# Cree® XLamp® CXA1304 LED

## PRODUCT DESCRIPTION

The XLamp CXA1304 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 CXA1304'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 6-mm optical source, the CXA1304 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 2700 K, 3000 K, 3500 K, 4000 K and 5000 K CCT
- Available in ANSI white bins as well as 4-step EasyWhite bins at 5700 K and 6500 K CCT
- Available in 70-, 80-, 90- and 93-minimum CRI options
- Forward voltage options: 9 V & 37 V
- 85 °C binning and characterization
- Maximum drive current: 1000 mA (9 V), 250 mA (37 V)
- 115° viewing angle, uniform chromaticity profile
- Top-side solder connections
- Thermocouple attach point
- NEMA SSL-3 2011 standard flux bins
- RoHS- and REACh-compliant
- UL-recognized component (E349212)

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## CHARACTERISTICS

| Characteristics | Unit | Minimum | Typical | Maximum |
|---|---|---|---|---|
| Viewing angle (FWHM) | degrees | | 115 | |
| ESD withstand voltage (HBM per Mil-Std-883D) | V | | | 8000 |
| DC forward current (9 V) | mA | | | 1000* |
| DC forward current (37 V) | mA | | | 250* |
| Reverse current (9 V, 37 V) | mA | | | 0.1 |
| Forward voltage (9 V, 400 mA, 85 °C) | V | | 9.3 | |
| Forward voltage (9 V, 400 mA, 25 °C) | V | | | 10.5 |
| Forward voltage (37 V, 100 mA, 85 °C) | V | | 37 | |
| Forward voltage (37 V, 100 mA, 25 °C) | V | | | 42 |

* Refer to the Operating Limits section.

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## OPERATING LIMITS

The maximum current rating of the CXA1304 is dependent on the case temperature (Tc) when the LED has reached thermal equilibrium under steady-state operation. Please refer to the Mechanical Dimensions section on page 21 for the location of the Tc measurement point.

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## FLUX CHARACTERISTICS, EASYWHITE ORDER CODES AND BINS - 9 V ($I_F$ = 400 mA, $T_J$ = 85 °C)

The following tables provide order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 21).

| CCT Range | CRI | | Base Order Codes Min. Luminous Flux @ 400 mA | | | 2-Step Order Code | | 4-Step Order Code | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Typ | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | | Chromaticity Region | |
| 6500 K | 70 | 75 | B4 | 410 | 457 | | | 65F | CXA1304-0000-000C00B465F |
| | | | C2 | 440 | 490 | | | | CXA1304-0000-000C00C265F |
| | | | C4 | 475 | 527 | | | | CXA1304-0000-000C00C465F |
| | 80 | --- | B2 | 380 | 423 | | | 65F | CXA1304-0000-000C0HB265F |
| | | | B4 | 410 | 457 | | | | CXA1304-0000-000C0HB465F |
| | | | C2 | 440 | 490 | | | | CXA1304-0000-000C0HC265F |
| 5700 K | 70 | 75 | B4 | 410 | 457 | | | 57F | CXA1304-0000-000C00B457F |
| | | | C2 | 440 | 490 | | | | CXA1304-0000-000C00C257F |
| | | | C4 | 475 | 527 | | | | CXA1304-0000-000C00C457F |
| | 80 | --- | B2 | 380 | 423 | | | 57F | CXA1304-0000-000C0HB257F |
| | | | B4 | 410 | 457 | | | | CXA1304-0000-000C0HB457F |
| | | | C2 | 440 | 490 | | | | CXA1304-0000-000C0HC257F |
| 5000 K | 70 | 75 | B4 | 410 | 457 | 50H | CXA1304-0000-000C00B450H | 50F | CXA1304-0000-000C00B450F |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C00C250H | | CXA1304-0000-000C00C250F |
| | | | C4 | 475 | 527 | | CXA1304-0000-000C00C450H | | CXA1304-0000-000C00C450F |
| | 80 | --- | B2 | 380 | 423 | 50H | CXA1304-0000-000C0HB250H | 50F | CXA1304-0000-000C0HB250F |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C0HB450H | | CXA1304-0000-000C0HB450F |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C0HC250H | | CXA1304-0000-000C0HC250F |
| | 90 | 95 | A2 | 330 | 366 | 50H | CXA1304-0000-000C0UA250H | 50F | CXA1304-0000-000C0UA250F |
| | | | A4 | 355 | 396 | | CXA1304-0000-000C0UA450H | | CXA1304-0000-000C0UA450F |
| 4000 K | 70 | 75 | B2 | 380 | 423 | 40H | CXA1304-0000-000C00B240H | 40F | CXA1304-0000-000C00B240F |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C00B440H | | CXA1304-0000-000C00B440F |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C00C240H | | CXA1304-0000-000C00C240F |
| | 80 | --- | A4 | 355 | 396 | 40H | CXA1304-0000-000C0HA440H | 40F | CXA1304-0000-000C0HA440F |
| | | | B2 | 380 | 423 | | CXA1304-0000-000C0HB240H | | CXA1304-0000-000C0HB240F |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C0HB440H | | CXA1304-0000-000C0HB440F |
| | 90 | 95 | 94 | 308 | 342 | 40H | CXA1304-0000-000C0U9440H | 40F | CXA1304-0000-000C0U9440F |
| | | | A2 | 330 | 366 | | CXA1304-0000-000C0UA240H | | CXA1304-0000-000C0UA240F |

