

Bridgelux® SMD 2835 0.2W 3V

BXVN-XXE-21L-3FJ Product Data Sheet

Introduction

SMD 2835



The Bridgelux SMD 2835 Low power LED is cold-color targeted, which ensures that the LEDs fall within their specified color bin at the typical application conditions of 25°C. With its broad lumen coverage and wide range of CCT options, the SMD 2835 provides unparalleled design-in flexibility for indoor and outdoor lighting applications. The SMD 2835 is ideal as a drop-in replacement for emitters with an industry standard 2.8mm x 3.5mm footprint.

Features

- Industry-standard 2835 footprint
- 7 bin color control enables tight color control
- Cold-color targeting ensures that color is within the ANSI bin at the typical application conditions of 25°C
- Enables 3- and 6-step MacAdam ellipse custom binning kits
- RoHS compliant and lead free
- Multiple CCT 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

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Product Selection Guide

The following product configurations are available:

Table 1: Selection Guide, Pulsed Measurement Data at 60mA ($T_j = T_{sp} = 25^\circ\text{C}$)

Part Number ^{1,6}	Nominal CCT ² (K)	CRI ^{3,5}	Nominal Drive Current (mA)	Forward Voltage (V)			Typical Pulsed flux (lm)		
				Min	Typical	Max	Min	Typical	Max
BXVN-27E-21L-3FJ-000-00-00-0	2700K	80	60	2.7	2.81	3.2	29.0	29.9	32.0
BXVN-30E-21L-3FJ-000-00-00-0	3000K	80	60	2.7	2.81	3.2	30.0	30.5	32.5
BXVN-35E-21L-3FJ-000-00-00-0	3500K	80	60	2.7	2.81	3.2	31.0	31.6	34.0
BXVN-40E-21L-3FJ-000-00-00-0	4000K	80	60	2.7	2.81	3.2	32.0	32.2	35.0
BXVN-50E-21L-3FJ-000-00-00-0	5000K	80	60	2.7	2.81	3.2	32.0	32.8	35.0
BXVN-57E-21L-3FJ-000-00-00-0	5700K	80	60	2.7	2.81	3.2	32.0	32.8	35.0
BXVN-65E-21L-3FJ-000-00-00-0	6500K	80	60	2.7	2.81	3.2	32.0	32.1	35.0

Notes for Table 1:

- The last 7 characters "00-00-0" (including hyphens '-') refer to flux bins, forward voltage bins, and color bin options, respectively.
Example: "BXVN-30E-21L-3FJ-AFF-1R-A3-U" refers to specific flux bin of "1R" (29-31lm), specific VF bin of "A3" (2.9-3.0V) and specific color bin of "U"(3-step) for the short ordering PN of "BXVN-30E-21L-3FJ-AFF", which means full distribution of flux, forward voltage, and color within a 3000K 6-step ANSI standard chromaticity region with a minimum of 80CRI, 2x1 die configuration, Low power, 3V typical forward voltage.
- Product CCT is targeted at $T_{sp} = 25^\circ\text{C}$. Nominal CCT as defined by ANSI C78.377-2011.
- Listed CRIs are minimum values and include test tolerance.
- Products tested under pulsed condition (10ms pulse width) at nominal drive current where $T_j = T_{sp} = 25^\circ\text{C}$.
- Bridgelux maintains a $\pm 7.5\%$ tolerance on luminous flux measurements, $\pm 0.1\text{V}$ tolerance on forward voltage measurements, and ± 2 tolerance on CRI measurements for the SMD 2835.
- Refer to Table 5 and Table 6 for Bridgelux SMD 2835 Luminous Flux Binning and Forward Voltage Binning information.
- Typical pulsed test performance values are provided as reference only and are not a guarantee of performance.
- Ask your sales representative for detailed ordering codes for different binning variations if needed.

Electrical Characteristics

Table 2: 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-sp} (°C/W)
		Minimum	Typical	Maximum		
BXVN-XXE-21L-3FJ-000-00-00-0	60	2.7	2.81	3.2	-1.06	9.9

Notes for Table 2:

- The last 7 characters "00-00-0" (including hyphens '-') refer to flux bins, forward voltage bins, and color bin options, respectively.
Example: "BXVN-30E-21L-3FJ-AFF-1R-A3-U" refers to specific flux bin of "1R" (29-31lm), specific VF bin of "A3" (2.9-3.0V) and specific color bin of "U"(3-step) for the short ordering PN of "BXVN-30E-21L-3FJ-AFF", which means full distribution of flux, forward voltage, and color within a 3000K 6-step ANSI standard chromaticity region with a minimum of 80CRI, 2x1 die configuration, Low power, 3V typical forward voltage.
- Bridgelux maintains a tolerance of $\pm 0.1V$ on forward voltage measurements. Voltage minimum and maximum values at the nominal drive current are guaranteed by 100% test.
- Products tested under pulsed condition (10ms pulse width) at nominal drive current where $T_{sp} = 25^{\circ}C$.
- Thermal resistance value was calculated using total electrical input power; optical power was not subtracted from input power.
- Ask your sales representative for detailed ordering codes for different binning variations if needed.

Absolute Maximum Ratings

Table 3: Maximum Ratings

Parameter	Maximum Rating
LED Junction Temperature (T_j)	125°C
Storage Temperature	-40 to +85°C
Ambient / Operating Temperature	-40 to +85°C
Soldering Temperature	260°C or lower for a maximum of 10 seconds
Maximum Drive Current	180mA
Maximum Peak Pulsed Forward Current ¹	360mA
Maximum Reverse Voltage ²	-
Moisture Sensitivity Rating	MSL3

Notes for Table 3:

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. no rating is provided

Product Bin Definitions

Table 4: 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 4: Luminous Flux Bin Definitions at 60mA, $T_{sp}=25^{\circ}\text{C}$

Bin Code	Minimum	Maximum	Unit	Condition
1R	29	31	lm	IF=60mA
1S	31	33		
1T	33	35		

Note for Table 4:

1. Bridgelux maintains a tolerance of $\pm 7.5\%$ on luminous flux measurements.

Table 5: Forward Voltage Bin Definition at 60mA, $T_{sp}=25^{\circ}\text{C}$

Bin Code	Minimum	Maximum	Unit	Condition
A1	2.7	2.8	V	IF=60mA
A2	2.8	2.9		
A3	2.9	3		
A4	3	3.1		
A5	3.1	3.2		

Note for Table 5:

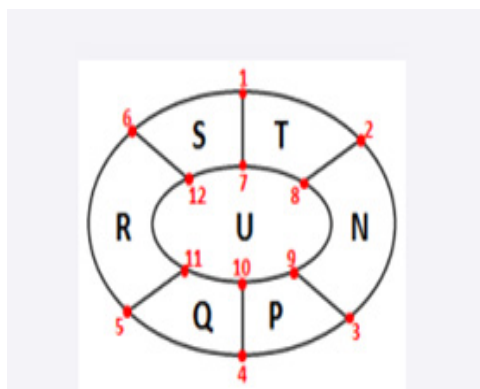
1. Bridgelux maintains a tolerance of $\pm 0.1\text{V}$ on forward voltage measurements.

