

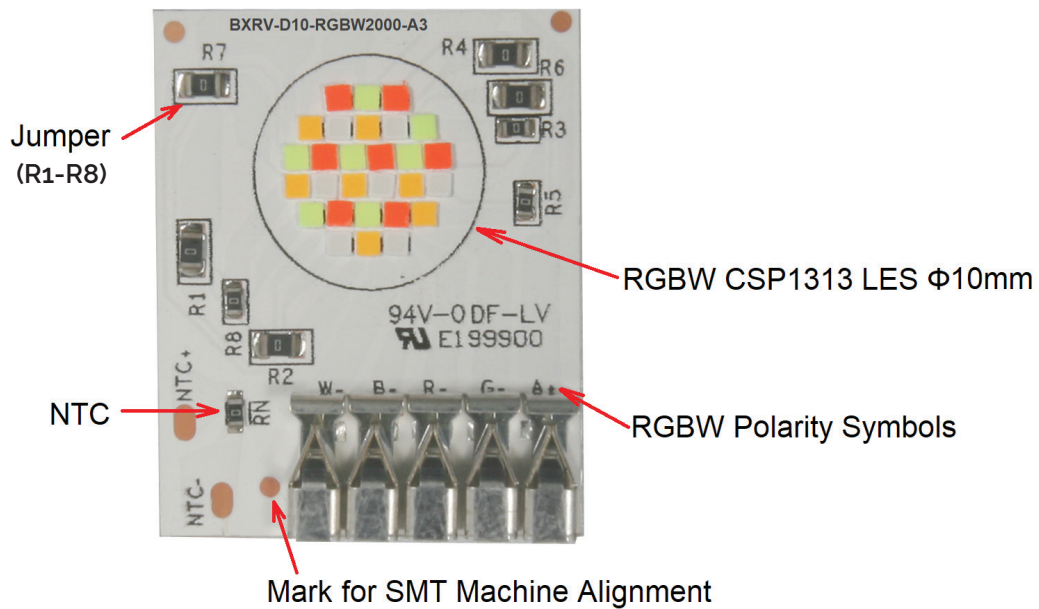
# Bridgelux® Vesta® Series RGBW 10mm Array With CSP

Product Data Sheet DS581



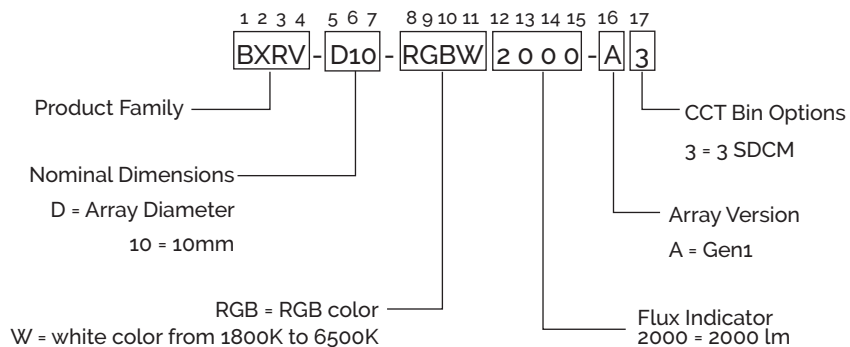
# Product Feature Map

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](http://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 <sup>1</sup> (K)	CRI <sup>2</sup>	Nominal Drive Current Per Channel (mA)				Forward Voltage <sup>3</sup> (V)				Typical Pulsed Flux <sup>3,4,5</sup> (lm)	Typical Power (W)	Typical Efficacy (lm/W)
			White	Red	Green	Blue	White	Red	Green	Blue			
BXR-V-D10-RGBW2000-A3	1800	86	190	300	0	0	19.7	20.2	0.0	0.0	810	9.8	83
	2200	93	230	300	27	1	19.9	20.2	18.6	17.6	1051	11.2	94
	2700	95	315	274	69	12	20.3	20.0	19.0	18.1	1460	13.4	109
	3000	95	282	275	93	20	20.1	20.0	19.2	18.2	1489	13.3	112
	3500	95	258	255	125	32	20.0	19.9	19.2	18.4	1564	13.2	118
	4000	95	272	196	155	47	20.1	19.7	19.4	18.6	1703	13.2	129
	5000	95	222	176	200	72	19.8	19.5	19.6	18.8	1737	13.1	132
	5700	95	207	153	222	88	19.7	19.4	19.7	18.9	1775	13.1	135
	6500	95	245	87	230	108	19.9	19.0	19.8	19.1	1870	13.1	142

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 <sup>3</sup> (V)			Typical Pulsed Flux <sup>3,4,5</sup> (lm)	Typical Power (W)	Typical Efficacy (lm/W)
			Min	Typical	Max			
BXR-V-D10-RGBW2000-A3	Red	300	19.0	20.4	21.8	256	6.1	42
	Green	350	19.6	21	22.4	1470	7.3	200
	Blue	350	19.6	21	22.4	175	7.4	24
	White <sup>7</sup>	350	19.6	21	22.4	1085	7.3	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) =  $25^\circ\text{C}$ .

