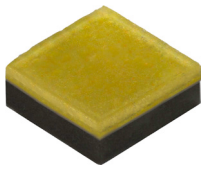
CLD-DS177 REV 1

# Cree® XLamp® XD16 LEDs



## PRODUCT DESCRIPTION

The XLamp® XD16 LEDs are the industry's first Extreme Density LEDs, delivering up to 5½ times higher lumen density than Cree's previous generation of high-power LEDs. The ceramic-based XD16 LED is built on Cree's groundbreaking NX Technology Platform to address challenges with luminaire manufacturing, thermal design, optical design and reliability that have been experienced with competing LEDs. The XD16 LED enables lighting manufacturers to achieve dramatic improvements in lumen output and efficacy, without increasing the size of the LED array, for a wide spectrum of lighting applications such as color tuning, directional lighting and industrial lighting.

## FEATURES

- Available in outdoor white and 70-, 80- and 90-CRI white
- ANSI-compatible chromaticity bins
- 3-step and 5-step options
- Binned at 85 °C
- Maximum drive current: 2000 mA
- Low thermal resistance: 6 °C/W
- Wide viewing angle: 135°
- Unlimited floor life at ≤ 30 °C/85% RH
- Reflow solderable - JEDEC J-STD-020C
- 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 | | 6 | |
| Viewing angle (FWHM) | degrees | | 135 | |
| Temperature coefficient of voltage | mV/°C | | -1.3 | |
| DC forward current | mA | | | 2000 |
| Reverse voltage | V | | | 5 |
| Forward voltage (@ 350 mA, 85 °C) | V | | 2.73 | 3 |
| Forward voltage (@ 700 mA, 85 °C) | V | | 2.83 | |
| Forward voltage (@ 1000 mA, 85 °C) | V | | 2.90 | |
| Forward voltage (@ 1500 mA, 85 °C) | V | | 3.00 | |
| Forward voltage (@ 2000 mA, 85 °C) | V | | 3.07 | |
| LED junction temperature | °C | | | 150 |

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## FLUX CHARACTERISTICS ($T_J$ = 85 °C)

The following table provides order codes for XLamp XD16 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 24). For definitions of the chromaticity kits, please see the Cree's Standard Chromaticity Kits section (page 23).

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| DT | 7000 K | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JDT | XD16AWT-H0-0000-00000BJDT | XD16AWT-H0-0000-00000HJDT | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HDT | XD16AWT-H0-0000-00000BHDT | XD16AWT-H0-0000-00000HHDT | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGDT | |
| E1 | 6500 K | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JE1 | XD16AWT-H0-0000-00000BJE1 | XD16AWT-H0-0000-00000HJE1 | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HE1 | XD16AWT-H0-0000-00000BHE1 | XD16AWT-H0-0000-00000HHE1 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGE1 | |
| 50 | 6200 K | S3 | 156 | 170 | 287 | 385 | XD16AWT-H0-0000-000000K50 | | | |
| | | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000J50 | | XD16AWT-H0-0000-00000HJ50 | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000H50 | | XD16AWT-H0-0000-00000HH50 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG50 | |
| DV | 6000 K | S3 | 156 | 170 | 287 | 385 | XD16AWT-H0-0000-000000KDV | XD16AWT-H0-0000-00000BKDV | | |
| | | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JDV | XD16AWT-H0-0000-00000BJDV | XD16AWT-H0-0000-00000HJDV | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HDV | XD16AWT-H0-0000-00000BHDV | XD16AWT-H0-0000-00000HHDV | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGDV | |
| | | R3 | 122 | 133 | 224 | 301 | | | | XD16AWT-H0-0000-00000UFDV |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UEDV |

Note

- 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 26).
- Cree XLamp XD16 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 values @ 700 mA and 1.0 A are calculated and for reference only.

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## FLUX CHARACTERISTICS ($T_J$ = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| E2 | 5700 K | S3 | 156 | 170 | 287 | 385 | XD16AWT-H0-0000-000000KE2 | XD16AWT-H0-0000-00000BKE2 | | |
| | | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JE2 | XD16AWT-H0-0000-00000BJE2 | XD16AWT-H0-0000-00000HJE2 | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HE2 | XD16AWT-H0-0000-00000BHE2 | XD16AWT-H0-0000-00000HHE2 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGE2 | |
| | | R3 | 122 | 133 | 224 | 301 | | | | XD16AWT-H0-0000-00000UFE2 |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UEE2 |
| 2E | 5700 K | S3 | 156 | 170 | 287 | 385 | | XD16AWT-H0-0000-00000BK2E | | |
| | | S2 | 148 | 162 | 272 | 365 | | XD16AWT-H0-0000-00000BJ2E | XD16AWT-H0-0000-00000HJ2E | |
| | | R5 | 139 | 152 | 255 | 343 | | XD16AWT-H0-0000-00000BH2E | XD16AWT-H0-0000-00000HH2E | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG2E | |
| | | R3 | 122 | 133 | 224 | 301 | | | | XD16AWT-H0-0000-00000UF2E |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UE2E |
| 3E | 5000 K | S3 | 156 | 170 | 287 | 385 | | XD16AWT-H0-0000-00000BK3E | | |
| | | S2 | 148 | 162 | 272 | 365 | | XD16AWT-H0-0000-00000BJ3E | | |
| | | R5 | 139 | 152 | 255 | 343 | | XD16AWT-H0-0000-00000BH3E | XD16AWT-H0-0000-00000HH3E | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG3E | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF3E | XD16AWT-H0-0000-00000UF3E |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UE3E |

Note

- 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 26).
- Cree XLamp XD16 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.

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** Flux values @ 700 mA and 1.0 A are calculated and for reference only.

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## FLUX CHARACTERISTICS ($T_J$ = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| E3 | 5000 K | S3 | 156 | 170 | 287 | 385 | XD16AWT-H0-0000-000000KE3 | XD16AWT-H0-0000-00000BKE3 | | |
| | | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JE3 | XD16AWT-H0-0000-00000BJE3 | | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HE3 | XD16AWT-H0-0000-00000BHE3 | XD16AWT-H0-0000-00000HHE3 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGE3 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFE3 | XD16AWT-H0-0000-00000UFE3 |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UEE3 |
| F4 | 4750K | S3 | 156 | 170 | 287 | 385 | XD16AWT-H0-0000-000000KF4 | XD16AWT-H0-0000-00000BKF4 | | |
| | | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JF4 | XD16AWT-H0-0000-00000BJF4 | | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HF4 | XD16AWT-H0-0000-00000BHF4 | XD16AWT-H0-0000-00000HHF4 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGF4 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFF4 | XD16AWT-H0-0000-00000UFF4 |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UEF4 |
| 4E | 4500K | S3 | 156 | 170 | 287 | 385 | | XD16AWT-H0-0000-00000BK4E | | |
| | | S2 | 148 | 162 | 272 | 365 | | XD16AWT-H0-0000-00000BJ4E | | |
| | | R5 | 139 | 152 | 255 | 343 | | XD16AWT-H0-0000-00000BH4E | XD16AWT-H0-0000-00000HH4E | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG4E | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF4E | XD16AWT-H0-0000-00000UF4E |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UE4E |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UD4E |

Note

- 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 26).
- Cree XLamp XD16 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.

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## FLUX CHARACTERISTICS ($T_J$ = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| E4 | 4500 K | S3 | 156 | 170 | 287 | 385 | XD16AWT-H0-0000-000000KE4 | XD16AWT-H0-0000-00000BKE4 | | |
| | | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JE4 | XD16AWT-H0-0000-00000BJE4 | | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HE4 | XD16AWT-H0-0000-00000BHE4 | XD16AWT-H0-0000-00000HHE4 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGE4 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFE4 | XD16AWT-H0-0000-00000UFE4 |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UEE4 |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UDE4 |
| F5 | 4200 K | S3 | 156 | 170 | 287 | 385 | XD16AWT-H0-0000-000000KF5 | XD16AWT-H0-0000-00000BKF5 | | |
| | | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JF5 | XD16AWT-H0-0000-00000BJF5 | | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HF5 | XD16AWT-H0-0000-00000BHF5 | XD16AWT-H0-0000-00000HHF5 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGF5 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFF5 | XD16AWT-H0-0000-00000UFF5 |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UEF5 |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UDF5 |

Note

- 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 26).
- Cree XLamp XD16 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.

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** Flux values @ 700 mA and 1.0 A are calculated and for reference only.

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## FLUX CHARACTERISTICS ($T_J$ = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| 5E | 4000 K | S3 | 156 | 170 | 287 | 385 | | XD16AWT-H0-0000-00000BK5E | | |
| | | S2 | 148 | 162 | 272 | 365 | | XD16AWT-H0-0000-00000BJ5E | | |
| | | R5 | 139 | 152 | 255 | 343 | | XD16AWT-H0-0000-00000BH5E | XD16AWT-H0-0000-00000HH5E | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG5E | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF5E | XD16AWT-H0-0000-00000UF5E |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UE5E |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UD5E |
| 5G | 4000 K | R5 | 139 | 152 | 255 | 343 | | | XD16AWT-H0-0000-00000HH5G | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG5G | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF5G | XD16AWT-H0-0000-00000UF5G |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UE5G |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UD5G |
| E5 | 4000 K | S3 | 156 | 170 | 287 | 385 | XD16AWT-H0-0000-000000KE5 | XD16AWT-H0-0000-00000BKE5 | | |
| | | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JE5 | XD16AWT-H0-0000-00000BJE5 | | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HE5 | XD16AWT-H0-0000-00000BHE5 | XD16AWT-H0-0000-00000HHE5 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGE5 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFE5 | XD16AWT-H0-0000-00000UFE5 |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UEE5 |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UDE5 |

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- 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 26).
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## FLUX CHARACTERISTICS ($T_J$ = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| F6 | 3700 K | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JF6 | XD16AWT-H0-0000-00000BJF6 | | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HF6 | XD16AWT-H0-0000-00000BHF6 | XD16AWT-H0-0000-00000HHF6 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGF6 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFF6 | |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UEF6 |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UDF6 |
| 6E | 3500 K | S2 | 148 | 162 | 272 | 365 | | XD16AWT-H0-0000-00000BJ6E | | |
| | | R5 | 139 | 152 | 255 | 343 | | XD16AWT-H0-0000-00000BH6E | XD16AWT-H0-0000-00000HH6E | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG6E | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF6E | |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UE6E |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UD6E |
| 6G | 3500 K | R5 | 139 | 152 | 255 | 343 | | | XD16AWT-H0-0000-00000HH6G | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG6G | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF6G | |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UE6G |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UD6G |

Note

- 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 26).
- Cree XLamp XD16 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.

