

Bridgelux® EB Series™ Square

Product Data Sheet DS180



Introduction

EB Series™



EB Series Square modules are designed for use in applications where high efficacy and robustness are required. These modules use high-efficacy Bridgelux 2835 SMDs to achieve over 170 lm/W (nominal), which enables designers and fixture manufacturers to meet DLC efficacy requirements. They are designed primarily for indoor commercial applications.

Available in 182mm (7.2 inches) and 284mm (11.2 inches) square form factors, these modules have several different LED configurations specifically targeted for certain applications. These modules are easily mountable and offer reusable poke-in connectors. The modules have long lifetimes of greater than 50,000 hours.

Features

- High efficacy up to 173 lm/W (nominal)
- Utilizes a robust aluminum core PCB with superior thermal properties
- Available in 4000K and 5000K
- Wide lumen range with 2x overdrive capability
- Long lifetime (L80, B50 > 50,000 hours)

Benefits

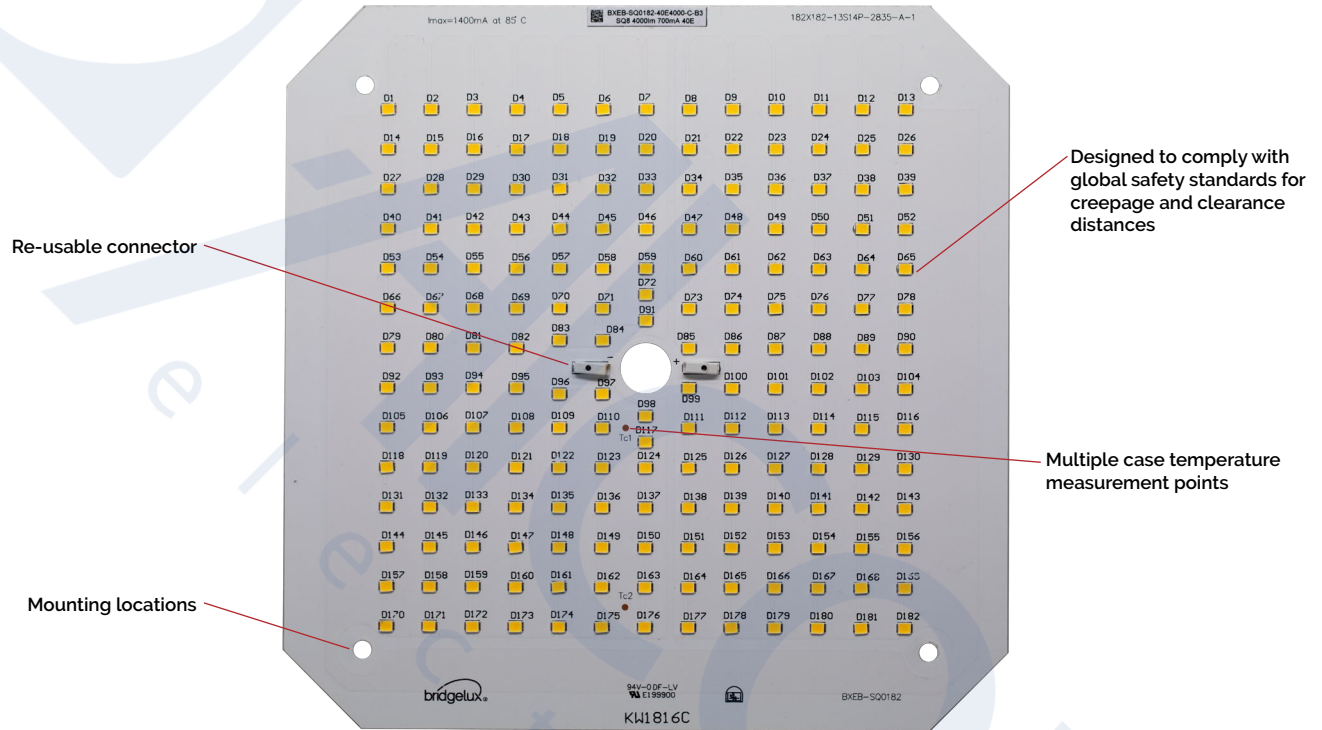
- Achieve up to 180 lm/W by under-driving
- Heat-sinking may not be required at low drive currents
- Reliable use at elevated currents for greater design flexibility
- Easy installation using mounting holes and poke-in connectors

