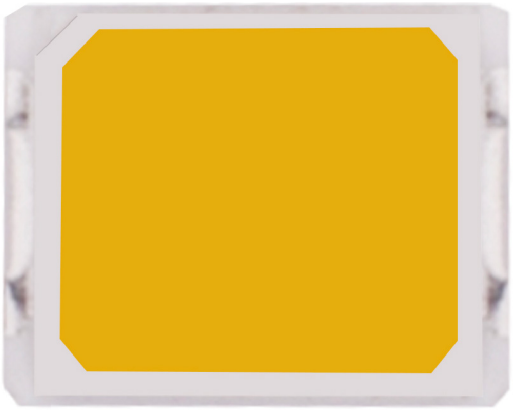


Bridgelux® SMD 2835 0.2W 3V India Tube Light Solution

Product Data Sheet DS67

BXKN-30E | 40E | 50E | 57E | 65E

Introduction

SMD 2835

The Bridgelux SMD 2835 0.2W 3V is ideal for all tube lighting solutions. With few flux bins and wide range of CCT options, the SMD 2835 0.2W 3V provides the unparalleled design-in flexibility for indoor lighting applications. This product is a drop-in replacement emitter with an industry standard 2.8mm x 3.5mm footprint.

Features

- Industry standard 2835 footprint
- Few flux bins for each CCT
- RoHS compliant and lead free
- Multiple CCT configurations for a wide range of lighting applications

Benefits

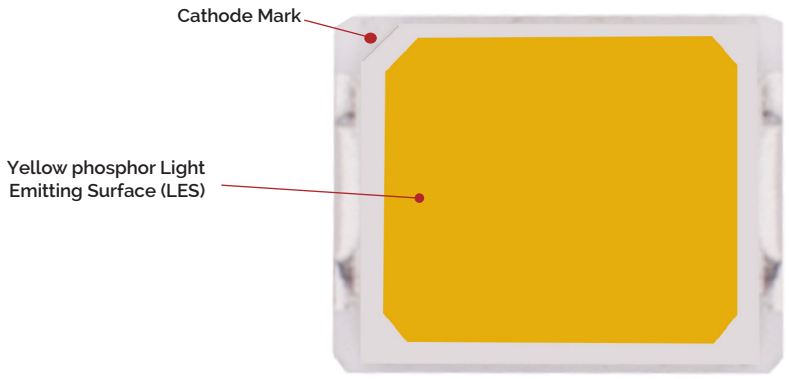
- Lower operating and manufacturing cost
- Best luminance uniformity
- Consistent white light
- Environmentally friendly
- Design flexibility that fulfills different application

Pb free RoHS

Contents

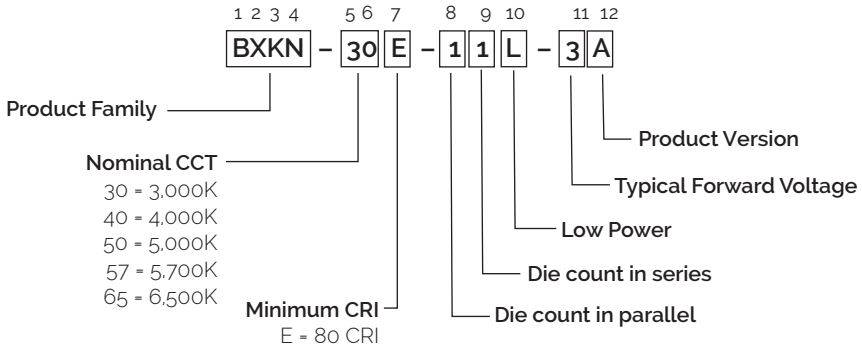
Product Feature Map

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 2835 is explained as follows:



Product Test Conditions

Bridgelux SMD 2835 LEDs are tested and binned with a 10ms pulse of 60mA at Tj (junction temperature)=Tsp (solder point temperature) =25°C. Forward voltage, luminous flux and color are binned at a Tj=Tsp=25°C.

Product Selection Guide

The following product configurations are available:

Table 1: Selection Guide, Pulsed Measurement Data at 60mA (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 Efficacy (lm/W)
				Min	Typical	Max			
BXKN-30E-11L-3A	3000	80	60	2.8	3.1	3.4	26.0	0.2	140
BXKN-40E-11L-3A	4000	80	60	2.8	3.1	3.4	28.0	0.2	151
BXKN-50E-11L-3A	5000	80	60	2.8	3.1	3.4	28.0	0.2	151
BXKN-57E-11L-3A	5700	80	60	2.8	3.1	3.4	28.0	0.2	151
BXKN-65E-11L-3A	6500	80	60	2.8	3.1	3.4	28.0	0.2	151

Table 2: Selection Guide, Stabilized DC Performance (T_{sp} = 85˚C)[7,8]

Part Number[1,6]	Nominal CCT[2] (K)	CRI[3,5]	Nominal Drive Current (mA)	Forward Voltage[5] (V)			Typical DC Flux (lm)[5]	Typical Power (W)	Typical Efficacy (lm/W)
				Min	Typical	Max			
BXKN-30E-11L-3A	3000	80	60	2.7	3.0	3.3	22.9	0.2	129
BXKN-40E-11L-3A	4000	80	60	2.7	3.0	3.3	24.6	0.2	139
BXKN-50E-11L-3A	5000	80	60	2.7	3.0	3.3	24.6	0.2	139
BXKN-57E-11L-3A	5700	80	60	2.7	3.0	3.3	24.6	0.2	139
BXKN-65E-11L-3A	6500	80	60	2.7	3.0	3.3	24.6	0.2	139

Notes for Table 1 & 2:

1. Example: BXKN-30E-11L-3A refers to a 3000K with a minimum of 80CRI, 1x1 die configuration, low power, 3.1V typical forward voltage.
2. Product CCT is targeted at T_{sp} = 25˚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 2835.
6. Refer to Table 5 and Table 6 for Bridgelux SMD 2835 Luminous Flux Binning and Forward Voltage Binning information.
7. Typical stabilized DC performance values are provided as reference only and are not a guarantee of performance.
8. 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.

Electrical Characteristics

Table 3: 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] $R_{j\text{-}sp}$ (°C/W)
		Minimum	Typical	Maximum		
BXKN-xxE-11L-3A	60	2.8	3.1	3.4	-2.1	25

Notes for Table 3:

1. Example: BXKN-30E-11L-3A refers to a 3000K with a minimum of 80CRI, 1x1 die configuration, low power, 3.1V 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 Tsp = 25°C.
4. Thermal resistance value was calculated using total electrical input power; optical power was not subtracted from input power.

