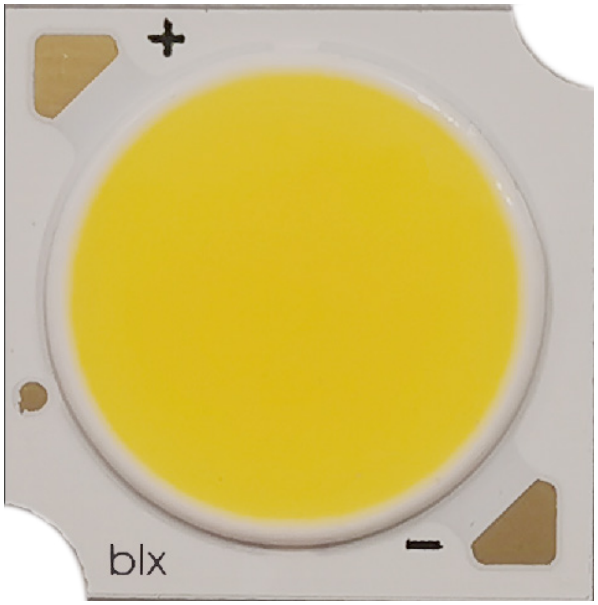


Bridgelux® E10 LED Array

Product Data Sheet DS442-1

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

- 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

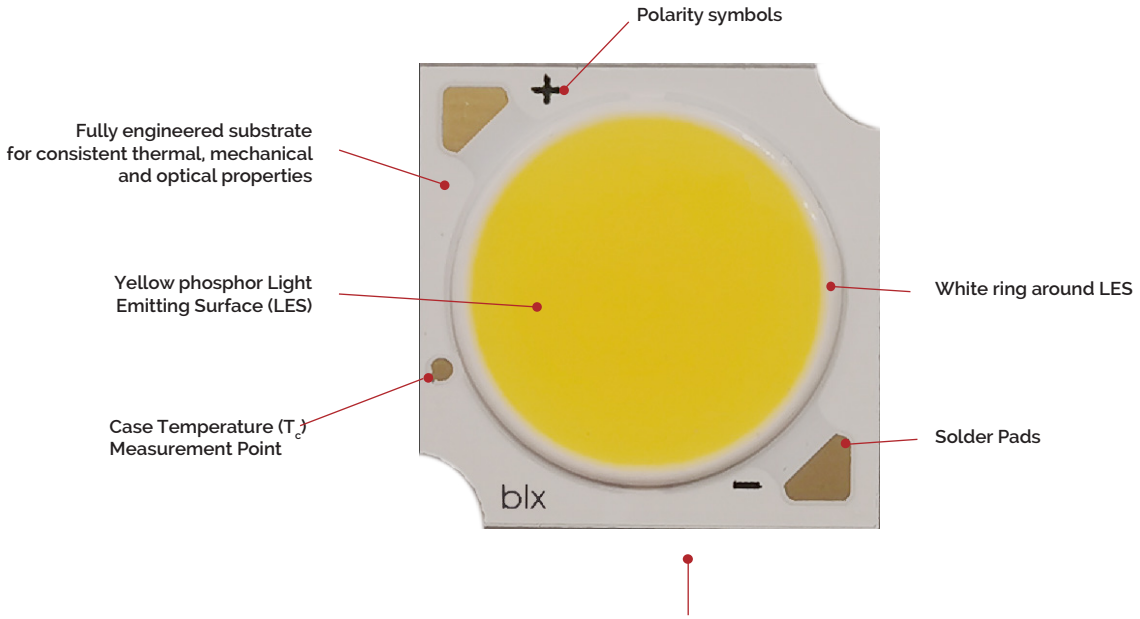
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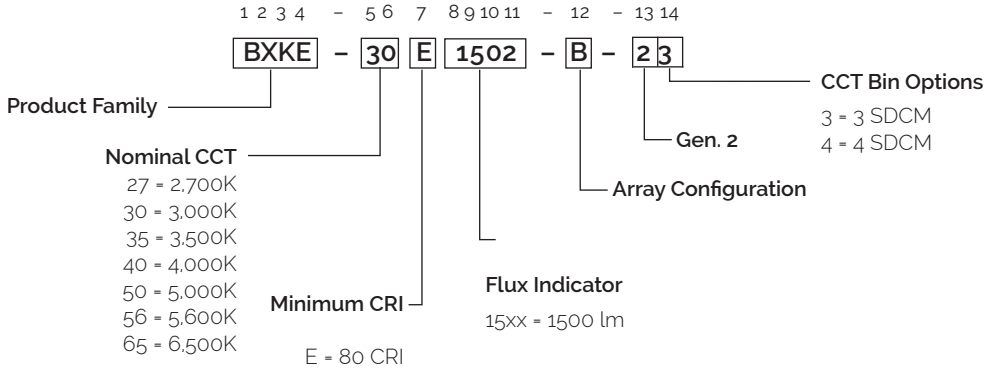
Product Feature Map

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.