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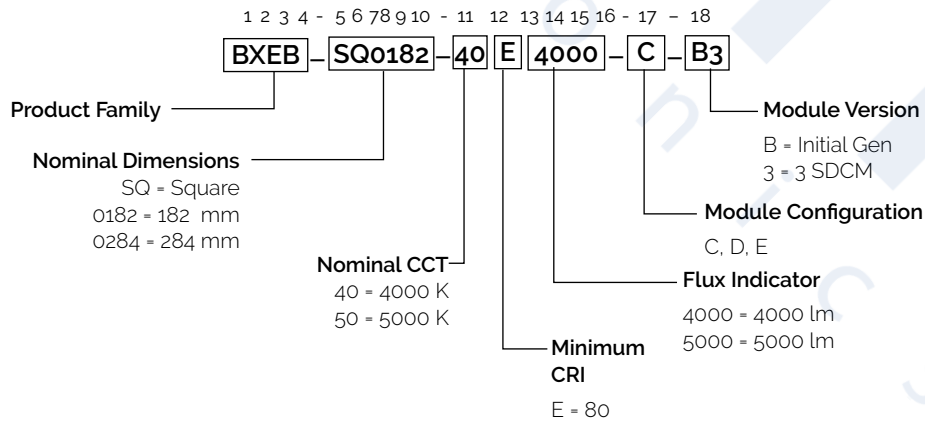
Product Feature Map

Bridgelux EB Series Square modules are fully engineered devices that provide consistent thermal and optical performance on an engineered mechanical platform. The square products incorporate several features to simplify design integration and assembly. Please visit www.bridgelux.com for more information on the EB Series family of products.



Product Nomenclature

The part number designation for Bridgelux EB Square is explained as follows:



Product Selection Guide

Table 1: Product Performance ($T_c = 25^\circ\text{C}$)

Part Number	Nominal CCT ¹ (K)	Min CRI	Typical Flux ^{2,3} $T_c = 25^\circ\text{C}$ (lm)	Nominal Drive Current (mA)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXEB-SQ0182-40E4000-C-B3	4000	80	4450	700	36.7	25.7	173
BXEB-SQ0182-50E4000-C-B3	5000						
BXEB-SQ0284-40E6000-C-B3	4000	80	6500	700	53.6	37.5	173
BXEB-SQ0284-50E6000-C-B3	5000						
BXEB-SQ0284-40E6000-D-B3	4000			950	39.5		
BXEB-SQ0284-50E6000-D-B3	5000						
BXEB-SQ0284-40E6000-E-B3	4000						
BXEB-SQ0284-50E6000-E-B3	5000						

Notes for Table 1:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. Data is at nominal test current where temperature of center case temperature point $T_c = 25^\circ\text{C}$.
3. Bridgelux maintains a $\pm 7\%$ tolerance on flux data.

Electrical Characteristics

Table 2: Electrical Characteristics

Part Number	Drive Current (mA)	Forward Voltage $T_{c2} = 25^{\circ}\text{C}$ (V) ^{1, 2, 3}			Typical Coefficient of Forward Voltage ⁴ $\Delta V_f / \Delta T$ (mV/ $^{\circ}\text{C}$)	Driver Selection Voltages ⁵ (V)	
		Minimum	Typical	Maximum		V_f Min, Hot $T_{c2} = 85^{\circ}\text{C}$ (V)	V_f Max, Cold $T_{c2} = -40^{\circ}\text{C}$ (V)
BXEB-SQ0182-xxE4000-C-B3	700	34.1	36.7	39.3	-12.7	33.4	40.1
	1400	36.5	39.3	42.1	-12.7	35.8	42.9
BXEB-SQ0284-xxE6000-C-B3	700	49.8	53.6	57.4	-18.6	48.7	58.6
	1400	53.4	57.4	61.4	-18.6	52.3	62.6
BXEB-SQ0284-xxE6000-D-B3	950	37.5	39.5	43.0	-13.7	36.7	43.9
	1900	39.3	42.3	45.3	-13.7	38.5	46.2
BXEB-SQ0284-xxE6000-E-B3	950	37.5	39.5	43.0	-13.7	36.7	43.9
	1900	39.3	42.3	45.3	-13.7	38.5	46.2

Notes for Table 2:

1. Voltage minimum and maximum are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a tolerance of ± 0.1 V on forward voltage data.
3. This product has been designed and manufactured per IEC 62031:2014. The working voltage designated for the insulation is 60 V d.c. The maximum allowable voltage across the module must be determined in the end product application.
4. Typical coefficient of forward voltage tolerance is ± 0.1 mV for nominal current.
5. V_f min hot and max cold values are provided as reference only and are not guaranteed. These values are provided to aid in driver design and selection over the operating range of the product.

Absolute Maximum Ratings

Table 3: Maximum Ratings

Parameter	Maximum Rating	
Storage Temperature	-40°C to +85°C	
Operating Case Temperature ² (T _c)	85°C	
Soldering Temperature	350°C or lower for a maximum of 5 seconds	
Maximum Reverse Voltage	Modules are not designed to be driven in reverse bias	
Maximum Drive Current	BXEB-SQ0182-xxE4000-C-B3 BXEB-SQ0284-xxE6000-C-B3	BXEB-SQ0284-xxE6000-D-B3 BXEB-SQ0284-xxE6000-E-B3
	1400 mA	1900 mA

Notes for Table 3:

1. For IEC 62717 requirement, please consult your Bridgelux sales representative.
2. Lumen maintenance (L70) and lifetime predictions are valid for drive current and case temperature conditions used for LM-80 testing as included in the applicable LM-80 test report for the SMDs used in the modules. Contact your Bridgelux sales representatives for LM-80 report.

