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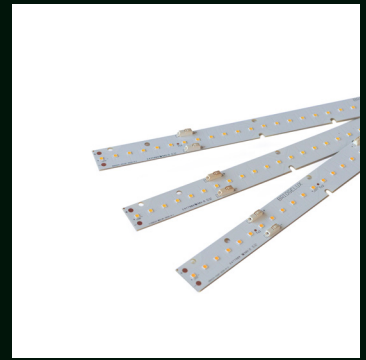


Bridgelux® EB Series™ Modules

Product Data Sheet DS130

Introduction

EB Series



EB Series linear modules are designed for linear troffers, pendants and other luminaires in indoor commercial and industrial applications. Available in 280 mm, 560 mm, and 1120 mm lengths, the modules can be connected end-to-end thereby providing flexibility in designing luminaires. The Zhaga compatible modules further simplify design by providing easy mounting options, reusable poke-in connectors and by being compatible with a variety of off-the-shelf optics.

The modules have long lifetimes of greater than 50,000 hours and are backed by a 5-year warranty.

Features

- High efficacy, up to 159 lm/W and wide lumen range with 2x overdrive capability
- Lumen output of up to 2270 lm, 4450 lm, and 8900 lm for 280 mm, 560 mm and 1120 mm modules.
- Designed following Zhaga Book 7 standards L28W2 and L56W2
- Easy, automated wiring enabled by poke-in connectors
- 5 year limited warranty
- Available in a variety of color temperatures (3000K-5700K)
- Energy Star / ANSI compliant 3 SDCM color binning structure

Benefits

- No separate heat sinking required
- Reliable use at elevated currents enables greater design flexibility
- Easy installation using mounting holes and connectors
- Long lifetime of > 50000 hours
- High quality, true color reproduction



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Product Selection Guide

The following product configurations are available:

Table 1a: Selection Guide, Pulsed Measurement Data for 280 mm, L0280 modules ($T_{c2} = 50^\circ\text{C}$)

Part Number	Nominal CCT ¹ (K)	CRI ²	Nominal Drive Current (mA)	Typical Flux ^{3,4} $T_{c2} = 50^\circ\text{C}$ (lm)	Minimum Flux ^{4,5} $T_{c2} = 50^\circ\text{C}$ (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXEB-L0280Z-30E1000-C-A3	3000	80	350	1205	1085	22.1	7.7	156
BXEB-L0280Z-35E1000-C-A3	3500	80	350	1205	1085	22.1	7.7	156
BXEB-L0280Z-40E1000-C-A3	4000	80	350	1230	1107	22.1	7.7	159
BXEB-L0280Z-50E1000-C-A3	5000	80	350	1230	1107	22.1	7.7	159
BXEB-L0280Z-57E1000-C-A3	5700	80	350	1230	1107	22.1	7.7	159

Table 1b: Selection Guide, Pulsed Measurement Data for 560 mm, L0560 modules ($T_{c2} = 50^\circ\text{C}$)

Part Number	Nominal CCT ¹ (K)	CRI ²	Nominal Drive Current (mA)	Typical Flux ^{3,4} $T_{c2} = 50^\circ\text{C}$ (lm)	Minimum Flux ^{4,5} $T_{c2} = 50^\circ\text{C}$ (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXEB-L0560Z-30E2000-C-A3	3000	80	700	2410	2169	22.1	15.5	156
BXEB-L0560Z-35E2000-C-A3	3500	80	700	2410	2169	22.1	15.5	156
BXEB-L0560Z-40E2000-C-A3	4000	80	700	2460	2214	22.1	15.5	159
BXEB-L0560Z-50E2000-C-A3	5000	80	700	2460	2214	22.1	15.5	159
BXEB-L0560Z-57E2000-C-A3	5700	80	700	2460	2214	22.1	15.5	159

Table 1c: Selection Guide, Pulsed Measurement Data for 1120 mm, L1120 modules ($T_{c2} = 50^\circ\text{C}$)

Part Number	Nominal CCT ¹ (K)	CRI ²	Nominal Drive Current (mA)	Typical Flux ^{3,4} $T_{c2} = 50^\circ\text{C}$ (lm)	Minimum Flux ^{4,5} $T_{c2} = 50^\circ\text{C}$ (lm)	Typical V_f (V)	Typical Power (W)	Typical Efficacy (lm/W)
BXEB-L1120Z-30E4000-C-A3	3000	80	700	4820	4338	44.2	31.0	156
BXEB-L1120Z-35E4000-C-A3	3500	80	700	4820	4338	44.2	31.0	156
BXEB-L1120Z-40E4000-C-A3	4000	80	700	4920	4428	44.2	31.0	159
BXEB-L1120Z-50E4000-C-A3	5000	80	700	4920	4428	44.2	31.0	159
BXEB-L1120Z-57E4000-C-A3	5700	80	700	4920	4428	44.2	31.0	159

Notes for Tables 1a, 1b and 1c:

1. Nominal CCT as defined by ANSI C78.377-2011.
2. CRI Values are minimums.
3. Products tested at nominal test current where temperature of center case temperature point $T_{c2} = 50^\circ\text{C}$. Two other measurement points T_{c1} and T_{c3} are provided for reference only. Values may vary depending on the thermal design of the luminaire and/or the exposed environment to which the product is subjected.
4. Bridgelux maintains a $\pm 7\%$ tolerance on flux measurements.
5. Minimum performance values are provided as reference only and are not a guarantee of performance.

Performance at Commonly Used Drive Currents

EB Series modules are tested to the specifications shown using the nominal drive currents in Tables 1a-1c. EB Series may also be driven at other drive currents depending on specific application design requirements. The performance at any drive current can be derived from the current vs. voltage characteristics shown in Figures 1-3 and the flux vs. current characteristics shown in Figures 4-5. The performance at commonly used drive currents is summarized in Tables 2a-2c.

