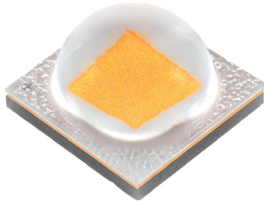


## XLamp® XM-L2 LEDs



### PRODUCT DESCRIPTION

The XLamp® XM-L2 LED builds on the unprecedented performance of the original XM-L, increasing lumen output up to 20% while providing a single die LED point source for precise optical control. The XM-L2 LED shares the same mechanical and optical footprint as the original XM-L, providing a seamless upgrade path and shortened design cycle.

XLamp XM-L2 LEDs are the ideal choice for lighting applications where high light output and maximum efficacy are required, such as LED light bulbs, outdoor lighting, portable lighting, indoor lighting and solar-powered lighting.

### FEATURES

- Available in white, 70-CRI white, 80-CRI white, and 90-CRI white
- ANSI-compatible chromaticity bins
- Binned at 85 °C
- Maximum drive current: 3000 mA
- Low thermal resistance: 0.75 °C/W
- Wide viewing angle: 120°
- Unlimited floor life at ≤ 30 °C/85% RH
- Reflow solderable - JEDEC J-STD-020C
- Electrically neutral thermal path
- RoHS and REACH compliant
- UL® recognized component (E349212)



Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27709 USA / +1.919.313.5330 / [www.cree-led.com](http://www.cree-led.com)

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## CHARACTERISTICS

| Characteristics                               | Unit    | Minimum | Typical | Maximum |
|-----------------------------------------------|---------|---------|---------|---------|
| Thermal resistance, junction to solder point* | °C/W    |         | 0.75    |         |
| Viewing angle (FWHM)                          | degrees |         | 120     |         |
| Temperature coefficient of voltage            | mV/°C   |         | -1.3    |         |
| ESD withstand voltage (HBM per Mil-Std-883D)  | V       |         |         | 8000    |
| DC forward current                            | mA      |         |         | 3000    |
| Reverse voltage                               | V       |         |         | 1       |
| Forward voltage (@ 700 mA, 85 °C)             | V       |         | 2.72    | 3.15    |
| Forward voltage (@ 1500 mA, 85 °C)            | V       |         | 2.84    |         |
| Forward voltage (@ 3000 mA, 85 °C)            | V       |         | 3.02    |         |
| LED junction temperature                      | °C      |         |         | 150     |

### Note

- \* Thermal resistance measurement was performed per JEDEC JESD51-14 standard. See the [Thermal Resistance Measurement application note](#) for more details.

ORDER CODES SUGGESTED FOR NEW DESIGNS ( $T_j = 85^\circ\text{C}$ )

The following tables provide order codes for XLamp XM-L2 LEDs. For a complete description of the order-code nomenclature, please consult the Bin and Order Code Formats section (page 23).

| Chromaticity                      |        | Minimum Luminous Flux (lm) @ 700 mA* |                   |                    | Calculated Minimum Luminous Flux (lm) @ 85 °C** |         |         | Order Codes              |
|-----------------------------------|--------|--------------------------------------|-------------------|--------------------|-------------------------------------------------|---------|---------|--------------------------|
| Kit                               | CCT    | Code                                 | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 1000 mA                                         | 1500 mA | 2000 mA | 65 CRI Typical           |
| ANSI Cool White (5000 K – 8300 K) |        |                                      |                   |                    |                                                 |         |         |                          |
| 51                                | 6200 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-0000U4051 |
|                                   |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-0000U3051 |
|                                   |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-0000U2051 |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-0000T6051 |
| 53                                | 6000 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-0000U4053 |
|                                   |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-0000U3053 |
|                                   |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-0000U2053 |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-0000T6053 |
| 50                                | 6200 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-0000U4050 |
|                                   |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-0000U3050 |
|                                   |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-0000U2050 |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-0000T6050 |
| E1                                | 6500 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-0000U40E1 |
|                                   |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-0000U30E1 |
|                                   |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-0000U20E1 |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-0000T60E1 |
| E2                                | 5700 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-0000U40E2 |
|                                   |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-0000U30E2 |
|                                   |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-0000U20E2 |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-0000T60E2 |

## Notes

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 31.
- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).
- XLamp XM-L2 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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.

\*\* Calculated flux values are for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS ( $T_J = 85^\circ\text{C}$ ) - CONTINUED

| Chromaticity                         |        | Minimum Luminous Flux (lm) @ 700 mA* |                   |                    | Calculated Minimum Luminous Flux (lm) @ 85 °C** |         |         | Order Codes              |                          |                          |
|--------------------------------------|--------|--------------------------------------|-------------------|--------------------|-------------------------------------------------|---------|---------|--------------------------|--------------------------|--------------------------|
| Kit                                  | CCT    | Code                                 | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 1000 mA                                         | 1500 mA | 2000 mA | 70 CRI Minimum           | 75 CRI Typical           | 80 CRI Minimum           |
| ANSI Neutral White (3700 K – 5000 K) |        |                                      |                   |                    |                                                 |         |         |                          |                          |                          |
| E3                                   | 5000 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-000BU40E3 | XMLBWT-00-0000-000LU40E3 |                          |
|                                      |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-000BU30E3 | XMLBWT-00-0000-000LU30E3 |                          |
|                                      |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000BU20E3 | XMLBWT-00-0000-000LU20E3 |                          |
| F4                                   | 4750 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-000BU40F4 |                          |                          |
|                                      |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-000BU30F4 | XMLBWT-00-0000-000LU30F4 |                          |
|                                      |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000BU20F4 | XMLBWT-00-0000-000LU20F4 |                          |
|                                      |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     |                          | XMLBWT-00-0000-000LT60F4 |                          |
| E4                                   | 4500 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-000BU40E4 |                          |                          |
|                                      |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-000BU30E4 | XMLBWT-00-0000-000LU30E4 |                          |
|                                      |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000BU20E4 | XMLBWT-00-0000-000LU20E4 |                          |
|                                      |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     |                          | XMLBWT-00-0000-000LT60E4 |                          |
| F5                                   | 4250 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-000BU40F5 |                          |                          |
|                                      |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-000BU30F5 | XMLBWT-00-0000-000LU30F5 |                          |
|                                      |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000BU20F5 | XMLBWT-00-0000-000LU20F5 |                          |
|                                      |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     |                          | XMLBWT-00-0000-000LT60F5 |                          |
| E5                                   | 4000 K | U4                                   | 340               | 370                | 469                                             | 667     | 848     | XMLBWT-00-0000-000BU40E5 |                          |                          |
|                                      |        | U3                                   | 320               | 348                | 441                                             | 628     | 798     | XMLBWT-00-0000-000BU30E5 | XMLBWT-00-0000-000LU30E5 | XMLBWT-00-0000-000HU30E5 |
|                                      |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000BU20E5 | XMLBWT-00-0000-000LU20E5 | XMLBWT-00-0000-000HU20E5 |
|                                      |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     |                          | XMLBWT-00-0000-000LT60E5 | XMLBWT-00-0000-000HT60E5 |

## Notes

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 31.
- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).
- XLamp XM-L2 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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.

\*\* Calculated flux values are for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS ( $T_j = 85^\circ\text{C}$ ) - CONTINUED

| Chromaticity                         |        | Minimum Luminous Flux (lm) @ 700 mA* |                   |                    | Calculated Minimum Luminous Flux (lm) @ 85 °C** |         |         | Order Codes    |                          |                          |
|--------------------------------------|--------|--------------------------------------|-------------------|--------------------|-------------------------------------------------|---------|---------|----------------|--------------------------|--------------------------|
| Kit                                  | CCT    | Code                                 | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 1000 mA                                         | 1500 mA | 2000 mA | 70 CRI Minimum | 75 CRI Typical           | 80 CRI Minimum           |
| ANSI Neutral White (3700 K – 5000 K) |        |                                      |                   |                    |                                                 |         |         |                |                          |                          |
| Z5                                   | 4000 K | U3                                   | 320               | 348                | 441                                             | 628     | 798     |                | XMLBWT-00-0000-000LU30Z5 | XMLBWT-00-0000-000HU30Z5 |
|                                      |        | U2                                   | 300               | 327                | 414                                             | 589     | 749     |                | XMLBWT-00-0000-000LU20Z5 | XMLBWT-00-0000-000HU20Z5 |
|                                      |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     |                | XMLBWT-00-0000-000LT60Z5 | XMLBWT-00-0000-000HT60Z5 |

## Notes

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 31.
- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).
- XLamp XM-L2 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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.

\*\* Calculated flux values are for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS ( $T_j = 85^\circ\text{C}$ ) - CONTINUED

| Chromaticity                      |        | Minimum Luminous Flux (lm) @ 700 mA* |                   |                    | Calculated Minimum Luminous Flux (lm) @ 85 °C** |         |         | Order Codes              |                          |                |
|-----------------------------------|--------|--------------------------------------|-------------------|--------------------|-------------------------------------------------|---------|---------|--------------------------|--------------------------|----------------|
| Kit                               | CCT    | Code                                 | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 1000 mA                                         | 1500 mA | 2000 mA | 80 CRI Typical           | 80 CRI Minimum           | 90 CRI Minimum |
| ANSI Warm White (2700 K - 3750 K) |        |                                      |                   |                    |                                                 |         |         |                          |                          |                |
| F6                                | 3750 K | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000LU20F6 | XMLBWT-00-0000-000HU20F6 |                |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-000LT60F6 | XMLBWT-00-0000-000HT60F6 |                |
|                                   |        | T5                                   | 260               | 283                | 359                                             | 510     | 649     | XMLBWT-00-0000-000LT50F6 | XMLBWT-00-0000-000HT50F6 |                |
| E6                                | 3500 K | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000LU20E6 | XMLBWT-00-0000-000HU20E6 |                |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-000LT60E6 | XMLBWT-00-0000-000HT60E6 |                |
|                                   |        | T5                                   | 260               | 283                | 359                                             | 510     | 649     | XMLBWT-00-0000-000LT50E6 | XMLBWT-00-0000-000HT50E6 |                |
| Z6                                | 3500 K | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000LU20Z6 | XMLBWT-00-0000-000HU20Z6 |                |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-000LT60Z6 | XMLBWT-00-0000-000HT60Z6 |                |
|                                   |        | T5                                   | 260               | 283                | 359                                             | 510     | 649     | XMLBWT-00-0000-000LT50Z6 | XMLBWT-00-0000-000HT50Z6 |                |
| F7                                | 3250 K | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000LU20F7 | XMLBWT-00-0000-000HU20F7 |                |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-000LT60F7 | XMLBWT-00-0000-000HT60F7 |                |
|                                   |        | T5                                   | 260               | 283                | 359                                             | 510     | 649     | XMLBWT-00-0000-000LT50F7 | XMLBWT-00-0000-000HT50F7 |                |

## Notes

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 31.
- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).
- XLamp XM-L2 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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.

