



Bridgelux® V13 F90 TS Array Series

Product Data Sheet DS1320



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 up to two times the nominal drive current, enabling design flexibility not previously possible. These high flux density light sources are designed to support a wide range of high quality, low cost directional luminaires and replacement lamps for both interior and exterior commercial and residential applications.

The F90 V Series COB is a high efficacy product that uses narrow band red phosphor to significantly improve the spectrum efficacy. The improved spectrum efficacy results in the 90 CRI product of the F90 Series delivering better or equivalent efficacy as that of our traditional 80 CRI V Series product.

The V13 LED Array is available in a variety of electrical, CCT, and CRI combinations providing substantial design flexibility and energy efficiency advantages.

Lighting system designs incorporating these LED arrays deliver increased system level efficacy and a longer service life. Typical applications include replacement lamps and task, accent, spot, track, wide area, security, wall packs and down lights.

Features

- Efficacy of 169 lm/W typical, 3000K 90 CRI
- Uniform high-quality illumination
- 2 and 3 SDCM binning options (2700K – 4000K)
- Forward voltage bin codes and backside marking
- Instant light with unlimited dimming
- 5-Year warranty

Benefits

- Enables high efficiency lighting systems and lower operating costs
- Supports the trend toward luminaire miniaturization and delivers enhanced optical control
- Design flexibility for a broad range of lighting applications
- Clean white light without pixelation
- Uniform consistent white light
- Design flexibility for multi-source applications
- Easy to use with daylight and motion sensors to increase energy savings
- Design with confidence



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Product Selection Guide

The following product configurations are available:

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

Part Number	Nominal CCT ¹ (K)	CRI ²	Nominal Drive Current ³ (mA)	Typical Pulsed Flux ^{4,5,6} $T_c = 25^\circ\text{C}$ (lm)	Minimum Pulsed Flux ^{6,7} $T_c = 25^\circ\text{C}$ (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXRE-27G20To-B-8x	2700	90	350	1960	1764	34.3	12.0	163
BXRE-27G20To-C-8x	2700	90	500	2780	2502	34.3	17.1	162
BXRE-30G20To-B-8x	3000	90	350	2030	1827	34.3	12.0	169
BXRE-30G20To-C-8x	3000	90	500	2880	2592	34.3	17.1	168
BXRE-35G20To-B-8x	3500	90	350	2050	1845	34.3	12.0	171
BXRE-35G20To-C-8x	3500	90	500	2920	2628	34.3	17.1	170
BXRE-40G20To-B-8x	4000	90	350	2095	1886	34.3	12.0	175
BXRE-40G20To-C-8x	4000	90	500	2980	2682	34.3	17.1	174

Notes for Table 1:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. CRI values are minimums and tested at $T_j = T_c = 85^\circ\text{C}$. Minimum Rg value for 90 CRI products is 50. Bridgelux maintains a ± 3 tolerance on CRI and Rg values.
3. Drive current is referred to as nominal drive current.
4. Products tested under pulsed condition (10ms pulse width) at nominal drive 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 $\pm 7\%$ tolerance on flux measurements.
7. Minimum flux values at the nominal drive current are guaranteed by 100% test.

Product Selection Guide

Table 2: Selection Guide, Stabilized DC Performance ($T_c = 85^\circ\text{C}$)^{4,5}

Part Number	Nominal CCT ¹ (K)	CRI ²	Nominal Drive Current ³ (mA)	Typical DC Flux ^{4,5} $T_c = 85^\circ\text{C}$ (lm)	Minimum DC Flux ⁶ $T_c = 85^\circ\text{C}$ (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXRE-27G20To-B-8x	2700	90	350	1803	1623	33.4	11.7	154
BXRE-27G20To-C-8x	2700	90	500	2558	2302	33.4	16.7	153
BXRE-30G20To-B-8x	3000	90	350	1868	1681	33.4	11.7	160
BXRE-30G20To-C-8x	3000	90	500	2650	2385	33.4	16.7	158
BXRE-35G20To-B-8x	3500	90	350	1886	1698	33.4	11.7	161
BXRE-35G20To-C-8x	3500	90	500	2686	2418	33.4	16.7	161
BXRE-40G20To-B-8x	4000	90	350	1927	1735	33.4	11.7	165
BXRE-40G20To-C-8x	4000	90	500	2741	2467	33.4	16.7	164

Notes for Table 2:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. CRI values are minimums and tested at $T_j = T_c = 85^\circ\text{C}$. Minimum Rg value for 90 CRI products is 50.
3. Drive current is referred to as nominal drive current.
4. Typical stabilized DC performance values are provided as reference only and are not a guarantee of performance.
5. 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.
6. 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.

European Product Registry for Energy Labeling

The European Product Registry for Energy Labeling (EPREL) is defined in the EU Regulation 2017/1369 to provide important energy efficiency information to consumers. Together with Energy Labeling Regulation ELR (EU) 2019/2015 which was amended by regulation (EU) 2021/340 for energy labelling of light sources, manufacturers are required to declare an energy class based on key technical specifications from each of their product and register it in an open data base managed by EPREL. It is now a legal requirement for a vendor of light sources to upload information about their products into the EPREL database before placing these products on the market in the EU.

