

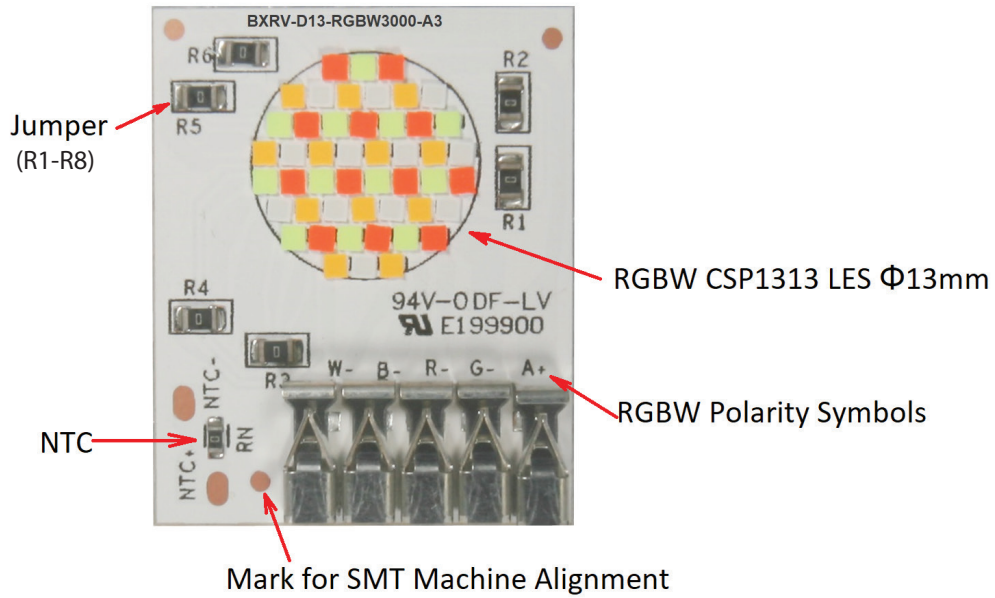
Bridgelux® Vesta® Series RGBW 13mm Array With CSP

Product Data Sheet DS582



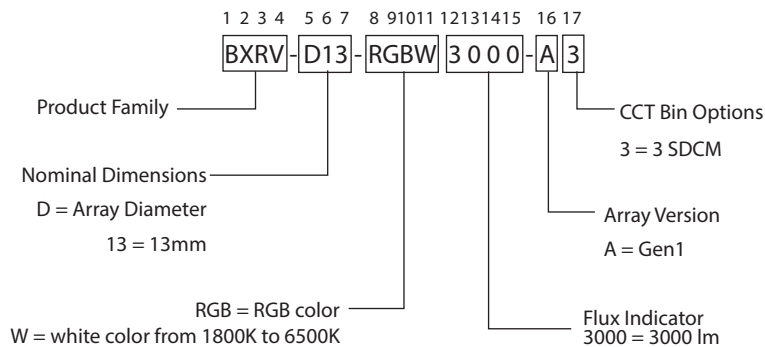
Product Feature Map

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			
BXRV-D13-RGBW3000-A3	1800	86	190	300	0	0	33.8	34.7	0.0	0.0	1288	16.8	77
	2200	90	240	288	23	0	34.2	34.6	31.8	0.0	1685	18.9	89
	2700	90	425	257	60	13	35.6	34.3	32.5	30.8	2658	26.3	101
	3000	90	464	187	81	23	35.8	33.8	32.8	31.1	2912	26.3	111
	3500	90	471	136	110	38	35.9	33.3	33.2	31.5	3115	26.3	119
	4000	90	449	109	142	55	35.7	33.0	33.5	31.8	3266	26.1	125
	5000	90	412	75	182	86	35.5	32.6	33.9	32.3	3407	26.0	131
	5700	90	398	55	200	102	35.4	32.3	34.1	32.6	3465	26.0	133
BXRV-D13-RGBW3000-A3	6500	90	377	40	220	118	35.3	32.0	34.3	32.8	3504	26.0	135
	1800	86	190	300	0	0	33.8	34.7	0.0	0.0	1286	16.8	76
	2200	93	235	300	23	0	34.2	34.7	31.8	0.0	1665	19.2	87
	2700	95	300	300	60	10	34.7	34.7	32.5	30.7	2231	23.1	97
	3000	95	281	291	80	18	34.5	34.6	32.8	31.0	2317	23.0	101
	3500	95	270	268	104	28	34.5	34.4	33.1	31.3	2458	22.8	108
	4000	95	280	210	135	45	34.5	34.0	33.4	31.7	2707	22.7	119
	5000	95	235	180	186	69	34.2	33.7	34.0	32.1	2854	22.6	126
5700	95	222	166	198	84	34.1	33.6	34.1	32.3	2882	22.6	128	
6500	95	240	119	207	104	34.2	33.1	34.2	32.6	2991	22.6	132	

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			
BXRV-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 ($T_c = 85^\circ\text{C}$)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			
BXRV-D13-RGBW3000-A3	1800	86	190	300	0	0	33.0	33.8	0.0	0.0	1060	16.4	65
	2200	90	240	288	23	0	33.5	33.7	31.0	0.0	1396	18.5	76
	2700	90	425	257	60	13	34.7	33.5	31.7	30.1	2184	25.7	85
	3000	90	464	187	81	23	35.0	33.0	32.0	30.4	2372	25.7	92
	3500	90	471	136	110	38	35.0	32.5	32.4	30.8	2519	25.6	98
	4000	90	449	109	142	55	34.9	32.2	32.7	31.1	2614	25.5	102
	5000	90	412	75	182	86	34.6	31.8	33.1	31.6	2648	25.4	104
	5700	90	398	55	200	102	34.5	31.5	33.2	31.8	2638	25.4	104
	6500	90	377	40	220	118	34.4	31.3	33.4	32.0	2582	25.3	102
BXRV-D13-RGBW3000-A3	1800	86	190	300	0	0	33.0	33.8	0.0	0.0	1076	16.4	66
	2200	93	235	300	23	0	33.4	33.8	31.0	0.0	1394	18.7	74
	2700	95	300	300	60	10	33.9	33.8	31.7	28.9	1836	22.5	82
	3000	95	281	291	80	18	33.8	33.8	32.0	30.0	1905	22.4	85
	3500	95	270	268	104	28	33.7	33.6	32.3	30.5	2008	22.3	90
	4000	95	280	210	135	45	33.8	33.2	32.6	31.1	2186	22.2	98
	5000	95	235	180	186	69	33.4	32.9	33.1	31.7	2169	22.1	98
	5700	95	222	166	198	84	33.3	32.8	33.2	32.0	2138	22.1	97
	6500	95	240	119	207	104	33.4	32.3	33.3	32.4	2199	22.1	99

