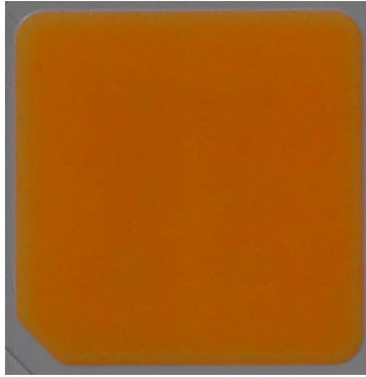


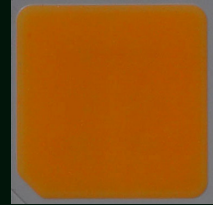


Bridgelux® SMD 5050 5W 24V

Product Data Sheet DS677

Introduction

SMD 5050



The Bridgelux SMD 5050 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 5050 provides unparalleled design-in flexibility for indoor and outdoor lighting applications. The SMD 5050 is ideal as a drop-in replacement for emitters with an industry standard 5.0mm x 5.0mm footprint.

Features

- Industry-standard 5050 footprint
- 2 color bin options enable tight color control
- Hot-color targeting ensures that color is within the bin at the typical application condition of 85°C
- 3- and 5-step MacAdam ellipse options
- RoHS compliant and lead free
- Multiple CCT and CRI configurations for a wide range of lighting applications

Benefits

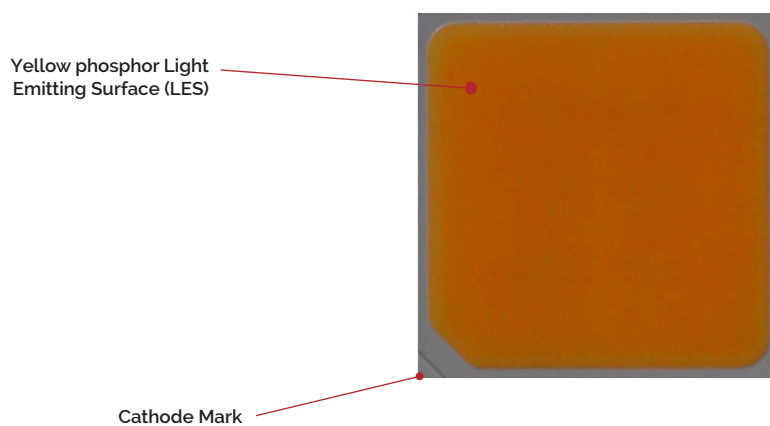
- Lower operating and manufacturing cost
- Ease of design and rapid go-to-market
- Uniform consistent white light
- Compliant with environmental standards
- Design flexibility

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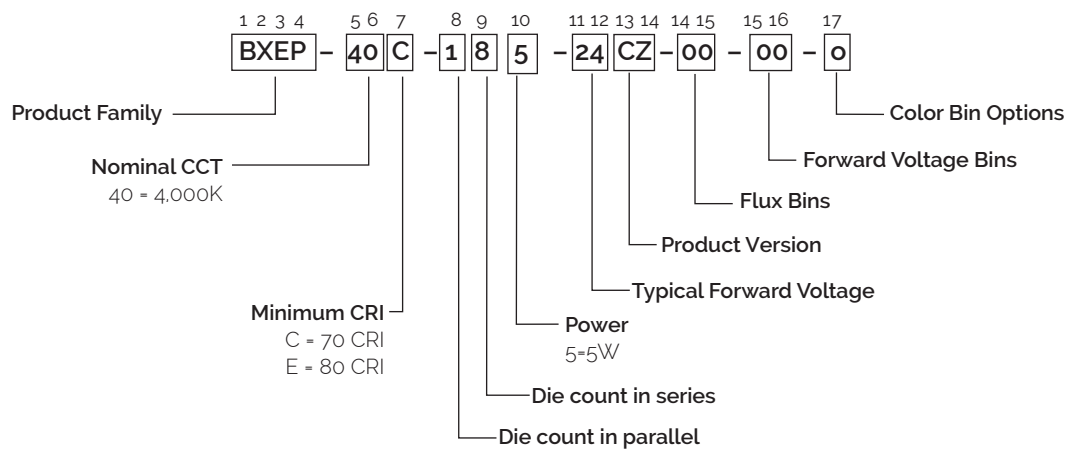
Product Feature Map

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 5050 is explained as follows:



Product Selection Guide

The following product configurations are available:

Table 1: Selection Guide, Pulsed Measurement Data at 160mA ($T_j = T_{sp} = 25^\circ\text{C}$)

Part Number ^{4,6}	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			
BXEP-18C-185-24CZ-00-00-0	1800	70	160	23.0	24.4	26.0	508	3.9	130
BXEP-18E-185-24CZ-00-00-0	1800	80	160	23.0	24.4	26.0	457	3.9	117
BXEP-24C-185-24CZ-00-00-0	2400	70	160	23.0	24.4	26.0	605	3.9	155
BXEP-24E-185-24CZ-00-00-0	2400	80	160	23.0	24.4	26.0	545	3.9	140
BXEP-27C-185-24CZ-00-00-0	2700	70	160	23.0	24.4	26.0	641	3.9	164
BXEP-27E-185-24CZ-00-00-0	2700	80	160	23.0	24.4	26.0	591	3.9	151
BXEP-30C-185-24CZ-00-00-0	3000	70	160	23.0	24.4	26.0	659	3.9	169
BXEP-30E-185-24CZ-00-00-0	3000	80	160	23.0	24.4	26.0	609	3.9	156
BXEP-40C-185-24CZ-00-00-0	4000	70	160	23.0	24.4	26.0	702	3.9	180
BXEP-40E-185-24CZ-00-00-0	4000	80	160	23.0	24.4	26.0	647	3.9	166
BXEP-50C-185-24CZ-00-00-0	5000	70	160	23.0	24.4	26.0	702	3.9	180
BXEP-50E-185-24CZ-00-00-0	5000	80	160	23.0	24.4	26.0	647	3.9	166
BXEP-57C-185-24CZ-00-00-0	5700	70	160	23.0	24.4	26.0	695	3.9	178
BXEP-57E-185-24CZ-00-00-0	5700	80	160	23.0	24.4	26.0	642	3.9	164
BXEP-65C-185-24CZ-00-00-0	6500	70	160	23.0	24.4	26.0	695	3.9	178
BXEP-65E-185-24CZ-00-00-0	6500	80	160	23.0	24.4	26.0	642	3.9	164

Notes for Table 1 :

- The last 7 characters (including hyphens '-') refer to flux bins, forward voltage bins, and color bin options, respectively. "00-00-0" denotes the full distribution of flux, forward voltage, and 5 SDCM color.
Example: BXEP-40C-185-24CZ-00-00-0 refers to the full distribution of flux, forward voltage, and color within a 4000K 5-step ANSI standard chromaticity region with a minimum of 70CRI, 1x8 die configuration, 5w power, 24.4V typical forward voltage.
- Product CCT is hot targeted at $T_{sp} = 85^\circ\text{C}$. 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 5050.
- Refer to Table 6 and Table 7 for Bridgelux SMD 5050 Luminous Flux Binning and Forward Voltage Binning information.