Table 3 below provides a list of part numbers that are in compliance with ELR and are currently listed in the EPREL database.

At Bridgelux, we are fully committed to supplying products that are compliant with pertinent laws, rules, and obligation imposed by relevant government bodies including the European Energy Labeling regulation. Customers can use these products with full confidence for any projects that fall under the ELR.

Table 3: Part numbers registered in European Product Registry for Energy Labeling

PART NUMBER ¹	CCT (K)	CRI	Current ² (mA)	Vf (V)	Useful flux ³ (Φ_{use}) at 85C (lm)	Power (W)	Efficacy (lm/W)	Energy efficiency class ⁴	Registration No	URL to Product Information Sheet in EPREL Database
BXRE-27G20To-B-83	2700	90	900	38.6	4310	35	124	E	1848543	https://eprelec.europa.eu/qr/1848543
BXRE-27G20To-C-83	2700	90	1260	38.0	6060	48	127	E	1848544	https://eprelec.europa.eu/qr/1848544
BXRE-30G20To-B-83	3000	90	900	38.6	4463	35	128	E	1848555	https://eprelec.europa.eu/qr/1848555
BXRE-30G20To-C-83	3000	90	1260	38.0	6278	48	131	E	1848556	https://eprelec.europa.eu/qr/1848556
BXRE-35G20To-B-83	3500	90	900	38.6	4508	35	130	E	1848567	https://eprelec.europa.eu/qr/1848567
BXRE-35G20To-C-83	3500	90	1260	38.0	6365	48	133	E	1848568	https://eprelec.europa.eu/qr/1848568
BXRE-40G20To-B-83	4000	90	900	38.6	4606	35	132	E	1848579	https://eprelec.europa.eu/qr/1848579
BXRE-40G20To-C-83	4000	90	1260	38.0	6496	48	136	E	1848580	https://eprelec.europa.eu/qr/1848580

Notes for Table 3:

1. All device listed here must be disposed as e-waste upon its end of life according to local country guideline in each country.
2. For information on performance values at alternative drive conditions, please refer to the Product Selection Guide, Absolute Maximum Rating Table and Performance Curves in this data sheet.
3. For a definition of useful luminous flux (Φ_{use}), please see the ELR regulations at <https://tinyurl.com/4b6zvt4m>.
4. EPREL requires an arrow symbol containing the letter of the energy efficiency class to be displayed, on technical promotional material. Refer to this energy efficiency class column for specific energy efficiency class on each part number.

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 4.

Table 4: Product Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current ¹ (mA)	Typical V_f $T_c = 25^\circ\text{C}$ (V)	Typical Power $T_c = 25^\circ\text{C}$ (W)	Typical Flux ² $T_c = 25^\circ\text{C}$ (lm)	Typical DC Flux ³ $T_c = 85^\circ\text{C}$ (lm)	Typical Efficacy $T_c = 25^\circ\text{C}$ (lm/W)
BXRE-27G20To-B-8x	90	175	33.0	5.8	985	906	171
		260	33.6	8.7	1465	1348	168
		350	34.3	12.0	1960	1803	163
		450	35.0	15.8	2493	2294	158
		700	36.6	25.6	3753	3453	146
		900	37.7	33.9	4684	4310	138
BXRE-27G20To-C-8x	90	250	33.0	8.3	1414	1301	171
		375	33.6	12.6	2122	1952	168
		500	34.3	17.2	2780	2558	162
		630	34.9	22.0	3506	3226	159
		1000	36.6	36.6	5374	4944	147
		1260	37.7	47.5	6587	6060	139
BXRE-30G20To-B-8x	90	175	33.0	5.8	1020	939	177
		260	33.6	8.7	1517	1396	174
		350	34.3	12.0	2030	1868	169
		450	35.0	15.8	2582	2376	164
		700	36.6	25.6	3887	3576	152
		900	37.7	33.9	4852	4463	143
BXRE-30G20To-C-8x	90	250	33.0	8.3	1465	1348	178
		375	33.6	12.6	2198	2022	174
		500	34.3	17.2	2880	2650	168
		630	34.9	22.0	3632	3342	165
		1000	36.6	36.6	5567	5121	152
		1260	37.7	47.5	6824	6278	144
BXRE-35G20To-B-8x	90	175	33.0	5.8	1031	948	178
		260	33.6	8.7	1532	1410	175
		350	34.3	12.0	2050	1886	171
		450	35.0	15.8	2608	2400	166
		700	36.6	25.6	3926	3612	153
		900	37.7	33.9	4900	4508	144
BXRE-35G20To-C-8x	90	250	33.0	8.3	1485	1366	180
		375	33.6	12.6	2229	2050	177
		500	34.3	17.2	2920	2686	170
		630	34.9	22.0	3683	3388	168
		1000	36.6	36.6	5644	5193	154
		1260	37.7	47.5	6919	6365	146

Notes for Table 4:

1. Alternate drive currents in Table 4 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a $\pm 7\%$ 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 4: Product Performance at Commonly Used Drive Currents (continued)

Part Number	CRI	Drive Current ¹ (mA)	Typical V_f $T_c = 25^\circ\text{C}$ (V)	Typical Power $T_c = 25^\circ\text{C}$ (W)	Typical Flux ² $T_c = 25^\circ\text{C}$ (lm)	Typical DC Flux ³ $T_c = 85^\circ\text{C}$ (lm)	Typical Efficacy $T_c = 25^\circ\text{C}$ (lm/W)
BXRE-40G20To-B-8x	90	175	33.0	5.8	1053	969	182
		260	33.6	8.7	1566	1440	179
		350	34.3	12.0	2095	1927	175
		450	35.0	15.8	2665	2452	169
		700	36.6	25.6	4012	3691	157
		900	37.7	33.9	5007	4606	148
BXRE-40G20To-C-8x	90	250	33.0	8.3	1516	1394	184
		375	33.6	12.6	2274	2092	180
		500	34.3	17.2	2980	2741	174
		630	34.9	22.0	3758	3458	171
		1000	36.6	36.6	5760	5299	157
		1260	37.7	47.5	7060	6496	149

Notes for Table 4:

1. Alternate drive currents in Table 4 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a $\pm 7\%$ 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 5: Electrical Characteristics

Part Number	Drive Current (mA)	Forward Voltage Pulsed, $T_c = 25^\circ\text{C}$ (V) ^{1, 2, 3, 8}			Typical Coefficient of Forward Voltage ⁴ $\Delta V_f / \Delta T_c$ (mV/ $^\circ\text{C}$)	Typical Thermal Resistance Junction to Case ^{5,6} R_{j-c} ($^\circ\text{C}/\text{W}$)	Driver Selection Voltages ⁷ (V)	
		Minimum	Typical	Maximum			V_f Min. Hot $T_c = 105^\circ\text{C}$ (V)	V_f Max. Cold $T_c = -40^\circ\text{C}$ (V)
BXRE-xxx20Tx-B-8x	350	32.2	34.3	36.3	-11	0.22	31.4	37.1
	900	35.5	37.7	40.0	-12	0.34	34.6	40.8
BXRE-xxx20Tx-C-8x	500	32.2	34.3	36.3	-11	0.19	31.4	37.1
	1260	35.4	37.7	39.9	-12	0.29	34.6	40.7

Notes for Table 5:

- Parts are tested in pulsed conditions, $T_c = 25^\circ\text{C}$. Pulse width is 10ms.
- Voltage minimum and maximum are provided for reference only and are not a guarantee of performance.
- Bridgelux maintains a tester tolerance of $\pm 0.10\text{V}$ on forward voltage measurements.
- Typical coefficient of forward voltage tolerance is $\pm 0.1\text{mV}$ for nominal current.
- Thermal resistance values are based from test data of a 3000K 90 CRI product.
- 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.
- 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.
- This product has been designed and manufactured per IEC 62031:2018. This product has passed dielectric withstand voltage testing at 1140 V. The working voltage designated for the insulation is 70V d.c. The maximum allowable voltage across the array must be determined in the end product application.

Eye Safety

Table 6: Eye Safety Risk Group (RG) Classifications

Part Number	Drive Current (mA)	CCT ³	
		2700K/3000K	3500-4000K ²
BXRE-xxx20Tx-B-8x	870	RG1	RG1
	900	RG1	RG2
BXRE-xxx20Tx-C-8x	895	RG1	RG1
	1260	RG1	RG2

Notes for Table 6:

1. Eye safety classification for the use of Bridgelux V Series LED arrays is in accordance with specification IEC/TR 62778: Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires.
2. For products classified as RG2 at 4000K, Ethr= 1980 lx.
3. Please contact your Bridgelux sales representative for Ethr values at specific drive currents and CCTs not listed.

Absolute Maximum Ratings

Table 7: Maximum Ratings

Parameter	Maximum Rating	
LED Junction Temperature (T_j)	150°C	
Storage Temperature ¹	-40°C to +105°C	
Operating Case Temperature ² (T_c)	105°C ⁷	
Soldering Temperature ³	350°C or lower for a maximum of 6 seconds	
	BXRE-xxx20Tx-B-8x	BXRE-xxx20Tx-C-8x
Maximum Drive Current ⁴	900 mA at ≤85°C 600 mA at 105°C	1260 mA at ≤85°C 840mA at 105°C
Maximum Peak Pulsed Drive Current ⁵	1290 mA	1800 mA
Maximum Reverse Voltage ⁶	-60V	-60V

Notes for Table 7:

1. The Fg0 product is robust enough to pass our internal humidity test but it is still more sensitive compared to regular LED array product. The product needs to be stored in a dry environment. It is not recommended to use the product in a damp environment that directly exposes it to moisture.
2. For IEC 62717 requirement, please consult your Bridgelux sales representative.
3. Refer to Bridgelux Application Note AN101: Handling and Assembly of Bridgelux V Series LED Arrays
4. Arrays may be driven at higher currents however lumen maintenance may be reduced and warranty will not apply.
5. 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.
6. 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.
7. For good thermal management and to achieve optimal LED lifetime, please ensure that your thermal design accounts for the temperature of the light emitting surface (LES) to not exceed 140 deg C.