Table 4: Selection Guide, RGBW Stabilized DC Performance at 350mA ($T_c=85^\circ\text{C}$)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			
BXRV-D13-RGBW3000-A3	Red	300	30.7	33.0	36.4	347	9.9	35
	Green	350	32.4	34.8	38.4	2094	12.1	172
	Blue	350	32.4	34.8	38.4	305	12.2	25
	White ⁷	350	32.4	34.8	38.4	1680	12.2	138

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 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.
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 3, 4 & 5. 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	33.2	34.1	0.0	0.0	866	10.1	85
		155	245	0	0	33.5	34.4	0.0	0.0	1105	13.6	81
		190	300	0	0	33.8	34.7	0.0	0.0	1288	16.8	77
2700	90	257	156	36	8	34.7	33.8	32.1	30.7	1791	15.6	115
		343	208	48	10	35.2	34.1	32.3	30.7	2268	21.0	108
		425	257	60	13	35.6	34.3	32.5	30.8	2658	26.3	101
		500	303	71	15	35.8	34.5	32.6	30.8	2987	31.2	96
4000	90	274	67	87	34	34.9	32.5	32.9	31.5	2123	15.6	136
		365	89	116	45	35.3	32.8	33.2	31.7	2792	21.1	132
		449	109	142	55	35.7	33.0	33.5	31.8	3266	26.1	125
		533	129	169	65	36.0	33.1	33.7	32.0	3740	31.2	120
6500	90	229	24	134	72	34.5	31.7	33.7	32.2	2303	15.5	149
		306	32	178	96	34.9	31.9	34.1	32.5	2953	20.9	141
		377	40	220	118	35.3	32.0	34.3	32.8	3504	26.0	135
		446	47	260	139	35.5	32.1	34.3	33.0	3975	30.9	129
1800	86	116	184	0	0	33.2	33.8	0.0	0.0	860	10.1	85
		155	245	0	0	33.5	34.3	0.0	0.0	1100	13.6	81
		190	300	0	0	33.8	34.7	0.0	0.0	1286	16.8	76
2700	95	205	205	41	7	33.9	33.8	32.1	30.6	1683	15.4	109
		273	273	55	9	34.3	34.3	32.3	30.6	2130	20.8	103
		300	300	60	10	34.7	34.7	32.5	30.7	2231	23.1	97
4000	95	193	144	93	31	33.8	33.3	32.7	31.3	1934	15.3	126
		257	193	124	41	34.2	33.7	33.1	31.5	2574	20.7	125
		280	210	135	45	34.5	34.0	33.4	31.7	2707	22.7	119
		374	281	181	60	34.8	34.2	33.7	31.8	3520	30.6	115
6500	95	164	82	142	71	33.5	32.7	33.4	32.1	2181	15.2	144
		219	109	189	95	33.9	32.9	33.8	32.4	2823	20.5	138
		240	119	207	104	34.2	33.1	34.2	32.6	2991	22.6	132
		320	159	276	139	34.4	33.2	34.4	32.8	3870	30.3	128

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) $T_c = 25^\circ\text{C}$	Typical Pulsed Flux ² (lm) $T_c = 85^\circ\text{C}$	Typical Efficacy (lm/W) $T_c = 85^\circ\text{C}$
Red	50	32.1	1.6	92	77	57
	150	33.4	5.0	250	209	50
	200	33.9	6.8	320	265	47
	250	34.4	8.6	384	319	45
	300	34.9	10.5	444	366	42
Green	50	32.0	1.6	410	338	257
	150	33.3	5.0	1182	959	237
	200	33.8	6.8	1538	1243	227
	250	34.4	8.6	1875	1503	218
	300	34.9	10.5	2209	1786	211
Blue	50	31.6	1.6	53	45	34
	150	33.2	5.0	146	121	29
	250	34.5	8.6	227	186	26
	350	35.7	12.5	300	243	24
	450	36.8	16.5	367	296	22
White	50	32.0	1.6	306	273	191
	150	33.4	5.0	875	773	175
	250	34.5	8.6	1390	1221	161
	350	36.0	12.6	1859	1627	148
	450	36.6	16.5	2308	2001	140
	500	37.0	18.5	2509	2156	136

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)	85°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 CRI90 Ratio

CCT \ Color	1800K	2200K	2700K	3000K	3500K	4000K	5000K	5700K	6500K
W	38.8%	43.6%	56.3%	61.5%	62.4%	59.5%	54.6%	52.7%	49.9%
R	61.2%	52.3%	34.0%	24.8%	18.0%	14.4%	9.9%	7.3%	5.3%
G	0.0%	4.2%	7.9%	10.7%	14.6%	18.8%	24.1%	26.5%	29.1%
B	0.0%	0.0%	1.7%	3.0%	5.0%	7.3%	11.4%	13.5%	15.6%

Table 9: Dimming White with CRI95 Ratio

CCT \ Color	1800K	2200K	2700K	3000K	3500K	4000K	5000K	5700K	6500K
W	38.8%	42.1%	44.8%	41.9%	40.3%	41.8%	35.1%	33.1%	35.8%
R	61.2%	53.8%	44.8%	43.4%	40.0%	31.3%	26.9%	24.8%	17.8%
G	0.0%	4.1%	9.0%	11.9%	15.5%	20.1%	27.8%	29.6%	30.9%
B	0.0%	0.0%	1.5%	2.7%	4.2%	6.7%	10.3%	12.5%	15.5%

Performance Curves

Figure 1: Relative Current Ratio vs. CCT at CRI 90 ($T_c = 85^\circ\text{C}$)

