	39.9	67.0	6156	5417	92
		1920	41.0	78.7	6821	6002	87
BXKE-35E6500-H-1x	80	960	36.3	34.8	4770	4198	137
		1200	37.6	45.1	5793	5097	128
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>6773</b>	<b>5960</b>	<b>122</b>
		1680	39.9	67.0	7640	6723	114
		1920	41.0	78.7	8464	7449	108
BXKE-35G6500-H-1x	90	960	36.3	34.8	3959	3484	114
		1200	37.6	45.1	4808	4231	107
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>5622</b>	<b>4947</b>	<b>101</b>
		1680	39.9	67.0	6341	5580	95
		1920	41.0	78.7	7025	6182	89

Notes for Table 3:

1. Alternate drive currents in Table 3 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a ± 7% tolerance on flux measurements.
3. Typical Pulsed performance values are provided as reference only and are not a guarantee of performance.

# Performance at Commonly Used Drive Currents

**Table 3:** Product Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current <sup>1</sup> (mA)	Typical $V_f$ $T_j = 25^\circ\text{C}$ (V)	Typical Power $T_j = 25^\circ\text{C}$ (W)	Typical Flux <sup>2</sup> $T_j = 25^\circ\text{C}$ (lm)	Typical Pulsed Flux <sup>3</sup> $T_j = 85^\circ\text{C}$ (lm)	Typical Efficacy $T_j = 25^\circ\text{C}$ (lm/W)
BXKE-40E6500-H-1x	80	960	36.3	34.8	4817	4239	138
		1200	37.6	45.1	5849	5147	130
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>6839</b>	<b>6018</b>	<b>123</b>
		1680	39.9	67.0	7714	6788	115
		1920	41.0	78.7	8547	7521	109
BXKE-40G6500-H-1x	90	960	36.3	34.8	3998	3518	115
		1200	37.6	45.1	4855	4272	108
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>5676</b>	<b>4995</b>	<b>102</b>
		1680	39.9	67.0	6403	5634	96
		1920	41.0	78.7	7094	6242	90
BXKE-50E6500-H-1x	80	960	36.3	34.8	4963	4367	143
		1200	37.6	45.1	6026	5303	134
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>7047</b>	<b>6201</b>	<b>127</b>
		1680	39.9	67.0	7948	6994	119
		1920	41.0	78.7	8806	7750	112
BXKE-50G6500-H-1x	90	960	36.3	34.8	4285	3765	123
		1200	37.6	45.1	5176	4548	115
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>6016</b>	<b>5285</b>	<b>108</b>
		1680	39.9	67.0	6844	6013	102
		1920	41.0	78.7	7599	6676	97
BXKE-56E6500-H-1x	80	960	36.3	34.8	5141	4524	148
		1200	37.6	45.1	6242	5493	138
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>7299</b>	<b>6423</b>	<b>131</b>
		1680	39.9	67.0	8233	7245	123
		1920	41.0	78.7	9122	8027	116
BXKE-65E6500-H-1x	80	960	36.3	34.8	5220	4594	150
		1200	37.6	45.1	6339	5578	141
		<b>1440</b>	<b>38.7</b>	<b>55.7</b>	<b>7412</b>	<b>6523</b>	<b>133</b>
		1680	39.9	67.0	8360	7357	125
		1920	41.0	78.7	9263	8151	118

Notes for Table 3:

1. Alternate drive currents in Table 3 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a  $\pm 7\%$  tolerance on flux measurements.
3. Typical Pulsed performance values are provided as reference only and are not a guarantee of performance.



