

Cree® XLamp® CXA1512 LED



PRODUCT DESCRIPTION

The XLamp CXA1512 LED array expands Cree’s family of high-flux, multi-die arrays in a smaller, easy-to-use platform. With XLamp lighting-class reliability, the CXA1512’s small, uniform emitting surface enables both directional and non-directional lighting applications including lamp retrofit and luminaire designs. Available in 2-step and 4-step color consistency, and featuring a 9-mm optical source, the CXA1512 brings new levels of flux and efficacy to this form factor.

FEATURES

- Available in ANSI white bins as well as 4-step and 2-step EasyWhite bins at 2700K, 3000K, 3500K, 4000K and 5000K CCT
- 80 and 90 minimum CRI options
- Forward voltage: 37 V
- 85 °C binning and characterization
- Maximum drive current: 500 mA
- 115° viewing angle, uniform chromaticity profile
- Top-side solder connections
- Thermocouple attach point
- NEMA SSL-3 2011 standard flux bins
- UL-recognized component (E349212)



TABLE OF CONTENTS

| | |
|--|----|
| Characteristics | 2 |
| Flux Characteristics, Standard Order Codes and Bins | 2 |
| Flux Characteristics, Standard Order Codes and Bins, 90 CRI..... | 4 |
| Flux Characteristics, Standard Order Codes and Bins, 80 CRI..... | 5 |
| Relative Spectral Power Distribution . | 6 |
| Relative Luminous Flux vs. Junction Temperature | 6 |
| Electrical Characteristics..... | 7 |
| Relative Luminous Flux vs. Current .. | 7 |
| Relative Chromaticity vs. Current and Temperature | 8 |
| Typical Spatial Distribution..... | 9 |
| Performance Groups - Brightness..... | 9 |
| Performance Groups - Chromaticity.10 | |
| Cree EasyWhite Bins Plotted on the 1931 CIE Color Space | 11 |
| Cree ANSI White Bins Plotted on the 1931 CIE Color Space | 12 |
| Bin and Order Code Formats | 13 |
| Mechanical Dimensions..... | 13 |
| Notes..... | 14 |
| Packaging..... | 15 |

CHARACTERISTICS

| Characteristics | Unit | Minimum | Typical | Maximum |
|--|---------|---------|---------|---------|
| Effective thermal resistance, junction to case | °C/W | | 2.1 | |
| Viewing angle (FWHM) | degrees | | 115 | |
| ESD classification (HBM per Mil-Std-883D) | | | Class 2 | |
| DC forward current | mA | | 350 | 500 |
| Reverse current | mA | | | -0.1 |
| Forward voltage (@ 350 mA, 85 °C) | V | | 37 | |
| Forward voltage (@ 350 mA, 25 °C) | V | | 38 | 42 |
| LED junction temperature | °C | | | 150 |
| Temperature coefficient of voltage | mV/°C | | -16 | |

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS ($I_f = 350 \text{ mA}$, $T_j = 85 \text{ °C}$)

The following tables provide order codes for XLamp CXA1512 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 13).