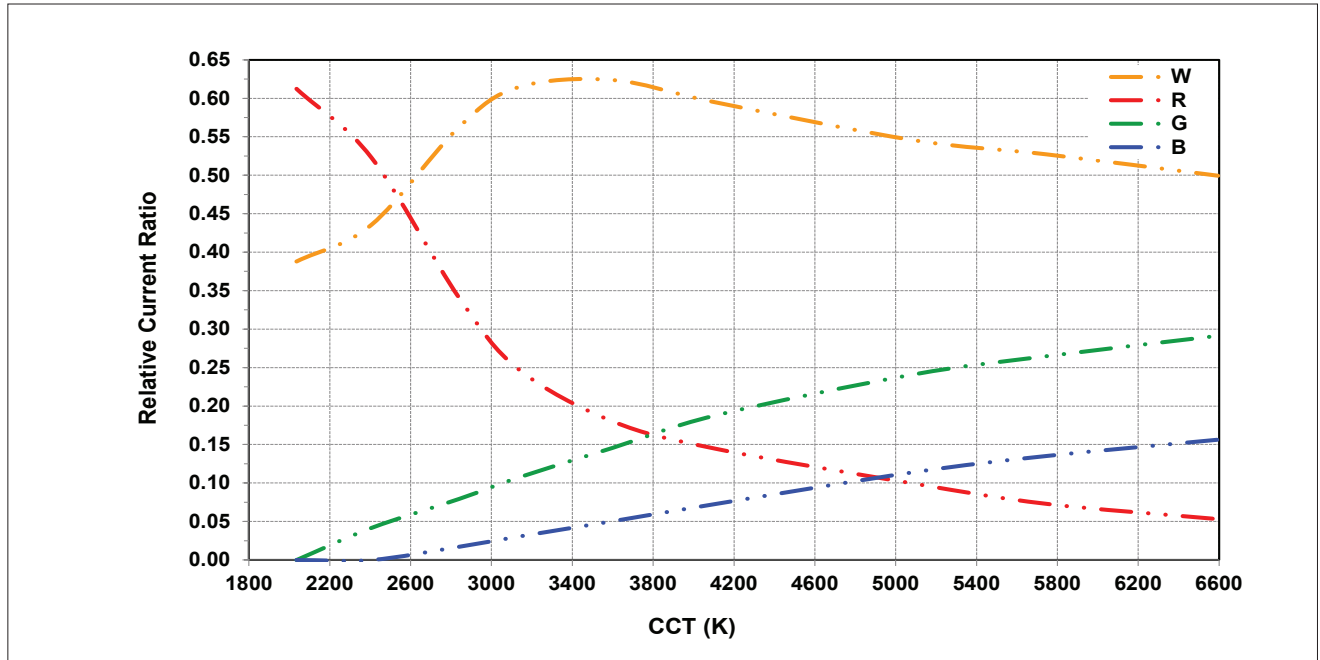
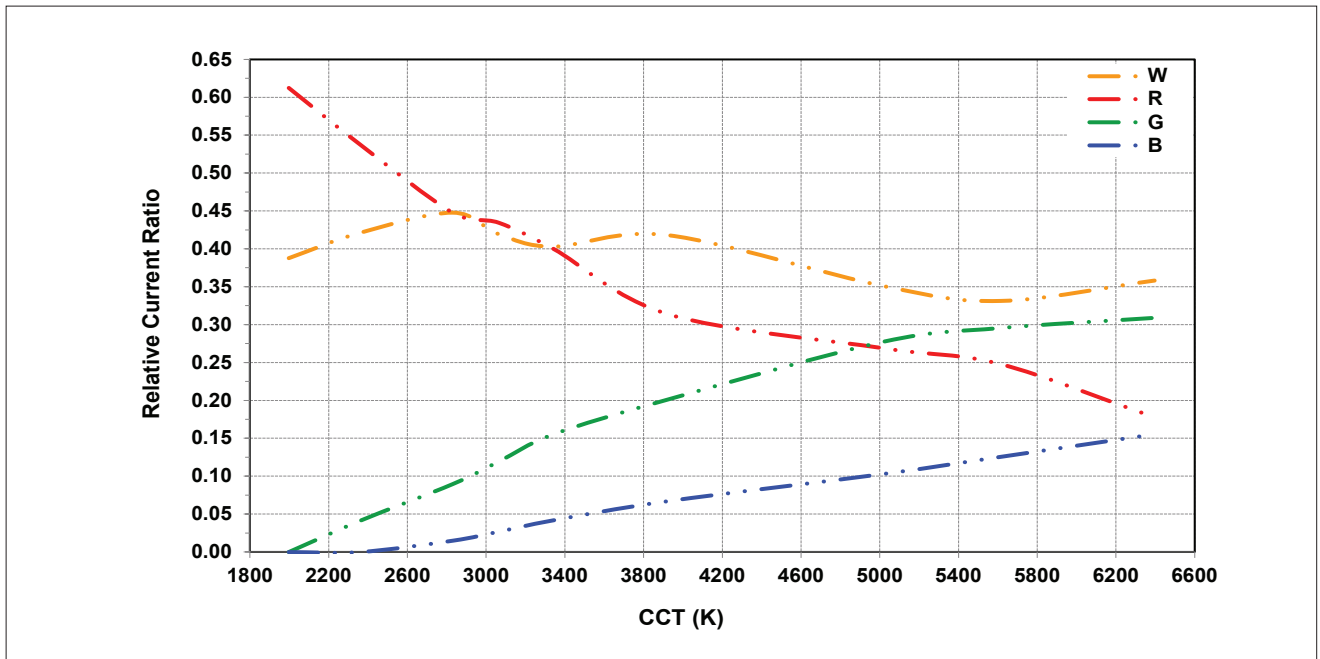


Figure 2: Relative Current Ratio vs. CCT at CRI 95 ($T_c = 85^\circ\text{C}$)



Performance Curves

Figure 3: Typical Relative Luminous Flux (White CCT) vs. Drive Current Per Channel at CRI 90