# Electrical Characteristics

**Table 4:** Electrical Characteristics

Part Number	Drive Current (mA)	Forward Voltage Pulsed, $T_j = 25^{\circ}\text{C}$ (V) <sup>1,2,3</sup>			Typical Coefficient of Forward Voltage <sup>4</sup> $\Delta V_f / \Delta T_j$ (mV/ $^{\circ}\text{C}$ )	Typical Thermal Resistance Junction to Case <sup>5,6</sup> $R_{j-c}$ ( $^{\circ}\text{C}/\text{W}$ )
		Minimum	Typical	Maximum		
BXKE-xxx6500-H-1x	1440	35	38.7	42.7	-15.5	0.64

Notes for Table 4:

1. Parts are tested in pulsed conditions,  $T_c = 25^{\circ}\text{C}$ . Pulse width is 10ms.
2. Voltage minimum and maximum are provided for reference only and are not a guarantee of performance.
3. Bridgelux maintains a tester tolerance of  $\pm 0.10\text{V}$  on forward voltage measurements.
4. Typical coefficient of forward voltage tolerance is  $\pm 0.1\text{mV}$  for nominal current.
5. Thermal resistance values are based from test data of a 3000K 80 CRI product.
6. Thermal resistance value was calculated using total electrical input power; optical power was not subtracted from input power. The thermal interface material used during testing is not included in the thermal resistance value.

# Absolute Maximum Ratings

**Table 5:** Maximum Ratings

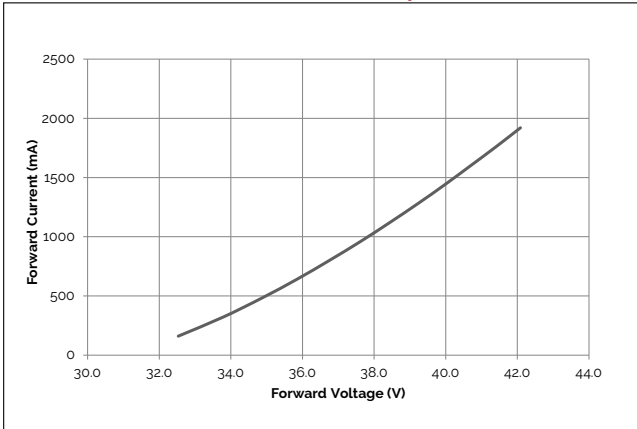
Parameter	Maximum Rating
LED Junction Temperature (T <sub>j</sub> )	125°C
Storage Temperature	-40°C to +100°C
Operating Case Temperature <sup>1</sup> (T <sub>c</sub> )	65°C
Soldering Temperature <sup>2</sup>	350°C ≤3.5sec
Maximum Drive Current <sup>3</sup>	1920 mA
Maximum Reverse Voltage <sup>4</sup>	-60 V

Notes for Table 5:

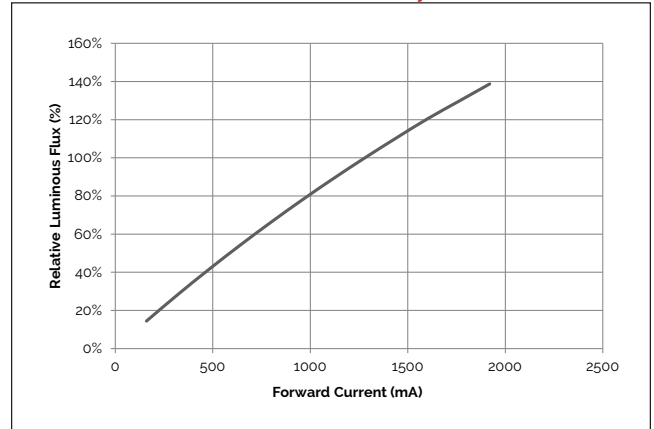
1. For IEC 62717 requirement, please consult your Bridgelux sales representative.
2. Arrays may be driven at higher currents however lumen maintenance may be reduced.
3. Light emitting diodes are not designed to be driven in reverse voltage and will not produce light under this condition. Maximum rating provided for reference only.

