

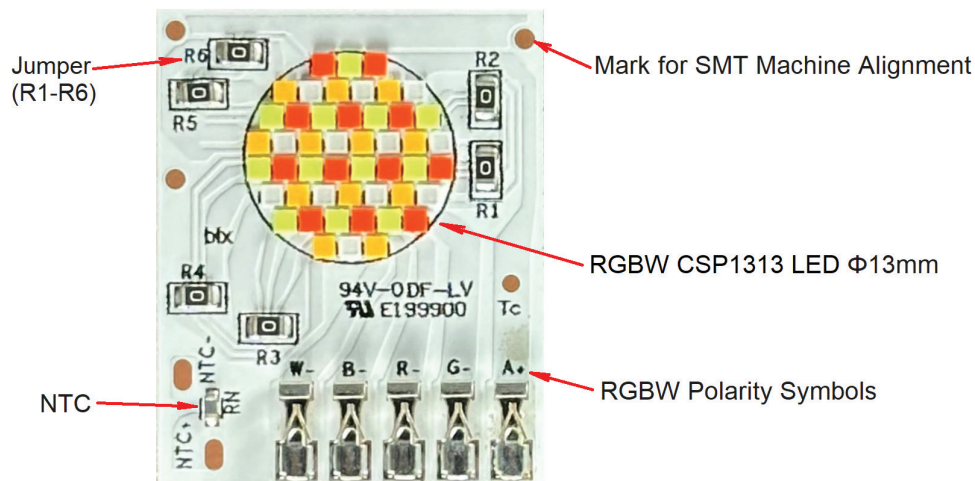
Bridgelux® Vesta® Series RGBW 13mm Array With CSP

Product Data Sheet DS582



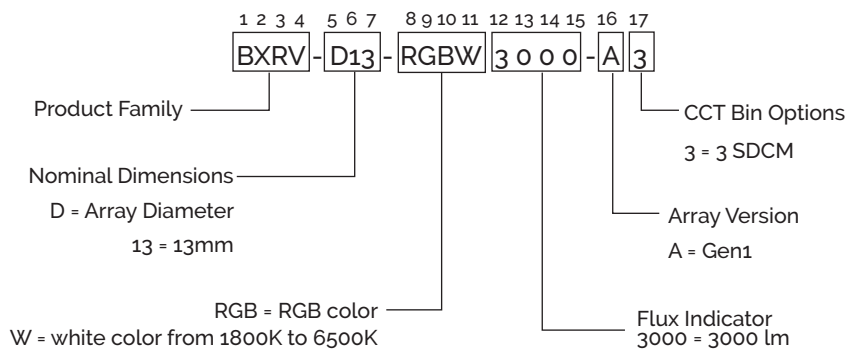
Product Feature Map

Bridgelux arrays are fully engineered devices that provide consistent thermal and optical performance on an engineered mechanical platform. The arrays incorporate several features to simplify design integration and assembly. Please visit www.bridgelux.com for more information on the Vesta Series family of products.



Product Nomenclature

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



Product Selection Guide

The following product configurations are available:

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

Part Number	Nominal CCT ¹ (K)	CRI ²	Nominal Drive Current Per Channel (mA)				Forward Voltage ³ (V)				Typical Pulsed Flux ^{3,4,5} (lm)	Typical Power (W)	Typical Efficacy (lm/W)
			White	Red	Green	Blue	White	Red	Green	Blue			
BXR-V-D13-RGBW3000-A3	1800	86	190	300	0	0	33.6	34.7	0.0	0.0	1393	16.8	83
	2200	93	230	300	27	1	34.0	34.7	31.9	30.2	1810	19.1	95
	2700	95	315	274	69	12	34.8	34.5	32.6	31.0	2513	23.0	109
	3000	95	282	275	93	20	34.5	34.5	33.0	31.3	2565	22.9	112
	3500	95	258	255	125	32	34.3	34.3	33.3	31.6	2694	22.8	118
	4000	95	272	196	155	47	34.4	33.9	33.7	31.9	2935	22.7	129
	5000	95	222	176	200	72	34.0	33.7	34.1	32.3	3011	22.6	133
	5700	95	207	153	222	88	33.8	33.5	34.3	32.5	3078	22.6	136
	6500	95	245	87	230	108	34.2	32.7	34.4	32.8	3243	22.7	143

Table 2: Selection Guide, RGBW Pulsed Measurement Data ($T_j = T_c = 25^\circ\text{C}$)

Part Number	Color	Nominal Drive Current (mA)	Forward Voltage ³ (V)			Typical Pulsed Flux ^{3,4,5} (lm)	Typical Power (W)	Typical Efficacy (lm/W)
			Min	Typical	Max			
BXR-V-D13-RGBW3000-A3	Red	300	31.7	34	36.3	428	10.2	42
	Green	350	33.6	36	38.4	2520	12.6	200
	Blue	350	33.6	36	38.4	300	12.6	24
	White ⁷	350	33.6	36	38.4	1860	12.6	148

Notes for Tables 1 & 2:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. Listed CRIs are minimum values and include test tolerance.
3. Products tested under pulsed condition (10ms pulse width) at nominal drive current where T_j (junction temperature) = T_c (case temperature) = 25°C .
4. Typical performance values are provided as a reference only and are not a guarantee of performance.
5. Bridgelux maintains a $\pm 7.5\%$ tolerance on flux measurements
6. Typical stabilized DC performance values are provided as reference only and are not a guarantee of performance.
7. CSP for White color is targeted at CCT of 2500K

Product Selection Guide

Table 3: Selection Guide, White Stabilized DC Performance ($T_c = 55^\circ\text{C}$)⁶