Absolute Maximum Ratings

Table 4: Maximum Ratings

Parameter	Maximum Rating
LED Junction Temperature (T_j)	115˚C
Storage Temperature	-40˚C to +105˚C
Operating Solder Point Temperature (T_{Sp})	-40˚C to +85˚C
Soldering Temperature	260˚C or lower for a maximum of 10 seconds
Maximum Drive Current	80mA
Maximum Peak Pulsed Forward Current[1]	150mA
Maximum Reverse Voltage[2]	-5V
Moisture Sensitivity Rating	MSL 3
Electrostatic Discharge	2kV HBM. JEDEC-JS-001-HBM and JEDEC-JS-001-2012

Notes for Table 4:

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 current indicate values where LED SMD can be driven without catastrophic failures.
2. 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.

Product Bin Definitions

Table 5 lists the standard photometric luminous flux bins for Bridgelux SMD 2835 LEDs. Although several bins are listed, product availability in a particular bin varies by production run and by product performance. Not all bins are available in all CCTs.

Table 5: Luminous Flux Bin Definitions at 60mA, T_{sp}=25˚C

Bin Code	Minimum	Maximum	Unit	Condition
A2	21	23	lm	I_F=60mA
A4	23	25		
A6	25	27		
A8	27	29		

Note for Table 5:

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

Table 6: Forward Voltage Bin Definition at 60mA, T_{sp}=25˚C

Bin Code	Minimum	Maximum	Unit	Condition
A	2.8	2.9	V	I_F=60mA
B	2.9	3.0		
C	3.0	3.1		
D	3.1	3.2		
E	3.2	3.3		
F	3.3	3.4		

Note for Table 6:

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

Product Bin Definitions

Table 7: Color Bin Definitions

30-0 (2950-3150K)		30-1 (2900-3050K)		30-2 (2900-3050K)		30-3 (3050-3200K)		30-4 (3050-3200K)	
X	Y	X	Y	X	Y	X	Y	X	Y
0.4364	0.4101	0.4484	0.4209	0.4479	0.4057	0.4352	0.4165	0.4278	0.399
0.4284	0.3909	0.4447	0.4128	0.4427	0.3957	0.4278	0.399	0.4204	0.3814
0.4427	0.3957	0.453	0.4156	0.4355	0.3933	0.4324	0.4005	0.4316	0.3852
0.453	0.4156	0.4479	0.4057	0.4316	0.3852	0.4364	0.4101	0.4355	0.3933
		0.4522	0.4071	0.4428	0.3889	0.4447	0.4128	0.4284	0.3909
		0.4616	0.4253	0.4522	0.4071	0.4484	0.4209	0.4324	0.4005

40-0 (3850-4250K)		40-1 (3750-4050)		40-2 (3750-4050K)		40-3 (4000-4350K)		40-4 (4000-4350K)	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3739	0.3841	0.3844	0.3956	0.3885	0.3853	0.3711	0.3878	0.3678	0.373
0.3695	0.3658	0.3828	0.3897	0.3853	0.3751	0.3678	0.373	0.3645	0.3582
0.3853	0.3751	0.3917	0.3954	0.3774	0.3705	0.3717	0.3749	0.3757	0.3645
0.3917	0.3954	0.3885	0.3853	0.3757	0.3645	0.3739	0.3841	0.3774	0.3705
		0.3926	0.3878	0.3869	0.3707	0.3828	0.3897	0.3695	0.3658
		0.3977	0.4033	0.3926	0.3878	0.3844	0.3956	0.3717	0.3749

50-0 (4750-5250K)		50-1 (4700-5000K)		50-2 (4700-5000K)		50-3 (4950-5300K)		50-4 (4950-5300K)	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3394	0.3617	0.3471	0.372	0.3528	0.3641	0.3383	0.3654	0.3379	0.3531
0.3389	0.3462	0.3467	0.3671	0.3517	0.3555	0.3379	0.3531	0.3374	0.3407
0.3517	0.3555	0.3539	0.3725	0.3452	0.3508	0.3392	0.3539	0.3448	0.3461
0.3539	0.3725	0.3528	0.3641	0.3448	0.3461	0.3394	0.3617	0.3452	0.3508
		0.354	0.365	0.3522	0.3515	0.3467	0.3671	0.3389	0.3462
		0.3558	0.3785	0.354	0.365	0.3471	0.372	0.3392	0.3539

