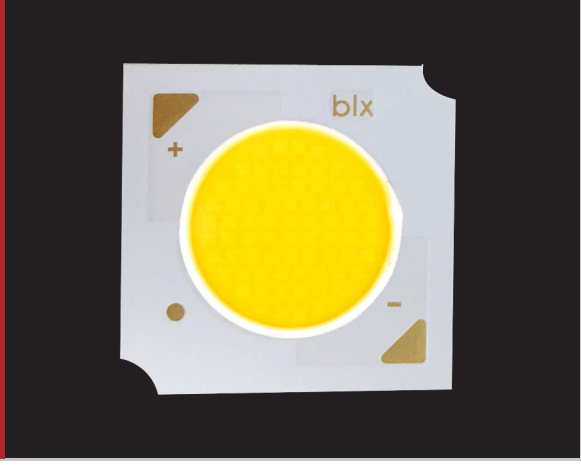
Bridgelux® Gen 8 V11 HD LED Array

Product Data Sheet DS409

FIVE YEAR Warranty™

Introduction

V Series HD



V Series™ HD LED array product, an ultra-high lumen density COB product line, is designed for high intensity spotlights used in commercial and retail settings. V Series HD arrays offer industry leading color over angle uniformity, and replace ceramic metal halide lamps by providing equal or greater center beam candle power at lower power and at greater lifetimes. Their tight beam control and exceptional quality of light is well suited for demanding directional spot applications.

The V11 HD LED array is available in a variety of CCT and CRI combinations providing substantial design flexibility and energy efficiencies.

Lighting system designs incorporating these LED arrays deliver increased system level efficacy and longer service life. Typical applications include, but are not limited to, commercial and residential down lights, accent, spot and track lights.

Bridgelux Décor Series™ is our state of the art color line designed specifically for premium applications, producing unmatched LED light quality with brilliant color-rendering options and offer pleasing and inspiring lighting palettes. Bridgelux Décor Series color points are available on Vero® SE Series, Vero® Series, V Series™ and V Series™ HD.

Décor Series™ Ultra products provide a high CRI of 97 and a minimum R9 value of 91, which emphasizes the reds and color tones to which the human eye is most receptive - perfect for the most luxurious retail shops and world renowned museums. Décor Series Ultra is designed as a replacement for halogen.

Features

- Efficacy of 142 lm/W typical
- Compact high flux density light source
- Uniform high quality illumination
- Minimum 80, 90 and 95 CRI options
- Streamlined thermal path
- ENERGY STAR® / ANSI compliant color binning structure with 3 SDCM options
- More energy efficient than incandescent, halogen and fluorescent lamps
- Low voltage DC operation
- Instant light with unlimited dimming
- V_f bin code backside marking

Benefits

- Enhanced optical control
- Clean white light without pixelation
- High quality true color reproduction
- Significantly reduced thermal resistance and increased operating temperatures
- Uniform consistent white light
- Lower operating costs
- Easy to use with daylight and motion detectors to enable increased energy savings
- Reduced maintenance costs
- Environmentally friendly, no disposal issue

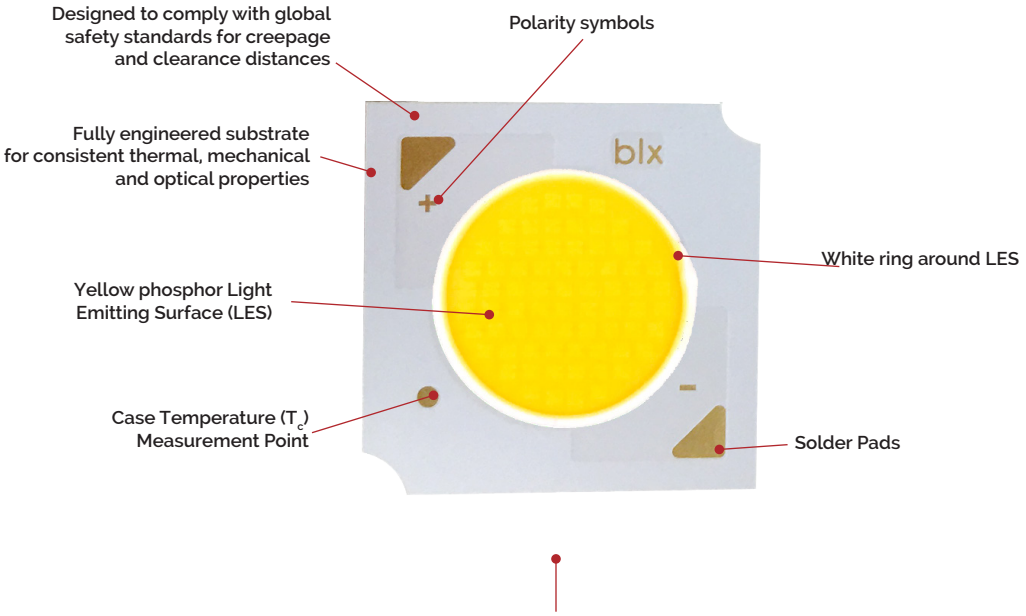
Pb free RoHS

Contents

Product Feature Map

Bridgelux arrays are fully engineered devices that provide consistent thermal and optical performance on an engineered mechanical platform. The V Series HD arrays are the most compact chip-on-board devices across all of Bridgelux's LED Array products.

