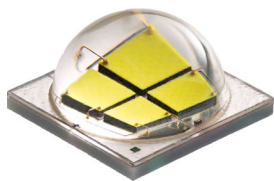


Cree® XLamp® MK-R LEDs



PRODUCT DESCRIPTION

Built on Cree's revolutionary SC³ Technology® platform, the XLamp® MK-R LED brings new levels of price and performance to directional LED arrays, enabling lighting manufacturers to create the next generation of high-lumen indoor and outdoor LED lighting systems. In single-LED systems, the XLamp MK-R LED, with EasyWhite® color binning, provides the LED industry's tightest unit-to-unit color consistency. For systems using multiple LEDs, the MK-R enables manufacturers to use fewer LEDs while maintaining light output and color consistency, which translates to lower system cost.

The XLamp MK-R LED is optimized for directional lighting applications and is a welcome addition to applications requiring high lumen output, a compact optical source and a broad palette of color temperature and CRI values.

FEATURES

- Available in ANSI white bins as well as 4-step and 2-step EasyWhite bins at 2700 K, 3000 K, 3500 K, 4000 K, 4500 K and 5000 K CCT
- Two voltage options: 6 V & 12 V
- Low thermal resistance: 1.7 °C/W
- Maximum junction temperature: 150 °C
- Binned at 85 °C
- Viewing angle: 120°
- Available in cool white, 70-, 80- and 90-CRI minimums
- Unlimited floor life at ≤ 30 °C/85% RH
- Reflow solderable - JEDEC J-STD-020C
- Electrically neutral thermal path
- RoHS and REACH compliant
- UL® recognized component (E349212)



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CHARACTERISTICS

| Characteristics | Unit | Minimum | Typical | Maximum |
|--|---------|---------|---------|---------|
| Thermal resistance, junction to solder point | °C/W | | 1.7 | |
| Viewing angle - full width half maximum (FWHM) | degrees | | 120 | |
| Temperature coefficient of voltage (6 V, 1400 mA, 85 °C) | mV/°C | | -4 | |
| Temperature coefficient of voltage (12 V, 700 mA, 85 °C) | mV/°C | | -8 | |
| ESD withstand voltage (HBM per Mil-Std-883D) | V | | | 8000 |
| DC forward current (6 V, 1400 mA, 85 °C) | mA | | | 2500 |
| DC forward current (12 V, 700 mA, 85 °C) | mA | | | 1250 |
| Reverse voltage | V | | | 5 |
| Forward voltage (6 V, 1400 mA, 85 °C) | V | | 5.85 | 7 |
| Forward voltage (12 V, 700 mA, 85 °C) | V | | 11.7 | 14 |
| LED junction temperature | °C | | | 150 |

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 6 V ($I_F = 1400 \text{ mA}$, $T_J = 85^\circ \text{C}$)

The following tables provide order codes for XLamp MK-R LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 27).

| Color | CCT Range | Minimum Luminous Flux** | | | 2-Step | | 4-Step | |
|------------------|-----------|-------------------------|---------------------------------|-----------------------------------|---------------------|--------------------------|---------------------|--------------------------|
| | | Group | Flux (lm) @ 85°C | Flux (lm) @ 25°C^* | Chromaticity Region | Order Code | Chromaticity Region | Order Code |
| 80-CRI EasyWhite | 5000 K | H4 | 970 | 1091 | 50H | MKRAWT-00-0000-0B0HH450H | 50F | MKRAWT-00-0000-0B0HH450F |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0B0HH250H | | MKRAWT-00-0000-0B0HH250F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0B0HG450H | | MKRAWT-00-0000-0B0HG450F |
| | 4500 K | H4 | 970 | 1091 | 45H | MKRAWT-00-0000-0B0HH445H | 45F | MKRAWT-00-0000-0B0HH445F |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0B0HH245H | | MKRAWT-00-0000-0B0HH245F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0B0HG445H | | MKRAWT-00-0000-0B0HG445F |
| | 4000 K | H4 | 970 | 1091 | 40H | MKRAWT-00-0000-0B0HH440H | 40F | MKRAWT-00-0000-0B0HH440F |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0B0HH240H | | MKRAWT-00-0000-0B0HH240F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0B0HG440H | | MKRAWT-00-0000-0B0HG440F |
| | 3500 K | H4 | 970 | 1091 | 35H | MKRAWT-00-0000-0B0HH435H | 35F | MKRAWT-00-0000-0B0HH435F |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0B0HH235H | | MKRAWT-00-0000-0B0HH235F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0B0HG435H | | MKRAWT-00-0000-0B0HG435F |
| | | G2 | 780 | 877 | | MKRAWT-00-0000-0B0HG235H | | MKRAWT-00-0000-0B0HG235F |
| | 3000 K | H2 | 900 | 1012 | 30H | MKRAWT-00-0000-0B0HH230H | 30F | MKRAWT-00-0000-0B0HH230F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0B0HG430H | | MKRAWT-00-0000-0B0HG430F |
| | | G2 | 780 | 877 | | MKRAWT-00-0000-0B0HG230H | | MKRAWT-00-0000-0B0HG230F |
| | 2700 K | H2 | 900 | 1012 | 27H | MKRAWT-00-0000-0B0HH227H | 27F | MKRAWT-00-0000-0B0HH227F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0B0HG427H | | MKRAWT-00-0000-0B0HG427F |
| | | G2 | 780 | 877 | | MKRAWT-00-0000-0B0HG227H | | MKRAWT-00-0000-0B0HG227F |
| | | F4 | 730 | 821 | | MKRAWT-00-0000-0B0HF427H | | MKRAWT-00-0000-0B0HF427F |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- Minimum CRI for 80-CRI White is 80.
- * Flux values @ 25°C are calculated and for reference only.
- ** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 6 V ($I_F = 1400 \text{ mA}$, $T_J = 85 \text{ °C}$) - CONTINUED

| Color | CCT Range | Minimum Luminous Flux** | | | 2-Step | | 4-Step | |
|------------------|-----------|-------------------------|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
| | | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | Order Code | Chromaticity Region | Order Code |
| 90-CRI EasyWhite | 3000 K | F4 | 730 | 821 | 30H | MKRAWT-00-0000-0B0UF430H | 30F | MKRAWT-00-0000-0B0UF430F |
| | | F2 | 680 | 765 | | MKRAWT-00-0000-0B0UF230H | | MKRAWT-00-0000-0B0UF230F |
| | | E4 | 635 | 714 | | MKRAWT-00-0000-0B0UE430H | | MKRAWT-00-0000-0B0UE430F |
| | | E2 | 590 | 664 | | MKRAWT-00-0000-0B0UE230H | | MKRAWT-00-0000-0B0UE230F |
| | 2700 K | F2 | 680 | 765 | 27H | MKRAWT-00-0000-0B0UF227H | 27F | MKRAWT-00-0000-0B0UF227F |
| | | E4 | 635 | 714 | | MKRAWT-00-0000-0B0UE427H | | MKRAWT-00-0000-0B0UE427F |
| | | E2 | 590 | 664 | | MKRAWT-00-0000-0B0UE227H | | MKRAWT-00-0000-0B0UE227F |
| | | D4 | 550 | 619 | | MKRAWT-00-0000-0B0UD427H | | MKRAWT-00-0000-0B0UD427F |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- Minimum CRI for 90-CRI White is 90.
- * Flux values @ 25 °C are calculated and for reference only.
- ** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 6 V ($I_F = 1400 \text{ mA}$, $T_J = 85^\circ\text{C}$)

| Chromaticity | | Minimum Luminous Flux** | | | Order Codes | | | |
|--------------|--------|-------------------------|-------------------|--------------------|--------------------------|--------------------------|--------------------------|----------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 65 CRI Typical | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| 51 | 6200 K | J4 | 1120 | 1260 | MKRAWT-00-0000-0B00J4051 | MKRAWT-00-0000-0B0BJ4051 | | |
| | | J2 | 1040 | 1170 | MKRAWT-00-0000-0B00J2051 | MKRAWT-00-0000-0B0BJ2051 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0B00H4051 | MKRAWT-00-0000-0B0BH4051 | | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0B0BH2051 | | |
| E1 | 6500 K | J4 | 1120 | 1260 | MKRAWT-00-0000-0B00J40E1 | | | |
| | | J2 | 1040 | 1170 | MKRAWT-00-0000-0B00J20E1 | MKRAWT-00-0000-0B0BJ20E1 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0B00H40E1 | MKRAWT-00-0000-0B0BH40E1 | | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0B0BH20E1 | | |
| E2 | 5700 K | J4 | 1120 | 1260 | MKRAWT-00-0000-0B00J40E2 | MKRAWT-00-0000-0B0BJ40E2 | | |
| | | J2 | 1040 | 1170 | MKRAWT-00-0000-0B00J20E2 | MKRAWT-00-0000-0B0BJ20E2 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0B00H40E2 | MKRAWT-00-0000-0B0BH40E2 | | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0B0BH20E2 | | |
| E3 | 5000 K | J2 | 1040 | 1170 | MKRAWT-00-0000-0B00J20E3 | MKRAWT-00-0000-0B0BJ20E3 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0B00H40E3 | MKRAWT-00-0000-0B0BH40E3 | MKRAWT-00-0000-0B0HH40E3 | |
| | | H2 | 900 | 1012 | MKRAWT-00-0000-0B00H20E3 | MKRAWT-00-0000-0B0BH20E3 | MKRAWT-00-0000-0B0HH20E3 | |
| | | G4 | 840 | 945 | | | MKRAWT-00-0000-0B0HG40E3 | |
| E4 | 4500 K | J2 | 1040 | 1170 | MKRAWT-00-0000-0B00J20E4 | MKRAWT-00-0000-0B0BJ20E4 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0B00H40E4 | MKRAWT-00-0000-0B0BH40E4 | MKRAWT-00-0000-0B0HH40E4 | |
| | | H2 | 900 | 1012 | MKRAWT-00-0000-0B00H20E4 | MKRAWT-00-0000-0B0BH20E4 | MKRAWT-00-0000-0B0HH20E4 | |
| | | G4 | 840 | 945 | | | MKRAWT-00-0000-0B0HG40E4 | |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- For information on chromaticity bins contained in the kits listed above, please reference the Performance Groups - Chromaticity section starting on page 21.
- * Flux values @ 25 °C are calculated and for reference only.
- ** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 6 V ($I_F = 1400 \text{ mA}$, $T_J = 85^\circ\text{C}$) - CONTINUED

| Chromaticity | | Minimum Luminous Flux** | | | Order Codes | | | |
|--------------|--------|-------------------------|-------------------|--------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 65 CRI Typical | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| E5 | 4000 K | J2 | 1040 | 1170 | MKRAWT-00-0000-0B00J20E5 | MKRAWT-00-0000-0B0BJ20E5 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0B00H40E5 | MKRAWT-00-0000-0B0BH40E | MKRAWT-00-0000-0B0HH40E5 | |
| | | H2 | 900 | 1012 | MKRAWT-00-0000-0B00H20E5 | MKRAWT-00-0000-0B0BH20E | MKRAWT-00-0000-0B0HH20E5 | |
| | | G4 | 840 | 945 | MKRAWT-00-0000-0B00G40E5 | MKRAWT-00-0000-0B0BG40E5 | MKRAWT-00-0000-0B0HG40E5 | |
| E6 | 3500 K | H4 | 970 | 1091 | | MKRAWT-00-0000-0B0BH40E6 | MKRAWT-00-0000-0B0HH40E6 | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0B0BH20E6 | MKRAWT-00-0000-0B0HH20E6 | |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0B0BG40E6 | MKRAWT-00-0000-0B0HG40E6 | |
| | | G2 | 780 | 877 | | | MKRAWT-00-0000-0B0HG20E6 | |
| E7 | 3000 K | H4 | 970 | 1091 | | MKRAWT-00-0000-0B0BH40E7 | | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0B0BH20E7 | MKRAWT-00-0000-0B0HH20E7 | |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0B0BG40E7 | MKRAWT-00-0000-0B0HG40E7 | |
| | | G2 | 780 | 877 | | | MKRAWT-00-0000-0B0HG20E7 | |
| | | F4 | 730 | 821 | | | | MKRAWT-00-0000-0B0UF40E7 |
| | | F2 | 680 | 765 | | | | MKRAWT-00-0000-0B0UF20E7 |
| | | E4 | 635 | 714 | | | | MKRAWT-00-0000-0B0UE40E7 |
| | | E2 | 590 | 664 | | | | MKRAWT-00-0000-0B0UE20E7 |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- For information on chromaticity bins contained in the kits listed above, please reference the Performance Groups - Chromaticity section starting on page 21.