Product Selection Guide

The following product configurations are available:

Table 2: Selection Guide, Stabilized DC Performance ($T_{sp} = 85^{\circ}\text{C}$)^{6,7}

Part Number	Nominal CCT ¹ (K)	CRI ^{2,3}	Nominal Drive Current (mA)	Forward Voltage ³ (V)			Typical DC Flux (lm) ⁵	Typical DC Power (W)	Typical DC Effi- cacy (lm/W)
				Min	Typical	Max			
BXEP-18C-185-24CZ-00-00-0	1800	70	160	22.6	24.0	25.5	465	3.8	121
BXEP-18E-185-24CZ-00-00-0	1800	80	160	22.6	24.0	25.5	418	3.8	109
BXEP-24C-185-24CZ-00-00-0	2400	70	160	22.6	24.0	25.5	553	3.8	144
BXEP-24E-185-24CZ-00-00-0	2400	80	160	22.6	24.0	25.5	498	3.8	130
BXEP-27C-185-24CZ-00-00-0	2700	70	160	22.6	24.0	25.5	586	3.8	153
BXEP-27E-185-24CZ-00-00-0	2700	80	160	22.6	24.0	25.5	540	3.8	141
BXEP-30C-185-24CZ-00-00-0	3000	70	160	22.6	24.0	25.5	603	3.8	157
BXEP-30E-185-24CZ-00-00-0	3000	80	160	22.6	24.0	25.5	557	3.8	145
BXEP-40C-185-24CZ-00-00-0	4000	70	160	22.6	24.0	25.5	642	3.8	167
BXEP-40E-185-24CZ-00-00-0	4000	80	160	22.6	24.0	25.5	592	3.8	154
BXEP-50C-185-24CZ-00-00-0	5000	70	160	22.6	24.0	25.5	642	3.8	167
BXEP-50E-185-24CZ-00-00-0	5000	80	160	22.6	24.0	25.5	592	3.8	154
BXEP-57C-185-24CZ-00-00-0	5700	70	160	22.6	24.0	25.5	635	3.8	166
BXEP-57E-185-24CZ-00-00-0	5700	80	160	22.6	24.0	25.5	587	3.8	153
BXEP-65C-185-24CZ-00-00-0	6500	70	160	22.6	24.0	25.5	635	3.8	166
BXEP-65E-185-24CZ-00-00-0	6500	80	160	22.6	24.0	25.5	587	3.8	153

Notes for Table 2:

- The last 7 characters (including hyphens '-') refer to flux bins, forward voltage bins, and color bin options, respectively. "00-00-0" denotes the full distribution of flux, forward voltage, and 5 SDCM color.
EExample: BXEP-40C-185-24CZ-00-00-0 refers to the full distribution of flux, forward voltage, and color within a 4000K 5-step ANSI standard chromaticity region with a minimum of 70CRI, 1x8 die configuration, 5w power, 24.4V typical forward voltage.
- Product CCT is hot targeted at $T_{sp} = 85^{\circ}\text{C}$. Nominal CCT as defined by ANSI C78.377-2011.
- Listed CRIs are minimum values and include test tolerance.
- 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 5050.
- Refer to Table 6 and Table 7 for Bridgelux SMD 5050 Luminous Flux Binning and Forward Voltage Binning information.
- Typical stabilized DC performance values are provided as reference only and are not a guarantee of performance.
- 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.

Performance at Commonly Used Drive Currents

SMD 5050 LEDs are tested to the specifications shown using the nominal drive currents in Table 1. SMD 5050 may also be driven at other drive currents dependent on specific application design requirements. The performance at any drive current can be derived from the current vs. voltage characteristics shown in Figure 2 and the relative luminous flux vs. current characteristics shown in Figure 3. The performance at commonly used drive currents is summarized in Table 3.

Table 3: Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current ¹ (mA)	Typical V_f $T_{sp} = 25^\circ\text{C}$ (V)	Typical Power $T_{sp} = 25^\circ\text{C}$ (W)	Typical Pulsed Flux ² $T_{sp} = 25^\circ\text{C}$ (lm)	Typical DC Flux ³ $T_{sp} = 85^\circ\text{C}$ (lm)	Typical Efficacy $T_{sp} = 25^\circ\text{C}$ (lm/W)
BXEP-18C-185-24CZ-00-00-0	70	45	21.9	1.0	152	142	155
		90	22.9	2.1	298	276	144
		135	23.9	3.2	435	399	135
		160	24.4	3.9	508	465	130
		180	24.8	4.5	566	515	127
		200	25.2	5.0	622	564	123
BXEP-18E-185-24CZ-00-00-0	80	45	21.9	1.0	137	128	139
		90	22.9	2.1	268	248	130
		135	23.9	3.2	392	359	121
		160	24.4	3.9	457	418	117
		180	24.8	4.5	509	464	114
		200	25.2	5.0	560	508	111
BXEP-24C-185-24CZ-00-00-0	70	45	21.9	1.0	181	169	184
		90	22.9	2.1	354	328	172
		135	23.9	3.2	518	475	161
		160	24.4	3.9	605	553	155
		180	24.8	4.5	674	614	151
		200	25.2	5.0	740	672	147
BXEP-24E-185-24CZ-00-00-0	80	45	21.9	1.0	163	152	166
		90	22.9	2.1	319	295	154
		135	23.9	3.2	466	428	145
		160	24.4	3.9	545	498	140
		180	24.8	4.5	606	552	136
		200	25.2	5.0	666	605	132

Performance at Commonly Used Drive Currents

Table 3: Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current ¹ (mA)	Typical V_f $T_{sp} = 25^\circ\text{C}$ (V)	Typical Power $T_{sp} = 25^\circ\text{C}$ (W)	Typical Pulsed Flux ² $T_{sp} = 25^\circ\text{C}$ (lm)	Typical DC Flux ³ $T_{sp} = 85^\circ\text{C}$ (lm)	Typical Efficacy $T_{sp} = 25^\circ\text{C}$ (lm/W)
BXEP-27C-185-24CZ-00-00-0	70	45	21.9	1.0	192	179	195
		90	22.9	2.1	375	347	182
		135	23.9	3.2	548	503	170
		160	24.4	3.9	641	586	164
		180	24.8	4.5	713	649	160
		200	25.2	5.0	784	711	156
BXEP-27E-185-24CZ-00-00-0	80	45	21.9	1.0	177	165	180
		90	22.9	2.1	346	321	168
		135	23.9	3.2	506	464	157
		160	24.4	3.9	591	540	151
		180	24.8	4.5	658	599	147
		200	25.2	5.0	723	656	144
BXEP-30C-185-24CZ-00-00-0	70	45	21.9	1.0	198	185	200
		90	22.9	2.1	386	358	187
		135	23.9	3.2	564	518	175
		160	24.4	3.9	659	603	169
		180	24.8	4.5	734	669	164
		200	25.2	5.0	807	732	160
BXEP-30E-185-24CZ-00-00-0	80	45	21.9	1.0	183	170	185
		90	22.9	2.1	356	330	173
		135	23.9	3.2	521	478	162
		160	24.4	3.9	609	557	156
		180	24.8	4.5	678	617	152
		200	25.2	5.0	745	676	148

Performance at Commonly Used Drive Currents

Table 3: Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current ¹ (mA)	Typical V_f $T_{sp} = 25^\circ\text{C}$ (V)	Typical Power $T_{sp} = 25^\circ\text{C}$ (W)	Typical Pulsed Flux ² $T_{sp} = 25^\circ\text{C}$ (lm)	Typical DC Flux ³ $T_{sp} = 85^\circ\text{C}$ (lm)	Typical Efficacy $T_{sp} = 25^\circ\text{C}$ (lm/W)
BXEP-40C-185-24CZ-00-00-0	70	45	21.9	1.0	210	197	213
		90	22.9	2.1	411	381	199
		135	23.9	3.2	601	551	186
		160	24.4	3.9	702	642	180
		180	24.8	4.5	781	712	175
		200	25.2	5.0	859	779	170
BXEP-40E-185-24CZ-00-00-0	80	45	21.9	1.0	194	181	197
		90	22.9	2.1	379	351	184
		135	23.9	3.2	554	508	172
		160	24.4	3.9	647	592	166
		180	24.8	4.5	721	657	161
		200	25.2	5.0	792	719	157
BXEP-50C-185-24CZ-00-00-0	70	45	21.9	1.0	210	197	213
		90	22.9	2.1	411	381	199
		135	23.9	3.2	601	551	186
		160	24.4	3.9	702	642	180
		180	24.8	4.5	781	712	175
		200	25.2	5.0	859	779	170
BXEP-50E-185-24CZ-00-00-0	80	45	21.9	1.0	194	181	197
		90	22.9	2.1	379	351	184
		135	23.9	3.2	554	508	172
		160	24.4	3.9	647	592	166
		180	24.8	4.5	721	657	161
		200	25.2	5.0	792	719	157