Performance Curves

Figure 1: SQ0182 Current vs. Forward Voltage, $T_c=25^\circ\text{C}$

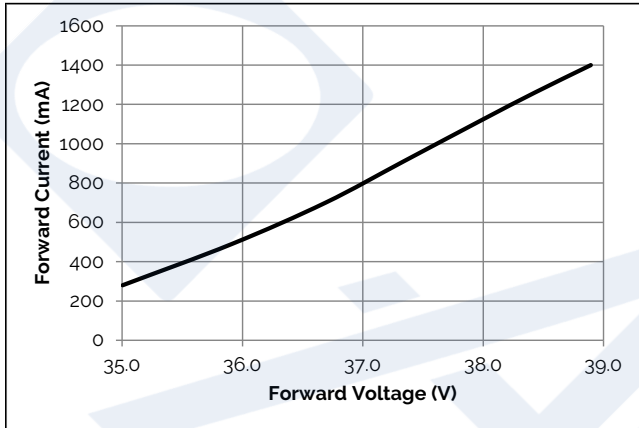


Figure 2: SQ0182 Relative Flux vs. Current, $T_c=25^\circ\text{C}$

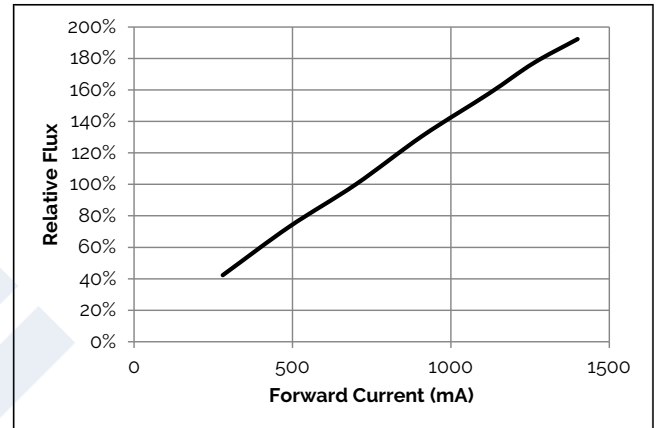


Figure 3: SQ0284 (Configuration C) Current vs. Forward Voltage, $T_c=25^\circ\text{C}$

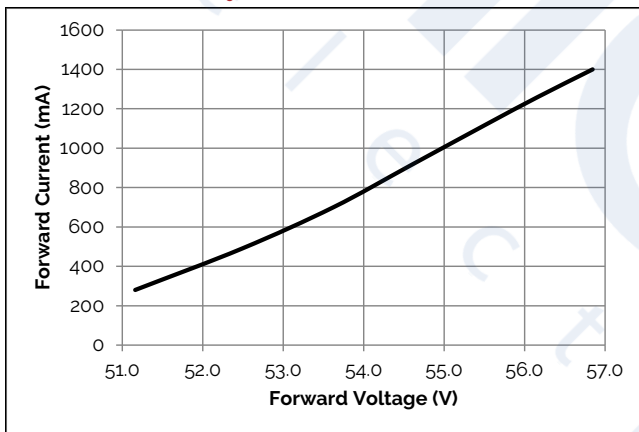


Figure 4: SQ0284 (Configuration C) Relative Flux vs. Current, $T_c=25^\circ\text{C}$

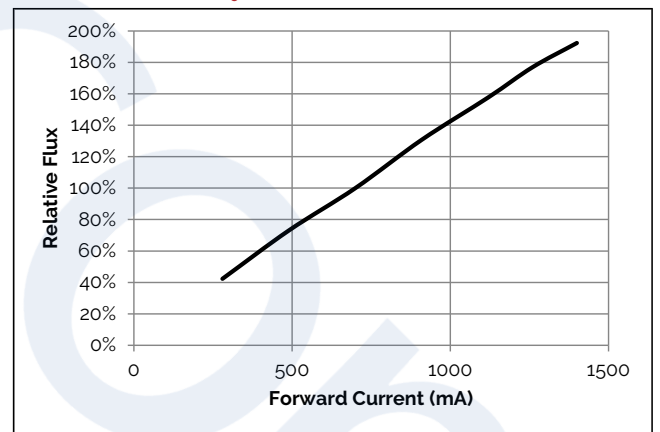


Figure 5: SQ0284 (Configurations D & E) Current vs. Forward Voltage, $T_c=25^\circ\text{C}$