Table 2a: Product Performance at Commonly Used Drive Currents for 280 mm, L0280 modules

Part Number	CRI	Drive Current ¹ (mA)	Typical V_f $T_{c2} = 50^\circ\text{C}$ (V)	Typical Power $T_{c2} = 50^\circ\text{C}$ (W)	Typical Flux ² $T_{c2} = 50^\circ\text{C}$ (lm)	Typical Efficacy $T_{c2} = 50^\circ\text{C}$ (lm/W)
BXEB-L0280Z-30E1000-C-A3	80	100	21.0	2.1	349	166
		200	21.5	4.3	704	164
		350	22.1	7.7	1205	156
		500	22.7	11.3	1667	147
		700	23.3	16.3	2223	136
BXEB-L0280Z-35E1000-C-A3	80	100	21.0	2.1	349	166
		200	21.5	4.3	704	164
		350	22.1	7.7	1205	156
		500	22.7	11.3	1667	147
		700	23.3	16.3	2223	136
BXEB-L0280Z-40E1000-C-A3	80	100	21.0	2.1	356	170
		200	21.5	4.3	719	167
		350	22.1	7.7	1230	159
		500	22.7	11.3	1702	150
		700	23.3	16.3	2269	139
BXEB-L0280Z-50E1000-C-A3	80	100	21.0	2.1	356	170
		200	21.5	4.3	719	167
		350	22.1	7.7	1230	159
		500	22.7	11.3	1702	150
		700	23.3	16.3	2269	139
BXEB-L0280Z-57E1000-C-A3	80	100	21.0	2.1	356	170
		200	21.5	4.3	719	167
		350	22.1	7.7	1230	159
		500	22.7	11.3	1702	150
		700	23.3	16.3	2269	139

Notes for Table 2a:

1. Alternate drive currents in Table 2 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a $\pm 7\%$ tolerance on flux measurements.

Performance at Commonly Used Drive Currents

Table 2b: Product Performance at Commonly Used Drive Currents for 560 mm, L0560 modules

Part Number	CRI	Drive Current ¹ (mA)	Typical V _f T _{c2} = 50° C (V)	Typical Power T _{c2} = 50° C (W)	Typical Flux ² T _{c2} = 50° C (lm)	Typical Efficacy T _{c2} = 50° C (lm/W)
BXEB-L0560Z-30E2000-C-A3	80	200	21.0	4.2	706	168
		500	21.7	10.9	1759	162
		700	22.1	15.5	2410	156
		1000	22.7	22.7	3309	146
		1400	23.3	32.6	4362	134
BXEB-L0560Z-35E2000-C-A3	80	200	21.0	4.2	706	168
		500	21.7	10.9	1759	162
		700	22.1	15.5	2410	156
		1000	22.7	22.7	3309	146
		1400	23.3	32.6	4362	134
BXEB-L0560Z-40E2000-C-A3	80	200	21.0	4.2	721	171
		500	21.7	10.9	1796	165
		700	22.1	15.5	2460	159
		1000	22.7	22.7	3377	149
		1400	23.3	32.6	4452	137
BXEB-L0560Z-50E2000-C-A3	80	200	21.0	4.2	721	171
		500	21.7	10.9	1796	165
		700	22.1	15.5	2460	159
		1000	22.7	22.7	3377	149
		1400	23.3	32.6	4452	137
BXEB-L0560Z-57E2000-C-A3	80	200	21.0	4.2	721	171
		500	21.7	10.9	1796	165
		700	22.1	15.5	2460	159
		1000	22.7	22.7	3377	149
		1400	23.3	32.6	4452	137

Notes for Table 2b:

1. Alternate drive currents in Table 2 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a ± 7% tolerance on flux measurements.

Performance at Commonly Used Drive Currents

Table 2c: Product Performance at Commonly Used Drive Currents for 1120 mm, L1120 modules

Part Number	CRI	Drive Current ¹ (mA)	Typical V_f $T_{c2} = 50^\circ\text{C}$ (V)	Typical Power $T_{c2} = 50^\circ\text{C}$ (W)	Typical Flux ² $T_{c2} = 50^\circ\text{C}$ (lm)	Typical Efficacy $T_{c2} = 50^\circ\text{C}$ (lm/W)
BXEB-L1120Z-30E4000-C-A3	80	200	42.1	8.4	1412	168
		500	43.4	21.7	3519	162
		700	44.2	31.0	4820	156
		1000	45.3	45.3	6617	146
		1400	46.5	65.2	8724	134
BXEB-L1120Z-35E4000-C-A3	80	200	42.1	8.4	1412	168
		500	43.4	21.7	3519	162
		700	44.2	31.0	4820	156
		1000	45.3	45.3	6617	146
		1400	46.5	65.2	8724	134
BXEB-L1120Z-40E4000-C-A3	80	200	42.1	8.4	1441	171
		500	43.4	21.7	3592	165
		700	44.2	31.0	4920	159
		1000	45.3	45.3	6754	149
		1400	46.5	65.2	8905	137
BXEB-L1120Z-50E4000-C-A3	80	200	42.1	8.4	1441	171
		500	43.4	21.7	3592	165
		700	44.2	31.0	4920	159
		1000	45.3	45.3	6754	149
		1400	46.5	65.2	8905	137
BXEB-L1120Z-57E4000-C-A3	80	200	42.1	8.4	1441	171
		500	43.4	21.7	3592	165
		700	44.2	31.0	4920	159
		1000	45.3	45.3	6754	149
		1400	46.5	65.2	8905	137

Notes for Table 2c:

1. Alternate drive currents in Table 2 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a $\pm 7\%$ tolerance on flux measurements.

Electrical Characteristics

Table 3: Electrical Characteristics

Part Number	Drive Current (mA)	Forward Voltage $T_{c2} = 50^{\circ} \text{C}$ (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-L0280Z-xxx1000-C-A3	350	20.5	22.1	24.8	-9.5	20.2	25.6
	700	21.6	23.3	26.1	-9.5	21.3	27.0
BXEB-L0560Z-xxx2000-C-A3	700	20.5	22.1	24.8	-9.5	20.2	25.6
	1400	21.6	23.3	26.1	-9.5	21.3	27.0
BXEB-L1120Z-xxx4000-C-A3	700	41.0	44.2	49.5	-19.0	40.4	51.2
	1400	43.2	46.5	52.1	-19.0	42.5	53.8

Notes for Table 3:

1. Voltage minimum and maximum are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a tolerance of ± 0.10 V on forward voltage measurements.
3. This product has been designed and manufactured per IEC 62031:2014. The working voltage designated for the insulation is 48 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 4: Absolute Maximum Ratings

