Bridgelux Vero® SE 18 F90 BBBL Array

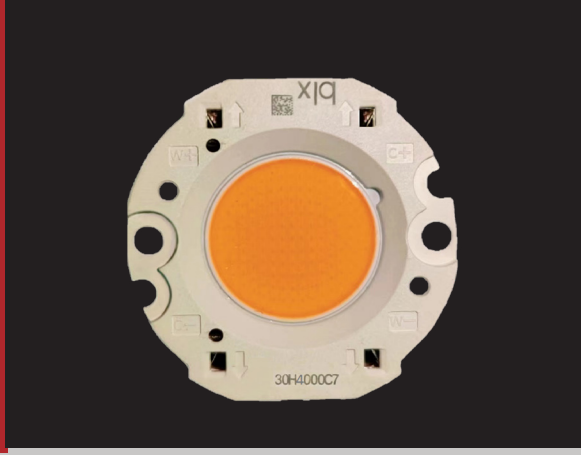
Product Data Sheet DS359-1

TEN YEAR Warranty™

BXRC-27G | 30G | 35G | 40G

Introduction

Vero SE F90



The Vero® SE Series is a revolutionary light source system that integrates Bridgelux's eighth generation COB technology with poke-in connectivity, enabling solder-free installation. Vero SE LED light sources streamline assembly processes, lower manufacturing costs, simplify the luminaire design process, improve light quality, and increase design flexibility.

Vero SE is available in four different light emitting surface (LES) configurations that operate reliably over a broad current range. With Vero SE, secondary connector and holder components are not required, allowing for rapid integration of arrays into fixtures, and an efficient field replaceable solution. Vero SE arrays deliver increased lumen density for improved beam control and precision lighting, with 2 and 3 SDCM color control standards for clean and consistent uniform lighting.

The F90 Vero® SE 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 Vero SE Series product.

Features

- Efficacy of 178 lm/W typical, 3000K 90 CRI
- Wide selection of CCT options (2700K-4000K) with minimum 90 CRI options
- Uniform high-quality illumination
- 2 and 3 SDCM binning options (2700K – 4000K)
- Forward voltage bin codes and backside marking
- Instant light with unlimited dimming
- Thermally isolated solder pads
- 10-Year warranty

Benefits

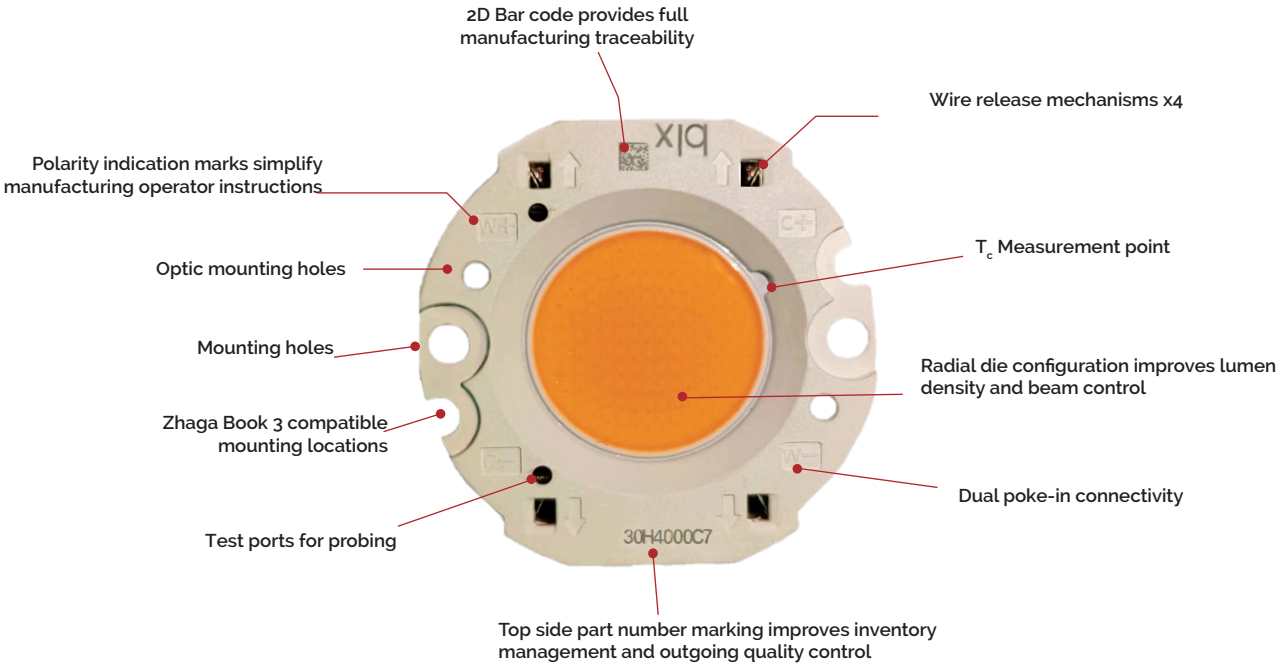
- Solder free installation and field upgradability
- Improved inventory management and quality control
- Enables high efficiency lighting systems and lower operating costs
- Supports the trend toward luminaire miniaturization and delivers enhanced optical control
- Design flexibility for a broad range of lighting applications
- Clean white light without pixelation
- Uniform consistent white light
- Design flexibility for multi-source applications
- Enhanced ease of use and installation

