

## CHARACTERISTICS

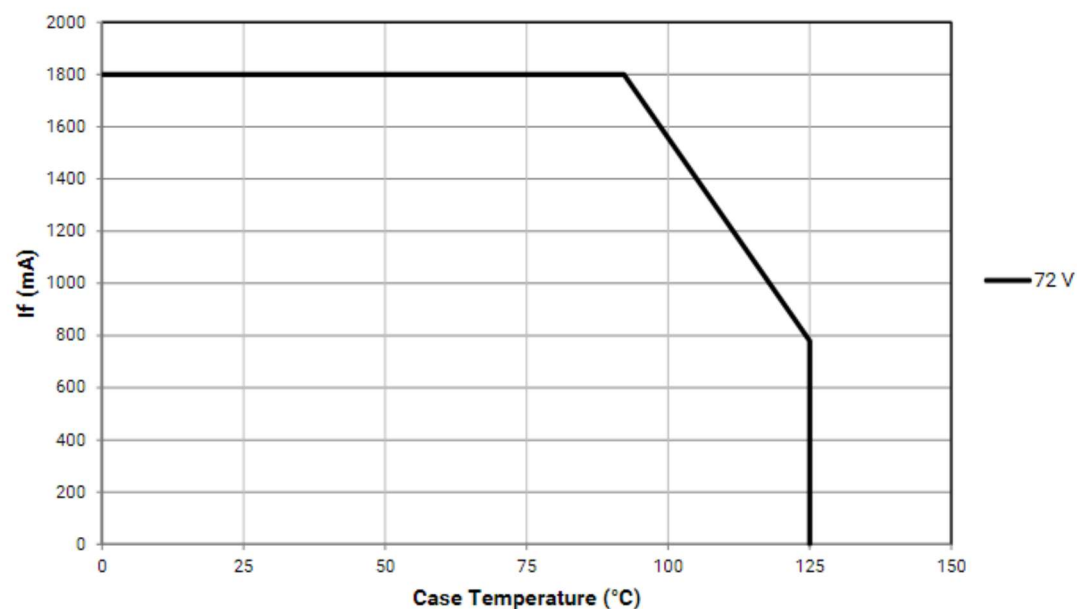
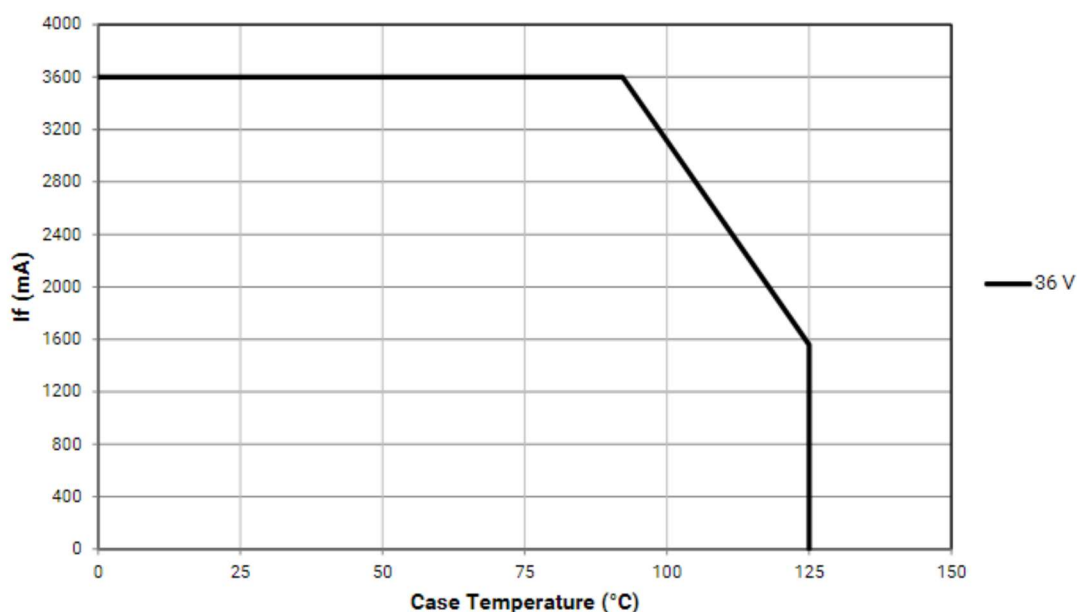
Characteristics	Unit	Minimum	Typical	Maximum
Viewing angle (FWHM)	degrees		115	
ESD withstand voltage (HBM per Mil-Std-883D)	V			8000
DC forward current (36 V)	mA			3600*
DC forward current (72 V)	mA			1800*
Reverse current (36 V, 72 V)	mA			0.1
Forward voltage (36 V, @ 2400 mA, T <sub>j</sub> = 85 °C)	V		36	39
Forward voltage (72 V, @ 1200 mA, T <sub>j</sub> = 85 °C)	V		72	78

\* Refer to the Operating Limits section.