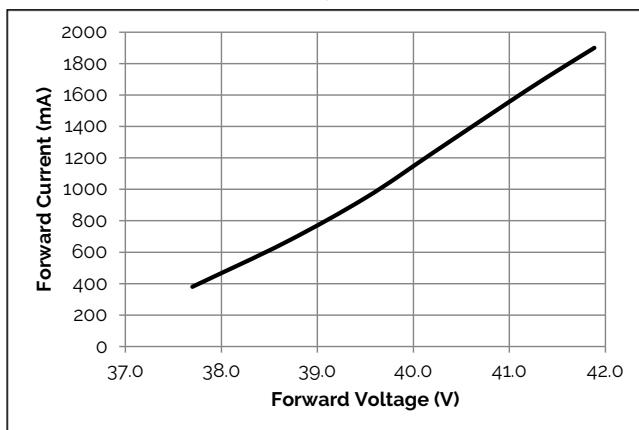
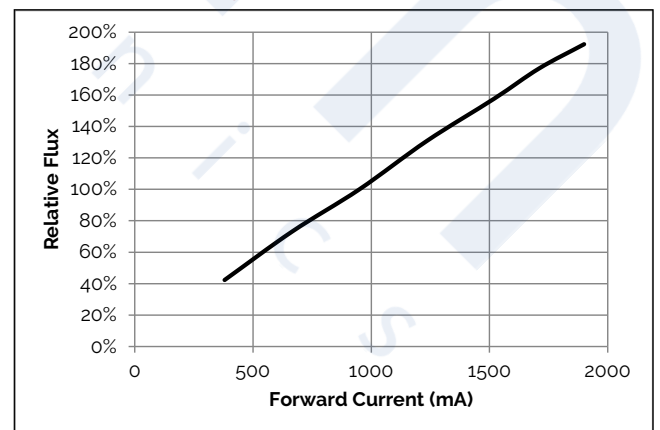


Figure 6: SQ0284 (Configurations D & E) Relative Flux vs. Current, $T_c=25^\circ\text{C}$



Performance Curves

Figure 7: Relative Voltage vs. Case Temperature

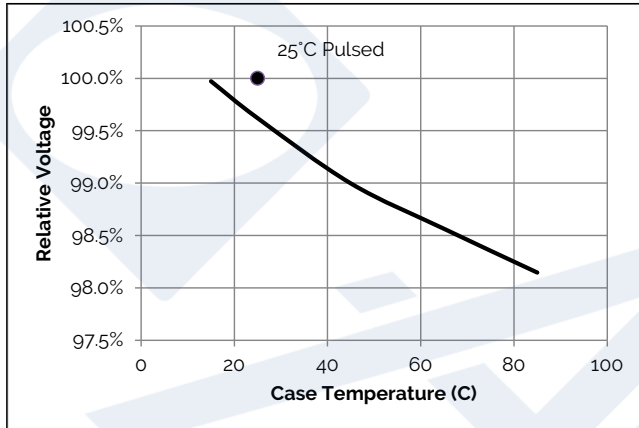
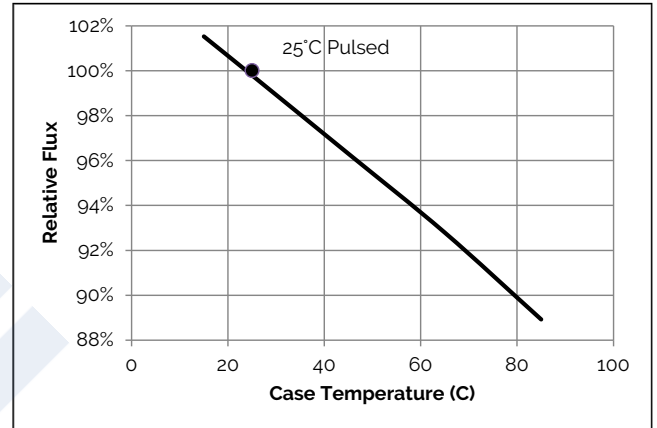
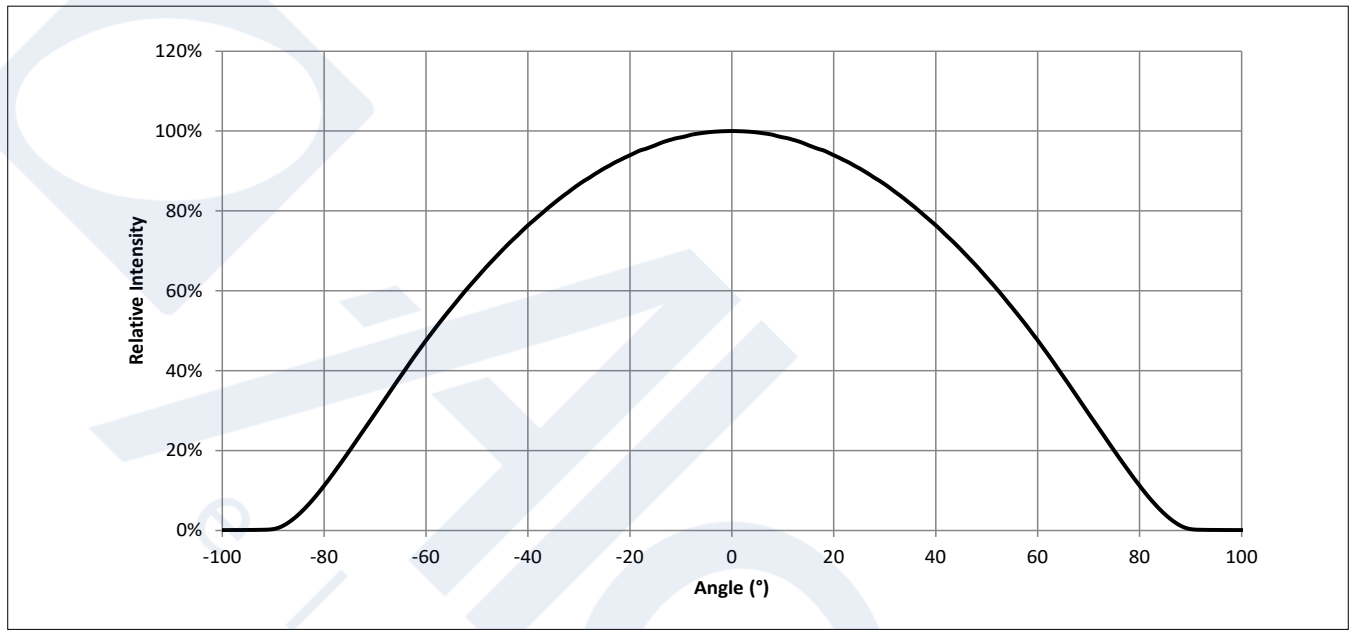


