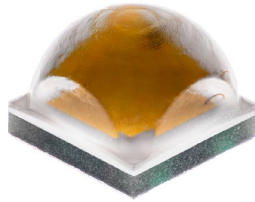
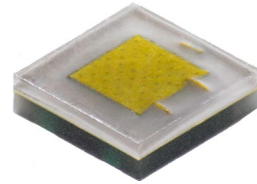


Cree® XLamp® XP-L LEDs



XP-L High Density LED



XP-L High Intensity LED

PRODUCT DESCRIPTION

XLamp® XP-L LEDs are available in two versions: High Density and High Intensity.

The XLamp XP-L High Density (HD) LED is the highest performing discrete in Cree’s High Density (HD) class of LEDs, delivering the next generation of lumen output and efficacy in the compact 3.45 mm x 3.45 mm XP footprint. Cree’s HD LEDs, optimized to deliver maximum lumen output in a small form factor, enable lighting manufacturers to improve the performance of any lighting design, create smaller and less expensive systems, and develop new lighting solutions that were previously not possible.

The XLamp XP-L High Intensity (HI) LED is the first of Cree’s new class of High Intensity (HI) LEDs optimized to deliver maximum candela through secondary optics. Built on Cree’s breakthrough SC5 Technology® Platform, the XP-L HI LED delivers 120 percent more candela than the XP-L HD LED through the same optic. The XP-L HI LED leverages the industry’s highest single-die performance and a new innovative primary optic design that radically reduces the optical source size to deliver both lumens and intensity.

FEATURES

- Available in white, 70-CRI white, 80-CRI white, 85 CRI white and 90-CRI white
- ANSI-compatible chromaticity bins
- Binned at 85 °C
- Maximum drive current: 3000 mA
- Low thermal resistance: 2.2 °C/W
- Wide viewing angle: 125° (XP-L High Density), 115° (XP-L High Intensity)
- 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 | | 2.2 | |
| Viewing angle (FWHM) - XP-L High Density | degrees | | 125 | |
| Viewing angle (FWHM) - XP-L High Intensity | degrees | | 115 | |
| Temperature coefficient of voltage | mV/°C | | -2 | |
| ESD withstand voltage (HBM per Mil-Std-883D) | V | | | 8000 |
| DC forward current | mA | | | 3000 |
| Reverse voltage | V | | | -5 |
| Forward voltage (@ 1050 mA, 85 °C) | V | | 2.95 | 3.25 |
| LED junction temperature | °C | | | 150 |

FLUX CHARACTERISTICS - XP-L HIGH DENSITY ($T_j = 85\text{ }^\circ\text{C}$)

The following table provides order codes for XLamp XP-L High Density LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 27). For definitions of the chromaticity kits, please see the Cree's Standard Chromaticity Kits section (page 26).

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | |
|--------------|--------|---|----------------------|-----------------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 65 CRI Typical | 70 CRI Minimum |
| 51 | 6200 K | V6 | 480 | 535 | XPLAWT-00-0000-0000V6051 | XPLAWT-00-0000-000BV6051 |
| | | V5 | 460 | 513 | XPLAWT-00-0000-0000V5051 | XPLAWT-00-0000-000BV5051 |
| | | V4 | 440 | 491 | XPLAWT-00-0000-0000V4051 | XPLAWT-00-0000-000BV4051 |
| | | V3 | 420 | 468 | XPLAWT-00-0000-0000V3051 | XPLAWT-00-0000-000BV3051 |
| | | V2 | 400 | 446 | | XPLAWT-00-0000-000BV2051 |
| 53 | 6000 K | V6 | 480 | 535 | XPLAWT-00-0000-0000V6053 | XPLAWT-00-0000-000BV6053 |
| | | V5 | 460 | 513 | XPLAWT-00-0000-0000V5053 | XPLAWT-00-0000-000BV5053 |
| | | V4 | 440 | 491 | XPLAWT-00-0000-0000V4053 | XPLAWT-00-0000-000BV4053 |
| | | V3 | 420 | 468 | XPLAWT-00-0000-0000V3053 | XPLAWT-00-0000-000BV3053 |
| | | V2 | 400 | 446 | | XPLAWT-00-0000-000BV2053 |
| 50 | 6200 K | V6 | 480 | 535 | XPLAWT-00-0000-0000V6050 | XPLAWT-00-0000-000BV6050 |
| | | V5 | 460 | 513 | XPLAWT-00-0000-0000V5050 | XPLAWT-00-0000-000BV5050 |
| | | V4 | 440 | 491 | XPLAWT-00-0000-0000V4050 | XPLAWT-00-0000-000BV4050 |
| | | V3 | 420 | 468 | XPLAWT-00-0000-0000V3050 | XPLAWT-00-0000-000BV3050 |
| | | V2 | 400 | 446 | | XPLAWT-00-0000-000BV2050 |
| E1 | 6500 K | V6 | 480 | 535 | XPLAWT-00-0000-0000V60E1 | XPLAWT-00-0000-000BV60E1 |
| | | V5 | 460 | 513 | XPLAWT-00-0000-0000V50E1 | XPLAWT-00-0000-000BV50E1 |
| | | V4 | 440 | 491 | XPLAWT-00-0000-0000V40E1 | XPLAWT-00-0000-000BV40E1 |
| | | V3 | 420 | 468 | XPLAWT-00-0000-0000V30E1 | XPLAWT-00-0000-000BV30E1 |
| | | V2 | 400 | 446 | | XPLAWT-00-0000-000BV20E1 |
| E2 | 5700 K | V6 | 480 | 535 | XPLAWT-00-0000-0000V60E2 | XPLAWT-00-0000-000BV60E2 |
| | | V5 | 460 | 513 | XPLAWT-00-0000-0000V50E2 | XPLAWT-00-0000-000BV50E2 |
| | | V4 | 440 | 491 | XPLAWT-00-0000-0000V40E2 | XPLAWT-00-0000-000BV40E2 |
| | | V3 | 420 | 468 | | XPLAWT-00-0000-000BV30E2 |
| | | V2 | 400 | 446 | | XPLAWT-00-0000-000BV20E2 |

Notes

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements. See the Measurements section (page 29).
- Cree XLamp XP-L 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 bin restrictions specified by the order code.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS - XP-L HIGH DENSITY (T_j = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | | |
|--------------|--------|---|----------------------|-----------------------|--------------------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 70 CRI Minimum | 75 CRI Typical | 80 CRI Minimum |
| E3 | 5000 K | V6 | 480 | 535 | XPLAWT-00-0000-000BV60E3 | | |
| | | V5 | 460 | 513 | XPLAWT-00-0000-000BV50E3 | XPLAWT-00-0000-000LV50E3 | |
| | | V4 | 440 | 491 | XPLAWT-00-0000-000BV40E3 | XPLAWT-00-0000-000LV40E3 | |
| | | V3 | 420 | 468 | XPLAWT-00-0000-000BV30E3 | XPLAWT-00-0000-000LV30E3 | |
| | | V2 | 400 | 446 | XPLAWT-00-0000-000BV20E3 | XPLAWT-00-0000-000LV20E3 | |
| F4 | 4750 K | V6 | 480 | 535 | XPLAWT-00-0000-000BV60F4 | | |
| | | V5 | 460 | 513 | XPLAWT-00-0000-000BV50F4 | XPLAWT-00-0000-000LV50F4 | |
| | | V4 | 440 | 491 | XPLAWT-00-0000-000BV40F4 | XPLAWT-00-0000-000LV40F4 | |
| | | V3 | 420 | 468 | XPLAWT-00-0000-000BV30F4 | XPLAWT-00-0000-000LV30F4 | |
| | | V2 | 400 | 446 | XPLAWT-00-0000-000BV20F4 | XPLAWT-00-0000-000LV20F4 | |
| E4 | 4500 K | V6 | 480 | 535 | XPLAWT-00-0000-000BV60E4 | | |
| | | V5 | 460 | 513 | XPLAWT-00-0000-000BV50E4 | XPLAWT-00-0000-000LV50E4 | |
| | | V4 | 440 | 491 | XPLAWT-00-0000-000BV40E4 | XPLAWT-00-0000-000LV40E4 | |
| | | V3 | 420 | 468 | XPLAWT-00-0000-000BV30E4 | XPLAWT-00-0000-000LV30E4 | |
| | | V2 | 400 | 446 | XPLAWT-00-0000-000BV20E4 | XPLAWT-00-0000-000LV20E4 | |
| F5 | 4250 K | V6 | 480 | 535 | XPLAWT-00-0000-000BV60F5 | | |
| | | V5 | 460 | 513 | XPLAWT-00-0000-000BV50F5 | XPLAWT-00-0000-000LV50F5 | |
| | | V4 | 440 | 491 | XPLAWT-00-0000-000BV40F5 | XPLAWT-00-0000-000LV40F5 | |
| | | V3 | 420 | 468 | XPLAWT-00-0000-000BV30F5 | XPLAWT-00-0000-000LV30F5 | |
| | | V2 | 400 | 446 | XPLAWT-00-0000-000BV20F5 | XPLAWT-00-0000-000LV20F5 | |
| E5 | 4000 K | V6 | 480 | 535 | XPLAWT-00-0000-000BV60E5 | | |
| | | V5 | 460 | 513 | XPLAWT-00-0000-000BV50E5 | | |
| | | V4 | 440 | 491 | XPLAWT-00-0000-000BV40E5 | XPLAWT-00-0000-000LV40E5 | XPLAWT-00-0000-000HV40E5 |
| | | V3 | 420 | 468 | XPLAWT-00-0000-000BV30E5 | XPLAWT-00-0000-000LV30E5 | XPLAWT-00-0000-000HV30E5 |
| | | V2 | 400 | 446 | XPLAWT-00-0000-000BV20E5 | XPLAWT-00-0000-000LV20E5 | XPLAWT-00-0000-000HV20E5 |
| | | U6 | 380 | 424 | XPLAWT-00-0000-000BU60E5 | XPLAWT-00-0000-000LU60E5 | XPLAWT-00-0000-000HU60E5 |
| | | U5 | 360 | 401 | | | XPLAWT-00-0000-000HU50E5 |
| Z5 | 4000 K | V4 | 440 | 491 | XPLAWT-00-0000-000BV40Z5 | XPLAWT-00-0000-000LV40Z5 | XPLAWT-00-0000-000HV40Z5 |
| | | V3 | 420 | 468 | XPLAWT-00-0000-000BV30Z5 | XPLAWT-00-0000-000LV30Z5 | XPLAWT-00-0000-000HV30Z5 |
| | | V2 | 400 | 446 | XPLAWT-00-0000-000BV20Z5 | XPLAWT-00-0000-000LV20Z5 | XPLAWT-00-0000-000HV20Z5 |
| | | U6 | 380 | 424 | XPLAWT-00-0000-000BU60Z5 | XPLAWT-00-0000-000LU60Z5 | XPLAWT-00-0000-000HU60Z5 |
| | | U5 | 360 | 401 | | | XPLAWT-00-0000-000HU50Z5 |

Notes

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 29).
- Cree XLamp XP-L 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 bin restrictions specified by the order code.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS - XP-L HIGH DENSITY (T_j = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | | |
|--------------|--------|--------------------------------------|-------------------|--------------------|----------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 70 CRI Minimum | 75 CRI Typical | 80 CRI Minimum |
| F6 | 3700 K | V4 | 440 | 491 | | | XPLAWT-00-0000-000HV40F6 |
| | | V3 | 420 | 468 | | XPLAWT-00-0000-000LV30F6 | XPLAWT-00-0000-000HV30F6 |
| | | V2 | 400 | 446 | | XPLAWT-00-0000-000LV20F6 | XPLAWT-00-0000-000HV20F6 |
| | | U6 | 380 | 424 | | XPLAWT-00-0000-000LU60F6 | XPLAWT-00-0000-000HU60F6 |
| | | U5 | 360 | 401 | | XPLAWT-00-0000-000LU50F6 | XPLAWT-00-0000-000HU50F6 |

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | | | |
|--------------|--------|--------------------------------------|-------------------|--------------------|--------------------------|--------------------------|----------------|----------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 80 CRI Typical | 80 CRI Minimum | 85 CRI Minimum | 90 CRI Minimum |
| E6 | 3500 K | V3 | 420 | 468 | XPLAWT-00-0000-000LV30E6 | XPLAWT-00-0000-000HV30E6 | | |
| | | V2 | 400 | 446 | XPLAWT-00-0000-000LV20E6 | XPLAWT-00-0000-000HV20E6 | | |
| | | U6 | 380 | 424 | XPLAWT-00-0000-000LU60E6 | XPLAWT-00-0000-000HU60E6 | | |
| | | U5 | 360 | 401 | XPLAWT-00-0000-000LU50E6 | XPLAWT-00-0000-000HU50E6 | | |
| Z6 | 3500 K | V2 | 400 | 446 | XPLAWT-00-0000-000LV20Z6 | XPLAWT-00-0000-000HV20Z6 | | |
| | | U6 | 380 | 424 | XPLAWT-00-0000-000LU60Z6 | XPLAWT-00-0000-000HU60Z6 | | |
| | | U5 | 360 | 401 | XPLAWT-00-0000-000LU50Z6 | XPLAWT-00-0000-000HU50Z6 | | |
| F7 | 3250 K | V2 | 400 | 446 | XPLAWT-00-0000-000LV20F7 | XPLAWT-00-0000-000HV20F7 | | |
| | | U6 | 380 | 424 | XPLAWT-00-0000-000LU60F7 | XPLAWT-00-0000-000HU60F7 | | |
| | | U5 | 360 | 401 | XPLAWT-00-0000-000LU50F7 | XPLAWT-00-0000-000HU50F7 | | |
| | | U4 | 340 | 379 | XPLAWT-00-0000-000LU40F7 | XPLAWT-00-0000-000HU40F7 | | |