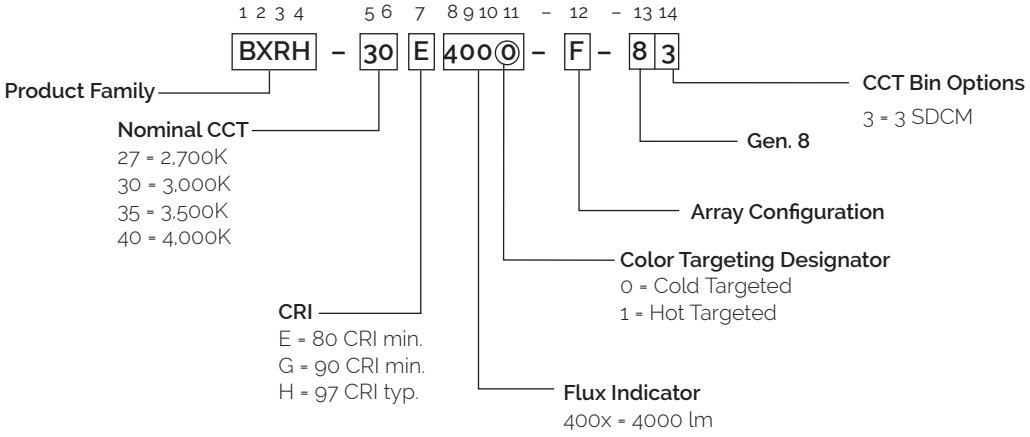
The arrays incorporate several features to simplify design integration and assembly. Please visit www.bridgelux.com for more information on the V Series HD family of products.



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

Product Nomenclature

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



Product Selection Guide

The following product configurations are available:

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

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)
BXRH-27E4000-F-83	2700K	80	1050	5124	4613	36.6	38.4	133
BXRH-27G4000-F-83	2700K	90	1050	4229	3806	36.6	38.4	110
BXRH-27H4000-F-83	2700K	97	1050	3747	3372	36.6	38.4	98
BXRH-30E4000-F-83	3000K	80	1050	5445	4901	36.6	38.4	142
BXRH-30G4000-F-83	3000K	90	1050	4421	3978	36.6	38.4	115
BXRH-30H4000-F-83	3000K	97	1050	4004	3603	36.6	38.4	104
BXRH-35E4000-F-83	3500K	80	1050	5573	5016	36.6	38.4	145
BXRH-35G4000-F-83	3500K	90	1050	4580	4122	36.6	38.4	119
BXRH-35H4000-F-83	3500K	97	1050	4116	3704	36.6	38.4	107
BXRH-40E4000-F-83	4000K	80	1050	5606	5045	36.6	38.4	146
BXRH-40G4000-F-83	4000K	90	1050	4677	4209	36.6	38.4	122
BXRH-40H4000-F-83	4000K	97	1050	4229	3806	36.6	38.4	110
BXRH-27G40H0-F-83	2700K	90	1050	4360	3924	36.6	38.4	114
BXRH-30G40H0-F-83	3000K	90	1050	4583	4124	36.6	38.4	119
BXRH-40G40H0-F-83	4000K	90	1050	4833	4349	36.6	38.4	126

Notes for Table 1:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. CRI values are typical for Decor Series Ultra and Decor Series Class A products. CRI values are minimums for all other products. Minimum R9 value for 80 CRI products is 0, the minimum R9 values for 90 CRI products is 50, the minimum R9 values for 97 CRI products is 90. Bridgelux maintains a ± 3 tolerance on CRI and R9 values.
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°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 test current are guaranteed by 100% test.

Product Selection Guide

Table 2: Selection Guide, Stabilized DC Performance (T_c = 85˚C)

Part Number	Nominal CCT[1] (K)	CRI[2]	Nominal Drive Current[3] (mA)	Typical DC Flux[4,5] T_c = 85°C (lm)	Minimum DC Flux[6] T_c = 85°C (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXRH-27E4000-F-83	2700K	80	1050	4613	4151	35.4	37.2	120
BXRH-27G4000-F-83	2700K	90	1050	3806	3425	35.4	37.2	99
BXRH-27H4000-F-83	2700K	97	1050	3372	3036	35.4	37.2	88
BXRH-30E4000-F-83	3000K	80	1050	4901	4410	35.4	37.2	128
BXRH-30G4000-F-83	3000K	90	1050	3978	3581	35.4	37.2	104
BXRH-30H4000-F-83	3000K	97	1050	3603	3243	35.4	37.2	94
BXRH-35E4000-F-83	3500K	80	1050	5016	4514	35.4	37.2	131
BXRH-35G4000-F-83	3500K	90	1050	4122	3710	35.4	37.2	107
BXRH-35H4000-F-83	3500K	97	1050	3704	3335	35.4	37.2	96
BXRH-40E4000-F-83	4000K	80	1050	5045	4541	35.4	37.2	131
BXRH-40G4000-F-83	4000K	90	1050	4209	3788	35.4	37.2	110
BXRH-40H4000-F-83	4000K	97	1050	3806	3425	35.4	37.2	99
BXRH-27G40H0-F-83	2700K	90	1050	3924	3531	35.4	37.2	102
BXRH-30G40H0-F-83	3000K	90	1050	4124	3712	35.4	37.2	107
BXRH-40G40H0-F-83	4000K	90	1050	4349	3915	35.4	37.2	113

Notes for Table 2:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. All CRI values are measured at T_j = T_c = 25˚C. CRI values are typical for Decor Series Ultra and Decor Series Class A products. CRI values are minimums for all other products. Minimum R9 value for 80 CRI products is 0, the minimum R9 values for 90 CRI products is 50, the minimum R9 values for 97 CRI products is 90. Bridgelux maintains a ± 3 tolerance on CRI and R9 values.
3. Drive current is referred to as nominal drive current.
4. Typical stabilized DC performance values are provided as reference only and are not a guarantee of performance.
5. Typical performance is estimated based on operation under DC (direct current) with LED array mounted onto a heat sink with thermal interface material and the case 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

