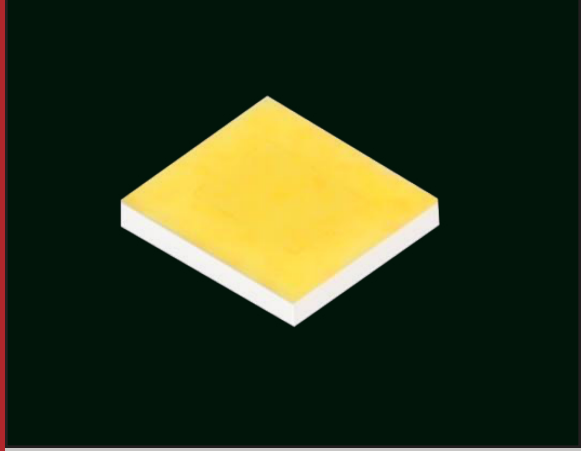
Bridgelux® CSP 1111 Series

Product Data Sheet DS951

BXCP-27x | 30x | 40x | 50x | 57x | 65x

Introduction

CSP 1111



The Bridgelux Chip Scale Package (CSP) 1111 LED offers exceptional performance in an ultra compact size. This CSP 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 superior performance without bonding wires and ability to assemble a densely populated and high luminous flux LED board, the CSP 1111 provides unparalleled design-in flexibility for indoor and outdoor lighting applications. The CSP 1111 is ideal as a drop in replacement for emitters with an industry standard 1.1mm x 1.1mm footprint.

Features

- Competitive efficacy and lumen per dollar
- Industry-standard 1111 footprint, 1-sided emitter
- Excellent color maintenance
- Compatible with SMT
- 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
- 120 degrees viewing angle
- 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

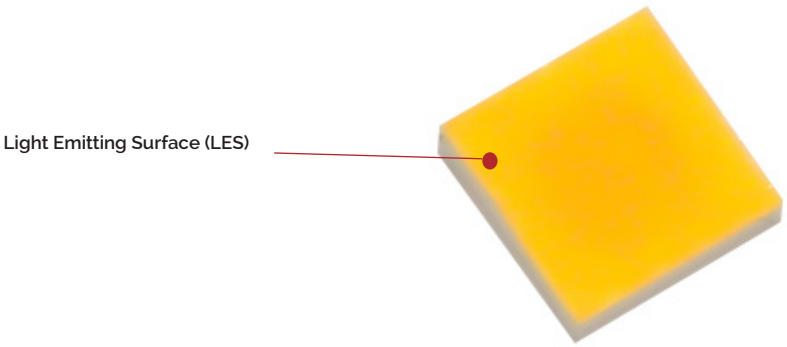
Pb free RoHS

Contents

Product Feature Map

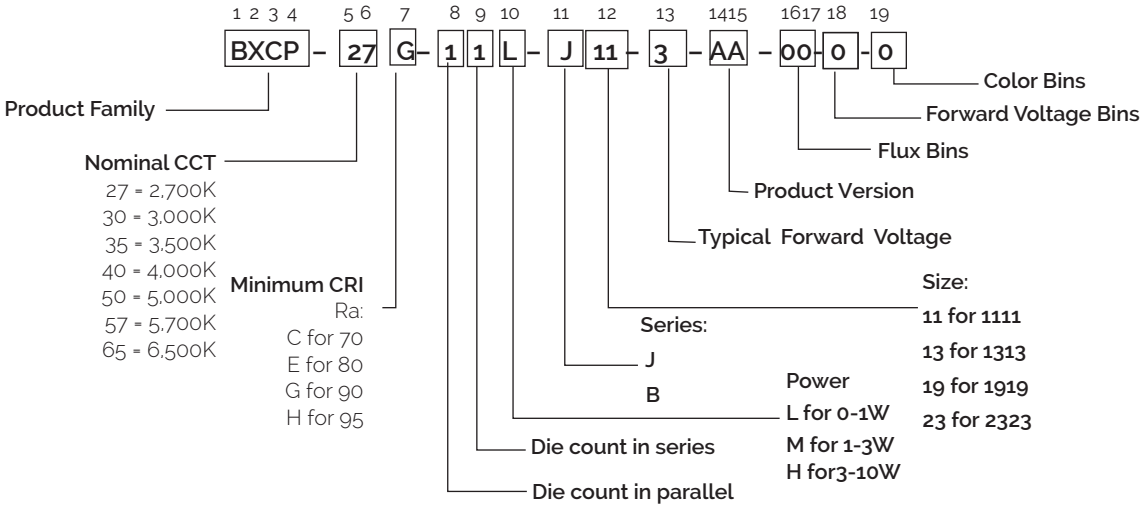
Bridgelux CSP LED products offer exceptional performance and color quality all in a highly reliable, cost effective, compact package. Our CSP products come in industry standard package sizes and follow ANSI binning standards.

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 CSP 1111 is explained as follows:



Product Test Conditions

Bridgelux CSP 1111 LEDs are tested and binned with a 10ms pulse of 350mA at T_j (junction temperature)=T_{sp} (solder point temperature) =85˚C. Luminous flux , color and forward voltage are binned at T_j=T_{sp}=85˚C,

Product Selection Guide

The following product configurations are available:

Table 1: Selection Guide, Pulsed Measurement Data at 150mA (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[4,5] (lm)	Typical Power (W)	Typical Efficacy (lm/W)
				Min	Typical	Max			
BXCP-27G-11L-J11-3-A1-00-0-0	2700	90	150	2.70	2.90	3.20	51	0.4	118
BXCP-30G-11L-J11-3-A1-00-0-0	3000	90	150	2.70	2.90	3.20	54	0.4	124
BXCP-40G-11L-J11-3-A1-00-0-0	4000	90	150	2.70	2.90	3.20	59	0.4	137
BXCP-50G-11L-J11-3-A1-00-0-0	5000	90	150	2.70	2.90	3.20	59	0.4	137
BXCP-57G-11L-J11-3-A1-00-0-0	5700	90	150	2.70	2.90	3.20	59	0.4	137
BXCP-65G-11L-J11-3-A1-00-0-0	6500	90	150	2.70	2.90	3.20	59	0.4	137
BXCP-27H-11L-J11-3-A1-00-0-0	2700	95	150	2.70	2.90	3.20	46	0.4	106
BXCP-30H-11L-J11-3-A1-00-0-0	3000	95	150	2.70	2.90	3.20	48	0.4	111
BXCP-40H-11L-J11-3-A1-00-0-0	4000	95	150	2.70	2.90	3.20	55	0.4	126
BXCP-50H-11L-J11-3-A1-00-0-0	5000	95	150	2.70	2.90	3.20	55	0.4	126
BXCP-57H-11L-J11-3-A1-00-0-0	5700	95	150	2.70	2.90	3.20	55	0.4	126
BXCP-65H-11L-J11-3-A1-00-0-0	6500	95	150	2.70	2.90	3.20	55	0.4	126

Notes for Table 1:

1. The last 6 characters (including hyphens '-') refer to nominal flux, nominal forward voltage, and color bins, respectively. "00-0-0" denotes the full distribution of flux, forward voltage, and 5 SDCM color.

   Example: BXCP-27G-11L-J11-3-A1-00-0-0 refers to the full distribution of flux, forward voltage, and color within a 2700K 5-step ANSI standard chromaticity region with a minimum of 90 CRI.
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 CSP.
6. Refer to Table 6 and Table 7 for Bridgelux CSP Luminous Flux Binning and Forward Voltage Binning information.