Performance Curves

Figure 1: V13B Drive Current vs. Voltage

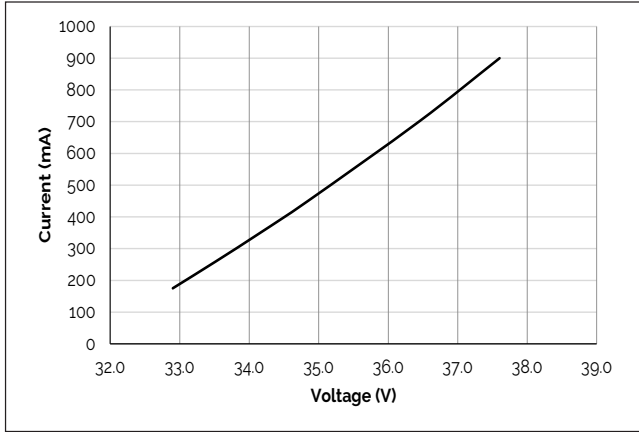


Figure 2: V13C Drive Current vs. Voltage

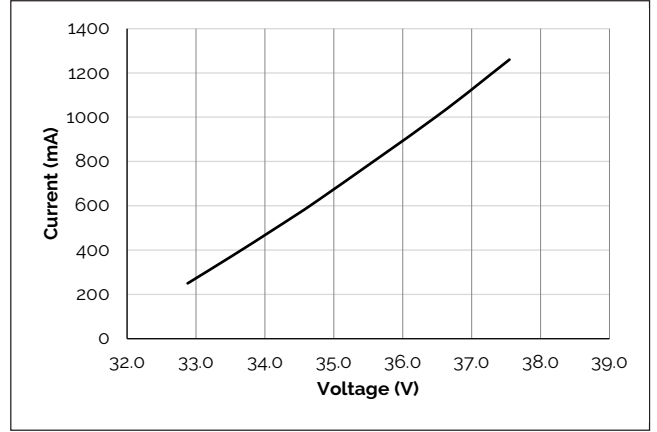


Figure 3: V13B Typical Relative Flux vs. Current

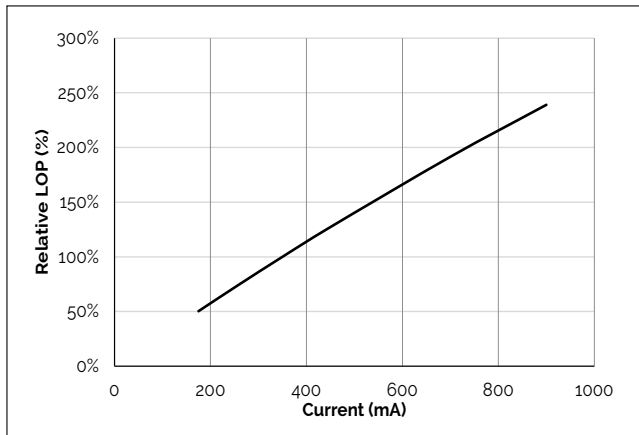


Figure 4: V13C Typical Relative Flux vs. Current

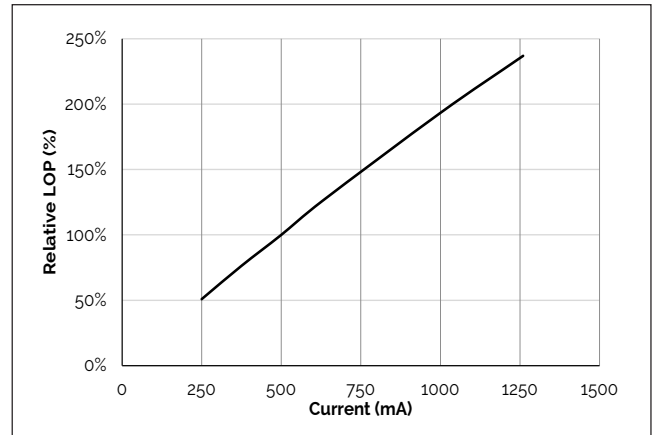


Figure 5: Typical DC Flux vs. Case Temperature

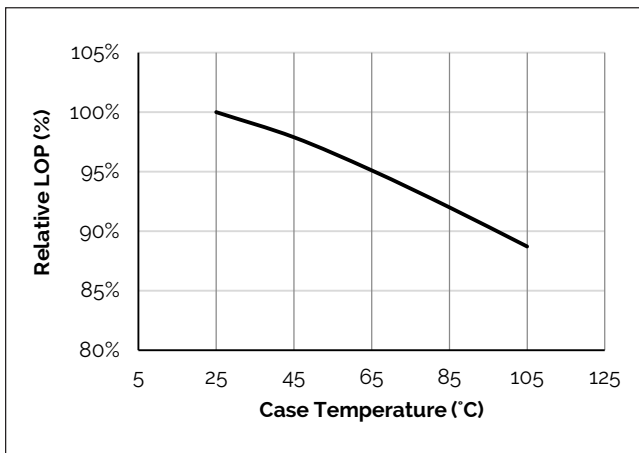
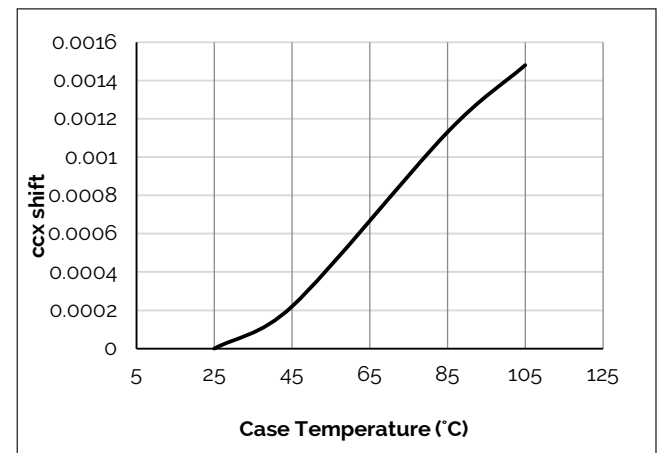


Figure 6: Typical DC ccx Shift vs. Case Temperature



Notes for Figures 1-4:

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.
2. Products tested under pulsed condition (10ms pulse width) at nominal drive current where T_j (junction temperature) = T_c (case temperature) + 25°C.

Note for Figures 5-6:

1. Characteristics shown for Warm White.

Performance Curves

Figure 7: Typical DC ccy Shift vs. Case Temperature

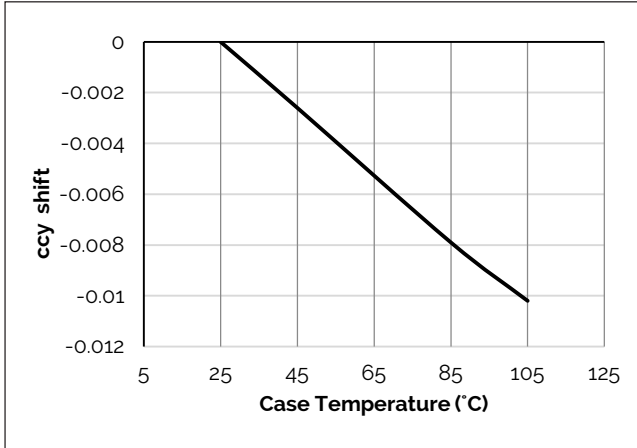


Figure 8: V13B Drive Current vs. ccx Shift

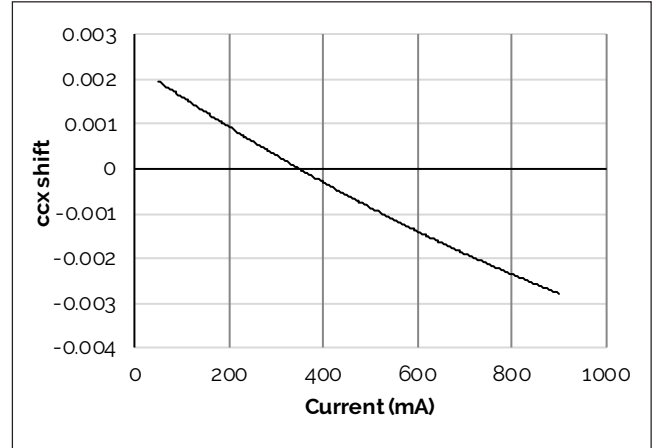


Figure 9: V13B Drive Current vs. ccy Shift

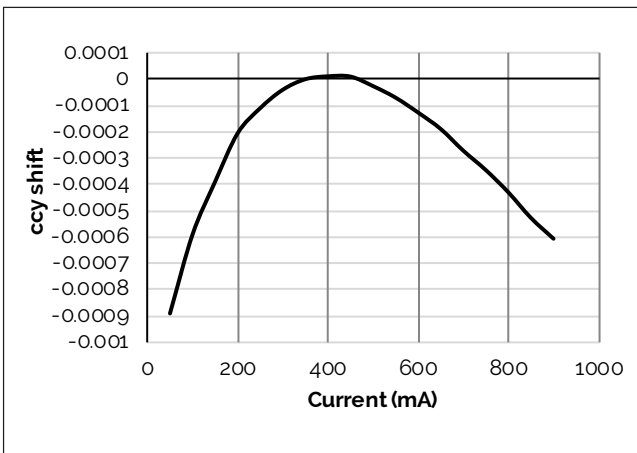