V Series HD LED arrays are tested to the specifications shown using the nominal drive currents in Table 1. V Series HD LED 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[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 DC Flux[3] T_c = 85°C (lm)	Typical Efficacy T_c = 25°C (lm/W)
BXRH-27E4000-F-83	80	525	34.2	18	2720	2448	151
		750	35.3	26.5	3787	3409	143
		1050	**36.6**	**38.4**	**5124**	**4613**	**133**
		1313	37.7	49.5	6223	5601	126
		1440	38.2	55.1	6729	6057	122
		1800	39.5	71.1	8066	7261	113
BXRH-27G4000-F-83	90	525	34.2	18	2245	2019	125
		750	35.3	26.5	3125	2812	118
		1050	**36.6**	**38.4**	**4229**	**3806**	**110**
		1313	37.7	49.5	5135	4621	104
		1440	38.2	55.1	5553	4997	101
		1800	39.5	71.1	6657	5991	94
BXRH-27H4000-F-83	97	525	34.2	18	1989	1789	111
		750	35.3	26.5	2769	2492	105
		1050	**36.6**	**38.4**	**3747**	**3372**	**98**
		1313	37.7	49.5	4551	4095	92
		1440	38.2	55.1	4921	4428	89
		1800	39.5	71.1	5899	5309	83
BXRH-30E4000-F-83	80	525	34.2	18	2890	2600	161
		750	35.3	26.5	4024	3622	152
		1050	**36.6**	**38.4**	**5445**	**4901**	**142**
		1313	37.7	49.5	6613	5951	134
		1440	38.2	55.1	7151	6435	130
		1800	39.5	71.1	8572	7715	121
BXRH-30G4000-F-83	90	525	34.2	18	2347	2111	131
		750	35.3	26.5	3267	2940	123
		1050	**36.6**	**38.4**	**4421**	**3978**	**115**
		1313	37.7	49.5	5368	4830	108
		1440	38.2	55.1	5805	5224	106
		1800	39.5	71.1	6959	6263	98
BXRH-30H4000-F-83	97	525	34.2	18	2125	1912	118
		750	35.3	26.5	2959	2663	112
		1050	**36.6**	**38.4**	**4004**	**3603**	**104**
		1313	37.7	49.5	4862	4375	98
		1440	38.2	55.1	5258	4731	96
		1800	39.5	71.1	6302	5672	89

Notes for Table 3:

1. Alternate drive currents are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a ± 7% tolerance on flux measurements.
3. Typical stabilized DC 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 (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 DC Flux[3] T_c = 85°C (lm)	Typical Efficacy T_c = 25°C (lm/W)
BXRH-35E4000-F-83	80	525	34.2	18	2958	2662	165
		750	35.3	26.5	4118	3707	156
		1050	**36.6**	**38.4**	**5573**	**5016**	**145**
		1313	37.7	49.5	6768	6091	137
		1440	38.2	55.1	7318	6587	133
		1800	39.5	71.1	8772	7897	123
BXRH-35G4000-F-83	90	525	34.2	18	2431	2187	135
		750	35.3	26.5	3384	3046	128
		1050	**36.6**	**38.4**	**4580**	**4122**	**119**
		1313	37.7	49.5	5562	5005	112
		1440	38.2	55.1	6014	5413	109
		1800	39.5	71.1	7209	6489	101
BXRH-35H4000-F-83	97	525	34.2	18	2185	1965	122
		750	35.3	26.5	3042	2737	115
		1050	**36.6**	**38.4**	**4116**	**3704**	**107**
		1313	37.7	49.5	4999	4497	101
		1440	38.2	55.1	5405	4863	98
		1800	39.5	71.1	6480	5830	91
BXRH-40E4000-F-83	80	525	34.2	18	2976	2677	166
		750	35.3	26.5	4142	3728	156
		1050	**36.6**	**38.4**	**5606**	**5045**	**146**
		1313	37.7	49.5	6808	6125	138
		1440	38.2	55.1	7361	6624	134
		1800	39.5	71.1	8824	7942	124
BXRH-40G4000-F-83	90	525	34.2	18	2483	2234	138
		750	35.3	26.5	3456	3111	131
		1050	**36.6**	**38.4**	**4677**	**4209**	**122**
		1313	37.7	49.5	5680	5111	115
		1440	38.2	55.1	6142	5527	112
		1800	39.5	71.1	7363	6626	104
BXRH-40H4000-F-83	97	525	34.2	18	2245	2019	125
		750	35.3	26.5	3125	2812	118
		1050	**36.6**	**38.4**	**4229**	**3806**	**110**
		1313	37.7	49.5	5135	4621	104
		1440	38.2	55.1	5553	4997	101
		1800	39.5	71.1	6657	5991	94

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 stabilized DC 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 (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 DC Flux[3] T_c = 85°C (lm)	Typical Efficacy T_c = 25°C (lm/W)
BXRH-27G40H0-F-83	80	525	34.2	18	2314	2083	129
		750	35.3	26.5	3222	2900	122
		1050	**36.6**	**38.4**	**4360**	**3924**	**113**
		1313	37.7	49.5	5295	4765	107
		1440	38.2	55.1	5726	5153	104
		1800	39.5	71.1	6864	6178	97
BXRH-30G40H0-F-83	90	525	34.2	18	2432	2189	135
		750	35.3	26.5	3387	3048	128
		1050	**36.6**	**38.4**	**4583**	**4124**	**119**
		1313	37.7	49.5	5565	5009	112
		1440	38.2	55.1	6018	5416	109
		1800	39.5	71.1	7215	6493	101
BXRH-40G40H0-F-83	97	525	34.2	18	2565	2309	143
		750	35.3	26.5	3571	3214	135
		1050	**36.6**	**38.4**	**4833**	**4349**	**126**
		1313	37.7	49.5	5869	5282	119
		1440	38.2	55.1	6347	5712	115
		1800	39.5	71.1	7609	6848	107