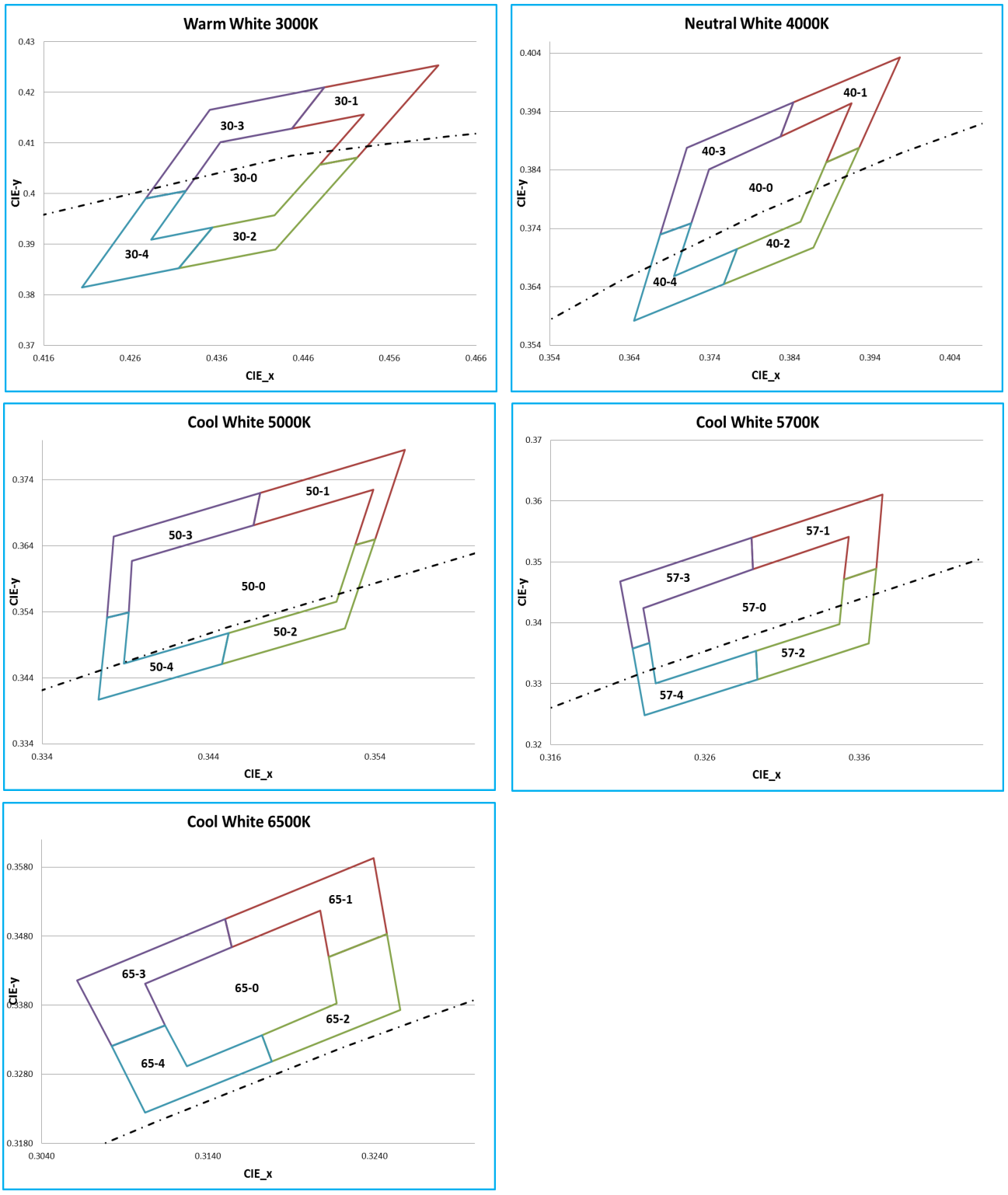
57-0 (5380-5970K)		57-1 (5300-5650K)		57-2 (5300-5650K)		57-3 (5600-6050K)		57-4 (5600-6050K)	
X	Y	X	Y	X	Y	X	Y	X	Y
0.322	0.3424	0.329	0.354	0.3293	0.3354	0.3205	0.3468	0.3213	0.3358
0.3228	0.3301	0.3291	0.3488	0.3294	0.3307	0.3213	0.3358	0.3221	0.3248
0.3347	0.3398	0.3353	0.3541	0.3366	0.3366	0.3224	0.3367	0.3294	0.3307
0.3353	0.3541	0.335	0.3471	0.3371	0.3489	0.322	0.3424	0.3293	0.3354
		0.3371	0.3489	0.335	0.3471	0.3291	0.3488	0.3228	0.3301
		0.3375	0.3611	0.3347	0.3398	0.329	0.354	0.3224	0.3367

65-0 (6000-6550K)		65-1 (5800-6250K)		65-2 (5800-6250K)		65-3 (6250-6750K)		65-4 (6250-6750K)	
X	Y	X	Y	X	Y	X	Y	X	Y
0.3102	0.3411	0.3239	0.3593	0.3178	0.3299	0.315	0.3505	0.3082	0.3321
0.3127	0.3292	0.315	0.3505	0.3172	0.3337	0.3154	0.3464	0.3114	0.3351
0.3217	0.3383	0.3154	0.3464	0.3217	0.3383	0.3102	0.3411	0.3127	0.3292
0.3207	0.3517	0.3207	0.3517	0.3212	0.345	0.3114	0.3351	0.3172	0.3337
		0.3212	0.345	0.3247	0.3483	0.3082	0.3321	0.3178	0.3299
		0.3247	0.3483	0.3255	0.3373	0.3061	0.3416	0.3102	0.3225

Notes for Table 7:
1. Color binning at Tsp=25˚C
2. Bridgelux maintains a tolerance of ± 0.007 on x and y color coordinates in the color space

Product Bin Definitions

Figure 1: C.I.E. 1931 Chromaticity Diagram (color targeted at T_{sp}=25˚C)