Notes

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 29).
- Cree XLamp XP-L 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 bin restrictions specified by the order code.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS - XP-L HIGH DENSITY (T_j = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | | | |
|--------------|--------|--------------------------------------|-------------------|--------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 80 CRI Typical | 80 CRI Minimum | 85 CRI Minimum | 90 CRI Minimum |
| E7 | 3000 K | V2 | 400 | 446 | XPLAWT-00-0000-000LV20E7 | XPLAWT-00-0000-000HV20E7 | | |
| | | U6 | 380 | 424 | XPLAWT-00-0000-000LU60E7 | XPLAWT-00-0000-000HU60E7 | | |
| | | U5 | 360 | 401 | XPLAWT-00-0000-000LU50E7 | XPLAWT-00-0000-000HU50E7 | | |
| | | U4 | 340 | 379 | XPLAWT-00-0000-000LU40E7 | XPLAWT-00-0000-000HU40E7 | | |
| | | U3 | 320 | 357 | | | XPLAWT-00-0000-000PU30E7 | XPLAWT-00-0000-000UU30E7 |
| | | U2 | 300 | 334 | | | XPLAWT-00-0000-000PU20E7 | XPLAWT-00-0000-000UU20E7 |
| | | T6 | 280 | 312 | | | XPLAWT-00-0000-000PT60E7 | XPLAWT-00-0000-000UT60E7 |
| Z7 | 3000 K | U6 | 380 | 424 | XPLAWT-00-0000-000LU60Z7 | XPLAWT-00-0000-000HU60Z7 | | |
| | | U5 | 360 | 401 | XPLAWT-00-0000-000LU50Z7 | XPLAWT-00-0000-000HU50Z7 | | |
| | | U4 | 340 | 379 | XPLAWT-00-0000-000LU40Z7 | XPLAWT-00-0000-000HU40Z7 | | |
| | | U3 | 320 | 357 | | | XPLAWT-00-0000-000PU30Z7 | XPLAWT-00-0000-000UU30Z7 |
| | | U2 | 300 | 334 | | | XPLAWT-00-0000-000PU20Z7 | XPLAWT-00-0000-000UU20Z7 |
| | | T6 | 280 | 312 | | | XPLAWT-00-0000-000PT60Z7 | XPLAWT-00-0000-000UT60Z7 |
| F8 | 2850 K | V2 | 400 | 446 | XPLAWT-00-0000-000LV20F8 | | | |
| | | U6 | 380 | 424 | XPLAWT-00-0000-000LU60F8 | XPLAWT-00-0000-000HU60F8 | | |
| | | U5 | 360 | 401 | XPLAWT-00-0000-000LU50F8 | XPLAWT-00-0000-000HU50F8 | | |
| | | U4 | 340 | 379 | XPLAWT-00-0000-000LU40F8 | XPLAWT-00-0000-000HU40F8 | | |
| | | U3 | 320 | 357 | | | XPLAWT-00-0000-000PU30F8 | XPLAWT-00-0000-000UU30F8 |
| | | U2 | 300 | 334 | | | XPLAWT-00-0000-000PU20F8 | XPLAWT-00-0000-000UU20F8 |
| | | T6 | 280 | 312 | | | XPLAWT-00-0000-000PT60F8 | XPLAWT-00-0000-000UT60F8 |
| | | T5 | 260 | 290 | | | XPLAWT-00-0000-000PT50F8 | XPLAWT-00-0000-000UT50F8 |

Notes

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 29).
- Cree XLamp XP-L 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 bin restrictions specified by the order code.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS - XP-L HIGH DENSITY (T_j = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | | | | |
|--------------|--------|--------------------------------------|-------------------|--------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 80 CRI Typical | 80 CRI Minimum | 85 CRI Minimum | 90 CRI Minimum | |
| E8 | 2700 K | V2 | 400 | 446 | XPLAWT-00-0000-000LV20E8 | | | | |
| | | U6 | 380 | 424 | XPLAWT-00-0000-000LU60E8 | XPLAWT-00-0000-000HU60E8 | | | |
| | | U5 | 360 | 401 | XPLAWT-00-0000-000LU50E8 | XPLAWT-00-0000-000HU50E8 | | | |
| | | U4 | 340 | 379 | XPLAWT-00-0000-000LU40E8 | XPLAWT-00-0000-000HU40E8 | | | |
| | | U3 | 320 | 357 | | | XPLAWT-00-0000-000PU30E8 | XPLAWT-00-0000-000UU30E8 | |
| | | U2 | 300 | 334 | | | XPLAWT-00-0000-000PU20E8 | XPLAWT-00-0000-000UU20E8 | |
| | | T6 | 280 | 312 | | | XPLAWT-00-0000-000PT60E8 | XPLAWT-00-0000-000UT60E8 | |
| | | T5 | 260 | 290 | | | XPLAWT-00-0000-000PT50E8 | XPLAWT-00-0000-000UT50E8 | |
| Z8 | 2700 K | U6 | 380 | 424 | XPLAWT-00-0000-000LU60Z8 | | | | |
| | | U5 | 360 | 401 | XPLAWT-00-0000-000LU50Z8 | XPLAWT-00-0000-000HU50Z8 | | | |
| | | U4 | 340 | 379 | XPLAWT-00-0000-000LU40Z8 | XPLAWT-00-0000-000HU40Z8 | | | |
| | | U3 | 320 | 357 | | | | | |
| | | U2 | 300 | 334 | | | XPLAWT-00-0000-000PU20Z8 | XPLAWT-00-0000-000UU20Z8 | |
| | | T6 | 280 | 312 | | | XPLAWT-00-0000-000PT60Z8 | XPLAWT-00-0000-000UT60Z8 | |
| | | T5 | 260 | 290 | | | XPLAWT-00-0000-000PT50Z8 | XPLAWT-00-0000-000UT50Z8 | |

Notes

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 29).
- Cree XLamp XP-L 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 bin restrictions specified by the order code.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS - XP-L HIGH INTENSITY ($T_j = 85\text{ }^\circ\text{C}$)

The following table provides order codes for XLamp XP-L High Intensity LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 27). For definitions of the chromaticity kits, please see the Cree's Standard Chromaticity Kits section (page 26).

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | |
|--------------|--------|---|----------------------|-----------------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 65 CRI Typical | 70 CRI Minimum |
| 51 | 6200 K | V2 | 400 | 446 | XPLAWT-H0-0000-0000V2051 | XPLAWT-H0-0000-000BV2051 |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-0000U6051 | XPLAWT-H0-0000-000BU6051 |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-0000U5051 | XPLAWT-H0-0000-000BU5051 |
| 53 | 6000 K | V2 | 400 | 446 | XPLAWT-H0-0000-0000V2053 | XPLAWT-H0-0000-000BV2053 |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-0000U6053 | XPLAWT-H0-0000-000BU6053 |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-0000U5053 | XPLAWT-H0-0000-000BU5053 |
| 50 | 6200 K | V2 | 400 | 446 | XPLAWT-H0-0000-0000V2050 | XPLAWT-H0-0000-000BV2050 |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-0000U6050 | XPLAWT-H0-0000-000BU6050 |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-0000U5050 | XPLAWT-H0-0000-000BU5050 |
| E1 | 6500 K | V2 | 400 | 446 | XPLAWT-H0-0000-0000V20E1 | XPLAWT-H0-0000-000BV20E1 |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-0000U60E1 | XPLAWT-H0-0000-000BU60E1 |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-0000U50E1 | XPLAWT-H0-0000-000BU50E1 |
| E2 | 5700 K | V2 | 400 | 446 | XPLAWT-H0-0000-0000V20E2 | XPLAWT-H0-0000-000BV20E2 |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-0000U60E2 | XPLAWT-H0-0000-000BU60E2 |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-0000U50E2 | XPLAWT-H0-0000-000BU50E2 |

Notes

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements. See the Measurements section (page 29).
- Cree XLamp XP-L 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 bin restrictions specified by the order code.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS - XP-L HIGH INTENSITY ($T_j = 85^\circ\text{C}$) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | | |
|--------------|--------|--------------------------------------|-------------------|--------------------|--------------------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 70 CRI Minimum | 75 CRI Typical | 80 CRI Minimum |
| E3 | 5000 K | V2 | 400 | 446 | XPLAWT-H0-0000-000BV20E3 | XPLAWT-H0-0000-000LV20E3 | |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-000BU60E3 | XPLAWT-H0-0000-000LU60E3 | |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-000BU50E3 | XPLAWT-H0-0000-000LU50E3 | |
| F4 | 4750 K | V2 | 400 | 446 | XPLAWT-H0-0000-000BV20F4 | XPLAWT-H0-0000-000LV20F4 | |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-000BU60F4 | XPLAWT-H0-0000-000LU60F4 | |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-000BU50F4 | XPLAWT-H0-0000-000LU50F4 | |
| E4 | 4500 K | V2 | 400 | 446 | XPLAWT-H0-0000-000BV20E4 | XPLAWT-H0-0000-000LV20E4 | |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-000BU60E4 | XPLAWT-H0-0000-000LU60E4 | |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-000BU50E4 | XPLAWT-H0-0000-000LU50E4 | |
| F5 | 4250 K | V2 | 400 | 446 | XPLAWT-H0-0000-000BV20F5 | XPLAWT-H0-0000-000LV20F5 | |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-000BU60F5 | XPLAWT-H0-0000-000LU60F5 | |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-000BU50F5 | XPLAWT-H0-0000-000LU50F5 | |
| E5 | 4000 K | V2 | 400 | 446 | XPLAWT-H0-0000-000BV20E5 | XPLAWT-H0-0000-000LV20E5 | |
| | | U6 | 380 | 424 | XPLAWT-H0-0000-000BU60E5 | XPLAWT-H0-0000-000LU60E5 | XPLAWT-H0-0000-000HU60E5 |
| | | U5 | 360 | 401 | XPLAWT-H0-0000-000BU50E5 | XPLAWT-H0-0000-000LU50E5 | XPLAWT-H0-0000-000HU50E5 |
| | | U4 | 340 | 379 | XPLAWT-H0-0000-000BU40E5 | XPLAWT-H0-0000-000LU40E5 | XPLAWT-H0-0000-000HU40E5 |
| F6 | 3700 K | U5 | 360 | 401 | | XPLAWT-H0-0000-000LU50F6 | XPLAWT-H0-0000-000HU50F6 |
| | | U4 | 340 | 379 | | XPLAWT-H0-0000-000LU40F6 | XPLAWT-H0-0000-000HU40F6 |
| | | U3 | 320 | 357 | | XPLAWT-H0-0000-000LU30F6 | XPLAWT-H0-0000-000HU30F6 |

Notes

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements. See the Measurements section (page 29).
- Cree XLamp XP-L 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 bin restrictions specified by the order code.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS - XP-L HIGH INTENSITY (T_j = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | | | |
|--------------|--------|--------------------------------------|-------------------|--------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 80 CRI Typical | 80 CRI Minimum | 85 CRI Minimum | 90 CRI Minimum |
| E6 | 3500 K | U5 | 360 | 401 | XPLAWT-H0-0000-000LU50E6 | XPLAWT-H0-0000-000HU50E6 | | |
| | | U4 | 340 | 379 | XPLAWT-H0-0000-000LU40E6 | XPLAWT-H0-0000-000HU40E6 | | |
| | | U3 | 320 | 357 | XPLAWT-H0-0000-000LU30E6 | XPLAWT-H0-0000-000HU30E6 | | |
| F7 | 3250 K | U4 | 340 | 379 | XPLAWT-H0-0000-000LU40F7 | XPLAWT-H0-0000-000HU40F7 | | |
| | | U3 | 320 | 357 | XPLAWT-H0-0000-000LU30F7 | XPLAWT-H0-0000-000HU30F7 | | |
| | | U2 | 300 | 334 | XPLAWT-H0-0000-000LU20F7 | XPLAWT-H0-0000-000HU20F7 | | |
| E7 | 3000 K | U4 | 340 | 379 | XPLAWT-H0-0000-000LU40E7 | XPLAWT-H0-0000-000HU40E7 | | |
| | | U3 | 320 | 357 | XPLAWT-H0-0000-000LU30E7 | XPLAWT-H0-0000-000HU30E7 | | |
| | | U2 | 300 | 334 | XPLAWT-H0-0000-000LU20E7 | XPLAWT-H0-0000-000HU20E7 | | |
| | | T6 | 280 | 312 | | | XPLAWT-H0-0000-000PT60E7 | XPLAWT-H0-0000-000UT60E7 |
| | | T5 | 260 | 290 | | | XPLAWT-H0-0000-000PT50E7 | XPLAWT-H0-0000-000UT50E7 |
| | | T4 | 240 | 268 | | | XPLAWT-H0-0000-000PT40E7 | XPLAWT-H0-0000-000UT40E7 |
| F8 | 2850 K | U4 | 340 | 379 | XPLAWT-H0-0000-000LU40F8 | XPLAWT-H0-0000-000HU40F8 | | |
| | | U3 | 320 | 357 | XPLAWT-H0-0000-000LU30F8 | XPLAWT-H0-0000-000HU30F8 | | |
| | | U2 | 300 | 334 | XPLAWT-H0-0000-000LU20F8 | XPLAWT-H0-0000-000HU20F8 | | |
| | | T6 | 280 | 312 | | | XPLAWT-H0-0000-000PT60F8 | |
| | | T5 | 260 | 290 | | | XPLAWT-H0-0000-000PT50F8 | XPLAWT-H0-0000-000UT50F8 |
| | | T4 | 240 | 268 | | | XPLAWT-H0-0000-000PT40F8 | XPLAWT-H0-0000-000UT40F8 |
| | | T3 | 220 | 245 | | | XPLAWT-H0-0000-000PT30F8 | |

Notes

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 29).
- Cree XLamp XP-L 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 bin restrictions specified by the order code.
- * Flux values @ 25 °C are calculated and for reference only.