## OPERATING LIMITS

The maximum current rating of the CXB3590 depends on the case temperature ( $T_c$ ) when the LED has reached thermal equilibrium under steady-state operation. The graphs shown below assume that the system design employs good thermal management (thermal interface material and heat sink) and may vary when poor thermal management is employed. Please refer to the Mechanical Dimensions section on [page 10](#) for the location of the  $T_c$  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 135 °C to ensure optimal LED lifetime. Please refer to the Thermal Design section on [page 11](#) for more information on LES temperature measurement.



**FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 36 V ( $I_F = 2400 \text{ mA}$ ,  $T_J = 85^\circ\text{C}$ )**

The following table provides order codes for XLamp CXB3590 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section ( ).

Nominal CCT	CRI*		Minimum Luminous Flux			2-Step		3-Step		5-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C**	Group	Order Code	Group	Order Code	Group	Order Code
6500 K	70	---	CD	12,000	13,237					65E	CXB3590-0000-000N0BCD65E
			DB	13,000	14,340						CXB3590-0000-000N0BDB65E
			DD	14,000	15,443						CXB3590-0000-000N0BDD65E
	80	---	CB	11,000	12,134					65E	CXB3590-0000-000N0HCB65E
			CD	12,000	13,237						CXB3590-0000-000N0HCD65E
			DB	13,000	14,340						CXB3590-0000-000N0HDB65E
5700 K	70	---	CD	12,000	13,237					57E	CXB3590-0000-000N0BCD57E
			DB	13,000	14,340						CXB3590-0000-000N0BDB57E
			DD	14,000	15,443						CXB3590-0000-000N0BDD57E
	80	---	CB	11,000	12,134					57E	CXB3590-0000-000N0HCB57E
			CD	12,000	13,237						CXB3590-0000-000N0HCD57E
			DB	13,000	14,340						CXB3590-0000-000N0HDB57E
	90	92	BD	10,000	11,031			57G	CXB3590-0000-000N0UBD57G		
			CB	11,000	12,134				CXB3590-0000-000N0UCB57G		
			CD	12,000	13,237				CXB3590-0000-000N0UCD57G		

**Notes**

- 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 ( ).
- Cree XLamp CXB3590 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.
- \* For 80 CRI minimum LEDs, CRI R9 minimum is 0 with a  $\pm 2$  tolerance. For 90 CRI minimum LEDs, CRI R9 typical is 60.
- \*\* Flux values @ 25 °C are calculated and for reference only.

**FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 36 V ( $I_F = 2400$  mA,  $T_J = 85$  °C) - CONTINUED**

Nominal CCT	CRI*		Minimum Luminous Flux			2-Step		3-Step		5-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C**	Group	Order Code	Group	Order Code	Group	Order Code
5000 K	70	---	CD	12,000	13,237					50E	CXB3590-0000-000N0BCD50E
			DB	13,000	14,340						CXB3590-0000-000N0BDB50E
			DD	14,000	15,443						CXB3590-0000-000N0BDD50E
	80	---	CB	11,000	12,134			50G	CXB3590-0000-000N0HCB50G	50E	CXB3590-0000-000N0HCB50E
			CD	12,000	13,237				CXB3590-0000-000N0HCD50G		CXB3590-0000-000N0HCD50E
			DB	13,000	14,340				CXB3590-0000-000N0HDB50G		
	90	92	BD	10,000	11,031			50G	CXB3590-0000-000N0UBD50G		
			CB	11,000	12,134				CXB3590-0000-000N0UCB50G		
			CD	12,000	13,237				CXB3590-0000-000N0UCD50G		
4000 K	70	---	CD	12,000	13,237					40E	CXB3590-0000-000N0BCD40E
			DB	13,000	14,340						CXB3590-0000-000N0BDB40E
			DD	14,000	15,443						CXB3590-0000-000N0BDD40E
	80	---	CB	11,000	12,134	40H	CXB3590-0000-000N0HCB40H	40G	CXB3590-0000-000N0HCB40G		
			CD	12,000	13,237		CXB3590-0000-000N0HCD40H		CXB3590-0000-000N0HCD40G		
			DB	13,000	14,340		CXB3590-0000-000N0HDB40H		CXB3590-0000-000N0HDB40G		
	90	92	BB	9,500	10,479	40H	CXB3590-0000-000N0UBB40H	40G	CXB3590-0000-000N0UBB40G		
			BD	10,000	11,031		CXB3590-0000-000N0UBD40H		CXB3590-0000-000N0UBD40G		
			CB	11,000	12,134		CXB3590-0000-000N0UCB40H		CXB3590-0000-000N0UCB40G		

