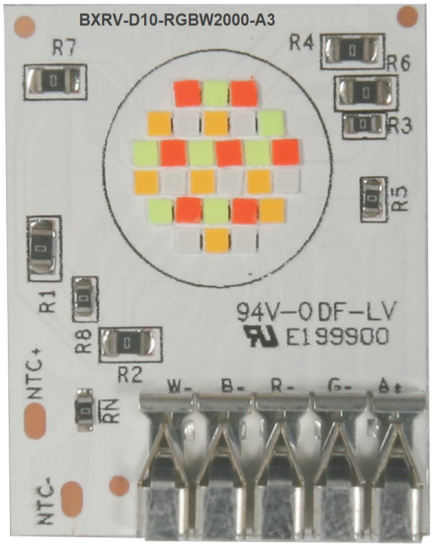
bridgelux®



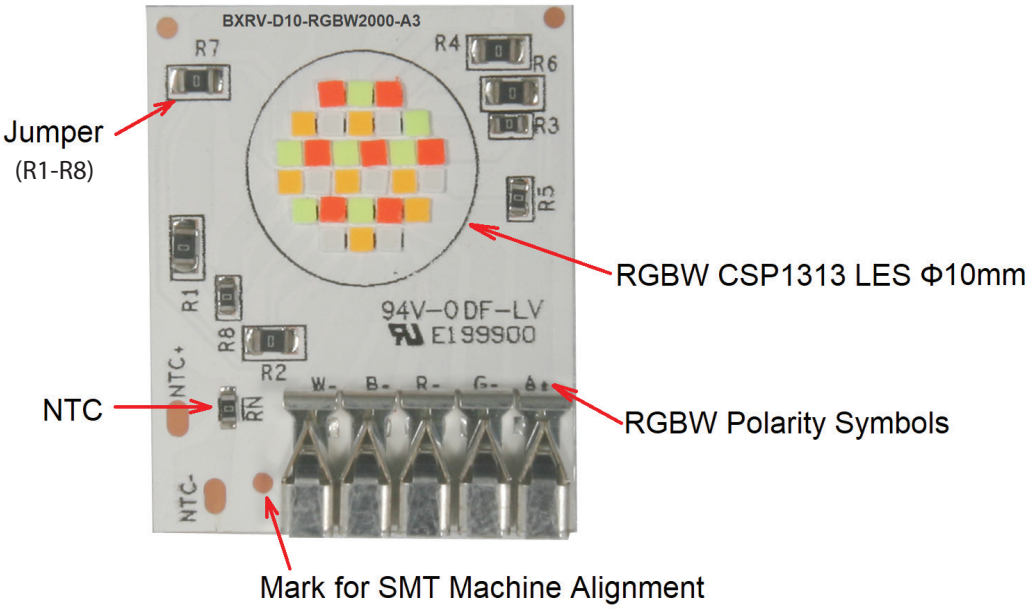
Bridgelux® Vesta® Series RGBW 10mm Array With CSP

Product Data Sheet DS581

FIVE YEAR Warranty™

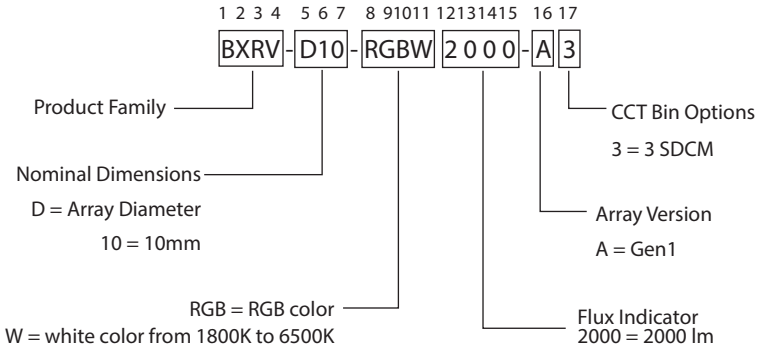
Product Feature Map

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°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-D10-RGBW2000-A3	1800	86	190	300	0	0	19.8	20.3	0.0	0.0	774	9.8	79
	2200	90	240	288	23	0	20.1	20.2	18.6	0.0	1018	11.1	92
	2700	90	425	257	60	13	21.0	20.1	19.0	18.0	1599	15.4	103
	3000	90	464	187	81	23	21.1	19.8	19.2	18.2	1741	15.5	113
	3500	90	471	136	110	38	21.2	19.5	19.4	18.4	1858	15.4	120
	4000	90	449	109	142	55	21.1	19.3	19.6	18.6	1941	15.4	126
	5000	90	412	75	182	86	20.9	19.0	19.9	18.9	2026	15.3	133
	5700	90	398	55	200	102	20.8	18.9	20.0	19.1	2056	15.3	135
	6500	90	377	40	220	118	20.7	18.7	20.1	19.2	2078	15.2	136
BXRV-D10-RGBW2000-A3	1800	86	190	300	0	0	19.8	20.3	0.0	0.0	774	9.6	81
	2200	93	235	300	23	0	20.0	20.3	18.6	0.0	1006	10.9	92
	2700	95	300	300	60	10	20.4	20.3	19.0	17.9	1342	13.2	102
	3000	95	281	291	80	18	20.3	20.2	19.2	18.1	1392	13.1	106
	3500	95	270	268	104	28	20.2	20.1	19.4	18.3	1474	13.1	113
	4000	95	280	210	135	45	20.3	19.9	19.6	18.5	1618	13.0	124
	5000	95	235	180	186	69	20.0	19.7	19.9	18.8	1702	12.9	132
	5700	95	222	166	198	84	20.0	19.6	19.9	18.9	1719	12.9	133
	6500	95	240	119	207	104	20.1	19.3	20.0	19.1	1780	12.9	138

