Bridgelux® SMD 3030 1W 3V

Product Data Sheet DS290

BXEM-27X | 30X | 40X | 57X

Introduction

SMD 3030

The Bridgelux SMD 3030 offers exceptional performance in a compact LED package. This high power LED is hot-color targeted which ensures that the LEDs fall within their specified color bin at the typical application conditions of 85˚C. With its broad lumen coverage and wide range of CCT and CRI options, the SMD 3030 provides unparalleled design-in flexibility for indoor and outdoor lighting applications. Its high flux capability reduces the number of LEDs and enables industry leading system level lumen per dollar. The SMD 3030 is ideal as a drop in replacement for emitters with an industry standard 3.0mm x 3.0mm footprint.

Features

- Industry-standard 3030 footprint
- Excellent color maintenance
- 9 bin color control enables tight color control
- Superior luminous flux at maximum current for reduced LED count
- Hot-color targeting ensures that color is within the ANSI bin at the typical application conditions of 85˚C
- Enables 3- and 5-step MacAdam ellipse custom binning kits
- RoHS compliant and Lead free
- Multiple CCT and CRI configurations for a wide range of lighting applications

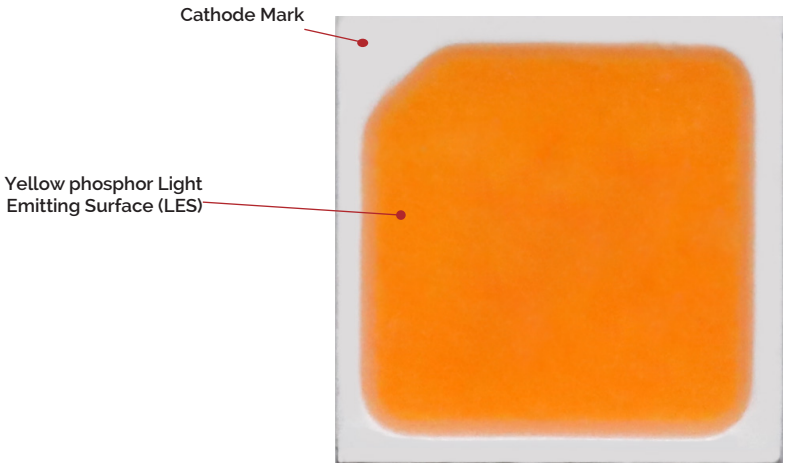
Benefits

- Lower operating and manufacturing cost
- Ease of design and rapid go-to-market
- Uniform consistent white light
- Reliable and constant white point
- Environmentally friendly, complies with standards
- Design flexibility

Contents

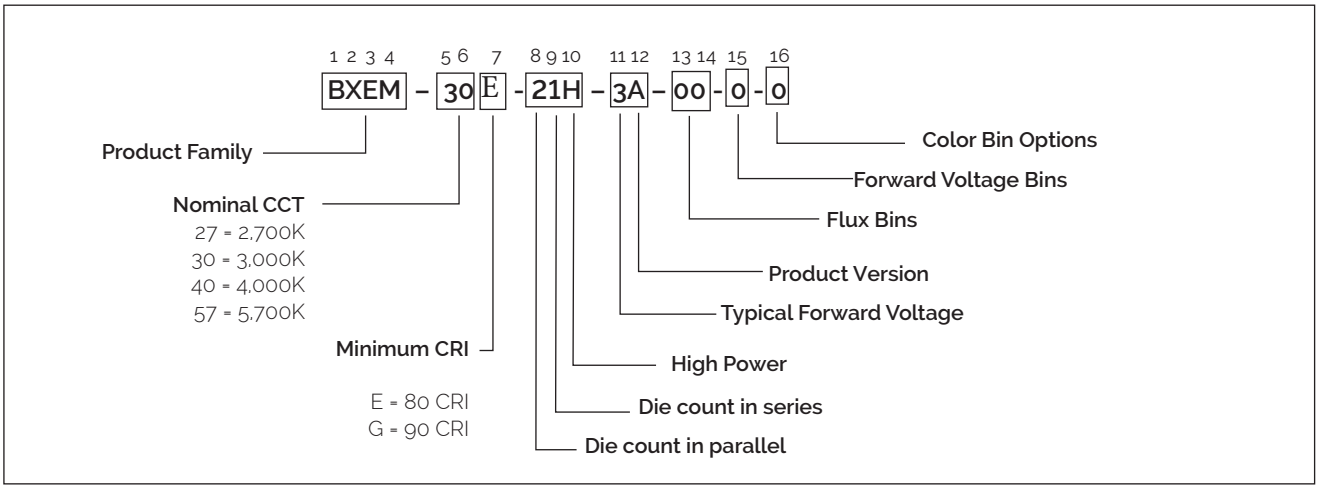
Product Feature Map

Bridgelux SMD LED products come in industry standard package sizes and follow ANSI binning standards. These LEDs are optimized for cost and performance, helping to ensure highly competitive system lumen per dollar performance while addressing the stringent efficacy and reliability standards required for modern lighting applications.