\*\* Calculated flux values are for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS ( $T_j = 85^\circ\text{C}$ ) - CONTINUED

| Chromaticity                      |        | Minimum Luminous Flux (lm) @ 700 mA* |                   |                    | Calculated Minimum Luminous Flux (lm) @ 85 °C** |         |         | Order Codes              |                          |                          |
|-----------------------------------|--------|--------------------------------------|-------------------|--------------------|-------------------------------------------------|---------|---------|--------------------------|--------------------------|--------------------------|
| Kit                               | CCT    | Code                                 | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 1000 mA                                         | 1500 mA | 2000 mA | 80 CRI Typical           | 80 CRI Minimum           | 90 CRI Minimum           |
| ANSI Warm White (2700 K - 3750 K) |        |                                      |                   |                    |                                                 |         |         |                          |                          |                          |
| E7                                | 3000 K | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000LU20E7 | XMLBWT-00-0000-000HU20E7 |                          |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-000LT60E7 | XMLBWT-00-0000-000HT60E7 |                          |
|                                   |        | T5                                   | 260               | 283                | 359                                             | 510     | 649     | XMLBWT-00-0000-000LT50E7 | XMLBWT-00-0000-000HT50E7 |                          |
|                                   |        | T4                                   | 240               | 261                | 331                                             | 471     | 599     |                          |                          |                          |
|                                   |        | T3                                   | 220               | 239                | 303                                             | 432     | 549     |                          |                          |                          |
|                                   |        | T2                                   | 200               | 218                | 276                                             | 392     | 499     |                          |                          | XMLBWT-00-0000-000UT20E7 |
|                                   |        | S6                                   | 182               | 198                | 251                                             | 357     | 454     |                          |                          | XMLBWT-00-0000-000US60E7 |
|                                   |        | S5                                   | 172               | 187                | 237                                             | 337     | 429     |                          |                          | XMLBWT-00-0000-000US50E7 |
|                                   |        | S4                                   | 164               | 179                | 226                                             | 322     | 409     |                          |                          | XMLBWT-00-0000-000US40E7 |
| Z7                                | 3000 K | U2                                   | 300               | 327                | 414                                             | 589     | 749     | XMLBWT-00-0000-000LU20Z7 | XMLBWT-00-0000-000HU20Z7 |                          |
|                                   |        | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-000LT60Z7 | XMLBWT-00-0000-000HT60Z7 |                          |
|                                   |        | T5                                   | 260               | 283                | 359                                             | 510     | 649     | XMLBWT-00-0000-000LT50Z7 | XMLBWT-00-0000-000HT50Z7 |                          |
|                                   |        | T4                                   | 240               | 261                | 331                                             | 471     | 599     |                          |                          |                          |
|                                   |        | T3                                   | 220               | 239                | 303                                             | 432     | 549     |                          |                          |                          |
|                                   |        | T2                                   | 200               | 218                | 276                                             | 392     | 499     |                          |                          |                          |
|                                   |        | S6                                   | 182               | 198                | 251                                             | 357     | 454     |                          |                          | XMLBWT-00-0000-000US60Z7 |
|                                   |        | S5                                   | 172               | 187                | 237                                             | 337     | 429     |                          |                          | XMLBWT-00-0000-000US50Z7 |
|                                   |        | S4                                   | 164               | 179                | 226                                             | 322     | 409     |                          |                          | XMLBWT-00-0000-000US40Z7 |

## Notes

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 31.
- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).
- XLamp XM-L2 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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.

\*\* Calculated flux values are for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS ( $T_J = 85^\circ\text{C}$ ) - CONTINUED

| Chromaticity                      |        | Minimum Luminous Flux (lm) @ 700 mA* |                   |                    | Calculated Minimum Luminous Flux (lm) @ 85 °C** |         |         | Order Codes              |                          |                          |
|-----------------------------------|--------|--------------------------------------|-------------------|--------------------|-------------------------------------------------|---------|---------|--------------------------|--------------------------|--------------------------|
| Kit                               | CCT    | Code                                 | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 1000 mA                                         | 1500 mA | 2000 mA | 80 CRI Typical           | 80 CRI Minimum           | 90 CRI Minimum           |
| ANSI Warm White (2700 K - 3750 K) |        |                                      |                   |                    |                                                 |         |         |                          |                          |                          |
| F8                                | 2850 K | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-000LT60F8 | XMLBWT-00-0000-000HT60F8 |                          |
|                                   |        | T5                                   | 260               | 283                | 359                                             | 510     | 649     | XMLBWT-00-0000-000LT50F8 | XMLBWT-00-0000-000HT50F8 |                          |
|                                   |        | T4                                   | 240               | 261                | 331                                             | 471     | 599     | XMLBWT-00-0000-000LT40F8 | XMLBWT-00-0000-000HT40F8 |                          |
|                                   |        | T3                                   | 220               | 239                | 303                                             | 432     | 549     |                          |                          |                          |
|                                   |        | T2                                   | 200               | 218                | 276                                             | 392     | 499     |                          |                          |                          |
|                                   |        | S6                                   | 182               | 198                | 251                                             | 357     | 454     |                          |                          | XMLBWT-00-0000-000US60F8 |
|                                   |        | S5                                   | 172               | 187                | 237                                             | 337     | 429     |                          |                          | XMLBWT-00-0000-000US50F8 |
|                                   |        | S4                                   | 164               | 179                | 226                                             | 322     | 409     |                          |                          | XMLBWT-00-0000-000US40F8 |
|                                   |        | S3                                   | 156               | 170                | 215                                             | 306     | 389     |                          |                          | XMLBWT-00-0000-000US30F8 |
| E8                                | 2700 K | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-000LT60E8 | XMLBWT-00-0000-000HT60E8 |                          |
|                                   |        | T5                                   | 260               | 283                | 359                                             | 510     | 649     | XMLBWT-00-0000-000LT50E8 | XMLBWT-00-0000-000HT50E8 |                          |
|                                   |        | T4                                   | 240               | 261                | 331                                             | 471     | 599     | XMLBWT-00-0000-000LT40E8 | XMLBWT-00-0000-000HT40E8 |                          |
|                                   |        | T3                                   | 220               | 239                | 303                                             | 432     | 549     |                          |                          |                          |
|                                   |        | T2                                   | 200               | 218                | 276                                             | 392     | 499     |                          |                          |                          |
|                                   |        | S6                                   | 182               | 198                | 251                                             | 357     | 454     |                          |                          | XMLBWT-00-0000-000US60E8 |
|                                   |        | S5                                   | 172               | 187                | 237                                             | 337     | 429     |                          |                          | XMLBWT-00-0000-000US50E8 |
|                                   |        | S4                                   | 164               | 179                | 226                                             | 322     | 409     |                          |                          | XMLBWT-00-0000-000US40E8 |
|                                   |        | S3                                   | 156               | 170                | 215                                             | 306     | 389     |                          |                          | XMLBWT-00-0000-000US30E8 |

## Notes

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 31.
- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).
- XLamp XM-L2 LED order codes specify only a minimum flux bin and not a maximum. Cree LED 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.

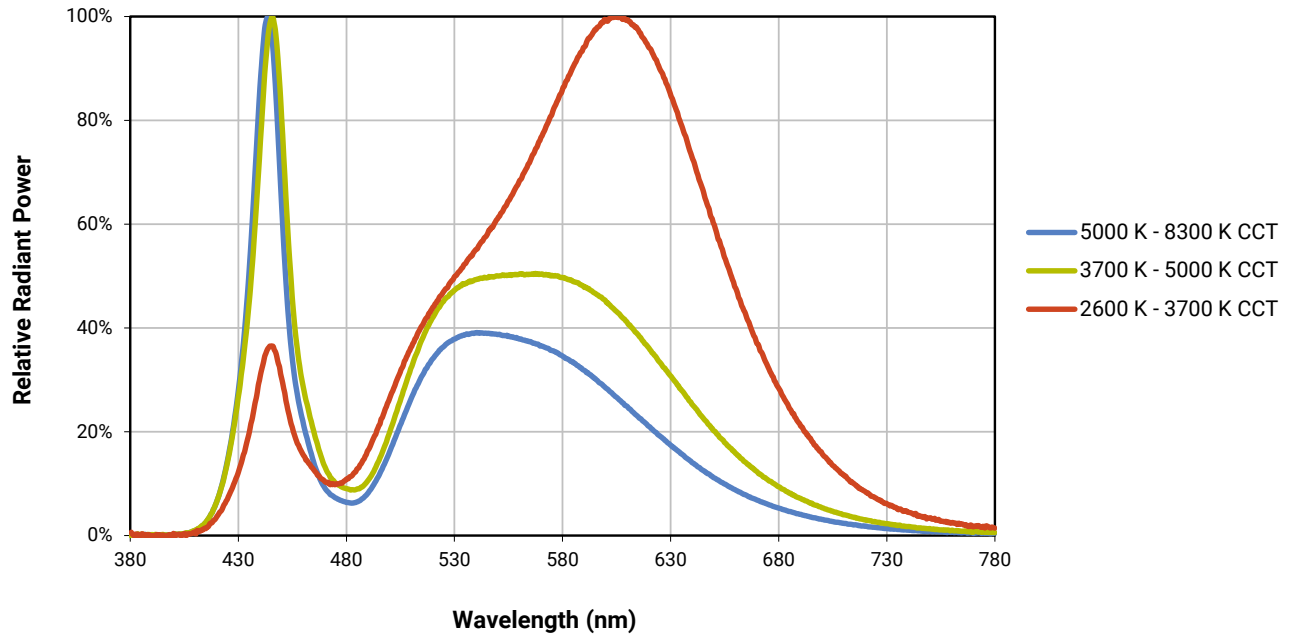
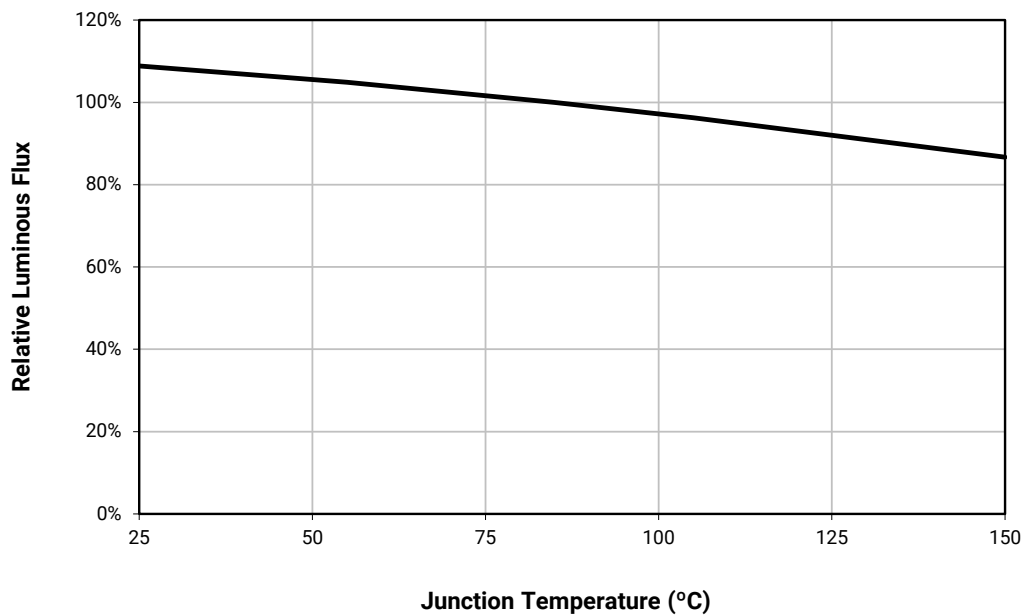
\* Flux values @ 25 °C are calculated and for reference only.

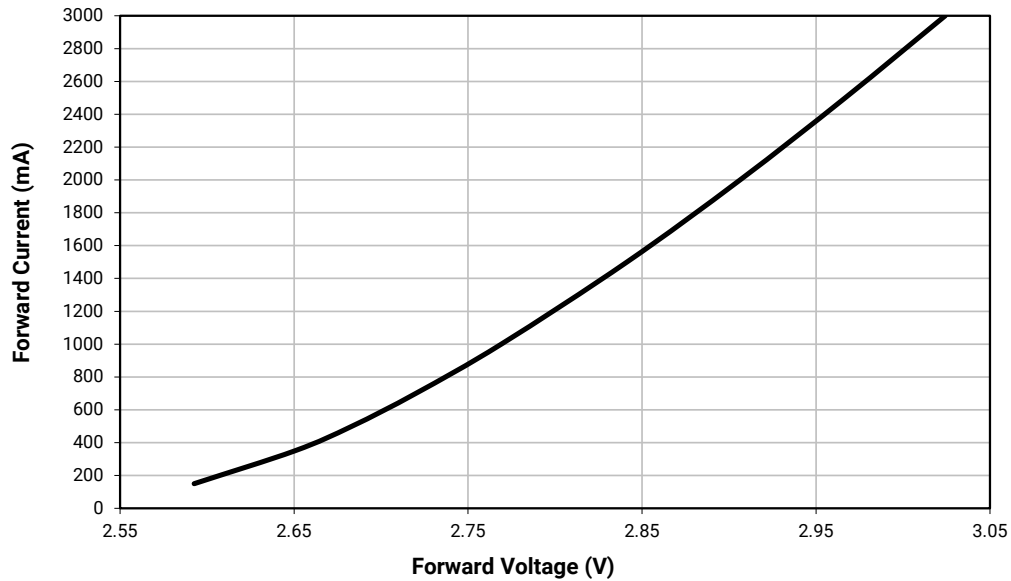
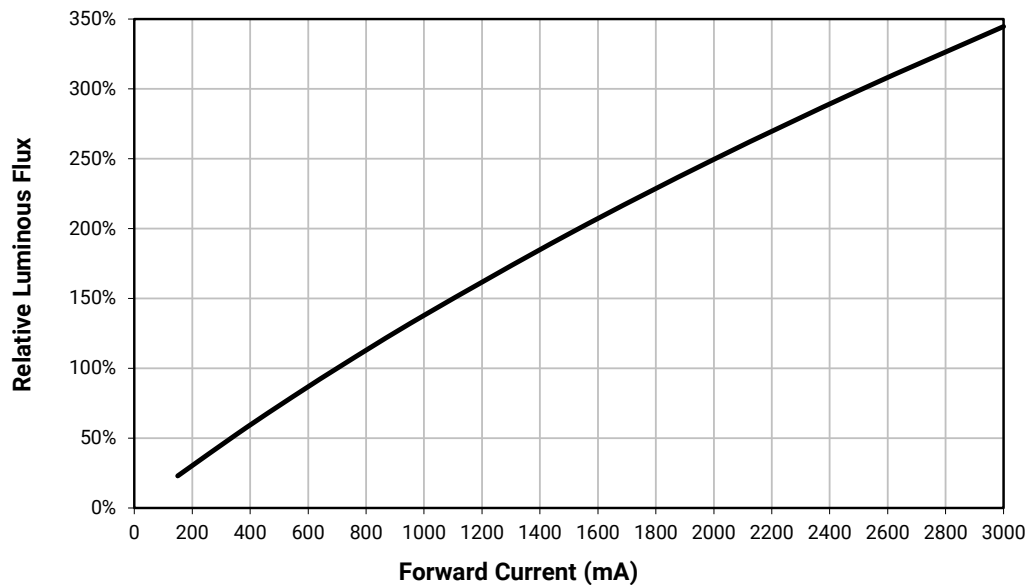
\*\* Calculated flux values are for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS ( $T_J = 85^\circ\text{C}$ ) - CONTINUED