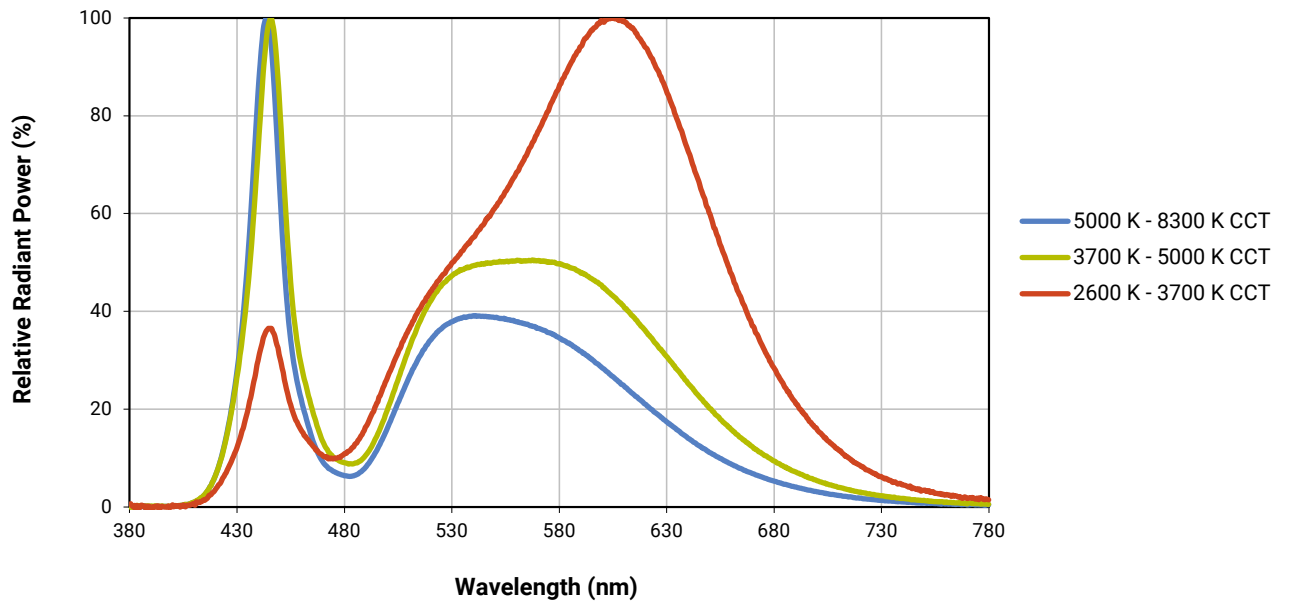
FLUX CHARACTERISTICS - XP-L HIGH INTENSITY (T_j = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 1050 mA | | | Order Codes | | | |
|--------------|--------|--------------------------------------|-------------------|--------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 80 CRI Typical | 80 CRI Minimum | 85 CRI Minimum | 90 CRI Minimum |
| E8 | 2700 K | U4 | 340 | 379 | XPLAWT-H0-0000-000LU40E8 | | | |
| | | U3 | 320 | 357 | XPLAWT-H0-0000-000LU30E8 | XPLAWT-H0-0000-000HU30E8 | | |
| | | U2 | 300 | 334 | XPLAWT-H0-0000-000LU20E8 | XPLAWT-H0-0000-000HU20E8 | | |
| | | T6 | 280 | 312 | | | XPLAWT-H0-0000-000PT60E8 | |
| | | T5 | 260 | 290 | | | XPLAWT-H0-0000-000PT50E8 | XPLAWT-H0-0000-000UT50E8 |
| | | T4 | 240 | 268 | | | XPLAWT-H0-0000-000PT40E8 | XPLAWT-H0-0000-000UT40E8 |
| | | T3 | 220 | 245 | | | XPLAWT-H0-0000-000PT30E8 | |

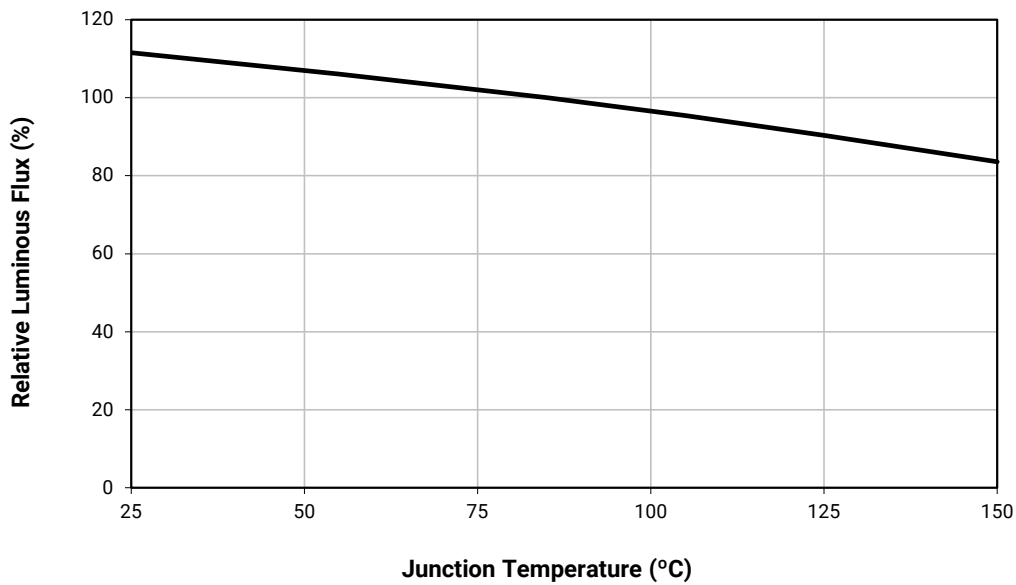
Notes

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 29).
- Cree XLamp XP-L 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 bin restrictions specified by the order code.
- * Flux values @ 25 °C are calculated and for reference only.

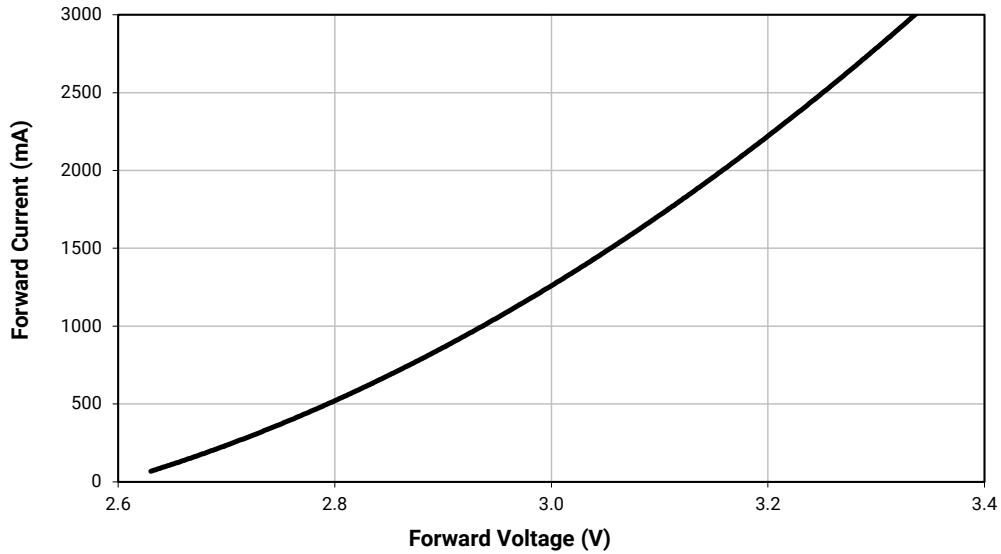
RELATIVE SPECTRAL POWER DISTRIBUTION



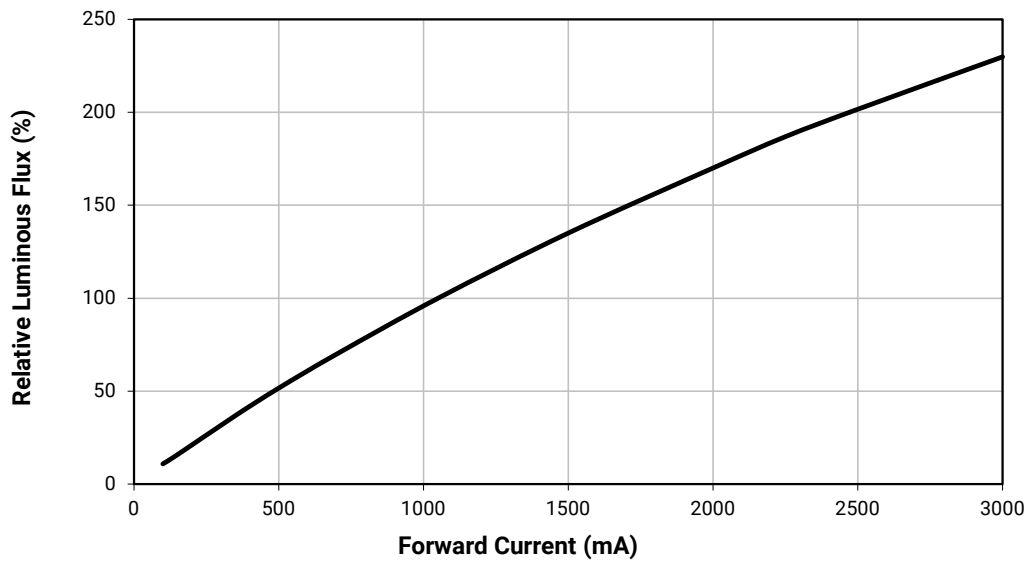
RELATIVE FLUX VS. JUNCTION TEMPERATURE ($I_F = 1050$ mA)



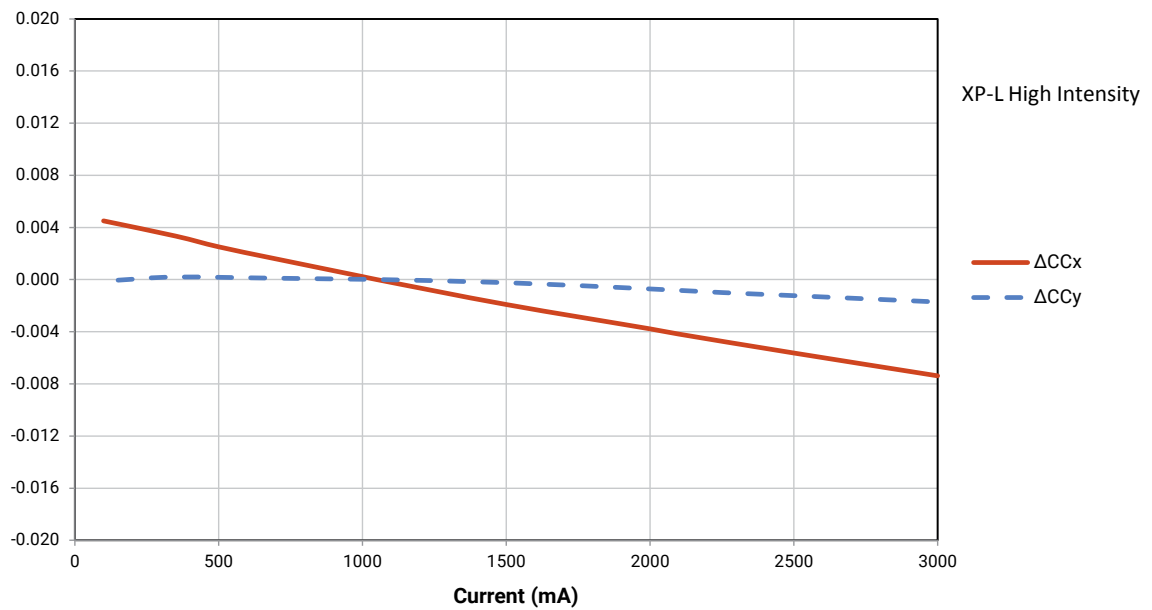
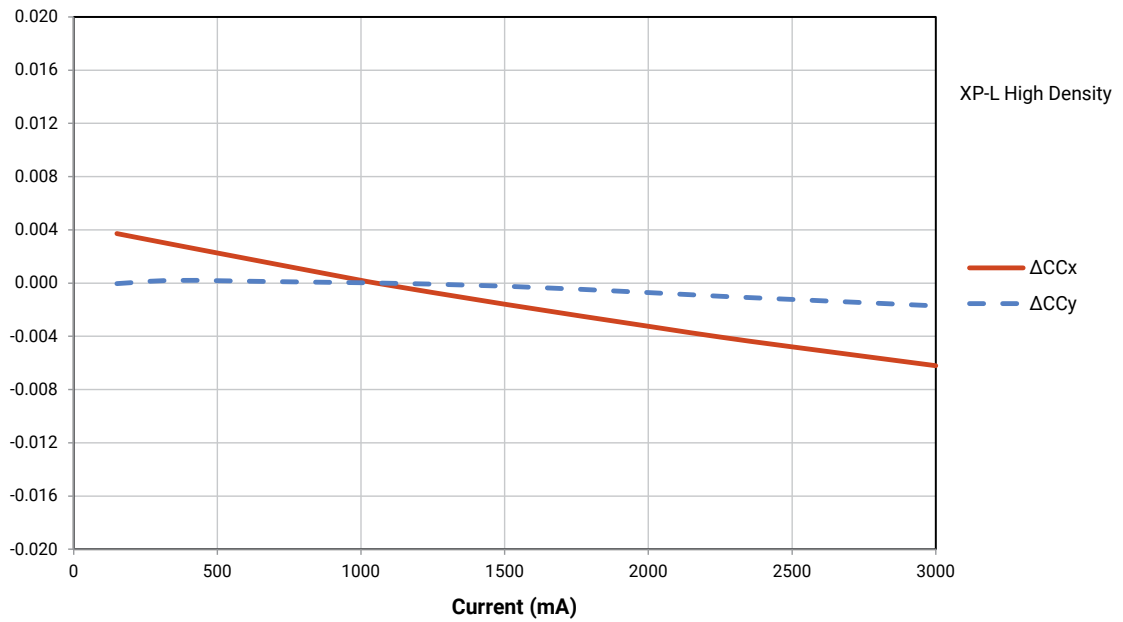
ELECTRICAL CHARACTERISTICS ($T_j = 85\text{ }^\circ\text{C}$)



