

# Cree® XLamp® CXA2 Family LEDs



NVLAP Lab Code 500041-0

## INFORMATION REQUIRED BY LM-80-08

Cree classifies XLamp CXA2 Family LEDs as “LED arrays” (Section 3.7) per Sep 9, 2011 ENERGY STAR® guidelines<sup>1</sup>: LED arrays constructed as an assembly of LED dies on a substrate with one common phosphor layer overlaying all dies.

1. Number of LED light sources tested	See individual data sets on following pages.
2. Description of tested LED light sources	XLamp® CXB3050 & CXA3590 White LEDs (Series: CXB3050 & CXA3590)  See the Scaling For Applicable Products section for list of applicable order codes and currents. All measurements provided are LED array measurements.
3. Description of auxiliary equipment	Instrument Systems ISP-500 Integrating Sphere Instrument Systems CAS-140 Spectrometer Keithley 2420 Sourcemeter
4. Operating cycle	LED arrays are driven at constant current.
5. Ambient conditions	LED arrays are operated in environmental control chambers. The temperature of the ambient air around the LED arrays is actively controlled by air flowing through the chamber.  T <sub>A</sub> : See individual data sets on following pages RH : < 45% Air flow : 800 CFM
6. Case temperature	See individual data sets on following pages.
7. Drive current of the LED light source during lifetime test.	See individual data sets on following pages.
8. Initial luminous flux and forward voltage at photometric measurement current	See individual data sets on following pages.
9. Lumen maintenance data for each individual LED light source	See individual data sets on following pages. Ambient temperature during luminous flux testing set to 25°C ±2°C.
10. Observation of LED light source failures	No failures occurred during testing.
11. LED light source monitoring interval	See individual data sets on following pages.
12. Photometric measurement uncertainty	Cree maintains a tolerance of ±2.0% on flux measurements for LM-80 testing.
13. Chromaticity shift reported over the measurement time	See individual data sets on following pages. Ambient temperature during chromaticity testing set to 25°C ±2°C.
Test Report Authorization	Amber Abare, Components Reliability Laboratory Manager
Sampling method	Cree uses systematic sampling of production LEDs, with checks to ensure that the behavior of early samples are representative of the behavior of later samples.

1 [http://www.energystar.gov/ia/partners/prod\\_development/new\\_specs/downloads/luminaires/ENERGY\\_STAR\\_Final\\_Lumen\\_Maintenance\\_Guidance.pdf](http://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/luminaires/ENERGY_STAR_Final_Lumen_Maintenance_Guidance.pdf)

**REVISION HISTORY**

Revision	Date	Change
0	March 24, 2015	Date of first issue
1	September 28, 2015	Removed data sets CXA3050-4, 4+, & 6. Added data sets CXB3050-1 & 2. Added CXB1830, CXB2540. Changed precision of the EPA tables to 2-place decimals.

**RESULTS SUMMARY FOR TESTED LED ARRAY: XLAMP CXB3050**

Data Set	Case Temp. [T <sub>s</sub> ]	Ambient Temp. [T <sub>A</sub> ]	Drive Current [I <sub>F</sub> ]	ANSI CCT Target	Sample Count	Test Duration	Reported TM-21 Lifetimes
B3050-1	105°C	105°C	1500 mA	3000K	10	6,048 hrs	L90(6k) > 33,300 hrs L80(6k) > 33,300 hrs L70(6k) > 33,300 hrs
B3050-2	85°C	85°C	2500 mA	3000K	10	6,048 hrs	L90(6k) = 31,500 hrs L80(6k) > 33,300 hrs L70(6k) > 33,300 hrs

**SCALING FOR APPLICABLE PRODUCTS: XLAMP CXB3050**

The data sets in this document meet the all criteria for one LM-80 data set to apply to a range of LED arrays, as defined in ENERGY STAR Sep 9, 2011 guidelines, Section 3.7.d. The table below defines the current values that apply to each product when scaled from the tested LM-80 product. The tested product is listed in bold text below.

Product Name	Voltage Class	Product Order Code	Applicable Currents	
			Data Set B3050-1 (105°C)	Data Set B3050-2 (85°C)
CXB1304	9V	CXB1304-xxxx-xxxNxxxxxxxx	460 mA	768 mA
CXB1304	18V	CXB1304-xxxx-xxxNxxxxxxxx	230 mA	384 mA
CXB1304	36V	CXB1304-xxxx-xxxNxxxxxxxx	115 mA	192 mA
CXB1507	18V	CXB1507-xxxx-xxxNxxxxxxxx	462 mA	750 mA
CXB1507	36V	CXB1507-xxxx-xxxNxxxxxxxx	231 mA	375 mA
CXB1512	18V	CXB1512-xxxx-xxxNxxxxxxxx	898 mA	1200 mA
CXB1512	36V	CXB1512-xxxx-xxxNxxxxxxxx	449 mA	600 mA
CXB1816	36V	CXB1816-xxxx-xxxNxxxxxxxx	462 mA	769 mA
CXB1820	36V	CXB1820-xxxx-xxxNxxxxxxxx	630 mA	1040 mA
CXB1830	36V	CXB1830-xxxx-xxxNxxxxxxxx	651 mA	1084 mA
CXB2530	36V	CXB2530-xxxx-xxxNxxxxxxxx	808 mA	1346 mA
CXB2540	36V	CXB2540-xxxx-xxxNxxxxxxxx	1142 mA	1907 mA
<b>CXB3050</b>	<b>36V</b>	<b>CXB3050-xxxx-xxxNxxxxxxxx</b>	<b>1500 mA</b>	<b>2500 mA</b>