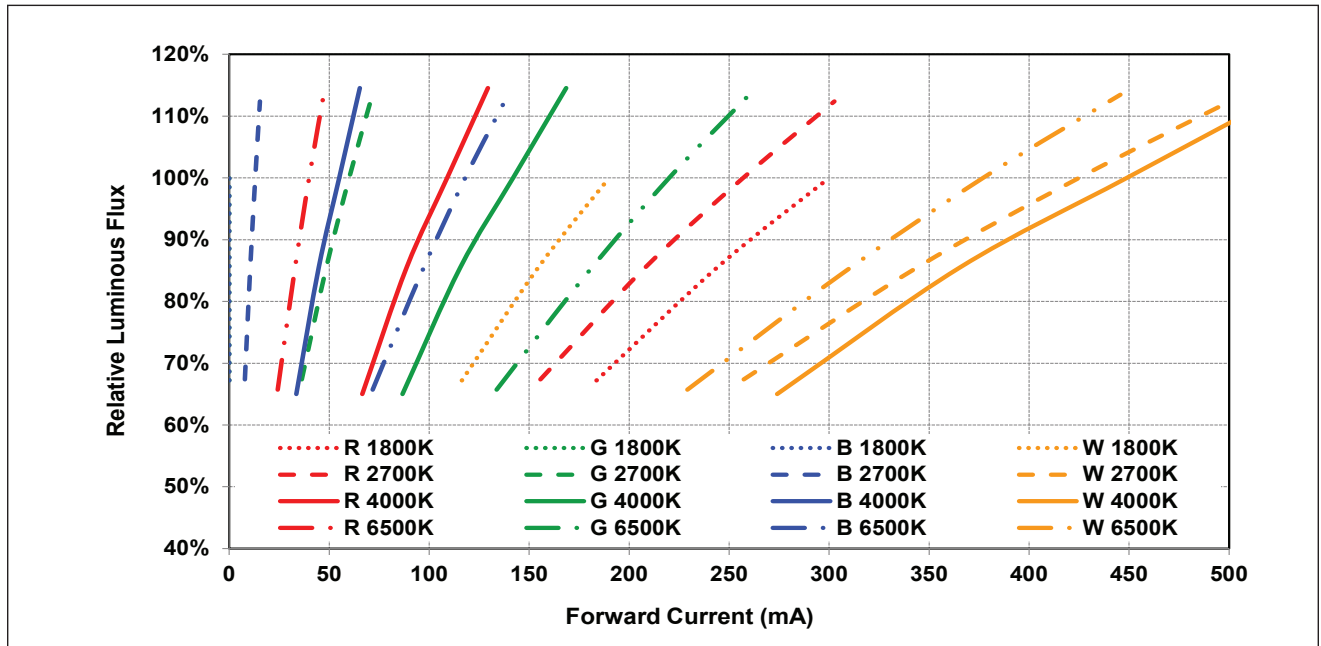
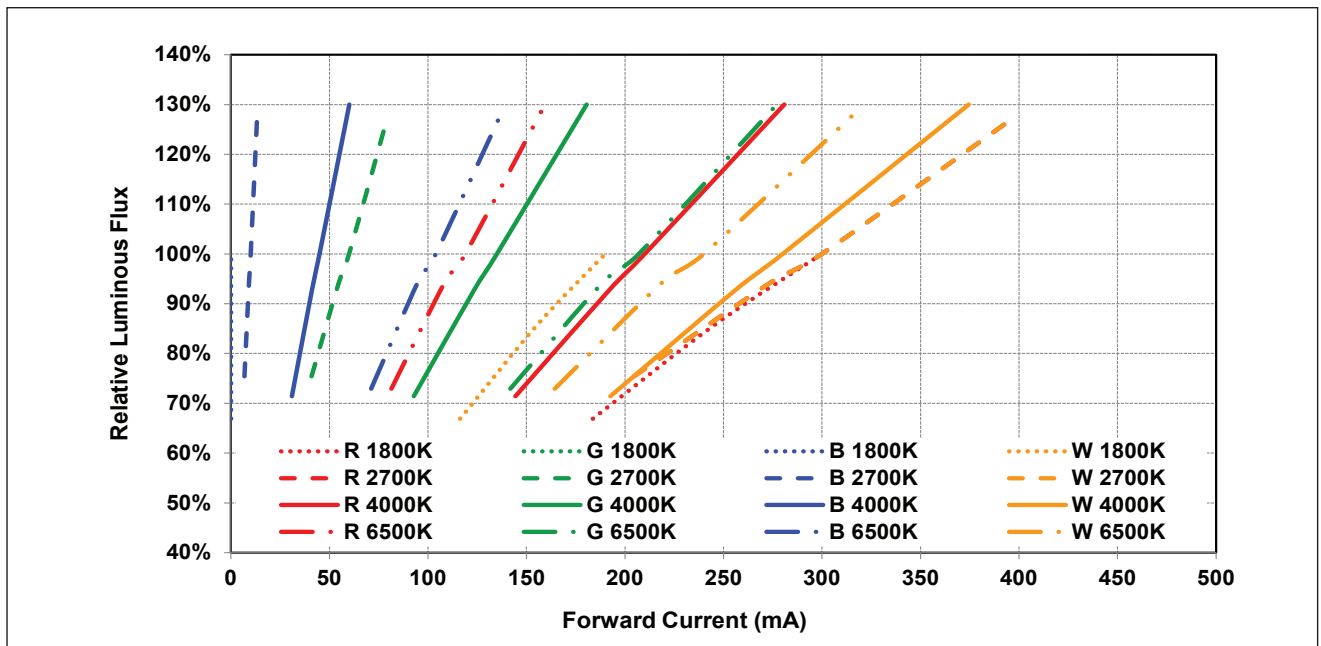


Figure 4: Typical Relative Luminous Flux (White CCT) vs. Drive Current Per Channel at CRI 95

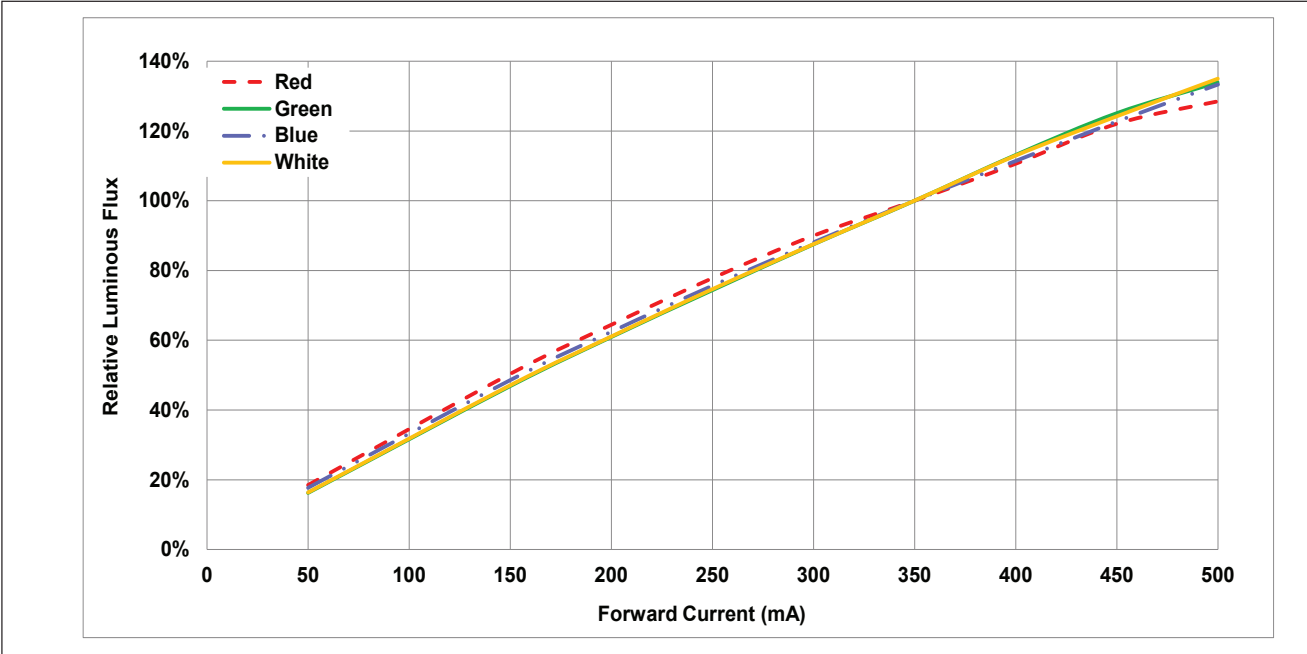


Notes for Figures 3 & 4:

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



Notes for Figure 5:

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 6: Typical Relative Luminous Flux (White CCT) vs. Solder Point Temperature at CRI 90

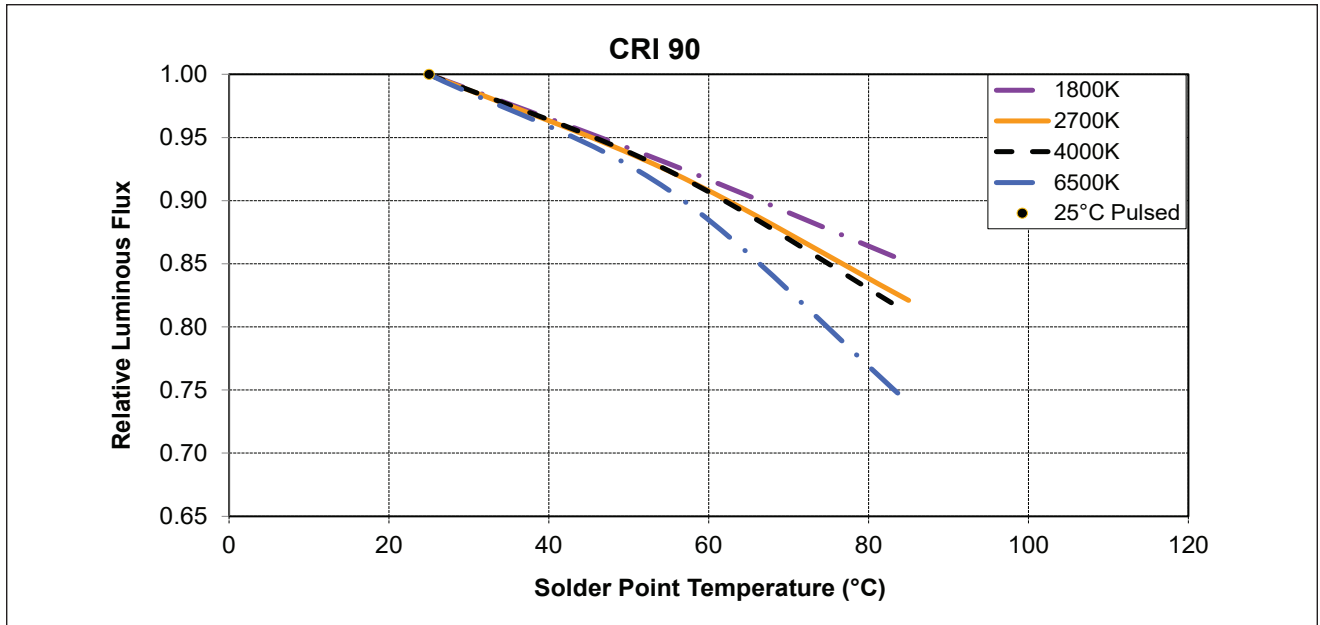