Product Bin Definitions

Table 6: Color Bin Definitions

CCT	Color Space	Center Point		Major Axis	Minor Axis	Ellipse Rotation Angle	Color Bin
		X	Y				
2700K	3SDCM	0.4578	0.4101	0.0081	0.0042	53.7	U/S/T/N/P/Q/R
	6SDCM	0.4578	0.4101	0.0162	0.0084	53.7	
3000K	3SDCM	0.4338	0.403	0.0083	0.0041	53.22	U/S/T/N/P/Q/R
	6SDCM	0.4338	0.403	0.0166	0.0082	53.22	
3500K	3SDCM	0.4073	0.3917	0.0093	0.0041	54	U/S/T/N/P/Q/R
	6SDCM	0.4073	0.3917	0.0186	0.0082	54	
4000K	3SDCM	0.3818	0.3797	0.0094	0.004	53.72	U/S/T/N/P/Q/R
	6SDCM	0.3818	0.3797	0.0188	0.008	53.72	
5000K	3SDCM	0.3447	0.3553	0.0082	0.0035	59.62	U/S/T/N/P/Q/R
	6SDCM	0.3447	0.3553	0.0164	0.007	59.62	
5700K	3SDCM	0.3287	0.3417	0.0075	0.0032	59.1	U/S/T/N/P/Q/R
	6SDCM	0.3287	0.3417	0.015	0.0064	59.1	
6500K	3SDCM	0.3123	0.3282	0.0067	0.0029	58.57	U/S/T/N/P/Q/R
	6SDCM	0.3123	0.3282	0.0134	0.0058	58.57	

Region	2700K		3000K		3500K		4000K		5000K		5700K		6500K	
	x	y	x	y	x	y	x	y	x	y	x	y	x	y
1	0.4507	0.4146	0.4272	0.4078	0.4005	0.3963	0.3754	0.3844	0.3385	0.3588	0.3232	0.345	0.3072	0.3313
2	0.4625	0.4239	0.4389	0.4169	0.4133	0.4071	0.3882	0.3953	0.349	0.3694	0.3326	0.3544	0.3159	0.3396
3	0.4694	0.4197	0.4458	0.4122	0.4201	0.4027	0.3947	0.3905	0.3549	0.3661	0.3382	0.3514	0.3209	0.3365
4	0.4647	0.4054	0.4405	0.3983	0.4141	0.3871	0.3882	0.375	0.3509	0.3519	0.3342	0.3384	0.3174	0.3252
5	0.4531	0.3963	0.4284	0.389	0.401	0.3762	0.3754	0.3641	0.3405	0.3413	0.3249	0.329	0.3087	0.3167
6	0.4462	0.4005	0.4219	0.3938	0.3945	0.3807	0.3689	0.3687	0.3346	0.3447	0.3192	0.3321	0.3037	0.3198
7	0.4544	0.4126	0.4305	0.4054	0.404	0.3941	0.3786	0.3821	0.3417	0.3571	0.326	0.3434	0.3098	0.3297
8	0.4603	0.417	0.4364	0.41	0.4104	0.3994	0.385	0.3874	0.3468	0.3623	0.3307	0.3481	0.3141	0.3339
9	0.4636	0.4145	0.4397	0.4075	0.4137	0.397	0.3882	0.3851	0.3498	0.3605	0.3334	0.3464	0.3166	0.3324
10	0.4612	0.4076	0.4371	0.4005	0.4106	0.3893	0.385	0.3773	0.3477	0.3535	0.3314	0.3401	0.3148	0.3267
11	0.4553	0.4032	0.4311	0.396	0.4042	0.384	0.3786	0.372	0.3426	0.3483	0.3267	0.3353	0.3105	0.3225
12	0.452	0.4057	0.4279	0.3984	0.4009	0.3864	0.3754	0.3743	0.3396	0.35	0.324	0.3369	0.308	0.324

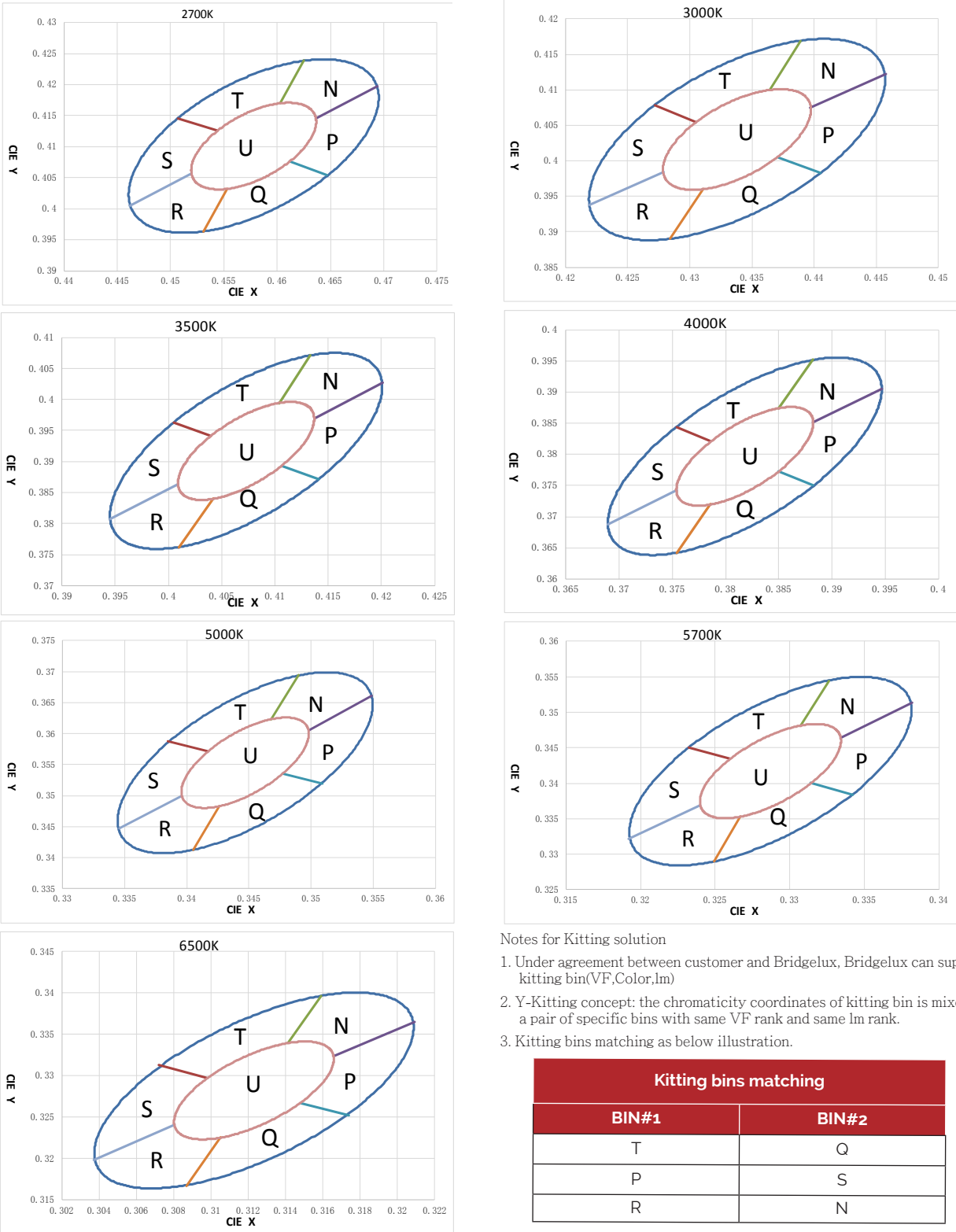


Notes for Table 6:

1. Color binning at $T_{sp} = 25^{\circ}\text{C}$
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 (7 Color Bin Structure, at $T_{sp}=25^{\circ}\text{C}$)



Performance Curves

Figure 2: Drive Current vs. Voltage ($T_{sp}=25^{\circ}\text{C}$)

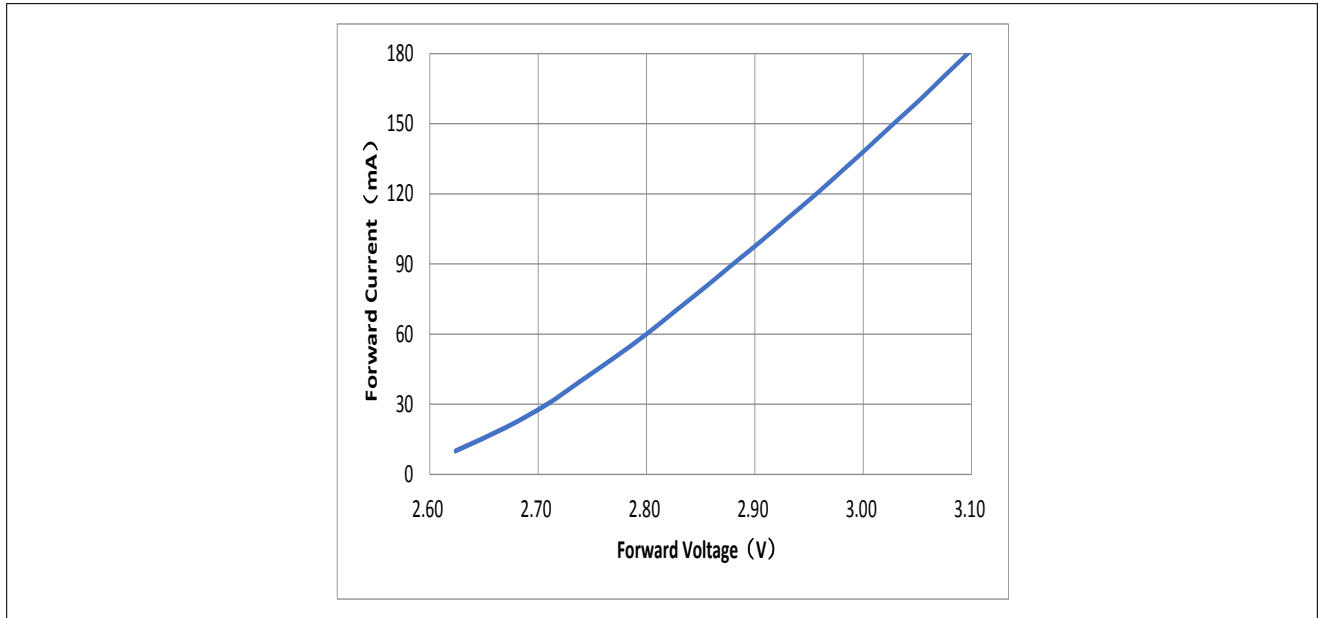
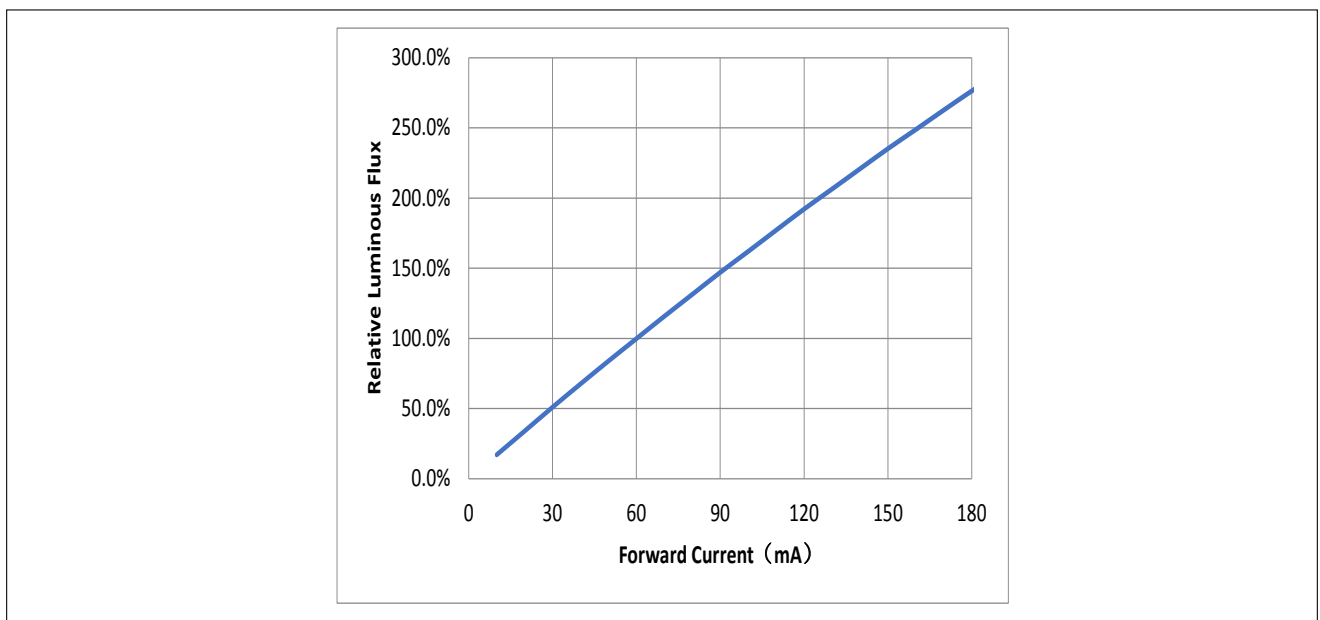


Figure 3: Typical Relative Luminous Flux vs. Drive Current ($T_{sp}=25^{\circ}\text{C}$)



Note for Figure 3:

1. Bridgelux does not recommend driving Low 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 Flux vs. Solder Point Temperature

