XLamp® CM Family Standard LEDs

GENERAL TEST INFORMATION

Manufacturer's name	Cree LED
Product series & applicable order codes in this report	XLamp CM Family Standard LEDs: CMA1303-xxxx-xx0Cxxxxxxx : CMA1303 9-V Standard CMA1303-xxxx-xx0Fxxxxxxx : CMA1303 18-V Standard CMA1303-xxxx-xx0Nxxxxxxx : CMA1303 36-V Standard CMA1306-xxxx-xx0Cxxxxxxx : CMA1306 9-V Standard CMA1306-xxxx-xx0Fxxxxxxx : CMA1306 18-V Standard CMA1306-xxxx-xx0Nxxxxxxx : CMA1306 36-V Standard CMA1516-xxxx-xx0Nxxxxxxx : CMA1516 36-V Standard CMA1825-xxxx-xx0Nxxxxxxx : CMA1825 36-V Standard CMA1840-xxxx-xx0Nxxxxxxx : CMA1840 36-V Standard CMA2550-xxxx-xx0Nxxxxxxx : CMA2550 36-V Standard CMA3090-xxxx-xx0Qxxxxxxx : CMA3090 48-V Standard CMA3090-xxxx-xx0Rxxxxxxx : CMA3090 72-V Standard CMB1304-xxxx-xx0Cxxxxxxx : CMB1304 9-V Standard CMB1304-xxxx-xx0Fxxxxxxx : CMB1304 18-V Standard CMB1304-xxxx-xx0Nxxxxxxx : CMB1304 36-V Standard CMB1306-xxxx-xx0Fxxxxxxx : CMB1306 18-V Standard CMB1306-xxxx-xx0Nxxxxxxx : CMB1306 36-V Standard CMB1507-xxxx-xx0Fxxxxxxx : CMB1507 18-V Standard CMB1507-xxxx-xx0Nxxxxxxx : CMB1507 36-V Standard CMB1510-xxxx-xx0Fxxxxxxx : CMB1510 18-V Standard CMB1510-xxxx-xx0Nxxxxxxx : CMB1510 36-V Standard CMB1516-xxxx-xx0Nxxxxxxx : CMB1516 36-V Standard CMB1818-xxxx-xx0Nxxxxxxx : CMB1818 36-V Standard CMB1825-xxxx-xx0Nxxxxxxx : CMB1825 36-V Standard CMB1840-xxxx-xx0Nxxxxxxx : CMB1840 36-V Standard CMB2550-xxxx-xx0Nxxxxxxx : CMB2550 36-V Standard CMB3090-xxxx-xx0Qxxxxxxx : CMB3090 48-V Standard CMB3090-xxxx-xx0Rxxxxxxx : CMB3090 72-V Standard CMT1407-xxxx-xx0Nxxxxxxx : CMT1407 36-V Standard CMT1412-xxxx-xx0Nxxxxxxx : CMT1412 36-V Standard CMT1420-xxxx-xx0Nxxxxxxx : CMT1420 36-V Standard CMT1922-xxxx-xx0Nxxxxxxx : CMT1922 36-V Standard CMT1925-xxxx-xx0Nxxxxxxx : CMT1925 36-V Standard CMT1930-xxxx-xx0Nxxxxxxx : CMT1930 36-V Standard CMT1945-xxxx-xx0Nxxxxxxx : CMT1945 36-V Standard CMT2850-xxxx-xx0Nxxxxxxx : CMT2850 36-V Standard CMT2870-xxxx-xx0Pxxxxxxx : CMT2870 54-V Standard CMT2890-xxxx-xx0Pxxxxxxx : CMT2890 54-V Standard CMU1003-xxxx-xx0Nxxxxxxx : CMU1003 36-V Standard CMU1006-xxxx-xx0Nxxxxxxx : CMU1006 36-V Standard CMU1010-xxxx-xx0Nxxxxxxx : CMU1010 36-V Standard CMU1013-xxxx-xx0Nxxxxxxx : CMU1013 36-V Standard CMU1516-xxxx-xx0Nxxxxxxx : CMU1516 36-V Standard CMU1519-xxxx-xx0Nxxxxxxx : CMU1519 36-V Standard CMU1526-xxxx-xx0Nxxxxxxx : CMU1526 36-V Standard CMU1532-xxxx-xx0Nxxxxxxx : CMU1532 36-V Standard CMU2236-xxxx-xx0Nxxxxxxx : CMU2236 36-V Standard CMU2239-xxxx-xx0Nxxxxxxx : CMU2239 36-V Standard CMU2258-xxxx-xx0Pxxxxxxx : CMU2258 54-V Standard CMU2287-xxxx-xx0Pxxxxxxx : CMU2287 54-V Standard
Drive level type	Constant direct current (DC)

Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27709 USA / +1.919.313.5330 / www.cree-led.com

REVISION HISTORY

Revision	Date	Change
0	Apr 17, 2018	Date of first issue
1	May 09, 2018	Extended the CMA3090 72-V Standard @ 85 °C, 1800 mA data set with additional test duration.
2	May 16, 2018	Added the CMT1420 36-V Standard @ 85 °C, 1050 mA data set.
3	May 31, 2018	Extended the CMT1420 36-V @ 105 °C, 700 mA data set with additional test duration.
4	Aug 13, 2018	Extended the CMT1420 36-V @ 105 °C, 700 mA & CMA3090 72-V Standard @ 85 °C, 1800 mA data sets with additional test duration. Corrected calculation errors in color shift (du'v') values for all data sets.
5	Jan 7, 2019	Added scaling support for CMA1306 9-V Standard, 18-V Standard & 36-V Standard.
6	Mar 6, 2019	Deleted CMA3090 72-V Standard data sets. Added CMA3090 48-V Standard @ 105 °C, 2400 mA & 85 °C, 3300 mA data sets. Separated Standard & eTone product versions to make eTone scaling currents clearer.
7	Mar 22, 2019	Extended the CMA3090 48-V Standard sets with additional test duration.
8	Jul 19, 2019	Extended the CMA3090 48-V Standard sets with additional test duration. Added CMA1303 scaling support. Deleted eTone product versions.
9	Feb 11, 2021	Added scaling support for all CMUxxxx LEDs, except CMU2287. Adjusted scaled current for CMT2890 @ 105 °C.
10	Apr 30, 2021	Updated CreeLED testing agency information. Converted document style & information to Cree LED.
11	Jul 21, 2021	Added CMU2287 data sets & scaling information.
12	Dec 13, 2021	Extended the CMU2287 sets with additional test duration.
13	Jun 22, 2022	Extended the CMA3090 48-V Standard sets with additional test duration. Extended the CMU2287 sets with additional test duration. Replaced the CMT1420 @ 85 °C, 1050 mA data set with a newer data set.
14	Mar 10, 2023	Extended the CMT1420 @ 85 °C, 1050 mA data set with additional test duration. Added scaling support for CMBxxxx LEDs.