Performance Curves

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

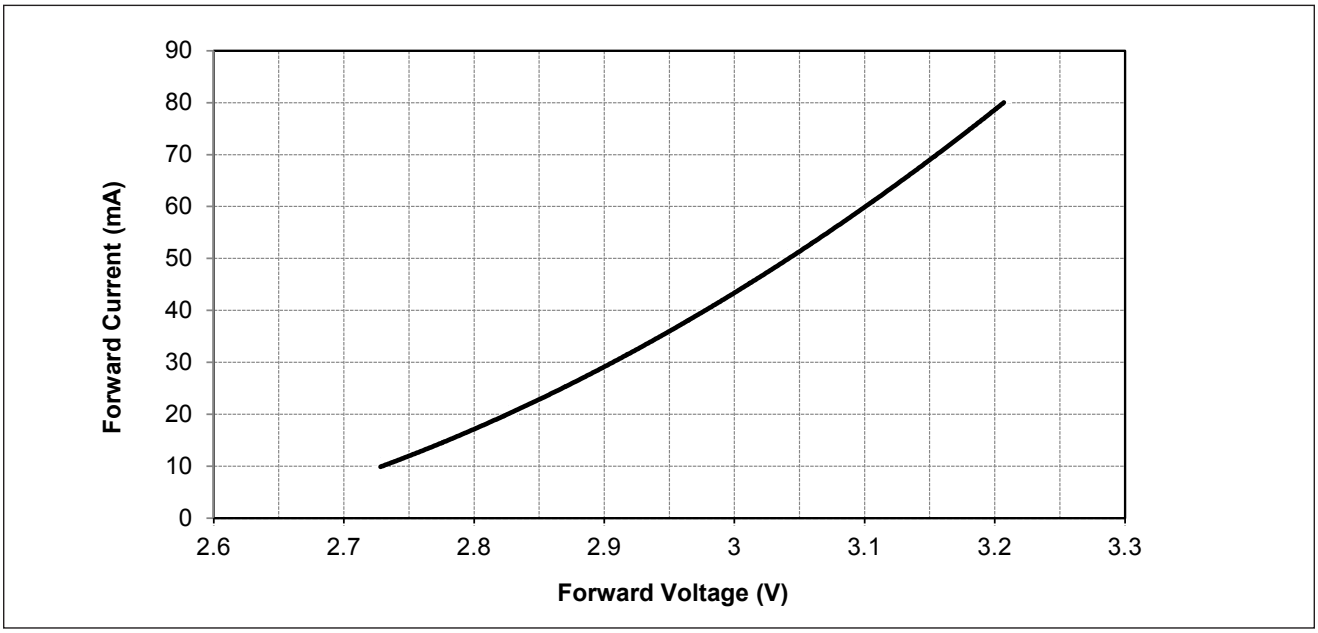
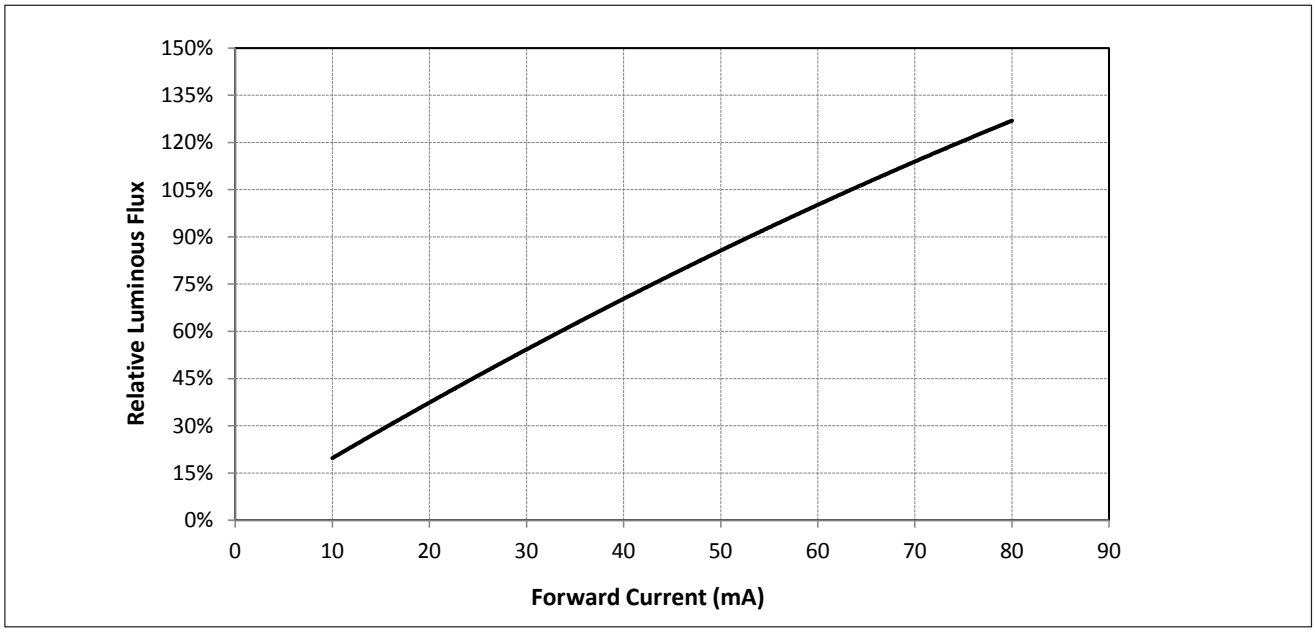


Figure 3: Typical Relative Luminous Flux vs. Drive Current (T_{sp}=25˚C)



Note for Figure 3:

1. Pulse width modulation (PWM) is recommended for dimming effects.

Performance Curves

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

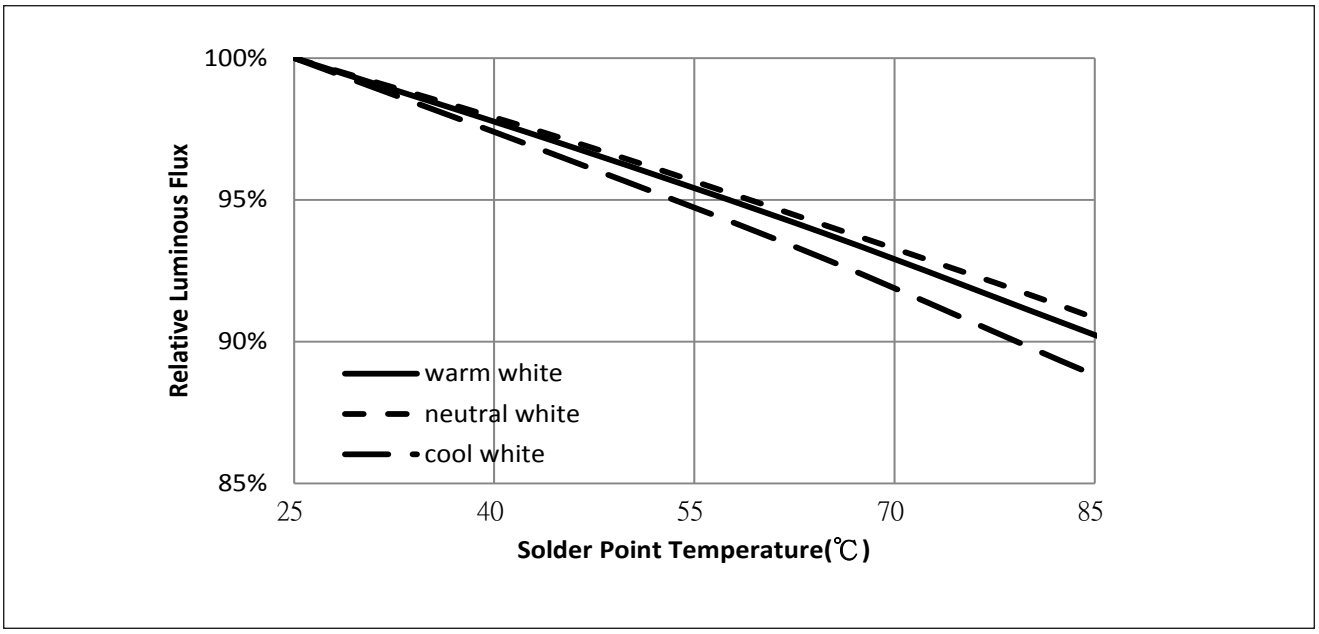
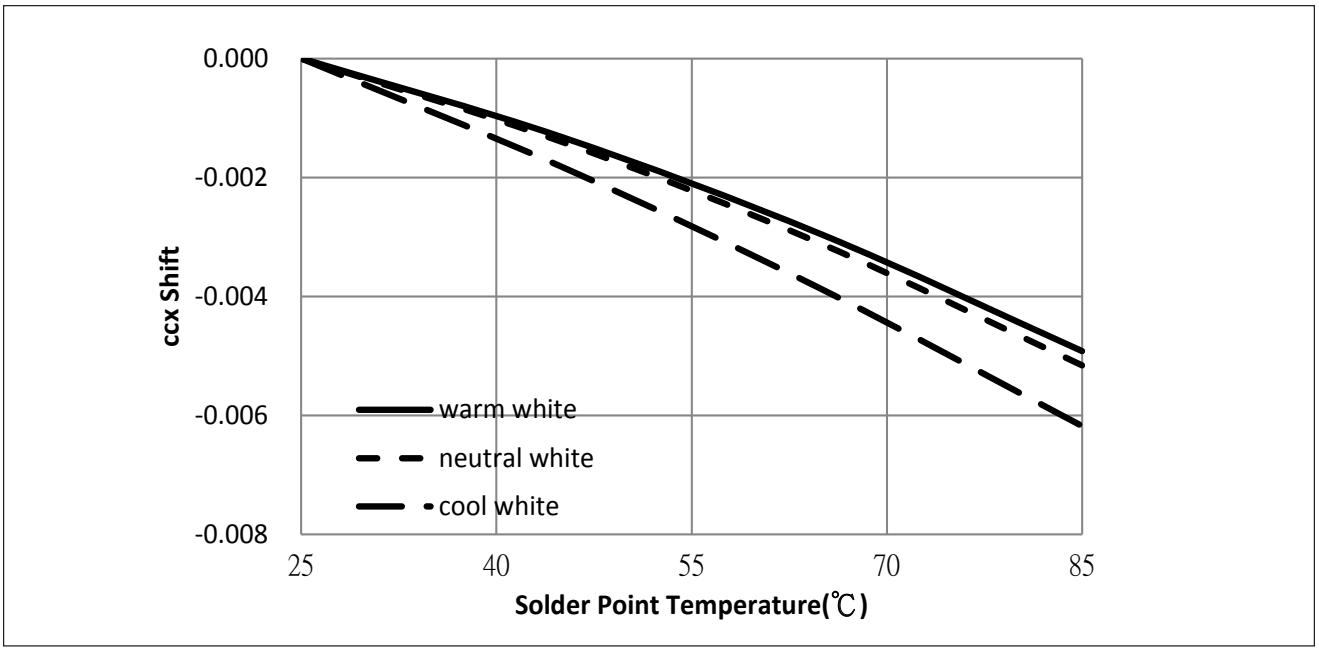