| Color | CCT Range | Base Order Codes Min. Luminous Flux @ 350 mA | | | 2-Step Order Code | | 4-Step Order Code | |
|-----------|-----------|--|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
| | | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | | Chromaticity Region | |
| EasyWhite | 5000K | M2 | 1380 | 1563 | 50H | CXA1512-0000-000N00M250H | 50F | CXA1512-0000-000N00M250F |
| | | M4 | 1485 | 1682 | | CXA1512-0000-000N00M450H | | CXA1512-0000-000N00M450F |
| | 4000K | K4 | 1290 | 1461 | 40H | CXA1512-0000-000N00K440H | 40F | CXA1512-0000-000N00K440F |
| | | M2 | 1380 | 1563 | | CXA1512-0000-000N00M240H | | CXA1512-0000-000N00M240F |
| | | M4 | 1485 | 1682 | | CXA1512-0000-000N00M440H | | CXA1512-0000-000N00M440F |
| | 3500K | K2 | 1200 | 1359 | 35H | CXA1512-0000-000N00K235H | 35F | CXA1512-0000-000N00K235F |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N00K435H | | CXA1512-0000-000N00K435F |
| | | M2 | 1380 | 1563 | | CXA1512-0000-000N00M235H | | CXA1512-0000-000N00M235F |
| | 3000K | K2 | 1200 | 1359 | 30H | CXA1512-0000-000N00K230H | 30F | CXA1512-0000-000N00K230F |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N00K430H | | CXA1512-0000-000N00K430F |
| | 2700K | J4 | 1120 | 1269 | 27H | CXA1512-0000-000N00J427H | 27F | CXA1512-0000-000N00J427F |
| | | K2 | 1200 | 1359 | | CXA1512-0000-000N00K227H | | CXA1512-0000-000N00K227F |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N00K427H | | CXA1512-0000-000N00K427F |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements.
- Minimum CRI for standard color temperatures 0E8, 27F, 27H, 0E7, 30F, 30H, 0E6, 35F, 35H is 80.
- Minimum CRI for standard color temperatures 0E5, 40F, 40H, 0E3, 50F, 50H is 70.
- Typical CRI for standard color temperatures 0E5, 40F, 40H, 0E3, 50F, 50H is 75.
- * Flux values @ 25 °C are calculated and for reference only.

| Color | CCT Range | Base Order Codes Min. Luminous Flux @ 350 mA | | | Chromaticity Regions | Order Code |
|------------|-----------|--|----------------------|-----------------------|----------------------|--------------------------|
| | | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | | |
| ANSI White | 5000K | M2 | 1380 | 1563 | 3A0, 3B0, 3C0, 3D0 | CXA1512-0000-000N00M20E3 |
| | | M4 | 1485 | 1682 | | CXA1512-0000-000N00M40E3 |
| | 4000K | K4 | 1290 | 1461 | 5A0, 5B0, 5C0, 5D0 | CXA1512-0000-000N00K40E5 |
| | | M2 | 1380 | 1563 | | CXA1512-0000-000N00M20E5 |
| | | M4 | 1485 | 1682 | | CXA1512-0000-000N00M40E5 |
| | 3500K | K2 | 1200 | 1359 | 6A0, 6B0, 6C0, 6D0 | CXA1512-0000-000N00K20E6 |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N00K40E6 |
| | | M2 | 1380 | 1563 | | CXA1512-0000-000N00M20E6 |
| | 3000K | K2 | 1200 | 1359 | 7A0, 7B0, 7C0, 7D0 | CXA1512-0000-000N00K20E7 |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N00K40E7 |
| | 2700K | J4 | 1120 | 1269 | 8A0, 8B0, 8C0, 8D0 | CXA1512-0000-000N00J40E8 |
| | | K2 | 1200 | 1359 | | CXA1512-0000-000N00K20E8 |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N00K40E8 |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements.
- Minimum CRI for standard color temperatures 0E8, 27F, 27H, 0E7, 30F, 30H, 0E6, 35F, 35H is 80.
- Minimum CRI for standard color temperatures 0E5, 40F, 40H, 0E3, 50F, 50H is 70.
- Typical CRI for standard color temperatures 0E5, 40F, 40H, 0E3, 50F, 50H is 75.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 90 CRI ($I_f = 350 \text{ mA}$, $T_j = 85 \text{ }^\circ\text{C}$)

The following tables provide order codes for XLamp CXA1512 90 CRI minimum LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 13).

