



Bridgelux® Gen 8 V4 HD F90 TS LED Array

Product Data Sheet DS1361





Introduction

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 V4 HD Fgo 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 135 lm/W typical for 3000K go 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, 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











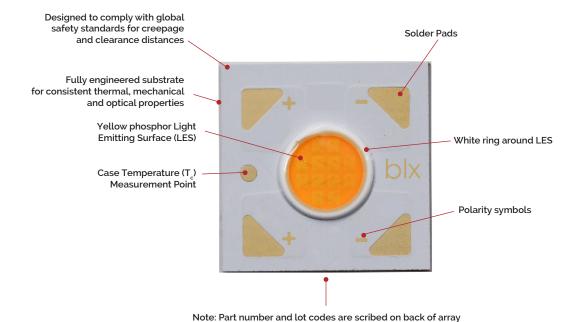
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Product Feature Map

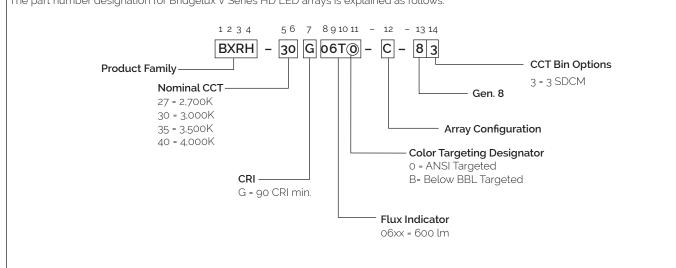
Bridgelux arrays are fully engineered devices that provide consistent thermal and optical performance on an engineered mechanical platform. The V Series HD arrays are the most compact chip-on-board devices across all of Bridgelux's LED Array products.

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 ($T_i = T_c = 25^{\circ}C$)

Part Number	Nominal CCT¹ (K)	CRI²	Nominal Drive Current³ (mA)	Typical Pulsed Flux ^{45,6} 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-27G06To-C-8x	2700	90	175	767	691	33.9	5.9	130
BXRH-27G06TB-C-8x	2700	90	175	767	691	33.9	5.9	130
BXRH-30G06To-C-8x	3000	90	175	799	720	33.9	5.9	135
BXRH-30G06TB-C-8x	3000	90	175	779	702	33.9	5.9	132
BXRH-35G06To-C-8x	3500	90	175	807	727	33.9	5.9	136
BXRH-35G06TB-C-8x	3500	90	175	795	716	33.9	5.9	134
BXRH-40G06To-C-8x	4000	90	175	829	746	33.9	5.9	140
BXRH-40G06TB-C-8x	4000	90	175	822	740	33.9	5.9	139

Notes for Table 1:

- 1. Nominal CCT as defined by ANSI C78.377-2011.
- 2. CRI values are minimums and tested at T_i = T_c = 85°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_i (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 CCT¹ (K)	CRI²	Nominal Drive Current³ (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-27G06T0-C-8x	2700	90	175	691	622	33.1	5.8	119
BXRH-27G06TB-C-8x	2700	90	175	691	622	33.1	5.8	119
BXRH-30G06T0-C-8x	3000	90	175	720	648	33.1	5.8	124
BXRH-30G06TB-C-8x	3000	90	175	702	631	33.1	5.8	121
BXRH-35G06T0-C-8x	3500	90	175	727	654	33.1	5.8	125
BXRH-35G06TB-C-8x	3500	90	175	716	644	33.1	5.8	123
BXRH-40G06T0-C-8x	4000	90	175	746	672	33.1	5.8	129
BXRH-40G06TB-C-8x	4000	90	175	740	666	33.1	5.8	128

Notes for Table 2:

- 1. Nominal CCT as defined by ANSI C78.377-2011.
- 2. CRI values are minimums and tested at T_i = T_c = 85°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	Current² (mA)	Vf (V)	Useful flux³ (Фuse) at 85C (lm)	Pow- er (W)	Efficacy (lm/W)	Energy efficiency class ⁴	Regis- tration No	URL to Product Information Sheet in EPREL Database
BXRH-27G06T0-C-83	2700	90	250	33.3	917	8	110	F	1848633	https://eprel.ec.europa.eu/qr/1848633
BXRH-27G06TB-C-83	2700	90	250	33.3	917	8	110	F	1848634	https://eprel.ec.europa.eu/qr/1848634
BXRH-30G06To-C-83	3000	90	250	33.3	955	8	115	F	1848639	https://eprel.ec.europa.eu/qr/1848639
BXRH-30G06TB-C-83	3000	90	250	33.3	931	8	112	F	1848640	https://eprel.ec.europa.eu/qr/1848640
BXRH-35G06T0-C-83	3500	90	250	33.3	965	8	116	F	1848645	https://eprel.ec.europa.eu/qr/1848645
BXRH-35G06TB-C-83	3500	90	250	33.3	950	8	114	F	1848646	https://eprel.ec.europa.eu/qr/1848646
BXRH-40G06T0-C-83	4000	90	250	33.3	991	8	119	Е	1848651	https://eprel.ec.europa.eu/qr/1848651
BXRH-40G06TB-C-83	4000	90	250	33.3	983	8	118	F	1848652	https://eprel.ec.europa.eu/qr/1848652