Figure 5: Typical DC ccx Shift vs. Solder Point Temperature

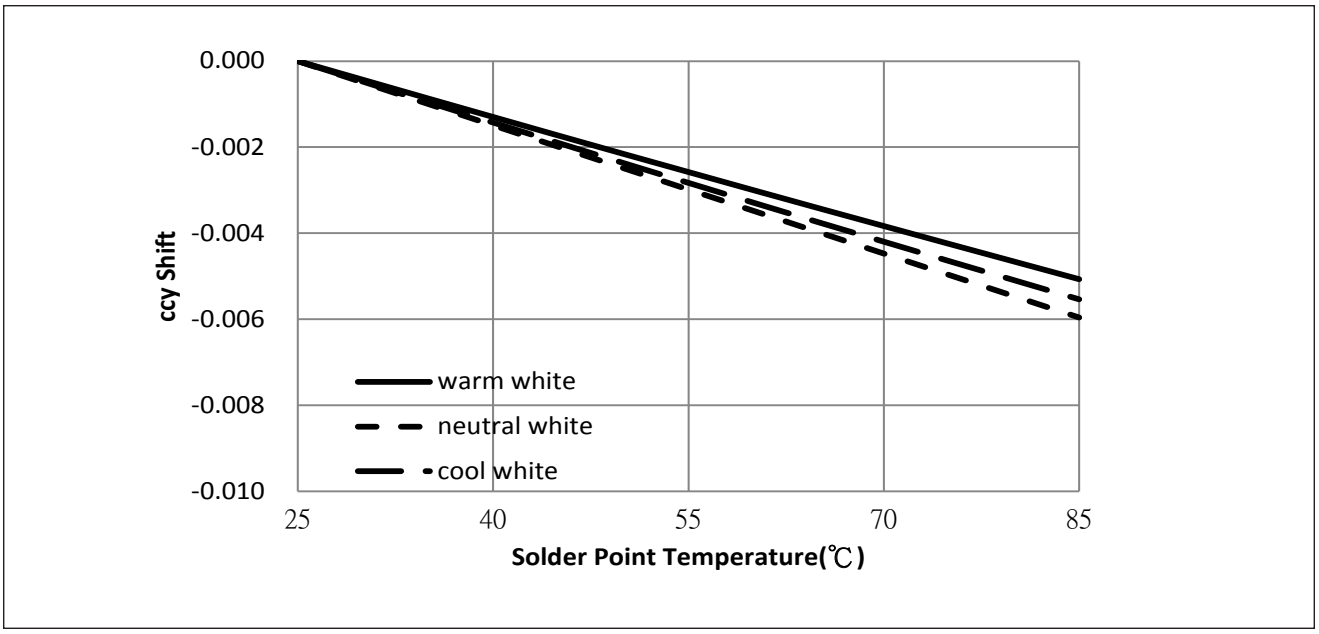


Notes for Figures 4 & 5:

1. Characteristics shown for warm white based on 3000K and 80 CRI.
2. Characteristics shown for neutral white based on 4000K and 80 CRI.
3. Characteristics shown for cool white based on 5000K and 80 CRI.
4. For other color SKUs, the shift in color will vary. Please contact your Bridgelux Sales Representative for more information.