Product Selection Guide

Table 2: Selection Guide, Pulsed Measurement Data at 150mA (T_j=T_{sp}=85˚C)

Part Number[1,5]	Nominal CCT[2] (K)	CRI[3, 4]	Nominal Drive Current (mA)	Forward Voltage[4] (V)			Typical Pulsed Flux[4] (lm)	Typical Power (W)	Typical Efficacy (lm/W)
				Min	Typical	Max			
BXCP-27G-11L-J11-3-A1-00-0-0	2700	90	150	2.60	2.80	3.00	46	0.4	110
BXCP-30G-11L-J11-3-A1-00-0-0	3000	90	150	2.60	2.80	3.00	48	0.4	114
BXCP-40G-11L-J11-3-A1-00-0-0	4000	90	150	2.60	2.80	3.00	53	0.4	126
BXCP-50G-11L-J11-3-A1-00-0-0	5000	90	150	2.60	2.80	3.00	53	0.4	126
BXCP-57G-11L-J11-3-A1-00-0-0	5700	90	150	2.60	2.80	3.00	53	0.4	126
BXCP-65G-11L-J11-3-A1-00-0-0	6500	90	150	2.60	2.80	3.00	53	0.4	126
BXCP-27H-11L-J11-3-A1-00-0-0	2700	95	150	2.60	2.80	3.00	41	0.4	98
BXCP-30H-11L-J11-3-A1-00-0-0	3000	95	150	2.60	2.80	3.00	43	0.4	102
BXCP-40H-11L-J11-3-A1-00-0-0	4000	95	150	2.60	2.80	3.00	49	0.4	117
BXCP-50H-11L-J11-3-A1-00-0-0	5000	95	150	2.60	2.80	3.00	49	0.4	117
BXCP-57H-11L-J11-3-A1-00-0-0	5700	95	150	2.60	2.80	3.00	49	0.4	117
BXCP-65H-11L-J11-3-A1-00-0-0	6500	95	150	2.60	2.80	3.00	49	0.4	117

Notes for Table 2:

1. The last 6 characters (including hyphens '-') refer to nominal flux, nominal forward voltage, and color bins, respectively. "00-0-0" denotes the full distribution of flux, forward voltage, and 5 SDCM color.

   Example: BXCP-27G-11L-J11-3-A1-00-0-0 refers to the full distribution of flux, forward voltage, and color within a 2700K 5-step ANSI standard chromaticity region with a minimum of 90 CRI.
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 CSP.
5. Refer to Table 6 and Table 7 for Bridgelux CSP Luminous Flux Binning and Forward Voltage Binning information.
6. Products tested under pulsed condition (10ms pulse width) at nominal drive current where Tj=Tsp=85˚C.

Performance at Commonly Used Drive Currents

CSP 1111 LEDs specifications at nominal drive current are shown in Table 1 and Table 2. CSP 1111 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°C (V)	Typical Power T_{sp} = 25°C (W)	Typical Pulsed Flux[2] T_{sp} = 25°C (lm)	Typical Pulsed Flux[3] T_{sp} = 85°C (lm)	Typical Efficacy T_{sp} = 25°C (lm/W)
BXCP-27G-11L-J11-3-A1-00-0-0	90	50	2.7	0.1	19	17	139
		150	**2.9**	**0.4**	**51**	**46**	**118**
		250	3.0	0.8	77	70	102
		350	3.1	1.1	100	90	92
		400	3.2	1.3	111	100	87
		500	3.3	1.7	131	118	79
BXCP-30G-11L-J11-3-A1-00-0-0	90	50	2.7	0.1	20	18	147
		150	**2.9**	**0.4**	**54**	**48**	**124**
		250	3.0	0.8	82	73	108
		350	3.1	1.1	106	95	98
		400	3.2	1.3	117	105	91
		500	3.3	1.7	138	124	83
BXCP-40G-11L-J11-3-A1-00-0-0	90	50	2.7	0.1	22	20	162
		150	**2.9**	**0.4**	**59**	**53**	**137**
		250	3.0	0.8	90	81	119
		350	3.1	1.1	117	105	108
		400	3.2	1.3	129	116	101
		500	3.3	1.7	152	137	92
BXCP-50G-11L-J11-3-A1-00-0-0	90	50	2.7	0.1	22	20	162
		150	**2.9**	**0.4**	**59**	**53**	**137**
		250	3.0	0.8	90	81	119
		350	3.1	1.1	117	105	108
		400	3.2	1.3	129	116	101
		500	3.3	1.7	152	137	92
BXCP-57G-11L-J11-3-A1-00-0-0	90	50	2.7	0.1	22	20	162
		150	**2.9**	**0.4**	**59**	**53**	**137**
		250	3.0	0.8	90	81	119
		350	3.1	1.1	117	105	108
		400	3.2	1.3	129	116	101
		500	3.3	1.7	152	137	92
BXCP-65G-11L-J11-3-A1-00-0-0	90	50	2.7	0.1	22	20	162
		150	**2.9**	**0.4**	**59**	**53**	**137**
		250	3.0	0.8	90	81	119
		350	3.1	1.1	117	105	108
		400	3.2	1.3	129	116	101
		500	3.3	1.7	152	137	92

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 pulsed performance values are provided as reference only and are not a guarantee of performance.

Performance at Commonly Used Drive Currents

Table 3: Performance at Commonly Used Drive Currents (Continued)

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 Pulsed Flux[3] T_{sp} = 85°C (lm)	Typical Efficacy T_{sp} = 25°C (lm/W)
BXCP-27H-11L-J11-3-A1-00-0-0	95	50	2.7	0.1	17	15	125
		150	**2.9**	**0.4**	**46**	**41**	**106**
		250	3.0	0.8	70	63	92
		350	3.1	1.1	90	81	83
		400	3.2	1.3	100	90	78
		500	3.3	1.7	118	106	71
BXCP-30H-11L-J11-3-A1-00-0-0	95	50	2.7	0.1	18	16	131
		150	**2.9**	**0.4**	**48**	**43**	**111**
		250	3.0	0.8	73	66	97
		350	3.1	1.1	94	85	87
		400	3.2	1.3	105	94	82
		500	3.3	1.7	123	111	75
BXCP-40H-11L-J11-3-A1-00-0-0	95	50	2.7	0.1	20	18	150
		150	**2.9**	**0.4**	**55**	**49**	**126**
		250	3.0	0.8	83	75	110
		350	3.1	1.1	108	97	100
		400	3.2	1.3	119	107	93
		500	3.3	1.7	141	127	85
BXCP-50H-11L-J11-3-A1-00-0-0	95	50	2.7	0.1	20	18	150
		150	**2.9**	**0.4**	**55**	**49**	**126**
		250	3.0	0.8	83	75	110
		350	3.1	1.1	108	97	100
		400	3.2	1.3	119	107	93
		500	3.3	1.7	141	127	85
BXCP-57H-11L-J11-3-A1-00-0-0	95	50	2.7	0.1	20	18	150
		150	**2.9**	**0.4**	**55**	**49**	**126**
		250	3.0	0.8	83	75	110
		350	3.1	1.1	108	97	100
		400	3.2	1.3	119	107	93
		500	3.3	1.7	141	127	85
BXCP-65H-11L-J11-3-A1-00-0-0	95	50	2.7	0.1	20	18	150
		150	**2.9**	**0.4**	**55**	**49**	**126**
		250	3.0	0.8	83	75	110
		350	3.1	1.1	108	97	100
		400	3.2	1.3	119	107	93
		500	3.3	1.7	141	127	85

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 pulsed performance values are provided as reference only and are not a guarantee of performance.

Electrical and Thermal Characteristics

Table 4: Electrical and Thermal Characteristics

Part Number [1]	Drive Current (mA)	Forward Voltage[2,3] (V)			Typical Temperature Coefficient of Forward Voltage[4] $\Delta V_f/\Delta T$ (mV/°C)	Typical Thermal Resistance Junction to Solder Point[5,6] R_{j-sp} (°C/W)
		Minimum	Typical	Maximum		
BXCP-XXX-11L-J11-3-A1-00-0-0	350	2.80	3.00	3.20	-1.7	9.5

Notes for Table 4:

1. The last 6 characters (including hyphens '-') refer to nominal flux, nominal forward voltage, and color bins, respectively. "00-0-0" denotes the full distribution of flux, forward voltage, and 5 SDCM color.

   Example: BXCP-27G-11L-J11-3-A1-00-0-0 refers to the full distribution of flux, forward voltage, and color within a 2700K 5-step ANSI standard chromaticity region with a minimum of 90 CRI.
2. Products tested under pulsed condition (10ms pulse width) where T_{sp} = 85°C.
3. Bridgelux maintains a tolerance of ± 0.1V on forward voltage measurements.
4. Products measured between 25°C and 105°C under pulsed condition (10ms pulse width).
5. Thermal Resistance values based on 2700K 90 CRI product.
6. 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)	135˚C
Storage Temperature	-40˚C to +125˚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]	500mA
Maximum Peak Pulsed Forward Current[2]	1000mA
Maximum Reverse Voltage[3]	-5V
Moisture Sensitivity Rating	MSL 3
Electrostatic Discharge	2kV HBM. JEDEC-JS-001-HBM and JEDEC-JS-001-2012

Notes for Table 5:

1. The maximum drive current is limited depending on the solder point temperature. Refer to Figure 7.
2. Bridgelux recommends a maximum duty cycle of 10% and pulse width of 10 ms when operating CSP LED at maximum peak pulsed current specified. Maximum peak pulsed currents indicate values where CSP LED 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. Maximum rating provided for reference only.