Figure 8: Relative Flux vs. Case Temperature



Typical Radiation Pattern

Figure 9: Typical Spatial Radiation Pattern

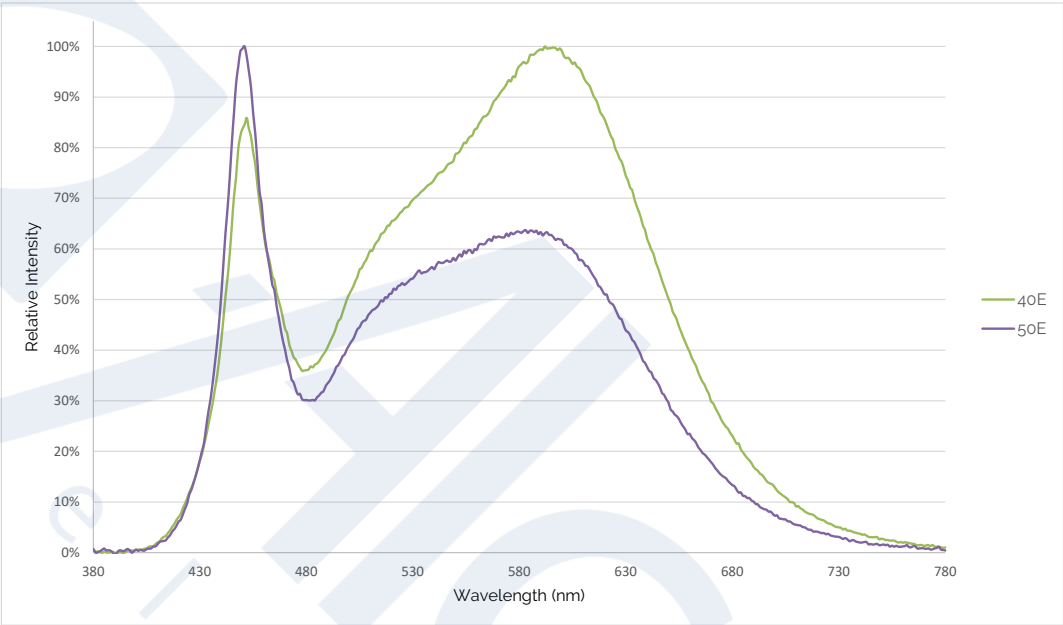


Notes for Figure 9:

1. Typical viewing angle is 120°.
2. The viewing angle is defined as the off axis angle from the centerline where I_v is $\frac{1}{2}$ of the peak value.