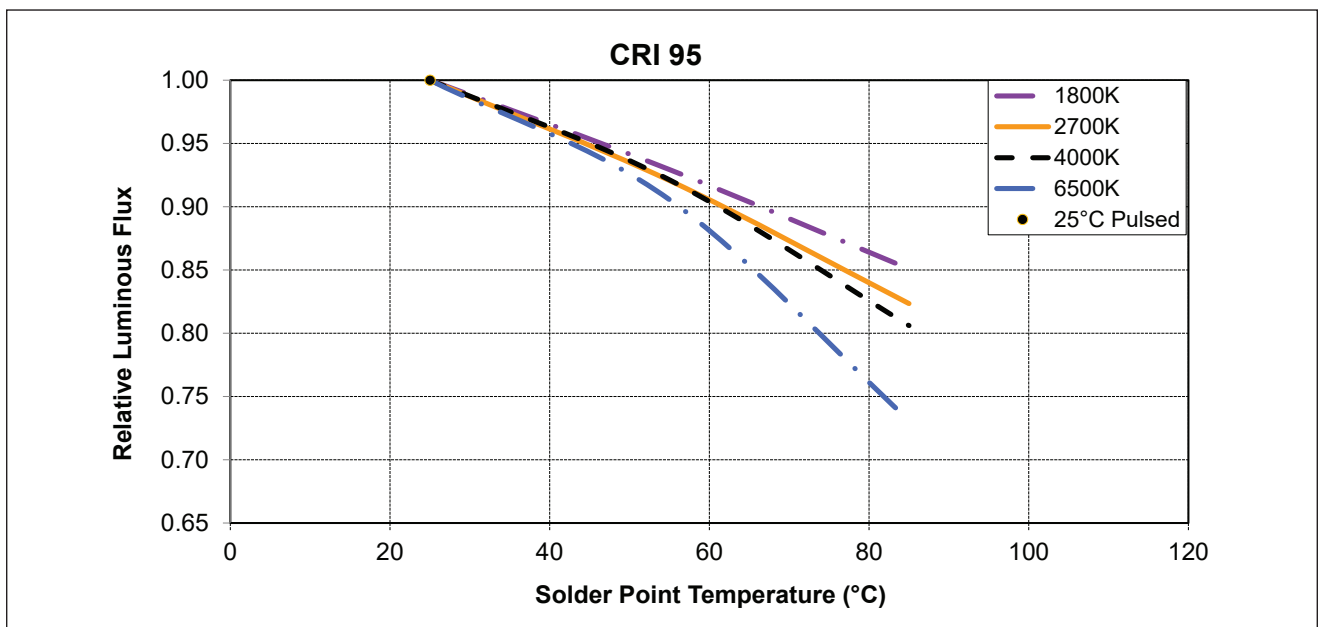
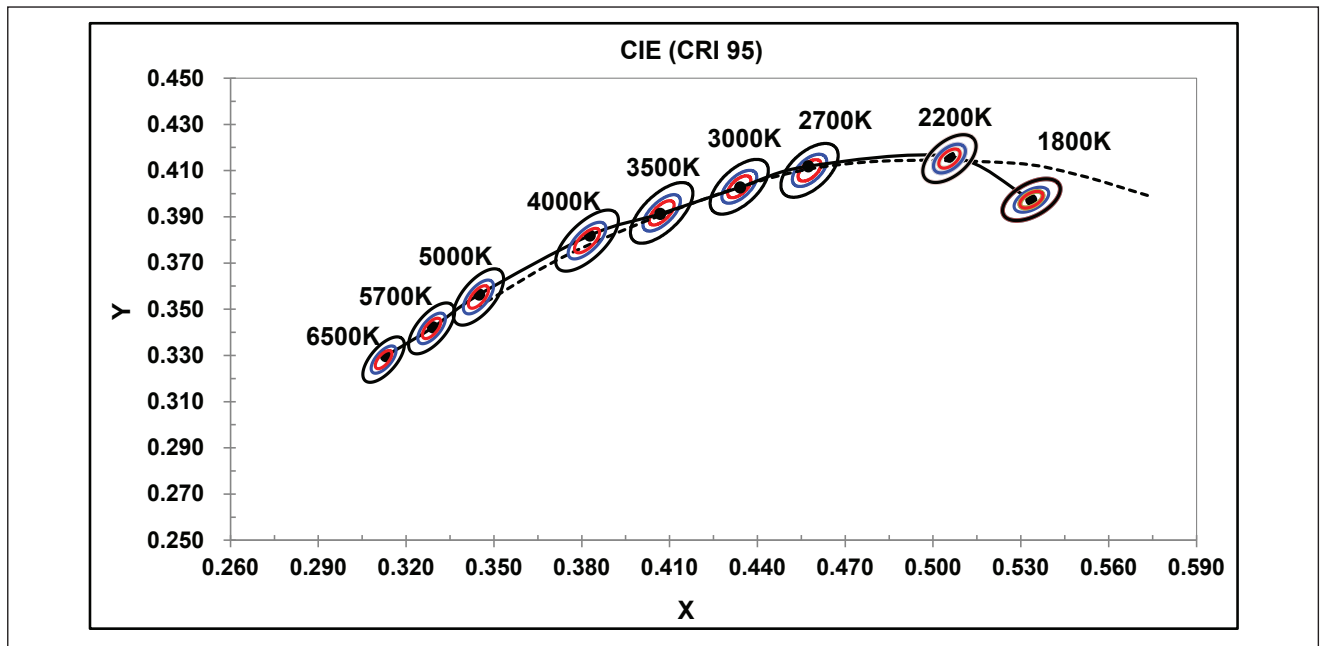
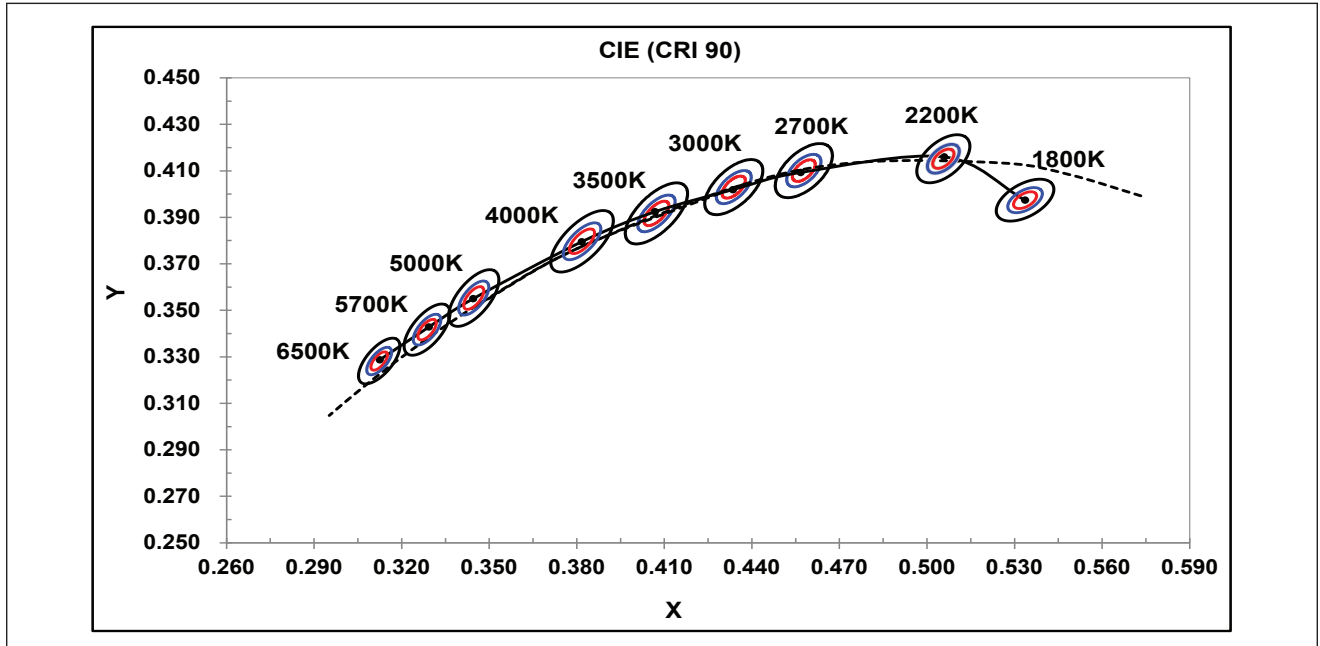


Figure 7: Typical Relative Luminous Flux (White CCT) vs. Solder Point Temperature at CRI 95