Contents

Product Feature Map

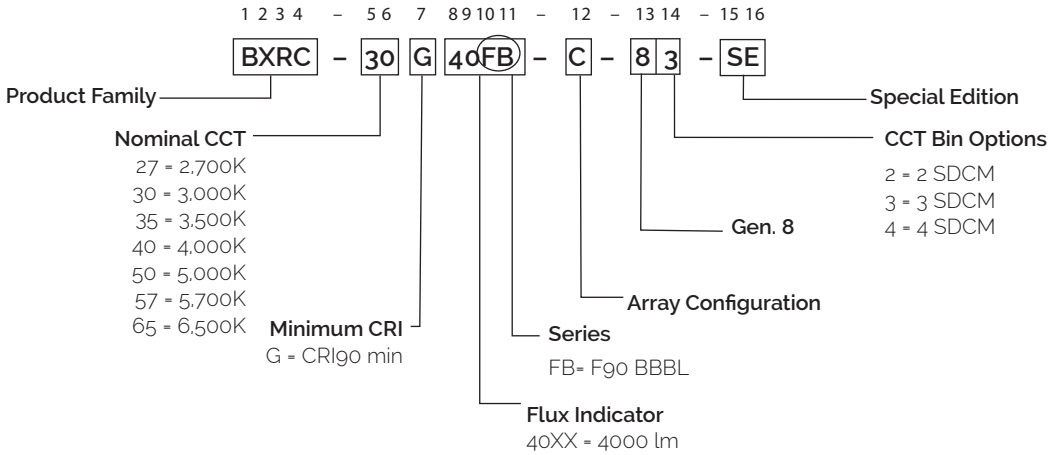
Vero SE 18 is the second largest form factor in the product family of next generation solid state light sources. In addition to delivering the performance and light quality required for many lighting applications,

Vero SE incorporates several features to simplify the design integration and manufacturing process, accelerate time to market and reduce system costs. Please visit www.bridgelux.com for more information on the Vero SE family of products.



Product Nomenclature

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



Product Selection Guide

The following product configurations are available:

Table 1: Selection Guide, Pulsed Measurement Data (T_c = 25˚C)

Part Number	Nominal CCT[1] (K)	CRI[2]	Nominal Drive Current[3] (mA)	Typical Pulsed Flux[4,5,6] T_c = 25°C (lm)	Minimum Pulsed Flux[6,7] T_c = 25°C (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXRC-27G40FB-B-8x-SE	2700	90	700	4236	3812	34.6	24.2	175
BXRC-27G40FB-C-8x-SE	2700	90	1050	6350	5715	34.9	36.6	173
BXRC-30G40FB-B-8x-SE	3000	90	700	4323	3891	34.6	24.2	178
BXRC-30G40FB-C-8x-SE	3000	90	1050	6481	5833	34.9	36.6	177
BXRC-35G40FB-B-8x-SE	3500	90	700	4299	3869	34.6	24.2	178
BXRC-35G40FB-C-8x-SE	3500	90	1050	6445	5801	34.9	36.6	176
BXRC-40G40FB-B-8x-SE	4000	90	700	4341	3907	34.6	24.2	179
BXRC-40G40FB-C-8x-SE	4000	90	1050	6509	5858	34.9	36.6	178

Table 2: Selection Guide, Stabilized DC Test Performance (T_c = 85˚C)[4,5,6]

Part Number	Nominal CCT[1] (K)	CRI[2]	Nominal Drive Current[3] (mA)	Typical DC Flux[4,5] T_c = 85°C (lm)	Minimum DC Flux[6] T_c = 85°C (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXRC-27G40FB-B-8x-SE	2700	90	700	3897	3507	34.1	23.9	163
BXRC-27G40FB-C-8x-SE	2700	90	1050	5842	5258	34.4	36.1	162
BXRC-30G40FB-B-8x-SE	3000	90	700	3977	3579	34.1	23.9	167
BXRC-30G40FB-C-8x-SE	3000	90	1050	5962	5366	34.4	36.1	165
BXRC-35G40FB-B-8x-SE	3500	90	700	3955	3560	34.1	23.9	166
BXRC-35G40FB-C-8x-SE	3500	90	1050	5930	5337	34.4	36.1	164
BXRC-40G40FB-B-8x-SE	4000	90	700	3993	3594	34.1	23.9	167
BXRC-40G40FB-C-8x-SE	4000	90	1050	5988	5389	34.4	36.1	166

Notes for Table 1 & 2:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. CRI values are minimums and tested at T_j = T_c = 85˚C. Minimum R9 value for 90 CRI products is 50.Bridgelux maintains a ± 3 tolerance on CRI and R9 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 ±7% tolerance on flux measurements.
7. Minimum flux values at the nominal drive current are guaranteed by 100% test.

