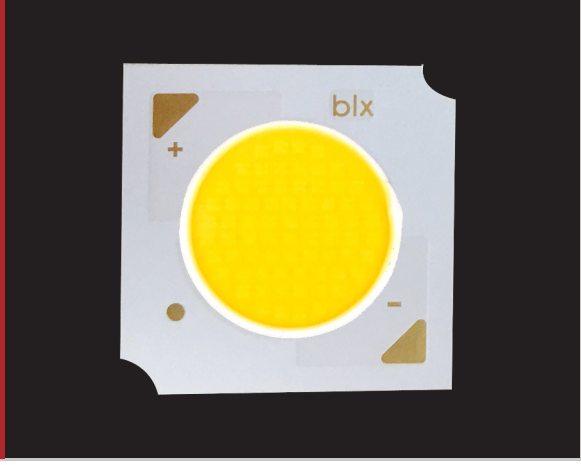
Bridgelux® Gen 8 V11 HD F90 TS LED Array

Product Data Sheet DS1363

Introduction

V Series HD



V Series™ HD LED array product, an ultra-high lumen density COB product line, is designed for high intensity spotlights used in commercial and retail settings. V Series HD arrays offer industry leading color over angle uniformity, and replace ceramic metal halide lamps by providing equal or greater center beam candle power at lower power and at greater lifetimes. Their tight beam control and exceptional quality of light is well suited for demanding directional spot applications.

The V11 HD F90 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.

Lighting system designs incorporating these LED arrays deliver increased system level efficacy and longer service life. Typical applications include, but are not limited to, commercial and residential down lights, accent, spot and track lights.

Features

- Efficacy of 137 lm/W typical for 3000K 90 CRI
- Compact high flux density light source
- Uniform high quality illumination
- Minimum 90 CRI options
- Streamlined thermal path
- ENERGY STAR® / ANSI compliant color binning structure with 3 SDCM options
- More energy efficient than incandescent, halogen and fluorescent lamps
- Low voltage DC operation
- Instant light with unlimited dimming
- V_f bin code backside marking

Benefits

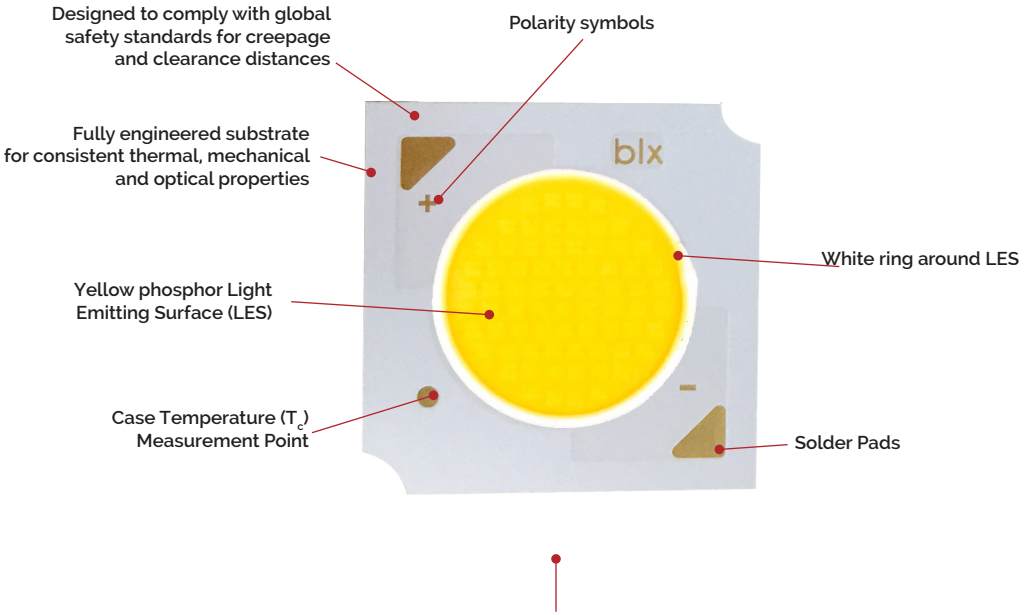
- Enhanced optical control
- Clean white light without pixelation
- High quality true color reproduction
- Significantly reduced thermal resistance and increased operating temperatures
- Uniform consistent white light
- Lower operating costs
- Easy to use with daylight and motion detectors to enable increased energy savings
- Reduced maintenance costs
- Environmentally friendly, no disposal issue