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## FLUX CHARACTERISTICS ($T_J$ = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| E6 | 3500 K | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JE6 | XD16AWT-H0-0000-00000BJE6 | | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HE6 | XD16AWT-H0-0000-00000BHE6 | XD16AWT-H0-0000-00000HHE6 | |
| | | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGE6 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFE6 | |
| | | R2 | 114 | 125 | 209 | 281 | | | | XD16AWT-H0-0000-00000UEE6 |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UDE6 |
| F7 | 3200 K | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JF7 | XD16AWT-H0-0000-00000BJF7 | | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HF7 | XD16AWT-H0-0000-00000BHF7 | | |
| | | R4 | 130 | 142 | 239 | 321 | XD16AWT-H0-0000-000000GF7 | XD16AWT-H0-0000-00000BGF7 | XD16AWT-H0-0000-00000HGF7 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFF7 | |
| | | R2 | 114 | 125 | 209 | 281 | | | XD16AWT-H0-0000-00000HEF7 | XD16AWT-H0-0000-00000UEF7 |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UDF7 |
| 7E | 3000 K | S2 | 148 | 162 | 272 | 365 | | XD16AWT-H0-0000-00000BJ7E | | |
| | | R5 | 139 | 152 | 255 | 343 | | XD16AWT-H0-0000-00000BH7E | | |
| | | R4 | 130 | 142 | 239 | 321 | | XD16AWT-H0-0000-00000BG7E | XD16AWT-H0-0000-00000HG7E | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF7E | |
| | | R2 | 114 | 125 | 209 | 281 | | | XD16AWT-H0-0000-00000HE7E | XD16AWT-H0-0000-00000UE7E |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UD7E |

Note

- 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 26).
- Cree XLamp XD16 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 values @ 700 mA and 1.0 A are calculated and for reference only.

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## FLUX CHARACTERISTICS ($T_J$ = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| 7G | 3000 K | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG7G | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF7G | |
| | | R2 | 114 | 125 | 209 | 281 | | | XD16AWT-H0-0000-00000HE7G | |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UD7G |
| | | Q4 | 100 | 109 | 184 | 247 | | | | XD16AWT-H0-0000-00000UD7G |
| E7 | 3000 K | S2 | 148 | 162 | 272 | 365 | XD16AWT-H0-0000-000000JE7 | XD16AWT-H0-0000-00000BJE7 | | |
| | | R5 | 139 | 152 | 255 | 343 | XD16AWT-H0-0000-000000HE7 | XD16AWT-H0-0000-00000BHE7 | | |
| | | R4 | 130 | 142 | 239 | 321 | XD16AWT-H0-0000-000000GE7 | XD16AWT-H0-0000-00000BGE7 | XD16AWT-H0-0000-00000HGE7 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFE7 | |
| | | R2 | 114 | 125 | 209 | 281 | | | XD16AWT-H0-0000-00000HEE7 | |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UDE7 |
| | | Q4 | 100 | 109 | 184 | 247 | | | | XD16AWT-H0-0000-00000UCE7 |
| F8 | 2850 K | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGF8 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFF8 | |
| | | R2 | 114 | 125 | 209 | 281 | | | XD16AWT-H0-0000-00000HEF8 | |
| | | Q5 | 107 | 117 | 197 | 264 | | | | XD16AWT-H0-0000-00000UDF8 |
| | | Q4 | 100 | 109 | 184 | 247 | | | | XD16AWT-H0-0000-00000UCF8 |
| | | Q3 | 93.9 | 103 | 172 | 232 | | | | XD16AWT-H0-0000-00000UBF8 |

Note

- 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 26).
- Cree XLamp XD16 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 values @ 700 mA and 1.0 A are calculated and for reference only.

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## FLUX CHARACTERISTICS ($T_J$ = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| 8E | 2700 K | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG8E | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF8E | |
| | | R2 | 114 | 125 | 209 | 281 | | | XD16AWT-H0-0000-00000HE8E | |
| | | Q5 | 107 | 117 | 197 | 264 | | | | |
| | | Q4 | 100 | 109 | 184 | 247 | | | | XD16AWT-H0-0000-00000UC8E |
| | | Q3 | 93.9 | 103 | 172 | 232 | | | | XD16AWT-H0-0000-00000UB8E |
| 8G | 2700 K | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HG8G | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HF8G | |
| | | R2 | 114 | 125 | 209 | 281 | | | XD16AWT-H0-0000-00000HE8G | |
| | | Q5 | 107 | 117 | 197 | 264 | | | | |
| | | Q4 | 100 | 109 | 184 | 247 | | | | XD16AWT-H0-0000-00000UC8G |
| | | Q3 | 93.9 | 103 | 172 | 232 | | | | XD16AWT-H0-0000-00000UB8G |
| E8 | 2700K | R4 | 130 | 142 | 239 | 321 | | | XD16AWT-H0-0000-00000HGE8 | |
| | | R3 | 122 | 133 | 224 | 301 | | | XD16AWT-H0-0000-00000HFE8 | |
| | | R2 | 114 | 125 | 209 | 281 | | | XD16AWT-H0-0000-00000HEE8 | |
| | | Q5 | 107 | 117 | 197 | 264 | | | | |
| | | Q4 | 100 | 109 | 184 | 247 | | | | XD16AWT-H0-0000-00000UCE8 |
| | | Q3 | 93.9 | 103 | 172 | 232 | | | | XD16AWT-H0-0000-00000UBE8 |

Note

- 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 26).
- Cree XLamp XD16 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 values @ 700 mA and 1.0 A are calculated and for reference only.

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## FLUX CHARACTERISTICS ($T_J$ = 85 °C) - CONTINUED

| Chromaticity | | Minimum Luminous Flux (lm) @ 350 mA | | | Calculated Minimum Luminous Flux (lm) @ 85 °C** | | Order Codes | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Kit | CCT | Code | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA | 1.0 A | No Minimum CRI | 70 CRI Minimum | 80 CRI Minimum | 90 CRI Minimum |
| AG | 2200 K | Q5 | 107 | 117 | 197 | 264 | | | XD16AWT-H0-0000-00000HDAG | |
| | | Q4 | 100 | 109 | 184 | 247 | | | XD16AWT-H0-0000-00000HCAG | |
| | | Q3 | 93.9 | 103 | 172 | 232 | | | | |
| | | Q2 | 87.4 | 95 | 161 | 216 | | | | XD16AWT-H0-0000-00000UAAG |
| | | P4 | 80.6 | 88 | 148 | 199 | | | | XD16AWT-H0-0000-00000U9AG |
| EA | 2200 K | Q5 | 107 | 117 | 197 | 264 | | | XD16AWT-H0-0000-00000HDEA | |
| | | Q4 | 100 | 109 | 184 | 247 | | | XD16AWT-H0-0000-00000HCEA | |
| | | Q3 | 93.9 | 103 | 172 | 232 | | | | |
| | | Q2 | 87.4 | 95 | 161 | 216 | | | | XD16AWT-H0-0000-00000UAEA |
| | | P4 | 80.6 | 88 | 148 | 199 | | | | XD16AWT-H0-0000-00000U9EA |

Note

- 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 26).
- Cree XLamp XD16 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.

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** Flux values @ 700 mA and 1.0 A are calculated and for reference only.