# Performance Curves

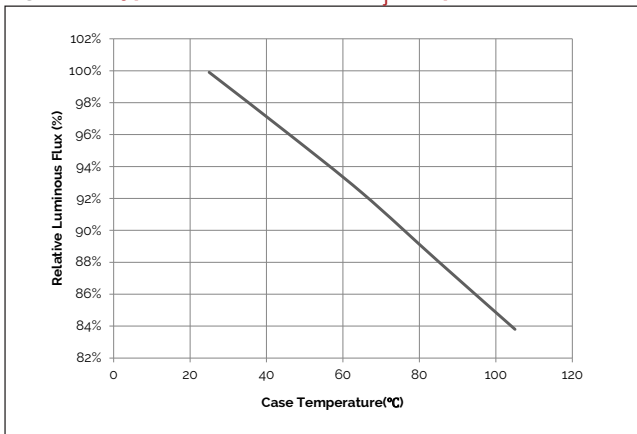
**Figure 1: Drive Current vs. Voltage  $T_j = 25^\circ\text{C}$**



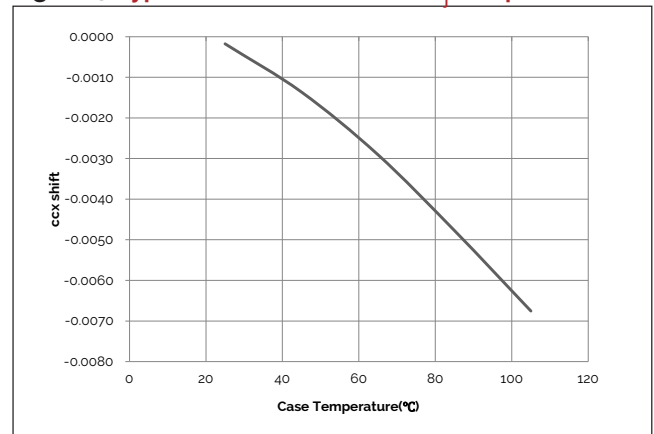
**Figure 2: Relative Flux vs. Current  $T_j = 25^\circ\text{C}$**



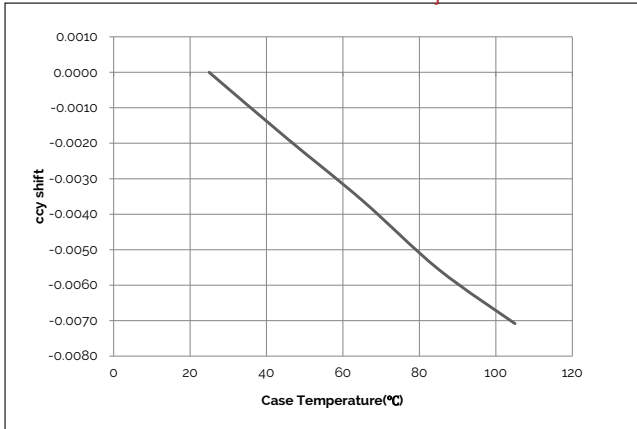
**Figure 3: Typical Pulsed Flux vs.  $T_j$  Temperature**



