CLD-DS219 REV 0C

# Cree® XLamp® CMA1303 LED

## PRODUCT DESCRIPTION

Cree's XLamp® High-Current LED Array family is optimized for best-in-class lumen output, efficacy and reliability at high drive currents. XLamp CMA LEDs share the same package design and LES sizes as Cree's industry-leading CXA2 Standard Density LEDs, enabling lighting manufacturers to address a range of performance requirements for applications such as track, downlight and outdoor lighting using a single easy-to-use platform. XLamp High-Current LED Arrays are available in 2-step, 3-step and 5-step EasyWhite® bins.

## FEATURES

- 4.5-mm optical source
- Mechanical and optical design consistent with CXA13 and CXB13 LEDs
- Cree EasyWhite® 2-, 3- and 5-step binning
- Premium Color 2- and 3-step binning
- Standard & Premium Color LEDs available in 70, 80, 90 and 95 CRI minimum options
- Forward voltage options: 9-V class, 18-V class & 36-V class
- 85 °C binning and characterization
- Maximum drive current: 1400 mA (9 V), 700 mA (18 V), 350 mA (36 V)
- 116° viewing angle, uniform chromaticity profile
- Top-side solder connections
- RoHS compliant



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## CHARACTERISTICS

| Characteristics | Unit | Minimum | Typical | Maximum |
|---|---|---|---|---|
| Viewing angle (FWHM) | degrees | | 116 | |
| ESD withstand voltage (JEDEC JS-001-2012) | | | Class 3A | |
| DC forward current (9 V) | mA | | | 1400* |
| DC forward current (18 V) | mA | | | 700* |
| DC forward current (36 V) | mA | | | 350* |
| Reverse current | mA | | | 0.1 |
| Forward voltage (9 V, 700 mA, 85 °C) | V | | 9.35 | 10.675 |
| Forward voltage (18 V, 350 mA, 85 °C) | V | | 18.7 | 21.35 |
| Forward voltage (36 V, 175 mA, 85 °C) | V | | 37.4 | 42.7 |

* Refer to the Operating Limits section.

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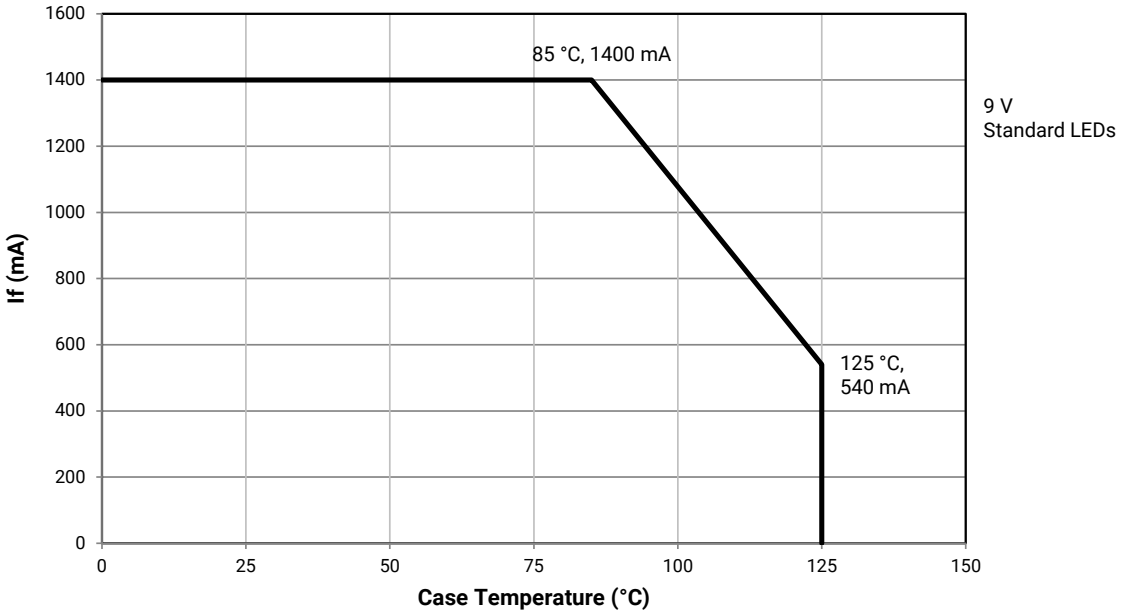
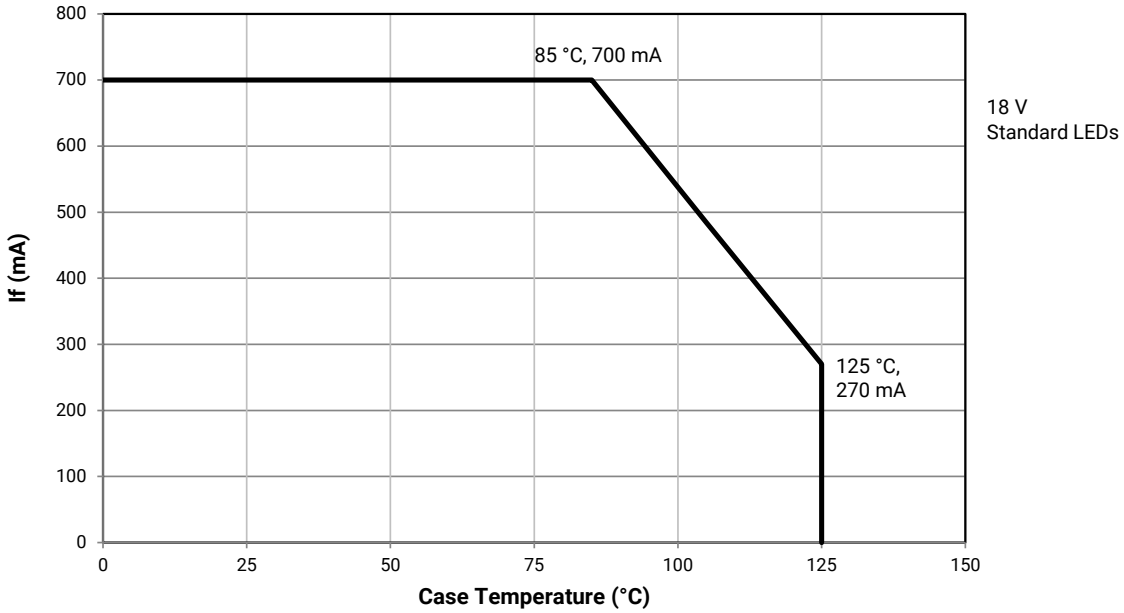
## OPERATING LIMITS

The maximum current rating of the CMA1303 depends on the case temperature (Tc) when the LED has reached thermal equilibrium under steady-state operation. The graph shown below assumes that the system design employs good thermal management (thermal interface material and heat sink) and may vary when poor thermal management is employed. Either solder pad shown in the Mechanical Dimensions section on page 26 can be used as the Tc measurement point.

Another important factor in good thermal management is the temperature of the Light Emitting Surface (LES). Cree recommends a maximum LES temperature of 140 °C to ensure optimal LED lifetime. Please refer to the Thermal Design section on page 27 for more information on LES temperature measurement.

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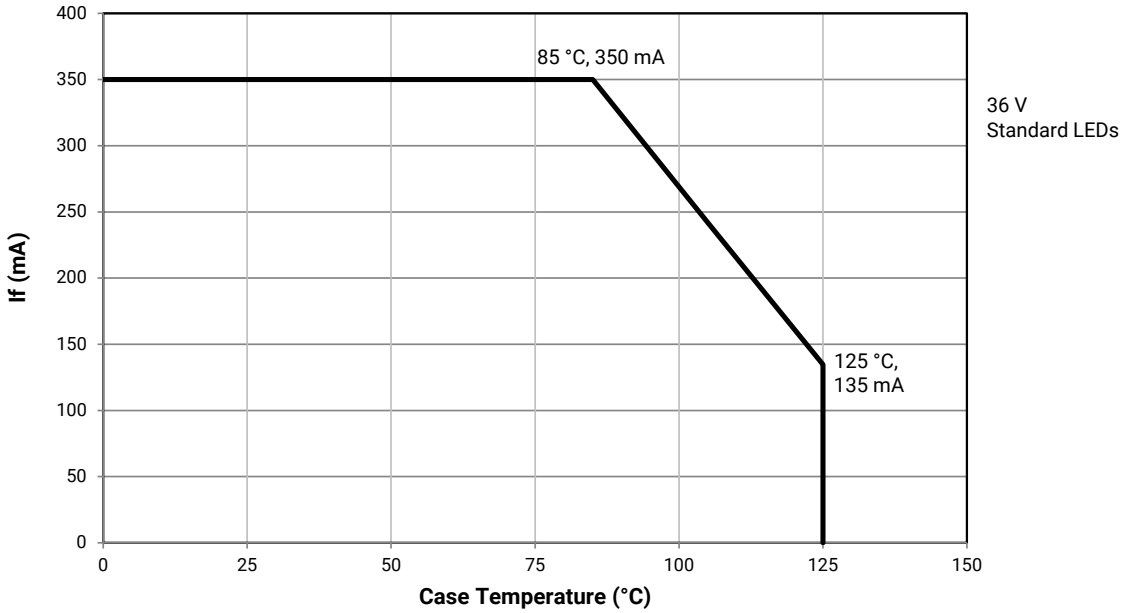
## OPERATING LIMITS - CONTINUED

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## FLUX CHARACTERISTICS, ORDER CODES & BINS - STANDARD LEDS - 9 V ($I_F$ = 700 mA, $T_J$ = 85 °C)

The following table provides order codes for XLamp CMA1303 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 25).

| Nominal CCT | CRI | | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | 2-Step | | 3-Step | | 5-Step | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Typ. | | | Group | Order Code | Group | Order Code | Group | Order Code |
| 6500 K | 70 | 73 | 847 | 891 | | | | | 65E | CMA1303-0000-000C0B0A65E |
| | 80 | 82 | 791 | 833 | | | | | 65E | CMA1303-0000-000C0H0A65E |
| 5700 K | 70 | 73 | 847 | 891 | | | | | 57E | CMA1303-0000-000C0B0A57E |
| | 80 | 82 | 791 | 833 | | | | | 57E | CMA1303-0000-000C0H0A57E |
| | 90 | 92 | 693 | 729 | | | 57G | CMA1303-0000-000C0U0A57G | | |
| 5000 K | 70 | 73 | 847 | 891 | | | | | 50E | CMA1303-0000-000C0B0A50E |
| | 80 | 82 | 791 | 833 | | | 50G | CMA1303-0000-000C0H0A50G | | |
| | 90 | 92 | 693 | 729 | | | 50G | CMA1303-0000-000C0U0A50G | | |
| 4000 K | 70 | 73 | 840 | 885 | | | | | 40E | CMA1303-0000-000C0B0A40E |
| | 80 | 82 | 782 | 823 | 40H | CMA1303-0000-000C0H0A40H | 40G | CMA1303-0000-000C0H0A40G | | |
| | 90 | 92 | 673 | 709 | 40H | CMA1303-0000-000C0U0A40H | 40G | CMA1303-0000-000C0U0A40G | | |
| 3500 K | 80 | 82 | 763 | 803 | 35H | CMA1303-0000-000C0H0A35H | 35G | CMA1303-0000-000C0H0A35G | | |
| | 90 | 92 | 655 | 689 | 35H | CMA1303-0000-000C0U0A35H | 35G | CMA1303-0000-000C0U0A35G | | |
| 3000 K | 70 | 73 | 820 | 860 | | | | | 30E | CMA1303-0000-000C0B0A30E |
| | 80 | 82 | 741 | 780 | 30H | CMA1303-0000-000C0H0A30H | 30G | CMA1303-0000-000C0H0A30G | | |
| | 90 | 92 | 626 | 659 | 30H | CMA1303-0000-000C0U0A30H | 30G | CMA1303-0000-000C0U0A30G | | |
| 2700 K | 80 | 82 | 711 | 748 | 27H | CMA1303-0000-000C0H0A27H | 27G | CMA1303-0000-000C0H0A27G | | |
| | 90 | 92 | 598 | 630 | 27H | CMA1303-0000-000C0U0A27H | 27G | CMA1303-0000-000C0U0A27G | | |
| 2200 K | 80 | 82 | 598 | 630 | | | 22G | CMA1303-0000-000C0H0A22G | | |
| | 90 | 92 | 520 | 547 | 22H | | 22G | CMA1303-0000-000C0U0A22G | | |

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. See the Measurements section (page 29).
- For 80 CRI minimum LEDs, CRI R9 minimum is 0 with a ±2 tolerance. For 90 CRI minimum LEDs, CRI R9 typical is 60.