Performance at Commonly Used Drive Currents

Table 3: Performance at Commonly Used Drive Currents

Part Number	CRI	Drive Current ¹ (mA)	Typical V_f $T_{sp} = 25^\circ\text{C}$ (V)	Typical Power $T_{sp} = 25^\circ\text{C}$ (W)	Typical Pulsed Flux ² $T_{sp} = 25^\circ\text{C}$ (lm)	Typical DC Flux ³ $T_{sp} = 85^\circ\text{C}$ (lm)	Typical Efficacy $T_{sp} = 25^\circ\text{C}$ (lm/W)
BXEP-57C-185-24CZ-00-00-0	70	45	21.9	1.0	208	195	211
		90	22.9	2.1	407	377	197
		135	23.9	3.2	595	546	184
		160	24.4	3.9	695	635	178
		180	24.8	4.5	774	705	173
		200	25.2	5.0	850	771	169
BXEP-57E-185-24CZ-00-00-0	80	45	21.9	1.0	192	180	195
		90	22.9	2.1	376	348	182
		135	23.9	3.2	549	504	170
		160	24.4	3.9	642	587	164
		180	24.8	4.5	714	651	160
		200	25.2	5.0	785	712	156
BXEP-65C-185-24CZ-00-00-0	70	45	21.9	1.0	208	195	211
		90	22.9	2.1	407	377	197
		135	23.9	3.2	595	546	184
		160	24.4	3.9	695	635	178
		180	24.8	4.5	774	705	173
		200	25.2	5.0	850	771	169
BXEP-65E-185-24CZ-00-00-0	80	45	21.9	1.0	192	180	195
		90	22.9	2.1	376	348	182
		135	23.9	3.2	549	504	170
		160	24.4	3.9	642	587	164
		180	24.8	4.5	714	651	160
		200	25.2	5.0	785	712	156

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 $\pm 7.5\%$ 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	Drive Current (mA)	Forward Voltage (V) ^{1,2}			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		
BXEP-XXX-185-24CZ-00-00-0	160	23.0	24.4	26.0	-0.91	3.2

Notes for Table 4:

1. 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.
2. Products tested under pulsed condition (10ms pulse width) at nominal drive current where $T_{sp} = 25^\circ C$.
3. Thermal Resistance values based on 3000K 70CRI product.
4. 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 +105°C
Operating Solder Point Temperature (T_{sp})	-40°C to +105°C
Soldering Temperature	260°C or lower for a maximum of 10 seconds
Maximum Drive Current ¹	200 mA
Maximum Peak Pulsed Forward Current ²	240 mA
Maximum Reverse Voltage ³	-
Moisture Sensitivity Rating	MSL 3
Electrostatic Discharge	8kV HBM. JEDEC-JS-001-HBM and JEDEC-JS-001-2012

Notes for Table 5:

1. Maximum drive current may be limited by the solder point temperature. Please see Figure 7 for further details.
2. 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.
3. 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 6 lists the standard photometric luminous flux bins for Bridgelux SMD 5050 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 6: Luminous Flux Bin Definitions at 160mA, $T_{sp}=25^{\circ}\text{C}$

Bin Code	Minimum	Maximum	Unit	Condition
A6	410	455	lm	$I_F=160\text{mA}$
A7	455	500		
A8	500	545		
A9	545	590		
B1	590	635		
B2	635	685		
B3	685	740		
B4	740	800		

Note for Table 6:

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

Table 7: Forward Voltage Bin Definition at 160mA, $T_{sp}=25^{\circ}\text{C}$

Bin Code	Minimum	Maximum	Unit	Condition
HE	23	24	V	$I_F=160\text{mA}$
HF	24	25		
HG	25	26		

Note for Table 7:

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

Product Bin Definitions

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

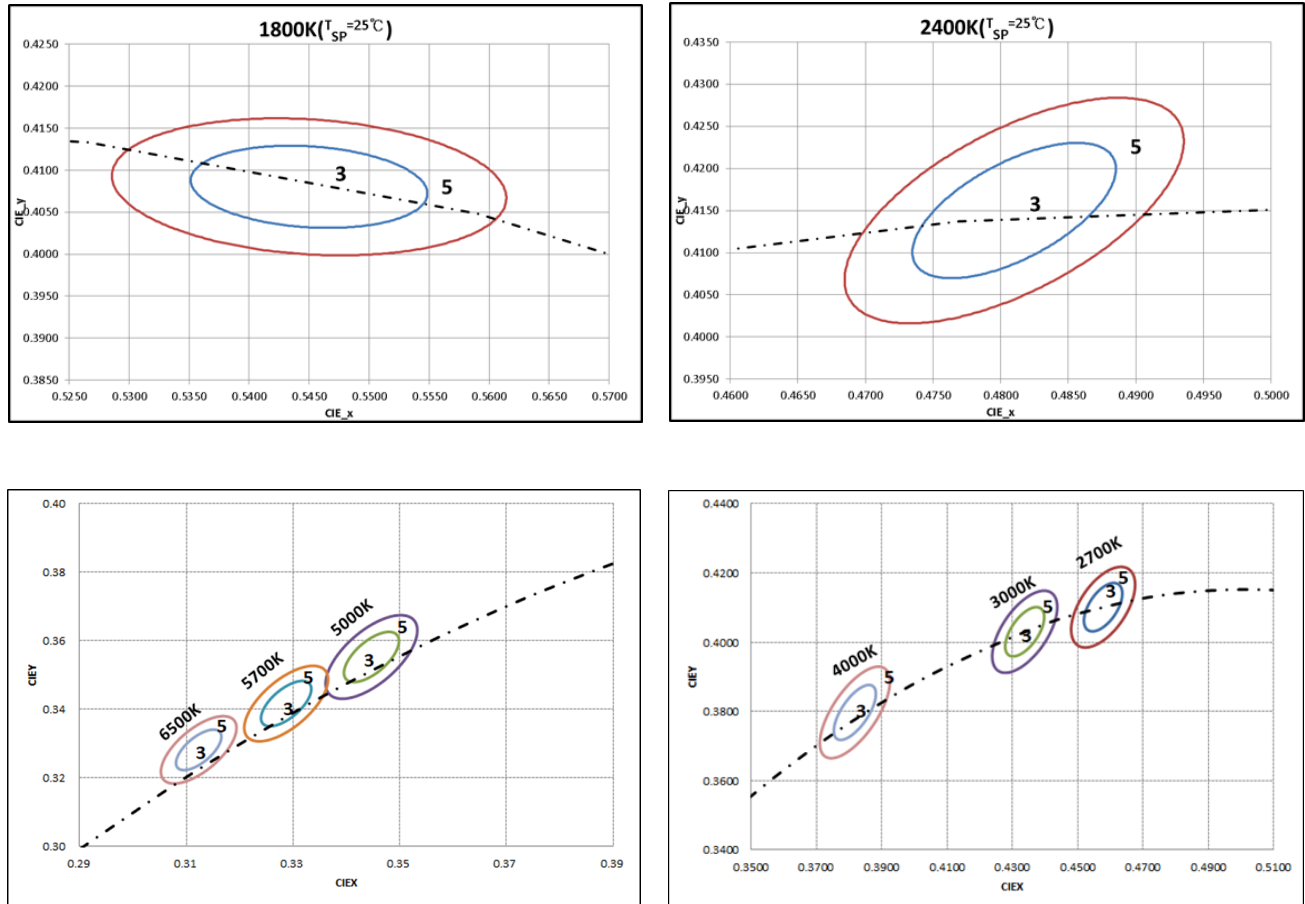
CCT	Color Space	Center Point		Major Axis	Minor Axis	Ellipse Rotation Angle	Color Bin
		X	Y				
1800K ($T_{sp}=25^{\circ}\text{C}$)	3 SDCM	0.5450	0.4080	0.0099	0.0048	174	3
	5 SDCM	0.5450	0.4080	0.0165	0.008	174	5
2400K ($T_{sp}=25^{\circ}\text{C}$)	3 SDCM	0.4810	0.4150	0.0096	0.00426	53.41	3
	5 SDCM	0.4810	0.4150	0.016	0.0071	53.41	5
2700K	3 SDCM	0.4578	0.4101	0.00810	0.00420	53.70	3
	5 SDCM	0.4578	0.4101	0.01350	0.00700	53.70	5
3000K	3 SDCM	0.4338	0.4030	0.00834	0.00408	53.22	3
	5 SDCM	0.4338	0.4030	0.01390	0.00680	53.22	5
4000K	3 SDCM	0.3818	0.3797	0.00939	0.00402	53.72	3
	5 SDCM	0.3818	0.3797	0.01565	0.00670	53.72	5
5000K	3 SDCM	0.3447	0.3553	0.00822	0.00354	59.62	3
	5 SDCM	0.3447	0.3553	0.01370	0.00590	59.62	5
5700K	3 SDCM	0.3287	0.3417	0.00746	0.00320	59.09	3
	5 SDCM	0.3287	0.3417	0.01243	0.00533	59.09	5
6500K	3 SDCM	0.3123	0.3282	0.00669	0.00285	58.57	3
	5 SDCM	0.3123	0.3282	0.01115	0.00475	58.57	5