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] (Φuse) at 85C (lm)	Power (W)	Efficacy (lm/W)	Energy efficiency class[4] 	Registration No	URL to Product Information Sheet in EPREL Database

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 **(Φuse),** 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

Vero SE LED arrays are tested to the specifications shown using the nominal drive currents in Table 1. Vero SE 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°C (V)	Typical Power T_c = 25°C (W)	Typical Flux[2] T_c = 25°C (lm)	Typical DC Flux[3] T_c = 85°C (lm)	Typical Efficacy T_c = 25°C (lm/W)
BXRC-27G40FB-B-8x-SE	90	350	33.2	11.6	2169	1995	187
		525	33.9	17.8	3209	2952	180
		700	**34.6**	**24.2**	**4236**	**3896**	**175**
		900	35.4	31.9	5395	4964	169
		1400	37.2	52.1	8224	7567	158
		1620	38	61.6	9437	8683	153
BXRC-27G40FB-C-8x-SE	90	525	33.4	17.5	3365	3096	192
		785	34.1	26.8	4963	4566	185
		1050	**34.9**	**36.6**	**6350**	**5843**	**173**
		1170	35.3	41.3	7291	6708	177
		2100	37.9	79.6	12726	11708	160
		2160	38	82.1	13068	12023	159
BXRC-30G40FB-B-8x-SE	90	350	33.2	11.6	2214	2036	191
		525	33.9	17.8	3274	3013	184
		700	**34.6**	**24.2**	**4323**	**3977**	**178**
		900	35.4	31.9	5505	5065	173
		1400	37.2	52.1	8393	7721	161
		1620	38	61.6	9630	8860	156
BXRC-30G40FB-C-8x-SE	90	525	33.4	17.5	3434	3159	196
		785	34.1	26.8	5064	4659	189
		1050	**34.9**	**36.6**	**6481**	**5962**	**177**
		1170	35.3	41.3	7439	6844	180
		2100	37.9	79.6	12986	11947	163
		2160	38	82.1	13335	12268	162
BXRC-35G40FB-B-8x-SE	90	350	33.2	11.6	2201	2026	189
		525	33.9	17.8	3257	2996	183
		700	**34.6**	**24.2**	**4299**	**3956**	**178**
		900	35.4	31.9	5475	5037	172
		1400	37.2	52.1	8346	7679	160
		1620	38	61.6	9579	8812	156
BXRC-35G40FB-C-8x-SE	90	525	33.4	17.5	3415	3142	195
		785	34.1	26.8	5037	4634	188
		1050	**34.9**	**36.6**	**6445**	**5930**	**176**
		1170	35.3	41.3	7399	6807	179
		2100	37.9	79.6	12916	11882	162
		2160	38	82.1	13262	12200	162

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 ± 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°C (V)	Typical Power T_c = 25°C (W)	Typical Flux[2] T_c = 25°C (lm)	Typical DC Flux[3] T_c = 85°C (lm)	Typical Efficacy T_c = 25°C (lm/W)
BXRC-40G40FB-B-8x-SE	90	350	33.2	11.6	2223	2046	191
		525	33.9	17.8	3289	3025	185
		700	**34.6**	**24.2**	**4341**	**3994**	**179**
		900	35.4	31.9	5529	5087	174
		1400	37.2	52.1	8429	7755	162
		1620	38	61.6	9672	8898	157
BXRC-40G40FB-C-8x-SE	90	525	33.4	17.5	3449	3173	197
		785	34.1	26.8	5087	4679	190
		1050	**34.9**	**36.6**	**6509**	**5989**	**178**
		1170	35.3	41.3	7472	6875	181
		2100	37.9	79.6	13043	12000	164
		2160	38	82.1	13393	12321	163

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 ± 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°C (V) [1, 2, 3, 8]			Typical Coefficient of Forward Voltage[4] $\Delta V_f/\Delta T_c$ (mV/°C)	Typical Thermal Resistance Junction to Case[5,6] R_{j-c} (°C/W)	Driver Selection Voltages[7] (V)	
		Minimum	Typical	Maximum			V_f Min. Hot T_c = 105°C (V)	V_f Max. Cold T_c = -40°C (V)
BXRC-xxx40Fx-B-8x-SE	700	32.5	34.6	36.7	-10	0.14	31.8	37.3
	1620	35.7	38.0	40.3	-11	0.23	35.0	41.0
BXRC-xxx40Fx-C-8x-SE	1050	32.8	34.9	37.0	-10	0.12	32.1	37.7
	2160	35.8	38.0	40.3	-11	0.20	35.0	41.1

Notes for Table 5:

1. Parts are tested in pulsed conditions, T_c = 25°C. Pulse width is 10ms.
2. Voltage minimum and maximum are provided for reference only and are not a guarantee of performance.
3. Bridgelux maintains a tester tolerance of ± 0.10V on forward voltage measurements.
4. Typical coefficient of forward voltage tolerance is ± 0.1mV for nominal current.
5. Thermal resistance values are based from test data of a 3000K 80 CRI product.
6. 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.
7. 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.
8. This product has been designed and manufactured per IEC 62031:2018. This product has passed dielectric withstand voltage testing at 1160 V. The working voltage designated for the insulation is 80V 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	3500K-5000K[2]
BXRC-xxx40Fx-B-8x-SE	1360	RG1	RG1
	1620	RG1	RG2
BXRC-xxx40Fx-C-8x-SE	1405	RG1	RG1
	2160	RG1	RG2

Notes for Table 6:

1. Eye safety classification for the use of Bridgelux Vero SE 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 5000K Ethr= 1530 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 +95˚C	
Operating Case Temperature[2] (T_c)	95˚C	
Soldering Temperature[3]	300˚C or lower for a maximum of 6 seconds	
	BXRC-xxx40Fx-B-8x-SE	BXRC-xxx40Fx-C-8x-SE
Maximum Drive Current[4]	1620 mA at ≤85˚C 1215 mA at 95˚C	2160 mA at ≤85˚C 1620 mA at 95˚C
Maximum Peak Pulsed Drive Current[5]	2320mA	3090 mA
Maximum Reverse Voltage[6]	-60V	-60V

Notes for Table 7:

1. The F90 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 AN31: Bridgelux Vero SE Array Design Guide.
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.