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 ( $T_c = 55^\circ\text{C}$ )<sup>6</sup>

Part Number	Nominal CCT <sup>1</sup> (K)	CRI <sup>2</sup>	Nominal Drive Current Per Channel (mA)				Forward Voltage <sup>4</sup> (V)				Typical DC Flux <sup>3, 5, 6</sup> (lm)	Typical Power (W)	Typical Efficacy (lm/W)
			White	Red	Green	Blue	White	Red	Green	Blue			
BXR-V-D10-RGBW2000-A3	1800	86	190	300	0	0	19.2	19.7	0.0	0.0	724	9.6	76
	2200	93	230	300	27	1	19.4	19.7	18.0	17.1	937	10.9	86
	2700	95	315	274	69	12	19.8	19.6	18.4	17.7	1305	13.2	100
	3000	95	282	275	93	20	19.7	19.6	18.6	17.8	1333	13.1	102
	3500	95	258	255	125	32	19.6	19.5	18.8	18.0	1397	13.1	108
	4000	95	272	196	155	47	19.6	19.2	19.0	18.2	1522	13.0	118
	5000	95	222	176	200	72	19.4	19.1	19.2	18.4	1555	12.9	121
	5700	95	207	153	222	88	19.3	19.0	19.3	18.5	1580	12.9	123
	6500	95	245	87	230	108	19.5	18.7	19.3	18.7	1666	12.9	130

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

Part Number	Color	Nominal Drive Current (mA)	Forward Voltage <sup>4</sup> (V)			Typical DC Flux <sup>3, 5, 6</sup> (lm)	Typical Power (W)	Typical Efficacy (lm/W)
			Min	Typical	Max			
BXR-V-D10-RGBW2000-A3	Red	300	18.6	20.0	22.1	218	6.0	36
	Green	350	18.9	20.3	22.4	1271	7.1	179
	Blue	350	18.9	20.3	22.4	185	7.1	26
	White <sup>7</sup>	350	18.9	20.3	22.4	1019	7.1	144

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  $55^\circ\text{C}$ . 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 <sup>2</sup> (lm)	Typical Power (W)	Typical Efficacy (lm/W)
		White	Red	Green	Blue	White	Red	Green	Blue			
1800	86	116	184	0	0	19.4	19.8	0.0	0.0	542	5.9	92
		155	245	0	0	19.6	20.0	0.0	0.0	693	7.9	87
		190	300	0	0	19.7	20.2	0.0	0.0	810	9.8	83
2700	95	215	187	47	8	19.8	19.5	18.8	18.0	1055	8.9	118
		287	249	63	11	20.0	19.7	18.9	18.1	1390	12.1	115
		315	274	69	12	20.3	20.0	19.0	18.1	1460	13.4	109
4000	95	187	135	107	32	19.6	19.2	19.0	18.5	1260	8.9	142
		249	180	142	43	19.8	19.4	19.2	18.6	1615	12.0	135
		272	196	155	47	20.1	19.7	19.4	18.6	1703	13.2	129
		307	221	175	53	20.2	19.7	19.5	18.8	1859	14.9	125
6500	95	166	57	160	75	19.4	18.7	19.3	18.9	1361	8.8	154
		222	76	214	100	19.6	18.8	19.5	19.1	1761	11.9	148
		245	87	230	108	19.9	19.0	19.8	19.1	1870	13.1	142
		274	94	264	124	19.9	19.0	19.9	19.4	2044	14.9	137

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 <sup>2</sup> (lm) $T_c = 25^\circ\text{C}$
Red	50	18.7	0.9	54
	150	19.5	2.9	146
	200	19.8	4.0	187
	250	20.1	5.0	224
	300	20.4	6.1	259
Green	50	18.6	0.9	239
	150	19.4	2.9	689
	200	19.7	3.9	897
	250	20.1	5.0	1094
	300	20.3	6.1	1289
	350	21.0	7.4	1470
Blue	50	18.5	0.9	31
	150	19.4	2.9	85
	250	20.2	5.0	132
	350	20.8	7.3	175
	450	21.5	9.7	214
	500	21.7	10.9	233