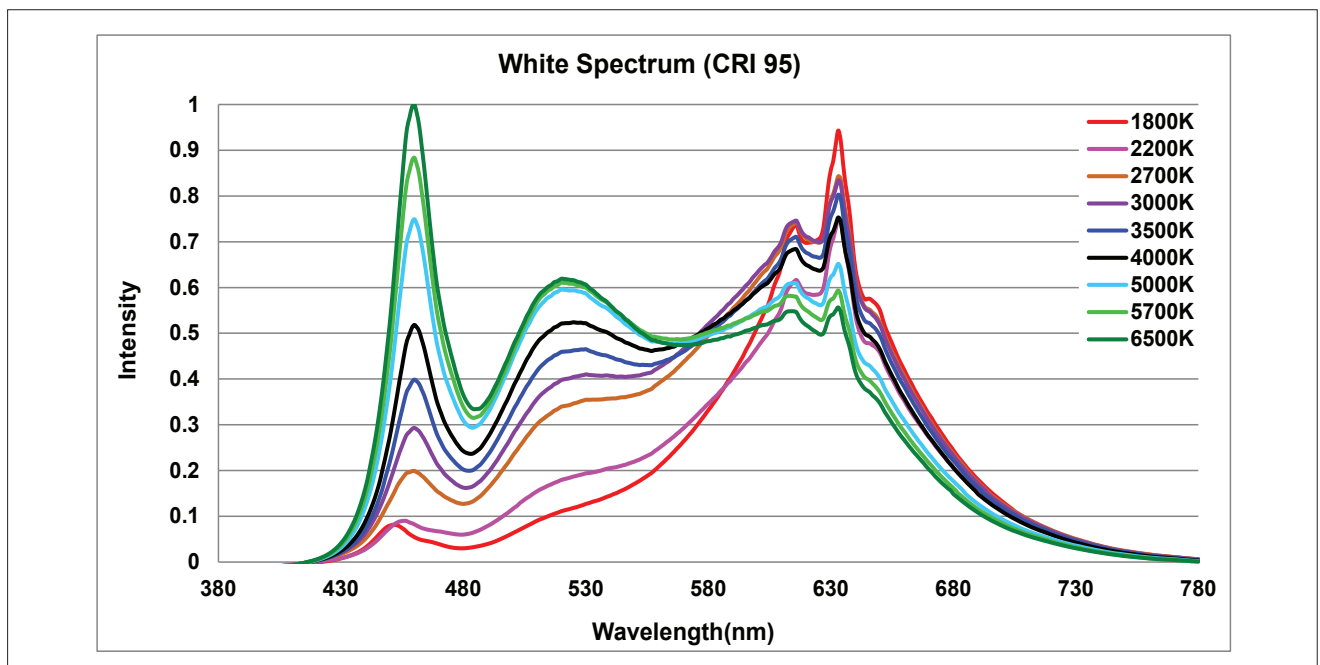
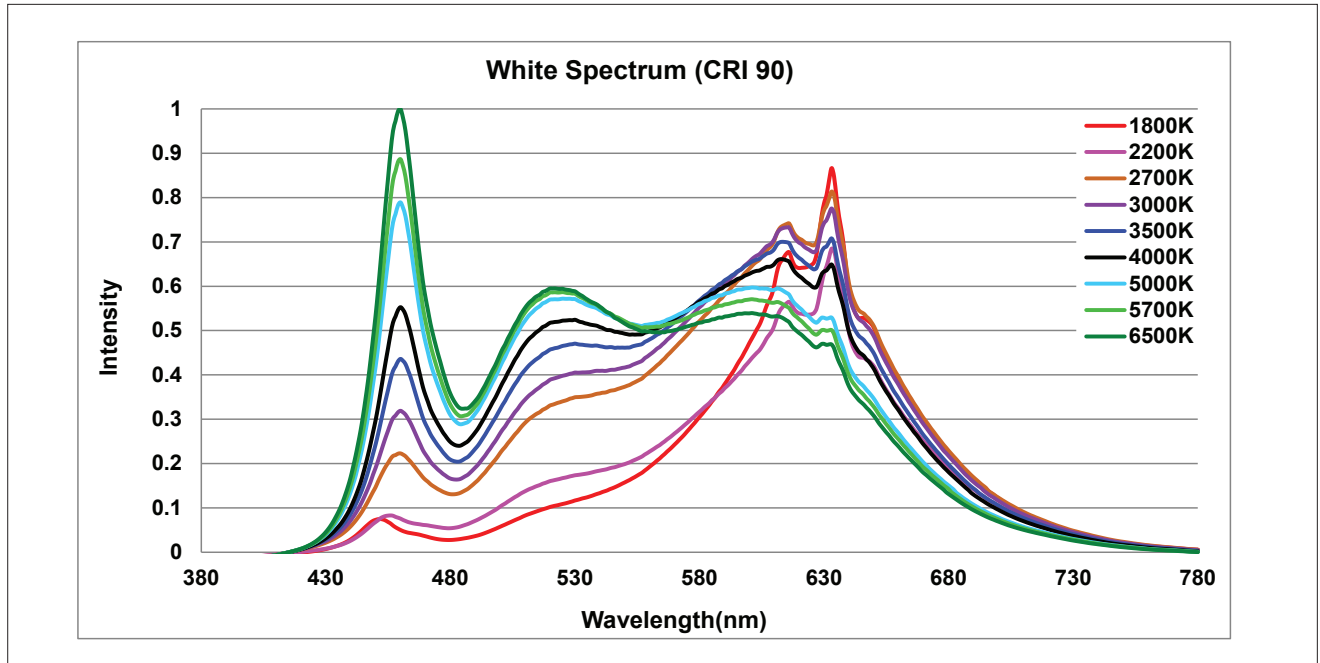
Performance Curves

Figure 8: Chromaticity Coordinate Group (Color Targeted at $T_c = 85^\circ\text{C}$)