Performance Curves

Figure 1: Vero SE 18B Drive Current vs. Voltage

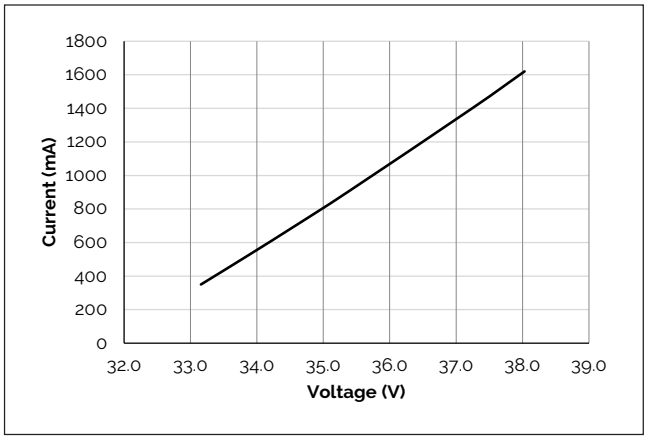


Figure 2: Vero SE 18C Drive Current vs. Voltage

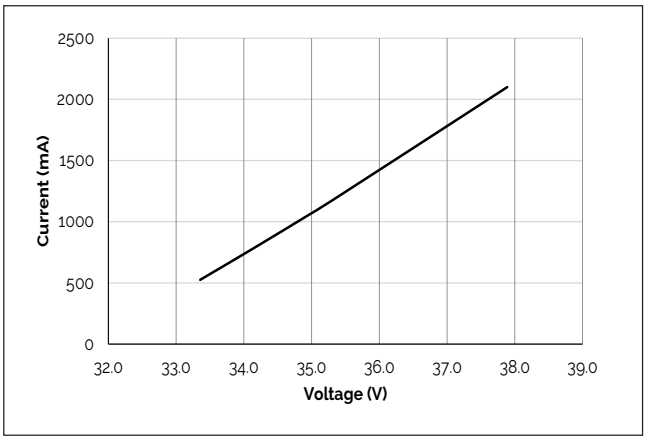


Figure 3: Vero SE 18B Typical Relative Flux vs. Current

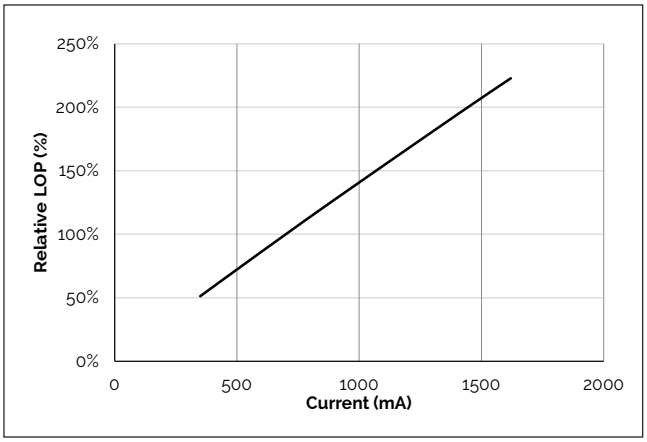


Figure 4: Vero SE 18C Typical Relative Flux vs. Current

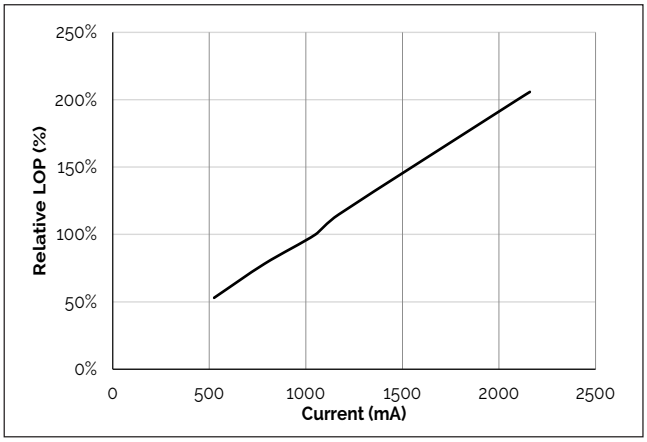


Figure 5: Typical DC Flux vs. Case Temperature

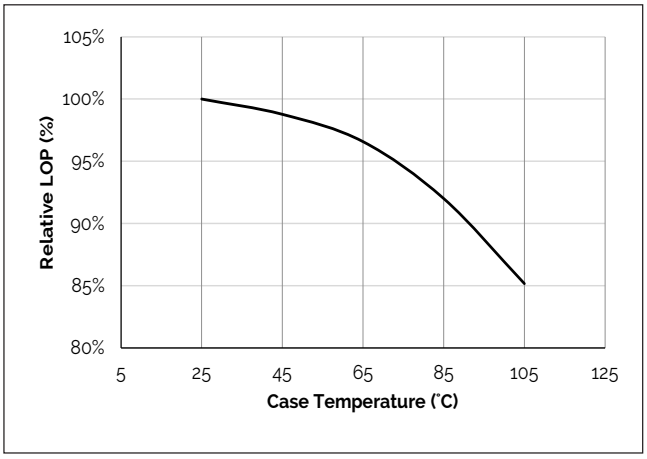
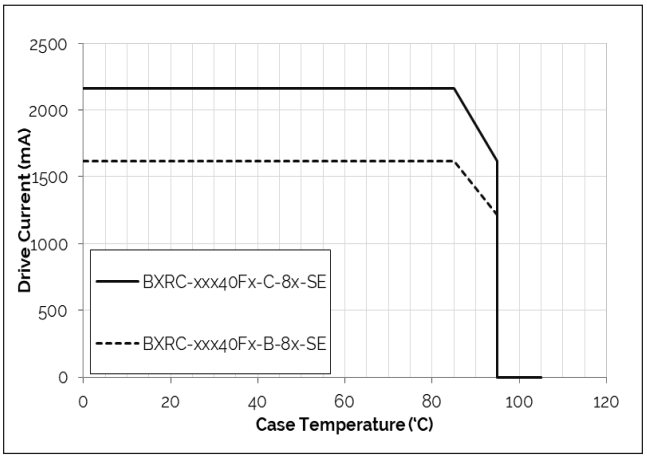


Figure 6: Derating Curve