Notes for Table 6:

1. Alternate drive currents in Table 6 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 <sup>1</sup>	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 ( $T_c = 55^\circ\text{C}$ )

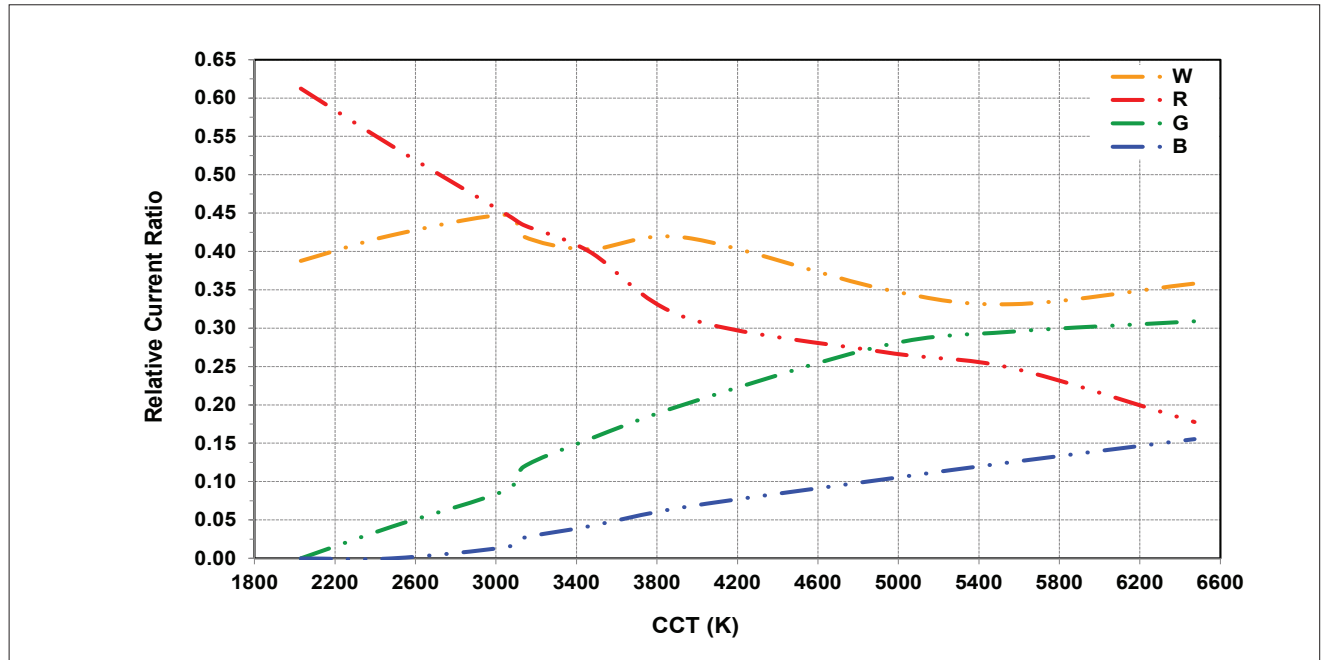
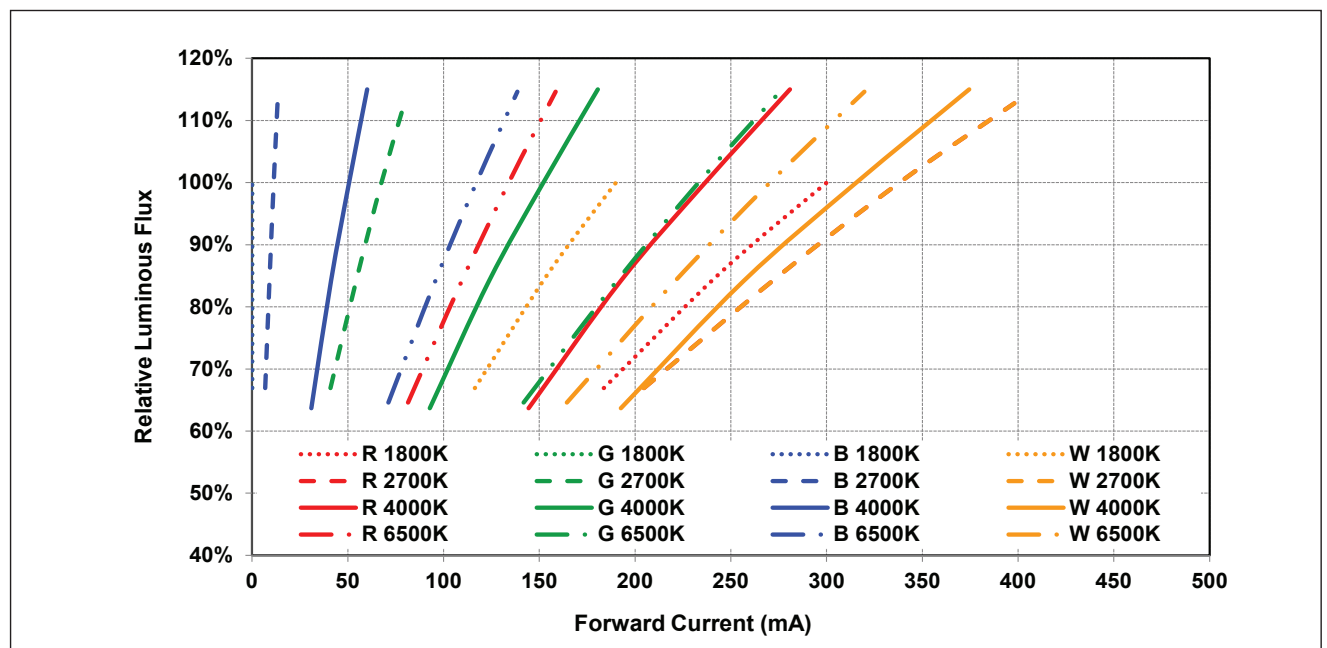