Part Number	Nominal CCT ¹ (K)	CRI ²	Nominal Drive Current Per Channel (mA)				Forward Voltage ⁴ (V)				Typical DC Flux ^{3, 5, 6} (lm)	Typical Power (W)	Typical Efficacy (lm/W)
			White	Red	Green	Blue	White	Red	Green	Blue			
BXR-V-D13-RGBW3000-A3	1800	86	190	300	0	0	33.2	33.7	0.0	0.0	1224	16.4	75
	2200	93	230	300	27	1	33.5	33.7	31.2	29.4	1587	18.7	85
	2700	95	315	274	69	12	34.2	33.6	31.9	30.3	2211	22.5	98
	3000	95	282	275	93	20	34.0	33.6	32.2	30.6	2249	22.4	100
	3500	95	258	255	125	32	33.8	33.4	32.5	30.9	2355	22.3	106
	4000	95	272	196	155	47	33.9	33.0	32.9	31.2	2566	22.2	115
	5000	95	222	176	200	72	33.5	32.8	33.3	31.5	2604	22.1	118
	5700	95	207	153	222	88	33.3	32.6	33.5	31.7	2638	22.1	119
	6500	95	245	87	230	108	33.7	31.9	33.5	32.0	2782	22.2	125

Table 4: Selection Guide, RGBW Stabilized DC Performance at 350mA ($T_c=55^\circ\text{C}$)⁶

Part Number	Color	Nominal Drive Current (mA)	Forward Voltage ⁴ (V)			Typical DC Flux ^{3, 5, 6} (lm)	Typical Power (W)	Typical Efficacy (lm/W)
			Min	Typical	Max			
BXR-V-D13-RGBW3000-A3	Red	300	30.7	33.0	36.4	361	9.9	36
	Green	350	32.4	34.8	38.4	2178	12.1	180
	Blue	350	32.4	34.8	38.4	317	12.2	26
	White ⁷	350	32.4	34.8	38.4	1747	12.2	143

Notes for Tables 3 & 4:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. Listed CRIs are minimum values and include test tolerance.
3. Typical stabilized DC performance values are provided as reference only and are not a guarantee of performance.
4. Typical performance values are provided as a reference only and are not a guarantee of performance.
5. Bridgelux maintains a $\pm 7.5\%$ tolerance on flux measurements
6. 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 55°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.
7. CSP for White color is targeted at CCT of 2500K

Performance at Commonly Used Drive Currents

Vesta Series CSP RGBW arrays are tested to the specifications shown using the nominal drive currents in Tables 1 & 2. Vesta Series CSP RGBW arrays may also be driven at other drive currents dependent on specific application design requirements. The relative luminous flux vs. current characteristics are shown in Figures 2 & 3. The performance at commonly used drive currents is summarized in Tables 5 & 6.

Table 5: White Performance at Commonly Used Drive Currents ($T_j=T_c=25^{\circ}\text{C}$)

Nominal CCT (K)	CRI	Nominal Drive Current Per Channel (mA)				Forward Voltage (V)				Typical Pulsed Flux ² (lm)	Typical Power (W)	Typical Efficacy (lm/W)
		White	Red	Green	Blue	White	Red	Green	Blue			
1800	86	116	184	0	0	33.1	33.9	0.0	0.0	931	10.1	93
		155	245	0	0	33.4	34.3	0.0	0.0	1192	13.6	88
		190	300	0	0	33.6	34.7	0.0	0.0	1393	16.8	83
2700	95	215	187	47	8	34.0	33.7	32.2	30.9	1823	15.4	119
		287	249	63	11	34.4	34.1	32.4	31.0	2399	20.7	116
		315	274	69	12	34.8	34.5	32.6	31.0	2513	23.0	109
4000	95	187	135	107	32	33.7	33.2	33.0	31.5	2179	15.3	142
		249	180	142	43	34.1	33.5	33.4	31.7	2790	20.6	135
		272	196	155	47	34.4	33.9	33.7	31.9	2935	22.7	129
		307	221	175	53	34.7	34.1	33.9	32.0	3215	25.8	125
6500	95	168	60	158	74	33.5	32.4	33.6	32.2	2364	15.2	155
		224	79	210	99	33.9	32.5	34.1	32.5	3061	20.5	149
		245	87	230	108	34.2	32.7	34.4	32.8	3243	22.7	143
		276	98	259	122	34.4	32.9	34.6	32.9	3550	25.7	138

Notes for Table 5:

1. Alternate drive currents in Table 5 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a $\pm 7.5\%$ tolerance on flux measurements.
3. Please refer to Table 7 for maximum current ratings for each color.

Performance at Commonly Used Drive Currents

Table 6: RGB Performance at Commonly Used Drive Currents

Color	Drive Current Per Channel (mA)	Forward Voltage (V) $T_c = 25^\circ\text{C}$	Typical Power (W) $T_c = 25^\circ\text{C}$	Typical Pulsed Flux ² (lm) $T_c = 25^\circ\text{C}$
Red	50	32.1	1.6	92
	150	33.4	5.0	250
	200	33.9	6.8	320
	250	34.4	8.6	384
	300	34.9	10.5	444
Green	50	32.0	1.6	410
	150	33.3	5.0	1182
	200	33.8	6.8	1538
	250	34.4	8.6	1875
	300	34.9	10.5	2209
	350	36.0	12.6	2519
Blue	50	31.6	1.6	53
	150	33.2	5.0	146
	250	34.5	8.6	227
	350	35.7	12.5	300
	450	36.8	16.5	367
	500	37.3	18.6	399
White	50	32.0	1.6	306
	150	33.4	5.0	875
	250	34.5	8.6	1390
	350	36.0	12.6	1859
	450	36.6	16.5	2308
	500	37.0	18.5	2509

Notes for Table 6:

1. Alternate drive currents in Table 5 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a $\pm 7.5\%$ tolerance on flux measurements.
3. Please refer to Table 7 for maximum current ratings for each color.