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_c = 25˚C)

Part Number	Nominal CCT[1] (K)	CRI[2]	Nominal Drive Current[3] (mA)	Typical Pulsed Flux[4,5,6] T_c = 25°C (lm)	Minimum Pulsed Flux[6,7] T_c = 25°C (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXKE-27E1502-B-2X	2700K	80	180	973	876	34.8	6.3	155
BXKE-27G1502-B-2X	2700K	90	180	840	756	34.8	6.3	134
BXKE-30E1502-B-2X	3000K	80	180	1017	915	34.8	6.3	162
BXKE-30G1502-B-2X	3000K	90	180	880	792	34.8	6.3	140
BXKE-35E1502-B-2X	3500K	80	180	1047	942	34.8	6.3	167
BXKE-35G1502-B-2X	3500K	90	180	910	819	34.8	6.3	145
BXKE-40E1502-B-2X	4000K	80	180	1057	951	34.8	6.3	169
BXKE-40G1502-B-2X	4000K	90	180	943	849	34.8	6.3	151
BXKE-50E1502-B-2X	5000K	80	180	1087	978	34.8	6.3	173
BXKE-50G1502-B-2X	5000K	90	180	943	849	34.8	6.3	151
BXKE-56E1502-B-2X	5600K	80	180	1077	969	34.8	6.3	172
BXKE-65E1502-B-2X	6500K	80	180	1077	969	34.8	6.3	172

Notes for Table 1:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. CRI values are minimums. Minimum R9 value for 80 CRI products is 0, the minimum R9 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 drive current where T_j (junction temperature) = T_c (case temperature) = 25˚C.
5. Typical performance values are provided as a reference only and are not a guarantee of performance.
6. Bridgelux maintains a ±7% tolerance on flux measurements.
7. Minimum flux values at the nominal drive current are guaranteed by 100% test.

Product Selection Guide

Table 2: Selection Guide, Pulsed Measurement Data (T_c = 85˚C) [4,5]

Part Number	Nominal CCT[1] (K)	CRI[2]	Nominal Drive Current[3] (mA)	Typical Pulsed Flux[4,5] T_c = 25°C (lm)	Minimum Pulsed Flux[6] T_c = 25°C (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXKE-27E1502-B-2X	2700K	80	180	876	788	34	6.1	143
BXKE-27G1502-B-2X	2700K	90	180	756	680	34	6.1	124
BXKE-30E1502-B-2X	3000K	80	180	915	824	34	6.1	150
BXKE-30G1502-B-2X	3000K	90	180	792	713	34	6.1	129
BXKE-35E1502-B-2X	3500K	80	180	942	848	34	6.1	154
BXKE-35G1502-B-2X	3500K	90	180	819	737	34	6.1	134
BXKE-40E1502-B-2X	4000K	80	180	951	856	34	6.1	155
BXKE-40G1502-B-2X	4000K	90	180	849	764	34	6.1	139
BXKE-50E1502-B-2X	5000K	80	180	978	880	34	6.1	160
BXKE-50G1502-B-2X	5000K	90	180	849	764	34	6.1	139
BXKE-56E1502-B-2X	5600K	80	180	969	872	34	6.1	158
BXKE-65E1502-B-2X	6500K	80	180	969	872	34	6.1	158

Notes for Table 2:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. CRI values are minimums. Minimum R9 value for 80 CRI products is 0, the minimum R9 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_j - T_c 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.

European Product Registry for Energy Labeling

The European Product Registry for Energy Labeling (EPREL) is defined in the EU Regulation 2017/1369 to provide important energy efficiency information to consumers. Together with Energy Labeling Regulation ELR (EU) 2019/2015 which was amended by regulation (EU) 2021/340 for energy labelling of light sources, manufacturers are required to declare an energy class based on key technical specifications from each of their product and register it in an open data base managed by EPREL It is now a legal requirement for a vendor of light sources to upload information about their products into the EPREL database before placing these products on the market in the EU.

Table 3 below provides a list of part numbers that are in compliance with ELR and are currently listed in the EPREL database.

At Bridgelux, we are fully committed to supplying products that are compliant with pertinent laws, rules, and obligation imposed by relevant government bodies including the European Energy Labeling regulation. Customers can use these products with full confidence for any projects that fall under the ELR.