| Color | CCT Range | Base Order Codes Min. Luminous Flux @ 350 mA | | | 2-Step Order Code | | 4-Step Order Code | |
|-----------|-----------|--|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
| | | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | | Chromaticity Region | |
| EasyWhite | 3000K | H2 | 900 | 1019 | 30H | CXA1512-0000-000N0UH230H | 30F | CXA1512-0000-000N0UH230F |
| | | H4 | 970 | 1099 | | CXA1512-0000-000N0UH430H | | CXA1512-0000-000N0UH430F |
| | | J2 | 1040 | 1178 | | CXA1512-0000-000N0UJ230H | | CXA1512-0000-000N0UJ230F |
| | 2700K | G4 | 840 | 952 | 27H | CXA1512-0000-000N0UG427H | 27F | CXA1512-0000-000N0UG427F |
| | | H2 | 900 | 1019 | | CXA1512-0000-000N0UH227H | | CXA1512-0000-000N0UH227F |
| | | H4 | 970 | 1099 | | CXA1512-0000-000N0UH427H | | CXA1512-0000-000N0UH427F |

| Color | CCT Range | Base Order Codes Min Luminous Flux @ 350 mA | | | Chromaticity Regions | Order Code |
|------------|-----------|---|-------------------|--------------------|----------------------|--------------------------|
| | | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | | |
| ANSI White | 3000K | H2 | 900 | 1019 | 7A0, 7B0, 7C0, 7D0 | CXA1512-0000-000N0UH20E7 |
| | | H4 | 970 | 1099 | | CXA1512-0000-000N0UH40E7 |
| | | J2 | 1040 | 1178 | | CXA1512-0000-000N0UJ20E7 |
| | 2700K | G4 | 840 | 952 | 8A0, 8B0, 8C0, 8D0 | CXA1512-0000-000N0UG40E8 |
| | | H2 | 900 | 1019 | | CXA1512-0000-000N0UH20E8 |
| | | H4 | 970 | 1099 | | CXA1512-0000-000N0UH40E8 |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements.
- Minimum CRI for high CRI color temperatures 0E8, 27F, 27H, 0E7, 30F, 30H is 90.
- * Flux values @ 25 °C are calculated and for reference only.

FLUX CHARACTERISTICS, STANDARD ORDER CODES AND BINS, 80 CRI ($I_f = 350 \text{ mA}$, $T_j = 85 \text{ }^\circ\text{C}$)

The following tables provide order codes for XLamp CXA1512 80 CRI minimum LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 13).

| Color | CCT Range | Base Order Codes Min. Luminous Flux @ 350 mA | | | 2-Step Order Code | | 4-Step Order Code | |
|-----------|-----------|--|-------------------|--------------------|---------------------|--------------------------|---------------------|--------------------------|
| | | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | | Chromaticity Region | |
| EasyWhite | 5000K | K2 | 1200 | 1359 | 50H | CXA1512-0000-000N0HK250H | 50F | CXA1512-0000-000N0HK250F |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N0HK450H | | CXA1512-0000-000N0HK450F |
| | | M2 | 1380 | 1563 | | CXA1512-0000-000N0HM250H | | CXA1512-0000-000N0HM250F |
| | 4000K | K2 | 1200 | 1359 | 40H | CXA1512-0000-000N0HK240H | 40F | CXA1512-0000-000N0HK240F |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N0HK440H | | CXA1512-0000-000N0HK440F |
| | | M2 | 1380 | 1563 | | CXA1512-0000-000N0HM240H | | CXA1512-0000-000N0HM240F |

| Color | CCT Range | Base Order Codes Min Luminous Flux @ 350 mA | | | Chromaticity Regions | Order Code |
|------------|-----------|---|-------------------|--------------------|----------------------|--------------------------|
| | | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | | |
| ANSI White | 5000K | K2 | 1200 | 1359 | 3A0, 3B0, 3C0, 3D0 | CXA1512-0000-000N0HK20E3 |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N0HK40E3 |
| | | M2 | 1380 | 1563 | | CXA1512-0000-000N0HM20E3 |
| | 4000K | K2 | 1200 | 1359 | 5A0, 5B0, 5C0, 5D0 | CXA1512-0000-000N0HK20E5 |
| | | K4 | 1290 | 1461 | | CXA1512-0000-000N0HK40E5 |
| | | M2 | 1380 | 1563 | | CXA1512-0000-000N0HM20E5 |

Notes:

- Cree maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ± 2 on CRI measurements.
- Minimum CRI for high CRI color temperatures 0E5, 40F, 40H, 0E3, 50F, 50H is 80.
- * Flux values @ 25 °C are calculated and for reference only.