Contents

Product Feature Map

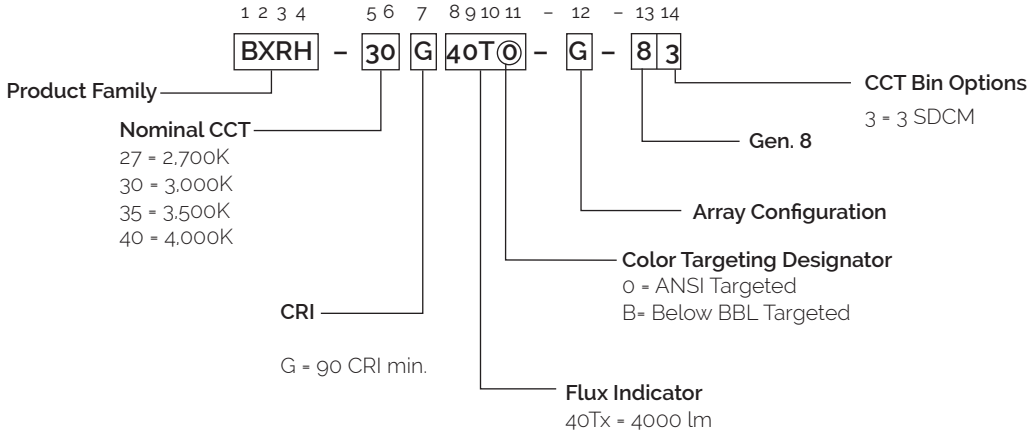
Bridgelux arrays are fully engineered devices that provide consistent thermal and optical performance on an engineered mechanical platform. The V Series HD arrays are the most compact chip-on-board devices across all of Bridgelux's LED Array products.

The arrays incorporate several features to simplify design integration and assembly. Please visit www.bridgelux.com for more information on the V Series HD family of products.



Product Nomenclature

The part number designation for Bridgelux V Series HD LED arrays is explained as follows:



Product Selection Guide

The following product configurations are available:

Table 1: Selection Guide, Pulsed Measurement Data (T_j = 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)
BXRH-27G40T0-G-8x	2700	90	1050	4665	4199	33.9	35.5	131
BXRH-27G40TB-G-8x	2700	90	1050	4665	4199	33.9	35.5	131
BXRH-30G40T0-G-8x	3000	90	1050	4860	4374	33.9	35.5	137
BXRH-30G40TB-G-8x	3000	90	1050	4740	4266	33.9	35.5	133
BXRH-35G40T0-G-8x	3500	90	1050	4908	4417	33.9	35.5	138
BXRH-35G40TB-G-8x	3500	90	1050	4833	4350	33.9	35.5	136
BXRH-40G40T0-G-8x	4000	90	1050	5040	4536	33.9	35.5	142
BXRH-40G40TB-G-8x	4000	90	1050	5000	4500	33.9	35.5	141

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˚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.

Product Selection Guide

Table 2: Selection Guide, Stabilized DC Performance (T_c = 85˚C)

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)
BXRH-27G40T0-G-8x	2700	90	1050	4199	3779	33.1	34.8	121
BXRH-27G40TB-G-8x	2700	90	1050	4199	3779	33.1	34.8	121
BXRH-30G40T0-G-8x	3000	90	1050	4374	3937	33.1	34.8	126
BXRH-30G40TB-G-8x	3000	90	1050	4266	3839	33.1	34.8	123
BXRH-35G40T0-G-8x	3500	90	1050	4417	3975	33.1	34.8	127
BXRH-35G40TB-G-8x	3500	90	1050	4350	3915	33.1	34.8	125
BXRH-40G40T0-G-8x	4000	90	1050	4536	4082	33.1	34.8	131
BXRH-40G40TB-G-8x	4000	90	1050	4500	4050	33.1	34.8	129

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˚C. Minimum R9 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] (Φuse) at 85C (lm)	Power (W)	Efficacy (lm/W)	Energy efficiency class[4] 	Registration No	URL to Product Information Sheet in EPREL Database
BXRH-27G40T0-G-83	2700	90	1200	33.3	4701	40	118	F	2063033	https://eprel.ec.europa.eu/qr/2063033
BXRH-27G40TB-G-83	2700	90	1200	33.3	4701	40	118	F	2063034	https://eprel.ec.europa.eu/qr/2063034
BXRH-30G40T0-G-83	3000	90	1200	33.3	4897	40	123	E	2063035	https://eprel.ec.europa.eu/qr/2063035
BXRH-30G40TB-G-83	3000	90	1200	33.3	4776	40	120	E	2063036	https://eprel.ec.europa.eu/qr/2063036
BXRH-35G40T0-G-83	3500	90	1200	33.3	4946	40	124	E	2063037	https://eprel.ec.europa.eu/qr/2063037
BXRH-35G40TB-G-83	3500	90	1200	33.3	4870	40	122	E	2063038	https://eprel.ec.europa.eu/qr/2063038
BXRH-40G40T0-G-83	4000	90	1200	33.3	5079	40	127	E	2063039	https://eprel.ec.europa.eu/qr/2063039
BXRH-40G40TB-G-83	4000	90	1200	33.3	5038	40	126	E	2063040	https://eprel.ec.europa.eu/qr/2063040