Notes for Table 8:

1. Color binning at $T_{sp}=85^{\circ}\text{C}$
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 (2 Color Bin Structure, Hot-color Targeted at $T_{sp}=85^{\circ}\text{C}$)



Performance Curves

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

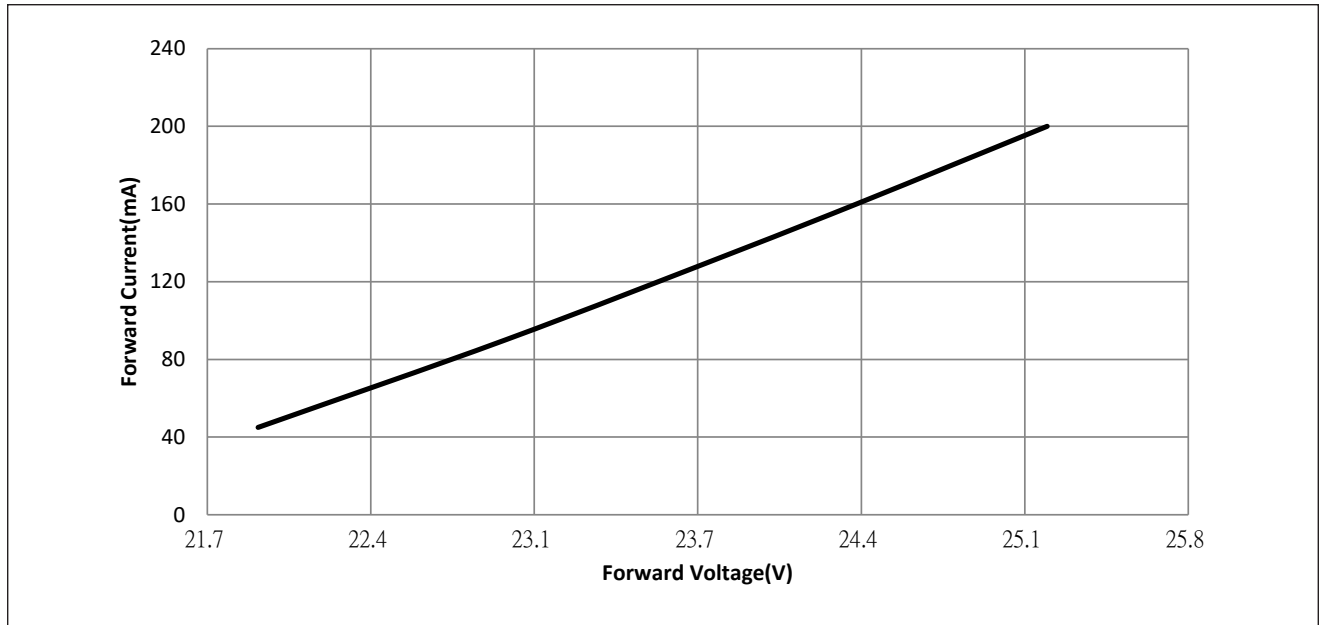
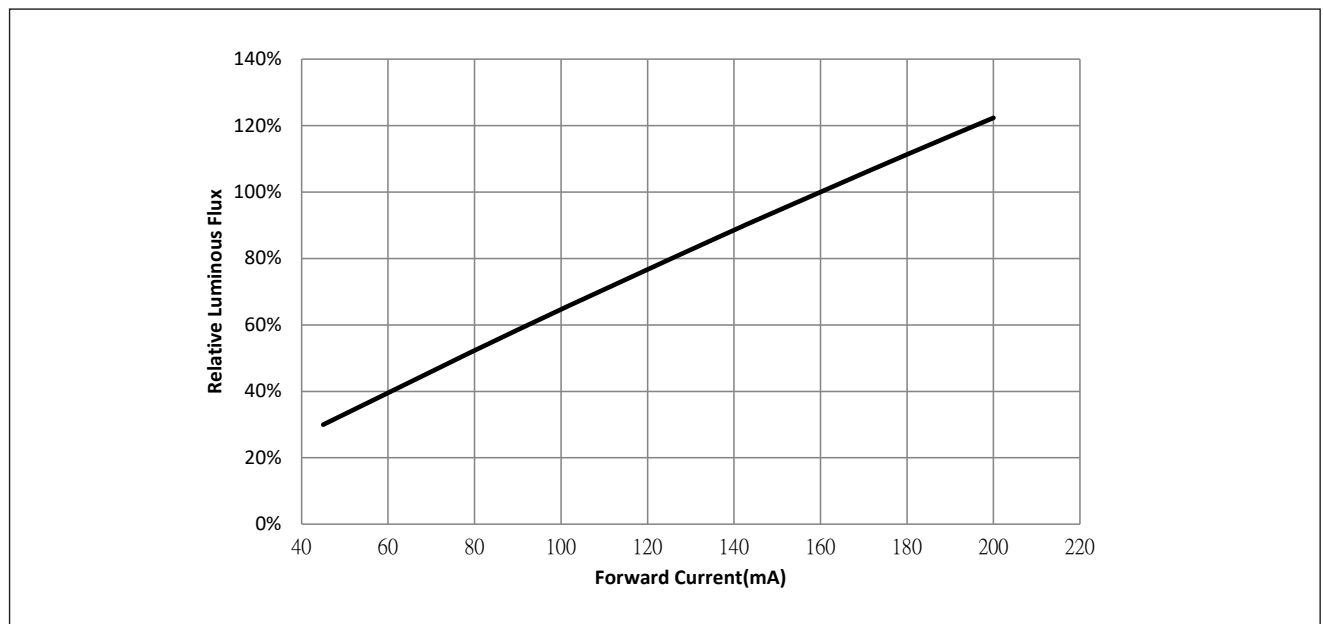


Figure 3: Relative Luminous Flux vs. Drive Current ($T_{sp}=25^{\circ}\text{C}$)



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: Relative DC Flux vs. Solder Point Temperature

