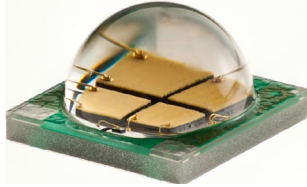


# Cree® XLamp® XM-L EasyWhite® LEDs



## PRODUCT DESCRIPTION

The XLamp® XM-L EasyWhite® (EZW) LED eliminates chromaticity binning, and enables luminaire and bulb manufacturers to deliver the consistent color and high efficacy light output of a multi-die LED in the compact XM-L footprint. XLamp XM-L EasyWhite LEDs can reduce LED-to-LED color variation to within a 2-step MacAdam ellipse, 94% smaller than the total area of the corresponding ANSI C78.377 color region.

The XLamp XM-L EasyWhite LED is the perfect choice for lighting applications where moderate to high luminous flux output is required from a single, small point source. Example applications include: LED retrofit bulbs, commercial/retail display spotlights, and other indoor general-illumination applications.

## FEATURES

- Available in 4-step and 2-step EasyWhite bins at 2700 K, 3000 K, 3500 K, 4000 K, 5000 K CCT
- Wide range of operating current – up to 2 A @ 6 V
- 85 °C binning and characterization
- Available in 6-V and 12-V versions
- Low thermal resistance: 2.5 °C/W
- Wide viewing angle: 115°
- Wide variety of CRI choices: standard CRI as well as 80-, 85-, 90-minimum CRI
- Electrically neutral thermal path
- 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    |         | 2.5     |         |
| Viewing angle (FWHM)                         | degrees |         | 115     |         |
| Temperature coefficient of voltage (6 V)     | mV/°C   |         | -6.0    |         |
| Temperature coefficient of voltage (12 V)    | mV/°C   |         | -12.0   |         |
| ESD withstand voltage (HBM per Mil-Std-883D) | V       |         |         | 8000    |
| DC forward current (6 V)                     | mA      |         |         | 2000    |
| DC forward current (12 V)                    | mA      |         |         | 1000    |
| Reverse current (6 V, 12 V)                  | mA      |         |         | -0.1    |
| Forward voltage (@ 700 mA, 85 °C, 6 V)       | V       |         | 5.7     | 7.0     |
| Forward voltage (@ 350 mA, 85 °C, 12 V)      | V       |         | 11.5    | 14.0    |
| LED junction temperature                     | °C      |         |         | 150     |

## FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 6-VOLT XM-L EZW (700 mA, T<sub>j</sub> = 85 °C)

The following table provides the order codes for 6-Volt XLamp XM-L EZW LEDs.

| Color                  | CCT Range | Minimum Luminous Flux @ 700 mA |                   |                    | 2-Step              |                          | 4-Step              |                          |
|------------------------|-----------|--------------------------------|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
|                        |           | Group                          | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | Order Code               | Chromaticity Region | Order Code               |
| Standard CRI EasyWhite | 5000 K    | U4                             | 340               | 404                | 50H                 | XMLEZW-00-0000-0B00U450H | 50F                 | XMLEZW-00-0000-0B00U450F |
|                        |           | U5                             | 360               | 427                |                     | XMLEZW-00-0000-0B00U550H |                     | XMLEZW-00-0000-0B00U550F |
|                        |           | U6                             | 380               | 451                |                     | XMLEZW-00-0000-0B00U650H |                     | XMLEZW-00-0000-0B00U650F |
|                        |           | V2                             | 400               | 475                |                     | XMLEZW-00-0000-0B00V250H |                     | XMLEZW-00-0000-0B00V250F |
|                        | 4000 K    | U2                             | 300               | 356                | 40H                 | XMLEZW-00-0000-0B00U240H | 40F                 | XMLEZW-00-0000-0B00U240F |
|                        |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0B00U340H |                     | XMLEZW-00-0000-0B00U340F |
|                        |           | U4                             | 340               | 404                |                     | XMLEZW-00-0000-0B00U440H |                     | XMLEZW-00-0000-0B00U440F |
|                        | 3500 K    | T6                             | 280               | 332                | 35H                 | XMLEZW-00-0000-0B00T635H | 35F                 | XMLEZW-00-0000-0B00T635F |
|                        |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0B00U235H |                     | XMLEZW-00-0000-0B00U235F |
|                        |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0B00U335H |                     | XMLEZW-00-0000-0B00U335F |
|                        | 3000 K    | T5                             | 260               | 309                | 30H                 | XMLEZW-00-0000-0B00T530H | 30F                 | XMLEZW-00-0000-0B00T530F |
|                        |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0B00T630H |                     | XMLEZW-00-0000-0B00T630F |
|                        |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0B00U230H |                     | XMLEZW-00-0000-0B00U230F |
|                        |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0B00U330H |                     | XMLEZW-00-0000-0B00U330F |
|                        | 2700 K    | T4                             | 240               | 285                | 27H                 | XMLEZW-00-0000-0B00T427H | 27F                 | XMLEZW-00-0000-0B00T427F |
|                        |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0B00T527H |                     | XMLEZW-00-0000-0B00T527F |
|                        |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0B00T627H |                     | XMLEZW-00-0000-0B00T627F |
|                        |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0B00U227H |                     | XMLEZW-00-0000-0B00U227F |

### Notes

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 18).
- For Standard CRI parts, typical CRI is 80 for 4000 – 3500 K CCT parts and 82 for 3000 – 2700 K CCT parts.
- \* Flux values @ 25 °C are calculated and for reference only.

# FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 6-VOLT XM-L EZW (700 mA, T<sub>j</sub> = 85 °C) - CONTINUED

| Color                    | CCT Range | Minimum Luminous Flux @ 700 mA |                   |                    | 2-Step              |                          | 4-Step              |                          |
|--------------------------|-----------|--------------------------------|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
|                          |           | Group                          | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | Order Code               | Chromaticity Region | Order Code               |
| 80-CRI Minimum EasyWhite | 4000 K    | T6                             | 280               | 332                | 40H                 | XMLEZW-00-0000-0B0HT640H | 40F                 | XMLEZW-00-0000-0B0HT640F |
|                          |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0B0HU240H |                     | XMLEZW-00-0000-0B0HU240F |
|                          |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0B0HU340H |                     | XMLEZW-00-0000-0B0HU340F |
|                          |           | U4                             | 340               | 404                |                     | XMLEZW-00-0000-0B0HU440H |                     | XMLEZW-00-0000-0B0HU440F |
|                          | 3500 K    | T5                             | 260               | 309                | 35H                 | XMLEZW-00-0000-0B0HT535H | 35F                 | XMLEZW-00-0000-0B0HT535F |
|                          |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0B0HT635H |                     | XMLEZW-00-0000-0B0HT635F |
|                          |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0B0HU235H |                     | XMLEZW-00-0000-0B0HU235F |
|                          |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0B0HU335H |                     | XMLEZW-00-0000-0B0HU335F |
|                          | 3000 K    | T5                             | 260               | 309                | 30H                 | XMLEZW-00-0000-0B0HT530H | 30F                 | XMLEZW-00-0000-0B0HT530F |
|                          |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0B0HT630H |                     | XMLEZW-00-0000-0B0HT630F |
|                          |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0B0HU230H |                     | XMLEZW-00-0000-0B0HU230F |
|                          |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0B0HU330H |                     | XMLEZW-00-0000-0B0HU330F |
|                          | 2700 K    | T4                             | 240               | 285                | 27H                 | XMLEZW-00-0000-0B0HT427H | 27F                 | XMLEZW-00-0000-0B0HT427F |
|                          |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0B0HT527H |                     | XMLEZW-00-0000-0B0HT527F |
|                          |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0B0HT627H |                     | XMLEZW-00-0000-0B0HT627F |
|                          |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0B0HU227H |                     | XMLEZW-00-0000-0B0HU227F |
| 85-CRI Minimum EasyWhite | 3000 K    | T3                             | 220               | 261                | 30H                 | XMLEZW-00-0000-0B0PT330H | 30F                 | XMLEZW-00-0000-0B0PT330F |
|                          |           | T4                             | 240               | 285                |                     | XMLEZW-00-0000-0B0PT430H |                     | XMLEZW-00-0000-0B0PT430F |
|                          |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0B0PT530H |                     | XMLEZW-00-0000-0B0PT530F |
|                          |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0B0PT630H |                     | XMLEZW-00-0000-0B0PT630F |
|                          | 2700 K    | T2                             | 200               | 237                | 27H                 | XMLEZW-00-0000-0B0PT227H | 27F                 | XMLEZW-00-0000-0B0PT227F |
|                          |           | T3                             | 220               | 261                |                     | XMLEZW-00-0000-0B0PT327H |                     | XMLEZW-00-0000-0B0PT327F |
|                          |           | T4                             | 240               | 285                |                     | XMLEZW-00-0000-0B0PT427H |                     | XMLEZW-00-0000-0B0PT427F |
|                          |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0B0PT527H |                     | XMLEZW-00-0000-0B0PT527F |

## Notes

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 18).
- For Standard CRI parts, typical CRI is 80 for 4000 – 3500 K CCT parts and 82 for 3000 – 2700 K CCT parts.
- \* Flux values @ 25 °C are calculated and for reference only.

**FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 6-VOLT XM-L EZW (700 mA, T<sub>j</sub> = 85 °C) - CONTINUED**

| Color                    | CCT Range | Minimum Luminous Flux @ 700 mA |                   |                    | 2-Step              |                          | 4-Step              |                          |
|--------------------------|-----------|--------------------------------|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
|                          |           | Group                          | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | Order Code               | Chromaticity Region | Order Code               |
| 90-CRI Minimum EasyWhite | 3000 K    | T2                             | 200               | 237                | 30H                 | XMLEZW-00-0000-0B0UT230H | 30F                 | XMLEZW-00-0000-0B0UT230F |
|                          |           | T3                             | 220               | 261                |                     | XMLEZW-00-0000-0B0UT330H |                     | XMLEZW-00-0000-0B0UT330F |
|                          |           | T4                             | 240               | 285                |                     | XMLEZW-00-0000-0B0UT430H |                     | XMLEZW-00-0000-0B0UT430F |
|                          |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0B0UT530H |                     | XMLEZW-00-0000-0B0UT530F |
|                          | 2700 K    | S6                             | 180               | 214                | 27H                 | XMLEZW-00-0000-0B0US627H | 27F                 | XMLEZW-00-0000-0B0US627F |
|                          |           | T2                             | 200               | 237                |                     | XMLEZW-00-0000-0B0UT227H |                     | XMLEZW-00-0000-0B0UT227F |
|                          |           | T3                             | 220               | 261                |                     | XMLEZW-00-0000-0B0UT327H |                     | XMLEZW-00-0000-0B0UT327F |
|                          |           | T4                             | 240               | 285                |                     | XMLEZW-00-0000-0B0UT427H |                     | XMLEZW-00-0000-0B0UT427F |

| Color      | CCT Range | Minimum Luminous Flux @ 700 mA |                   |                    | Chromaticity Regions | Order Code               |
|------------|-----------|--------------------------------|-------------------|--------------------|----------------------|--------------------------|
|            |           | Group                          | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* |                      |                          |
| ANSI White | 5000 K    | U4                             | 340               | 404                | 0E3                  | XMLEZW-00-0000-0B00U40E3 |
|            |           | U5                             | 360               | 427                |                      | XMLEZW-00-0000-0B00U50E3 |
|            |           | U6                             | 380               | 451                |                      | XMLEZW-00-0000-0B00U60E3 |
|            |           | V2                             | 400               | 475                |                      | XMLEZW-00-0000-0B00V20E3 |

**Notes**

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 18).
- For Standard CRI parts, typical CRI is 80 for 4000 – 3500 K CCT parts and 82 for 3000 – 2700 K CCT parts.
- \* Flux values @ 25 °C are calculated and for reference only.

**FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 12-VOLT XM-L EZW (350 mA, T<sub>j</sub> = 85 °C)**

The following table provides the order codes for 12-Volt XLamp XM-L EZW LEDs.

| Color                  | CCT Range | Minimum Luminous Flux @ 350 mA |                   |                    | 2-Step              |                          | 4-Step              |                          |
|------------------------|-----------|--------------------------------|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
|                        |           | Group                          | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | Order Code               | Chromaticity Region | Order Code               |
| Standard CRI EasyWhite | 5000 K    | U4                             | 340               | 404                | 50H                 | XMLEZW-00-0000-0D00U450H | 50F                 | XMLEZW-00-0000-0D00U450F |
|                        |           | U5                             | 360               | 427                |                     | XMLEZW-00-0000-0D00U550H |                     | XMLEZW-00-0000-0D00U550F |
|                        |           | U6                             | 380               | 451                |                     | XMLEZW-00-0000-0D00U650H |                     | XMLEZW-00-0000-0D00U650F |
|                        |           | V2                             | 400               | 475                |                     | XMLEZW-00-0000-0D00V250H |                     | XMLEZW-00-0000-0D00V250F |
|                        | 4000 K    | U2                             | 300               | 356                | 40H                 | XMLEZW-00-0000-0D00U240H | 40F                 | XMLEZW-00-0000-0D00U240F |
|                        |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0D00U340H |                     | XMLEZW-00-0000-0D00U340F |
|                        |           | U4                             | 340               | 404                |                     | XMLEZW-00-0000-0D00U440H |                     | XMLEZW-00-0000-0D00U440F |
|                        | 3500 K    | T6                             | 280               | 332                | 35H                 | XMLEZW-00-0000-0D00T635H | 35F                 | XMLEZW-00-0000-0D00T635F |
|                        |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0D00U235H |                     | XMLEZW-00-0000-0D00U235F |
|                        |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0D00U335H |                     | XMLEZW-00-0000-0D00U335F |
|                        | 3000 K    | T5                             | 260               | 309                | 30H                 | XMLEZW-00-0000-0D00T530H | 30F                 | XMLEZW-00-0000-0D00T530F |
|                        |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0D00T630H |                     | XMLEZW-00-0000-0D00T630F |
|                        |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0D00U230H |                     | XMLEZW-00-0000-0D00U230F |
|                        |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0D00U330H |                     | XMLEZW-00-0000-0D00U330F |
|                        | 2700 K    | T4                             | 240               | 285                | 27H                 | XMLEZW-00-0000-0D00T427H | 27F                 | XMLEZW-00-0000-0D00T427F |
|                        |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0D00T527H |                     | XMLEZW-00-0000-0D00T527F |
|                        |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0D00T627H |                     | XMLEZW-00-0000-0D00T627F |
|                        |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0D00U227H |                     | XMLEZW-00-0000-0D00U227F |

**Notes**

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 18).
- For Standard CRI parts, typical CRI is 80 for 4000 – 3500 K CCT parts and 82 for 3000 – 2700 K CCT parts.
- \* Flux values @ 25 °C are calculated and for reference only.

# FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 12-VOLT XM-L EZW (350 mA, T<sub>J</sub> = 85 °C) - CONTINUED

| Color                    | CCT Range | Minimum Luminous Flux @ 350 mA |                   |                    | 2-Step              |                          | 4-Step              |                          |
|--------------------------|-----------|--------------------------------|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
|                          |           | Group                          | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | Order Code               | Chromaticity Region | Order Code               |
| 80-CRI Minimum EasyWhite | 4000 K    | T6                             | 280               | 332                | 40H                 | XMLEZW-00-0000-0D0HT640H | 40F                 | XMLEZW-00-0000-0D0HT640F |
|                          |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0D0HU240H |                     | XMLEZW-00-0000-0D0HU240F |
|                          |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0D0HU340H |                     | XMLEZW-00-0000-0D0HU340F |
|                          |           | U4                             | 340               | 404                |                     | XMLEZW-00-0000-0D0HU440H |                     | XMLEZW-00-0000-0D0HU440F |
|                          | 3500 K    | T5                             | 260               | 309                | 35H                 | XMLEZW-00-0000-0D0HT535H | 35F                 | XMLEZW-00-0000-0D0HT535F |
|                          |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0D0HT635H |                     | XMLEZW-00-0000-0D0HT635F |
|                          |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0D0HU235H |                     | XMLEZW-00-0000-0D0HU235F |
|                          |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0D0HU335H |                     | XMLEZW-00-0000-0D0HU335F |
|                          | 3000 K    | T5                             | 260               | 309                | 30H                 | XMLEZW-00-0000-0D0HT530H | 30F                 | XMLEZW-00-0000-0D0HT530F |
|                          |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0D0HT630H |                     | XMLEZW-00-0000-0D0HT630F |
|                          |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0D0HU230H |                     | XMLEZW-00-0000-0D0HU230F |
|                          |           | U3                             | 320               | 380                |                     | XMLEZW-00-0000-0D0HU330H |                     | XMLEZW-00-0000-0D0HU330F |
|                          | 2700 K    | T4                             | 240               | 285                | 27H                 | XMLEZW-00-0000-0D0HT427H | 27F                 | XMLEZW-00-0000-0D0HT427F |
|                          |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0D0HT527H |                     | XMLEZW-00-0000-0D0HT527F |
|                          |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0D0HT627H |                     | XMLEZW-00-0000-0D0HT627F |
|                          |           | U2                             | 300               | 356                |                     | XMLEZW-00-0000-0D0HU227H |                     | XMLEZW-00-0000-0D0HU227F |
| 85-CRI Minimum EasyWhite | 3000 K    | T3                             | 220               | 261                | 30H                 | XMLEZW-00-0000-0D0PT330H | 30F                 | XMLEZW-00-0000-0D0PT330F |
|                          |           | T4                             | 240               | 285                |                     | XMLEZW-00-0000-0D0PT430H |                     | XMLEZW-00-0000-0D0PT430F |
|                          |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0D0PT530H |                     | XMLEZW-00-0000-0D0PT530F |
|                          |           | T6                             | 280               | 332                |                     | XMLEZW-00-0000-0D0PT630H |                     | XMLEZW-00-0000-0D0PT630F |
|                          | 2700 K    | T2                             | 200               | 237                | 27H                 | XMLEZW-00-0000-0D0PT227H | 27F                 | XMLEZW-00-0000-0D0PT227F |
|                          |           | T3                             | 220               | 261                |                     | XMLEZW-00-0000-0D0PT327H |                     | XMLEZW-00-0000-0D0PT327F |
|                          |           | T4                             | 240               | 285                |                     | XMLEZW-00-0000-0D0PT427H |                     | XMLEZW-00-0000-0D0PT427F |
|                          |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0D0PT527H |                     | XMLEZW-00-0000-0D0PT527F |

## Notes

- Cree maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and  $\pm 2$  on CRI measurements. See the Measurements section (page 18).
- For Standard CRI parts, typical CRI is 80 for 4000 – 3500 K CCT parts and 82 for 3000 – 2700 K CCT parts.
- \* Flux values @ 25 °C are calculated and for reference only.

# FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 12-VOLT XM-L EZW (350 mA, T<sub>J</sub> = 85 °C) - CONTINUED

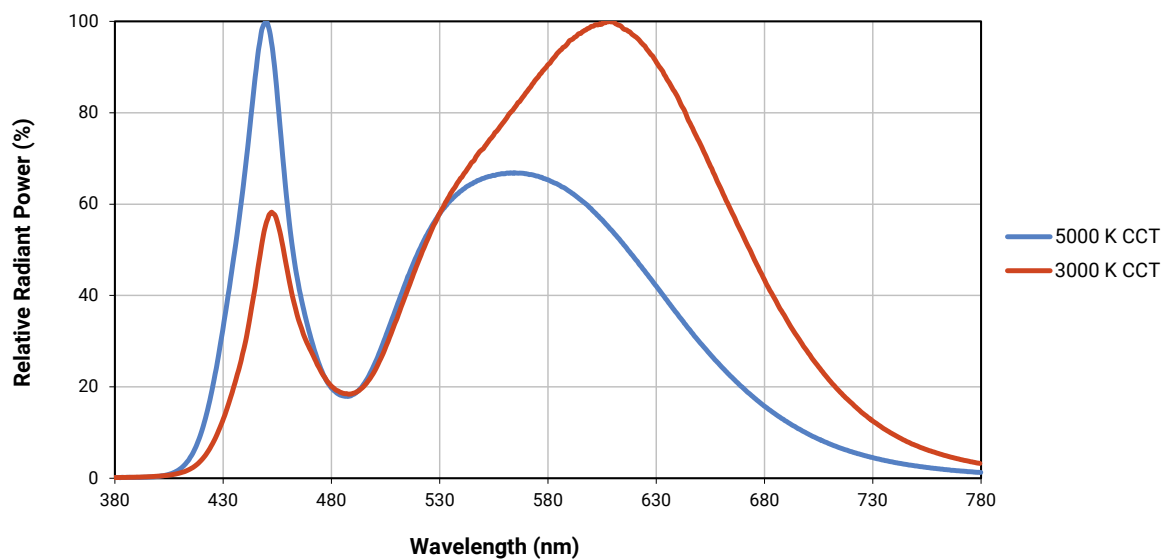
| Color                    | CCT Range | Minimum Luminous Flux @ 350 mA |                   |                    | 2-Step              |                          | 4-Step              |                          |
|--------------------------|-----------|--------------------------------|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
|                          |           | Group                          | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | Order Code               | Chromaticity Region | Order Code               |
| 90-CRI Minimum EasyWhite | 3000 K    | T2                             | 200               | 237                | 30H                 | XMLEZW-00-0000-0D0UT230H | 30F                 | XMLEZW-00-0000-0D0UT230F |
|                          |           | T3                             | 220               | 261                |                     | XMLEZW-00-0000-0D0UT330H |                     | XMLEZW-00-0000-0D0UT330F |
|                          |           | T4                             | 240               | 285                |                     | XMLEZW-00-0000-0D0UT430H |                     | XMLEZW-00-0000-0D0UT430F |
|                          |           | T5                             | 260               | 309                |                     | XMLEZW-00-0000-0D0UT530H |                     | XMLEZW-00-0000-0D0UT530F |
|                          | 2700 K    | S6                             | 180               | 214                | 27H                 | XMLEZW-00-0000-0D0US627H | 27F                 | XMLEZW-00-0000-0D0US627F |
|                          |           | T2                             | 200               | 237                |                     | XMLEZW-00-0000-0D0UT227H |                     | XMLEZW-00-0000-0D0UT227F |
|                          |           | T3                             | 220               | 261                |                     | XMLEZW-00-0000-0D0UT327H |                     | XMLEZW-00-0000-0D0UT327F |
|                          |           | T4                             | 240               | 285                |                     | XMLEZW-00-0000-0D0UT427H |                     | XMLEZW-00-0000-0D0UT427F |

| Color      | CCT Range | Minimum Luminous Flux @ 350 mA |                   |                    | Chromaticity Regions | Order Code               |
|------------|-----------|--------------------------------|-------------------|--------------------|----------------------|--------------------------|
|            |           | Group                          | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* |                      |                          |
| ANSI White | 5000 K    | U4                             | 340               | 404                | 0E3                  | XMLEZW-00-0000-0D00U40E3 |
|            |           | U5                             | 360               | 427                |                      | XMLEZW-00-0000-0D00U50E3 |
|            |           | U6                             | 380               | 451                |                      | XMLEZW-00-0000-0D00U60E3 |
|            |           | V2                             | 400               | 475                |                      | XMLEZW-00-0000-0D00V20E3 |