Table 3: Part numbers registered in European Product Registry for Energy Labeling

PART NUMBER[1]	CCT (K)	CRI	Current[2] (mA)	Vf (V)	Useful flux[3] (Φuse) at 85C (lm)	Power (W)	Efficacy (lm/W)	Energy efficiency class[4] 	Registration No	URL to Product Information Sheet in EPREL Database

Notes for Table 3:

1. All device listed here must be disposed as e-waste upon its end of life according to local country guideline in each country.
2. For information on performance values at alternative drive conditions. please refer to the Product Selection Guide, Absolute Maximum Rating Table and Performance Curves in this data sheet.
3. For a definition of useful luminous flux (Φuse), please see the ELR regulations at https://tinyurl.com/4b6zvt4m.
4. EPREL requires an arrow symbol containing the letter of the energy efficiency class to be displayed. on technical promotional material. Refer to this energy efficiency class column for specific energy efficiency class on each part number.

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 4

Table 4: Product Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current[1] (mA)	Typical V_f T_c = 25°C (V)	Typical Power T_c = 25°C (W)	Typical Flux[2] T_c = 25°C (lm)	Typical Pulsed Flux[3] T_c = 85°C (lm)	Typical Efficacy T_c = 25°C (lm/W)
BXKE-27E1502-B-2X	80	60	32.6	2.0	341	307	174
		120	33.8	4.1	664	598	164
		180	**34.8**	**6.3**	**973**	**876**	**155**
		300	36.9	11.1	1555	1399	140
		480	39.7	19.1	2352	2117	123
BXKE-27G1502-B-2X	90	60	32.6	2.0	294	265	150
		120	33.8	4.1	573	516	141
		180	**34.8**	**6.3**	**840**	**756**	**134**
		300	36.9	11.1	1342	1208	121
		480	39.7	19.1	2030	1827	107
BXKE-30E1502-B-2X	80	60	32.6	2.0	356	321	182
		120	33.8	4.1	694	625	171
		180	**34.8**	**6.3**	**1017**	**915**	**162**
		300	36.9	11.1	1624	1462	147
		480	39.7	19.1	2457	2211	129
BXKE-30G1502-B-2X	90	60	32.6	2.0	308	277	158
		120	33.8	4.1	601	541	148
		180	**34.8**	**6.3**	**880**	**792**	**140**
		300	36.9	11.1	1406	1265	127
		480	39.7	19.1	2127	1914	112
BXKE-35E1502-B-2X	80	60	32.6	2.0	367	330	187
		120	33.8	4.1	715	643	176
		180	**34.8**	**6.3**	**1047**	**942**	**167**
		300	36.9	11.1	1672	1505	151
		480	39.7	19.1	2529	2276	133
BXKE-35G1502-B-2X	90	60	32.6	2.0	319	287	163
		120	33.8	4.1	621	559	153
		180	**34.8**	**6.3**	**910**	**819**	**145**
		300	36.9	11.1	1454	1308	131
		480	39.7	19.1	2199	1979	115
BXKE-40E1502-B-2X	80	60	32.6	2.0	370	333	189
		120	33.8	4.1	721	649	178
		180	**34.8**	**6.3**	**1057**	**951**	**169**
		300	36.9	11.1	1688	1519	152
		480	39.7	19.1	2554	2298	134

Notes for Table 4:

1. Alternate drive currents in Table 4 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 4: Product Performance at Commonly Used Drive Currents (Continued)

Part Number	CRI	Drive Current[1] (mA)	Typical V_f T_c = 25°C (V)	Typical Power T_c = 25°C (W)	Typical Flux[2] T_c = 25°C (lm)	Typical Pulsed Flux[3] T_c = 85°C (lm)	Typical Efficacy T_c = 25°C (lm/W)
BXKE-40G1502-B-2X	90	60	32.6	2.0	330	297	169
		120	33.8	4.1	644	580	159
		180	**34.8**	**6.3**	**943**	**849**	**151**
		300	36.9	11.1	1507	1356	136
		480	39.7	19.1	2280	2052	120
BXKE-50E1502-B-2X	80	60	32.6	2.0	381	343	195
		120	33.8	4.1	742	668	183
		180	**34.8**	**6.3**	**1087**	**978**	**173**
		300	36.9	11.1	1736	1562	157
		480	39.7	19.1	2626	2363	138
BXKE-50G1502-B-2X	90	60	32.6	2.0	330	297	169
		120	33.8	4.1	644	580	159
		180	**34.8**	**6.3**	**943**	**849**	**151**
		300	36.9	11.1	1507	1356	136
		480	39.7	19.1	2280	2052	120
BXKE-56E1502-B-2X	80	60	32.6	2.0	377	339	193
		120	33.8	4.1	735	662	181
		180	**34.8**	**6.3**	**1077**	**969**	**172**
		300	36.9	11.1	1720	1548	155
		480	39.7	19.1	2602	2342	137
BXKE-65E1502-B-2X	80	60	32.6	2.0	377	339	193
		120	33.8	4.1	735	662	181
		180	**34.8**	**6.3**	**1077**	**969**	**172**
		300	36.9	11.1	1720	1548	155
		480	39.7	19.1	2602	2342	137

