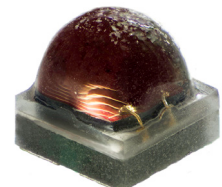
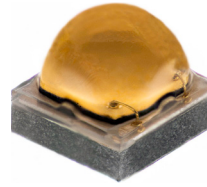
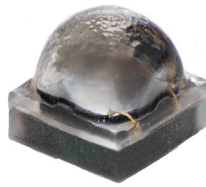
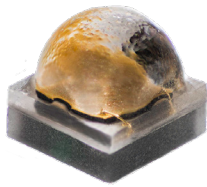
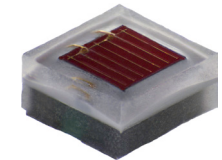
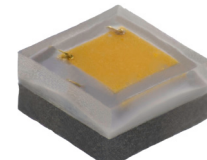
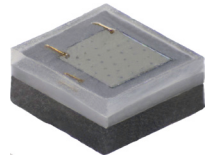
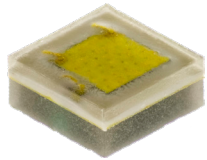


## Cree® XLamp® XQ-E LEDs



XQ-E High Density LEDs



XQ-E High Intensity LEDs

### PRODUCT DESCRIPTION

The XLamp® XQ-E LEDs are available in two versions: high density and high intensity. The XQ-E High Density LED enables lighting manufacturers to significantly reduce the size and total cost of their LED luminaires versus similar performance 3.5-mm footprint LEDs, without sacrificing lumen output, efficacy or reliability. The XQ-E's combination of optical symmetry, consistent design across all configurations and tiny 1.6 mm X 1.6 mm footprint simplifies manufacturing and design while providing excellent color mixing.

The new XQ-E High Intensity LED uses an innovative primary optic design optimized to deliver maximum candela, especially through narrow-beam secondary optics.

### FEATURES

- Cree's smallest lighting class LED: 1.6 mm X 1.6 mm
- Available in high-density & high-intensity versions for design flexibility
- Available in 70, 80, & 90 CRI white, royal blue, blue, PC blue, green, PC amber, red-orange, red & high efficiency (HE) photo red
- Maximum drive current: 1 A (high density & high intensity)
- Reflow solderable - JEDEC J-STD-020C compatible
- Unlimited floor life at ≤ 30 °C/85% RH
- RoHS and REACH compliant
- UL® recognized component (E349212)

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## CHARACTERISTICS

| Characteristics   | Unit    | Minimum | Typical  | Maximum |
|---|---------|---------|----------|---------|
| Thermal resistance, junction to solder point - white, royal blue, blue, PC blue | °C/W    |         | 6        |         |
| Thermal resistance, junction to solder point - green                            | °C/W    |         | 9        |         |
| Thermal resistance, junction to solder point - PC amber                         | °C/W    |         | 8        |         |
| Thermal resistance, junction to solder point - red-orange, red, HE photo red    | °C/W    |         | 5        |         |
| Viewing angle (FWHM) - High Density white                                       | degrees |         | 110      |         |
| Viewing angle (FWHM) - High Density royal blue, blue, green, PC amber           | degrees |         | 125      |         |
| Viewing angle (FWHM) - High Density red-orange, red, HE photo red               | degrees |         | 130      |         |
| Viewing angle (FWHM) - High Intensity white                                     | degrees |         | 120      |         |
| Viewing angle (FWHM) - High Intensity royal blue, blue, PC blue, green          | degrees |         | 130      |         |
| Viewing angle (FWHM) - High Intensity PC amber                                  | degrees |         | 120      |         |
| Viewing angle (FWHM) - High Intensity red-orange, red                           | degrees |         | 125      |         |
| Temperature coefficient of voltage - white                                      | mV/°C   |         | -2.3     |         |
| Temperature coefficient of voltage - royal blue, blue, PC blue                  | mV/°C   |         | -3.3     |         |
| Temperature coefficient of voltage - green                                      | mV/°C   |         | -3.8     |         |
| Temperature coefficient of voltage - PC amber                                   | mV/°C   |         | -3.3     |         |
| Temperature coefficient of voltage - red-orange, red                            | mV/°C   |         | -1.8     |         |
| Temperature coefficient of voltage - HE photo red                               | mV/°C   |         | -1.6     |         |
| ESD withstand voltage (HBM per Mil-Std-883D)- High Density                      | V       |         |          | 8000    |
| ESD classification (HBM per Mil-Std-883D) - High Intensity                      |         |         | Class 3A |         |
| DC forward current  | mA      |         |          | 1000    |
| Reverse voltage   | V       |         |          | 5       |
| Forward voltage (@ 350 mA, 85 °C) - white                                       | V       |         | 2.9      | 3.25    |
| Forward voltage (@ 350 mA, 25 °C) - royal blue, blue, PC blue                   | V       |         | 3.1      | 3.5     |
| Forward voltage (@ 350 mA, 25 °C) - green                                       | V       |         | 3.2      | 3.6     |
| Forward voltage (@ 350 mA, 25 °C) - PC amber                                    | V       |         | 3.1      | 3.5     |
| Forward voltage (@ 350 mA, 25 °C) - red-orange, red                             | V       |         | 2.2      | 2.6     |
| Forward voltage (@ 350 mA, 25 °C) - HE photo red                                | V       |         | 2.1      | 2.4     |
| LED junction temperature  | °C      |         |          | 150     |

## FLUX CHARACTERISTICS - HIGH DENSITY WHITE ( $T_J = 85\text{ }^\circ\text{C}$ )

The following table provides several base order codes for XLamp XQ-E High Density white LEDs. It is important to note that the base order codes listed here are a subset of the total available order codes for the product family. For more order codes, as well as a complete description of the order-code nomenclature, please consult the XLamp XQ Family LEDs Binning and Labeling document.

| Color         | CCT Range |         | Minimum Luminous Flux (lm) @ 350 mA |                   |                    | Calculated Minimum Luminous Flux (lm) @ 85 °C** |       | Order Code               |
|---------------|-----------|---------|-------------------------------------|-------------------|--------------------|---|-------|--------------------------|
|               | Minimum   | Maximum | Group                               | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA  | 1.0 A |                          |
| Cool White    | 5000 K    | 8300 K  | R3                                  | 122               | 141                | 210   | 270   | XQEAWT-00-0000-00000LFE1 |
|               |           |         | R2                                  | 114               | 132                | 196   | 252   | XQEAWT-00-0000-00000LEE1 |
| 70-CRI White  | 3700 K    | 8300 K  | R3                                  | 122               | 141                | 210   | 270   | XQEAWT-00-0000-00000BFE1 |
|               |           |         | R2                                  | 114               | 132                | 196   | 252   | XQEAWT-00-0000-00000BEE1 |
| Neutral White | 3700 K    | 5300 K  | R2                                  | 114               | 132                | 196   | 252   | XQEAWT-00-0000-00000LEE4 |
|               |           |         | Q5                                  | 107               | 124                | 184   | 237   | XQEAWT-00-0000-00000LDE4 |
|               |           |         | Q4                                  | 100               | 116                | 172   | 221   | XQEAWT-00-0000-00000LCE4 |
| Warm White    | 2700 K    | 3500 K  | Q5                                  | 107               | 124                | 184   | 237   | XQEAWT-00-0000-00000LDE7 |
|               |           |         | Q4                                  | 100               | 116                | 172   | 221   | XQEAWT-00-0000-00000LCE7 |
|               |           |         | Q3                                  | 93.9              | 109                | 162   | 208   | XQEAWT-00-0000-00000LBE7 |
|               |           |         | Q2                                  | 87.4              | 101                | 150   | 193   | XQEAWT-00-0000-00000LAE7 |
| 80-CRI White  | 2700 K    | 3500 K  | Q5                                  | 107               | 124                | 184   | 237   | XQEAWT-00-0000-00000HDE7 |
|               |           |         | Q4                                  | 100               | 116                | 172   | 221   | XQEAWT-00-0000-00000HCE7 |
|               |           |         | Q3                                  | 93.9              | 109                | 162   | 208   | XQEAWT-00-0000-00000HBE7 |
|               |           |         | Q2                                  | 87.4              | 101                | 150   | 193   | XQEAWT-00-0000-00000HAE7 |
| 90-CRI White  | 2850 K    | 3000 K  | P4                                  | 80.6              | 93.3               | 139   | 178   | XQEAWT-00-0000-00000U9E7 |
|               |           |         | P3                                  | 73.9              | 85.5               | 127   | 163   | XQEAWT-00-0000-00000U8E7 |
|               |           |         | P2                                  | 67.2              | 77.8               | 116   | 149   | XQEAWT-00-0000-00000U7E7 |
|               |           |         | N4                                  | 62                | 71.7               | 107   | 137   | XQEAWT-00-0000-00000U6E7 |

### 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 24).
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 70.
- Typical CRI for Neutral White (3700 K – 5300 K CCT) is 75.
- Typical CRI for Warm White (2700 K – 3500 K CCT) is 80.
- Minimum CRI for 70-CRI White is 70.
- Minimum CRI for 80-CRI White is 80.
- Minimum CRI for 90-CRI White is 90.
- \* Flux values @ 25 °C are calculated and for reference only.
- \*\* Calculated flux values at 700 mA and 1 A are for reference only.