Notes

- 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.

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

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## FLUX CHARACTERISTICS, EASYWHITE ORDER CODES AND BINS - 9 V ($I_F$ = 400 mA, $T_J$ = 85 °C) - CONTINUED

| CCT Range | CRI | | Base Order Codes Min. Luminous Flux @ 400 mA | | | 2-Step Order Code | | 4-Step Order Code | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Typ | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | | Chromaticity Region | |
| 3500 K | 80 | --- | A4 | 355 | 396 | 35H | CXA1304-0000-000C00A435H | 35F | CXA1304-0000-000C00A435F |
| | | | B2 | 380 | 423 | | CXA1304-0000-000C00B235H | | CXA1304-0000-000C00B235F |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C00B435H | | CXA1304-0000-000C00B435F |
| | 93 | 95 | 92 | 286 | 317 | 35H | CXA1304-0000-000C0Y9235H | 35F | CXA1304-0000-000C0Y9235F |
| | | | 94 | 308 | 342 | | CXA1304-0000-000C0Y9435H | | CXA1304-0000-000C0Y9435F |
| 3000 K | 80 | --- | A4 | 355 | 396 | 30H | CXA1304-0000-000C00A430H | 30F | CXA1304-0000-000C00A430F |
| | | | B2 | 380 | 423 | | CXA1304-0000-000C00B230H | | CXA1304-0000-000C00B230F |
| | 93 | 95 | 84 | 268 | 297 | 30H | CXA1304-0000-000C0Y8430H | 30F | CXA1304-0000-000C0Y8430F |
| | | | 92 | 286 | 317 | | CXA1304-0000-000C0Y9230H | | CXA1304-0000-000C0Y9230F |
| 2700 K | 80 | --- | A2 | 330 | 368 | 27H | CXA1304-0000-000C00A227H | 27F | CXA1304-0000-000C00A227F |
| | | | A4 | 355 | 396 | | CXA1304-0000-000C00A427H | | CXA1304-0000-000C00A427F |
| | | | B2 | 380 | 423 | | CXA1304-0000-000C00B227H | | CXA1304-0000-000C00B227F |
| | 93 | 95 | 82 | 249 | 276 | 27H | CXA1304-0000-000C0Y8227H | 27F | CXA1304-0000-000C0Y8227F |
| | | | 84 | 268 | 297 | | CXA1304-0000-000C0Y8427H | | CXA1304-0000-000C0Y8427F |

Notes

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## FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 9 V ($I_F$ = 400 mA, $T_J$ = 85 °C)

The following tables provide order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 21).