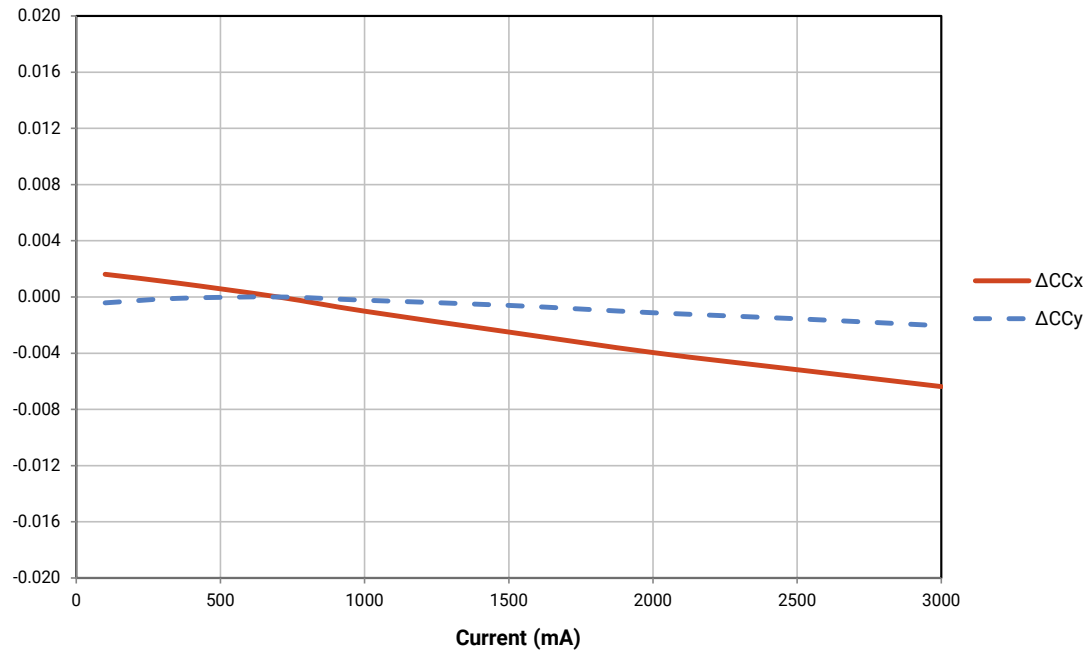
| Chromaticity                      |        | Minimum Luminous Flux (lm) @ 700 mA* |                   |                    | Calculated Minimum Luminous Flux (lm) @ 85 °C** |         |         | Order Codes              |                          |                          |
|-----------------------------------|--------|--------------------------------------|-------------------|--------------------|-------------------------------------------------|---------|---------|--------------------------|--------------------------|--------------------------|
| Kit                               | CCT    | Code                                 | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 1000 mA                                         | 1500 mA | 2000 mA | 80 CRI Typical           | 80 CRI Minimum           | 90 CRI Minimum           |
| ANSI Warm White (2700 K - 3750 K) |        |                                      |                   |                    |                                                 |         |         |                          |                          |                          |
| Z8                                | 2700 K | T6                                   | 280               | 305                | 386                                             | 549     | 699     | XMLBWT-00-0000-000LT60Z8 | XMLBWT-00-0000-000HT60Z8 |                          |
|                                   |        | T5                                   | 260               | 283                | 359                                             | 510     | 649     | XMLBWT-00-0000-000LT50Z8 | XMLBWT-00-0000-000HT50Z8 |                          |
|                                   |        | T4                                   | 240               | 261                | 331                                             | 471     | 599     | XMLBWT-00-0000-000LT40Z8 | XMLBWT-00-0000-000HT40Z8 |                          |
|                                   |        | T3                                   | 220               | 239                | 303                                             | 432     | 549     |                          |                          |                          |
|                                   |        | T2                                   | 200               | 218                | 276                                             | 392     | 499     |                          |                          |                          |
|                                   |        | S6                                   | 182               | 198                | 251                                             | 357     | 454     |                          |                          |                          |
|                                   |        | S5                                   | 172               | 187                | 237                                             | 337     | 429     |                          |                          | XMLBWT-00-0000-000US50Z8 |
|                                   |        | S4                                   | 164               | 179                | 226                                             | 322     | 409     |                          |                          | XMLBWT-00-0000-000US40Z8 |
|                                   |        | S3                                   | 156               | 170                | 215                                             | 306     | 389     |                          |                          | XMLBWT-00-0000-000US30Z8 |

## RELATIVE SPECTRAL POWER DISTRIBUTION

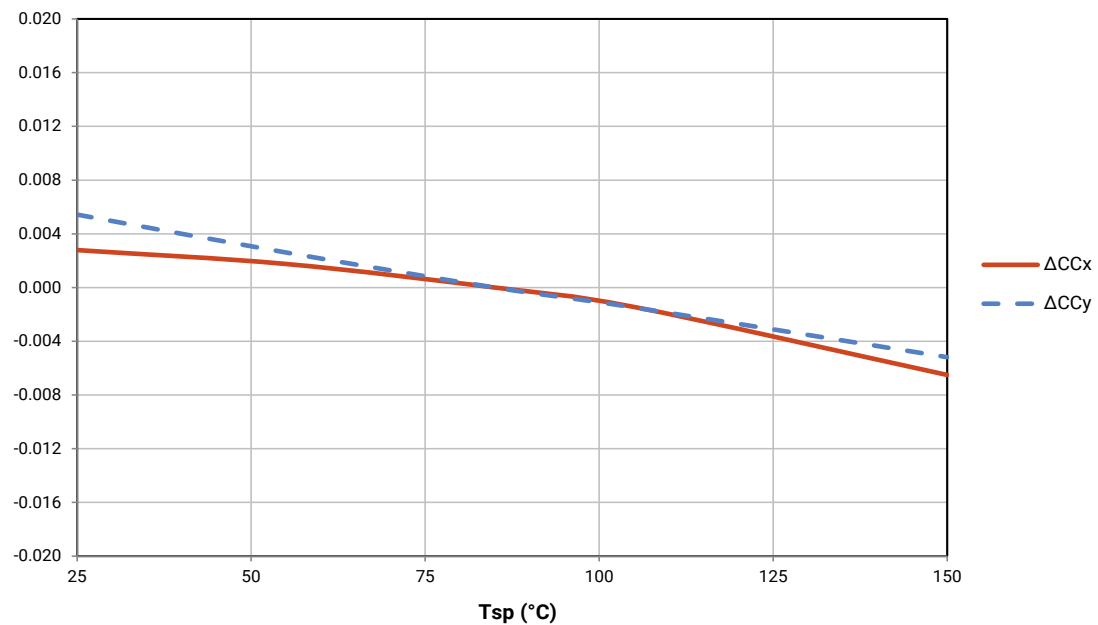
RELATIVE FLUX VS. JUNCTION TEMPERATURE ( $I_F = 700$  MA)

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

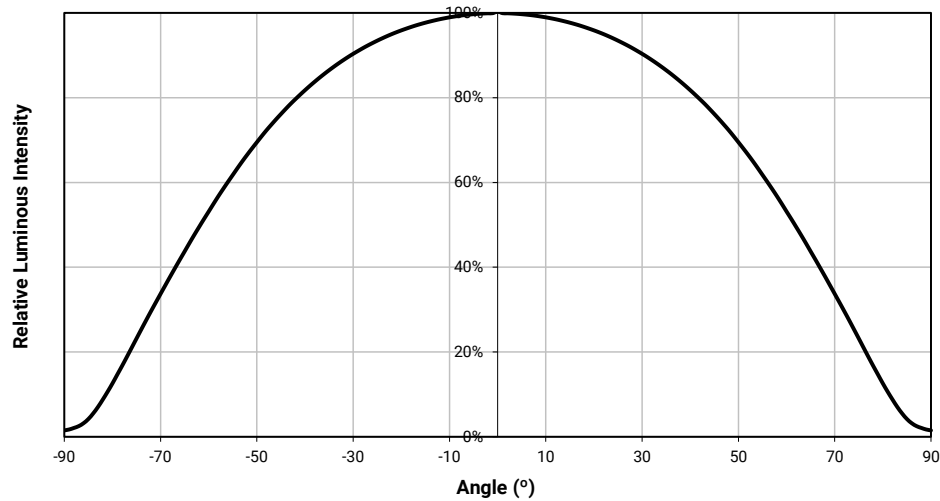
## RELATIVE CHROMATICITY VS. CURRENT (WARM WHITE)



## RELATIVE CHROMATICITY VS. TEMPERATURE (WARM WHITE)

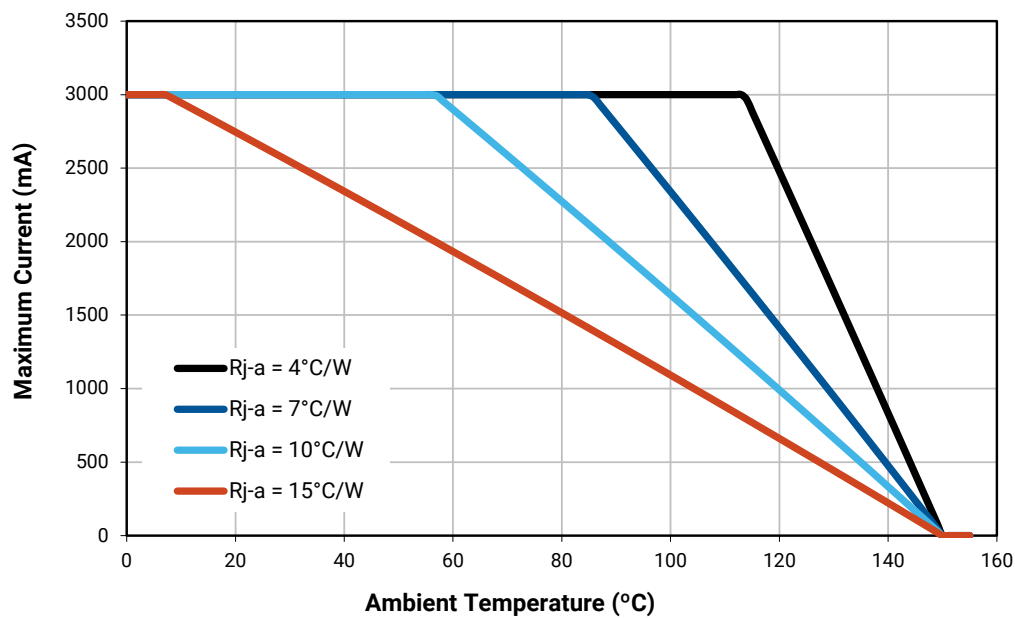


## TYPICAL SPATIAL DISTRIBUTION



## THERMAL DESIGN

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



## PERFORMANCE GROUPS – LUMINOUS FLUX

XLamp XM-L2 LEDs are tested for luminous flux and placed into one of the following luminous-flux groups:

| Group Code | Minimum Luminous Flux<br>@ 700 mA (lm) | Maximum Luminous Flux<br>@ 700 mA (lm) |
|------------|----------------------------------------|----------------------------------------|
| S3         | 156                                    | 164                                    |
| S4         | 164                                    | 172                                    |
| S5         | 172                                    | 182                                    |
| S6         | 182                                    | 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                                    |