## FLUX CHARACTERISTICS - HIGH DENSITY COLOR ( $T_j = 25\text{ }^\circ\text{C}$ )

The following tables provide several base order codes for XLamp XQ-E High Density color LEDs. It is important to note that the base order codes listed here are a subset of the total available order codes for the product family. For more order codes, as well as a complete description of the order-code nomenclature, please consult the XLamp XQ Family LEDs Binning and Labeling document.

| Color      | Dominant Wavelength Range |          |         |          | Minimum Radiant Flux (mW) @ 350 mA |           | Calculated Minimum PPF ( $\mu\text{mol/s}$ )* | Order Code               |
|------------|---------------------------|----------|---------|----------|------------------------------------|-----------|---|--------------------------|
|            | Minimum                   |          | Maximum |          | Group                              | Flux (mW) |   |                          |
|            | Group                     | DWL (nm) | Group   | DWL (nm) |                                    |           |   |                          |
| Royal Blue | D36                       | 450      | D57     | 465      | 36 (Q)                             | 600       | 2.27  | XQEROY-00-0000-000000Q01 |
|            |                           |          |         |          | 35 (P)                             | 575       | 2.18  | XQEROY-00-0000-000000P01 |
|            |                           |          |         |          | 34 (N)                             | 550       | 2.08  | XQEROY-00-0000-000000N01 |
|            |                           |          |         |          | 33 (M)                             | 525       | 1.99  | XQEROY-00-0000-000000M01 |
|            |                           |          |         |          | 32 (L)                             | 500       | 1.90  | XQEROY-00-0000-000000L01 |
|            |                           |          |         |          | 31 (K)                             | 475       | 1.80  | XQEROY-00-0000-000000K01 |
|            |                           |          |         |          | 30 (J)                             | 450       | 1.71  | XQEROY-00-0000-000000J01 |

| Color | Dominant Wavelength Range |          |         |          | Minimum Luminous Flux (lm) @ 350 mA |           | Order Code               |
|-------|---------------------------|----------|---------|----------|-------------------------------------|-----------|--------------------------|
|       | Minimum                   |          | Maximum |          | Group                               | Flux (lm) |                          |
|       | Group                     | DWL (nm) | Group   | DWL (nm) |                                     |           |                          |
| Blue  | B3                        | 465      | B6      | 485      | M3                                  | 45.7      | XQEBLU-00-0000-000000301 |
|       |                           |          |         |          | M2                                  | 39.8      | XQEBLU-00-0000-000000201 |
|       |                           |          |         |          | K3                                  | 35.2      | XQEBLU-00-0000-000000Z01 |
|       |                           |          |         |          | K2                                  | 30.6      | XQEBLU-00-0000-000000Y01 |

| Color | Dominant Wavelength Range |          |         |          | Minimum Luminous Flux (lm) @ 350 mA |           | Calculated Minimum PPF ( $\mu\text{mol/s}$ )* | Order Code               |
|-------|---------------------------|----------|---------|----------|-------------------------------------|-----------|---|--------------------------|
|       | Minimum                   |          | Maximum |          | Group                               | Flux (lm) |   |                          |
|       | Group                     | DWL (nm) | Group   | DWL (nm) |                                     |           |   |                          |
| Green | G2                        | 520      | G4      | 535      | Q5                                  | 107       | 0.98  | XQEGRN-00-0000-000000D01 |
|       |                           |          |         |          | Q4                                  | 100       | 0.91  | XQEGRN-00-0000-000000C01 |
|       |                           |          |         |          | Q3                                  | 93.9      | 0.86  | XQEGRN-00-0000-000000B01 |

### Note

- Cree 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 24).
- \* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

**FLUX CHARACTERISTICS - HIGH DENSITY COLOR (T<sub>j</sub> = 25 °C) - CONTINUED**

| Color    | Color Bin | Minimum Luminous Flux (lm) @ 350 mA |           | Order Code               |
|----------|-----------|-------------------------------------|-----------|--------------------------|
|          |           | Group                               | Flux (lm) |                          |
| PC Amber | Y2        | P4                                  | 80.6      | XQEAPA-00-0000-000000901 |
|          |           | P3                                  | 73.9      | XQEAPA-00-0000-000000801 |

| Color      | Dominant Wavelength Range |          |         |          | Minimum Luminous Flux (lm) @ 350 mA |           | Order Code               |
|------------|---------------------------|----------|---------|----------|-------------------------------------|-----------|--------------------------|
|            | Minimum                   |          | Maximum |          | Group                               | Flux (lm) |                          |
|            | Group                     | DWL (nm) | Group   | DWL (nm) |                                     |           |                          |
| Red-Orange | O3                        | 610      | O4      | 620      | Q3                                  | 93.9      | XQERDO-00-0000-000000B01 |
|            |                           |          |         |          | Q2                                  | 87.4      | XQERDO-00-0000-000000A01 |
|            |                           |          |         |          | P4                                  | 80.6      | XQERDO-00-0000-000000901 |
|            |                           |          |         |          | P3                                  | 73.9      | XQERDO-00-0000-000000801 |
|            |                           |          |         |          | P2                                  | 67.2      | XQERDO-00-0000-000000701 |

| Color | Dominant Wavelength Range |          |         |          | Minimum Luminous Flux (lm) @ 350 mA |           | Calculated Minimum PPF (μmol/s)* | Order Code               |
|-------|---------------------------|----------|---------|----------|-------------------------------------|-----------|----------------------------------|--------------------------|
|       | Minimum                   |          | Maximum |          | Group                               | Flux (lm) |                                  |                          |
|       | Group                     | DWL (nm) | Group   | DWL (nm) |                                     |           |                                  |                          |
| Red   | R2                        | 620      | R3      | 630      | P3                                  | 73.9      | 1.92                             | XQERED-00-0000-000000801 |
|       |                           |          |         |          | P2                                  | 67.2      | 1.75                             | XQERED-00-0000-000000701 |
|       |                           |          |         |          | N4                                  | 62        | 1.61                             | XQERED-00-0000-000000601 |
|       |                           |          |         |          | N3                                  | 56.8      | 1.48                             | XQERED-00-0000-000000501 |

| Color        | Peak Wavelength Range |          |       |          | Minimum Radiant Flux (mW) @ 350 mA |           | Calculated Minimum PPF (μmol/s)* | Order Code               |
|--------------|-----------------------|----------|-------|----------|------------------------------------|-----------|----------------------------------|--------------------------|
|              | Min.                  |          | Max.  |          | Group                              | Flux (mW) |                                  |                          |
|              | Group                 | PWL (nm) | Group | PWL (nm) |                                    |           |                                  |                          |
| HE Photo Red | P2                    | 650      | P5    | 670      | 28                                 | 400       | 2.20                             | XQEEPR-00-0000-000000B01 |
|              |                       |          |       |          | 27                                 | 375       | 2.06                             | XQEEPR-00-0000-000000A01 |
|              |                       |          |       |          | 26                                 | 350       | 1.93                             | XQEEPR-00-0000-000000901 |

- Note
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 24).
  - \* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

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

The following table provides several base order codes for XLamp XQ-E High Intensity white LEDs. It is important to note that the base order codes listed here are a subset of the total available order codes for the product family. For more order codes, as well as a complete description of the order-code nomenclature, please consult the XLamp XQ Family LEDs Binning and Labeling document.

| Color         | CCT Range |         | Minimum Luminous Flux (lm) @ 350 mA |                   |                    | Calculated Minimum Luminous Flux (lm) @ 85 °C** |       | Order Code               |
|---------------|-----------|---------|-------------------------------------|-------------------|--------------------|---|-------|--------------------------|
|               | Minimum   | Maximum | Group                               | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | 700 mA  | 1.0 A |                          |
| Cool White    | 5000 K    | 8300 K  | R3                                  | 122               | 136                | 213   | 276   | XQEAWT-H0-0000-00000LFE1 |
|               |           |         | R2                                  | 114               | 127                | 199   | 258   | XQEAWT-H0-0000-00000LEE1 |
| 70-CRI White  | 3700 K    | 8300 K  | R3                                  | 122               | 136                | 213   | 276   | XQEAWT-H0-0000-00000BFE1 |
|               |           |         | R2                                  | 114               | 127                | 199   | 258   | XQEAWT-H0-0000-00000BEE1 |
| Neutral White | 3700 K    | 5300 K  | R2                                  | 114               | 127                | 199   | 258   | XQEAWT-H0-0000-00000LEE4 |
|               |           |         | Q5                                  | 107               | 119                | 187   | 242   | XQEAWT-H0-0000-00000LDE4 |
|               |           |         | Q4                                  | 100               | 111                | 175   | 226   | XQEAWT-H0-0000-00000LCE4 |
| Warm White    | 2700 K    | 3500 K  | Q5                                  | 107               | 119                | 187   | 242   | XQEAWT-H0-0000-00000LDE7 |
|               |           |         | Q4                                  | 100               | 111                | 175   | 226   | XQEAWT-H0-0000-00000LCE7 |
|               |           |         | Q3                                  | 93.9              | 105                | 164   | 213   | XQEAWT-H0-0000-00000LBE7 |
| 80-CRI White  | 2700 K    | 3500 K  | Q5                                  | 107               | 119                | 187   | 242   | XQEAWT-H0-0000-00000HDE7 |
|               |           |         | Q4                                  | 100               | 111                | 175   | 226   | XQEAWT-H0-0000-00000HCE7 |
|               |           |         | Q3                                  | 93.9              | 105                | 164   | 213   | XQEAWT-H0-0000-00000HBE7 |
| 90-CRI White  | 2850 K    | 3000 K  | P4                                  | 80.6              | 89.9               | 141   | 182   | XQEAWT-H0-0000-00000U9E7 |
|               |           |         | P3                                  | 73.9              | 82.4               | 129   | 167   | XQEAWT-H0-0000-00000U8E7 |
|               |           |         | P2                                  | 67.2              | 74.9               | 117   | 152   | XQEAWT-H0-0000-00000U7E7 |

### 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 24).
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 70.
- Typical CRI for Neutral White (3700 K – 5300 K CCT) is 75.
- Typical CRI for Warm White (2700 K – 3500 K CCT) is 80.
- Minimum CRI for 70-CRI White is 70.
- Minimum CRI for 80-CRI White is 80.
- Minimum CRI for 90-CRI White is 90.
- \* Flux values @ 25 °C are calculated and for reference only.
- \*\* Calculated flux values at 700 mA and 1 A are for reference only.