Performance Curves

Figure 6: Typical DC ccy Shift vs. Solder Point Temperature

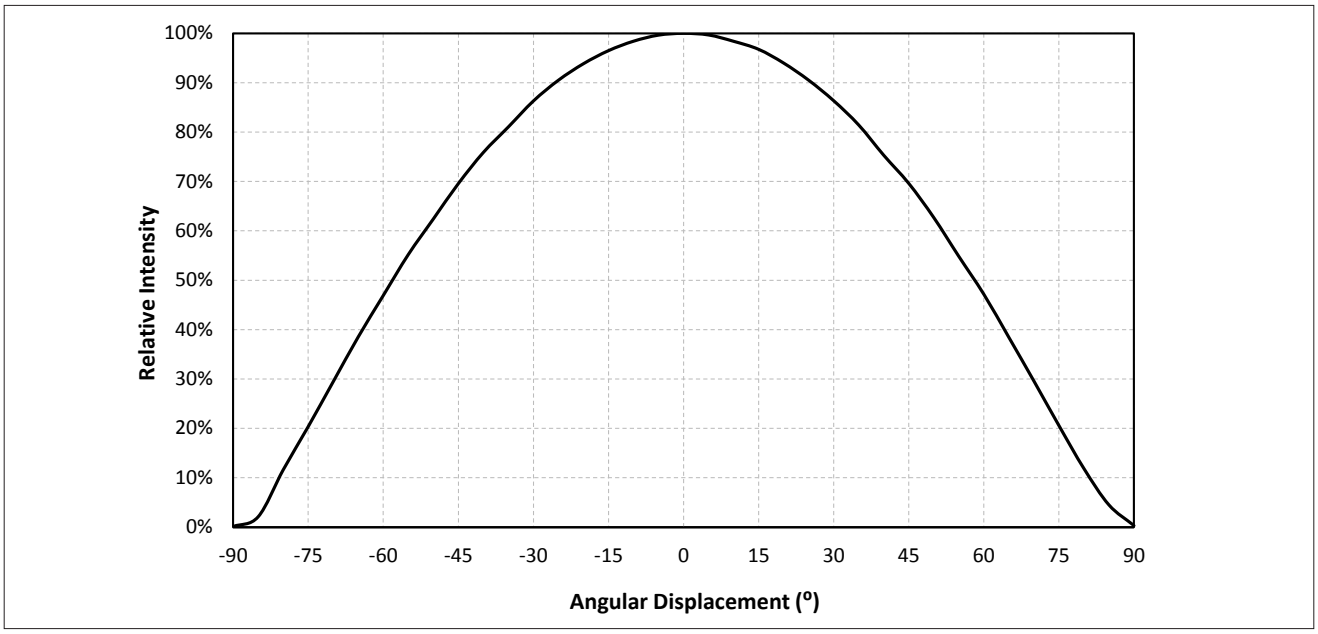


Notes for Figure 6:

1. Characteristics shown for warm white based on 3000K and 80 CRI.
2. Characteristics shown for neutral white based on 4000K and 80 CRI.
3. Characteristics shown for cool white based on 5000K and 80 CRI.
4. For other color SKUs, the shift in color will vary. Please contact your Bridgelux Sales Representative for more information.

Typical Radiation Pattern

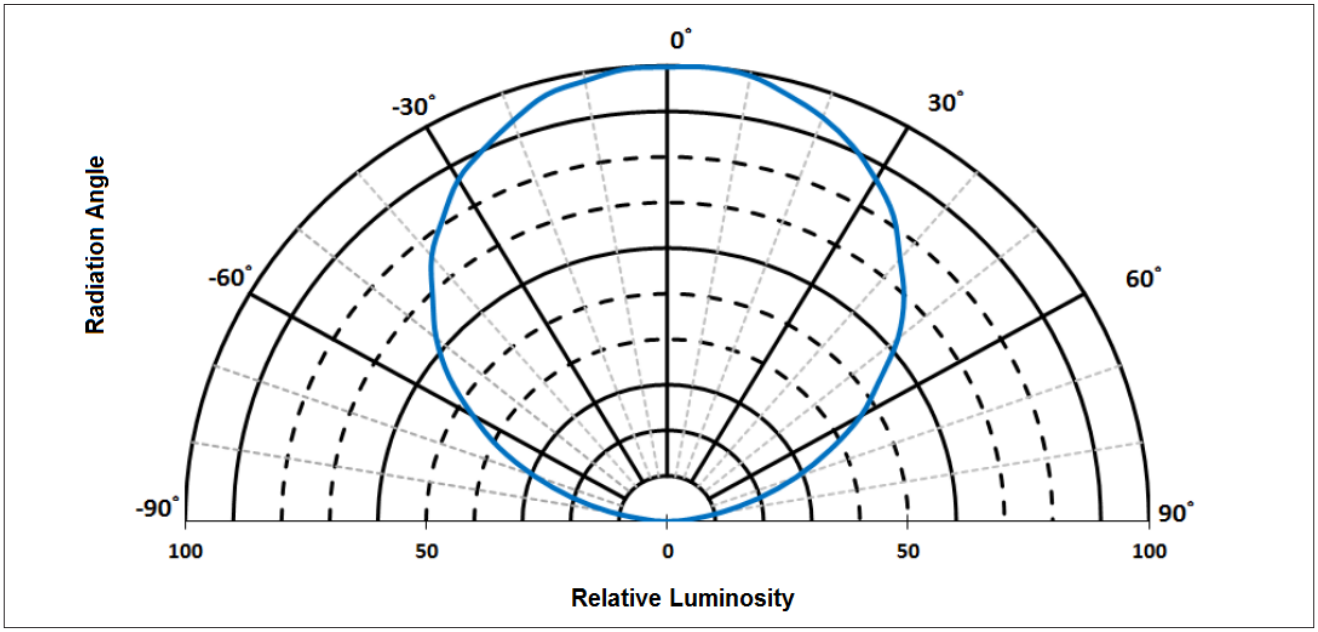
Figure 7: Typical Spatial Radiation Pattern at 60mA, T_{sp}=25°C



Notes for Figure 7:

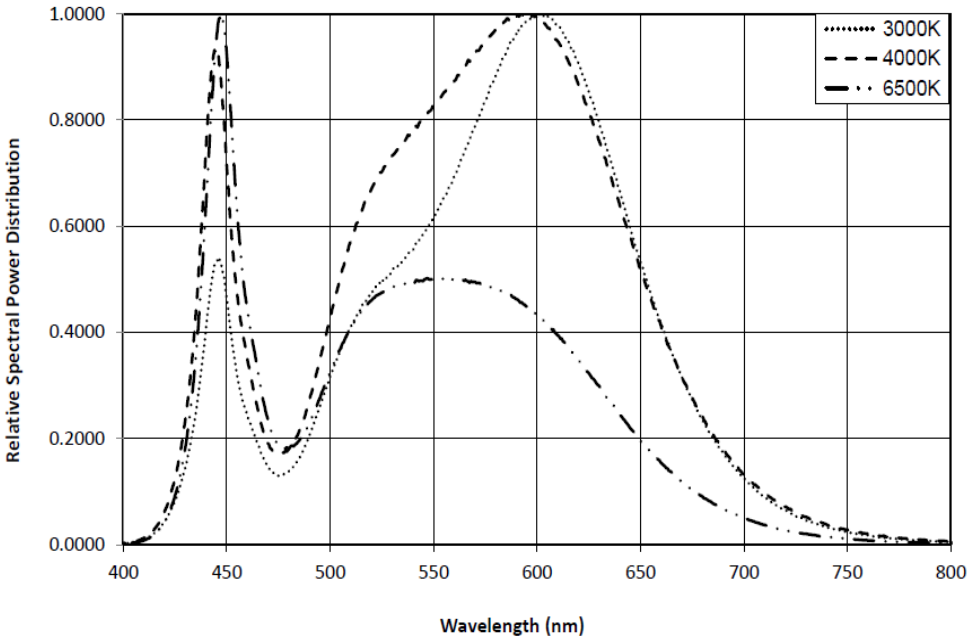
1. Typical viewing angle is 116°.
2. The viewing angle is defined as the off axis angle from the centerline where luminous intensity (Iv) is ½ of the peak value.

