Bridgelux® V18 Array

Product Data Sheet DS45

FIVE YEAR Warranty™

BXEM-27E000 | 30x4000 | 35x4000 | 40x4000 | 50x4000

Introduction

V Series

The V Series™ LED Array products deliver high quality light in a compact and cost-effective solid-state lighting package. These Chip-on-Board (CoB) arrays can be efficiently driven at twice the nominal drive current, enabling design flexibility not previously possible. This high flux density light source is designed to support a wide range of high quality, low cost directional luminaires and replacement lamps for commercial and residential applications.

The V18 LED Array is available in a variety of electrical, 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, replacement lamps, task, accent, spot, track, down light, wide area, security, and wall pack.

Features

- Efficacy of 130 lm/W typical
- Compact high flux density light source
- Uniform high quality illumination
- Minimum 70, 80 and 90 CRI options
- Streamlined thermal path
- Energy Star / ANSI compliant color binning structure with 3SDCM and 4SDCM options
- More energy efficient than incandescent, halogen and fluorescent lamps
- Low voltage DC operation
- Instant light with unlimited dimming

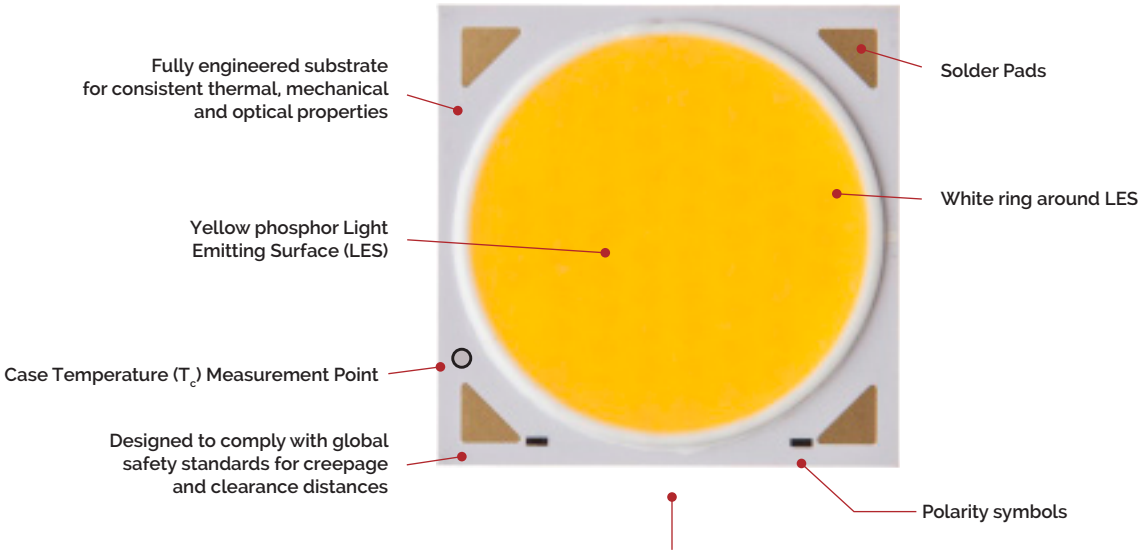
Benefits

- Enhanced optical control
- Clean white light without pixilation
- 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

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 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.



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

Product Nomenclature

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

1 2 3 4	5 6	7	8 9 10 11	–	12	–	13 14
BXRE	– 30	E	4000	–	F	–	23

Product Family

Nominal CCT
27 = 2,700K
30 = 3,000K
35 = 3,500K
40 = 4,000K
50 = 5,000K

Minimum CRI
C = 70 CRI
E = 80 CRI
G = 90 CRI

Flux Indicator
4000 = 4000lm

Array Configuration

CCT Bin Options
23 = 3 SDCM
24 = 4 SDCM

Product Selection Guide

The following product configurations are available:

Table 1: Selection Guide, Pulsed Measurement Data (T_j = 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)
BXRE-27E4000-F-2x	2700	80	1050	3961	3723	29.5	31.0	128
BXRE-27G4000-F-2x	2700	90	1050	3224	3010	29.5	31.0	104
BXRE-30E4000-F-2x	3000	80	1050	4097	3698	29.5	31.0	132
BXRE-30G4000-F-2x	3000	90	1050	3423	3152	29.5	31.0	111
BXRE-35E4000-F-2x	3500	80	1050	4289	3866	29.5	31.0	138
BXRE-35G4000-F-2x	3500	90	1050	3655	3256	29.5	31.0	118
BXRE-40E4000-F-2x	4000	80	1050	4341	3931	29.5	31.0	140
BXRE-40G4000-F-2x	4000	90	1050	3750	3529	29.5	31.0	121
BXRE-50C4000-F-24	5000	70	1050	4603	4303	29.5	31.0	149
BXRE-50E4000-F-24	5000	80	1050	4305	4070	29.5	31.0	139
BXRE-50G4000-F-24	5000	90	1050	3885	3697	29.5	31.0	125

Table 2: Selection Guide, Stabilized DC Performance (T_c = 85˚C) [8,9]

Part Number	Nominal CCT[1] (K)	CRI[2]	Nominal Drive Current[3] (mA)	Typical DC Flux T_c = 85°C (lm)	Minimum DC Flux[10] T_c = 85°C (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXRE-27E4000-F-2x	2700	80	1050	3592	3376	28.6	30.0	120
BXRE-27G4000-F-2x	2700	90	1050	2837	2649	28.6	30.0	94
BXRE-30E4000-F-2x	3000	80	1050	3705	3344	28.6	30.0	123
BXRE-30G4000-F-2x	3000	90	1050	3012	2774	28.6	30.0	100
BXRE-35E4000-F-2x	3500	80	1050	3896	3512	28.6	30.0	130
BXRE-35G4000-F-2x	3500	90	1050	3216	2865	28.6	30.0	107
BXRE-40E4000-F-2x	4000	80	1050	3920	3550	28.6	30.0	131
BXRE-40G4000-F-2x	4000	90	1050	3300	3106	28.6	30.0	110
BXRE-50C4000-F-24	5000	70	1050	4051	3787	28.6	30.0	135
BXRE-50E4000-F-24	5000	80	1050	3788	3582	28.6	30.0	126
BXRE-50G4000-F-24	5000	90	1050	3419	3253	28.6	30.0	114

Notes for Tables 1 & 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. 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.
8. Typical stabilized DC performance values are provided as reference only and are not a guarantee of performance.
9. 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.
10. 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 LED arrays are tested to the specifications shown using the nominal drive currents in Table 1. V Series 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 Figures 1 & 2 and the flux vs. current characteristics shown in Figures 3 & 4. The performance at commonly used drive currents is summarized in Table 3.