Typical Color Spectrum

Figure 10: Typical Color Spectra, 80 CRI



Note for Figure 10:

- 1. Color spectra measured at nominal current for $T_c = 85^\circ\text{C}$

Mechanical Dimensions

Figure 11: Drawing for BXEB-SQ0182-xxE4000-C-B3

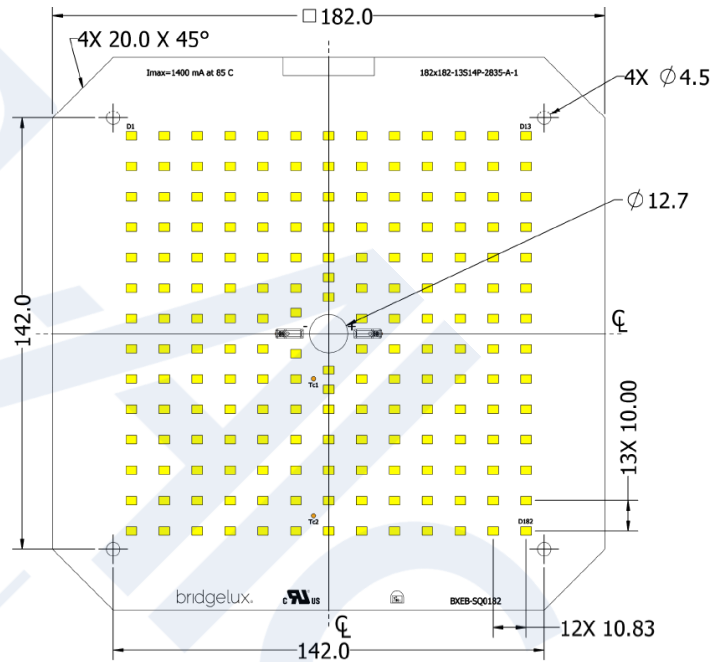
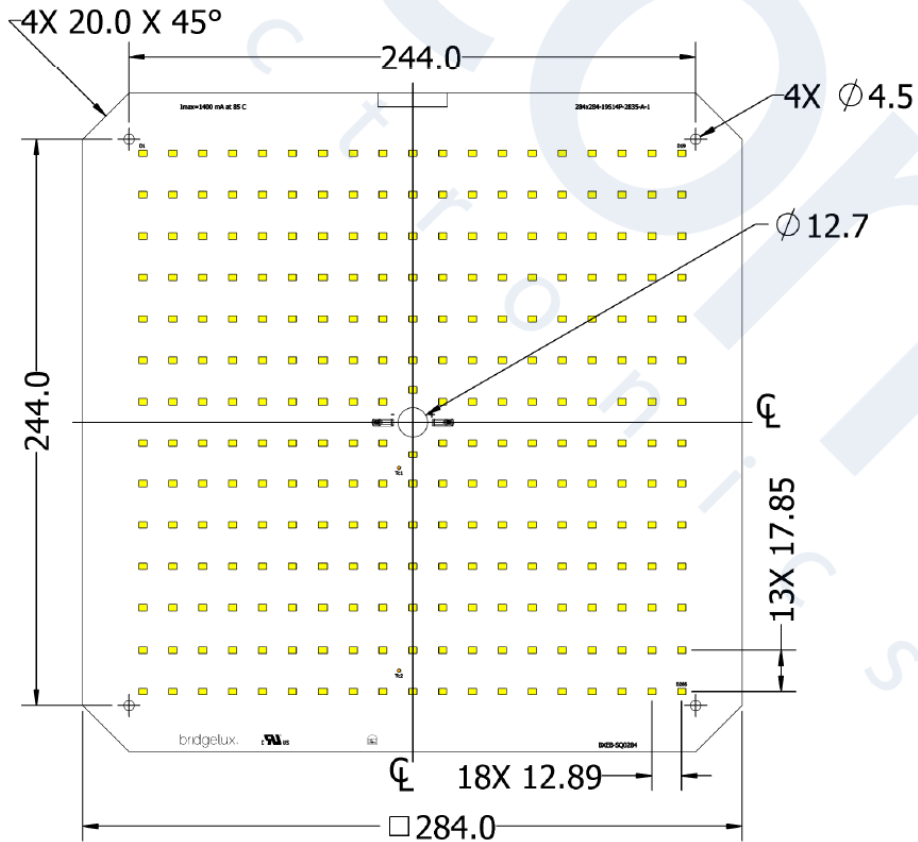
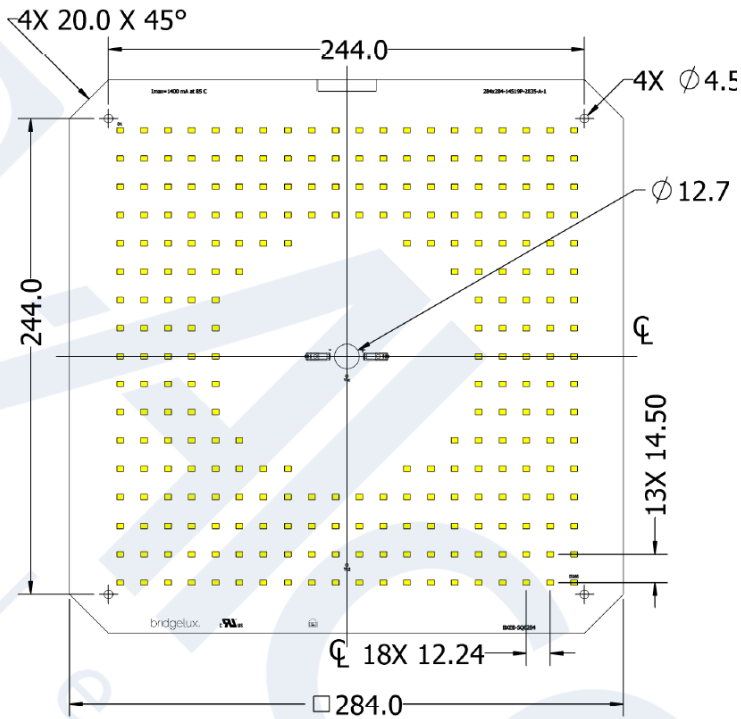