* Flux values @ 25 °C are calculated and for reference only.

** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 6 V ($I_F = 1400 \text{ mA}$, $T_J = 85^\circ\text{C}$) - CONTINUED

| Chromaticity | | Minimum Luminous Flux** | | | Order Codes | | | |
|--------------|--------|-------------------------|--------------------------------|----------------------------------|----------------|----------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85°C | Flux (lm) @ 25°C^* | 65 CRI Typical | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| E8 | 2700 K | H2 | 900 | 1012 | | | MKRAWT-00-0000-0B0HH20E8 | |
| | | G4 | 840 | 945 | | | MKRAWT-00-0000-0B0HG40E8 | |
| | | G2 | 780 | 877 | | | MKRAWT-00-0000-0B0HG20E8 | |
| | | F4 | 730 | 821 | | | MKRAWT-00-0000-0B0HF40E8 | |
| | | F2 | 680 | 765 | | | | MKRAWT-00-0000-0B0UF20E8 |
| | | E4 | 635 | 714 | | | | MKRAWT-00-0000-0B0UE40E8 |
| | | E2 | 590 | 664 | | | | MKRAWT-00-0000-0B0UE20E8 |
| | | D4 | 550 | 619 | | | | MKRAWT-00-0000-0B0UD40E8 |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- For information on chromaticity bins contained in the kits listed above, please reference the Performance Groups - Chromaticity section starting on page 21.

* Flux values @ 25°C are calculated and for reference only.

** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS -12 V ($I_F = 700 \text{ mA}$, $T_J = 85^\circ \text{C}$)

The following tables provide order codes for XLamp MK-R LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 27).

| Color | CCT Range | Minimum Luminous Flux** | | | 2-Step | | 4-Step | |
|------------------|-----------|-------------------------|---------------------------------|-----------------------------------|---------------------|--------------------------|---------------------|--------------------------|
| | | Group | Flux (lm) @ 85°C | Flux (lm) @ 25°C^* | Chromaticity Region | Order Code | Chromaticity Region | Order Code |
| 80-CRI EasyWhite | 5000 K | H4 | 970 | 1091 | 50H | MKRAWT-00-0000-0D0HH450H | 50F | MKRAWT-00-0000-0D0HH450F |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0D0HH250H | | MKRAWT-00-0000-0D0HH250F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0D0HG450H | | MKRAWT-00-0000-0D0HG450F |
| | 4500 K | H4 | 970 | 1091 | 45H | MKRAWT-00-0000-0D0HH445H | 45F | MKRAWT-00-0000-0D0HH445F |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0D0HH245H | | MKRAWT-00-0000-0D0HH245F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0D0HG445H | | MKRAWT-00-0000-0D0HG445F |
| | 4000 K | H4 | 970 | 1091 | 40H | MKRAWT-00-0000-0D0HH440H | 40F | MKRAWT-00-0000-0D0HH440F |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0D0HH240H | | MKRAWT-00-0000-0D0HH240F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0D0HG440H | | MKRAWT-00-0000-0D0HG440F |
| | 3500 K | H4 | 970 | 1091 | 35H | MKRAWT-00-0000-0D0HH435H | 35F | MKRAWT-00-0000-0D0HH435F |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0D0HH235H | | MKRAWT-00-0000-0D0HH235F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0D0HG435H | | MKRAWT-00-0000-0D0HG435F |
| | | G2 | 780 | 877 | | MKRAWT-00-0000-0D0HG235H | | MKRAWT-00-0000-0D0HG235F |
| | 3000 K | H2 | 900 | 1012 | 30H | MKRAWT-00-0000-0D0HH230H | 30F | MKRAWT-00-0000-0D0HH230F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0D0HG430H | | MKRAWT-00-0000-0D0HG430F |
| | | G2 | 780 | 877 | | MKRAWT-00-0000-0D0HG230H | | MKRAWT-00-0000-0D0HG230F |
| | 2700 K | H2 | 900 | 1012 | 27H | MKRAWT-00-0000-0D0HH227H | 27F | MKRAWT-00-0000-0D0HH227F |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0D0HG427H | | MKRAWT-00-0000-0D0HG427F |
| | | G2 | 780 | 877 | | MKRAWT-00-0000-0D0HG227H | | MKRAWT-00-0000-0D0HG227F |
| | | F4 | 730 | 821 | | MKRAWT-00-0000-0D0HF427H | | MKRAWT-00-0000-0D0HF427F |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- Minimum CRI for 80-CRI White is 80.
- * Flux values @ 25°C are calculated and for reference only.
- ** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 12 V ($I_F = 700 \text{ mA}$, $T_J = 85 \text{ °C}$) - CONTINUED

| Color | CCT Range | Minimum Luminous Flux** | | | 2-Step | | 4-Step | |
|------------------|-----------|-------------------------|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
| | | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | Order Code | Chromaticity Region | Order Code |
| 90-CRI EasyWhite | 3000 K | F4 | 730 | 821 | 30H | MKRAWT-00-0000-0D0UF430H | 30F | MKRAWT-00-0000-0D0UF430F |
| | | F2 | 680 | 765 | | MKRAWT-00-0000-0D0UF230H | | MKRAWT-00-0000-0D0UF230F |
| | | E4 | 635 | 714 | | MKRAWT-00-0000-0D0UE430H | | MKRAWT-00-0000-0D0UE430F |
| | | E2 | 590 | 664 | | MKRAWT-00-0000-0D0UE230H | | MKRAWT-00-0000-0D0UE230F |
| | 2700 K | F2 | 680 | 765 | 27H | MKRAWT-00-0000-0D0UF227H | 27F | MKRAWT-00-0000-0D0UF227F |
| | | E4 | 635 | 714 | | MKRAWT-00-0000-0D0UE427H | | MKRAWT-00-0000-0D0UE427F |
| | | E2 | 590 | 664 | | MKRAWT-00-0000-0D0UE227H | | MKRAWT-00-0000-0D0UE227F |
| | | D4 | 550 | 619 | | MKRAWT-00-0000-0D0UD427H | | MKRAWT-00-0000-0D0UD427F |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- Minimum CRI for 90-CRI White is 90.
- * Flux values @ 25 °C are calculated and for reference only.
- ** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 12 V ($I_F = 700 \text{ mA}$, $T_J = 85^\circ\text{C}$)

| Chromaticity | | Minimum Luminous Flux** | | | Order Codes | | | |
|--------------|--------|-------------------------|-------------------|--------------------|--------------------------|--------------------------|--------------------------|----------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 65 CRI Typical | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| 51 | 6200 K | J4 | 1120 | 1260 | MKRAWT-00-0000-0D00J4051 | MKRAWT-00-0000-0D0BJ4051 | | |
| | | J2 | 1040 | 1170 | MKRAWT-00-0000-0D00J2051 | MKRAWT-00-0000-0D0BJ2051 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0D00H4051 | MKRAWT-00-0000-0D0BH4051 | | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0D0BH2051 | | |
| E1 | 6500 K | J4 | 1120 | 1260 | MKRAWT-00-0000-0D00J40E1 | | | |
| | | J2 | 1040 | 1170 | MKRAWT-00-0000-0D00J20E1 | MKRAWT-00-0000-0D0BJ20E1 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0D00H40E1 | MKRAWT-00-0000-0D0BH40E1 | | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0D0BH20E1 | | |
| E2 | 5700 K | J4 | 1120 | 1260 | MKRAWT-00-0000-0D00J40E2 | MKRAWT-00-0000-0D0BJ40E2 | | |
| | | J2 | 1040 | 1170 | MKRAWT-00-0000-0D00J20E2 | MKRAWT-00-0000-0D0BJ20E2 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0D00H40E2 | MKRAWT-00-0000-0D0BH40E2 | | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0D0BH20E2 | | |
| E3 | 5000 K | J2 | 1040 | 1170 | MKRAWT-00-0000-0D00J20E3 | MKRAWT-00-0000-0D0BJ20E3 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0D00H40E3 | MKRAWT-00-0000-0D0BH40E3 | MKRAWT-00-0000-0D0HH40E3 | |
| | | H2 | 900 | 1012 | MKRAWT-00-0000-0D00H20E3 | MKRAWT-00-0000-0D0BH20E3 | MKRAWT-00-0000-0D0HH20E3 | |
| | | G4 | 840 | 945 | | | MKRAWT-00-0000-0D0HG40E3 | |
| E4 | 4500 K | J2 | 1040 | 1170 | MKRAWT-00-0000-0D00J20E4 | MKRAWT-00-0000-0D0BJ20E4 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0D00H40E4 | MKRAWT-00-0000-0D0BH40E4 | MKRAWT-00-0000-0D0HH40E4 | |
| | | H2 | 900 | 1012 | MKRAWT-00-0000-0D00H20E4 | MKRAWT-00-0000-0D0BH20E4 | MKRAWT-00-0000-0D0HH20E4 | |
| | | G4 | 840 | 945 | | | MKRAWT-00-0000-0D0HG40E4 | |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- For information on chromaticity bins contained in the kits listed above, please reference the Performance Groups - Chromaticity section starting on page 21.
- * Flux values @ 25 °C are calculated and for reference only.
- ** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 12 V ($I_F = 700 \text{ mA}$, $T_J = 85^\circ\text{C}$) - CONTINUED

| Chromaticity | | Minimum Luminous Flux** | | | Order Codes | | | |
|--------------|--------|-------------------------|-------------------|--------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 65 CRI Typical | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| E5 | 4000 K | J2 | 1040 | 1170 | MKRAWT-00-0000-0D00J20E5 | MKRAWT-00-0000-0D0BJ20E5 | | |
| | | H4 | 970 | 1091 | MKRAWT-00-0000-0D00H40E5 | MKRAWT-00-0000-0D0BH40E | MKRAWT-00-0000-0D0HH40E5 | |
| | | H2 | 900 | 1012 | MKRAWT-00-0000-0D00H20E5 | MKRAWT-00-0000-0D0BH20E | MKRAWT-00-0000-0D0HH20E5 | |
| | | G4 | 840 | 945 | MKRAWT-00-0000-0D00G40E5 | MKRAWT-00-0000-0D0BG40E5 | MKRAWT-00-0000-0D0HG40E5 | |
| E6 | 3500 K | H4 | 970 | 1091 | | MKRAWT-00-0000-0D0BH40E6 | MKRAWT-00-0000-0D0HH40E6 | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0D0BH20E6 | MKRAWT-00-0000-0D0HH20E6 | |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0D0BG40E6 | MKRAWT-00-0000-0D0HG40E6 | |
| | | G2 | 780 | 877 | | | MKRAWT-00-0000-0D0HG20E6 | |
| E7 | 3000 K | H4 | 970 | 1091 | | MKRAWT-00-0000-0D0BH40E7 | | |
| | | H2 | 900 | 1012 | | MKRAWT-00-0000-0D0BH20E7 | MKRAWT-00-0000-0D0HH20E7 | |
| | | G4 | 840 | 945 | | MKRAWT-00-0000-0D0BG40E7 | MKRAWT-00-0000-0D0HG40E7 | |
| | | G2 | 780 | 877 | | | MKRAWT-00-0000-0D0HG20E7 | |
| | | F4 | 730 | 821 | | | | MKRAWT-00-0000-0D0UF40E7 |
| | | F2 | 680 | 765 | | | | MKRAWT-00-0000-0D0UF20E7 |
| | | E4 | 635 | 714 | | | | MKRAWT-00-0000-0D0UE40E7 |
| | | E2 | 590 | 664 | | | | MKRAWT-00-0000-0D0UE20E7 |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- For information on chromaticity bins contained in the kits listed above, please reference the Performance Groups - Chromaticity section starting on page 21.