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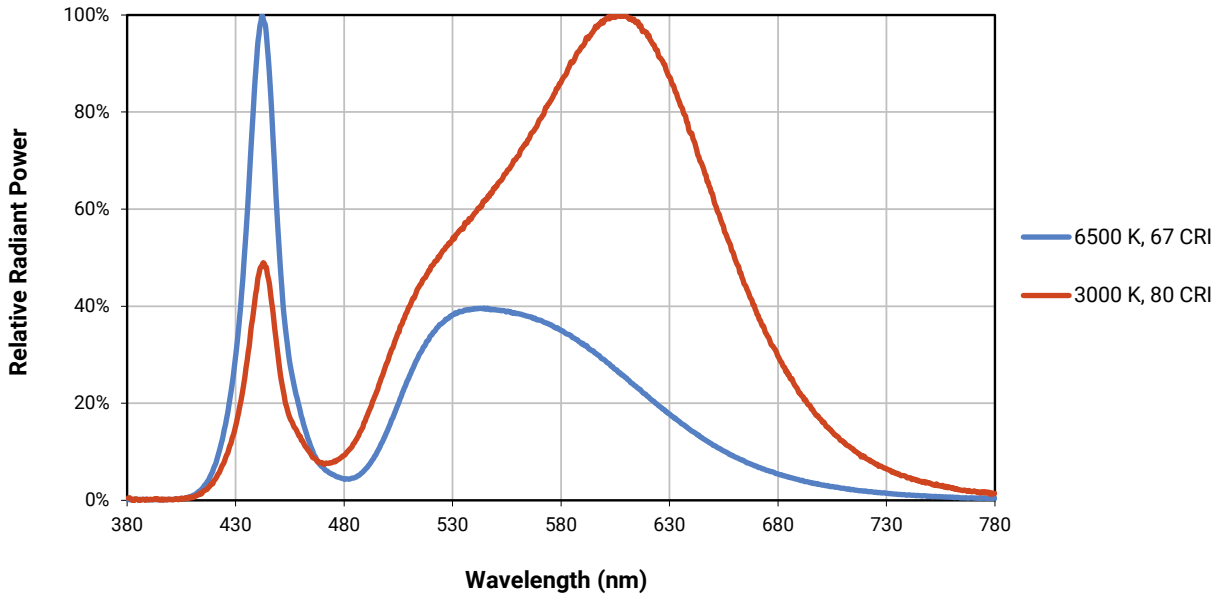
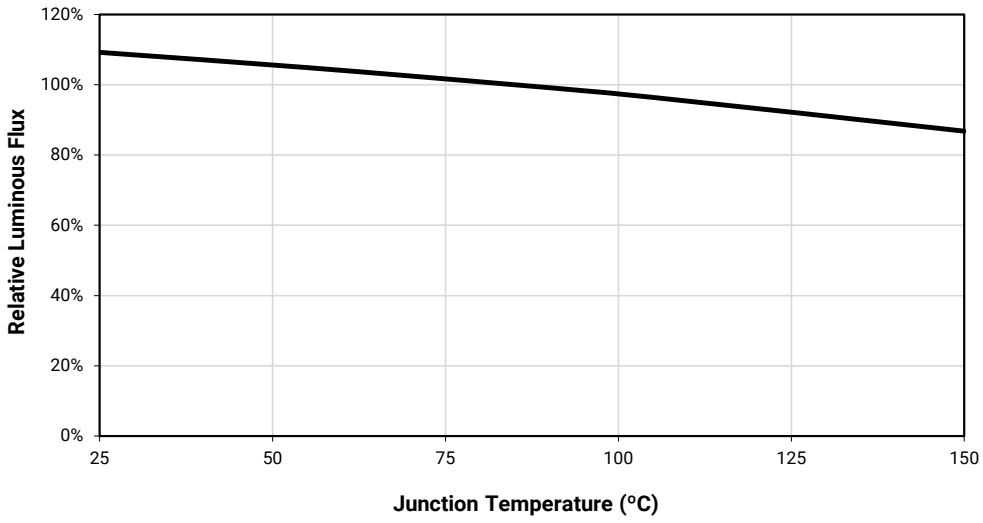
## RELATIVE SPECTRAL POWER DISTRIBUTION




## RELATIVE FLUX VS. JUNCTION TEMPERATURE ($I_F$ = 350 mA)

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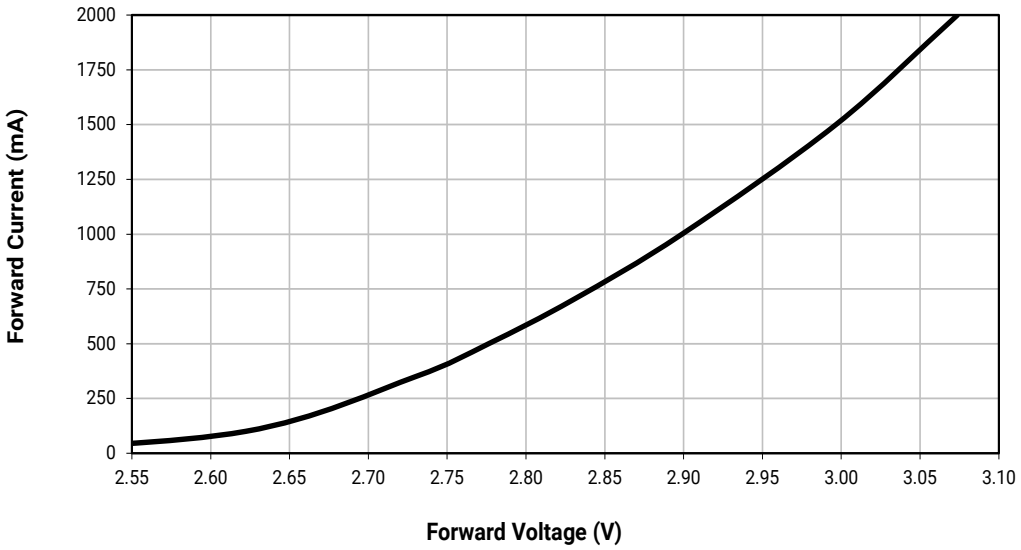
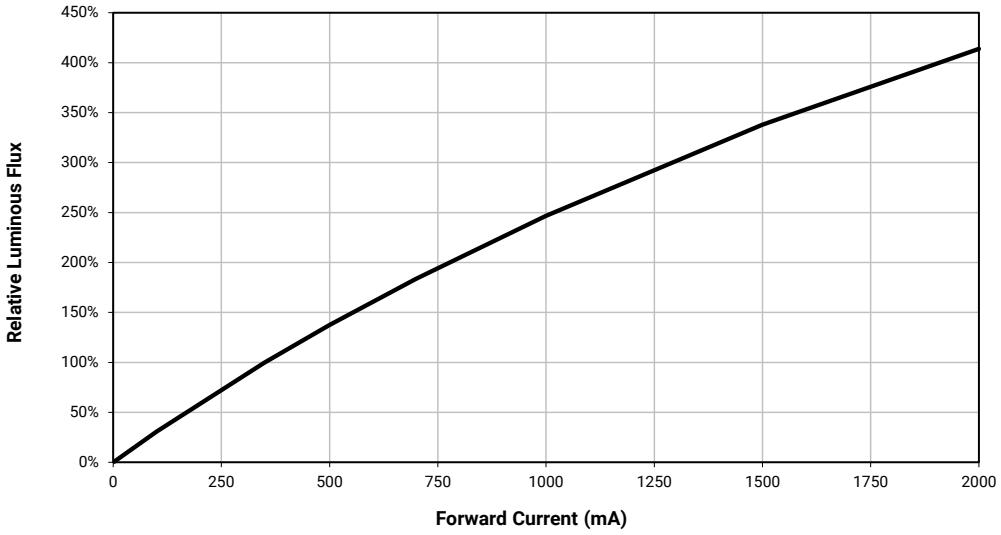
## ELECTRICAL CHARACTERISTICS ($T_J$ = 85 °C)




## RELATIVE FLUX VS. CURRENT ($T_J$ = 85 °C)

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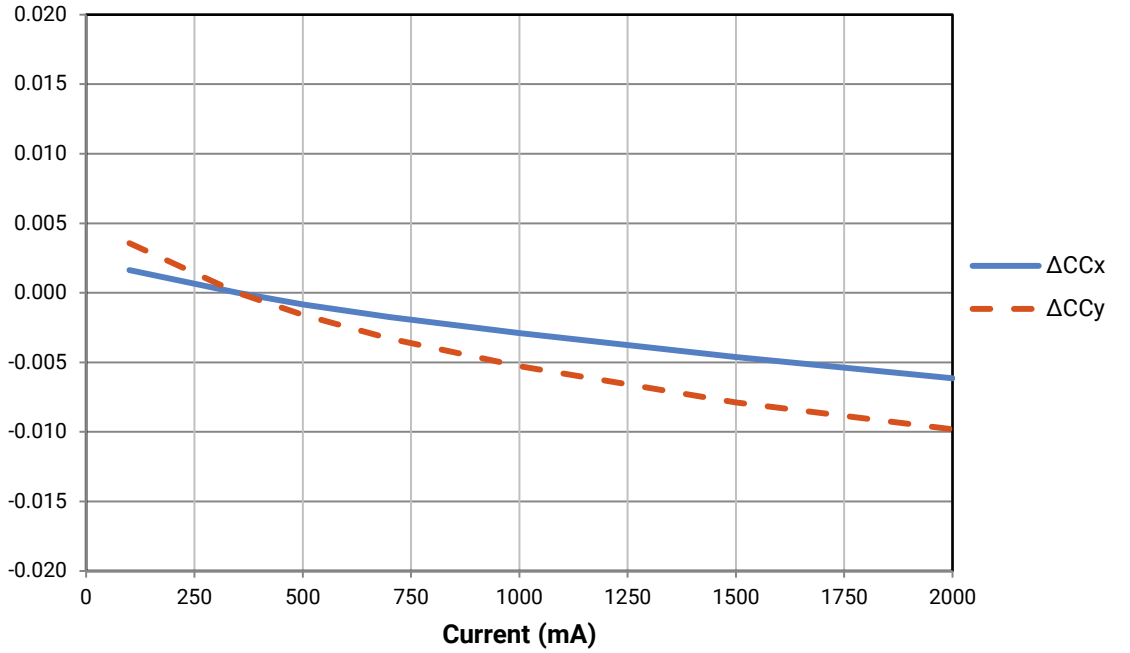
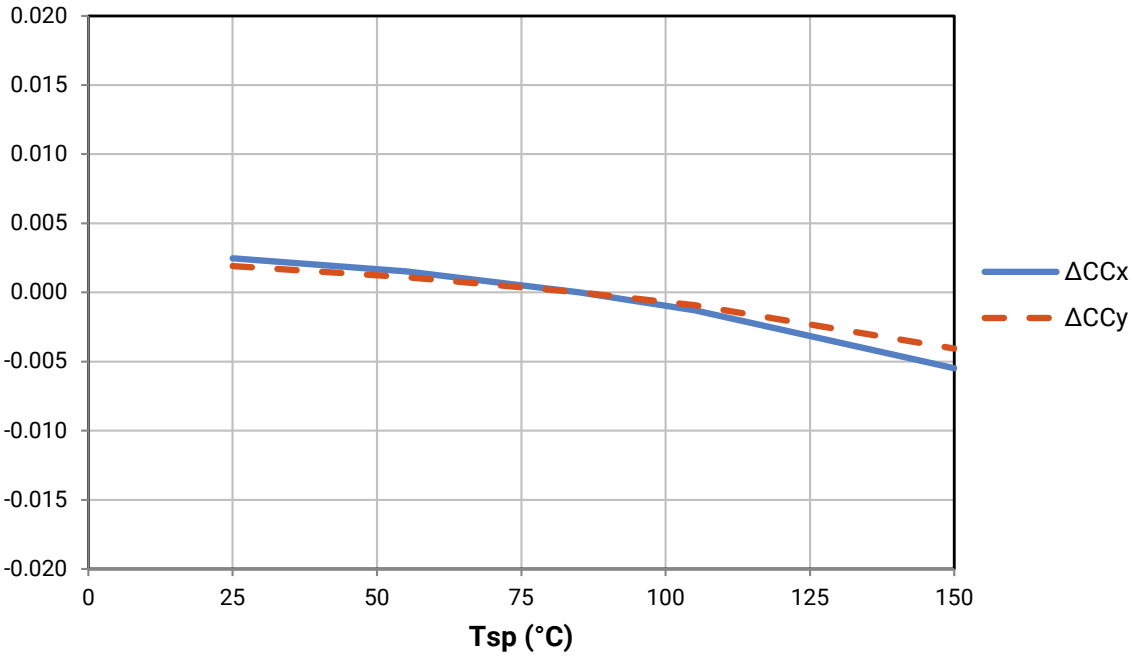
## RELATIVE CHROMATICITY VS. CURRENT AND TEMPERATURE