Absolute Maximum Ratings

Table 7: Maximum Ratings

Parameter	Maximum Rating			
Storage Temperature	-40°C to +85°C			
Operating Case Temperature (T _c)	65°C			
Soldering Temperature	350°C or lower for a maximum of 5 seconds			
	White	Red	Green	Blue
Maximum Drive Current Per Channel or Per Color	500mA	300mA	350mA	500mA
Maximum Peak Pulsed Forward Current ¹	700mA	500mA	500mA	700mA

Note for Table 7:

1. Bridgelux recommends a maximum duty cycle of 10% and pulse width of 20ms when operating LED arrays at the maximum peak pulsed current specified. Maximum peak pulsed currents indicate values where the LED array can be driven without catastrophic failures.

Table 8: Dimming White with CRI95 Ratio

CCT Color	1800K	2200K	2700K	3000K	3500K	4000K	5000K	5700K	6500K
W	38.78%	41.22%	47.01%	42.09%	38.51%	40.60%	33.13%	30.90%	36.57%
R	61.22%	53.76%	40.90%	41.04%	38.06%	29.25%	26.27%	22.84%	12.99%
G	0.00%	4.84%	10.30%	13.88%	18.66%	23.13%	29.85%	33.13%	34.33%
B	0.00%	0.18%	1.79%	2.99%	4.78%	7.01%	10.75%	13.13%	16.12%

Performance Curves

Figure 1: Relative Current Ratio vs. CCT at CRI 95 ($T_c = 55^\circ\text{C}$)

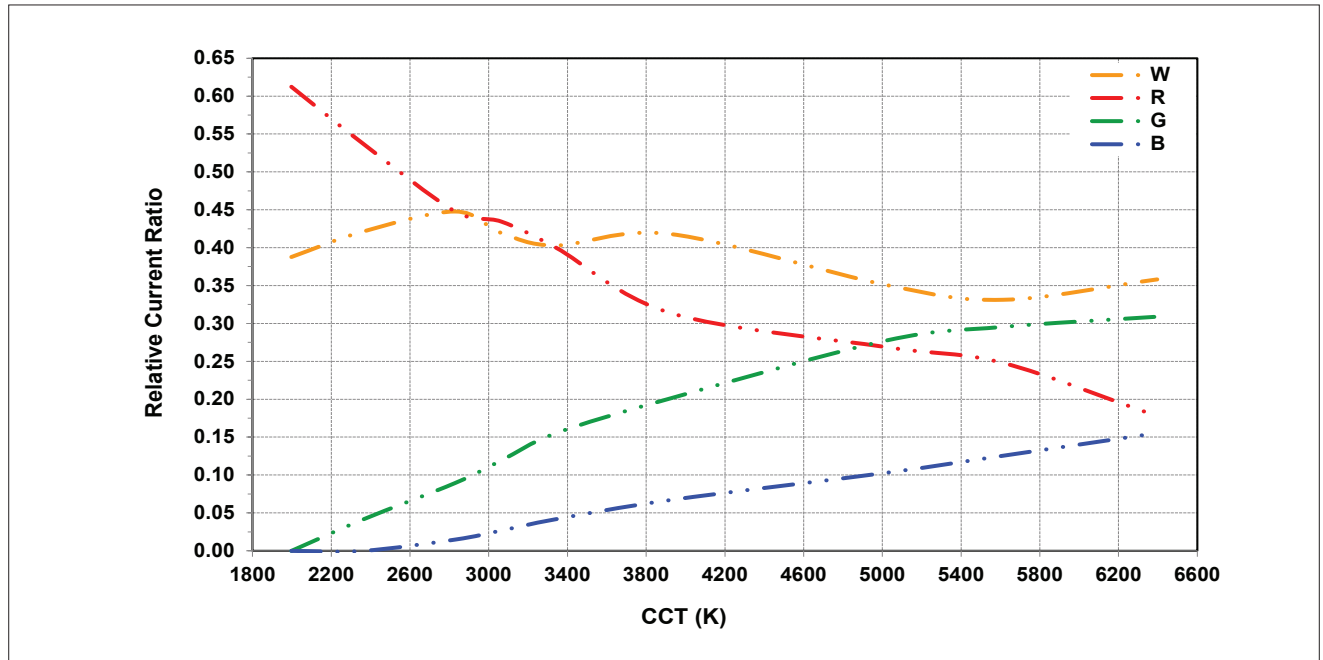
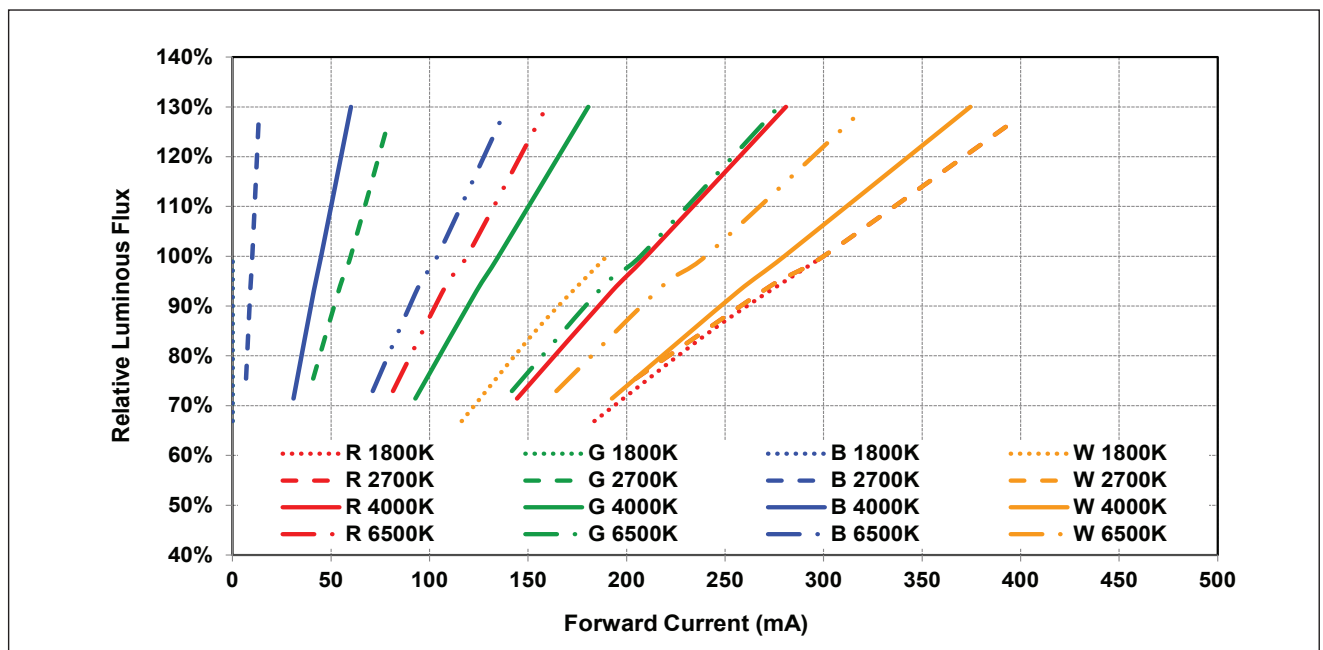