Notes for Table 4:

1. Alternate drive currents in Table 4 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.

Electrical Characteristics

Table 5: Electrical Characteristics

Part Number	Drive Current (mA)	Forward Voltage Pulsed, T_c = 25°C (V) [1, 2, 3]			Typical Coefficient of Forward Voltage[4] $\Delta V_f/\Delta T_j$ (mV/°C)	Typical Thermal Resistance Junction to Case[5,6] R_{j-c} (°C/W)
		Minimum	Typical	Maximum		
BXKE-XXX1502-B-2x	180	31.6	34.8	38.4	-14.38	1.26

Notes for Table 5:

1. Parts are tested in pulsed conditions, T_c = 25°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 ± 0.10V on forward voltage measurements.
4. Typical coefficient of forward voltage tolerance is ±0.1mV 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 6: Maximum Ratings

Parameter	Maximum Rating
LED Junction Temperature (T_j)	140˚C
Storage Temperature	-40˚C to +100˚C
Operating Case Temperature[1,2] (T_c)	105˚C
Soldering Temperature	350˚C ≤3.5sec
	BXKE-xxx1502-B-2x
Maximum Drive Current[3]	480 mA
Maximum Reverse Voltage[4]	-60V

Notes for Table 6:

1. For the IEC 62717 requirement, please consult your Bridgelux sales representative.
2. Operating Case Temperature 105˚C is with drive current≤320mA, When drive current is Maximum drive current, Operating Case Temperature should be limited with ≤90˚C.
3. Arrays may be driven at higher currents however lumen maintenance may be reduced and warranty will not apply.
4. 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: E10B Forward Voltage vs. Forward Current, T_c=25°C