Product Nomenclature

The part number designation for Bridgelux SMD 3030 is explained as follows:



Product Test Conditions

Bridgelux SMD 3030 LEDs are tested and binned with a 10ms pulse of 65mA at T_j (junction temperature)=T_{sp} (solder point temperature) =25˚C. Forward voltage and luminous flux are binned at a T_j=T_{sp}=25˚C, while color is hot targeted at a T_{sp} of 85˚C.

Product Selection Guide

The following product configurations are available:

Table 1: Selection Guide, Pulsed Measurement Data at 65mA (T_j=T_{sp}=25˚C)

Part Number[1,6]	Nominal CCT[2] (K)	CRI[3, 5]	Nominal Drive Current (mA)	Forward Voltage[4, 5] (V)			Typical Pulsed Flux (lm)[4, 5]	Typical Power (W)	Typical Efficcy (lm/W)
				Min	Typical	Max			
BXEM-27E-21H-3A-00-0-0	2700	80	65	2.6	2.7	2.9	30	0.2	173
BXEM-27G-21H-3A-00-0-0	2700	90	65	2.6	2.7	2.9	27	0.2	152
BXEM-30G-21H-3A-00-0-0	3000	90	65	2.6	2.7	2.9	28	0.2	157
BXEM-40E-21H-3A-00-0-0	4000	80	65	2.6	2.7	2.9	33	0.2	188
BXEM-40G-21H-3A-00-0-0	4000	90	65	2.6	2.7	2.9	29	0.2	165
BXEM-57E-21H-3A-00-0-0	5700	80	65	2.6	2.7	2.9	33	0.2	186
BXEM-57G-21H-3A-00-0-0	5700	90	65	2.6	2.7	2.9	29	0.2	164

Notes for Table 1:

1. The last 6 characters (including hyphens '-') refer to flux, forward voltage, and color bins, respectively. "00-0-0" denotes the full distribution of flux, forward voltage, and 7 SDCM color.

   Example: BXEM-27E-21H-3A-00-0-0 refers to the full distribution of flux, forward voltage, and color within a 2700K 7-step ANSI standard chromaticity region with a minimum of 80CRI. 2x1 die configuration, high power, 2.7V typical forward voltage.
2. Product CCT is hot targeted at T_{sp} = 85 ˚C. Nominal CCT as defined by ANSI C78.377-2011.
3. Listed CRIs are minimum values and include test tolerance.
4. Products tested under pulsed condition (10ms pulse width) at nominal drive current where T_j=T_{sp}=25˚C.
5. Bridgelux maintains a ±7.5% tolerance on luminous flux measurements, ±0.1V tolerance on forward voltage measurements, and ±2 tolerance on CRI measurements for the SMD 3030.
6. Refer to Table 6and Table 7 for Bridgelux SMD 3030 Luminous Flux Binning and Forward Voltage Binning information.
7. Minimum flux values at elevated temperatures are provided for reference only and are not guaranteed by 100% production testing.

Product Selection Guide

Table 2: Selection Guide, Stabilized DC Performance (T_{sp} = 85°C)[6,7]

Part Number[1,5]	Nominal CCT[2] (K)	CRI[3,4]	Nominal Drive Current (mA)	Forward Voltage[4] (V)			Typical DC Flux (lm)[4]	Typical DC Power (W)	Typical DC Efficcy (lm/W)
				Min	Typical	Max			
BXEM-27E-21H-3A-00-0-0	2700	80	65	2.6	2.7	2.9	27	0.2	156
BXEM-27G-21H-3A-00-0-0	2700	90	65	2.6	2.7	2.9	24	0.2	137
BXEM-30G-21H-3A-00-0-0	3000	90	65	2.6	2.7	2.9	25	0.2	142
BXEM-40E-21H-3A-00-0-0	4000	80	65	2.6	2.7	2.9	29	0.2	170
BXEM-40G-21H-3A-00-0-0	4000	90	65	2.6	2.7	2.9	26	0.2	149
BXEM-57E-21H-3A-00-0-0	5700	80	65	2.6	2.7	2.9	29	0.2	168
BXEM-57G-21H-3A-00-0-0	5700	90	65	2.6	2.7	2.9	26	0.2	148

Notes for Table 2:

1. The last 6 characters (including hyphens '-') refer to flux, forward voltage, and color bins, respectively. "00-0-0" denotes the full distribution of flux, forward voltage, and 7 SDCM color.

   Example: BXEM-27E-21H-3A-00-0-0 refers to the full distribution of flux, forward voltage, and color within a 2700K 7-step ANSI standard chromaticity region with a minimum of 80CRI, 2x1 die configuration, high power, 2.7V typical forward voltage.
2. Product CCT is hot targeted at T_{sp} = 85°C. Nominal CCT as defined by ANSI C78.377-2011.
3. Listed CRIs are minimum values and include test tolerance.
4. Bridgelux maintains a ±7.5% tolerance on luminous flux measurements, ±0.1V tolerance on forward voltage measurements, and ±2 tolerance on CRI measurements for the SMD 3030.
5. Refer to Table 6 and Table 7 for Bridgelux SMD 3030 Luminous Flux Binning and Forward Voltage Binning information.
6. Typical stabilized DC performance values are provided as reference only and are not a guarantee of performance.
7. Typical performance is estimated based on operation under DC (direct current) with LED emitter mounted onto a heat sink with thermal interface material and the solder point 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.
8. Minimum flux values at elevated temperatures are provided for reference only and are not guaranteed by 100% production testing.