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 (ouse), 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 3.

Table 4: Product Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current¹ (mA)	Typical V _f T _c = 25°C (V)	Typical Power T _c = 25°C (W)	Typical Flux² T _c = 25°C (lm)	Typical DC Flux³ T _c = 85°C (lm)	Typical Efficacy T _c = 25°C (lm/W)
		50	30.3	1.5	242	224	160
		75	31.1	2.3	355	328	153
DVDII arcacta C 0.		125	32.5	4.1	569	521	140
BXRH-27G06To-C-8x	90	175	33.9	5.9	767	691	130
		225	35.1	7.9	948	852	120
		250	35.6	8.9	1033	922	116
		50	30.3	1.5	242	224	160
		75	31.1	2.3	355	328	153
DVDII 27C26TD C 0v		125	32.5	4.1	569	521	140
BXRH-27G06TB-C-8x	90	175	33.9	5.9	767	691	130
		225	35.1	7.9	948	852	120
		250	35.6	8.9	1033	922	116
		50	30.3	1.5	253	234	167
		75	31.1	2.3	370	342	159
DVDII aaCaCTa C 0		125	32.5	4.1	593	543	146
BXRH-30G06To-C-8x	90	175	33.9	5.9	799	720	135
		225	35.1	7.9	988	887	125
		250	35.6	8.9	1076	960	121
		50	30.3	1.5	246	228	162
		75	31.1	2.3	361	333	155
DVDII aacacTD C O.		125	32.5	4.1	578	529	142
BXRH-30G06TB-C-8x	90	175	33.9	5.9	779	702	132
		225	35.1	7.9	963	865	122
		250	35.6	8.9	1049	936	118
		50	30.3	1.5	255	236	168
		75	31.1	2.3	374	345	160
DVDII ofCoGTo C Ov		125	32.5	4.1	599	548	147
BXRH-35G06T0-C-8x	90	175	33.9	5.9	807	727	136
		225	35.1	7.9	998	896	126
		250	35.6	8.9	1087	970	122
		50	30.3	1.5	251	232	166
		75	31.1	2.3	368	340	158
DVDII OFCOSTD C O		125	32.5	4.1	590	540	145
BXRH-35G06TB-C-8x	90	175	33.9	5.9	795	716	134
		225	35.1	7.9	983	883	125
		250	35.6	8.9	1070	956	120

Performance at Commonly Used Drive Currents

Table 4: Product Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current¹ (mA)	Typical V _f T _c = 25°C (V)	Typical Power T _c = 25°C (W)	Typical Flux² T _c = 25°C (lm)	Typical DC Flux³ T _c = 85°C (lm)	Typical Efficacy T _c = 25°C (lm/W)
		50	30.3	1.5	262	242	173
		75	31.1	2.3	384	354	165
BXRH-40G06T0-C-8x		125	32.5	4.1	615	563	151
BART1-4000010-C-0X	90	175	33.9	5.9	829	746	140
		225	35.1	7.9	1025	921	130
		250	35.6	8.9	1116	996	125
		50	30.3	1.5	260	240	171
		75	31.1	2.3	381	351	163
DVDLL 40C06TD C 9v		125	32.5	4.1	610	558	150
BXRH-40G06TB-C-8x	90	175	33.9	5.9	822	740	139
		225	35.1	7.9	1016	913	129
		250	35.6	8.9	1107	988	124

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.