Figure 2: Typical Relative Luminous Flux (White CCT) vs. Drive Current Per Channel at CRI 95

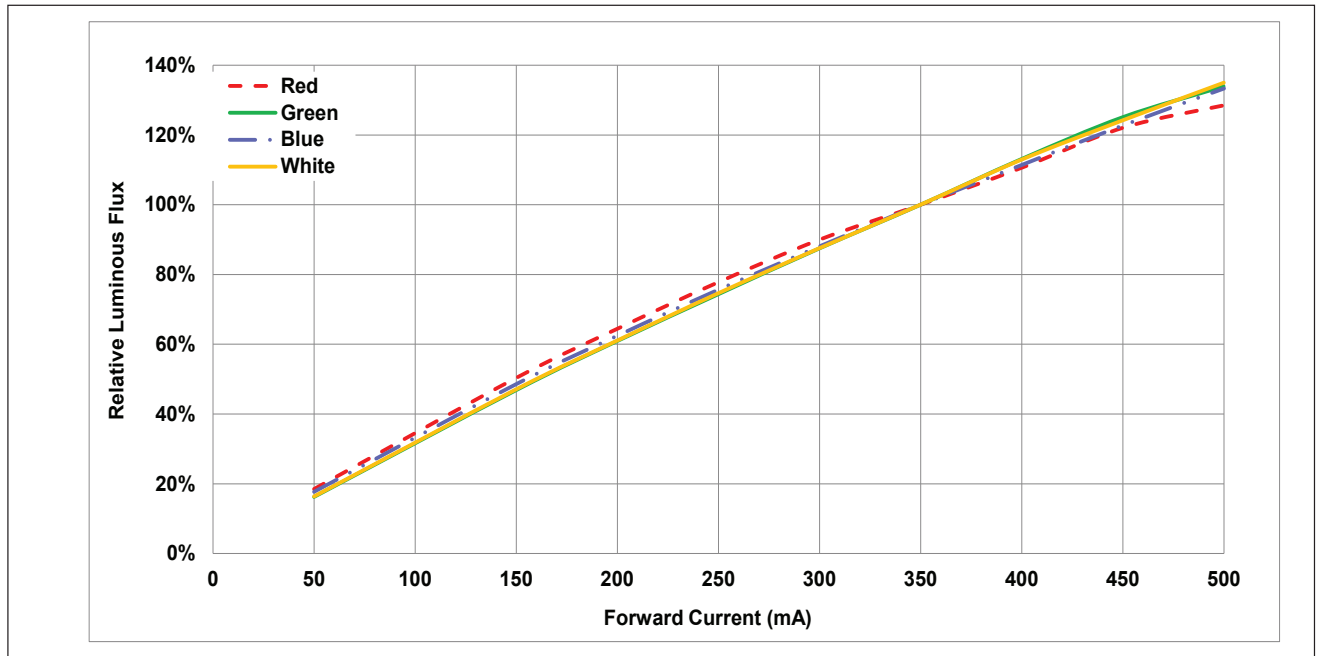


Notes for Figure 2:

1. Bridgelux does not recommend driving LEDs at low currents. Doing so may produce unpredictable results. Pulse width modulation (PWM) is recommended for dimming effects
2. Please refer to Table 7 for maximum current ratings for each color. The curves extending beyond the maximum current are provided for reference only.