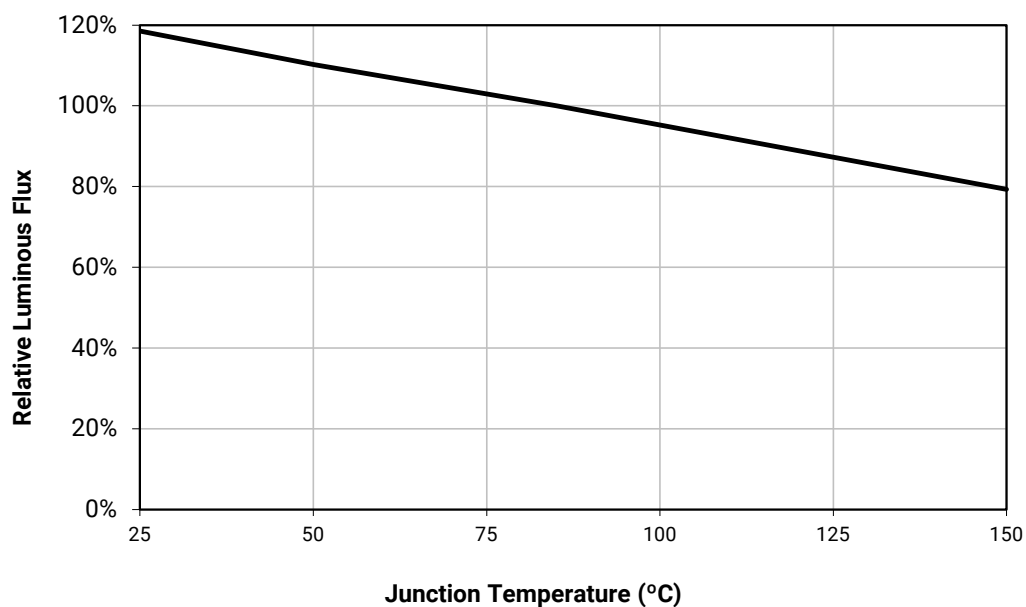
## Notes

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 18).
- For Standard CRI parts, typical CRI is 80 for 4000 – 3500 K CCT parts and 82 for 3000 – 2700 K CCT parts.
- \* Flux values @ 25 °C are calculated and for reference only.

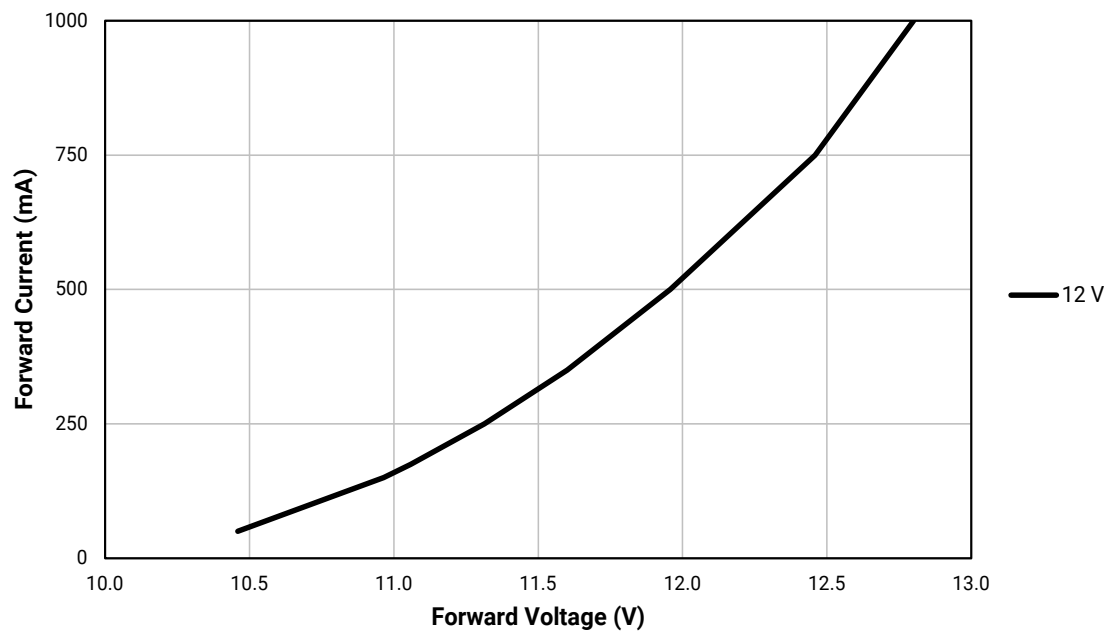
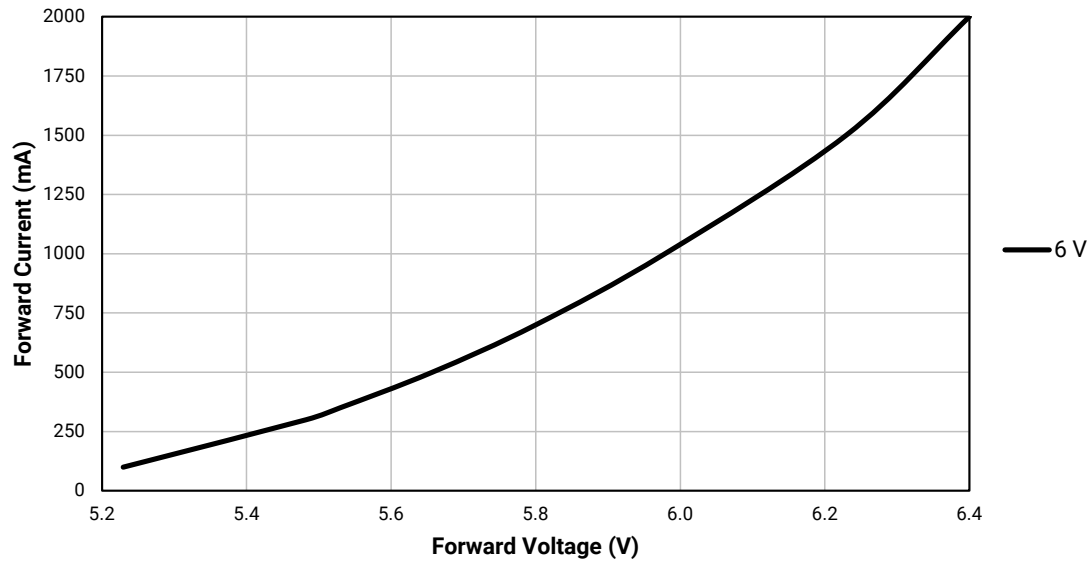
## RELATIVE SPECTRAL POWER DISTRIBUTION



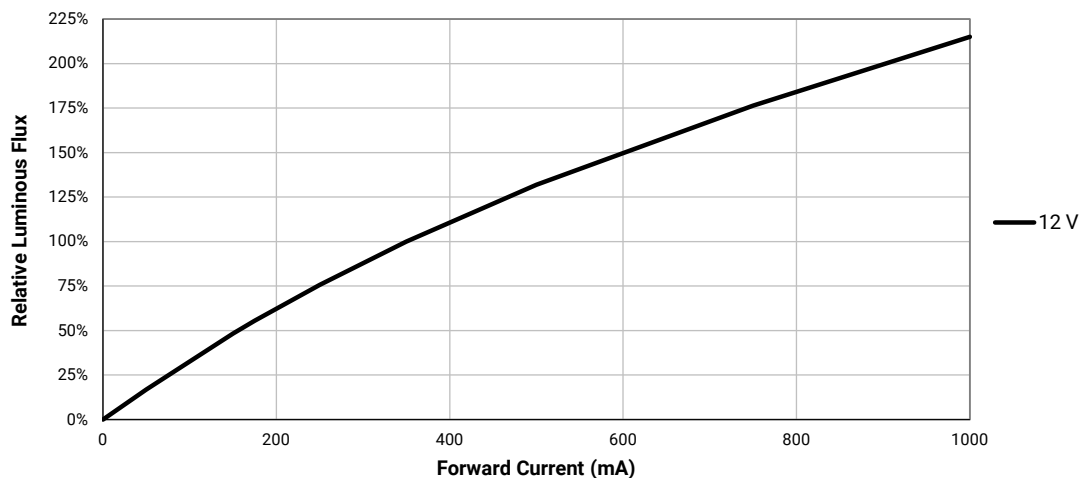
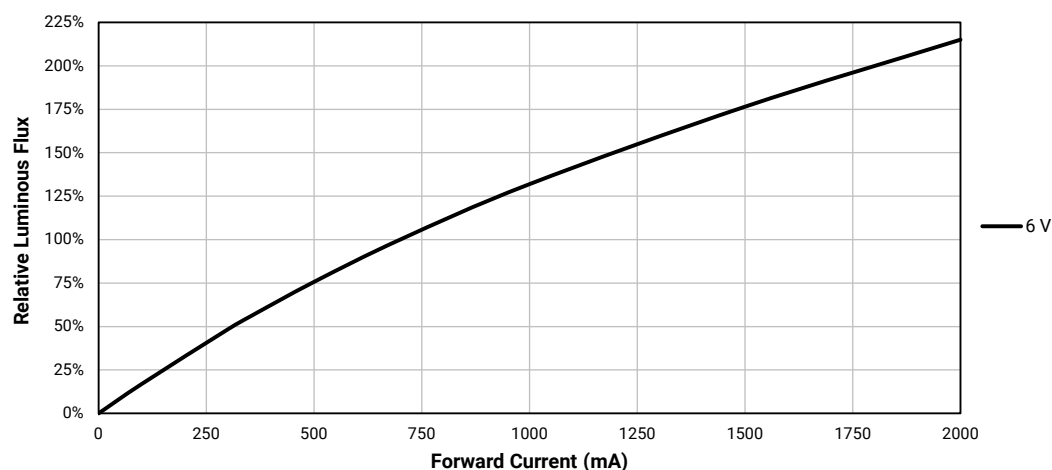
## RELATIVE FLUX VS. JUNCTION TEMPERATURE (6-V - $I_F = 700$ mA; 12-V - $I_F = 350$ mA)