**RESULTS SUMMARY FOR TESTED LED ARRAY: XLAMP CXA3590**

Data Set	Case Temp. [T <sub>s</sub> ]	Ambient Temp. [T <sub>A</sub> ]	Drive Current [I <sub>F</sub> ]	ANSI CCT Target	Sample Count	Test Duration	Reported TM-21 Lifetimes
3590-1	105°C	105°C	1050 mA	3000K	25	6,048 hrs	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3590-2	85°C	85°C	1400 mA	3000K	25	6,048 hrs	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs

**SCALING FOR APPLICABLE PRODUCTS: XLAMP CXA3590**

The data sets in this document meet the all criteria for one LM-80 data set to apply to a range of LED arrays, as defined in ENERGY STAR Sep 9, 2011 guidelines, Section 3.7.d. The table below defines the current values that apply to each product when scaled from the tested LM-80 product. The tested product is listed in bold text below.

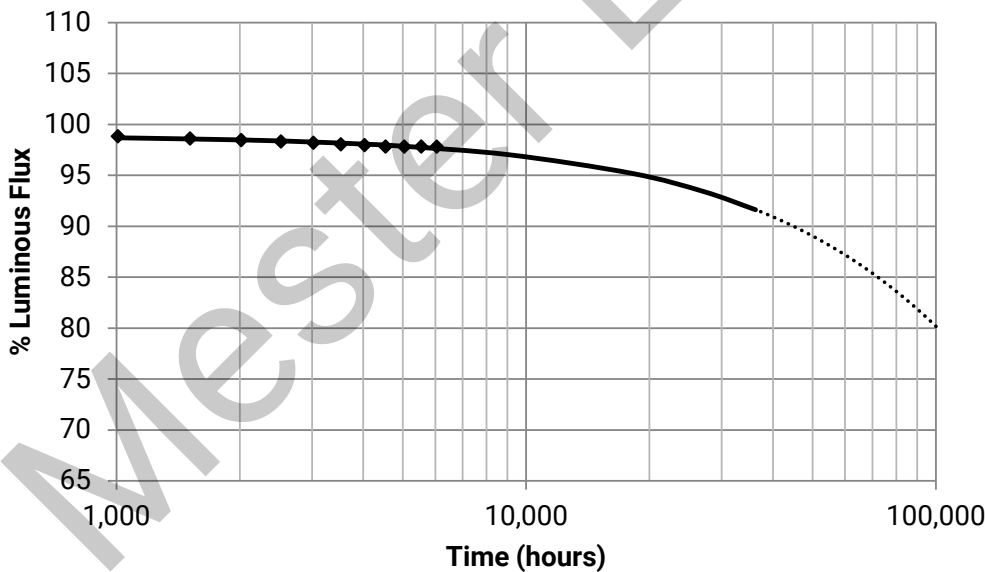
Product Name	Voltage Class	Product Order Code	Applicable Currents	
			Data Set 3590-1 (105°C)	Data Set 3590-2 (85°C)
CXB1830	36V	CXB1830-xxxx-xxxNxxxxxxxx	610 mA	820 mA
CXB2540	36V	CXB2540-xxxx-xxxNxxxxxxxx	1070 mA	1440 mA
CXB3050	36V	CXB3050-xxxx-xxxNxxxxxxxx	1400 mA	1900 mA
CXB3070	36V	CXB3070-xxxx-xxxNxxxxxxxx	1400 mA	1880 mA
<b>CXA3590</b>	<b>72V</b>	<b>CXA3590-xxxx-xxxRxxxxxxxx</b>	<b>1050 mA</b>	<b>1400 mA</b>

### DATA SET B3050-1: 105°C; 1500 mA

Tested LED Array Series	XLamp CXB3050 White LEDs (Series: CXB3050) See the Scaling For Applicable Products section for list of applicable order codes and currents.
Tested Model Number	CXB3050-0000-000N00Z430F
Tested Drive Current [ $I_F$ ]	1500 mA
Average Current-Per-Die	115.4 mA per die
Testing Initiation Date	November 06, 2014
Case Temperature [ $T_C$ ]	105°C
Ambient Temperature [ $T_A$ ]	105°C
Failures observed	None

#### Projection Generated By Cree's Internal TM-21 Calculator:

<b>Test duration</b>	6,048 hours
<b>Test duration used for projection</b>	t=1,008 to t=6,048
<b><math>\alpha</math></b>	2.098E-06
<b><math>\beta</math></b>	9.888E-01
<b>Reported Lifetimes</b>	<b>L90(6k) &gt; 33,300 hours</b>
	<b>L80(6k) &gt; 33,300 hours</b>
	<b>L70(6k) &gt; 33,300 hours</b>



#### LM-80 Data For The Official TM-21 Calculator\*

Time (hours)	Lumen Maintenance
0	100.00%
168	99.33%
1008	98.83%
1512	98.62%
2016	98.46%
2520	98.32%
3024	98.20%
3528	98.04%
4032	97.96%
4536	97.82%
5040	97.82%
5544	97.82%
6048	97.81%

\* <http://www.energystar.gov/TM-21calculator>

Suggestion for exporting the LM-80 data:

- Copy above table from PDF & paste into Microsoft Word.
- Copy table out of Word & paste into Microsoft Excel (Match destination formatting)