Performance Curves

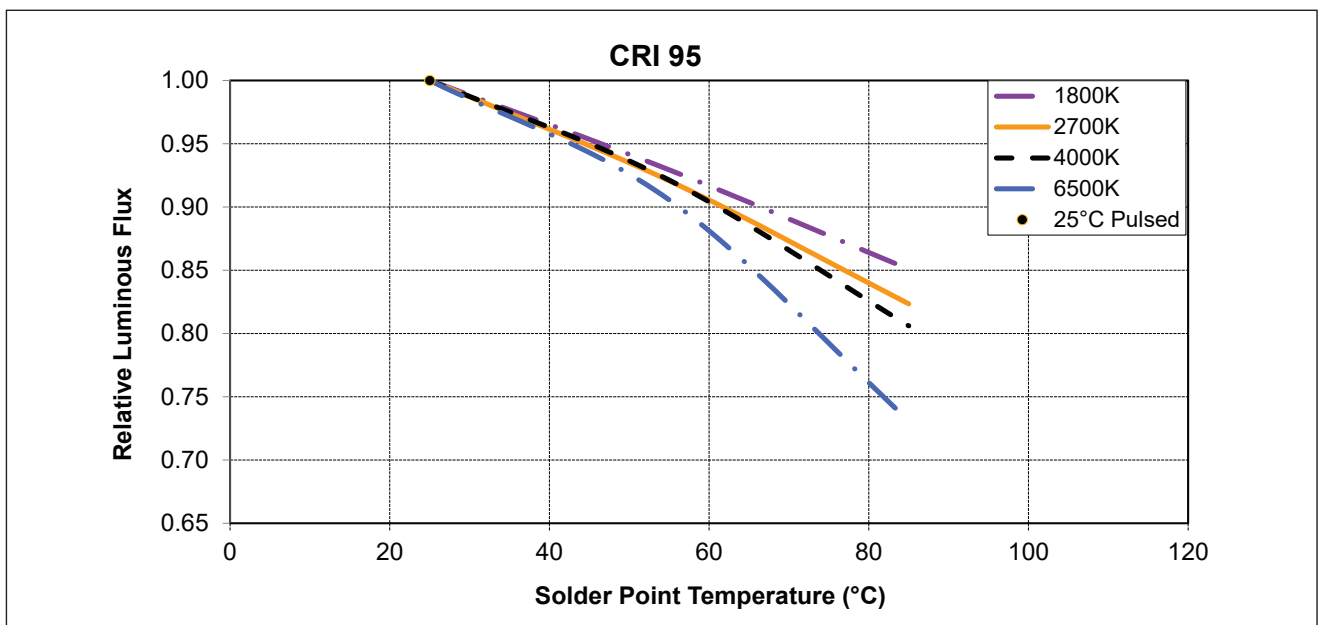
Figure 3: Typical Relative Luminous Flux (RGBW) vs. Drive Current Per Color ($T_c = 25^\circ\text{C}$)



Notes for Figure 3:

1. Bridgelux does not recommend driving LEDs at low currents. Doing so may produce unpredictable results. Pulse width modulation (PWM) is recommended for dimming effects.
2. Please refer to Table 7 for maximum current ratings for each color. The curves extending beyond the maximum current are provided for reference only.

Figure 4: Typical Relative Luminous Flux (White CCT) vs. Solder Point Temperature at CRI 95



Performance Curves

Figure 5: Chromaticity Coordinate Group (Color Targeted at $T_c = 55^\circ\text{C}$)