Figure 2: Typical Relative Luminous Flux (White CCT) vs. Drive Current Per Channel at CRI 95



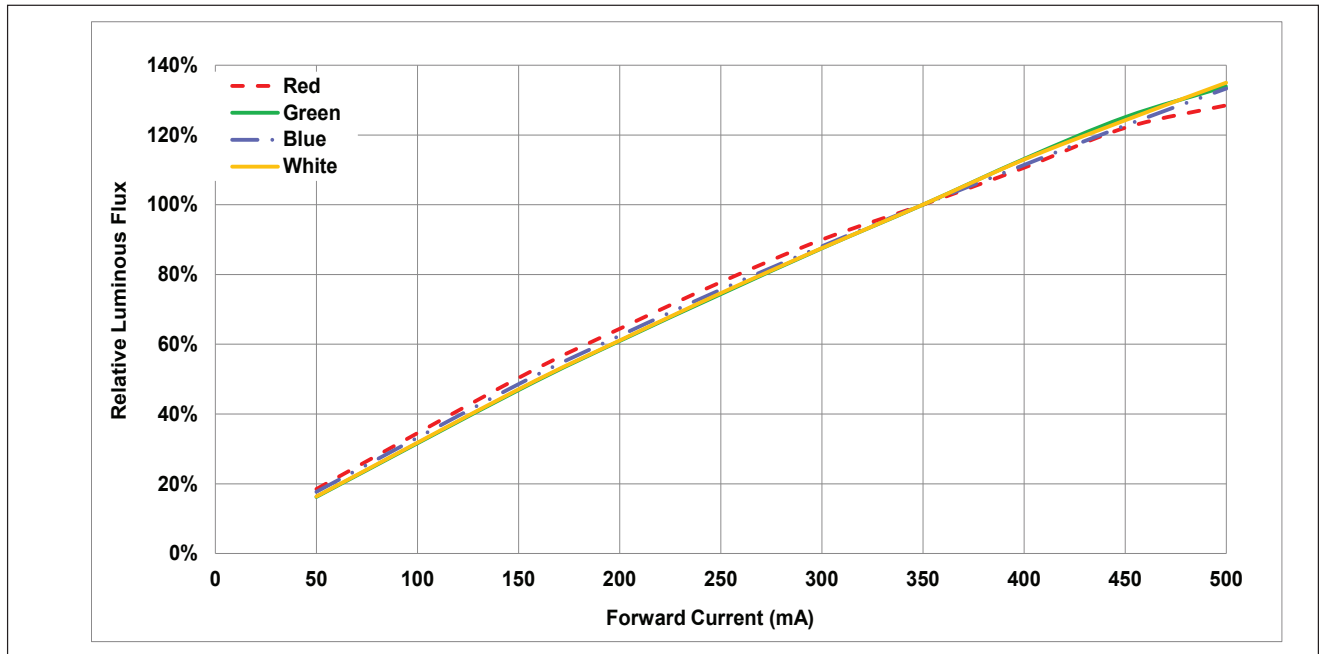
Notes for Figure 2:

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

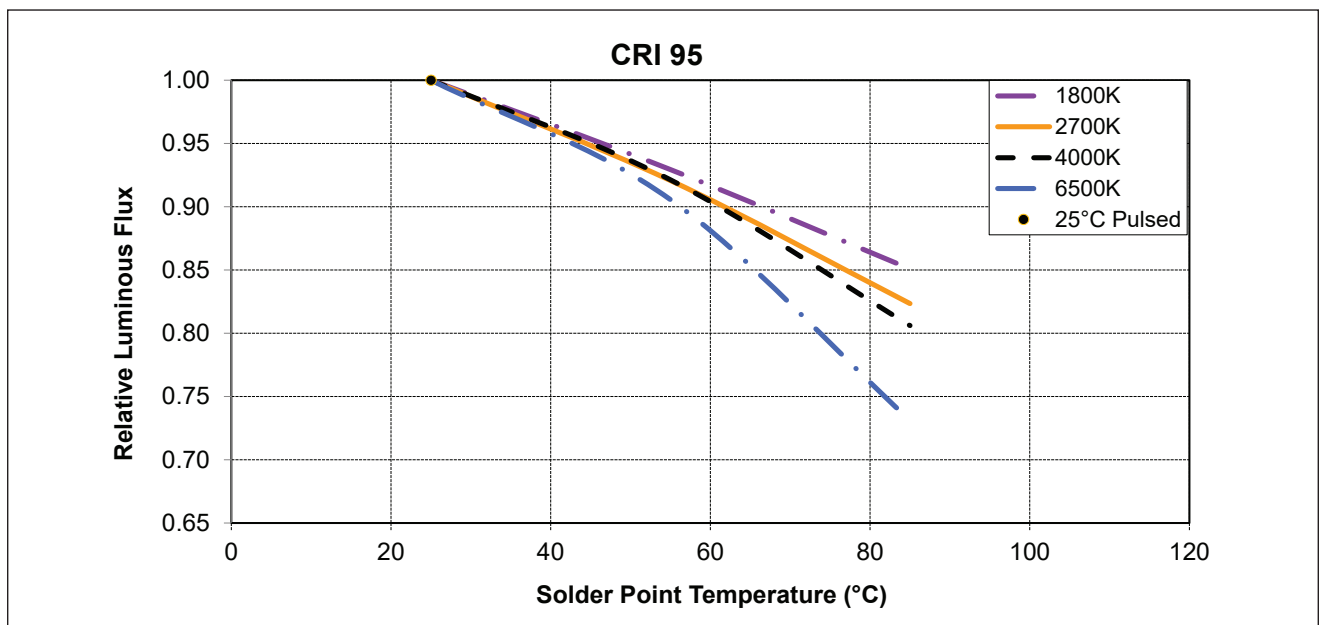
Figure 3: Typical Relative Luminous Flux (RGBW) vs. Drive Current Per Color ( $T_c = 25^\circ\text{C}$ )



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  $T_c = 55^\circ\text{C}$ )