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

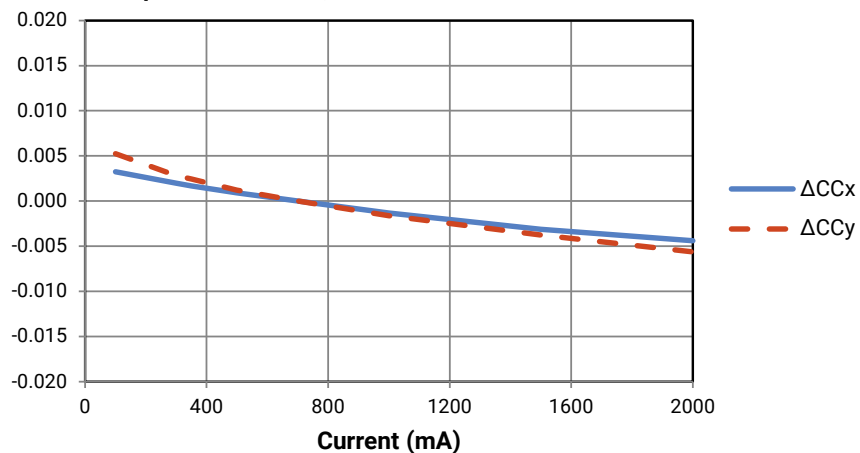


RELATIVE FLUX VS. CURRENT ( $T_j = 85^\circ\text{C}$ )

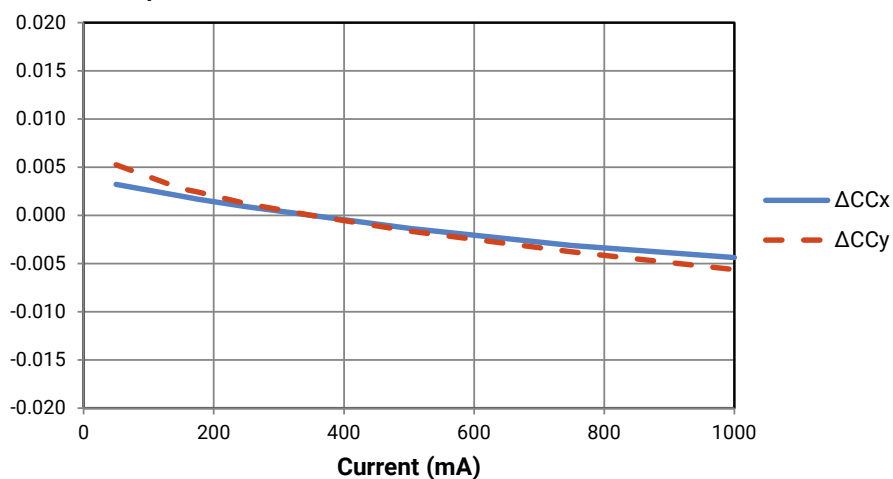


## RELATIVE CHROMATICITY VS. CURRENT AND TEMPERATURE

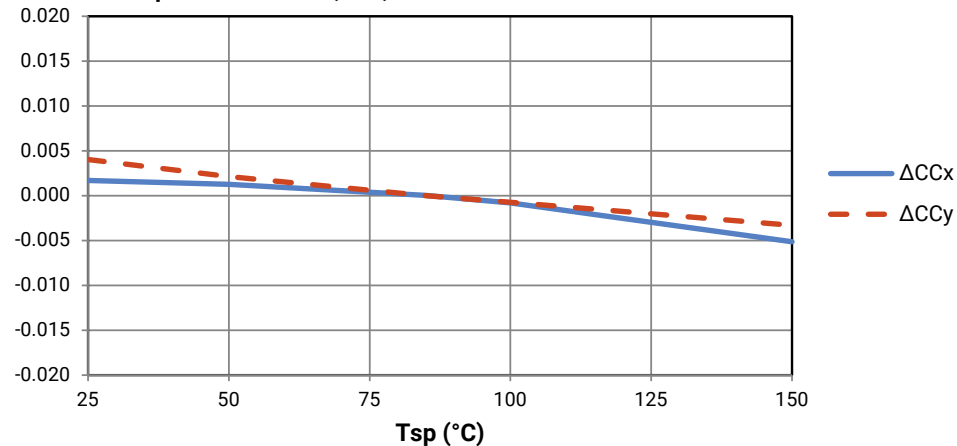
XLamp XM-L EZW LED, 6-V



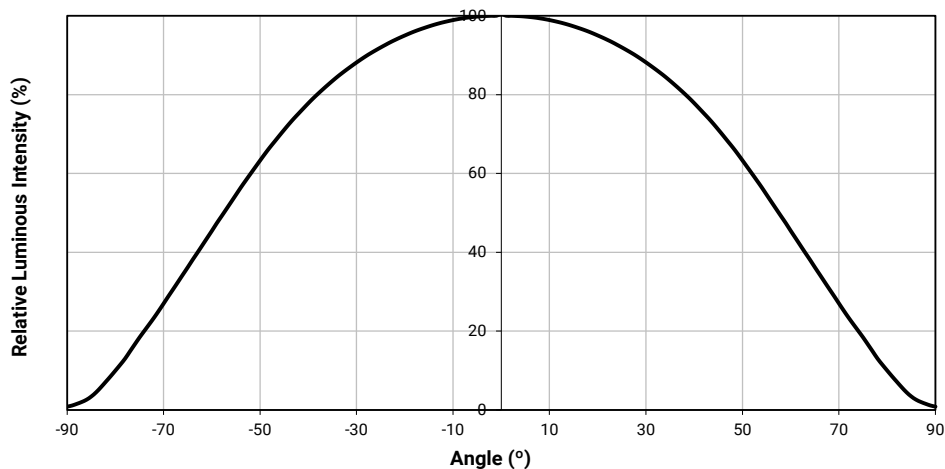
XLamp XM-L EZW LED, 12-V



XLamp XM-L EZW LED, 6-V, 12V



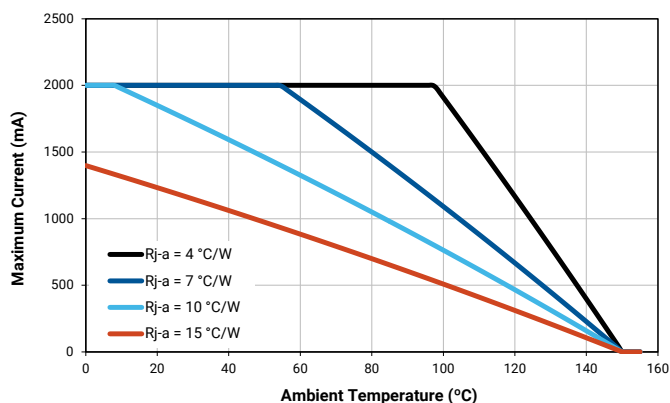
## TYPICAL SPATIAL DISTRIBUTION



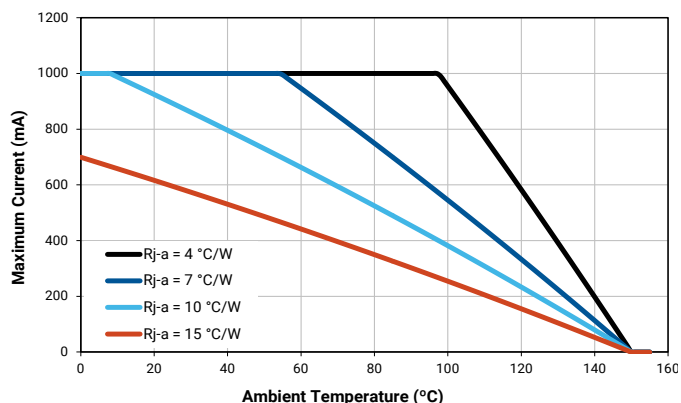
## THERMAL DESIGN

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.