SUMMARY: XLAMP CMA1303 STANDARD WHITE

Applicable order codes: CMA1303-xxxx-xx0Cxxxxxxx (9-V), CMA1303-xxxx-xx0Fxxxxxxx (18-V), CMA1303-xxxx-xx0Nxxxxxxx (36-V)

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	536 mA (9-V) 268 mA (18-V) 134 mA (36-V)	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	804 mA (9-V) 402 mA (18-V) 201 mA (36-V)	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMA1306 STANDARD WHITE

Applicable order codes: CMA1306-xxxx-xx0Cxxxxxxx (9-V), CMA1306-xxxx-xx0Fxxxxxxx (18-V), CMA1306-xxxx-xx0Nxxxxxxx (36-V)

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	771 mA (9-V) 385 mA (18-V) 193 mA (36-V)	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1156 mA (9-V) 578 mA (18-V) 289 mA (36-V)	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMA1516 STANDARD WHITE

Applicable order codes: CMA1516-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	560 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	840 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMA1825 STANDARD WHITE

Applicable order codes: CMA1825-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	731 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1067 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMA1840 STANDARD WHITE

Applicable order codes: CMA1840-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1206 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1644 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMA2550 STANDARD WHITE

Applicable order codes: CMA2550-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	2067 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	2818 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMA3090 STANDARD WHITE

Applicable order codes: CMA3090-xxxx-xx0Qxxxxxxx (48-V), CMA3090-xxxx-xx0Rxxxxxxx (72-V)

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	2400 mA (48-V) 1600 mA (72-V)	CMA3090 48-V Standard @ 105 °C, 2400 mA	3000 K	83	13	12,000 hrs	L90(12k) = 34,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	3300 mA (48-V) 2200 mA (72-V)	CMA3090 48-V @ 85 °C, 3300 mA	3000 K	83	13	12,000 hrs	L90(12k) = 30,100 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMB1304 STANDARD WHITE

Applicable order codes: CMB1304-xxxx-xx0Cxxxxxxx (9-V), CMB1304-xxxx-xx0Fxxxxxxx (18-V), CMB1304-xxxx-xx0Nxxxxxxx (36-V)

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	536 mA (9-V) 268 mA (18-V) 134 mA (36-V)	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	808 mA (9-V) 404 mA (18-V) 202 mA (36-V)	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMB1306 STANDARD WHITE

Applicable order codes: CMB1306-xxxx-xx0Fxxxxxxx (18-V), CMB1306-xxxx-xx0Nxxxxxxx (36-V)

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	538 mA (18-V) 269 mA (36-V)	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	806 mA (18-V) 403 mA (36-V)	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMB1507 STANDARD WHITE

Applicable order codes: CMB1507-xxxx-xx0Fxxxxxxx (18-V), CMB1507-xxxx-xx0Nxxxxxxx (36-V)

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	620 mA (18-V) 310 mA (36-V)	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	930 mA (18-V) 465 mA (36-V)	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMB1510 STANDARD WHITE

Applicable order codes: CMB1510-xxxx-xx0Fxxxxxxx (18-V), CMB1510-xxxx-xx0Nxxxxxxx (36-V)

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	930 mA (18-V) 465 mA (36-V)	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1394 mA (18-V) 697 mA (36-V)	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMB1516 STANDARD WHITE

Applicable order codes: CMB1516-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	602 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	889 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMB1818 STANDARD WHITE

Applicable order codes: CMB1818-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	721 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1069 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMB1825 STANDARD WHITE

Applicable order codes: CMB1825-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	831 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1133 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMB1840 STANDARD WHITE

Applicable order codes: CMB1840-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1108 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1511 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMB2550 STANDARD WHITE

Applicable order codes: CMB2550-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1662 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	2266 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMB3090 STANDARD WHITE

Applicable order codes: CMB3090-xxxx-xx0Qxxxxxxx (48-V), CMB3090-xxxx-xx0Rxxxxxxx (72-V)

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	2493 mA (48-V) 1662 mA (72-V)	CMA3090 48-V Standard @ 105 °C, 2400 mA	3000 K	83	13	12,000 hrs	L90(12k) = 34,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	3399 mA (48-V) 2266 mA (72-V)	CMA3090 48-V @ 85 °C, 3300 mA	3000 K	83	13	12,000 hrs	L90(12k) = 30,100 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMT1407 STANDARD WHITE

Applicable order codes: CMT1407-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	280 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	420 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMT1412 STANDARD WHITE

Applicable order codes: CMT1412-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	420 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	630 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMT1420 STANDARD WHITE

Applicable order codes: CMT1420-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	700 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1050 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMT1922 STANDARD WHITE

Applicable order codes: CMT1922-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	751 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1024 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMT1925 STANDARD WHITE

Applicable order codes: CMT1925-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	876 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1194 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMT1930 STANDARD WHITE

Applicable order codes: CMT1930-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1033 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1409 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMT1945 STANDARD WHITE

Applicable order codes: CMT1945-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1378 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1879 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMT2850 STANDARD WHITE

Applicable order codes: CMT2850-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	2239 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	3053 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMT2870 STANDARD WHITE

Applicable order codes: CMT2870-xxxx-xx0Pxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1894 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	2583 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMT2890 STANDARD WHITE

Applicable order codes: CMT2890-xxxx-xx0Pxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	2185 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	2980 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMU1003 STANDARD WHITE

Applicable order codes: CMU1003-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	137 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	205 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMU1006 STANDARD WHITE

Applicable order codes: CMU1006-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	274 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	410 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMU1010 STANDARD WHITE

Applicable order codes: CMU1010-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	410 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	615 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMU1013 STANDARD WHITE

Applicable order codes: CMU1013-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	547 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	821 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMU1516 STANDARD WHITE

Applicable order codes: CMU1516-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	684 mA	CMT1420 36-V @ 105 °C, 700 mA	3000 K	83	13	12,000 hrs	L90(12k) > 41,500 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1026 mA	CMT1420 36-V @ 85 °C, 1050 mA	2700 K	85	13	10,000 hrs	L90(10k) = 45,300 hrs L80(10k) > 55,000 hrs L70(10k) > 55,000 hrs

SUMMARY: XLAMP CMU1519 STANDARD WHITE

Applicable order codes: CMU1519-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	733 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1000 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMU1526 STANDARD WHITE

Applicable order codes: CMU1526-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	978 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1333 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMU1532 STANDARD WHITE

Applicable order codes: CMU1532-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1222 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1667 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMU2236 STANDARD WHITE

Applicable order codes: CMU2236-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1344 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	1833 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMU2239 STANDARD WHITE

Applicable order codes: CMU2239-xxxx-xx0Nxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1467 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	2000 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMU2258 STANDARD WHITE

Applicable order codes: CMU2258-xxxx-xx0Pxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	1467 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	2000 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

SUMMARY: XLAMP CMU2287 STANDARD WHITE

Applicable order codes: CMU2287-xxxx-xx0Pxxxxxxx

Nominal Case & Ambient Temp.	Drive Current	Tested Product & Data Set	ANSI CCT Target	Mean CRI	Sample Count	Test Duration	Reported TM-21 Lifetimes
105 °C	2200 mA	CMU2287 54-V Standard @ 105 °C, 2200 mA	2700 K	84	13	12,000 hrs	L90(12k) = 37,900 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs
85 °C	3000 mA	CMU2287 54-V Standard @ 85 °C, 3000 mA	2700 K	84	13	12,000 hrs	L90(12k) = 33,400 hrs L80(12k) > 66,000 hrs L70(12k) > 66,000 hrs

XLAMP CMT1420 36-V STANDARD @ 105 °C, 700 mA

General Test Information:

Description of air movement	Minimized
Relative humidity (RH) level	< 65%
Photometric measurement uncertainty	2.8% (95% confidence level)
Testing agency identification	SGS Taiwan Ltd., Optics Laboratory 33, Wu Chyuan Rd., New Taipei Industrial Park New Taipei City, Taiwan 24886
Testing agency third-party accreditation	Taiwan Accreditation Foundation (TAF) Accreditation Number: 2253
Test report authorization	Hank Shen, Asst. Supervisor
Sampling method	The CCT and CRI combinations of samples tested were chosen to provide maximum applicability under the ENERGY STAR LM-80 Guidelines. The results in this report represent the long-term performance of the CCT and CRI combinations tested, and may vary slightly for different CCT and CRI combinations.