Product Bin Definitions

Table 6 lists the standard photometric luminous flux bins for Bridgelux CSP 1111 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 350mA, T_{sp}=85˚C

Bin Code	Minimum	Maximum	Unit	Condition
E1	70	80	lm	I_F=350mA
F1	80	90		
G1	90	100		
H1	100	110		
I1	110	120		
J1	120	130		

Note for Table 6:

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

Table 7: Forward Voltage Bin Definition at 350mA, T_{sp}=85˚C

Bin Code	Minimum	Maximum	Unit	Condition
D	2.8	3.0	V	I_F=350mA
E	3.0	3.2		
F	3.2	3.4		

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 (T_{sp}=85˚C)

Table 8: 3- and 5-step MacAdam Ellipse Color Bin Defnitions (Tsp=85°C)							
CCT	Color Space	Center Point		Major Axis	minor Axis	θ'(angle)	Color Bin [2,3]
		x	y				
2700K	2	0.4578	0.4101	0.0054	0.0028	53.70	2
	3			0.0081	0.0042		3
	5			0.0135	0.0070		5(E/F/G/H)
3000K	2	0.4338	0.4030	0.0056	0.0027	53.22	2
	3			0.0083	0.0041		3
	5			0.0139	0.0068		5(E/F/G/H)
3500K	2	0.4073	0.3917	0.0062	0.0028	54.00	2
	3			0.0093	0.0041		3
	5			0.0155	0.0069		5(E/F/G/H)
4000K	2	0.3818	0.3797	0.0063	0.0027	53.72	2
	3			0.0094	0.0040		3
	5			0.0157	0.0067		5(E/F/G/H)
5000K	2	0.3447	0.3553	0.0055	0.0024	59.62	2
	3			0.0082	0.0035		3
	5			0.0137	0.0059		5(E/F/G/H)
5700K	2	0.3287	0.3417	0.0050	0.0021	59.09	2
	3			0.0075	0.0032		3
	5			0.0124	0.0053		5(E/F/G/H)
6500K	2	0.3123	0.3282	0.0045	0.0019	58.57	2
	3			0.0067	0.0029		3
	5			0.0112	0.0048		5(E/F/G/H)

Note for Table 8:

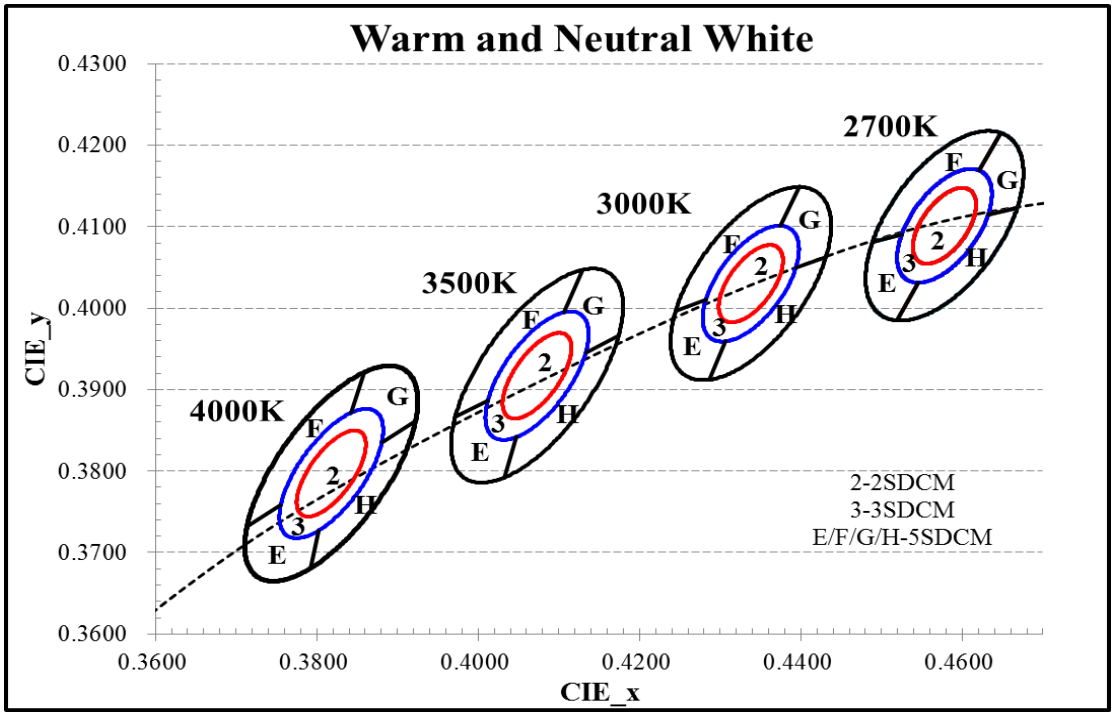
1.Bridgelux maintains a tolerance of ± 0.007 on x and y color coordinates in the CIE 1931 color space.

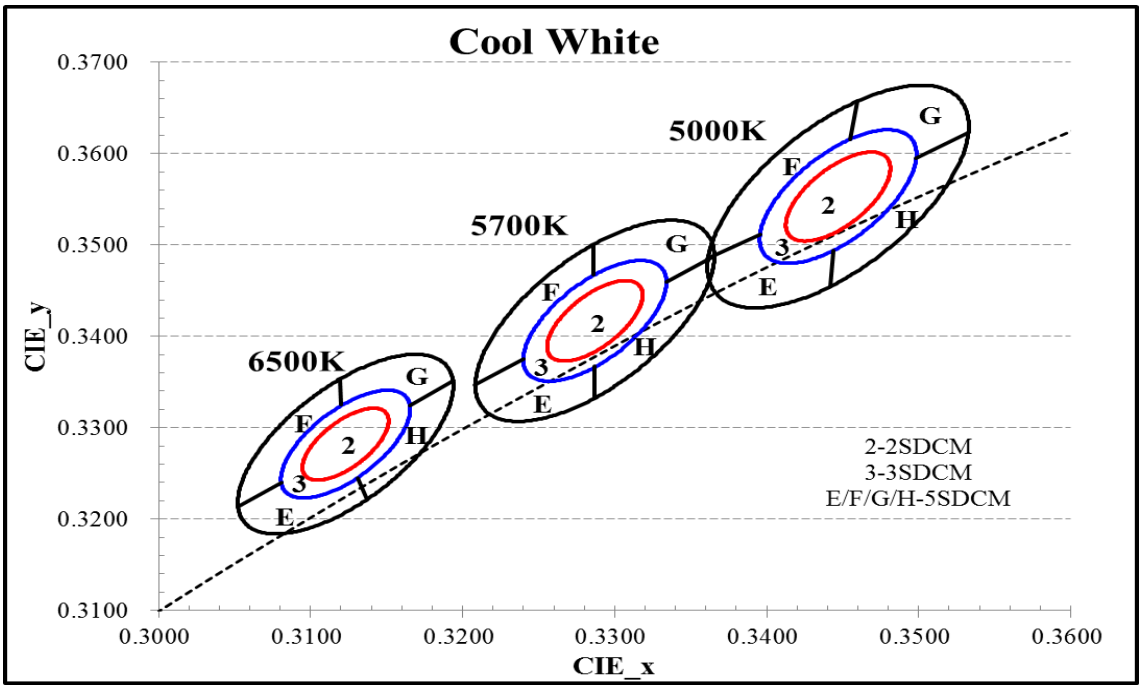
2. MacAdam Ellipse Color bin code for CRI ≥90: 2(2 SDCM)/ 3(3 SDCM)/ EFGH(5 SDCM).