## PERFORMANCE GROUPS – CHROMATICITY

| Region | x      | y      | Region | x      | y      | Region | x      | y      | Region | x      | y      |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0A     | 0.2950 | 0.2970 | 0B     | 0.2920 | 0.3060 | 0C     | 0.2984 | 0.3133 | 0D     | 0.2984 | 0.3133 |
|        | 0.2920 | 0.3060 |        | 0.2895 | 0.3135 |        | 0.2962 | 0.3220 |        | 0.3048 | 0.3207 |
|        | 0.2984 | 0.3133 |        | 0.2962 | 0.3220 |        | 0.3028 | 0.3304 |        | 0.3068 | 0.3113 |
|        | 0.3009 | 0.3042 |        | 0.2984 | 0.3133 |        | 0.3048 | 0.3207 |        | 0.3009 | 0.3042 |
| 0R     | 0.2980 | 0.2880 | 0S     | 0.2895 | 0.3135 | 0T     | 0.2962 | 0.3220 | 0U     | 0.3037 | 0.2937 |
|        | 0.2950 | 0.2970 |        | 0.2870 | 0.3210 |        | 0.2937 | 0.3312 |        | 0.3009 | 0.3042 |
|        | 0.3009 | 0.3042 |        | 0.2937 | 0.3312 |        | 0.3005 | 0.3415 |        | 0.3068 | 0.3113 |
|        | 0.3037 | 0.2937 |        | 0.2962 | 0.3220 |        | 0.3028 | 0.3304 |        | 0.3093 | 0.2993 |
| 1A     | 0.3048 | 0.3207 | 1B     | 0.3028 | 0.3304 | 1C     | 0.3115 | 0.3391 | 1D     | 0.3130 | 0.3290 |
|        | 0.3130 | 0.3290 |        | 0.3115 | 0.3391 |        | 0.3205 | 0.3481 |        | 0.3213 | 0.3373 |
|        | 0.3144 | 0.3186 |        | 0.3130 | 0.3290 |        | 0.3213 | 0.3373 |        | 0.3221 | 0.3261 |
|        | 0.3068 | 0.3113 |        | 0.3048 | 0.3207 |        | 0.3130 | 0.3290 |        | 0.3144 | 0.3186 |
| 1R     | 0.3068 | 0.3113 | 1S     | 0.3005 | 0.3415 | 1T     | 0.3099 | 0.3509 | 1U     | 0.3144 | 0.3186 |
|        | 0.3144 | 0.3186 |        | 0.3099 | 0.3509 |        | 0.3196 | 0.3602 |        | 0.3221 | 0.3261 |
|        | 0.3161 | 0.3059 |        | 0.3115 | 0.3391 |        | 0.3205 | 0.3481 |        | 0.3231 | 0.3120 |
|        | 0.3093 | 0.2993 |        | 0.3028 | 0.3304 |        | 0.3115 | 0.3391 |        | 0.3161 | 0.3059 |

## 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 |
| 3R     | 0.3366 | 0.3369 | 3S     | 0.3381 | 0.3762 | 3T     | 0.3480 | 0.3840 | 3U     | 0.3440 | 0.3428 |
|        | 0.3440 | 0.3428 |        | 0.3480 | 0.3840 |        | 0.3571 | 0.3907 |        | 0.3515 | 0.3487 |
|        | 0.3429 | 0.3307 |        | 0.3463 | 0.3687 |        | 0.3551 | 0.3760 |        | 0.3495 | 0.3339 |
|        | 0.3361 | 0.3245 |        | 0.3376 | 0.3616 |        | 0.3463 | 0.3687 |        | 0.3429 | 0.3307 |
| 4A     | 0.3530 | 0.3597 | 4B     | 0.3548 | 0.3736 | 4C     | 0.3641 | 0.3804 | 4D     | 0.3615 | 0.3659 |
|        | 0.3615 | 0.3659 |        | 0.3641 | 0.3804 |        | 0.3736 | 0.3874 |        | 0.3702 | 0.3722 |
|        | 0.3590 | 0.3521 |        | 0.3615 | 0.3659 |        | 0.3702 | 0.3722 |        | 0.3670 | 0.3578 |
|        | 0.3512 | 0.3465 |        | 0.3530 | 0.3597 |        | 0.3615 | 0.3659 |        | 0.3590 | 0.3521 |
| 4R     | 0.3512 | 0.3465 | 4S     | 0.3571 | 0.3907 | 4T     | 0.3668 | 0.3957 | 4U     | 0.3590 | 0.3521 |
|        | 0.3590 | 0.3521 |        | 0.3668 | 0.3957 |        | 0.3771 | 0.4034 |        | 0.3670 | 0.3578 |
|        | 0.3567 | 0.3389 |        | 0.3641 | 0.3804 |        | 0.3736 | 0.3874 |        | 0.3640 | 0.3440 |
|        | 0.3495 | 0.3339 |        | 0.3548 | 0.3736 |        | 0.3641 | 0.3804 |        | 0.3567 | 0.3389 |
| 5A1    | 0.3670 | 0.3578 | 5A2    | 0.3686 | 0.3649 | 5A3    | 0.3744 | 0.3685 | 5A4    | 0.3726 | 0.3612 |
|        | 0.3686 | 0.3649 |        | 0.3702 | 0.3722 |        | 0.3763 | 0.3760 |        | 0.3744 | 0.3685 |
|        | 0.3744 | 0.3685 |        | 0.3763 | 0.3760 |        | 0.3825 | 0.3798 |        | 0.3804 | 0.3721 |
|        | 0.3726 | 0.3612 |        | 0.3744 | 0.3685 |        | 0.3804 | 0.3721 |        | 0.3783 | 0.3646 |
| 5B1    | 0.3702 | 0.3722 | 5B2    | 0.3719 | 0.3797 | 5B3    | 0.3782 | 0.3837 | 5B4    | 0.3763 | 0.3760 |
|        | 0.3719 | 0.3797 |        | 0.3736 | 0.3874 |        | 0.3802 | 0.3916 |        | 0.3782 | 0.3837 |
|        | 0.3782 | 0.3837 |        | 0.3802 | 0.3916 |        | 0.3869 | 0.3958 |        | 0.3847 | 0.3877 |
|        | 0.3763 | 0.3760 |        | 0.3782 | 0.3837 |        | 0.3847 | 0.3877 |        | 0.3825 | 0.3798 |
| 5C1    | 0.3825 | 0.3798 | 5C2    | 0.3847 | 0.3877 | 5C3    | 0.3912 | 0.3917 | 5C4    | 0.3887 | 0.3836 |
|        | 0.3847 | 0.3877 |        | 0.3869 | 0.3958 |        | 0.3937 | 0.4001 |        | 0.3912 | 0.3917 |
|        | 0.3912 | 0.3917 |        | 0.3937 | 0.4001 |        | 0.4006 | 0.4044 |        | 0.3978 | 0.3958 |
|        | 0.3887 | 0.3836 |        | 0.3912 | 0.3917 |        | 0.3978 | 0.3958 |        | 0.3950 | 0.3875 |
| 5D1    | 0.3783 | 0.3646 | 5D2    | 0.3804 | 0.3721 | 5D3    | 0.3863 | 0.3758 | 5D4    | 0.3840 | 0.3681 |
|        | 0.3804 | 0.3721 |        | 0.3825 | 0.3798 |        | 0.3887 | 0.3836 |        | 0.3863 | 0.3758 |
|        | 0.3863 | 0.3758 |        | 0.3887 | 0.3836 |        | 0.3950 | 0.3875 |        | 0.3924 | 0.3794 |
|        | 0.3840 | 0.3681 |        | 0.3863 | 0.3758 |        | 0.3924 | 0.3794 |        | 0.3898 | 0.3716 |

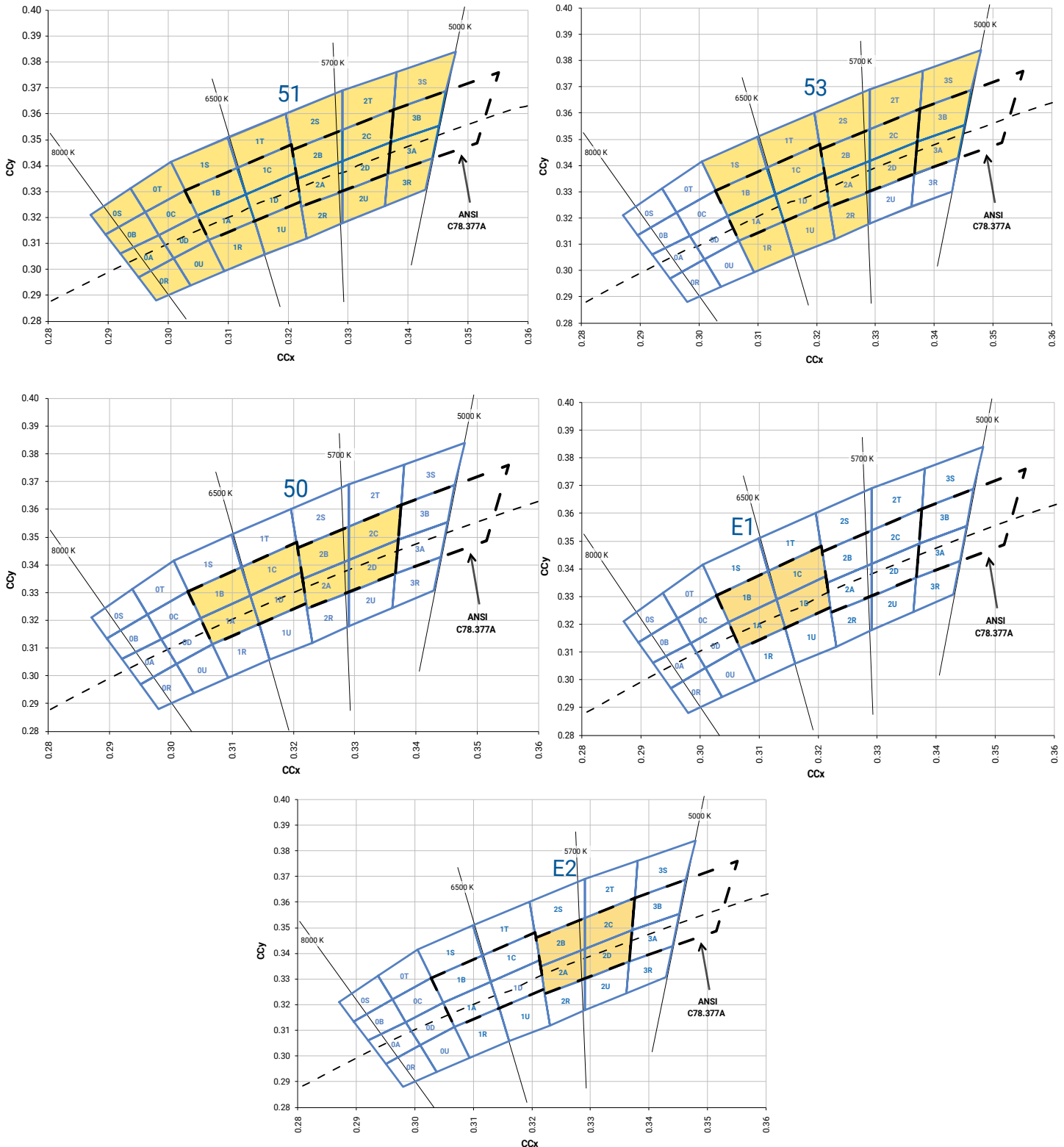
## PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