Information Required by IES LM-80-15:

DUT Model Number	CMT1420-0000-000N0H0A30G
Description of DUT	LED array
Drive Current [I_F]	700 mA
Testing Start Date	February 15, 2017
Testing Completion Date	March 30, 2019
Nominal Case Temperature	105 °C
Nominal Ambient Temperature	105 °C
Test Equipment	Labsphere CDS 2100 / LMS-100 Integrating Sphere Agilent E3634A Power Supply Agilent U1242A Handheld Digital Multimeter
Failures observed	None

Additional Information Required by ENERGY STAR© 2017 Guidelines:

Nominal ANSI CCT Target	3000 K
Mean CRI	83
Mean Initial Forward Voltage	36.0 V
Average Input Power	25.2 W
Nominal LED Die Area	0.510 mm^2
Average Current per LED Die	140 mA
Average Current Density per LED Die	275 mA/mm^2
Average Power per LED Die	0.420 W
Average Power Density per LED Die	0.824 W/mm^2
Minimum Spacing from Die Edge to Die Edge	0.20 mm

XLAMP CMT1420 36-V STANDARD @ 105 °C, 700 mA

Other LEDs Represented by This Data Set (Per ENERGY STAR Sep 28, 2017 guidelines, Section 4.5.b.iv)

Tested Product	DUT Model Number	Tested Current	Average Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMT1420 36-V Standard	CMT1420-0000-000N0H0A30G	700 mA	25.2 W	60	0.20 mm	0.334 W/mm²	275 mA/mm²

Other Products	Applicable Order Codes	Scaled Current	Calc. Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMA1303 9-V Standard	CMA1303-xxxx-xx0Cxxxxxxx	536 mA	4.8 W	12	0.20 mm	0.171 W/mm²	275 mA/mm²
CMA1303 18-V Standard	CMA1303-xxxx-xx00Fxxxxxxx	268 mA	4.8 W	12	0.20 mm	0.171 W/mm²	275 mA/mm²
CMA1303 36-V Standard	CMA1303-xxxx-xx0Nxxxxxxx	134 mA	4.8 W	12	0.20 mm	0.171 W/mm²	275 mA/mm²
CMA1306 9-V Standard	CMA1306-xxxx-xx0Cxxxxxxx	771 mA	6.8 W	12	0.20 mm	0.239 W/mm²	275 mA/mm²
CMA1306 18-V Standard	CMA1306-xxxx-xx00Fxxxxxxx	385 mA	6.8 W	12	0.20 mm	0.239 W/mm²	275 mA/mm²
CMA1306 36-V Standard	CMA1306-xxxx-xx0Nxxxxxxx	193 mA	6.8 W	12	0.20 mm	0.239 W/mm²	275 mA/mm²
CMA1516 36-V Standard	CMA1516-xxxx-xx0Nxxxxxxx	560 mA	19.7 W	48	0.25 mm	0.310 W/mm²	275 mA/mm²
CMA1825 36-V Standard	CMA1825-xxxx-xx0Nxxxxxxx	731 mA	25.2 W	60	0.25 mm	0.223 W/mm²	208 mA/mm²
CMB1304 9-V Standard	CMB1304-xxxx-xx0Cxxxxxxx	536 mA	4.6 W	12	0.6 mm	0.292 W/mm²	274 mA/mm²
CMB1304 18-V Standard	CMB1304-xxxx-xx0Fxxxxxxx	268 mA	4.6 W	12	0.6 mm	0.292 W/mm²	274 mA/mm²
CMB1304 36-V Standard	CMB1304-xxxx-xx0Nxxxxxxx	134 mA	4.6 W	12	0.6 mm	0.292 W/mm²	274 mA/mm²
CMB1306 18-V Standard	CMB1306-xxxx-xx0Fxxxxxxx	538 mA	9.3 W	24	0.2 mm	0.329 W/mm²	275 mA/mm²
CMB1306 36-V Standard	CMB1306-xxxx-xx0Nxxxxxxx	269 mA	9.3 W	24	0.2 mm	0.329 W/mm²	275 mA/mm²
CMB1507 18-V Standard	CMB1507-xxxx-xx0Fxxxxxxx	620 mA	10.9 W	24	0.5 mm	0.171 W/mm²	275 mA/mm²
CMB1507 36-V Standard	CMB1507-xxxx-xx0Nxxxxxxx	310 mA	10.9 W	24	0.5 mm	0.171 W/mm²	275 mA/mm²
CMB1510 18-V Standard	CMB1510-xxxx-xx0Fxxxxxxx	930 mA	16.4 W	36	0.3 mm	0.258 W/mm²	275 mA/mm²
CMB1510 36-V Standard	CMB1510-xxxx-xx0Nxxxxxxx	465 mA	16.4 W	36	0.3 mm	0.258 W/mm²	275 mA/mm²
CMB1516 36-V Standard	CMB1516-xxxx-xx0Nxxxxxxx	602 mA	21.2 W	48	0.3 mm	0.334 W/mm²	267 mA/mm²
CMB1818 36-V Standard	CMB1818-xxxx-xx0Nxxxxxxx	721 mA	25.2 W	60	0.4 mm	0.223 W/mm²	256 mA/mm²
CMT1407 36-V Standard	CMT1407-xxxx-xx0Nxxxxxxx	280 mA	9.8 W	24	0.60 mm	0.130 W/mm²	275 mA/mm²
CMT1412 36-V Standard	CMT1412-xxxx-xx0Nxxxxxxx	420 mA	14.6 W	36	0.50 mm	0.194 W/mm²	275 mA/mm²
CMU1003 36-V Standard	CMU1003-xxxx-xx0Nxxxxxxx	137 mA	4.8 W	12	1.5 mm	0.064 W/mm²	275 mA/mm²
CMU1006 36-V Standard	CMU1006-xxxx-xx0Nxxxxxxx	274 mA	9.6 W	24	0.6 mm	0.127 W/mm²	275 mA/mm²
CMU1010 36-V Standard	CMU1010-xxxx-xx0Nxxxxxxx	410 mA	14.3 W	36	0.4 mm	0.190 W/mm²	275 mA/mm²
CMU1013 36-V Standard	CMU1013-xxxx-xx0Nxxxxxxx	547 mA	19.1 W	48	0.4 mm	0.253 W/mm²	275 mA/mm²
CMU1516 36-V Standard	CMU1516-xxxx-xx0Nxxxxxxx	684 mA	23.9 W	60	0.6 mm	0.145 W/mm²	275 mA/mm²

Notes:

- Please see the Reference Information for Array Scaling section for more product details and information on the scaling method.
- CMA1825 36-V Standard & CMB1818 36-V Standard scaled currents are limited by Calculated Power and not by a Power Density or Current Density limit.