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 stabilized DC 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_c = 25°C (V) [1, 2, 3, 8]			Typical Coefficient of Forward Voltage[4] $\Delta V_f/\Delta T_c$ (mV/°C)	Typical Thermal Resistance Junction to Case[5,6] R_{j-c} (°C/W)	Driver Selection Voltages[7] (V)	
		Minimum	Typical	Maximum			V_f Min. Hot T_c = 105°C (V)	V_f Max. Cold T_c = -40°C (V)
BXRH-xxx400x-F-83	1050	33.9	36.6	39.3	-20.00	0.329	32.3	40.6
	1800	36.5	39.5	42.5	-21.58	0.391	34.8	43.9

Notes for Table 4:

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.
7. V_f min hot and max cold values are provided as reference only and are not guaranteed by test. These values are provided to aid in driver design and selection over the operating range of the product.
8. This product has been designed and manufactured per IEC 62031:2018. This product has passed dielectric withstand voltage testing at 500 V. The working voltage designated for the insulation is 50V d.c. The maximum allowable voltage across the array must be determined in the end product application.

Absolute Maximum Ratings

Table 6: Maximum Ratings

Parameter	Maximum Rating
LED Junction Temperature (T_j)	125˚C
Storage Temperature	-40˚C to +105˚C
Operating Case Temperature[1] (T_c)	105˚C
Soldering Temperature[2]	300˚C or lower for a maximum of 6 seconds
	BXRH-xxx40xx-F-83
Maximum Drive Current[3]	1800 mA
Maximum Peak Pulsed Drive Current[4]	2036 mA
Maximum Reverse Voltage[5]	-60V

Notes for Table 6:

1. For IEC 62717 requirement, please consult your Bridgelux sales representative.
2. Refer to Bridgelux Application Note AN101: Handling and Assembly of Bridgelux V Series LED Arrays.
3. Arrays may be driven at higher currents however lumen maintenance may be reduced and warranty will not apply.
4. Bridgelux recommends a maximum duty cycle of 10% and pulse width of 20 ms when operating LED Arrays at maximum peak pulsed current specified. Maximum peak pulsed currents indicate values where LED Arrays can be driven without catastrophic failures.
5. 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: V11F HD Drive Current vs. Voltage ($T_j = T_c = 25°C$)[1]

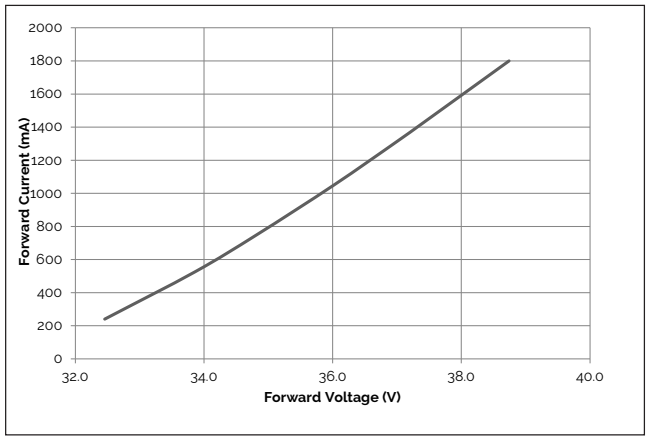


Figure 2: V11F HD Typical Relative Luminous Flux vs. Drive Current ($T_j = T_c = 25°C$)[1]