Table 3: 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)
BXRE-27E4000-F-2x	80	500	28.1	14.1	2042	1846	145
		700	28.7	20.1	2779	2513	138
		1050	**29.5**	**31.0**	**3961**	**3592**	**128**
		1400	30.2	42.3	5032	4575	119
		2100	31.6	66.4	6777	6211	102
BXRE-27G4000-F-2x	90	500	28.1	14.1	1662	1458	118
		700	28.7	20.1	2262	1985	113
		1050	**29.5**	**31.0**	**3224**	**2837**	**104**
		1400	30.2	42.3	4096	3614	97
		2100	31.6	66.4	5516	4905	83
BXRE-30E4000-F-2x	80	500	28.1	14.1	2112	1903	150
		700	28.7	20.1	2874	2592	143
		1050	**29.5**	**31.0**	**4097**	**3705**	**132**
		1400	30.2	42.3	5205	4718	123
		2100	31.6	66.4	7009	6405	106
BXRE-30G4000-F-2x	90	500	28.1	14.1	1764	1548	126
		700	28.7	20.1	2402	2107	120
		1050	**29.5**	**31.0**	**3423**	**3012**	**111**
		1400	30.2	42.3	4349	3837	103
		2100	31.6	66.4	5856	5208	88
BXRE-35E4000-F-2x	80	500	28.1	14.1	2211	2002	157
		700	28.7	20.1	3009	2726	150
		1050	**29.5**	**31.0**	**4289**	**3896**	**138**
		1400	30.2	42.3	5449	4963	129
		2100	31.6	66.4	7338	6736	111
BXRE-35G4000-F-2x	90	500	28.1	14.1	1884	1653	134
		700	28.7	20.1	2564	2250	128
		1050	**29.5**	**31.0**	**3655**	**3216**	**118**
		1400	30.2	42.3	4643	4097	110
		2100	31.6	66.4	6253	5561	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: 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)
BXRE-40E4000-F-2x	80	500	28.1	14.1	2238	2014	159
		700	28.7	20.1	3046	2743	152
		1050	**29.5**	**31.0**	**4341**	**3920**	**140**
		1400	30.2	42.3	5515	4993	130
		2100	31.6	66.4	7427	6778	112
BXRE-40G4000-F-2x	90	500	28.1	14.1	1933	1696	138
		700	28.7	20.1	2631	2309	131
		1050	**29.5**	**31.0**	**3750**	**3300**	**121**
		1400	30.2	42.3	4764	4203	113
		2100	31.6	66.4	6416	5705	97
BXRE-50C4000-F-24	70	500	28.1	14.1	2373	2081	169
		700	28.7	20.1	3229	2834	161
		1050	**29.5**	**31.0**	**4603**	**4051**	**149**
		1400	30.2	42.3	5848	5159	138
		2100	31.6	66.4	7875	7003	119
BXRE-50E4000-F-24	80	500	28.1	14.1	2219	1947	158
		700	28.7	20.1	3020	2651	150
		1050	**29.5**	**31.0**	**4305**	**3788**	**139**
		1400	30.2	42.3	5469	4825	129
		2100	31.6	66.4	7365	6550	111
BXRE-50G4000-F-24	90	500	28.1	14.1	2003	1757	143
		700	28.7	20.1	2726	2392	136
		1050	**29.5**	**31.0**	**3885**	**3419**	**125**
		1400	30.2	42.3	4936	4354	117
		2100	31.6	66.4	6647	5911	100

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]			Typical Coefficient of Forward Voltage[4] $\Delta V_f/\Delta T$ (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)
BXRE-xxx4000-F-2x	1050	27.3	29.5	31.7	-15	0.13	26.1	32.7
	2100	29.2	31.6	34.2	-15	0.17	28.0	35.2

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.

Absolute Maximum Ratings

Table 5: Maximum Ratings

Parameter	Maximum Rating
LED Junction Temperature (T_j)	150˚C
Storage Temperature	-40˚C to +105˚C
Operating Case Temperature[1] (T_c)	105˚C
Soldering Temperature[2]	350˚C or lower for a maximum of 10 seconds
Maximum Drive Current[3,4,5]	2100mA
Maximum Peak Pulsed Drive Current[6]	3000mA
Maximum Reverse Voltage[7]	-55V

Notes for Table 5:

1. For IEC 62717 requirement, please consult your Bridgelux sales representative.
2. Refer to Bridgelux Application Note AN41: Assembly Considerations for Bridgelux V Series LED Arrays.
3. DC Forward Current for LM-80 is the maximum drive current for which LM-80 data is currently available.
4. Lumen maintenance (L70) and lifetime predictions are valid for drive current and case temperature conditions used for LM-80 testing as included in the applicable LM-80 test report for these arrays. Contact your Bridgelux sales representatives for LM-80 report.
5. Arrays may be driven at higher currents however lumen maintenance may be reduced.
6. 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.
7. 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 ($T_j = T_c = 25°C$)