| CCT Range | CRI | | Base Order Codes Min. Luminous Flux @ 400 mA | | | Chromaticity Regions | Order Code |
|---|---|---|---|---|---|---|---|
| | Min | Typ | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | | |
| 6500 K | 70 | 75 | B4 | 410 | 457 | 1A0, 1B0, 1C0, 1D0 | CXA1304-0000-000C00B40E1 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C00C20E1 |
| | | | C4 | 475 | 527 | | CXA1304-0000-000C00C40E1 |
| | 80 | --- | B2 | 380 | 423 | 1A0, 1B0, 1C0, 1D0 | CXA1304-0000-000C0HB20E1 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C0HB40E1 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C0HC20E1 |
| 5700 K | 70 | 75 | B4 | 410 | 457 | 2A0, 2B0, 2C0, 2D0 | CXA1304-0000-000C00B40E2 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C00C20E2 |
| | | | C4 | 475 | 527 | | CXA1304-0000-000C00C40E2 |
| | 80 | --- | B2 | 380 | 423 | 2A0, 2B0, 2C0, 2D0 | CXA1304-0000-000C0HB20E2 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C0HB40E2 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C0HC20E2 |
| 5000 K | 70 | 75 | B4 | 410 | 457 | 3A0, 3B0, 3C0, 3D0 | CXA1304-0000-000C00B40E3 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C00C20E3 |
| | | | C4 | 475 | 527 | | CXA1304-0000-000C00C40E3 |
| | 80 | --- | B2 | 380 | 423 | 3A0, 3B0, 3C0, 3D0 | CXA1304-0000-000C0HB20E3 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C0HB40E3 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C0HC20E3 |
| | 90 | 95 | A2 | 330 | 366 | 3A0, 3B0, 3C0, 3D0 | CXA1304-0000-000C0UA20E3 |
| | | | A4 | 355 | 396 | | CXA1304-0000-000C0UA40E3 |
| 4000 K | 70 | 75 | B2 | 380 | 423 | 5A0, 5B0, 5C0, 5D0 | CXA1304-0000-000C00B20E5 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C00B40E5 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000C00C20E5 |
| | 80 | --- | A4 | 355 | 396 | 5A0, 5B0, 5C0, 5D0 | CXA1304-0000-000C0HA40E5 |
| | | | B2 | 380 | 423 | | CXA1304-0000-000C0HB20E5 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C0HB40E5 |
| | 90 | 95 | 94 | 308 | 342 | 5A0, 5B0, 5C0, 5D0 | CXA1304-0000-000C0U940E5 |
| | | | A2 | 330 | 366 | | CXA1304-0000-000C0UA20E5 |

Notes

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## FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 9 V ($I_F$ = 400 mA, $T_J$ = 85 °C) - CONTINUED

| CCT Range | CRI | | Base Order Codes Min. Luminous Flux @ 400 mA | | | Chromaticity Regions | Order Code |
|---|---|---|---|---|---|---|---|
| | Min | Typ | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | | |
| 3500 K | 80 | --- | A4 | 355 | 396 | 6A0, 6B0, 6C0, 6D0 | CXA1304-0000-000C00A40E6 |
| | | | B2 | 380 | 423 | | CXA1304-0000-000C00B20E6 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000C00B40E6 |
| | 93 | 95 | 92 | 286 | 317 | 6A0, 6B0, 6C0, 6D0 | CXA1304-0000-000C0Y920E6 |
| | | | 94 | 308 | 342 | | CXA1304-0000-000C0Y940E6 |
| 3000 K | 80 | --- | A4 | 355 | 396 | 7A0, 7B0, 7C0, 7D0 | CXA1304-0000-000C00A40E7 |
| | | | B2 | 380 | 423 | | CXA1304-0000-000C00B20E7 |
| | 93 | 95 | 84 | 268 | 297 | 7A0, 7B0, 7C0, 7D0 | CXA1304-0000-000C0Y840E7 |
| | | | 92 | 286 | 317 | | CXA1304-0000-000C0Y920E7 |
| 2700 K | 80 | --- | A2 | 330 | 368 | 8A0, 8B0, 8C0, 8D0 | CXA1304-0000-000C00A20E8 |
| | | | A4 | 355 | 396 | | CXA1304-0000-000C00A40E8 |
| | | | B2 | 380 | 423 | | CXA1304-0000-000C00B20E8 |
| | 93 | 95 | 82 | 249 | 276 | 8A0, 8B0, 8C0, 8D0 | CXA1304-0000-000C0Y820E8 |
| | | | 84 | 268 | 297 | | CXA1304-0000-000C0Y840E8 |

