

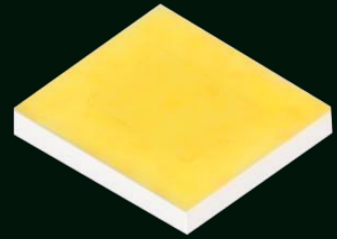


# Bridgelux® CSP 1313 Series

Product Data Sheet DSg60

# Introduction

CSP 1313



The Bridgelux Chip Scale Package (CSP) 1313 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 1313 provides unparalleled design-in flexibility for indoor and outdoor lighting applications. The CSP 1313 is ideal as a drop in replacement for emitters with an industry standard 1.3mm x 1.3mm footprint.

## Features

- Competitive efficacy and lumen per dollar
- Industry-standard 1313 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



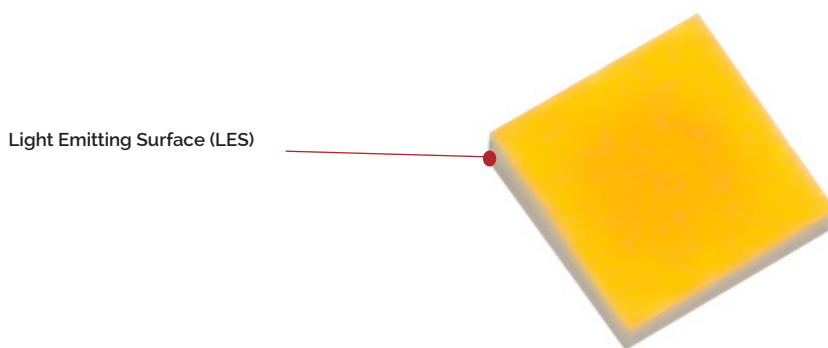
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# Product Feature Map

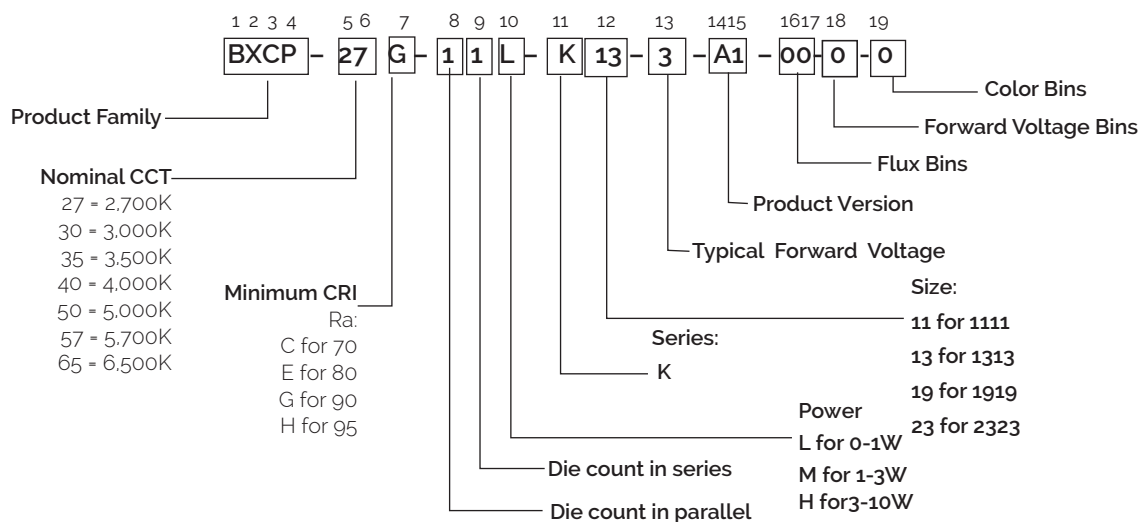
Bridgelux CSP LED products offer exceptional performance and color quality all in a highly reliable, cost effective, compact package. Our CSP products come in industry standard package sizes and follow ANSI binning standards.

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 1313 is explained as follows:



## Product Test Conditions

Bridgelux CSP1313 White 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  $T_j = T_{sp} = 85^\circ\text{C}$ .

Bridgelux CSP 1313 PC Amber LEDs are tested and binned with a 10ms pulse of 350mA at  $T_j$  (junction temperature) =  $T_{sp}$  (solder point temperature) = 25°C. Luminous flux, color and forward voltage are binned at  $T_j = T_{sp} = 25^\circ\text{C}$ .

# Product Selection Guide

The following product configurations are available:

**Table 1:** Selection Guide, Pulsed Measurement Data at 350mA ( $T_j = T_{sp} = 25^\circ\text{C}$ )

| Part Number <sup>1,6</sup>   | Nominal CCT <sup>2</sup><br>(K) | CRI <sup>3,5</sup> | Nominal<br>Drive Cur-<br>rent<br>(mA) | Forward Voltage <sup>4,5</sup><br>(V) |         |      | Typical<br>Pulsed<br>Flux <sup>4,5</sup><br>(lm) | Typical<br>Power<br>(W) | Typical<br>Efficacy<br>(lm/W) |
|------------------------------|---------------------------------|--------------------|---------------------------------------|---------------------------------------|---------|------|--------------------------------------------------|-------------------------|-------------------------------|
|                              |                                 |                    |                                       | Min                                   | Typical | Max  |                                                  |                         |                               |
| BXCP-PCA-11L-K13-3-A1-00-0-0 | 1500                            | 45                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 105                                              | 1.1                     | 100                           |
| BXCP-18C-11L-K13-3-A1-00-0-0 | 1800                            | 70                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 122                                              | 1.1                     | 116                           |
| BXCP-22C-11L-K13-3-A1-00-0-0 | 2200                            | 70                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 142                                              | 1.1                     | 135                           |
| BXCP-27C-11L-K13-3-A1-00-0-0 | 2700                            | 70                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 156                                              | 1.1                     | 149                           |
| BXCP-30C-11L-K13-3-A1-00-0-0 | 3000                            | 70                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 159                                              | 1.1                     | 151                           |
| BXCP-35C-11L-K13-3-A1-00-0-0 | 3500                            | 70                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 162                                              | 1.1                     | 154                           |
| BXCP-40C-11L-K13-3-A1-00-0-0 | 4000                            | 70                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 172                                              | 1.1                     | 164                           |
| BXCP-50C-11L-K13-3-A1-00-0-0 | 5000                            | 70                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 172                                              | 1.1                     | 164                           |
| BXCP-57C-11L-K13-3-A1-00-0-0 | 5700                            | 70                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 172                                              | 1.1                     | 164                           |
| BXCP-65C-11L-K13-3-A1-00-0-0 | 6500                            | 70                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 172                                              | 1.1                     | 164                           |
| BXCP-18E-11L-K13-3-A1-00-0-0 | 1800                            | 80                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 94                                               | 1.1                     | 90                            |
| BXCP-22E-11L-K13-3-A1-00-0-0 | 2200                            | 80                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 119                                              | 1.1                     | 113                           |
| BXCP-27E-11L-K13-3-A1-00-0-0 | 2700                            | 80                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 142                                              | 1.1                     | 136                           |
| BXCP-30E-11L-K13-3-A1-00-0-0 | 3000                            | 80                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 149                                              | 1.1                     | 142                           |
| BXCP-35E-11L-K13-3-A1-00-0-0 | 3500                            | 80                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 153                                              | 1.1                     | 146                           |
| BXCP-40E-11L-K13-3-A1-00-0-0 | 4000                            | 80                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 161                                              | 1.1                     | 153                           |
| BXCP-50E-11L-K13-3-A1-00-0-0 | 5000                            | 80                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 161                                              | 1.1                     | 153                           |
| BXCP-57E-11L-K13-3-A1-00-0-0 | 5700                            | 80                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 161                                              | 1.1                     | 153                           |
| BXCP-65E-11L-K13-3-A1-00-0-0 | 6500                            | 80                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 161                                              | 1.1                     | 153                           |
| BXCP-18G-11L-K13-3-A1-00-0-0 | 1800                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 82                                               | 1.1                     | 78                            |
| BXCP-20G-11L-K13-3-A1-00-0-0 | 2000                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 91                                               | 1.1                     | 87                            |
| BXCP-22G-11L-K13-3-A1-00-0-0 | 2200                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 100                                              | 1.1                     | 95                            |
| BXCP-27G-11L-K13-3-A1-00-0-0 | 2700                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 119                                              | 1.1                     | 113                           |
| BXCP-30G-11L-K13-3-A1-00-0-0 | 3000                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 125                                              | 1.1                     | 119                           |
| BXCP-35G-11L-K13-3-A1-00-0-0 | 3500                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 129                                              | 1.1                     | 123                           |
| BXCP-40G-11L-K13-3-A1-00-0-0 | 4000                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 137                                              | 1.1                     | 130                           |
| BXCP-50G-11L-K13-3-A1-00-0-0 | 5000                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 137                                              | 1.1                     | 130                           |
| BXCP-57G-11L-K13-3-A1-00-0-0 | 5700                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 137                                              | 1.1                     | 130                           |
| BXCP-65G-11L-K13-3-A1-00-0-0 | 6500                            | 90                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 137                                              | 1.1                     | 130                           |

Notes for Table 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-K13-3-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.
- 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  $\pm 2$  tolerance on CRI measurements for the CSP.
- Refer to Table 6 and Table 7 for Bridgelux CSP Luminous Flux Binning and Forward Voltage Binning information.

# Product Selection Guide

The following product configurations are available:

**Table 1:** Selection Guide, Pulsed Measurement Data at 350mA ( $T_j = T_{sp} = 25^\circ\text{C}$ )

| Part Number <sup>1,6</sup>   | Nominal CCT <sup>2</sup><br>(K) | CRI <sup>3,5</sup> | Nominal<br>Drive Cur-<br>rent<br>(mA) | Forward Voltage <sup>4,5</sup><br>(V) |         |      | Typical<br>Pulsed<br>Flux <sup>4,5</sup><br>(lm) | Typical<br>Power<br>(W) | Typical<br>Efficacy<br>(lm/W) |
|------------------------------|---------------------------------|--------------------|---------------------------------------|---------------------------------------|---------|------|--------------------------------------------------|-------------------------|-------------------------------|
|                              |                                 |                    |                                       | Min                                   | Typical | Max  |                                                  |                         |                               |
| BXCP-18H-11L-K13-3-A1-00-0-0 | 1800                            | 95                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 75                                               | 1.1                     | 67                            |
| BXCP-20H-11L-K13-3-A1-00-0-0 | 2000                            | 95                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 81                                               | 1.1                     | 72                            |
| BXCP-27H-11L-K13-3-A1-00-0-0 | 2700                            | 95                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 106                                              | 1.1                     | 101                           |
| BXCP-30H-11L-K13-3-A1-00-0-0 | 3000                            | 95                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 112                                              | 1.1                     | 107                           |
| BXCP-35H-11L-K13-3-A1-00-0-0 | 3500                            | 95                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 116                                              | 1.1                     | 110                           |
| BXCP-40H-11L-K13-3-A1-00-0-0 | 4000                            | 95                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 126                                              | 1.1                     | 120                           |
| BXCP-50H-11L-K13-3-A1-00-0-0 | 5000                            | 95                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 126                                              | 1.1                     | 120                           |
| BXCP-57H-11L-K13-3-A1-00-0-0 | 5700                            | 95                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 126                                              | 1.1                     | 120                           |
| BXCP-65H-11L-K13-3-A1-00-0-0 | 6500                            | 95                 | 350                                   | 2.80                                  | 3.00    | 3.20 | 126                                              | 1.1                     | 120                           |