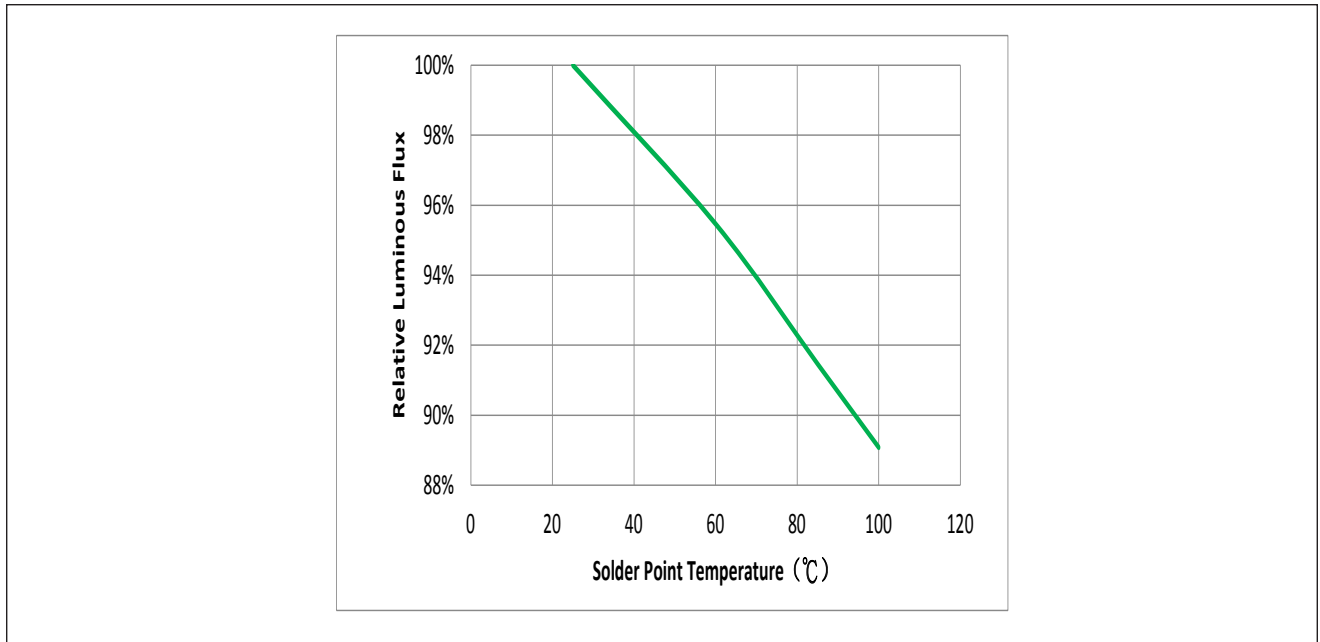
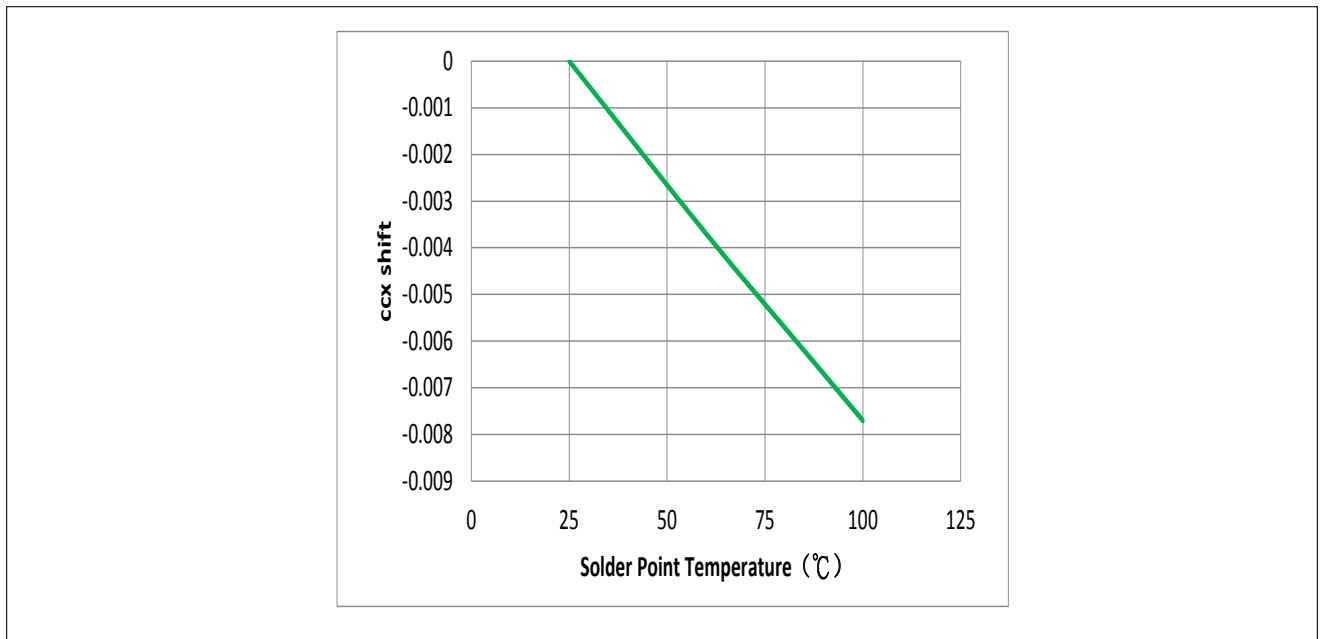


Figure 5: Typical ccx Shift vs. Solder Point Temperature

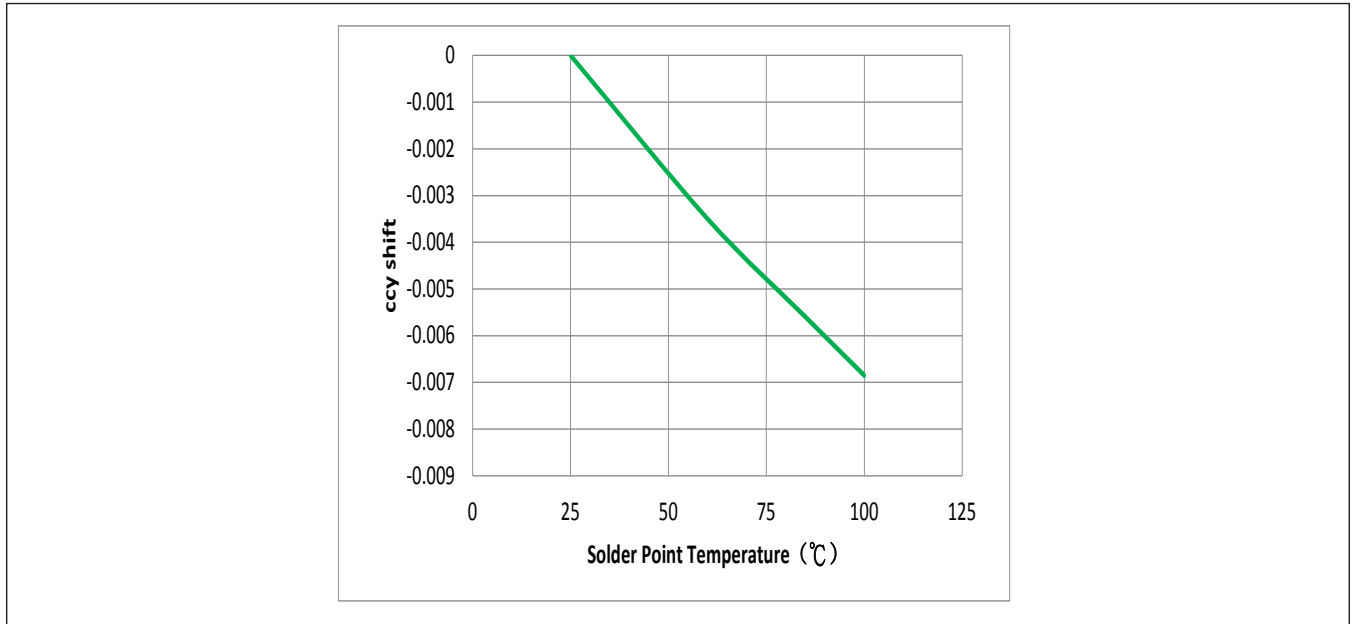


Notes for Figures 4 & 5:

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

Performance Curves

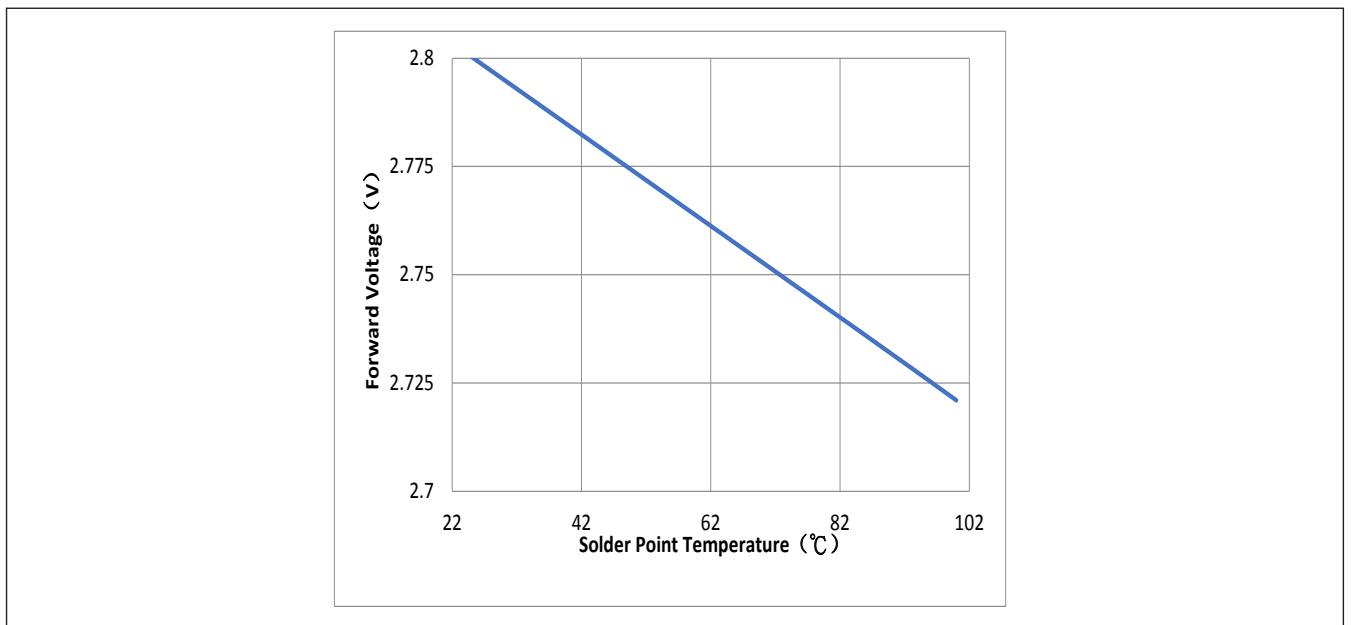
Figure 6: Typical ccy Shift vs.Solder Point Temperature



Notes for Figure 6:

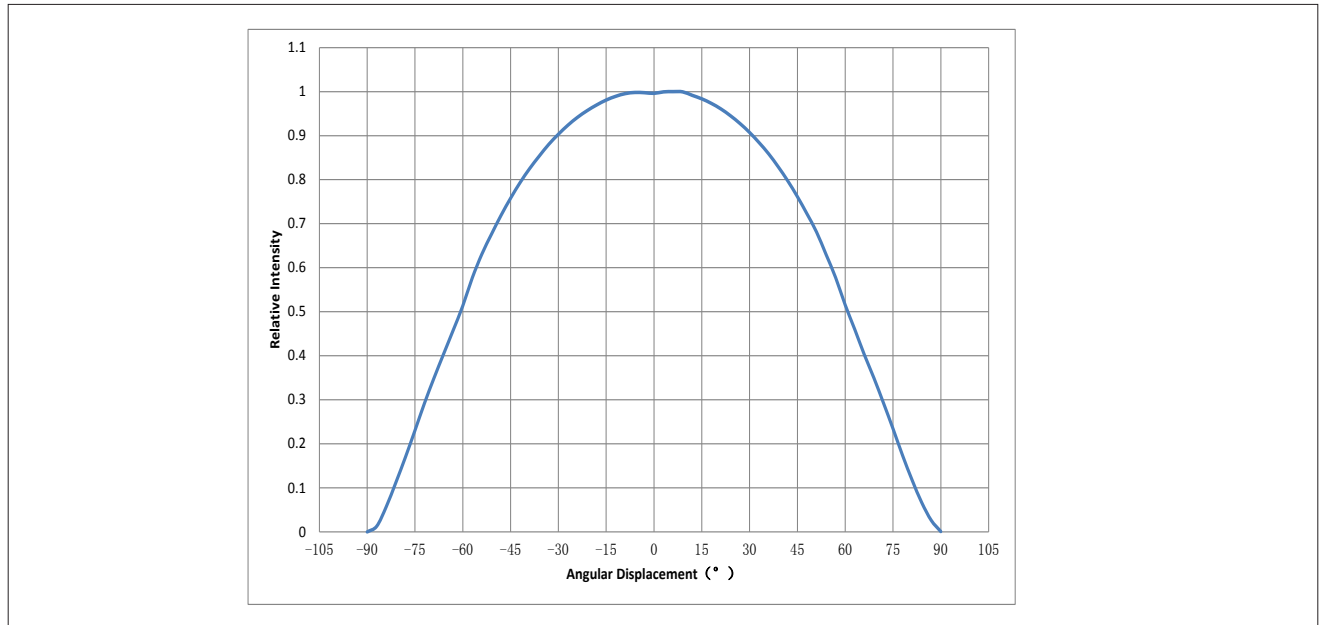
1. Characteristics shown for neutral white based on 4000K and 80 CRI.
2. For other color SKUs, the shift in color will vary. Please contact your Bridgelux Sales Representative for more information