Figure 10: V13C Drive Current vs. ccx Shift

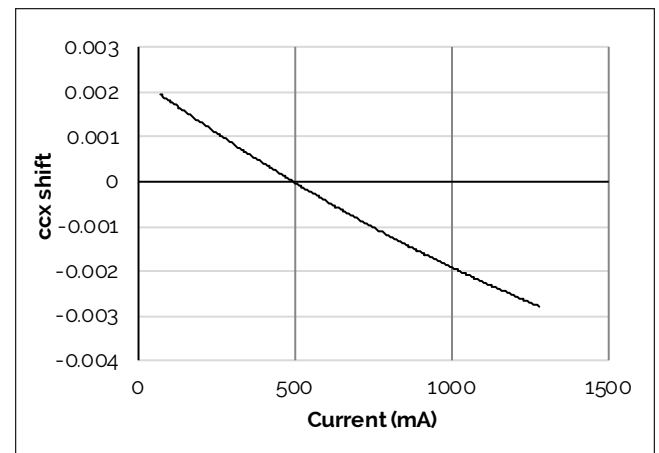


Figure 11: V13C Drive Current vs. ccy Shift

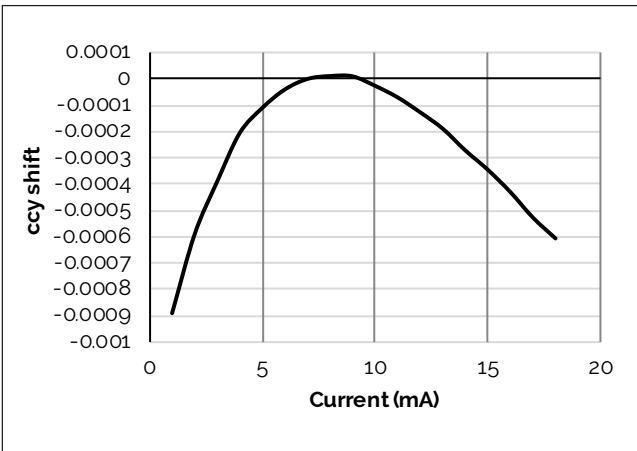
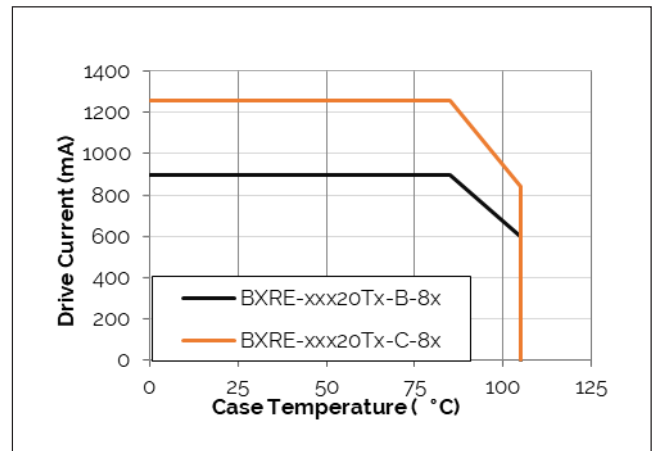


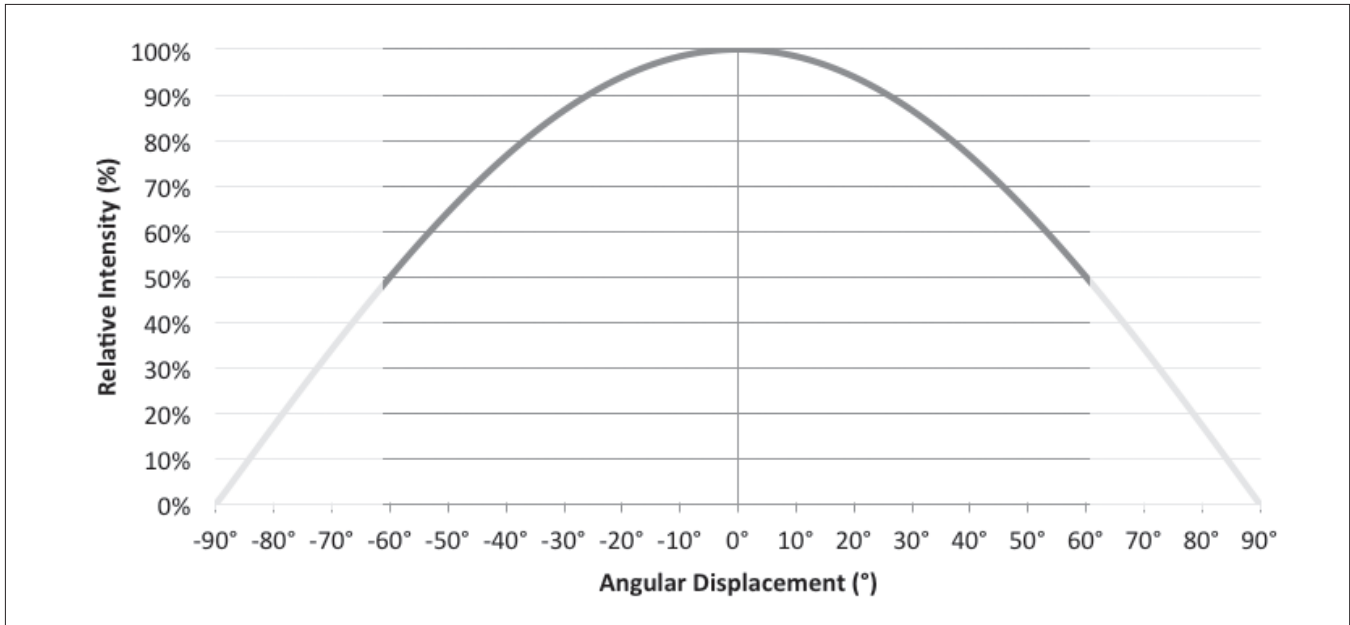
Figure 12: Derating Curve



Note for Figures 7-11:
1. Characteristics shown for Warm White.