**Notes**

- 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 ( ).
- Cree XLamp CXB3590 LED order codes specify only a minimum flux bin and not a maximum. Cree may ship reels in flux bins higher than the minimum specified by the order code without advance notice. Shipments will always adhere to the chromaticity bin restrictions specified by the order code.
- \* For 80 CRI minimum LEDs, CRI R9 minimum is 0 with a  $\pm 2$  tolerance. For 90 CRI minimum LEDs, CRI R9 typical is 60.
- \*\* Flux values @ 25 °C are calculated and for reference only.

**FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 36 V ( $I_F = 2400$  mA,  $T_J = 85$  °C) - CONTINUED**

Nominal CCT	CRI*		Minimum Luminous Flux			2-Step		3-Step		5-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C <sup>90%</sup>	Group	Order Code	Group	Order Code	Group	Order Code
3500 K	80	---	CB	11,000	12,134	35H	CXB3590-0000-000N0HCB35H	35G	CXB3590-0000-000N0HCB35G		
			CD	12,000	13,237		CXB3590-0000-000N0HCD35H		CXB3590-0000-000N0HCD35G		
	90	92	BB	9,500	10,479	35H	CXB3590-0000-000N0UBB35H	35G	CXB3590-0000-000N0UBB35G		
			BD	10,000	11,031		CXB3590-0000-000N0UBD35H		CXB3590-0000-000N0UBD35G		
			CB	11,000	12,134		CXB3590-0000-000N0UCB35H		CXB3590-0000-000N0UCB35G		
	3000 K	80	---	BD	10,000	11,031	30H	CXB3590-0000-000N0HBD30H	30G	CXB3590-0000-000N0HBD30G	
CB				11,000	12,134	CXB3590-0000-000N0HCB30H		CXB3590-0000-000N0HCB30G			
CD				12,000	13,237	CXB3590-0000-000N0HCD30H		CXB3590-0000-000N0HCD30G			
90		92	BB	9,500	10,479	30H	CXB3590-0000-000N0UBB30H	30G	CXB3590-0000-000N0UBB30G		
			BD	10,000	11,031		CXB3590-0000-000N0UBD30H		CXB3590-0000-000N0UBD30G		
2700 K		80	---	BD	10,000	11,031	27H	CXB3590-0000-000N0HBD27H	27G	CXB3590-0000-000N0HBD27G	
	CB			11,000	12,134	CXB3590-0000-000N0HCB27H		CXB3590-0000-000N0HCB27G			
	90	92	AD	9,000	9,928	27H	CXB3590-0000-000N0UAD27H	27G	CXB3590-0000-000N0UAD27G		
			BB	9,500	10,479		CXB3590-0000-000N0UBB27H		CXB3590-0000-000N0UBB27G		
			BD	10,000	11,031		CXB3590-0000-000N0UBD27H		CXB3590-0000-000N0UBD27G		

**Notes**

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- \* For 80 CRI minimum LEDs, CRI R9 minimum is 0 with a  $\pm 2$  tolerance. For 90 CRI minimum LEDs, CRI R9 typical is 60.
- \*\* Flux values @ 25 °C are calculated and for reference only.

**FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 72 V ( $I_F = 1200 \text{ mA}$ ,  $T_J = 85^\circ\text{C}$ )**

The following table provides order codes for XLamp CXB3590 LEDs. For a complete description of the order code nomenclature, please see the Bin and Order Code Formats section ( ).