* Flux values @ 25 °C are calculated and for reference only.

** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 12 V ($I_F = 700 \text{ mA}$, $T_J = 85 \text{ }^\circ\text{C}$) - CONTINUED

| Chromaticity | | Minimum Luminous Flux** | | | Order Codes | | | |
|--------------|--------|-------------------------|-------------------|--------------------|----------------|----------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 65 CRI Typical | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| E8 | 2700 K | H2 | 900 | 1012 | | | MKRAWT-00-0000-0D0HH20E8 | |
| | | G4 | 840 | 945 | | | MKRAWT-00-0000-0D0HG40E8 | |
| | | G2 | 780 | 877 | | | MKRAWT-00-0000-0D0HG20E8 | |
| | | F4 | 730 | 821 | | | MKRAWT-00-0000-0D0HF40E8 | |
| | | F2 | 680 | 765 | | | | MKRAWT-00-0000-0D0UF20E8 |
| | | E4 | 635 | 714 | | | | MKRAWT-00-0000-0D0UE40E8 |
| | | E2 | 590 | 664 | | | | MKRAWT-00-0000-0D0UE20E8 |
| | | D4 | 550 | 619 | | | | MKRAWT-00-0000-0D0UD40E8 |

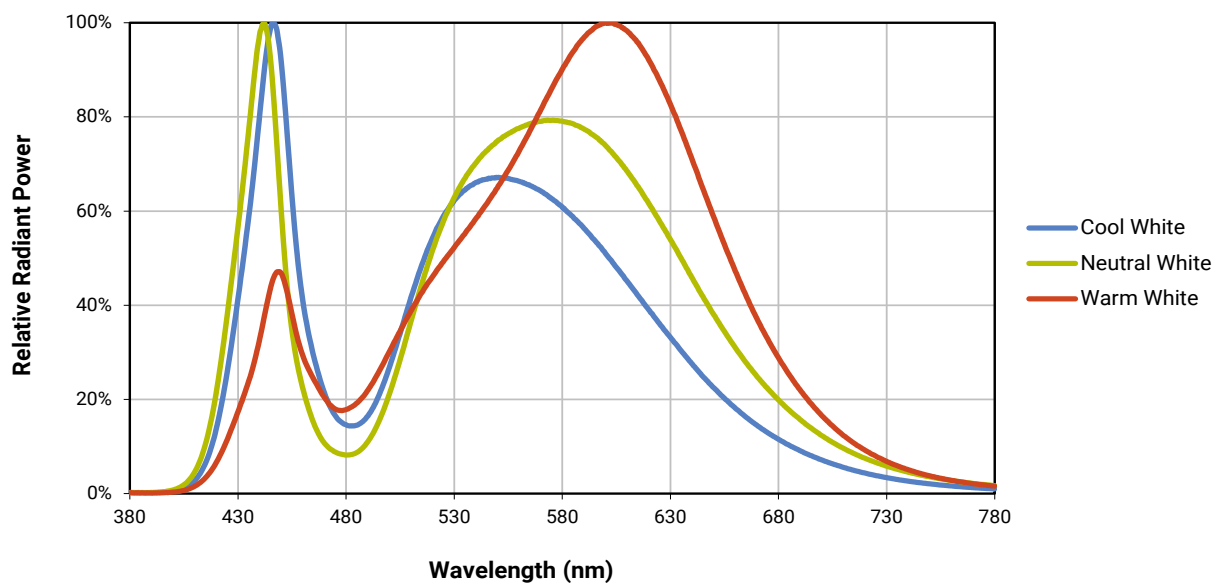
Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and ± 2 on CRI measurements. See the Measurements section (page 29).
- For information on chromaticity bins contained in the kits listed above, please reference the Performance Groups - Chromaticity section starting on page 21.

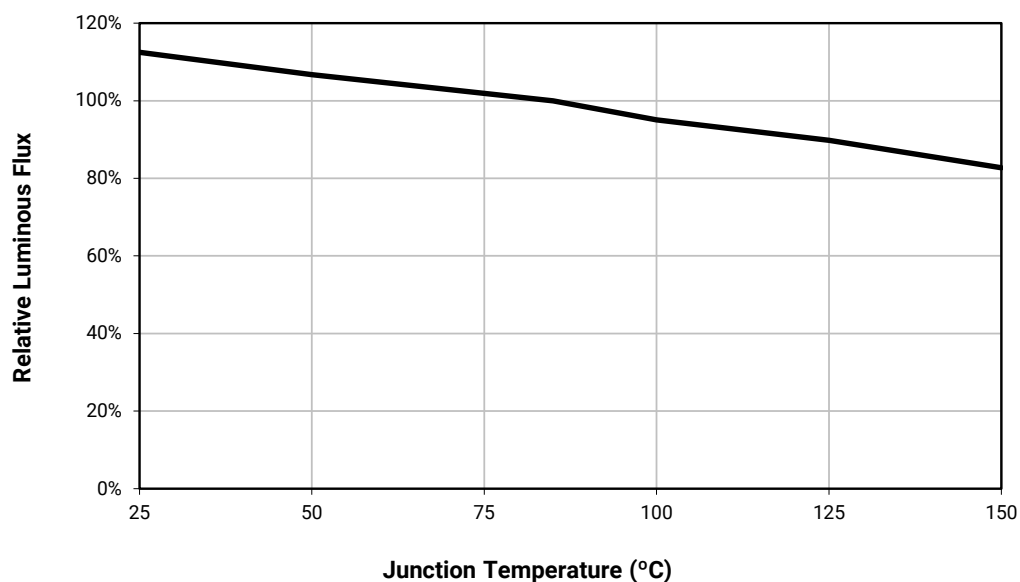
* Flux values @ 25 °C are calculated and for reference only.

** Cree XLamp MK-R LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity restrictions specified by the order code.

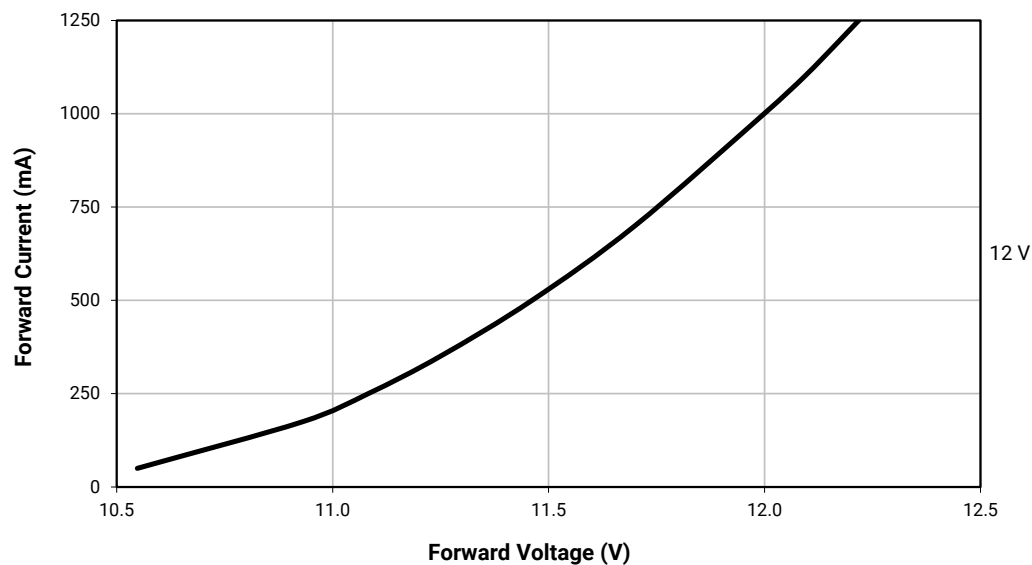
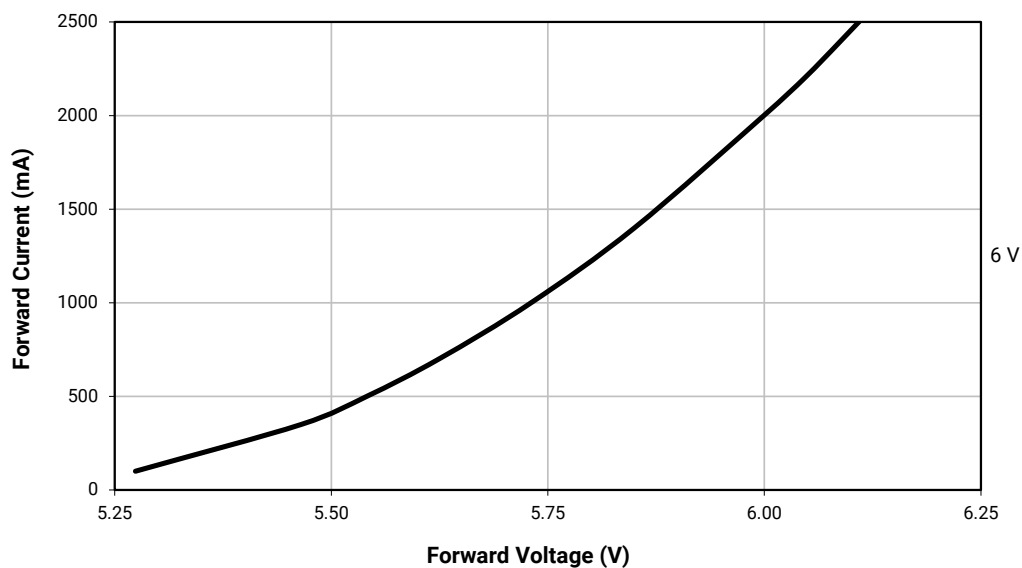
RELATIVE SPECTRAL POWER DISTRIBUTION (6 V, 1400 mA; 12 V, 700 mA; $T_j = 85^\circ\text{C}$)