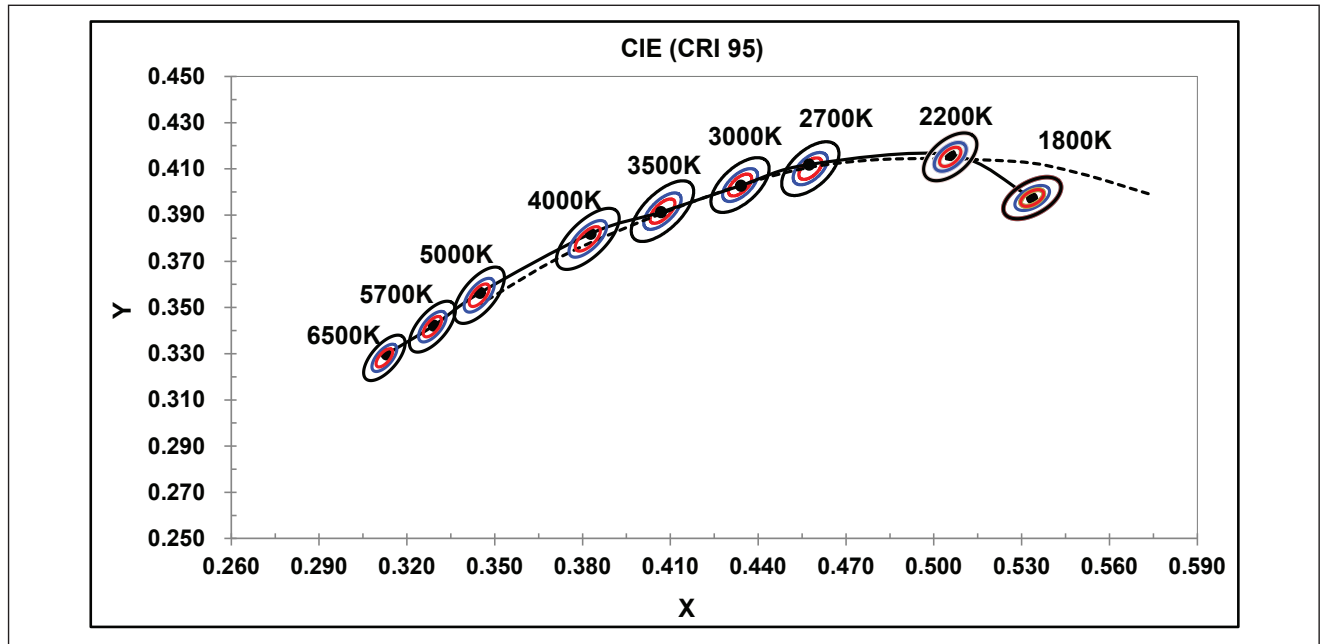
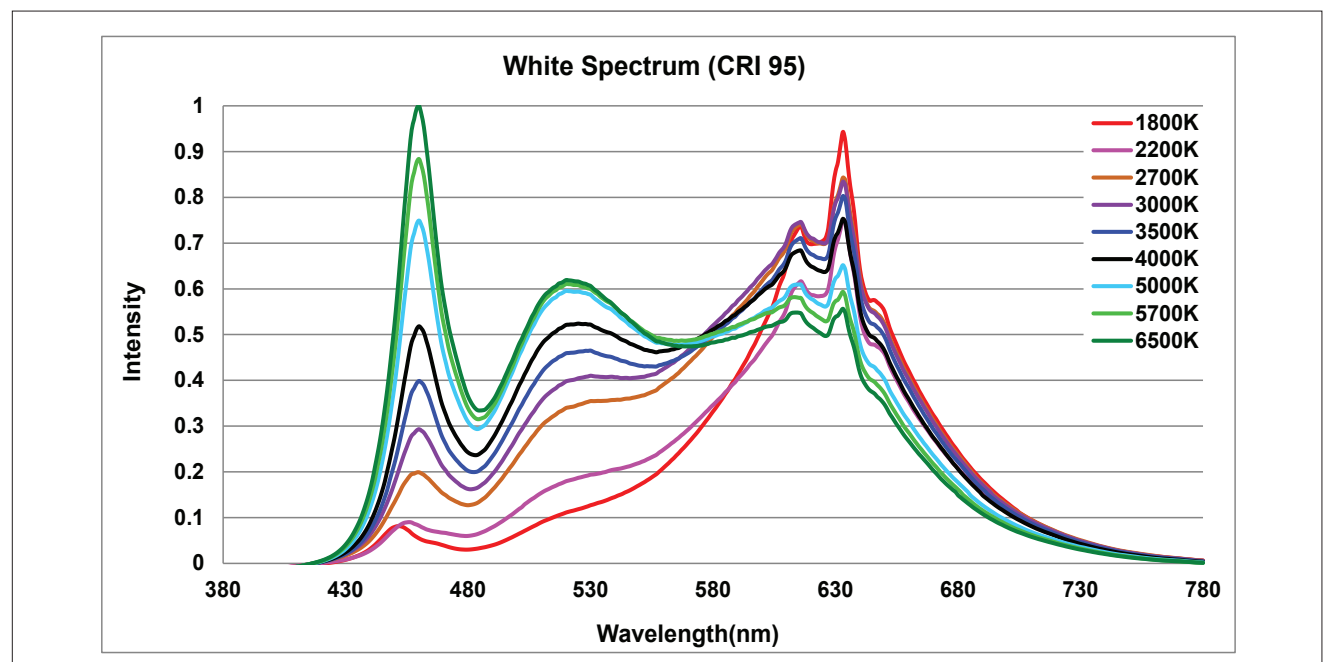
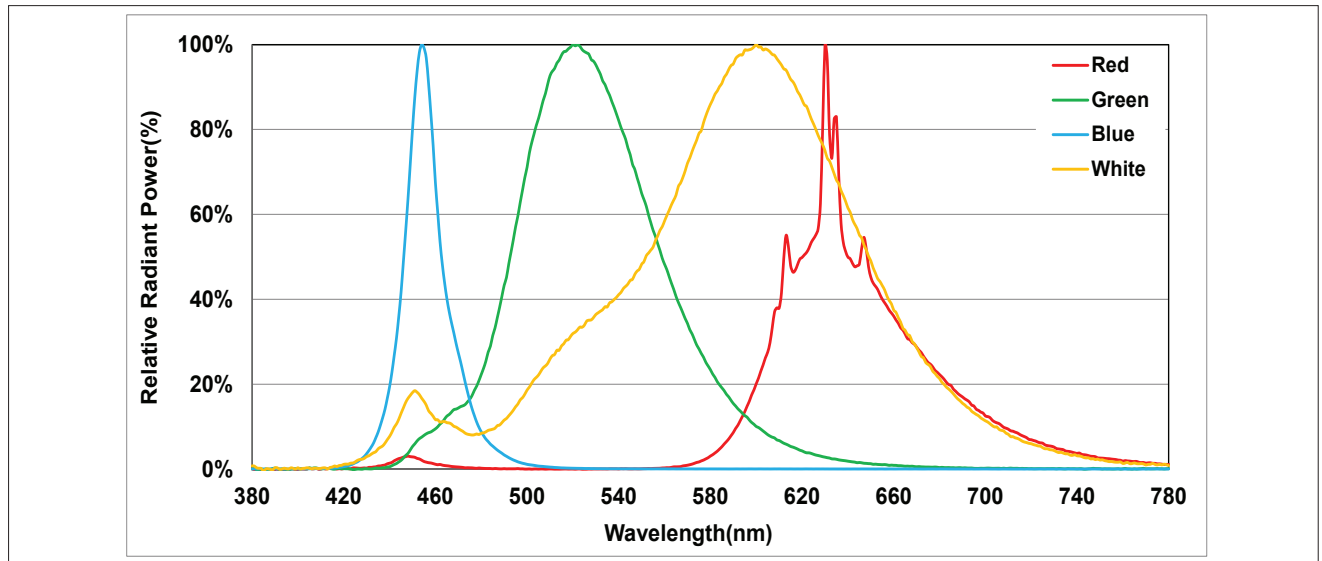


Figure 6: Typical Color Spectrum (White CCT, at $T_c = 55^\circ\text{C}$)



Typical Color Spectrum

Figure 7: Typical Color Spectrum (RGBW)



Notes for Figure 7: Color spectra measured at nominal current for $T_c = 55^\circ\text{C}$.