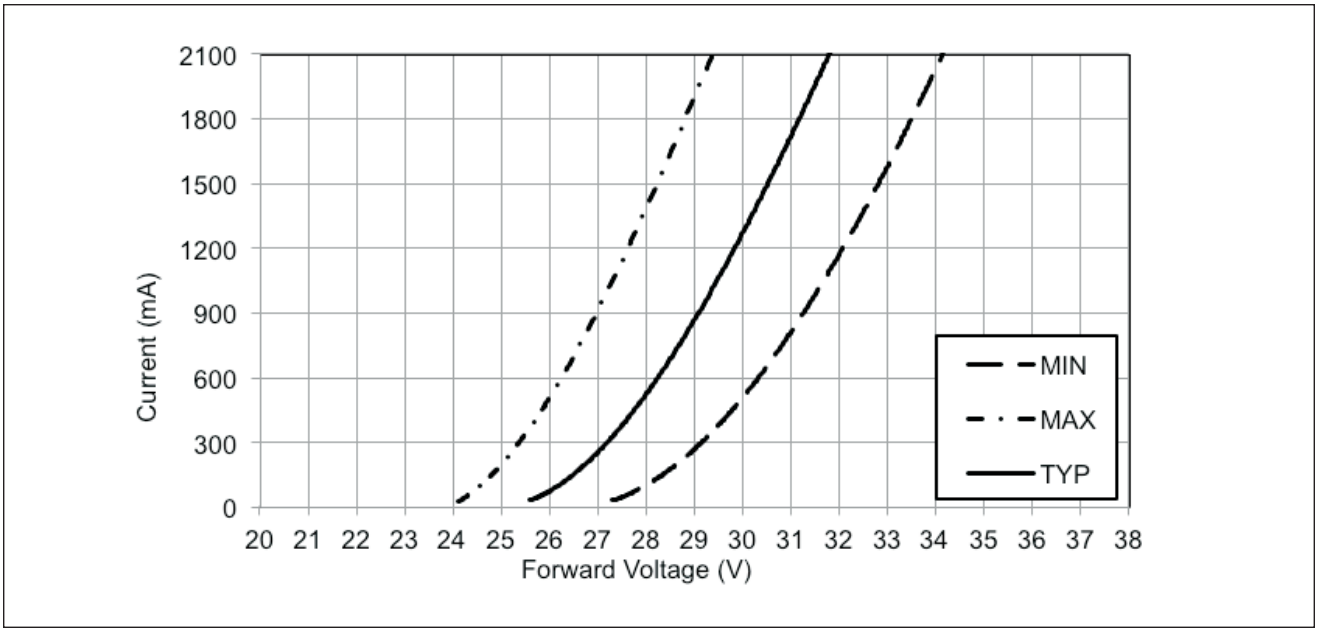
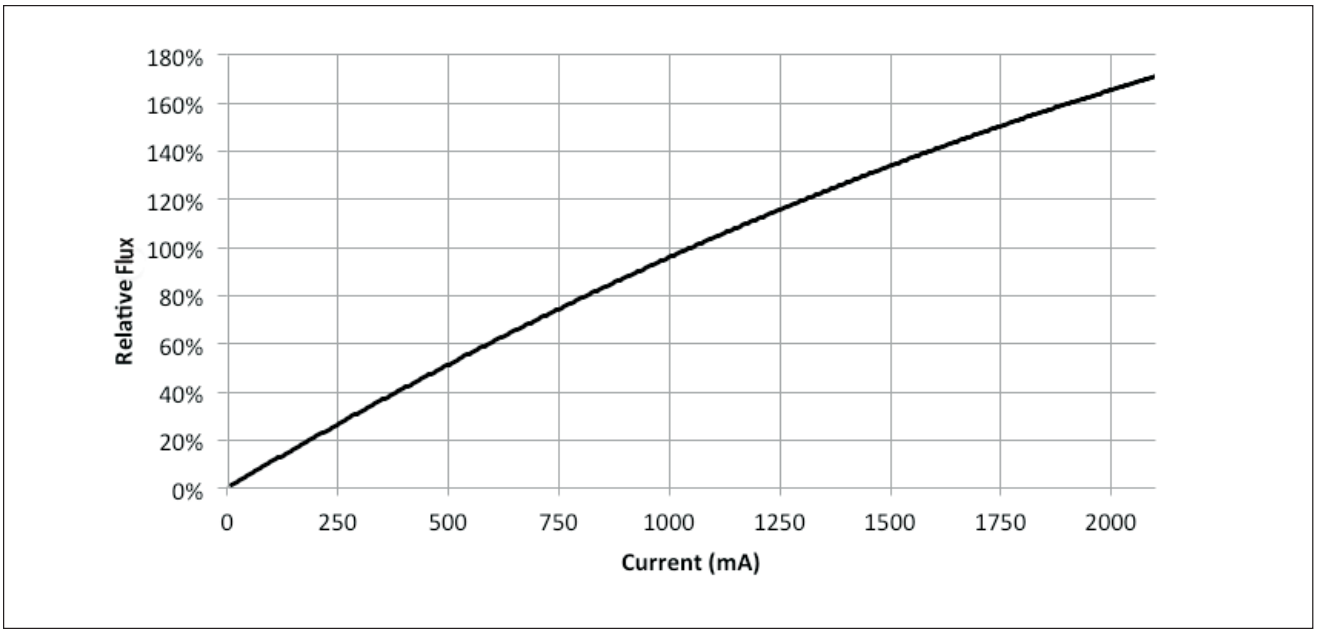


Figure 2: Typical Relative Luminous Flux vs. Drive Current ($T_j = T_c = 25°C$)



Note for Figure 2:

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.