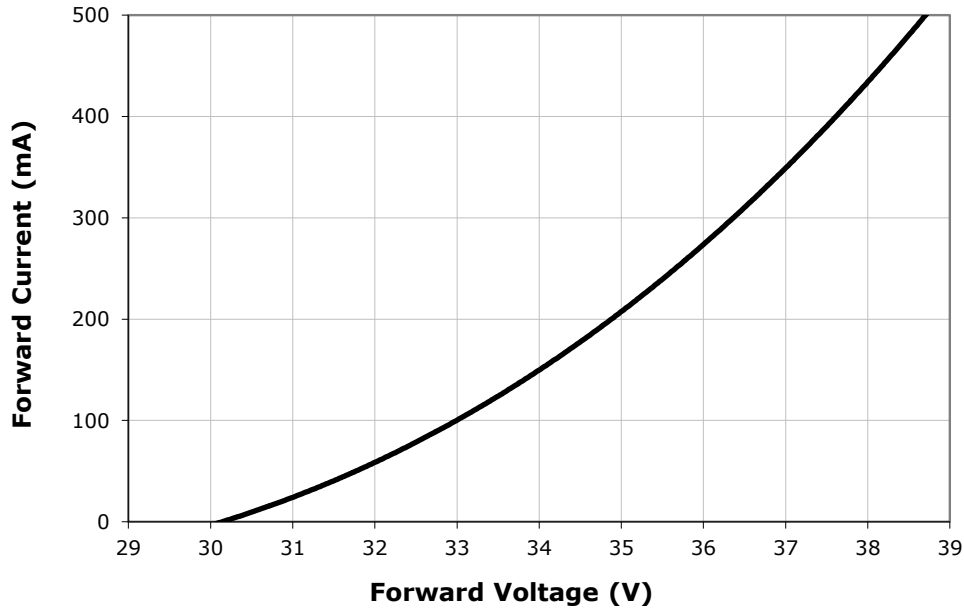
RELATIVE SPECTRAL POWER DISTRIBUTION ($I_f = 350 \text{ mA}$, $T_j = 85 \text{ }^\circ\text{C}$)



RELATIVE LUMINOUS FLUX VS. JUNCTION TEMPERATURE ($I_f = 350 \text{ mA}$)



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



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



RELATIVE CHROMATICITY VS. CURRENT AND TEMPERATURE (3000K, 80 CRI)



TYPICAL SPATIAL DISTRIBUTION



PERFORMANCE GROUPS - BRIGHTNESS ($I_f = 350\text{ mA}$, $T_j = 85\text{ °C}$)

XLamp CXA1512 LEDs are tested for luminous flux and placed into one of the following bins.

| Group Code | Min. Luminous Flux @ 350 mA | Max. Luminous Flux @ 350 mA |
|------------|-----------------------------|-----------------------------|
| G4 | 840 | 900 |
| H2 | 900 | 970 |
| H4 | 970 | 1040 |
| J2 | 1040 | 1120 |
| J4 | 1120 | 1200 |
| K2 | 1200 | 1290 |
| K4 | 1290 | 1380 |
| M2 | 1380 | 1485 |
| M4 | 1485 | 1590 |