Product Bin Definitions

Table 9: RGW MacAdam Ellipse Color Bin Definitions

Color	Center Point		Major Axis	Minor Axis	Ellipse Rotation Angle	Color Bin
	X	Y				
R	0.6568	0.3095	0.01854	0.00828	160	1
G	0.2455	0.6000	0.03084	0.00960	75	1
W	0.4870	0.4320	0.00834	0.00408	53.22	3
			0.01390	0.00680	53.22	5 (E/F/G/H)

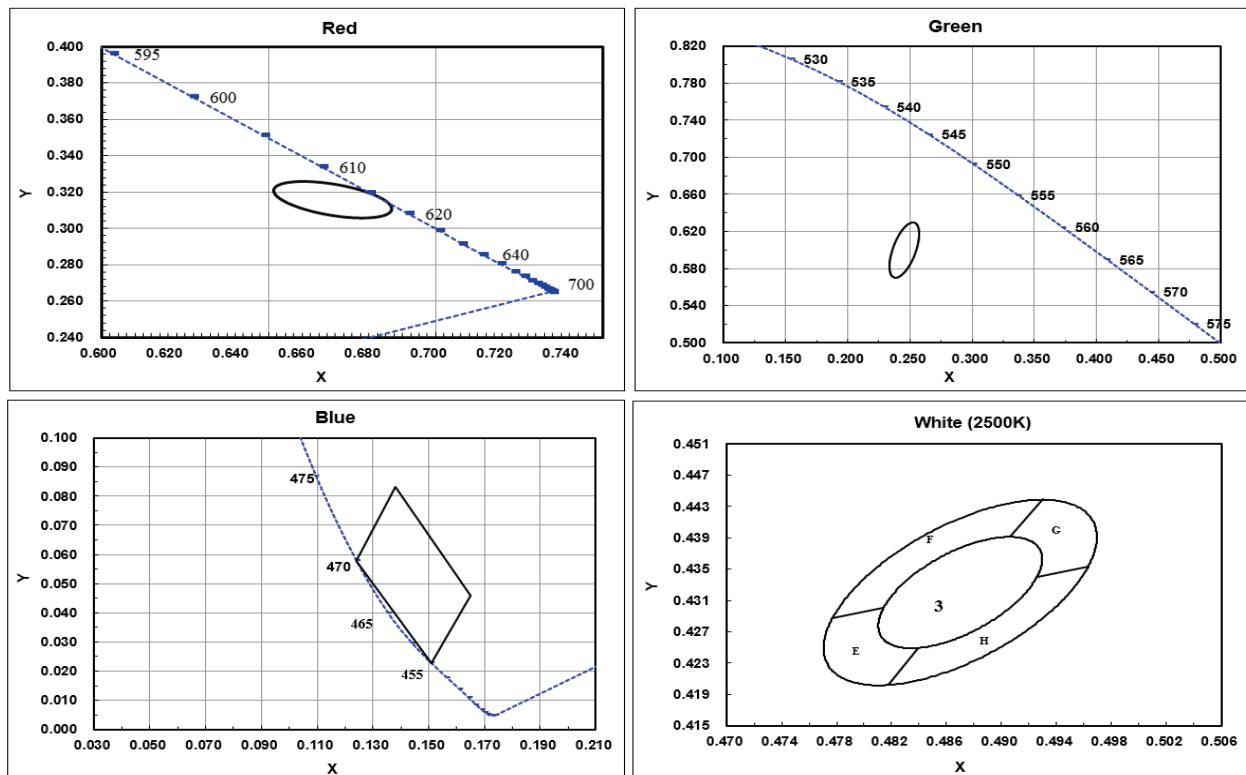
Table 10: Blue MacAdam Ellipse Color Bin Definitions

	Coordinates			
X	0.1510	0.1241	0.1380	0.1650
Y	0.0227	0.0578	0.0830	0.0460

Notes for Tables 9 & 10:

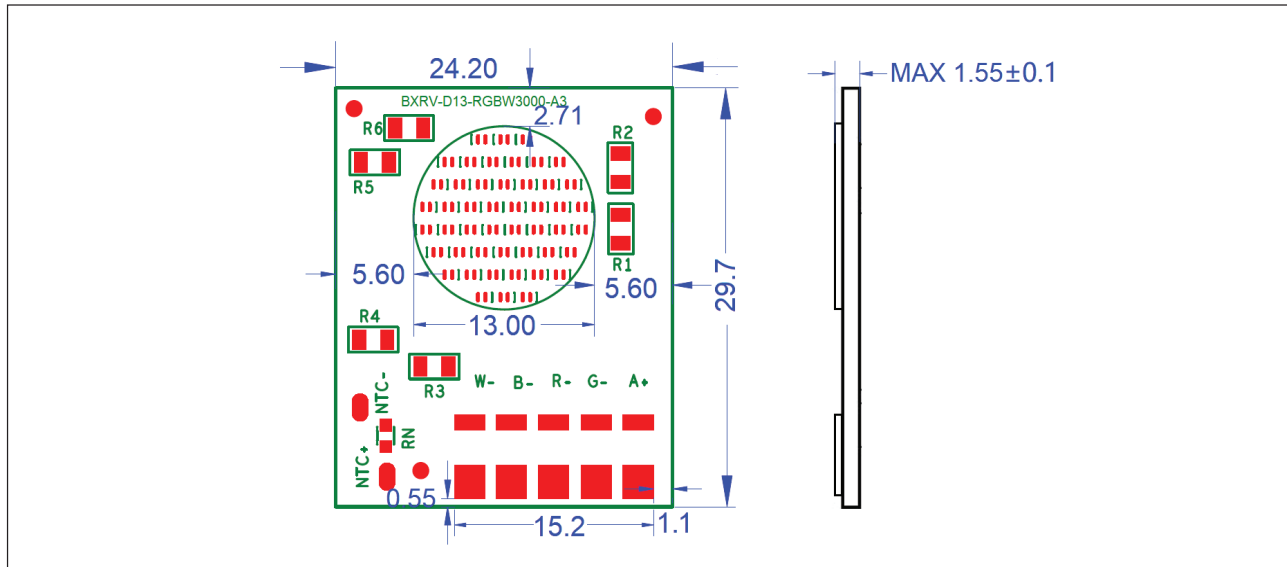
1. Color binning at $T_c = 55^\circ\text{C}$ unless otherwise specified
2. Bridgelux maintains a tolerance of ± 0.007 on x and y color coordinates.