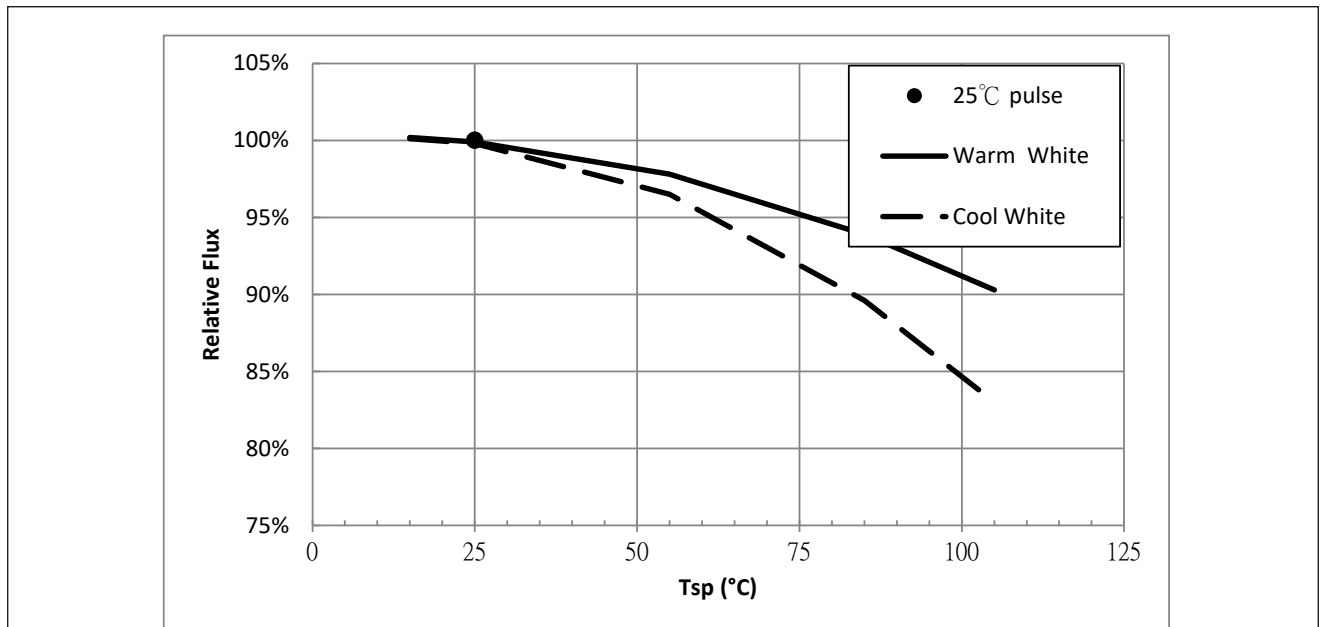
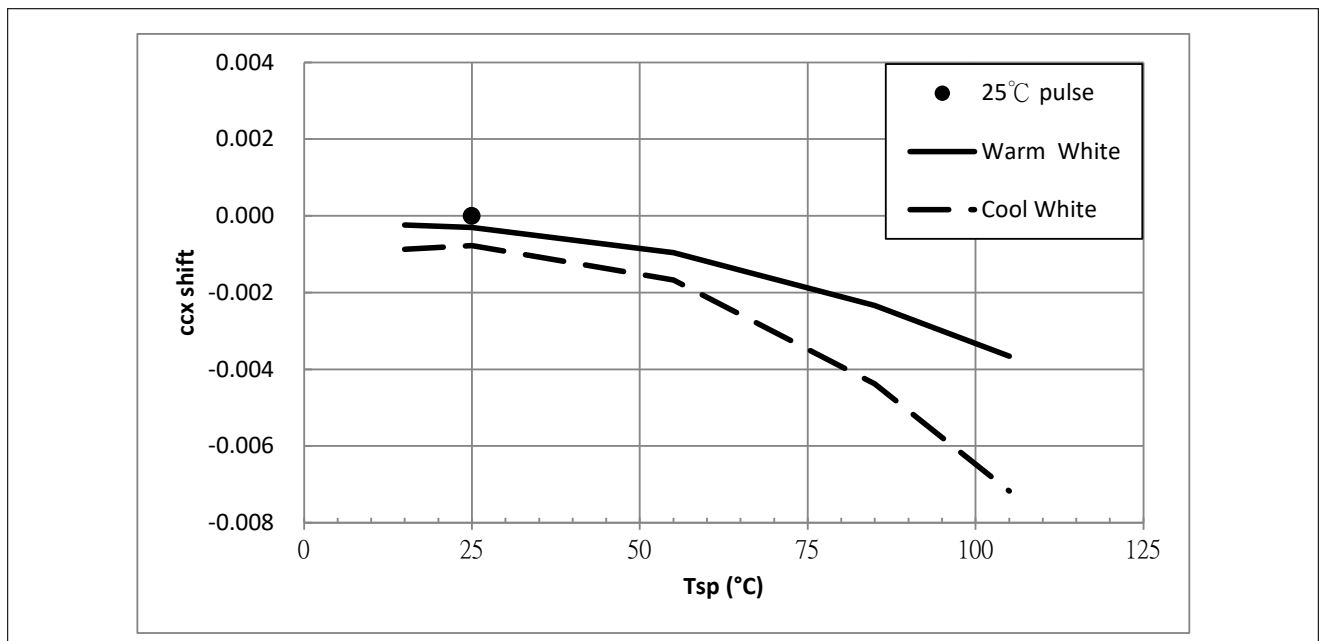


Figure 5: Typical DC ccx Shift vs. Solder Point Temperature

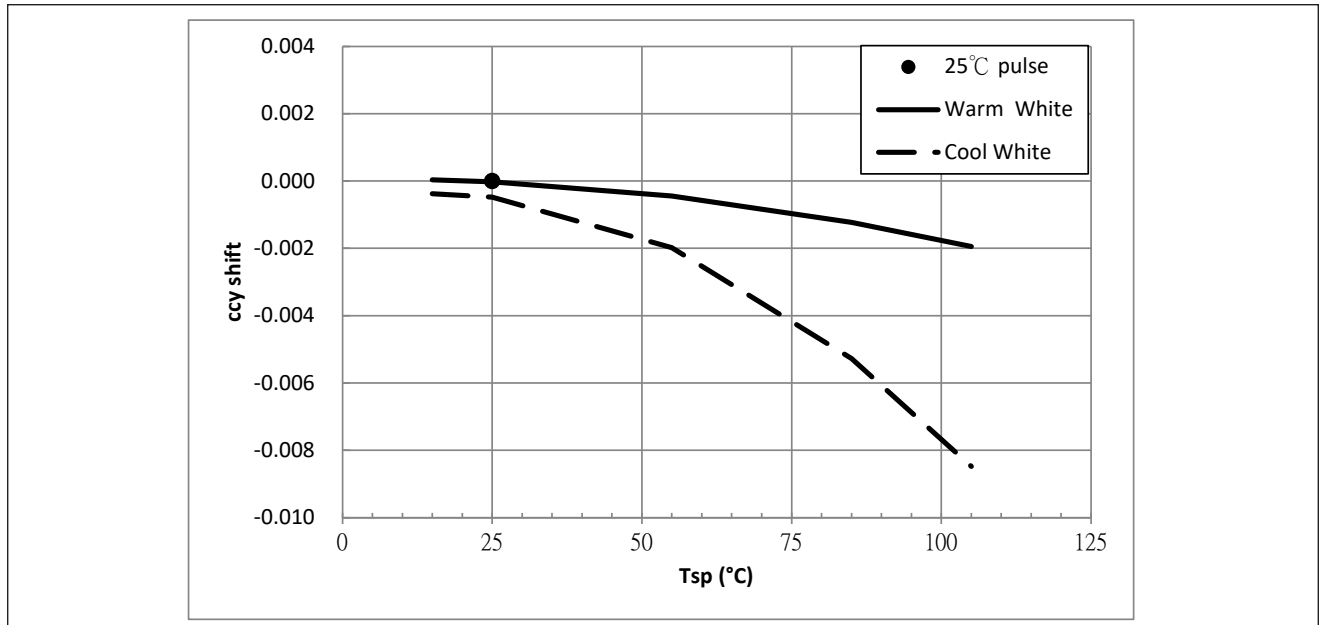


Notes for Figures 4 & 5:

1. Characteristics shown for warm white based on 3000K.
2. Characteristics shown for cool white based on 5700K.
3. 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

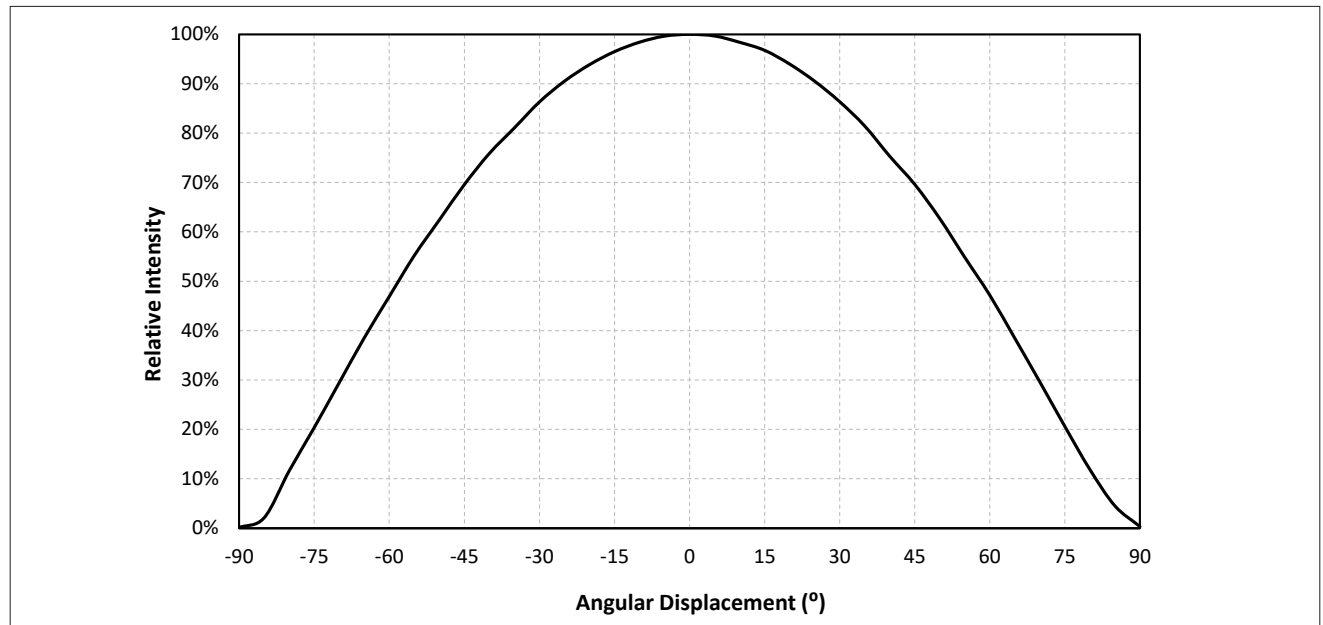


Notes for Figure 6:

1. Characteristics shown for warm white based on 3000K.
2. Characteristics shown for cool white based on 5700K.
3. For other color SKUs, the shift in color will vary. Please contact your Bridgelux Sales Representative for more information.

Typical Radiation Pattern

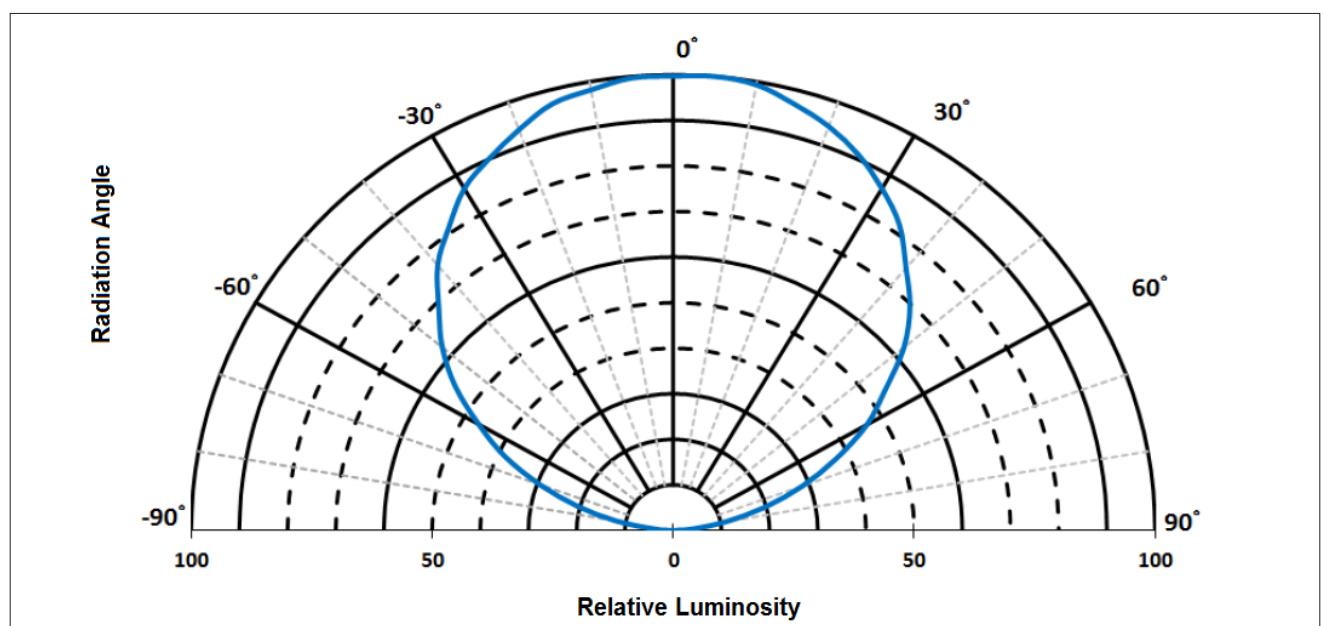
Figure 7: Typical Spatial Radiation Pattern at 160mA, $T_{sp}=25^{\circ}\text{C}$



Notes for Figure 7:

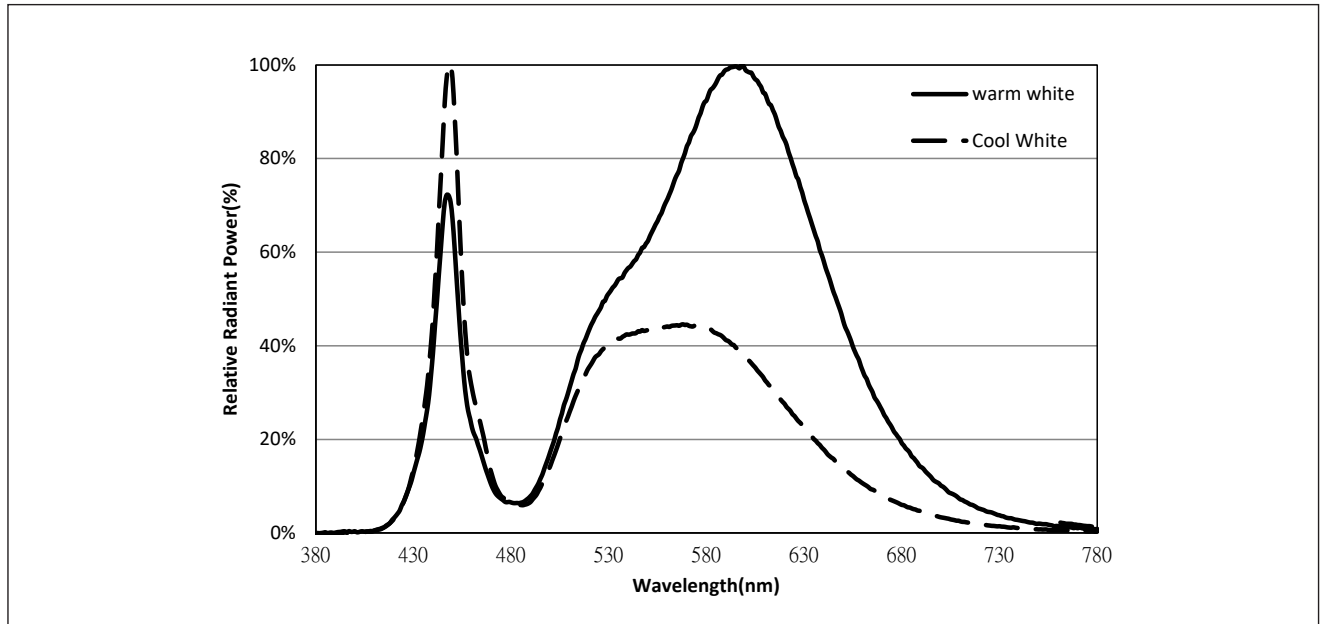
1. Typical viewing angle is 116° .
2. The viewing angle is defined as the off axis angle from the centerline where luminous intensity (Iv) is $\frac{1}{2}$ of the peak value.