Table 2: Selection Guide, RGBW Pulsed Measurement Data (T_j=T_c=25°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-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[7]	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°C.
4. Typical performance values are provided as a reference only and are not a guarantee of performance.
5. Bridgelux maintains a ±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°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-D10-RGBW2000-A3	1800	86	190	300	0	0	19.3	19.8	0.0	0.0	645	9.6	67
	2200	90	240	288	23	0	19.6	19.8	18.2	0.0	853	10.8	79
	2700	90	425	257	60	13	20.4	19.6	18.6	17.6	1320	15.1	88
	3000	90	464	187	81	23	20.7	19.3	18.8	17.8	1441	15.1	95
	3500	90	471	136	110	38	20.7	19.0	19.0	18.0	1527	15.1	101
	4000	90	449	109	142	55	20.6	18.9	19.2	18.2	1580	15.0	105
	5000	90	412	75	182	86	20.4	18.6	19.4	18.5	1600	14.9	107
	5700	90	398	55	200	102	20.4	18.4	19.5	18.6	1597	14.9	107
	6500	90	377	40	220	118	20.3	18.3	19.6	18.7	1565	14.9	105
BXRV-D10-RGBW2000-A3	1800	86	190	300	0	0	19.3	19.8	0.0	0.0	632	9.6	66
	2200	93	235	300	23	0	19.6	19.8	18.2	0.0	810	10.9	74
	2700	95	300	300	60	10	19.9	19.8	18.6	17.5	1073	13.2	81
	3000	95	281	291	80	18	19.8	19.8	18.7	17.7	1150	13.1	88
	3500	95	270	268	104	28	19.7	19.7	18.9	17.9	1213	13.1	93
	4000	95	280	210	135	45	19.8	19.4	19.1	18.1	1323	13.0	102
	5000	95	235	180	186	69	19.6	19.2	19.4	18.3	1326	12.9	103
	5700	95	222	166	198	84	19.5	19.2	19.4	18.5	1311	12.9	102
	6500	95	240	119	207	104	19.6	18.9	19.5	18.6	1356	12.9	105

Table 4: Selection Guide, RGBW Stabilized DC Performance at 350mA (T_c=85°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-D10-RGBW2000-A3	Red	300	18.6	20.0	22.1	210	6.0	35
	Green	350	18.9	20.3	22.4	1222	7.1	172
	Blue	350	18.9	20.3	22.4	178	7.1	25
	White[7]	350	18.9	20.3	22.4	980	7.1	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 ±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°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	19.4	19.9	0.0	0.0	518	5.9	88
		155	245	0	0	19.6	20.1	0.0	0.0	662	8.0	83
		190	300	0	0	19.8	20.3	0.0	0.0	774	9.8	79
2700	90	257	156	36	8	20.4	19.6	18.8	18.0	1075	9.1	118
		343	208	48	10	20.6	19.8	18.9	18.1	1357	12.3	110
		425	257	60	13	21.0	20.1	19.0	18.0	1599	15.4	103
		500	303	71	15	21.1	20.1	19.1	18.2	1792	18.3	98
4000	90	274	67	87	34	20.5	18.9	19.1	18.5	1273	9.2	139
		365	89	116	45	20.7	19.1	19.2	18.7	1650	12.3	134
		449	109	142	55	21.1	19.3	19.6	18.6	1941	15.4	126
		533	129	169	65	21.1	19.2	19.6	18.9	2213	18.3	121
6500	90	229	24	134	72	20.1	18.4	19.6	19.1	1359	9.0	150
		306	32	178	96	20.3	18.5	19.8	19.3	1743	12.2	143
		377	40	220	118	20.7	18.7	20.1	19.2	2078	15.2	136
		446	47	260	139	20.9	18.7	20.2	20.0	2370	18.2	130
1800	86	116	184	0	0	19.4	19.8	0.0	0.0	531	5.9	90
		155	245	0	0	19.6	20.1	0.0	0.0	679	8.0	85
		190	300	0	0	19.8	20.3	0.0	0.0	793	9.8	81
2700	95	205	205	41	7	19.9	19.7	18.8	17.9	1037	9.0	115
		273	273	55	9	20.1	20.0	18.9	18.0	1309	12.1	108
		338	338	68	11	20.4	20.3	19.0	17.9	1550	15.2	102
4000	95	193	144	93	31	19.8	19.4	19.2	18.4	1189	9.0	133
		257	193	124	41	20.0	19.6	19.4	18.6	1572	12.1	130
		316	237	152	51	20.3	19.9	19.6	18.5	1868	15.0	124
		374	281	181	60	20.4	19.9	19.6	18.7	2148	17.9	120
6500	95	164	82	142	71	19.5	19.0	19.5	18.9	1328	8.9	150
		219	109	189	95	19.8	19.1	19.7	19.1	1718	12.0	144
		270	134	233	117	20.1	19.3	20.0	19.1	2055	14.9	138
		320	159	276	139	20.1	19.3	20.1	19.4	2356	17.7	133

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 ± 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°C	Typical Power (W) T_c = 25°C	Typical Pulsed Flux[2] (lm) T_c = 25°C	Typical Pulsed Flux[2] (lm) T_c = 85°C	Typical Efficacy (lm/W) T_c = 85°C
Red	50	18.7	0.9	54	45	57
	150	19.5	2.9	146	122	50
	200	19.8	4.0	187	154	47
	250	20.1	5.0	224	186	45
	300	20.4	6.1	259	213	42
Green	50	18.6	0.9	239	197	257
	150	19.4	2.9	689	559	237
	200	19.7	3.9	897	725	227
	250	20.1	5.0	1094	877	218
	300	20.3	6.1	1289	1042	211
	350	21.0	7.4	1470	1176	200
Blue	50	18.5	0.9	31	26	34
	150	19.4	2.9	85	71	29
	250	20.2	5.0	132	108	26
	350	20.8	7.3	175	142	24
	450	21.5	9.7	214	173	22
	500	21.7	10.9	233	187	21
White	50	18.7	0.9	178	160	191
	150	19.5	2.9	511	451	175
	250	20.2	5.0	811	712	161
	350	21.0	7.4	1085	949	148
	450	21.3	9.6	1346	1167	140
	500	21.6	10.8	1464	1258	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 ± 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°C)