Performance at Commonly Used Drive Currents

SMD 3030 LEDs are tested to the specifications shown using the nominal drive currents in Table 1. SMD 3030 may also be driven at other drive currents dependent on specific application design requirements.

Table 3: Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current[1] (mA)	Typical V_f T_{sp} = 25°C (V)	Typical Power T_{sp} = 25°C (W)	Typical Pulsed Flux[2] T_{sp} = 25°C (lm)	Typical DC Flux[3] T_{sp} = 85°C (lm)	Typical Efficacy T_{sp} = 25°C (lm/W)
BXEM-27E-21H-3A-00-0-0	80	150	2.9	0.4	70	64	163
		200	2.9	0.6	91	83	155
		300	3.1	0.9	131	117	142
		350	3.1	1.1	150	132	136
BXEM-27G-21H-3A-00-0-0	90	150	2.9	0.4	59	55	139
		200	2.9	0.6	78	71	133
		300	3.1	0.9	112	100	121
		350	3.1	1.1	128	112	116
BXEM-30G-21H-3A-00-0-0	90	150	2.9	0.4	63	58	148
		200	2.9	0.6	83	76	142
		300	3.1	0.9	118	105	128
		350	3.1	1.1	136	120	124
BXEM-40E-21H-3A-00-0-0	80	150	2.9	0.4	78	71	182
		200	2.9	0.6	101	92	173
		300	3.1	0.9	144	128	156
		350	3.1	1.1	163	144	148
BXEM-40G-21H-3A-00-0-0	90	150	2.9	0.4	67	61	156
		200	2.9	0.6	87	79	149
		300	3.1	0.9	126	112	136
		350	3.1	1.1	140	126	127
BXEM-57E-21H-3A-00-0-0	80	150	2.9	0.4	78	71	182
		200	2.9	0.6	101	92	173
		300	3.1	0.9	144	128	156
		350	3.1	1.1	163	144	148
BXEM-57G-21H-3A-00-0-0	90	150	2.9	0.4	67	61	156
		200	2.9	0.6	87	79	149
		300	3.1	0.9	126	112	136
		350	3.1	1.1	140	126	127

Notes for Table 3:

1. Alternate drive currents in Table 3 are provided for reference only and are not a guarantee of performance.
2. Bridgelux maintains a ± 7.5% 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 4: Electrical Characteristics

Part Number [1]	Drive Current (mA)	Forward Voltage (V) [2,3]			Typical Temperature Coefficient of Forward Voltage $\Delta V_f/\Delta T$ (mV/°C)	Typical Thermal Resistance Junction to Solder Point [4,5] $R_{j\text{-}sp}$ (C/W)
		Minimum	Typical	Maximum		
BXEM-xxx-21H-3A-00-0-0	65	2.6	2.7	2.9	-2.0 to -4.0	12

Notes for Table 4:

1. The last 6 characters (including hyphens '-') refer to flux, forward voltage, and color bins, respectively. "00-0-0" denotes the full distribution of flux, forward voltage, and 7 SDCM color.

   Example: BXEM-27E-21H-3A-00-0-0 refers to the full distribution of flux, forward voltage, and color within a 2700K 7-step ANSI standard chromaticity region with a minimum of 80CRI. 2x1 die configuration, high power, 2.7V typical forward voltage.
2. Bridgelux maintains a tolerance of ± 0.1V on forward voltage measurements. Voltage minimum and maximum values at the nominal drive current are guaranteed by 100% test.
3. Products tested under pulsed condition (10ms pulse width) at nominal drive current where T_{sp} = 25°C.
4. Thermal Resistance values based on 2700K 80CRI product.
5. Thermal resistance value was calculated using total electrical input power; optical power was not subtracted from input power.

Absolute Maximum Ratings

Table 5: Maximum Ratings

Parameter	Maximum Rating
LED Junction Temperature (T_j)	125˚C
Storage Temperature	-40˚C to +100˚C
Operating Solder Point Temperature (T_{Sp})	-40˚C to +100˚C
Soldering Temperature	260˚C or lower for a maximum of 10 seconds
Maximum Drive Current	480mA
Maximum Reverse Voltage[2]	-
Moisture Sensitivity Rating	MSL 3
Electrostatic Discharge	2kV HBM. JEDEC-JS-001-HBM and JEDEC-JS-001-2012

Notes for Table 5:

1. Bridgelux recommends a maximum duty cycle of 10% and pulse width of 10 ms when operating LED SMD at maximum peak pulsed current specified. Maximum peak pulsed currents indicate values where LED SMD can be driven without catastrophic failures.

Product Bin Definitions

Table 6 lists the standard photometric luminous flux bins for Bridgelux SMD 3030 LEDs. Although several bins are outlined, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all CCTs.