**DATA SET B3050-1: 105°C; 1500 mA**

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V <sub>F</sub> (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	7672	36.04	2876	3000	99.43	98.89	98.65	98.38	98.18	98.08	98.11	98.09	98.05	98.02	98.22	98.07
2	7708	36.15	2898	3000	99.68	99.11	98.88	98.80	98.70	98.56	98.54	98.52	98.30	98.23	98.11	98.25
3	7682	36.38	2979	3000	99.33	98.95	98.85	98.50	98.43	98.40	98.34	98.34	98.15	98.26	98.07	98.02
4	7852	36.12	2983	3000	99.51	98.93	98.60	98.52	98.53	98.50	98.31	98.32	98.16	98.08	97.94	98.18
5	7748	37.40	2972	3000	99.50	98.72	98.57	98.35	98.20	97.89	97.74	97.66	97.53	97.55	97.67	97.53
6	7709	35.62	2891	3000	99.37	98.91	98.73	98.61	98.09	98.03	97.63	97.48	97.34	97.51	97.34	97.31
7	7655	35.43	2875	3000	99.15	98.88	98.70	98.49	98.45	98.30	98.20	97.97	97.85	97.81	97.89	98.08
8	7737	36.85	2961	3000	99.23	98.63	98.51	98.43	98.40	98.23	97.96	97.76	97.50	97.48	97.65	97.44
9	7724	37.49	2974	3000	99.00	98.76	98.21	98.14	97.93	97.92	97.83	97.81	97.71	97.77	97.97	97.89
10	7710	36.90	2969	3000	99.13	98.57	98.45	98.39	98.28	98.06	97.77	97.68	97.62	97.46	97.39	97.36
n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Mean	7720	36.44			99.33	98.83	98.61	98.46	98.32	98.20	98.04	97.96	97.82	97.82	97.82	97.81
Median	7710	36.27			99.35	98.88	98.62	98.46	98.34	98.15	98.04	97.89	97.78	97.79	97.91	97.95
σ	55	0.70			0.21	0.16	0.20	0.17	0.23	0.24	0.30	0.34	0.33	0.31	0.30	0.36
Min.	7655	35.43			99.00	98.57	98.21	98.14	97.93	97.89	97.63	97.48	97.34	97.46	97.34	97.31
Max.	7852	37.49			99.68	99.11	98.88	98.80	98.70	98.56	98.54	98.52	98.30	98.26	98.22	98.25

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4429	0.4006	2876	3000	0.0007	0.0007	0.0010	0.0011	0.0012	0.0011	0.0011	0.0010	0.0009	0.0009	0.0009	0.0009
2	0.4429	0.4034	2898	3000	0.0006	0.0008	0.0009	0.0010	0.0010	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
3	0.4401	0.4075	2979	3000	0.0007	0.0008	0.0009	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0007	0.0008	0.0007
4	0.4414	0.4105	2983	3000	0.0007	0.0008	0.0009	0.0009	0.0009	0.0009	0.0008	0.0007	0.0007	0.0007	0.0008	0.0008
5	0.4419	0.4103	2972	3000	0.0007	0.0008	0.0009	0.0010	0.0011	0.0011	0.0010	0.0009	0.0009	0.0009	0.0009	0.0009
6	0.4450	0.4066	2891	3000	0.0005	0.0008	0.0008	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008
7	0.4462	0.4068	2875	3000	0.0006	0.0008	0.0008	0.0009	0.0009	0.0008	0.0007	0.0007	0.0006	0.0006	0.0007	0.0007
8	0.4418	0.4087	2961	3000	0.0007	0.0008	0.0009	0.0010	0.0010	0.0010	0.0009	0.0008	0.0007	0.0008	0.0008	0.0009
9	0.4421	0.4108	2974	3000	0.0006	0.0008	0.0009	0.0009	0.0011	0.0010	0.0010	0.0009	0.0008	0.0008	0.0008	0.0009
10	0.4407	0.4074	2969	3000	0.0007	0.0009	0.0010	0.0010	0.0010	0.0010	0.0010	0.0009	0.0008	0.0009	0.0009	0.0009
n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Mean					0.0006	0.0008	0.0009	0.0010	0.0010	0.0010	0.0009	0.0008	0.0008	0.0008	0.0008	0.0009
Median					0.0007	0.0008	0.0009	0.0009	0.0010	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0009
σ					0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.					0.0005	0.0007	0.0008	0.0009	0.0009	0.0008	0.0007	0.0007	0.0006	0.0006	0.0007	0.0007
Max.					0.0007	0.0009	0.0010	0.0011	0.0012	0.0011	0.0011	0.0010	0.0009	0.0009	0.0009	0.0009

## DATA SET B3050-2: 85°C; 2500 mA

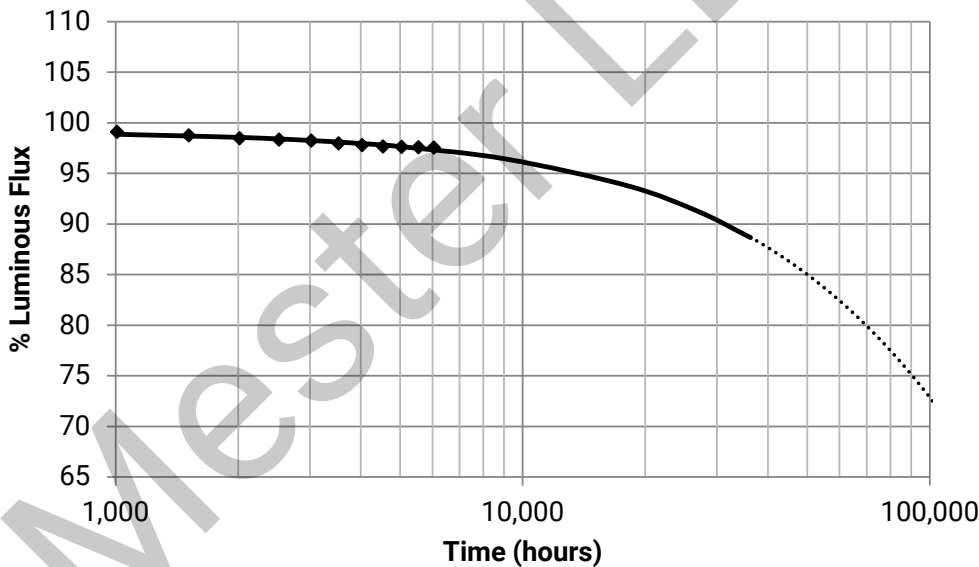
Tested LED Array Series	XLamp CXB3050 White LEDs (Series: CXB3050) See the Scaling For Applicable Products section for list of applicable order codes and currents.
Tested Model Number	CXB3050-0000-000N00Z430F
Tested Drive Current [ $I_F$ ]	2500 mA
Average Current-Per-Die	192.3 mA per die
Testing Initiation Date	November 06, 2014
Case Temperature [ $T_s$ ]	85°C
Ambient Temperature [ $T_A$ ]	85°C
Failures observed	None