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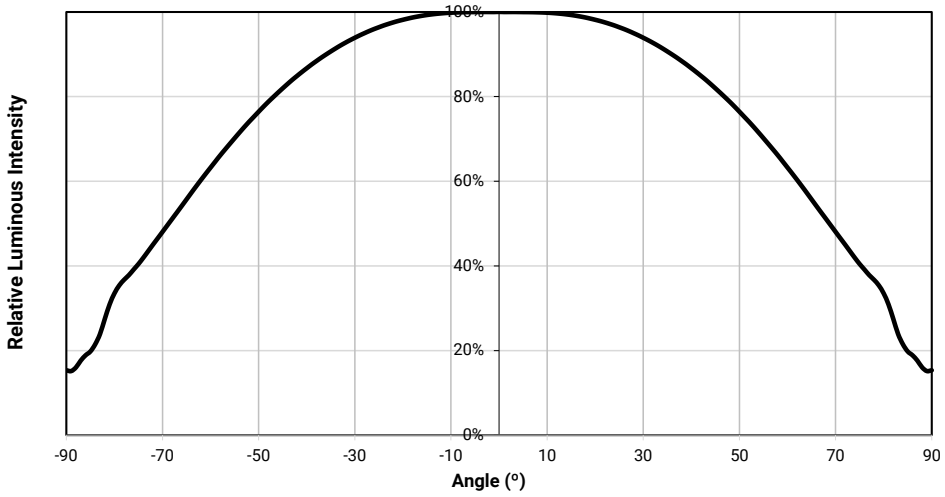
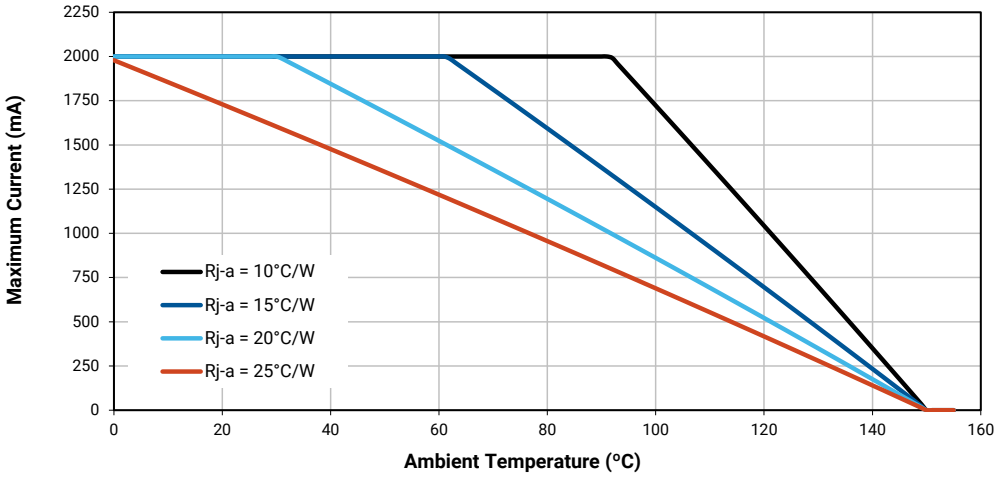
## TYPICAL SPATIAL DISTRIBUTION




## 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.

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## PERFORMANCE GROUPS - LUMINOUS FLUX ($T_J$ = 85 °C)

XLamp XD16 LEDs are tested for luminous flux and placed into one of the following luminous-flux groups. The group codes, with a zero appended, are used in the bin code "Luminous flux group." The flux groups are used in the order code "Minimum luminous flux group code."

| Group Code | Flux Group | Minimum Luminous Flux (lm) @ 350 mA | Maximum Luminous Flux (lm) @ 350 mA |
|---|---|---|---|
| P4 | 9 | 80.6 | 87.4 |
| Q2 | A | 87.4 | 93.9 |
| Q3 | B | 93.9 | 100 |
| Q4 | C | 100 | 107 |
| Q5 | D | 107 | 114 |
| R2 | E | 114 | 122 |
| R3 | F | 122 | 130 |
| R4 | G | 130 | 139 |
| R5 | H | 139 | 148 |
| S2 | J | 148 | 156 |
| S3 | K | 156 | 164 |
| S4 | L | 164 | 172 |

## PERFORMANCE GROUPS - CHROMATICITY

XLamp XD16 LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

| 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 |

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## PERFORMANCE GROUPS - CHROMATICITY (CONTINUED)

| Region | x | y | Region | x | y | Region | x | y | Region | x | y |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 3C | 0.3463 | 0.3687 | 3D | 0.3451 | 0.3554 |
| | 0.3451 | 0.3554 | | 0.3463 | 0.3687 | | 0.3551 | 0.3760 | | 0.3533 | 0.3620 |
| | 0.3440 | 0.3427 | | 0.3451 | 0.3554 | | 0.3533 | 0.3620 | | 0.3515 | 0.3487 |
| | 0.3366 | 0.3369 | | 0.3371 | 0.3490 | | 0.3451 | 0.3554 | | 0.3440 | 0.3427 |
| 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 |
| 5A | 0.3670 | 0.3578 | 5B | 0.3702 | 0.3722 | 5C | 0.3825 | 0.3798 | 5D | 0.3783 | 0.3646 |
| | 0.3702 | 0.3722 | | 0.3736 | 0.3874 | | 0.3869 | 0.3958 | | 0.3825 | 0.3798 |
| | 0.3825 | 0.3798 | | 0.3869 | 0.3958 | | 0.4006 | 0.4044 | | 0.3950 | 0.3875 |
| | 0.3783 | 0.3646 | | 0.3825 | 0.3798 | | 0.3950 | 0.3875 | | 0.3898 | 0.3716 |
| 6A | 0.3889 | 0.3690 | 6B | 0.3941 | 0.3848 | 6C | 0.4080 | 0.3916 | 6D | 0.4017 | 0.3751 |
| | 0.3941 | 0.3848 | | 0.3996 | 0.4015 | | 0.4146 | 0.4089 | | 0.4080 | 0.3916 |
| | 0.4080 | 0.3916 | | 0.4146 | 0.4089 | | 0.4299 | 0.4165 | | 0.4221 | 0.3984 |
| | 0.4017 | 0.3751 | | 0.4080 | 0.3916 | | 0.4221 | 0.3984 | | 0.4147 | 0.3814 |
| 7A | 0.4221 | 0.3985 | 7B | 0.4299 | 0.4165 | 7C | 0.4430 | 0.4212 | 7D | 0.4342 | 0.4028 |
| | 0.4342 | 0.4028 | | 0.443 | 0.4212 | | 0.4562 | 0.4260 | | 0.4465 | 0.4071 |
| | 0.426 | 0.3853 | | 0.4342 | 0.4028 | | 0.4465 | 0.4071 | | 0.4373 | 0.3893 |
| | 0.4147 | 0.3814 | | 0.4221 | 0.3985 | | 0.4342 | 0.4028 | | 0.4260 | 0.3853 |
| 8A | 0.4465 | 0.4071 | 8B | 0.4562 | 0.4260 | 8C | 0.4687 | 0.4289 | 8D | 0.4582 | 0.4099 |
| | 0.4582 | 0.4099 | | 0.4687 | 0.4289 | | 0.4813 | 0.4319 | | 0.4700 | 0.4126 |
| | 0.4483 | 0.3918 | | 0.4582 | 0.4099 | | 0.4700 | 0.4126 | | 0.4593 | 0.3944 |
| | 0.4373 | 0.3893 | | 0.4465 | 0.4071 | | 0.4582 | 0.4099 | | 0.4483 | 0.3918 |