## FLUX CHARACTERISTICS - HIGH INTENSITY COLOR ( $T_j = 25\text{ }^\circ\text{C}$ )

The following tables provide several base order codes for XLamp XQ-E High Intensity color LEDs. It is important to note that the base order codes listed here are a subset of the total available order codes for the product family. For more order codes, as well as a complete description of the order-code nomenclature, please consult the XLamp XQ Family LEDs Binning and Labeling document.

| Color      | Dominant Wavelength Range |          |         |          | Minimum Radiant Flux (mW) @ 350 mA |           | Calculated Minimum PPF ( $\mu\text{mol/s}$ )* | Order Code               |
|------------|---------------------------|----------|---------|----------|------------------------------------|-----------|---|--------------------------|
|            | Minimum                   |          | Maximum |          | Group                              | Flux (mW) |   |                          |
|            | Group                     | DWL (nm) | Group   | DWL (nm) |                                    |           |   |                          |
| Royal Blue | D36                       | 450      | D57     | 465      | 35 (P)                             | 575       | 2.18  | XQEROY-H0-0000-000000P01 |
|            |                           |          |         |          | 34 (N)                             | 550       | 2.08  | XQEROY-H0-0000-000000N01 |
|            |                           |          |         |          | 33 (M)                             | 525       | 1.99  | XQEROY-H0-0000-000000M01 |

| Color | Dominant Wavelength Range |          |         |          | Minimum Luminous Flux (lm) @ 350 mA |           | Order Code               |
|-------|---------------------------|----------|---------|----------|-------------------------------------|-----------|--------------------------|
|       | Minimum                   |          | Maximum |          | Group                               | Flux (lm) |                          |
|       | Group                     | DWL (nm) | Group   | DWL (nm) |                                     |           |                          |
| Blue  | B3                        | 465      | B6      | 485      | M3                                  | 45.7      | XQEBLU-H0-0000-000000301 |
|       |                           |          |         |          | M2                                  | 39.8      | XQEBLU-H0-0000-000000201 |
|       |                           |          |         |          | K3                                  | 35.2      | XQEBLU-H0-0000-000000Z01 |
|       |                           |          |         |          | K2                                  | 30.6      | XQEBLU-H0-0000-000000Y01 |

|         | Color Bin | Minimum Luminous Flux (lm) @ 350 mA |           | Order Code               |
|---------|-----------|-------------------------------------|-----------|--------------------------|
|         |           | Group                               | Flux (lm) |                          |
| PC Blue | N4B & N5B | N2                                  | 51.7      | XQEAPB-H0-0000-000000401 |
|         |           | M3                                  | 45.7      | XQEAPB-H0-0000-000000301 |
|         |           | M2                                  | 39.8      | XQEAPB-H0-0000-000000201 |

### Note

- Cree 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 24).
- \* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

**FLUX CHARACTERISTICS - HIGH INTENSITY COLOR (T<sub>j</sub> = 25 °C) - CONTINUED**

| Color | Dominant Wavelength Range |          |         |          | Minimum Luminous Flux (lm) @ 350 mA |           | Calculated Minimum PPF (μmol/s)* | Order Code               |
|-------|---------------------------|----------|---------|----------|-------------------------------------|-----------|----------------------------------|--------------------------|
|       | Minimum                   |          | Maximum |          | Group                               | Flux (lm) |                                  |                          |
|       | Group                     | DWL (nm) | Group   | DWL (nm) |                                     |           |                                  |                          |
| Green | G2                        | 520      | G4      | 535      | R2                                  | 114       | 1.11                             | XQEGRN-H0-0000-000000E01 |
|       |                           |          |         |          | Q5                                  | 107       | 0.98                             | XQEGRN-H0-0000-000000D01 |
|       |                           |          |         |          | Q4                                  | 100       | 0.91                             | XQEGRN-H0-0000-000000C01 |
|       |                           |          |         |          | Q3                                  | 93.9      | 0.86                             | XQEGRN-H0-0000-000000B01 |
|       |                           |          |         |          | Q2                                  | 87.4      | 0.80                             | XQEGRN-H0-0000-000000A01 |
|       |                           |          |         |          | P4                                  | 80.6      | 0.74                             | XQEGRN-H0-0000-000000901 |

|          | Color Bin | Minimum Luminous Flux (lm) @ 350 mA |           | Order Code               |
|----------|-----------|-------------------------------------|-----------|--------------------------|
|          |           | Group                               | Flux (lm) |                          |
| PC Amber | Y2        | P3                                  | 73.9      | XQEAPA-H0-0000-000000801 |
|          |           | P2                                  | 67.2      | XQEAPA-H0-0000-000000701 |

| Color      | Dominant Wavelength Range |          |         |          | Minimum Luminous Flux (lm) @ 350 mA |           | Order Code               |
|------------|---------------------------|----------|---------|----------|-------------------------------------|-----------|--------------------------|
|            | Minimum                   |          | Maximum |          | Group                               | Flux (lm) |                          |
|            | Group                     | DWL (nm) | Group   | DWL (nm) |                                     |           |                          |
| Red-Orange | O3                        | 610      | O4      | 620      | P3                                  | 73.9      | XQERDO-H0-0000-000000801 |
|            |                           |          |         |          | P2                                  | 67.2      | XQERDO-H0-0000-000000701 |
|            |                           |          |         |          | N4                                  | 62        | XQERDO-H0-0000-000000601 |

| Color | Dominant Wavelength Range |          |         |          | Minimum Luminous Flux (lm) @ 350 mA |           | Calculated Minimum PPF (μmol/s)* | Order Code               |
|-------|---------------------------|----------|---------|----------|-------------------------------------|-----------|----------------------------------|--------------------------|
|       | Minimum                   |          | Maximum |          | Group                               | Flux (lm) |                                  |                          |
|       | Group                     | DWL (nm) | Group   | DWL (nm) |                                     |           |                                  |                          |
| Red   | R2                        | 620      | R3      | 630      | N2                                  | 51.7      | 1.35                             | XQERED-H0-0000-000000401 |
|       |                           |          |         |          | M3                                  | 45.7      | 1.19                             | XQERED-H0-0000-000000301 |
|       |                           |          |         |          | M2                                  | 39.8      | 1.04                             | XQERED-H0-0000-000000201 |

- Note
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 24).
  - \* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.