Figure 8: Typical Polar Radiation Pattern at 60mA, T_{sp}=25°C



Typical Color Spectrum

Figure 9: Typical Color Spectrum

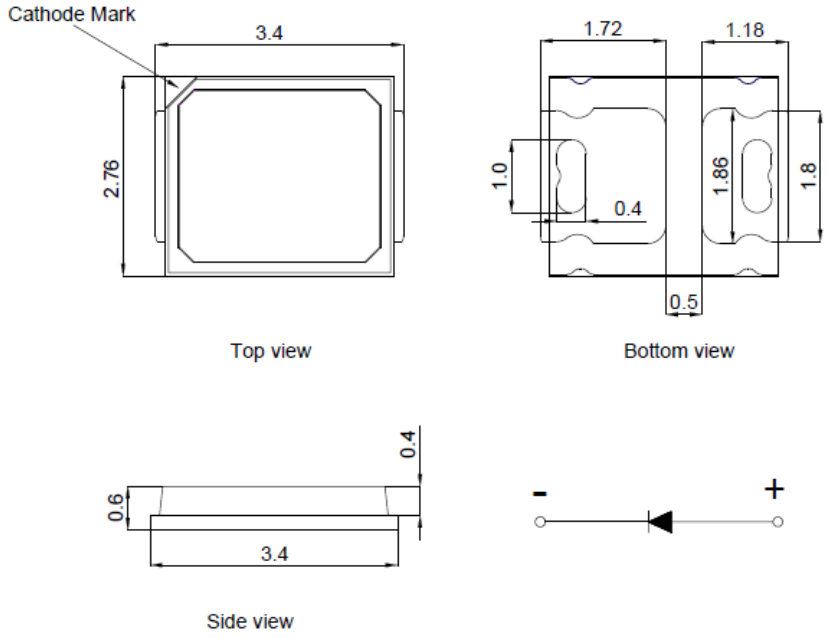


Notes for Figure 9:

1. Color spectra measured at nominal current for Tsp = 25°C
2. Color spectra shown for warm white is 3000K and 80 CRI.
3. Color spectra shown for neutral white is 4000K and 80 CRI.
4. Color spectra shown for cool white is 6500K and 80 CRI

Mechanical Dimensions

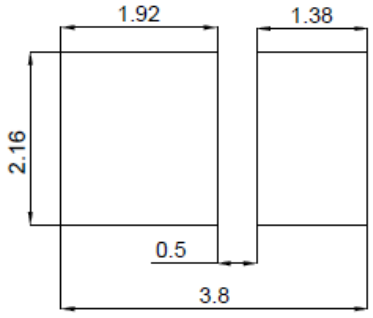
Figure 10: Drawing for SMD 2835



Notes for Figure 10:

1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Unless otherwise specified, tolerances are ± 0.10mm.

Recommended PCB Soldering Pad Pattern



Reliability

Table 8: Reliability Test Items and Conditions

No .	Items	Reference Standard	Test Conditions	Drive Current	Test Duration	Units Failed/Tested
1	High Temperature Operating Life	JESD22-A103D	T_a= 105˚C	80mA	1000 hours	0/22
2	Temperature Humidity Operating Life	JESD22-A101C	T_{sp}=85˚C, RH=85%	60mA	1000 hours	0/22
3	Thermal Shock	JESD22-A106B	T_a=-40˚C ~100˚C; Dwell : 15min; Transfer: 10sec	-	200 cycles	0/22

Passing Criteria

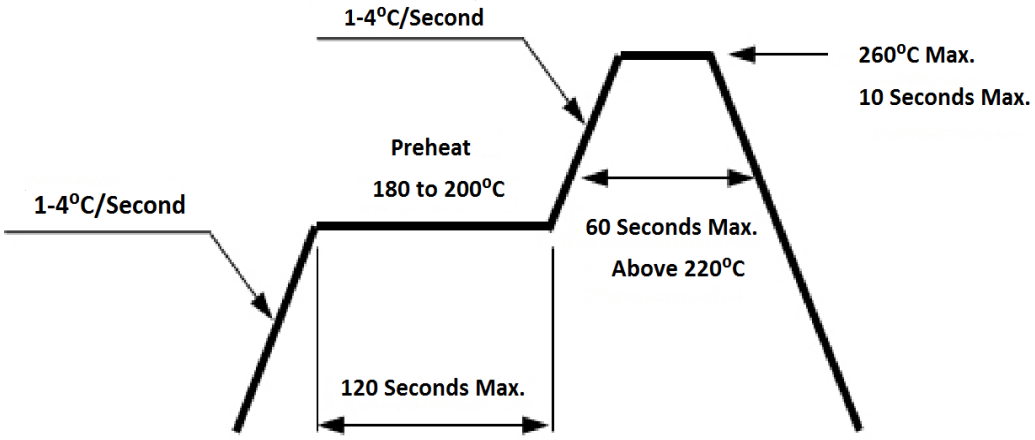
Item	Symbol	Test Condition	Passing Criteria
Forward Voltage	Vf	60mA	ΔVf<10%
Luminous Flux	Fv	60mA	ΔFv<30%
Chromaticity Coordinates	(x, y)	60mA	Δu'v'<0.007

Notes for Table 8:

1. Measurements are performed after allowing the LEDs to return to room temperature
2. T_a : ambient temperature

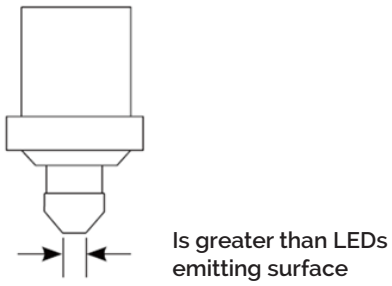
Reflowing Characteristics

Figure 11 : 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 12 : Pick and Place