| Region | x      | y      | Region | x      | y      | Region | x      | y      | Region | x      | y      |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 6A1    | 0.3889 | 0.3690 | 6A2    | 0.3915 | 0.3768 | 6A3    | 0.3981 | 0.3800 | 6A4    | 0.3953 | 0.3720 |
|        | 0.3915 | 0.3768 |        | 0.3941 | 0.3848 |        | 0.4010 | 0.3882 |        | 0.3981 | 0.3800 |
|        | 0.3981 | 0.3800 |        | 0.4010 | 0.3882 |        | 0.4080 | 0.3916 |        | 0.4048 | 0.3832 |
|        | 0.3953 | 0.3720 |        | 0.3981 | 0.3800 |        | 0.4048 | 0.3832 |        | 0.4017 | 0.3751 |
| 6B1    | 0.3941 | 0.3848 | 6B2    | 0.3968 | 0.3930 | 6B3    | 0.4040 | 0.3966 | 6B4    | 0.4010 | 0.3882 |
|        | 0.3968 | 0.3930 |        | 0.3996 | 0.4015 |        | 0.4071 | 0.4052 |        | 0.4040 | 0.3966 |
|        | 0.4040 | 0.3966 |        | 0.4071 | 0.4052 |        | 0.4146 | 0.4089 |        | 0.4113 | 0.4001 |
|        | 0.4010 | 0.3882 |        | 0.4040 | 0.3966 |        | 0.4113 | 0.4001 |        | 0.4080 | 0.3916 |
| 6C1    | 0.4080 | 0.3916 | 6C2    | 0.4113 | 0.4001 | 6C3    | 0.4186 | 0.4037 | 6C4    | 0.4150 | 0.3950 |
|        | 0.4113 | 0.4001 |        | 0.4146 | 0.4089 |        | 0.4222 | 0.4127 |        | 0.4186 | 0.4037 |
|        | 0.4186 | 0.4037 |        | 0.4222 | 0.4127 |        | 0.4299 | 0.4165 |        | 0.4259 | 0.4073 |
|        | 0.4150 | 0.3950 |        | 0.4186 | 0.4037 |        | 0.4259 | 0.4073 |        | 0.4221 | 0.3984 |
| 6D1    | 0.4017 | 0.3751 | 6D2    | 0.4048 | 0.3832 | 6D3    | 0.4116 | 0.3865 | 6D4    | 0.4082 | 0.3782 |
|        | 0.4048 | 0.3832 |        | 0.4080 | 0.3916 |        | 0.4150 | 0.3950 |        | 0.4116 | 0.3865 |
|        | 0.4116 | 0.3865 |        | 0.4150 | 0.3950 |        | 0.4221 | 0.3984 |        | 0.4183 | 0.3898 |
|        | 0.4082 | 0.3782 |        | 0.4116 | 0.3865 |        | 0.4183 | 0.3898 |        | 0.4147 | 0.3814 |
| 7A1    | 0.4147 | 0.3814 | 7A2    | 0.4183 | 0.3898 | 7A3    | 0.4242 | 0.3919 | 7A4    | 0.4203 | 0.3833 |
|        | 0.4183 | 0.3898 |        | 0.4221 | 0.3984 |        | 0.4281 | 0.4006 |        | 0.4242 | 0.3919 |
|        | 0.4242 | 0.3919 |        | 0.4281 | 0.4006 |        | 0.4342 | 0.4028 |        | 0.4300 | 0.3939 |
|        | 0.4203 | 0.3833 |        | 0.4242 | 0.3919 |        | 0.4300 | 0.3939 |        | 0.4259 | 0.353  |
| 7B1    | 0.4221 | 0.3984 | 7B2    | 0.4259 | 0.4073 | 7B3    | 0.4322 | 0.4096 | 7B4    | 0.4281 | 0.4006 |
|        | 0.4259 | 0.4073 |        | 0.4299 | 0.4165 |        | 0.4364 | 0.4188 |        | 0.4322 | 0.4096 |
|        | 0.4322 | 0.4096 |        | 0.4364 | 0.4188 |        | 0.4430 | 0.4212 |        | 0.4385 | 0.4119 |
|        | 0.4281 | 0.4006 |        | 0.4322 | 0.4096 |        | 0.4385 | 0.4119 |        | 0.4342 | 0.4028 |
| 7C1    | 0.4342 | 0.4028 | 7C2    | 0.4385 | 0.4119 | 7C3    | 0.4449 | 0.4141 | 7C4    | 0.4403 | 0.4049 |
|        | 0.4385 | 0.4119 |        | 0.4430 | 0.4212 |        | 0.4496 | 0.4236 |        | 0.4449 | 0.4141 |
|        | 0.4449 | 0.4141 |        | 0.4496 | 0.4236 |        | 0.4562 | 0.4260 |        | 0.4513 | 0.4164 |
|        | 0.4403 | 0.4049 |        | 0.4449 | 0.4141 |        | 0.4513 | 0.4164 |        | 0.4465 | 0.4071 |
| 7D1    | 0.4259 | 0.3853 | 7D2    | 0.4300 | 0.3939 | 7D3    | 0.4359 | 0.3960 | 7D4    | 0.4316 | 0.3873 |
|        | 0.4300 | 0.3939 |        | 0.4342 | 0.4028 |        | 0.4403 | 0.4049 |        | 0.4359 | 0.3960 |
|        | 0.4359 | 0.3960 |        | 0.4403 | 0.4049 |        | 0.4465 | 0.4071 |        | 0.4418 | 0.3981 |
|        | 0.4316 | 0.3873 |        | 0.4359 | 0.3960 |        | 0.4418 | 0.3981 |        | 0.4373 | 0.3893 |
| 8A1    | 0.4373 | 0.3893 | 8A2    | 0.4418 | 0.3981 | 8A3    | 0.4475 | 0.3994 | 8A4    | 0.4428 | 0.3906 |
|        | 0.4418 | 0.3981 |        | 0.4465 | 0.4071 |        | 0.4523 | 0.4085 |        | 0.4475 | 0.3994 |
|        | 0.4475 | 0.3994 |        | 0.4523 | 0.4085 |        | 0.4582 | 0.4099 |        | 0.4532 | 0.4008 |
|        | 0.4428 | 0.3906 |        | 0.4475 | 0.3994 |        | 0.4532 | 0.4008 |        | 0.4483 | 0.3919 |
| 8B1    | 0.4465 | 0.4071 | 8B2    | 0.4513 | 0.4164 | 8B3    | 0.4573 | 0.4178 | 8B4    | 0.4523 | 0.4085 |
|        | 0.4513 | 0.4164 |        | 0.4562 | 0.4260 |        | 0.4624 | 0.4274 |        | 0.4573 | 0.4178 |
|        | 0.4573 | 0.4178 |        | 0.4624 | 0.4274 |        | 0.4687 | 0.4289 |        | 0.4634 | 0.4193 |
|        | 0.4523 | 0.4085 |        | 0.4573 | 0.4178 |        | 0.4634 | 0.4193 |        | 0.4582 | 0.4099 |

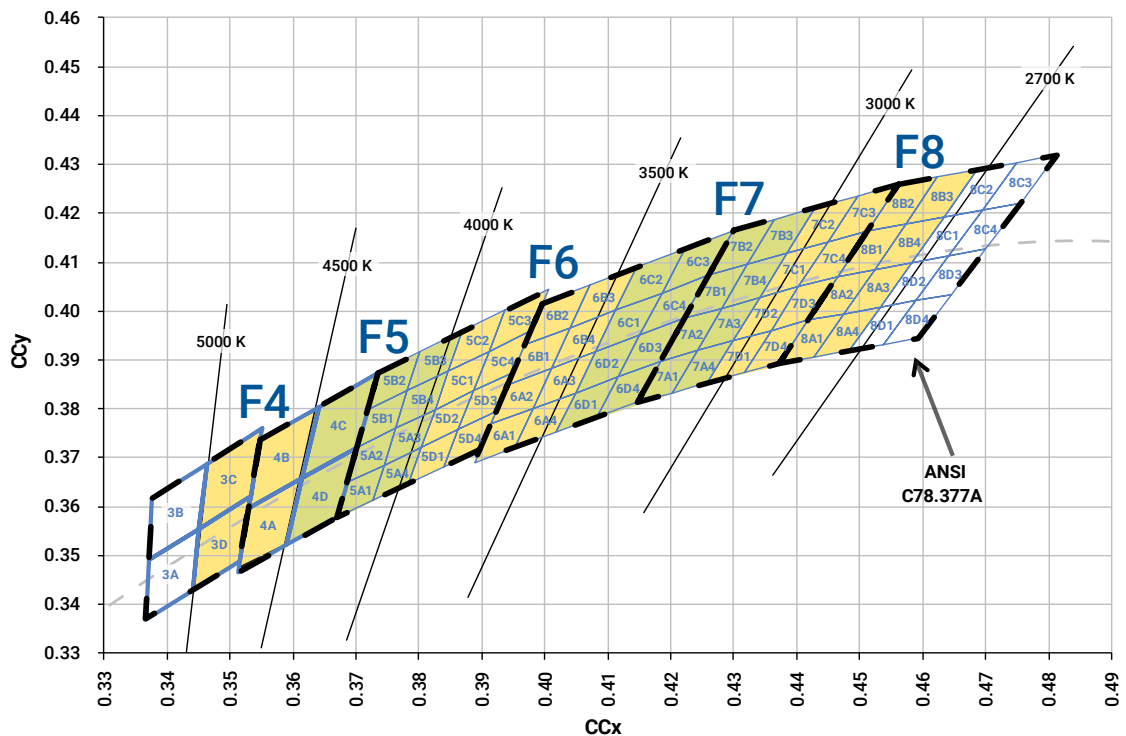
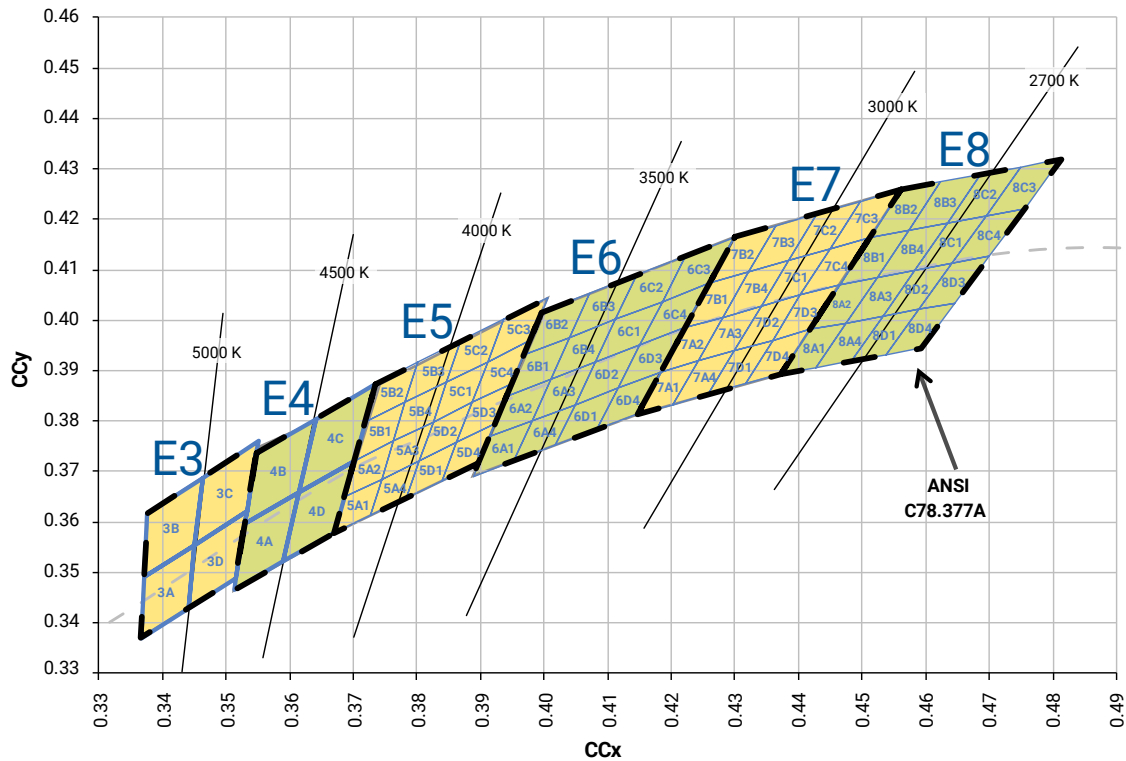
## PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

| Region | x      | y      | Region | x      | y      | Region | x      | y      | Region | x      | y      |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 8C1    | 0.4582 | 0.4099 | 8C2    | 0.4634 | 0.4193 | 8C3    | 0.4695 | 0.4207 | 8C4    | 0.4641 | 0.4112 |
|        | 0.4634 | 0.4193 |        | 0.4687 | 0.4289 |        | 0.4750 | 0.4304 |        | 0.4695 | 0.4207 |
|        | 0.4695 | 0.4207 |        | 0.4750 | 0.4304 |        | 0.4813 | 0.4319 |        | 0.4756 | 0.4221 |
|        | 0.4641 | 0.4112 |        | 0.4695 | 0.4207 |        | 0.4756 | 0.4221 |        | 0.4700 | 0.4126 |
| 8D1    | 0.4483 | 0.3919 | 8D2    | 0.4532 | 0.4008 | 8D3    | 0.4589 | 0.4021 | 8D4    | 0.4538 | 0.3931 |
|        | 0.4532 | 0.4008 |        | 0.4582 | 0.4099 |        | 0.4641 | 0.4112 |        | 0.4589 | 0.4021 |
|        | 0.4589 | 0.4021 |        | 0.4641 | 0.4112 |        | 0.4700 | 0.4126 |        | 0.4646 | 0.4034 |
|        | 0.4538 | 0.3931 |        | 0.4589 | 0.4021 |        | 0.4646 | 0.4034 |        | 0.4593 | 0.3944 |