**RELATIVE SPECTRAL POWER DISTRIBUTION**

**High Density**



**High Density Color**

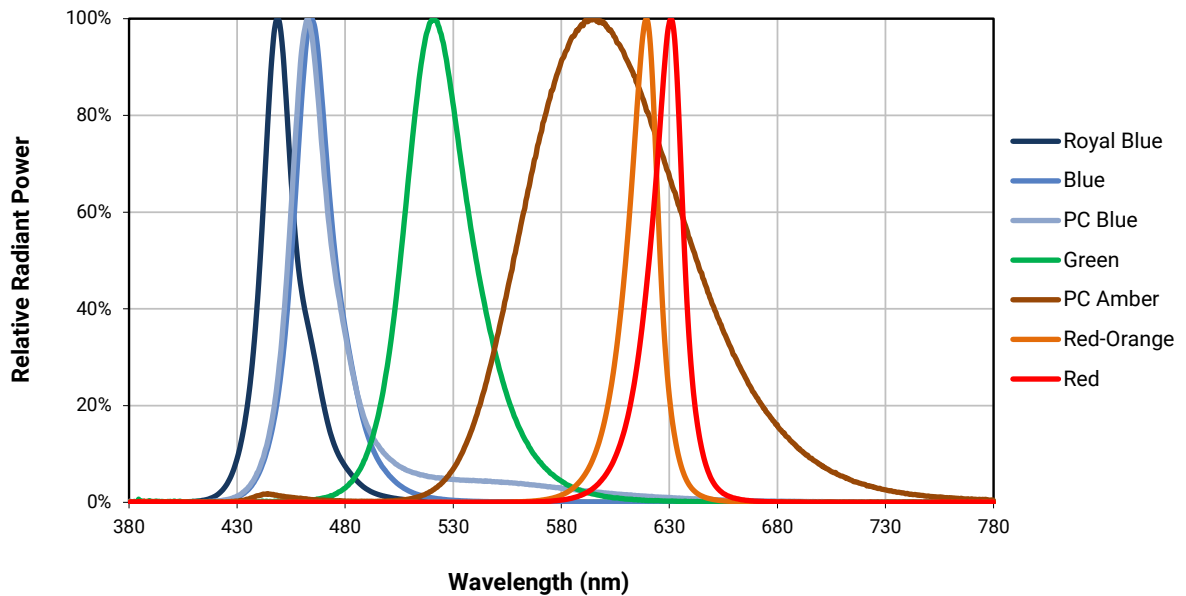


**RELATIVE SPECTRAL POWER DISTRIBUTION - CONTINUED**

**High Intensity**



**High Intensity Color**



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

**High Density**



**High Density Color**



**RELATIVE FLUX VS. JUNCTION TEMPERATURE ( $I_F = 350$  mA) - CONTINUED**

**High Density Color**

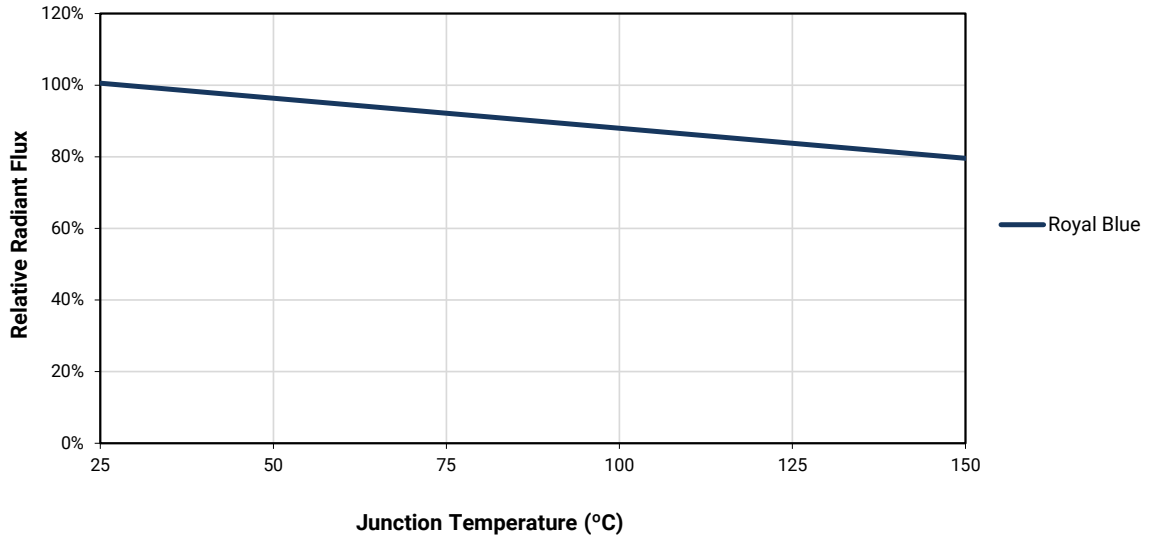


**High Intensity**

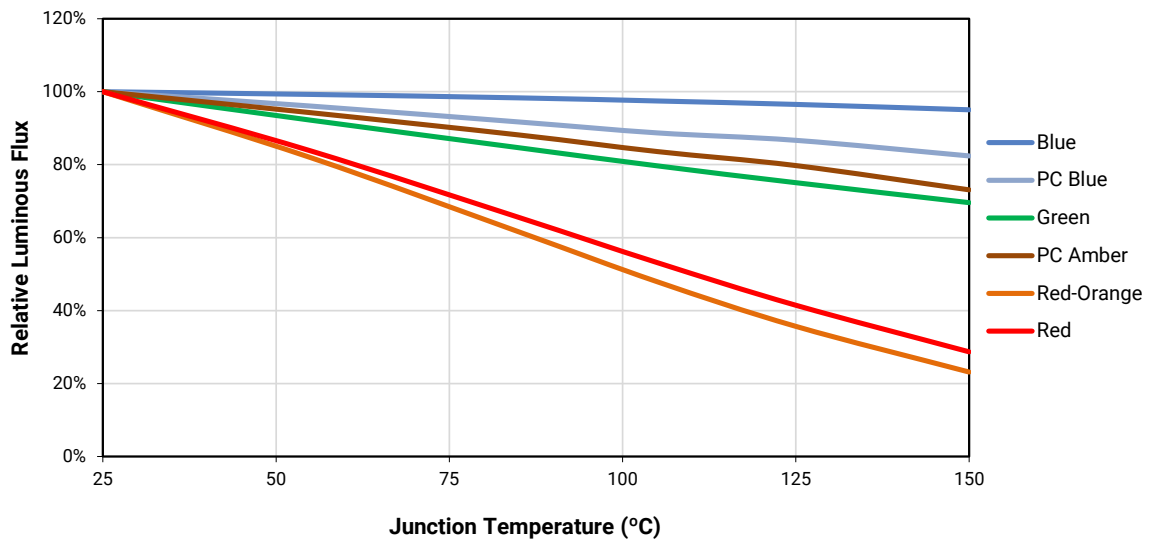


**RELATIVE FLUX VS. JUNCTION TEMPERATURE ( $I_F = 350$  mA) - CONTINUED**

**High Intensity Color**

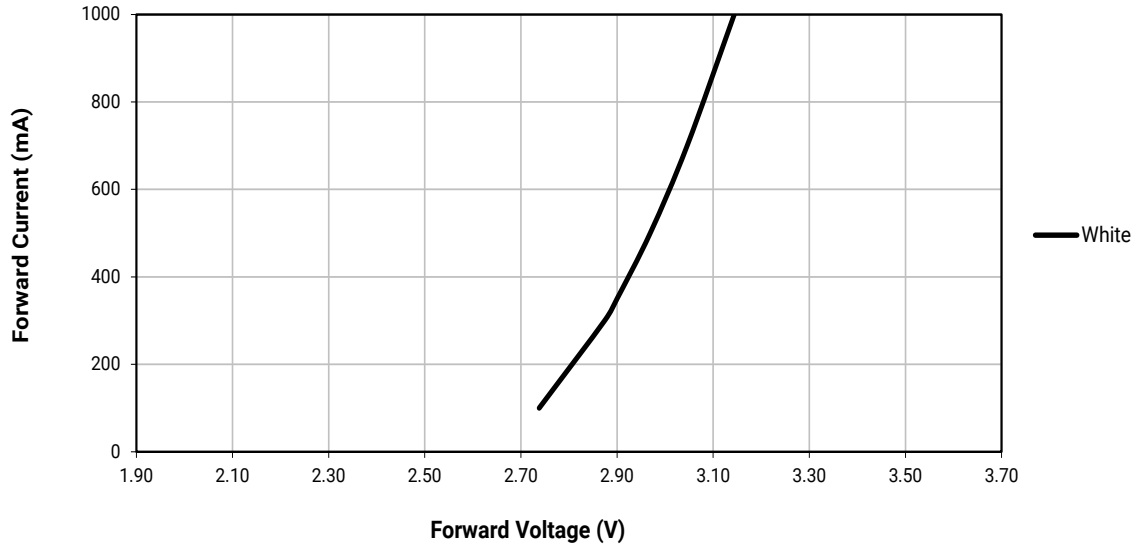


**High Intensity Color**

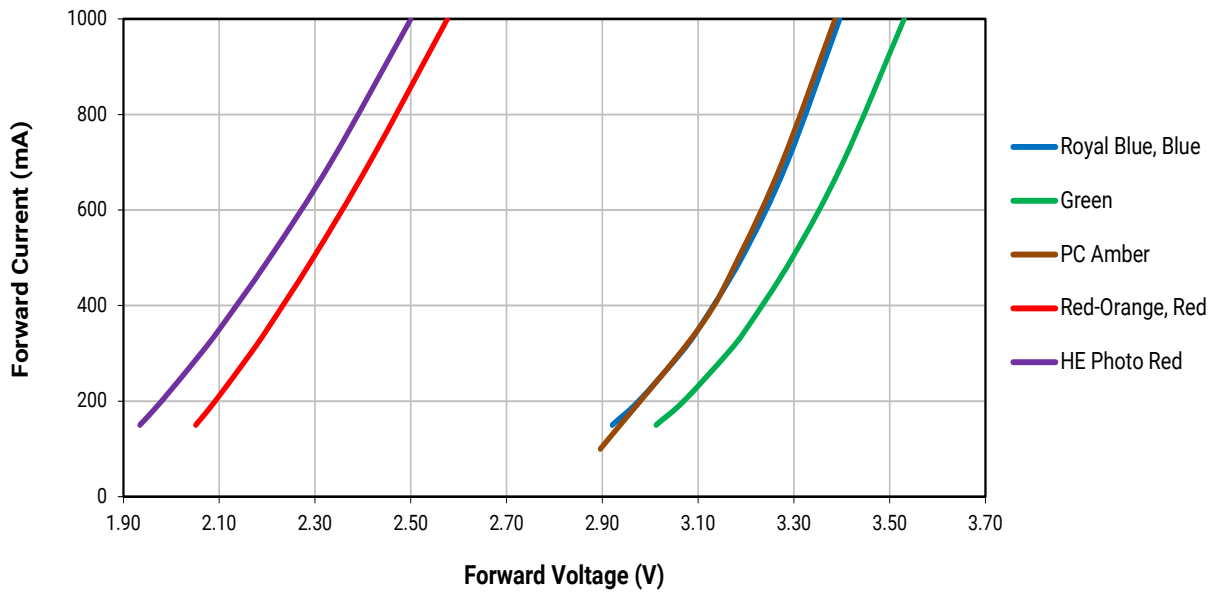