Notes for Table 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-K13-3-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.
- Product CCT is not 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  $\pm 2$  tolerance on CRI measurements for the CSP.
- 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 350mA ( $T_j = T_{sp} = 85^\circ\text{C}$ )

| Part Number <sup>1,5</sup>   | Nominal CCT <sup>2</sup> (K) | CRI <sup>3,4</sup> | Nominal Drive Current (mA) | Forward Voltage <sup>4</sup> (V) |         |      | Typical Pulsed Flux <sup>4</sup> (lm) | Typical Power (W) | Typical Efficacy (lm/W) |
|------------------------------|------------------------------|--------------------|----------------------------|----------------------------------|---------|------|---------------------------------------|-------------------|-------------------------|
|                              |                              |                    |                            | Min                              | Typical | Max  |                                       |                   |                         |
| BXCP-PCA-11L-K13-3-A1-00-0-0 | 1500                         | 45                 | 350                        | 2.70                             | 2.90    | 3.20 | 95                                    | 1.0               | 93                      |
| BXCP-18C-11L-K13-3-A1-00-0-0 | 1800                         | 70                 | 350                        | 2.70                             | 2.90    | 3.20 | 110                                   | 1.0               | 108                     |
| BXCP-22C-11L-K13-3-A1-00-0-0 | 2200                         | 70                 | 350                        | 2.70                             | 2.90    | 3.20 | 128                                   | 1.0               | 126                     |
| BXCP-27C-11L-K13-3-A1-00-0-0 | 2700                         | 70                 | 350                        | 2.70                             | 2.90    | 3.20 | 140                                   | 1.0               | 138                     |
| BXCP-30C-11L-K13-3-A1-00-0-0 | 3000                         | 70                 | 350                        | 2.70                             | 2.90    | 3.20 | 143                                   | 1.0               | 141                     |
| BXCP-35C-11L-K13-3-A1-00-0-0 | 3500                         | 70                 | 350                        | 2.70                             | 2.90    | 3.20 | 146                                   | 1.0               | 144                     |
| BXCP-40C-11L-K13-3-A1-00-0-0 | 4000                         | 70                 | 350                        | 2.70                             | 2.90    | 3.20 | 155                                   | 1.0               | 153                     |
| BXCP-50C-11L-K13-3-A1-00-0-0 | 5000                         | 70                 | 350                        | 2.70                             | 2.90    | 3.20 | 155                                   | 1.0               | 153                     |
| BXCP-57C-11L-K13-3-A1-00-0-0 | 5700                         | 70                 | 350                        | 2.70                             | 2.90    | 3.20 | 155                                   | 1.0               | 153                     |
| BXCP-65C-11L-K13-3-A1-00-0-0 | 6500                         | 70                 | 350                        | 2.70                             | 2.90    | 3.20 | 155                                   | 1.0               | 153                     |
| BXCP-18E-11L-K13-3-A1-00-0-0 | 1800                         | 80                 | 350                        | 2.70                             | 2.90    | 3.20 | 85                                    | 1.0               | 84                      |
| BXCP-22E-11L-K13-3-A1-00-0-0 | 2200                         | 80                 | 350                        | 2.70                             | 2.90    | 3.20 | 107                                   | 1.0               | 105                     |
| BXCP-27E-11L-K13-3-A1-00-0-0 | 2700                         | 80                 | 350                        | 2.70                             | 2.90    | 3.20 | 128                                   | 1.0               | 127                     |
| BXCP-30E-11L-K13-3-A1-00-0-0 | 3000                         | 80                 | 350                        | 2.70                             | 2.90    | 3.20 | 134                                   | 1.0               | 132                     |
| BXCP-35E-11L-K13-3-A1-00-0-0 | 3500                         | 80                 | 350                        | 2.70                             | 2.90    | 3.20 | 138                                   | 1.0               | 136                     |
| BXCP-40E-11L-K13-3-A1-00-0-0 | 4000                         | 80                 | 350                        | 2.70                             | 2.90    | 3.20 | 144                                   | 1.0               | 142                     |
| BXCP-50E-11L-K13-3-A1-00-0-0 | 5000                         | 80                 | 350                        | 2.70                             | 2.90    | 3.20 | 144                                   | 1.0               | 142                     |
| BXCP-57E-11L-K13-3-A1-00-0-0 | 5700                         | 80                 | 350                        | 2.70                             | 2.90    | 3.20 | 144                                   | 1.0               | 142                     |
| BXCP-65E-11L-K13-3-A1-00-0-0 | 6500                         | 80                 | 350                        | 2.70                             | 2.90    | 3.20 | 144                                   | 1.0               | 142                     |
| BXCP-18G-11L-K13-3-A1-00-0-0 | 1800                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 74                                    | 1.0               | 73                      |
| BXCP-20G-11L-K13-3-A1-00-0-0 | 2000                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 81                                    | 1.0               | 80                      |
| BXCP-22G-11L-K13-3-A1-00-0-0 | 2200                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 90                                    | 1.0               | 89                      |
| BXCP-27G-11L-K13-3-A1-00-0-0 | 2700                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 107                                   | 1.0               | 105                     |
| BXCP-30G-11L-K13-3-A1-00-0-0 | 3000                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 112                                   | 1.0               | 111                     |
| BXCP-35G-11L-K13-3-A1-00-0-0 | 3500                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 116                                   | 1.0               | 114                     |
| BXCP-40G-11L-K13-3-A1-00-0-0 | 4000                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 123                                   | 1.0               | 121                     |
| BXCP-50G-11L-K13-3-A1-00-0-0 | 5000                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 123                                   | 1.0               | 121                     |
| BXCP-57G-11L-K13-3-A1-00-0-0 | 5700                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 123                                   | 1.0               | 121                     |
| BXCP-65G-11L-K13-3-A1-00-0-0 | 6500                         | 90                 | 350                        | 2.70                             | 2.90    | 3.20 | 123                                   | 1.0               | 121                     |

Notes for Table 2:

- 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-K13-3-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.
- 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  $\pm 2$  tolerance on CRI measurements for the CSP.
- Refer to Table 6 and Table 7 for Bridgelux CSP Luminous Flux Binning and Forward Voltage Binning information.
- Products tested under pulsed condition (10ms pulse width) at nominal drive current where  $T_j = T_{sp} = 85^\circ\text{C}$ .

# Product Selection Guide

**Table 2:** Selection Guide, Pulsed Measurement Data at 350mA ( $T_j = T_{sp} = 85^\circ\text{C}$ )

| Part Number <sup>1,6</sup>   | Nominal CCT <sup>2</sup><br>(K) | CRI <sup>3,5</sup> | Nominal<br>Drive Cur-<br>rent<br>(mA) | Forward Voltage <sup>4,5</sup><br>(V) |         |      | Typical<br>Pulsed<br>Flux <sup>4,5</sup><br>(lm) | Typical<br>Power<br>(W) | Typical<br>Efficacy<br>(lm/W) |
|------------------------------|---------------------------------|--------------------|---------------------------------------|---------------------------------------|---------|------|--------------------------------------------------|-------------------------|-------------------------------|
|                              |                                 |                    |                                       | Min                                   | Typical | Max  |                                                  |                         |                               |
| BXCP-18H-11L-K13-3-A1-00-0-0 | 1800                            | 95                 | 350                                   | 2.70                                  | 2.90    | 3.20 | 67                                               | 1.0                     | 66                            |
| BXCP-20H-11L-K13-3-A1-00-0-0 | 2000                            | 95                 | 350                                   | 2.70                                  | 2.90    | 3.20 | 73                                               | 1.0                     | 72                            |
| BXCP-27H-11L-K13-3-A1-00-0-0 | 2700                            | 95                 | 350                                   | 2.70                                  | 2.90    | 3.20 | 95                                               | 1.0                     | 94                            |
| BXCP-30H-11L-K13-3-A1-00-0-0 | 3000                            | 95                 | 350                                   | 2.70                                  | 2.90    | 3.20 | 101                                              | 1.0                     | 100                           |
| BXCP-35H-11L-K13-3-A1-00-0-0 | 3500                            | 95                 | 350                                   | 2.70                                  | 2.90    | 3.20 | 104                                              | 1.0                     | 102                           |
| BXCP-40H-11L-K13-3-A1-00-0-0 | 4000                            | 95                 | 350                                   | 2.70                                  | 2.90    | 3.20 | 113                                              | 1.0                     | 111                           |
| BXCP-50H-11L-K13-3-A1-00-0-0 | 5000                            | 95                 | 350                                   | 2.70                                  | 2.90    | 3.20 | 113                                              | 1.0                     | 111                           |
| BXCP-57H-11L-K13-3-A1-00-0-0 | 5700                            | 95                 | 350                                   | 2.70                                  | 2.90    | 3.20 | 113                                              | 1.0                     | 111                           |
| BXCP-65H-11L-K13-3-A1-00-0-0 | 6500                            | 95                 | 350                                   | 2.70                                  | 2.90    | 3.20 | 113                                              | 1.0                     | 111                           |

Notes for Table 2:

- 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-K13-3-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.
- 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  $\pm 2$  tolerance on CRI measurements for the CSP.
- Refer to Table 6 and Table 7 for Bridgelux CSP Luminous Flux Binning and Forward Voltage Binning information.
- Products tested under pulsed condition (10ms pulse width) at nominal drive current where  $T_j = T_{sp} = 85^\circ\text{C}$ .

# Performance at Commonly Used Drive Currents

CSP 1313 LEDs specifications at nominal drive current are shown in Table 1 and Table 2. CSP 1313 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 <sup>1</sup><br>(mA) | Typical $V_f$<br>$T_{sp} = 25^\circ\text{C}$<br>(V) | Typical Power<br>$T_{sp} = 25^\circ\text{C}$<br>(W) | Typical Pulsed Flux <sup>2</sup><br>$T_{sp} = 25^\circ\text{C}$<br>(lm) | Typical Pulsed Flux <sup>3</sup><br>$T_{sp} = 85^\circ\text{C}$<br>(lm) | Typical Efficacy<br>$T_{sp} = 25^\circ\text{C}$<br>(lm/W) |
|------------------------------|-----|------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------|
| BXCP-PCA-11L-K13-3-A1-00-0-0 | 45  | 50                                 | 2.7                                                 | 0.1                                                 | 18                                                                      | 16                                                                      | 133                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 51                                                                      | 46                                                                      | 121                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 79                                                                      | 71                                                                      | 109                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>105</b>                                                              | <b>95</b>                                                               | <b>100</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 149                                                                     | 134                                                                     | 85                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 178                                                                     | 161                                                                     | 77                                                        |
| BXCP-18C-11L-K13-3-A1-00-0-0 | 70  | 50                                 | 2.7                                                 | 0.1                                                 | 21                                                                      | 19                                                                      | 155                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 59                                                                      | 53                                                                      | 141                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 92                                                                      | 83                                                                      | 127                                                       |
|                              |     | <b>350</b>                         | <b>3</b>                                            | <b>1.1</b>                                          | <b>122</b>                                                              | <b>110</b>                                                              | <b>116</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 174                                                                     | 156                                                                     | 99                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 208                                                                     | 187                                                                     | 90                                                        |
| BXCP-22C-11L-K13-3-A1-00-0-0 | 70  | 50                                 | 2.7                                                 | 0.1                                                 | 24                                                                      | 22                                                                      | 181                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 69                                                                      | 62                                                                      | 164                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 108                                                                     | 97                                                                      | 148                                                       |
|                              |     | <b>350</b>                         | <b>3</b>                                            | <b>1.1</b>                                          | <b>142</b>                                                              | <b>128</b>                                                              | <b>135</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 202                                                                     | 182                                                                     | 115                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 242                                                                     | 218                                                                     | 105                                                       |
| BXCP-27C-11L-K13-3-A1-00-0-0 | 70  | 50                                 | 2.7                                                 | 0.1                                                 | 27                                                                      | 24                                                                      | 198                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 75                                                                      | 68                                                                      | 179                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 118                                                                     | 106                                                                     | 162                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>156</b>                                                              | <b>140</b>                                                              | <b>148</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 221                                                                     | 199                                                                     | 126                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 264                                                                     | 238                                                                     | 114                                                       |
| BXCP-30C-11L-K13-3-A1-00-0-0 | 70  | 50                                 | 2.7                                                 | 0.1                                                 | 27                                                                      | 25                                                                      | 202                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 77                                                                      | 69                                                                      | 183                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 120                                                                     | 108                                                                     | 166                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>159</b>                                                              | <b>143</b>                                                              | <b>151</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 226                                                                     | 203                                                                     | 128                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 270                                                                     | 243                                                                     | 117                                                       |
| BXCP-35C-11L-K13-3-A1-00-0-0 | 70  | 50                                 | 2.7                                                 | 0.1                                                 | 28                                                                      | 25                                                                      | 206                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 78                                                                      | 71                                                                      | 187                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 123                                                                     | 110                                                                     | 169                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>162</b>                                                              | <b>146</b>                                                              | <b>154</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 231                                                                     | 208                                                                     | 131                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 276                                                                     | 248                                                                     | 119                                                       |