3. MacAdam Ellipse Color bin code for CRI<90: 3(3 SDCM)/ 5(5 SDCM).

Product Bin Definitions

Figure 1: C.I.E. 1931 Chromaticity Diagram (Color Bin Structure, T_{sp}=85˚C)





Performance Curves

Figure 2: Drive Current vs. Voltage (T_{sp}=85˚C)

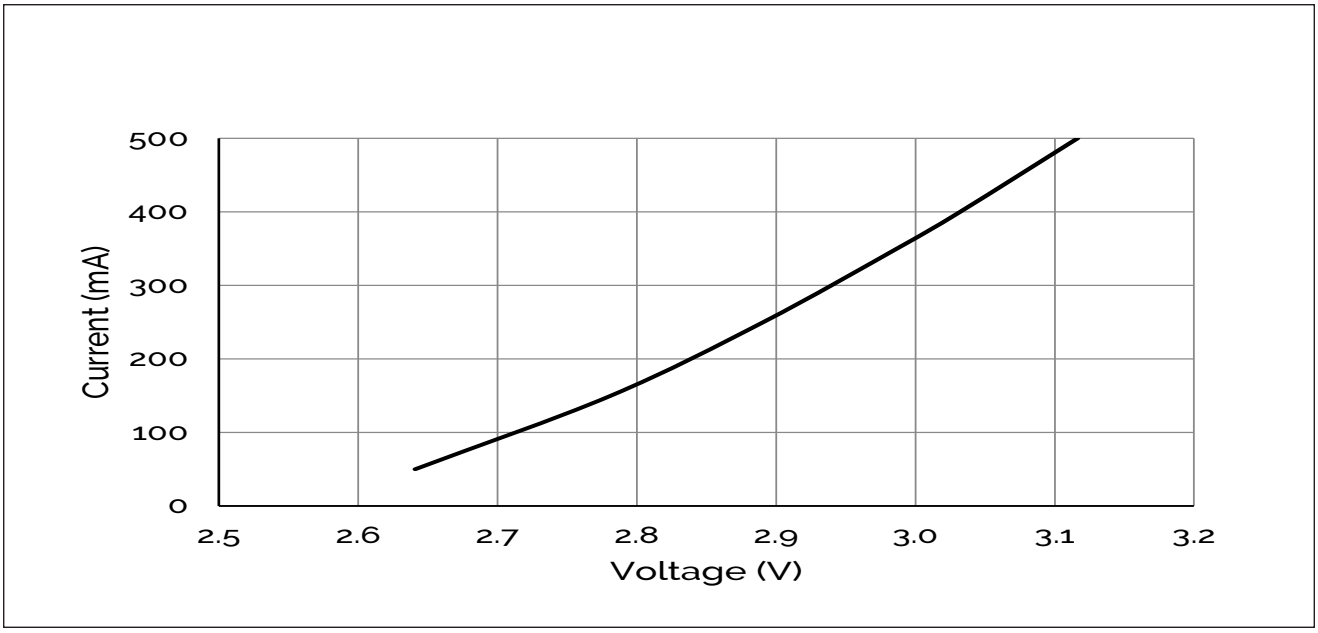
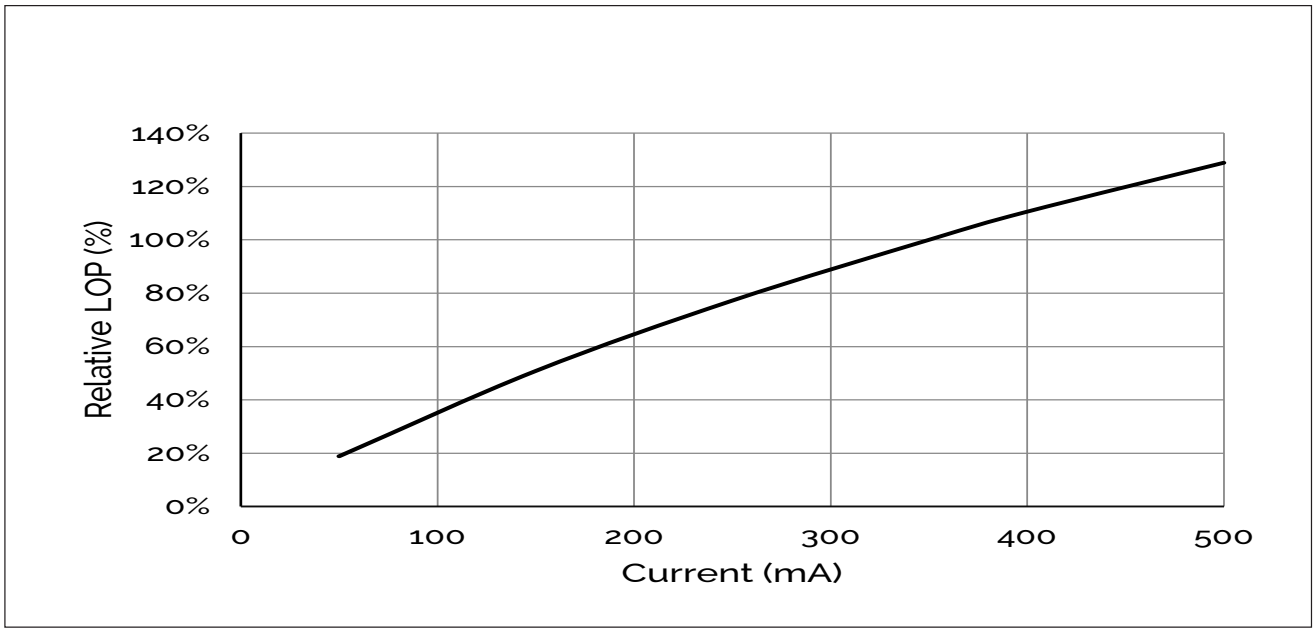


Figure 3: Typical Relative Luminous Flux vs. Drive Current (T_{sp}=85˚C)



Note for Figure 3:

1. Bridgelux does not recommend driving low power LEDs at low current (< 10mA). 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_350mA