**ELECTRICAL CHARACTERISTICS ( $T_j = 85\text{ }^\circ\text{C}$ )**

**High Density**

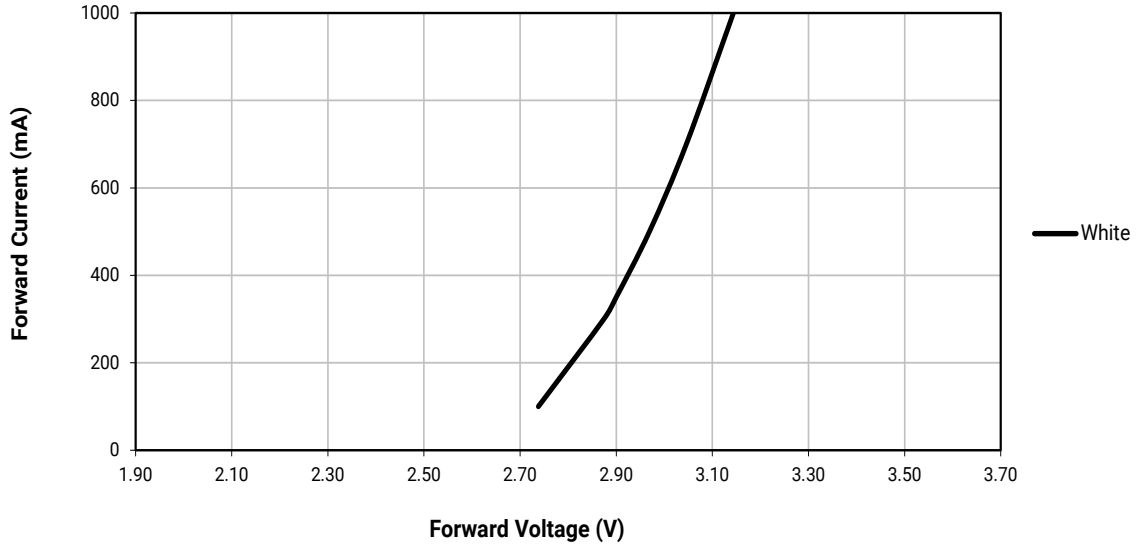


**High Density Color**

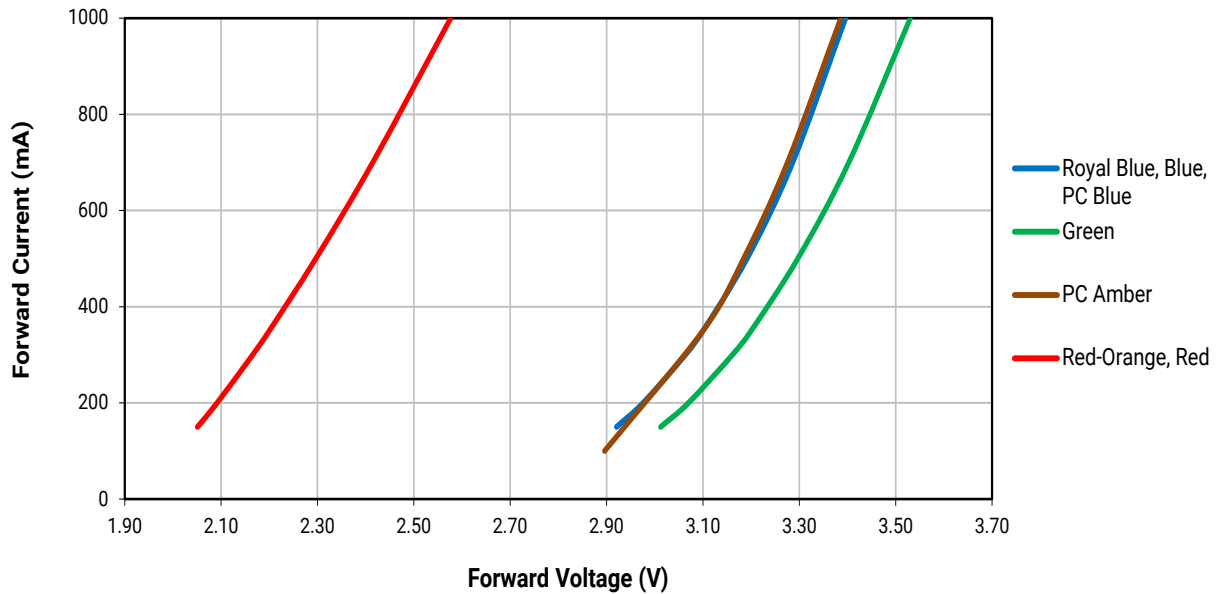


ELECTRICAL CHARACTERISTICS ( $T_j = 25\text{ }^\circ\text{C}$ ) - CONTINUED

High Intensity



High Intensity Color



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

**High Density**



**High Density Color**



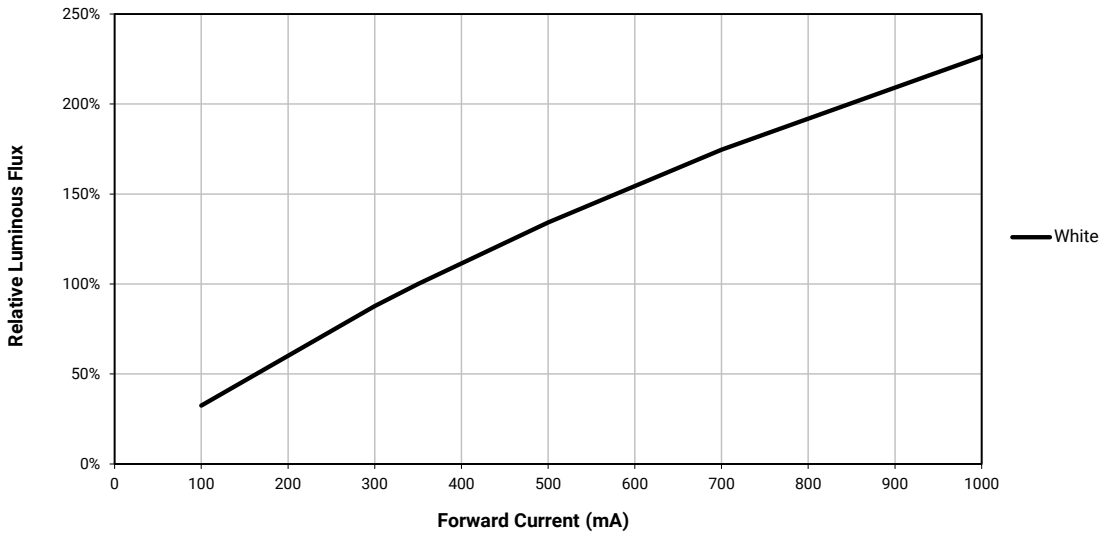


**RELATIVE FLUX VS. CURRENT ( $T_j = 25\text{ }^\circ\text{C}$ ) - CONTINUED**

**High Density Color**



**High Intensity**



RELATIVE FLUX VS. CURRENT ( $T_j = 25\text{ }^\circ\text{C}$ ) - CONTINUED

High Intensity Color

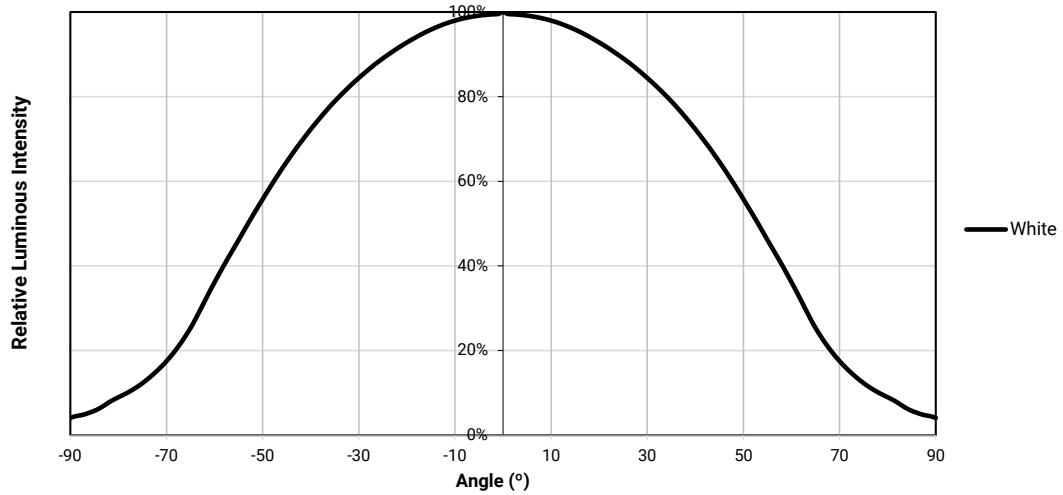


High Intensity Color

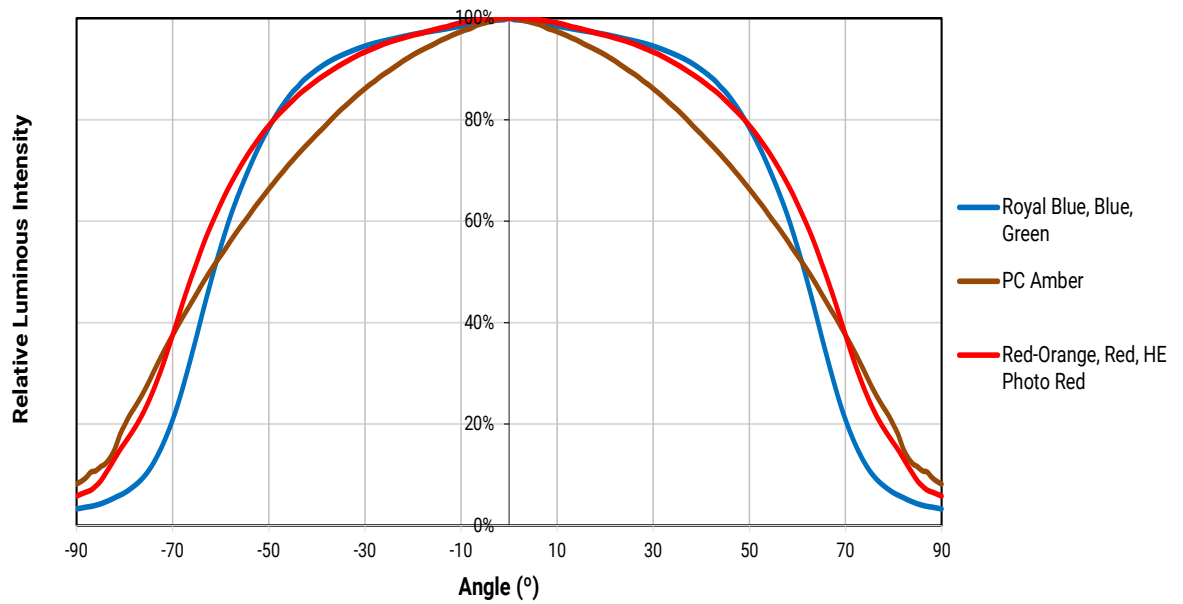