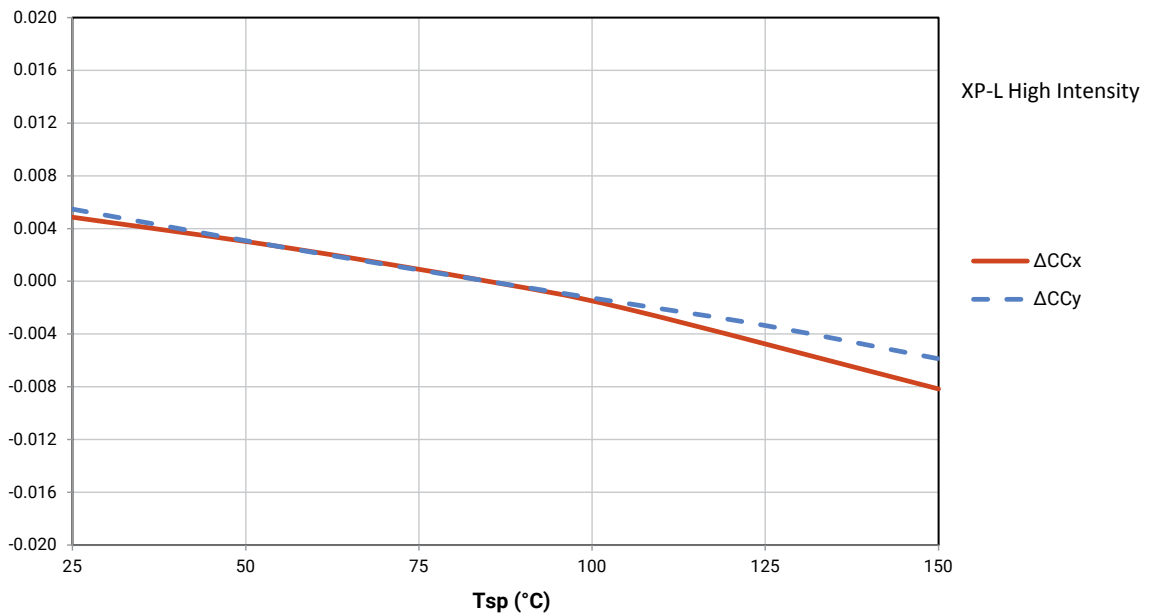
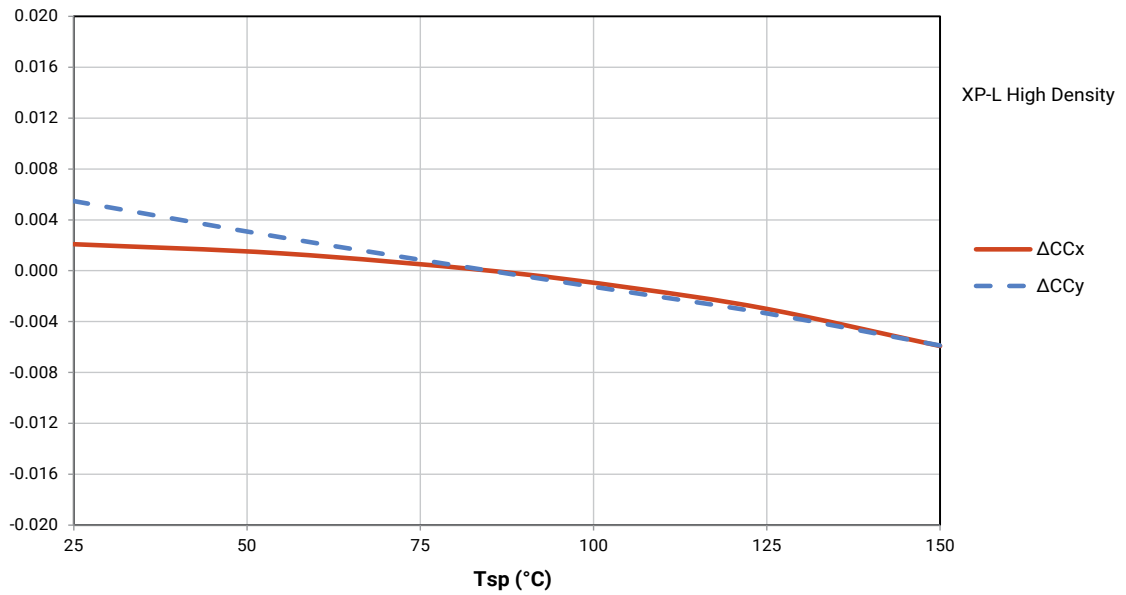
RELATIVE FLUX VS. CURRENT ($T_j = 85\text{ }^\circ\text{C}$)



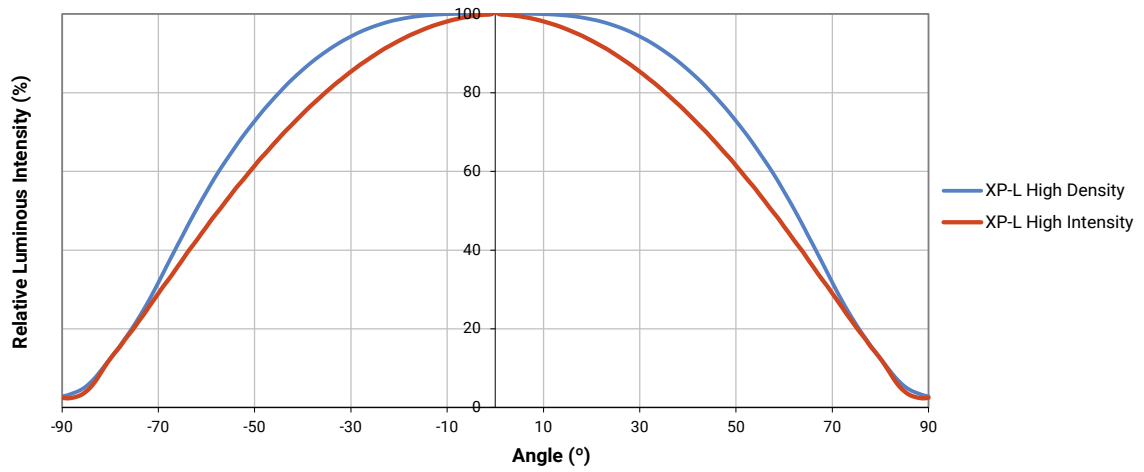
RELATIVE CHROMATICITY VS. CURRENT (WARM WHITE)



RELATIVE CHROMATICITY VS. TEMPERATURE (WARM WHITE)

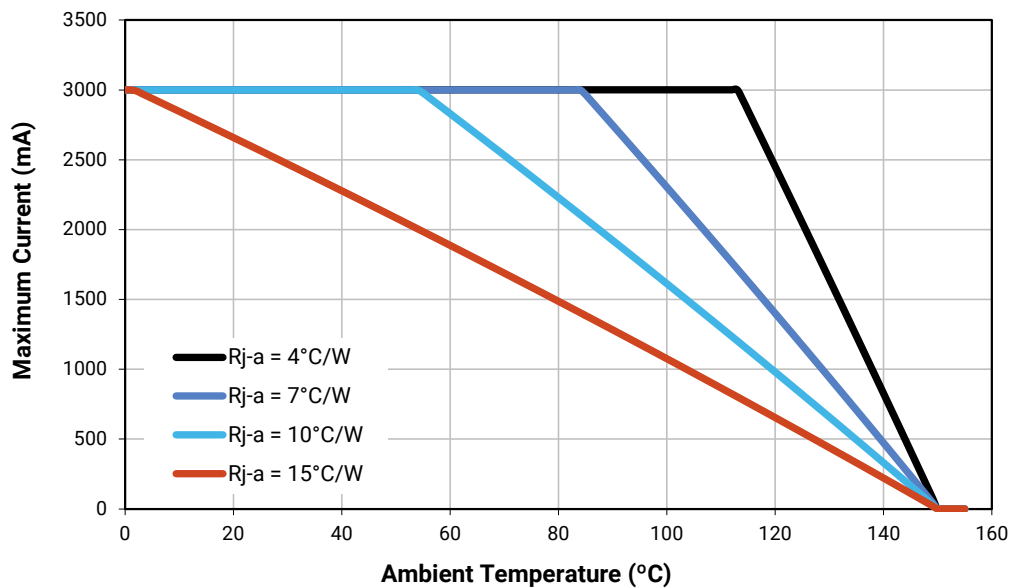


TYPICAL SPATIAL DISTRIBUTION



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

XLamp XP-L LEDs are tested for luminous flux and placed into one of the following luminous-flux groups:

| Group Code | Minimum Luminous Flux (lm) @ 1050 mA | Maximum Luminous Flux (lm) @ 1050 mA |
|------------|--------------------------------------|--------------------------------------|
| T3 | 220 | 240 |
| T4 | 240 | 260 |
| T5 | 260 | 280 |
| T6 | 280 | 300 |
| U2 | 300 | 320 |
| U3 | 320 | 340 |
| U4 | 340 | 360 |
| U5 | 360 | 380 |
| U6 | 380 | 400 |
| V2 | 400 | 420 |
| V3 | 420 | 440 |
| V4 | 440 | 460 |
| V5 | 460 | 480 |
| V6 | 480 | 500 |
| W2 | 500 | 520 |
| W3 | 520 | 540 |

PERFORMANCE GROUPS – CHROMATICITY

| Region | x | y | Region | x | y | Region | x | y | Region | x | y |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0A | 0.2950 | 0.2970 | 0B | 0.2920 | 0.3060 | 0C | 0.2984 | 0.3133 | 0D | 0.2984 | 0.3133 |
| | 0.2920 | 0.3060 | | 0.2895 | 0.3135 | | 0.2962 | 0.3220 | | 0.3048 | 0.3207 |
| | 0.2984 | 0.3133 | | 0.2962 | 0.3220 | | 0.3028 | 0.3304 | | 0.3068 | 0.3113 |
| | 0.3009 | 0.3042 | | 0.2984 | 0.3133 | | 0.3048 | 0.3207 | | 0.3009 | 0.3042 |
| 0R | 0.2980 | 0.2880 | 0S | 0.2895 | 0.3135 | 0T | 0.2962 | 0.3220 | 0U | 0.3037 | 0.2937 |
| | 0.2950 | 0.2970 | | 0.2870 | 0.3210 | | 0.2937 | 0.3312 | | 0.3009 | 0.3042 |
| | 0.3009 | 0.3042 | | 0.2937 | 0.3312 | | 0.3005 | 0.3415 | | 0.3068 | 0.3113 |
| | 0.3037 | 0.2937 | | 0.2962 | 0.3220 | | 0.3028 | 0.3304 | | 0.3093 | 0.2993 |
| 1A | 0.3048 | 0.3207 | 1B | 0.3028 | 0.3304 | 1C | 0.3115 | 0.3391 | 1D | 0.3130 | 0.3290 |
| | 0.3130 | 0.3290 | | 0.3115 | 0.3391 | | 0.3205 | 0.3481 | | 0.3213 | 0.3373 |
| | 0.3144 | 0.3186 | | 0.3130 | 0.3290 | | 0.3213 | 0.3373 | | 0.3221 | 0.3261 |
| | 0.3068 | 0.3113 | | 0.3048 | 0.3207 | | 0.3130 | 0.3290 | | 0.3144 | 0.3186 |
| 1R | 0.3068 | 0.3113 | 1S | 0.3005 | 0.3415 | 1T | 0.3099 | 0.3509 | 1U | 0.3144 | 0.3186 |
| | 0.3144 | 0.3186 | | 0.3099 | 0.3509 | | 0.3196 | 0.3602 | | 0.3221 | 0.3261 |
| | 0.3161 | 0.3059 | | 0.3115 | 0.3391 | | 0.3205 | 0.3481 | | 0.3231 | 0.3120 |
| | 0.3093 | 0.2993 | | 0.3028 | 0.3304 | | 0.3115 | 0.3391 | | 0.3161 | 0.3059 |
| 2A | 0.3215 | 0.3350 | 2B | 0.3207 | 0.3462 | 2C | 0.3290 | 0.3538 | 2D | 0.3290 | 0.3417 |
| | 0.3290 | 0.3417 | | 0.3290 | 0.3538 | | 0.3376 | 0.3616 | | 0.3371 | 0.3490 |
| | 0.3290 | 0.3300 | | 0.3290 | 0.3417 | | 0.3371 | 0.3490 | | 0.3366 | 0.3369 |
| | 0.3222 | 0.3243 | | 0.3215 | 0.3350 | | 0.3290 | 0.3417 | | 0.3290 | 0.3300 |
| 2R | 0.3222 | 0.3243 | 2S | 0.3196 | 0.3602 | 2T | 0.3290 | 0.3690 | 2U | 0.3290 | 0.3300 |
| | 0.3290 | 0.3300 | | 0.3290 | 0.3690 | | 0.3381 | 0.3762 | | 0.3366 | 0.3369 |
| | 0.3290 | 0.3180 | | 0.3290 | 0.3538 | | 0.3376 | 0.3616 | | 0.3361 | 0.3245 |
| | 0.3231 | 0.3120 | | 0.3207 | 0.3462 | | 0.3290 | 0.3538 | | 0.3290 | 0.3180 |
| 3A | 0.3371 | 0.3490 | 3B | 0.3376 | 0.3616 | 3R | 0.3366 | 0.3369 | 3S | 0.3381 | 0.3762 |
| | 0.3451 | 0.3554 | | 0.3463 | 0.3687 | | 0.3440 | 0.3428 | | 0.3480 | 0.3840 |
| | 0.3440 | 0.3427 | | 0.3451 | 0.3554 | | 0.3429 | 0.3307 | | 0.3463 | 0.3687 |
| | 0.3366 | 0.3369 | | 0.3371 | 0.3490 | | 0.3361 | 0.3245 | | 0.3376 | 0.3616 |
| 4A | 0.3530 | 0.3597 | 4B | 0.3548 | 0.3736 | 4C | 0.3641 | 0.3804 | 4D | 0.3615 | 0.3659 |
| | 0.3615 | 0.3659 | | 0.3641 | 0.3804 | | 0.3736 | 0.3874 | | 0.3702 | 0.3722 |
| | 0.3590 | 0.3521 | | 0.3615 | 0.3659 | | 0.3702 | 0.3722 | | 0.3670 | 0.3578 |
| | 0.3512 | 0.3465 | | 0.3530 | 0.3597 | | 0.3615 | 0.3659 | | 0.3590 | 0.3521 |
| 4R | 0.3512 | 0.3465 | 4S | 0.3571 | 0.3907 | 4T | 0.3668 | 0.3957 | 4U | 0.3590 | 0.3521 |
| | 0.3590 | 0.3521 | | 0.3668 | 0.3957 | | 0.3771 | 0.4034 | | 0.3670 | 0.3578 |
| | 0.3567 | 0.3389 | | 0.3641 | 0.3804 | | 0.3736 | 0.3874 | | 0.3640 | 0.3440 |
| | 0.3495 | 0.3339 | | 0.3548 | 0.3736 | | 0.3641 | 0.3804 | | 0.3567 | 0.3389 |

PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

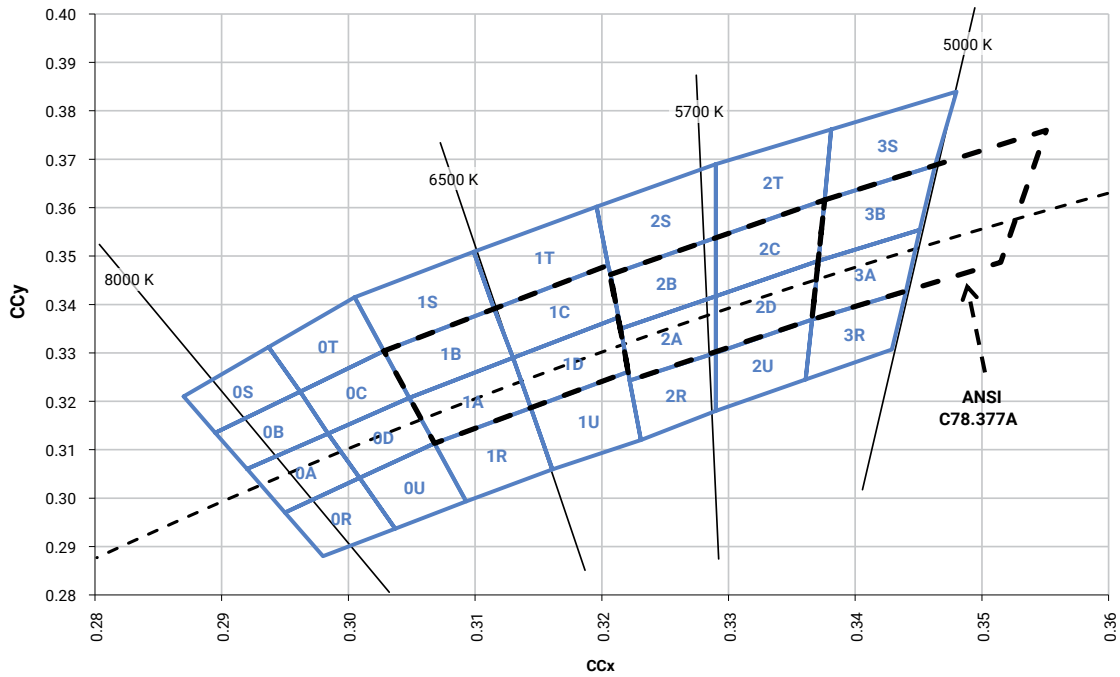
| Region | x | y | Region | x | y | Region | x | y | Region | x | y |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 5A1 | 0.3670 | 0.3578 | 5A2 | 0.3686 | 0.3649 | 5A3 | 0.3744 | 0.3685 | 5A4 | 0.3726 | 0.3612 |
| | 0.3686 | 0.3649 | | 0.3702 | 0.3722 | | 0.3763 | 0.3760 | | 0.3744 | 0.3685 |
| | 0.3744 | 0.3685 | | 0.3763 | 0.3760 | | 0.3825 | 0.3798 | | 0.3804 | 0.3721 |
| | 0.3726 | 0.3612 | | 0.3744 | 0.3685 | | 0.3804 | 0.3721 | | 0.3783 | 0.3646 |
| 5B1 | 0.3702 | 0.3722 | 5B2 | 0.3719 | 0.3797 | 5B3 | 0.3782 | 0.3837 | 5B4 | 0.3763 | 0.3760 |
| | 0.3719 | 0.3797 | | 0.3736 | 0.3874 | | 0.3802 | 0.3916 | | 0.3782 | 0.3837 |
| | 0.3782 | 0.3837 | | 0.3802 | 0.3916 | | 0.3869 | 0.3958 | | 0.3847 | 0.3877 |
| | 0.3763 | 0.3760 | | 0.3782 | 0.3837 | | 0.3847 | 0.3877 | | 0.3825 | 0.3798 |
| 5C1 | 0.3825 | 0.3798 | 5C2 | 0.3847 | 0.3877 | 5C3 | 0.3912 | 0.3917 | 5C4 | 0.3887 | 0.3836 |
| | 0.3847 | 0.3877 | | 0.3869 | 0.3958 | | 0.3937 | 0.4001 | | 0.3912 | 0.3917 |
| | 0.3912 | 0.3917 | | 0.3937 | 0.4001 | | 0.4006 | 0.4044 | | 0.3978 | 0.3958 |
| | 0.3887 | 0.3836 | | 0.3912 | 0.3917 | | 0.3978 | 0.3958 | | 0.3950 | 0.3875 |
| 5D1 | 0.3783 | 0.3646 | 5D2 | 0.3804 | 0.3721 | 5D3 | 0.3863 | 0.3758 | 5D4 | 0.3840 | 0.3681 |
| | 0.3804 | 0.3721 | | 0.3825 | 0.3798 | | 0.3887 | 0.3836 | | 0.3863 | 0.3758 |
| | 0.3863 | 0.3758 | | 0.3887 | 0.3836 | | 0.3950 | 0.3875 | | 0.3924 | 0.3794 |
| | 0.3840 | 0.3681 | | 0.3863 | 0.3758 | | 0.3924 | 0.3794 | | 0.3898 | 0.3716 |
| 6A1 | 0.3889 | 0.3690 | 6A2 | 0.3915 | 0.3768 | 6A3 | 0.3981 | 0.3800 | 6A4 | 0.3953 | 0.3720 |
| | 0.3915 | 0.3768 | | 0.3941 | 0.3848 | | 0.4010 | 0.3882 | | 0.3981 | 0.3800 |
| | 0.3981 | 0.3800 | | 0.4010 | 0.3882 | | 0.4080 | 0.3916 | | 0.4048 | 0.3832 |
| | 0.3953 | 0.3720 | | 0.3981 | 0.3800 | | 0.4048 | 0.3832 | | 0.4017 | 0.3751 |
| 6B1 | 0.3941 | 0.3848 | 6B2 | 0.3968 | 0.3930 | 6B3 | 0.4040 | 0.3966 | 6B4 | 0.4010 | 0.3882 |
| | 0.3968 | 0.3930 | | 0.3996 | 0.4015 | | 0.4071 | 0.4052 | | 0.4040 | 0.3966 |
| | 0.4040 | 0.3966 | | 0.4071 | 0.4052 | | 0.4146 | 0.4089 | | 0.4113 | 0.4001 |
| | 0.4010 | 0.3882 | | 0.4040 | 0.3966 | | 0.4113 | 0.4001 | | 0.4080 | 0.3916 |
| 6C1 | 0.4080 | 0.3916 | 6C2 | 0.4113 | 0.4001 | 6C3 | 0.4186 | 0.4037 | 6C4 | 0.4150 | 0.3950 |
| | 0.4113 | 0.4001 | | 0.4146 | 0.4089 | | 0.4222 | 0.4127 | | 0.4186 | 0.4037 |
| | 0.4186 | 0.4037 | | 0.4222 | 0.4127 | | 0.4299 | 0.4165 | | 0.4259 | 0.4073 |
| | 0.4150 | 0.3950 | | 0.4186 | 0.4037 | | 0.4259 | 0.4073 | | 0.4221 | 0.3984 |
| 6D1 | 0.4017 | 0.3751 | 6D2 | 0.4048 | 0.3832 | 6D3 | 0.4116 | 0.3865 | 6D4 | 0.4082 | 0.3782 |
| | 0.4048 | 0.3832 | | 0.4080 | 0.3916 | | 0.4150 | 0.3950 | | 0.4116 | 0.3865 |
| | 0.4116 | 0.3865 | | 0.4150 | 0.3950 | | 0.4221 | 0.3984 | | 0.4183 | 0.3898 |
| | 0.4082 | 0.3782 | | 0.4116 | 0.3865 | | 0.4183 | 0.3898 | | 0.4147 | 0.3814 |
| 7A1 | 0.4147 | 0.3814 | 7A2 | 0.4183 | 0.3898 | 7A3 | 0.4242 | 0.3919 | 7A4 | 0.4203 | 0.3833 |
| | 0.4183 | 0.3898 | | 0.4221 | 0.3984 | | 0.4281 | 0.4006 | | 0.4242 | 0.3919 |
| | 0.4242 | 0.3919 | | 0.4281 | 0.4006 | | 0.4342 | 0.4028 | | 0.4300 | 0.3939 |
| | 0.4203 | 0.3833 | | 0.4242 | 0.3919 | | 0.4300 | 0.3939 | | 0.4259 | 0.3853 |

PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

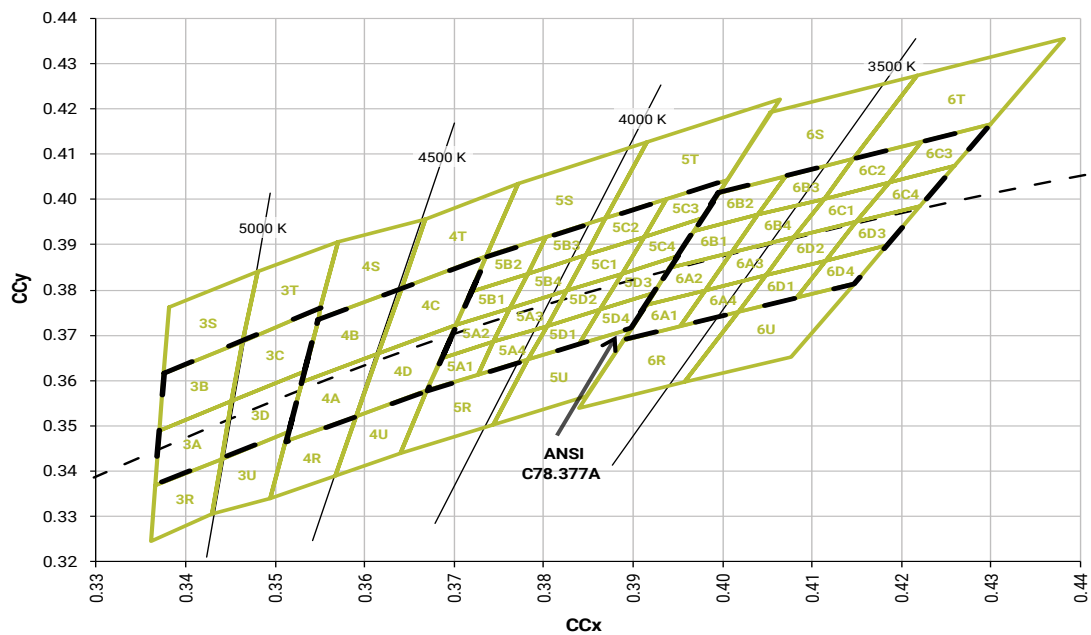
| Region | x | y | Region | x | y | Region | x | y | Region | x | y |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 7B1 | 0.4221 | 0.3984 | 7B2 | 0.4259 | 0.4073 | 7B3 | 0.4322 | 0.4096 | 7B4 | 0.4281 | 0.4006 |
| | 0.4259 | 0.4073 | | 0.4299 | 0.4165 | | 0.4364 | 0.4188 | | 0.4322 | 0.4096 |
| | 0.4322 | 0.4096 | | 0.4364 | 0.4188 | | 0.4430 | 0.4212 | | 0.4385 | 0.4119 |
| | 0.4281 | 0.4006 | | 0.4322 | 0.4096 | | 0.4385 | 0.4119 | | 0.4342 | 0.4028 |
| 7C1 | 0.4342 | 0.4028 | 7C2 | 0.4385 | 0.4119 | 7C3 | 0.4449 | 0.4141 | 7C4 | 0.4403 | 0.4049 |
| | 0.4385 | 0.4119 | | 0.4430 | 0.4212 | | 0.4496 | 0.4236 | | 0.4449 | 0.4141 |
| | 0.4449 | 0.4141 | | 0.4496 | 0.4236 | | 0.4562 | 0.4260 | | 0.4513 | 0.4164 |
| | 0.4403 | 0.4049 | | 0.4449 | 0.4141 | | 0.4513 | 0.4164 | | 0.4465 | 0.4071 |
| 7D1 | 0.4259 | 0.3853 | 7D2 | 0.4300 | 0.3939 | 7D3 | 0.4359 | 0.3960 | 7D4 | 0.4316 | 0.3873 |
| | 0.4300 | 0.3939 | | 0.4342 | 0.4028 | | 0.4403 | 0.4049 | | 0.4359 | 0.3960 |
| | 0.4359 | 0.3960 | | 0.4403 | 0.4049 | | 0.4465 | 0.4071 | | 0.4418 | 0.3981 |
| | 0.4316 | 0.3873 | | 0.4359 | 0.3960 | | 0.4418 | 0.3981 | | 0.4373 | 0.3893 |
| 8A1 | 0.4373 | 0.3893 | 8A2 | 0.4418 | 0.3981 | 8A3 | 0.4475 | 0.3994 | 8A4 | 0.4428 | 0.3906 |
| | 0.4418 | 0.3981 | | 0.4465 | 0.4071 | | 0.4523 | 0.4085 | | 0.4475 | 0.3994 |
| | 0.4475 | 0.3994 | | 0.4523 | 0.4085 | | 0.4582 | 0.4099 | | 0.4532 | 0.4008 |
| | 0.4428 | 0.3906 | | 0.4475 | 0.3994 | | 0.4532 | 0.4008 | | 0.4483 | 0.3919 |
| 8B1 | 0.4465 | 0.4071 | 8B2 | 0.4513 | 0.4164 | 8B3 | 0.4573 | 0.4178 | 8B4 | 0.4523 | 0.4085 |
| | 0.4513 | 0.4164 | | 0.4562 | 0.4260 | | 0.4624 | 0.4274 | | 0.4573 | 0.4178 |
| | 0.4573 | 0.4178 | | 0.4624 | 0.4274 | | 0.4687 | 0.4289 | | 0.4634 | 0.4193 |
| | 0.4523 | 0.4085 | | 0.4573 | 0.4178 | | 0.4634 | 0.4193 | | 0.4582 | 0.4099 |
| 8C1 | 0.4582 | 0.4099 | 8C2 | 0.4634 | 0.4193 | 8C3 | 0.4695 | 0.4207 | 8C4 | 0.4641 | 0.4112 |
| | 0.4634 | 0.4193 | | 0.4687 | 0.4289 | | 0.4750 | 0.4304 | | 0.4695 | 0.4207 |
| | 0.4695 | 0.4207 | | 0.4750 | 0.4304 | | 0.4813 | 0.4319 | | 0.4756 | 0.4221 |
| | 0.4641 | 0.4112 | | 0.4695 | 0.4207 | | 0.4756 | 0.4221 | | 0.4700 | 0.4126 |
| 8D1 | 0.4483 | 0.3919 | 8D2 | 0.4532 | 0.4008 | 8D3 | 0.4589 | 0.4021 | 8D4 | 0.4538 | 0.3931 |
| | 0.4532 | 0.4008 | | 0.4582 | 0.4099 | | 0.4641 | 0.4112 | | 0.4589 | 0.4021 |
| | 0.4589 | 0.4021 | | 0.4641 | 0.4112 | | 0.4700 | 0.4126 | | 0.4646 | 0.4034 |
| | 0.4538 | 0.3931 | | 0.4589 | 0.4021 | | 0.4646 | 0.4034 | | 0.4593 | 0.3944 |