Notes

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## FLUX CHARACTERISTICS, EASYWHITE ORDER CODES AND BINS - 37 V ($I_F$ = 100 mA, $T_J$ = 85 °C)

The following tables provide order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 21).

| CCT Range | CRI | | Base Order Codes Min. Luminous Flux @ 100 mA | | | 2-Step Order Code | | 4-Step Order Code | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Typ | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | | Chromaticity Region | |
| 6500 K | 70 | 75 | B4 | 410 | 457 | | | 65F | CXA1304-0000-000N00B465F |
| | | | C2 | 440 | 490 | | | | CXA1304-0000-000N00C265F |
| | | | C4 | 475 | 527 | | | | CXA1304-0000-000N00C465F |
| | 80 | --- | B2 | 380 | 423 | | | 65F | CXA1304-0000-000N0HB265F |
| | | | B4 | 410 | 457 | | | | CXA1304-0000-000N0HB465F |
| | | | C2 | 440 | 490 | | | | CXA1304-0000-000N0HC265F |
| 5700 K | 70 | 75 | B4 | 410 | 457 | | | 57F | CXA1304-0000-000N00B457F |
| | | | C2 | 440 | 490 | | | | CXA1304-0000-000N00C257F |
| | | | C4 | 475 | 527 | | | | CXA1304-0000-000N00C457F |
| | 80 | --- | B2 | 380 | 423 | | | 57F | CXA1304-0000-000N0HB257F |
| | | | B4 | 410 | 457 | | | | CXA1304-0000-000N0HB457F |
| | | | C2 | 440 | 490 | | | | CXA1304-0000-000N0HC257F |
| 5000 K | 70 | 75 | B4 | 410 | 457 | 50H | CXA1304-0000-000N00B450H | 50F | CXA1304-0000-000N00B450F |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N00C250H | | CXA1304-0000-000N00C250F |
| | | | C4 | 475 | 527 | | CXA1304-0000-000N00C450H | | CXA1304-0000-000N00C450F |
| | 80 | --- | B2 | 380 | 423 | 50H | CXA1304-0000-000N0HB250H | 50F | CXA1304-0000-000N0HB250F |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N0HB450H | | CXA1304-0000-000N0HB450F |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N0HC250H | | CXA1304-0000-000N0HC250F |
| | 90 | 95 | A2 | 330 | 366 | 50H | CXA1304-0000-000N0UA250H | 50F | CXA1304-0000-000N0UA250F |
| | | | A4 | 355 | 396 | | CXA1304-0000-000N0UA450H | | CXA1304-0000-000N0UA450F |

Notes

- 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.

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## FLUX CHARACTERISTICS, EASYWHITE ORDER CODES AND BINS - 37 V ($I_F$ = 100 mA, $T_J$ = 85 °C) - CONTINUED