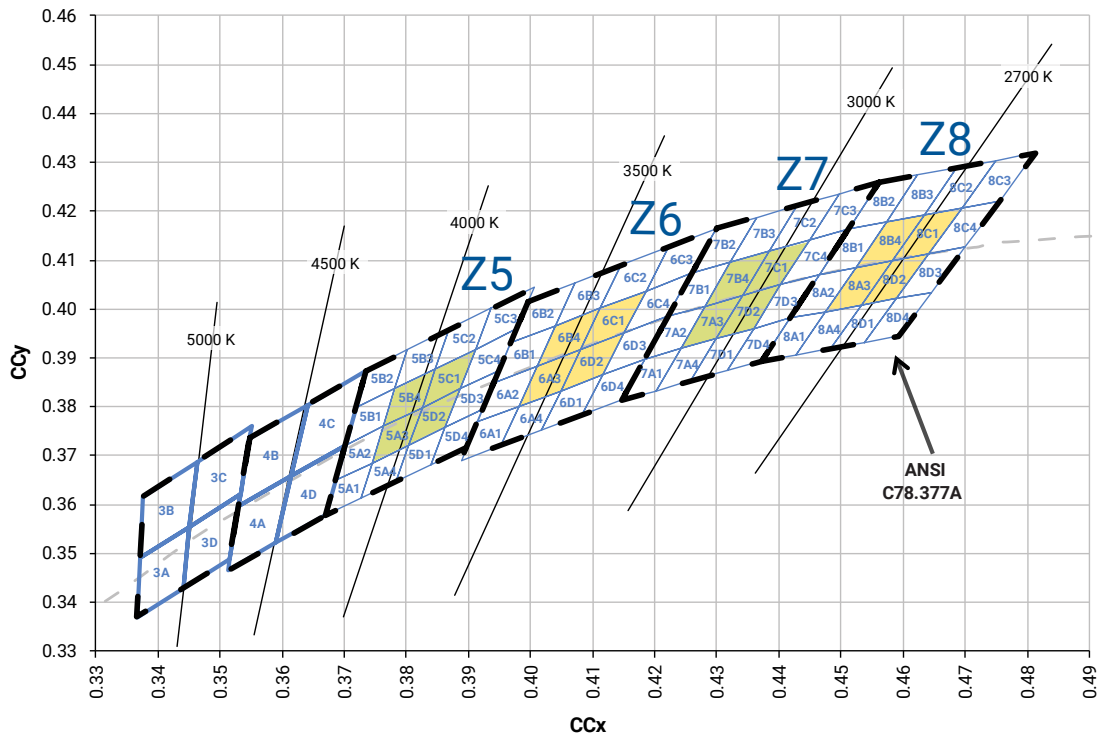
## STANDARD COOL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS



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



## STANDARD WARM AND NEUTRAL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS - CONTINUED



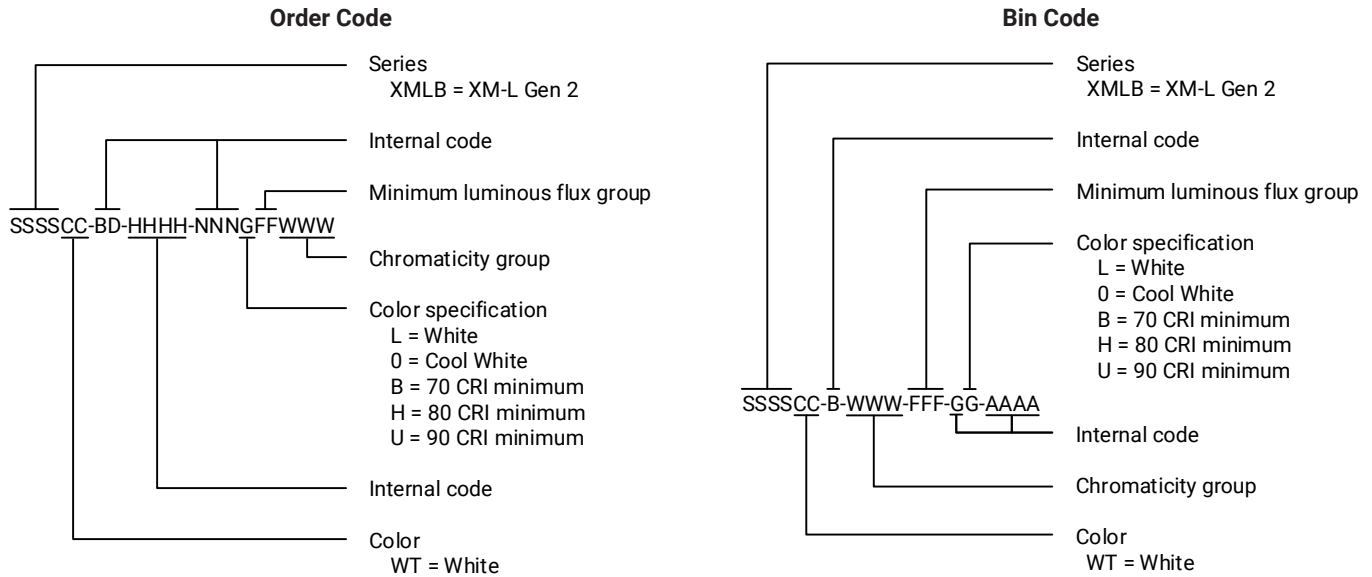
## STANDARD CHROMATICITY KITS

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

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

## BIN AND ORDER CODE FORMATS

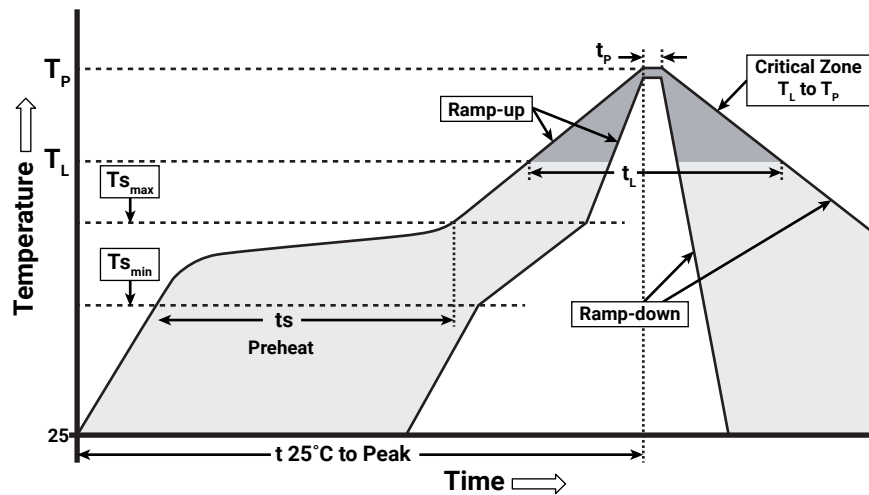
Bin codes and order codes for XM-L2 LEDs are configured in the following manner:



## REFLOW SOLDERING CHARACTERISTICS

In testing, Cree LED has found XLamp XM-L2 LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree LED recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used, and therefore it is the lamp or luminaire manufacturer's responsibility to determine applicable soldering requirements.

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



IPC/JEDEC J-STD-020C

| Profile Feature                                       | Lead-Free Solder |
|-------------------------------------------------------|------------------|
| Average Ramp-Up Rate ( $T_{s_{max}}$ to $T_P$ )       | 1.2 °C/second    |
| Preheat: Temperature Min ( $T_{s_{min}}$ )            | 120 °C           |
| Preheat: Temperature Max ( $T_{s_{max}}$ )            | 170 °C           |
| Preheat: Time ( $t_{s_{min}}$ to $t_{s_{max}}$ )      | 65-150 seconds   |
| Time Maintained Above: Temperature ( $T_L$ )          | 217 °C           |
| Time Maintained Above: Time ( $t_L$ )                 | 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 LED'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 LED applies to ensure long-term reliability for XLamp LEDs and details of Cree LED's pre-release qualification testing for XLamp LEDs.

### Lumen Maintenance

Cree LED 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 LED'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 LED 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-L2 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 the storage condition, Cree LED 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 LED representative or from the [Product Ecology](#) section of the Cree LED 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 LED 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**

This product meets the requirements to be considered a UL Recognized Component with Level 4 enclosure consideration. The LED package or a portion thereof has been investigated as a fire and electrical enclosure per ANSI/UL 8750.