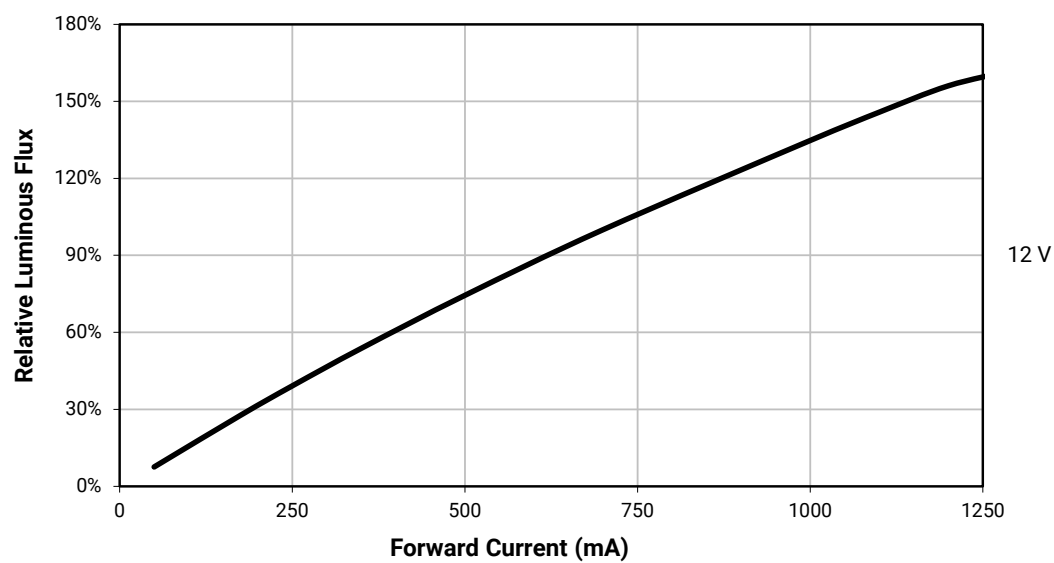
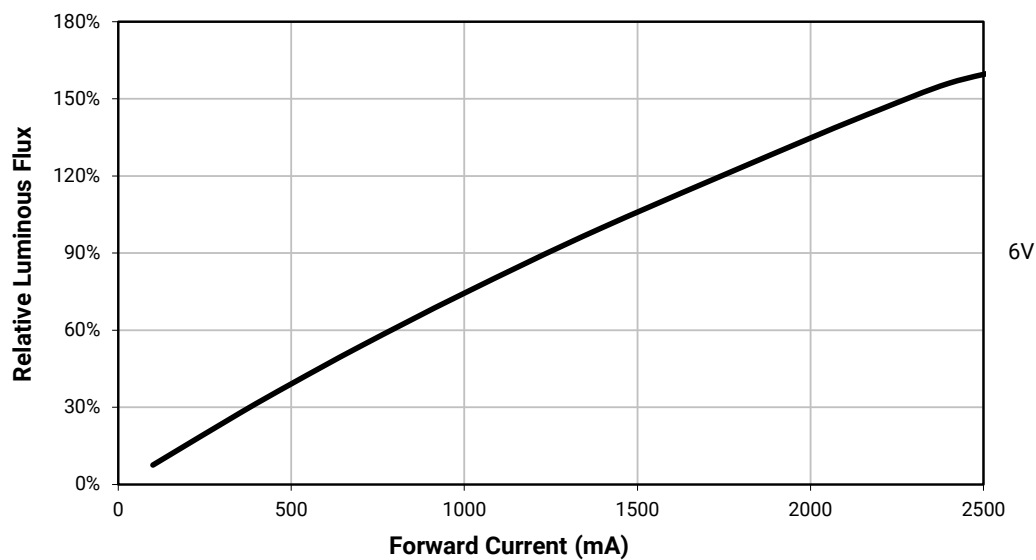
RELATIVE FLUX VS. JUNCTION TEMPERATURE (6 V, $I_F = 1400\text{ mA}$; 12 V, $I_F = 700\text{ mA}$)



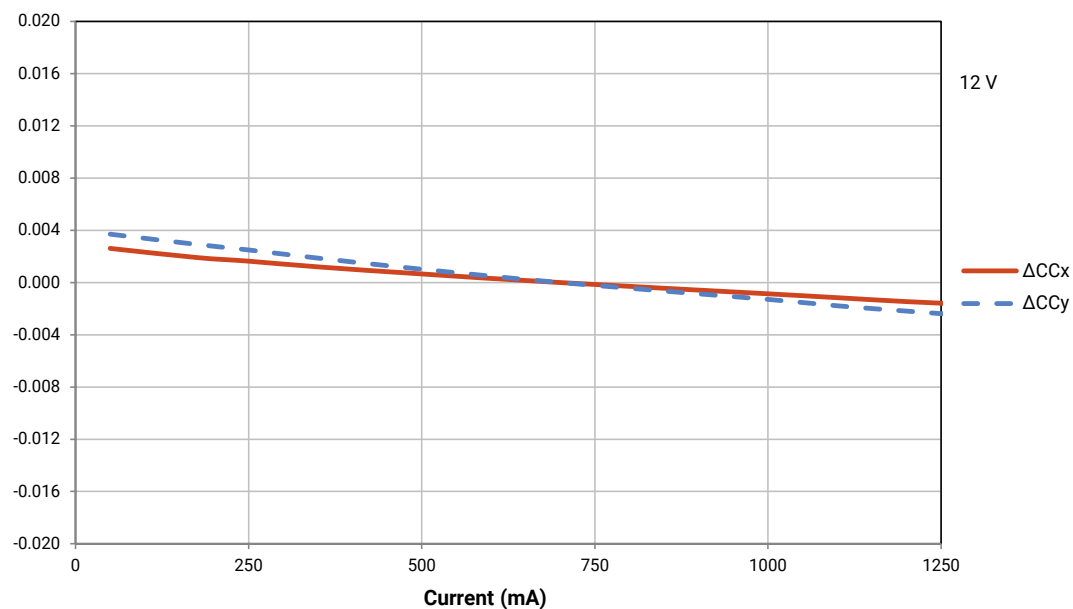
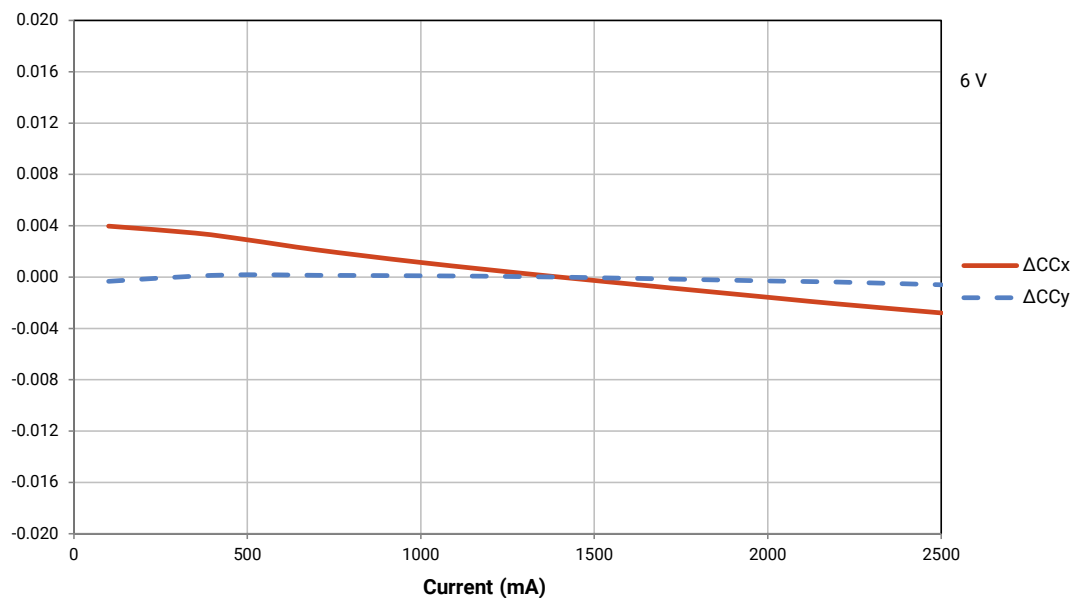
ELECTRICAL CHARACTERISTICS ($T_j = 85^\circ\text{C}$)



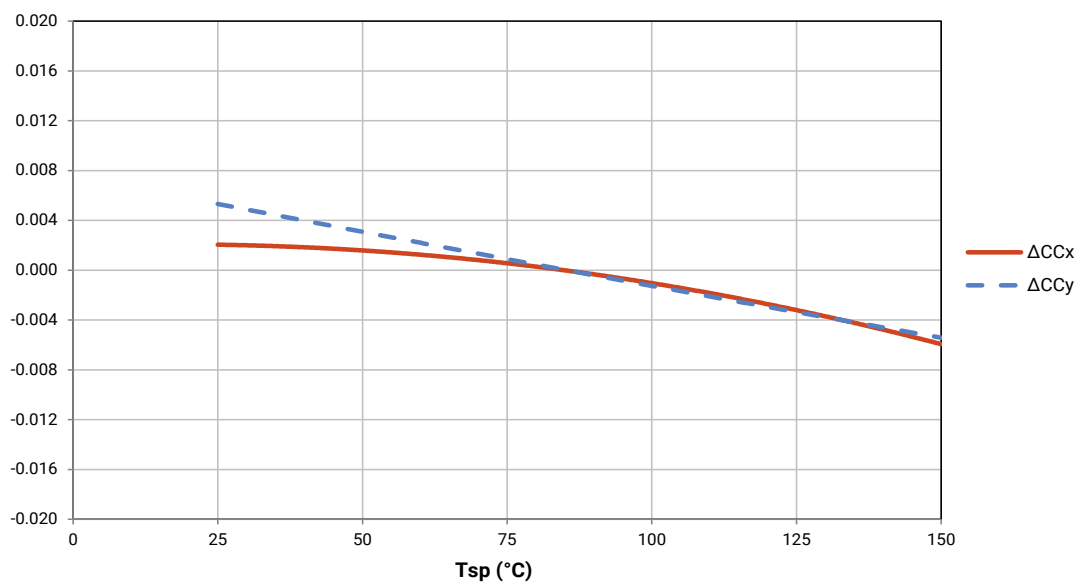
RELATIVE FLUX VS. CURRENT ($T_j = 85\text{ }^{\circ}\text{C}$)



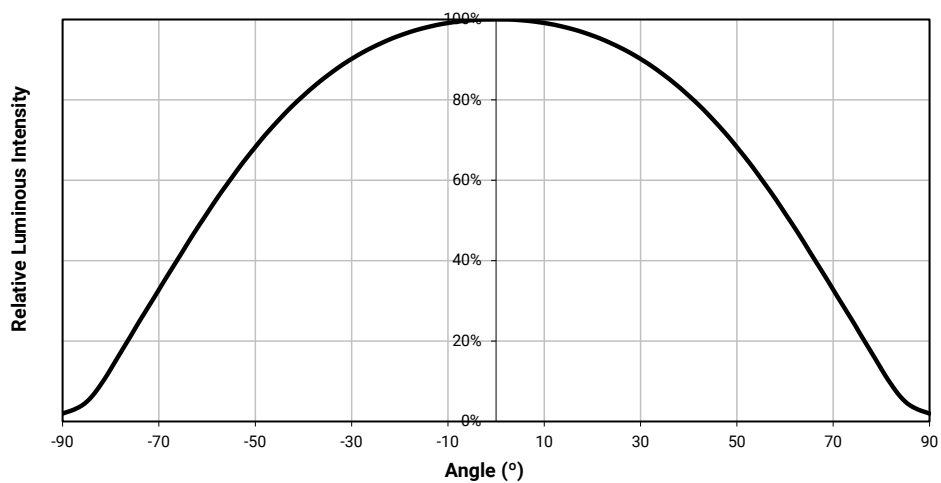
RELATIVE CHROMATICITY VS. CURRENT - WARM WHITE ($T_j = 85^\circ\text{C}$)



RELATIVE CHROMATICITY VS. TEMPERATURE - WARM WHITE (6 V, $I_F = 1400$ mA; 12 V, $I_F = 700$ mA)