Notes for Figures 1-4:

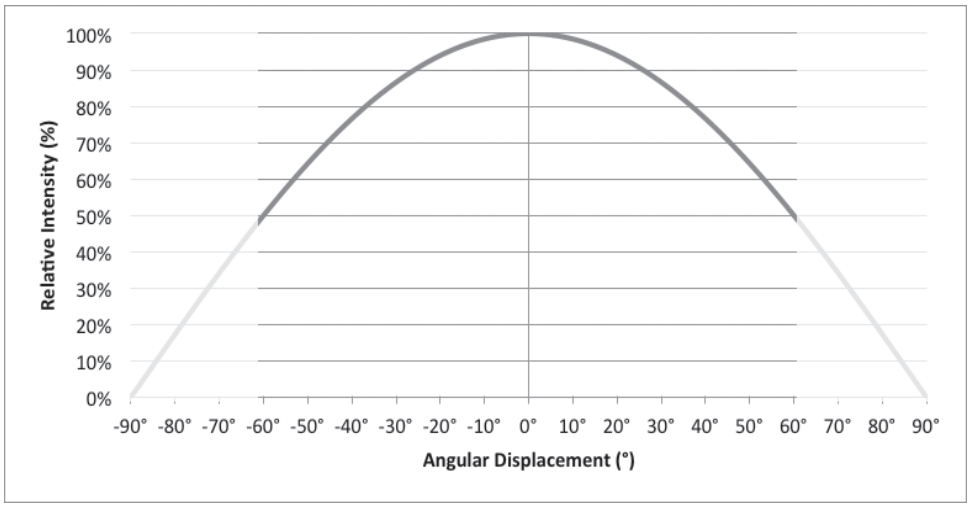
1. Bridgelux does not recommend driving high power LEDs at low currents. Doing so may produce unpredictable results. Pulse width modulation (PWM) is recommended for dimming effects.
2. Products tested under pulsed condition (10ms pulse width) at nominal drive current where T_j (junction temperature) = T_c (case temperature) = 25˚C.

Note for Figures 5-6:

1. Characteristics shown for Warm White.

Typical Radiation Pattern

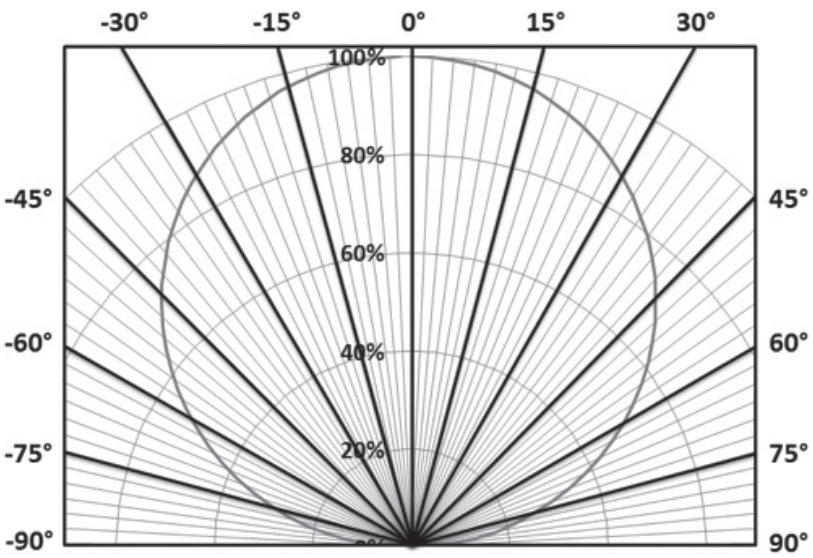
Figure 7: Typical Spatial Radiation Pattern