### Projection Generated By Cree’s Internal TM-21 Calculator:

Test duration	6,048 hours
Test duration used for projection	t=1,008 to t=6,048
$\alpha$	3.085E-06
$\beta$	9.917E-01
Reported Lifetimes	L90(6k) = 31,500 hours
	L80(6k) > 33,300 hours
	L70(6k) > 33,300 hours

### LM-80 Data For The Official TM-21 Calculator\*

Time (hours)	Lumen Maintenance
0	100.00%
168	99.46%
1008	99.10%
1512	98.74%
2016	98.47%
2520	98.34%
3024	98.24%
3528	97.97%
4032	97.80%
4536	97.66%
5040	97.62%
5544	97.58%
6048	97.55%



\* <http://www.energystar.gov/TM-21calculator>

Suggestion for exporting the LM-80 data:

1. Copy above table from PDF & paste into Microsoft Word.
2. Copy table out of Word & paste into Microsoft Excel (Match destination formatting)

**DATA SET B3050-2: 85°C; 2500 mA**

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V <sub>F</sub> (V)	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	11910	38.14	2977	3000	99.54	99.32	98.92	98.45	98.38	98.22	97.95	97.77	97.49	97.40	97.42	97.37
2	11697	38.51	2993	3000	99.20	98.90	98.35	98.11	97.90	97.82	97.60	97.45	97.25	97.20	97.18	97.22
3	11843	39.61	2985	3000	99.31	99.05	98.61	98.44	98.37	98.33	98.06	98.11	97.91	97.91	97.87	97.92
4	11584	39.86	2976	3000	99.72	99.27	98.88	98.75	98.59	98.59	98.21	98.11	97.86	97.81	97.62	97.62
5	12509	37.71	2998	3000	99.72	99.35	99.21	98.79	98.78	98.72	98.51	98.30	98.24	98.21	98.20	98.06
6	11746	37.21	2968	3000	99.83	99.30	99.07	98.46	98.05	97.90	97.53	97.34	97.30	97.28	97.17	97.10
7	11562	38.75	2892	3000	99.20	98.94	98.44	98.14	98.11	97.85	97.68	97.64	97.63	97.74	97.61	97.50
8	12055	38.15	2989	3000	99.92	99.18	98.68	98.29	98.08	98.04	97.58	97.36	97.18	97.09	97.18	97.12
9	11848	39.56	2981	3000	99.10	98.80	98.66	98.54	98.49	98.37	98.30	98.10	97.94	97.86	97.86	97.95
10	11471	38.70	2906	3000	99.06	98.93	98.75	98.74	98.59	98.55	98.27	97.77	97.77	97.71	97.73	97.66
n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Mean	11823	38.62			99.46	99.10	98.75	98.47	98.34	98.24	97.97	97.80	97.66	97.62	97.58	97.55
Median	11794	38.60			99.42	99.11	98.72	98.45	98.38	98.28	98.01	97.77	97.70	97.73	97.62	97.56
σ	299	0.86			0.32	0.20	0.27	0.24	0.29	0.33	0.35	0.35	0.35	0.36	0.35	0.35
Min.	11471	37.21			99.06	98.80	98.35	98.11	97.90	97.82	97.53	97.34	97.18	97.09	97.17	97.10
Max.	12509	39.86			99.92	99.35	99.21	98.79	98.78	98.72	98.51	98.30	98.24	98.21	98.20	98.06

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	168	1008	1512	2016	2520	3024	3528	4032	4536	5040	5544	6048
1	0.4417	0.4104	2977	3000	0.0006	0.0007	0.0008	0.0008	0.0009	0.0009	0.0009	0.0008	0.0008	0.0007	0.0007	0.0008
2	0.4392	0.4072	2993	3000	0.0006	0.0007	0.0009	0.0009	0.0009	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008
3	0.4407	0.4094	2985	3000	0.0006	0.0007	0.0008	0.0009	0.0009	0.0010	0.0010	0.0009	0.0008	0.0008	0.0008	0.0008
4	0.4416	0.4103	2976	3000	0.0005	0.0006	0.0007	0.0008	0.0008	0.0009	0.0008	0.0007	0.0007	0.0007	0.0008	0.0009
5	0.4393	0.4083	2998	3000	0.0006	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
6	0.4411	0.4082	2968	3000	0.0006	0.0008	0.0008	0.0009	0.0010	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
7	0.4445	0.4057	2892	3000	0.0004	0.0007	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008
8	0.4412	0.4110	2989	3000	0.0007	0.0008	0.0008	0.0009	0.0010	0.0010	0.0009	0.0008	0.0008	0.0007	0.0008	0.0008
9	0.4412	0.4099	2981	3000	0.0006	0.0008	0.0008	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0007	0.0008
10	0.4433	0.4049	2906	3000	0.0005	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0008	0.0008	0.0008	0.0008	0.0009
n	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Mean					0.0006	0.0007	0.0008	0.0009	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
Median					0.0006	0.0007	0.0008	0.0009	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008
σ					0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001
Min.					0.0004	0.0006	0.0007	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007
Max.					0.0007	0.0008	0.0009	0.0009	0.0010	0.0010	0.0010	0.0009	0.0009	0.0009	0.0009	0.0009