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

# Performance at Commonly Used Drive Currents

CSP 1313 LEDs specifications at nominal drive current are shown in Table 1 and Table 2. CSP 1313 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 <sup>1</sup><br>(mA) | Typical $V_f$<br>$T_{sp} = 25^\circ\text{C}$<br>(V) | Typical Power<br>$T_{sp} = 25^\circ\text{C}$<br>(W) | Typical Pulsed Flux <sup>2</sup><br>$T_{sp} = 25^\circ\text{C}$<br>(lm) | Typical Pulsed Flux <sup>3</sup><br>$T_{sp} = 85^\circ\text{C}$<br>(lm) | Typical Efficacy<br>$T_{sp} = 25^\circ\text{C}$<br>(lm/W) |
|------------------------------|-----|------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------|
| BXCP-40C-11L-K13-3-A1-00-0-0 | 70  | 50                                 | 2.7                                                 | 0.1                                                 | 30                                                                      | 27                                                                      | 219                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 83                                                                      | 75                                                                      | 198                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 130                                                                     | 117                                                                     | 180                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>172</b>                                                              | <b>155</b>                                                              | <b>164</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 245                                                                     | 220                                                                     | 139                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 293                                                                     | 263                                                                     | 127                                                       |
| BXCP-50C-11L-K13-3-A1-00-0-0 | 70  | 50                                 | 2.7                                                 | 0.1                                                 | 30                                                                      | 27                                                                      | 219                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 83                                                                      | 75                                                                      | 198                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 130                                                                     | 117                                                                     | 180                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>172</b>                                                              | <b>155</b>                                                              | <b>164</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 245                                                                     | 220                                                                     | 139                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 293                                                                     | 263                                                                     | 127                                                       |
| BXCP-57C-11L-K13-3-A1-00-0-0 | 70  | 50                                 | 2.7                                                 | 0.1                                                 | 30                                                                      | 27                                                                      | 219                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 83                                                                      | 75                                                                      | 198                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 130                                                                     | 117                                                                     | 180                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>172</b>                                                              | <b>155</b>                                                              | <b>164</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 245                                                                     | 220                                                                     | 139                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 293                                                                     | 263                                                                     | 127                                                       |
| BXCP-65C-11L-K13-3-A1-00-0-0 | 70  | 50                                 | 2.7                                                 | 0.1                                                 | 30                                                                      | 27                                                                      | 219                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 83                                                                      | 75                                                                      | 198                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 130                                                                     | 117                                                                     | 180                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>172</b>                                                              | <b>155</b>                                                              | <b>164</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 245                                                                     | 220                                                                     | 139                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 293                                                                     | 263                                                                     | 127                                                       |
| BXCP-18E-11L-K13-3-A1-00-0-0 | 80  | 50                                 | 2.7                                                 | 0.1                                                 | 16                                                                      | 15                                                                      | 120                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 46                                                                      | 41                                                                      | 109                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 71                                                                      | 64                                                                      | 98                                                        |
|                              |     | <b>350</b>                         | <b>3</b>                                            | <b>1.1</b>                                          | <b>94</b>                                                               | <b>85</b>                                                               | <b>90</b>                                                 |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 134                                                                     | 121                                                                     | 76                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 161                                                                     | 144                                                                     | 69                                                        |
| BXCP-22E-11L-K13-3-A1-00-0-0 | 80  | 50                                 | 2.7                                                 | 0.1                                                 | 20                                                                      | 18                                                                      | 151                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 58                                                                      | 52                                                                      | 137                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 90                                                                      | 81                                                                      | 124                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>119</b>                                                              | <b>107</b>                                                              | <b>113</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 169                                                                     | 152                                                                     | 96                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 202                                                                     | 182                                                                     | 87                                                        |

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 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 <sup>1</sup><br>(mA) | Typical V <sub>f</sub><br>T <sub>sp</sub> = 25° C<br>(V) | Typical Power<br>T <sub>sp</sub> = 25° C<br>(W) | Typical Pulsed Flux <sup>2</sup><br>T <sub>sp</sub> = 25° C<br>(lm) | Typical Pulsed Flux <sup>3</sup><br>T <sub>sp</sub> = 85° C<br>(lm) | Typical Efficacy<br>T <sub>sp</sub> = 25° C<br>(lm/W) |
|------------------------------|-----|------------------------------------|----------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------|
| BXCP-27E-11L-K13-3-A1-00-0-0 | 80  | 50                                 | 2.7                                                      | 0.1                                             | 24                                                                  | 22                                                                  | 181                                                   |
|                              |     | 150                                | 2.8                                                      | 0.4                                             | 69                                                                  | 62                                                                  | 164                                                   |
|                              |     | 250                                | 2.9                                                      | 0.7                                             | 108                                                                 | 97                                                                  | 149                                                   |
|                              |     | <b>350</b>                         | <b>3.0</b>                                               | <b>1.1</b>                                      | <b>142</b>                                                          | <b>128</b>                                                          | <b>136</b>                                            |
|                              |     | 550                                | 3.2                                                      | 1.8                                             | 203                                                                 | 183                                                                 | 115                                                   |
|                              |     | 700                                | 3.3                                                      | 2.3                                             | 242                                                                 | 218                                                                 | 105                                                   |
| BXCP-30E-11L-K13-3-A1-00-0-0 | 80  | 50                                 | 2.7                                                      | 0.1                                             | 26                                                                  | 23                                                                  | 189                                                   |
|                              |     | 150                                | 2.8                                                      | 0.4                                             | 72                                                                  | 65                                                                  | 171                                                   |
|                              |     | 250                                | 2.9                                                      | 0.7                                             | 112                                                                 | 101                                                                 | 155                                                   |
|                              |     | <b>350</b>                         | <b>3.0</b>                                               | <b>1.1</b>                                      | <b>149</b>                                                          | <b>134</b>                                                          | <b>142</b>                                            |
|                              |     | 550                                | 3.2                                                      | 1.8                                             | 211                                                                 | 190                                                                 | 120                                                   |
|                              |     | 700                                | 3.3                                                      | 2.3                                             | 253                                                                 | 227                                                                 | 109                                                   |
| BXCP-35E-11L-K13-3-A1-00-0-0 | 80  | 50                                 | 2.7                                                      | 0.1                                             | 26                                                                  | 24                                                                  | 195                                                   |
|                              |     | 150                                | 2.8                                                      | 0.4                                             | 74                                                                  | 67                                                                  | 176                                                   |
|                              |     | 250                                | 2.9                                                      | 0.7                                             | 116                                                                 | 104                                                                 | 160                                                   |
|                              |     | <b>350</b>                         | <b>3.0</b>                                               | <b>1.1</b>                                      | <b>153</b>                                                          | <b>138</b>                                                          | <b>146</b>                                            |
|                              |     | 550                                | 3.2                                                      | 1.8                                             | 218                                                                 | 196                                                                 | 124                                                   |
|                              |     | 700                                | 3.3                                                      | 2.3                                             | 260                                                                 | 234                                                                 | 113                                                   |
| BXCP-40E-11L-K13-3-A1-00-0-0 | 80  | 50                                 | 2.7                                                      | 0.1                                             | 28                                                                  | 25                                                                  | 204                                                   |
|                              |     | 150                                | 2.8                                                      | 0.4                                             | 78                                                                  | 70                                                                  | 185                                                   |
|                              |     | 250                                | 2.9                                                      | 0.7                                             | 121                                                                 | 109                                                                 | 167                                                   |
|                              |     | <b>350</b>                         | <b>3.0</b>                                               | <b>1.1</b>                                      | <b>161</b>                                                          | <b>144</b>                                                          | <b>153</b>                                            |
|                              |     | 550                                | 3.2                                                      | 1.8                                             | 228                                                                 | 205                                                                 | 130                                                   |
|                              |     | 700                                | 3.3                                                      | 2.3                                             | 273                                                                 | 245                                                                 | 118                                                   |
| BXCP-50E-11L-K13-3-A1-00-0-0 | 80  | 50                                 | 2.7                                                      | 0.1                                             | 28                                                                  | 25                                                                  | 204                                                   |
|                              |     | 150                                | 2.8                                                      | 0.4                                             | 78                                                                  | 70                                                                  | 185                                                   |
|                              |     | 250                                | 2.9                                                      | 0.7                                             | 121                                                                 | 109                                                                 | 167                                                   |
|                              |     | <b>350</b>                         | <b>3.0</b>                                               | <b>1.1</b>                                      | <b>161</b>                                                          | <b>144</b>                                                          | <b>153</b>                                            |
|                              |     | 550                                | 3.2                                                      | 1.8                                             | 228                                                                 | 205                                                                 | 130                                                   |
|                              |     | 700                                | 3.3                                                      | 2.3                                             | 273                                                                 | 245                                                                 | 118                                                   |
| BXCP-57E-11L-K13-3-A1-00-0-0 | 80  | 50                                 | 2.7                                                      | 0.1                                             | 28                                                                  | 25                                                                  | 204                                                   |
|                              |     | 150                                | 2.8                                                      | 0.4                                             | 78                                                                  | 70                                                                  | 185                                                   |
|                              |     | 250                                | 2.9                                                      | 0.7                                             | 121                                                                 | 109                                                                 | 167                                                   |
|                              |     | <b>350</b>                         | <b>3.0</b>                                               | <b>1.1</b>                                      | <b>161</b>                                                          | <b>144</b>                                                          | <b>153</b>                                            |
|                              |     | 550                                | 3.2                                                      | 1.8                                             | 228                                                                 | 205                                                                 | 130                                                   |
|                              |     | 700                                | 3.3                                                      | 2.3                                             | 273                                                                 | 245                                                                 | 118                                                   |

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 <sup>1</sup><br>(mA) | Typical $V_f$<br>$T_{sp} = 25^\circ\text{C}$<br>(V) | Typical Power<br>$T_{sp} = 25^\circ\text{C}$<br>(W) | Typical Pulsed Flux <sup>2</sup><br>$T_{sp} = 25^\circ\text{C}$<br>(lm) | Typical Pulsed Flux <sup>3</sup><br>$T_{sp} = 85^\circ\text{C}$<br>(lm) | Typical Efficacy<br>$T_{sp} = 25^\circ\text{C}$<br>(lm/W) |
|------------------------------|-----|------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------|
| BXCP-65E-11L-K13-3-A1-00-0-0 | 80  | 50                                 | 2.7                                                 | 0.1                                                 | 28                                                                      | 25                                                                      | 204                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 78                                                                      | 70                                                                      | 185                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 121                                                                     | 109                                                                     | 167                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>161</b>                                                              | <b>144</b>                                                              | <b>153</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 228                                                                     | 205                                                                     | 130                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 273                                                                     | 245                                                                     | 118                                                       |
| BXCP-18G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 14                                                                      | 13                                                                      | 105                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 40                                                                      | 36                                                                      | 95                                                        |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 62                                                                      | 56                                                                      | 86                                                        |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>82</b>                                                               | <b>74</b>                                                               | <b>78</b>                                                 |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 117                                                                     | 105                                                                     | 67                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 140                                                                     | 126                                                                     | 61                                                        |
| BXCP-20G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 16                                                                      | 14                                                                      | 115                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 44                                                                      | 40                                                                      | 105                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 69                                                                      | 62                                                                      | 95                                                        |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>91</b>                                                               | <b>81</b>                                                               | <b>87</b>                                                 |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 129                                                                     | 116                                                                     | 73                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 154                                                                     | 139                                                                     | 67                                                        |
| BXCP-22G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 17                                                                      | 15                                                                      | 127                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 48                                                                      | 43                                                                      | 115                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 75                                                                      | 68                                                                      | 104                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>100</b>                                                              | <b>90</b>                                                               | <b>95</b>                                                 |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 141                                                                     | 127                                                                     | 80                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 169                                                                     | 152                                                                     | 73                                                        |
| BXCP-27G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 20                                                                      | 18                                                                      | 151                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 58                                                                      | 52                                                                      | 137                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 90                                                                      | 81                                                                      | 124                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>119</b>                                                              | <b>107</b>                                                              | <b>113</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 169                                                                     | 152                                                                     | 96                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 202                                                                     | 182                                                                     | 87                                                        |
| BXCP-30G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 21                                                                      | 19                                                                      | 159                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 61                                                                      | 55                                                                      | 144                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 95                                                                      | 85                                                                      | 131                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>125</b>                                                              | <b>112</b>                                                              | <b>119</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 178                                                                     | 160                                                                     | 101                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 213                                                                     | 191                                                                     | 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  $\pm 7.5\%$  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 <sup>1</sup><br>(mA) | Typical $V_f$<br>$T_{sp} = 25^\circ\text{C}$<br>(V) | Typical Power<br>$T_{sp} = 25^\circ\text{C}$<br>(W) | Typical Pulsed Flux <sup>2</sup><br>$T_{sp} = 25^\circ\text{C}$<br>(lm) | Typical Pulsed Flux <sup>3</sup><br>$T_{sp} = 85^\circ\text{C}$<br>(lm) | Typical Efficacy<br>$T_{sp} = 25^\circ\text{C}$<br>(lm/W) |
|------------------------------|-----|------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------|
| BXCP-35G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 22                                                                      | 20                                                                      | 164                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 62                                                                      | 56                                                                      | 149                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 98                                                                      | 88                                                                      | 135                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>129</b>                                                              | <b>116</b>                                                              | <b>123</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 183                                                                     | 165                                                                     | 104                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 219                                                                     | 197                                                                     | 95                                                        |
| BXCP-40G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 23                                                                      | 21                                                                      | 174                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 66                                                                      | 60                                                                      | 157                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 103                                                                     | 93                                                                      | 143                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>137</b>                                                              | <b>123</b>                                                              | <b>130</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 194                                                                     | 175                                                                     | 110                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 232                                                                     | 209                                                                     | 101                                                       |
| BXCP-50G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 23                                                                      | 21                                                                      | 174                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 66                                                                      | 60                                                                      | 157                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 103                                                                     | 93                                                                      | 143                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>137</b>                                                              | <b>123</b>                                                              | <b>130</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 194                                                                     | 175                                                                     | 110                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 232                                                                     | 209                                                                     | 101                                                       |
| BXCP-57G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 23                                                                      | 21                                                                      | 174                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 66                                                                      | 60                                                                      | 157                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 103                                                                     | 93                                                                      | 143                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>137</b>                                                              | <b>123</b>                                                              | <b>130</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 194                                                                     | 175                                                                     | 110                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 232                                                                     | 209                                                                     | 101                                                       |
| BXCP-65G-11L-K13-3-A1-00-0-0 | 90  | 50                                 | 2.7                                                 | 0.1                                                 | 23                                                                      | 21                                                                      | 174                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 66                                                                      | 60                                                                      | 157                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 103                                                                     | 93                                                                      | 143                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>137</b>                                                              | <b>123</b>                                                              | <b>130</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 194                                                                     | 175                                                                     | 110                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 232                                                                     | 209                                                                     | 101                                                       |
| BXCP-18H-11L-K13-3-A1-00-0-0 | 95  | 50                                 | 2.7                                                 | 0.1                                                 | 13                                                                      | 12                                                                      | 95                                                        |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 36                                                                      | 33                                                                      | 86                                                        |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 57                                                                      | 51                                                                      | 78                                                        |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>75</b>                                                               | <b>67</b>                                                               | <b>71</b>                                                 |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 106                                                                     | 96                                                                      | 60                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 127                                                                     | 115                                                                     | 55                                                        |