**TYPICAL SPATIAL DISTRIBUTION**

**High Density**

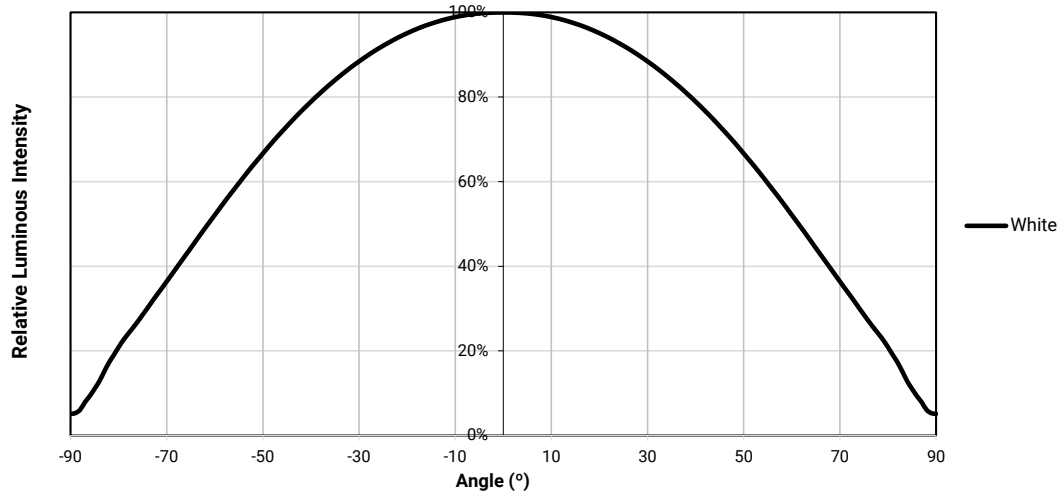


**High Density Color**



**TYPICAL SPATIAL DISTRIBUTION - CONTINUED**

**High Intensity**



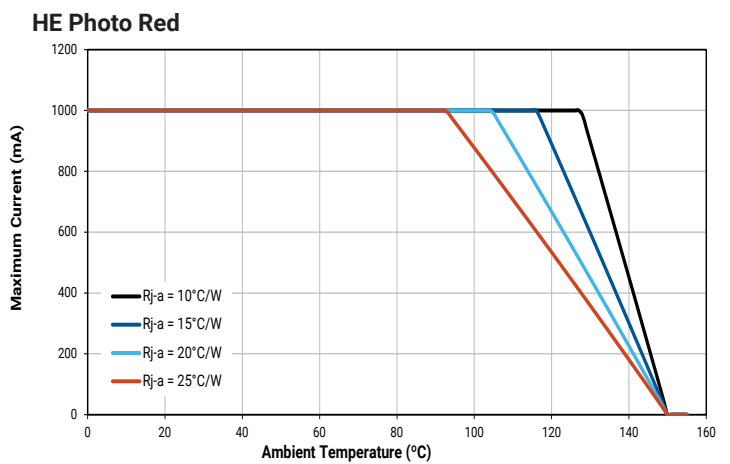
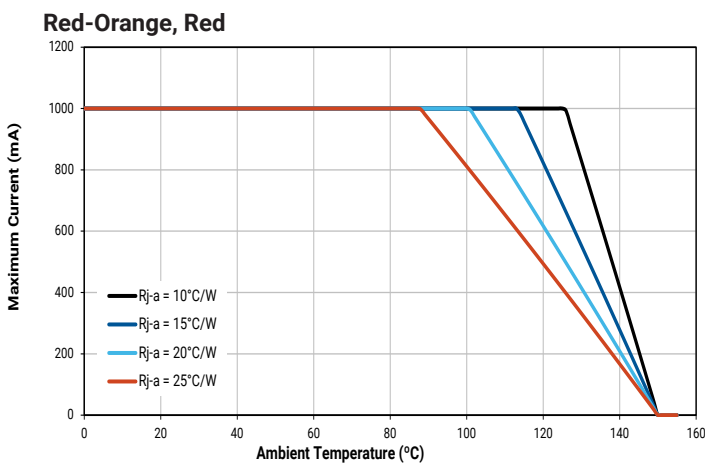
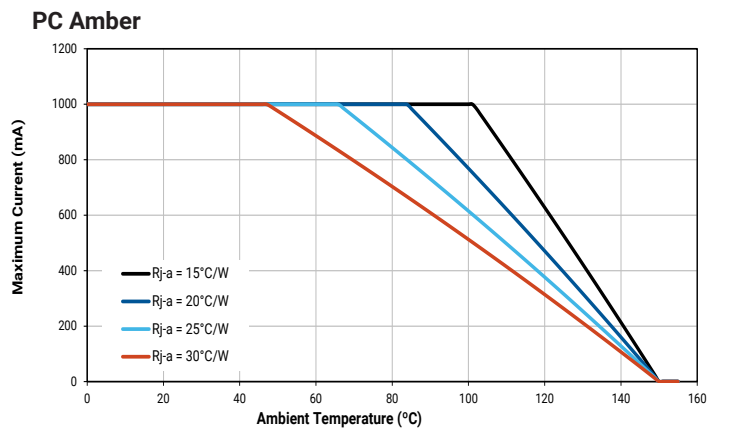
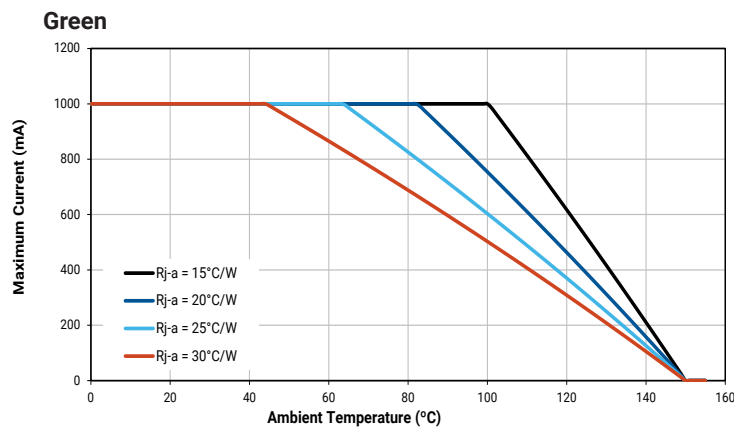
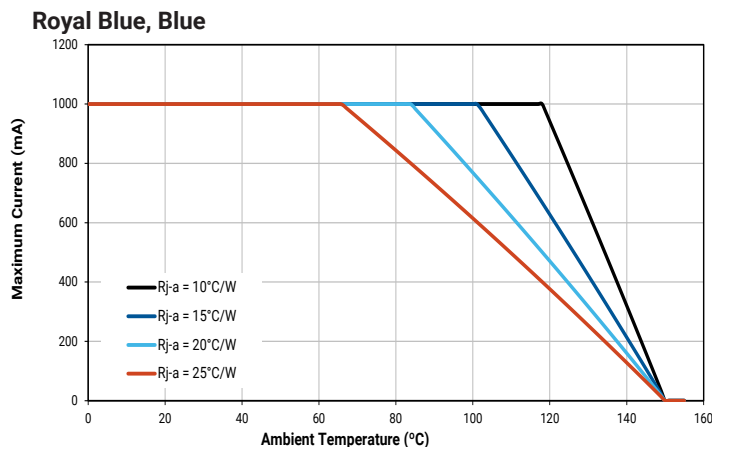
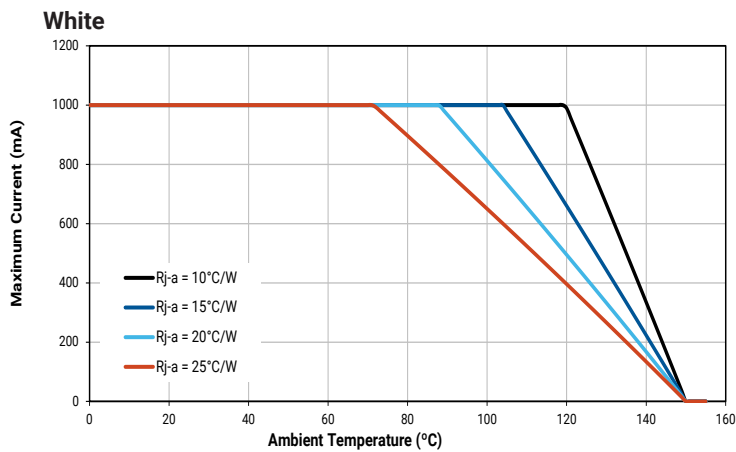
**High Intensity Color**



**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.

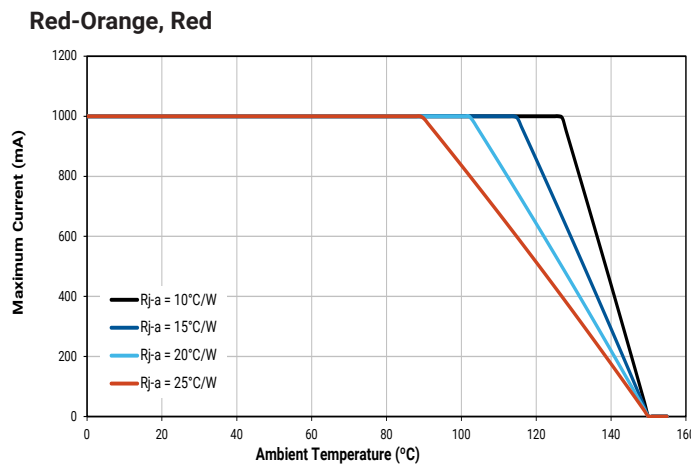
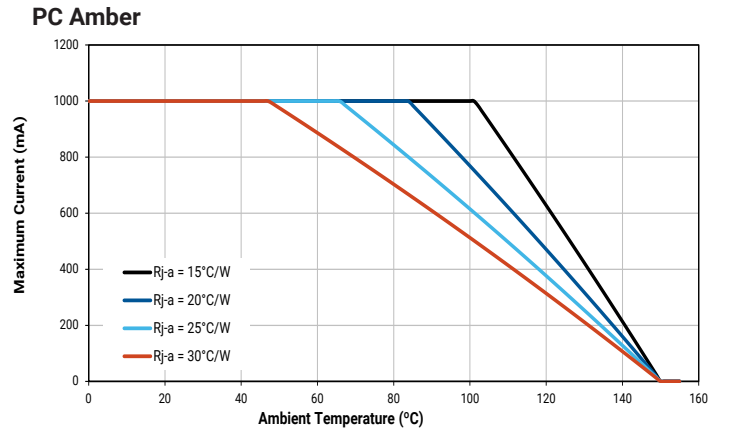
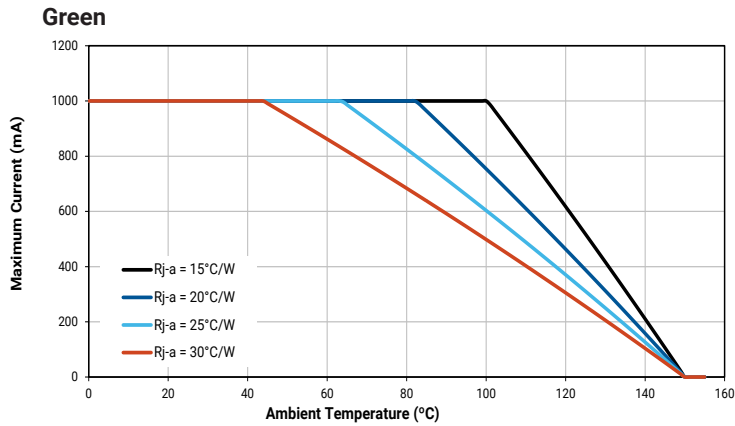
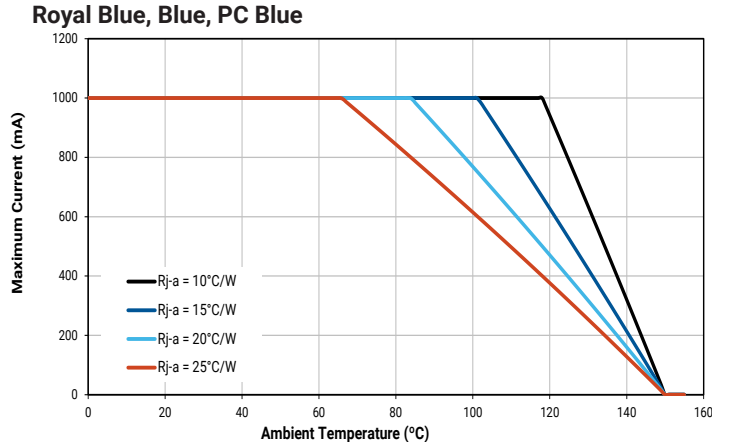
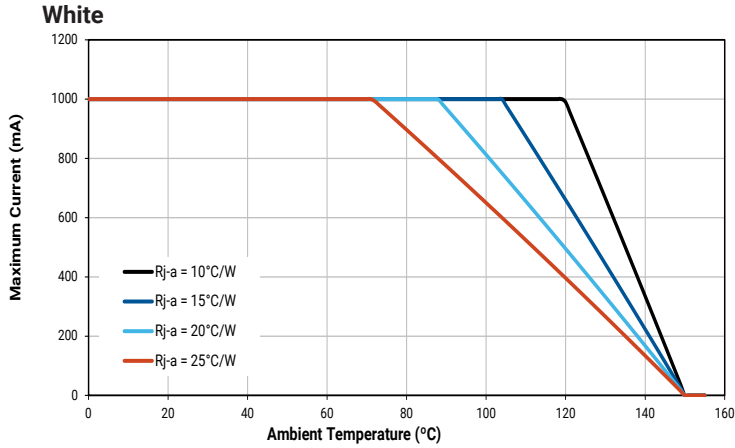
**High Density**