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## FLUX CHARACTERISTICS, ORDER CODES & BINS - STANDARD LEDS, PREMIUM COLOR - 9 V ($I_F$ = 700 mA, $T_J$ = 85 °C)

### Fidelity

| Nominal CCT | CRI* | | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | 2-Step | |
|---|---|---|---|---|---|---|
| | Min. | Typ | | | Group | Order Code |
| 4000 K | 95 | 98 | 603 | 635 | L5A | CMA1303-0000-000C0Z0AL5A |
| 3500 K | 95 | 98 | 587 | 618 | 35H | CMA1303-0000-000C0Z0A35H |
| 3000 K | 95 | 98 | 549 | 578 | 30H | CMA1303-0000-000C0Z0A30H |
| 2700 K | 95 | 98 | 520 | 547 | 27H | CMA1303-0000-000C0Z0A27H |

### Specialty

| Nominal CCT | CRI | | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | 2-Step | | 3-Step | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Typ | | | Group | Order Code | Group | Order Code | Group | Order Code |
| 3100 K | 90 | 92 | 630 | 665 | | | 31Q | CMA1303-0000-000C0U0A31Q | | |
| 3000 K | 80 | 82 | 741 | 780 | L7B | CMA1303-0000-000C0H0AL7B | | | | |
| | 90 | 92 | 626 | 650 | | | 30Q | CMA1303-0000-000C0U0A30Q | 30U | CMA1303-0000-000C0U0A30U |
| | 95 | 98 | 535 | 560 | L7C | CMA1303-0000-000C0Z0AL7C | | | | |

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. See the Measurements section (page 29).
- For 80 CRI minimum LEDs, CRI R9 minimum is 0 with a ±2 tolerance. For 90 CRI minimum LEDs, CRI R9 typical is 60.

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## FLUX CHARACTERISTICS, ORDER CODES & BINS - STANDARD LEDS - 18 V ($I_F$ = 350 mA, $T_J$ = 85 °C)

The following table provides order codes for XLamp CMA1303 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 25).

| Nominal CCT | CRI | | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | 2-Step | | 3-Step | | 5-Step | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Typ | | | Group | Order Code | Group | Order Code | Group | Order Code |
| 6500 K | 70 | 73 | 847 | 891 | | | | | 65E | CMA1303-0000-000F0B0A65E |
| | 80 | 82 | 791 | 833 | | | | | 65E | CMA1303-0000-000F0H0A65E |
| 5700 K | 70 | 73 | 847 | 891 | | | | | 57E | CMA1303-0000-000F0B0A57E |
| | 80 | 82 | 791 | 833 | | | | | 57E | CMA1303-0000-000F0H0A57E |
| | 90 | 92 | 693 | 729 | | | 57G | CMA1303-0000-000F0U0A57G | | |
| 5000 K | 70 | 73 | 847 | 891 | | | | | 50E | CMA1303-0000-000F0B0A50E |
| | 80 | 82 | 791 | 833 | | | 50G | CMA1303-0000-000F0H0A50G | | |
| | 90 | 92 | 693 | 729 | | | 50G | CMA1303-0000-000F0U0A50G | | |
| 4000 K | 70 | 73 | 840 | 885 | | | | | 40E | CMA1303-0000-000F0B0A40E |
| | 80 | 82 | 782 | 823 | 40H | CMA1303-0000-000F0H0A40H | 40G | CMA1303-0000-000F0H0A40G | | |
| | 90 | 92 | 673 | 709 | 40H | CMA1303-0000-000F0U0A40H | 40G | CMA1303-0000-000F0U0A40G | | |
| 3500 K | 80 | 82 | 763 | 803 | 35H | CMA1303-0000-000F0H0A35H | 35G | CMA1303-0000-000F0H0A35G | | |
| | 90 | 92 | 655 | 689 | 35H | CMA1303-0000-000F0U0A35H | 35G | CMA1303-0000-000F0U0A35G | | |
| 3000 K | 70 | 73 | 820 | 860 | | | | | 30E | CMA1303-0000-000F0B0A30E |
| | 80 | 82 | 741 | 780 | 30H | CMA1303-0000-000F0H0A30H | 30G | CMA1303-0000-000F0H0A30G | | |
| | 90 | 92 | 626 | 659 | 30H | CMA1303-0000-000F0U0A30H | 30G | CMA1303-0000-000F0U0A30G | | |
| 2700 K | 80 | 82 | 711 | 748 | 27H | CMA1303-0000-000F0H0A27H | 27G | CMA1303-0000-000F0H0A27G | | |
| | 90 | 92 | 598 | 630 | 27H | CMA1303-0000-000F0U0A27H | 27G | CMA1303-0000-000F0U0A27G | | |
| 2200 K | 80 | 82 | 598 | 630 | | | 22G | CMA1303-0000-000F0H0A22G | | |
| | 90 | 92 | 520 | 547 | 22H | | 22G | CMA1303-0000-000F0U0A22G | | |

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. See the Measurements section (page 29).
- For 80 CRI minimum LEDs, CRI R9 minimum is 0 with a ±2 tolerance. For 90 CRI minimum LEDs, CRI R9 typical is 60.

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## FLUX CHARACTERISTICS, ORDER CODES & BINS - STANDARD LEDS, PREMIUM COLOR - 18 V ($I_F$ = 350 mA, $T_J$ = 85 °C)

### Fidelity

| Nominal CCT | CRI* | | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | 2-Step | |
|---|---|---|---|---|---|---|
| | Min. | Typ | | | Group | Order Code |
| 4000 K | 95 | 98 | 603 | 635 | L5A | CMA1303-0000-000F0Z0AL5A |
| 3500 K | 95 | 98 | 587 | 618 | 35H | CMA1303-0000-000F0Z0A35H |
| 3000 K | 95 | 98 | 549 | 578 | 30H | CMA1303-0000-000F0Z0A30H |
| 2700 K | 95 | 98 | 520 | 547 | 27H | CMA1303-0000-000F0Z0A27H |

### Specialty

| Nominal CCT | CRI | | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | 2-Step | | 3-Step | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Typ | | | Group | Order Code | Group | Order Code | Group | Order Code |
| 3100 K | 90 | 92 | 630 | 665 | | | 31Q | CMA1303-0000-000F0U0A31Q | | |
| 3000 K | 80 | 82 | 741 | 780 | L7B | CMA1303-0000-000F0H0AL7B | | | | |
| | 90 | 92 | 626 | 650 | | | 30Q | CMA1303-0000-000F0U0A30Q | 30U | CMA1303-0000-000F0U0A30U |
| | 95 | 98 | 535 | 560 | L7C | CMA1303-0000-000F0Z0AL7C | | | | |

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. See the Measurements section (page 29).
- For 80 CRI minimum LEDs, CRI R9 minimum is 0 with a ±2 tolerance. For 90 CRI minimum LEDs, CRI R9 typical is 60.

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## FLUX CHARACTERISTICS, ORDER CODES & BINS - STANDARD LEDS - 36 V ($I_F$ = 175 mA, $T_J$ = 85 °C)

The following table provides order codes for XLamp CMA1303 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section (page 25).

| Nominal CCT | CRI | | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | 2-Step | | 3-Step | | 5-Step | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Typ | | | Group | Order Code | Group | Order Code | Group | Order Code |
| 6500 K | 70 | 73 | 847 | 891 | | | | | 65E | CMA1303-0000-000N0B0A65E |
| | 80 | 82 | 791 | 833 | | | | | 65E | CMA1303-0000-000N0H0A65E |
| 5700 K | 70 | 73 | 847 | 891 | | | | | 57E | CMA1303-0000-000N0B0A57E |
| | 80 | 82 | 791 | 833 | | | | | 57E | CMA1303-0000-000N0H0A57E |
| | 90 | 92 | 693 | 729 | | | 57G | CMA1303-0000-000N0U0A57G | | |
| 5000 K | 70 | 73 | 847 | 891 | | | | | 50E | CMA1303-0000-000N0B0A50E |
| | 80 | 82 | 791 | 833 | | | 50G | CMA1303-0000-000N0H0A50G | | |
| | 90 | 92 | 693 | 729 | | | 50G | CMA1303-0000-000N0U0A50G | | |
| 4000 K | 70 | 73 | 840 | 885 | | | | | 40E | CMA1303-0000-000N0B0A40E |
| | 80 | 82 | 782 | 823 | 40H | CMA1303-0000-000N0H0A40H | 40G | CMA1303-0000-000N0H0A40G | | |
| | 90 | 92 | 673 | 709 | 40H | CMA1303-0000-000N0U0A40H | 40G | CMA1303-0000-000N0U0A40G | | |
| 3500 K | 80 | 82 | 763 | 803 | 35H | CMA1303-0000-000N0H0A35H | 35G | CMA1303-0000-000N0H0A35G | | |
| | 90 | 92 | 655 | 689 | 35H | CMA1303-0000-000N0U0A35H | 35G | CMA1303-0000-000N0U0A35G | | |
| 3000 K | 70 | 73 | 820 | 860 | | | | | 30E | CMA1303-0000-000N0B0A30E |
| | 80 | 82 | 741 | 780 | 30H | CMA1303-0000-000N0H0A30H | 30G | CMA1303-0000-000N0H0A30G | | |
| | 90 | 92 | 626 | 659 | 30H | CMA1303-0000-000N0U0A30H | 30G | CMA1303-0000-000N0U0A30G | | |
| 2700 K | 80 | 82 | 711 | 748 | 27H | CMA1303-0000-000N0H0A27H | 27G | CMA1303-0000-000N0H0A27G | | |
| | 90 | 92 | 598 | 630 | 27H | CMA1303-0000-000N0U0A27H | 27G | CMA1303-0000-000N0U0A27G | | |
| 2200 K | 80 | 82 | 598 | 630 | | | 22G | CMA1303-0000-000N0H0A22G | | |
| | 90 | 92 | 520 | 547 | 22H | | 22G | CMA1303-0000-000N0U0A22G | | |

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. See the Measurements section (page 29).
- For 80 CRI minimum LEDs, CRI R9 minimum is 0 with a ±2 tolerance. For 90 CRI minimum LEDs, CRI R9 typical is 60.