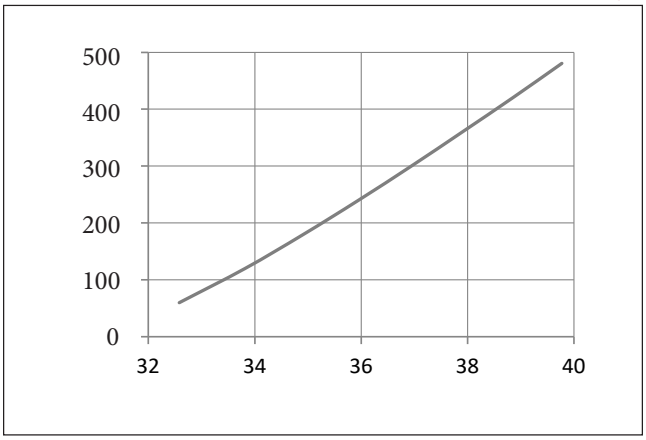


Figure 2: E10B Relative Flux vs. Drive Current T_c=25°C

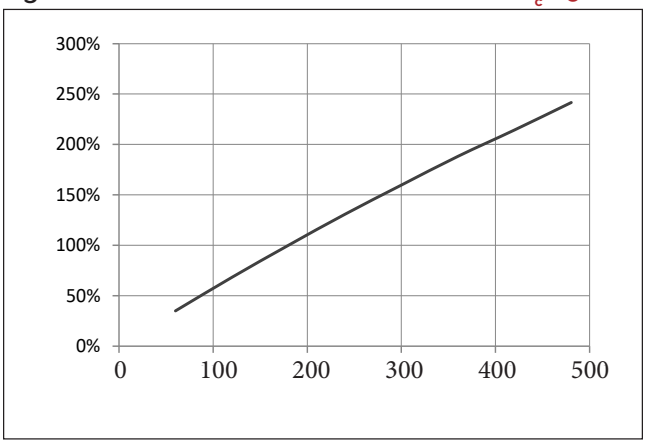


Figure 3: Typical Pulsed Flux vs. T_c Temperature

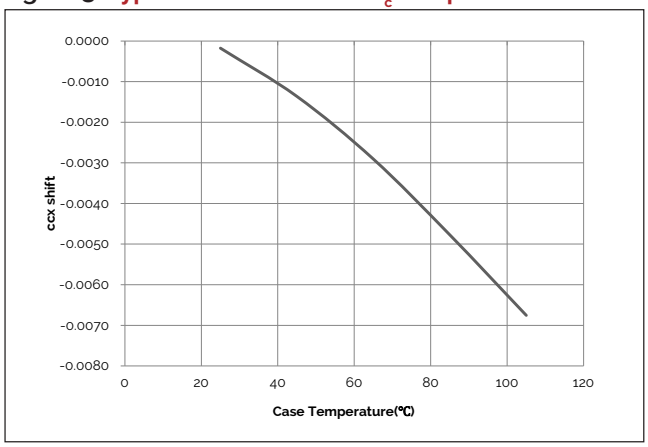


Figure 4: Typical Pulsed ccx Shift vs. T_c Temperature

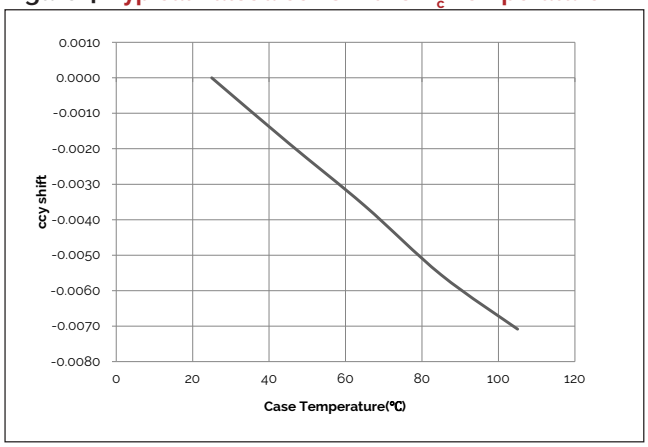
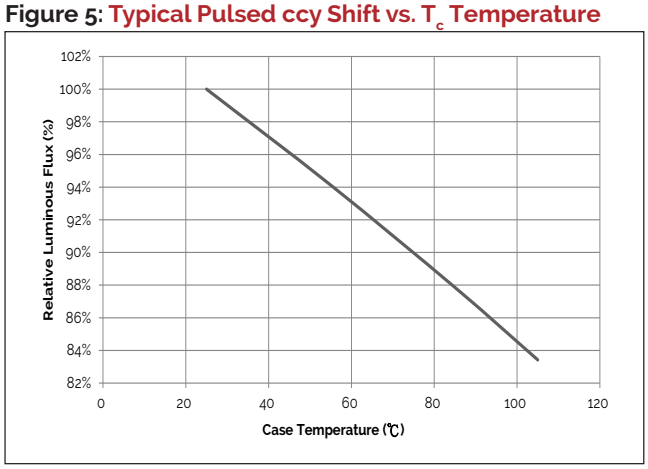