Table 6: Luminous Flux Bin Definitions at 65mA, T_{sp}=25˚C

Bin Code	Minimum	Maximum	Unit	Condition
20	20	25	lm	I_F=65mA
25	25	30		
30	30	35		
35	35	40		
40	40	45		
45	45	50		
50	50	55		
55	55	60		

Note for Table 6:

1. Bridgelux maintains a tolerance of ± 7.5% on luminous flux measurements.

Table 7: Forward Voltage Bin Definition at 65mA, T_{sp}=25˚C

Bin Code	Minimum	Maximum	Unit	Condition
P	2.6	2.7	V	I_F=65mA
Q	2.7	2.8		
R	2.8	2.9		

Note for Table 7:

1. Bridgelux maintains a tolerance of ± 0.1V on forward voltage measurements.

Product Bin Definitions

Table 8: 3- and 5-step MacAdam Ellipse Color Bin Definitions

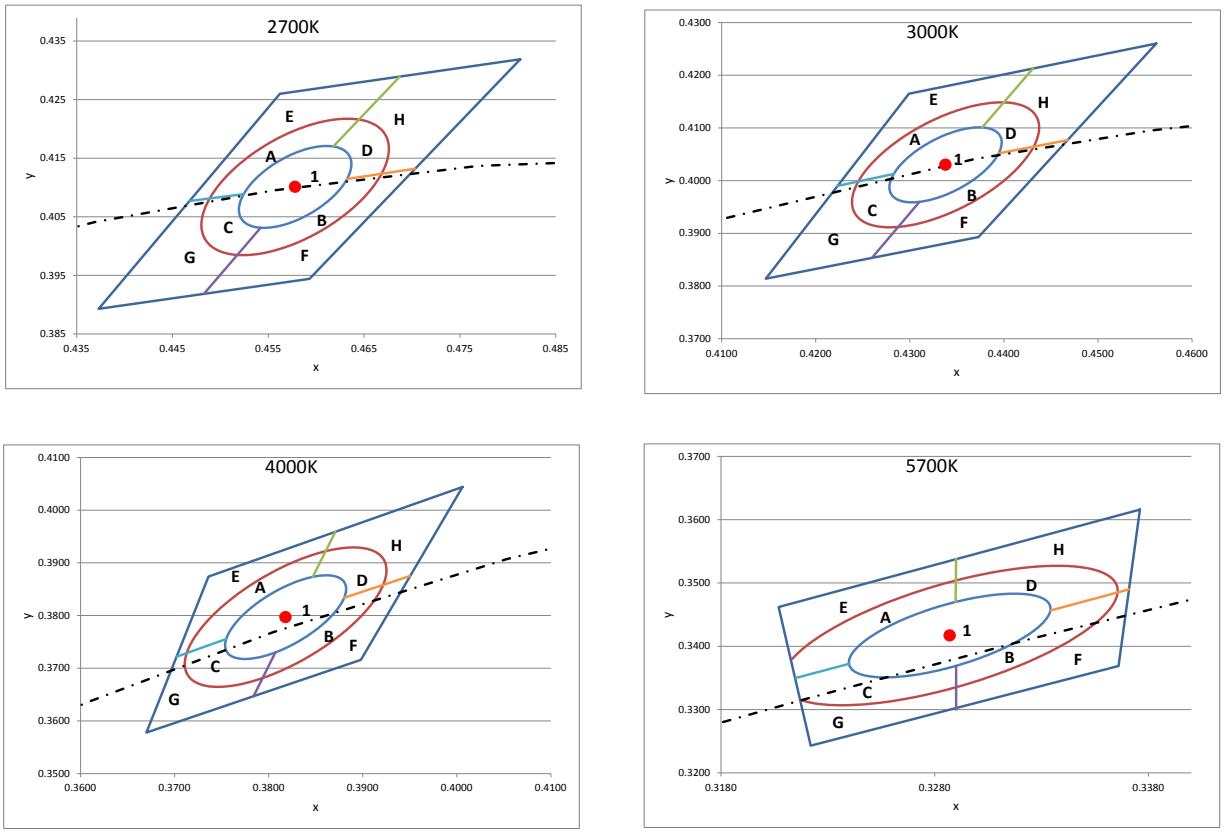
CCT	Color Space	Center Point		Major Axis	Minor Axis	Ellipse Rotation Angle	Color Bin
		X	Y				
2700K	3 SDCM	0.4578	0.4101	0.00810	0.00420	53.70	1
	5 SDCM	0.4578	0.4101	0.01350	0.00700	53.70	1/A/B/C/D
3000K	3 SDCM	0.4338	0.4030	0.00834	0.00408	53.22	1
	5 SDCM	0.4338	0.4030	0.01390	0.00680	53.22	1/A/B/C/D
4000K	3 SDCM	0.3818	0.3797	0.00939	0.00402	53.72	1
	5 SDCM	0.3818	0.3797	0.01565	0.00670	53.72	1/A/B/C/D
5700K	3 SDCM	0.3287	0.3417	0.00746	0.00320	59.09	1
	5 SDCM	0.3287	0.3417	0.01243	0.00533	59.09	1/A/B/C/D

Notes for Table 8:

1. Color binning at T_{sp}=85˚C
2. Bridgelux maintains a tolerance of ± 0.007 on x and y color coordinates in the CIE 1931 color space.