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## FLUX CHARACTERISTICS, ORDER CODES & BINS - STANDARD LEDS, PREMIUM COLOR - 36 V ($I_F$ = 175 mA, $T_J$ = 85 °C)

### Fidelity

| Nominal CCT | CRI* | | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | 2-Step | |
|---|---|---|---|---|---|---|
| | Min. | Typ | | | Group | Order Code |
| 4000 K | 95 | 98 | 603 | 635 | L5A | CMA1303-0000-000N0Z0AL5A |
| 3500 K | 95 | 98 | 587 | 618 | 35H | CMA1303-0000-000N0Z0A35H |
| 3000 K | 95 | 98 | 549 | 578 | 30H | CMA1303-0000-000N0Z0A30H |
| 2700 K | 95 | 98 | 520 | 547 | 27H | CMA1303-0000-000N0Z0A27H |

### Specialty

| Nominal CCT | CRI | | Minimum Luminous Flux (lm) | Typical Luminous Flux (lm) | 2-Step | | 3-Step | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Min. | Typ | | | Group | Order Code | Group | Order Code | Group | Order Code |
| 3100 K | 90 | 92 | 630 | 665 | | | 31Q | CMA1303-0000-000N0U0A31Q | | |
| 3000 K | 80 | 82 | 741 | 780 | L7B | CMA1303-0000-000N0H0AL7B | | | | |
| | 90 | 92 | 626 | 650 | | | 30Q | CMA1303-0000-000N0U0A30Q | 30U | CMA1303-0000-000N0U0A30U |
| | 95 | 98 | 535 | 560 | L7C | CMA1303-0000-000N0Z0AL7C | | | | |

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. See the Measurements section (page 29).
- For 80 CRI minimum LEDs, CRI R9 minimum is 0 with a ±2 tolerance. For 90 CRI minimum LEDs, CRI R9 typical is 60.

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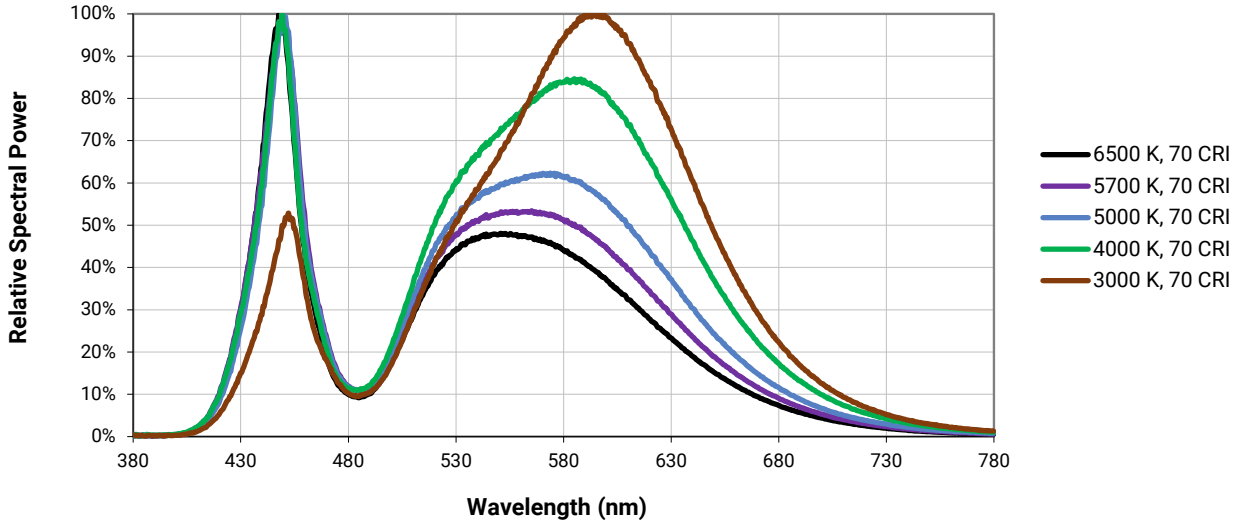
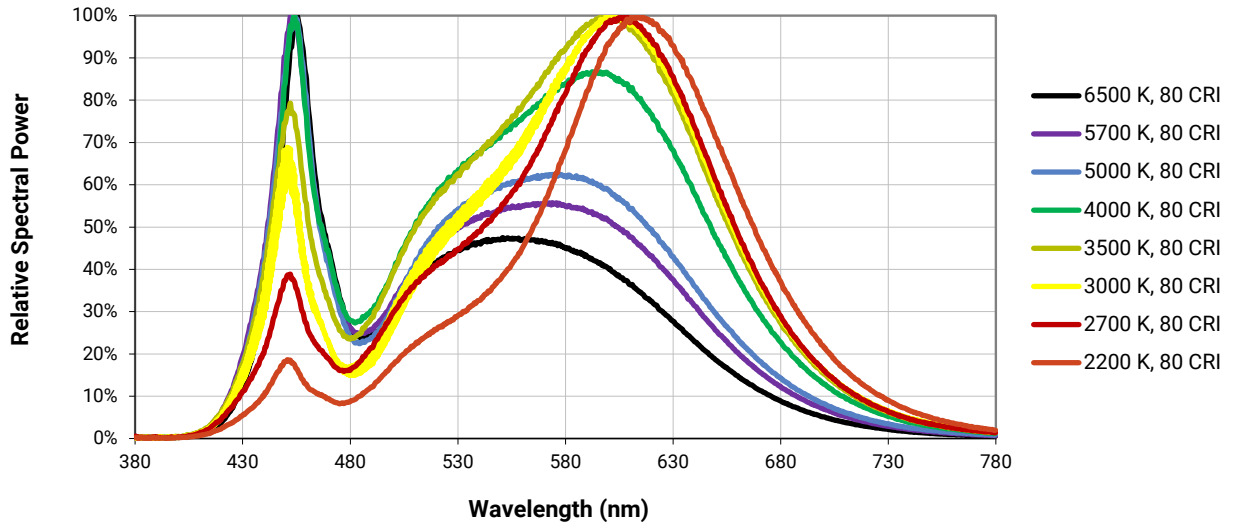
## RELATIVE SPECTRAL POWER DISTRIBUTION - STANDARD LEDS

The following graphs are the result of a series of pulsed measurements at 700 mA for the 9-V CMA1303 LED, 350 mA for the 18-V CMA1303 LED and 175 mA for the 36-V CMA1303 LED and $T_J$ = 85 °C.

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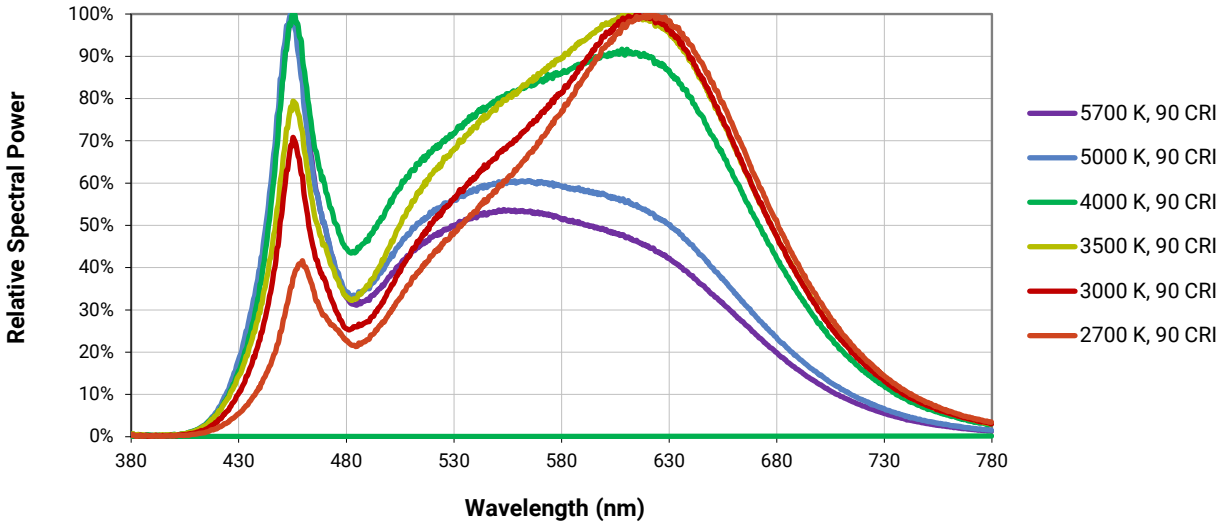
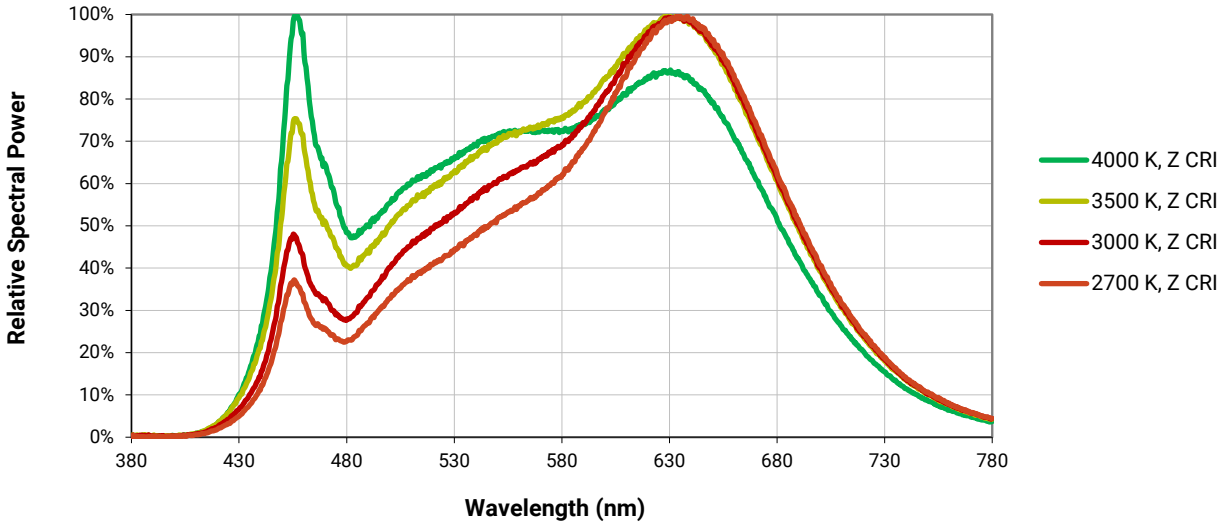
## RELATIVE SPECTRAL POWER DISTRIBUTION - STANDARD LEDS (CONTINUED)




## RELATIVE SPECTRAL POWER DISTRIBUTION - STANDARD LEDS, PREMIUM COLOR

The following graphs are the result of a series of pulsed measurements at 700 mA for the 9-V CMA1303 LED, 350 mA for the 18-V CMA1303 LED and 175 mA for the 36-V CMA1303 LED and $T_J$ = 85 °C.