Typical Radiation Pattern

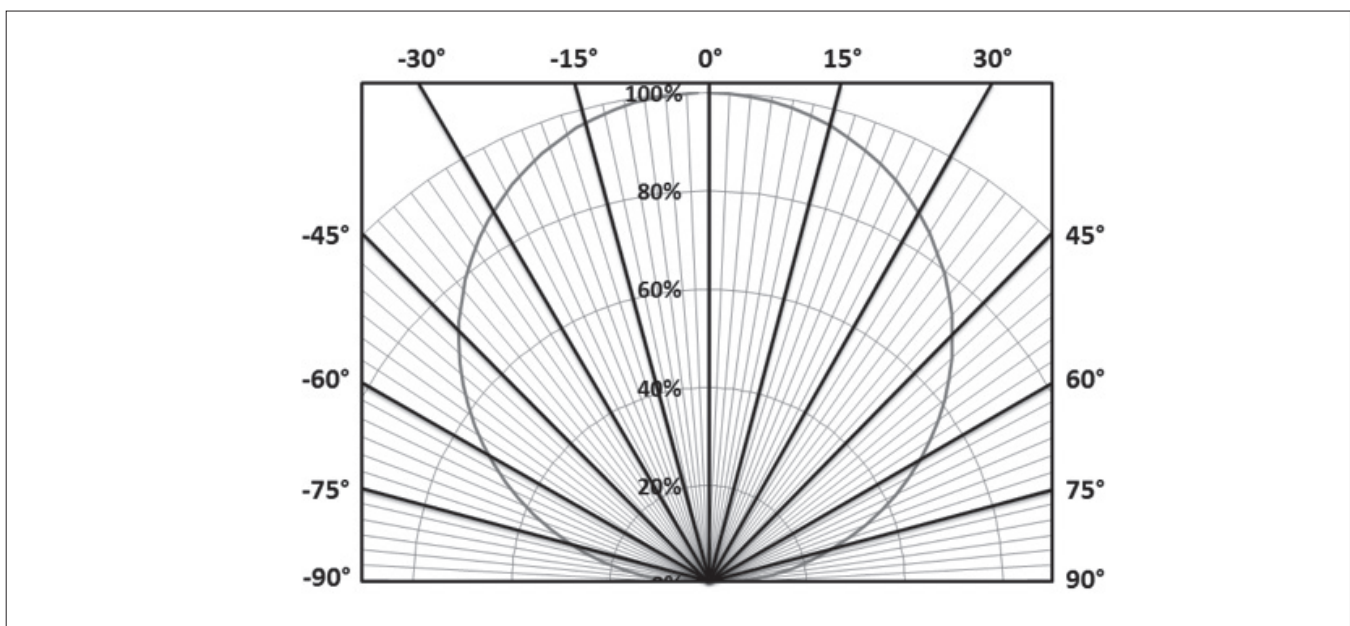
Figure 13: Typical Spatial Radiation Pattern



Notes for Figure 13:

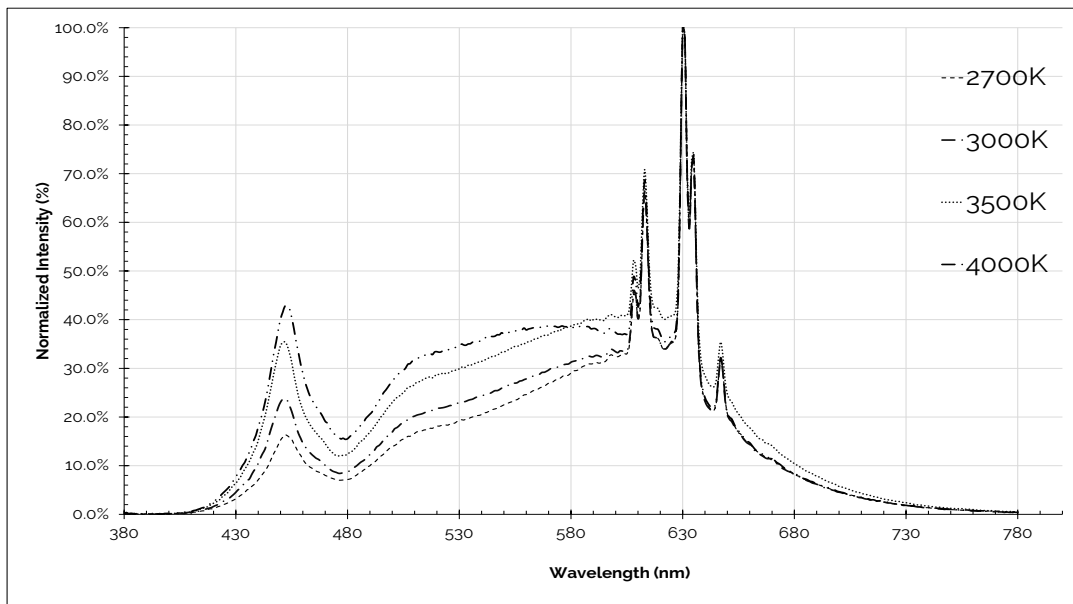
1. Typical viewing angle is 120°.
2. The viewing angle is defined as the off axis angle from the centerline where intensity is ½ of the peak value.