Performance Curves

Figure 3: Typical DC Flux vs. Case Temperature

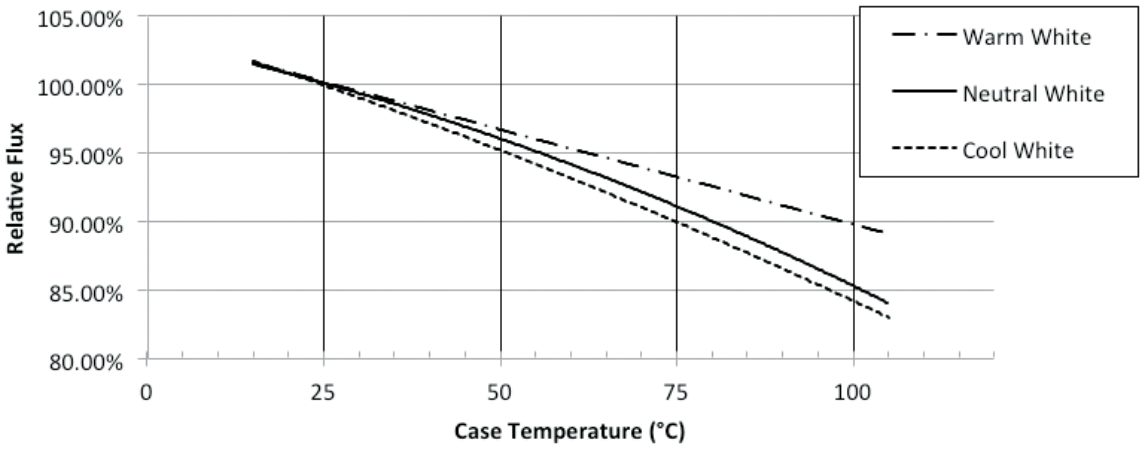
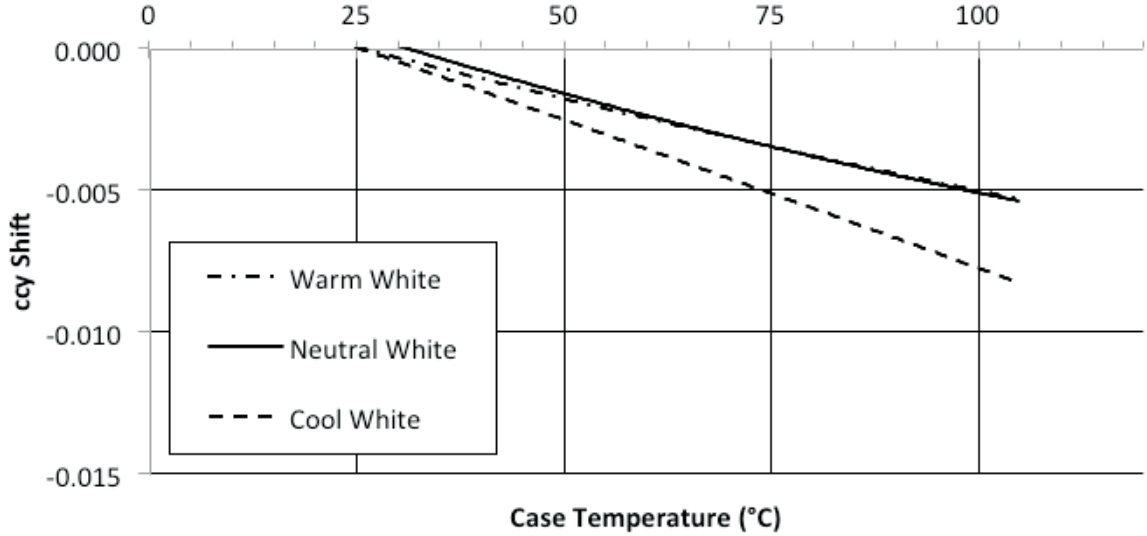


Figure 4: Typical DC ccy Shift vs. Case Temperature

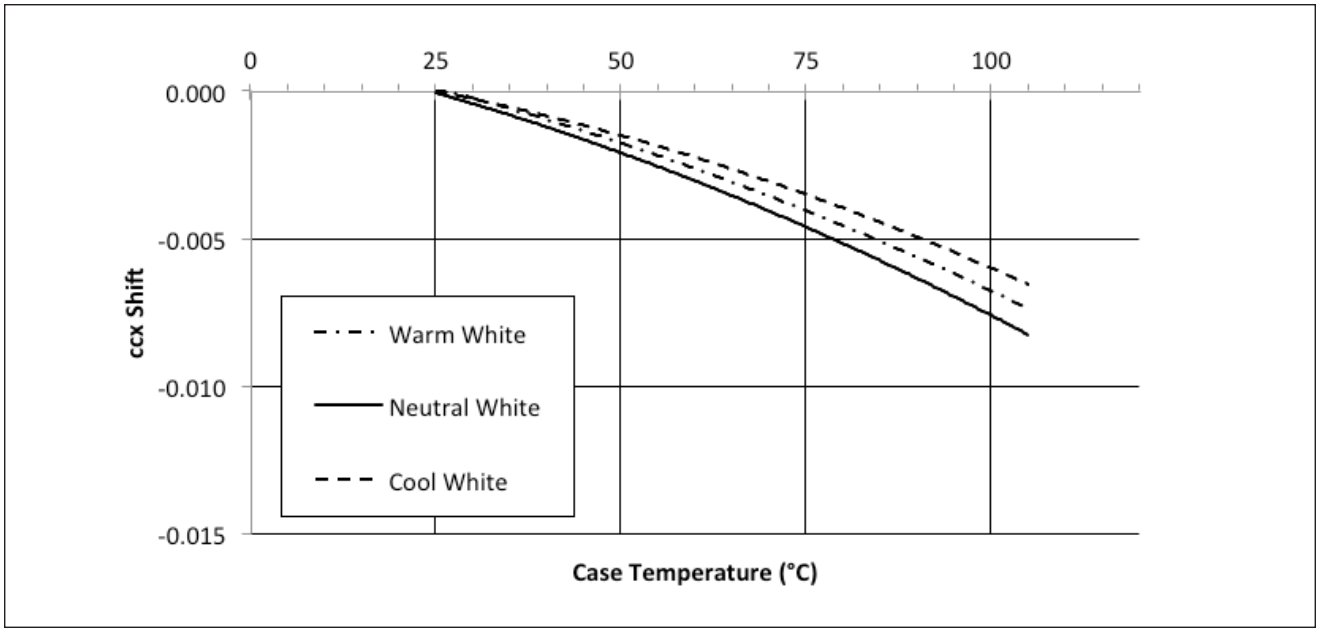


Notes for Figures 3-4:

1. Characteristics shown for warm white based on 3000K and 80 CRI.
2. Characteristics shown for neutral white based on 4000K and 80 CRI.
3. Characteristics shown for cool white based on 5000K and 70 CRI.
4. For other color SKUs, the shift in color will vary. Please contact your Bridgelux Sales Representative for more information.