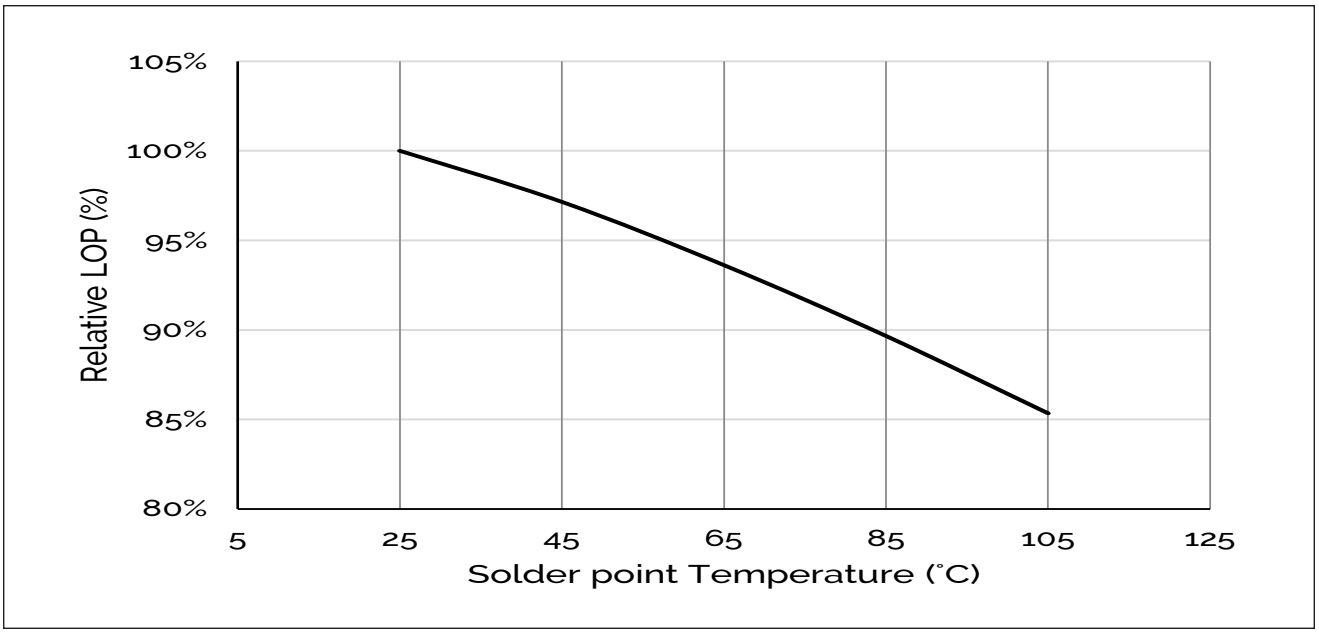
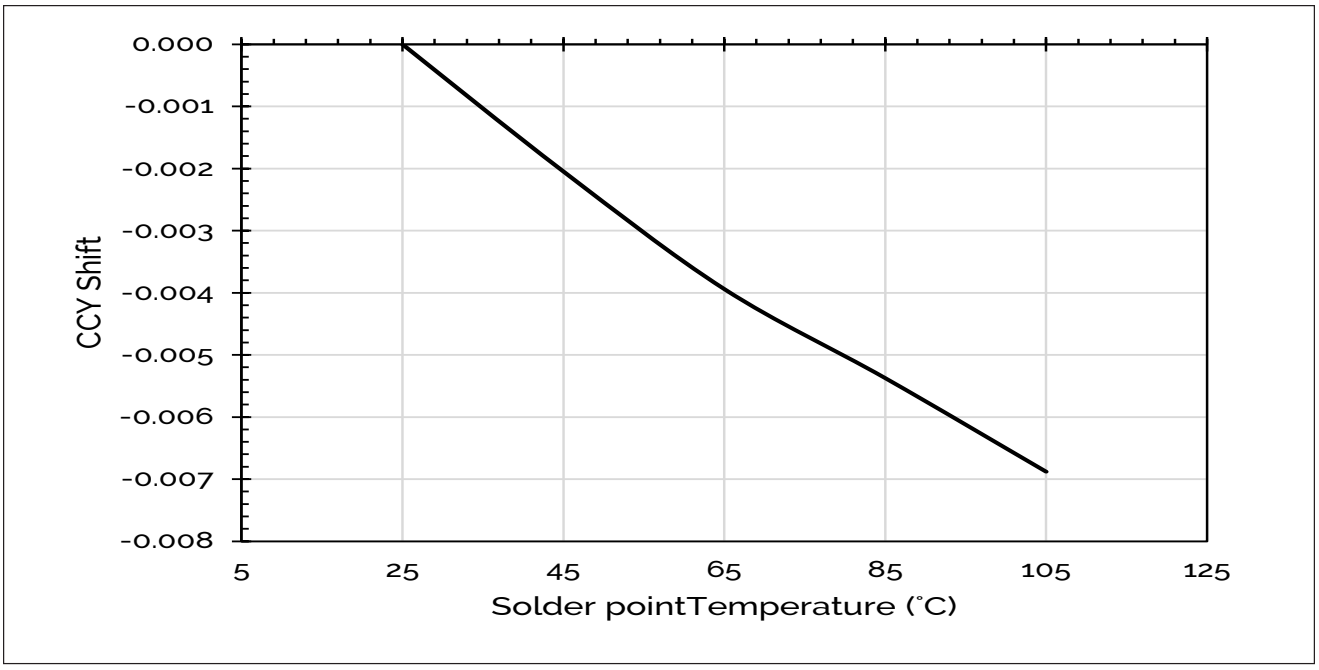


Figure 5: Typical ccy Shift vs. Solder Point Temperature_350mA



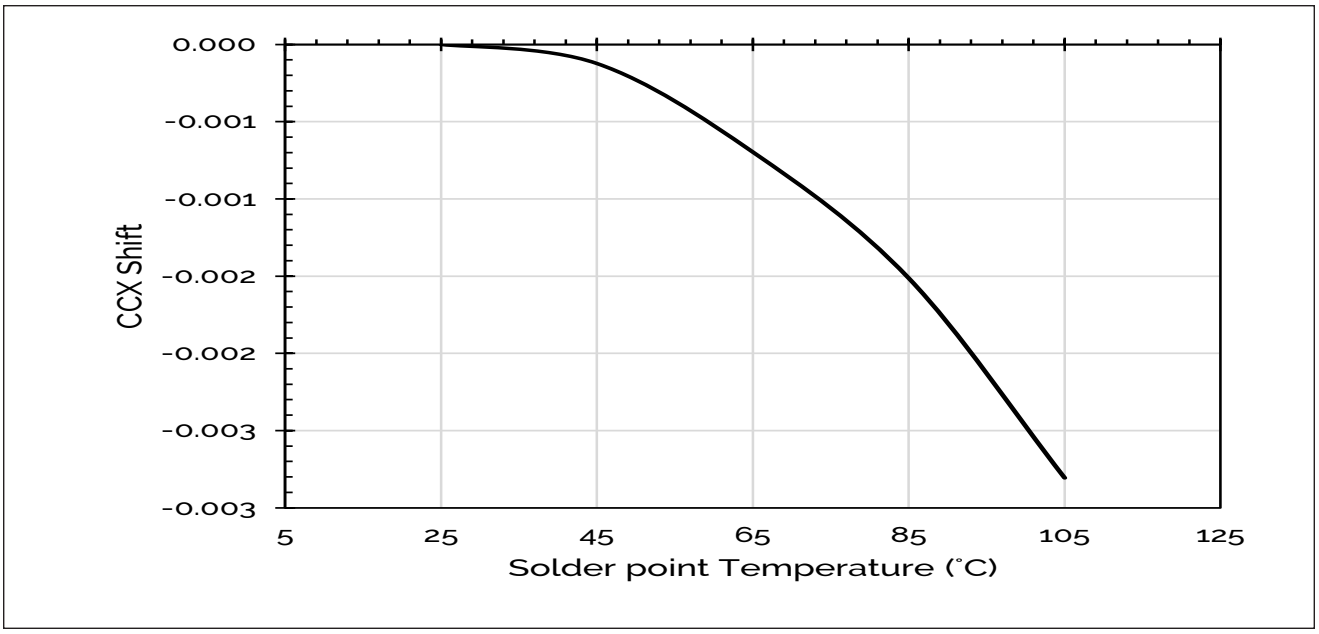
Notes for Figures 4 & 5:

1.Characteristics shown for warm white based on 2700K and 90 CRI.

2 .For other color SKUs, the shift in color will vary. Please contact your Bridgelux Sales Representative for more information.

Performance Curves

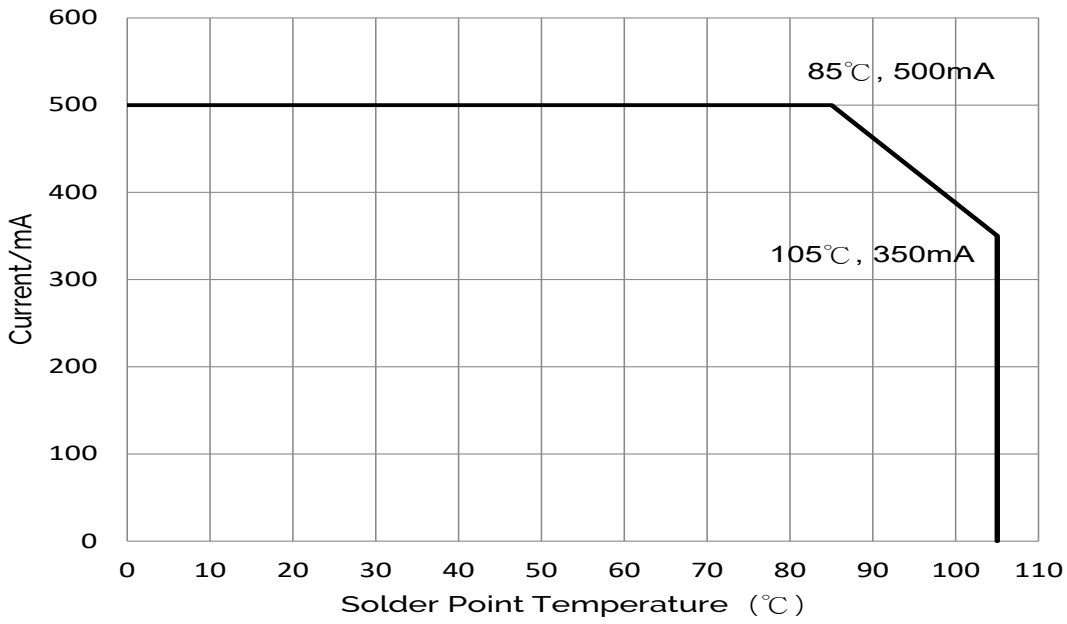
Figure 6: Typical ccx Shift vs. Solder Point Temperature_350mA