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## PERFORMANCE GROUPS - CHROMATICITY (CONTINUED)

| EasyWhite Color Temperatures – 3-Step Ellipse | | | | | | |
|---|---|---|---|---|---|---|
| Bin Code | CCT | Center Point | | Major Axis | Minor Axis | Rotation Angle (°) |
| | | x | y | a | b | |
| 5G | 4000 K | 0.3818 | 0.3797 | 0.0094 | 0.0040 | 53.72 |
| 6G | 3500 K | 0.4073 | 0.3917 | 0.0093 | 0.0041 | 53.22 |
| 7G | 3000 K | 0.4338 | 0.4030 | 0.0083 | 0.0041 | 53.20 |
| 8G | 2700 K | 0.4578 | 0.4101 | 0.0081 | 0.0042 | 53.70 |
| AG | 2200 K | 0.5066 | 0.4158 | 0.0098 | 0.0048 | 45.50 |

| EasyWhite Color Temperatures – 5-Step Ellipse | | | | | | |
|---|---|---|---|---|---|---|
| Bin Code | CCT | Center Point | | Major Axis | Minor Axis | Rotation Angle (°) |
| | | x | y | a | b | |
| 2E | 5700 K | 0.3287 | 0.3417 | 0.01230 | 0.00600 | 72.0 |
| 3E | 5000 K | 0.3447 | 0.3553 | 0.01400 | 0.00520 | 65.0 |
| 4E | 4500 K | 0.3611 | 0.3658 | 0.01420 | 0.00550 | 61.5 |
| 5E | 4000 K | 0.3818 | 0.3797 | 0.01565 | 0.00670 | 53.7 |
| 6E | 3500 K | 0.4073 | 0.3917 | 0.01545 | 0.00690 | 54.0 |
| 7E | 3000 K | 0.4338 | 0.4030 | 0.01390 | 0.00680 | 53.2 |
| 8E | 2700 K | 0.4577 | 0.4099 | 0.01350 | 0.00700 | 48.5 |

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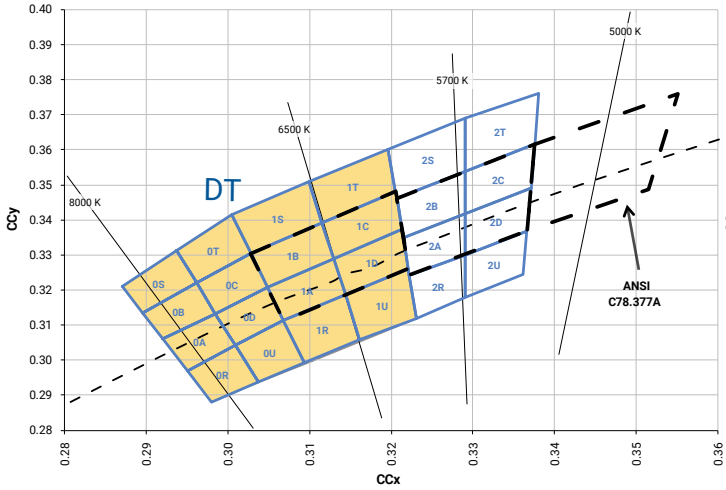
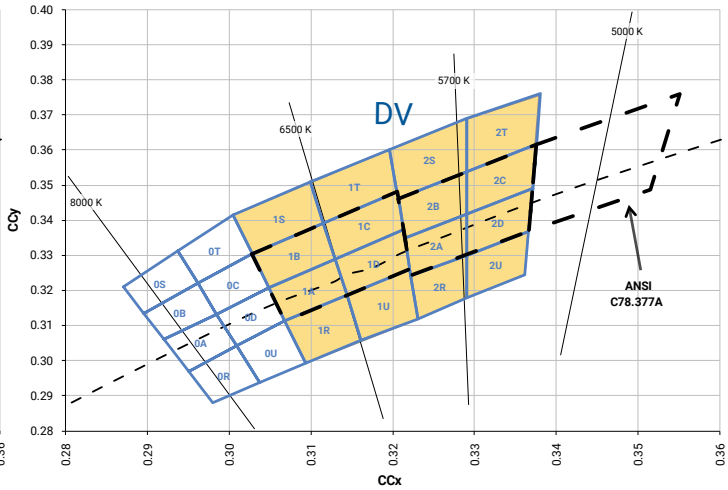
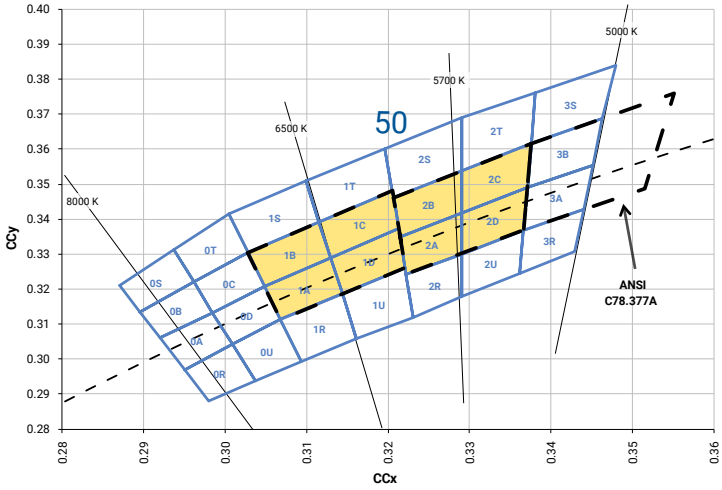
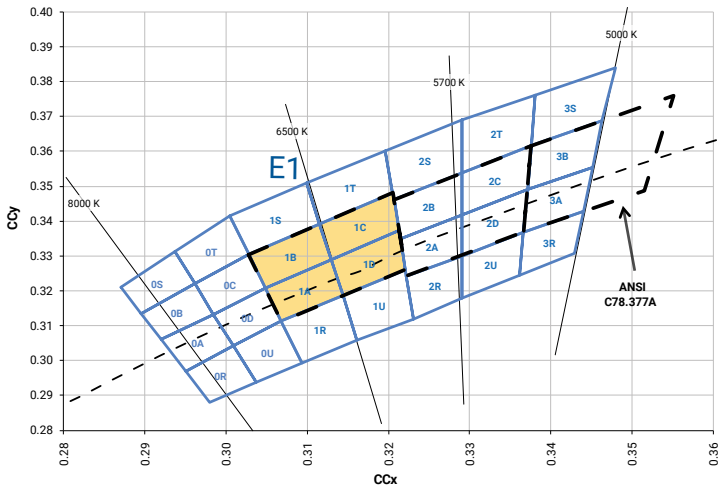
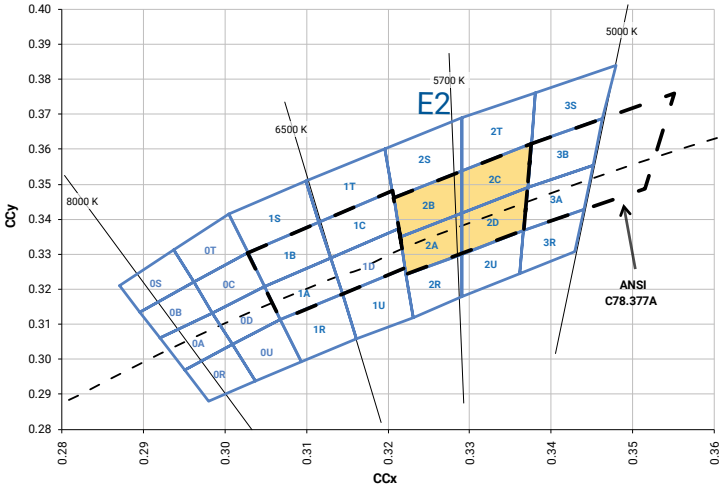
## CREE'S COOL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS

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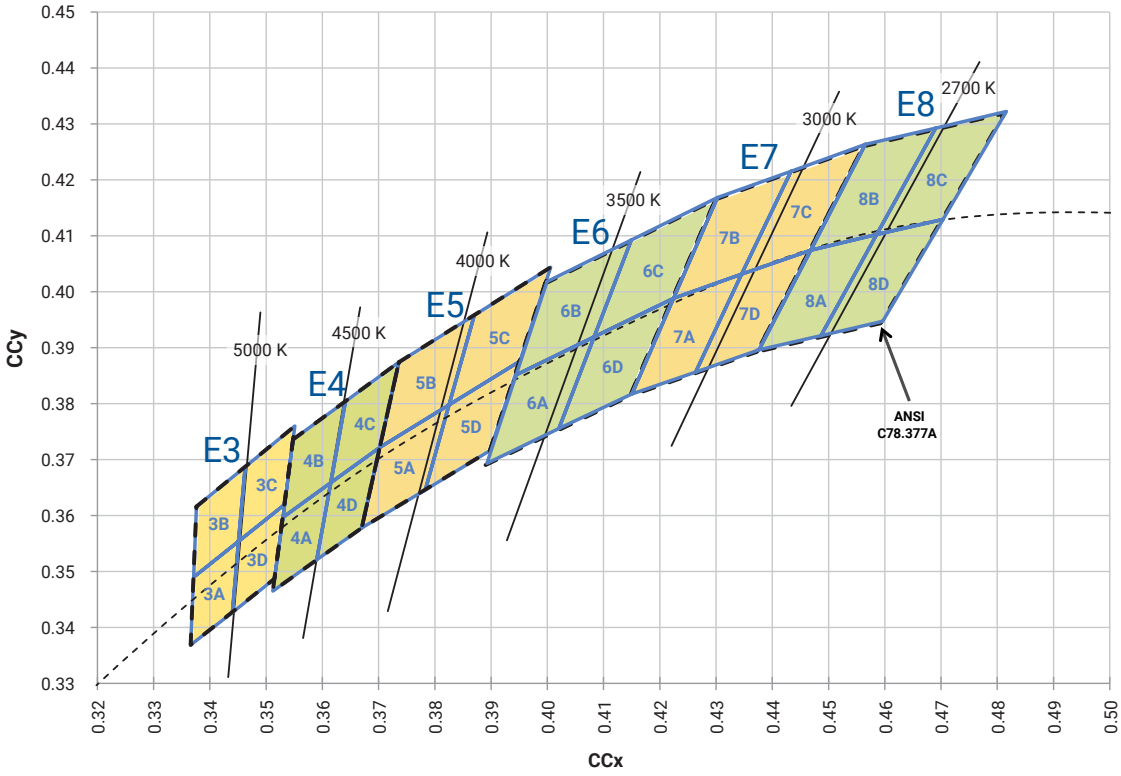
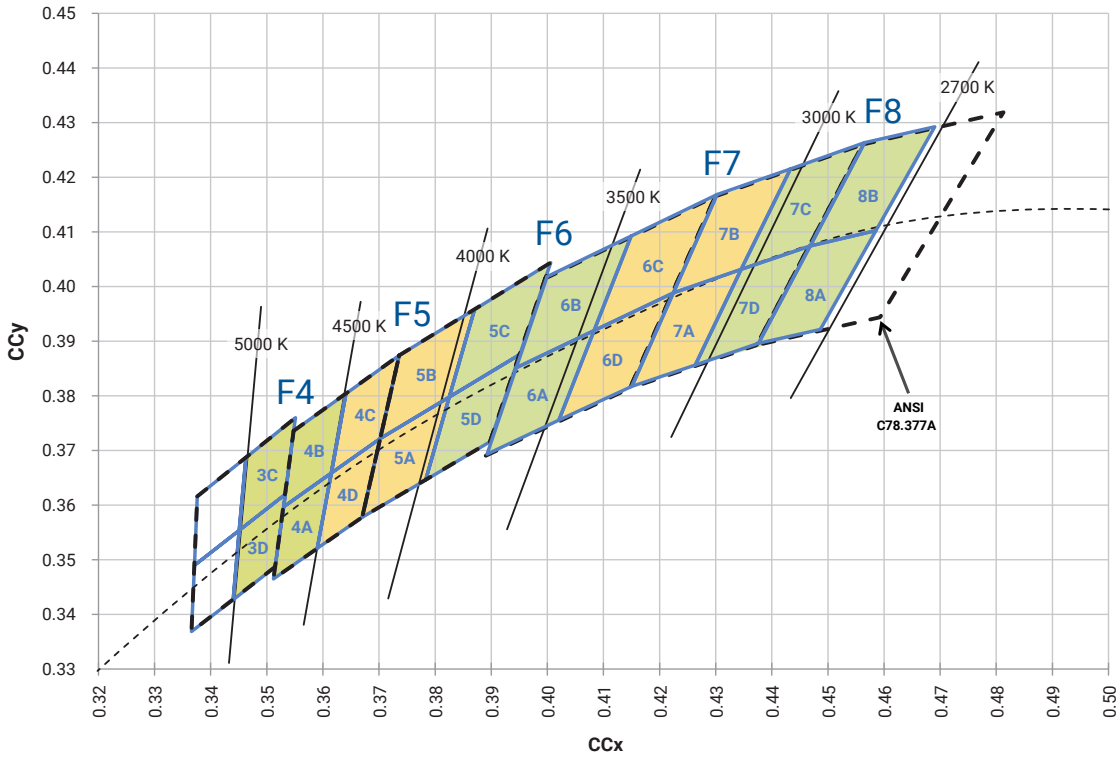
## CREE'S WARM AND NEUTRAL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS

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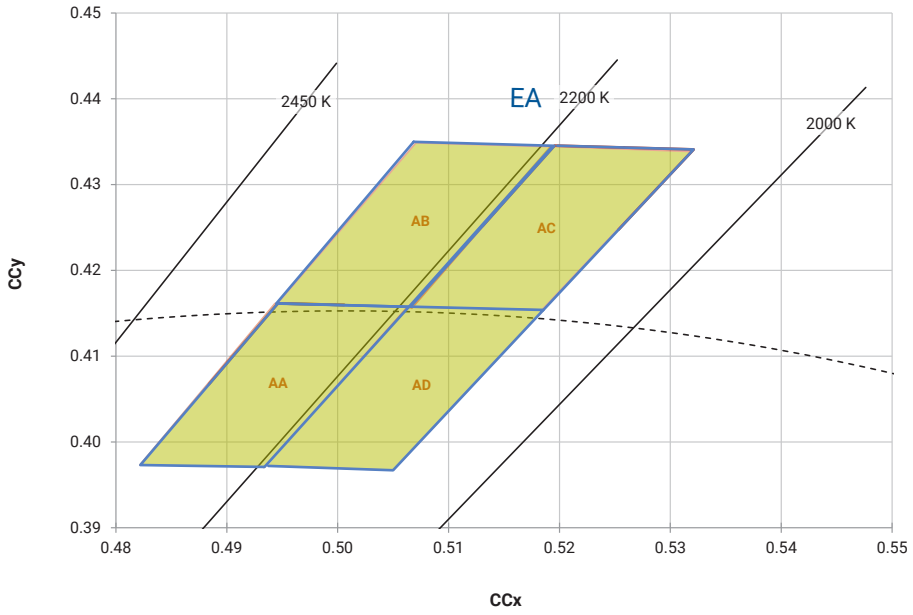
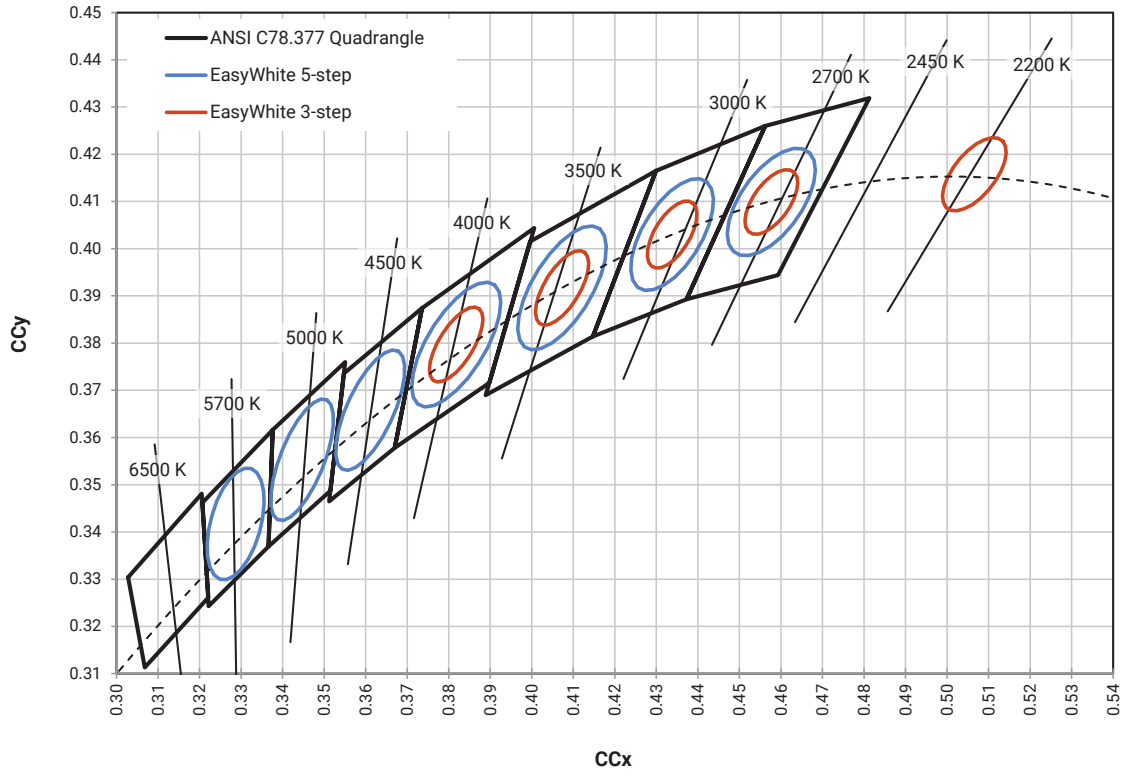
## CREE'S WARM WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS




## CREE'S EASYWHITE® WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS

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## CREE'S STANDARD CHROMATICITY KITS

The following table provides the chromaticity bins associated with chromaticity kits for XD16 LEDs.

| Color | CCT | Kit | Chromaticity Bins |
|---|---|---|---|
| Cool White | 7000 K | DT | 0A, 0B, 0C, 0D, 0R, 0S, 0T, 0U, 1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U |
| | 6500 K | E1 | 1A, 1B, 1C, 1D |
| | 6200 K | 50 | 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D |
| | 6000 K | DV | 1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U, 2A, 2B, 2C, 2D, 2R, 2S, 2T, 2U |
| | 5700 K | E2 | 2A, 2B, 2C, 2D |
| | 5700 K | 2E | 57E |
| Neutral White | 5000 K | 3E | 50E |
| | 5000 K | E3 | 3A, 3B, 3C, 3D |
| | 4750 K | F4 | 3C, 3D, 4A, 4B |
| | 4500 K | 4E | 45E |
| | 4500 K | E4 | 4A, 4B, 4C, 4D |
| | 4250 K | F5 | 4C, 4D, 5A, 5B |
| | 4000 K | 5E | 40E, 40G |
| | 4000 K | 5G | 40G |
| | 4000 K | E5 | 5A 5B, 5C, 5D |
| Warm White | 3750 K | F6 | 5C, 5D, 6A, 6B |
| | 3500 K | 6E | 35E, 35G |
| | 3500 K | 6G | 35G |
| | 3500 K | E6 | 6A, 6B, 6C, 6D |
| | 3250 K | F7 | 6C, 6D, 7A, 7B |
| | 3000 K | 7E | 30E, 30G |
| | 3000 K | 7G | 30G |
| | 3000 K | E7 | 7A, 7B, 7C, 7D |
| | 2850 K | F8 | 7C, 7D, 8A, 8B |
| | 2700 K | 8E | 27E, 27G |
| | 2700 K | 8G | 27G |
| | 2700 K | E8 | 8A, 8B, 8C, 8D |
| | 2200 K | AG | 22G |
| | 2200 K | EA | AA, AB, AC, AD |