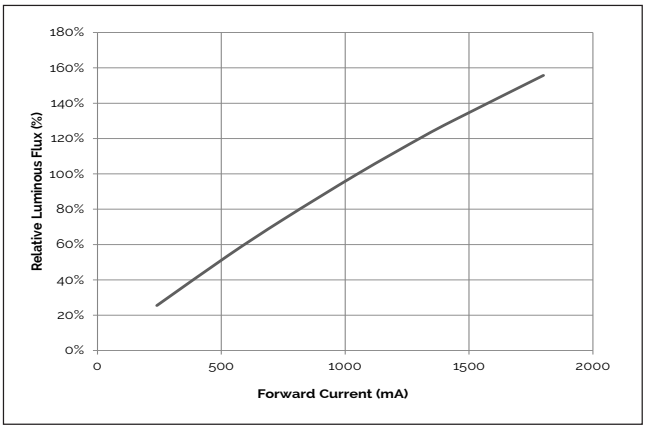


Figure 3: Typical DC Flux vs. Case Temperature

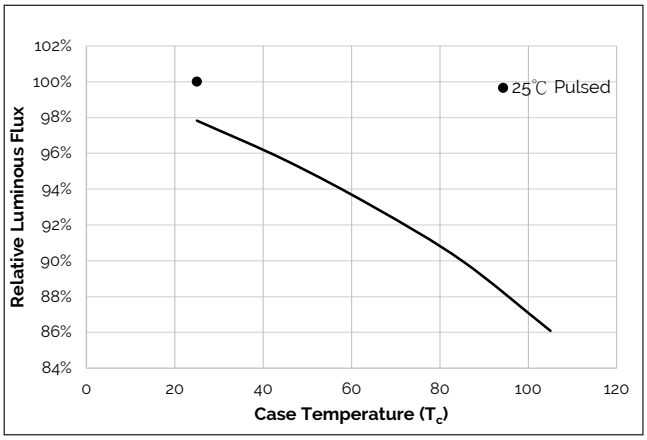


Figure 4: Typical DC ccx Shift vs. Case Temperature

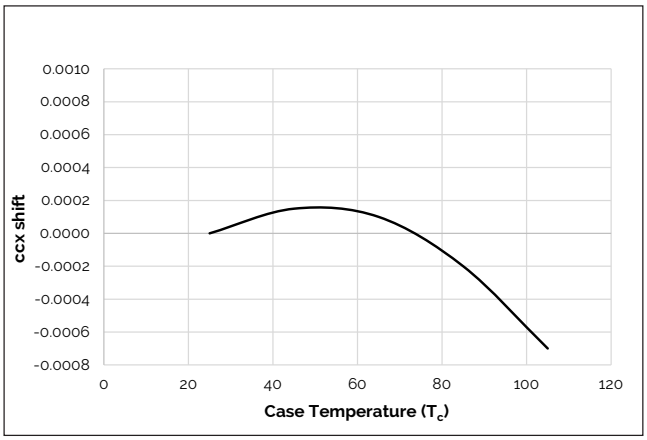


Figure 5: Typical DC ccy Shift vs. Case Temperature

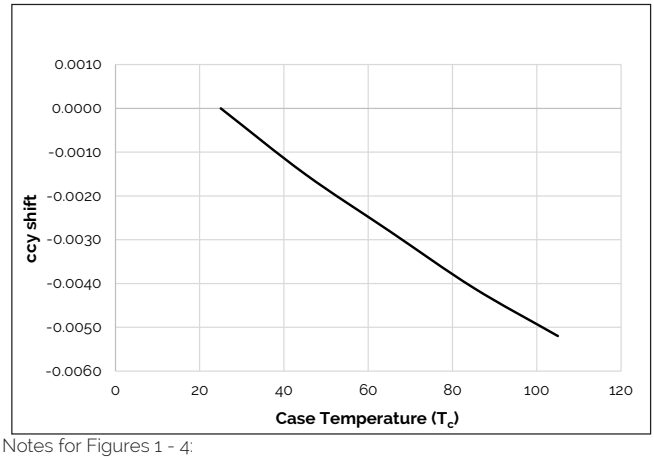
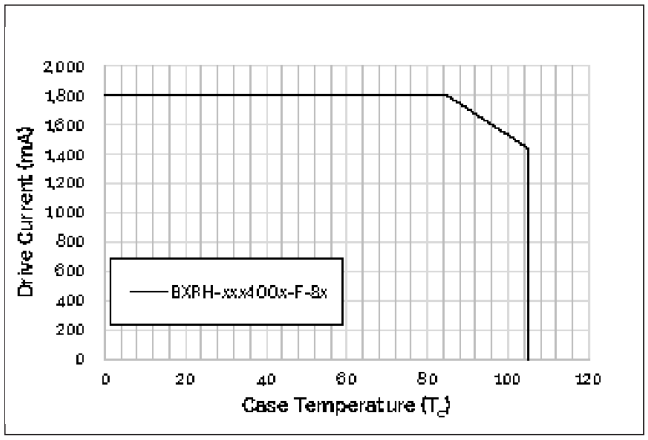


Figure 6: Derating Curve

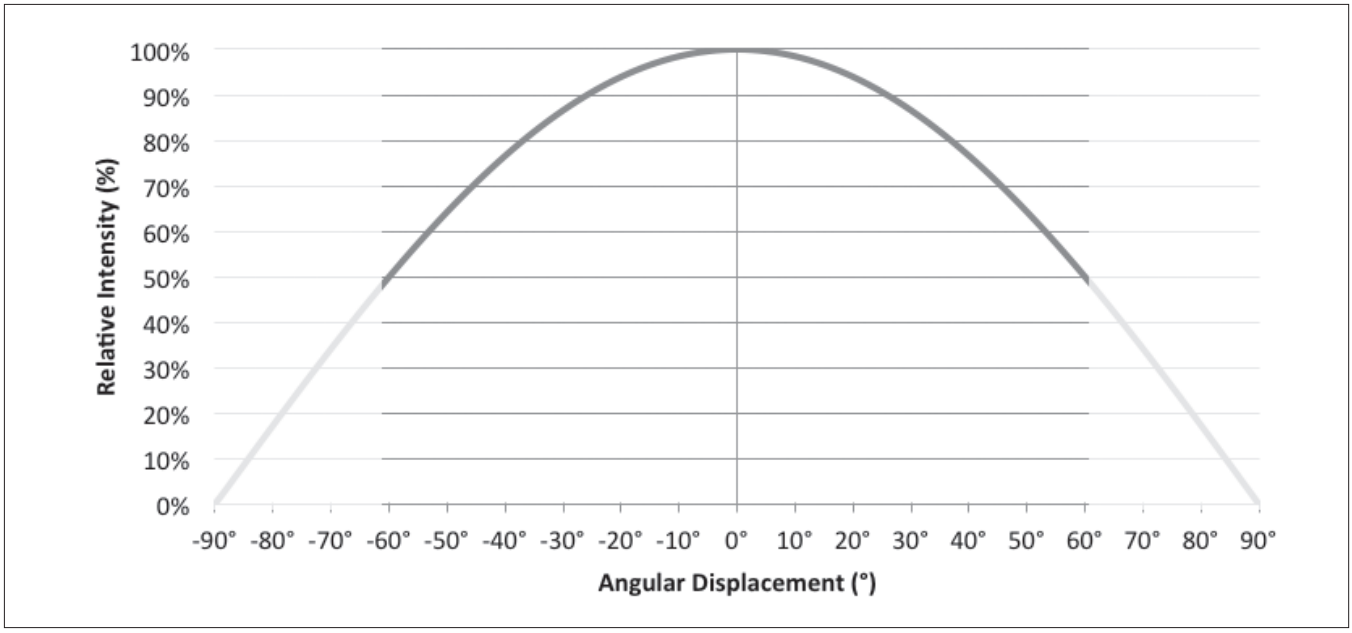


Notes for Figures 1 - 4:

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 3000K and 90 CRI.