Notes for Figure 7:

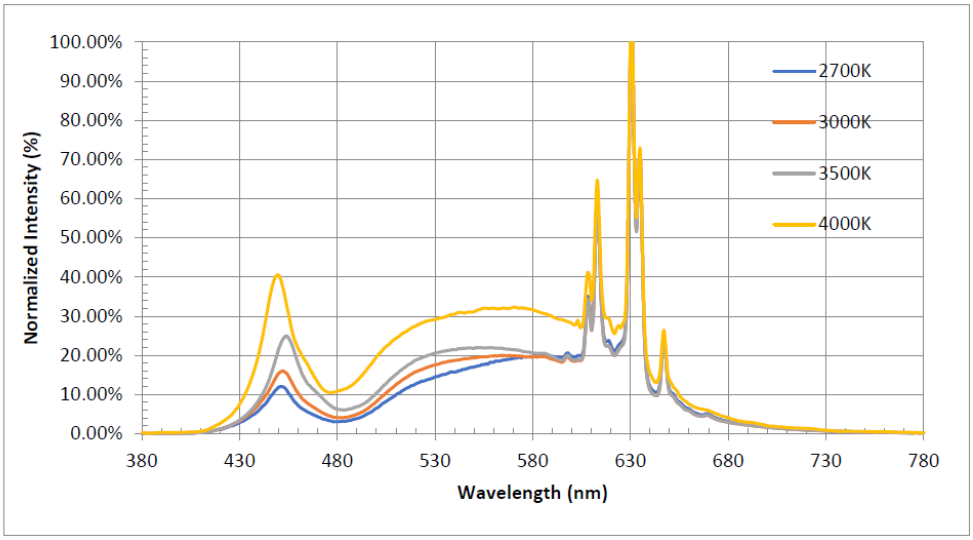
1. Typical viewing angle is 120°.
2. The viewing angle is defined as the off axis angle from the centerline where intensity is ½ of the peak value.

Figure 8: Typical Polar Radiation Pattern



Typical Color Spectrum

Figure 9: Typical Color Spectrum

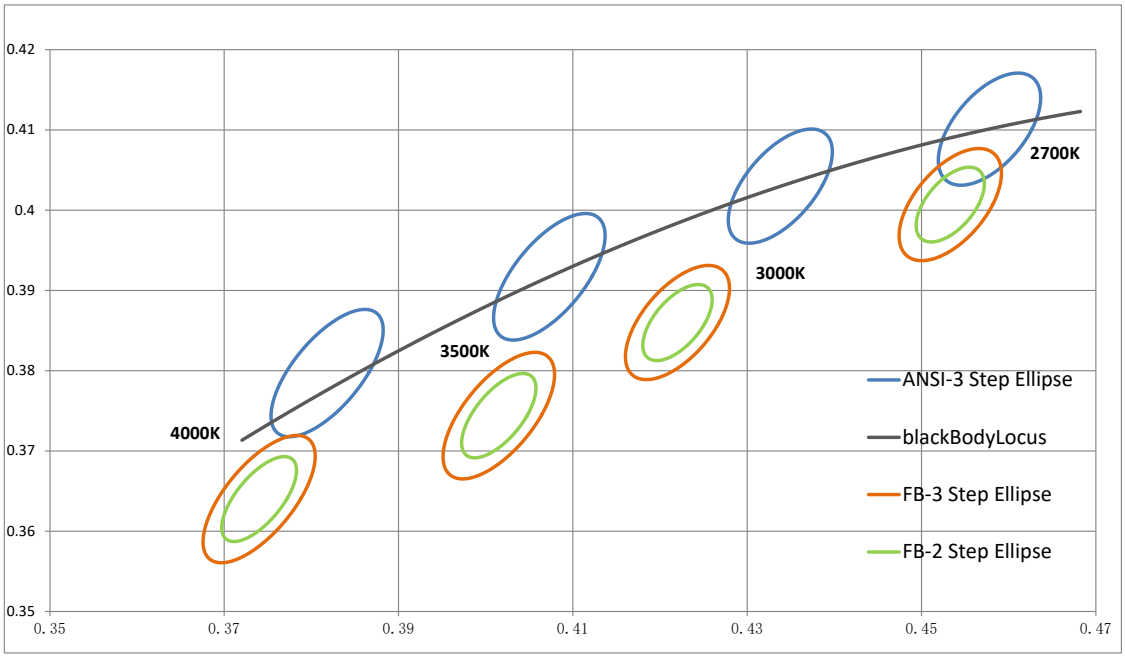


Notes for Figure 9:

1. Color spectra measured at nominal current for T_j = T_c = 85˚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 10: Warm and Neutral White Test Bins in xy Color Space



Note: Pulsed Test Conditions, T_c = 85˚C

Table 8: Warm and Neutral White xy Bin Coordinates and Associated Typical CCT (product is hot targeted to Tc = 85˚C)