**XLamp XM-L EZW LED, 6-V**



**XLamp XM-L EZW LED, 12-V**



## PERFORMANCE GROUPS – BRIGHTNESS ( $T_j = 85^\circ\text{C}$ )

XLamp XM-L EasyWhite LEDs are tested for luminous flux and placed into one the following bins.

| Group Code | Minimum Luminous Flux @ 700 mA, 6 V (@ 350 mA, 12 V) | Maximum Luminous Flux @ 700 mA, 6 V (@ 350 mA, 12 V) |
|------------|------------------------------------------------------|------------------------------------------------------|
| S6         | 180                                                  | 200                                                  |
| T2         | 200                                                  | 220                                                  |
| 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                                                  |

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

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

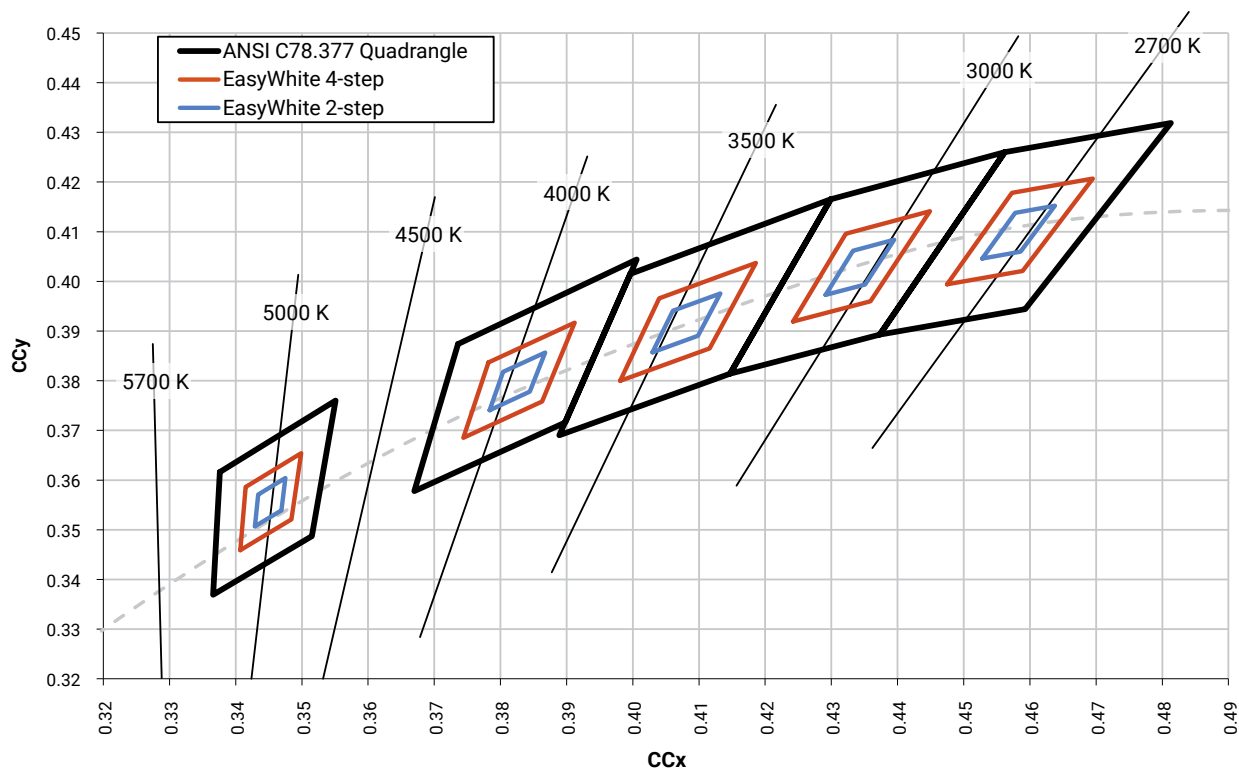
| EasyWhite Color Temperatures – 4-Step |        |        |        |
|---------------------------------------|--------|--------|--------|
| Code                                  | CCT    | x      | y      |
| 50F                                   | 5000 K | 0.3407 | 0.3459 |
|                       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

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

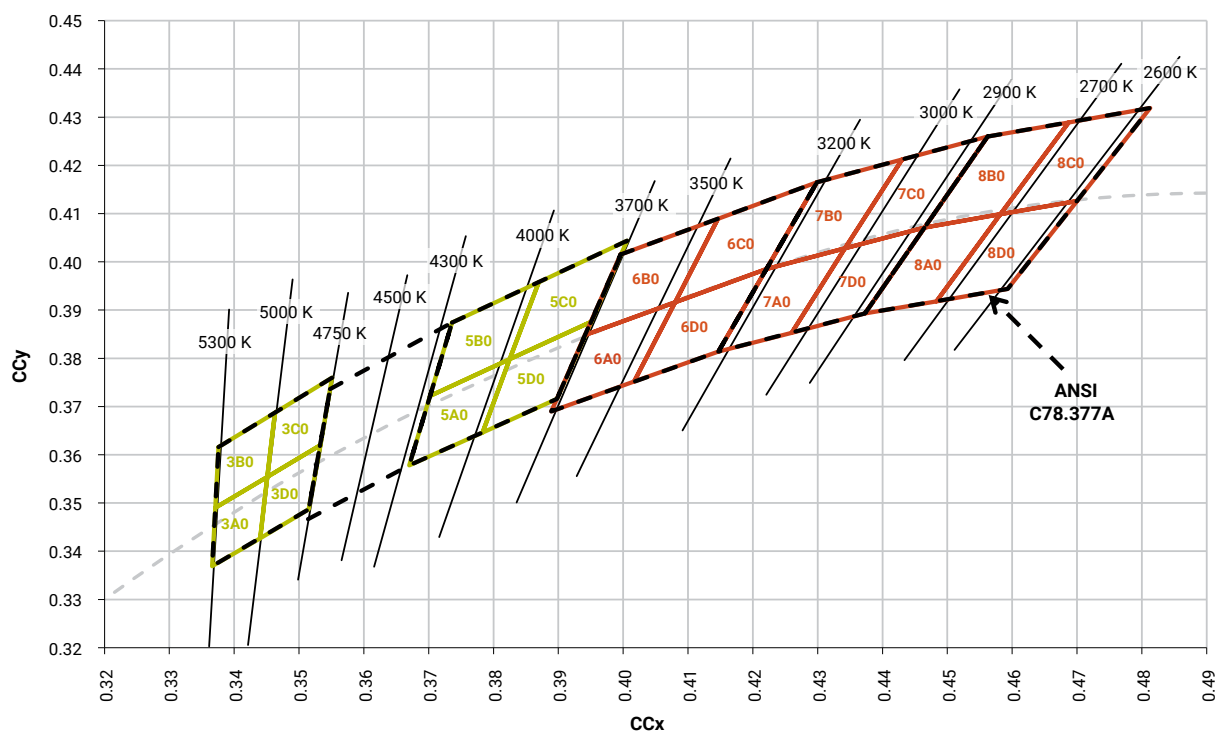
## PERFORMANCE GROUPS – CHROMATICITY ( $T_j = 85\text{ }^\circ\text{C}$ ) - CONTINUED