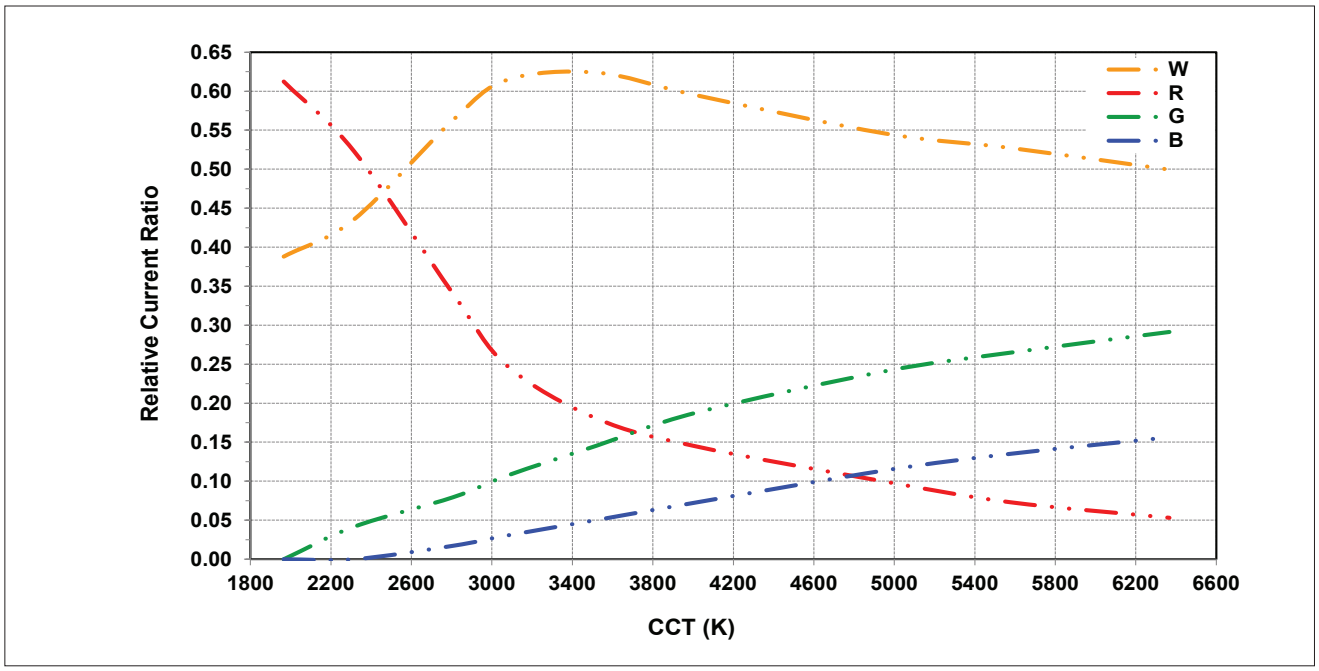
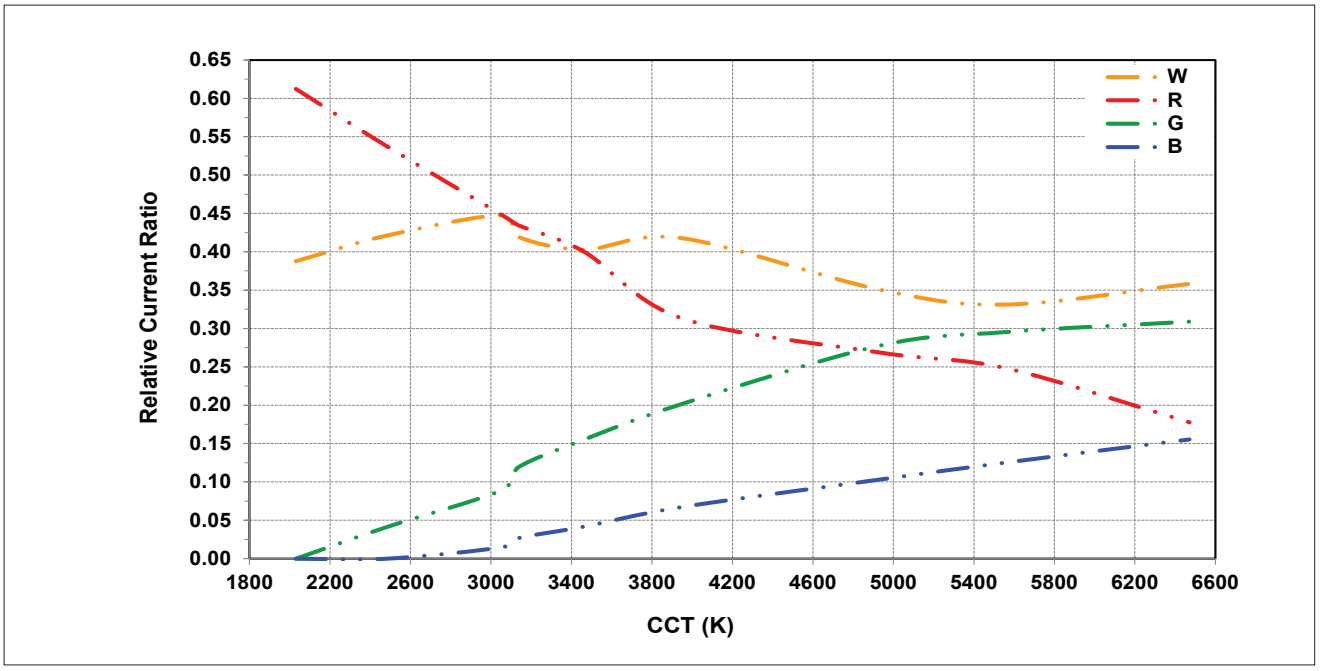


Figure 2: Relative Current Ratio vs. CCT at CRI 95 (T_c= 85°C)