Nominal CCT	CRI*		Minimum Luminous Flux			2-Step		3-Step		5-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C**	Group	Order Code	Group	Order Code	Group	Order Code
6500 K	70	---	CD	12,000	13,237					65E	CXB3590-0000-000R0BCD65E
			DB	13,000	14,340						CXB3590-0000-000R0BDB65E
			DD	14,000	15,443						CXB3590-0000-000R0BDD65E
	80	---	CB	11,000	12,134					65E	CXB3590-0000-000R0HCB65E
			CD	12,000	13,237						CXB3590-0000-000R0HCD65E
			DB	13,000	14,340						CXB3590-0000-000R0HDB65E
5700 K	70	---	CD	12,000	13,237					57E	CXB3590-0000-000R0BCD57E
			DB	13,000	14,340						CXB3590-0000-000R0BDB57E
			DD	14,000	15,443						CXB3590-0000-000R0BDD57E
	80	---	CB	11,000	12,134					57E	CXB3590-0000-000R0HCB57E
			CD	12,000	13,237						CXB3590-0000-000R0HCD57E
			DB	13,000	14,340						CXB3590-0000-000R0HDB57E
	90	92	BD	10,000	11,031			57G	CXB3590-0000-000R0UBD57G		
			CB	11,000	12,134				CXB3590-0000-000R0UCB57G		
			CD	12,000	13,237				CXB3590-0000-000R0UCD57G		

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

**FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 72 V ( $I_F = 1200$  mA,  $T_J = 85$  °C) - CONTINUED**

Nominal CCT	CRI*		Minimum Luminous Flux			2-Step		3-Step		5-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C**	Group	Order Code	Group	Order Code	Group	Order Code
5000 K	70	---	CD	12,000	13,237					50E	CXB3590-0000-000R0BCD50E
			DB	13,000	14,340						CXB3590-0000-000R0BDB50E
			DD	14,000	15,443						CXB3590-0000-000R0BDD50E
	80	---	CB	11,000	12,134			50G	CXB3590-0000-000R0HCB50G	50E	CXB3590-0000-000R0HCB50E
			CD	12,000	13,237				CXB3590-0000-000R0HCD50G		CXB3590-0000-000R0HCD50E
			DB	13,000	14,340				CXB3590-0000-000R0HDB50G		
	90	92	BD	10,000	11,031			50G	CXB3590-0000-000R0UBD50G		
			CB	11,000	12,134				CXB3590-0000-000R0UCB50G		
			CD	12,000	13,237				CXB3590-0000-000R0UCD50G		
4000 K	70	---	CD	12,000	13,237					40E	CXB3590-0000-000R0BCD40E
			DB	13,000	14,340						CXB3590-0000-000R0BDB40E
			DD	14,000	15,443						CXB3590-0000-000R0BDD40E
	80	---	CB	11,000	12,134	40H	CXB3590-0000-000R0HCB40H	40G	CXB3590-0000-000R0HCB40G		
			CD	12,000	13,237		CXB3590-0000-000R0HCD40H		CXB3590-0000-000R0HCD40G		
			DB	13,000	14,340		CXB3590-0000-000R0HDB40H		CXB3590-0000-000R0HDB40G		
	90	92	BB	9,500	10,479	40H	CXB3590-0000-000R0UBB40H	40G	CXB3590-0000-000R0UBB40G		
			BD	10,000	11,031		CXB3590-0000-000R0UBD40H		CXB3590-0000-000R0UBD40G		
			CB	11,000	12,134		CXB3590-0000-000R0UCB40H		CXB3590-0000-000R0UCB40G		

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

**FLUX CHARACTERISTICS, EASYWHITE® ORDER CODES AND BINS - 72 V ( $I_F = 1200 \text{ mA}$ ,  $T_J = 85^\circ\text{C}$ ) - CONTINUED**