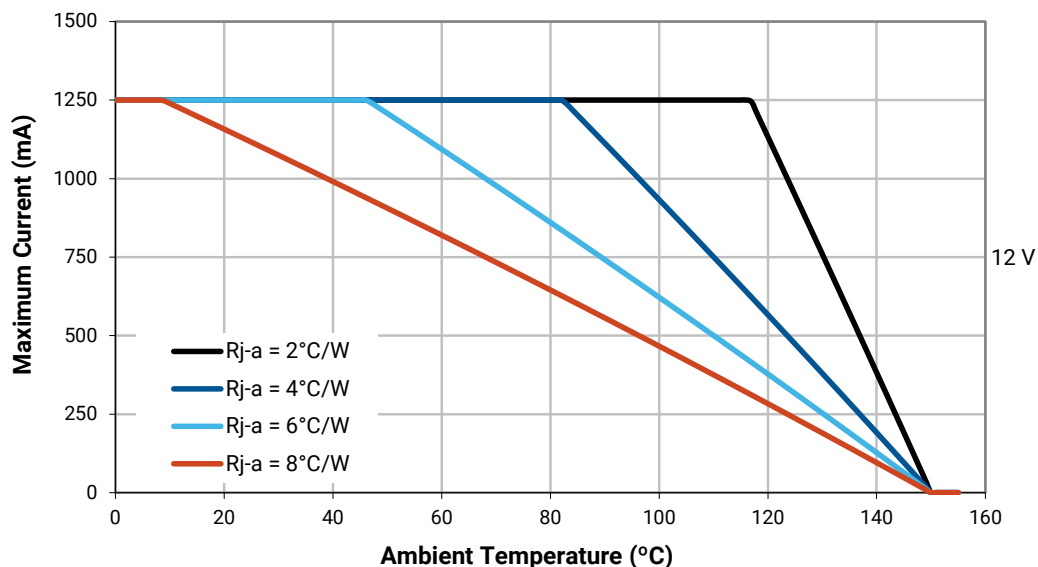
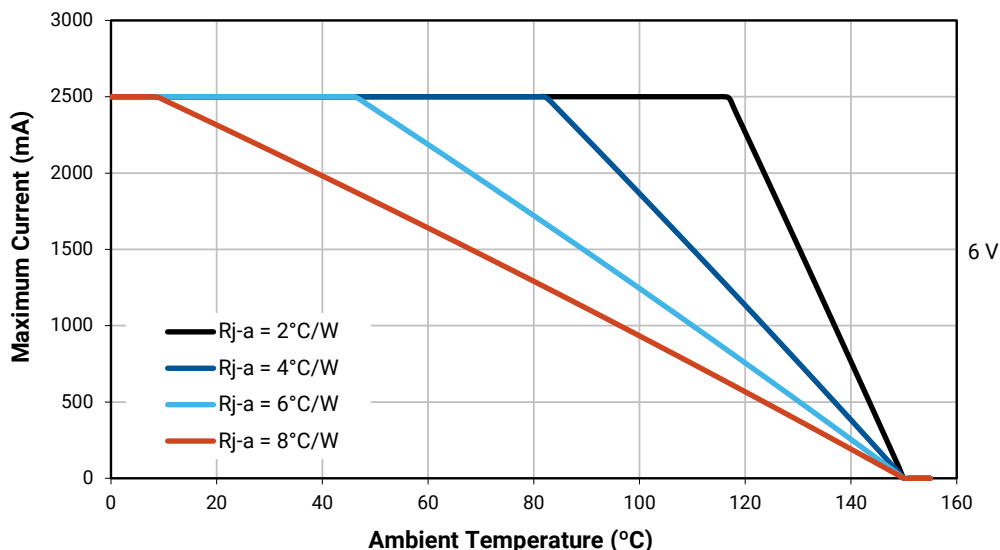


TYPICAL SPATIAL DISTRIBUTION



THERMAL DESIGN

The maximum forward current is determined by the thermal resistance between the LED junction and ambient. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.



PERFORMANCE GROUPS - LUMINOUS FLUX ($T_j = 85\text{ }^{\circ}\text{C}$)

XLamp MK-R LEDs are tested for luminous flux and placed into one of the following bins.

| Group Code | Minimum Luminous Flux | Maximum Luminous Flux |
|------------|-----------------------|-----------------------|
| D2 | 510 | 550 |
| D4 | 550 | 590 |
| E2 | 590 | 635 |
| E4 | 635 | 680 |
| F2 | 680 | 730 |
| F4 | 730 | 780 |
| G2 | 780 | 840 |
| G4 | 840 | 900 |
| H2 | 900 | 970 |
| H4 | 970 | 1040 |
| J2 | 1040 | 1120 |
| J4 | 1120 | 1200 |
| K2 | 1200 | 1290 |

PERFORMANCE GROUPS - CHROMATICITY ($T_j = 85^\circ\text{C}$)

XLamp MK-R LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

| EasyWhite Color Temperatures – 4-Step | | | |
|---------------------------------------|--------|--------|--------|
| Code | CCT | x | y |
| 50H | 5000 K | 0.3407 | 0.3459 |
| | | 0.3415 | 0.3586 |
| | | 0.3499 | 0.3654 |
| | | 0.3484 | 0.3521 |
| 45H | 4500 K | 0.3674 | 0.3772 |
| | | 0.3582 | 0.3710 |
| | | 0.3562 | 0.3573 |
| | | 0.3642 | 0.3625 |
| 40H | 4000 K | 0.3744 | 0.3685 |
| | | 0.3782 | 0.3837 |
| | | 0.3912 | 0.3917 |
| | | 0.3863 | 0.3758 |
| 35H | 3500 K | 0.3981 | 0.3800 |
| | | 0.4040 | 0.3966 |
| | | 0.4186 | 0.4037 |
| | | 0.4116 | 0.3865 |
| 30H | 3000 K | 0.4242 | 0.3919 |
| | | 0.4322 | 0.4096 |
| | | 0.4449 | 0.4141 |
| | | 0.4359 | 0.3960 |
| 27H | 2700 K | 0.4475 | 0.3994 |
| | | 0.4573 | 0.4178 |
| | | 0.4695 | 0.4207 |
| | | 0.4589 | 0.4021 |

| EasyWhite Color Temperatures – 2-Step | | | |
|---------------------------------------|--------|--------|--------|
| Code | CCT | x | y |
| 50F | 5000 K | 0.3429 | 0.3507 |
| | | 0.3434 | 0.3571 |
| | | 0.3475 | 0.3604 |
| | | 0.3469 | 0.3539 |
| 45F | 4500 K | 0.3643 | 0.3720 |
| | | 0.3597 | 0.3689 |
| | | 0.3587 | 0.3620 |
| | | 0.3628 | 0.3647 |
| 40F | 4000 K | 0.3784 | 0.3741 |
| | | 0.3804 | 0.3818 |
| | | 0.3867 | 0.3857 |
| | | 0.3844 | 0.3778 |
| 35F | 3500 K | 0.4030 | 0.3857 |
| | | 0.4061 | 0.3941 |
| | | 0.4132 | 0.3976 |
| | | 0.4099 | 0.3890 |
| 30F | 3000 K | 0.4291 | 0.3973 |
| | | 0.4333 | 0.4062 |
| | | 0.4395 | 0.4084 |
| | | 0.4351 | 0.3994 |
| 27F | 2700 K | 0.4528 | 0.4046 |
| | | 0.4578 | 0.4138 |
| | | 0.4638 | 0.4152 |
| | | 0.4586 | 0.4060 |

PERFORMANCE GROUPS - CHROMATICITY ($T_J = 85^\circ\text{C}$) - CONTINUED

| ANSI White Bins | | | | | | | | | | | | | |
|-----------------|--------|----------|--------|--------|----------|--------|--------|----------|--------|--------|----------|--------|--------|
| Code | CCT | Bin Code | x | y | Bin Code | x | y | Bin Code | x | y | Bin Code | x | y |
| 051 | 6200 K | 0A0 | 0.2920 | 0.3060 | 0R0 | 0.2950 | 0.2970 | 1A0 | 0.3048 | 0.3207 | 1R0 | 0.3068 | 0.3113 |
| | | | 0.2984 | 0.3133 | | 0.3009 | 0.3042 | | 0.3130 | 0.3290 | | 0.3144 | 0.3186 |
| | | | 0.3009 | 0.3042 | | 0.3037 | 0.2937 | | 0.3144 | 0.3186 | | 0.3161 | 0.3059 |
| | | | 0.2950 | 0.2970 | | 0.2980 | 0.2880 | | 0.3068 | 0.3113 | | 0.3093 | 0.2993 |
| | | 0B0 | 0.2895 | 0.3135 | 0S0 | 0.2870 | 0.3210 | 1B0 | 0.3028 | 0.3304 | 1S0 | 0.3005 | 0.3415 |
| | | | 0.2962 | 0.3220 | | 0.2937 | 0.3312 | | 0.3115 | 0.3391 | | 0.3099 | 0.3509 |
| | | | 0.2984 | 0.3133 | | 0.2962 | 0.3220 | | 0.3130 | 0.3290 | | 0.3115 | 0.3391 |
| | | | 0.2920 | 0.3060 | | 0.2895 | 0.3135 | | 0.3048 | 0.3207 | | 0.3028 | 0.3304 |
| | | 0C0 | 0.2962 | 0.3220 | 0T0 | 0.2937 | 0.3312 | 1C0 | 0.3115 | 0.3391 | 1T0 | 0.3099 | 0.3509 |
| | | | 0.3028 | 0.3304 | | 0.3005 | 0.3415 | | 0.3205 | 0.3481 | | 0.3196 | 0.3602 |
| | | | 0.3048 | 0.3207 | | 0.3028 | 0.3304 | | 0.3213 | 0.3373 | | 0.3205 | 0.3481 |
| | | | 0.2984 | 0.3133 | | 0.2962 | 0.3220 | | 0.3130 | 0.3290 | | 0.3115 | 0.3391 |
| | | 0D0 | 0.2984 | 0.3133 | 0U0 | 0.3009 | 0.3042 | 1D0 | 0.3130 | 0.3290 | 1U0 | 0.3144 | 0.3186 |
| | | | 0.3048 | 0.3207 | | 0.3068 | 0.3113 | | 0.3213 | 0.3373 | | 0.3221 | 0.3261 |
| | | | 0.3068 | 0.3113 | | 0.3093 | 0.2993 | | 0.3221 | 0.3261 | | 0.3231 | 0.3120 |
| | | | 0.3009 | 0.3042 | | 0.3037 | 0.2937 | | 0.3144 | 0.3186 | | 0.3161 | 0.3059 |

| ANSI White Bins | | | | | | | | | | |
|-----------------|--------|----------|--------|--------|----------|--------|--------|----------|-------|-------|
| Code | CCT | Bin Code | x | y | Bin Code | x | y | Bin Code | x | y |
| 051 | 6200 K | 2A0 | 0.3215 | 0.3350 | 2R0 | 0.3222 | 0.3243 | 3A0 | .3371 | .3490 |
| | | | 0.3290 | 0.3417 | | 0.3290 | 0.3300 | | .3451 | .3554 |
| | | | 0.3290 | 0.3300 | | 0.3290 | 0.3180 | | .3440 | .3427 |
| | | | 0.3222 | 0.3243 | | 0.3231 | 0.3120 | | .3366 | .3369 |
| | | 2B0 | 0.3207 | 0.3462 | 2S0 | 0.3196 | 0.3602 | 3B0 | .3376 | .3616 |
| | | | 0.3290 | 0.3538 | | 0.3290 | 0.3690 | | .3463 | .3687 |
| | | | 0.3290 | 0.3417 | | 0.3290 | 0.3538 | | .3451 | .3554 |
| | | | 0.3215 | 0.3350 | | 0.3207 | 0.3462 | | .3371 | .3490 |
| | | 2C0 | 0.3290 | 0.3538 | 2T0 | 0.3290 | 0.3690 | 3C0 | .3463 | .3687 |
| | | | 0.3376 | 0.3616 | | 0.3381 | 0.3762 | | .3551 | .3760 |
| | | | 0.3371 | 0.3490 | | 0.3376 | 0.3616 | | .3533 | .3620 |
| | | | 0.3290 | 0.3417 | | 0.3290 | 0.3538 | | .3451 | .3554 |
| | | 2D0 | 0.3290 | 0.3417 | 2U0 | 0.3290 | 0.3300 | 3D0 | .3451 | .3554 |
| | | | 0.3371 | 0.3490 | | 0.3366 | 0.3369 | | .3533 | .3620 |
| | | | 0.3366 | 0.3369 | | 0.3361 | 0.3245 | | .3515 | .3487 |
| | | | 0.3290 | 0.3300 | | 0.3290 | 0.3180 | | .3440 | .3427 |