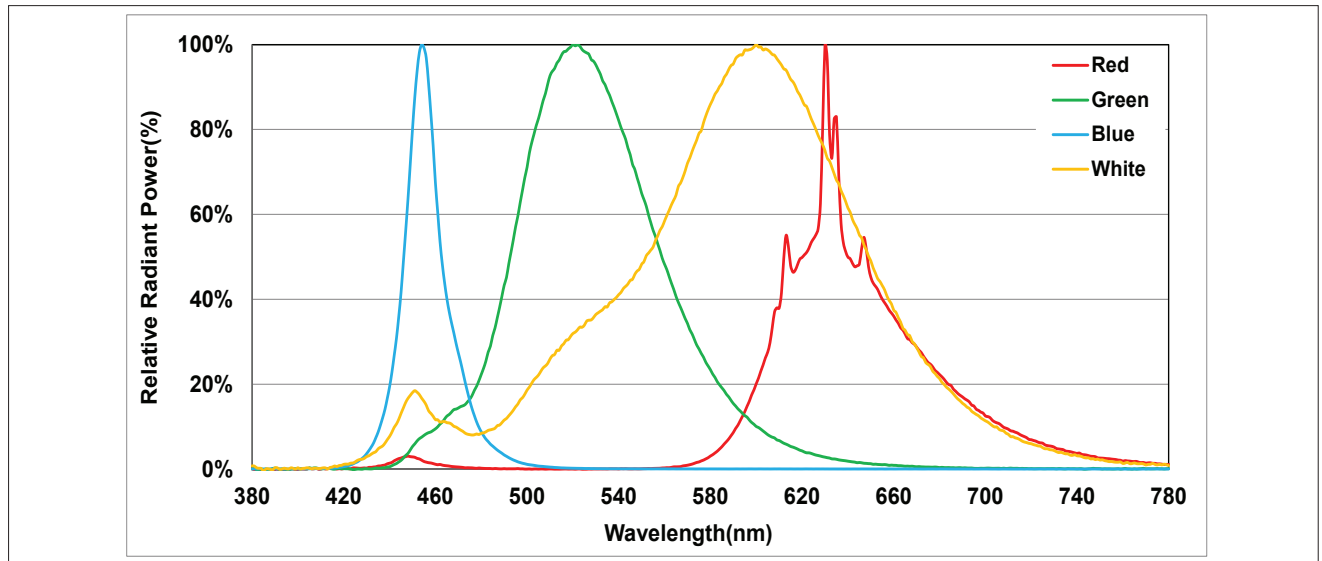
Performance Curves

Figure 9: Typical Color Spectrum (White CCT, at $T_c = 85^\circ\text{C}$)



Typical Color Spectrum

Figure 10: Typical Color Spectrum (RGBW)



Notes for Figures 9 & 10: Color spectra measured at nominal current for Tc = 85°C.

Product Bin Definitions

Table 10: 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)

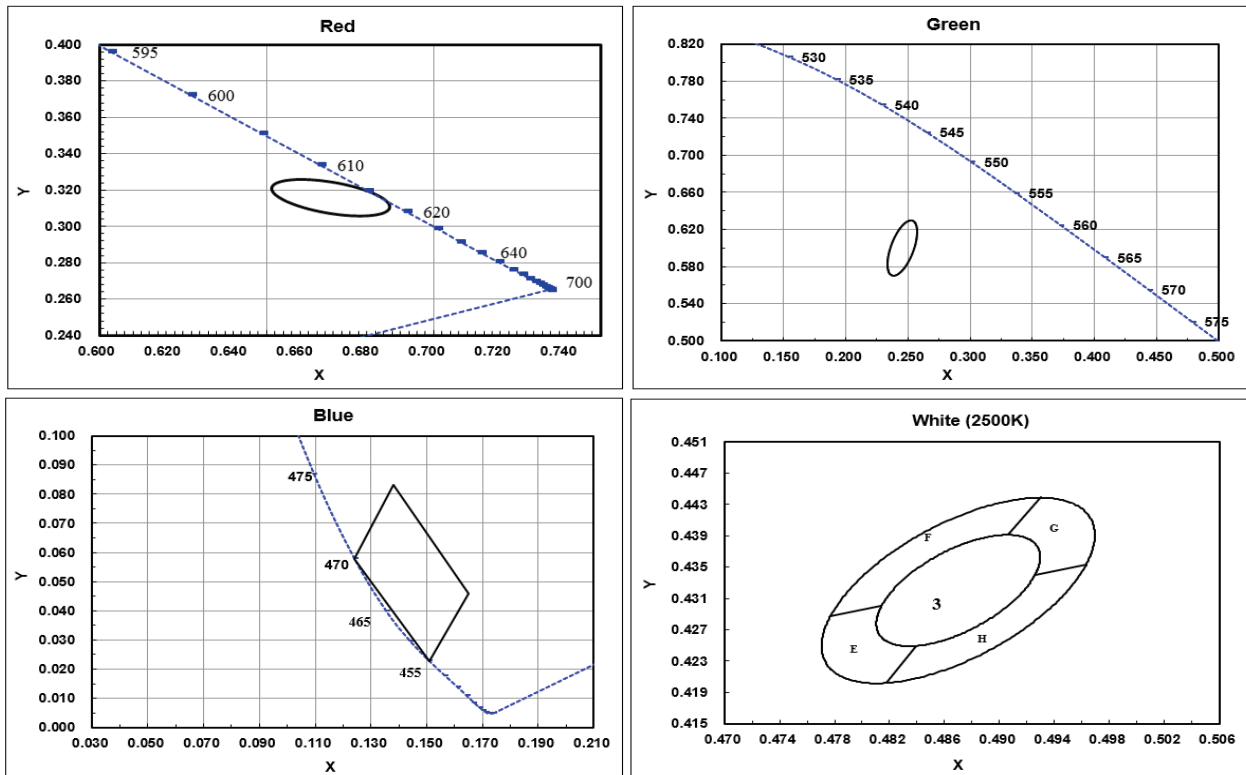
Table 11: Blue MacAdam Ellipse Color Bin Definitions

	Coordinates			
X	0.1510	0.1241	0.1380	0.1650
Y	0.0227	0.0578	0.0830	0.0460

Notes for Tables 10 & 11:

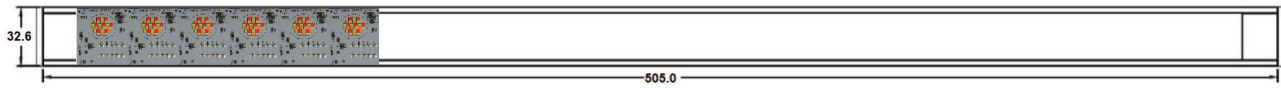
1. Color binning at $T_c = 85^\circ\text{C}$ unless otherwise specified
2. Bridgelux maintains a tolerance of ± 0.007 on x and y color coordinates.

Figure 11: Chromaticity Coordinate Group (1 Color Bin Structure, Color Targeted at $T_c = 85^\circ\text{C}$)



Packaging and Labeling

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



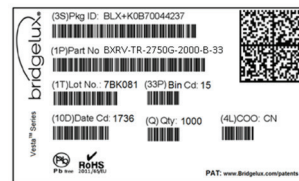
Tube label



Bag



Box



Notes for Figure 13:

1. Each tube holds 20 Vesta Series RGBW 10mm LES arrays.
2. Four tubes are sealed in an anti-static bag. Up to five such bags are placed in a box and shipped. Depending on quantities ordered, a bigger shipping box, containing four boxes will be used to ship products.
3. Each bag and box is to be labeled as shown above.
4. Dimensions for each tube are 505.0 mm (L) x 32.6 mm (W) x 9.5 mm (H). Dimensions for the anti-static bag are 100.0 mm (W) x 625.0 mm (L) x 0.1 mm (T) and that of the inner box are 58.7 mm (L) x 13.3 mm (W) x 7.9 mm (H).

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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