XLAMP CMT1420 36-V STANDARD @ 105 °C, 700 mA

Test Results Summary

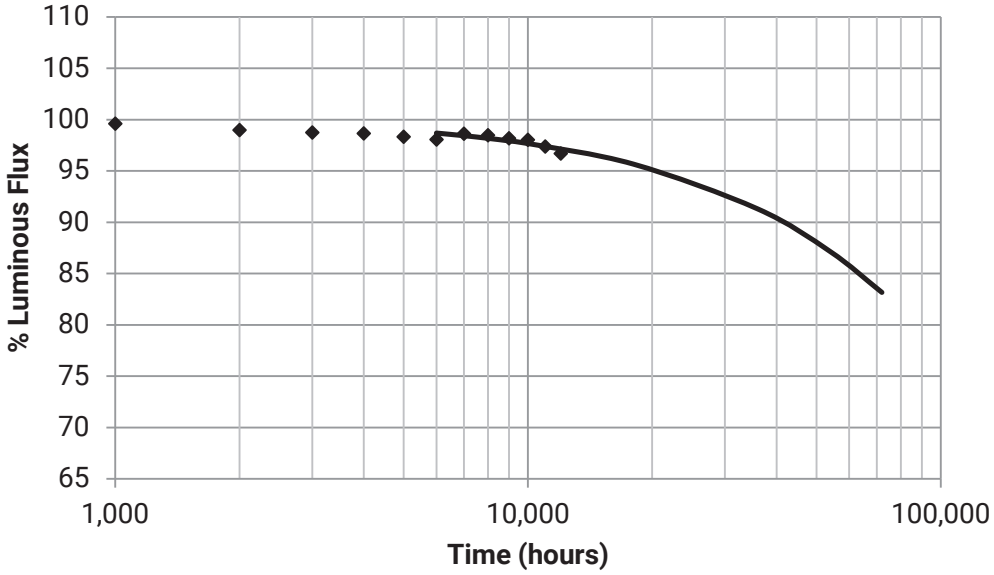
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)
0	100.00%	0.0000	0.0	0.0%
1000	99.60%	0.0004	0.0	0.0%
2000	98.99%	0.0005	0.0	0.4%
3000	98.73%	0.0007	0.1	0.4%
4000	98.64%	0.0005	0.0	0.4%
5000	98.33%	0.0006	0.1	0.5%
6000	98.07%	0.0007	0.2	0.6%
7000	98.63%	0.0006	0.1	0.8%
8000	98.48%	0.0004	0.1	0.6%
9000	98.18%	0.0006	0.3	0.8%
10000	98.04%	0.0004	0.3	1.1%
11000	97.39%	0.0004	0.2	1.0%
12000	96.68%	0.0007	0.1	1.2%

Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)

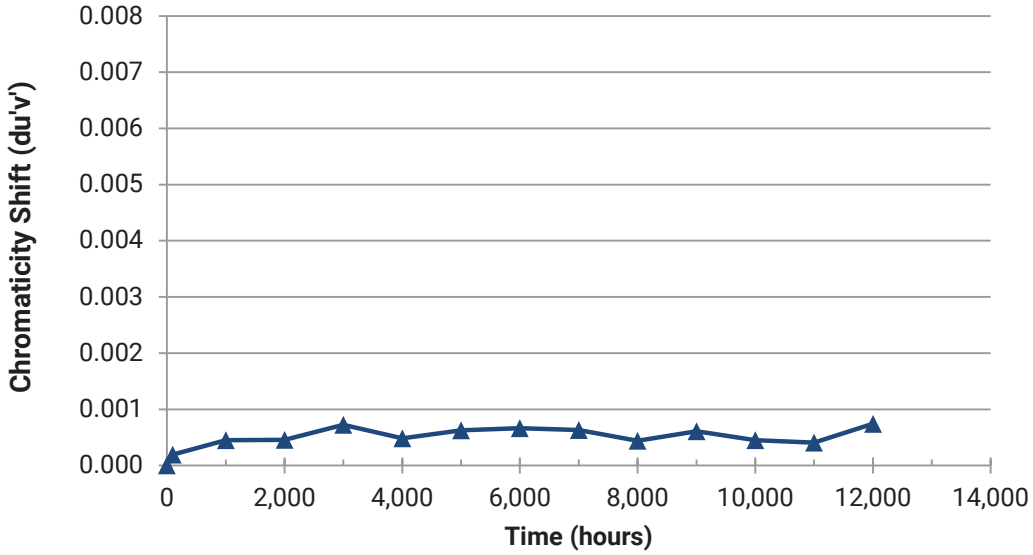
XLAMP CMT1420 36-V STANDARD @ 105 °C, 700 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	12,000 hours
Test duration used for projection	t=6,000 to t=12,000
α	2.593E-06
β	**1.002E+00**
Reported Lifetimes	**L90(12k) = 41,500 hours**
	L80(12k) > 66,000 hours
	L70(12k) > 66,000 hours



Color Shift Graph



XLAMP CMT1420 36-V STANDARD @ 105 °C, 700 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V_F (V)	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	2837	35.8	2993	3000	99.82	99.47	99.05	98.59	98.63	98.73	99.01	98.55	98.17	97.96	97.14	96.33
2	2820	35.9	2992	3000	99.01	98.16	97.73	98.12	97.98	97.94	98.90	98.19	97.70	97.70	96.77	95.99
3	2766	36.0	3000	3000	98.95	98.77	99.17	99.53	99.13	98.99	98.08	98.01	97.79	97.54	97.11	96.38
4	2829	36.1	2975	3000	99.86	98.90	98.55	98.02	97.88	97.21	97.88	97.81	97.63	97.81	97.17	96.50
5	2829	36.2	2969	3000	100.00	99.26	98.94	98.16	97.74	97.49	98.44	98.23	97.99	97.49	96.57	95.83
6	2816	36.1	2990	3000	99.40	98.93	98.54	99.15	98.19	98.05	98.26	98.08	97.90	97.76	96.98	96.20
7	2787	35.9	2922	3000	99.32	98.67	98.24	98.10	97.45	97.45	97.81	97.99	97.60	97.49	97.70	97.02
8	2785	35.8	2973	3000	99.75	99.25	99.03	98.42	97.99	98.03	98.74	99.10	98.85	99.10	98.53	97.85
9	2803	35.9	2972	3000	100.04	99.39	99.71	99.86	99.50	98.72	99.61	99.39	99.04	98.97	98.36	97.57
10	2840	36.2	2945	3000	99.44	98.66	98.42	97.96	98.70	98.17	98.87	98.31	97.82	97.64	96.90	96.09
11	2828	36.3	2958	3000	99.40	98.90	98.59	98.76	98.87	98.69	99.54	99.58	99.22	98.94	98.16	97.60
12	2855	36.2	2942	3000	99.93	99.58	98.95	98.84	98.04	97.48	98.46	98.35	98.21	97.86	96.95	96.36
13	2825	36.3	2941	3000	99.89	98.90	98.58	98.76	98.16	97.95	98.51	98.69	98.37	98.30	97.77	97.10
n	13	13.0	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**2817**	**36.0**	**2967**		**99.60**	**98.99**	**98.73**	**98.64**	**98.33**	**98.07**	**98.63**	**98.48**	**98.18**	**98.04**	**97.39**	**96.68**
Median	2825	36.1	2972		99.75	98.90	98.59	98.59	98.16	98.03	98.51	98.31	97.99	97.81	97.14	96.38
σ	25	0.2	24		0.37	0.39	0.49	0.60	0.59	0.57	0.56	0.56	0.55	0.59	0.64	0.67
Min.	2766	35.8	2922		98.95	98.16	97.73	97.96	97.45	97.21	97.81	97.81	97.60	97.49	96.57	95.83
Max.	2855	36.3	3000		100.04	99.58	99.71	99.86	99.50	98.99	99.61	99.58	99.22	99.10	98.53	97.85