Typical Radiation Pattern

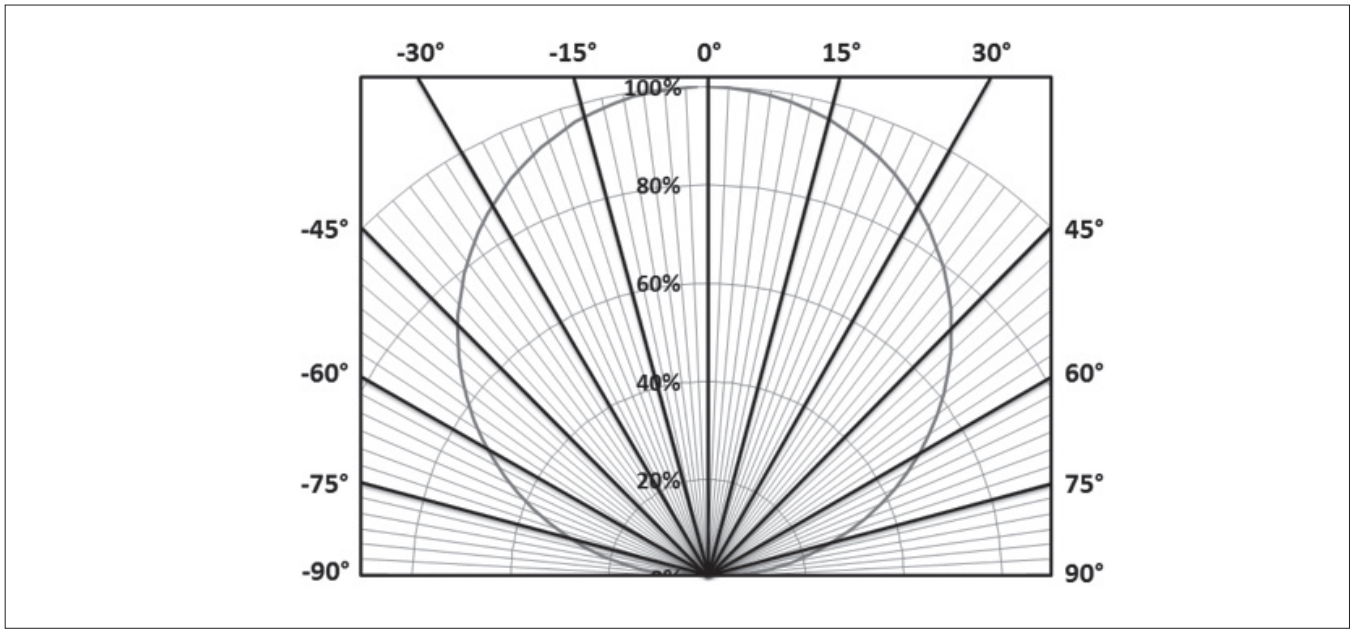
Figure 7: Typical Spatial Radiation Pattern



Notes for Figure 7:

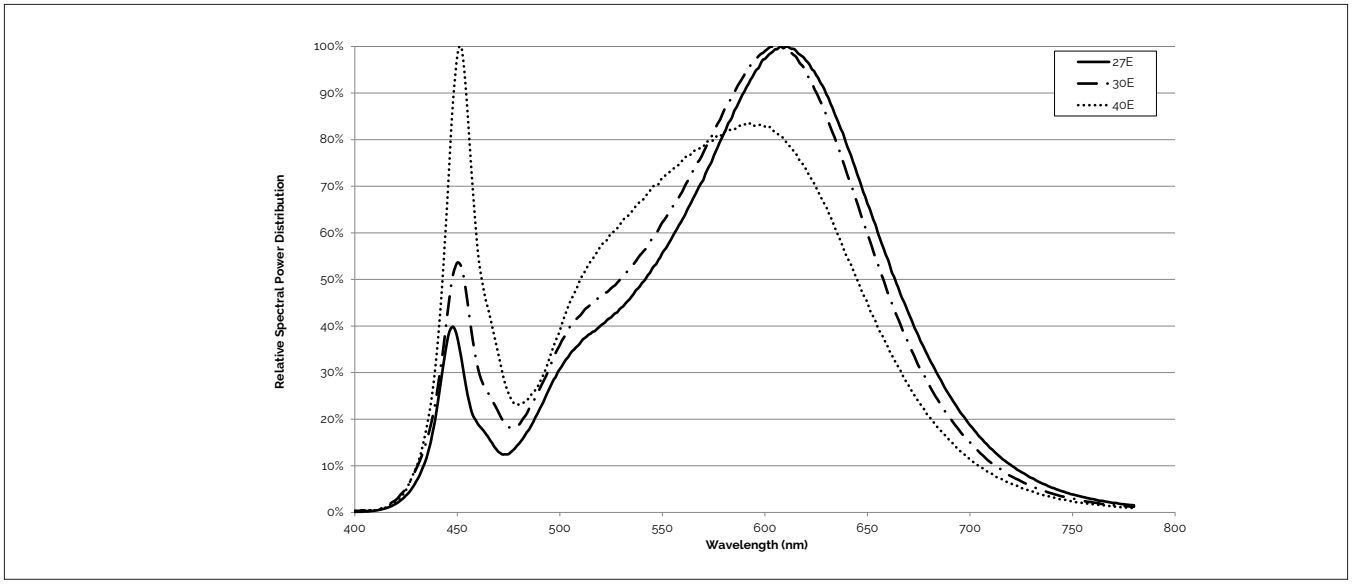
1. Typical viewing angle is 120°.
2. The viewing angle is defined as the off axis angle from the centerline where intensity is ½ of the peak value.