Figure 7: Vf vs.Solder Point Temperature



Typical Radiation Pattern

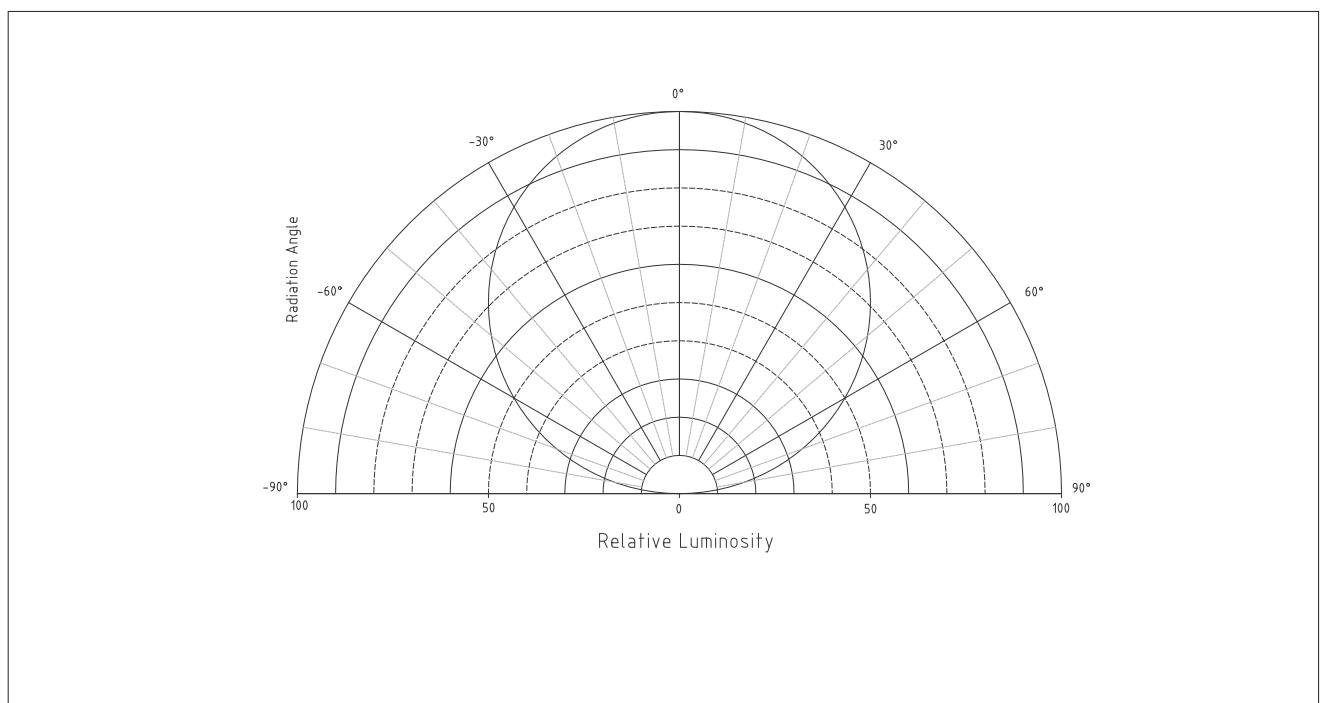
Figure 8: Typical Spatial Radiation Pattern at 60mA, $T_{sp}=25^{\circ}\text{C}$



Notes for Figure 8:

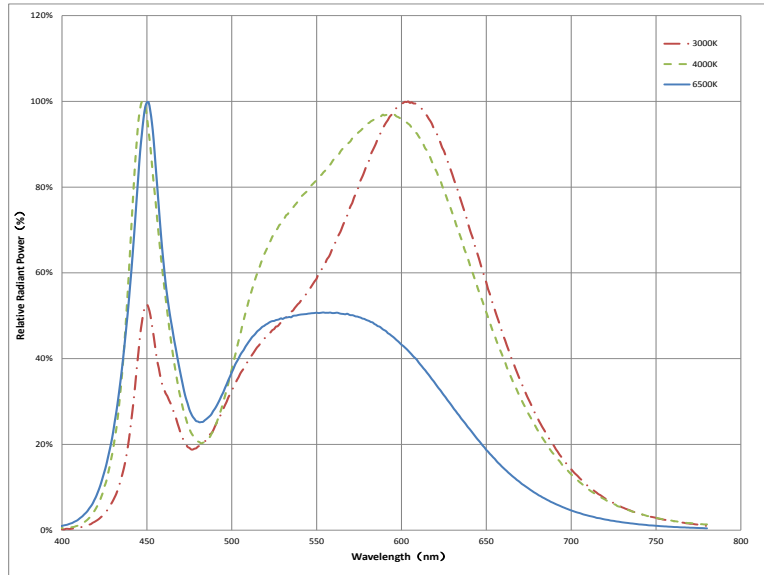
1. Typical viewing angle is 118° .
2. The viewing angle is defined as the off axis angle from the centerline where luminous intensity (lv) is $\frac{1}{2}$ of the peak value.

Figure 9: Typical Polar Radiation Pattern at 60mA, $T_{sp}=25^{\circ}\text{C}$



Typical Color Spectrum

Figure 10: Typical Color Spectrum

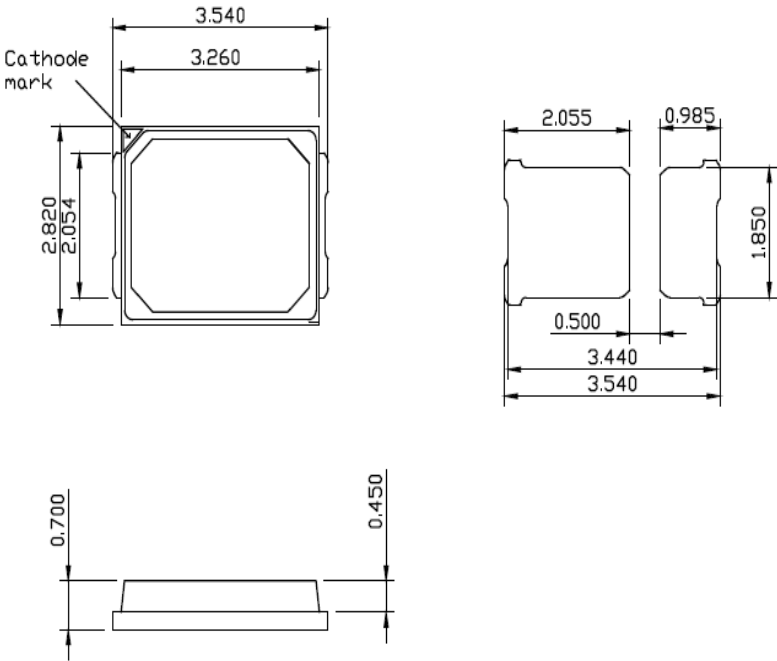


Notes for Figure 10:

1. Color spectra measured at nominal current for $T_{sp} = 25^{\circ}\text{C}$
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.

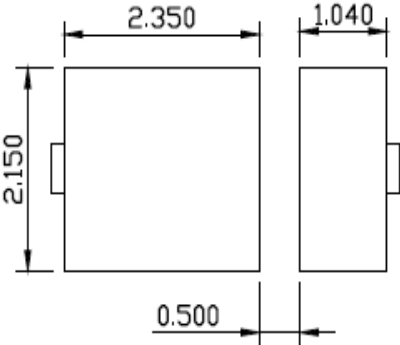
Mechanical Dimensions

Figure 11: Drawing for SMD 2835



- Notes for Figure 11:
1. Drawings are not to scale.
 2. Drawing dimensions are in millimeters.
 3. Unless otherwise specified, tolerances are $\pm 0.10\text{mm}$.