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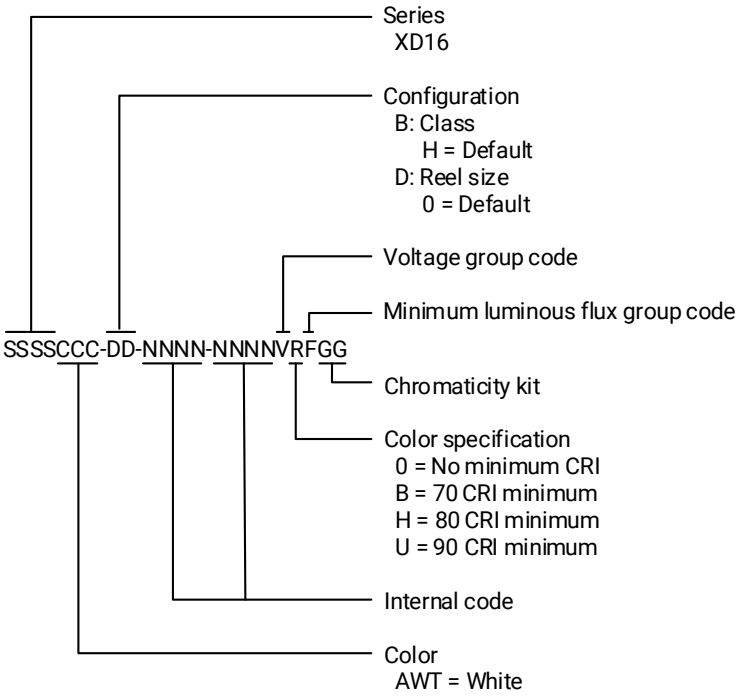
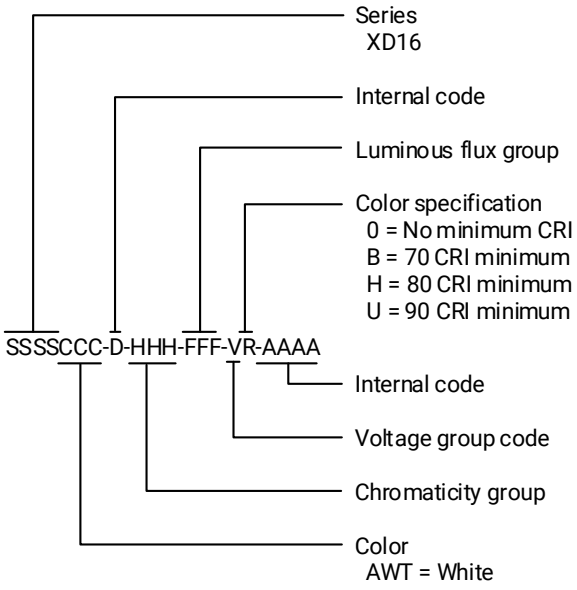
## BIN AND ORDER CODE FORMATS

Bin codes and order codes for XD16 LEDs are configured in the following manner:

**Order Code**




**Bin Code**

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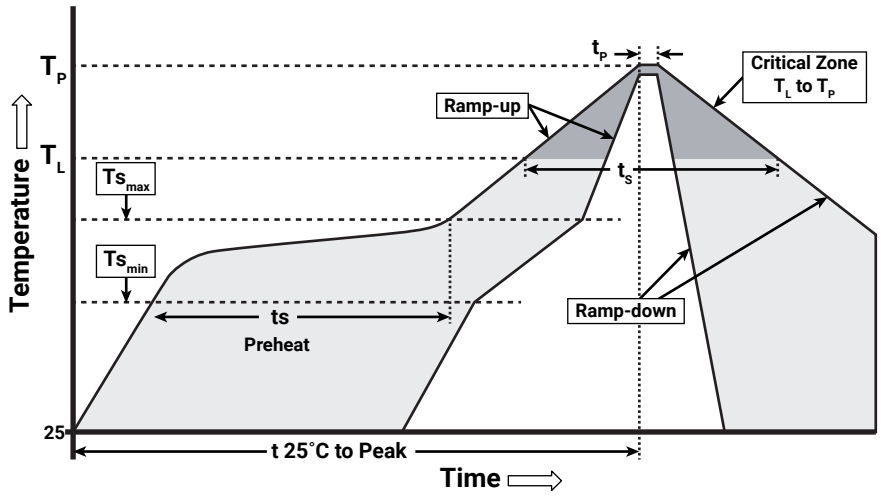
## REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XD16 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 ($Ts_{max}$ to Tp) | 1.2 °C/second |
| Preheat: Temperature Min ($Ts_{min}$) | 120 °C |
| Preheat: Temperature Max ($Ts_{max}$) | 170 °C |
| Preheat: Time ($Ts_{min}$ to $Ts_{max}$) | 65-150 seconds |
| Time Maintained Above: Temperature ($T_L$) | 217 °C |
| Time Maintained Above: Time ($t_L$) | 45-90 seconds |
| Peak/Classification Temperature (Tp) | 235 - 245 °C |
| Time Within 5 °C of Actual Peak Temperature (tp) | 20-40 seconds |
| Ramp-Down Rate | 1 - 6 °C/second |
| Time 25 °C to Peak Temperature | 4 minutes max. |

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

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## 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. Cree did not perform Room Temperature Operating Life (RTOL) testing on the XD16 LED.

### 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 XD16 LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of ≤ 30 ºC/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 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 SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

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## 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 not been investigated as a fire enclosure or 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.

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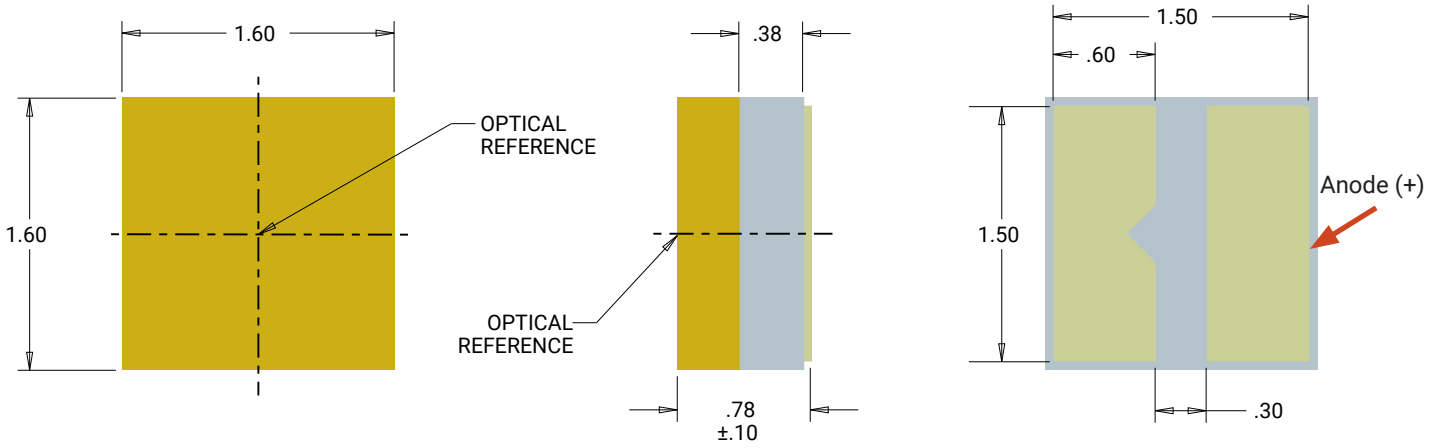
## MECHANICAL DIMENSIONS

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

All dimensions in mm.

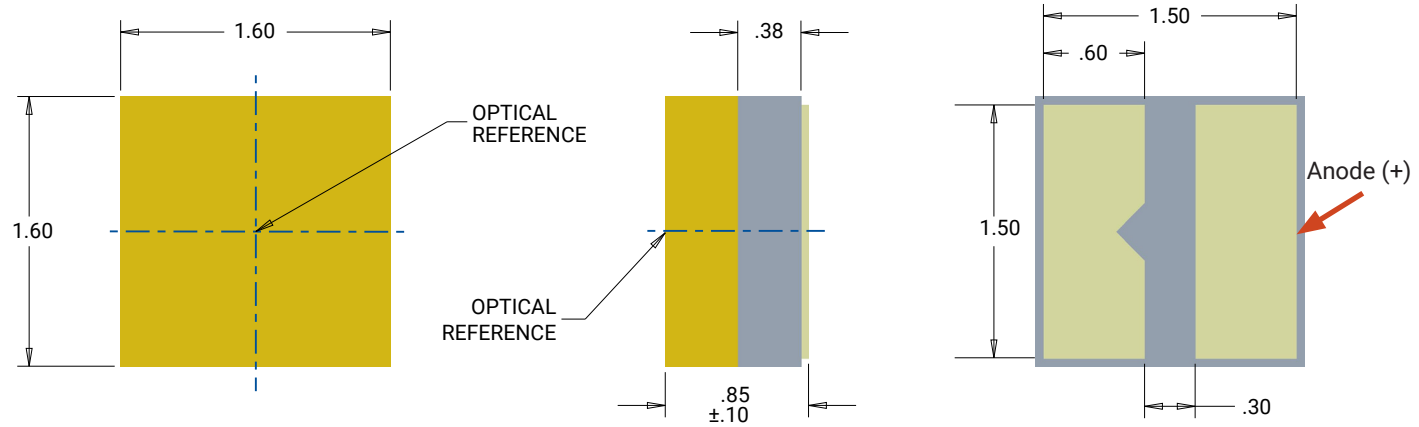
Measurement tolerances unless indicated otherwise: ±.13 mm