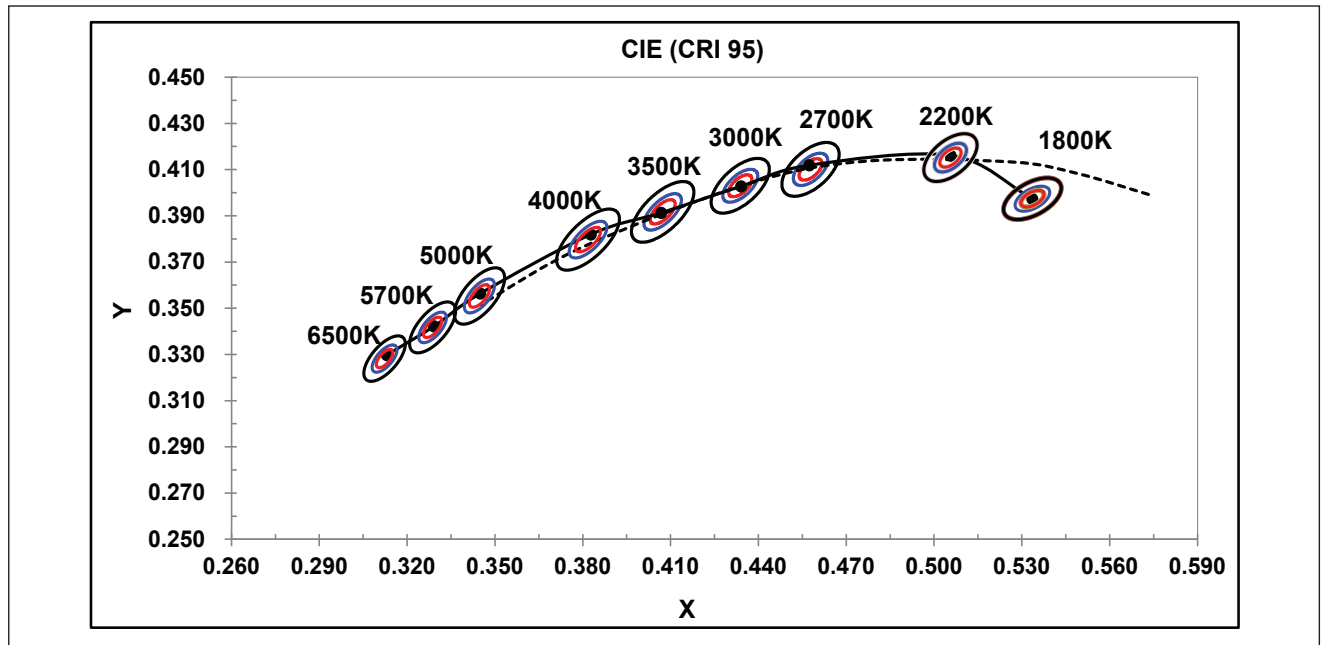
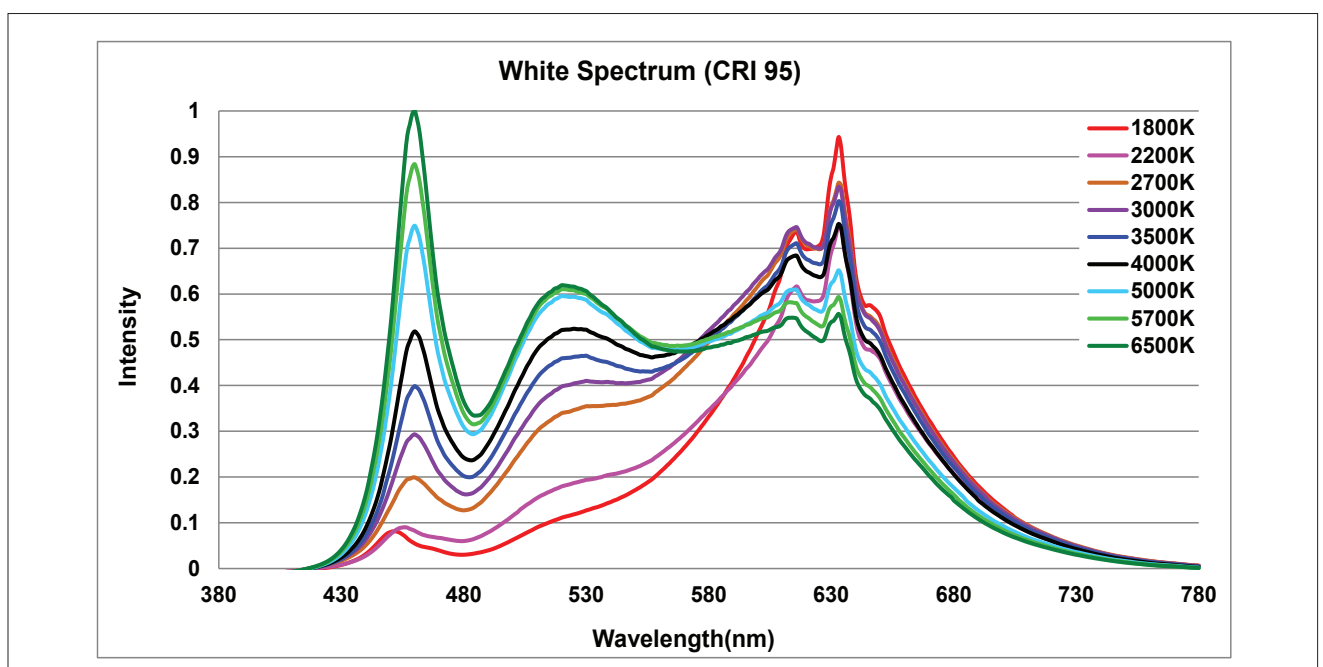
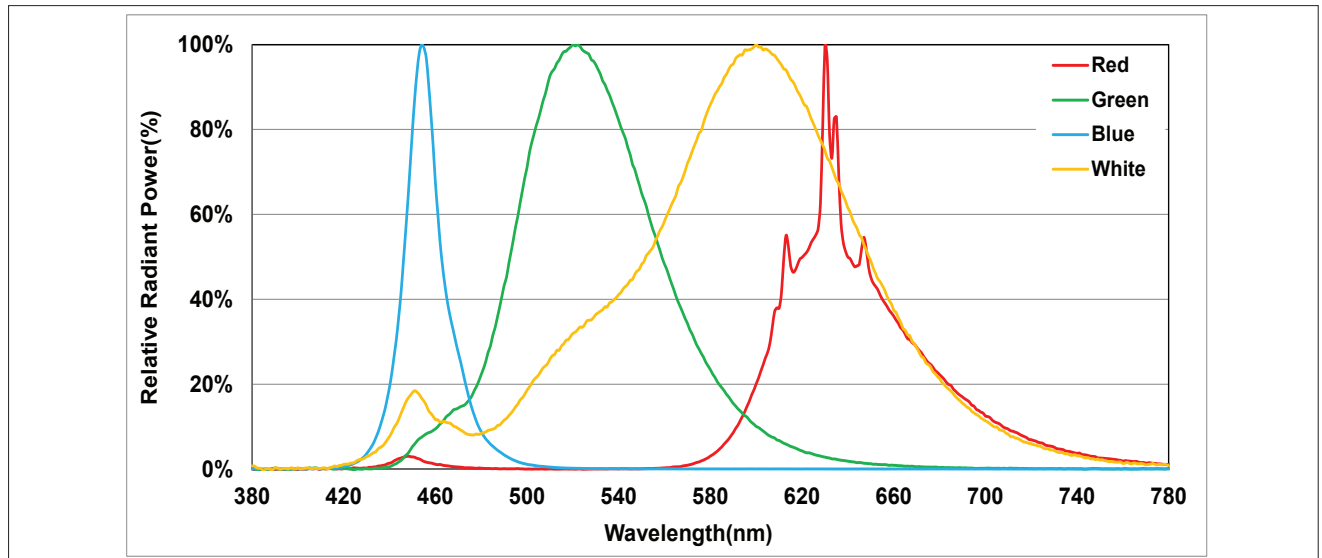