### Fidelity

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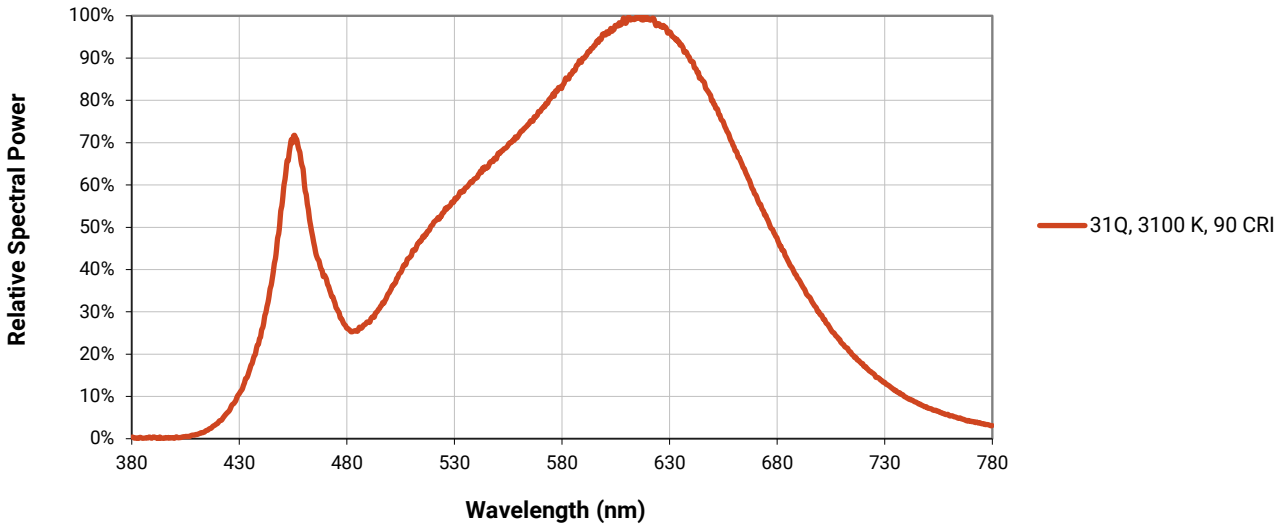
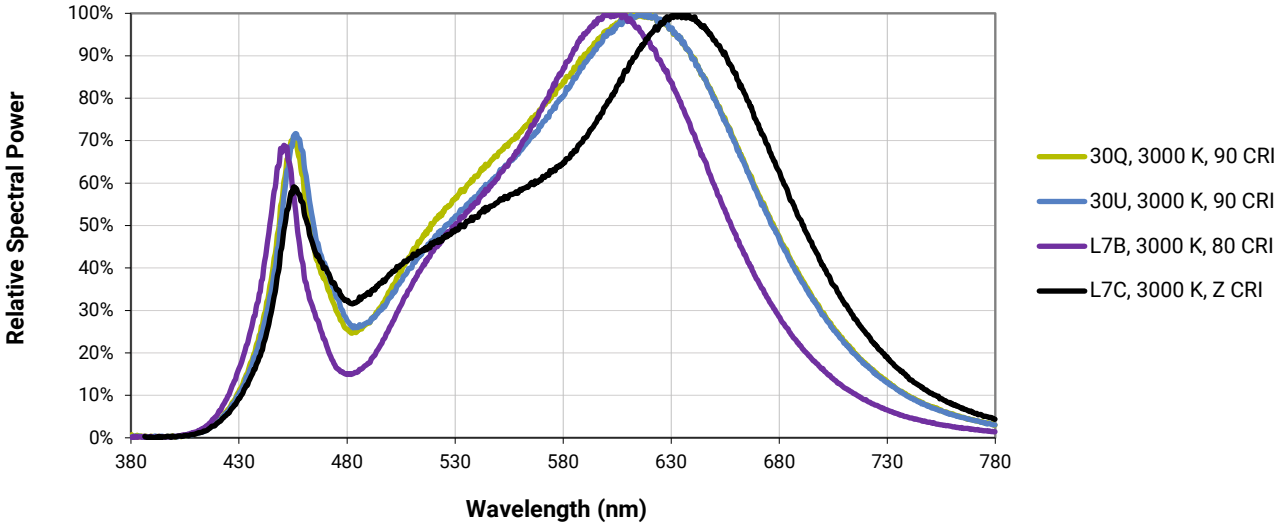
## RELATIVE SPECTRAL POWER DISTRIBUTION - STANDARD LEDS, PREMIUM COLOR (CONTINUED)

### Specialty

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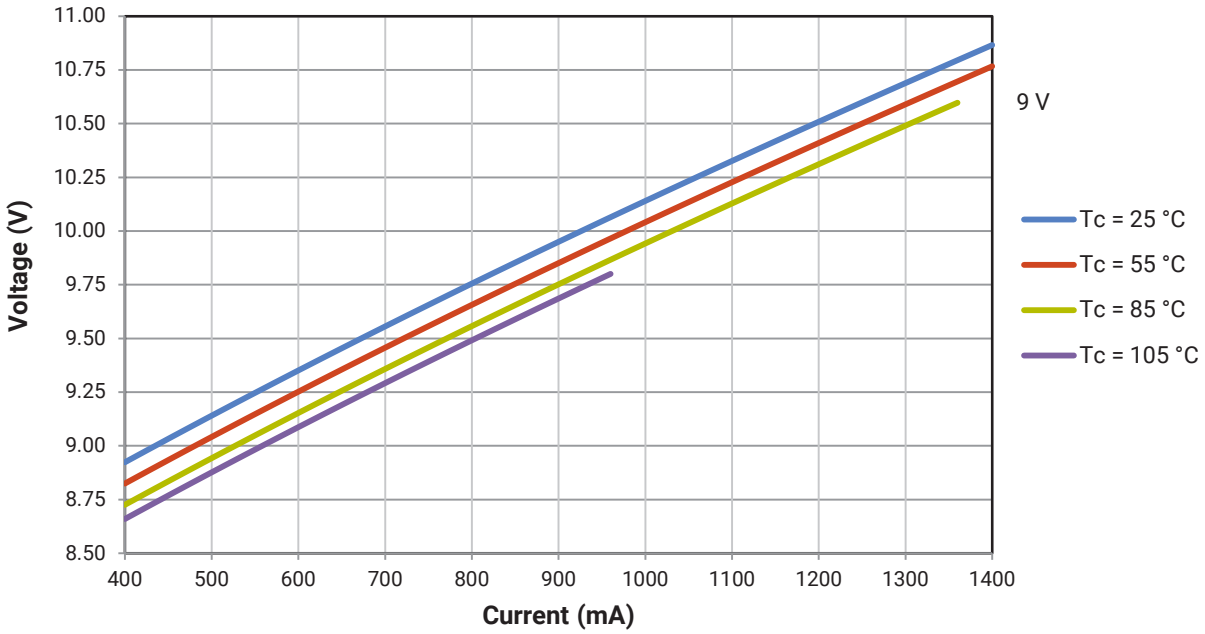
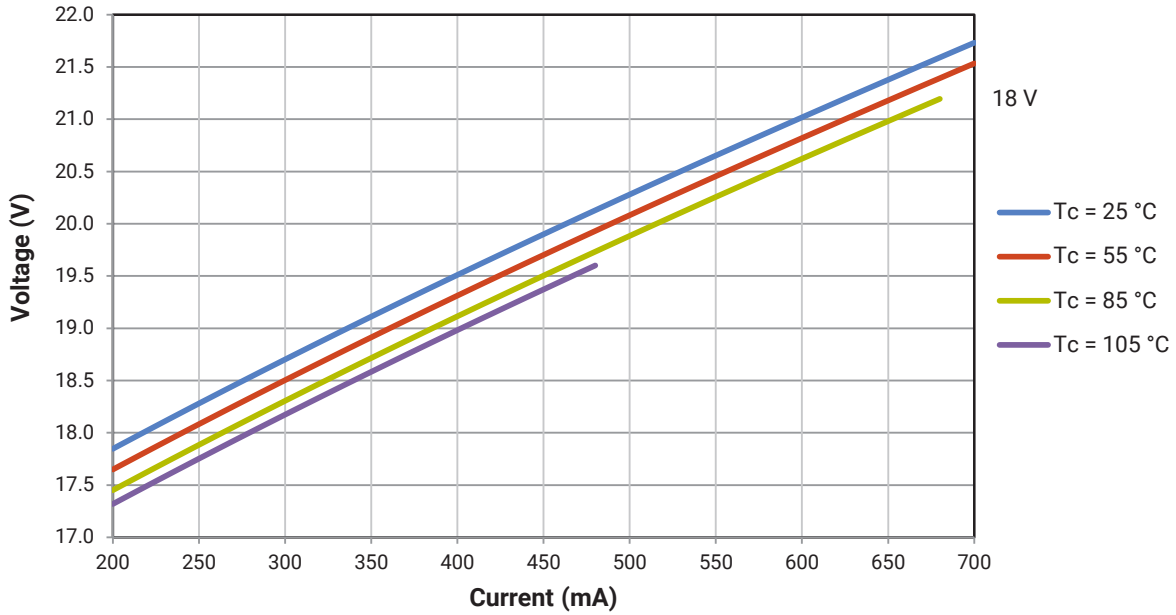
## ELECTRICAL CHARACTERISTICS

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

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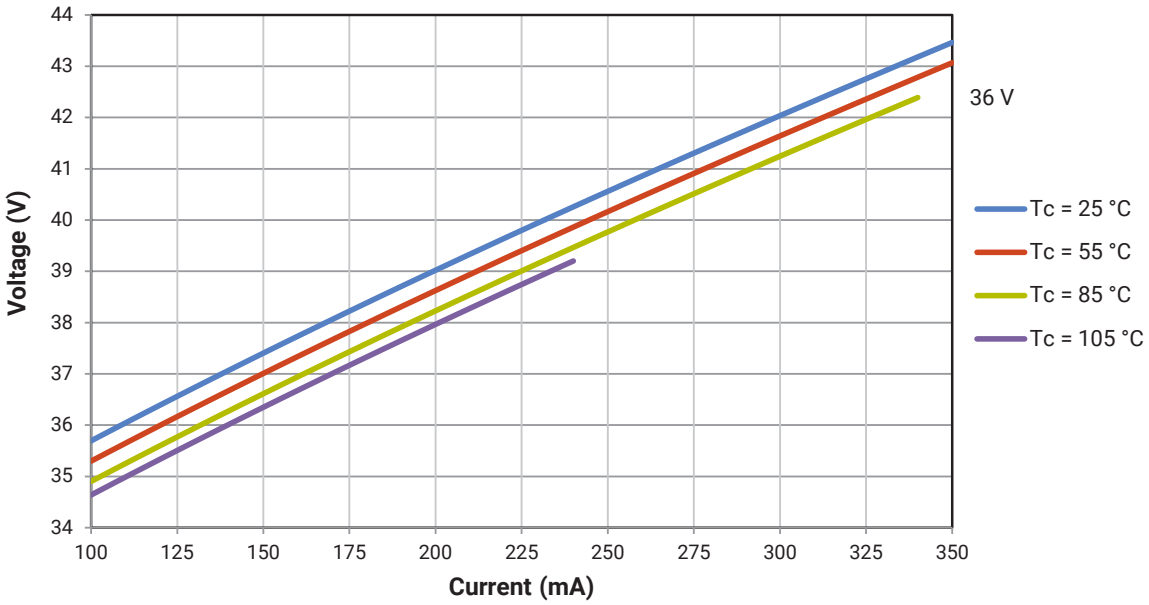
## ELECTRICAL CHARACTERISTICS - CONTINUED