Figure 5: Typical Pulsed ccy Shift vs. T_c Temperature

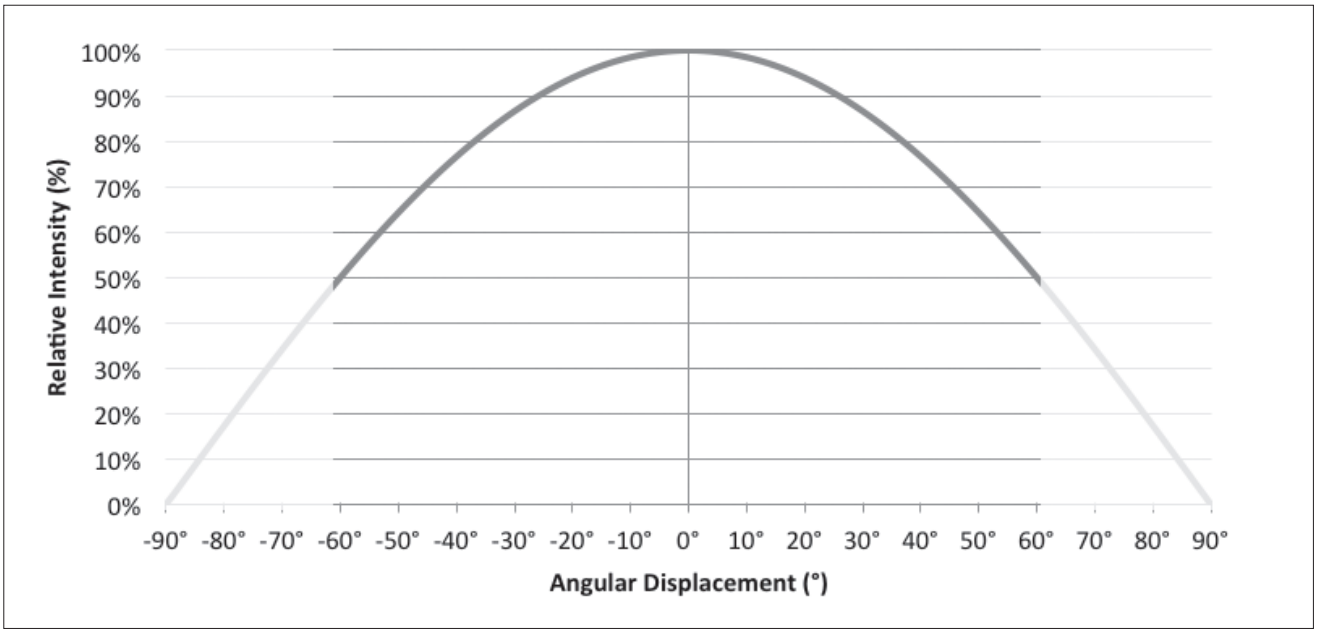


Note for Figures 1-5:

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 warm 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

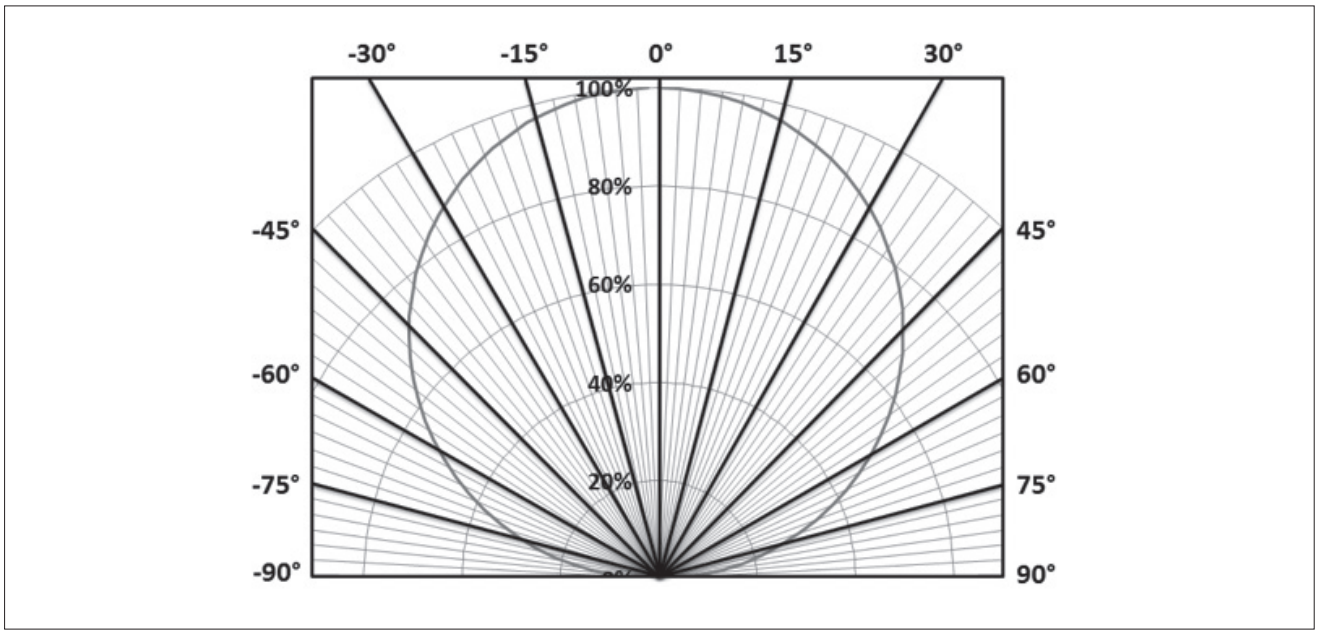
Figure 6: Typical Spatial Radiation Pattern



Notes for Figure 6:

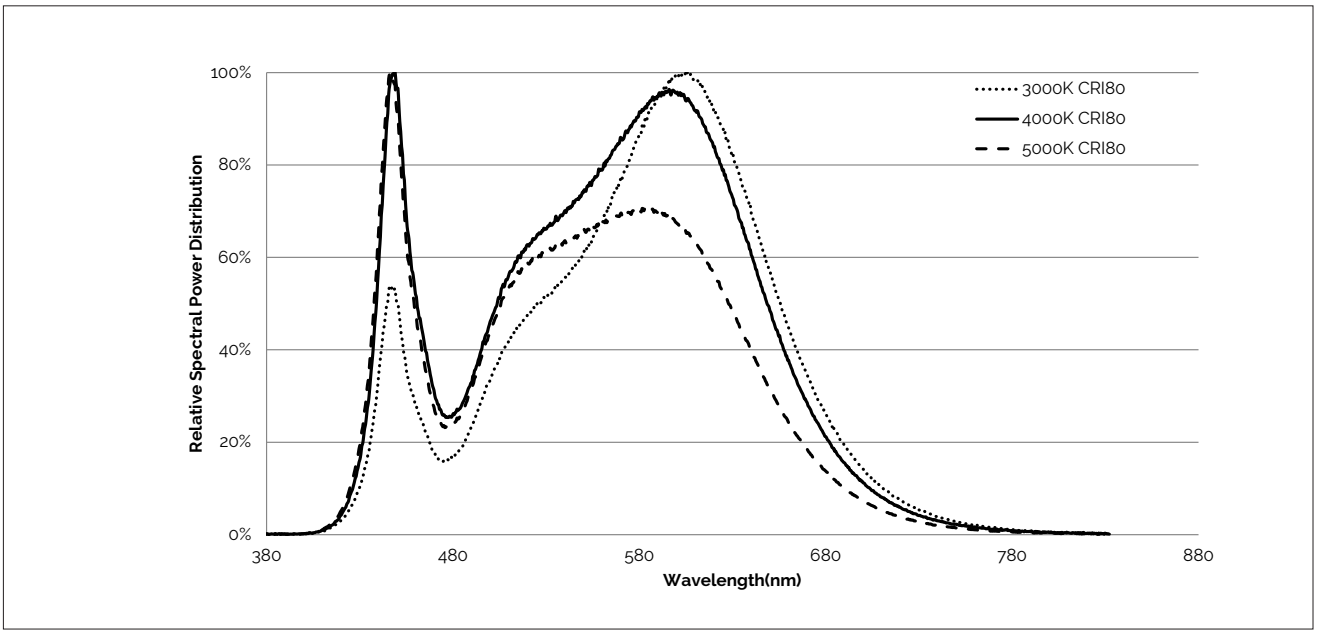
1. Typical viewing angle is 120°.
2. The viewing angle is defined as the off axis angle from the centerline where intensity is ½ of the peak value.