## DATA SET 3590-1: 105°C; 1050 mA

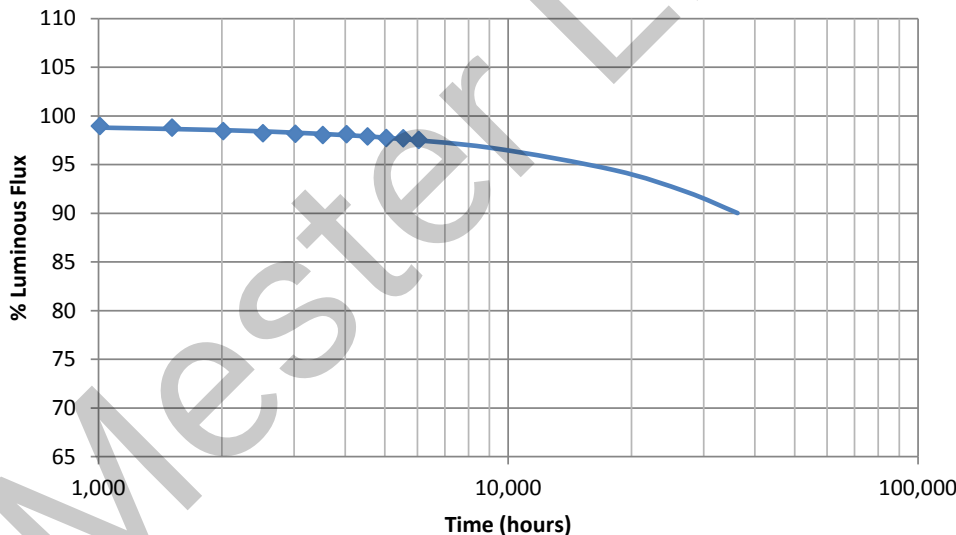
Tested LED Array Series	XLamp CXA3590 White LEDs (Series: CXA3590) See the Scaling For Applicable Products section for list of applicable order codes and currents.
Tested Model Number	CXA3590-0000-000R00AD30F
Tested Drive Current [ $I_F$ ]	1050 mA
Average Current-Per-Die	150 mA per die
Testing Initiation Date	August 14, 2013
Case Temperature [ $T_s$ ]	105°C
Ambient Temperature [ $T_A$ ]	105°C
Failures observed	None

### Projection Generated By Cree's Internal TM-21 Calculator:

Test duration	6,048 hours
Test duration used for projection	t=1,008 to t=6,048
$\alpha$	2.640E-06
$\beta$	9.906E-01
Calculated Lifetime	L70(6k) > 109,000 hours
Reported Lifetime	L70(6k) > 36,300 hours

### LM-80 Data For The Official TM-21 Calculator\*

Time (hours)	Lumen Maintenance
0	100.00%
168	99.67%
1008	98.96%
1512	98.80%
2016	98.44%
2520	98.22%
3024	98.16%
3528	98.04%
4032	98.12%
4536	97.89%
5040	97.73%
5544	97.70%
6048	97.53%



\* <http://www.energystar.gov/TM-21calculator>

Suggestion for exporting the LM-80 data:

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2. Copy table out of Word & paste into Microsoft Excel (Match destination formatting)





### DATA SET 3590-2: 85°C; 1400 mA

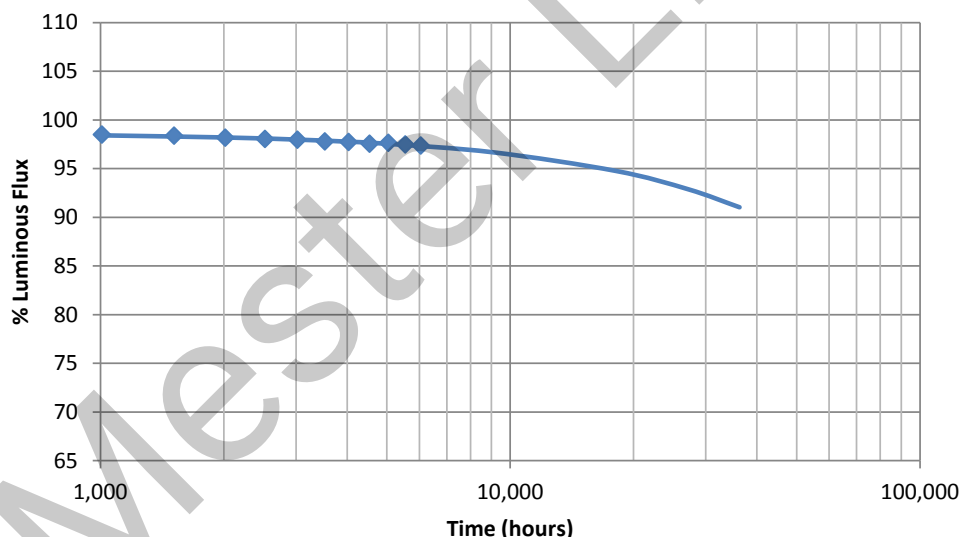
Tested LED Array Series	XLamp CXA3590 White LEDs (Series: CXA3590) See the Scaling For Applicable Products section for list of applicable order codes and currents.
Tested Model Number	CXA3590-0000-000R00AD30F
Tested Drive Current [ $I_F$ ]	1400 mA
Average Current-Per-Die	200 mA per die
Testing Initiation Date	August 21, 2013
Case Temperature [ $T_s$ ]	85°C
Ambient Temperature [ $T_A$ ]	85°C
Failures observed	None