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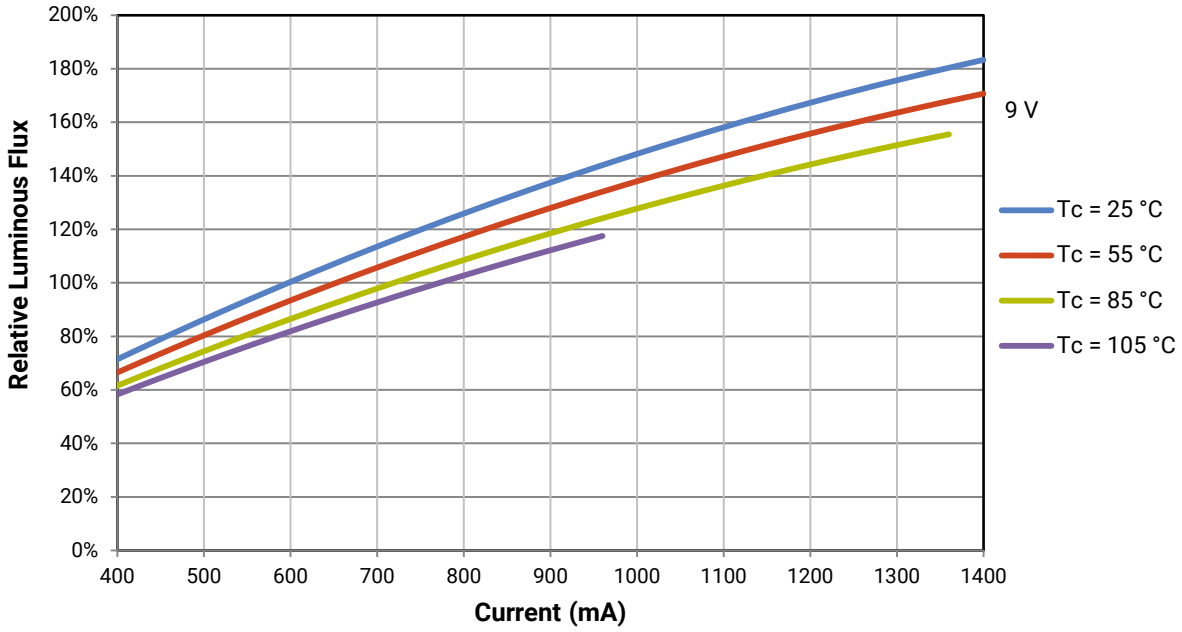
## RELATIVE LUMINOUS FLUX

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

- Measurements of CMA1303 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 700 mA at $T_J$ = 85 °C for the 9-V CMA1303 LED.

Using the 9-V CMA1303 LED as an example, at steady-state operation of Tc = 25 °C, $I_F$ = 900 mA, the relative luminous flux ratio is 140% in the chart below. A 9-V CMA1303 LED that measures 860 lm during binning will deliver 1204 lm (860 * 1.4) at steady-state operation of Tc = 25 °C, $I_F$ = 900 mA.

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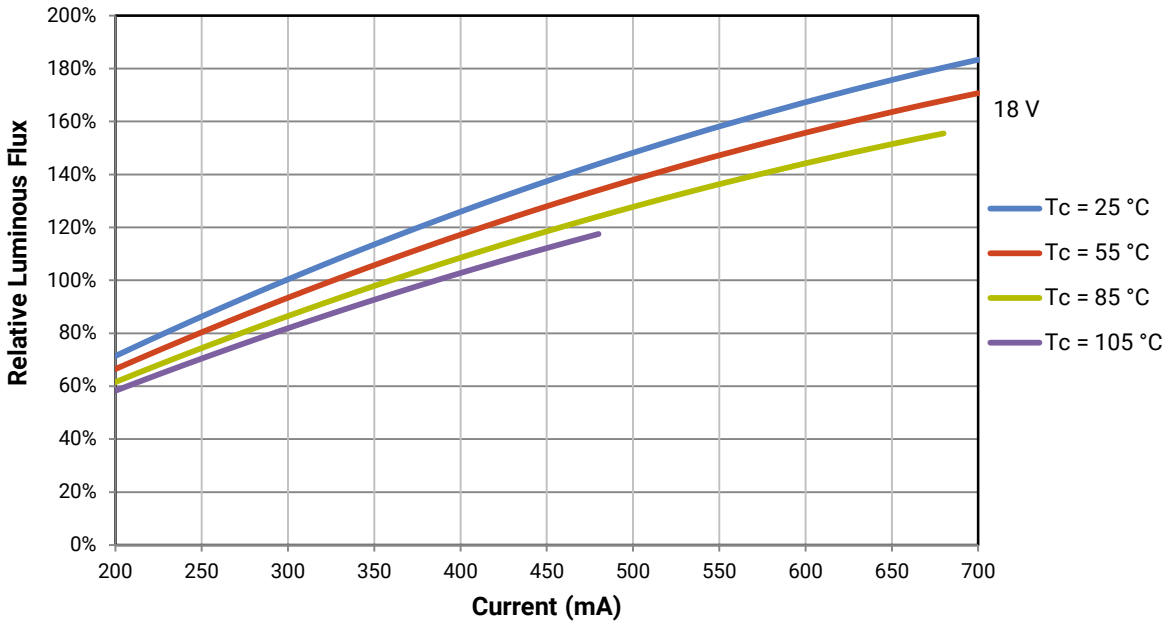
## RELATIVE LUMINOUS FLUX - CONTINUED

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

- Measurements of CMA1303 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 350 mA at $T_J$ = 85 °C for the 18-V CMA1303 LED.

Using the 18-V CMA1303 LED as an example, at steady-state operation of Tc = 25 °C, $I_F$ = 450 mA, the relative luminous flux ratio is 140% in the chart below. An 18-V CMA1303 LED that measures 860 lm during binning will deliver 1204 lm (860 * 1.4) at steady-state operation of Tc = 25 °C, $I_F$ = 450 mA.

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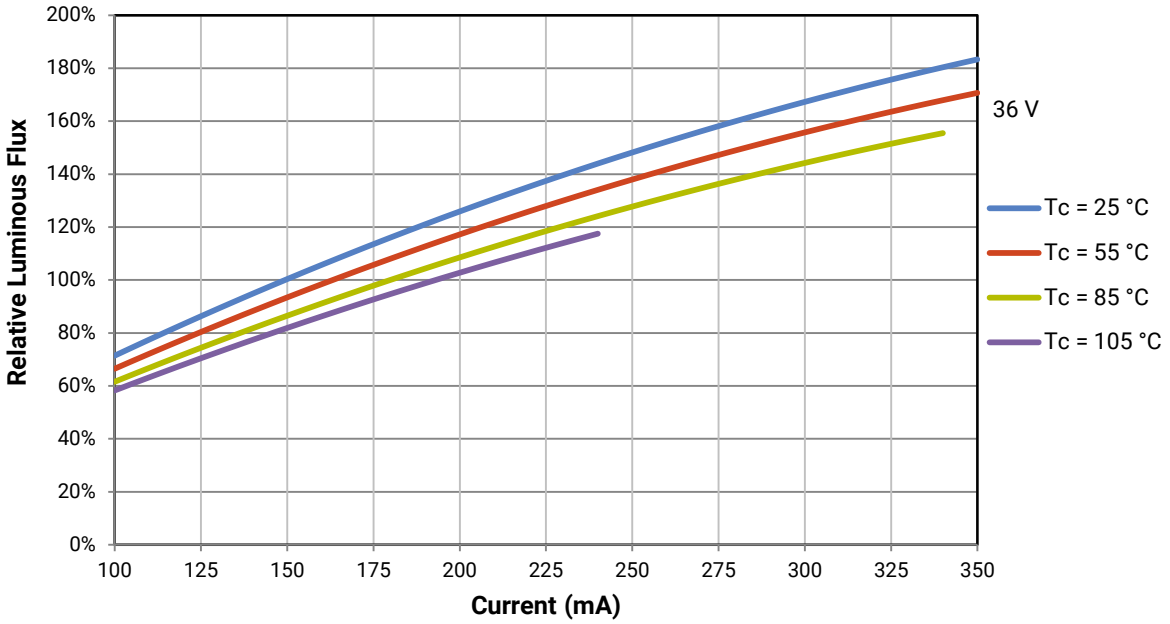
## RELATIVE LUMINOUS FLUX - CONTINUED

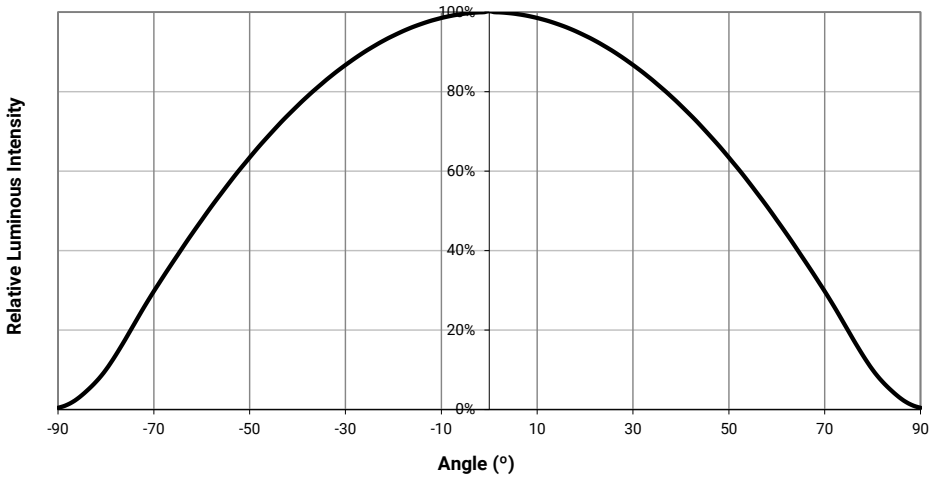
The relative luminous flux values provided below are the ratio of:

- Measurements of CMA1303 at steady-state operation at the given conditions, divided by
- Flux measured during binning, which is a pulsed measurement at 175 mA at $T_J$ = 85 °C for the 36-V CMA1303 LED.

Using the 36-V CMA1303 LED as an example, at steady-state operation of Tc = 25 °C, $I_F$ = 225 mA, the relative luminous flux ratio is 140% in the chart below. A 36-V CMA1303 LED that measures 860 lm during binning will deliver 1204 lm (860 * 1.43) at steady-state operation of Tc = 25 °C, $I_F$ = 225 mA.