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4410	0.4118	2993	3000	0.0001	0.0004	0.0011	0.0002	0.0007	0.0008	0.0006	0.0004	0.0007	0.0006	0.0003	0.0012
2	0.4408	0.4113	2992	3000	0.0007	0.0004	0.0008	0.0001	0.0003	0.0003	0.0003	0.0002	0.0007	0.0002	0.0002	0.0009
3	0.4408	0.4123	3000	3000	0.0011	0.0004	0.0011	0.0003	0.0007	0.0001	0.0003	0.0004	0.0005	0.0005	0.0005	0.0012
4	0.4423	0.4122	2975	3000	0.0011	0.0007	0.0010	0.0001	0.0005	0.0002	0.0002	0.0002	0.0003	0.0006	0.0005	0.0013
5	0.4424	0.4116	2969	3000	0.0009	0.0005	0.0008	0.0002	0.0003	0.0004	0.0003	0.0003	0.0006	0.0002	0.0002	0.0008
6	0.4410	0.4116	2990	3000	0.0003	0.0002	0.0002	0.0002	0.0004	0.0003	0.0004	0.0001	0.0005	0.0003	0.0003	0.0011
7	0.4471	0.4151	2922	3000	0.0004	0.0005	0.0008	0.0001	0.0004	0.0002	0.0003	0.0002	0.0004	0.0002	0.0002	0.0008
8	0.4424	0.4123	2973	3000	0.0001	0.0001	0.0001	0.0007	0.0007	0.0009	0.0008	0.0005	0.0008	0.0004	0.0004	0.0003
9	0.4426	0.4124	2972	3000	0.0002	0.0004	0.0004	0.0007	0.0007	0.0009	0.0008	0.0006	0.0005	0.0004	0.0004	0.0005
10	0.4453	0.4144	2945	3000	0.0002	0.0006	0.0002	0.0008	0.0010	0.0012	0.0011	0.0007	0.0006	0.0008	0.0007	0.0002
11	0.4437	0.4131	2958	3000	0.0003	0.0004	0.0005	0.0016	0.0011	0.0015	0.0014	0.0011	0.0011	0.0010	0.0010	0.0003
12	0.4446	0.4127	2942	3000	0.0001	0.0007	0.0018	0.0007	0.0007	0.0009	0.0009	0.0004	0.0007	0.0004	0.0004	0.0005
13	0.4451	0.4135	2941	3000	0.0002	0.0006	0.0005	0.0007	0.0007	0.0009	0.0008	0.0005	0.0004	0.0003	0.0002	0.0006
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4430**	**0.4126**	**2967**		**0.0004**	**0.0005**	**0.0007**	**0.0005**	**0.0006**	**0.0007**	**0.0006**	**0.0004**	**0.0006**	**0.0004**	**0.0004**	**0.0007**
Median	0.4424	0.4123	2972		0.0003	0.0004	0.0008	0.0003	0.0007	0.0008	0.0006	0.0004	0.0006	0.0004	0.0004	0.0008
σ	0.0020	0.0011	24		0.0004	0.0002	0.0005	0.0004	0.0002	0.0004	0.0004	0.0003	0.0002	0.0002	0.0002	0.0004
Min.	0.4408	0.4113	2922		0.0001	0.0001	0.0001	0.0001	0.0003	0.0001	0.0002	0.0001	0.0003	0.0002	0.0002	0.0002
Max.	0.4471	0.4151	3000		0.0011	0.0007	0.0018	0.0016	0.0011	0.0015	0.0014	0.0011	0.0011	0.0010	0.0010	0.0013

XLAMP CMT1420 36-V STANDARD @ 105 °C, 700 mA

Lamp #	Initial (0 hrs)				Chromaticity (CCx)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4410	0.4118	2993	3000	0.4410	0.4405	0.4399	0.4411	0.4419	0.4424	0.4415	0.4418	0.4422	0.4401	0.4405	0.4388
2	0.4408	0.4113	2992	3000	0.4395	0.4401	0.4395	0.4410	0.4407	0.4413	0.4410	0.4411	0.4420	0.4404	0.4405	0.4392
3	0.4408	0.4123	3000	3000	0.4388	0.4404	0.4389	0.4404	0.4397	0.4406	0.4402	0.4401	0.4406	0.4398	0.4400	0.4385
4	0.4423	0.4122	2975	3000	0.4403	0.4413	0.4405	0.4424	0.4417	0.4423	0.4421	0.4420	0.4427	0.4412	0.4413	0.4399
5	0.4424	0.4116	2969	3000	0.4408	0.4415	0.4411	0.4427	0.4422	0.4430	0.4427	0.4429	0.4434	0.4420	0.4421	0.4410
6	0.4410	0.4116	2990	3000	0.4404	0.4406	0.4412	0.4410	0.4408	0.4413	0.4412	0.4411	0.4408	0.4405	0.4404	0.4390
7	0.4471	0.4151	2922	3000	0.4464	0.4465	0.4456	0.4470	0.4468	0.4475	0.4473	0.4468	0.4478	0.4467	0.4468	0.4456
8	0.4424	0.4123	2973	3000	0.4424	0.4426	0.4422	0.4435	0.4434	0.4440	0.4437	0.4430	0.4425	0.4430	0.4431	0.4419
9	0.4426	0.4124	2972	3000	0.4423	0.4430	0.4419	0.4436	0.4434	0.4440	0.4437	0.4426	0.4421	0.4430	0.4430	0.4418
10	0.4453	0.4144	2945	3000	0.4450	0.4446	0.4449	0.4465	0.4465	0.4473	0.4471	0.4460	0.4457	0.4465	0.4465	0.4451
11	0.4437	0.4131	2958	3000	0.4433	0.4432	0.4446	0.4466	0.4455	0.4464	0.4462	0.4458	0.4450	0.4454	0.4456	0.4443
12	0.4446	0.4127	2942	3000	0.4444	0.4434	0.4420	0.4435	0.4455	0.4460	0.4460	0.4449	0.4446	0.4449	0.4452	0.4437
13	0.4451	0.4135	2941	3000	0.4448	0.4442	0.4456	0.4462	0.4458	0.4466	0.4462	0.4450	0.4456	0.4456	0.4455	0.4441
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4430**	**0.4126**	**2967**		**0.4423**	**0.4425**	**0.4421**	**0.4435**	**0.4434**	**0.4441**	**0.4438**	**0.4433**	**0.4435**	**0.4430**	**0.4431**	**0.4418**
Median	0.4424	0.4123	2972		0.4423	0.4426	0.4419	0.4435	0.4434	0.4440	0.4437	0.4429	0.4427	0.4430	0.4430	0.4418
σ	0.0020	0.0011	24		0.0024	0.0019	0.0023	0.0024	0.0024	0.0025	0.0025	0.0022	0.0021	0.0025	0.0025	0.0026
Min.	0.4408	0.4113	2922		0.4388	0.4401	0.4389	0.4404	0.4397	0.4406	0.4402	0.4401	0.4406	0.4398	0.4400	0.4385
Max.	0.4471	0.4151	3000		0.4464	0.4465	0.4456	0.4470	0.4468	0.4475	0.4473	0.4468	0.4478	0.4467	0.4468	0.4456