Electrical Characteristics

Table 5: Electrical Characteristics

Part Number			orward Voltag ed, T _c = 25°C (V		Typical Coefficient	Typical Thermal	Driver Selection Voltages ⁷ (V)	
	Drive Current (mA)	Minimum	Typical	Maximum	of Forward Voltage⁴ △V, ∕ △T (mV/°C)	Resistance Junction to Case ^{5,6} R _{j-c} (°C/W)	V _r Min. Hot T _c = 105°C (V)	V _F Max. Cold T _c = -40°C (V)
BXRH-xxx06xx-C-8x	175	31.8	33.9	35.9	-10.8	1.43	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 \pm 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 90 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_r 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 ^{a,3}			
		2700K/3000K	4000K²		
DVDLL vaca Gray C. Ov	175	RG1	RG1		
BXRH-xxx06xx-C-8x	250	RG1	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 4000K, $\rm E_{thr}^{\tt =}$ 1760 lx.
- 3. 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 Temperature¹	-40°C to +85°C				
Operating Case Temperature ² (T _c)	85°C				
Soldering Temperature ³	350°C or lower for a maximum of 6 seconds				
	BXRH-xxxo6xx-C-8x				
Maximum Drive Current⁴	250mA				
Maximum Peak Pulsed Drive Current ⁵	300 mA				
Maximum Reverse Voltage	-6oV				

Notes for Table 7:

- 1 The Fgo 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.

Performance Curves

Figure 1: V4C HD Drive Current vs. Voltage (T, = T = 25°C)1

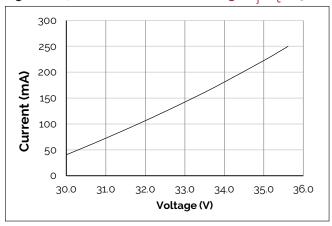


Figure 2: V4C HD Typical Relative Flux vs. Drive Current $(T_i = T_c = 25^{\circ}C)^{1}$

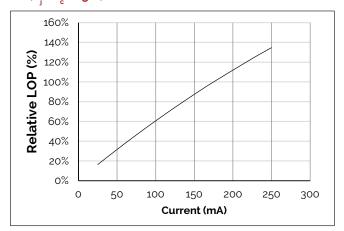


Figure 3: Typical DC Flux vs. Case Temperature

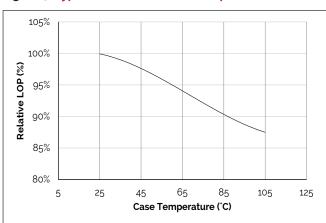


Figure 4: Typical DC ccx Shift vs. Case Temperature

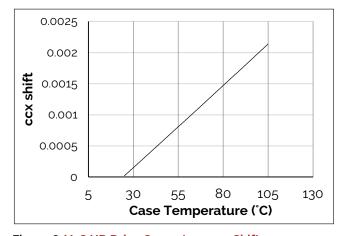


Figure 5: Typical DC ccy Shift vs. Case Temperature

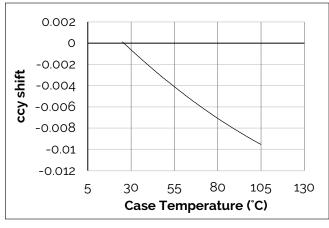
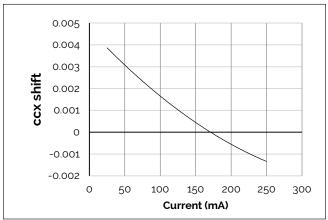


Figure 6: V4C HD Drive Current vs. ccx Shift



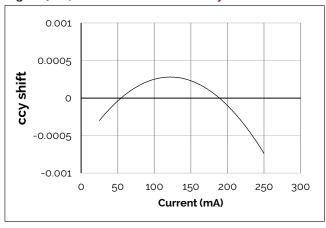
Notes for Figures 1 - 6:

^{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: V4C HD Drive Current vs. ccy Shift

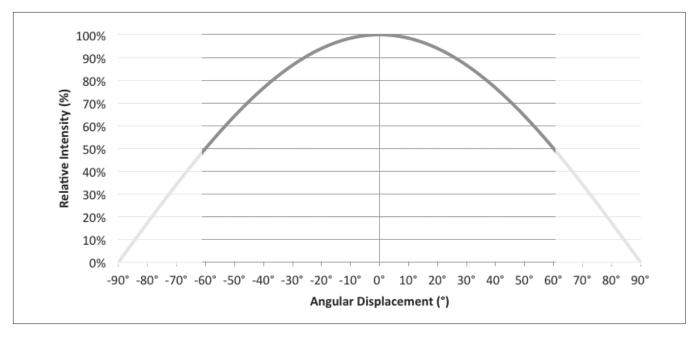


Notes for Figure 7:

- 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.
 Characteristics shown for 3000K and 90 CRI.