Performance Curves

Figure 5: Typical ccx Shift vs. Case Temperature

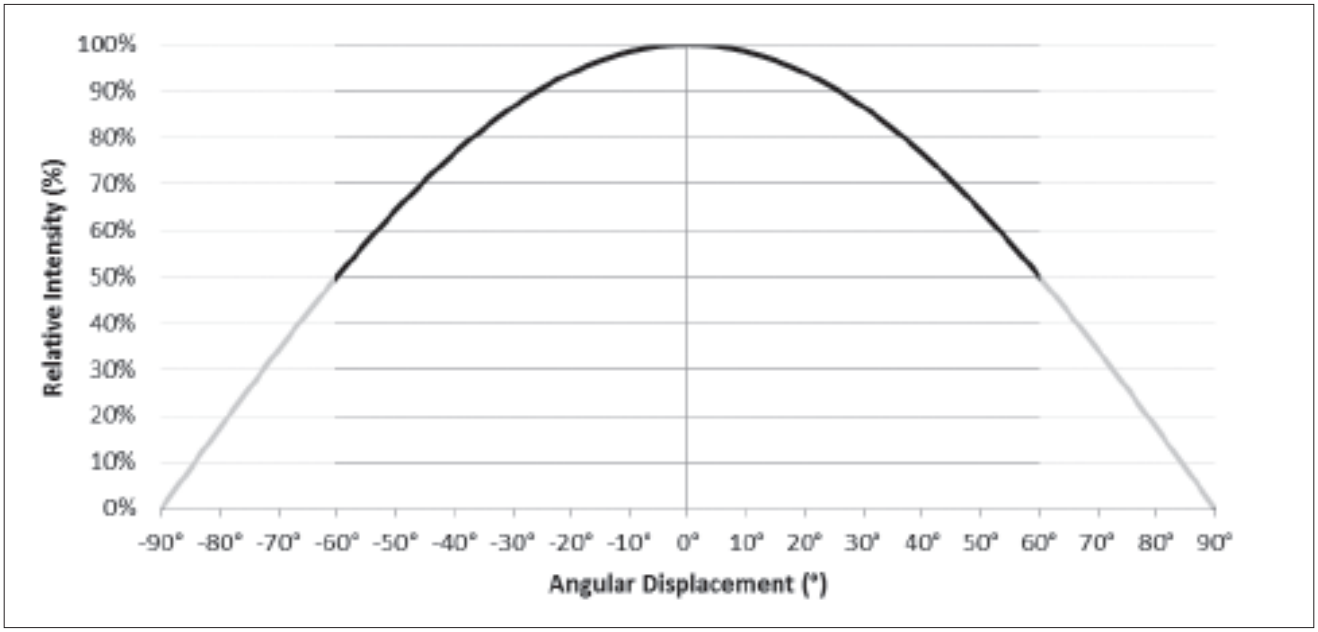


Notes for Figure 5:

1. Characteristics shown for warm white based on 3000K and 80 CRI.
2. Characteristics shown for neutral white based on 4000K and 80 CRI.
3. Characteristics shown for cool white based on 5000K and 70 CRI.
4. For other color SKUs, the shift in color will vary. Please contact your Bridgelux Sales Representative for more information.

Typical Radiation Pattern

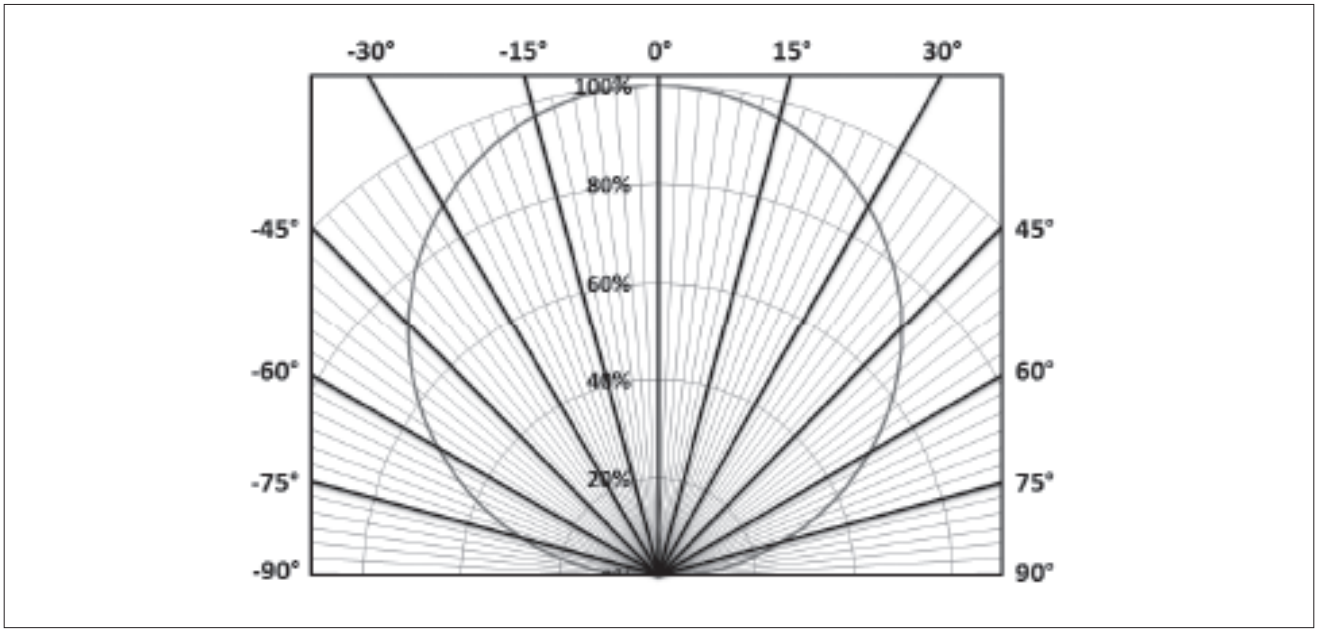
Figure 6: Typical Spatial Radiation Pattern