CREE'S STANDARD CHROMATICITY REGIONS PLOTTED ON THE 1931 CIE CURVE

ANSI Cool White

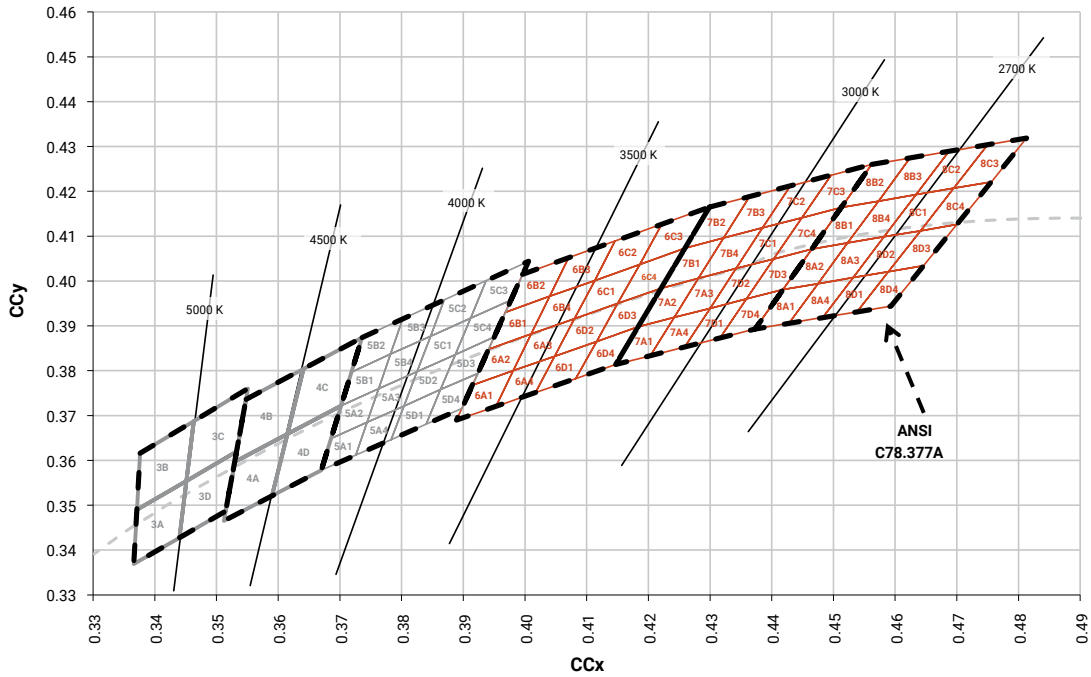


Neutral White

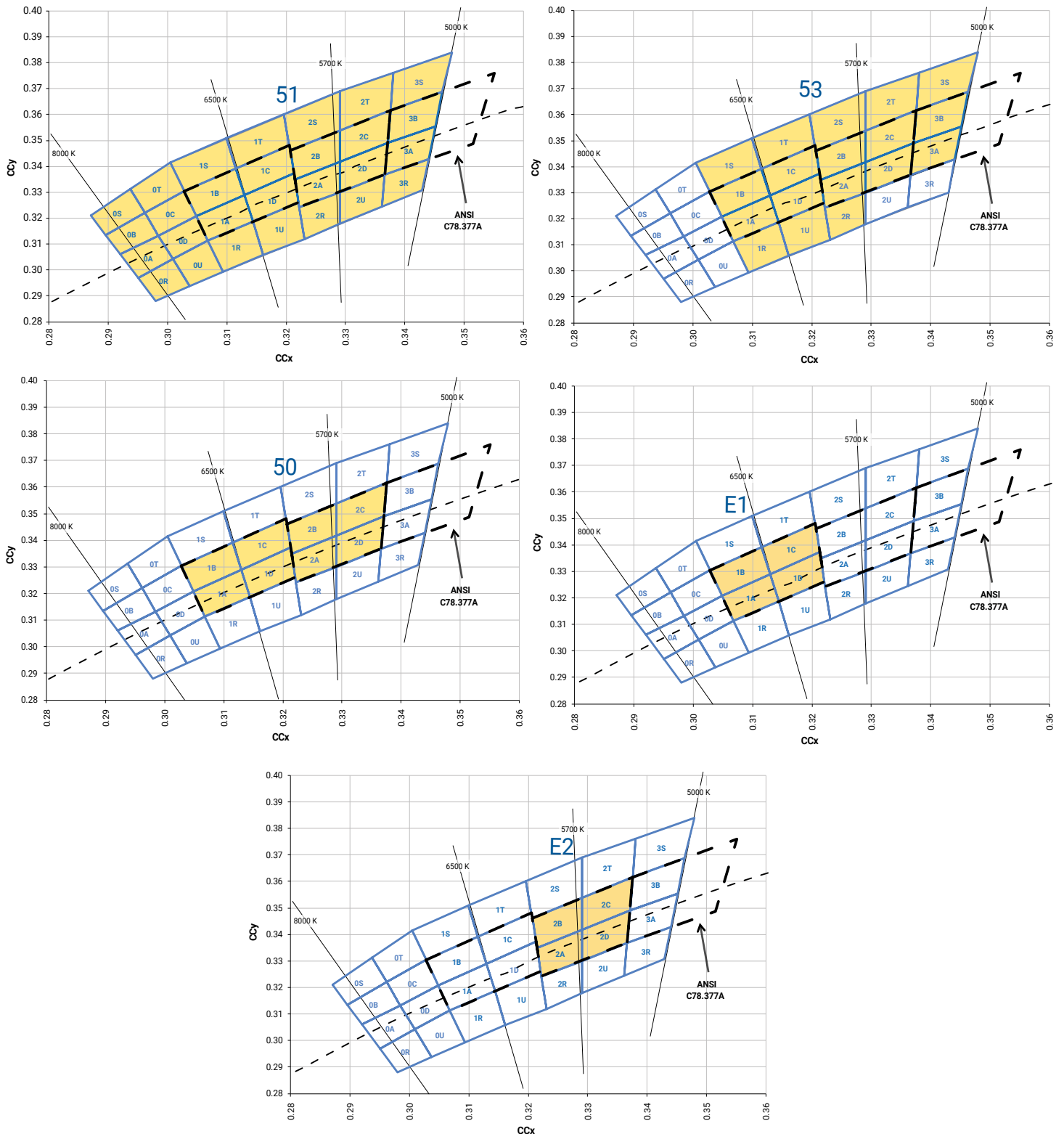


CREE'S STANDARD CHROMATICITY REGIONS PLOTTED ON THE 1931 CIE CURVE - CONTINUED

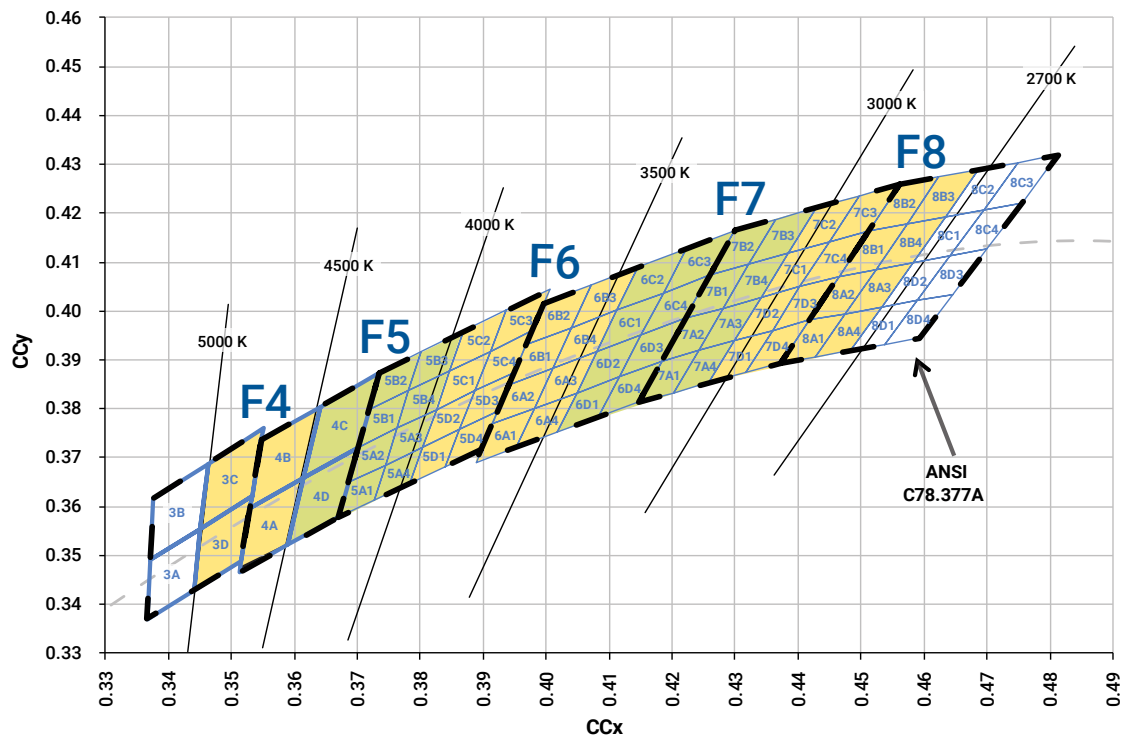
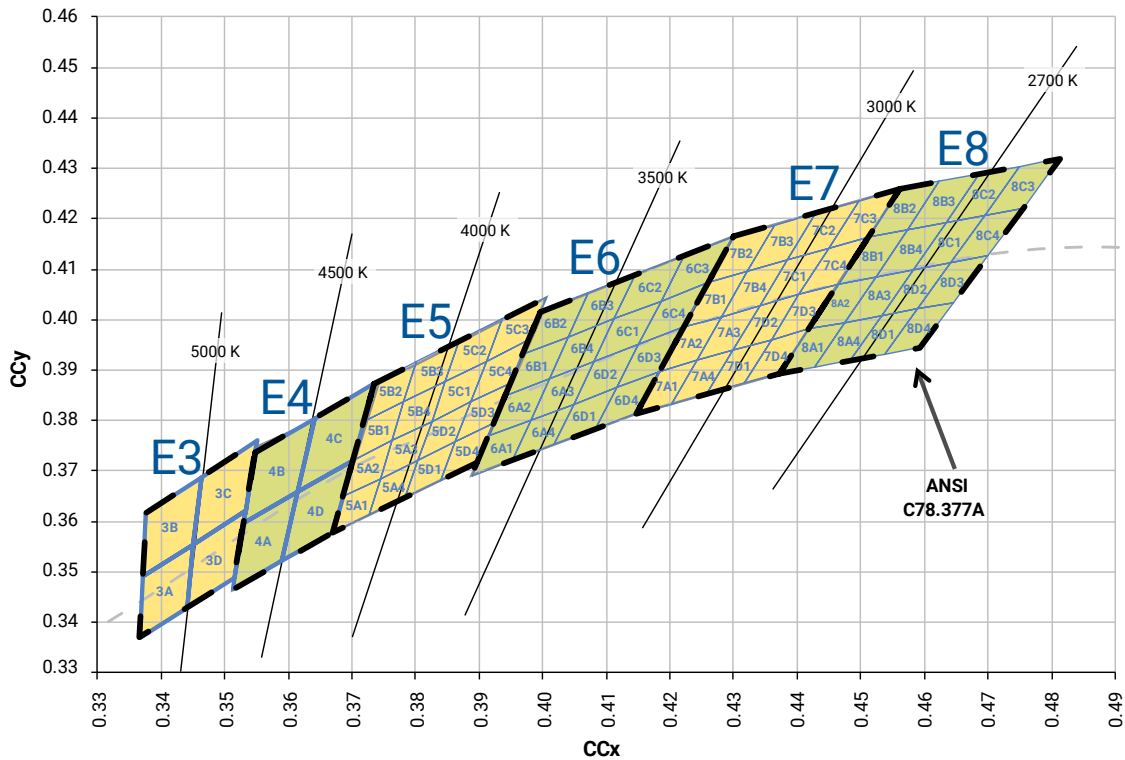
ANSI Neutral White and ANSI Warm White



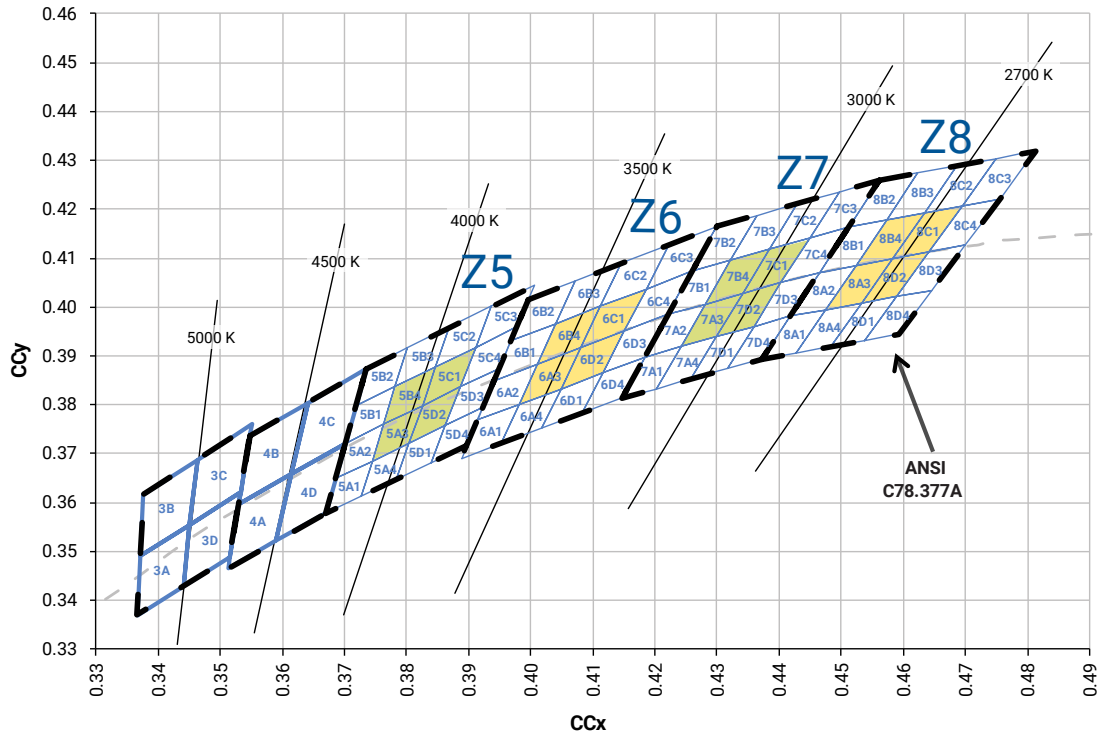
CREE'S STANDARD COOL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS



CREE'S STANDARD WARM AND NEUTRAL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS



CREE'S STANDARD WARM AND NEUTRAL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS - CONTINUED



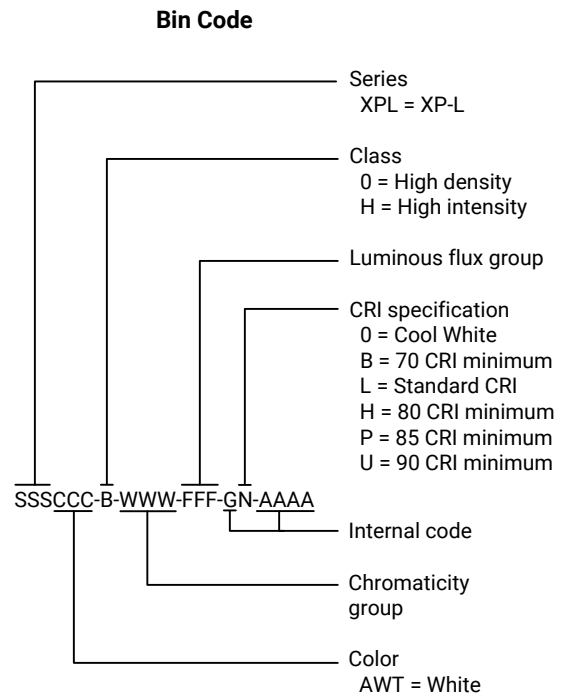
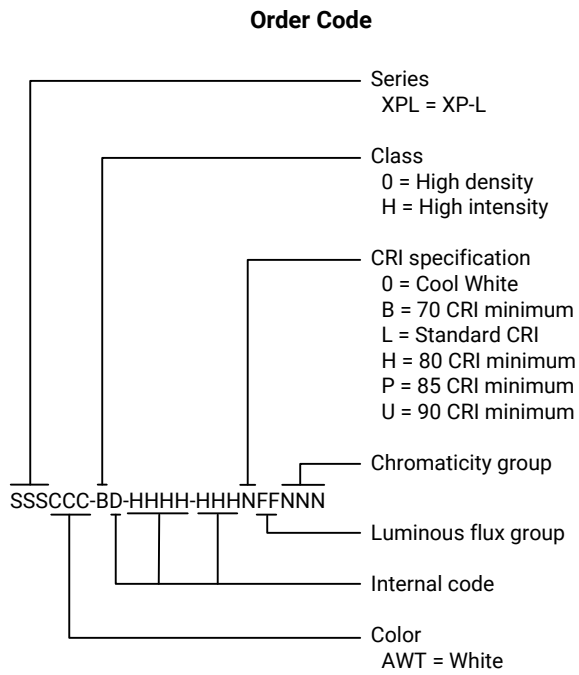
CREE'S STANDARD CHROMATICITY KITS

The following table provides the chromaticity bins associated with chromaticity kits.

| Color | CCT | Kit | Chromaticity Bins |
|---------------|--------|-----|--|
| Cool White | 6200 K | 51 | 0A, 0B, 0C, 0D, 0R, 0S, 0T, 0U, 1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U, 2A, 2B, 2C, 2D, 2R, 2S, 2T, 2U, 3A, 3B, 3R, 3S |
| | 6000 K | 53 | 1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U, 2A, 2B, 2C, 2D, 2R, 2S, 2T, 3A, 3B, 3S |
| | 6200 K | 50 | 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D |
| | 6500 K | E1 | 1A, 1B, 1C, 1D |
| | 5700 K | E2 | 2A, 2B, 2C, 2D |
| Neutral White | 5000 K | E3 | 3A, 3B, 3C, 3D |
| | 4750 K | F4 | 3C, 3D, 4A, 4B |
| | 4500 K | E4 | 4A, 4B, 4C, 4D |
| | 4250 K | F5 | 4C, 4D, 5A1, 5A2, 5A3, 5A4, 5B1, 5B2, 5B3, 5B4 |
| | 4000 K | E5 | 5A1, 5A2, 5A3, 5A4, 5B1, 5B2, 5B3, 5B4, 5C1, 5C2, 5C3, 5C4, 5D1, 5D2, 5D3, 5D4 |
| | 4000 K | Z5 | 5A3, 5B4, 5C1, 5D2 |
| | 3750 K | F6 | 5C1, 5C2, 5C3, 5C4, 5D1, 5D2, 5D3, 5D4, 6A1, 6A2, 6A3, 6A4, 6B1, 6B2, 6B3, 6B4 |
| Warm White | 3500 K | E6 | 6A1, 6A2, 6A3, 6A4, 6B1, 6B2, 6B3, 6B4, 6C1, 6C2, 6C3, 6C4, 6D1, 6D2, 6D3, 6D4 |
| | 3500 K | Z6 | 6A3, 6B4, 6C1, 6D2 |
| | 3250 K | F7 | 6C1, 6C2, 6C3, 6C4, 6D1, 6D2, 6D3, 6D4, 7A1, 7A2, 7A3, 7A4, 7B1, 7B2, 7B3, 7B4 |
| | 3000 K | E7 | 7A1, 7A2, 7A3, 7A4, 7B1, 7B2, 7B3, 7B4, 7C1, 7C2, 7C3, 7C4, 7D1, 7D2, 7D3, 7D4 |
| | 3000 K | Z7 | 7A3, 7B4, 7C1, 7D2 |
| | 2850 K | F8 | 7C1, 7C2, 7C3, 7C4, 7D1, 7D2, 7D3, 7D4, 8A1, 8A2, 8A3, 8A4, 8B1, 8B2, 8B3, 8B4 |
| | 2700 K | E8 | 8A1, 8A2, 8A3, 8A4, 8B1, 8B2, 8B3, 8B4, 8C1, 8C2, 8C3, 8C4, 8D1, 8D2, 8D3, 8D4 |
| | 2700 K | Z8 | 8A3, 8B4, 8C1, 8D2 |

BIN AND ORDER CODE FORMATS

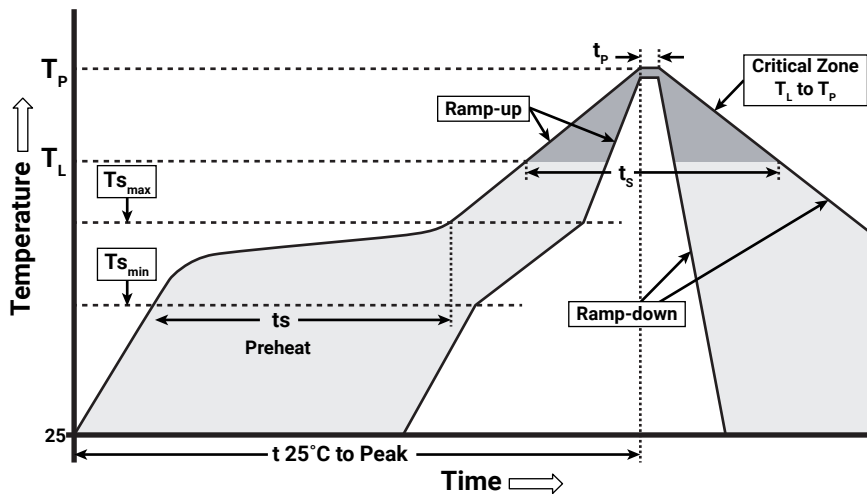
XP-L bin codes and order codes are configured in the following manner:



REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XP-L 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, and therefore it is the lamp or luminaire manufacturer’s responsibility to determine applicable soldering requirements.

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



IPC/JEDEC J-STD-020C

| 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_s) | 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 or provided 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 public [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 XP-L LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of ≤ 30 °C/85% relative humidity (RH). Regardless of the 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 Ecology](#) section of the Cree website.

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 Declaration. REACH banned substance information (REACH Article 67) is also available upon request.

NOTES - CONTINUED

UL® Recognized Component

This product meets the requirements to be considered a UL Recognized Component with 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](#).

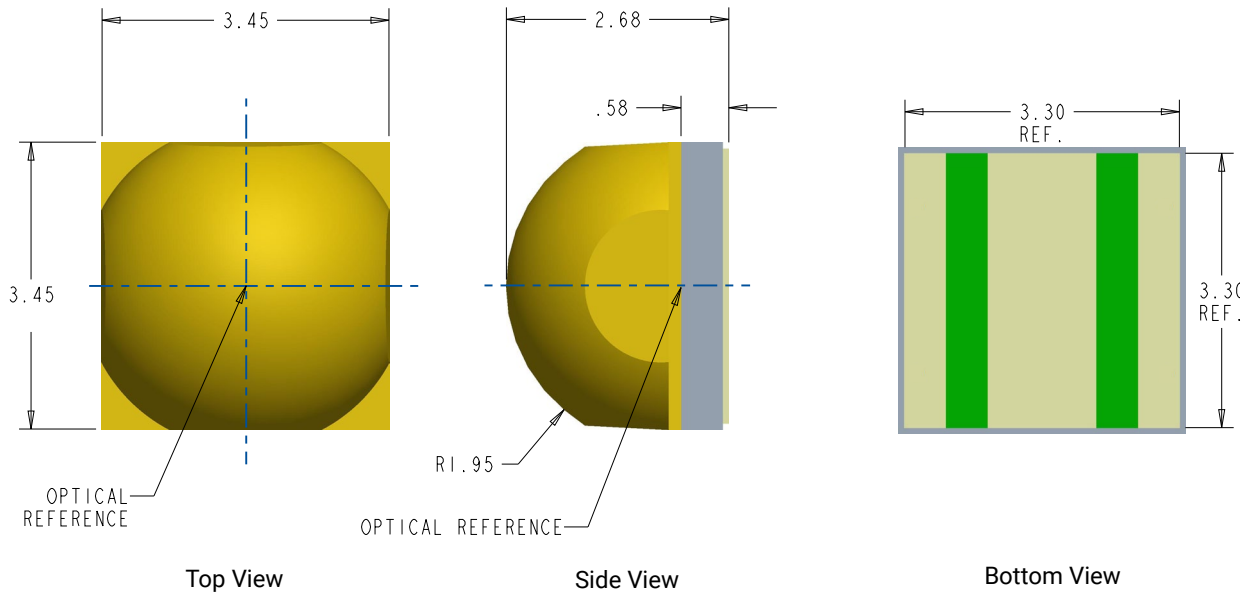
MECHANICAL DIMENSIONS

All measurements are $\pm .13$ mm unless otherwise indicated.

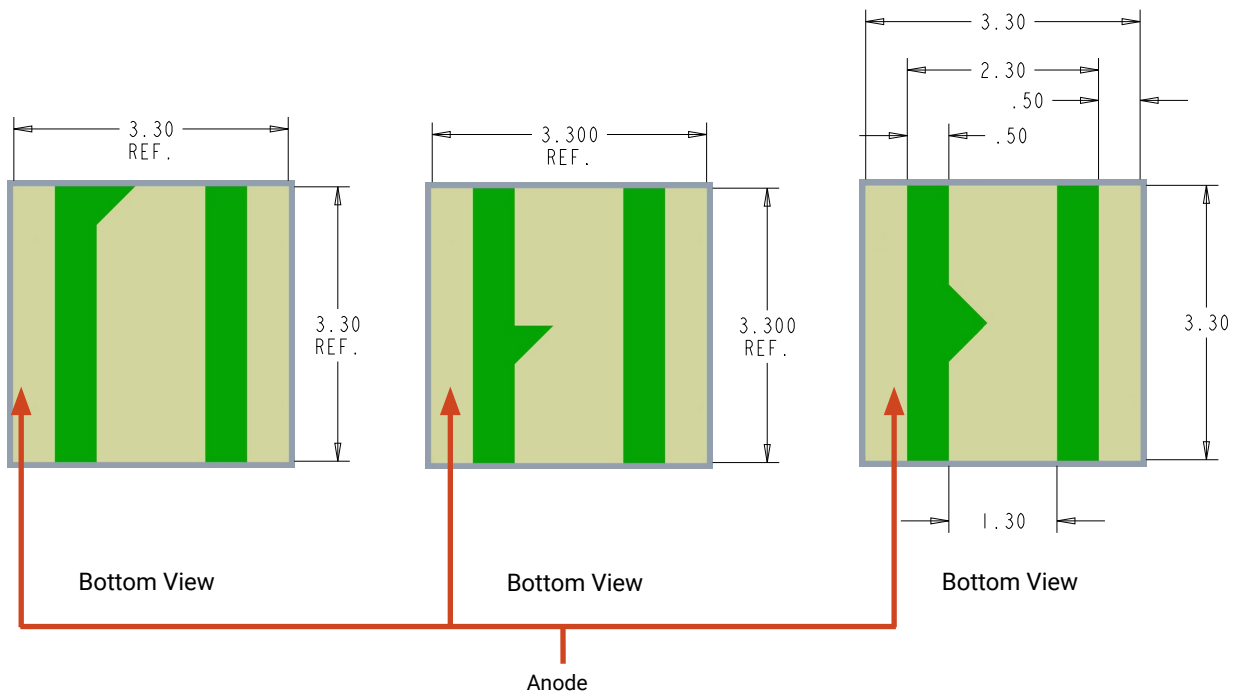
XP-L High Density

XPLAWT-00-xxxx-xxxxxxxxxx

High Density



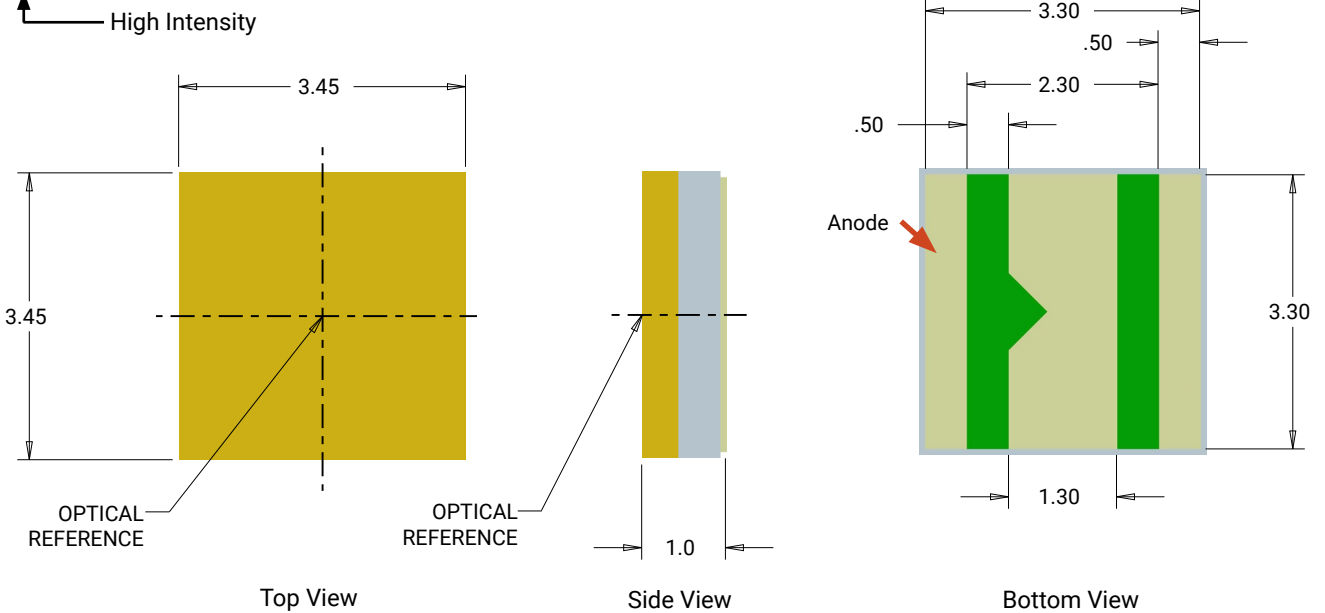
Alternate bottom views of the XP-L High Density LED are shown in the diagrams below.