Notes for Figure 6:

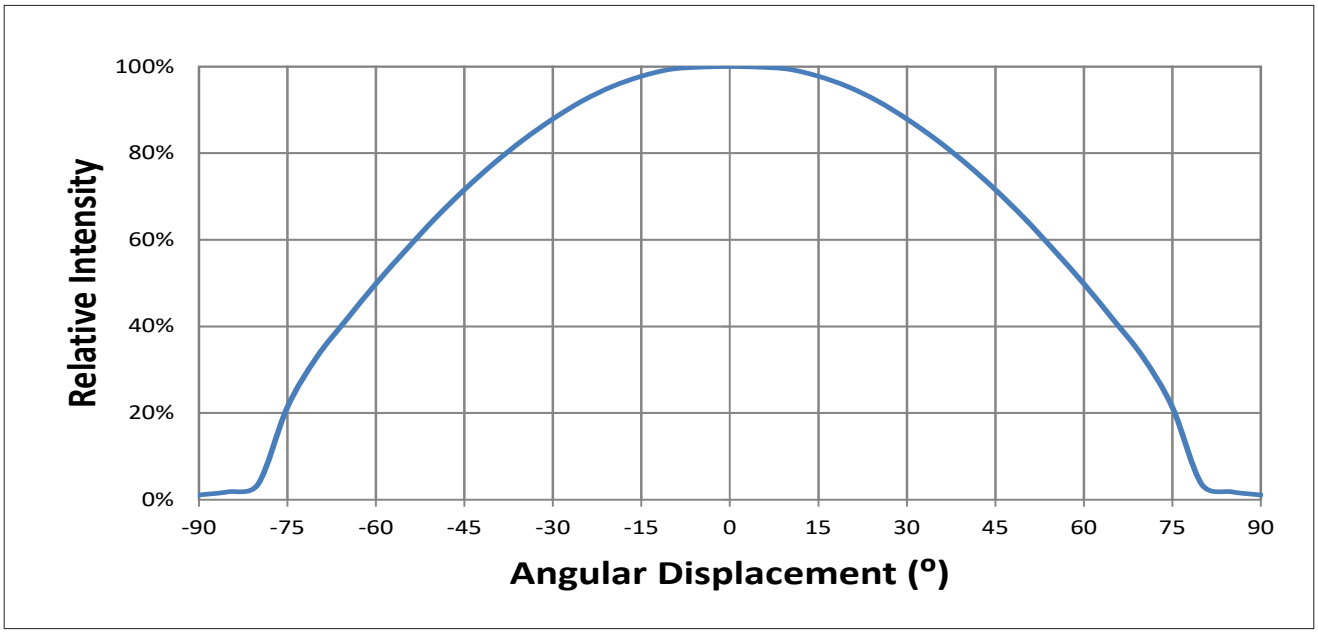
1. Characteristics shown for warm white based on 2700K and 90 CRI.
2. For other color SKUs, the shift in color will vary. Please contact your Bridgelux Sales Representative for more information.

Figure 7: Drive Current vs Solder Point Temperature



Typical Radiation Pattern

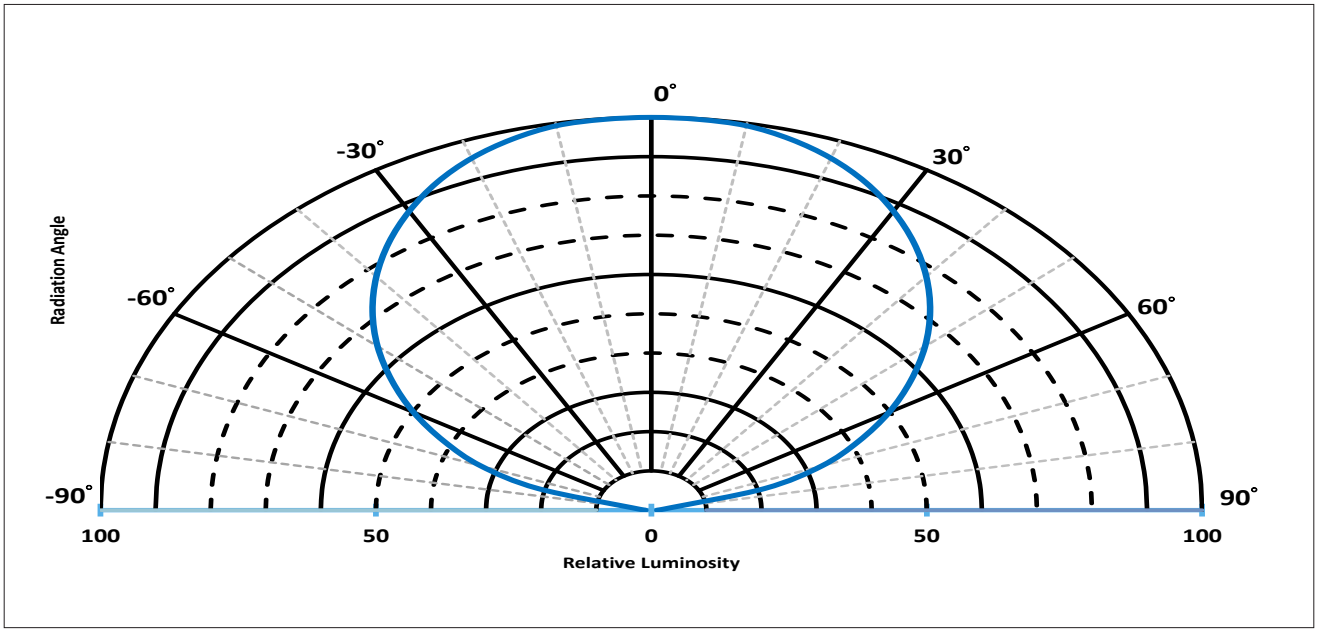
Figure 8: Typical Spatial Radiation Pattern at 350mA, T_{sp}=25˚C



Notes for Figure 8:

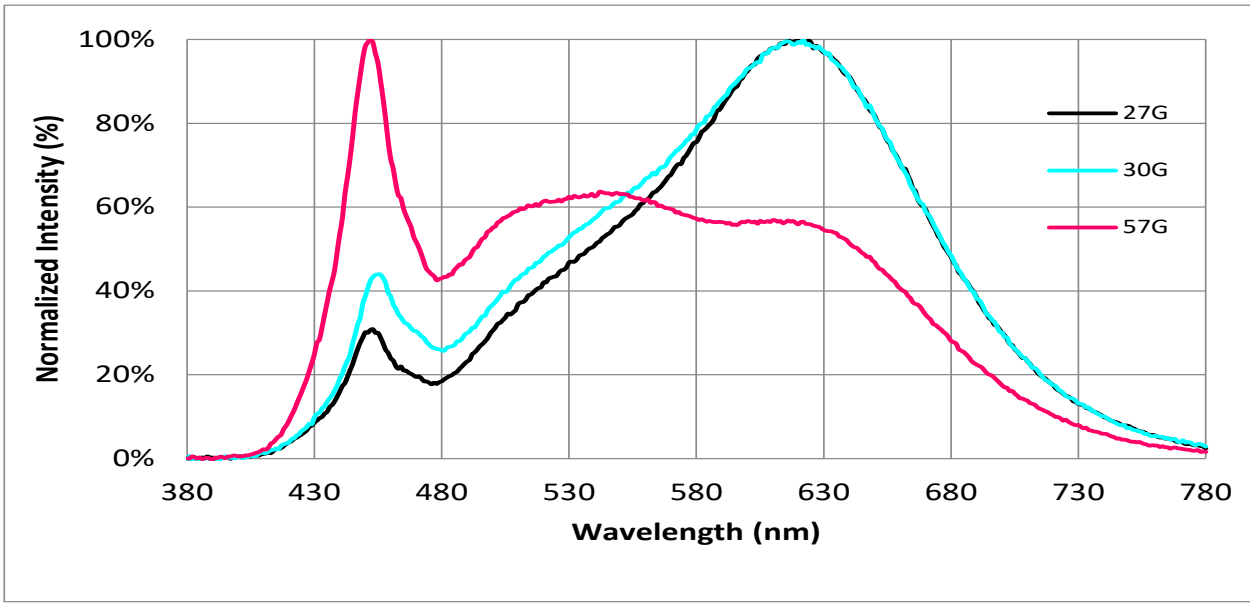
1. Typical viewing angle is 120°.
2. The viewing angle is defined as the off axis angle from the centerline where Iv is ½ of the peak value.