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

V Series HD LED arrays are tested to the specifications shown using the nominal drive currents in Table 1. V Series HD LED arrays 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 Figure 1 and the flux vs. current characteristics shown in Figure 2. 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)
BXRH-27G40T0-G-8x	90	600	31.3	18.8	3280	2973	175
		750	32.4	24.3	3843	3472	158
		900	33.2	29.9	4305	3880	144
		1050	**33.9**	**35.5**	**4665**	**4199**	**131**
		1200	34.4	41.3	5225	4701	127
BXRH-27G40TB-G-8x	90	600	31.3	18.8	3280	2973	175
		750	32.4	24.3	3843	3472	158
		900	33.2	29.9	4305	3880	144
		1050	**33.9**	**35.5**	**4665**	**4199**	**131**
		1200	34.4	41.3	5225	4701	127
BXRH-30G40T0-G-8x	90	600	31.3	18.8	3417	3097	182
		750	32.4	24.3	4004	3617	165
		900	33.2	29.9	4485	4042	150
		1050	**33.9**	**35.5**	**4860**	**4374**	**137**
		1200	34.4	41.3	5443	4897	132
BXRH-30G40TB-G-8x	90	600	31.3	18.8	3332	3020	178
		750	32.4	24.3	3905	3527	161
		900	33.2	29.9	4374	3942	146
		1050	**33.9**	**35.5**	**4740**	**4266**	**133**
		1200	34.4	41.3	5309	4776	129
BXRH-35G40T0-G-8x	90	600	31.3	18.8	3450	3127	184
		750	32.4	24.3	4043	3652	167
		900	33.2	29.9	4529	4082	151
		1050	**33.9**	**35.5**	**4908**	**4417**	**138**
		1200	34.4	41.3	5497	4946	133
BXRH-35G40TB-G-8x	90	600	31.3	18.8	3398	3080	181
		750	32.4	24.3	3981	3597	164
		900	33.2	29.9	4460	4019	149
		1050	**33.9**	**35.5**	**4833**	**4350**	**136**
		1200	34.4	41.3	5413	4870	131

Notes for Table 4:
1. Alternate drive currents 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)
BXRH-40G40T0-G-8x	90	600	31.3	18.8	3543	3212	189
		750	32.4	24.3	4152	3751	171
		900	33.2	29.9	4651	4191	156
		1050	**33.9**	**35.5**	**5040**	**4536**	**142**
		1200	34.4	41.3	5645	5079	137
BXRH-40G40TB-G-8x	90	600	31.3	18.8	3515	3186	187
		750	32.4	24.3	4119	3721	170
		900	33.2	29.9	4614	4158	154
		1050	**33.9**	**35.5**	**5000**	**4500**	**141**
		1200	34.4	41.3	5600	5038	136

Notes for Table 4:

1. Alternate drive currents in Table 3 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)
BXRH-xxx40xx-G-83	1050	31.8	33.9	35.9	-10.8	0.093	31.1	36.6

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 500 V. The working voltage designated for the insulation is 50V 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[1,4]	
		2700K/3000K[2]	4000K[3]
BXRH-xxx40xx-G-83	1050	RG1	RG2
	1200	RG2	RG2

Notes for Table 6:

1. Eye safety classification for the use of Bridgelux V Series HD 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 3000K, E_{thr} = 2670 lx.
3. For products classified as RG2 at 4000K, E_{thr} = 1760 lx.
4. Please contact your Bridgelux sales representative for E_{thr} values at specific drive currents and CCTs not listed.

Absolute Maximum Ratings

Table 7: Maximum Ratings

Parameter	Maximum Rating
LED Junction Temperature (T_j)	125˚C
Storage Temperature	-40˚C to +95˚C
Operating Case Temperature[1] (T_c)	95˚C
Soldering Temperature[2]	350˚C or lower for a maximum of 6 seconds
	BXRH-xxx40xx-G-83
Maximum Drive Current[3]	1200mA at ≤85˚C 1080 mA at 95˚C
Maximum Peak Pulsed Drive Current[4]	1440 mA
Maximum Reverse Voltage[5]	-55V

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. Refer to Bridgelux Application Note AN101: Handling and Assembly of Bridgelux V Series LED Arrays
3. Arrays may be driven at higher currents however lumen maintenance may be reduced and warranty will not apply.
4. 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.
5. 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: V11 HD Drive Current vs. Voltage ($T_j = T_c = 25°C$)[1]