Recommended PCB Soldering Pad Pattern



Reliability

Table 7: 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	-	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	60mA	1000 hours	0/22
5	Temperature Humidity Operating Life	JESD22-A101C	T _{sp} = 85°C, RH=85%	60mA	1000 hours	0/22
6	High Temperature Operating Life	JESD22-A108D	T _{sp} = 85°C	180mA	1000 hours	0/22
7	Thermal Shock	JESD22-A106B	T _a = -40°C ~100°C; Dwell : 15min; Transfer: 10sec	-	200 cycles	0/22

Passing Criteria

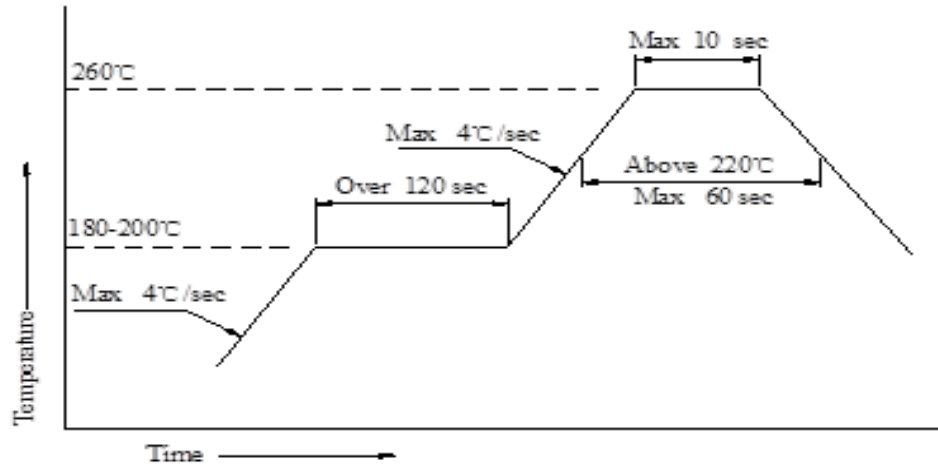
Item	Symbol	Test Condition	Passing Criteria
Forward Voltage	V _f	60mA	ΔV _f < 10%
Luminous Flux	F _v	60mA	ΔF _v < 30%
Chromaticity Coordinates	(x, y)	60mA	Δu'v' < 0.007

Notes for Table 7:

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

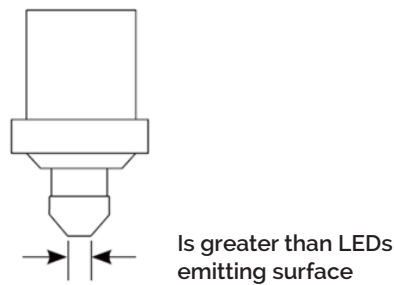
Reflowing Characteristics

Figure 12 : Reflow Profile



Profile Feature	Lead Free Assembly
Preheat Temperature Range	180-200°C
Preheat Time Maximum	120 seconds
Peak Temperature	260°C
Soldering TimeMaximum	10 seconds
Allowable Reflow Cycles	2

Figure 13 : Pick and Place

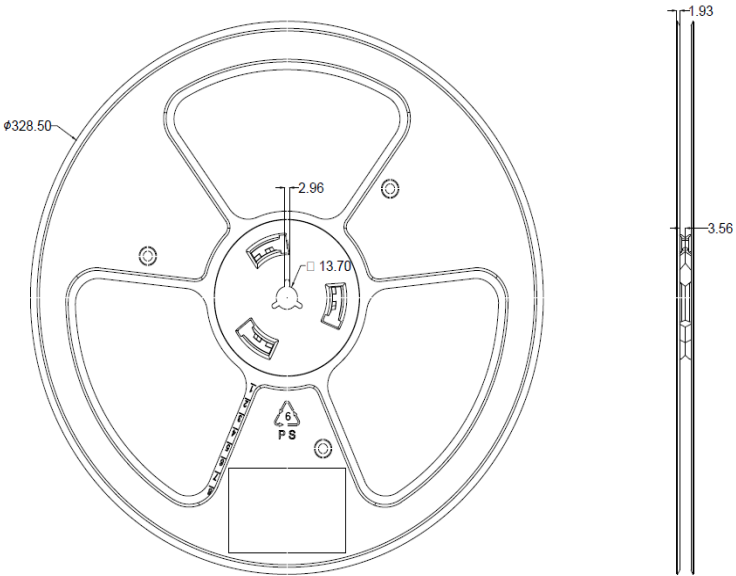


Note for Figure 13:

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 14: Emitter Reel Drawings



Note for Figure 14:
 1. Drawings are not to scale. Drawing dimensions are in millimeters.
 2. Max quantity per reel: 18000pcs

Figure 15: Tags, for example, the following specific information

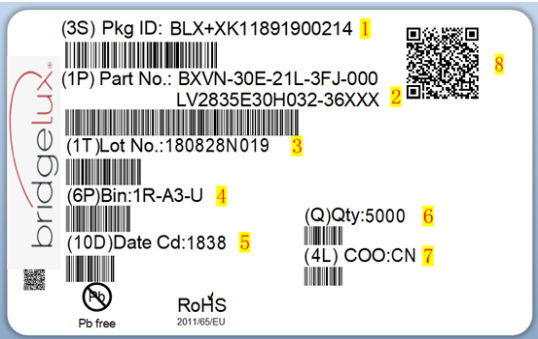


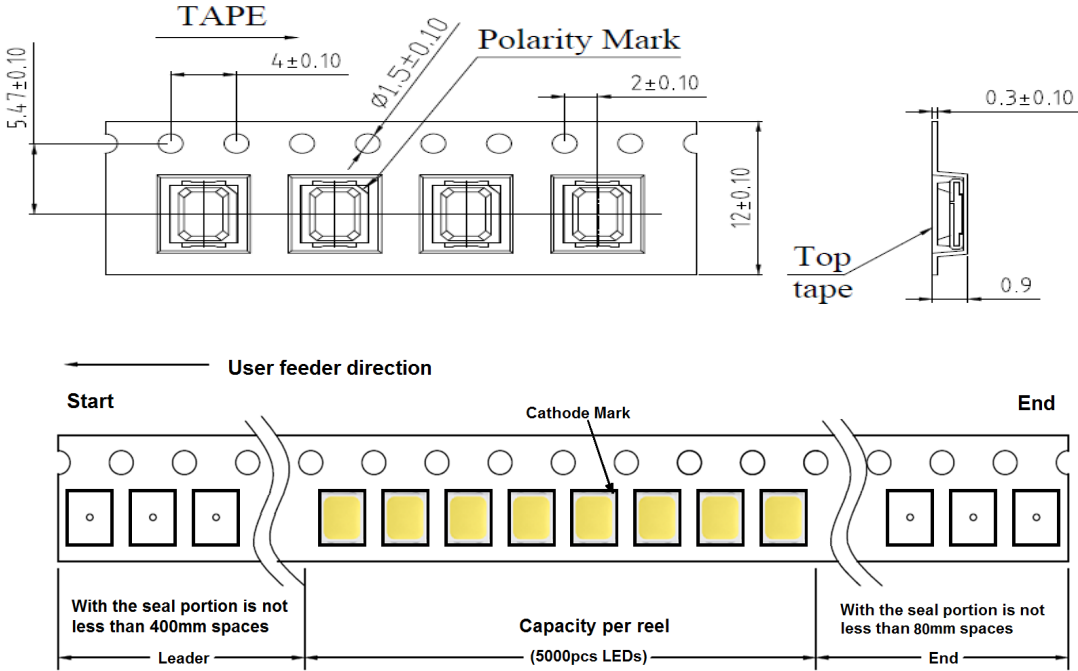
Figure 16: Label comments

The serial number	Illustration
1	Package ID
2	Product Part Number
3	Lot Number(date+serial No.)
4	Specific BIN Code(flux-VF-color)
5	Production Date Code(year+week)
6	Quantity
7	Production site
8	Scan code for comprehensive information