Figure 8: Typical Polar Radiation Pattern at 160mA, $T_{sp}=25^{\circ}\text{C}$



Typical Color Spectrum

Figure 9: Typical Color Spectrum

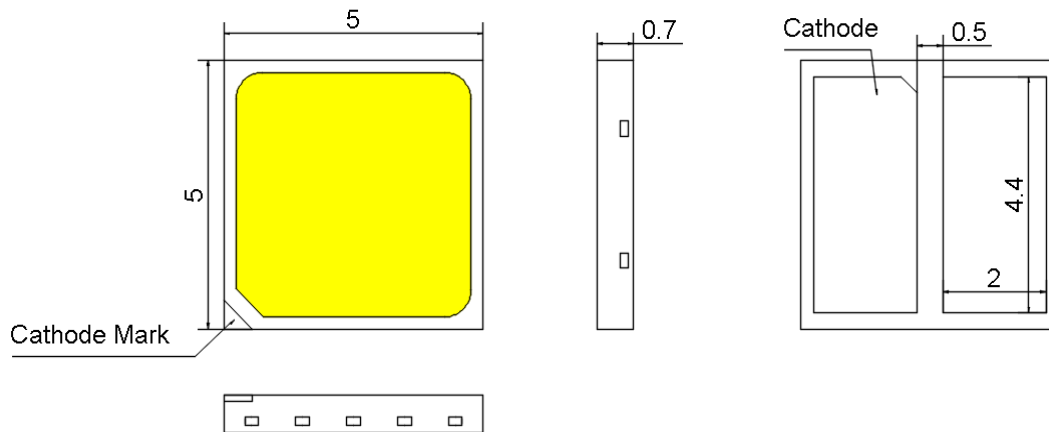


Notes for Figure 9:

1. Color spectra measured at nominal current for $T_{sp} = 25^{\circ}\text{C}$
2. Color spectra shown for warm white is 3000K
3. Color spectra shown for cool white is 5700K

Mechanical Dimensions

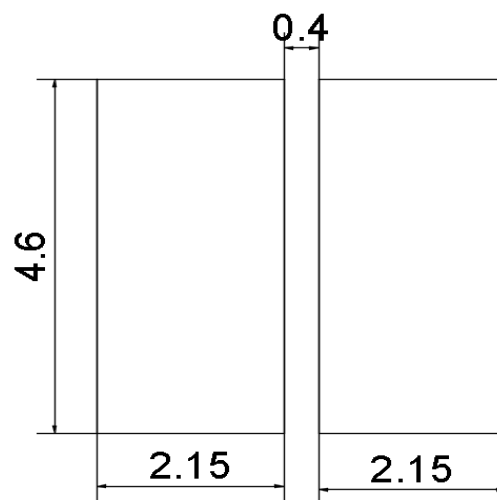
Figure 10: Drawing for SMD 5050



Notes for Figure 10:

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 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	$T_{\text{slid}} = 260^{\circ}\text{C}$, 10sec, Precondition: 30°C , 60%RH, 168hr	-	3 reflows	0/20
2	Low Temperature Storage	JESD22-A119	$T_{\text{a}} = -40^{\circ}\text{C}$	-	1000 hours	0/20
3	High Temperature Storage	JESD22-A103D	$T_{\text{a}} = 105^{\circ}\text{C}$	-	1000 hours	0/20
4	Low Temperature Operating Life	JESD22-A108D	$T_{\text{a}} = -40^{\circ}\text{C}$	160mA	1000 hours	0/20
5	Temperature Humidity Operating Life	JESD22-A101C	$T_{\text{sp}} = 85^{\circ}\text{C}$, RH-85%	160mA	1000 hours	0/20
6	High Temperature Operating Life	JESD22-A108D	$T_{\text{sp}} = 105^{\circ}\text{C}$	200mA	1000 hours	0/20
7	Thermal Shock	JESD22-A106B	$T_{\text{a}} = -40^{\circ}\text{C} \sim 100^{\circ}\text{C}$; Dwell : 15min; Transfer: 10sec	-	200 cycles	0/20
8	Temperature Cycle	JESD22-A104E	$T_{\text{a}} = -40^{\circ}\text{C} \sim 100^{\circ}\text{C}$; Dwell at extreme temperature: 15min; Ramp rate $< 105^{\circ}\text{C}/\text{min}$	-	200 cycles	0/20
9	Electrostatic Discharge	JS-001-2012	HBM, 8KV, 15k Ω , 100pF, Alternately positive or negative	-	-	0/20

Passing Criteria

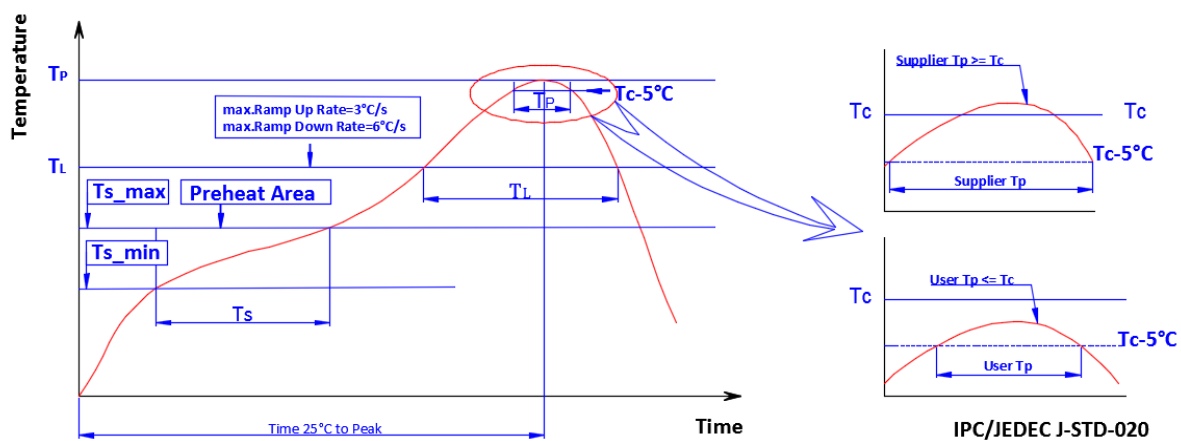
Item	Symbol	Test Condition	Passing Criteria
Forward Voltage	Vf	160mA	$\Delta V_f < 10\%$
Luminous Flux	Fv	160mA	$\Delta F_v < 30\%$
Chromaticity Coordinates	(x, y)	160mA	$\Delta u'v' < 0.007$

Notes for Table 9:

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

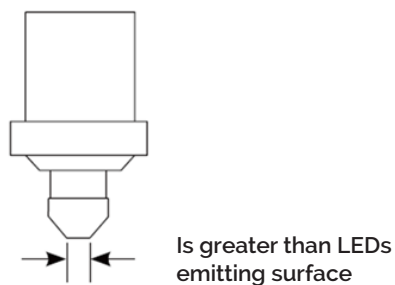
Reflow Characteristics

Figure 11 : Reflow Profile



Profile Feature	Lead Free Assembly
Temperature Min. (Ts_min)	160°C
Temperature Max. (Ts_max)	205°C
Time (ts) from Ts_min to Ts_max	60-150 seconds
Ramp-Up Rate (TL to Tp)	3 °C/second
Liquidus Temperature (TL)	220 °C
Time (TL) Maintained Above TL	60-150 seconds
Peak Temp(Tp)	260 °C max.
Time (Tp) Within 5 °C of the Specified Classification Temperature (Tc)	25 seconds max.
Ramp-Down Rate (Tp to TL)	5 °C/second max.
Time 25 °C to Peak Temperature	10 minutes max.