## TYPICAL SPATIAL DISTRIBUTION

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

XLamp CMA1303 LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

| EasyWhite Color Temperatures – 2-Step | | | |
|---|---|---|---|
| Code | CCT | x | y |
| 40H | 4000 K | 0.3777 | 0.3739 |
| | | 0.3797 | 0.3816 |
| | | 0.3861 | 0.3855 |
| | | 0.3838 | 0.3777 |
| 35H | 3500 K | 0.4022 | 0.3858 |
| | | 0.4053 | 0.3942 |
| | | 0.4125 | 0.3977 |
| | | 0.4091 | 0.3891 |
| 30H | 3000 K | 0.4287 | 0.3975 |
| | | 0.4328 | 0.4064 |
| | | 0.4390 | 0.4086 |
| | | 0.4347 | 0.3996 |
| 27H | 2700 K | 0.4524 | 0.4048 |
| | | 0.4574 | 0.4140 |
| | | 0.4633 | 0.4154 |
| | | 0.4581 | 0.4062 |

| EasyWhite Color Temperatures – 3-Step Ellipse | | | | | | |
|---|---|---|---|---|---|---|
| Bin Code | CCT | Center Point | | Major Axis | Minor Axis | Rotation Angle (°) |
| | | x | y | a | b | |
| 65G | 6500 K | 0.3123 | 0.3282 | 0.00666 | 0.00330 | 61.0 |
| 57G | 5700 K | 0.3287 | 0.3417 | 0.00738 | 0.00360 | 72.0 |
| 50G | 5000 K | 0.3447 | 0.3553 | 0.00840 | 0.00312 | 65.0 |
| 40G | 4000 K | 0.3818 | 0.3797 | 0.00939 | 0.00402 | 53.7 |
| 35G | 3500 K | 0.4073 | 0.3917 | 0.00927 | 0.00414 | 54.0 |
| 30G | 3000 K | 0.4338 | 0.4030 | 0.00834 | 0.00408 | 53.2 |
| 27G | 2700 K | 0.4577 | 0.4099 | 0.00834 | 0.00420 | 48.5 |
| 22G | 2200 K | 0.5066 | 0.5066 | 0.00980 | 0.00480 | 45.5 |

| EasyWhite Color Temperatures – 5-Step Ellipse | | | | | | |
|---|---|---|---|---|---|---|
| Bin Code | CCT | Center Point | | Major Axis | Minor Axis | Rotation Angle (°) |
| | | x | y | a | b | |
| 65E | 6500 K | 0.3123 | 0.3282 | 0.01110 | 0.00550 | 61.0 |
| 57E | 5700 K | 0.3287 | 0.3417 | 0.01230 | 0.00600 | 72.0 |
| 50E | 5000 K | 0.3447 | 0.3553 | 0.01400 | 0.00520 | 65.0 |
| 40E | 4000 K | 0.3818 | 0.3797 | 0.01565 | 0.00670 | 53.7 |
| 30E | 3000 K | 0.4338 | 0.4030 | 0.01390 | 0.00680 | 53.2 |

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

XLamp CMA1303 LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

### Fidelity

| EasyWhite Color Temperatures – 2-Step | | | |
|---|---|---|---|
| Code | CCT | x | y |
| L5A | 4000 K | 0.3764 | 0.3711 |
| | | 0.3784 | 0.3787 |
| | | 0.3847 | 0.3826 |
| | | 0.3825 | 0.3748 |
| 35H | 3500 K | 0.4022 | 0.3858 |
| | | 0.4053 | 0.3942 |
| | | 0.4125 | 0.3977 |
| | | 0.4091 | 0.3891 |
| 30H | 3000 K | 0.4287 | 0.3975 |
| | | 0.4328 | 0.4064 |
| | | 0.4390 | 0.4086 |
| | | 0.4347 | 0.3996 |
| 27H | 2700 K | 0.4524 | 0.4048 |
| | | 0.4574 | 0.4140 |
| | | 0.4633 | 0.4154 |
| | | 0.4581 | 0.4062 |

### Specialty

| EasyWhite Color Temperatures – 2-Step | | | |
|---|---|---|---|
| Code | CCT | x | y |
| L7B | 3000 K | 0.4263 | 0.3848 |
| | | 0.4296 | 0.3916 |
| | | 0.4361 | 0.3938 |
| | | 0.4326 | 0.3868 |
| L7C | 3000 K | 0.4192 | 0.3754 |
| | | 0.4224 | 0.3823 |
| | | 0.4291 | 0.3847 |
| | | 0.4257 | 0.3777 |

| EasyWhite Color Temperatures – 3-Step Ellipse | | | | | | |
|---|---|---|---|---|---|---|
| Bin Code | CCT | Center Point | | Major Axis | Minor Axis | Rotation Angle (°) |
| | | x | y | a | b | |
| 31Q | 3100 K | 0.4236 | 0.3888 | 0.00848 | 0.00455 | 50.3 |
| 30Q | 3000 K | 0.4305 | 0.3935 | 0.00834 | 0.00408 | 53.2 |
| 30U | 3000 K | 0.4274 | 0.3837 | 0.00834 | 0.00408 | 53.2 |

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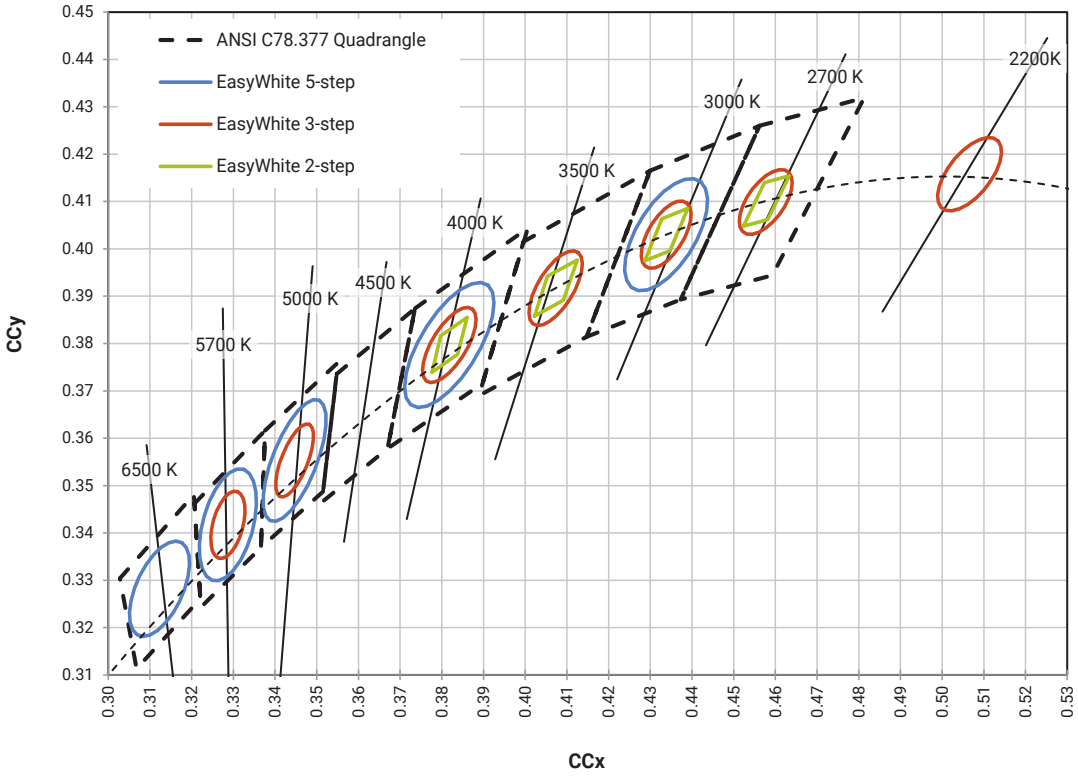
## CREE EASYWHITE® BINS PLOTTED ON THE 1931 CIE COLOR SPACE ($T_J$ = 85 °C)

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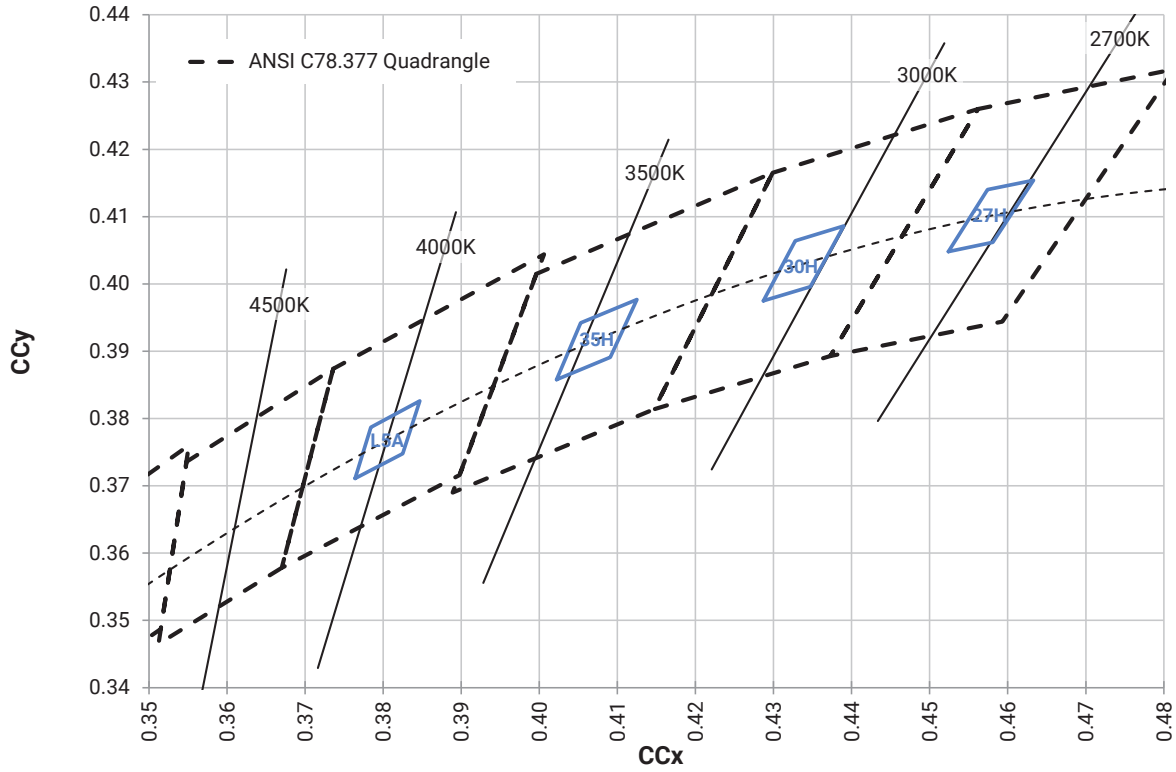
## CREE PREMIUM COLOR BINS PLOTTED ON THE 1931 CIE COLOR SPACE ($T_J$ = 85 °C)