Performance Curves

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

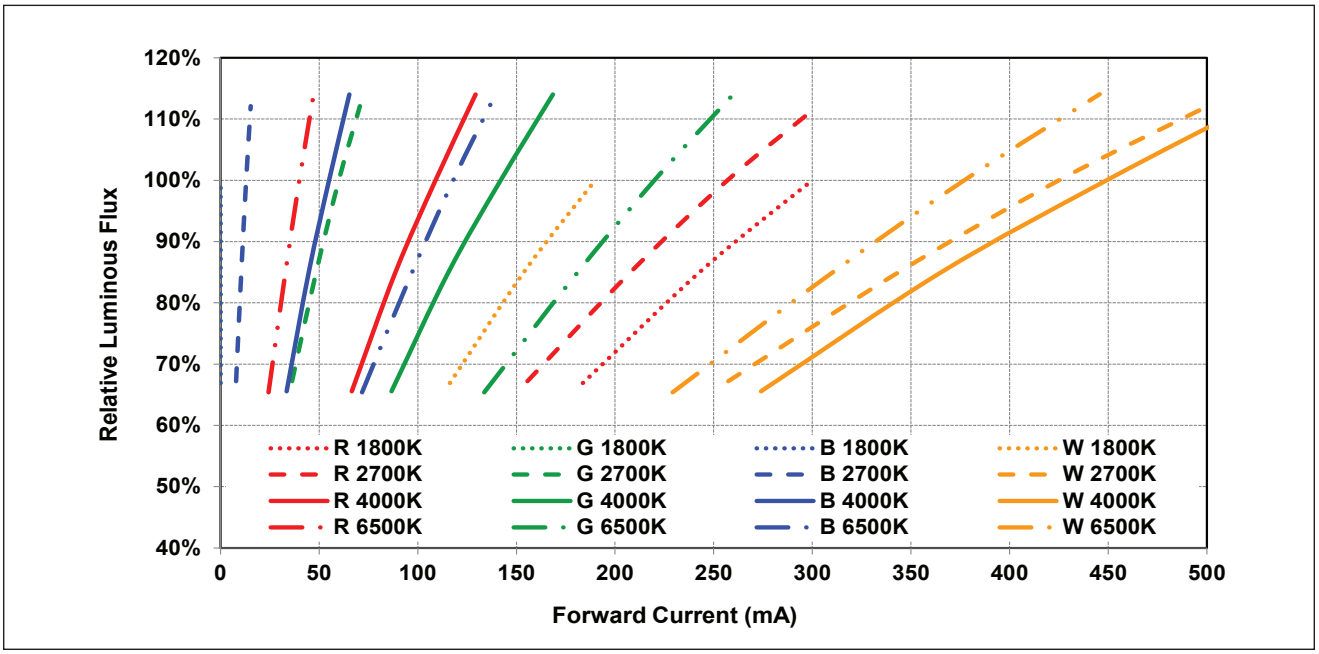
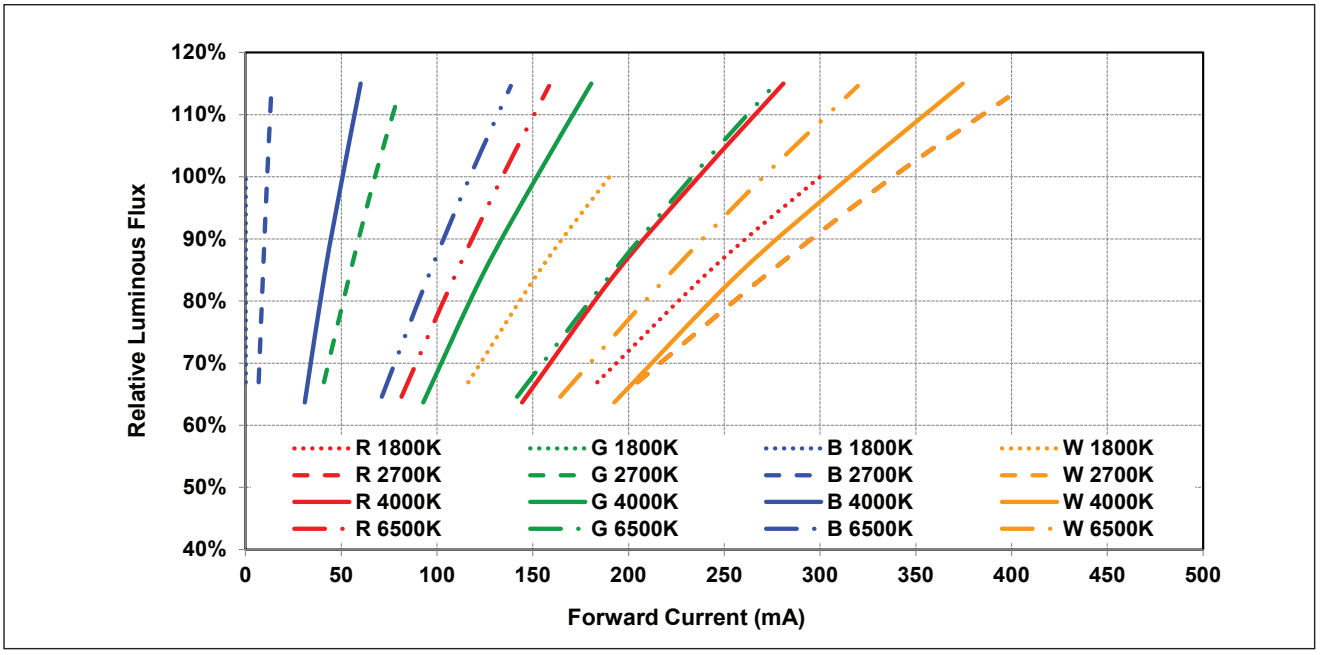


Figure 4: Typical Relative Luminous Flux (White CCT) vs. Drive Current Per Channel at CRI 95

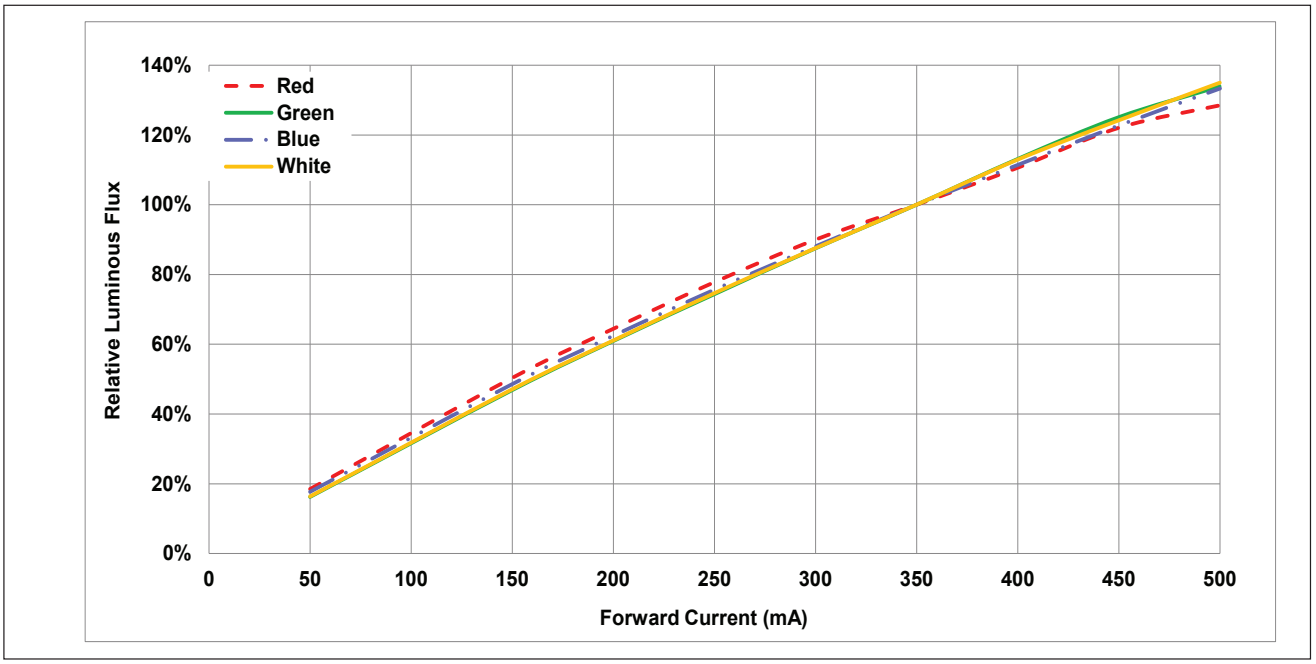


Notes for Figures 3 & 4:

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°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

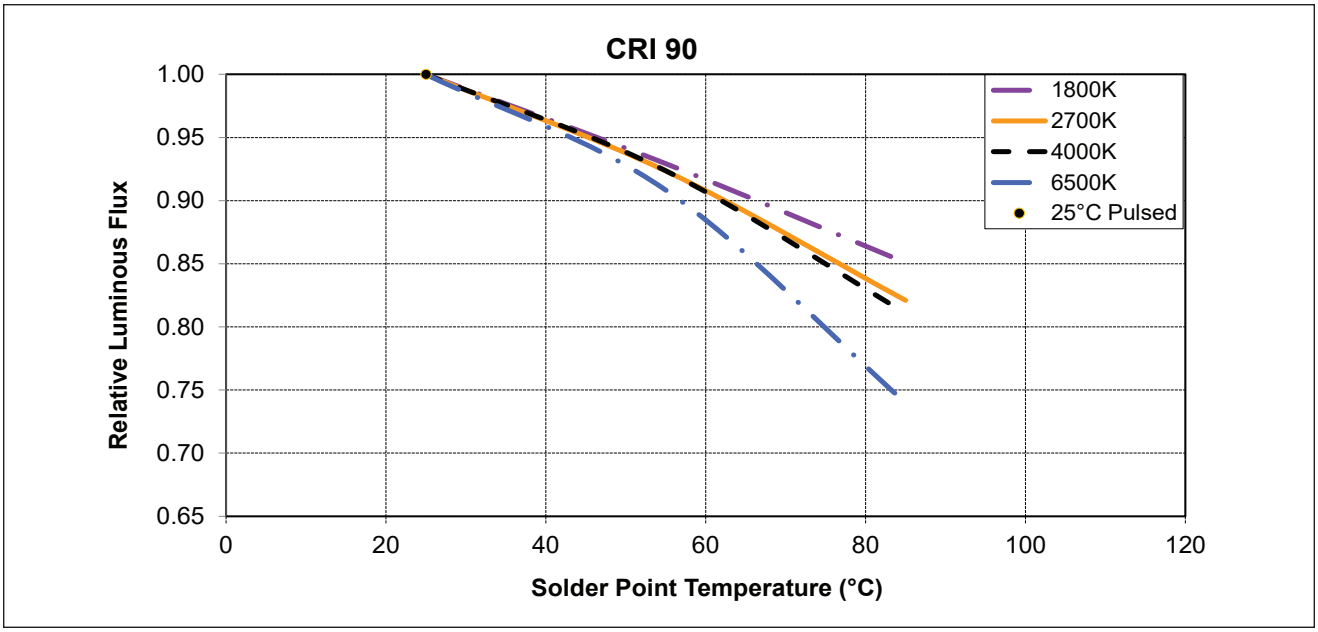
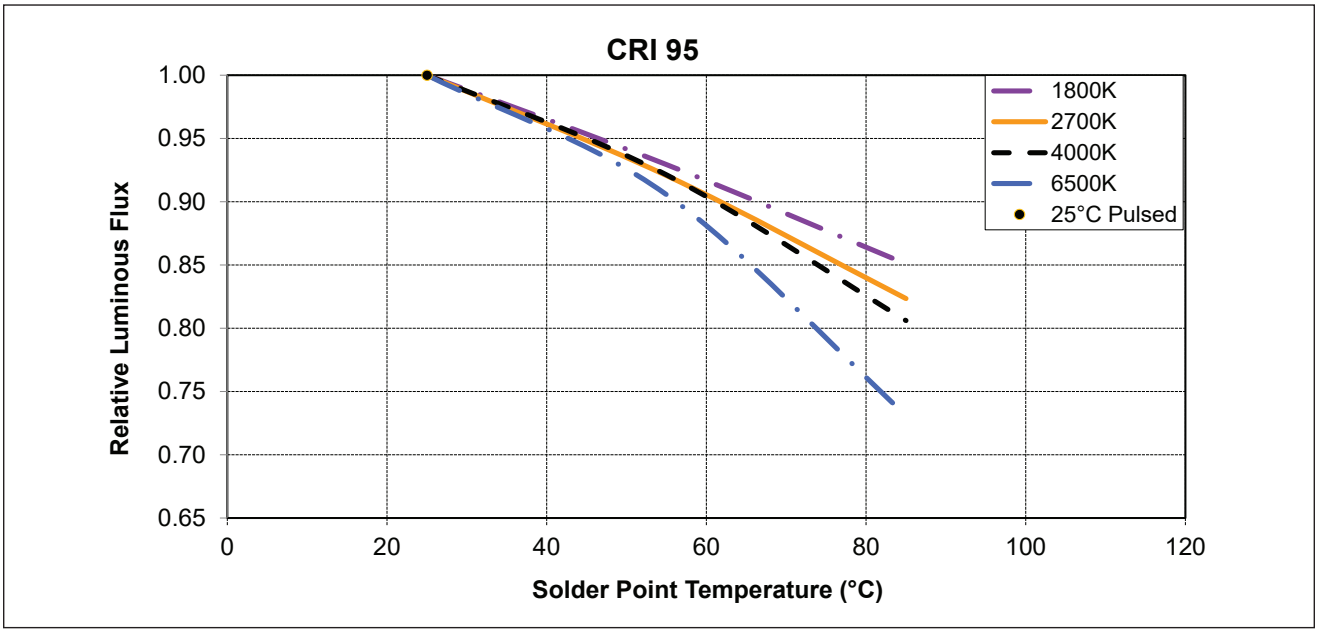
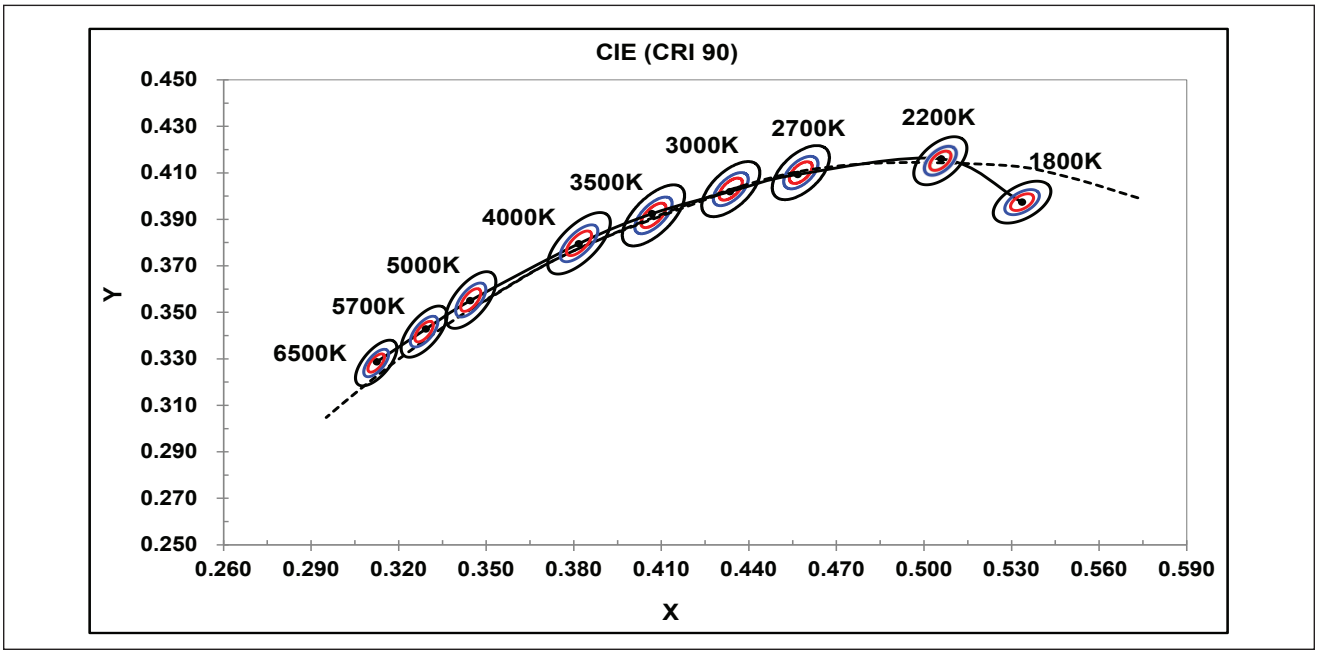