Figure 6: Typical Color Spectrum (White CCT, at  $T_c = 55^\circ\text{C}$ )



# 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)

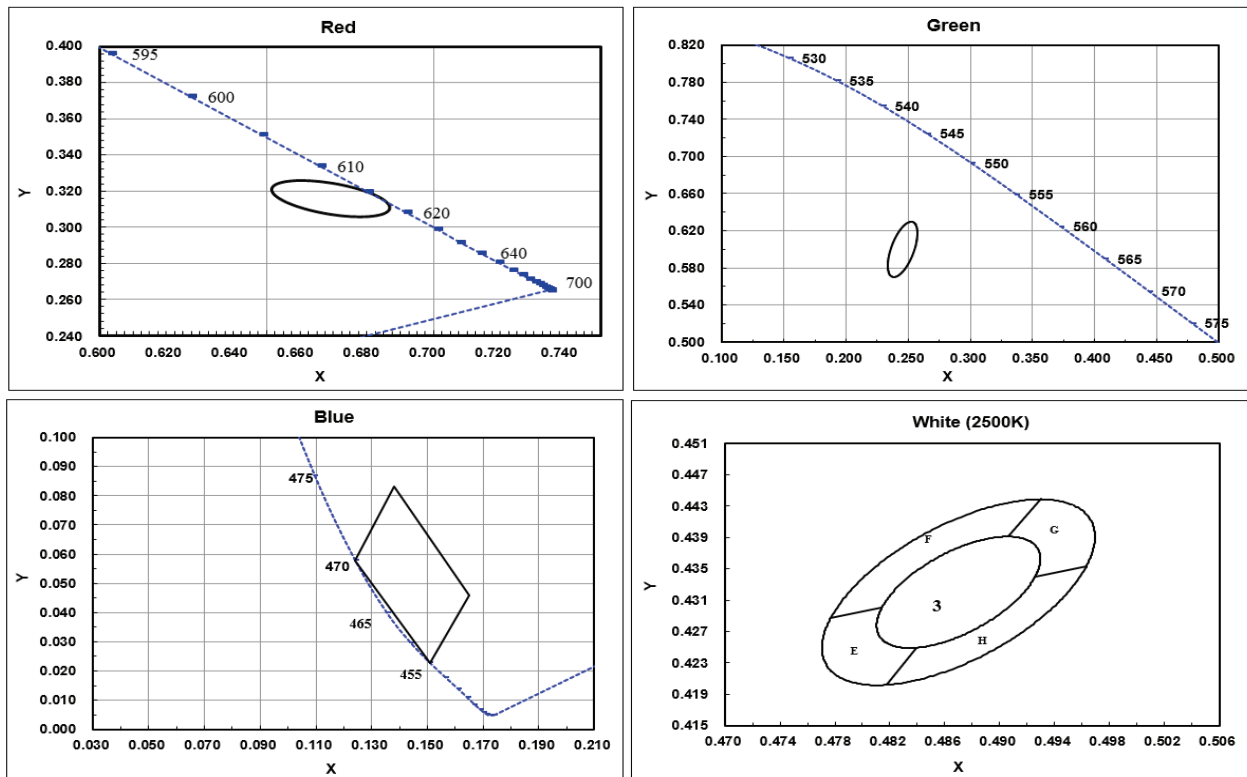
Table 10: Blue MacAdam Ellipse Color Bin Definitions