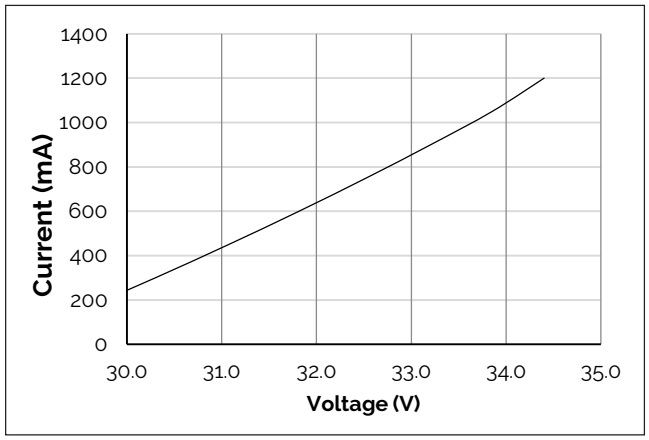


Figure 2: V11 HD Typical Relative Flux vs. Drive Current ($T_j = T_c = 25°C$)[1]

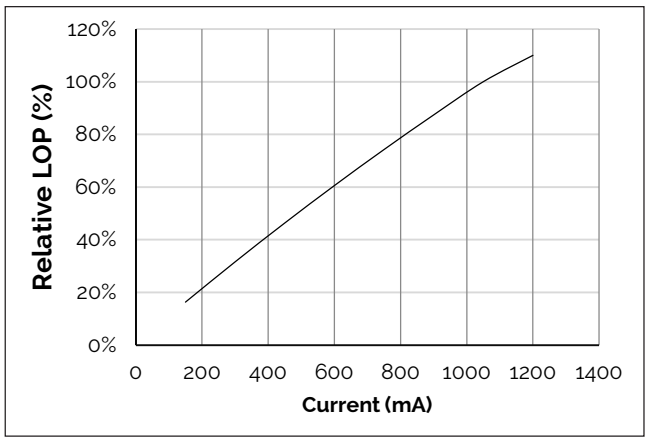


Figure 3: Typical DC Flux vs. Case Temperature

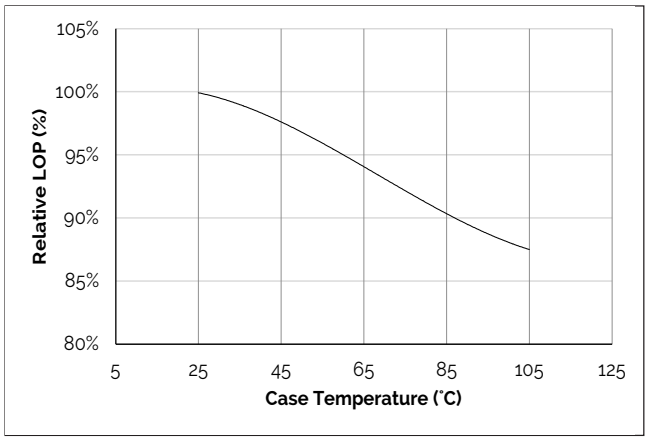


Figure 4: Typical DC ccx Shift vs. Case Temperature

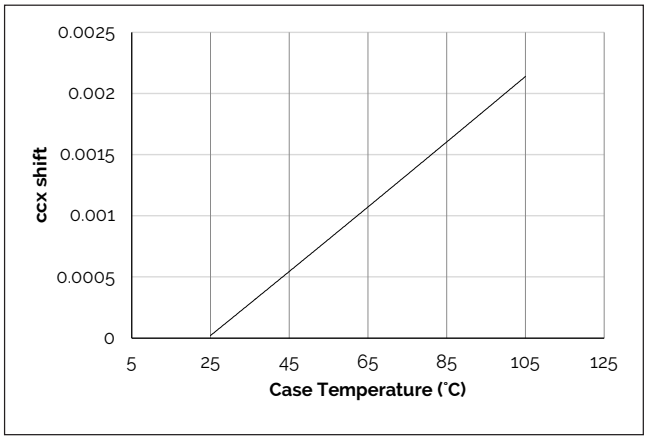


Figure 5: Typical DC ccy Shift vs. Case Temperature