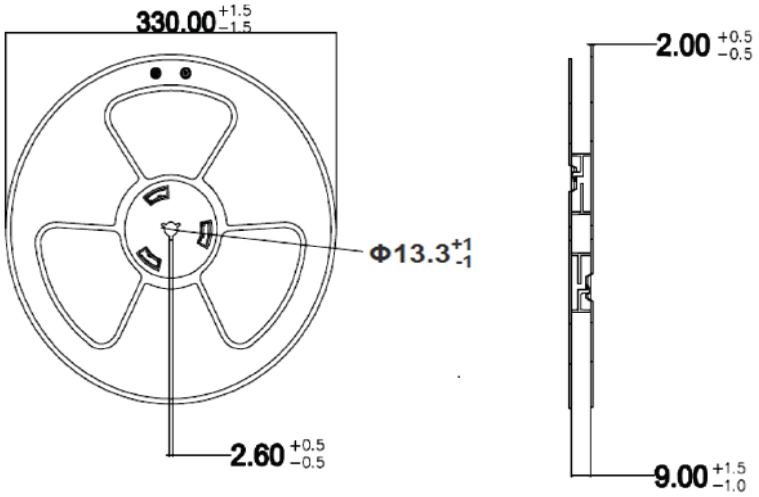


Note for Figure 12:

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

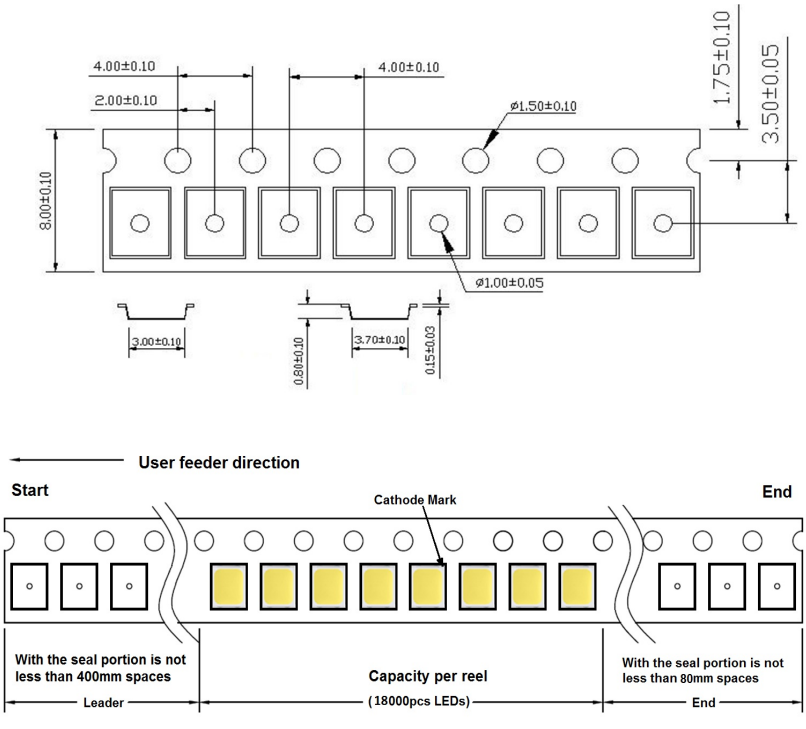
Figure 13: Emitter Reel Drawings



Note for Figure 13:

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

Figure 14: Emitter Tape Drawings

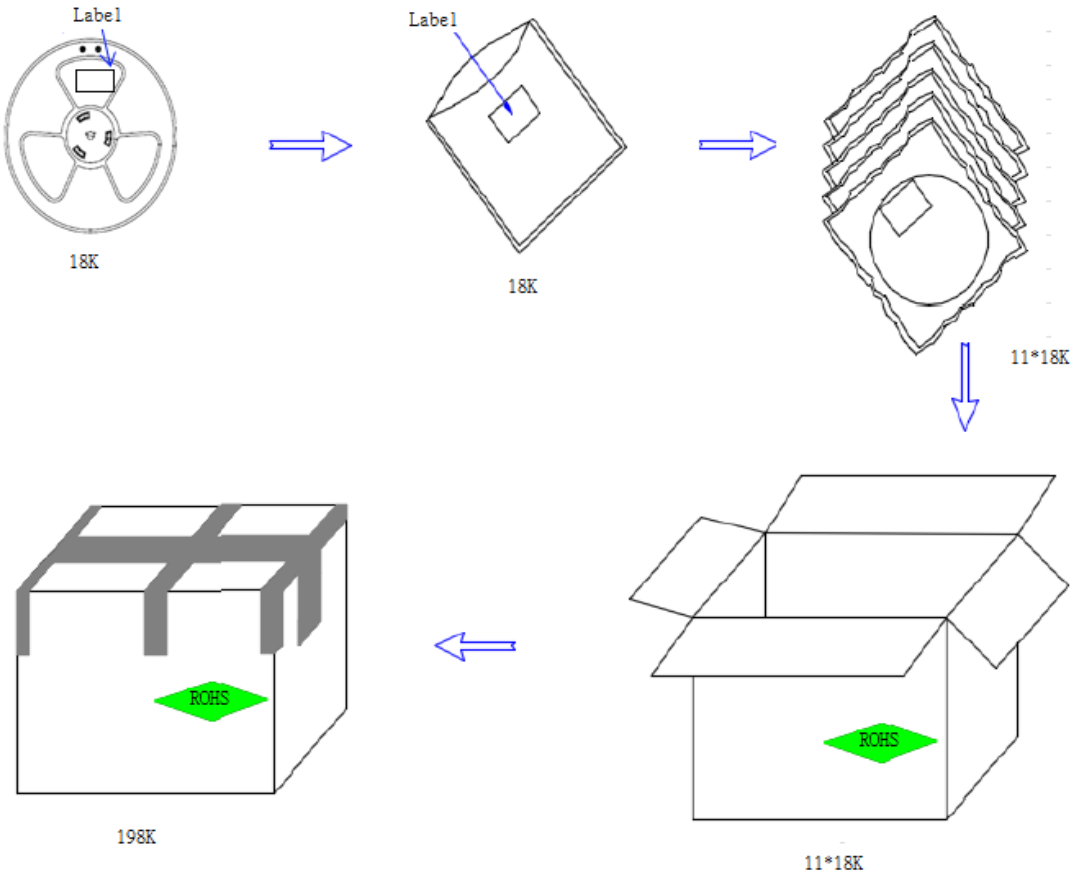


Note for Figure 14:

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

Packaging

Figure 15: Emitter Reel Packaging Drawings



Note for Figure 15:

1. Drawings are not to scale.

Design Resources

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 2835 LED emitters 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 SMD LED emitter during operation. Allow the emitter 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: 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
twitter.com/Bridgelux
facebook.com/Bridgelux
WeChat ID: BridgeluxInChina

46430 Fremont Boulevard
Fremont, CA 94538 USA
Tel (925) 583-8400
Fax (925) 583-8401
www.bridgelux.com