**THERMAL DESIGN - CONTINUED**

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.

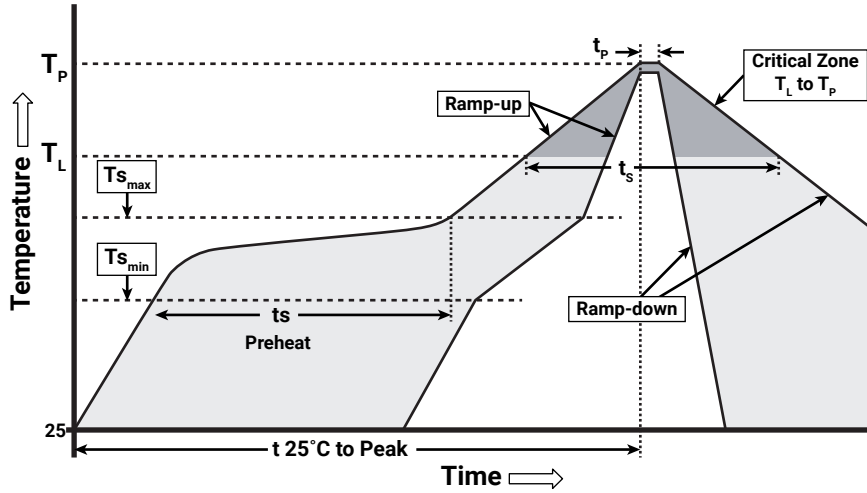
**High Intensity**



**REFLOW SOLDERING CHARACTERISTICS**

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

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



IPC/JEDEC J-STD-020C

| Profile Feature                                       | Lead-Free Solder |
|---|------------------|
| Average Ramp-Up Rate ( $T_{s_{max}}$ to $T_P$ )       | 1.2 °C/second    |
| Preheat: Temperature Min ( $T_{s_{min}}$ )            | 120 °C           |
| Preheat: Temperature Max ( $T_{s_{max}}$ )            | 170 °C           |
| Preheat: Time ( $t_{s_{min}}$ to $t_{s_{max}}$ )      | 65-150 seconds   |
| Time Maintained Above: Temperature ( $T_L$ )          | 217 °C           |
| Time Maintained Above: Time ( $t_L$ )                 | 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 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 or provided as specifications.

### Pre-Release Qualification Testing

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

### Lumen Maintenance

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

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

### Moisture Sensitivity

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

Once the MBP is opened, XLamp XQ-E LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of  $\leq 30$  °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**

This product meets the requirements to be considered a UL Recognized Component with Level 1 enclosure consideration. The LED package or a portion thereof has not been investigated as a fire enclosure or a fire and electrical enclosure per ANSI/UL 8750.

**Vision Advisory**

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


**MECHANICAL DIMENSIONS**

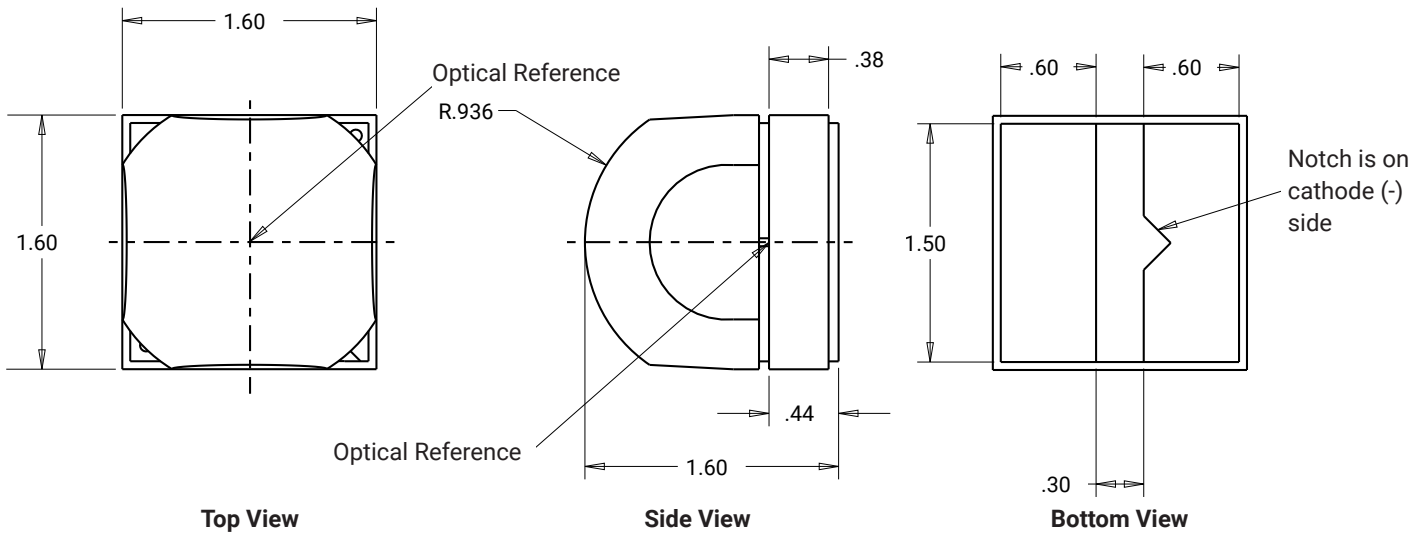
Thermal vias, if present, are not shown on these drawings.

All dimensions in mm.