PERFORMANCE GROUPS - CHROMATICITY ($T_J = 85^\circ\text{C}$) - CONTINUED

| ANSI White Bins | | | | |
|-----------------|--------|----------|--------|--------|
| Code | CCT | Bin Code | x | y |
| 0E1 | 6500 K | 1A0 | 0.3048 | 0.3207 |
| | | | 0.3130 | 0.3290 |
| | | | 0.3144 | 0.3186 |
| | | | 0.3068 | 0.3113 |
| | | 1B0 | 0.3028 | 0.3304 |
| | | | 0.3115 | 0.3391 |
| | | | 0.3130 | 0.3290 |
| | | | 0.3048 | 0.3207 |
| | | 1C0 | 0.3115 | 0.3391 |
| | | | 0.3205 | 0.3481 |
| | | | 0.3213 | 0.3373 |
| | | | 0.3130 | 0.3290 |
| | | 1D0 | 0.3130 | 0.3290 |
| | | | 0.3213 | 0.3373 |
| | | | 0.3221 | 0.3261 |
| | | | 0.3144 | 0.3186 |

| ANSI White Bins | | | | |
|-----------------|--------|----------|--------|--------|
| Code | CCT | Bin Code | x | y |
| 0E2 | 5700 K | 2A0 | 0.3215 | 0.3350 |
| | | | 0.3290 | 0.3417 |
| | | | 0.3290 | 0.3300 |
| | | | 0.3222 | 0.3243 |
| | | 2B0 | 0.3207 | 0.3462 |
| | | | 0.3290 | 0.3538 |
| | | | 0.3290 | 0.3417 |
| | | | 0.3215 | 0.3350 |
| | | 2C0 | 0.3290 | 0.3538 |
| | | | 0.3376 | 0.3616 |
| | | | 0.3371 | 0.3490 |
| | | | 0.3290 | 0.3417 |
| | | 2D0 | 0.3290 | 0.3417 |
| | | | 0.3371 | 0.3490 |
| | | | 0.3366 | 0.3369 |
| | | | 0.3290 | 0.3300 |

| ANSI White Bins | | | | |
|-----------------|--------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E3 | 5000 K | 3A0 | .3371 | .3490 |
| | | | .3451 | .3554 |
| | | | .3440 | .3427 |
| | | | .3366 | .3369 |
| | | 3B0 | .3376 | .3616 |
| | | | .3463 | .3687 |
| | | | .3451 | .3554 |
| | | | .3371 | .3490 |
| | | 3C0 | .3463 | .3687 |
| | | | .3551 | .3760 |
| | | | .3533 | .3620 |
| | | | .3451 | .3554 |
| | | 3D0 | .3451 | .3554 |
| | | | .3533 | .3620 |
| | | | .3515 | .3487 |
| | | | .3440 | .3427 |

| ANSI White Bins | | | | |
|-----------------|--------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E4 | 4500 K | 4A0 | .3530 | .3597 |
| | | | .3615 | .3659 |
| | | | .3590 | .3521 |
| | | | .3512 | .3465 |
| | | 4B0 | .3548 | .3736 |
| | | | .3641 | .3804 |
| | | | .3615 | .3659 |
| | | | .3530 | .3597 |
| | | 4C0 | .3641 | .3804 |
| | | | .3736 | .3874 |
| | | | .3702 | .3722 |
| | | | .3615 | .3659 |
| | | 4D0 | .3668 | .3957 |
| | | | .3771 | .4034 |
| | | | .3736 | .3874 |
| | | | .3641 | .3804 |

| ANSI White Bins | | | | |
|-----------------|--------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E5 | 4000 K | 5A0 | .3670 | .3578 |
| | | | .3702 | .3722 |
| | | | .3825 | .3798 |
| | | | .3783 | .3646 |
| | | 5B0 | .3702 | .3722 |
| | | | .3736 | .3874 |
| | | | .3869 | .3958 |
| | | | .3825 | .3798 |
| | | 5C0 | .3825 | .3798 |
| | | | .3869 | .3958 |
| | | | .4006 | .4044 |
| | | | .3950 | .3875 |
| | | 5D0 | .3783 | .3646 |
| | | | .3825 | .3798 |
| | | | .3950 | .3875 |
| | | | .3898 | .3716 |

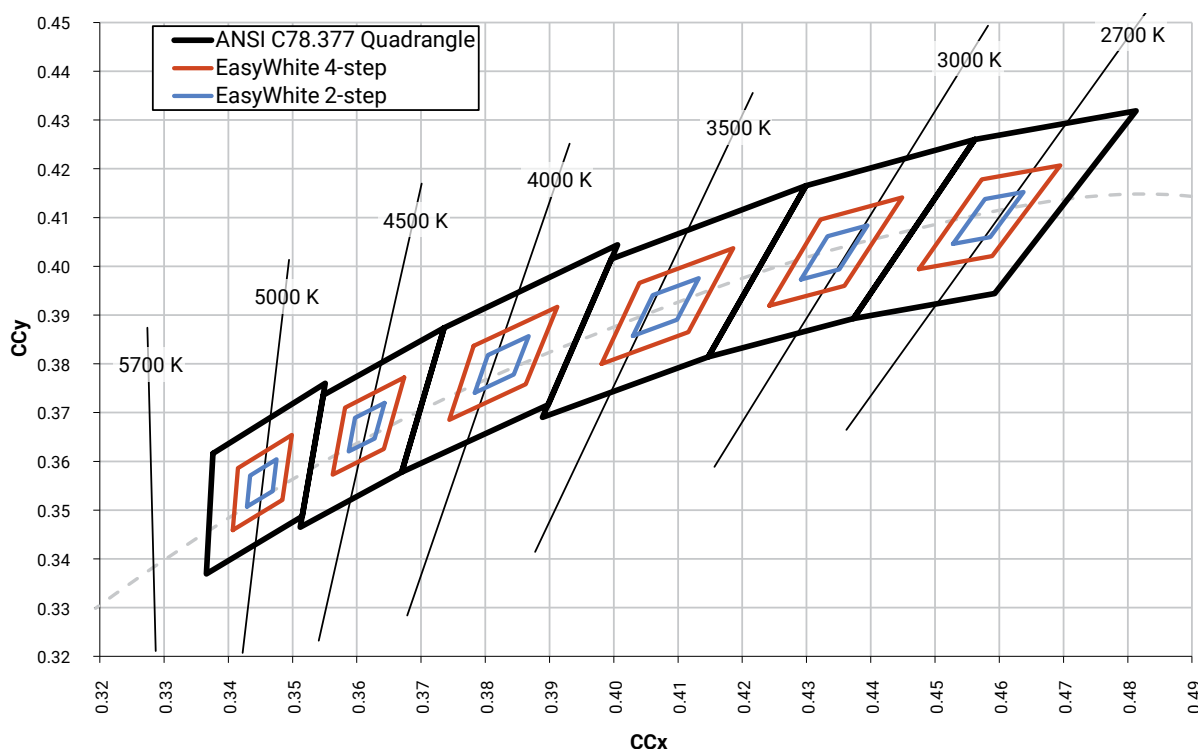
| ANSI White Bins | | | | |
|-----------------|--------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E6 | 3500 K | 6A0 | .3889 | .3690 |
| | | | .3941 | .3848 |
| | | | .4080 | .3916 |
| | | | .4017 | .3751 |
| | | 6B0 | .3941 | .3848 |
| | | | .3996 | .4015 |
| | | | .4146 | .4089 |
| | | | .4080 | .3916 |
| | | 6C0 | .4080 | .3916 |
| | | | .4146 | .4089 |
| | | | .4299 | .4165 |
| | | | .4221 | .3984 |
| | | 6D0 | .4017 | .3751 |
| | | | .4080 | .3916 |
| | | | .4221 | .3984 |
| | | | .4147 | .3814 |