Figure 8: Chromaticity Coordinate Group (1 Color Bin Structure, Color Targeted at $T_c = 55^\circ\text{C}$)



Mechanical Dimensions

Figure 9: Mechanical Drawing Specifications



Notes for Figure 9:

1. Solder pads are labeled "+" to denote positive polarity and "-" to denote negative polarity.
2. Drawings are not to scale.
3. Drawing dimensions are in millimeters.
4. Unless otherwise specified, tolerances are ± 0.10 mm.
5. The optical center of the LED array is nominally defined by the mechanical center of the array.

Packaging and Labeling

Figure 10: Vesta Series RGBW 13mm LES Array Packaging and Labeling

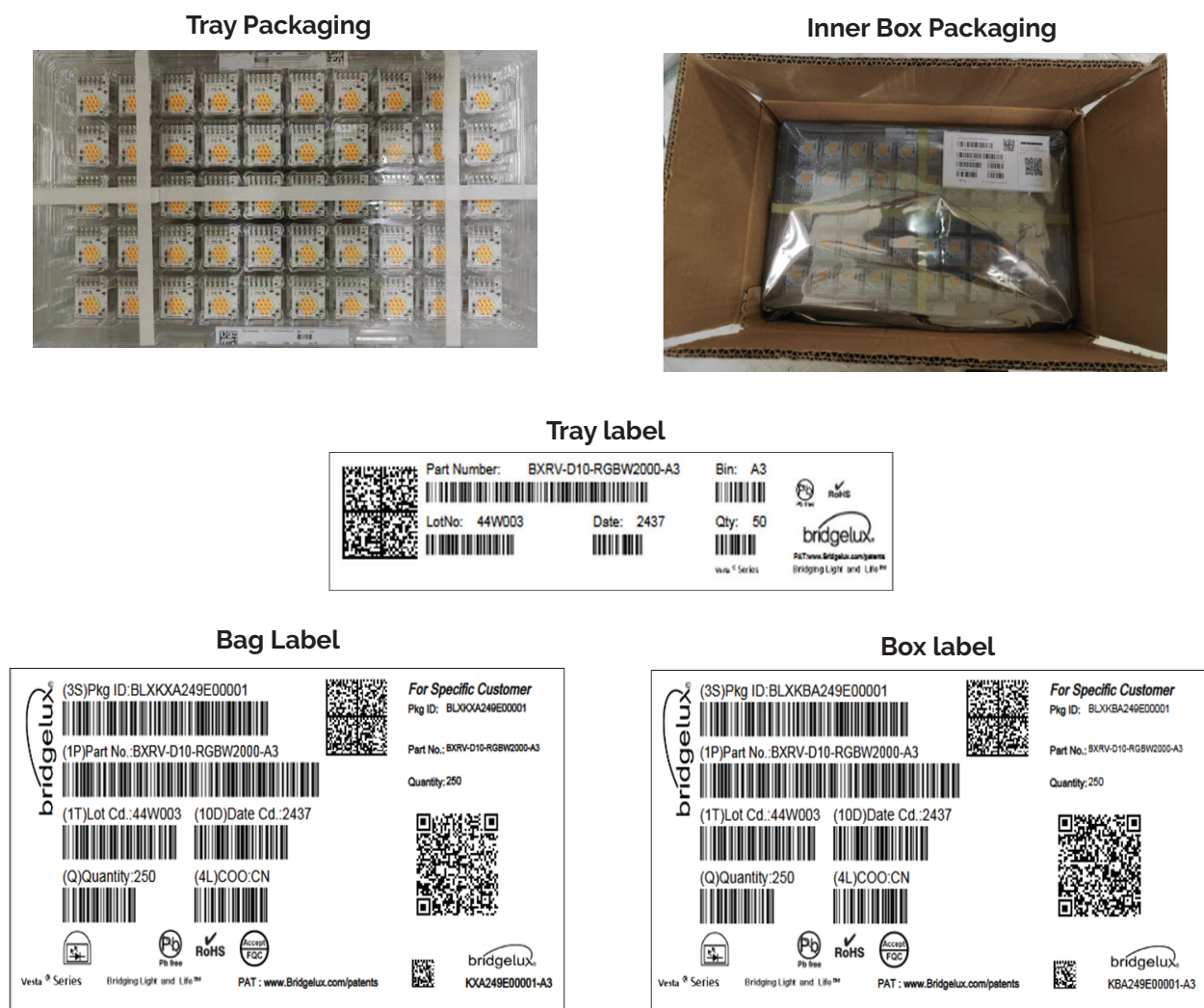


Table 11: Packaging Structure

Packaging Item	Quantity	Size
Tray	50pcs COB	360mm x 210mm x 10mm
Anti-static Bag	10 Trays + 1 Tray Cover	520mm x 340mm x 50mm
Inner Box	1 Bag	380mm x 230 mm x 230 mm

Outer Box Carton Type	Full Box Quantity	Shipping Box
1PK	1 Inner box (can ship directly)	380mm x 230 mm x 230 mm
4PK	4 Inner boxes	Add extra 4PK outer boxes based on order quantity
8PK	8 Inner boxes	Add extra 8PK outer boxes based on order quantity

Design Resources

Application Notes

Vesta Series RGBW arrays are intended for use in dry, indoor applications. Bridgelux has developed a comprehensive set of application notes and design resources to assist customers in successfully designing with the Vesta Series product family of LED array products. For a list 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 Vesta Series LED arrays are available in both IGS and STEP formats. Please contact your Bridgelux sales representative for assistance.

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Please contact your Bridgelux sales representative for more information.

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 for additional information.

CAUTION: EYE SAFETY

The Bridgelux Vesta 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 Vesta Series LED array during operation. Allow the array to cool for a sufficient period of time before handling. The Vesta 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). Optical devices may be mounted on the top surface of the Vesta Series LED array. Use the mechanical features of the LED array housing, edges and/or mounting holes to locate and secure optical devices as needed.

Disclaimers

STANDARD TEST CONDITIONS

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

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 optimi-

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

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