Figure 12: Drawing for BXEB-SQ0284-xxE6000-C-B3 and BXEB-SQ0284-xxE6000-D-B3



Mechanical Dimensions

Figure 13: Drawing for BXEB-SQ0284-xxE6000-E-B3



Notes for Figures 11, 12 & 13:

1. Unless otherwise specified, the tolerances are $\pm 0.10\text{mm}$.
2. Drawings are not to scale.
3. Drawing dimensions are in millimeters.

Table 4: Module dimensions

Part Number	Board Length	Board Width	Board Height
BXEB-SQ0182-xxE4000-C-B3	182 mm	182 mm	4.2 mm
BXEB-SQ0284-xxE6000-C-B3	284 mm	284 mm	5.5 mm
BXEB-SQ0284-xxE6000-D-B3	284 mm	284 mm	5.5 mm
BXEB-SQ0284-xxE6000-E-B3	284 mm	284 mm	5.5 mm

Table 5: Connector and wiring

Parameter	Specification
Input wire cross-section	20-24 AWG
Wire strip length	6.5-7.5 mm

Color Binning Information

Figure 14: Color Point Test Bins in CIE 1931 xy Color Space

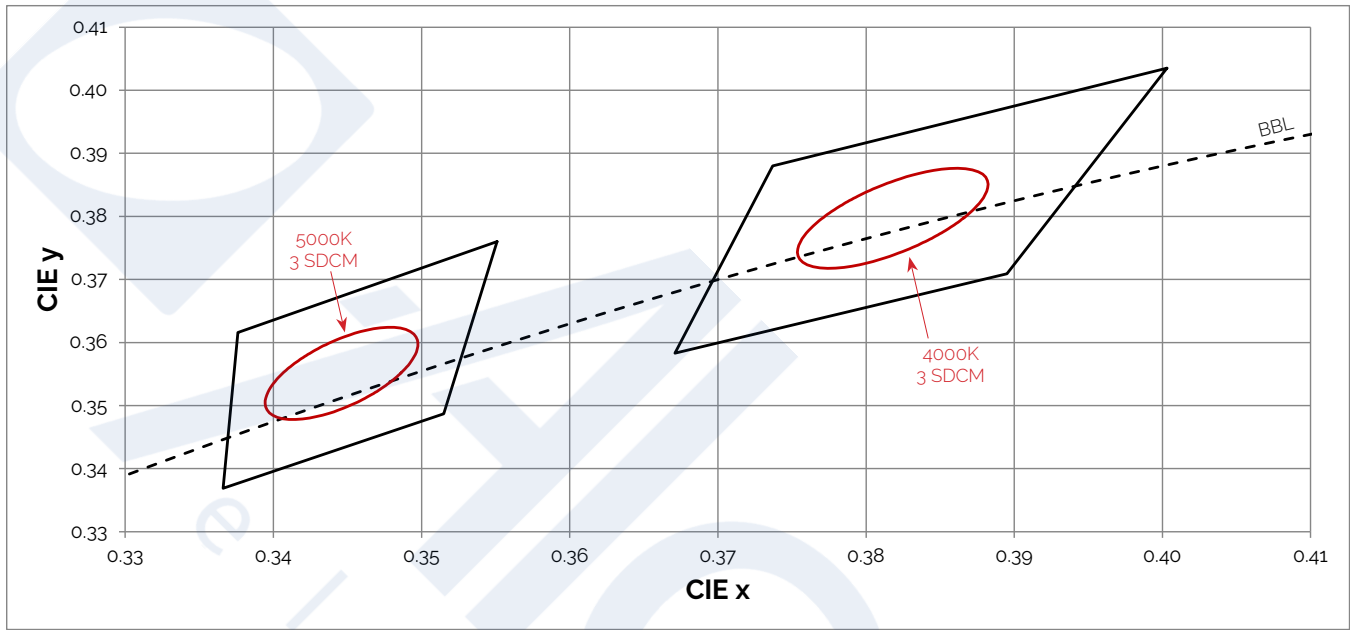


Table 6: Bin Coordinates and Associated Typical CCT

3 SDCM Bin	4000K	5000K
CCT Range	3851K - 4130K	4835K - 5215K
Center Point (x, y)	(0.382, 0.380)	(0.3445, 0.355)
ANSI Bin (for reference only)	(3710K - 4260K)	(4745K - 5311K)

Notes for Table 6:

1. Color binning at solder point temperature T_{sp} of SMDs at 25°C.
2. Bridgelux maintains a tolerance of ± 0.007 on x and y color coordinates in the CIE 1931 color space.