Product Bin Definitions

Figure 1: C.I.E. 1931 Chromaticity Diagram (9 Color Bin Structure, hot-color targeted at T_{sp}=85˚C)



Performance Curves

Figure 2: Drive Current vs. Voltage (T_{sp}=25˚C)

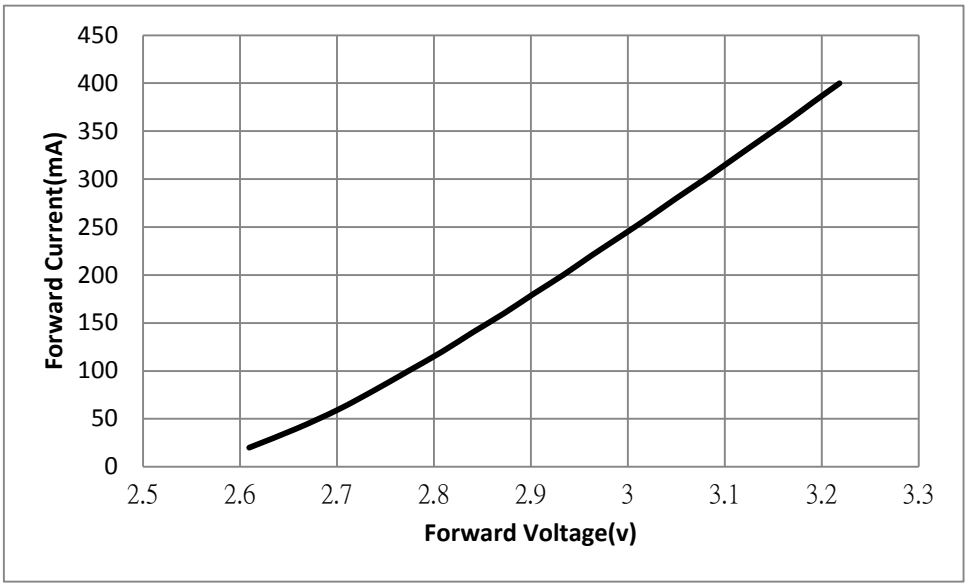
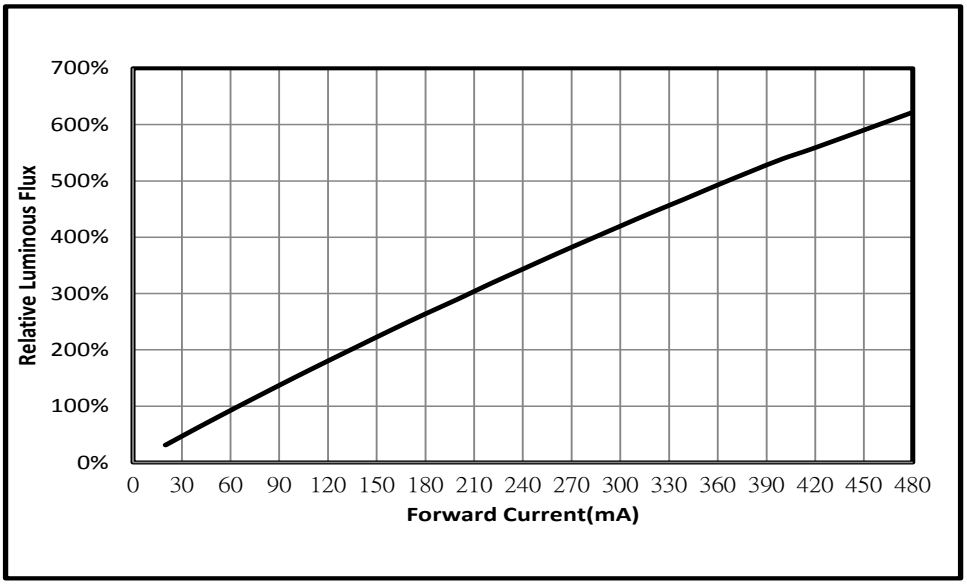


Figure 3: Typical Relative Luminous Flux vs. Drive Current (T_{sp}=25˚C)

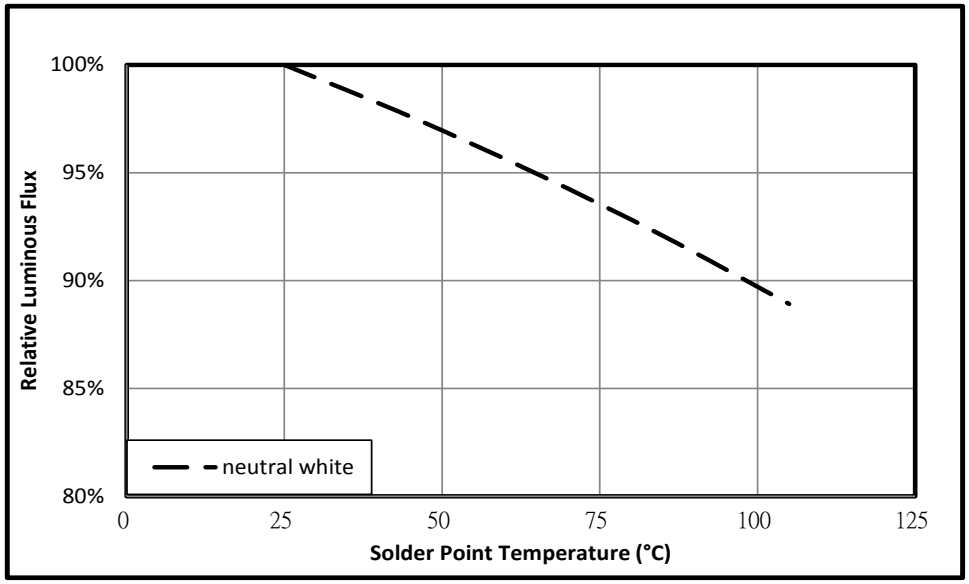


Note for Figure 3:

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.