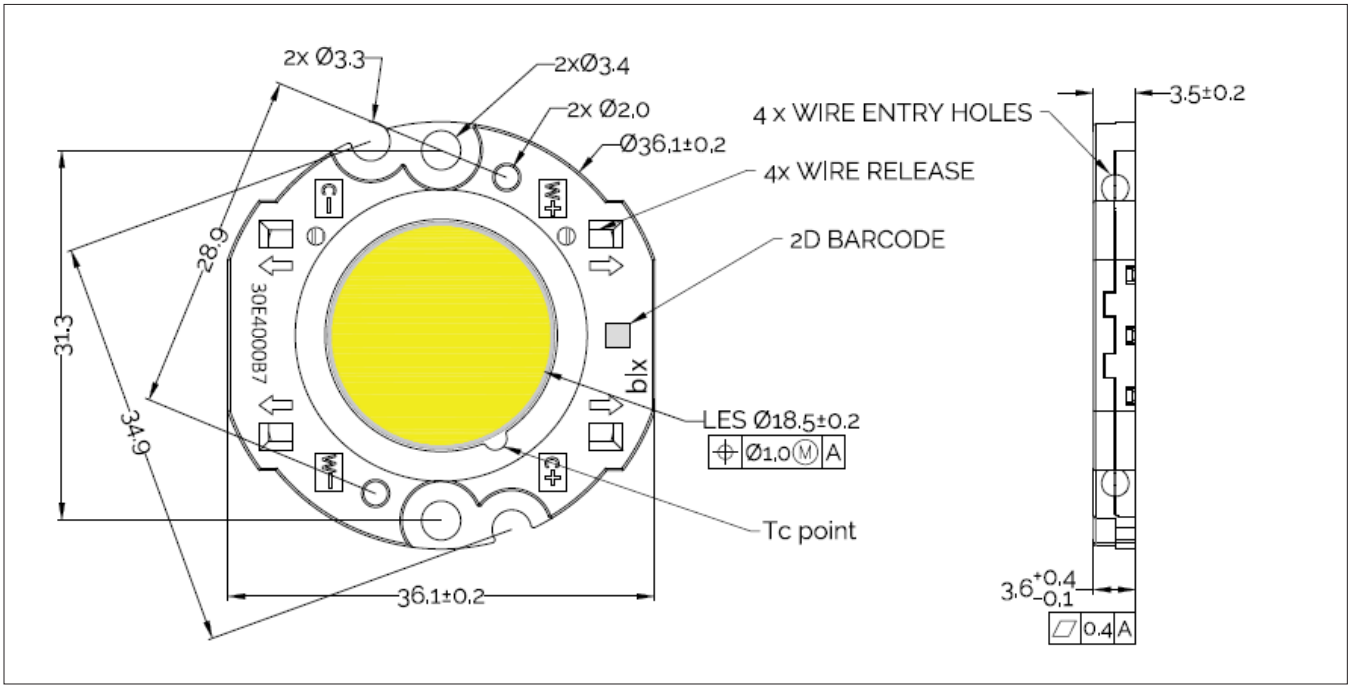
Bin Code	2700K	3000K	3500K	4000K
ANSI Bin (for reference only)	(2580K - 2870K)	(2870K - 3220K)	(3220K - 3710K)	(3710K - 4260K)
83 (3 SDCM)	(2645K - 2788K)	(3025K - 3210K)	(3333K - 3567K)	(3935K - 4254K)
82 (2 SDCM)	(2668K - 2764K)	(3055K - 3178K)	(3370K - 3526K)	(3985K - 4197K)
Center Point (x,y)	(0.4533, 0.4007)	(0.422 0.386)	(0.4015 0.3744)	(0.374, 0.364)

Note for Tables 8:

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

Mechanical Dimensions

Figure 11: Drawing for Vero SE 18 LED Array

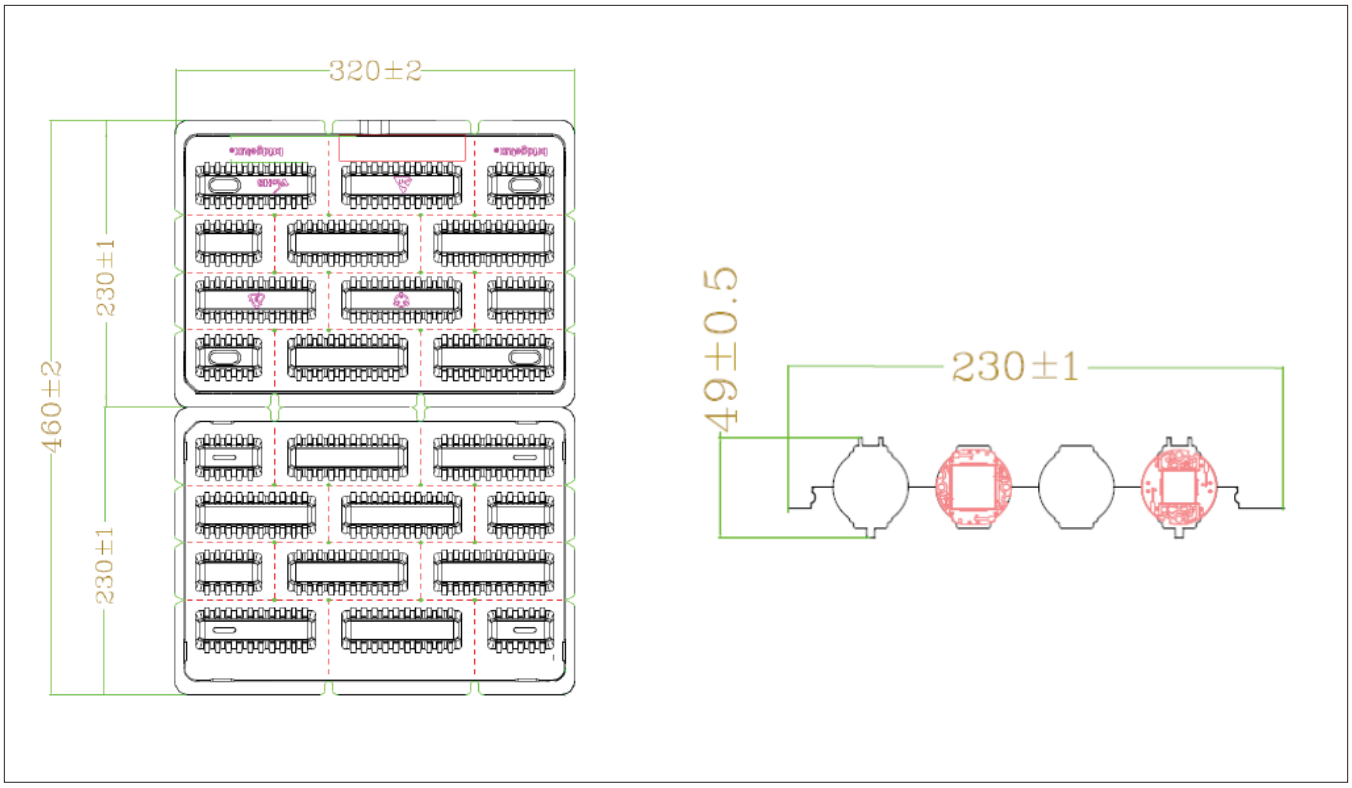


Notes for Figure 11:

1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Unless otherwise specified, tolerances are ±0.15 mm.
4. Mounting holes (2X) are for M3 screws.
5. Bridgelux recommends two tapped holes for mounting screws with 31.3± 0.10mm center-to-center spacing.
6. Screws with flat shoulders (pan, dome, button, round, truss, mushroom) provide optimal torque control. Do NOT use flat, countersink, or raised head screws.
7. The optical center of the LED Array is nominally defined by the mechanical center of the array to a tolerance of ± 0.2mm.
8. Bridgelux maintains a flatness of 0.10mm across the mounting surface of the array

Packaging and Labeling

Figure 12: **Drawing for Vero SE 18 Packaging Tray**

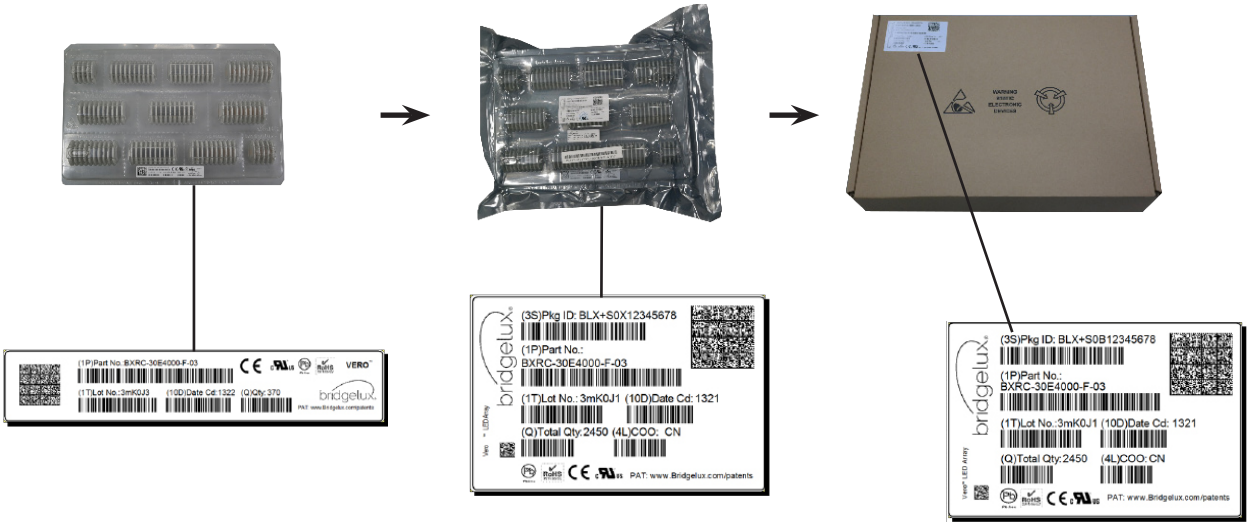


Notes for Figure 12:

1. Dimensions are in millimeters.
2. Drawings are not to scale.

Packaging and Labeling

Figure 13: Vero SE Series Packaging and Labeling



Notes for Figure 13:

1. Each tray holds 100 COBs.
2. Each tray is vacuum sealed in an anti-static bag and placed in its own box.
3. Each tray, bag and box is to be labeled as shown above.

Figure 14: 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 Vero SE 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 Vero SE 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 AN31 for additional information.

CAUTION: RISK OF BURN

Do not touch the Vero SE LED array during operation. Allow the array to cool for a sufficient period of time before handling. The Vero SE 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 plastic housing of the Vero SE 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

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
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