Figure 8: Typical Polar Radiation Pattern



Typical Color Spectrum

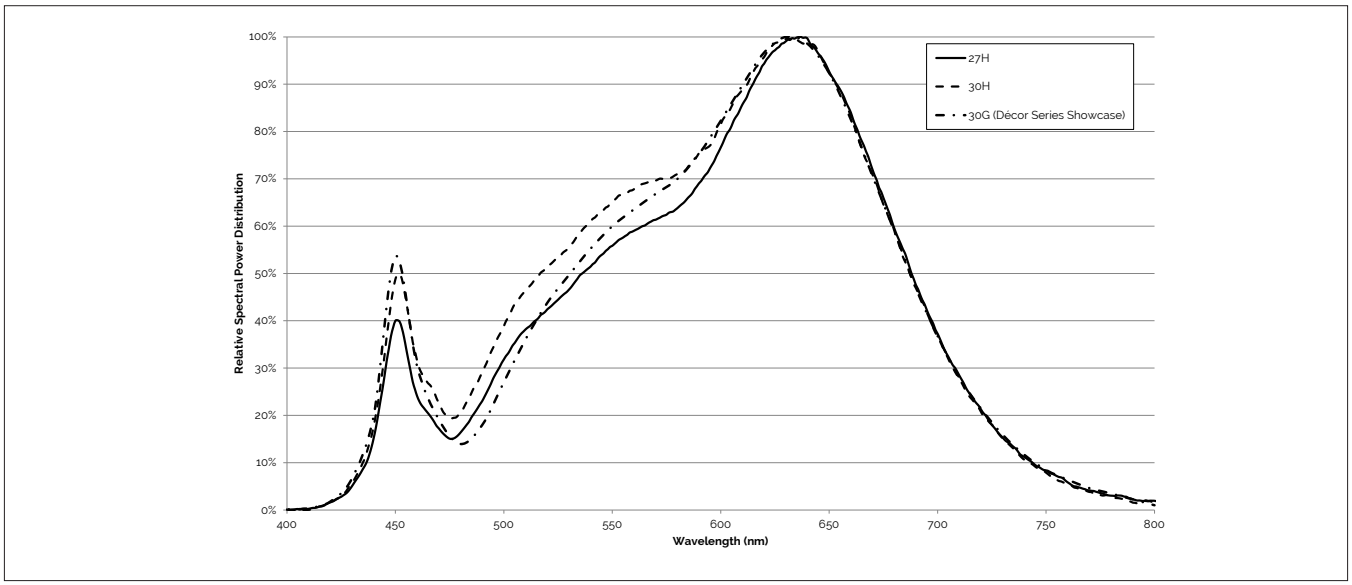
Figure 9: Typical Color Spectrum



Notes for Figure 9:

1. Color spectra measured at nominal current for T_j = T_c = 25°C.
2. Color spectra shown is 2700K and 80 CRI.
3. Color spectra shown is 3000K and 80 CRI.
4. Color spectra shown is 4000K and 80 CRI.

Figure 10: Typical Color Spectrum for Décor Series

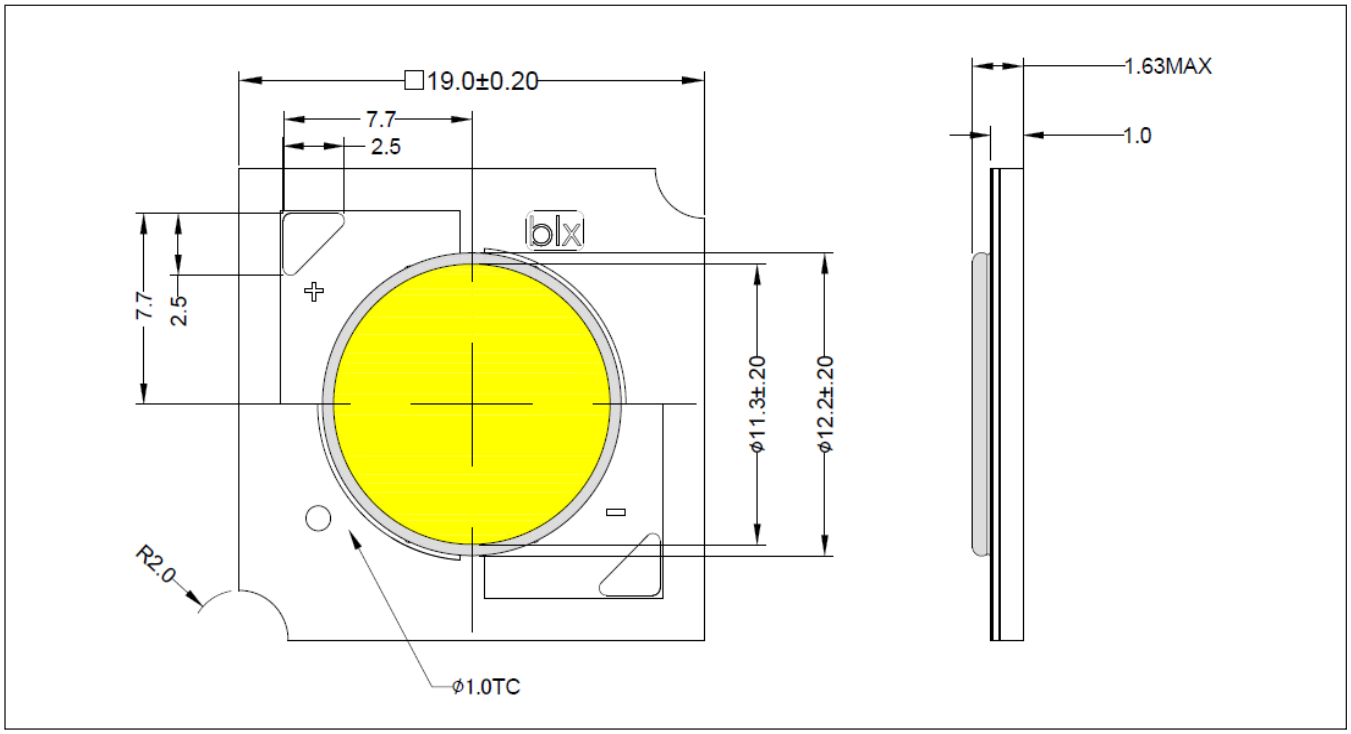


Note for Figure 10:

1. Color spectra measured at nominal current for T_j = T_c = 25°C.

Mechanical Dimensions

Figure 11: Drawing for V11 HD LED Array

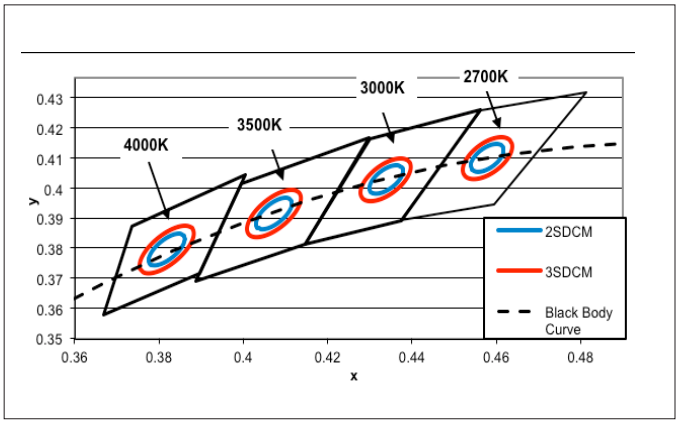


Notes for Figure 11:

1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Solder pads are labeled "+" and "-" to denote positive and negative polarity, respectively.
4. Unless otherwise specified, tolerances are ±0.1mm.
5. Refer to Application Notes AN101 for product handling, mounting and heat sink recommendations.
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

Figure 12: Warm and Neutral White Test Bins in xy Color Space



Note: Pulsed Test Conditions, T_c = 25°C

Table 7: Warm and Neutral White xy Bin Coordinates and Associated Typical CCT

Bin Code	2700K	3000K	3500K	4000K
ANSI Bin (for reference only)	(2580K - 2870K)	(2870K - 3220K)	(3220K - 3710K)	(3710K - 4260K)
83 (3 SDCM)	(2651K - 2794K)	(2968K - 3136K)	(3369K - 3586K)	(3851K - 4130K)
82 (2 SDCM)	(2674K - 2769K)	(2995K - 3107K)	(3404K - 3548K)	(3895K - 4081K)
Center Point (x,y)	(0.4578, 0.4101)	(0.4338, 0.403)	(0.4073, 0.3917)	(0.3818, 0.3797)

Note for Table 7:

1. Bridgelux maintains a tolerance of +/- 0.007 on x and y color coordinates in the CIE 1931 color Space.

Packaging and Labeling

Figure 13: V11 HD Packaging Tube

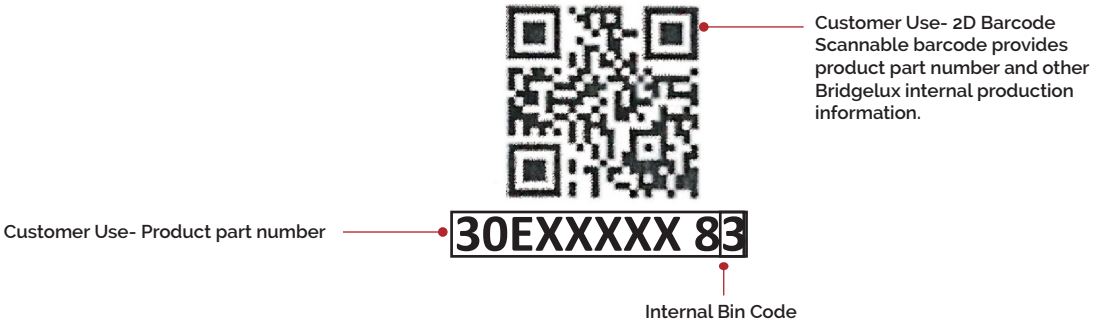
Notes for Figure 13:

1. Each tube holds 25 V11 HD COB arrays.
2. One tube is sealed in an anti-static bag. Four bags are placed in a shipping box. Depending on quantities ordered, a bigger shipping box, containing four boxes may be used to ship products.
3. Each bag and box is to be labeled as shown above.
4. Dimensions for each tube are 21.3 (W) x 9.5 (H) x 505 (L) mm. Dimensions for the anti-static bag are 100 (W) x 625 (L) x 0.075 (T) mm. Dimensions for the shipping box are 58.7 x 13.3 x 7.9 cm

Packaging and Labeling

Figure 14: **V Series HD Product Labeling**

Bridgelux COB arrays have laser markings on the back side of the substrate to help with product identification. In addition to the product identification markings, Bridgelux COB arrays also contain markings for internal Bridgelux manufacturing use only. The image below shows which markings are for customer use and which ones are for Bridgelux internal use only. The Bridgelux internal manufacturing markings are subject to change without notice, however these will not impact the form, function or performance of the COB array.



Design Resources

Application Notes

Bridgelux has developed a comprehensive set of application notes and design resources to assist customers in successfully designing with the V Series product family of LED array products. For all available application notes visit www.bridgelux.com.

Optical Source Models

Optical source models and ray set files are available for all Bridgelux products. For a list of available formats, visit www.bridgelux.com.

3D CAD Models

Three dimensional CAD models depicting the product outline of all Bridgelux V Series HD LED arrays are available in both IGS and STEP formats. Please contact your Bridgelux sales representative for assistance.

LM80

LM80 testing has been completed and the LM80 report is now available. Please contact your Bridgelux sales representatives for LM-80 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 AN101 for additional information.

CAUTION: RISK OF BURN

Do not touch the V Series HD LED array during operation. Allow the array to cool for a sufficient period of time before handling. The V Series HD 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).

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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