| CCT Range | CRI | | Base Order Codes Min. Luminous Flux @ 100 mA | | | 2-Step Order Code | | 4-Step Order Code | |
|---|---|---|---|---|---|---|---|---|---|
| | Min | Typ | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | Chromaticity Region | | Chromaticity Region | |
| 4000 K | 70 | 75 | B2 | 380 | 423 | 40H | CXA1304-0000-000N00B240H | 40F | CXA1304-0000-000N00B240F |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N00B440H | | CXA1304-0000-000N00B440F |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N00C240H | | CXA1304-0000-000N00C240F |
| | 80 | --- | A4 | 355 | 396 | 40H | CXA1304-0000-000N0HA440H | 40F | CXA1304-0000-000N0HA440F |
| | | | B2 | 380 | 423 | | CXA1304-0000-000N0HB240H | | CXA1304-0000-000N0HB240F |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N0HB440H | | CXA1304-0000-000N0HB440F |
| | 90 | 95 | 94 | 308 | 342 | 40H | CXA1304-0000-000N0U9440H | 40F | CXA1304-0000-000N0U9440F |
| | | | A2 | 330 | 366 | | CXA1304-0000-000N0UA240H | | CXA1304-0000-000N0UA240F |
| 3500 K | 80 | --- | A4 | 355 | 396 | 35H | CXA1304-0000-000N00A435H | 35F | CXA1304-0000-000N00A435F |
| | | | B2 | 380 | 423 | | CXA1304-0000-000N00B235H | | CXA1304-0000-000N00B235F |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N00B435H | | CXA1304-0000-000N00B435F |
| | 93 | 95 | 92 | 286 | 317 | 35H | CXA1304-0000-000N0Y9235H | 35F | CXA1304-0000-000N0Y9235F |
| | | | 94 | 308 | 342 | | CXA1304-0000-000N0Y9435H | | CXA1304-0000-000N0Y9435F |
| 3000 K | 80 | --- | A4 | 355 | 396 | 30H | CXA1304-0000-000N00A430H | 30F | CXA1304-0000-000N00A430F |
| | | | B2 | 380 | 423 | | CXA1304-0000-000N00B230H | | CXA1304-0000-000N00B230F |
| | 93 | 95 | 84 | 268 | 297 | 30H | CXA1304-0000-000N0Y8430H | 30F | CXA1304-0000-000N0Y8430F |
| | | | 92 | 286 | 317 | | CXA1304-0000-000N0Y9230H | | CXA1304-0000-000N0Y9230F |
| 2700 K | 80 | --- | A2 | 330 | 368 | 27H | CXA1304-0000-000N00A227H | 27F | CXA1304-0000-000N00A227F |
| | | | A4 | 355 | 396 | | CXA1304-0000-000N00A427H | | CXA1304-0000-000N00A427F |
| | | | B2 | 380 | 423 | | CXA1304-0000-000N00B227H | | CXA1304-0000-000N00B227F |
| | 93 | 95 | 82 | 249 | 276 | 27H | CXA1304-0000-000N0Y8227H | 27F | CXA1304-0000-000N0Y8227F |
| | | | 84 | 268 | 297 | | CXA1304-0000-000N0Y8427H | | CXA1304-0000-000N0Y8427F |

Notes

- 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.

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## FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 37 V ($I_F$ = 100 mA, $T_J$ = 85 °C)

The following tables provide order codes for XLamp CXA1304 LEDs. For a complete description of the order code nomenclature, please reference Bin and Order Code Formats (page 21).

| CCT Range | CRI | | Base Order Codes Min. Luminous Flux @ 100 mA | | | Chromaticity Regions | Order Code |
|---|---|---|---|---|---|---|---|
| | Min | Typ | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | | |
| 6500 K | 70 | 75 | B4 | 410 | 457 | 1A0, 1B0, 1C0, 1D0 | CXA1304-0000-000N00B40E1 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N00C20E1 |
| | | | C4 | 475 | 527 | | CXA1304-0000-000N00C40E1 |
| | 80 | --- | B2 | 380 | 423 | 1A0, 1B0, 1C0, 1D0 | CXA1304-0000-000N0HB20E1 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N0HB40E1 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N0HC20E1 |
| 5700 K | 70 | 75 | B4 | 410 | 457 | 2A0, 2B0, 2C0, 2D0 | CXA1304-0000-000N00B40E2 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N00C20E2 |
| | | | C4 | 475 | 527 | | CXA1304-0000-000N00C40E2 |
| | 80 | --- | B2 | 380 | 423 | 2A0, 2B0, 2C0, 2D0 | CXA1304-0000-000N0HB20E2 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N0HB40E2 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N0HC20E2 |
| 5000 K | 70 | 75 | B4 | 410 | 457 | 3A0, 3B0, 3C0, 3D0 | CXA1304-0000-000N00B40E3 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N00C20E3 |
| | | | C4 | 475 | 527 | | CXA1304-0000-000N00C40E3 |
| | 80 | --- | B2 | 380 | 423 | 3A0, 3B0, 3C0, 3D0 | CXA1304-0000-000N0HB20E3 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N0HB40E3 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N0HC20E3 |
| | 90 | 95 | A2 | 330 | 366 | 3A0, 3B0, 3C0, 3D0 | CXA1304-0000-000N0UA20E3 |
| | | | A4 | 355 | 396 | | CXA1304-0000-000N0UA40E3 |

Notes

- 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.