Figure 14: Typical Polar Radiation Pattern



Typical Color Spectrum

Figure 15: Typical Color Spectrum

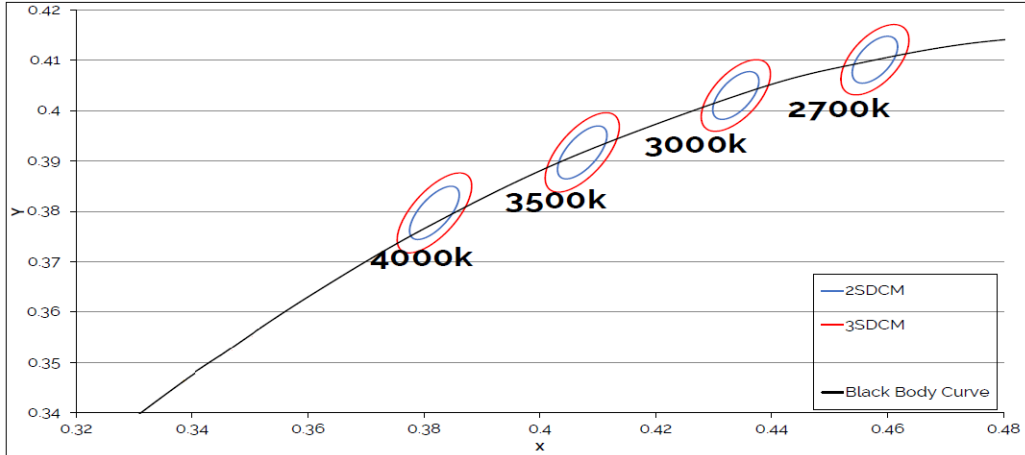


Notes for Figure 15:

1. Color spectra measured at nominal current for $T_j = T_c = 85^\circ\text{C}$.
2. Color spectra shown is 2700K and 90CRI.
3. Color spectra shown is 3000K and 90 CRI.
4. Color spectra shown is 3500K and 90 CRI.
5. Color spectra shown is 4000K and 90 CRI.

Color Binning Information

Figure 17: Warm and Neutral White Test Bins in xy Color Space



Note: Pulsed Test Conditions, $T_c = 85^\circ\text{C}$

Table 8: Warm and Neutral White xy Bin Coordinates and Associated Typical CCT (product is hot targeted to $T_c = 85^\circ\text{C}$)

Bin Code	2700K	3000K	3500K	4000K
ANSI Bin (for reference only)	(2580K - 2870K)	(2870K - 3220K)	(3220K - 3710K)	(3710K - 4260K)
83 (3 SDCM)	(2651K - 2794K)	(2968K - 3136K)	(3369K - 3586K)	(3851K - 4130K)
82 (2 SDCM)	(2674K - 2769K)	(2995K - 3107K)	(3404K - 3548K)	(3895K - 4081K)
Center Point (x,y)	(0.4578, 0.4101)	(0.4338, 0.403)	(0.4073, 0.3917)	(0.3818, 0.3797)

Note for Table 8:

1. Bridgelux maintains a tolerance of +/- 0.007 on x and y color coordinates in the CIE 1931 color Space.

Packaging and Labeling

Figure 18: Drawing for V13 Packaging Tubes



Notes for Figure 18:

1. Each tube holds 25 V13 COB arrays.
2. One tube is sealed in an anti-static bag. Four bags are placed in a shipping box. Depending on quantities ordered, a bigger shipping box, containing four boxes may be used to ship products.
3. Each bag and box is to be labeled as shown above.
4. Dimensions for each tube are 21.3 (W) x 9.5(H) x 505 (L). Dimensions for the anti-static bag are 75 (W) x 615 (L) x 3.1 (T) mm. Dimensions for the shipping box are 58.7 x 13.3 x 7.9 cm.

Packaging and Labeling

Figure 19: Gen. 8 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 all available application notes 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 V Series LED arrays are available in both IGS and STEP formats. Please contact your Bridgelux sales representative for assistance.

LM80

LM80 testing has been completed and the LM80 report is now available. Please contact your Bridgelux sales representative for LM-80 report.

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 AN101 for additional information.

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).

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: 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
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