Note for Figure 15&16:
 1. Drawings are not to scale. Drawing dimensions are in millimeters.

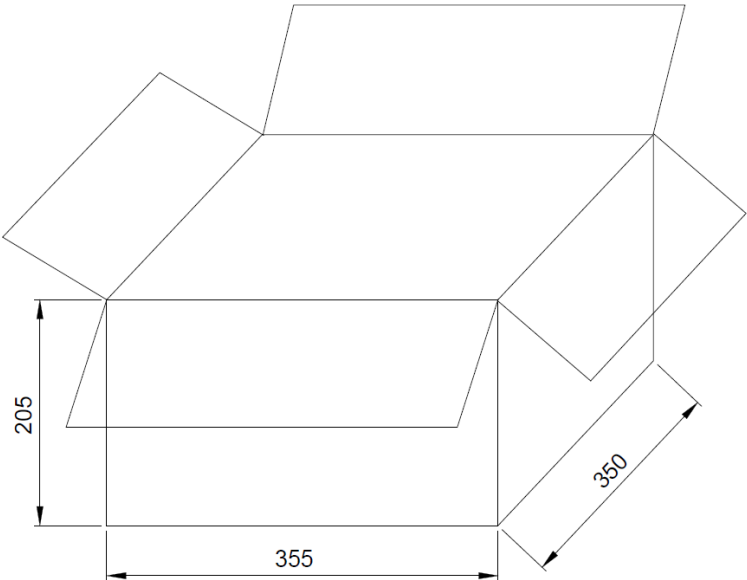
Packaging

Figure 17: Emitter Tape Drawings



Note for Figure 17:
 1. Drawings are not to scale. Drawing dimensions are in millimeters.

Figure 18: Unit carton size (Unit: mm)



Packaging

Figure 19: Emitter Reel Packaging Drawings

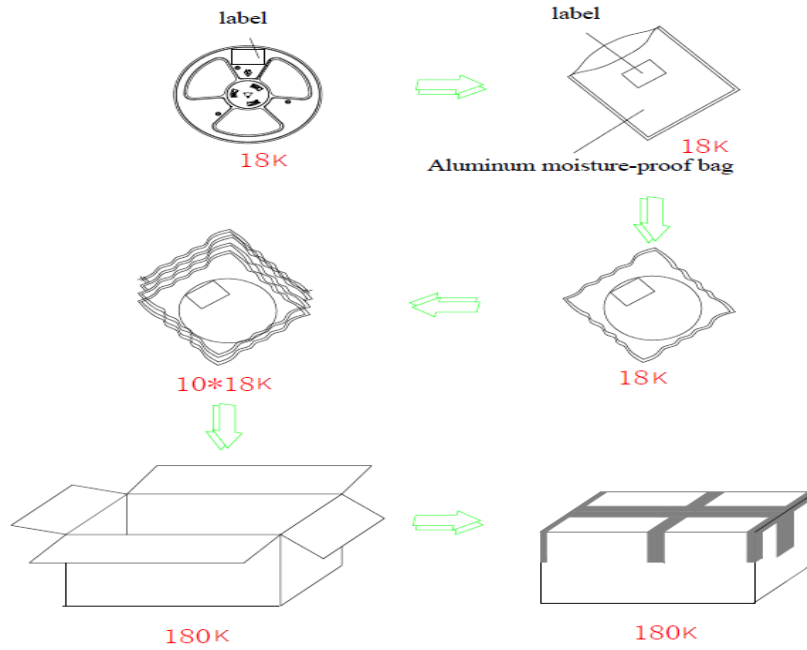
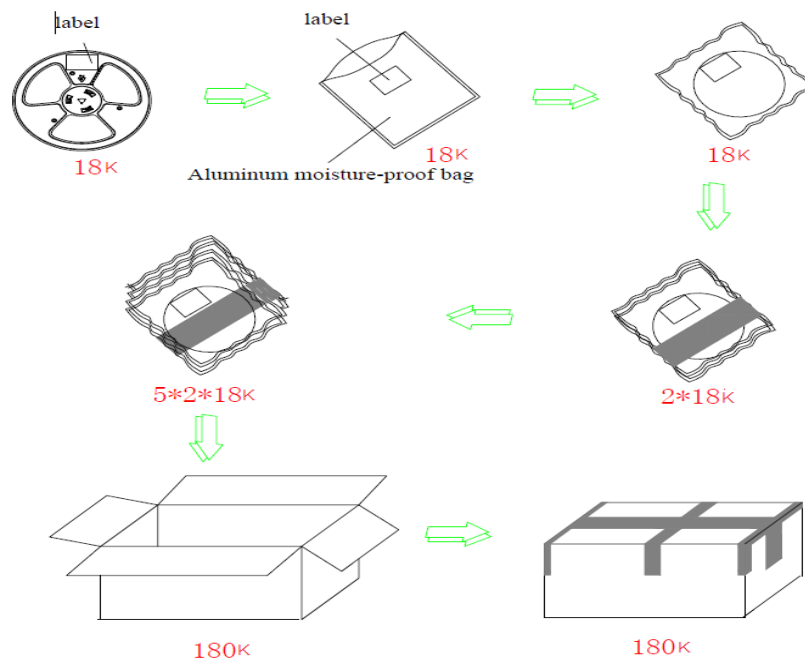


Figure 20: Y - kitting BIN packing delivery



Note for Figure 19&20:

1. Drawings are not to scale.
2. After finished packing 180 k material weight: 8.15 kg + 0.5 kg

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 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.

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.

Caution for bake condition description as below

1. Recommended storage condition: 5°C~30°C and <60%(RH), peak package body temperature when reflow: 250°C;
2. After bag is opened, devices that will be subjected to re-flow solder or other high temperature process must:
 - a) Mounted within 12 hours of factory conditions < 30°C/60%RH.
 - b) Stored at < 10%RH.
3. Devices require bake, before mounting, if:
 - a) Humidity Indicator Card is > 10% when read at 23±5°C.
 - b) 2a or 2b not met.
4. If baking is required, devices may be baked for 12 hours at 75±5°C.

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).

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
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