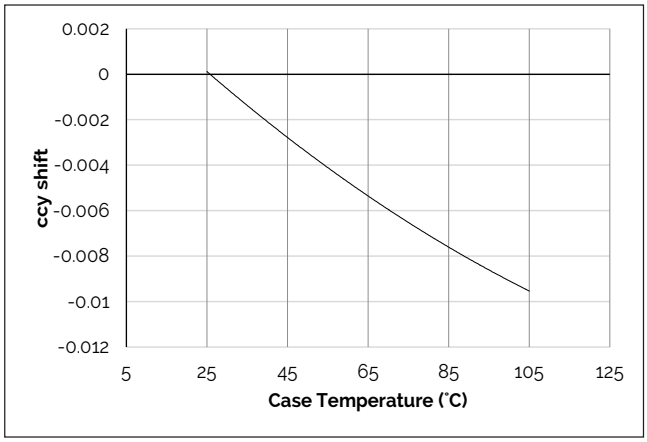
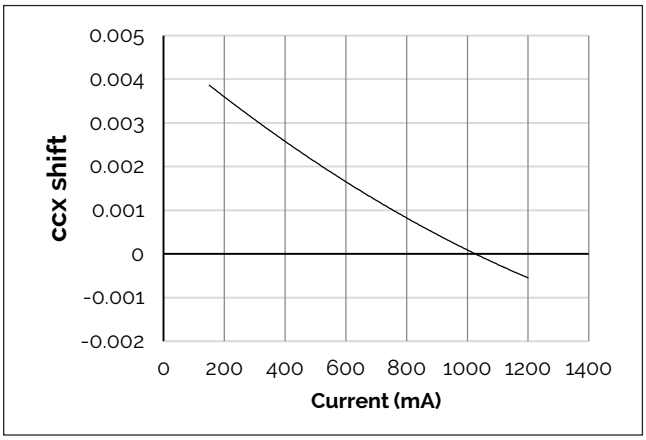


Figure 6: V11 HD Drive Current vs. ccx Shift



Notes for Figures 1 - 6:

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. Characteristics shown for 3000K and 90 CRI.

Performance Curves

Figure 7: V11 HD Drive Current vs. ccy Shift

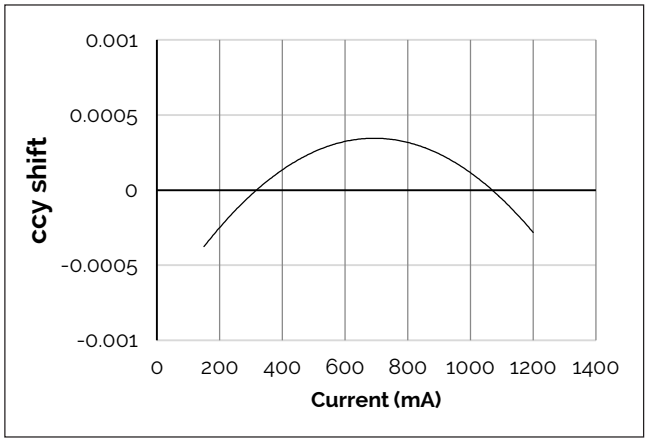
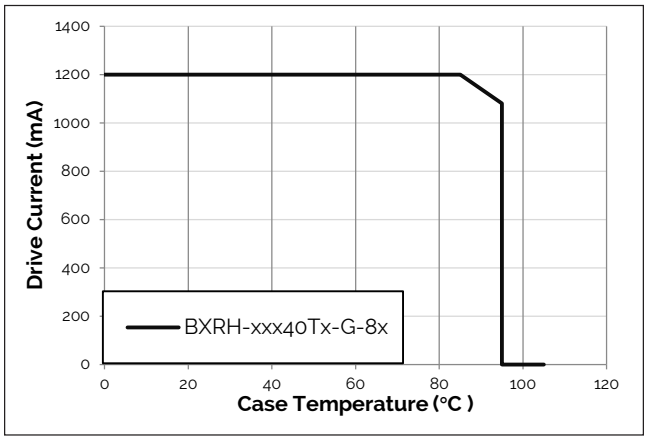