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

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## FLUX CHARACTERISTICS, ANSI WHITE ORDER CODES AND BINS - 37 V ($I_F$ = 100 mA, $T_J$ = 85 °C) - CONTINUED

| CCT Range | CRI | | Base Order Codes Min. Luminous Flux @ 100 mA | | | Chromaticity Regions | Order Code |
|---|---|---|---|---|---|---|---|
| | Min | Typ | Group | Flux (lm) @ 85 °C | Flux (lm) @ 25 °C* | | |
| 4000 K | 70 | 75 | B2 | 380 | 423 | 5A0, 5B0, 5C0, 5D0 | CXA1304-0000-000N00B20E5 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N00B40E5 |
| | | | C2 | 440 | 490 | | CXA1304-0000-000N00C20E5 |
| | 80 | --- | A4 | 355 | 396 | 5A0, 5B0, 5C0, 5D0 | CXA1304-0000-000N0HA40E5 |
| | | | B2 | 380 | 423 | | CXA1304-0000-000N0HB20E5 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N0HB40E5 |
| | 90 | 95 | 94 | 308 | 342 | 5A0, 5B0, 5C0, 5D0 | CXA1304-0000-000N0U940E5 |
| | | | A2 | 330 | 366 | | CXA1304-0000-000N0UA20E5 |
| 3500 K | 80 | --- | A4 | 355 | 396 | 6A0, 6B0, 6C0, 6D0 | CXA1304-0000-000N00A40E6 |
| | | | B2 | 380 | 423 | | CXA1304-0000-000N00B20E6 |
| | | | B4 | 410 | 457 | | CXA1304-0000-000N00B50E6 |
| | 93 | 95 | 92 | 286 | 317 | 6A0, 6B0, 6C0, 6D0 | CXA1304-0000-000N0Y920E6 |
| | | | 94 | 308 | 342 | | CXA1304-0000-000N0Y940E6 |
| 3000 K | 80 | --- | A4 | 355 | 396 | 7A0, 7B0, 7C0, 7D0 | CXA1304-0000-000N00A40E7 |
| | | | B2 | 380 | 423 | | CXA1304-0000-000N00B20E7 |
| | 93 | 95 | 84 | 268 | 297 | 7A0, 7B0, 7C0, 7D0 | CXA1304-0000-000N0Y840E7 |
| | | | 92 | 286 | 317 | | CXA1304-0000-000N0Y920E7 |
| 2700 K | 80 | --- | A2 | 330 | 368 | 8A0, 8B0, 8C0, 8D0 | CXA1304-0000-000N00A20E8 |
| | | | A4 | 355 | 396 | | CXA1304-0000-000N00A40E8 |
| | | | B2 | 380 | 423 | | CXA1304-0000-000N00B20E8 |
| | 93 | 95 | 82 | 249 | 276 | 8A0, 8B0, 8C0, 8D0 | CXA1304-0000-000N0Y820E8 |
| | | | 84 | 268 | 297 | | CXA1304-0000-000N0Y840E8 |

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## RELATIVE SPECTRAL POWER DISTRIBUTION (9 V, $I_F$ = 400 mA; 37 V, $I_F$ = 100 mA, $T_J$ = 85 °C)

The following graph is the result of a series of pulsed measurements at 400 mA for the 9-V CXA1304 LED and 100 mA for the 37-V CXA1304 LED and $T_J$ = 85 °C.

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## ELECTRICAL CHARACTERISTICS

The following graphs are the result of a series of steady-state measurements.

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## RELATIVE LUMINOUS FLUX

The relative luminous flux values provided below are the ratio of:

- Measurements of CXA1304 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 400 mA at $T_J$ = 85 °C for the 9-V CXA1304 LED.

Using the 9-V CXA1304 LED as an example, at steady-state operation of Tc = 55 °C, $I_F$ = 700 mA, the relative luminous flux ratio is 160% in the chart below. A 9-V CXA1304 LED that measures 380 lm during binning will deliver 608 lm (380 * 1.6) at steady-state operation of Tc = 55 °C, $I_F$ = 700 mA.

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## RELATIVE LUMINOUS FLUX - CONTINUED

The relative luminous flux values provided below are the ratio of:

- Measurements of CXA1304 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 100 mA at $T_J$ = 85 °C for the 37-V CXA1304 LED.