**Figure 4: Typical Pulsed cxx Shift vs.  $T_j$  Temperature**



**Figure 5: Typical Pulsed ccy Shift vs.  $T_j$  Temperature**

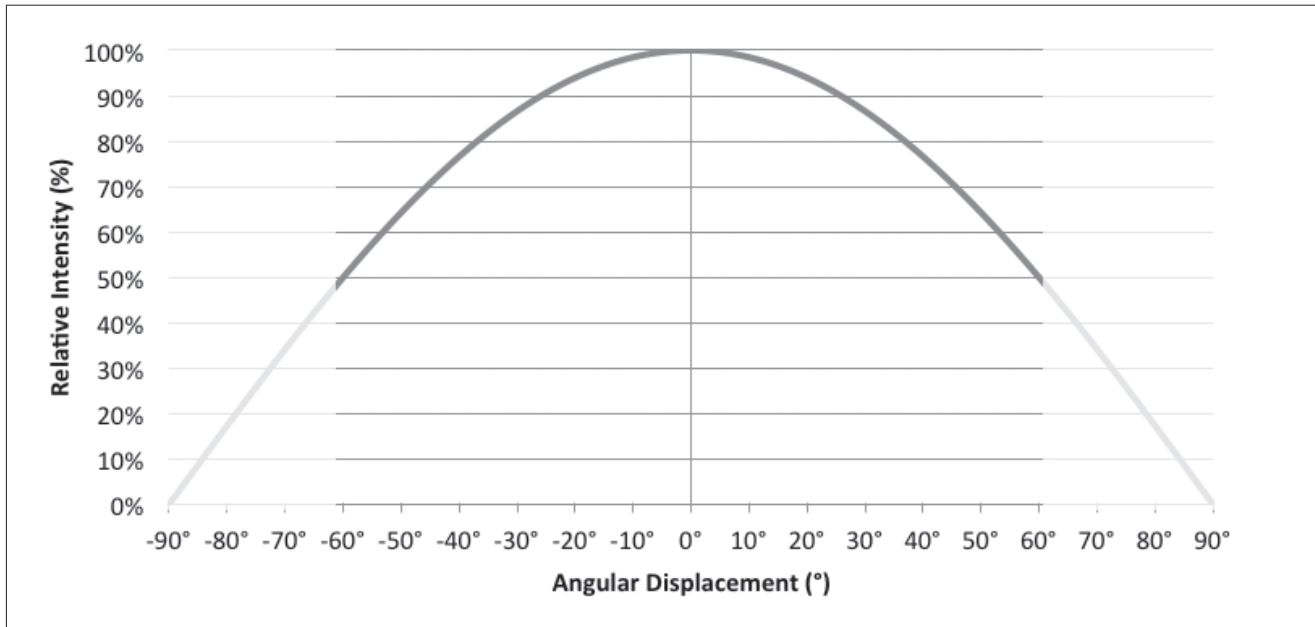


Notes for Figures 1-5:

1. Bridgelux does not recommend driving high power LEDs at low currents. Doing so may produce unpredictable results. Pulse width modulation (PWM) is recommended for dimming effects.
2. Characteristics shown for neutral white based on 3000K and 80 CRI.
3. For other color SKUs, the shift in color will vary. Please contact your Bridgelux sales representative for more information.

# Typical Radiation Pattern

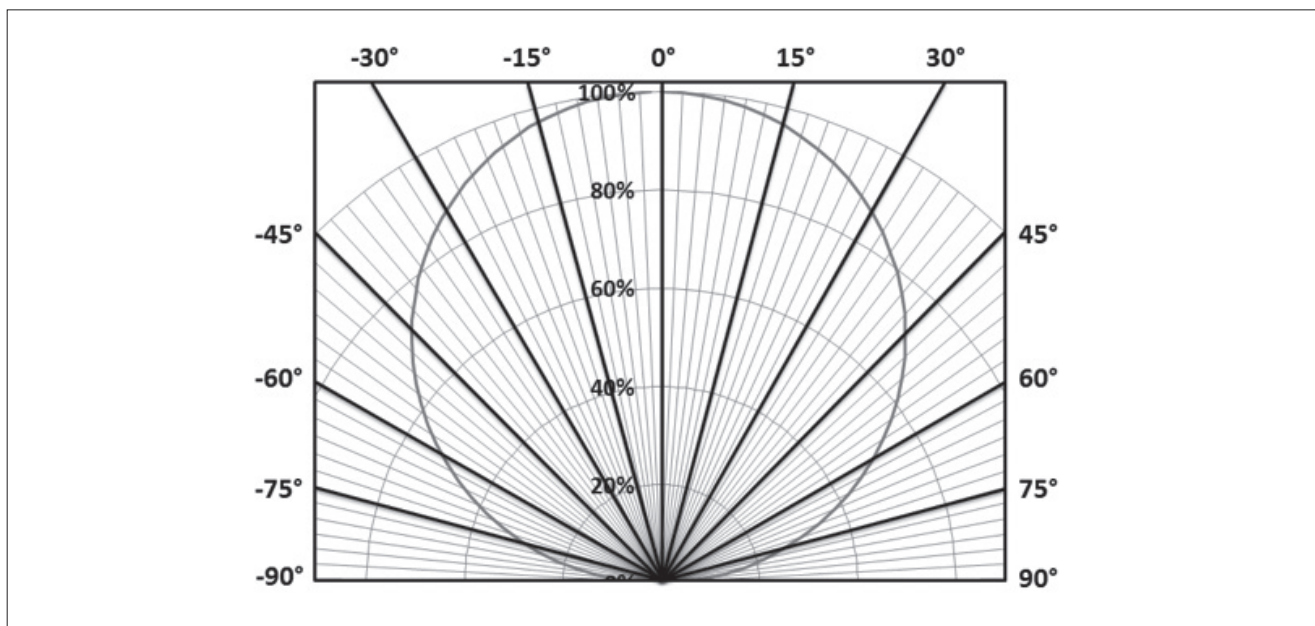
Figure 6: Typical Spatial Radiation Pattern