Parameter	Maximum Rating
Storage Temperature	-40 °C to +85 °C
Operating Case Temperature ¹ (T _c)	85 °C
Soldering Temperature ²	350 °C or lower for a maximum of 5 seconds
Maximum Drive Current ³	700 mA for L0280 modules 1400 mA for L0560 and L1120 modules
Maximum Reverse Voltage	EB Series modules are not designed to be driven in reverse bias

Notes for Table 4:

1. For IEC 62717 requirement, please consult your Bridgelux sales representative.
2. Refer to Bridgelux Design Guide for handling EB Series linear modules.
3. 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: Drive Current vs. Voltage ($T_{c2} = 50^{\circ}\text{C}$) for L0280 modules

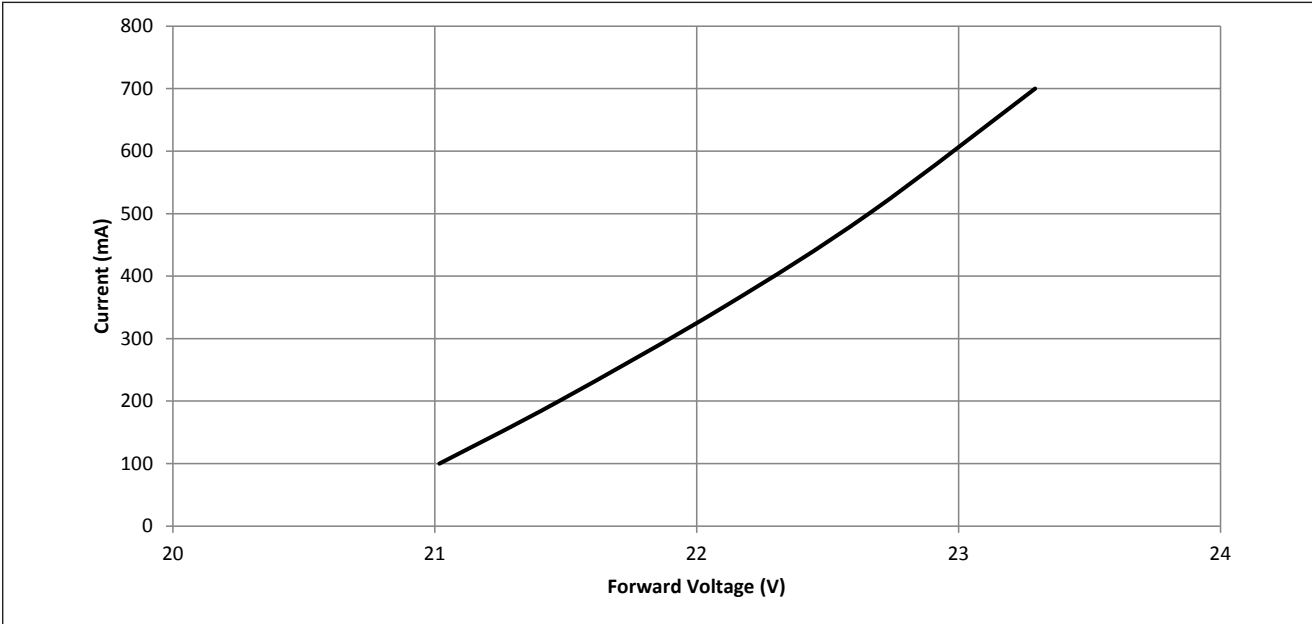
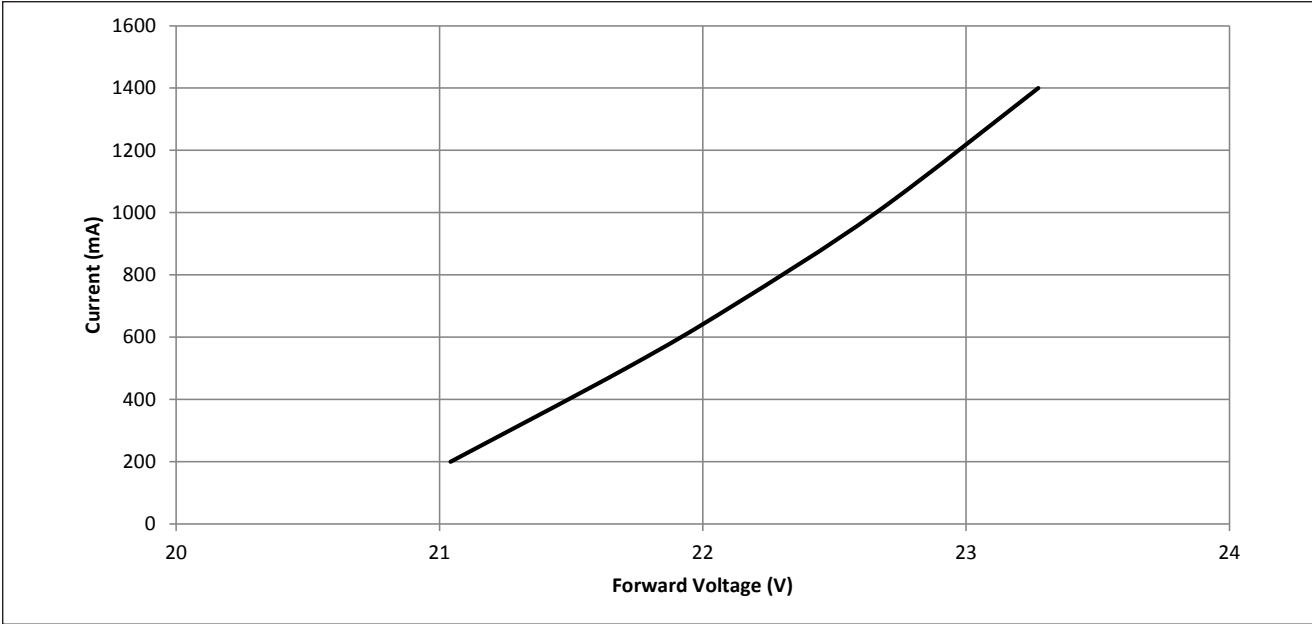


Figure 2: Drive Current vs. Voltage ($T_{c2} = 50^{\circ}\text{C}$) for L0560 modules