Using the 37-V CXA1304 LED as an example, at steady-state operation of Tc = 55 °C, $I_F$ = 175 mA, the relative luminous flux ratio is 160% in the chart below. A 37-V CXA1304 LED that measures 380 lm during binning will deliver 608 lm (380 * 1.6) at steady-state operation of Tc = 55 °C, $I_F$ = 175 mA.

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## TYPICAL SPATIAL DISTRIBUTION

## PERFORMANCE GROUPS - BRIGHTNESS (9 V, $I_F$ = 400 mA; 37 V, $I_F$ = 100 mA, $T_J$ = 85 °C)

XLamp CXA1304 LEDs are tested for luminous flux and placed into one of the following bins.

| Group Code | Min. Luminous Flux | Max. Luminous Flux |
|---|---|---|
| 82 | 249 | 268 |
| 84 | 268 | 286 |
| 92 | 286 | 308 |
| 94 | 308 | 330 |
| A2 | 330 | 355 |
| A4 | 355 | 380 |
| B2 | 380 | 410 |
| B4 | 410 | 440 |
| C2 | 440 | 475 |
| C4 | 475 | 510 |

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

XLamp CXA1304 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 |
| 65F | 6500 K | 0.3253 | 0.3325 |
| | | 0.3249 | 0.3439 |
| | | 0.3331 | 0.3514 |
| | | 0.3330 | 0.3393 |
| 57F | 5700 K | 0.3097 | 0.3196 |
| | | 0.3079 | 0.3297 |
| | | 0.3164 | 0.3382 |
| | | 0.3176 | 0.3275 |
| 50F | 5000 K | 0.3407 | 0.3459 |
| | | 0.3415 | 0.3586 |
| | | 0.3499 | 0.3654 |
| | | 0.3484 | 0.3521 |
| 40F | 4000 K | 0.3744 | 0.3685 |
| | | 0.3782 | 0.3837 |
| | | 0.3912 | 0.3917 |
| | | 0.3863 | 0.3758 |
| 35F | 3500 K | 0.3981 | 0.3800 |
| | | 0.4040 | 0.3966 |
| | | 0.4186 | 0.4037 |
| | | 0.4116 | 0.3865 |
| 30F | 3000 K | 0.4242 | 0.3919 |
| | | 0.4322 | 0.4096 |
| | | 0.4449 | 0.4141 |
| | | 0.4359 | 0.3960 |
| 27F | 2700 K | 0.4475 | 0.3994 |
| | | 0.4573 | 0.4178 |
| | | 0.4695 | 0.4207 |
| | | 0.4589 | 0.4021 |

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

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## PERFORMANCE GROUPS - CHROMATICITY ($T_J$ = 85 °C) - CONTINUED

| ANSI White Bins | | | | |
|---|---|---|---|---|
| Code | CCT | Bin Code | x | y |
| 0E1 | 6500 K | 1A0 | 0.3048 | 0.3207 |
| | | | 0.3130 | 0.3290 |
| | | | 0.3144 | 0.3186 |
| | | | 0.3068 | 0.3113 |
| | | 1B0 | 0.3028 | 0.3304 |
| | | | 0.3115 | 0.3391 |
| | | | 0.3130 | 0.3290 |
| | | | 0.3048 | 0.3207 |
| | | 1C0 | 0.3115 | 0.3391 |
| | | | 0.3205 | 0.3481 |
| | | | 0.3213 | 0.3373 |
| | | | 0.3130 | 0.3290 |
| | | 1D0 | 0.3130 | 0.3290 |
| | | | 0.3213 | 0.3373 |
| | | | 0.3221 | 0.3261 |
| | | | 0.3144 | 0.3186 |

| ANSI White Bins | | | | |
|---|---|---|---|---|
| Code | CCT | Bin Code | x | y |
| 0E2 | 5700 K | 2A0 | 0.3215 | 0.3350 |
| | | | 0.3290 | 0.3417 |
| | | | 0.3290 | 0.3300 |
| | | | 0.3222 | 0.3243 |
| | | 2B0 | 0.3207 | 0.3462 |
| | | | 0.3290 | 0.3538 |
| | | | 0.3290 | 0.3417 |
| | | | 0.3215 | 0.3350 |
| | | 2C0 | 0.3290 | 0.3538 |
| | | | 0.3376 | 0.3616 |
| | | | 0.3371 | 0.3490 |
| | | | 0.3290 | 0.3417 |
| | | 2D0 | 0.3290 | 0.3417 |
| | | | 0.3371 | 0.3490 |
| | | | 0.3366 | 0.3369 |
| | | | 0.3290 | 0.3300 |