Typical Radiation Pattern

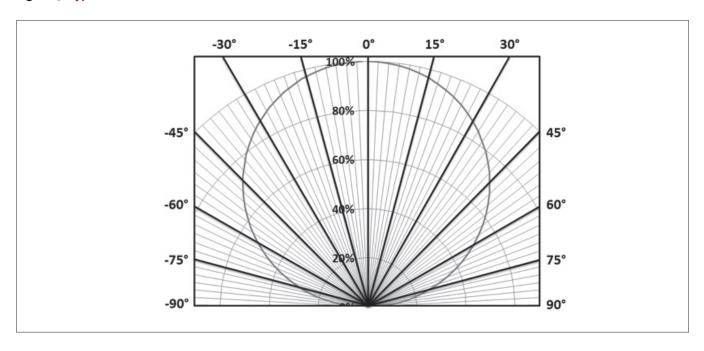
Figure 8: Typical Spatial Radiation Pattern



Notes for Figure 8:

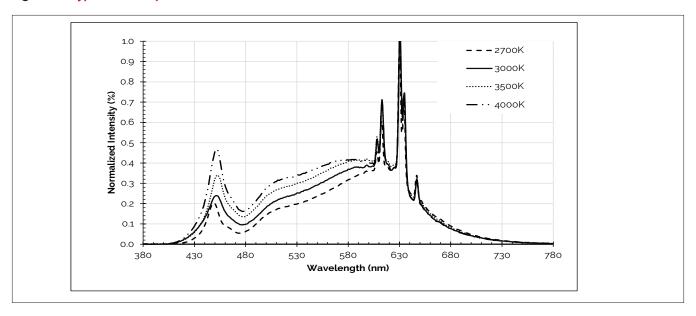
- 1. Typical viewing angle is 120°.
- 2. The viewing angle is defined as the off axis angle from the centerline where intensity is ½ of the peak value.

Figure 9: Typical Polar Radiation Pattern



Typical Color Spectrum

Figure 10: Typical Color Spectrum

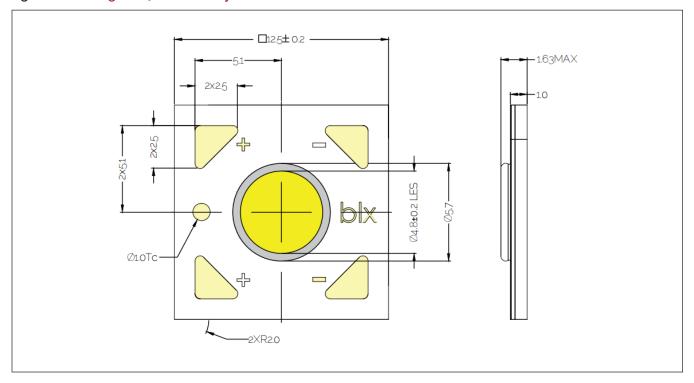


Notes for Figure 10:

- 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 11: Drawing for V4 HD LED Array

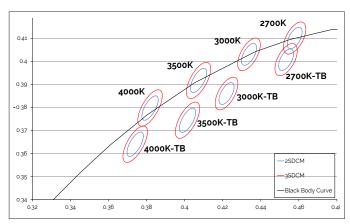


Notes for Figure 11:

- 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 12: 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 -	(2645K -	(2968K -	(3025K -	(3369K -	(3333K -	(3851K -	(3936K -
	2794K)	2788K)	3136K)	3210K)	3586K)	3566K)	4130K)	4254K)
82 (2 SDCM)	(2674K -	(2668K -	(2995K -	(3055K -	(3404K -	(3370K -	(3895K -	(3985K -
	2769K)	2764K)	3107K)	3178K)	3548K)	3526K)	4081K)	4197K)
Center Point (x,y)	(0.4578,	(0.4533,	(0.4338,	(0.4220,	(0.4073,	(0.4015,	(0.3818,	(0.3740,
	0.4101)	0.4007)	0.403)	0.3860)	0.3917)	0.3744)	0.3797)	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 13: V4 HD Packaging Tube



Notes for Figure 13:

- 1. Each tube holds 40 V4HD 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 15.4 (W) \times 8.3 (H) \times 430 (L) mm. Dimensions for the anti-static bag are 75 (W) \times 615 (L) \times 0.075 (T) mm. Dimensions for the shipping box are 58.7 \times 13.3 \times 7.9 cm

Packaging and Labeling

Figure 14: 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.

Precautions

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.

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

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.

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