Lamp #	Initial (0 hrs)				Chromaticity (CCy)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4410	0.4118	2993	3000	0.4117	0.4121	0.4128	0.4122	0.4116	0.4121	0.4112	0.4121	0.4123	0.4106	0.4113	0.4102
2	0.4408	0.4113	2992	3000	0.4109	0.4106	0.4110	0.4116	0.4108	0.4114	0.4110	0.4118	0.4123	0.4110	0.4112	0.4106
3	0.4408	0.4123	3000	3000	0.4116	0.4115	0.4118	0.4124	0.4110	0.4121	0.4117	0.4121	0.4131	0.4118	0.4121	0.4111
4	0.4423	0.4122	2975	3000	0.4114	0.4122	0.4116	0.4125	0.4112	0.4119	0.4117	0.4122	0.4129	0.4115	0.4117	0.4111
5	0.4424	0.4116	2969	3000	0.4112	0.4112	0.4114	0.4119	0.4109	0.4117	0.4113	0.4122	0.4126	0.4112	0.4114	0.4109
6	0.4410	0.4116	2990	3000	0.4113	0.4113	0.4115	0.4113	0.4108	0.4113	0.4111	0.4117	0.4124	0.4112	0.4113	0.4105
7	0.4471	0.4151	2922	3000	0.4148	0.4154	0.4146	0.4150	0.4143	0.4152	0.4148	0.4148	0.4160	0.4148	0.4150	0.4145
8	0.4424	0.4123	2973	3000	0.4121	0.4123	0.4120	0.4125	0.4121	0.4127	0.4124	0.4120	0.4137	0.4124	0.4124	0.4119
9	0.4426	0.4124	2972	3000	0.4120	0.4121	0.4116	0.4123	0.4119	0.4124	0.4122	0.4113	0.4129	0.4121	0.4121	0.4115
10	0.4453	0.4144	2945	3000	0.4139	0.4148	0.4141	0.4144	0.4139	0.4149	0.4145	0.4139	0.4157	0.4144	0.4146	0.4139
11	0.4437	0.4131	2958	3000	0.4126	0.4133	0.4138	0.4148	0.4134	0.4143	0.4141	0.4141	0.4155	0.4137	0.4141	0.4135
12	0.4446	0.4127	2942	3000	0.4124	0.4123	0.4130	0.4127	0.4123	0.4128	0.4127	0.4122	0.4140	0.4123	0.4128	0.4121
13	0.4451	0.4135	2941	3000	0.4131	0.4136	0.4146	0.4137	0.4129	0.4138	0.4134	0.4125	0.4134	0.4136	0.4136	0.4131
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4430**	**0.4126**	**2967**		**0.4122**	**0.4125**	**0.4126**	**0.4129**	**0.4121**	**0.4128**	**0.4125**	**0.4125**	**0.4136**	**0.4124**	**0.4126**	**0.4119**
Median	0.4424	0.4123	2972		0.4120	0.4122	0.4120	0.4125	0.4119	0.4124	0.4122	0.4122	0.4131	0.4121	0.4121	0.4115
σ	0.0020	0.0011	24		0.0011	0.0014	0.0013	0.0012	0.0012	0.0013	0.0013	0.0010	0.0013	0.0014	0.0013	0.0014
Min.	0.4408	0.4113	2922		0.4109	0.4106	0.4110	0.4113	0.4108	0.4113	0.4110	0.4113	0.4123	0.4106	0.4112	0.4102
Max.	0.4471	0.4151	3000		0.4148	0.4154	0.4146	0.4150	0.4143	0.4152	0.4148	0.4148	0.4160	0.4148	0.4150	0.4145

XLAMP CMT1420 36-V STANDARD @ 85 °C, 1050 mA

General Test Information:

Description of air movement	For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow.
Relative humidity (RH) level	< 65%
Photometric measurement uncertainty	The uncertainty of the light output measurements is U=1.59% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level.
Testing agency identification	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1st Road, Tangxia Town Dongguan, Guangdong, China.
Testing agency third-party accreditation	IAS TL-460
Sampling method	The CCT and CRI combinations of samples tested were chosen to provide maximum applicability under the ENERGY STAR LM-80 Guidelines. The results in this report represent the long-term performance of the CCT and CRI combinations tested, and may vary slightly for different CCT and CRI combinations.

Information Required by IES LM-80-15:

DUT Model Number	CMT1420-0000-000N0H0A27G
Description of DUT	LED array
Drive Current [I_F]	1050 mA
Testing Start Date	February 19, 2021
Testing Completion Date	September 28, 2022
Nominal Case Temperature	85 °C
Nominal Ambient Temperature	85 °C
Test Equipment	Everfine AIS-2 integrating sphere Everfine LTS-300 LED test source Everfine HAAS-2000 high accuracy array spectroradiometer BACL B3-900 multilayer aging machine Everfine WY5015 power supply
Failures observed	None

Additional Information Required by ENERGY STAR© 2017 Guidelines:

Nominal ANSI CCT Target	2700 K
Mean CRI	85
Mean Initial Forward Voltage	37.1 V
Average Input Power	39.0 W
Nominal LED Die Area	0.510 mm^2
Average Current per LED Die	210 mA
Average Current Density per LED Die	412 mA/mm^2
Average Power per LED Die	0.650 W
Average Power Density per LED Die	1.274 W/mm^2
Minimum Spacing from Die Edge to Die Edge	0.2 mm

XLAMP CMT1420 36-V STANDARD @ 85 °C, 1050 mA

Other LEDs Represented by This Data Set (Per ENERGY STAR Sep 28, 2017 guidelines, Section 4.5.b.iv)

Tested Product	DUT Model Number	Tested Current	Average Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMT1420 36-V Standard	CMT1420-0000-000N0H0A30G	1050 mA	39.0 W	60	0.2 mm	0.516 W/mm²	412 mA/mm²