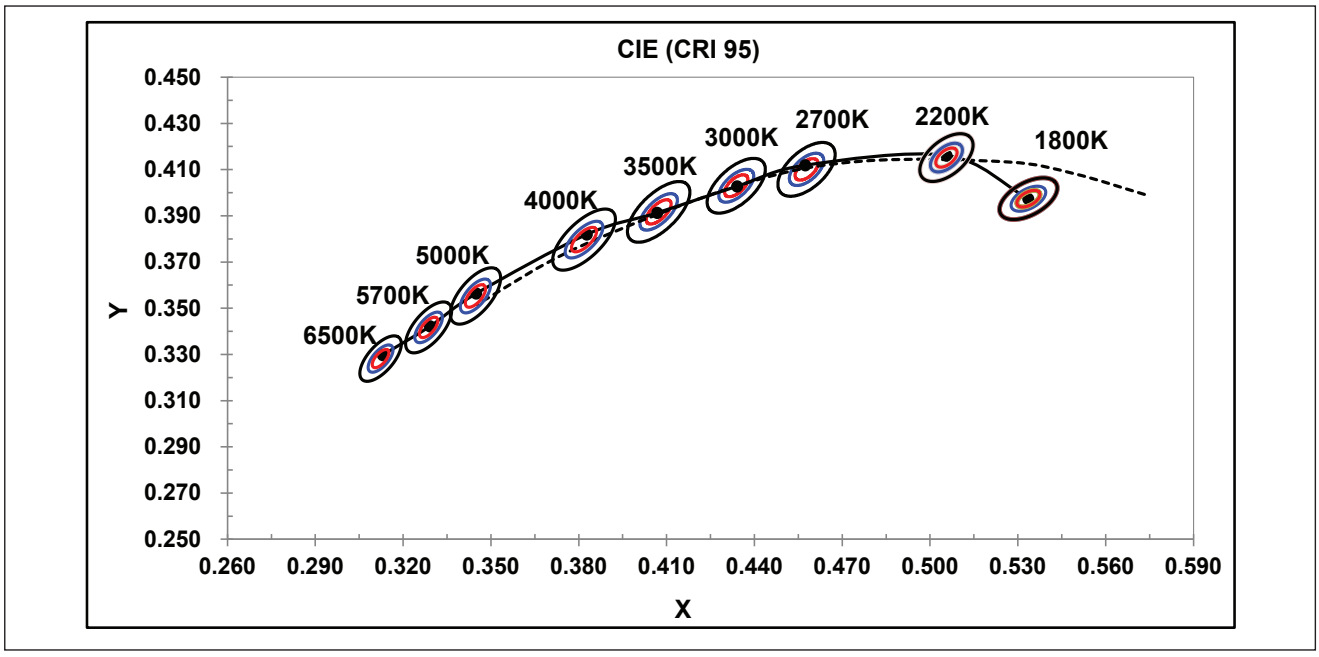
Figure 7: Typical Relative Luminous Flux (White CCT) vs. Solder Point Temperature at CRI 95



Performance Curves

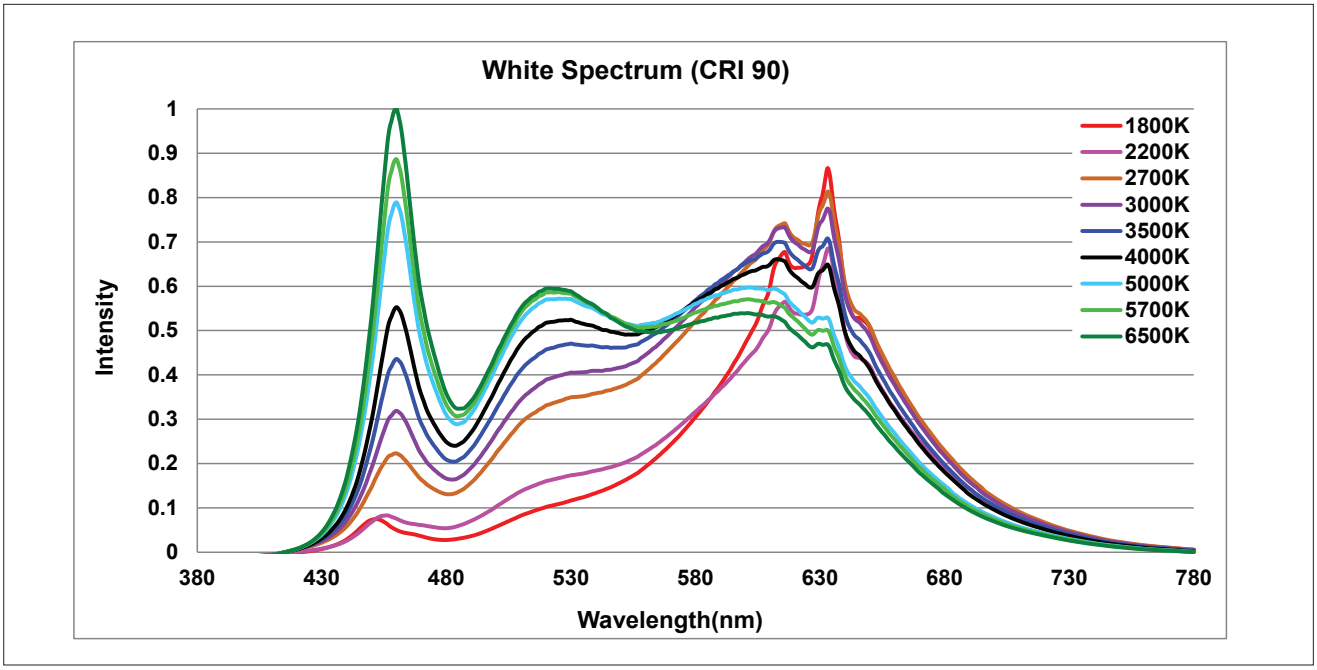
Figure 8: Chromaticity Coordinate Group (Color Targeted at T_c = 85°C)