PERFORMANCE GROUPS - CHROMATICITY ($T_j = 85^\circ\text{C}$) - CONTINUED

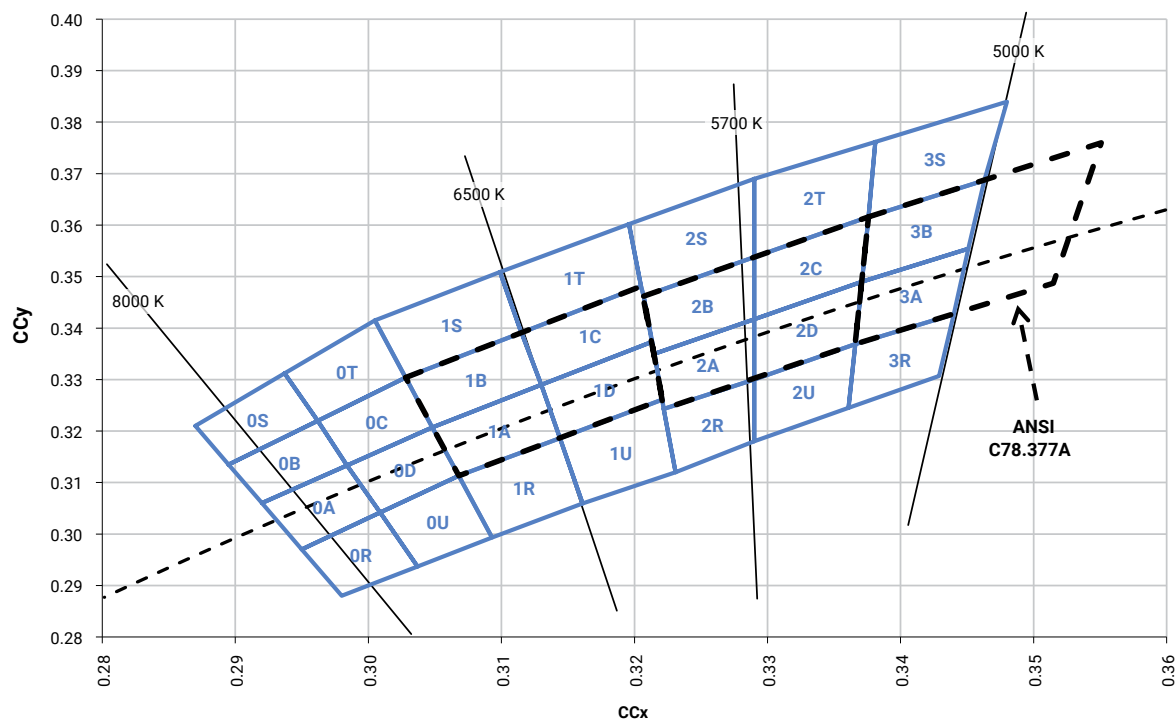
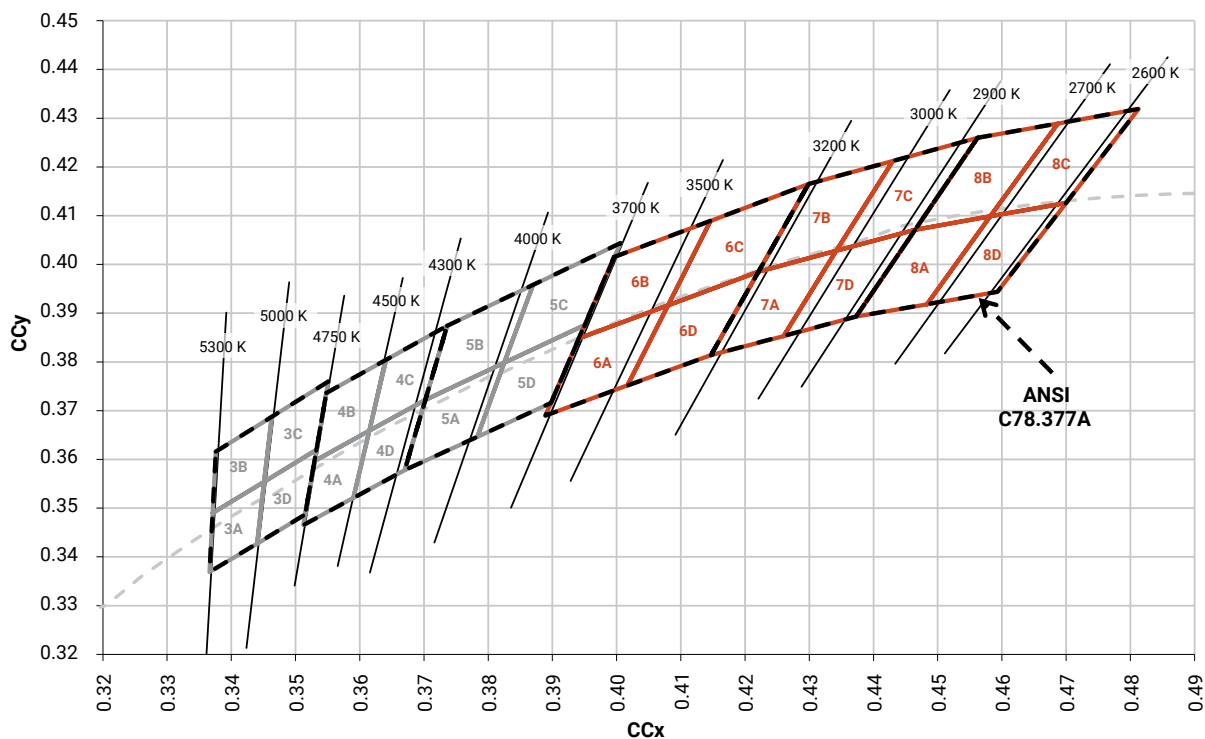
| ANSI White Bins | | | | |
|-----------------|--------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E7 | 3000 K | 7A0 | .4147 | .3814 |
| | | | .4221 | .3984 |
| | | | .4342 | .4028 |
| | | | .4259 | .3853 |
| | | 7B0 | .4221 | .3984 |
| | | | .4299 | .4165 |
| | | | .4430 | .4212 |
| | | | .4342 | .4028 |
| | | 7C0 | .4342 | .4028 |
| | | | .4430 | .4212 |
| | | | .4562 | .4260 |
| | | | .4465 | .4071 |
| | | 7D0 | .4259 | .3853 |
| | | | .4342 | .4028 |
| | | | .4465 | .4071 |
| | | | .4373 | .3893 |

| ANSI White Bins | | | | |
|-----------------|--------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E8 | 2700 K | 8A0 | .4373 | .3893 |
| | | | .4465 | .4071 |
| | | | .4582 | .4099 |
| | | | .4483 | .3919 |
| | | 8B0 | .4465 | .4071 |
| | | | .4562 | .4260 |
| | | | .4687 | .4289 |
| | | | .4582 | .4099 |
| | | 8C0 | .4582 | .4099 |
| | | | .4687 | .4289 |
| | | | .4813 | .4319 |
| | | | .4700 | .4126 |
| | | 8D0 | .4483 | .3919 |
| | | | .4582 | .4099 |
| | | | .4700 | .4126 |
| | | | .4593 | .3944 |

CREE EASYWHITE® BINS PLOTTED ON THE 1931 CIE COLOR SPACE ($T_j = 85^\circ\text{C}$)

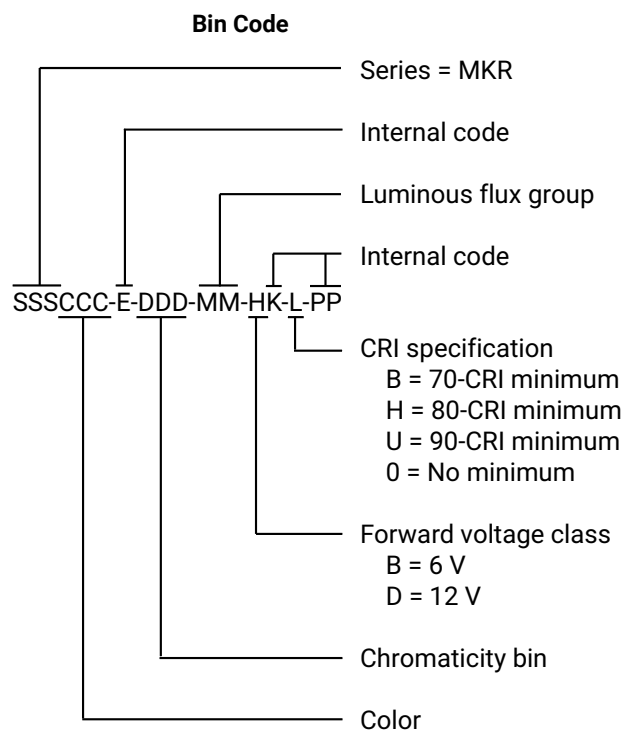
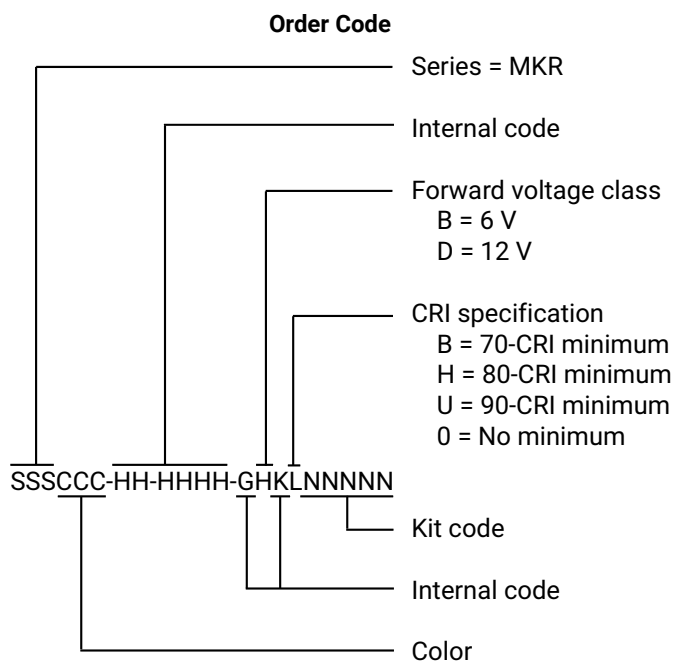


CREE ANSI WHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE ($T_j = 85^\circ\text{C}$)



BIN AND ORDER CODE FORMATS

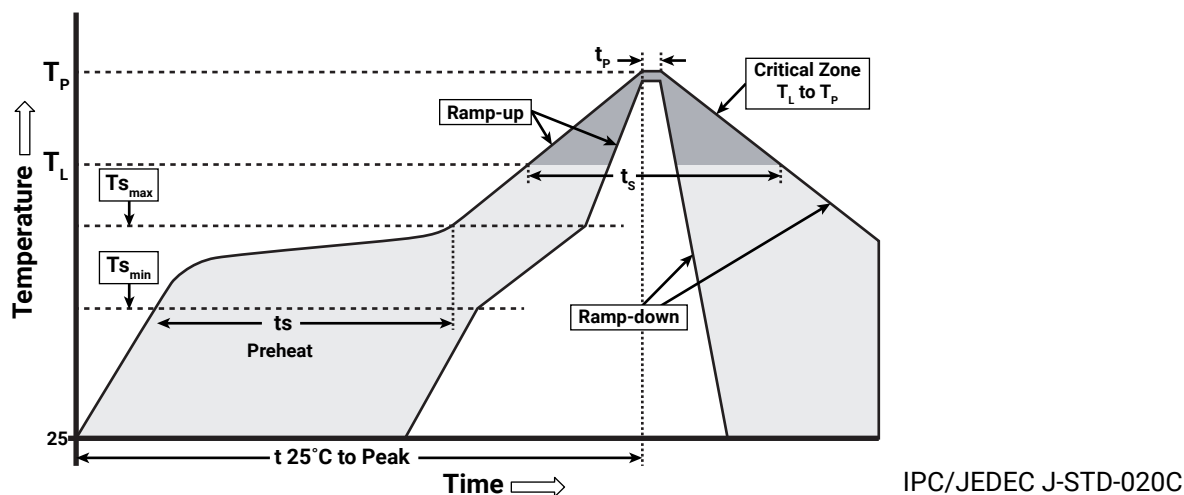
Bin codes and order codes are configured as follows.



REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp MK-R LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used.

Note that this general guideline may not apply to all PCB designs and configurations of reflow soldering equipment.



| Profile Feature | Lead-Free Solder |
|---|------------------|
| Average Ramp-Up Rate ($T_{s_{max}}$ to T_p) | 1.2 °C/second |
| Preheat: Temperature Min ($T_{s_{min}}$) | 120 °C |
| Preheat: Temperature Max ($T_{s_{max}}$) | 170 °C |
| Preheat: Time ($t_{s_{min}}$ to $t_{s_{max}}$) | 65-150 seconds |
| Time Maintained Above: Temperature (T_L) | 217 °C |
| Time Maintained Above: Time (t_L) | 45-90 seconds |
| Peak/Classification Temperature (T_p) | 235 - 245 °C |
| Time Within 5 °C of Actual Peak Temperature (t_p) | 20-40 seconds |
| Ramp-Down Rate | 1 - 6 °C/second |
| Time 25 °C to Peak Temperature | 4 minutes max. |

Note: All temperatures refer to the topside of the package, measured on the package body surface.

NOTES

Measurements

The luminous flux, radiant power, chromaticity, forward voltage and CRI measurements in this document are binning specifications only and solely represent product measurements as of the date of shipment. These measurements will change over time based on a number of factors that are not within Cree's control and are not intended or provided as operational specifications for the products. Calculated values are provided for informational purposes only and are not intended as specifications.

Pre-Release Qualification Testing

Please read the [LED Reliability Overview](#) for details of the qualification process Cree applies to ensure long-term reliability for XLamp LEDs and details of Cree's pre-release qualification testing for XLamp LEDs.

Lumen Maintenance

Cree now uses standardized IES LM-80-08 and TM-21-11 methods for collecting long-term data and extrapolating LED lumen maintenance. For information on the specific LM-80 data sets available for this LED, refer to the [LM-80 results document](#).

Please read the [Long-Term Lumen Maintenance application note](#) for more details on Cree's lumen maintenance testing and forecasting. Please read the [Thermal Management application note](#) for details on how thermal design, ambient temperature, and drive current affect the LED junction temperature.

Moisture Sensitivity

Cree recommends keeping XLamp LEDs in the provided, resealable moisture-barrier packaging (MBP) until immediately prior to soldering. Unopened MBPs that contain XLamp LEDs do not need special storage for moisture sensitivity.