Figure 8: Derating Curve

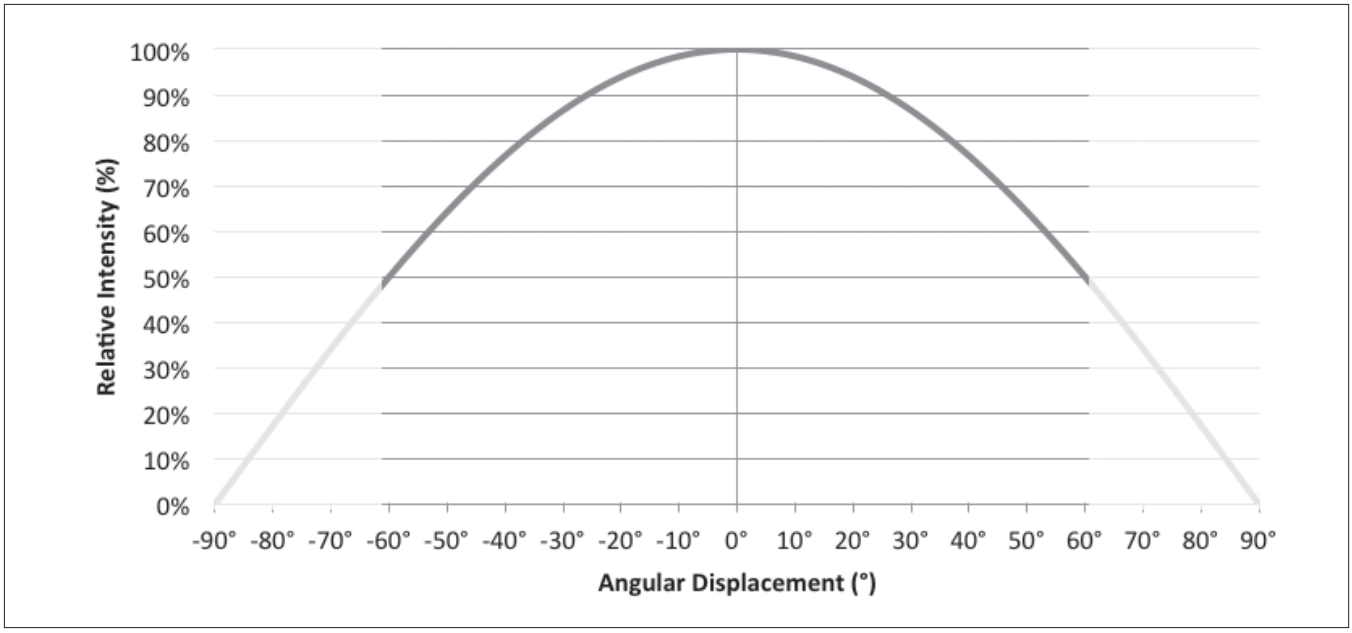


Notes for Figure 7:

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. Characteristics shown for 3000K and 90 CRI.

Typical Radiation Pattern

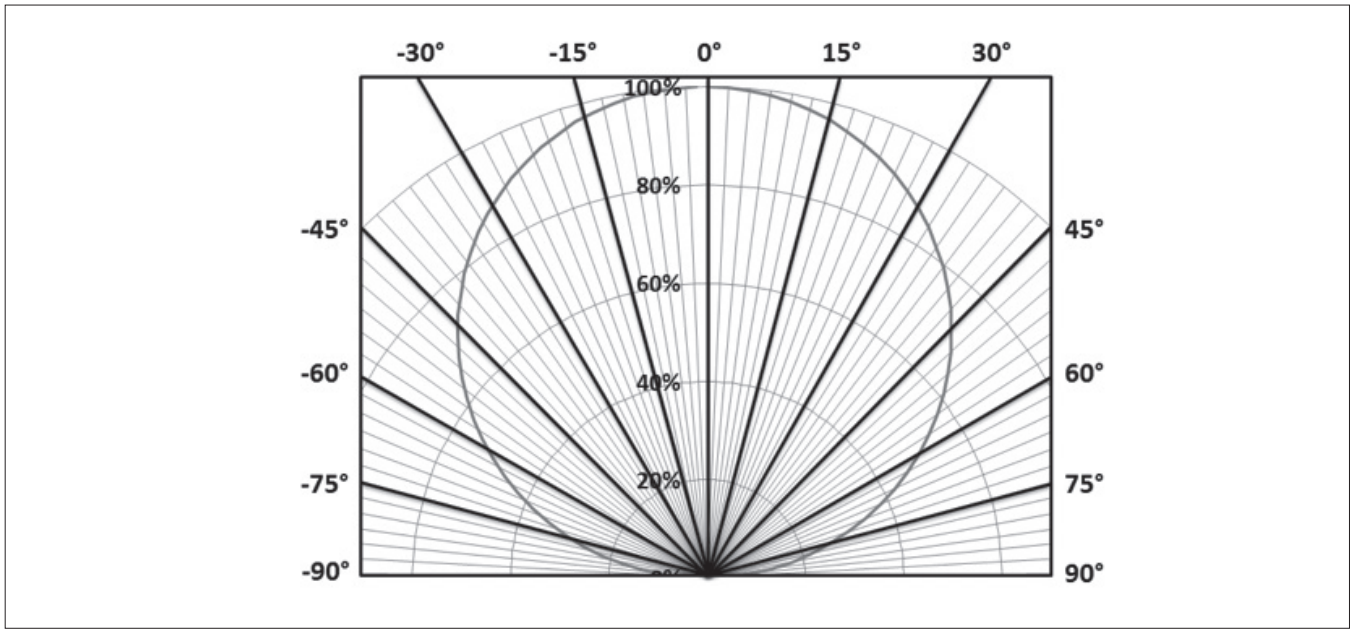
Figure 9: Typical Spatial Radiation Pattern