Performance Curves

Figure 3: Drive Current vs. Voltage ($T_{c2} = 50^{\circ}\text{C}$) for L1120 modules

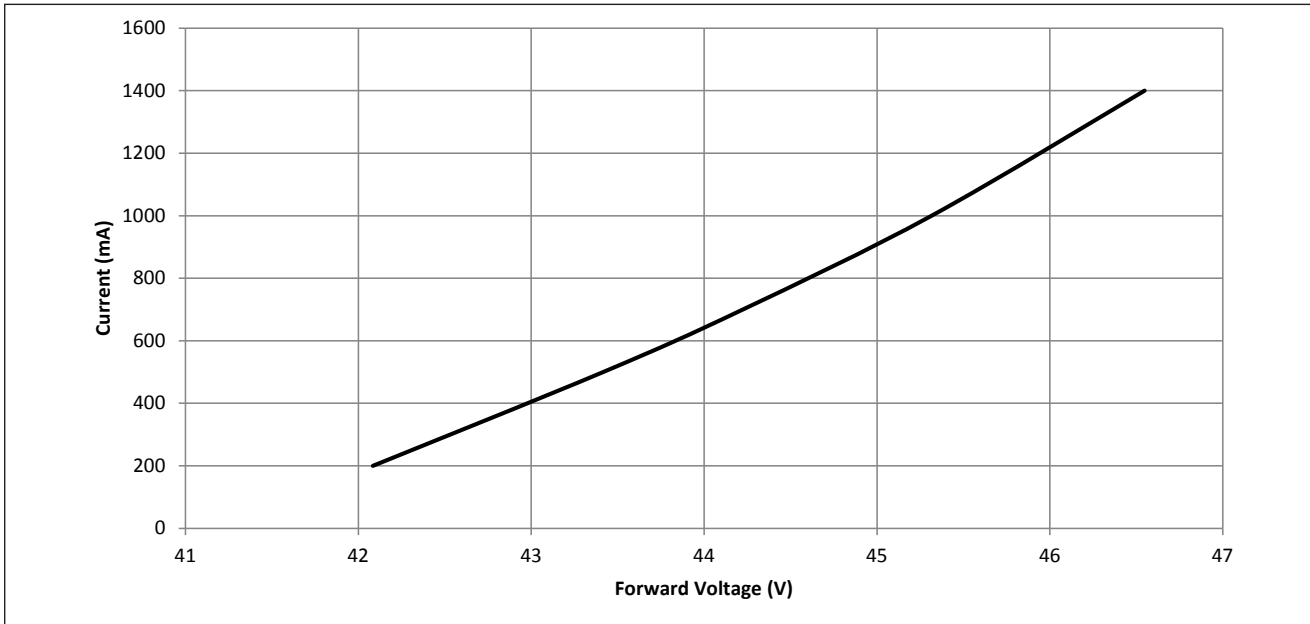
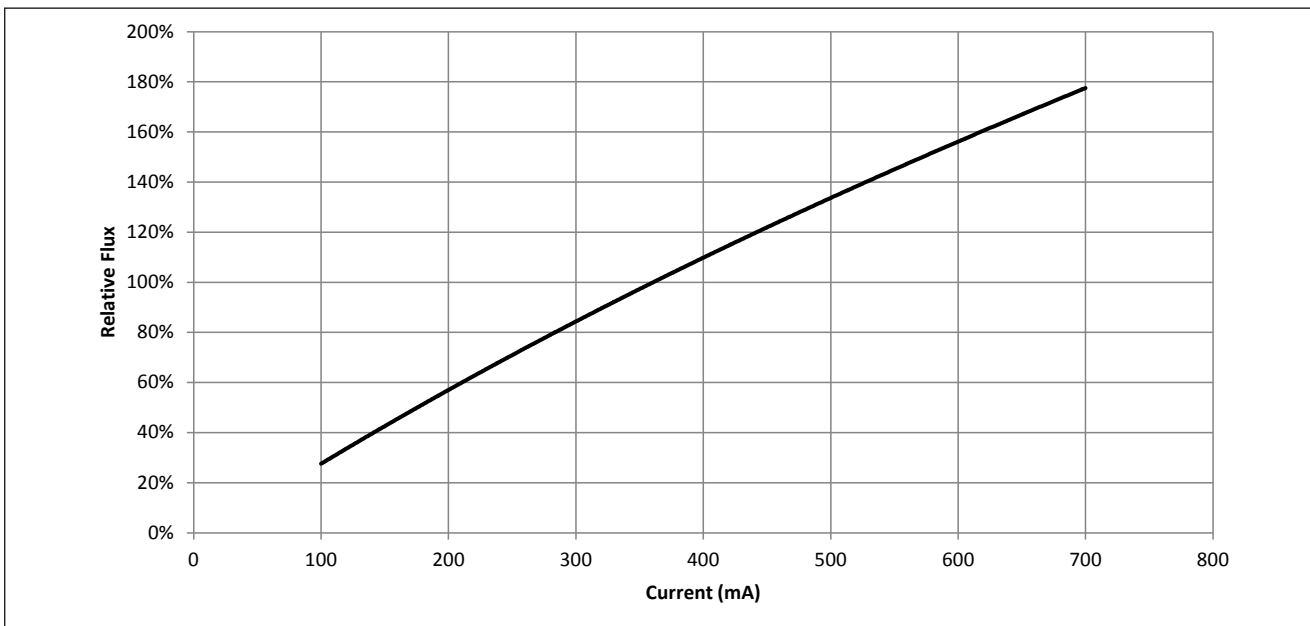


Figure 4: Typical Relative Luminous Flux vs. Drive Current ($T_{c2} = 50^{\circ}\text{C}$) for L0280 modules



Performance Curves

Figure 5: Typical Relative Luminous Flux vs. Drive Current ($T_{c2} = 50^{\circ}\text{C}$) for L0560 and L1120 modules