Notes for Figure 6:

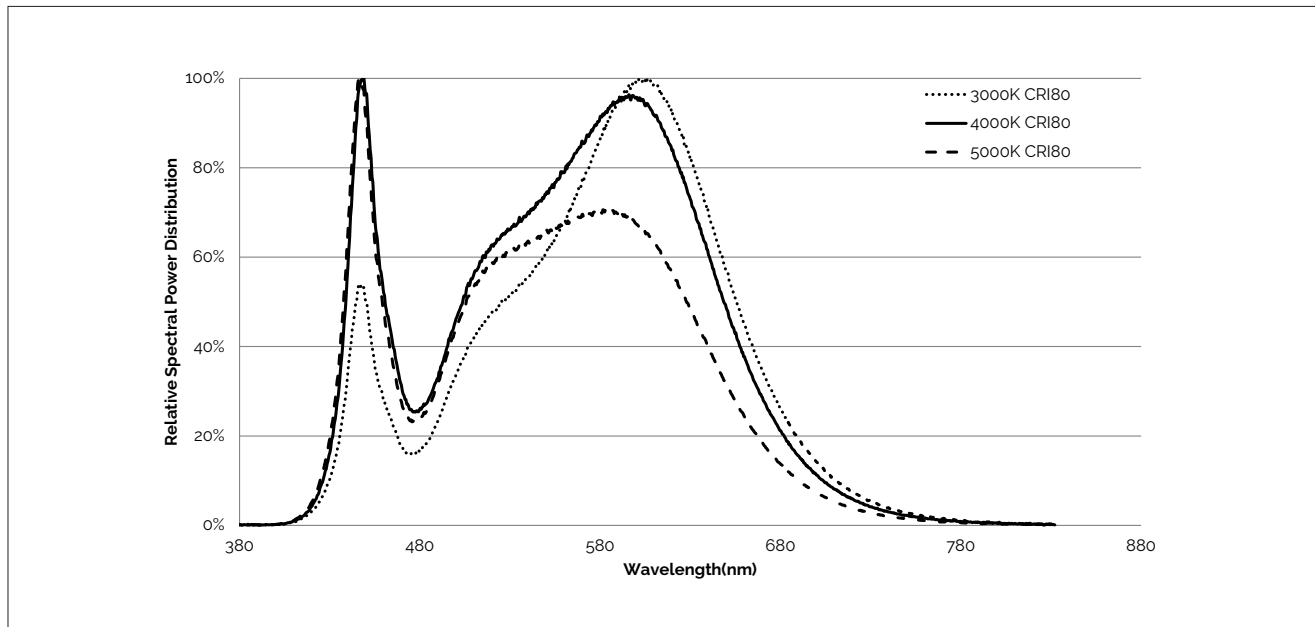
1. Typical viewing angle is 120°.
2. The viewing angle is defined as the off axis angle from the centerline where intensity is ½ of the peak value.