	Coordinates			
X	0.1510	0.1241	0.1380	0.1650
Y	0.0227	0.0578	0.0830	0.0460

Notes for Tables 9 & 10:

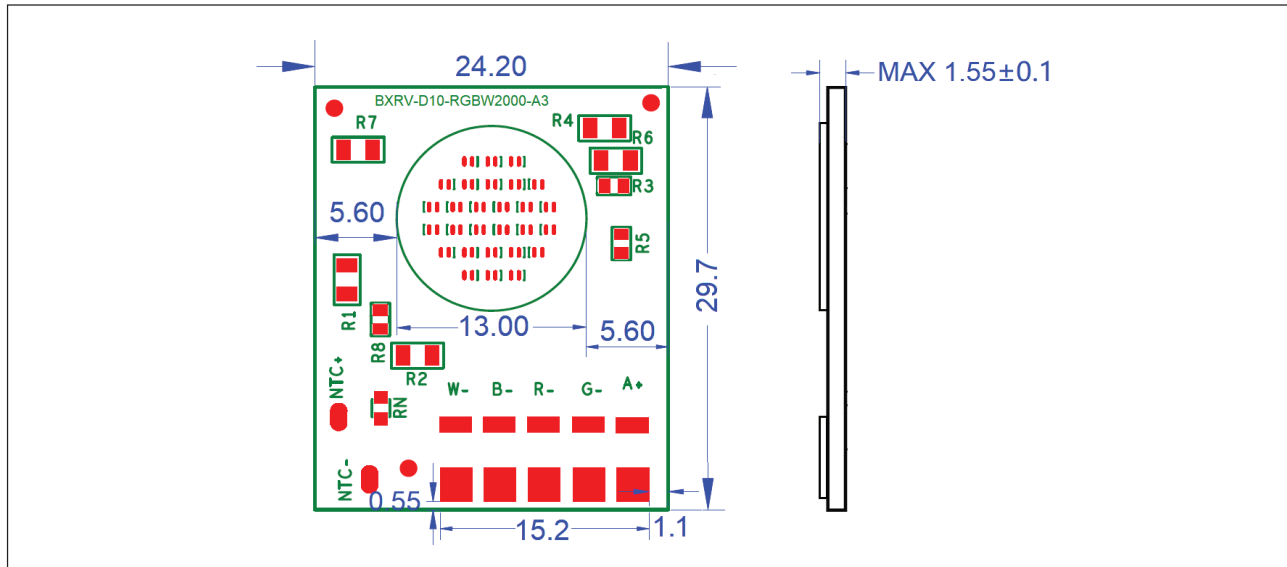
1. Color binning at  $T_c = 55^\circ\text{C}$  unless otherwise specified
2. Bridgelux maintains a tolerance of  $\pm 0.007$  on x and y color coordinates.

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  $\pm 0.10\text{mm}$ .
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 10mm 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](http://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](http://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.

## LM80

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 optimization.

# 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](http://bridgelux.com)

[twitter.com/Bridgelux](https://twitter.com/Bridgelux)

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46410 Fremont Blvd  
Fremont, CA 94538 USA  
Tel (925) 583-8400  
[www.bridgelux.com](http://www.bridgelux.com)