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 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 <sup>1</sup><br>(mA) | Typical $V_f$<br>$T_{sp} = 25^\circ\text{C}$<br>(V) | Typical Power<br>$T_{sp} = 25^\circ\text{C}$<br>(W) | Typical Pulsed Flux <sup>2</sup><br>$T_{sp} = 25^\circ\text{C}$<br>(lm) | Typical Pulsed Flux <sup>3</sup><br>$T_{sp} = 85^\circ\text{C}$<br>(lm) | Typical Efficacy<br>$T_{sp} = 25^\circ\text{C}$<br>(lm/W) |
|------------------------------|-----|------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------|
| BXCP-20H-11L-K13-3-A1-00-0-0 | 95  | 50                                 | 2.7                                                 | 0.1                                                 | 14                                                                      | 12                                                                      | 103                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 39                                                                      | 35                                                                      | 93                                                        |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 61                                                                      | 55                                                                      | 84                                                        |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>81</b>                                                               | <b>73</b>                                                               | <b>77</b>                                                 |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 115                                                                     | 103                                                                     | 65                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 137                                                                     | 124                                                                     | 59                                                        |
| BXCP-27H-11L-K13-3-A1-00-0-0 | 95  | 50                                 | 2.7                                                 | 0.1                                                 | 18                                                                      | 16                                                                      | 134                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 51                                                                      | 46                                                                      | 122                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 80                                                                      | 72                                                                      | 110                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>106</b>                                                              | <b>95</b>                                                               | <b>101</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 150                                                                     | 135                                                                     | 85                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 179                                                                     | 161                                                                     | 78                                                        |
| BXCP-30H-11L-K13-3-A1-00-0-0 | 95  | 50                                 | 2.7                                                 | 0.1                                                 | 19                                                                      | 17                                                                      | 143                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 54                                                                      | 49                                                                      | 129                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 85                                                                      | 76                                                                      | 117                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>112</b>                                                              | <b>101</b>                                                              | <b>107</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 160                                                                     | 144                                                                     | 91                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 191                                                                     | 172                                                                     | 83                                                        |
| BXCP-35H-11L-K13-3-A1-00-0-0 | 95  | 50                                 | 2.7                                                 | 0.1                                                 | 20                                                                      | 18                                                                      | 147                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 56                                                                      | 50                                                                      | 133                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 87                                                                      | 79                                                                      | 121                                                       |
|                              |     | <b>350</b>                         | <b>3</b>                                            | <b>1.1</b>                                          | <b>116</b>                                                              | <b>104</b>                                                              | <b>110</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 164                                                                     | 148                                                                     | 93                                                        |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 196                                                                     | 177                                                                     | 85                                                        |
| BXCP-40H-11L-K13-3-A1-00-0-0 | 95  | 50                                 | 2.7                                                 | 0.1                                                 | 22                                                                      | 19                                                                      | 160                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 61                                                                      | 55                                                                      | 145                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 95                                                                      | 85                                                                      | 131                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>126</b>                                                              | <b>113</b>                                                              | <b>120</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 178                                                                     | 161                                                                     | 101                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 213                                                                     | 192                                                                     | 92                                                        |
| BXCP-50H-11L-K13-3-A1-00-0-0 | 95  | 50                                 | 2.7                                                 | 0.1                                                 | 22                                                                      | 19                                                                      | 160                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 61                                                                      | 55                                                                      | 145                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 95                                                                      | 85                                                                      | 131                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>126</b>                                                              | <b>113</b>                                                              | <b>120</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 178                                                                     | 161                                                                     | 101                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 213                                                                     | 192                                                                     | 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  $\pm 7.5\%$  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 <sup>1</sup><br>(mA) | Typical $V_f$<br>$T_{sp} = 25^\circ\text{C}$<br>(V) | Typical Power<br>$T_{sp} = 25^\circ\text{C}$<br>(W) | Typical Pulsed Flux <sup>2</sup><br>$T_{sp} = 25^\circ\text{C}$<br>(lm) | Typical Pulsed Flux <sup>3</sup><br>$T_{sp} = 85^\circ\text{C}$<br>(lm) | Typical Efficacy<br>$T_{sp} = 25^\circ\text{C}$<br>(lm/W) |
|------------------------------|-----|------------------------------------|-----------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------|
| BXCP-57H-11L-K13-3-A1-00-0-0 | 95  | 50                                 | 2.7                                                 | 0.1                                                 | 22                                                                      | 19                                                                      | 160                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 61                                                                      | 55                                                                      | 145                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 95                                                                      | 85                                                                      | 131                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>126</b>                                                              | <b>113</b>                                                              | <b>120</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 178                                                                     | 161                                                                     | 101                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 213                                                                     | 192                                                                     | 92                                                        |
| BXCP-65H-11L-K13-3-A1-00-0-0 | 95  | 50                                 | 2.7                                                 | 0.1                                                 | 22                                                                      | 19                                                                      | 160                                                       |
|                              |     | 150                                | 2.8                                                 | 0.4                                                 | 61                                                                      | 55                                                                      | 145                                                       |
|                              |     | 250                                | 2.9                                                 | 0.7                                                 | 95                                                                      | 85                                                                      | 131                                                       |
|                              |     | <b>350</b>                         | <b>3.0</b>                                          | <b>1.1</b>                                          | <b>126</b>                                                              | <b>113</b>                                                              | <b>120</b>                                                |
|                              |     | 550                                | 3.2                                                 | 1.8                                                 | 178                                                                     | 161                                                                     | 101                                                       |
|                              |     | 700                                | 3.3                                                 | 2.3                                                 | 213                                                                     | 192                                                                     | 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  $\pm 7.5\%$  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 <sup>1</sup>     | Drive Current (mA) | Forward Voltage <sup>2,3</sup> (V) |         |         | Typical Temperature Coefficient of Forward Voltage <sup>4</sup><br>$\Delta V_f / \Delta T$ (mV/°C) | Typical Thermal Resistance Junction to Solder Point <sup>5,6</sup><br>$R_{j-sp}$ (°C/W) |
|------------------------------|--------------------|------------------------------------|---------|---------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
|                              |                    | Minimum                            | Typical | Maximum |                                                                                                    |                                                                                         |
| BXCP-xxx-11L-K13-3-A1-00-0-0 | 350                | 2.70                               | 2.90    | 3.20    | -16                                                                                                | 4.5                                                                                     |

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-K13-3-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  $T_{sp} = 85^{\circ}\text{C}$ .

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

4. Products measured between  $25^{\circ}\text{C}$  and  $105^{\circ}\text{C}$  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 <sup>1</sup>               | 700mA                                           |
| Maximum Peak Pulsed Forward Current <sup>2</sup> | 1000mA                                          |
| Maximum Reverse Voltage <sup>3</sup>             | -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 1313 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,  $T_{sp}=85^{\circ}\text{C}$

| Bin Code | Minimum | Maximum | Unit | Condition          |
|----------|---------|---------|------|--------------------|
| D1       | 60      | 70      | lm   | $I_F=350\text{mA}$ |
| E1       | 70      | 80      |      |                    |
| F1       | 80      | 90      |      |                    |
| G1       | 90      | 100     |      |                    |
| H1       | 100     | 110     |      |                    |
| I1       | 110     | 120     |      |                    |
| J1       | 120     | 130     |      |                    |
| K1       | 130     | 140     |      |                    |
| M1       | 140     | 150     |      |                    |
| N1       | 150     | 160     |      |                    |
| P1       | 160     | 170     |      |                    |
| Q1       | 170     | 180     |      |                    |
| R1       | 180     | 190     |      |                    |

Note for Table 6:

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

**Table 7:** Forward Voltage Bin Definitions at 350mA,  $T_{sp}=85^{\circ}\text{C}$

| Bin Code | Minimum | Maximum | Unit | Condition          |
|----------|---------|---------|------|--------------------|
| C        | 2.6     | 2.8     | V    | $I_F=350\text{mA}$ |
| D        | 2.8     | 3.0     |      |                    |
| E        | 3.0     | 3.2     |      |                    |

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 ( $T_{sp}=85^{\circ}\text{C}$ )