Note for Figure 6:

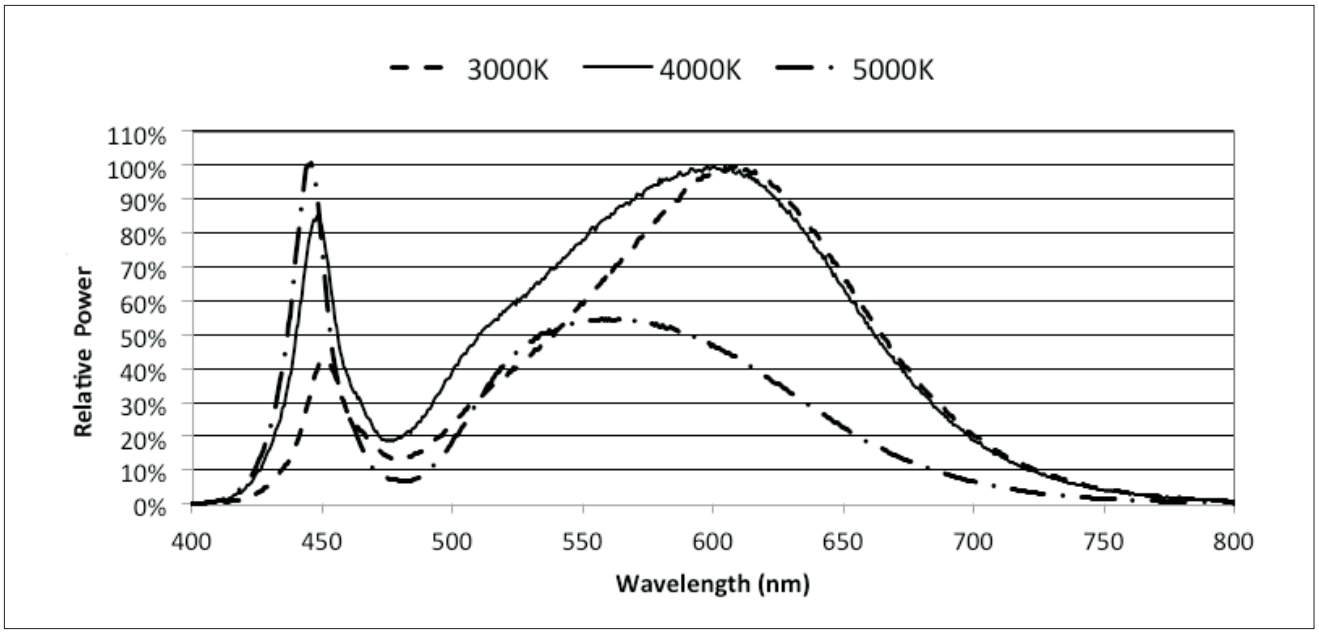
1. Typical viewing angle is 120°.
2. The viewing angle is defined as the off axis angle from the centerline where Iv is ½ of the peak value.