Packaging and Labeling

Figure 15: Packaging and Labeling

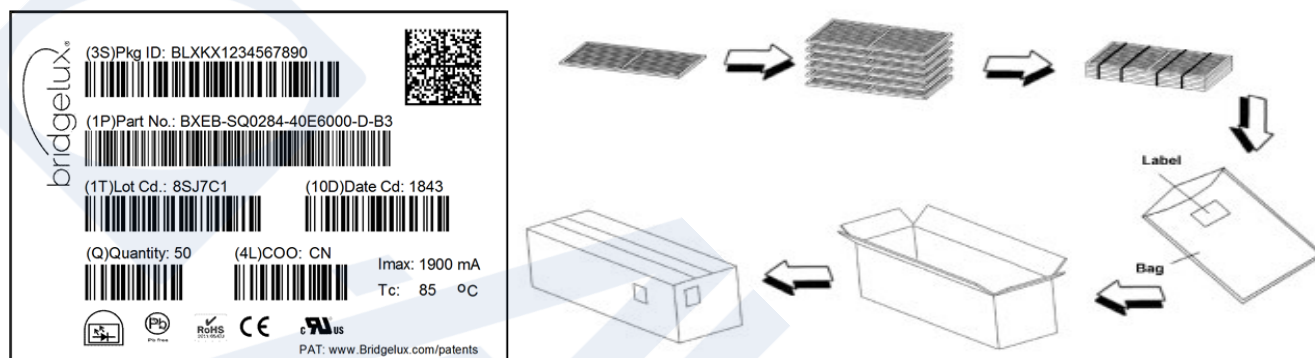


Table 7: Packaging Structure

SQ0182 modules	Tray	Box
Quantity	1	50
Dimension	255 mm x 255 mm x 15 mm	520 mm x 270 mm x 210 mm
SQ0284 modules		
Quantity	1	25
Dimension	355 mm x 355 mm x 15 mm	370 mm x 370 mm x 210 mm

Figure 16: Product Labeling

Bridgelux EB Series Square modules contain a label on the front to help with product identification. In addition to the product identification markings, modules 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 module.



BXEB-SQ0182-xxE4000-C-B3

Customer Use- 2D Barcode
Scannable barcode provides
product part number and other
Bridgelux internal production
information.

Design Resources

Application Notes

Bridgelux has developed a comprehensive set of application notes and design resources to assist customers in successfully designing with the EB Series product family. For a list of resources under development, visit www.bridgelux.com.

Optical Source Models

Optical source models and ray set files are available for all Bridgelux products. For a list of available formats, visit www.bridgelux.com.

3D CAD Models

Three dimensional CAD models depicting the product outline of all Bridgelux EB Series modules are available in both IGES and STEP formats. Please contact your Bridgelux sales representative for assistance.

Precautions

CAUTION: CHEMICAL EXPOSURE HAZARD

Exposure to some chemicals commonly used in luminaire manufacturing and assembly can cause damage to the LED linear. Please consult Bridgelux Application Note for additional information.

CAUTION: EYE SAFETY

Eye safety classification for the use of Bridgelux EB Series is in accordance with IEC/TR62778: Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires. EB Series modules are classified as Risk Group 1 when operated at or below the maximum drive current. Please use appropriate precautions. It is important that employees working with LEDs are trained to use them safely.

CAUTION: RISK OF BURN

Do not touch the EB Series modules during operation. Allow the linear to cool for a sufficient period of time before handling. The EB Series modules 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 linear or apply stress to the LES (yellow phosphor resin area). Contact may cause damage to the linear.

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 EB Square. Use the mechanical features of the linear housing, edges and/or mounting holes to locate and secure optical devices as needed.

Disclaimers

STANDARD TEST CONDITIONS

Unless otherwise stated, linear testing is performed at the nominal drive current.

MINOR PRODUCT CHANGE POLICY

The rigorous qualification testing on products offered by Bridgelux provides performance assurance. Slight cosmetic changes that do not affect form, fit, or function may occur as Bridgelux continues product optimization.

About Bridgelux: Bridging Light and Life™

At Bridgelux, we help companies, industries and people experience the power and possibility of light. Since 2002, we've designed LED solutions that are high performing, energy efficient, cost effective and easy to integrate. Our focus is on light's impact on human behavior, delivering products that create better environments, experiences and returns—both experiential and financial. And our patented technology drives new platforms for commercial and industrial luminaires.