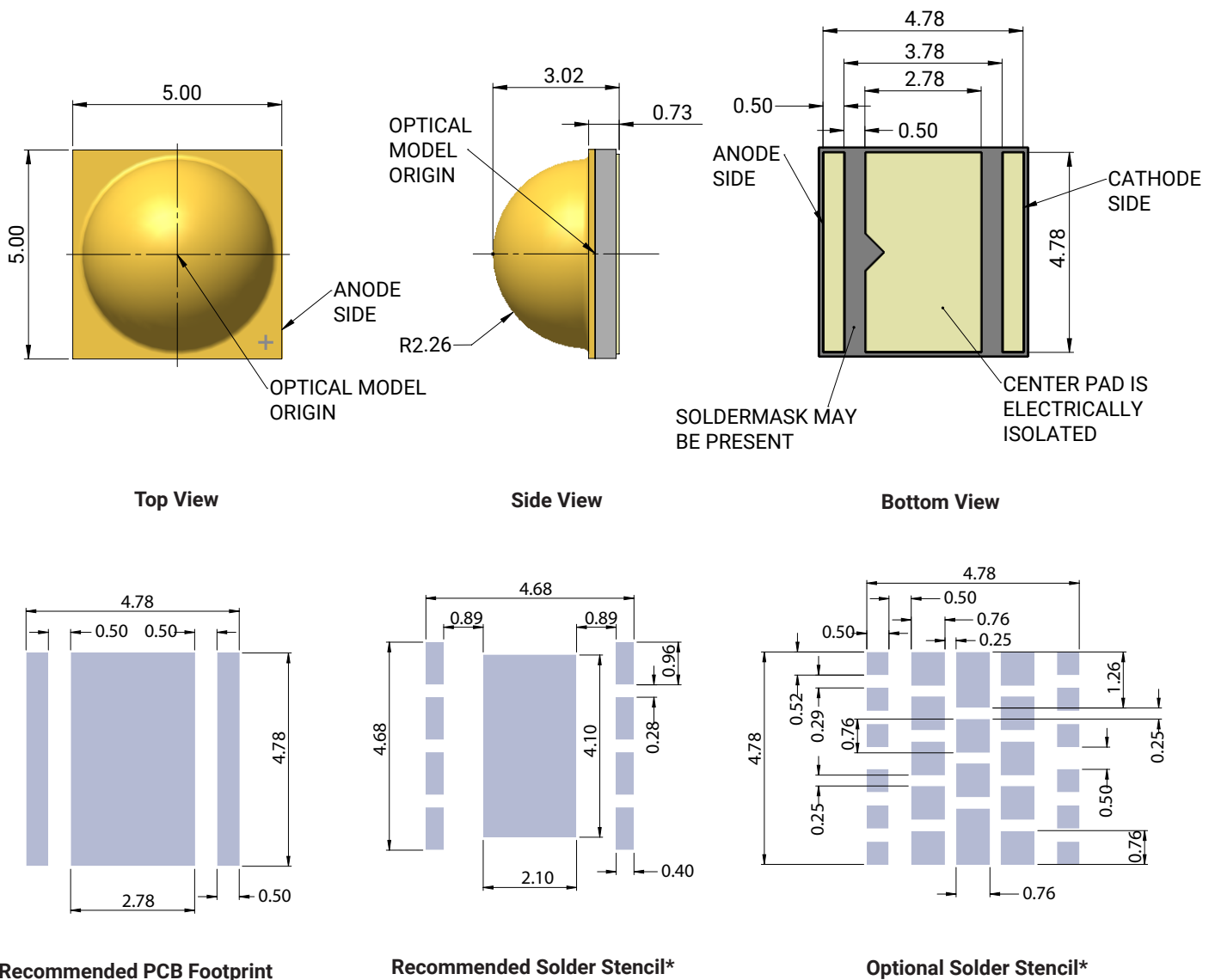
### **Vision Advisory**

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

## MECHANICAL DIMENSIONS

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

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



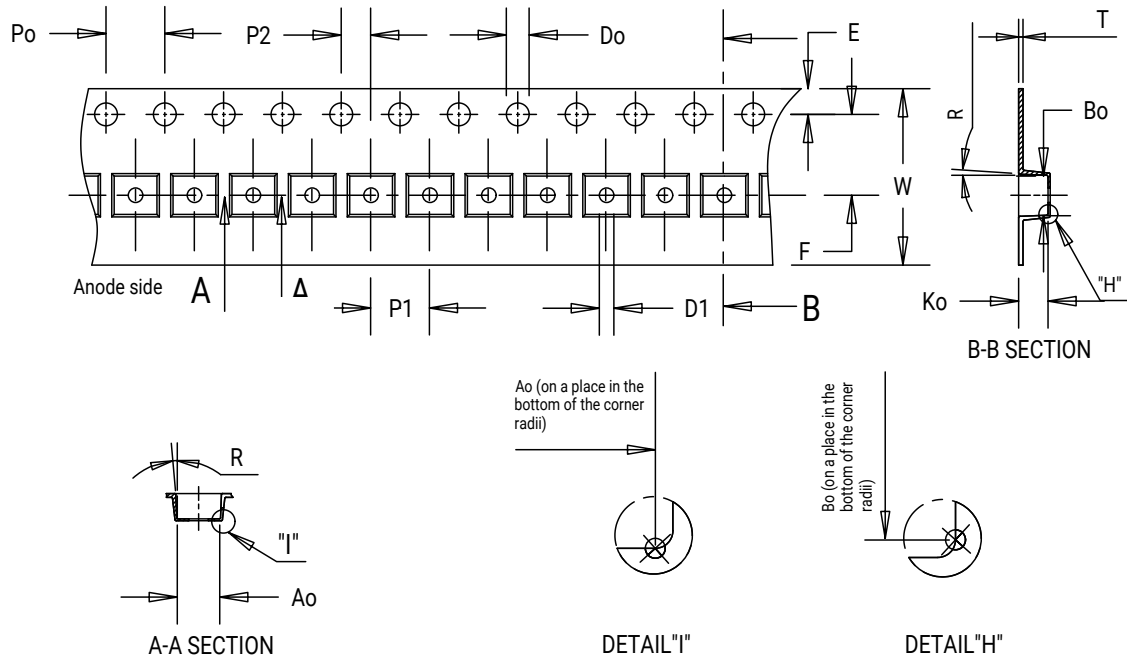
## Notes:

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

## TAPE AND REEL

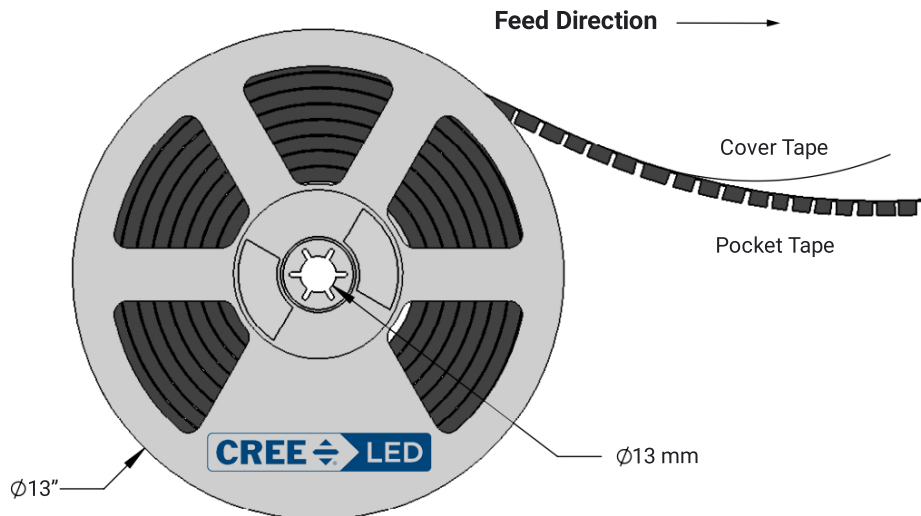
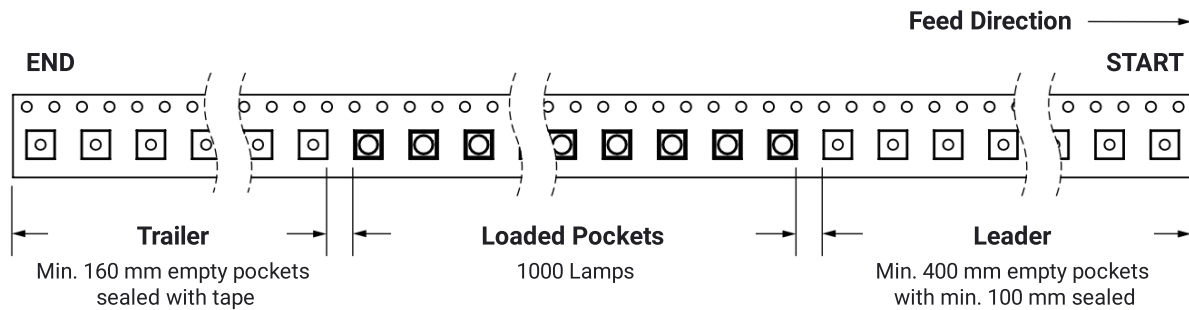
All Cree LED carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

Except as noted, all dimensions in mm.



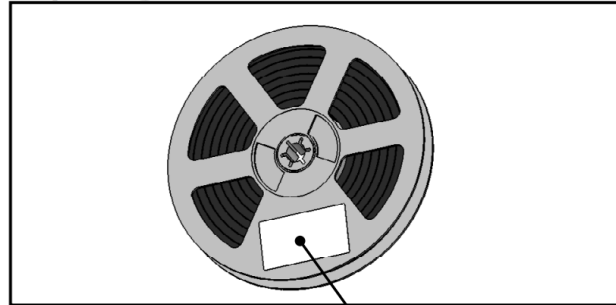
| Item | Ao   | Bo   | Ko   | Po   | P1   | P2   | T    | E    | F    | Do   | D1   | W     | R  |
|------|------|------|------|------|------|------|------|------|------|------|------|-------|----|
| Dim. | 5.40 | 5.40 | 3.35 | 4.00 | 8.00 | 2.00 | 0.36 | 1.75 | 5.50 | 1.50 | 1.50 | 12.00 | 3° |

## TAPE AND REEL - CONTINUED



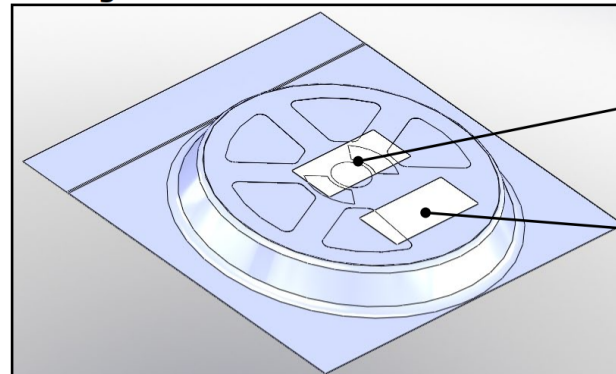
## PACKAGING

## Unpackaged Reel



Label with Cree LED Bin Code, Quantity, Reel ID

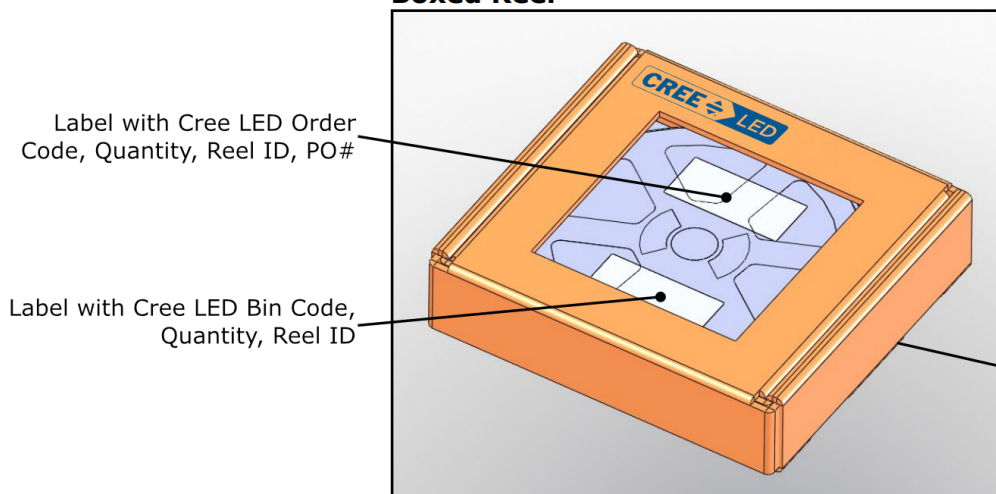
## Packaged Reel



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

Label with Cree LED Bin Code, Quantity, Reel ID

## Boxed Reel



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

Label with Cree LED Bin Code, Quantity, Reel ID

Patent Label (on bottom of box)

## APPENDIX - ORDER CODES NOT FOR NEW DESIGNS

The following order codes are active and valid order codes, but higher performance options are also available. Please see page 4 for order codes of XLamp XM-L2 LEDs that could serve as alternatives for the order codes set forth below.

| Chromaticity                      |        | Minimum Luminous Flux (lm) @ 700 mA |                   | Order Codes              |                          |
|-----------------------------------|--------|-------------------------------------|-------------------|--------------------------|--------------------------|
| Kit                               | CCT    | Code                                | Flux (lm) @ 85 °C | 65 CRI Typical           | 85 CRI Minimum           |
| ANSI Cool White (5000 K – 8300 K) |        |                                     |                   |                          |                          |
| 51                                | 6200 K | T5                                  | 260               | XMLBWT-00-0000-0000T5051 |                          |
|                                   |        | T4                                  | 240               |                          | XMLBWT-00-0000-000PT4051 |
|                                   |        | T3                                  | 220               |                          | XMLBWT-00-0000-000PT3051 |
|                                   |        | T2                                  | 200               |                          | XMLBWT-00-0000-000PT2051 |
| 53                                | 6000 K | T5                                  | 260               | XMLBWT-00-0000-0000T5053 |                          |
|                                   |        | T4                                  | 240               |                          | XMLBWT-00-0000-000PT4053 |
|                                   |        | T3                                  | 220               |                          | XMLBWT-00-0000-000PT3053 |
|                                   |        | T2                                  | 200               |                          | XMLBWT-00-0000-000PT2053 |
| 50                                | 6200 K | T5                                  | 260               | XMLBWT-00-0000-0000T5050 |                          |
|                                   |        | T4                                  | 240               |                          | XMLBWT-00-0000-000PT4050 |
|                                   |        | T3                                  | 220               |                          | XMLBWT-00-0000-000PT3050 |
|                                   |        | T2                                  | 200               |                          | XMLBWT-00-0000-000PT2050 |
| E1                                | 6500 K | T5                                  | 260               | XMLBWT-00-0000-0000T50E1 |                          |
|                                   |        | T4                                  | 240               |                          | XMLBWT-00-0000-000PT40E1 |
|                                   |        | T3                                  | 220               |                          | XMLBWT-00-0000-000PT30E1 |
|                                   |        | T2                                  | 200               |                          | XMLBWT-00-0000-000PT20E1 |
| E2                                | 5700 K | T5                                  | 260               | XMLBWT-00-0000-0000T50E2 |                          |
|                                   |        | T4                                  | 240               |                          | XMLBWT-00-0000-000PT40E2 |
|                                   |        | T3                                  | 220               |                          | XMLBWT-00-0000-000PT30E2 |
|                                   |        | T2                                  | 200               |                          | XMLBWT-00-0000-000PT20E2 |

### Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).