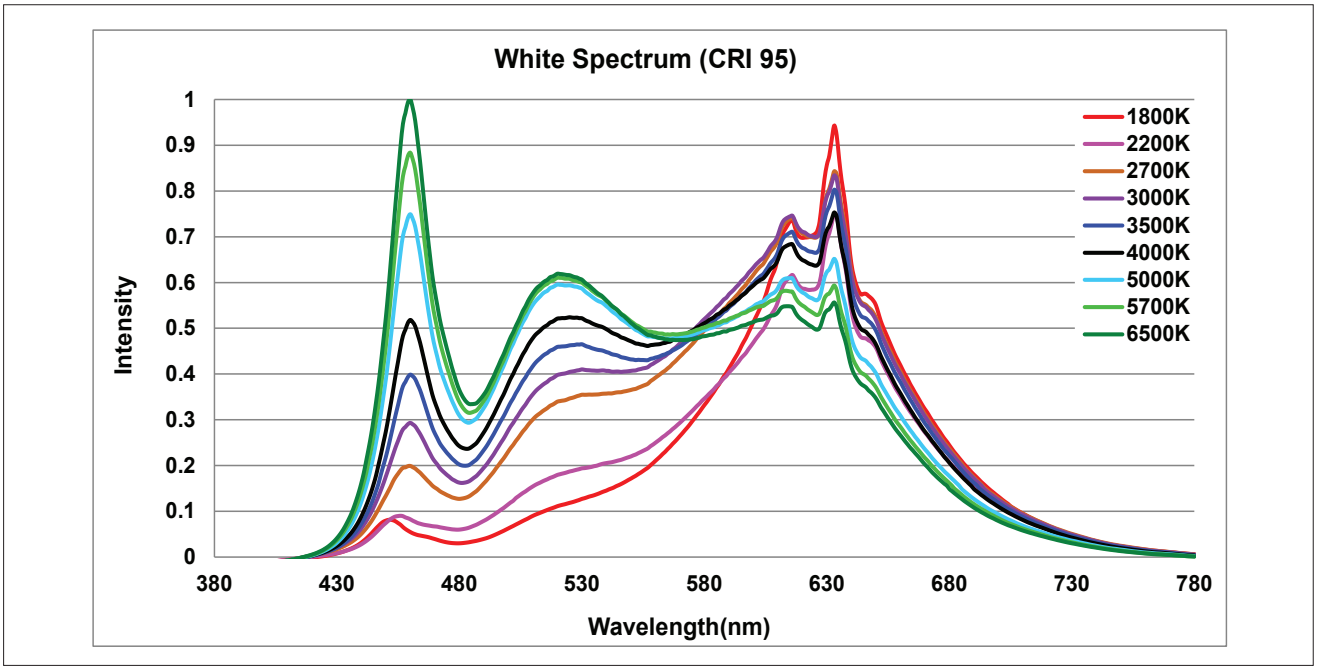




Performance Curves

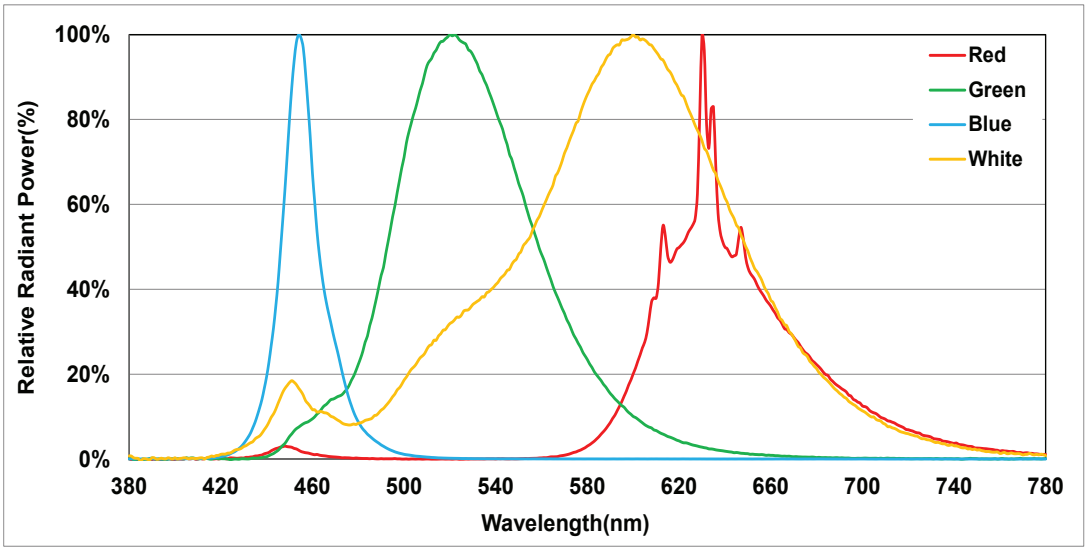
Figure 9: Typical Color Spectrum (White CCT, at T_c= 85°C)





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)