Figure 9: Typical Polar Radiation Pattern at 350mA, T_{sp}=25˚C



Typical Color Spectrum

Figure 10: **Typical Color Spectrum at 350mA, Tsp=85°C**

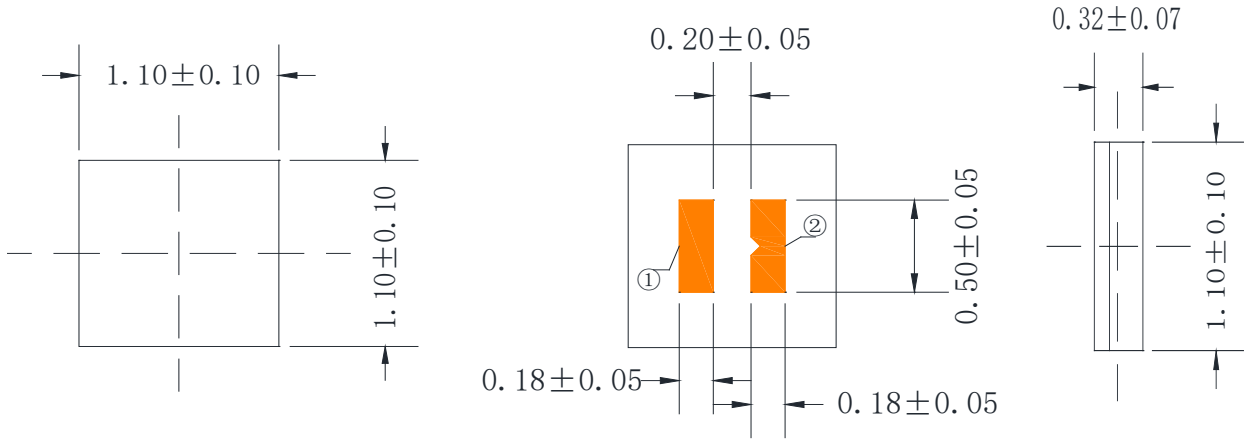


Notes for Figure 10:

1. Color spectra shown for warm white is 2700K and 90 CRI.
2. Color spectra shown for warm white is 3000K and 90 CRI.
3. Color spectra shown for cool white is 5700K and 90 CRI.

Mechanical Dimensions

Figure 11: Drawing for CSP 1111



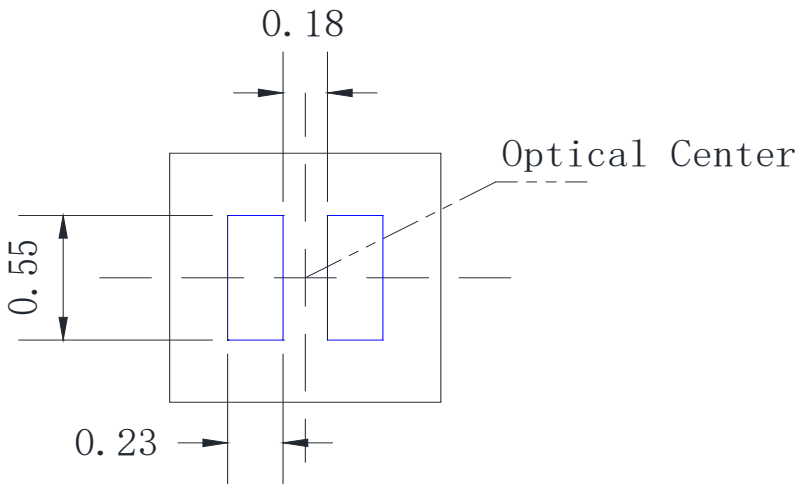
① Anode pad

② Cathode pad

Notes for Figure 11:

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 Sensitivity Level	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=125°C		1000 hours	0/22
4	Low Temperature Operating Life	JESD22-A108D	T_a=-40°C	500mA	1000 hours	0/22
5	Temperature Humidity Operating Life	JESD22-A101C	T_{sp}=85°C, RH=85%	500mA	1000 hours	0/22
6	High Temperature Operating Life	JESD22-A108D	T_{sp}=85°C	500mA	1000 hours	0/22
7	Thermal Shock	JESD22-A106B	T_a=-40°C ~125°C; Dwell : 15min; Transfer: 10sec		200 Cycle	0/22
8	Temperature Cycle	JESD22-A104E	T_a=-40°C ~125°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
10	Vibration Test	JESD22-B103	10m/s², 100~20000~100Hz 4 cycles,4min,eachX,Y,Z		4 Cycles	0/22

Passing Criteria

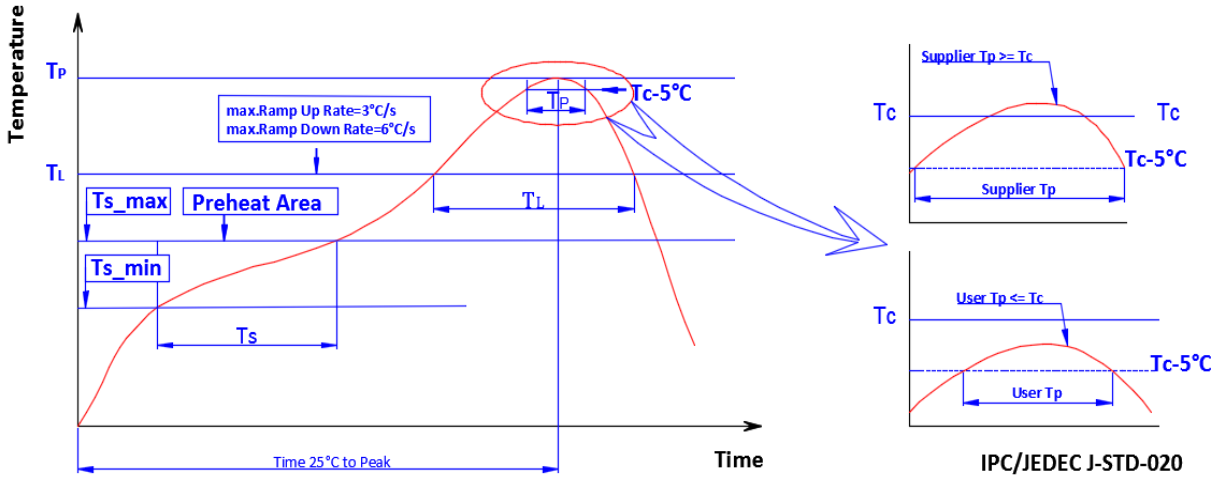
Item	Symbol	Test Condition	Passing Criteria
Forward Voltage	Vf	500mA	ΔVf<10%
Luminous Flux	Iv	500mA	ΔIv<30%
Chromaticity Coordinates	(x, y)	500mA	Δu'v'<0.007

Notes for Table 9:

1. Test board: Aluminum board thickness =1.0mm, Copper layer thickness=70um.
2. Measurements are performed after allowing the LEDs to return to room temperature
3. T_{sld} : reflow soldering temperature; T_a : ambient temperature