Figure 7: Typical Polar Radiation Pattern



# Typical Color Spectrum

Figure 8: Typical Color Spectrum

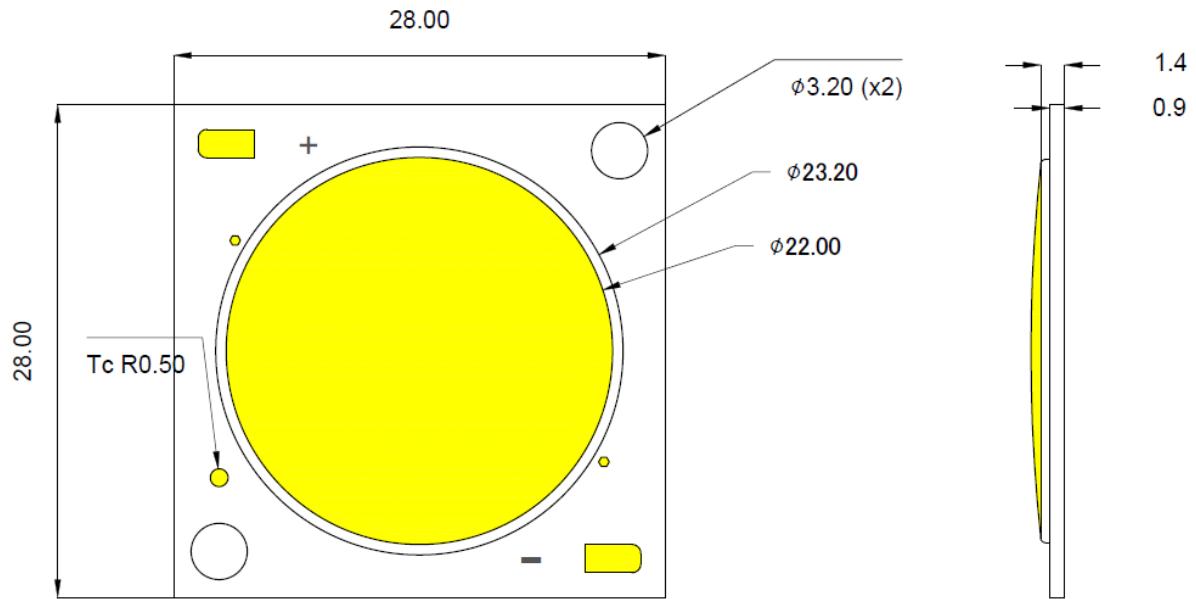


Notes for Figure 8:

1. Color spectra measured at nominal current for  $T_j = T_c = 25^\circ\text{C}$ .
2. Color spectra shown is 3000K and 80 CRI.
3. Color spectra shown is 4000K and 80 CRI.
4. Color spectra shown is 5000K and 80 CRI.

# Mechanical Dimensions

Figure 9: Bridgelux E22 LED Array



Notes for Figure 9:

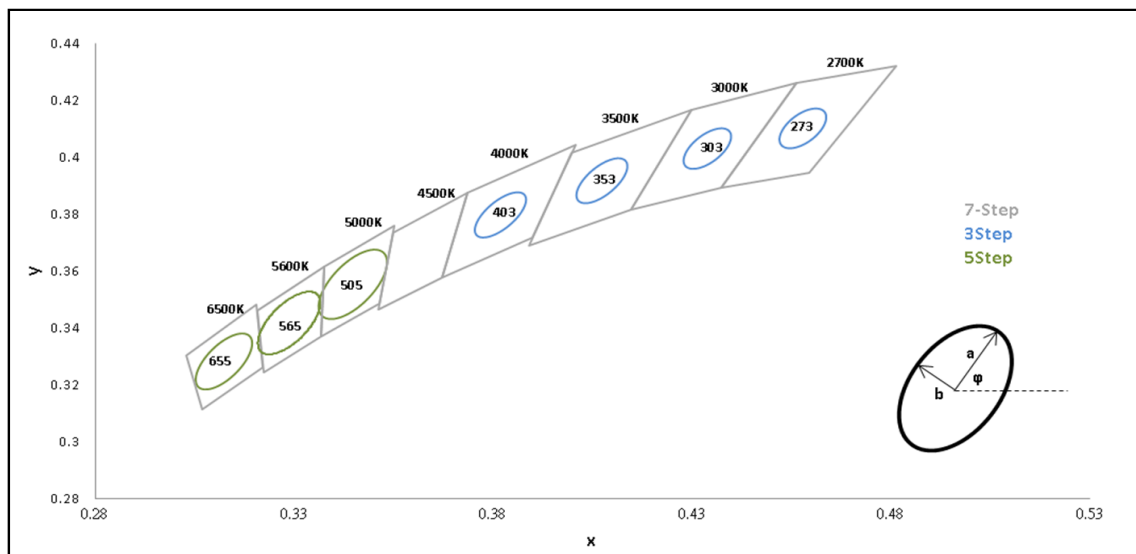
1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Unless otherwise specified, tolerances are  $\pm 0.1\text{mm}$ .
4. Mounting holes (2X) are for M2.5 screws.
5. Screws with flat shoulders (pan, dome, button, round, truss, mushroom) provide optimal torque control. Do NOT use flat, countersink, or raised head screws.
6. The optical center of the LED Array is nominally defined by the mechanical center of the array to a tolerance of  $\pm 0.2\text{mm}$ .
7. Bridgelux maintains a flatness of 0.10mm across the mounting surface of the array.