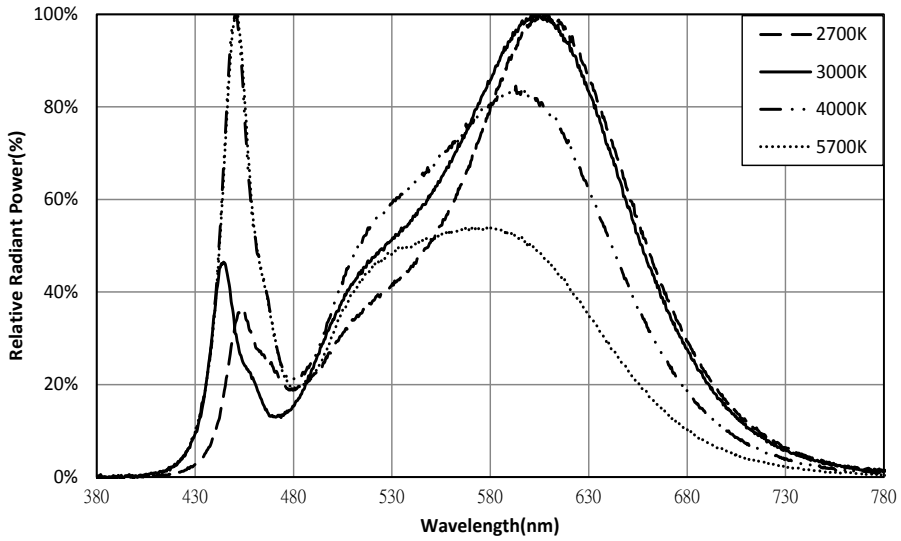
Performance Curves

Figure 4: Typical Relative DC Flux vs. Solder Point Temperature



Typical Color Spectrum

Figure 5: Typical Color Spectrum

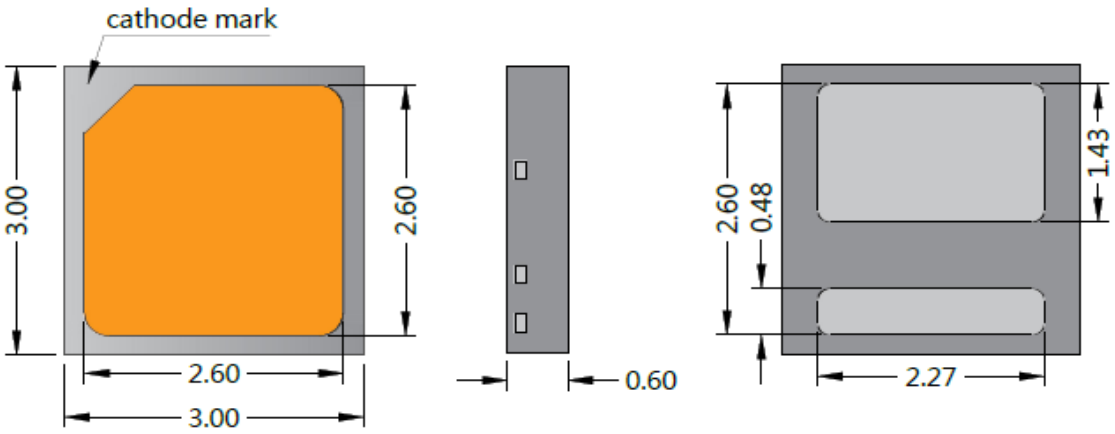


Notes for Figure 5:

1. Color spectra measured at nominal current for T_{sp} = 25˚C

Mechanical Dimensions

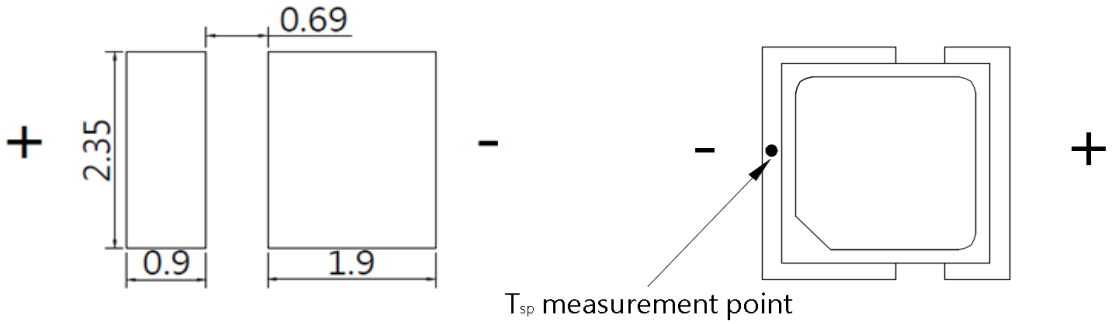
Figure 6: Drawing for SMD 3030



Notes for Figure 6:

1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Unless otherwise specified, tolerances are ± 0.10mm.
4. The optical center of the LED emitter is nominally defined by the mechanical center of the emitter. The light emitting surface (LES) is centered on the mechanical center of the LED emitter to a tolerance of ± 0.2 mm

Recommended PCB Soldering Pad Pattern



Reliability

Table 9: Reliability Test Items and Conditions

No .	Items	Reference Standard	Test Conditions	Drive Current	Test Duration	Units Failed/Tested
1	Moisture/reflow Sensitivity	J-STD-020E	T_{sld} = 260°C, 10sec, Precondition: 85°C, 60%RH, 168hr		3 reflows	0/22
2	Low Temperature Storage	JESD22-A119	T_a=-40°C		1000 hours	0/22
3	High Temperature Storage	JESD22-A103D	T_a=100°C		1000 hours	0/22
4	Low Temperature Operating Life	JESD22-A108D	T_a=-40°C	65mA	1000 hours	0/22
5	Temperature Humidity Operating Life	JESD22-A101C	T_{sp}=85°C, RH=85%	65mA	1000 hours	0/22
6	High Temperature Operating Life	JESD22-A108D	T_{sp}=105°C	480mA	1000 hours	0/22
7	Thermal Shock	JESD22-A106B	T_a=-40°C ~100°C; Dwell : 15min; Transfer: 10sec		200 Cycle	0/22
8	Temperature Cycle	JESD22-A104E	T_a=-40°C ~100°C; Dwell at extreme temperature: 15min; Ramp rate < 105°C/min		200 Cycle	0/22
9	Electrostatic Discharge	JS-001-2012	HBM, 2KV, 1.5kΩ, 100pF, Alternately positive or negative			0/22

Passing Criteria

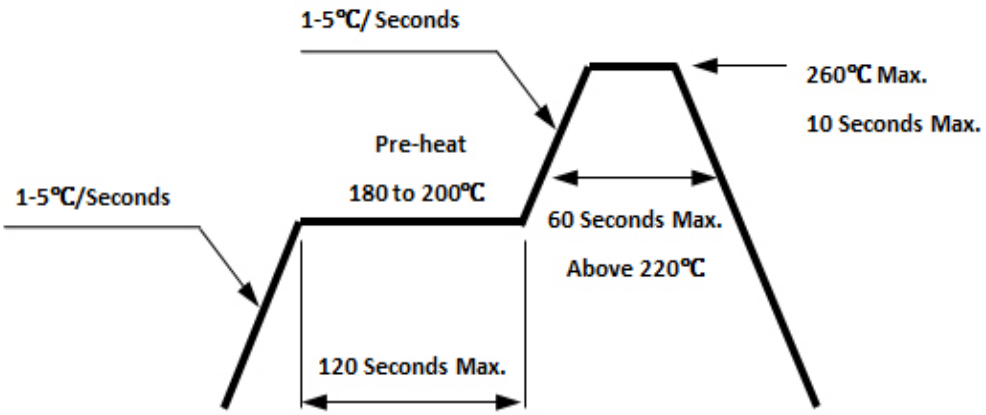
Item	Symbol	Test Condition	Passing Criteria
Forward Voltage	Vf	65mA	ΔVf<10%
Luminous Flux	Iv	65mA	ΔIv<30%
Chromaticity Coordinates	(x, y)	65mA	Δu'v'<0.007

Notes for Table 9:

1. Measurements are performed after allowing the LEDs to return to room temperature
2. T_{sld} : reflow soldering temperature; T_a : ambient temperature

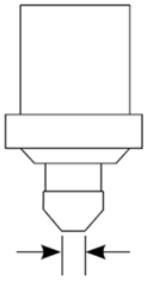
Reflow Characteristics

Figure 7 : Reflow Profile



Profile Feature	Lead Free Assembly
Preheat: Temperature Range	180˚C – 200˚C
Preheat: Time (Maximum)	120 seconds
Peak Temperature	260˚C
Soldering Time (Maximum)	10 seconds
Allowable Reflow Cycles	2

Figure 8 : Pick and Place



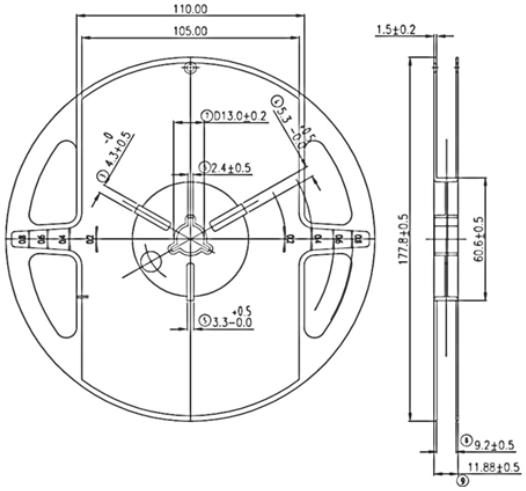
Is greater than LEDs emitting surface

Note for Figure 8:

1. When using a pick and place machine, choose a nozzle that has a larger diameter than the LED's emitting surface. Using a Pick-and-Place nozzle with a smaller diameter than the size of the LEDs emitting surface will cause damage and may also cause the LED to not illuminate.