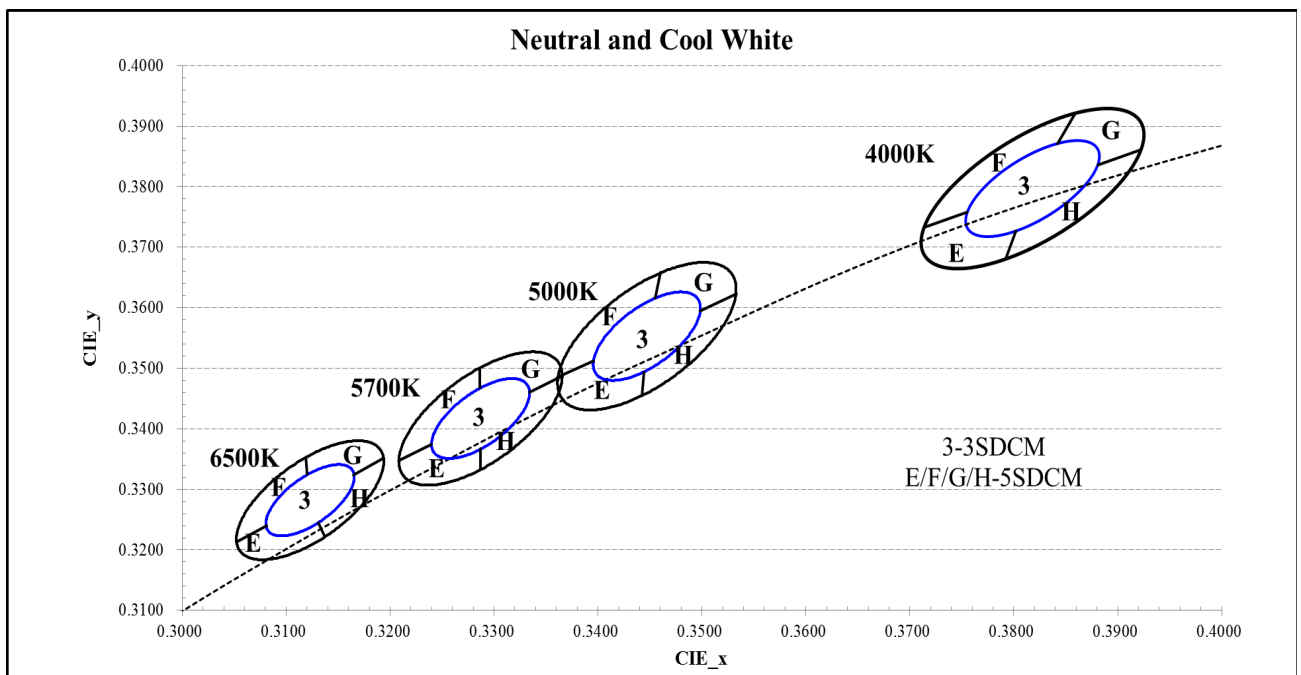
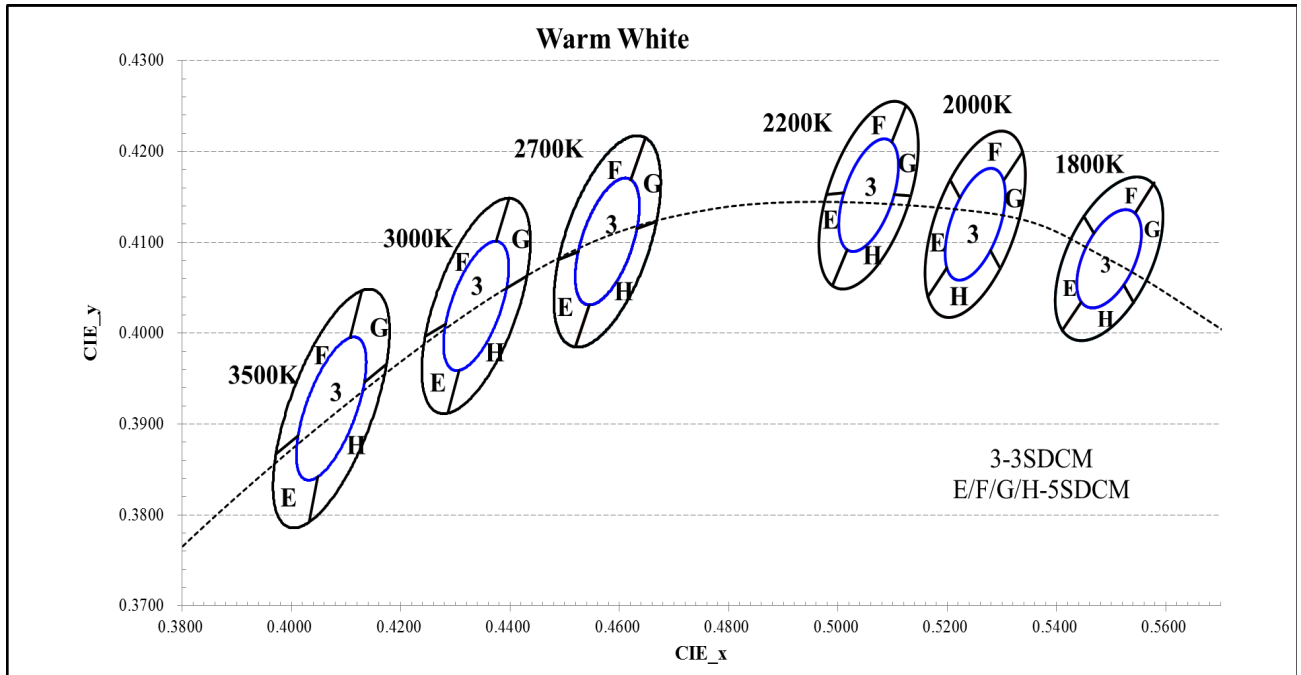
| Table 8: 3- and 5-step MacAdam Ellipse Color Bin Definitions ( $T_{sp}=85^{\circ}\text{C}$ ) |             |              |        |            |            |                |            |
|----------------------------------------------------------------------------------------------|-------------|--------------|--------|------------|------------|----------------|------------|
| CCT                                                                                          | Color Space | Center Point |        | Major Axis | Minor Axis | $\psi$ (angle) | Color Bin  |
|                                                                                              |             | x            | y      |            |            |                |            |
| 1800K                                                                                        | 3           | 0.5496       | 0.4082 | 0.00698    | 0.00393    | 40.000         | 3          |
|                                                                                              | 5           |              |        | 0.01164    | 0.00655    |                | 5(E/F/G/H) |
| 2000K                                                                                        | 3           | 0.5251       | 0.4120 | 0.00723    | 0.00399    | 51.000         | 3          |
|                                                                                              | 5           |              |        | 0.01205    | 0.00665    |                | 5(E/F/G/H) |
| 2200K                                                                                        | 3           | 0.5056       | 0.4152 | 0.00723    | 0.00399    | 51.918         | 3          |
|                                                                                              | 5           |              |        | 0.01205    | 0.00665    |                | 5(E/F/G/H) |
| 2700K                                                                                        | 3           | 0.4578       | 0.4101 | 0.00810    | 0.00420    | 53.700         | 3          |
|                                                                                              | 5           |              |        | 0.01350    | 0.00700    |                | 5(E/F/G/H) |
| 3000K                                                                                        | 3           | 0.4338       | 0.4030 | 0.00834    | 0.00408    | 53.220         | 3          |
|                                                                                              | 5           |              |        | 0.01390    | 0.00680    |                | 5(E/F/G/H) |
| 3500K                                                                                        | 3           | 0.4073       | 0.3917 | 0.00927    | 0.00414    | 54.000         | 3          |
|                                                                                              | 5           |              |        | 0.01545    | 0.00690    |                | 5(E/F/G/H) |
| 4000K                                                                                        | 3           | 0.3818       | 0.3797 | 0.00939    | 0.00402    | 53.720         | 3          |
|                                                                                              | 5           |              |        | 0.01565    | 0.00670    |                | 5(E/F/G/H) |
| 5000K                                                                                        | 3           | 0.3447       | 0.3553 | 0.00822    | 0.00354    | 59.620         | 3          |
|                                                                                              | 5           |              |        | 0.01370    | 0.00590    |                | 5(E/F/G/H) |
| 5700K                                                                                        | 3           | 0.3287       | 0.3417 | 0.00746    | 0.00320    | 59.090         | 3          |
|                                                                                              | 5           |              |        | 0.01243    | 0.00533    |                | 5(E/F/G/H) |
| 6500K                                                                                        | 3           | 0.3123       | 0.3282 | 0.00669    | 0.00285    | 58.570         | 3          |
|                                                                                              | 5           |              |        | 0.01115    | 0.00475    |                | 5(E/F/G/H) |

Note for Table 8:

1. Bridgelux maintains a tolerance of  $\pm 0.007$  on x and y color coordinates in the CIE 1931 color space.
2. MacAdam Ellipse Color bin code 3(3 SDCM)/ EFGH(5 SDCM).

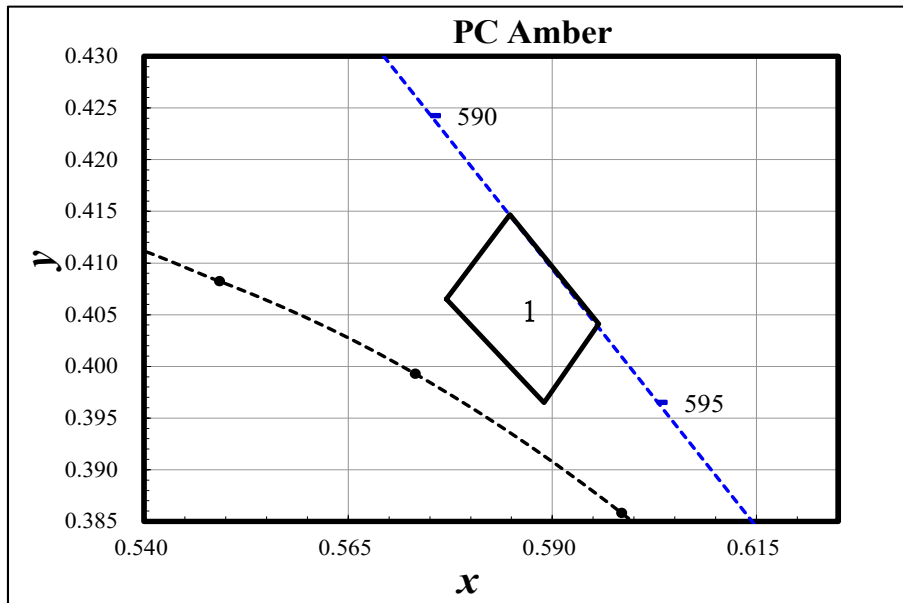
# Product Bin Definitions

Figure 1: C.I.E. 1931 Chromaticity Diagram ( Color Bin Structure,  $T_{sp}=85^{\circ}\text{C}$ )



# Product Bin Definitions

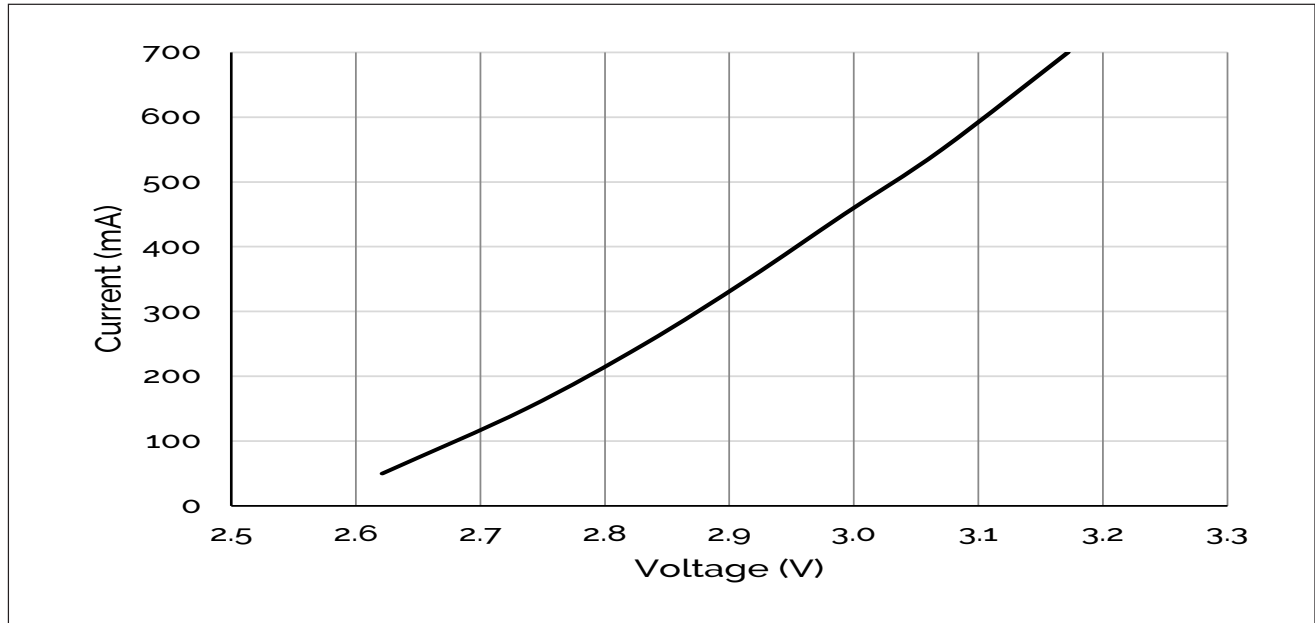
**Figure 1: Color Bin Structure of PC Amber, Tsp=25°C**