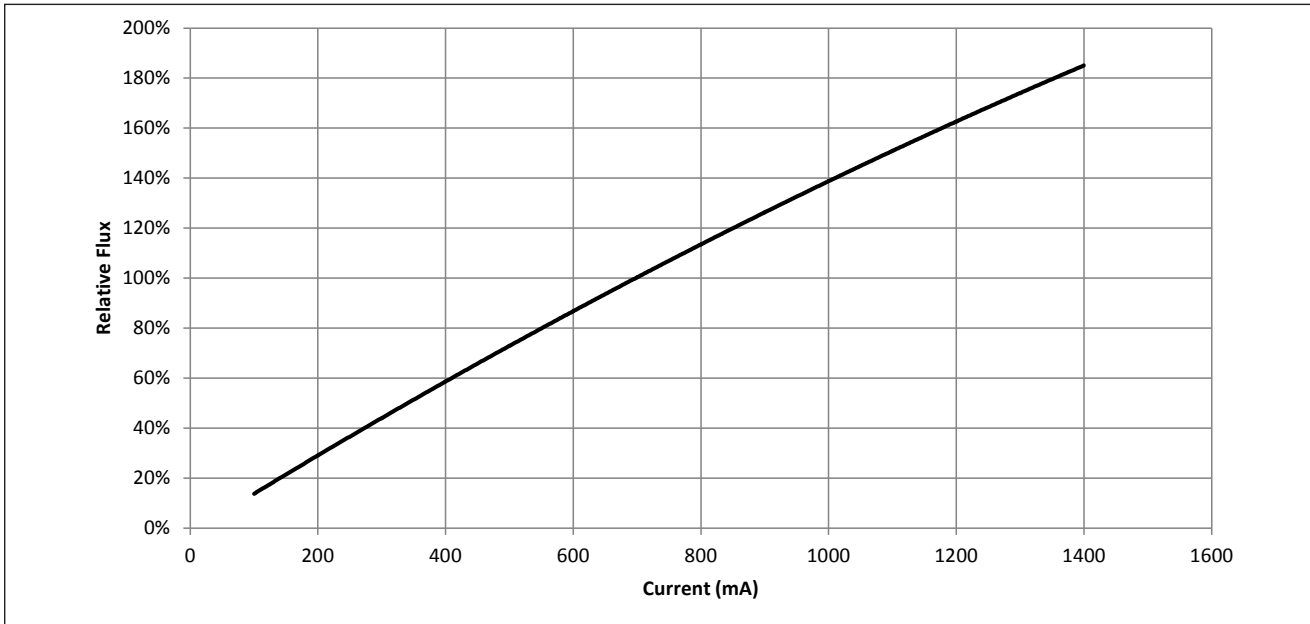
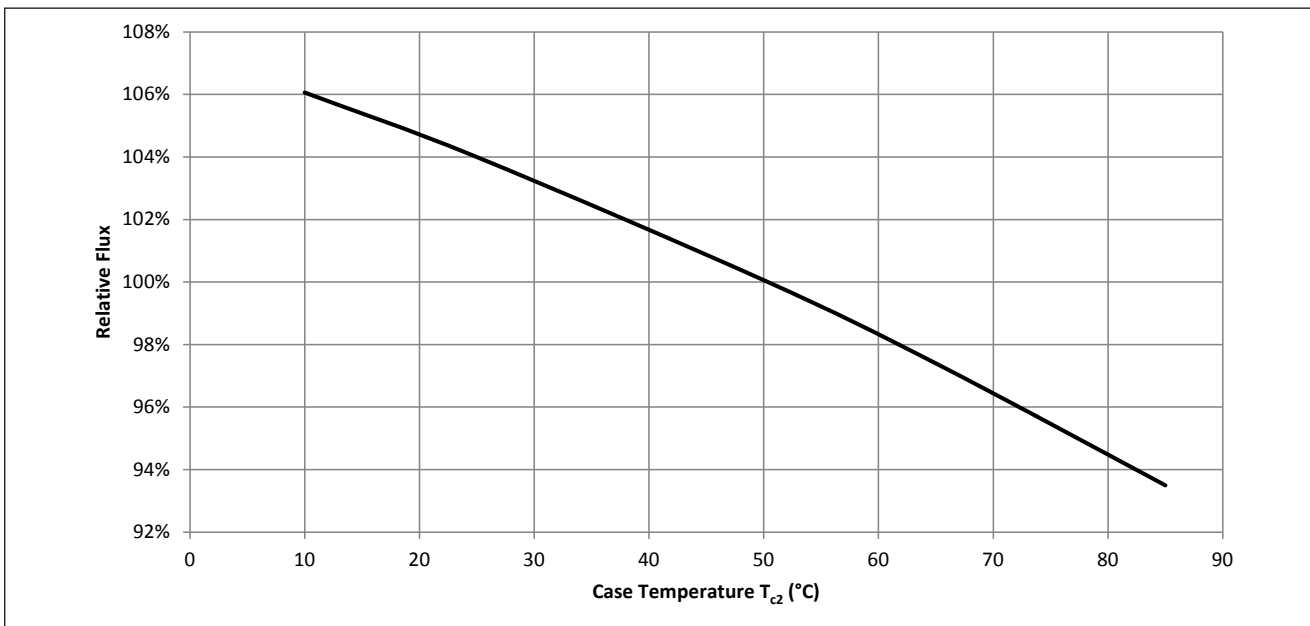
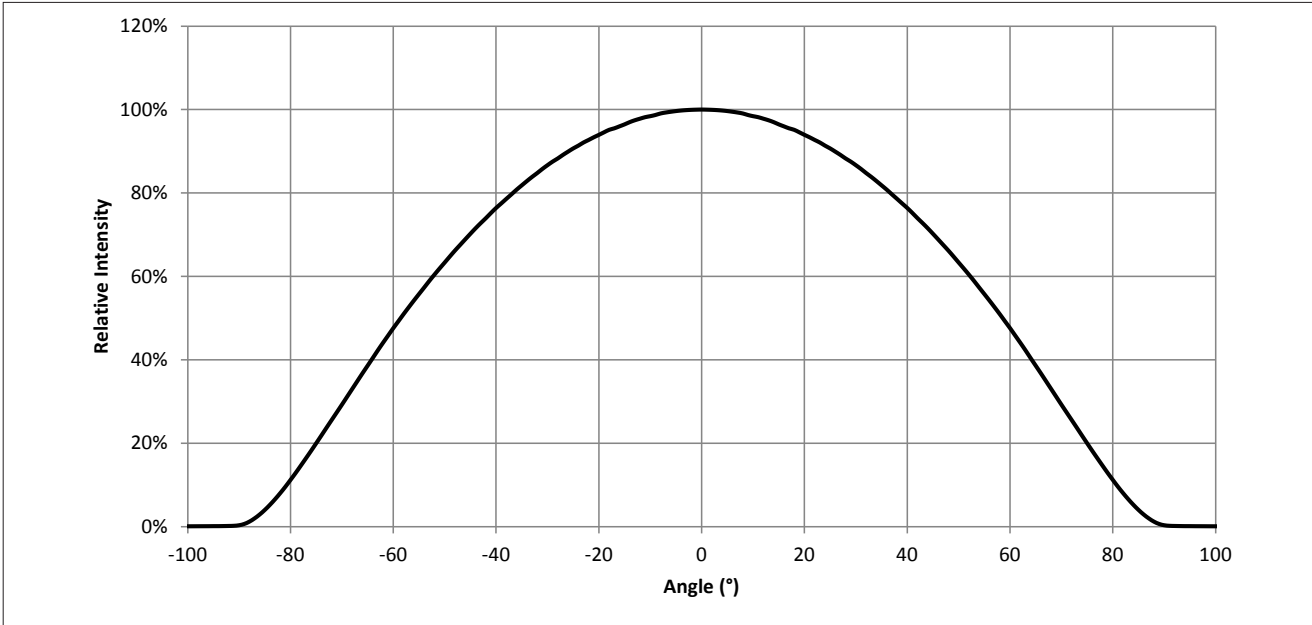