Once the MBP is opened, XLamp MK-R LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of $\leq 30^{\circ}\text{C}/85\%$ relative humidity (RH). Regardless of storage condition, Cree recommends sealing any unsoldered LEDs in the original MBP.

RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree representative or from the Product Documentation sections of www.cree.com.

REACH Compliance

REACH substances of very high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Cree representative to insure you get the most up-to-date REACH SVHC Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

NOTES - CONTINUED

UL® Recognized Component

Level 4 enclosure consideration. The LED package or a portion thereof has been investigated as a fire and electrical enclosure per ANSI/UL 8750.

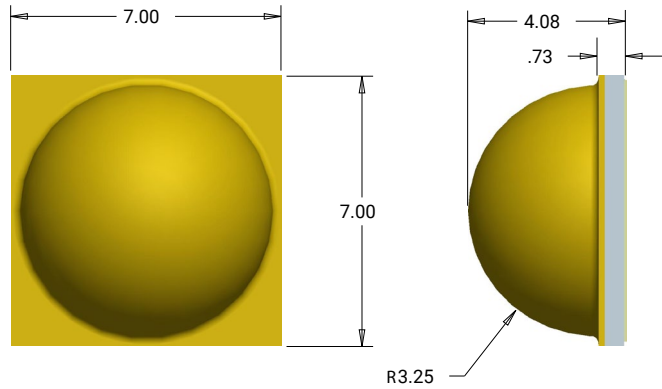
Vision Advisory

WARNING: Do not look at an exposed lamp in operation. Eye injury can result. For more information about LEDs and eye safety, please refer to the [LED Eye Safety application note](#).

MECHANICAL DIMENSIONS

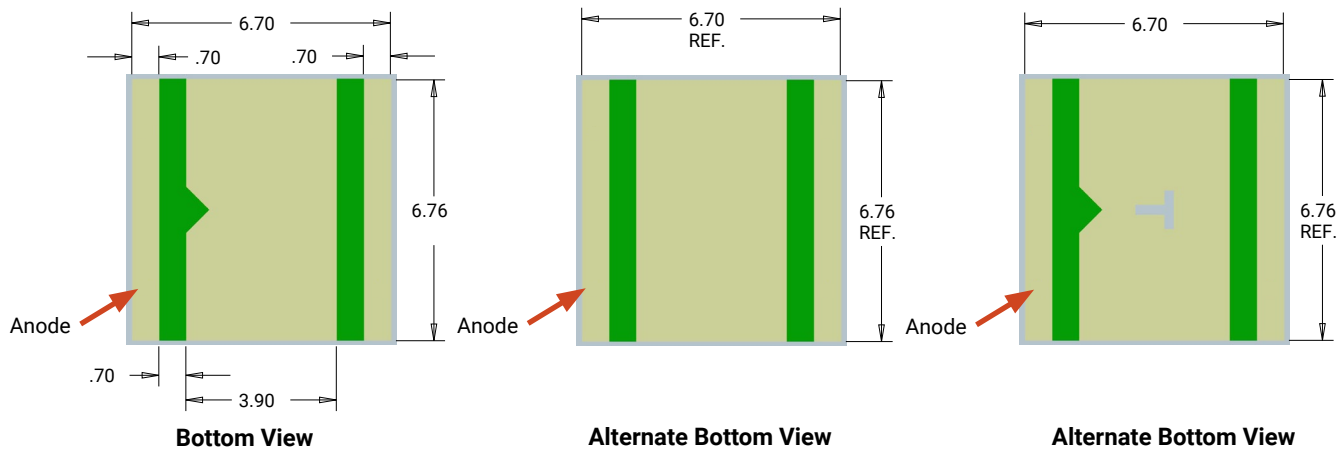
Thermal vias, if present, are not shown on these drawings.

All measurements are ± 0.13 mm unless otherwise indicated.



Top View

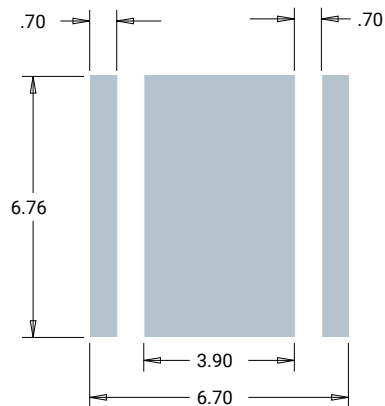
Side View



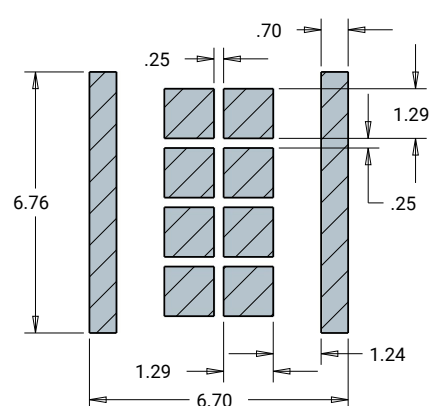
Bottom View

Alternate Bottom View

Alternate Bottom View



Recommended PCB Solder Pad

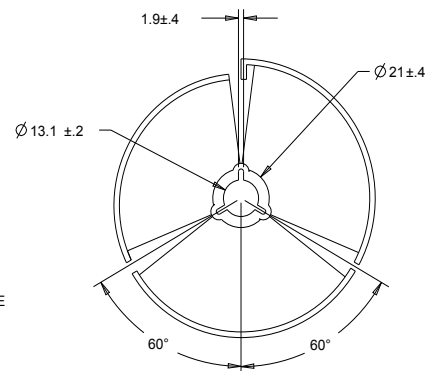
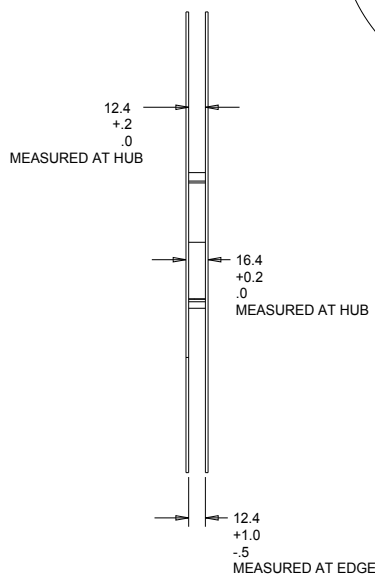
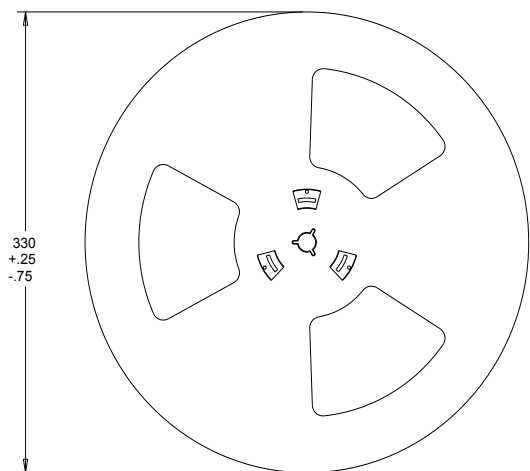
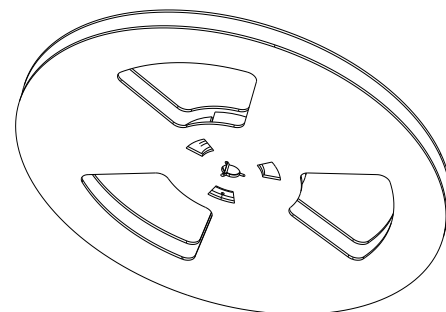
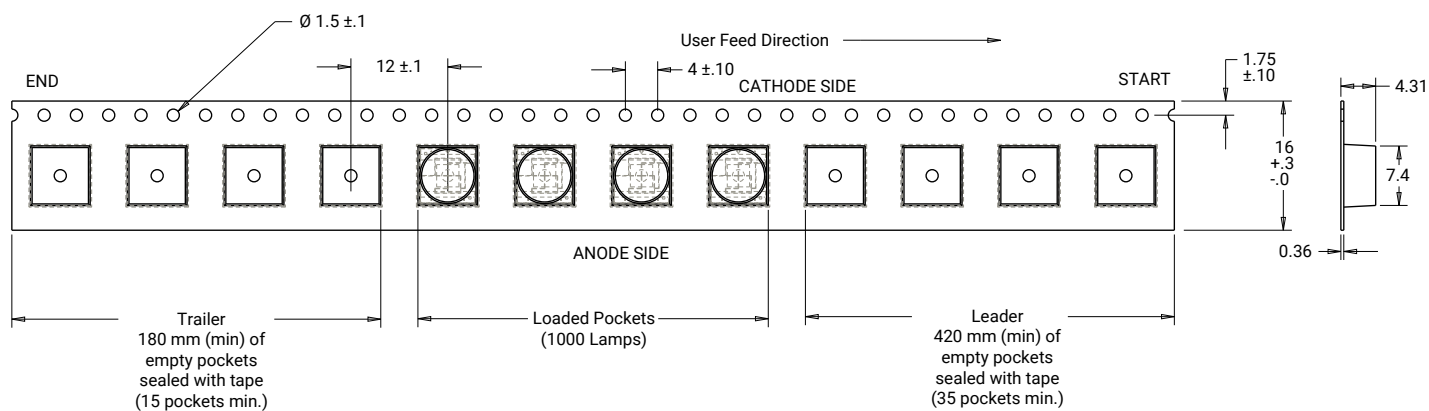


Recommended Stencil Pattern
(Shaded Area Is Open)

TAPE AND REEL

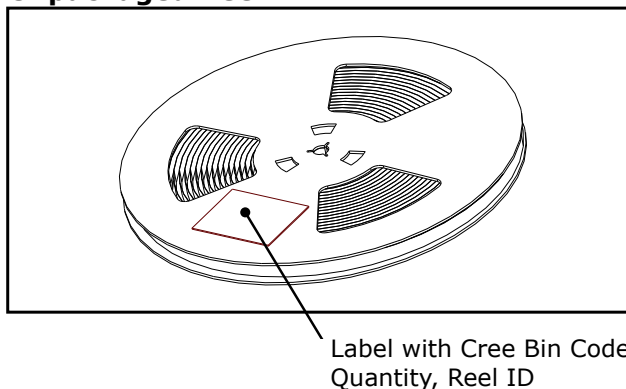
All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

All dimensions in mm.

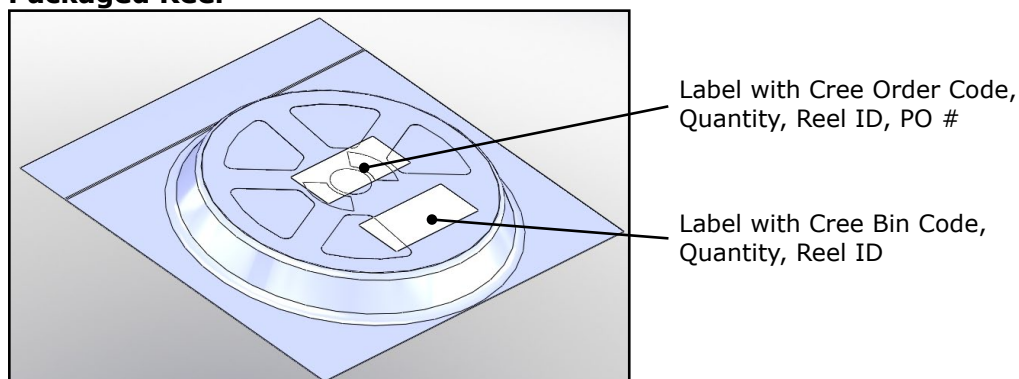


PACKAGING

Unpackaged Reel



Packaged Reel



Boxed Reel