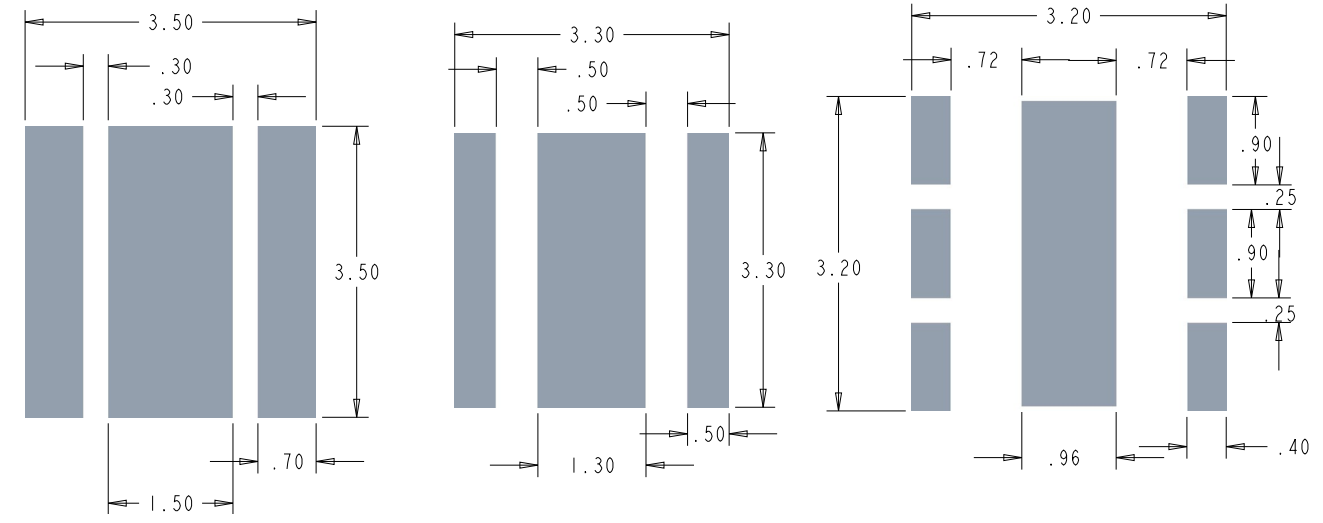
MECHANICAL DIMENSIONS - CONTINUED

XP-L High Intensity

XPLAWT-H0-xxxx-xxxxxxxxxx



XP-L High Density & High Intensity



Recommended Copper Layout

**Recommended Solder Pad
(Solder Mask Pattern)**

Recommended Stencil Openings*

Notes:

- Cree recommends using thermal pad kickouts to maximize component thermal performance.
- Cree recommends using white solder mask material to minimize system optical loss.
- * This stencil has been tested and optimized for the avoidance of voiding when using ALPHA® LUMET® P30 Maxrel solder paste. For other solder pastes, a “window pane” design for the thermal pad stencil may result in a lower voiding percentage. Contact your local Cree Field Applications Engineer for consultation regarding your specific application.

TAPE AND REEL

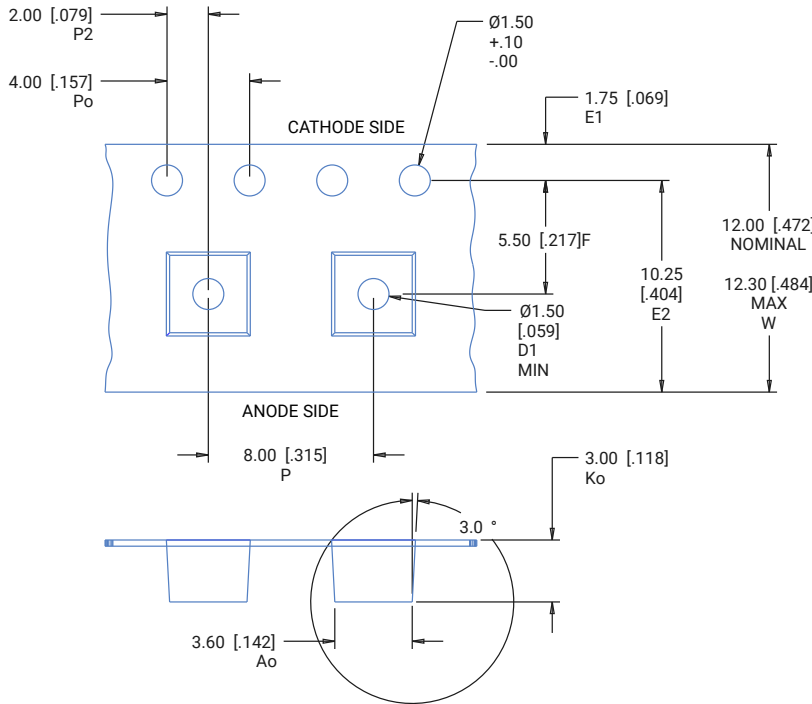
All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

Except as noted, all dimensions in mm [inches]

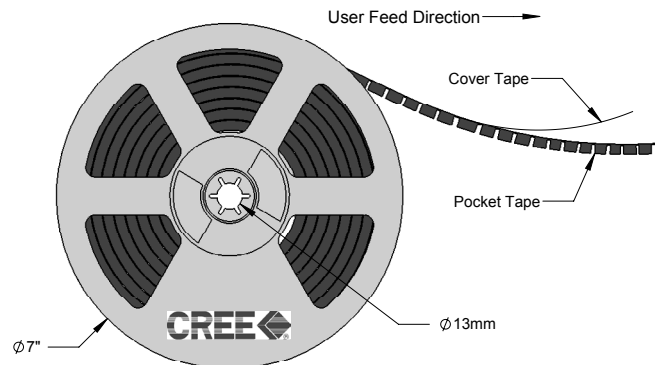
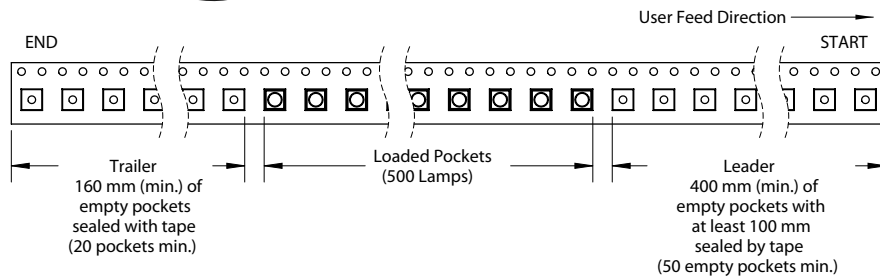
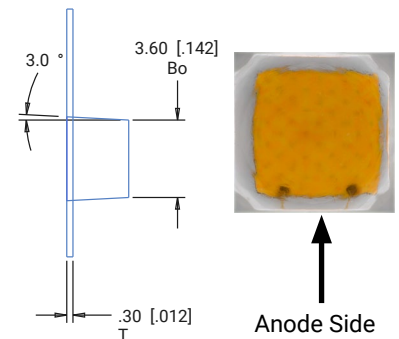
XP-L High Density

XPLAWT-00-xxxx-xxxxxxxxxx

High Density



| POCKET SIZE | |
|-------------|-----------------|
| Ao - | 3.60 mm [.142"] |
| Bo - | 3.60 mm [.142"] |
| Ko - | 3.00 mm [.118"] |

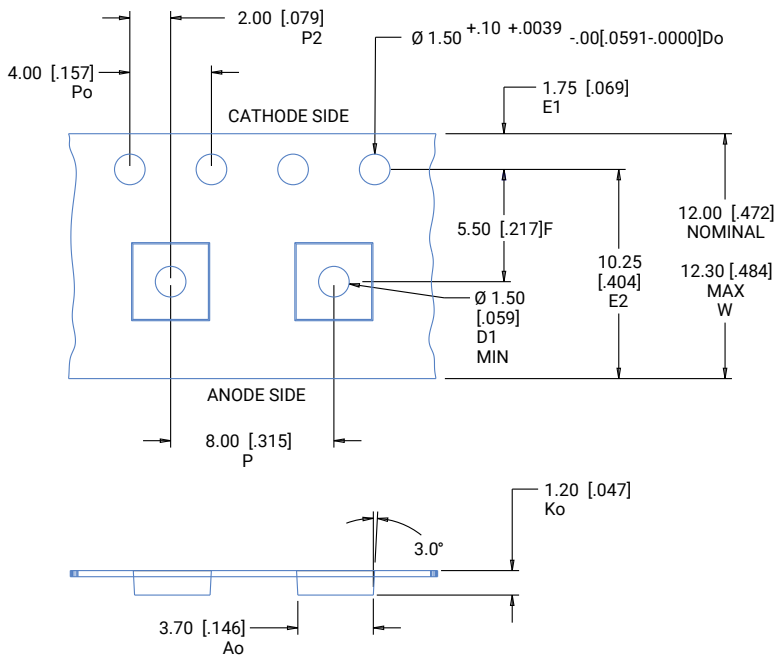


TAPE AND REEL - CONTINUED

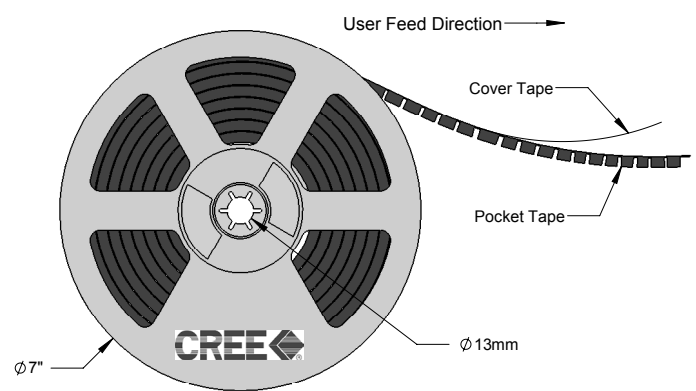
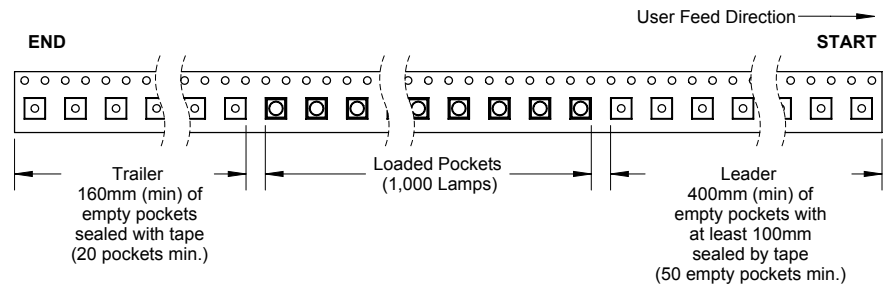
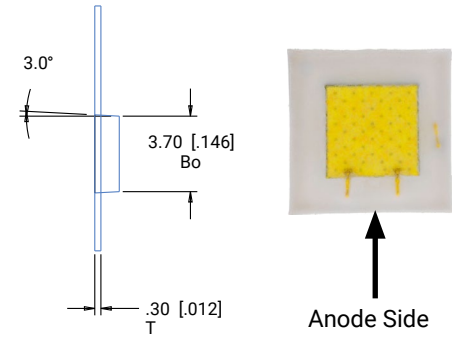
XP-L High Intensity

XPLAWT-H0-xxxx-xxxxxxxxxx

High Intensity

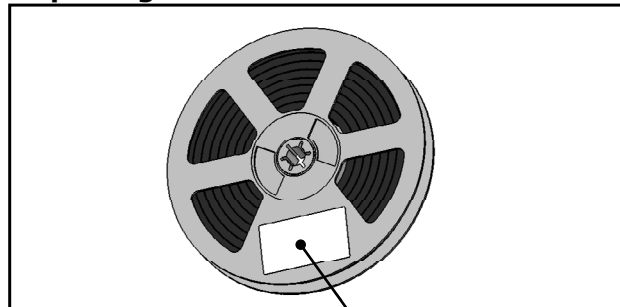


| POCKET SIZE | |
|-------------|------------------|
| Ao - | 3.70 mm [0.146"] |
| Bo - | 3.70 mm [0.146"] |
| Ko - | 1.20 mm [0.047"] |



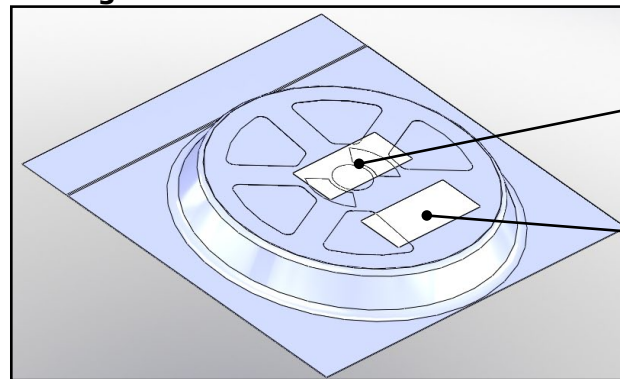
PACKAGING

Unpackaged Reel



Label with Cree Bin Code,
Quantity, Reel ID

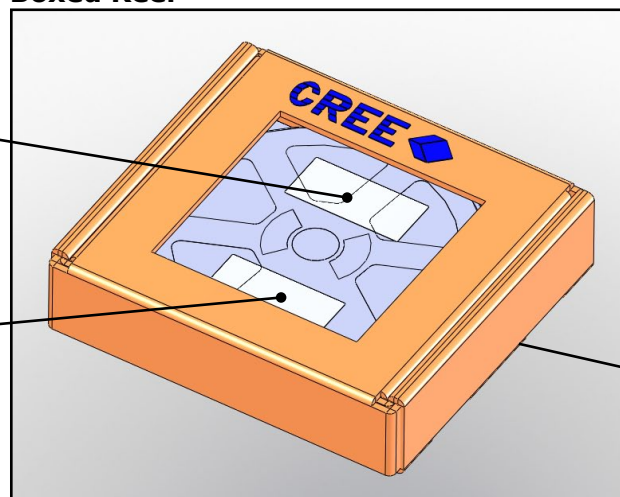
Packaged Reel



Label with Cree Order Code,
Quantity, Reel ID, PO #

Label with Cree Bin Code,
Quantity, Reel ID

Boxed Reel



Label with Cree Order Code,
Quantity, Reel ID, PO #

Label with Cree Bin Code,
Quantity, Reel ID

Patent Label
(on bottom of box)