Figure 6: Typical DC Flux vs. Case Temperature (T_{c2})



Typical Radiation Pattern

Figure 7: Typical Spatial Radiation Pattern

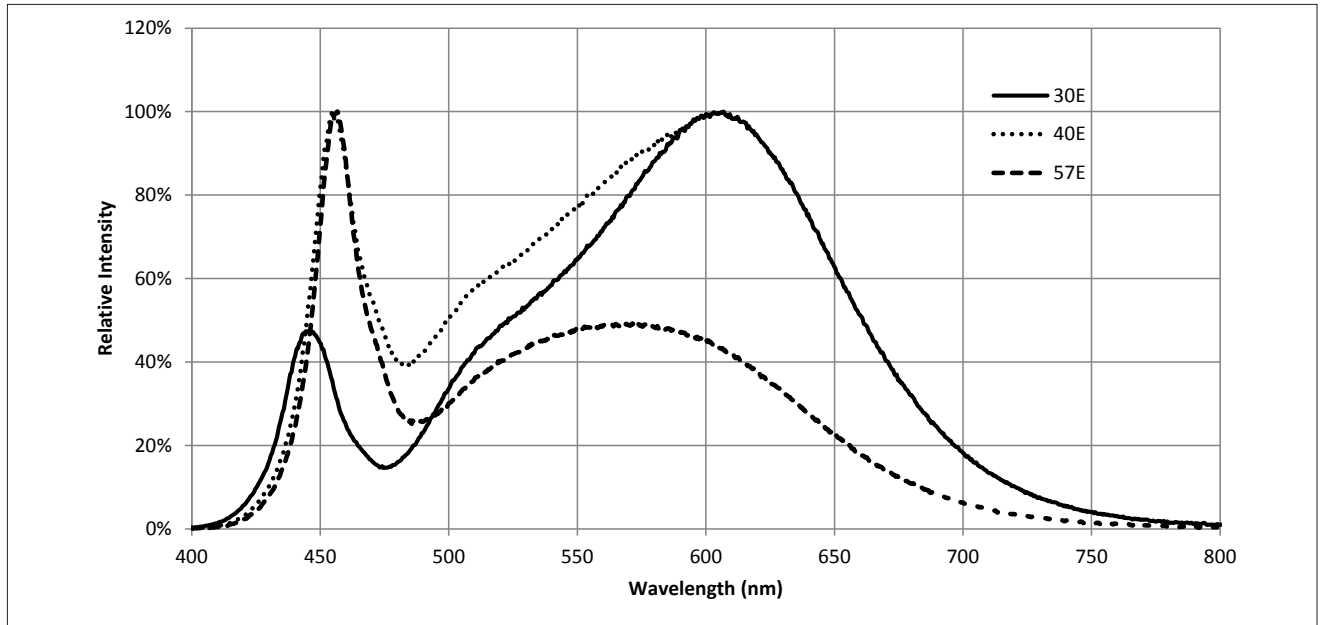


Note for Figure 7:

- 1. Typical viewing angle is 120°.
- 2. The viewing angle is defined as the off axis angle from the centerline where intensity is 50% of the peak value.

Typical Color Spectrum

Figure 8: Typical Color Spectrum



Notes for Figure 8:

1. Color spectra measured at nominal current for $T_{c2} = 50^{\circ}\text{C}$.
2. Color spectra shown for 30E is 3000K and 80 CRI.
3. Color spectra shown for 40E is 4000K and 80 CRI.
4. Color spectra shown for 57E is 5700K and 80 CRI.

Mechanical Dimensions

Figure 9: Drawing for L0280 module

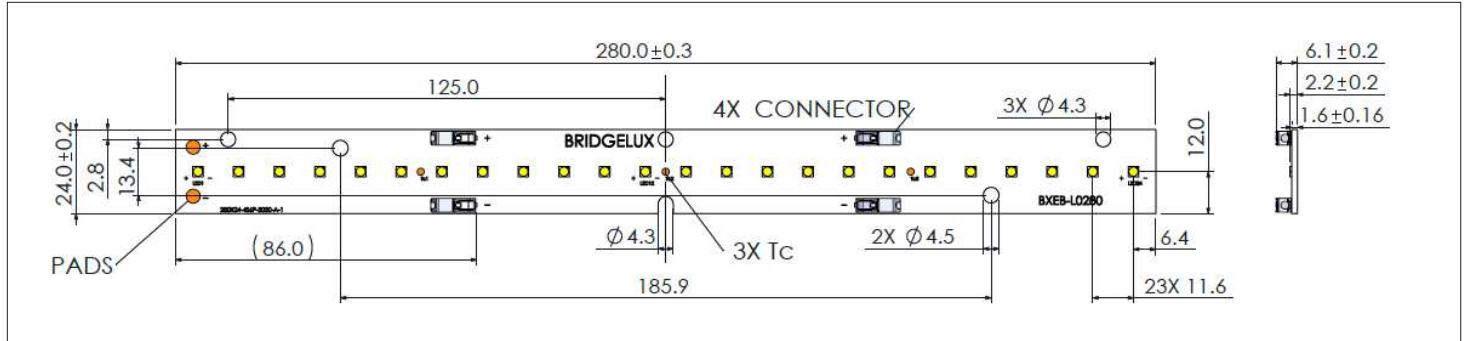


Table 5: Dimensions for L0280 module

Parameter	Specification	Tolerance	Unit
Module length	280	± 0.3	mm
Module width	24	± 0.2	mm
Module thickness	6.1	± 0.2	mm
PCB thickness	1.6	± 0.16	mm