Reflowing Characteristics

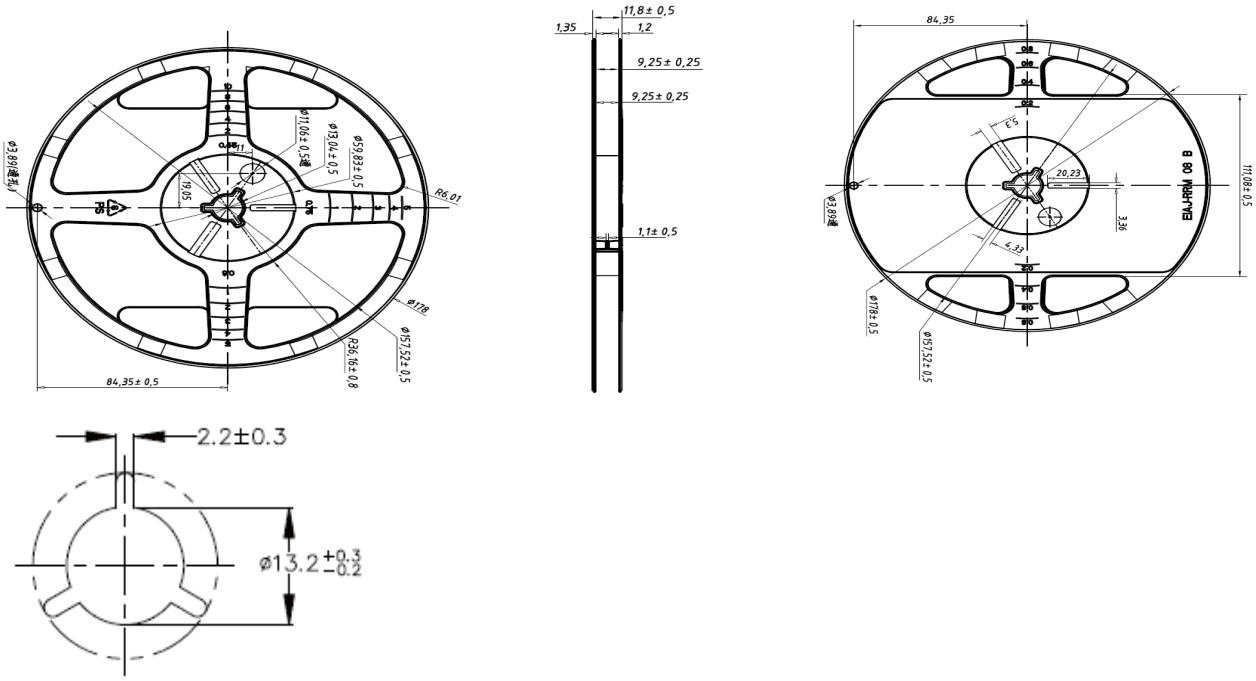
Figure 12 : Reflow Profile



Profile Parameters	Lead-Free Solder SAC305
Average Ramp-Up Rate ($T_{s\,max}$ to T_p)	3°C/second max.
Preheat: Temperature Min ($T_{s\,min}$)	150°C
Preheat: Temperature Max ($T_{s\,max}$)	190°C
Preheat: Time ($t_{s\,min}$ to $t_{s\,max}$)	90-120 seconds
Liquidous Temperature (T_L)	217°C
Time Maintained Above Liquidous Temperature (T_L): Time (t_L)	60-90 seconds
Peak/Classification Temperature (T_p)	250-255°C
Time Within 10°C of Actual Peak Temperature (T_p)	20-40 seconds
Ramp-Down Rate	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.

Packaging

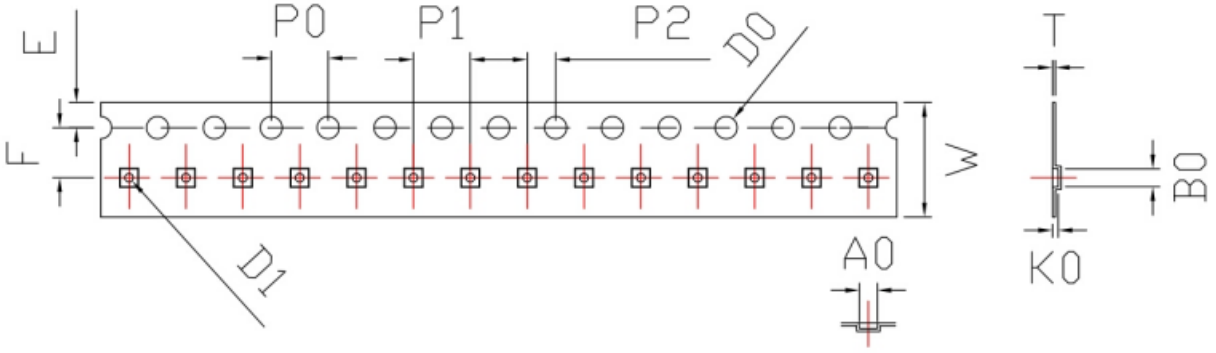
Figure 13: Reel Drawings



Note for Figure 13:

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

Figure 14: Tape Drawings



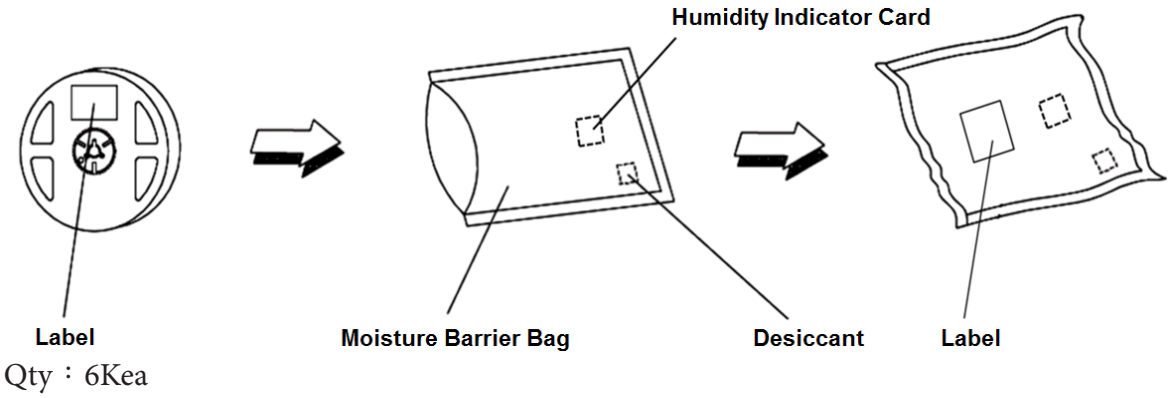
A0	B0	K0	P0	P1	P2	W	T	E	F	D0	D1
1.25±0.05	1.25±0.05	0.40±0.05	4.00±0.10	4.0±0.1	2.0±0.10	8.0±0.2	0.20±0.05	1.75±0.10	3.5±0.1	1.50±0.10	0.6±0.1

Note for Figure 14:

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

Packaging

Figure 15: Reel Packaging Drawings



Note for Figure 15:

1. Drawings are not to scale.

Design Resources

Optical Source Models

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 CSP.

CAUTION: EYE SAFETY

Eye safety classification for the use of Bridgelux CSP is in accordance with IEC specification 62471: Photobiological Safety of Lamps and Lamp Systems.
Most of Bridgelux CSPs are classified as Risk Group Exempt or Risk Group 1 in accordance with IEC specification 62471. However, the CSP LEDs will be classified as Risk Group 2 when operated at high power conditions with high ratio blue wavelength in the emission spectrum depending on characteristics. Please use appropriate precautions. It is important that employees working with LEDs are trained to use them safely.

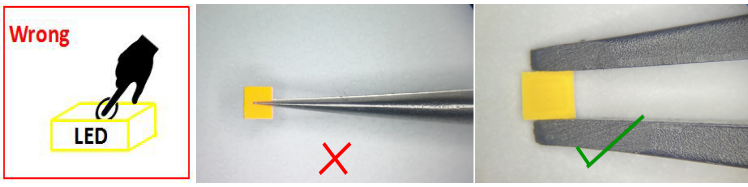
CAUTION: RISK OF BURN

Do not touch the CSP LES during operation. Allow the CSP to cool for a sufficient period of time before handling. The CSP may reach elevated temperatures such that could burn skin when touched.

CAUTION: PICK AND PLACE

Recommend using Teflon material for nozzle. Sharp steel material must not be used as pick up tools.

CAUTION



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
bridgelux.com
twitter.com/Bridgelux
facebook.com/Bridgelux
WeChat ID: BridgeluxInChina

46410 Fremont Boulevard
Fremont, CA 94538 U.S.A.
Tel (925) 583-8400
www.bridgelux.com

Bridgelux CSP 1111 Product Data Sheet DS951 Rev. B (04/2023)