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

| ANSI White Bins | | | | |
|---|---|---|---|---|
| Code | CCT | Bin Code | x | y |
| 0E5 | 4000 K | 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 | 3500 K | 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 |

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## PERFORMANCE GROUPS - CHROMATICITY ($T_J$ = 85 °C) - CONTINUED

| ANSI White Bins | | | | |
|---|---|---|---|---|
| Code | CCT | Bin Code | x | y |
| 0E7 | 3000 K | 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 | 2700 K | 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 °C)

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## CREE ANSI WHITE BINS PLOTTED ON THE 1931 CIE COLOR SPACE ($T_J$ = 85 °C)

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## BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:

### Order Code

SSSSSCC-HHHH-HHHGGNNNNNN

- Series = CXA13
- Internal code
- CRI Specification
  - 0 = Standard CRI
  - H = 80 min CRI
  - U = 90 min CRI
  - Y = 93 min CRI
- Kit code
- Vf class: C0 = 9-V class, N0 = 37-V class
- Performance class

### Bin Code

SSSSSCC-WWW-FF-GGR-AAAAA

- Series = CXA13
- Chromaticity bin
- Vf class: C0 = 9-V class, N0 = 37-V class
- Internal code
- CRI Specification
  - B = 70 min CRI
  - H = 80 min CRI
  - U = 90 min CRI
  - Y = 93 min CRI
- Flux bin
- Performance class

## MECHANICAL DIMENSIONS

Dimensions are in mm.

Tolerances unless otherwise specified:

.x ± .10

.xx ± .03

.xxx ± .010

x° ± 1°

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## THERMAL DESIGN

The CXA family of LED arrays can include over a hundred different LED die inside one package, and thus over a hundred different junction temperatures ($T_J$). Cree has intentionally removed junction-temperature-based operating limits and replaced the commonplace maximum $T_J$ calculations with maximum ratings based on forward current ($I_F$) and case temperature (Tc). No additional calculations are required to ensure the CXA LED is being operated within its designed limits. Please refer to page 2 for the Operating Limit specification.

Cree has measured the temperature at the bottom of the package, commonly referred to as the solder point ($T_{SP}$), and found this value to be equivalent to the temperature at the Tc location at the top of the package once the LED has reached thermal equilibrium. There is no need to calculate for $T_J$ inside the package, as the thermal management design process, specifically from $T_{SP}$ to ambient ($T_a$), remains identical to any other LED component. For more information on thermal management of Cree XLamp LEDs, please refer to the XLamp Thermal Management application note at www.cree.com/xlamp_app_notes/thermal_management. For CXA soldering recommendations and more information on thermal interface materials (TIM) and connection methods, please refer to the Cree XLamp CXA Family LEDs soldering and handling document at www.cree.com/xlamp_app_notes/CXA_SH.

To keep the CXA1304 LED at or below the maximum rated Tc, the case to ambient temperature thermal resistance (R_c-a) must be at or below the maximum R_c-a value shown on the following graphs, depending on the operating environment. The y-axis in each graph is a base 10 logarithmic scale.

As the figure at right shows, the R_c-a value is the sum of the thermal resistance of the TIM (R_tim) plus the thermal resistance of the heat sink (R_hs).

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## THERMAL DESIGN - CONTINUED

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## 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.

### 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 Documentation sections of www.cree.com.

### REACh Compliance

REACh substances of 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.

### 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.

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## PACKAGING

Cree CXA1304 LEDs are packaged in trays of 20. Five trays are sealed in an anti-static bag and placed inside a carton, for a total of 100 LEDs per carton. Each carton contains 100 LEDs from the same performance bin.

Dimensions are in inches.
Tolerances:
.x ± .1
.xx ± .05
.xxx ± .005
x° ± 1°

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