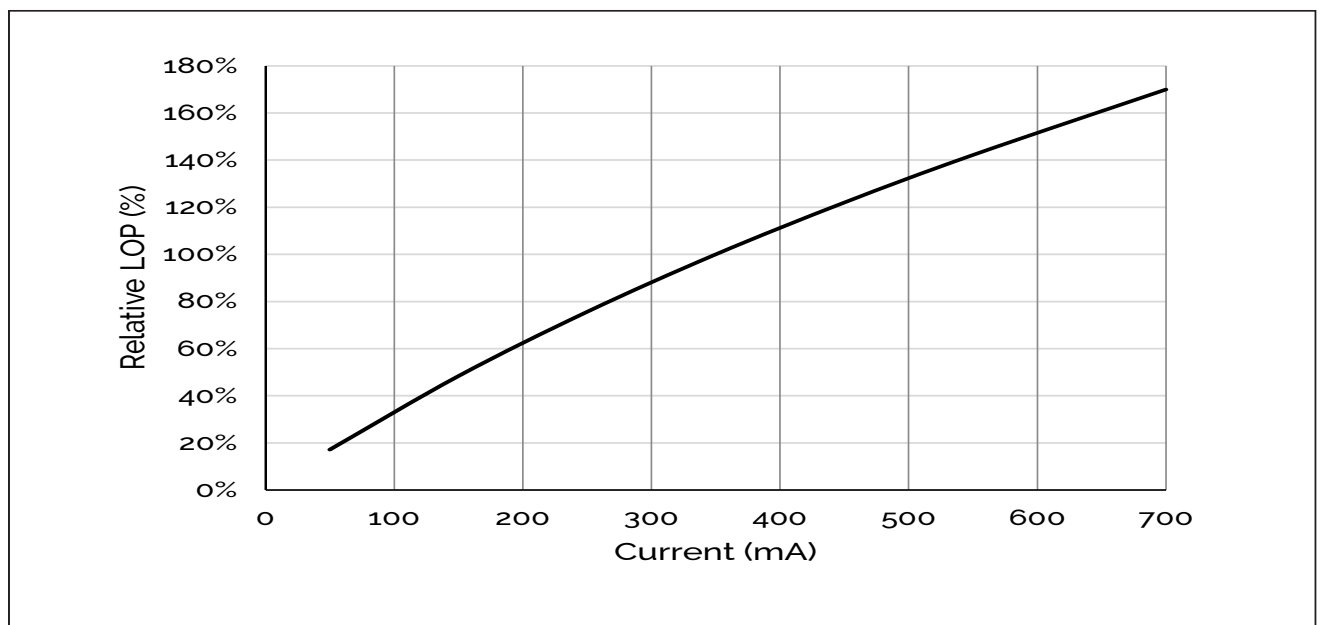
| Rank |        |        |        |        |        |
|------|--------|--------|--------|--------|--------|
| X    | 0.5770 | 0.5848 | 0.5957 | 0.5890 | 0.5770 |
| Y    | 0.4065 | 0.4147 | 0.4041 | 0.3965 | 0.4065 |

# Performance Curves

**Figure 2: Drive Current vs. Voltage ( $T_{sp}=85^{\circ}\text{C}$ )**



**Figure 3: Typical Relative Luminous Flux vs. Drive Current ( $T_{sp}=85^{\circ}\text{C}$ )**

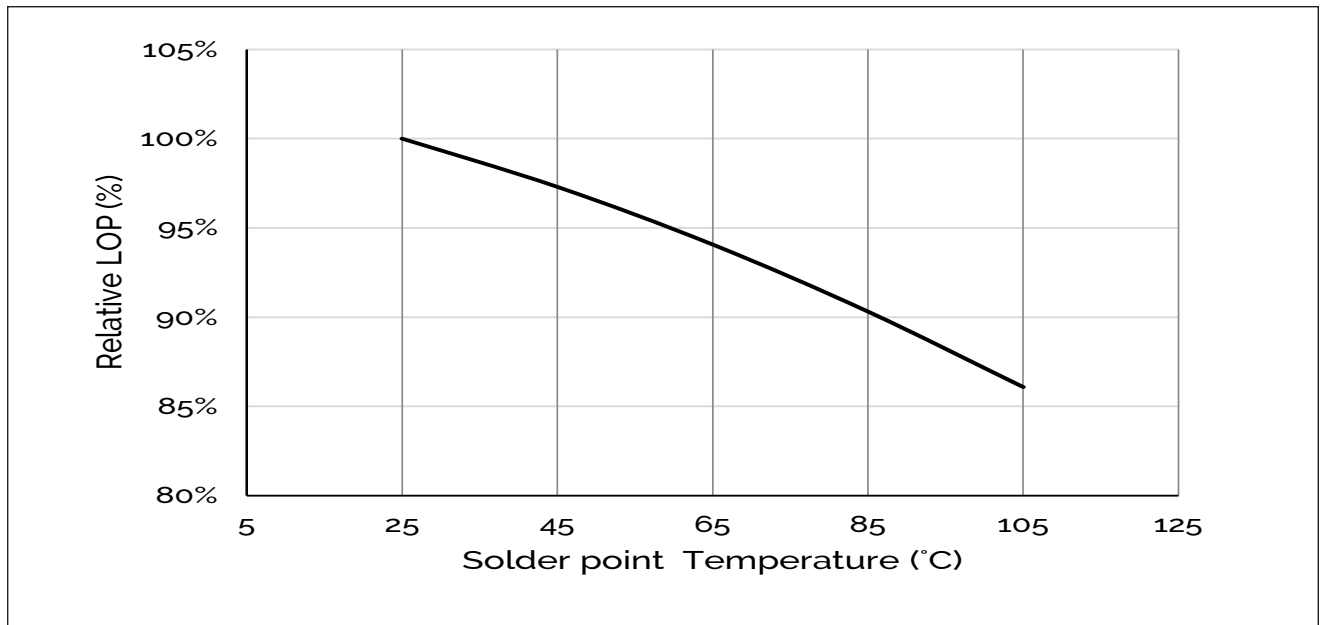


Note for Figure 3:

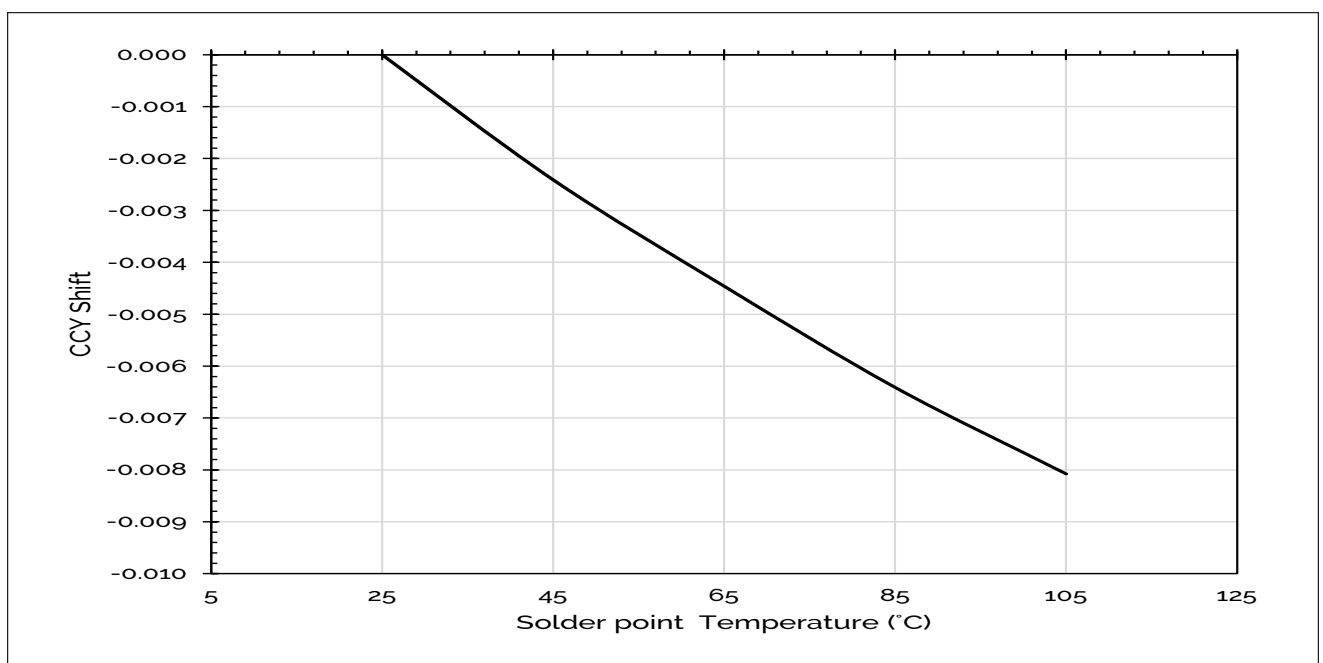
1. Bridgelux does not recommend driving this CSP LED at low current ( $< 10\text{mA}$ ). Doing so may produce unpredictable results. Pulse width modulation (PWM) is recommended for dimming effects.

# Performance Curves

**Figure 4: Typical Relative Flux vs. Solder Point Temperature\_350mA**



**Figure 5: Typical CCY Shift vs. Solder Point Temperature\_350mA**

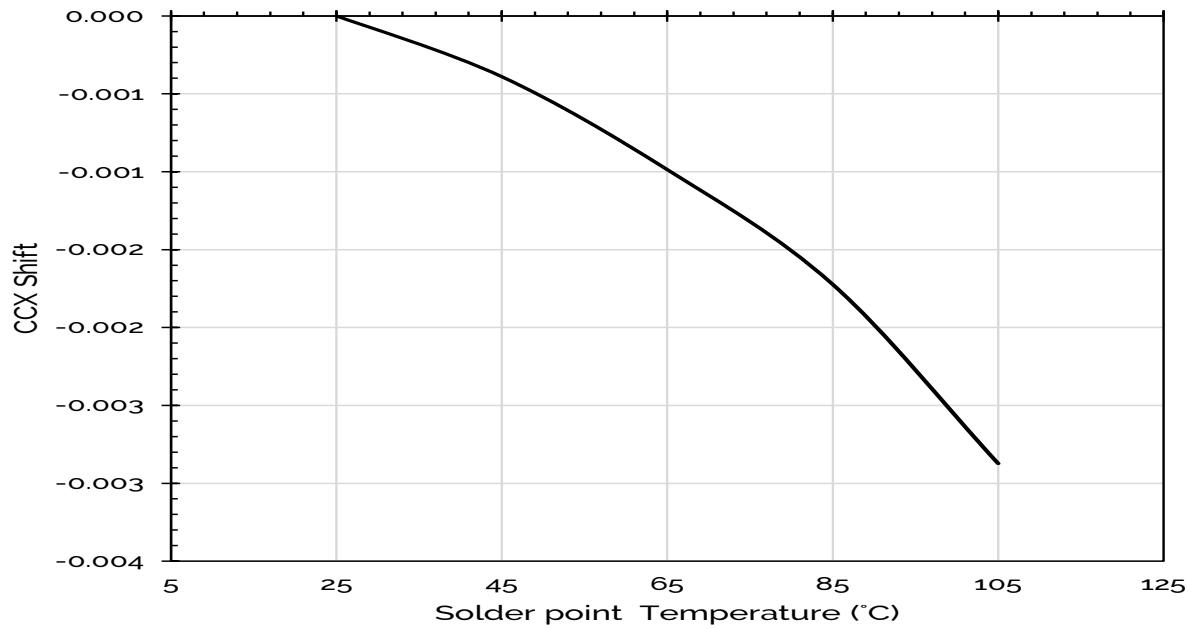


Notes for Figures 4 & 5:

- 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

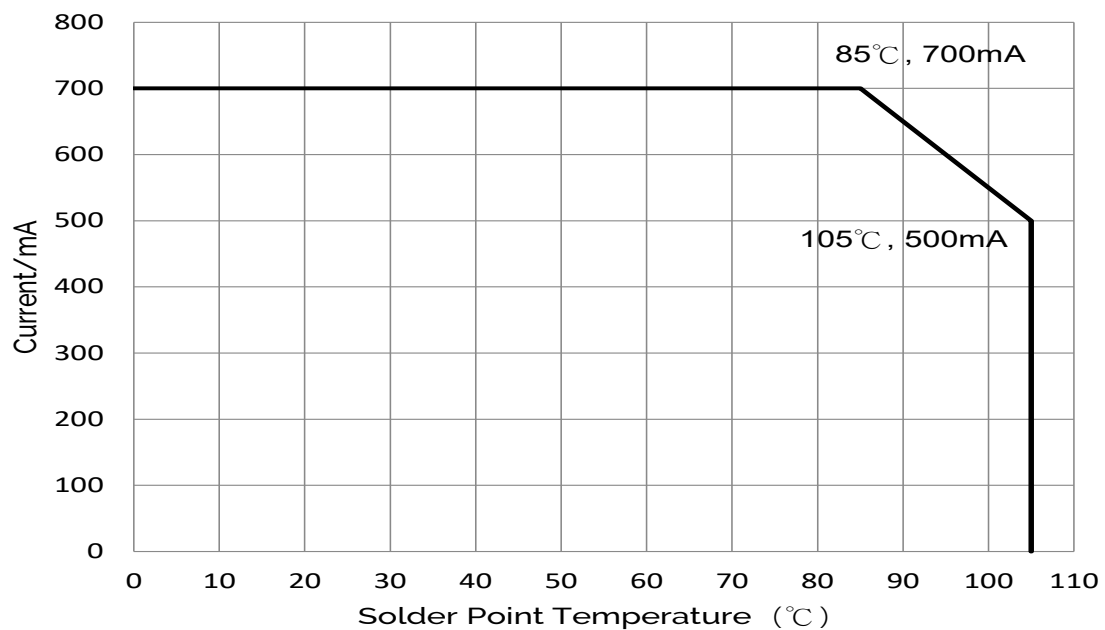
**Figure 6: Typical ccx Shift vs. Solder Point Temperature\_350mA**