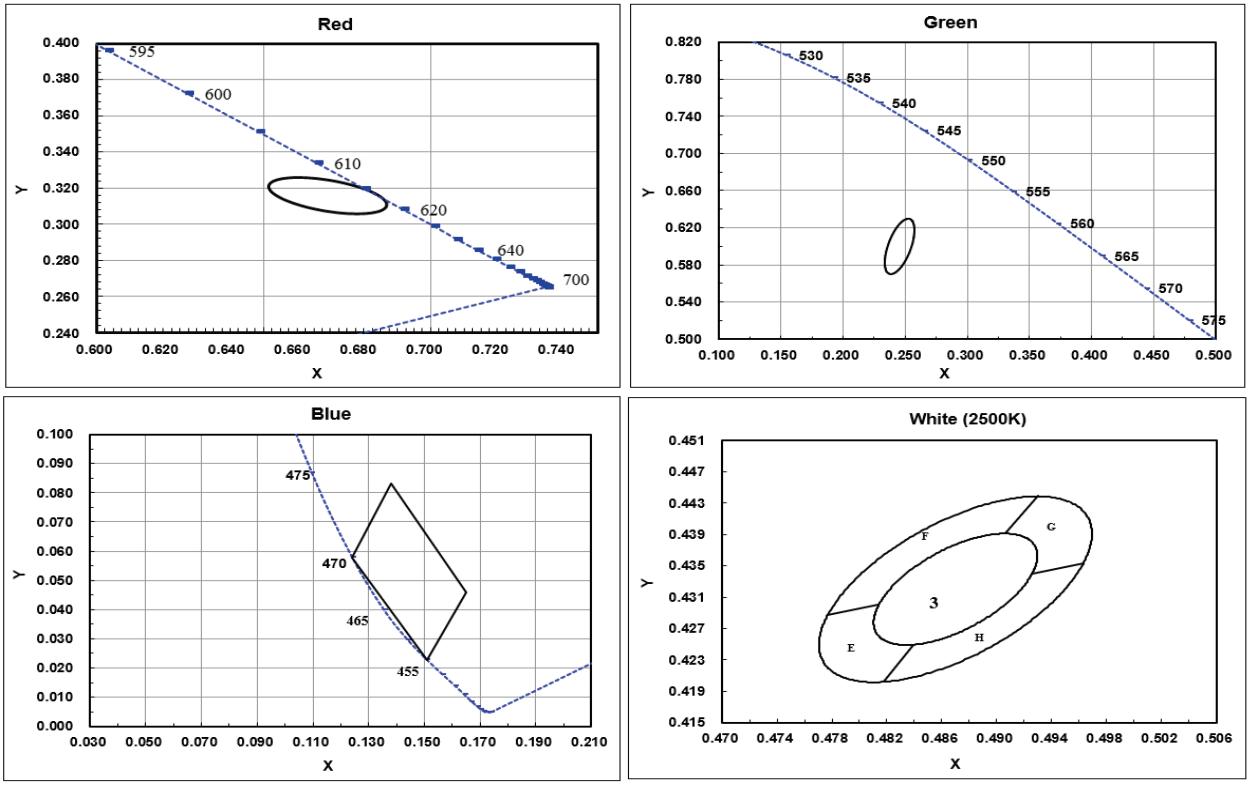
Table 11: Blue MacAdam Ellipse Color Bin Definitions

	Coordinates			
X	0.1510	0.1241	0.1380	0.1650
Y	0.0227	0.0578	0.0830	0.0460

Notes for Tables 10 & 11:

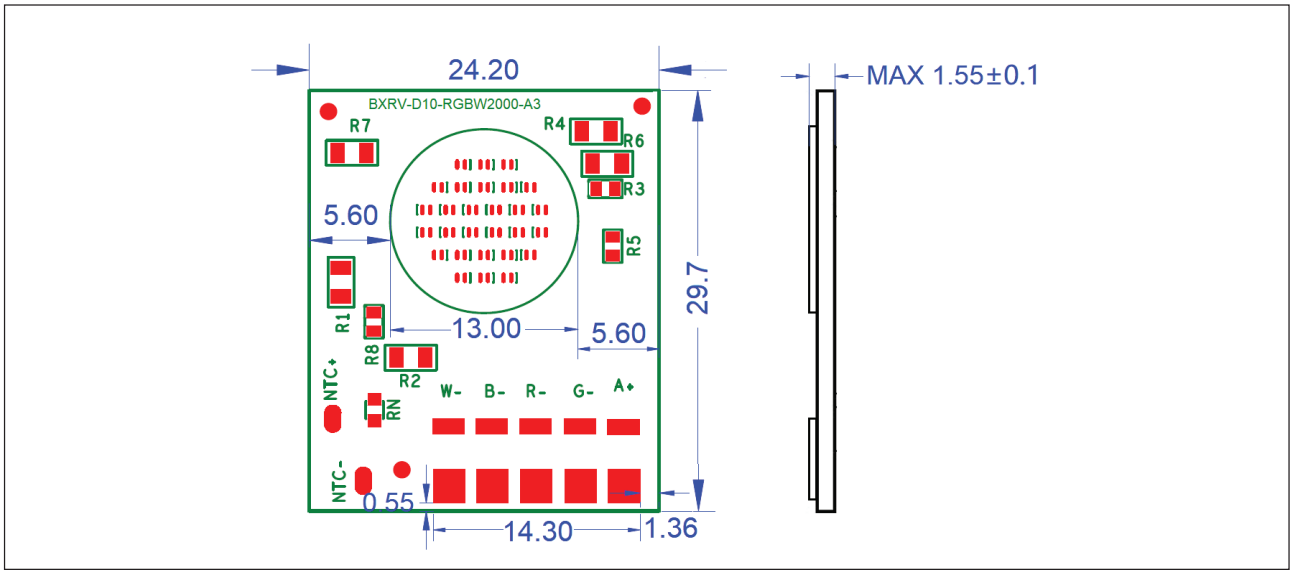
1. Color binning at T_c= 85°C unless otherwise specified
2. Bridgelux maintains a tolerance of ± 0.007 on x and y color coordinates.

Figure 11: Chromaticity Coordinate Group (1 Color Bin Structure, Color Targeted at T_c=85°C)



Mechanical Dimensions

Figure 12: Mechanical Drawing Specifications

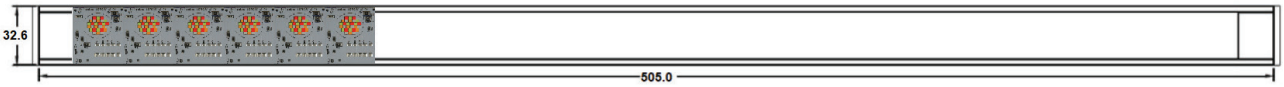


Notes for Figure 12:

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 ± 0.10mm.
5. The optical center of the LED array is nominally defined by the mechanical center of the array.

Packaging and Labeling

Figure 13: Vesta Series RGBW 10mm 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 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.

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Bridgelux Vesta Series RGBW 10mm LES Array With CSP Product Data Sheet DS581 Rev. B (02/2024)