### XD16 7000 K–2700 K




**Top View** **Side View** **Bottom View**

### XD16 2200 K




**Top View** **Side View** **Bottom View**

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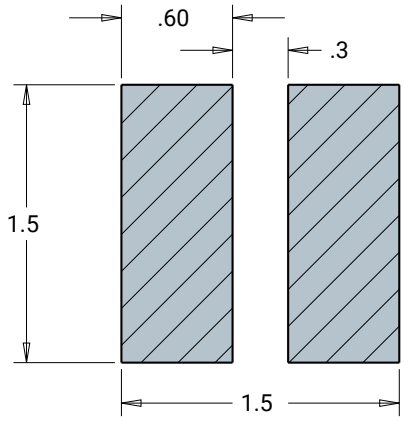
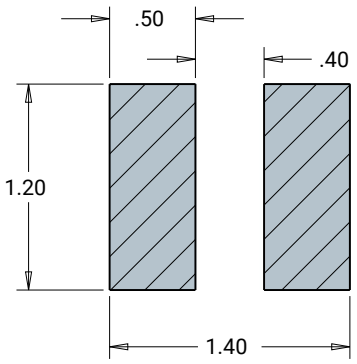
## MECHANICAL DIMENSIONS - CONTINUED

### XD16 7000 K—2200 K




**Recommended PC Board Solder Pad**




**Recommended Stencil Pattern**

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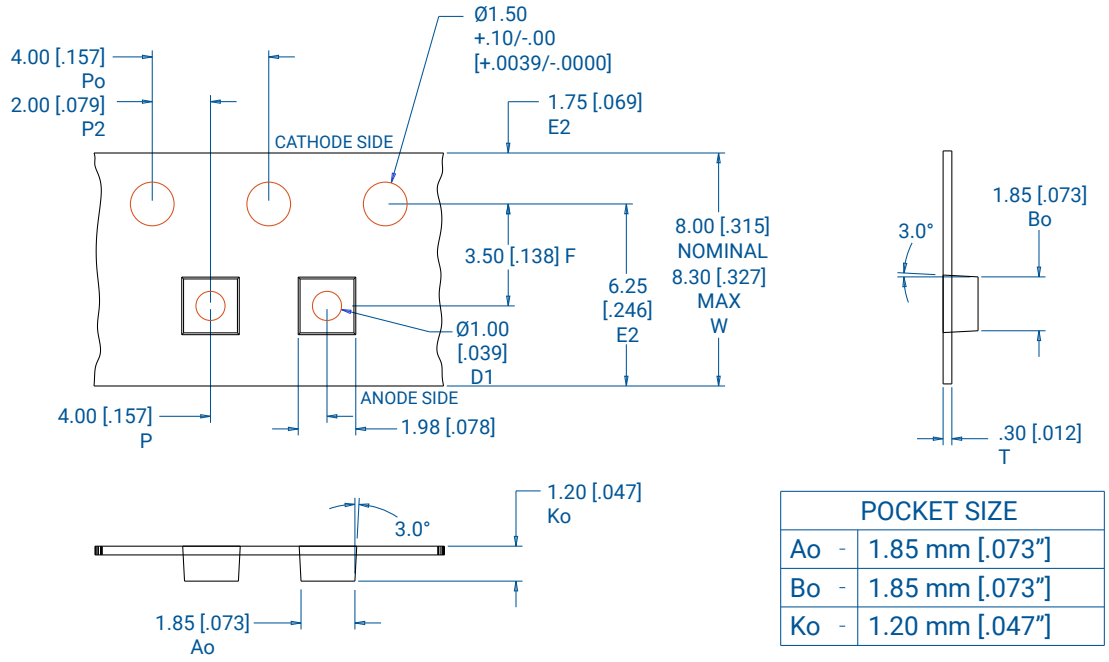
## TAPE AND REEL

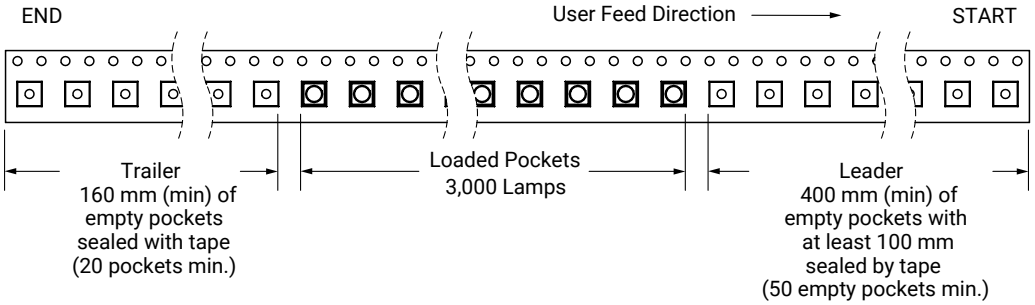
All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

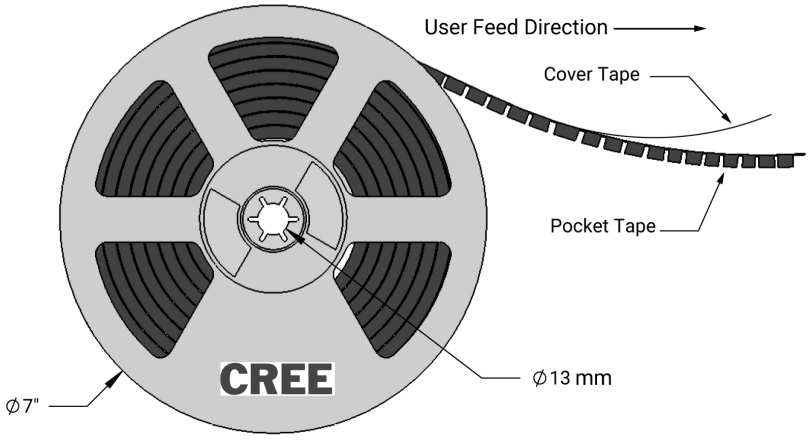
Except as noted, all dimensions in mm [in].

Measurement tolerances unless indicated otherwise: .xx = ±.10 mm




| POCKET SIZE | |
|---|---|
| Ao - | 1.85 mm [.073"] |
| Bo - | 1.85 mm [.073"] |
| Ko - | 1.20 mm [.047"] |

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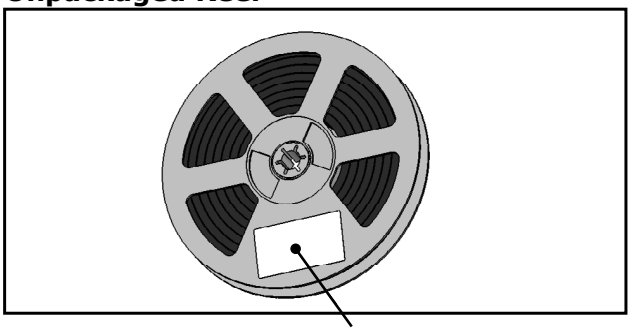
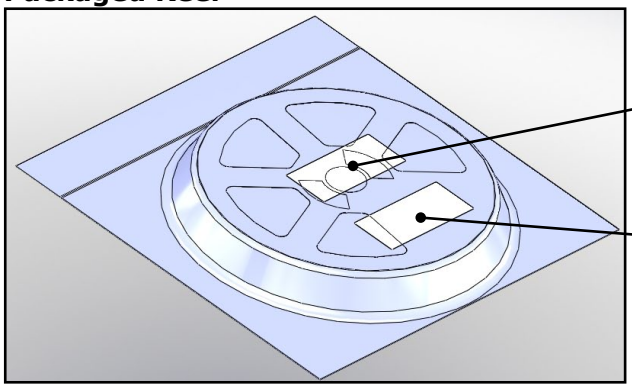
## PACKAGING

The diagrams below show the packaging and labels Cree uses to ship XLamp XD16 LEDs. XLamp XD16 LEDs are shipped in tape loaded on a reel. Each box contains only one reel in a moisture barrier bag.

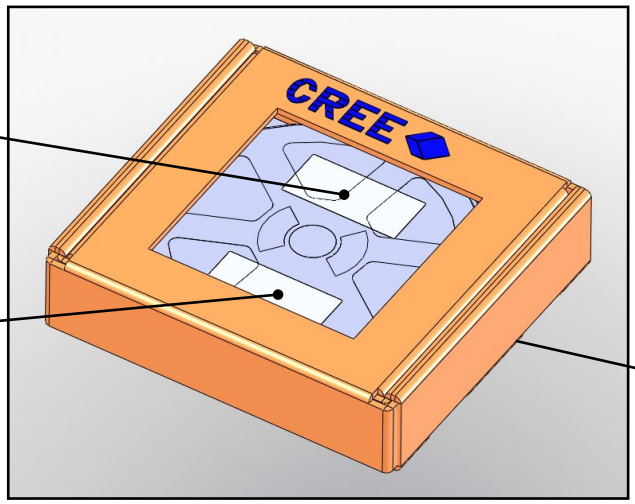
**Unpackaged Reel**




**Packaged Reel**




**Boxed Reel**

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LifeElectronics
Живое партнерство

**ООО «ЛайфЭлектроникс»** **“LifeElectronics” LLC**

*ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703*

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*С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров*

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- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
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*Конструкторский отдел помогает осуществить:*

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- *Техническую поддержку проекта.*
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