Figure 10: Drawing for L0560 module

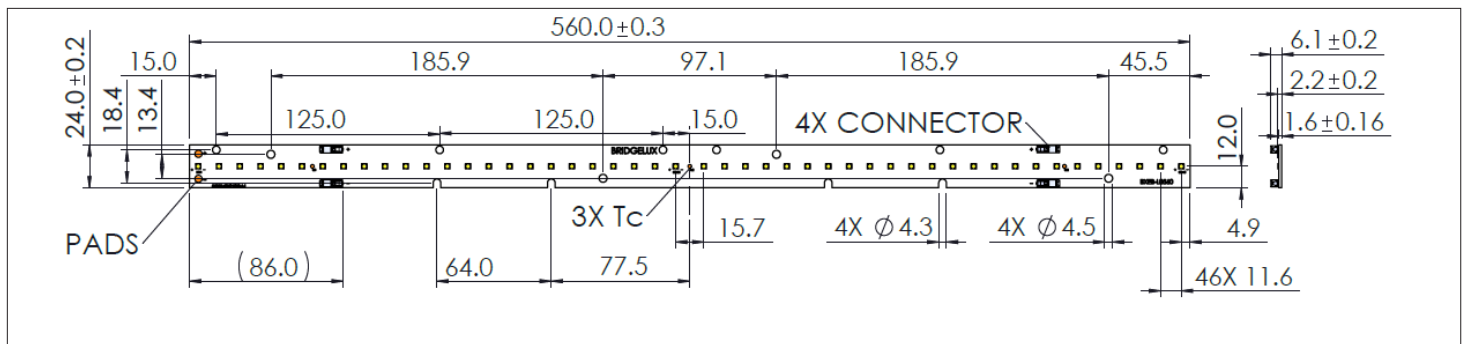


Table 6: Dimensions for L0560 module

Parameter	Specification	Tolerance	Unit
Module length	560	± 0.3	mm
Module width	24	± 0.2	mm
Module thickness	6.1	± 0.2	mm
PCB thickness	1.6	± 0.16	mm

Mechanical Dimensions

Figure 11: Drawing for L1120 module

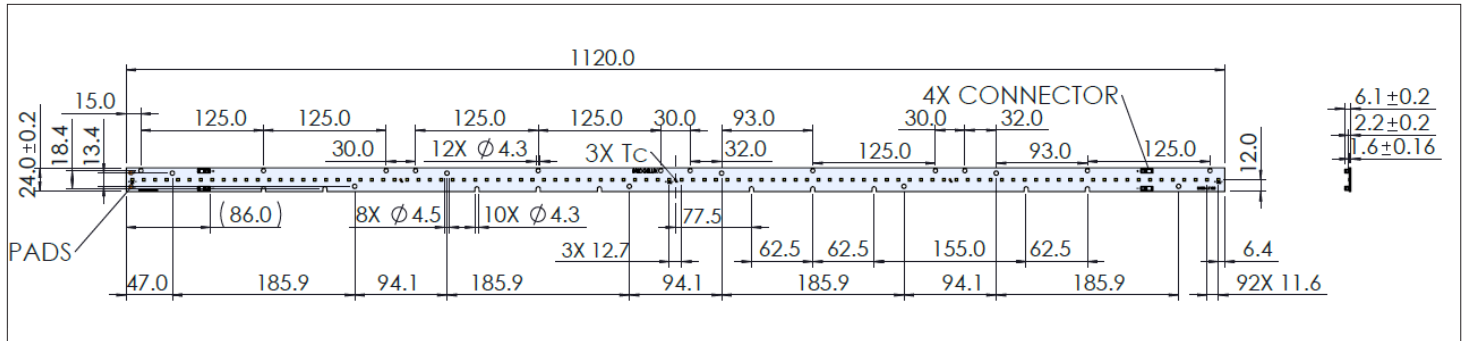


Table 7: Dimensions for L1120 module

Parameter	Specification	Tolerance	Unit
Module length	1120	± 1	mm
Module width	24	±0.2	mm
Module thickness	6.1	±0.2	mm
PCB thickness	1.6	±0.16	mm

Notes for Figures 9,10 and 11:

1. Solder pads are labeled "+" and "-" to denote positive and negative polarity, respectively.
2. Drawings are not to scale.
3. Drawing dimensions are in millimeters.
4. Tolerances for certain dimensions are provided. Tolerances for all other dimensions are listed in drawings for EB Series modules on the Bridgelux website.
5. Holes for mounting optics are 4.5 mm in diameter and shall only use insulated screws or washer plugs minimum 1.0 mm thick on the surface of the PCB.