Measurement tolerances unless indicated otherwise: ±.13 mm

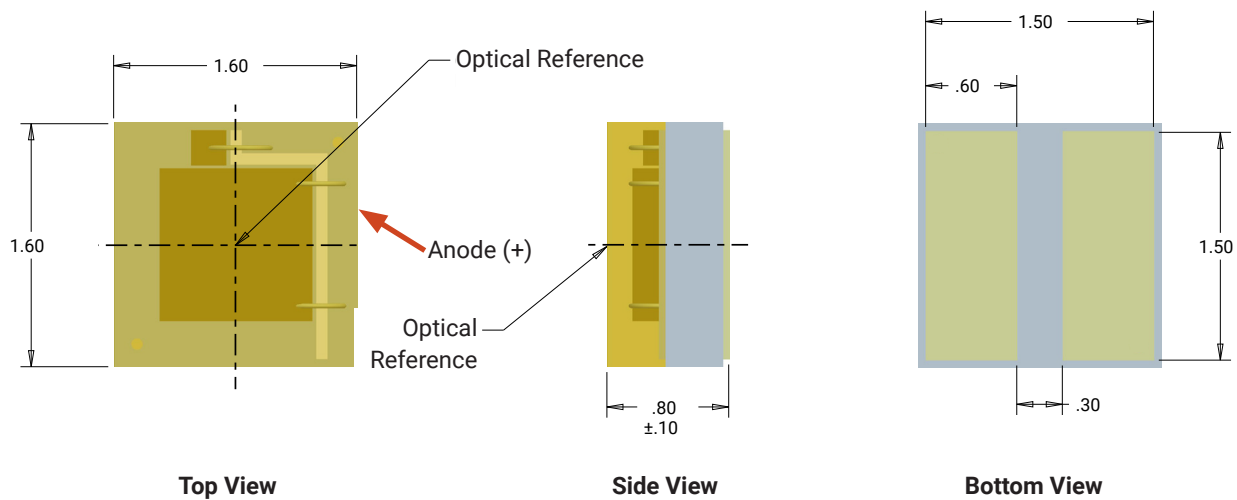
**High Density**

XQEAWT-0x-xxxx-xxxxxxxxx  
 XQ-E High Density



**High Intensity**

XQEAWT-Hx-xxxx-xxxxxxxxx  
 XQ-E High Intensity

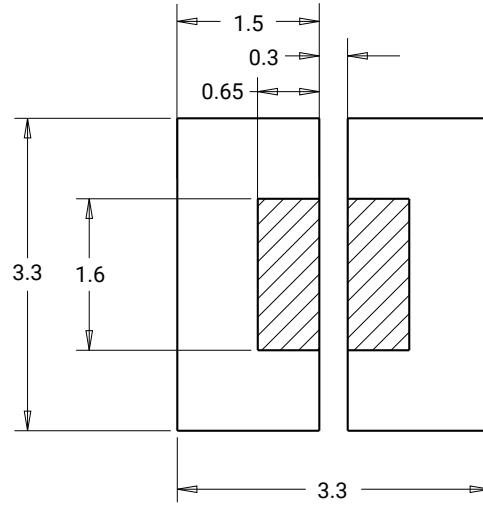


**MECHANICAL DIMENSIONS - CONTINUED**

**High Density & High Intensity**



**Recommended Stencil Pad**



**Recommended PC Board Solder Pad and Trace Layout**

**TAPE AND REEL**

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

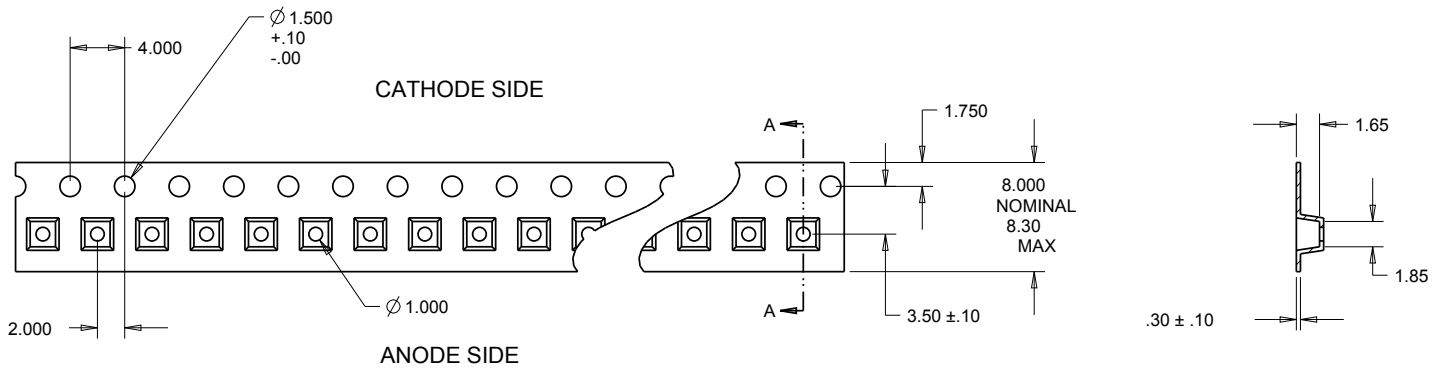
Except as noted, all dimensions in mm [in].

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

**High Density**

XQEAWT-0x-xxxx-xxxxxxxxxx

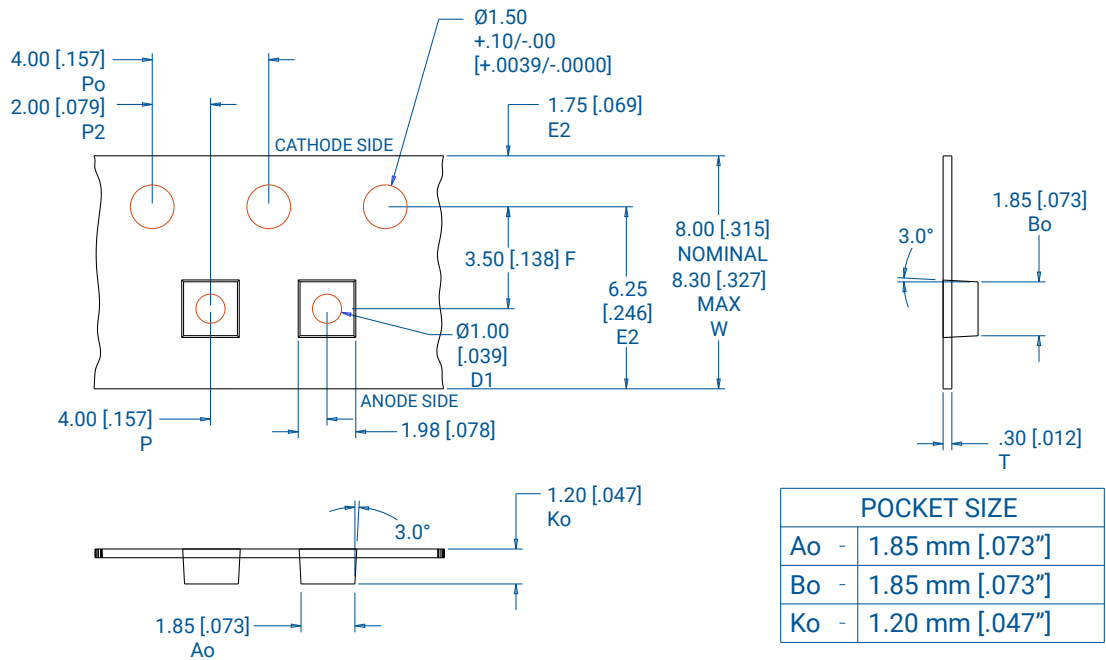
XQ-E High Density



**High Intensity**

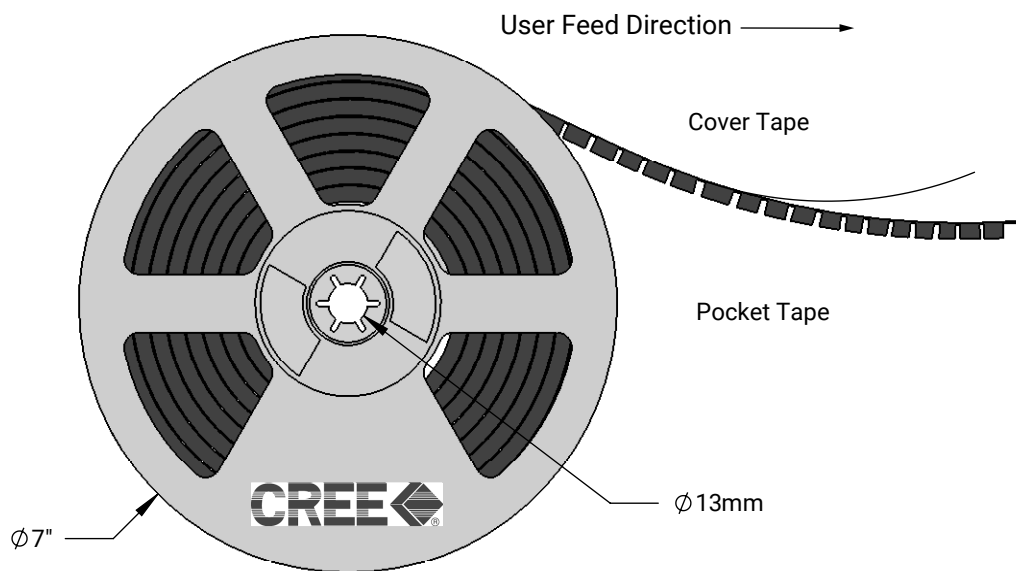
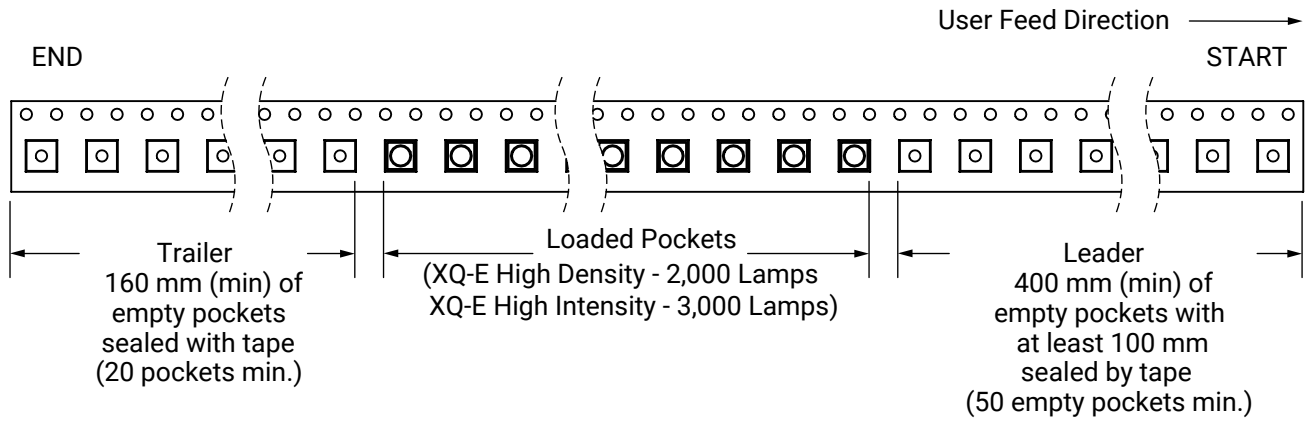
XQEAWT-Hx-xxxx-xxxxxxxxxx

XQ-E High Intensity



**TAPE AND REEL - CONTINUED**

**High Density & High Intensity**



**PACKAGING**

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

**Unpackaged Reel**



Label with Cree Bin Code, Quantity, Reel ID

**Packaged Reel**



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

Label with Cree Bin Code, Quantity, Reel ID

**Boxed Reel**



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

Label with Cree Bin Code, Quantity, Reel ID

Patent Label (on bottom of box)

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

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

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)