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

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

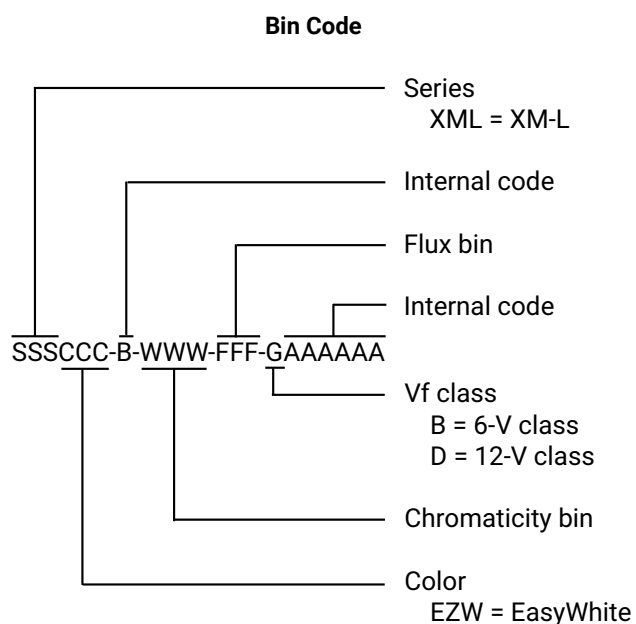
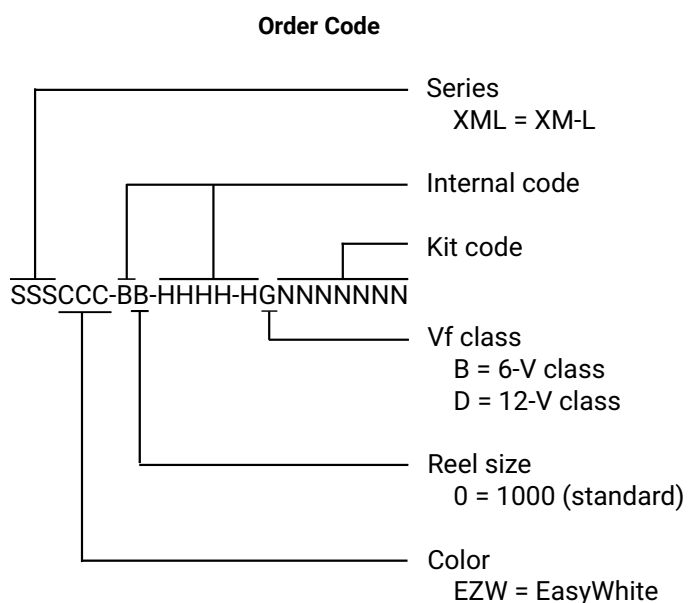


## CREE ANSI WHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE ( $T_j=85^\circ\text{C}$ )



## BIN AND ORDER CODE FORMATS

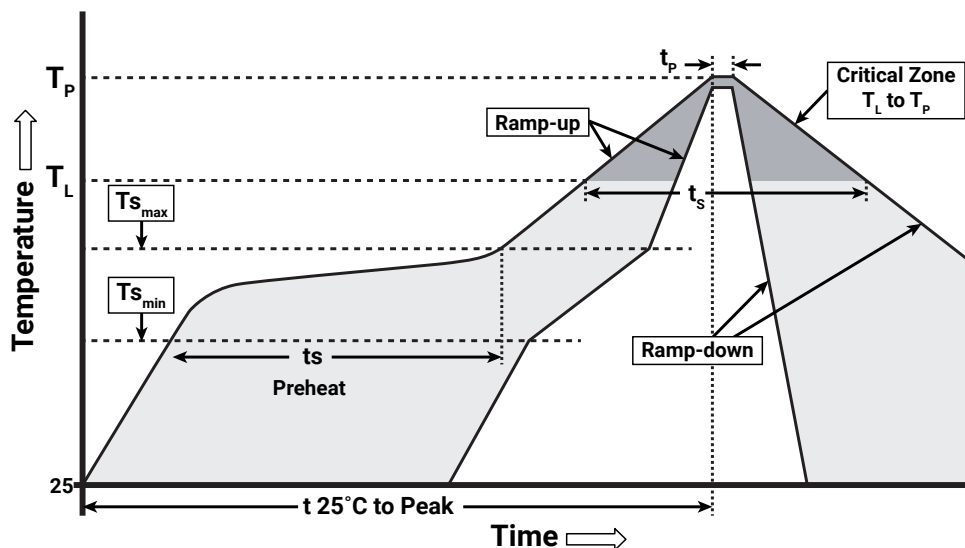
Bin codes and order codes are configured as follows:



## REFLOW SOLDERING CHARACTERISTICS

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

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



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 ( $t_L$ )                 | 45-90 seconds    |
| Peak/Classification Temperature ( $T_P$ )             | 235 - 245 °C     |
| Time Within 5 °C of Actual Peak Temperature ( $t_p$ ) | 20-40 seconds    |
| Ramp-Down Rate                                        | 1 - 6 °C/second  |
| Time 25 °C to Peak Temperature                        | 4 minutes max.   |

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

## NOTES

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### Measurements

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

### Pre-Release Qualification Testing

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

### Lumen Maintenance

Cree now uses standardized IES LM-80-08 and TM-21-11 methods for collecting long-term data and extrapolating LED lumen maintenance. For information on the specific LM-80 data sets available for this LED, refer to the 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 XM-L EasyWhite LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of  $\leq 30^{\circ}\text{C}/85\%$  relative humidity (RH). Regardless of storage condition, Cree recommends sealing any unsoldered LEDs in the original MBP.

### RoHS Compliance

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

**NOTES - CONTINUED**

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**UL® Recognized Component**