Table 8: Connector and wiring

Parameter	Specification
Input wire cross-section	24-18 AWG
Terminal strip length	7-9 mm

Color Binning Information

Figure 12: Graph of Warm and Neutral White Test Bins in xy Color Space

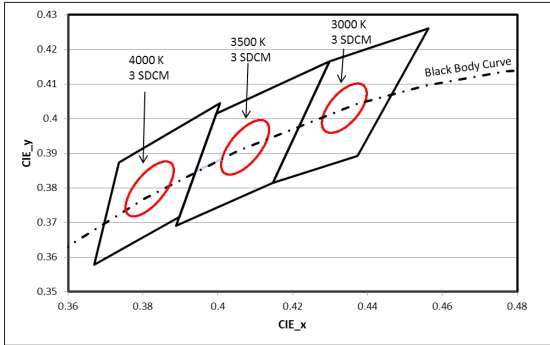


Table 9: Warm and Neutral White xy Bin Coordinates and Associated Typical CCT

Bin Code	3000K	3500 K	4000K
ANSI Bin (for reference only)	(2870K - 3220K)	(3220K - 3710K)	(3710K - 4260K)
A3 (3SDCM)	(2968K - 3136K)	(3369K - 3586K)	(3851K - 4130K)
Center Point (x,y)	(0.4338, 0.403)	(0.4073, 0.3917)	(0.3818, 0.3797)

Figure 13: Graph of Cool White Test Bins in xy Color Space

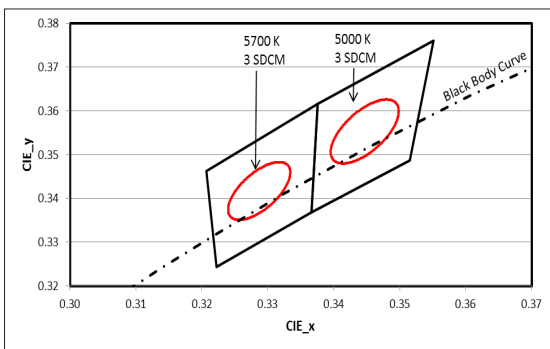


Table 10: Cool White xy Bin Coordinates and Associated Typical CCT

Bin Code	5000K	5700K
ANSI Bin (for reference only)	(4745K - 5311K)	(5312K - 6022K)
A3 (3SDCM)	(4835K - 5155K)	(5445K - 5850K)
Center Point (x,y)	(0.3447, 0.3553)	(0.3287, 0.3417)

Notes for Tables 9 and 10

1. Color binning at solder point temperature T_{sp} of SMDs at 85°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 14: EB Series Packaging and Labeling

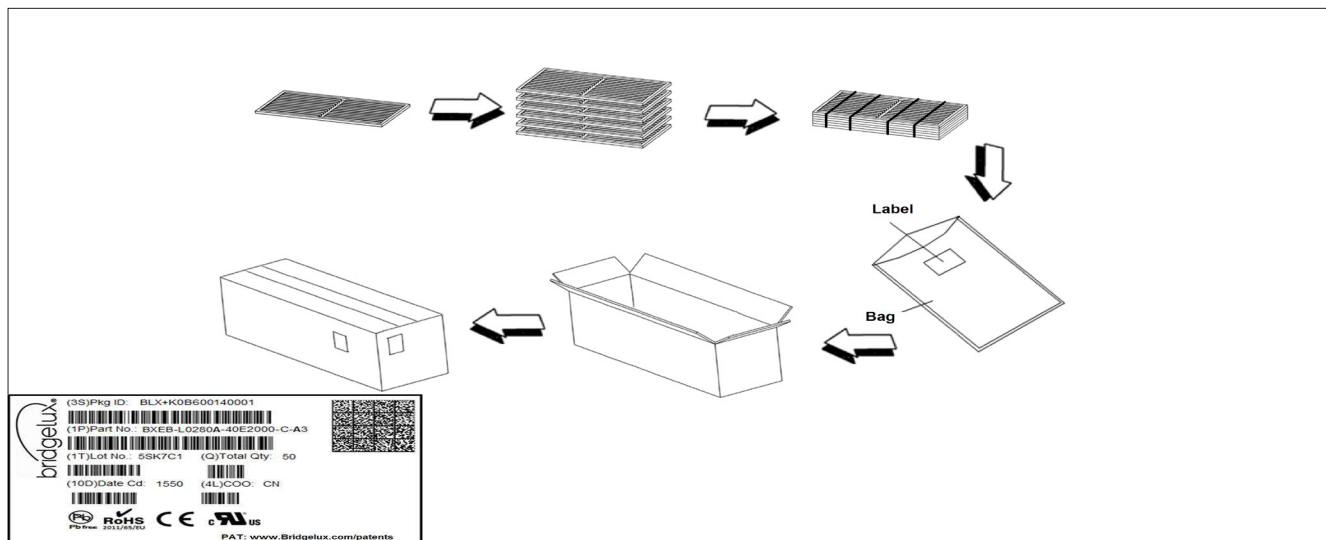


Table 11: Packaging Structure

Lo280 modules	Tray	Box	Shipping Box
Quantity	40	200	400
Dimension	63 cm x 39 cm x 2.4 cm	63.5 cm x 41.5 cm x 13.5 cm	134 cm x 43.5 cm x 18 cm
Lo560 modules			
Quantity	20	100	200
Dimension	63 cm x 39 cm x 2.4 cm	63.5 cm x 41.5 cm x 13.5 cm	134 cm x 43.5 cm x 18 cm
L1120 modules			
Quantity	20	n/a	100
Dimension	119 cm x 39 cm x 2.4 cm	n/a	134 cm x 43.5 cm x 18 cm

Figure 15: Product Labeling

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



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 EB Series modules. 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.

Precautions

CAUTION: CHEMICAL EXPOSURE HAZARD

Exposure to some chemicals commonly used in luminaire manufacturing and assembly can cause damage to the module. Please consult Bridgelux Application Note AN81 for additional information.

CAUTION: EYE SAFETY

Eye safety classification for the use of Bridgelux EB Series modules is in accordance with IEC specification TR 62778: Photobiological Safety of Lamps and Lamp Systems. EB Series modules are classified as Risk Group 1 (Low Risk) 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 module during operation. Allow the module to cool for a sufficient period of time before handling. EB Series modules may reach elevated temperatures such that could burn skin when touched.

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.

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. Visit www.bridgelux.com for details.

CAUTION

CONTACT WITH LIGHT EMITTING SURFACE (LES)

Avoid any contact with the LES. Do not touch the LES of the module or apply stress to the LES (yellow phosphor resin area). Contact may cause damage to the module.

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 Bridgelux EB Series module except the optical area. Customers may use the optical mounting holes or edges of the module to locate and secure optical devices as needed but do not apply large bending forces on the edges of the module.

STANDARD TEST CONDITIONS

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

About Bridgelux: We Build Light That Transforms

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

For more information about the company, please visit
bridgelux.com
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Bridgelux EB Series Product Data Sheet DS130 Rev. A (10/2016)