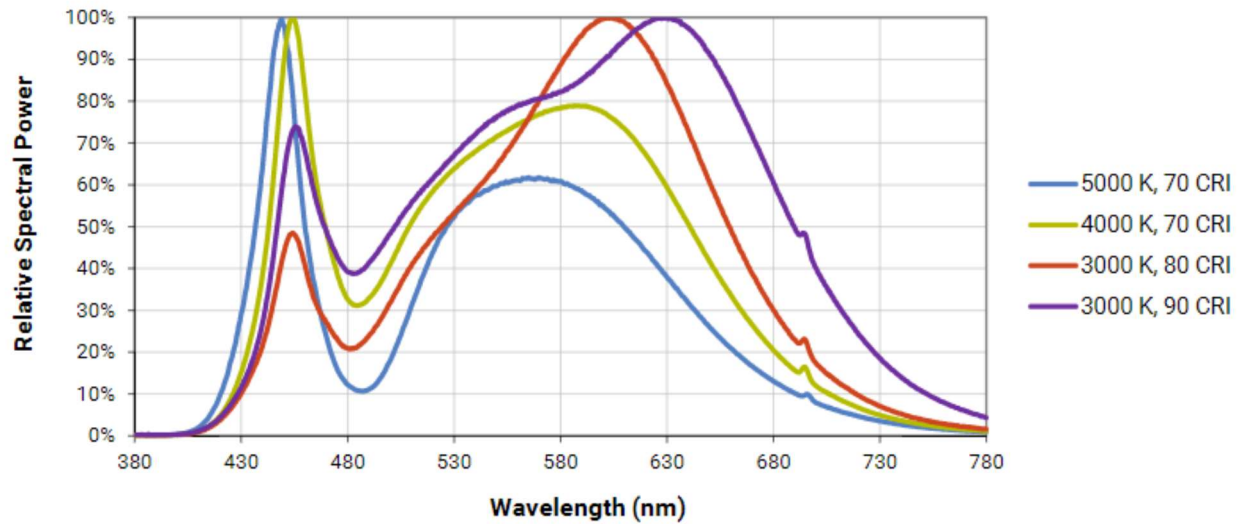
Nominal CCT	CRI*		Minimum Luminous Flux			2-Step		3-Step		5-Step	
	Min	Typ	Group	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C <sup>90%</sup>	Group	Order Code	Group	Order Code	Group	Order Code
3500 K	80	---	CB	11,000	12,134	35H	CXB3590-0000-000R0HCB35H	35G	CXB3590-0000-000R0HCB35G		
			CD	12,000	13,237		CXB3590-0000-000R0HCD35H		CXB3590-0000-000R0HCD35G		
	90	92	BB	9,500	10,479	35H	CXB3590-0000-000R0UBB35H	35G	CXB3590-0000-000R0UBB35G		
			BD	10,000	11,031		CXB3590-0000-000R0UBD35H		CXB3590-0000-000R0UBD35G		
			CB	11,000	12,134		CXB3590-0000-000R0UCB35H		CXB3590-0000-000R0UCB35G		
	3000 K	80	---	BD	10,000	11,031	30H	CXB3590-0000-000R0HBD30H	30G	CXB3590-0000-000R0HBD30G	
CB				11,000	12,134	CXB3590-0000-000R0HCB30H		CXB3590-0000-000R0HCB30G			
CD				12,000	13,237	CXB3590-0000-000R0HCD30H		CXB3590-0000-000R0HCD30G			
90		92	BB	9,500	10,479	30H	CXB3590-0000-000R0UBB30H	30G	CXB3590-0000-000R0UBB30G		
			BD	10,000	11,031		CXB3590-0000-000R0UBD30H		CXB3590-0000-000R0UBD30G		
2700 K		80	---	BD	10,000	11,031	27H	CXB3590-0000-000R0HBD27H	27G	CXB3590-0000-000R0HBD27G	
	CB			11,000	12,134	CXB3590-0000-000R0HCB27H		CXB3590-0000-000R0HCB27G			
	90	92	AD	9,000	9,928	27H	CXB3590-0000-000R0UAD27H	27G	CXB3590-0000-000R0UAD27G		
			BB	9,500	10,479		CXB3590-0000-000R0UBB27H		CXB3590-0000-000R0UBB27G		
			BD	10,000	11,031		CXB3590-0000-000R0UBD27H		CXB3590-0000-000R0UBD27G		

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## RELATIVE SPECTRAL POWER DISTRIBUTION

The following graph is the result of a series of pulsed measurements at 2400 mA for the 36-V CXB3590 and 1200 mA for the 72-V CXB3590 and  $T_j = 85^\circ\text{C}$ .



## ELECTRICAL CHARACTERISTICS

The following graph is the result of a series of steady-state measurements.