Notes for Figure 9:

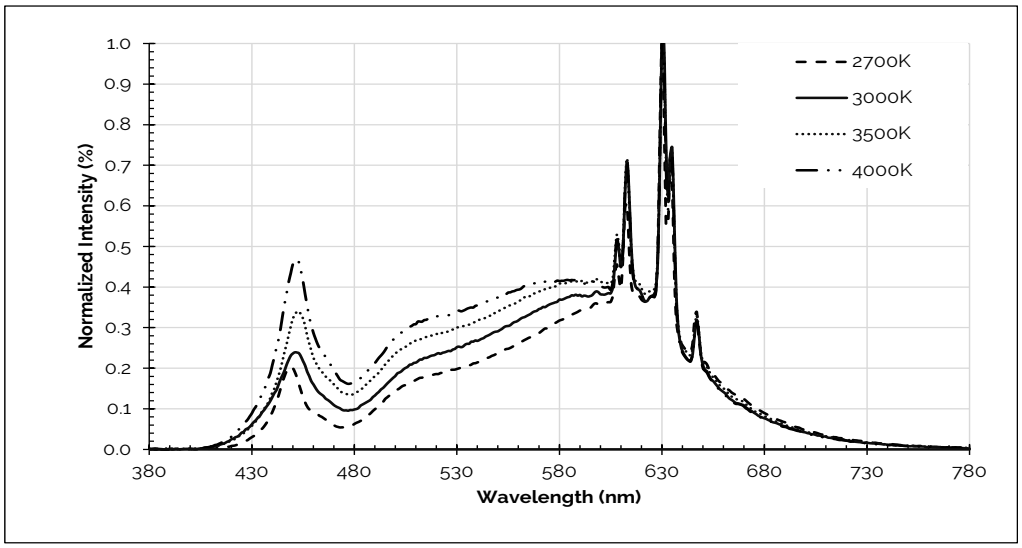
1. Typical viewing angle is 120°.
2. The viewing angle is defined as the off axis angle from the centerline where intensity is ½ of the peak value.