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

XLamp CXA1512 LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

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

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

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

| ANSI White Bins | | | | |
|-----------------|-------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E5 | 4000K | 5A0 | .3670 | .3578 |
| | | | .3702 | .3722 |
| | | | .3825 | .3798 |
| | | | .3783 | .3646 |
| | | 5B0 | .3702 | .3722 |
| | | | .3736 | .3874 |
| | | | .3869 | .3958 |
| | | | .3825 | .3798 |
| | | 5C0 | .3825 | .3798 |
| | | | .3869 | .3958 |
| | | | .4006 | .4044 |
| | | | .3950 | .3875 |
| | | 5D0 | .3783 | .3646 |
| | | | .3825 | .3798 |
| | | | .3950 | .3875 |
| | | | .3898 | .3716 |

| ANSI White Bins | | | | |
|-----------------|-------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E6 | 3500K | 6A0 | .3889 | .3690 |
| | | | .3941 | .3848 |
| | | | .4080 | .3916 |
| | | | .4017 | .3751 |
| | | 6B0 | .3941 | .3848 |
| | | | .3996 | .4015 |
| | | | .4146 | .4089 |
| | | | .4080 | .3916 |
| | | 6C0 | .4080 | .3916 |
| | | | .4146 | .4089 |
| | | | .4299 | .4165 |
| | | | .4221 | .3984 |
| | | 6D0 | .4017 | .3751 |
| | | | .4080 | .3916 |
| | | | .4221 | .3984 |
| | | | .4147 | .3814 |

| ANSI White Bins | | | | |
|-----------------|-------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E7 | 3000K | 7A0 | .4147 | .3814 |
| | | | .4221 | .3984 |
| | | | .4342 | .4028 |
| | | | .4259 | .3853 |
| | | 7B0 | .4221 | .3984 |
| | | | .4299 | .4165 |
| | | | .4430 | .4212 |
| | | | .4342 | .4028 |
| | | 7C0 | .4342 | .4028 |
| | | | .4430 | .4212 |
| | | | .4562 | .4260 |
| | | | .4465 | .4071 |
| | | 7D0 | .4259 | .3853 |
| | | | .4342 | .4028 |
| | | | .4465 | .4071 |
| | | | .4373 | .3893 |

| ANSI White Bins | | | | |
|-----------------|-------|----------|-------|-------|
| Code | CCT | Bin Code | x | y |
| 0E8 | 2700K | 8A0 | .4373 | .3893 |
| | | | .4465 | .4071 |
| | | | .4582 | .4099 |
| | | | .4483 | .3919 |
| | | 8B0 | .4465 | .4071 |
| | | | .4562 | .4260 |
| | | | .4687 | .4289 |
| | | | .4582 | .4099 |
| | | 8C0 | .4582 | .4099 |
| | | | .4687 | .4289 |
| | | | .4813 | .4319 |
| | | | .4700 | .4126 |
| | | 8D0 | .4483 | .3919 |
| | | | .4582 | .4099 |
| | | | .4700 | .4126 |
| | | | .4593 | .3944 |

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



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



BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:



MECHANICAL DIMENSIONS

Dimensions are in mm.
 Tolerances unless otherwise specified:
 .x ± .10
 .xx ± .03
 .xxx ± .010
 x° ± 1°



NOTES

Lumen Maintenance Projections

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 at www.cree.com/xlamp_app_notes/LM80_results.

Please read the XLamp Long-Term Lumen Maintenance application note at www.cree.com/xlamp_app_notes/lumen_maintenance for more details on Cree's lumen maintenance testing and forecasting. Please read the XLamp Thermal Management application note at www.cree.com/xlamp_app_notes/thermal_management for details on how thermal design, ambient temperature, and drive current affect the LED junction temperature.

UL Recognized Component

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

Vision Advisory Claim

Users should be cautioned not to stare at the light of this LED product. The bright light can damage the eye.

PACKAGING

Cree CXA1512 LEDs are packaged in tubes of 20, which are then combined in boxes of 5 tubes, or 100 LEDs. Boxes of 100 LEDs are of the same performance bin.

Dimensions are in mm.
Tolerances unless otherwise specified:

- .x ± .10
- .xx ± .03
- .xxx ± .010
- x° ± 1°