### Fidelity (2-step)

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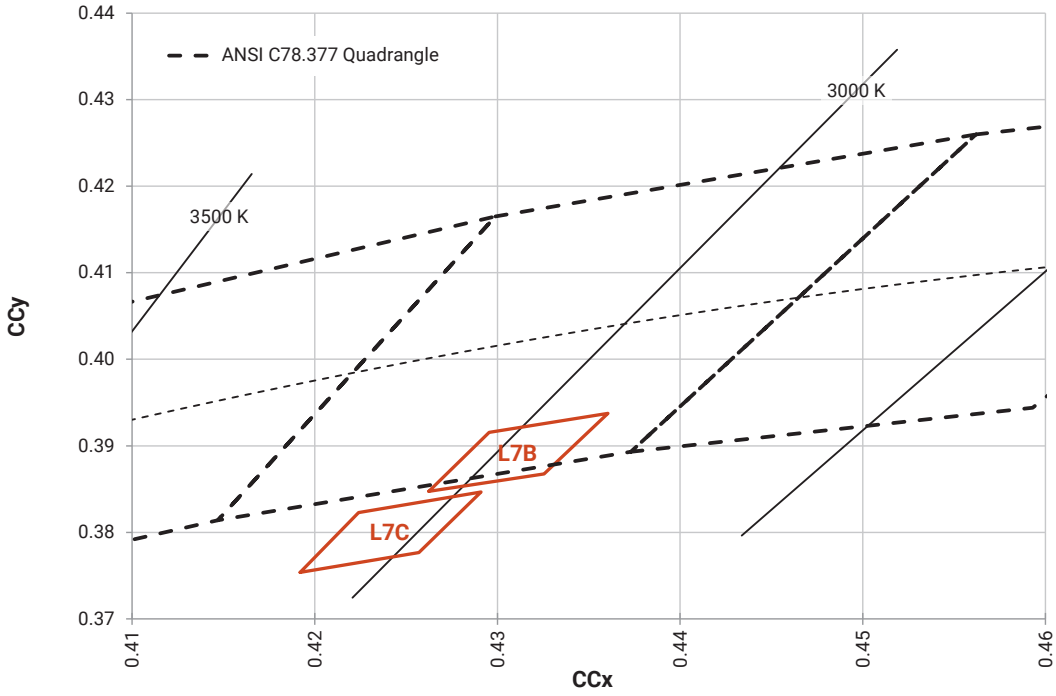
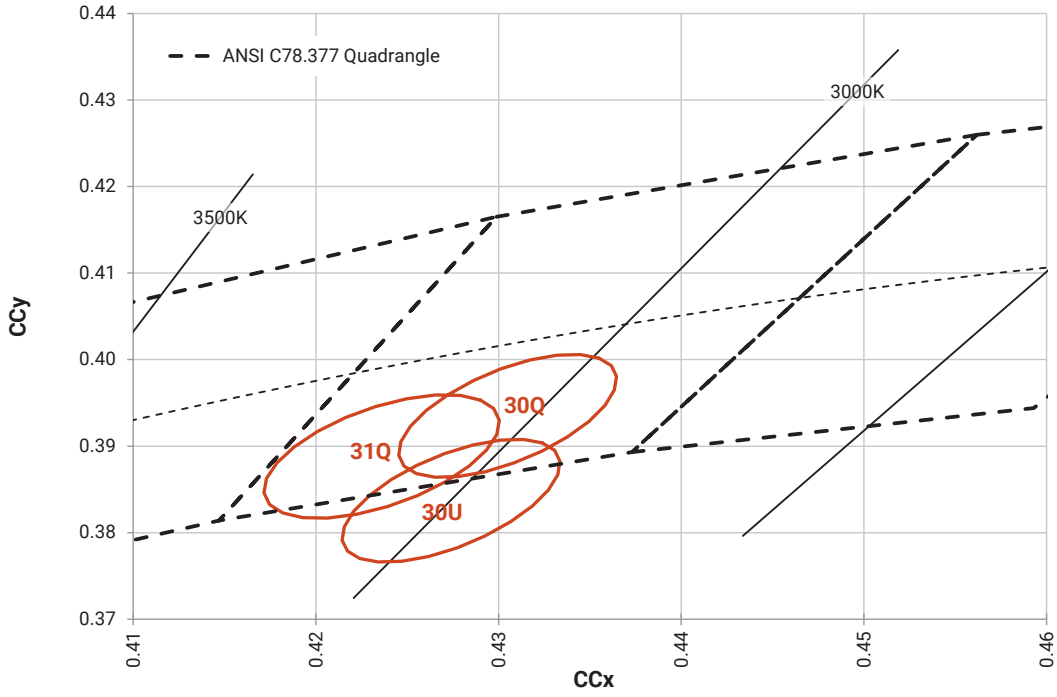
## CREE PREMIUM COLOR BINS PLOTTED ON THE 1931 CIE COLOR SPACE ($T_J$ = 85 °C) - CONTINUED

### Speciality (2-step)




### Speciality (3-step)

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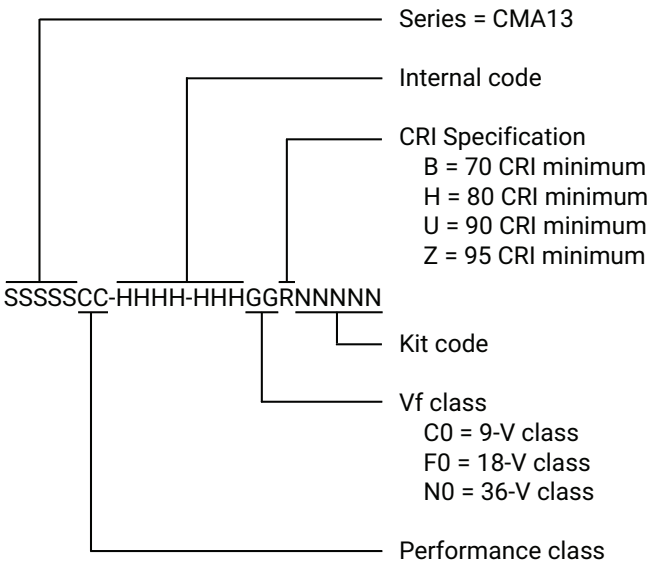
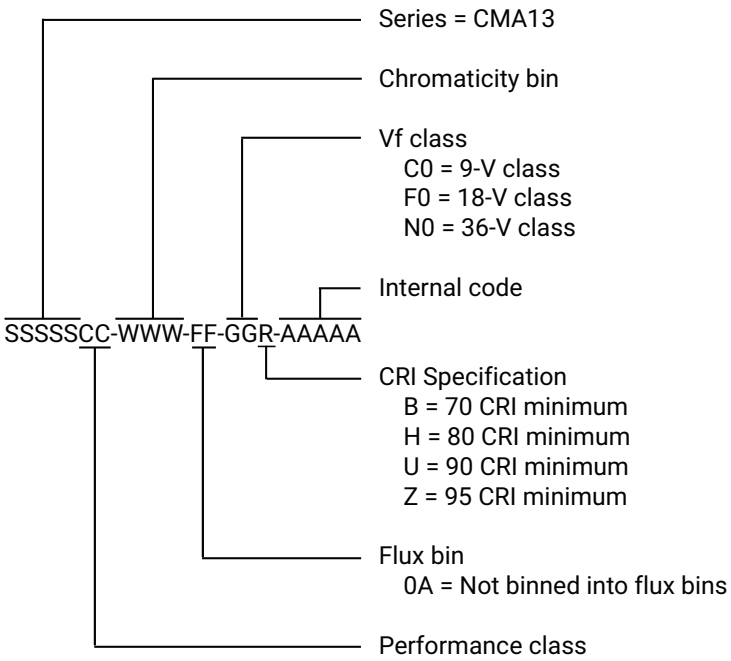
## BIN AND ORDER CODE FORMATS

Bin codes and order codes are configured as follows:

**Order Code**




**Bin Code**

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## MECHANICAL DIMENSIONS

Dimensions are in mm.

Tolerances unless otherwise specified: ±.13

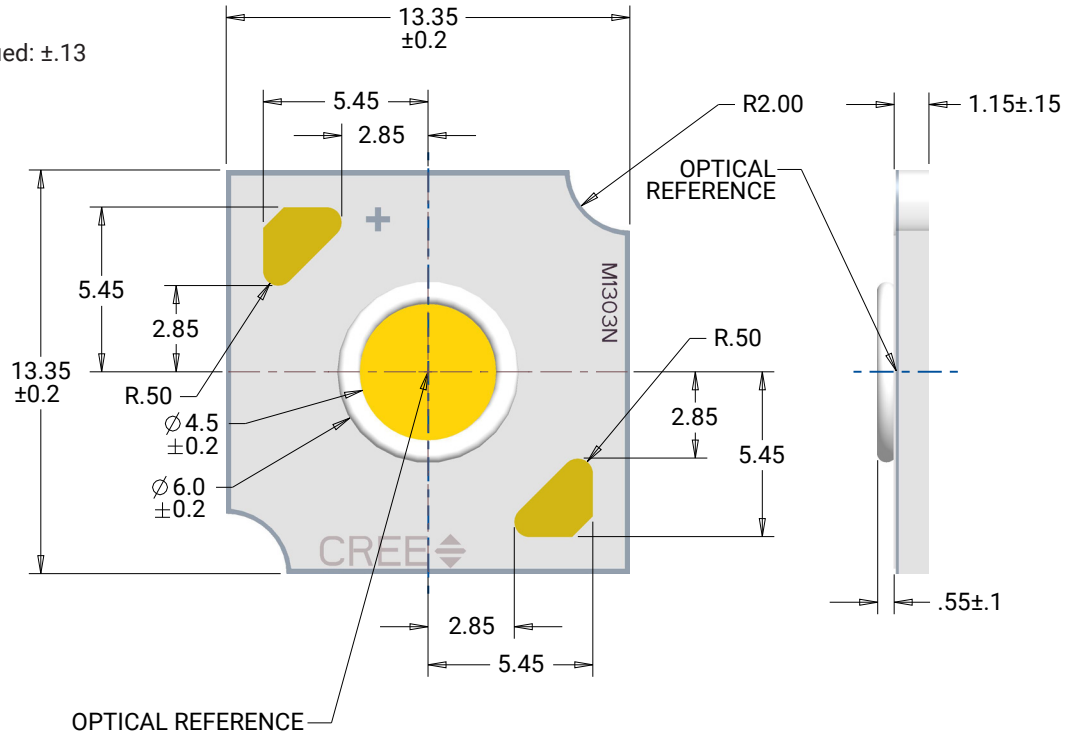
x° ± 1°

**Meaning of LED Marking**

M1303C = 9-V CMA1303

M1303C = 18-V CMA1303

M1303N = 36-V CMA1303




Tc measurement point: either the anode or cathode solder pad

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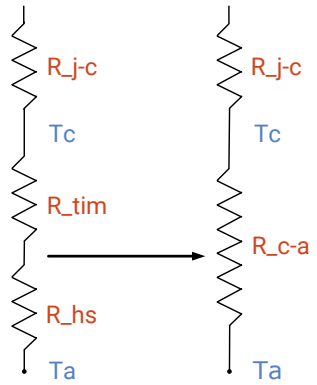
## THERMAL DESIGN