Notes for Figure 6:

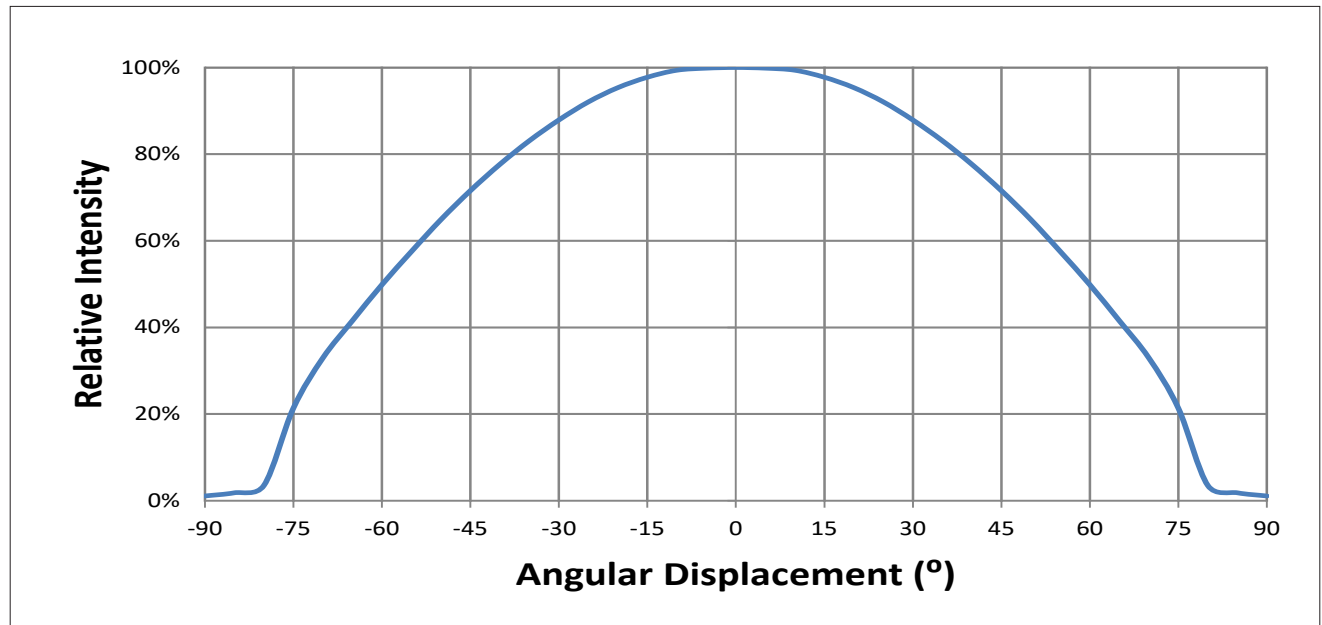
1. Characteristics shown for warm white based on 2700K and 90 CRI.
2. For other color SKUs, the shift in color will vary. Please contact your Bridgelux Sales Representative for more information.

**Figure 7: Drive Current vs Solder Point Temperature**



# Typical Radiation Pattern

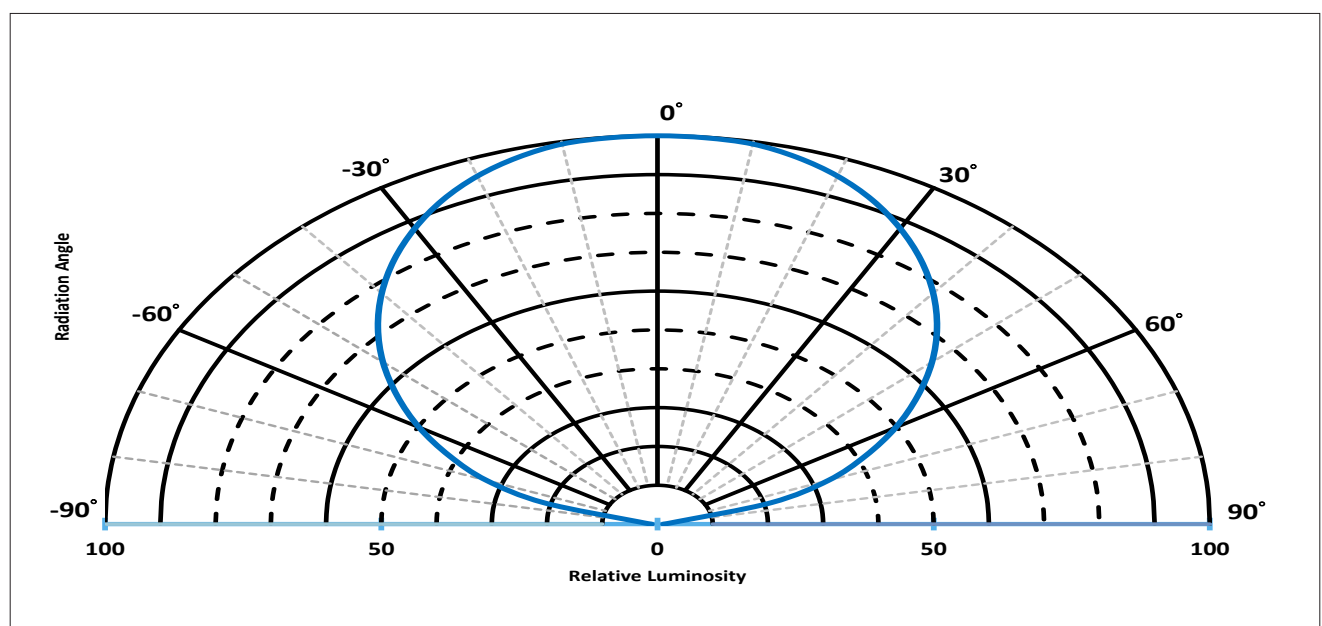
Figure 8: Typical Spatial Radiation Pattern at 350mA,  $T_{sp}=25^{\circ}\text{C}$



Notes for Figure 8:

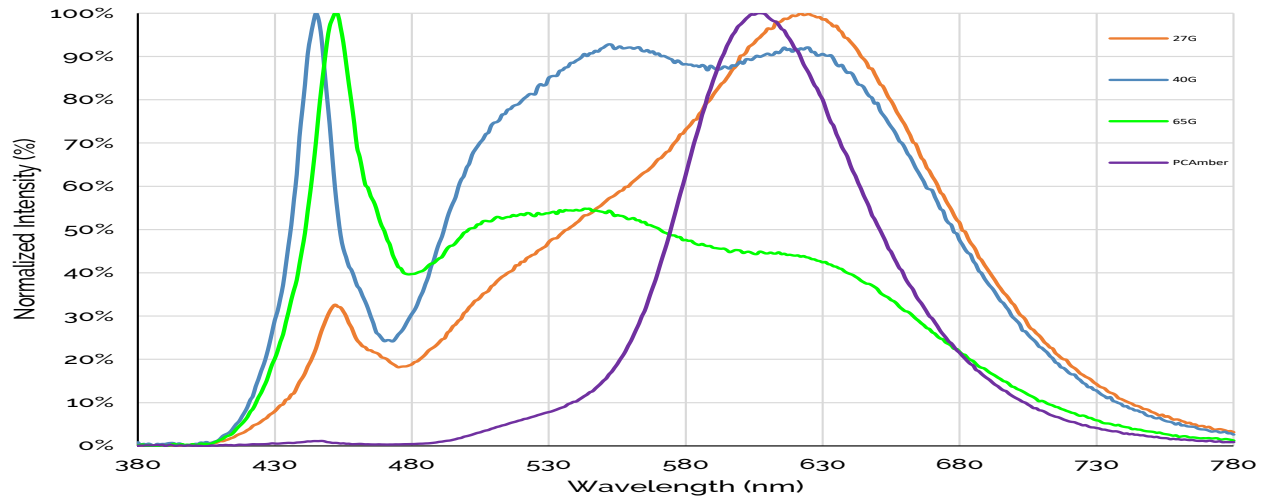
1. Typical viewing angle is  $120^{\circ}$ .
2. The viewing angle is defined as the off axis angle from the centerline where  $I_v$  is  $\frac{1}{2}$  of the peak value.

Figure 9: Typical Polar Radiation Pattern at 350mA,  $T_{sp}=25^{\circ}\text{C}$



# Typical Color Spectrum

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

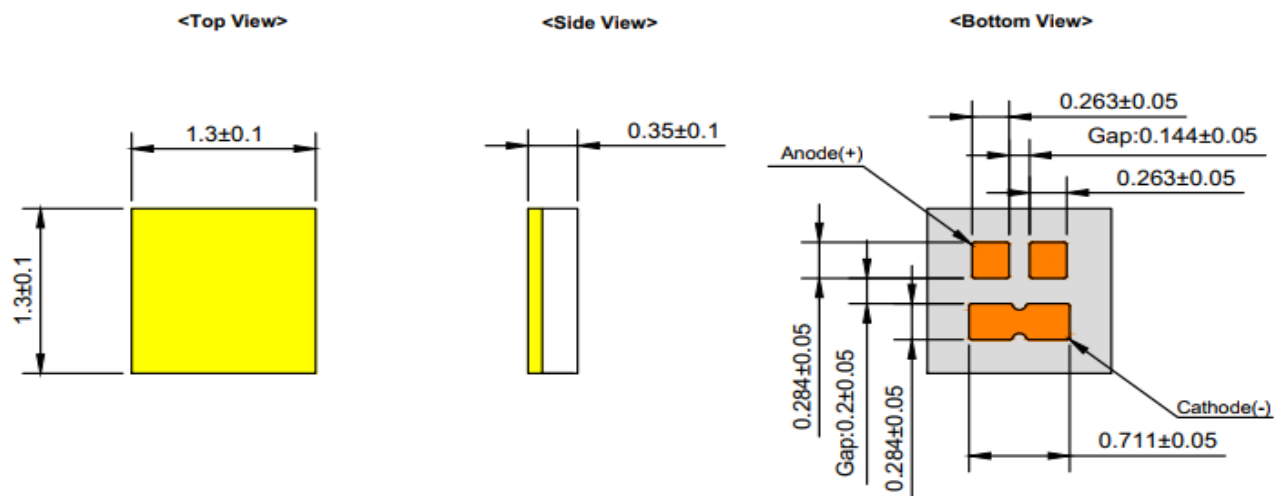


Notes for Figure 10:

1. Color spectra shown for warm white is 2700K and 90 CRI.
2. Color spectra shown for neutral white is 4000K and 90 CRI.
3. Color spectra shown for cool white is 6500K and 90 CRI.
4. Color spectra shown for PC Amber is 1500K and 45 CRI.