Figure 10: Typical Polar Radiation Pattern



Typical Color Spectrum

Figure 11: Typical Color Spectrum

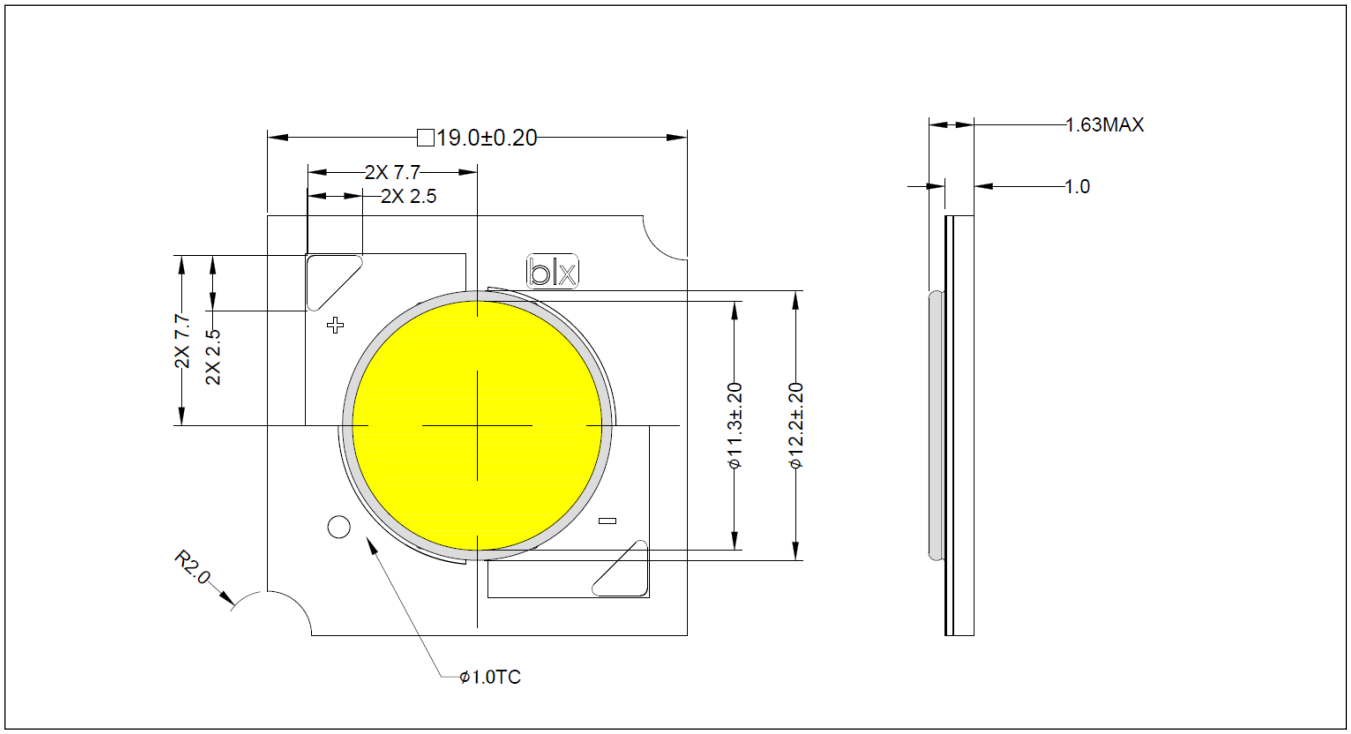


Notes for Figure 11:

1. Color spectra measured at nominal current for T_j = T_c = 85°C.
2. Color spectra shown is 2700K and 90 CRI.
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.

Mechanical Dimensions

Figure 12: **Drawing for V11 HD LED Array**

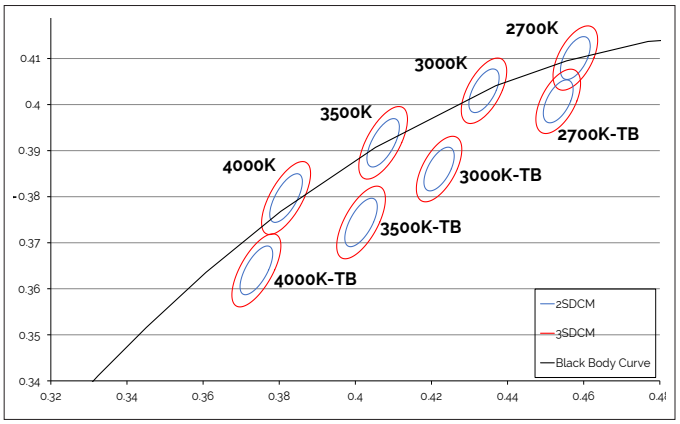


Notes for Figure 12:

1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Solder pads are labeled "+" and "-" to denote positive and negative polarity, respectively.
4. Unless otherwise specified, tolerances are ±0.1mm.
5. Refer to Application Notes AN101 for product handling, mounting and heat sink recommendations.
6. The optical center of the LED Array is nominally defined by the mechanical center of the array to a tolerance of ± 0.2mm.
7. Bridgelux maintains a flatness of 0.10mm across the mounting surface of the array.

Color Binning Information

Figure 13: 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

Bin Code	2700K	2700K-TB	3000K	3000K-TB	3500K	3500K-TB	4000K	4000K-TB
ANSI Bin (for reference only)	(2580K - 2870K)	N/A	(2870K - 3220K)	N/A	(3220K - 3710K)	N/A	(3710K - 4260K)	N/A
83 (3 SDCM)	(2651K - 2794K)	(2645K - 2788K)	(2968K - 3136K)	(3025K - 3210K)	(3369K - 3586K)	(3333K - 3566K)	(3851K - 4130K)	(3936K - 4254K)
82 (2 SDCM)	(2674K - 2769K)	(2668K - 2764K)	(2995K - 3107K)	(3055K - 3178K)	(3404K - 3548K)	(3370K - 3526K)	(3895K - 4081K)	(3985K - 4197K)
Center Point (x,y)	(0.4578, 0.4101)	(0.4533, 0.4007)	(0.4338, 0.403)	(0.4220, 0.3860)	(0.4073, 0.3917)	(0.4015, 0.3744)	(0.3818, 0.3797)	(0.3740, 0.3640)

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 14: V11 HD Packaging Tube

Notes for Figure 14:

1. Each tube holds 25 V11 HD 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) mm. Dimensions for the anti-static bag are 100 (W) x 625 (L) x 0.075 (T) mm. Dimensions for the shipping box are 58.7 x 13.3 x 7.9 cm

Packaging and Labeling

Figure 15: V Series HD 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 HD 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 representatives 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 HD LED array during operation. Allow the array to cool for a sufficient period of time before handling. The V Series HD LED array may reach elevated temperatures such that could burn skin when touched.

CAUTION: AVOID MOISTURE

The product is sensitive to moisture. It is not recommended for use in outdoor application or damp environment.

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
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