Packaging

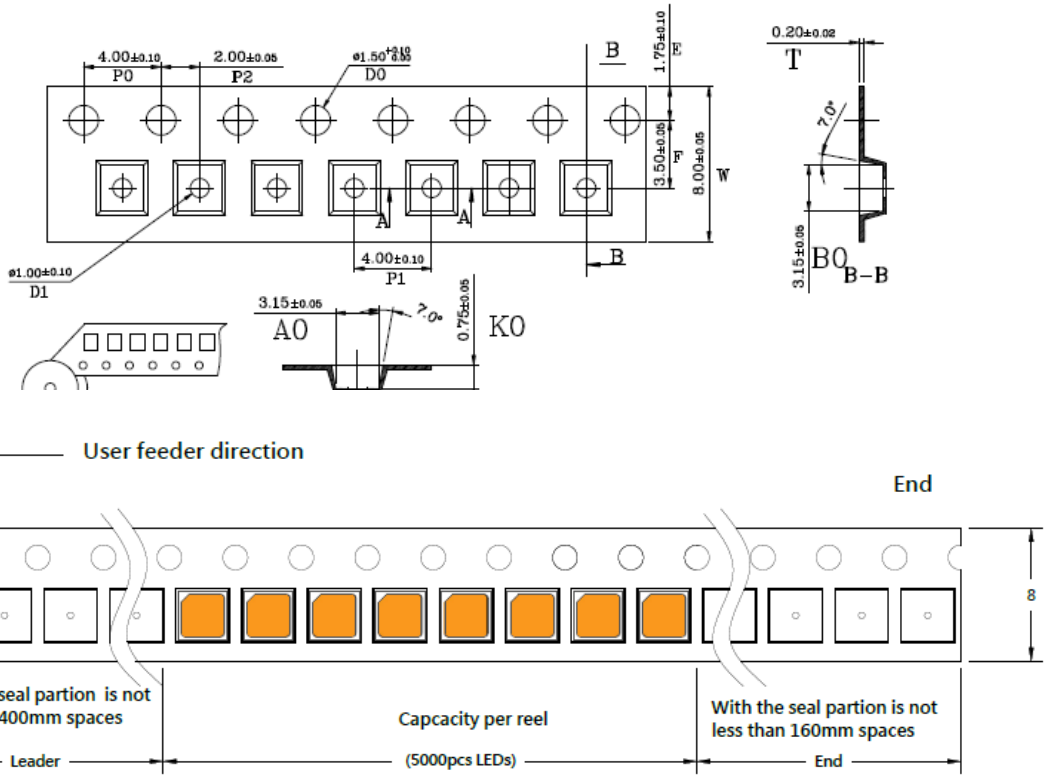
Figure 9: Emitter Reel Drawings



Note for Figure 9:

1. Drawings are not to scale. Drawing dimensions are in millimeters.

Figure 10: Emitter Tape Drawings

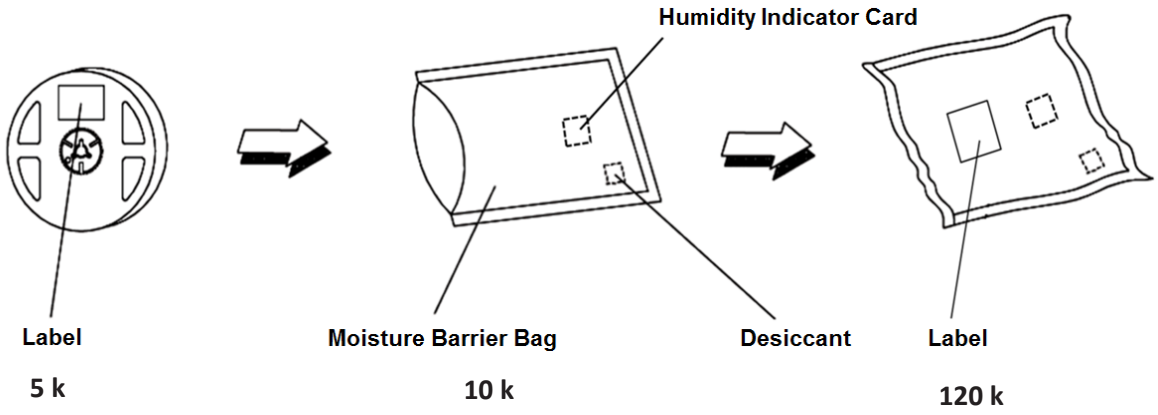


Note for Figure 10:

1. Drawings are not to scale. Drawing dimensions are in millimeters.

Packaging

Figure 11: Emitter Reel Packaging Drawings



Note for Figure 11:

1. Drawings are not to scale.

Design Resources

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.

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 emitter. Please consult Bridgelux Application Note AN51 for additional information.

CAUTION: EYE SAFETY

Eye safety classification for the use of Bridgelux SMD LED emitter is in accordance with IEC specification EN62471: Photobiological Safety of Lamps and Lamp Systems. SMD LED emitters are classified as Risk Group Exempt 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 SMD LED emitter during operation. Allow the array to cool for a sufficient period of time before handling. The SMD LED emitter 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 emitter or apply stress to the LES (yellow phosphor resin area). Contact may cause damage to the emitter

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, LED emitter 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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