## APPENDIX - ORDER CODES NOT FOR NEW DESIGNS - CONTINUED

The following order codes are active and valid order codes, but higher performance options are also available. Please see page 5 - page 6 for order codes of XLamp XM-L2 LEDs that could serve as alternatives for the order codes set forth below.

| Chromaticity                         |        | Minimum Luminous Flux (lm) @ 700 mA |                   | Order Codes              |                          |                          |
|--------------------------------------|--------|-------------------------------------|-------------------|--------------------------|--------------------------|--------------------------|
| Kit                                  | CCT    | Code                                | Flux (lm) @ 85 °C | 70 CRI Minimum           | 75 CRI Typical           | 80 CRI Minimum           |
| ANSI Neutral White (3700 K – 5000 K) |        |                                     |                   |                          |                          |                          |
| E3                                   | 5000 K | T6                                  | 280               | XMLBWT-00-0000-000BT60E3 | XMLBWT-00-0000-000LT60E3 |                          |
|                                      |        | T5                                  | 260               | XMLBWT-00-0000-000BT50E3 | XMLBWT-00-0000-000LT50E3 |                          |
|                                      |        | T4                                  | 240               |                          | XMLBWT-00-0000-000LT40E3 |                          |
| F4                                   | 4750 K | T6                                  | 280               | XMLBWT-00-0000-000BT60F4 |                          |                          |
|                                      |        | T5                                  | 260               | XMLBWT-00-0000-000BT50F4 | XMLBWT-00-0000-000LT50F4 |                          |
|                                      |        | T4                                  | 240               |                          | XMLBWT-00-0000-000LT40F4 |                          |
| E4                                   | 4500 K | T6                                  | 280               | XMLBWT-00-0000-000BT60E4 |                          |                          |
|                                      |        | T5                                  | 260               | XMLBWT-00-0000-000BT50E4 | XMLBWT-00-0000-000LT50E4 |                          |
|                                      |        | T4                                  | 240               |                          | XMLBWT-00-0000-000LT40E4 |                          |
| F5                                   | 4250 K | T6                                  | 280               | XMLBWT-00-0000-000BT60F5 |                          |                          |
|                                      |        | T5                                  | 260               | XMLBWT-00-0000-000BT50F5 | XMLBWT-00-0000-000LT50F5 |                          |
|                                      |        | T4                                  | 240               |                          | XMLBWT-00-0000-000LT40F5 |                          |
| E5                                   | 4000 K | T6                                  | 280               | XMLBWT-00-0000-000BT60E5 |                          |                          |
|                                      |        | T5                                  | 260               | XMLBWT-00-0000-000BT50E5 | XMLBWT-00-0000-000LT50E5 | XMLBWT-00-0000-000HT50E5 |
|                                      |        | T4                                  | 240               | XMLBWT-00-0000-000BT40E5 | XMLBWT-00-0000-000LT40E5 | XMLBWT-00-0000-000HT40E5 |
|                                      |        | T3                                  | 220               |                          | XMLBWT-00-0000-000LT30E5 | XMLBWT-00-0000-000HT30E5 |
| Z5                                   | 4000 K | T5                                  | 260               |                          | XMLBWT-00-0000-000LT50Z5 | XMLBWT-00-0000-000HT50Z5 |
|                                      |        | T4                                  | 240               |                          | XMLBWT-00-0000-000LT40Z5 | XMLBWT-00-0000-000HT40Z5 |
|                                      |        | T3                                  | 220               |                          | XMLBWT-00-0000-000LT30Z5 | XMLBWT-00-0000-000HT30Z5 |

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).

## APPENDIX - ORDER CODES NOT FOR NEW DESIGNS - CONTINUED

The following order codes are active and valid order codes, but higher performance options are also available. Please see page 7 - page 9 for order codes of XLamp XM-L2 LEDs that could serve as alternatives for the order codes set forth below.

| Chromaticity                      |        | Minimum Luminous Flux (lm) @ 700 mA |                   | Order Codes              |                          |                          |
|-----------------------------------|--------|-------------------------------------|-------------------|--------------------------|--------------------------|--------------------------|
| Kit                               | CCT    | Code                                | Flux (lm) @ 85 °C | 80 CRI Typical           | 80 CRI Minimum           | 85 CRI Minimum           |
| ANSI Warm White (2700 K - 3750 K) |        |                                     |                   |                          |                          |                          |
| F6                                | 3750 K | T4                                  | 240               | XMLBWT-00-0000-000LT40F6 | XMLBWT-00-0000-000HT40F6 |                          |
|                                   |        | T3                                  | 220               | XMLBWT-00-0000-000LT30F6 | XMLBWT-00-0000-000HT30F6 |                          |
|                                   |        | T2                                  | 200               | XMLBWT-00-0000-000LT20F6 | XMLBWT-00-0000-000HT20F6 |                          |
| E6                                | 3500 K | T4                                  | 240               | XMLBWT-00-0000-000LT40E6 | XMLBWT-00-0000-000HT40E6 |                          |
|                                   |        | T3                                  | 220               | XMLBWT-00-0000-000LT30E6 | XMLBWT-00-0000-000HT30E6 |                          |
|                                   |        | T2                                  | 200               | XMLBWT-00-0000-000LT20E6 | XMLBWT-00-0000-000HT20E6 |                          |
| Z6                                | 3500 K | T4                                  | 240               | XMLBWT-00-0000-000LT40Z6 | XMLBWT-00-0000-000HT40Z6 |                          |
|                                   |        | T3                                  | 220               | XMLBWT-00-0000-000LT30Z6 | XMLBWT-00-0000-000HT30Z6 |                          |
|                                   |        | T2                                  | 200               | XMLBWT-00-0000-000LT20Z6 | XMLBWT-00-0000-000HT20Z6 |                          |
| F7                                | 3250 K | T4                                  | 240               | XMLBWT-00-0000-000LT40F7 | XMLBWT-00-0000-000HT40F7 |                          |
|                                   |        | T3                                  | 220               | XMLBWT-00-0000-000LT30F7 | XMLBWT-00-0000-000HT30F7 |                          |
|                                   |        | T2                                  | 200               | XMLBWT-00-0000-000LT20F7 | XMLBWT-00-0000-000HT20F7 |                          |
| E7                                | 3000 K | T4                                  | 240               | XMLBWT-00-0000-000LT40E7 | XMLBWT-00-0000-000HT40E7 |                          |
|                                   |        | T3                                  | 220               | XMLBWT-00-0000-000LT30E7 | XMLBWT-00-0000-000HT30E7 |                          |
|                                   |        | T2                                  | 200               | XMLBWT-00-0000-000LT20E7 | XMLBWT-00-0000-000HT20E7 | XMLBWT-00-0000-000PT20E7 |
|                                   |        | S6                                  | 182               |                          |                          | XMLBWT-00-0000-000PS60E7 |
|                                   |        | S5                                  | 172               |                          |                          | XMLBWT-00-0000-000PS50E7 |
|                                   |        | S4                                  | 164               |                          |                          | XMLBWT-00-0000-000PS40E7 |

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).

## APPENDIX - ORDER CODES NOT FOR NEW DESIGNS - CONTINUED

| Chromaticity                      |        | Minimum Luminous Flux (lm) @ 700 mA |                   | Order Codes              |                          |                          |
|-----------------------------------|--------|-------------------------------------|-------------------|--------------------------|--------------------------|--------------------------|
| Kit                               | CCT    | Code                                | Flux (lm) @ 85 °C | 80 CRI Typical           | 80 CRI Minimum           | 85 CRI Minimum           |
| ANSI Warm White (2700 K - 3750 K) |        |                                     |                   |                          |                          |                          |
| Z7                                | 3000 K | T4                                  | 240               | XMLBWT-00-0000-000LT40Z7 | XMLBWT-00-0000-000HT40Z7 |                          |
|                                   |        | T3                                  | 220               | XMLBWT-00-0000-000LT30Z7 | XMLBWT-00-0000-000HT30Z7 |                          |
|                                   |        | T2                                  | 200               | XMLBWT-00-0000-000LT20Z7 | XMLBWT-00-0000-000HT20Z7 |                          |
|                                   |        | S6                                  | 182               |                          |                          | XMLBWT-00-0000-000PS60Z7 |
|                                   |        | S5                                  | 172               |                          |                          | XMLBWT-00-0000-000PS50Z7 |
|                                   |        | S4                                  | 164               |                          |                          | XMLBWT-00-0000-000PS40Z7 |
| F8                                | 2850 K | T3                                  | 220               | XMLBWT-00-0000-000LT30F8 | XMLBWT-00-0000-000LT30F8 |                          |
|                                   |        | T2                                  | 200               | XMLBWT-00-0000-000LT20F8 | XMLBWT-00-0000-000HT20F8 |                          |
|                                   |        | S6                                  | 182               | XMLBWT-00-0000-000LS60F8 | XMLBWT-00-0000-000HS60F8 | XMLBWT-00-0000-000PS60F8 |
|                                   |        | S5                                  | 172               |                          |                          | XMLBWT-00-0000-000PS50F8 |
|                                   |        | S4                                  | 164               |                          |                          | XMLBWT-00-0000-000PS40F8 |
|                                   |        | S3                                  | 156               |                          |                          | XMLBWT-00-0000-000PS30F8 |
| E8                                | 2700 K | T3                                  | 220               | XMLBWT-00-0000-000LT30E8 | XMLBWT-00-0000-000HT30E8 |                          |
|                                   |        | T2                                  | 200               | XMLBWT-00-0000-000LT20E8 | XMLBWT-00-0000-000HT20E8 |                          |
|                                   |        | S6                                  | 182               | XMLBWT-00-0000-000LS60E8 | XMLBWT-00-0000-000HS60E8 | XMLBWT-00-0000-000PS60E8 |
|                                   |        | S5                                  | 172               |                          |                          | XMLBWT-00-0000-000PS50E8 |
|                                   |        | S4                                  | 164               |                          |                          | XMLBWT-00-0000-000PS40E8 |
|                                   |        | S3                                  | 156               |                          |                          | XMLBWT-00-0000-000PS30E8 |

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).

## APPENDIX - ORDER CODES NOT FOR NEW DESIGNS - CONTINUED

| Chromaticity                      |        | Minimum Luminous Flux (lm) @ 700 mA |                   | Order Codes              |                          |                          |
|-----------------------------------|--------|-------------------------------------|-------------------|--------------------------|--------------------------|--------------------------|
| Kit                               | CCT    | Code                                | Flux (lm) @ 85 °C | 80 CRI Typical           | 80 CRI Minimum           | 85 CRI Minimum           |
| ANSI Warm White (2700 K - 3750 K) |        |                                     |                   |                          |                          |                          |
| Z8                                | 2700 K | T3                                  | 220               | XMLBWT-00-0000-000LT30Z8 | XMLBWT-00-0000-000HT30Z8 |                          |
|                                   |        | T2                                  | 200               | XMLBWT-00-0000-000LT20Z8 | XMLBWT-00-0000-000HT20Z8 |                          |
|                                   |        | S6                                  | 182               | XMLBWT-00-0000-000LS60Z8 | XMLBWT-00-0000-000HS60Z8 |                          |
|                                   |        | S5                                  | 172               |                          |                          | XMLBWT-00-0000-000PS50Z8 |
|                                   |        | S4                                  | 164               |                          |                          | XMLBWT-00-0000-000PS40Z8 |
|                                   |        | S3                                  | 156               |                          |                          | XMLBWT-00-0000-000PS30Z8 |

## Notes

- Cree LED maintains a tolerance of  $\pm 7\%$  on flux and power measurements,  $\pm 0.005$  on chromaticity (CCx, CCy) measurements and a tolerance of  $\pm 2$  on CRI measurements. See the Measurements section (page 25).

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