Figure 7: Typical Polar Radiation Pattern



Typical Color Spectrum

Figure 8: Typical Color Spectrum

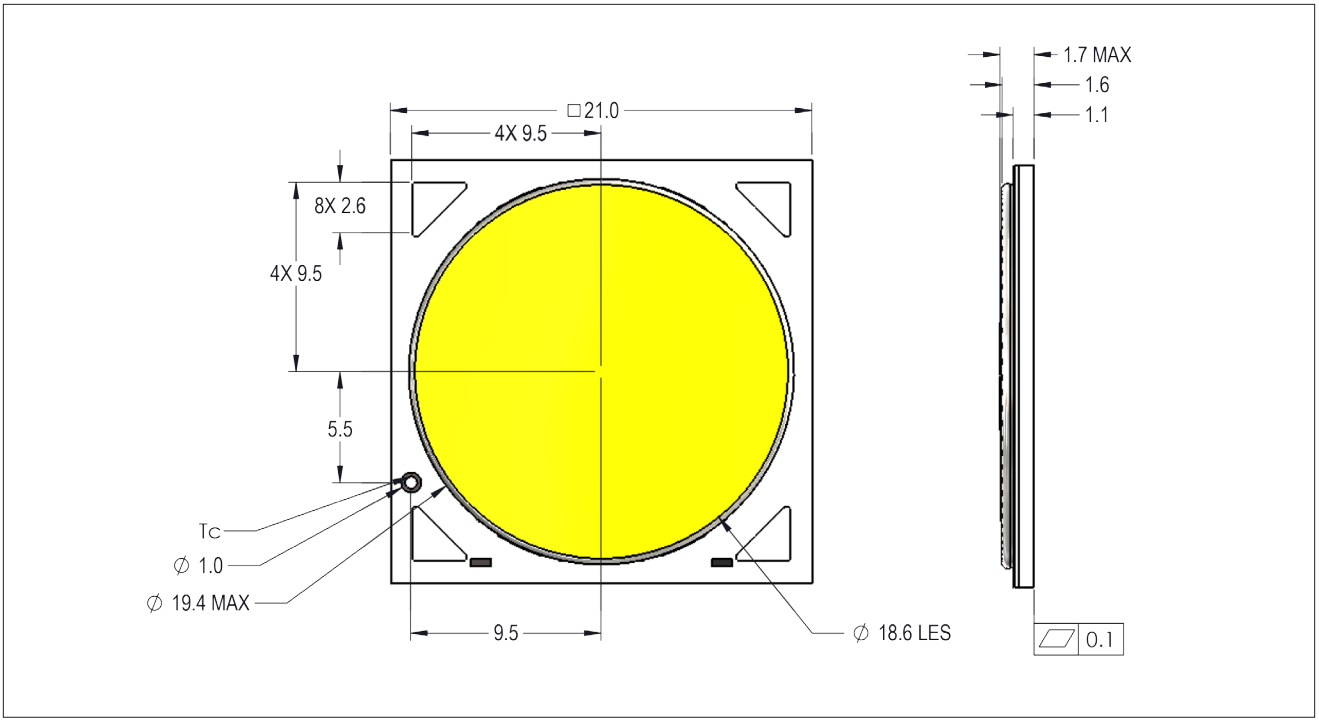


Notes for Figure 8:

1. Color spectra measured at nominal current for T_j = T_c = 25°C.
2. Color spectra shown for warm white is 3000K and 80 CRI.
3. Color spectra shown for neutral white is 4000K and 80 CRI.
4. Color spectra shown for cool white is 5000K and 70 CRI.

Mechanical Dimensions

Figure 9: Drawing for V18 LED Array

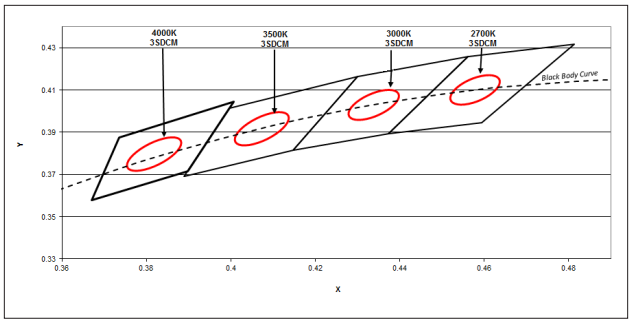


Notes for Figure 9:

1. Solder pads are labeled "+" and "-" to denote positive and negative polarity, respectively.
2. It is not necessary to provide electrical connections to both sets of solder pads. Either set may be used depending on application specific design requirements.
3. Drawings are not to scale.
4. Drawing dimensions are in millimeters.
5. Unless otherwise specified, tolerances are ± 0.10mm.
6. The optical center of the LED Array is nominally defined by the mechanical center of the array. The light emitting surface (LES) is centered on the mechanical center of the array to a tolerance of ± 0.2 mm
7. Bridgelux maintains a flatness of 0.1 mm across the mounting surface of the array. Refer to Application Notes AN40 and AN41 for product handling, mounting and heat sink recommendations.

Color Binning Information

Figure 10: Graph of Warm and Neutral White Test Bins in xy Color Space

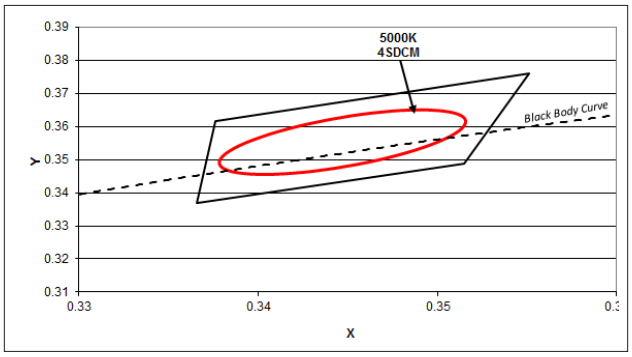


Note: Pulsed Test Conditions, T_c = 25°C

Table 6: 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)
23 (3SDCM)	(2651K - 2794K)	(2968K - 3136K)	(3369K - 3586K)	(3851K - 4130K)
Center Point (x,y)	(0.4578, 0.4101)	(0.4338, 0.403)	(0.4073, 0.3917)	(0.3818, 0.3797)