# Mechanical Dimensions

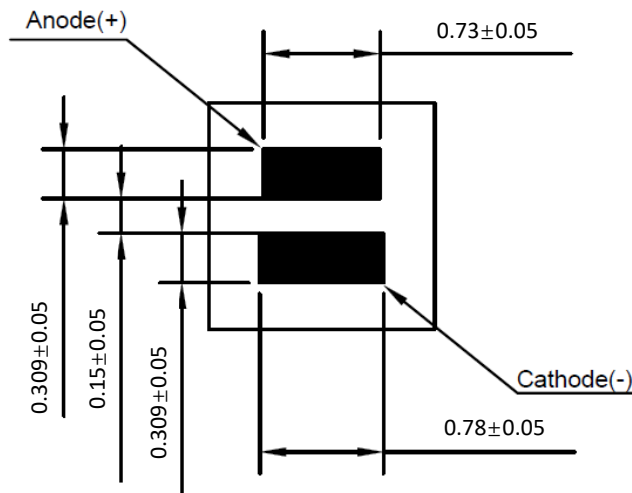
Figure 11: Drawing for CSP 1313



Notes for Figure 11:

1. Drawings are not to scale.
2. Drawing dimensions are in millimeters.
3. Unless otherwise specified, tolerances are  $\pm 0.10$  mm.
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  $\pm 0.2$  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         | $T_{sld} = 260^{\circ}\text{C}$ , 10sec,<br>Precondition: $85^{\circ}\text{C}$ , 60%RH, 168hr |               | 3 reflows     | 0/22                |
| 2    | Low Temperature Storage             | JESD22-A119        | $T_a = -40^{\circ}\text{C}$                                                                   |               | 1000 hours    | 0/22                |
| 3    | High Temperature Storage            | JESD22-A103D       | $T_a = 125^{\circ}\text{C}$                                                                   |               | 1000 hours    | 0/22                |
| 4    | Low Temperature Operating Life      | JESD22-A108D       | $T_a = -40^{\circ}\text{C}$                                                                   | 700mA         | 1000 hours    | 0/22                |
| 5    | Temperature Humidity Operating Life | JESD22-A101C       | $T_{sp} = 85^{\circ}\text{C}$ , RH=85%                                                        | 700mA         | 1000 hours    | 0/22                |
| 6    | High Temperature Operating Life     | JESD22-A108D       | $T_{sp} = 85^{\circ}\text{C}$                                                                 | 700mA         | 1000 hours    | 0/22                |
| 7    | Power Switching                     | IEC62717           | $T_{sp} = 85^{\circ}\text{C}$ ,<br>ON 30s OFF 30s                                             | 700mA         | 30000 Cycle   | 0/22                |
| 8    | Thermal Shock                       | JESD22-A106B       | $T_a = -40^{\circ}\text{C} \sim 125^{\circ}\text{C}$ ;<br>Dwell : 15min; Transfer: 10sec      |               | 200 Cycle     | 0/22                |
| 9    | Electrostatic Discharge             | JS-001-2012        | HBM, 2kV, 15k $\Omega$ , 100pF,<br>Alternately positive or negative                           |               |               | 0/22                |
| 10   | Vibration Test                      | JESD22-B103        | 10m/s <sup>2</sup> , 100-20000~100Hz<br>4 cycles,4min,eachX,Y,Z                               |               | 4 Cycles      | 0/22                |

## Passing Criteria

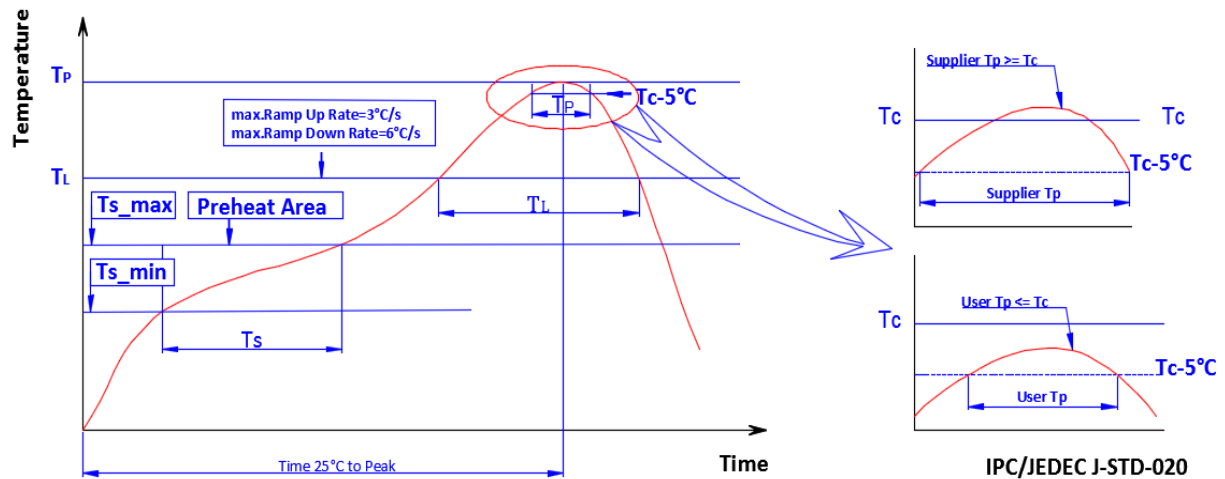
| Item                     | Symbol         | Test Condition | Passing Criteria      |
|--------------------------|----------------|----------------|-----------------------|
| Forward Voltage          | V <sub>f</sub> | 700mA          | $\Delta V_f < 10\%$   |
| Luminous Flux            | I <sub>v</sub> | 700mA          | $\Delta I_v < 30\%$   |
| Chromaticity Coordinates | (x, y)         | 700mA          | $\Delta u'v' < 0.007$ |

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

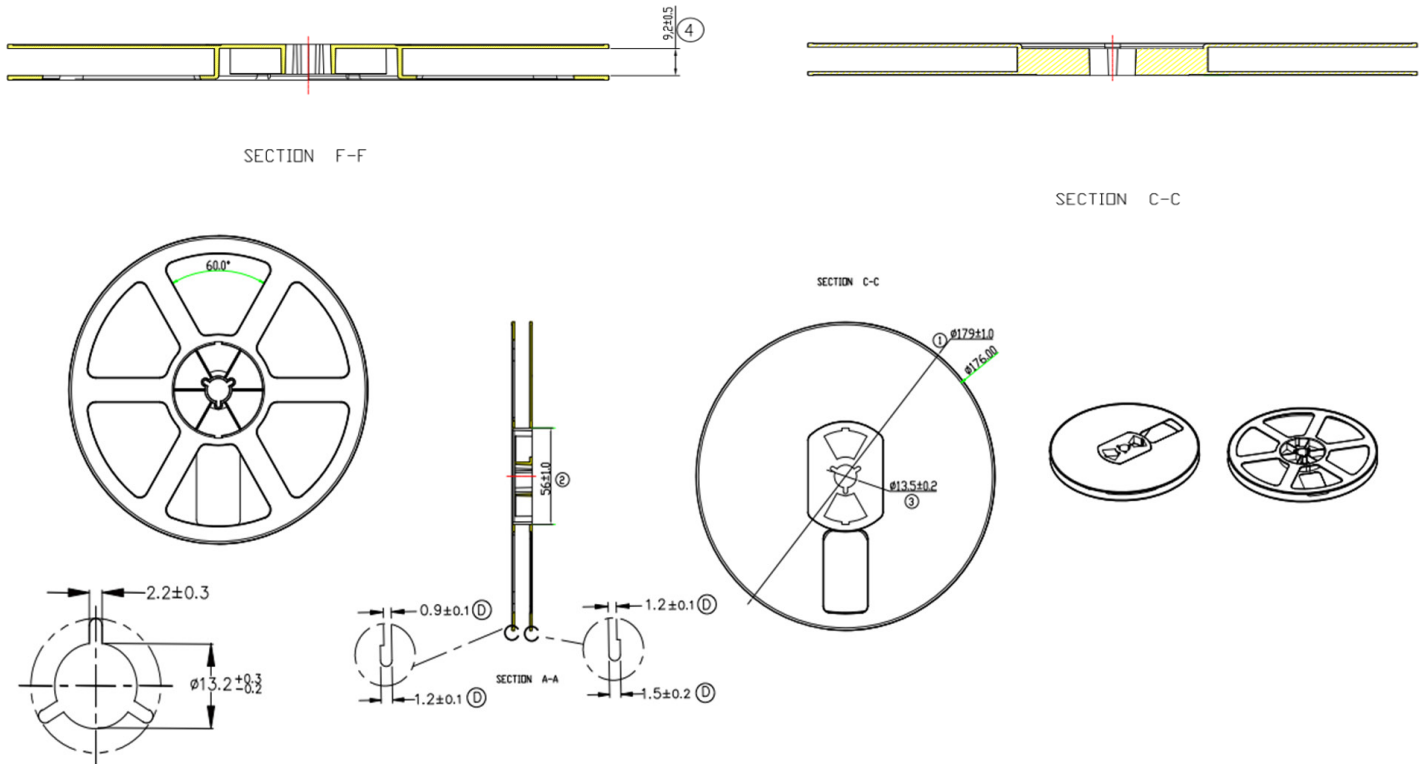
Figure 12 : Reflow Profile



| 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

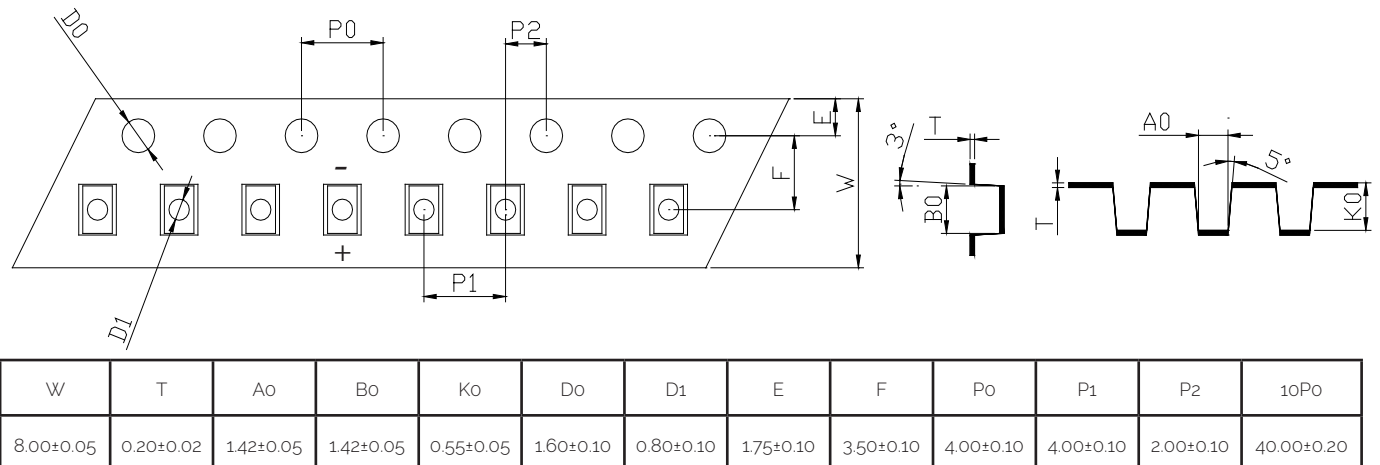
**Figure 13: Reel Drawings**



Note for Figure 13:

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

**Figure 14: Tape Drawings**

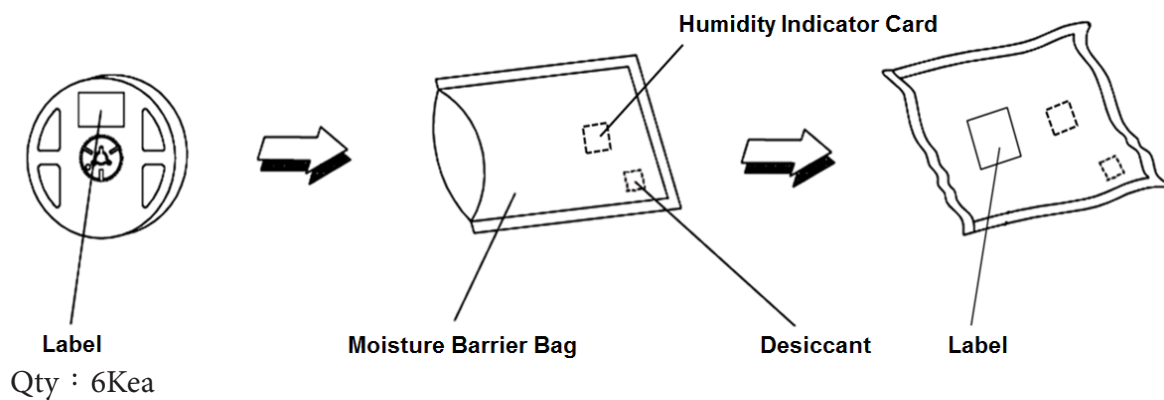


Note for Figure 14:

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.
2. LED Quantity of each reel is not less than labeling.
3. Empty cavity of reel is not more than 5ea, continuous empty cavity is not more than 2ea.

# 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 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.

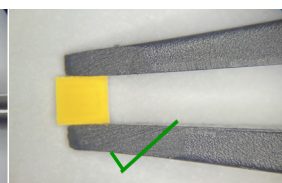
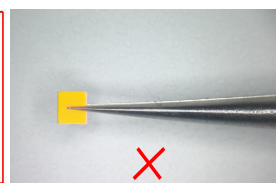
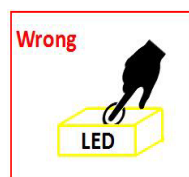
### CAUTION: RISK OF BURN

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.

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Bridgelux CSP1313 Product Data Sheet DS960 Rev. C (08/2026)