#### Projection Generated By Cree's Internal TM-21 Calculator:

Test duration	6,048 hours
Test duration used for projection	t=1,008 to t=6,048
$\alpha$	2.216E-06
$\beta$	9.865E-01
Calculated Lifetime	L70(6k) > 109,000 hours
Reported Lifetime	L70(6k) > 36,300 hours

#### LM-80 Data For The Official TM-21 Calculator\*

Time (hours)	Lumen Maintenance
0	100.00%
168	98.92%
1008	98.50%
1512	98.38%
2016	98.18%
2520	98.05%
3024	97.97%
3528	97.79%
4032	97.74%
4536	97.56%
5040	97.65%
5544	97.48%
6048	97.37%



\* <http://www.energystar.gov/TM-21calculator>

Suggestion for exporting the LM-80 data:

1. Copy above table from PDF & paste into Microsoft Word.
2. Copy table out of Word & paste into Microsoft Excel (Match destination formatting)

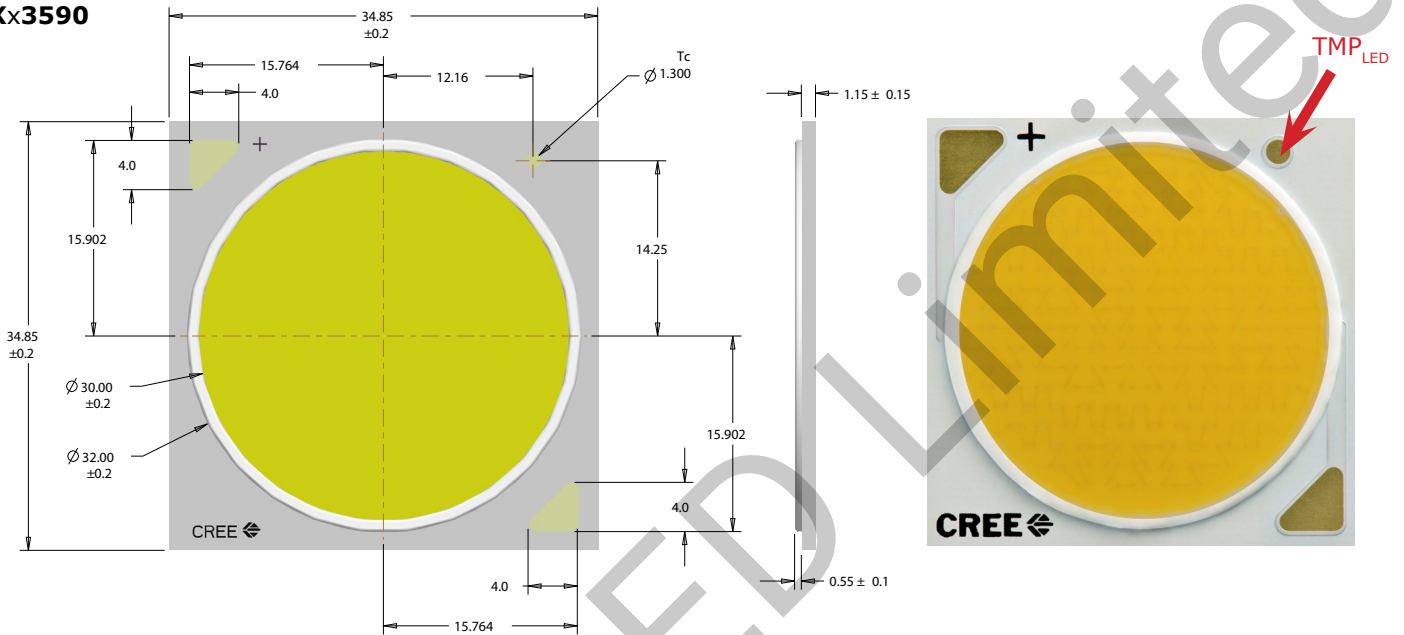


## MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT

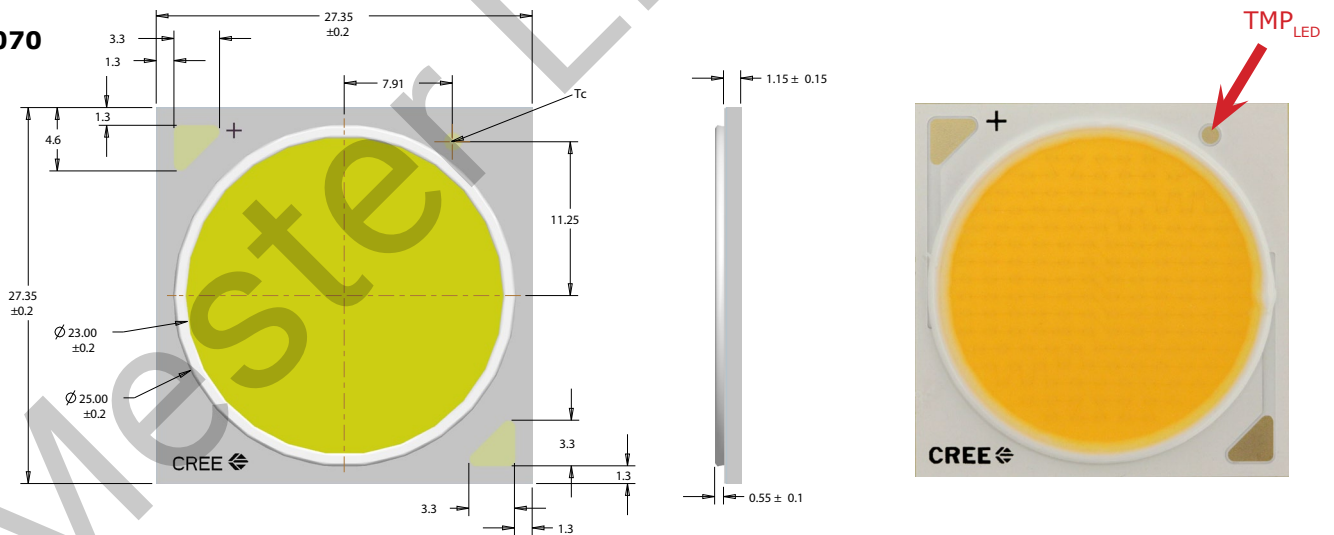
Dimensions are in mm. Tolerances unless otherwise specified:

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

### CXx3590

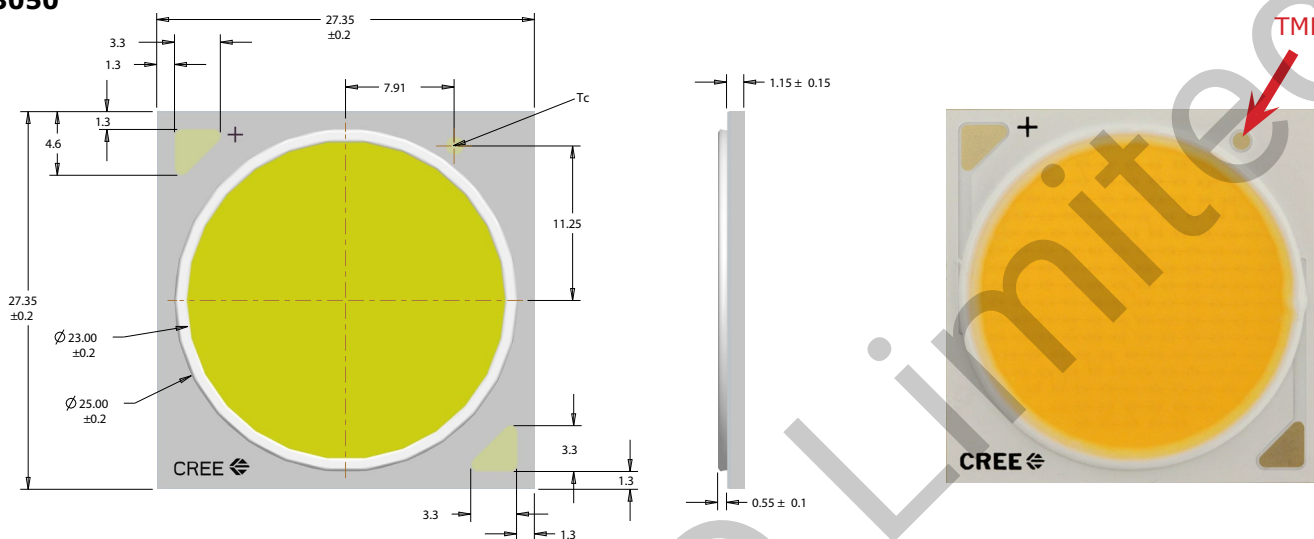


### CXx3070

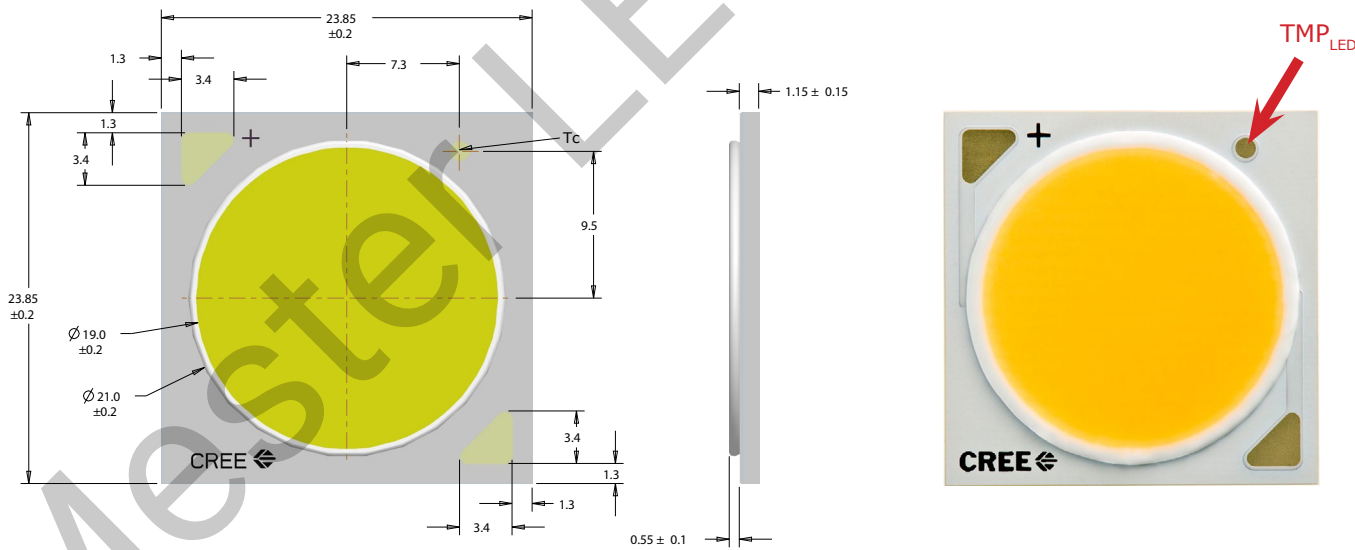


### MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT - CONTINUED

#### CXx3050

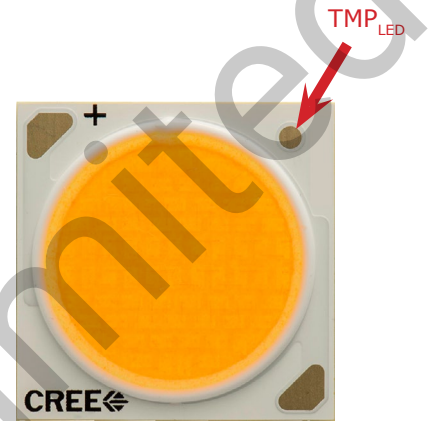
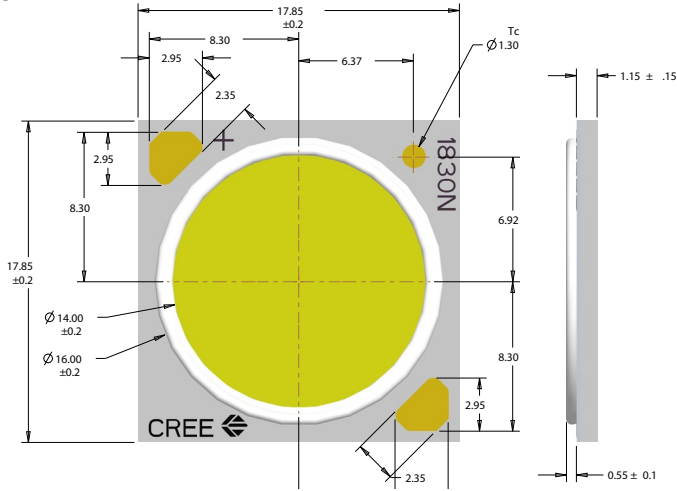