Figure 11: Graph of Cool White Test Bins in xy Color Space



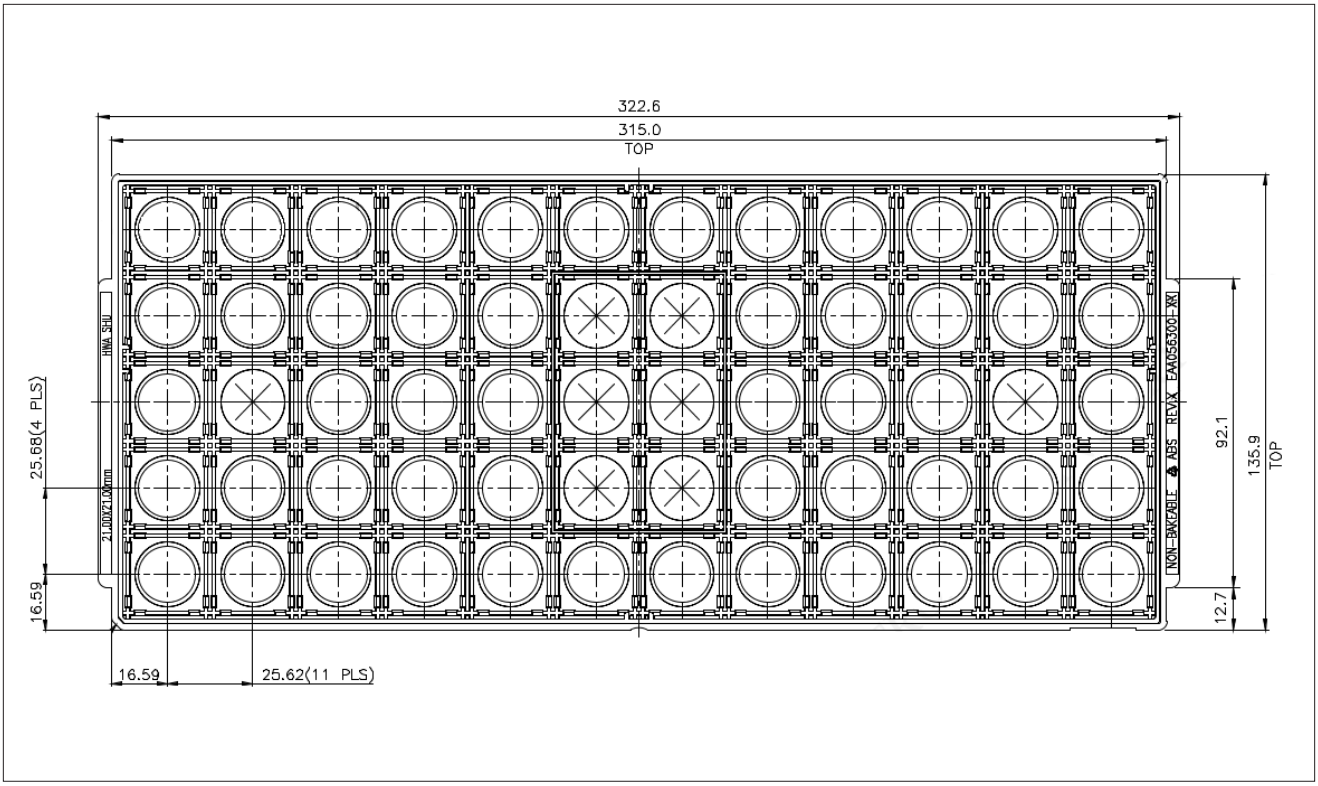
Note: Pulsed Test Conditions, T_c = 25°C

Table 7: Cool White xy Bin Coordinates and Associated Typical CCT

Bin Code	5000K
ANSI Bin (for reference only)	(4745K - 5311K)
24 (4SDCM)	(4801K - 5282K)
Center Point (x,y)	(0.3447, 0.3553)

Packaging and Labeling

Figure 12: **Drawing for V Series Packaging Tray**

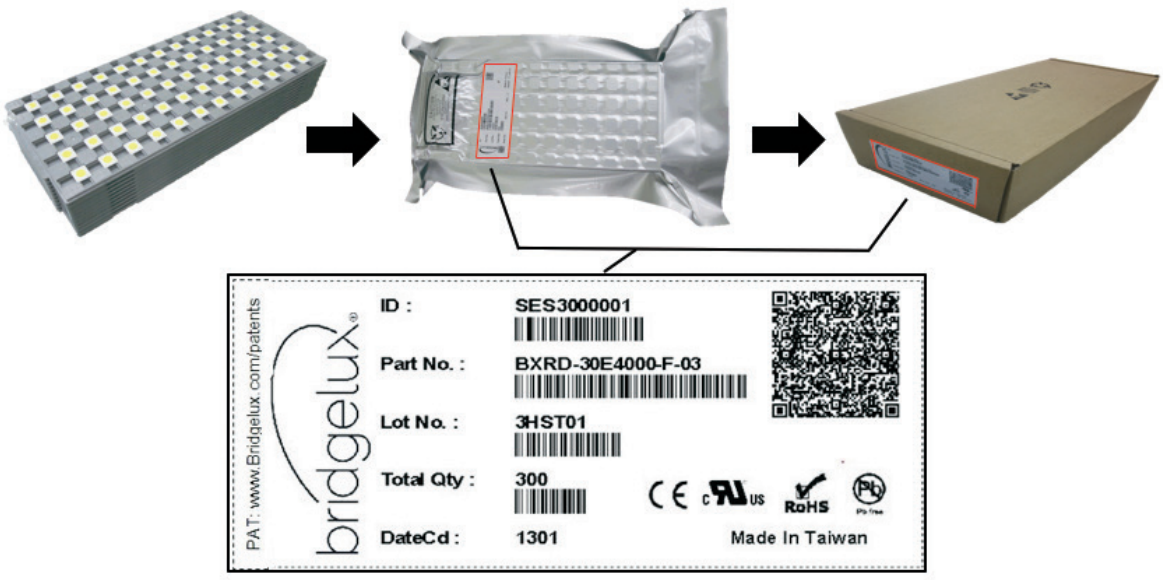


Notes for Figure 12:

1. Dimensions are in millimeters
2. Tolerances: X.X = ± 0.25, X.XX = ± 0.13, X°0' = ±0°30'
3. Trays are stackable without interference and will not stick together during unstacking operation

Packaging and Labeling

Figure 13: V Series Packaging and Labeling



Notes for Figure 13:

1. Each tray holds 60 COB arrays, 10 trays are stacked and one empty tray placed on top to cover the top tray.
2. Stacked trays are to contain only 1 part number and be vacuum sealed in an anti-static bag and placed in its own individual box.
3. Each bag and box is to be labeled as shown above.

Figure 14: 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 a list of of resources under development, 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 Vero LED arrays are available in both IGS and STEP formats. Please contact your Bridgelux sales representative for assistance.

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 AN41 for additional information.

CAUTION: EYE SAFETY

Eye safety classification for the use of Bridgelux V Series LED arrays is in accordance with IEC specification EN62471: Photobiological Safety of Lamps and Lamp Systems. V Series LED arrays are classified as Risk Group 1 (Low Risk) when operated at or below the maximum drive current. Please use appropriate precautions. It is important that employees working with LEDs are trained to use them safely.

CAUTION: RISK OF BURN

Do not touch the V Series LED array during operation. Allow the array to cool for a sufficient period of time before handling. The V 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: We Build Light That Transforms

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
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