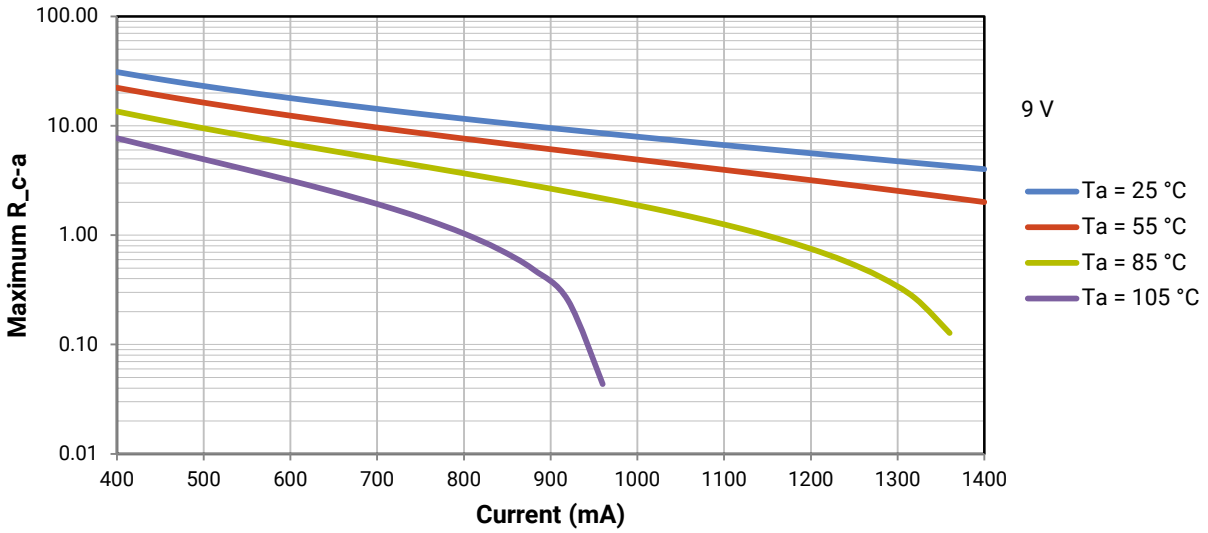
The CMA family of LED arrays can include over a hundred different LED die inside one package, and thus over a hundred different junction temperatures ($T_J$). Cree has intentionally removed junction-temperature-based operating limits and replaced the commonplace maximum $T_J$ calculations with maximum ratings based on forward current ($I_F$) and case temperature (Tc). No additional calculations are required to ensure that the CMA LED is being operated within its designed limits. LES temperature measurement provides additional verification of good thermal design. Please refer to page 4 for the Operating Limit specifications.

There is no need to calculate for $T_J$ inside the package, as the thermal management design process, specifically from solder point ($T_{SP}$) 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 Thermal Management application note. For CMA soldering recommendations and information on thermal interface materials (TIM), LES temperature measurement, and connection methods, please refer to the Cree XLamp CM Family LEDs soldering and handling document.

To keep the CMA1303 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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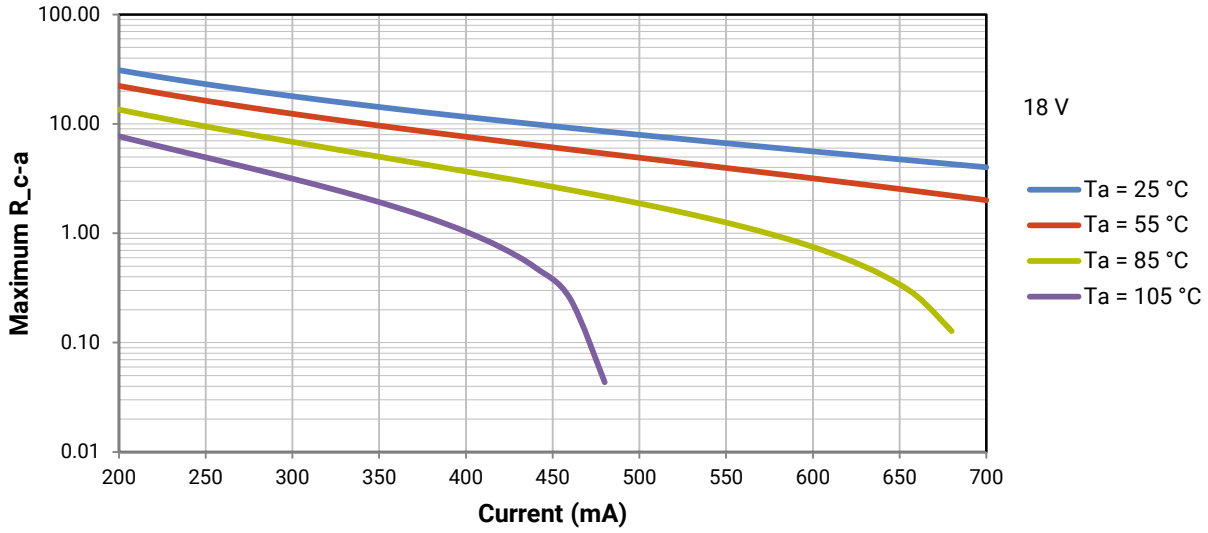
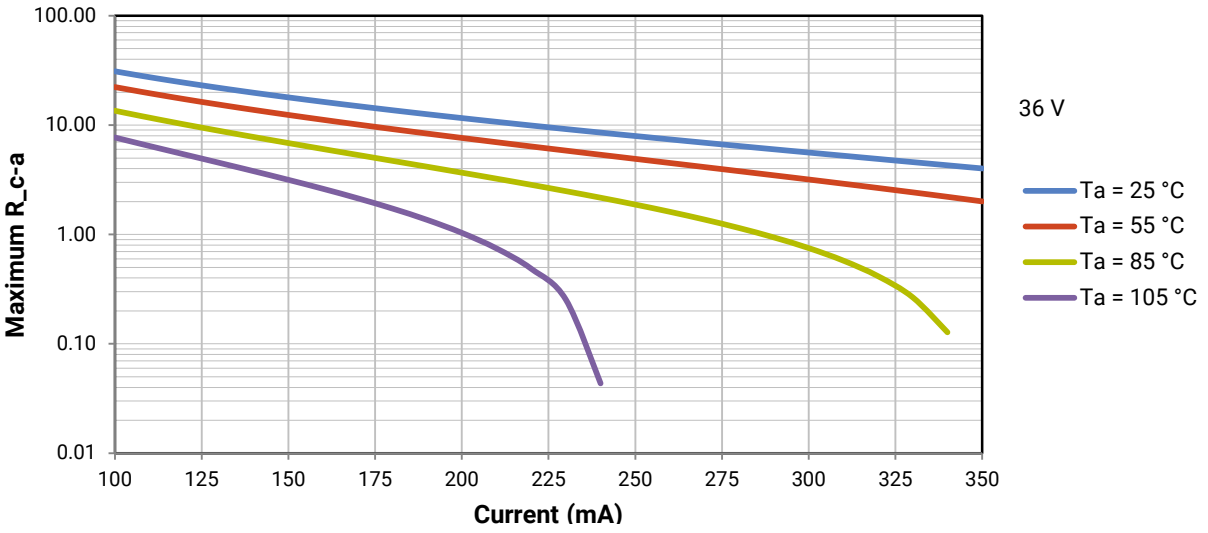
## THERMAL DESIGN - CONTINUED

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## NOTES

### 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. Cree did not perform Room Temperature Operating Life (RTOL) testing on the CMA1303 LED.

### 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.

### 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.

### 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.

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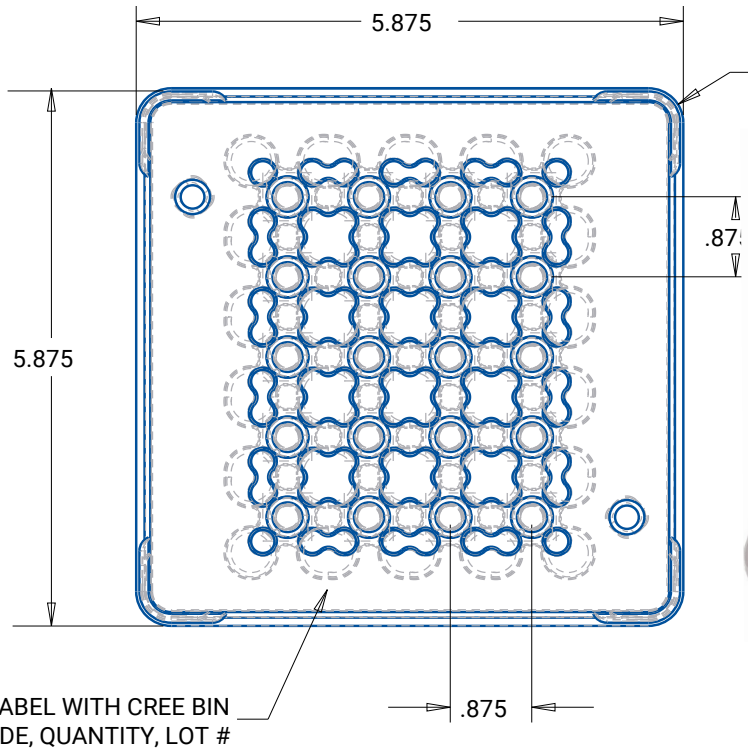
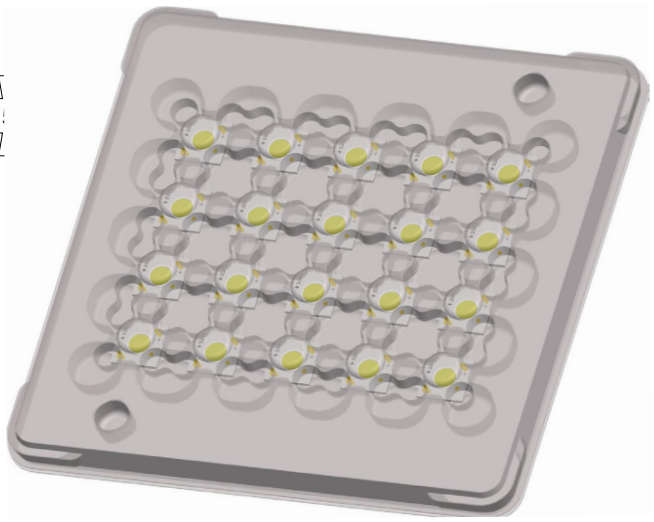
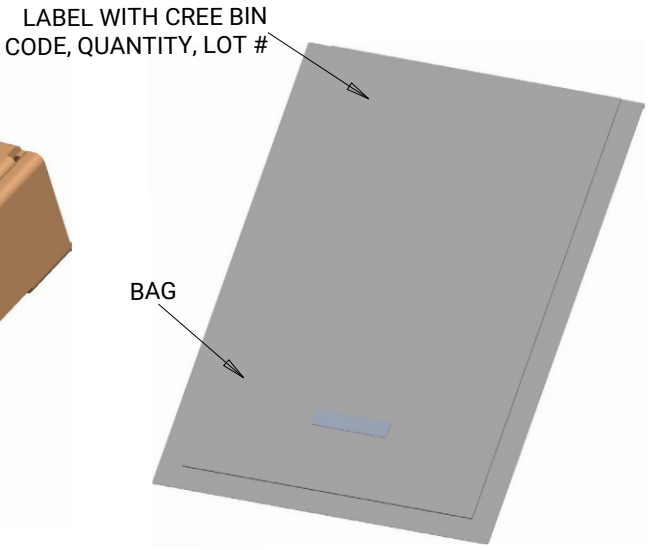
## PACKAGING

Cree CMA1303 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: ±.13
x° ±1°



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# OCEAN CHIPS
## Океан Электроники
## Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «**JONHON**», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «**FORSTAR**».

AVIC JONHON

**«JONHON»** (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

**«FORSTAR»** (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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