#### CXx25xx

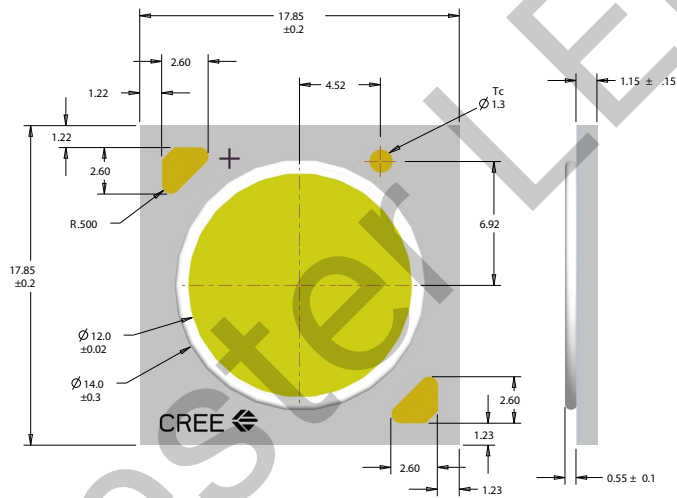


### MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT - CONTINUED

#### CXB1830

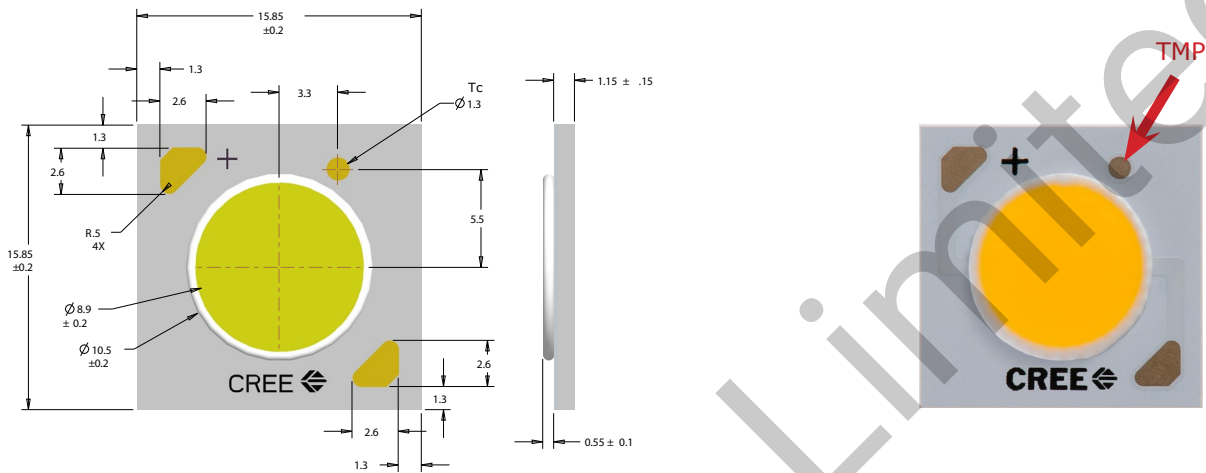


#### CXx1816, CXx1820



## MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT - CONTINUED

### CXx15xx



### CXx1304