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

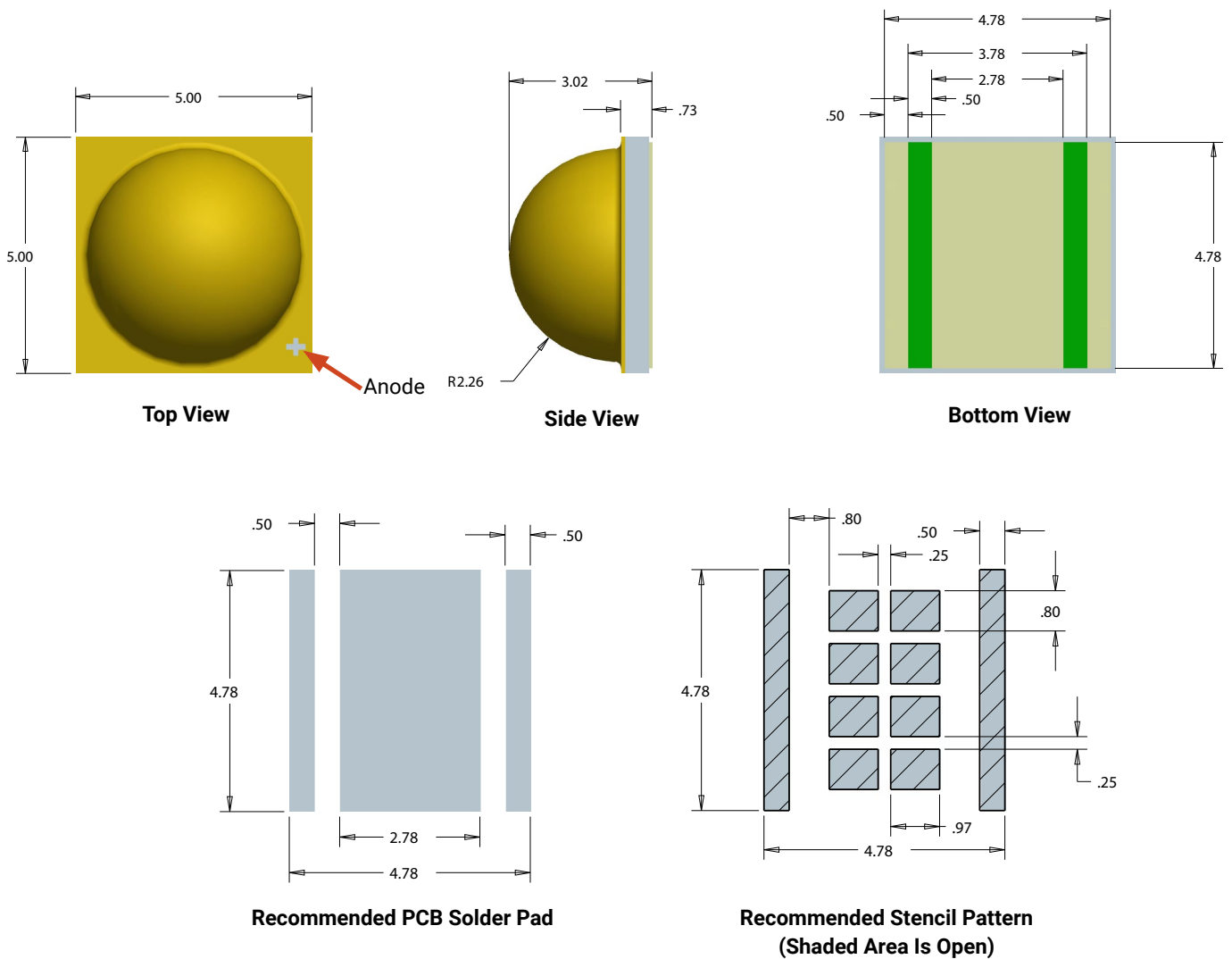
**Vision Advisory**

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

## MECHANICAL DIMENSIONS

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

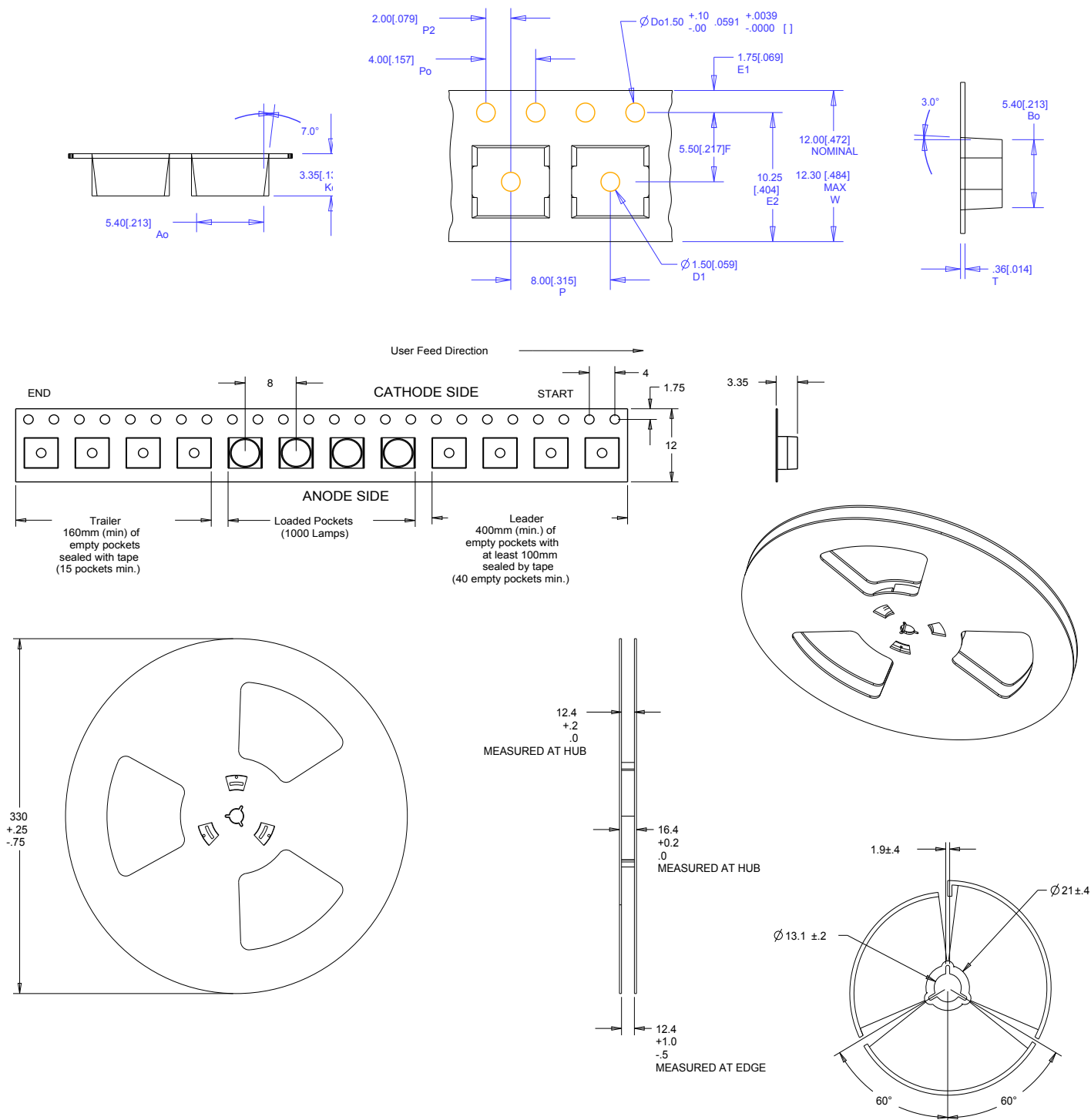
All measurements are  $\pm 0.13$  mm unless otherwise indicated.



## TAPE AND REEL

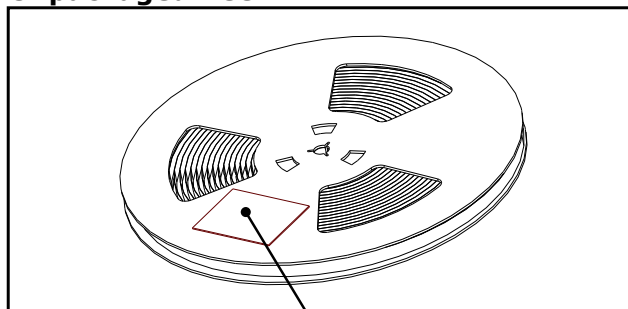
All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

All dimensions in mm.



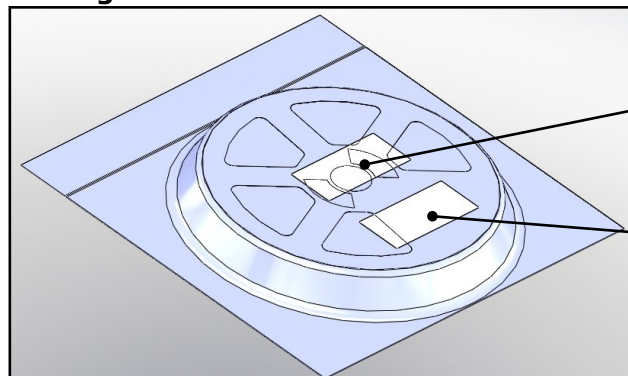
## PACKAGING

### Unpackaged Reel



Label with Cree Bin Code,  
Quantity, Reel ID

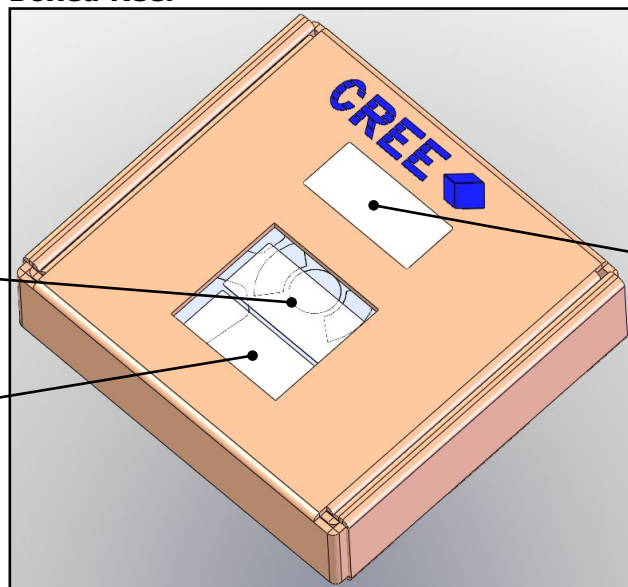
### Packaged Reel



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