Figure 7: Typical Polar Radiation Pattern



Typical Color Spectrum

Figure 8: Typical Color Spectrum

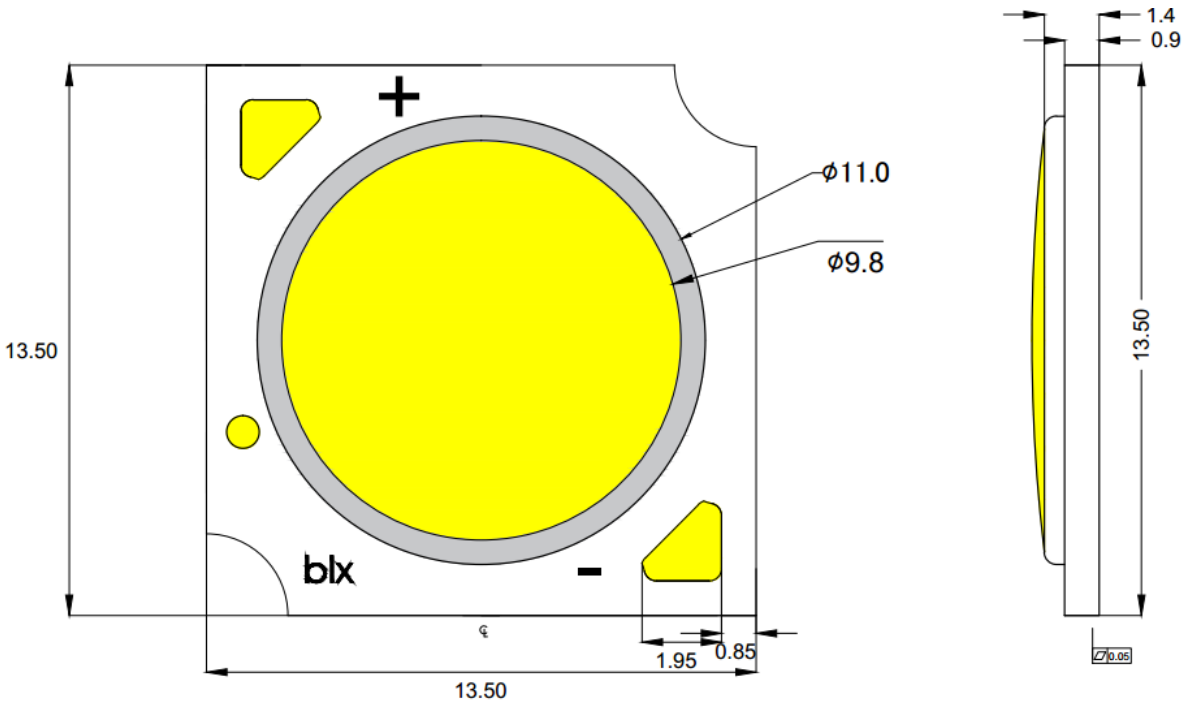


Notes for Figure 8:

1. Color spectra measured at nominal current for T_j = T_c = 25°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 E10 LED Array



Notes for Figure 9:

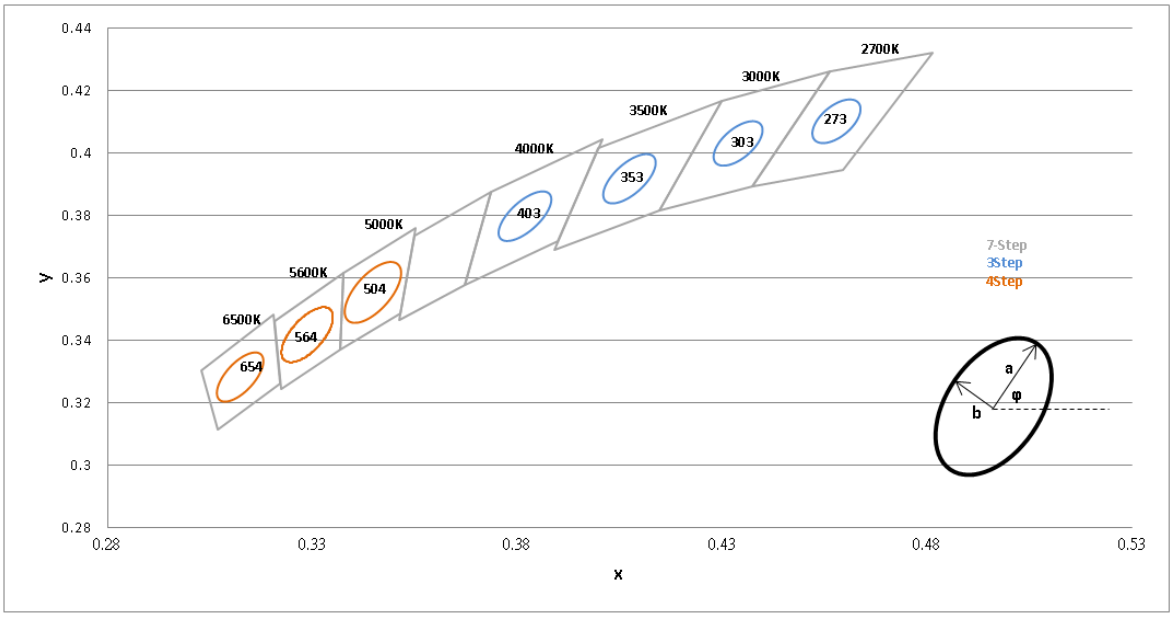
1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Unless otherwise specified, tolerances are ±0.1mm.
4. Mounting holes (2X) are for M2.5 screws.
5. Screws with flat shoulders (pan, dome, button, round, truss, mushroom) provide optimal torque control. Do NOT use flat, countersink, 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 ± 0.2mm.
7. Bridgelux maintains a flatness of 0.10mm across the mounting surface of the array.

Color Binning Information

Table 7: xy Bin Coordinates and Associated Typical CCT (T_j=85˚C)

CCT	Center Point		Degree	3 step		4 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	0.01096	0.00472
5600K	0.3287	0.3417	59.060	N/A	N/A	0.00992	0.00424
6500K	0.3123	0.3282	58.567	N/A	N/A	0.00896	0.00384

Figure 10: Typical Color Spectrum



Notes for Figure 10:

1. Pulsed Test Conditions at T_j = 85˚C.
2. Bridgelux maintains a tolerance of ± 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.

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WeChat ID: BridgeluxInChina

46410 Fremont Boulevard
Fremont, CA 94538 U.S.A.
Tel (925) 583-8400
Fax (925) 583-8401
www.bridgelux.com

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