Figure 12: Pick and Place

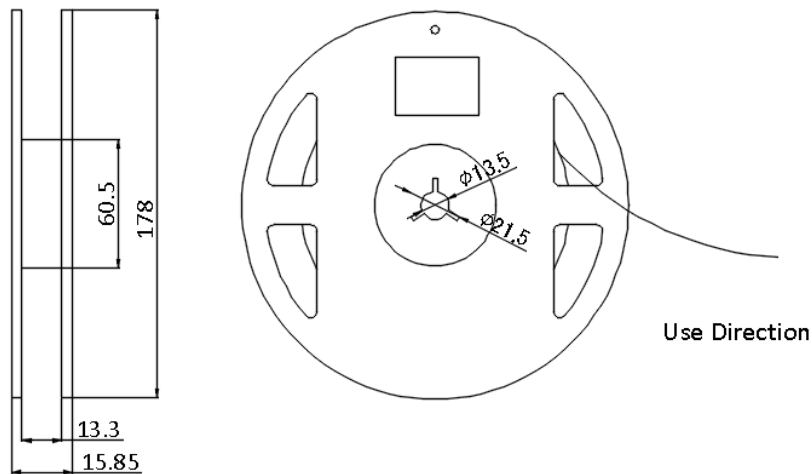


Note for Figure 12:

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

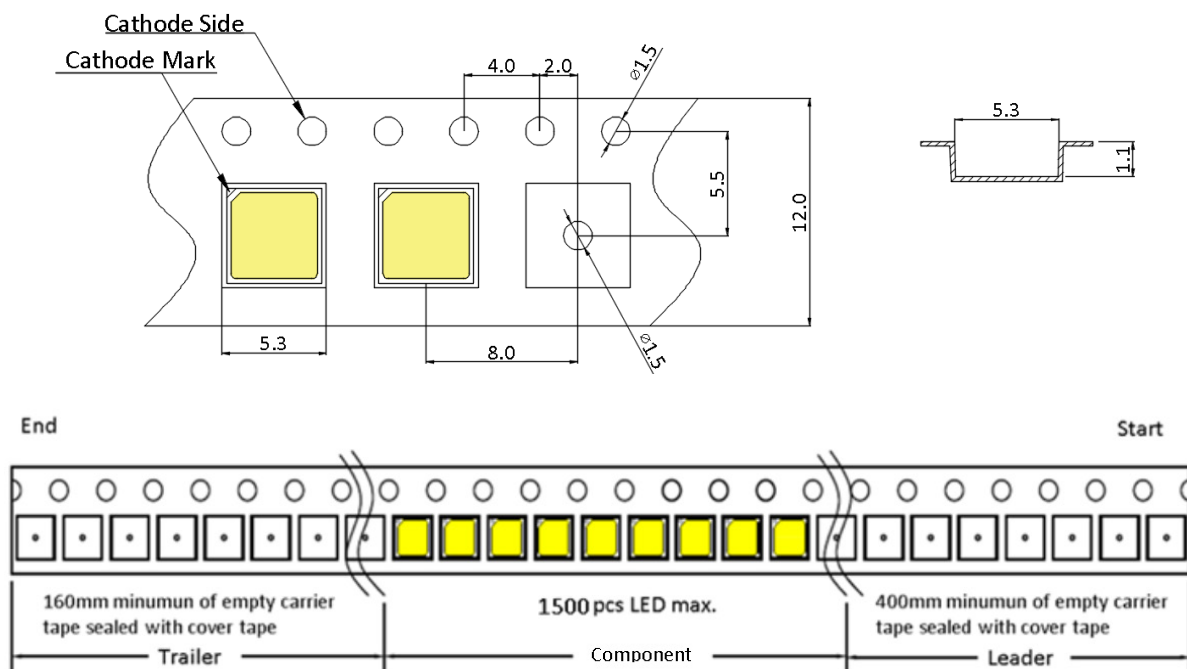
Figure 13: Emitter Reel Drawings



Note for Figure 13:

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

Figure 14: Emitter Tape Drawings

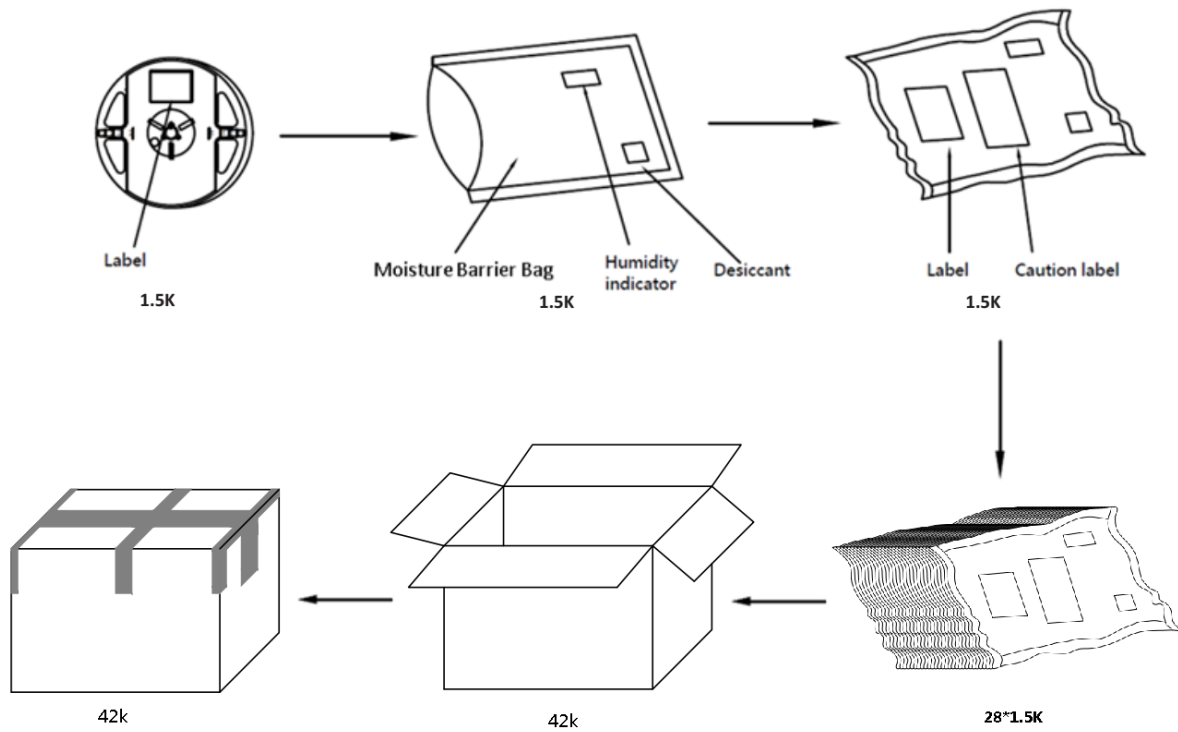


Note for Figure 14:

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 LED emitters are classified as Risk Group 2 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: 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.

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