# Color Binning Information

**Table 6:** xy Bin Coordinates and Associated Typical CCT

CCT	Center Point		Degree	3 step		5 step	
	x	y	(°)	a	b	a	b
2700K	0.4578	0.4101	53.700	0.0081	0.0042	N/A	N/A
3000K	0.4338	0.403	53.217	0.0083	0.0041	N/A	N/A
3500K	0.4073	0.3917	54.000	0.0093	0.0041	N/A	N/A
4000K	0.3818	0.3797	53.717	0.0094	0.0040	N/A	N/A
5000K	0.3447	0.3553	59.617	N/A	N/A	0.0110	0.0047
5600K	0.3287	0.3417	59.060	N/A	N/A	0.0099	0.0042
6500K	0.3123	0.3282	58.567	N/A	N/A	0.0090	0.0038

**Figure 10: Typical Color Spectrum**



Notes for Figure 10:

1. Pulsed Test Conditions at  $T_j = 85^\circ\text{C}$ .
2. Bridgelux maintains a tolerance of  $\pm 0.007$  on x and y color coordinates in the CIE 1931 color space.

# Design Resources

## LM80

LM80 testing has been completed and the LM80 report is now available. Please contact your Bridgelux sales representative for the LM80 report.

## Precautions

### CAUTION: CHEMICAL EXPOSURE HAZARD

Exposure to some chemicals commonly used in luminaire manufacturing and assembly can cause damage to the LED array. Please consult Bridgelux Application Note AN31 for additional information.

### CAUTION: EYE SAFETY

The Bridgelux E series LED array emits visible light, that, under certain circumstances, could be harmful to the eye. Proper safeguards must be used.

### CAUTION: RISK OF BURN

Do not touch the Bridgelux E series LED array during operation. Allow the array to cool for a sufficient period of time before handling. The Bridgelux E series LED array may reach elevated temperatures such that could burn skin when touched.

## CAUTION

### CONTACT WITH LIGHT EMITTING SURFACE (LES)

Avoid any contact with the LES. Do not touch the LES of the LED array or apply stress to the LES (yellow phosphor resin area). Contact may cause damage to the LED array.

Optics and reflectors must not be mounted in contact with the LES (yellow phosphor resin area). Use the mechanical features of the LED array housing, edges and/or mounting holes to locate and secure optical devices as needed.

## Disclaimers

### MINOR PRODUCT CHANGE POLICY

The rigorous qualification testing on products offered by Bridgelux provides performance assurance. Slight cosmetic changes that do not affect form, fit, or function may occur as Bridgelux continues product optimization.

### STANDARD TEST CONDITIONS

Unless otherwise stated, array testing is performed at the nominal drive current.



# About Bridgelux: Bridging Light and Life™

At Bridgelux, we help companies, industries and people experience the power and possibility of light. Since 2002, we've designed LED solutions that are high performing, energy efficient, cost effective and easy to integrate. Our focus is on light's impact on human behavior, delivering products that create better environments, experiences and returns—both experiential and financial. And our patented technology drives new platforms for commercial and industrial luminaires.

**For more information about the company, please visit**  
**bridgelux.com**  
**twitter.com/Bridgelux**  
**facebook.com/Bridgelux**  
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Bridgelux E22 Array Product Data Sheet DS444 Rev. A (02/2019)