Other Products	Applicable Order Codes	Scaled Current	Calc. Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMA1303 9-V Standard	CMA1303-xxxx-xx0Cxxxxxxx	804 mA	7.7 W	12	0.20 mm	0.272 W/mm²	412 mA/mm²
CMA1303 18-V Standard	CMA1303-xxxx-xx0Fxxxxxxx	402 mA	7.7 W	12	0.20 mm	0.272 W/mm²	412 mA/mm²
CMA1303 36-V Standard	CMA1303-xxxx-xx0Nxxxxxxx	201 mA	7.7 W	12	0.20 mm	0.272 W/mm²	412 mA/mm²
CMA1306 9-V Standard	CMA1306-xxxx-xx0Cxxxxxxx	1156 mA	10.8 W	12	0.20 mm	0.380 W/mm²	412 mA/mm²
CMA1306 18-V Standard	CMA1306-xxxx-xx0Fxxxxxxx	578 mA	10.8 W	12	0.20 mm	0.380 W/mm²	412 mA/mm²
CMA1306 36-V Standard	CMA1306-xxxx-xx0Nxxxxxxx	289 mA	10.8 W	12	0.20 mm	0.380 W/mm²	412 mA/mm²
CMA1516 36-V Standard	CMA1516-xxxx-xx0Nxxxxxxx	840 mA	31.3 W	48	0.25 mm	0.492 W/mm²	412 mA/mm²
CMA1825 36-V Standard	CMA1825-xxxx-xx0Nxxxxxxx	1067 mA	39.0 W	60	0.25 mm	0.357 W/mm²	304 mA/mm²
CMB1304 9-V Standard	CMB1304-xxxx-xx0Cxxxxxxx	808 mA	7.3 W	12	0.6 mm	0.463 W/mm²	412 mA/mm²
CMB1304 18-V Standard	CMB1304-xxxx-xx0Fxxxxxxx	404 mA	7.3 W	12	0.6 mm	0.463 W/mm²	412 mA/mm²
CMB1304 36-V Standard	CMB1304-xxxx-xx0Nxxxxxxx	202 mA	7.3 W	12	0.6 mm	0.463 W/mm²	412 mA/mm²
CMB1306 18-V Standard	CMB1306-xxxx-xx0Fxxxxxxx	806 mA	14.6 W	24	0.2 mm	0.516 W/mm²	412 mA/mm²
CMB1306 36-V Standard	CMB1306-xxxx-xx0Nxxxxxxx	403 mA	14.6 W	24	0.2 mm	0.516 W/mm²	412 mA/mm²
CMB1507 18-V Standard	CMB1507-xxxx-xx0Fxxxxxxx	930 mA	17.1 W	24	0.5 mm	0.269 W/mm²	412 mA/mm²
CMB1507 36-V Standard	CMB1507-xxxx-xx0Nxxxxxxx	465 mA	17.1 W	24	0.5 mm	0.269 W/mm²	412 mA/mm²
CMB1510 18-V Standard	CMB1510-xxxx-xx0Fxxxxxxx	1394 mA	25.7 W	36	0.3 mm	0.404 W/mm²	412 mA/mm²
CMB1510 36-V Standard	CMB1510-xxxx-xx0Nxxxxxxx	697 mA	25.7 W	36	0.3 mm	0.404 W/mm²	412 mA/mm²
CMB1516 36-V Standard	CMB1516-xxxx-xx0Nxxxxxxx	889 mA	32.9 W	48	0.3 mm	0.516 W/mm²	394 mA/mm²
CMB1818 36-V Standard	CMB1818-xxxx-xx0Nxxxxxxx	1069 mA	39.0 W	60	0.4 mm	0.344 W/mm²	379 mA/mm²
CMT1407 36-V Standard	CMT1407-xxxx-xx0Nxxxxxxx	420 mA	15.6 W	24	0.60 mm	0.207 W/mm²	412 mA/mm²
CMT1412 36-V Standard	CMT1412-xxxx-xx0Nxxxxxxx	630 mA	23.2 W	36	0.50 mm	0.308 W/mm²	412 mA/mm²
CMU1003 36-V Standard	CMU1003-xxxx-xx0Nxxxxxxx	205 mA	7.5 W	12	1.5 mm	0.100 W/mm²	412 mA/mm²
CMU1006 36-V Standard	CMU1006-xxxx-xx0Nxxxxxxx	410 mA	15.0 W	24	0.6 mm	0.199 W/mm²	412 mA/mm²
CMU1010 36-V Standard	CMU1010-xxxx-xx0Nxxxxxxx	615 mA	22.5 W	36	0.4 mm	0.298 W/mm²	412 mA/mm²
CMU1013 36-V Standard	CMU1013-xxxx-xx0Nxxxxxxx	821 mA	30.1 W	48	0.4 mm	0.399 W/mm²	412 mA/mm²
CMU1516 36-V Standard	CMU1516-xxxx-xx0Nxxxxxxx	1026 mA	37.6 W	60	0.6 mm	0.228 W/mm²	412 mA/mm²

Notes:

- Please see the Reference Information for Array Scaling section for more product details and information on the scaling method.
- CMA1825 36-V Standard & CMB1818 36-V Standard scaled currents are limited by Calculated Power and not by a Power Density or Current Density limit.

XLAMP CMT1420 36-V STANDARD @ 85 °C, 1050 mA

Test Results Summary

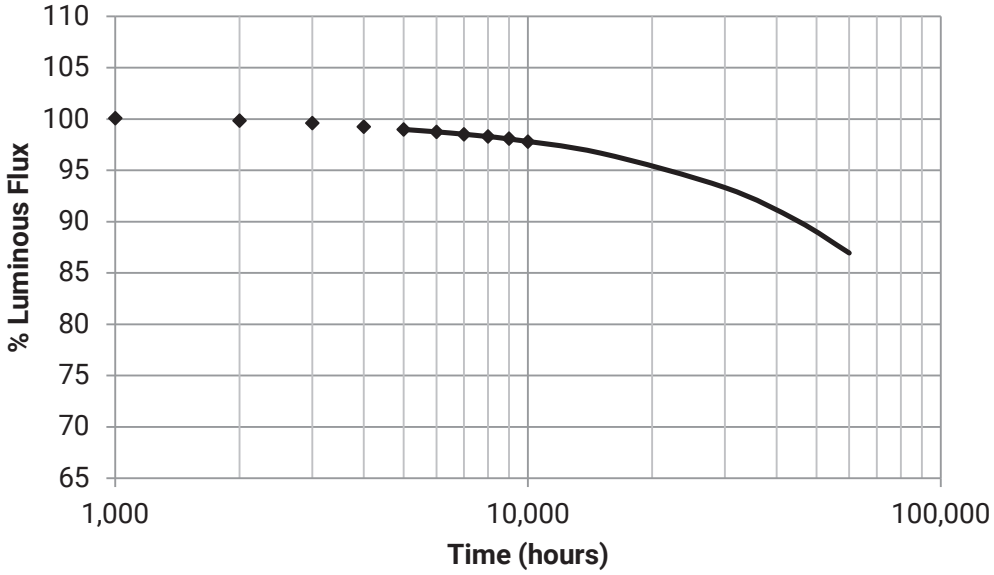
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)
0	100.00%	0.0000	0.0	0.0%
1000	100.08%	0.0013	-0.1	-0.4%
2000	99.83%	0.0011	-0.1	-0.2%
3000	99.60%	0.0012	-0.1	-0.1%
4000	99.26%	0.0013	-0.3	-0.6%
5000	98.98%	0.0013	-0.3	-0.4%
6000	98.75%	0.0013	-0.4	-0.5%
7000	98.50%	0.0013	0.8	0.1%
8000	98.29%	0.0013	0.8	0.1%
9000	98.08%	0.0011	0.9	0.3%
10000	97.80%	0.0011	0.8	0.2%

Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)

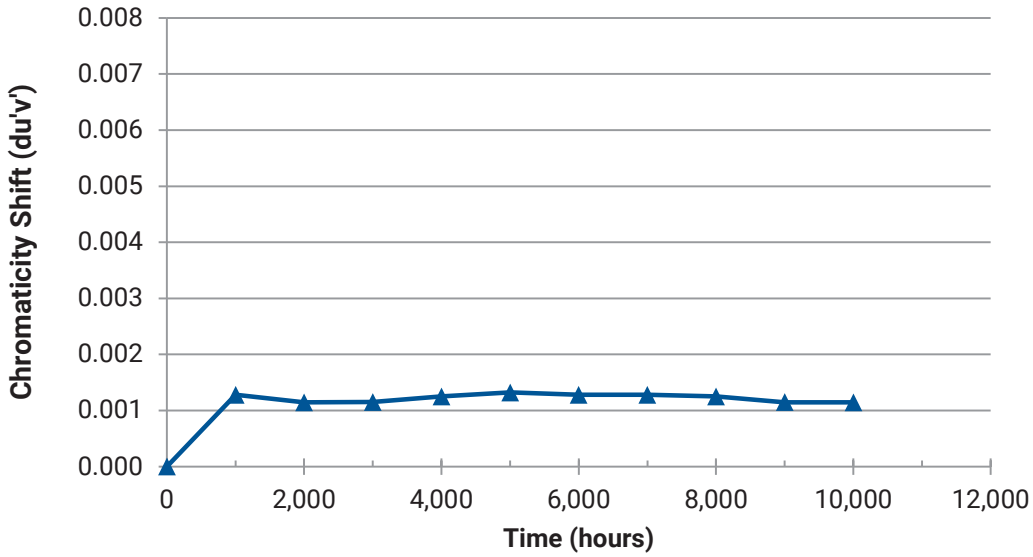
XLAMP CMT1420 36-V STANDARD @ 85 °C, 1050 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	10,000 hours
Test duration used for projection	t=5,000 to t=10,000
α	2.358E-06
β	1.002E+00
Reported Lifetimes	L90(10k) = 45,300 hrs
	L80(10k) > 55,000 hrs
	L70(10k) > 55,000 hrs



Color Shift Graph



XLAMP CMT1420 36-V STANDARD @ 85 °C, 1050 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)									
	LF (lm)	V_F (V)	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
1	5435	37.1	2741	2700	100.35	99.98	99.89	99.76	99.19	99.02	98.75	98.42	98.05	97.99
2	5448	37.3	2763	2700	99.80	99.50	99.34	98.73	98.42	98.04	97.61	97.38	96.86	96.70
3	5448	37.1	2769	2700	99.58	99.10	98.95	98.75	98.48	98.29	98.11	97.89	97.74	97.63
4	5353	37.2	2779	2700	100.17	99.96	99.68	99.31	99.08	98.88	98.51	98.26	98.15	97.80
5	5419	37.2	2750	2700	99.34	99.30	98.86	98.75	98.27	97.88	97.45	97.43	97.38	96.94
6	5425	37.3	2753	2700	99.82	99.63	99.50	99.02	98.88	98.60	98.10	97.99	97.70	97.22
7	5329	37.1	2758	2700	100.58	100.47	100.41	100.02	99.89	99.61	99.49	99.10	98.56	98.37
8	5260	37.1	2746	2700	100.48	100.23	99.90	99.70	99.54	99.39	99.26	98.78	98.59	98.31
9	5366	37.2	2743	2700	99.74	99.31	98.79	98.17	97.88	97.54	97.30	97.02	96.79	96.50
10	5389	37.2	2746	2700	100.35	100.07	99.85	99.59	99.42	99.35	99.11	99.02	98.91	98.59
11	5368	37.1	2759	2700	99.98	99.66	99.37	99.01	98.92	98.85	98.68	98.62	98.55	98.17
12	5351	37.0	2763	2700	100.62	100.54	100.41	100.02	99.48	99.40	99.36	99.22	99.18	98.86
13	5274	37.1	2728	2700	100.19	100.08	99.79	99.49	99.26	98.86	98.71	98.62	98.54	98.39
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**5374**	**37.1**	**2754**		**100.08**	**99.83**	**99.60**	**99.26**	**98.98**	**98.75**	**98.50**	**98.29**	**98.08**	**97.80**
Median	5368	37.1	2753		100.17	99.96	99.68	99.31	99.08	98.86	98.68	98.42	98.15	97.99
σ	62	0.1	13		0.40	0.46	0.53	0.57	0.58	0.65	0.73	0.70	0.75	0.76
Min.	5260	37.0	2728		99.34	99.10	98.79	98.17	97.88	97.54	97.30	97.02	96.79	96.50
Max.	5448	37.3	2779		100.62	100.54	100.41	100.02	99.89	99.61	99.49	99.22	99.18	98.86

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')									
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
1	0.4579	0.4123	2741	2700	0.0011	0.0012	0.0009	0.0004	0.0002	0.0003	0.0005	0.0005	0.0009	0.0009
2	0.4555	0.4109	2763	2700	0.0018	0.0014	0.0016	0.0019	0.0018	0.0018	0.0017	0.0017	0.0013	0.0012
3	0.4558	0.4121	2769	2700	0.0010	0.0008	0.0009	0.0009	0.0010	0.0009	0.0010	0.0008	0.0005	0.0007
4	0.4544	0.4108	2779	2700	0.0019	0.0015	0.0015	0.0022	0.0026	0.0024	0.0022	0.0021	0.0018	0.0018
5	0.4573	0.4123	2750	2700	0.0015	0.0012	0.0011	0.0021	0.0022	0.0020	0.0018	0.0018	0.0016	0.0015
6	0.4567	0.4117	2753	2700	0.0020	0.0017	0.0016	0.0017	0.0016	0.0016	0.0016	0.0016	0.0014	0.0014
7	0.4565	0.4120	2758	2700	0.0010	0.0011	0.0010	0.0013	0.0015	0.0015	0.0014	0.0013	0.0011	0.0011
8	0.4565	0.4102	2746	2700	0.0003	0.0002	0.0003	0.0006	0.0005	0.0004	0.0005	0.0005	0.0006	0.0005
9	0.4577	0.4121	2743	2700	0.0017	0.0020	0.0021	0.0012	0.0014	0.0016	0.0017	0.0018	0.0020	0.0021
10	0.4571	0.4116	2746	2700	0.0002	0.0002	0.0004	0.0004	0.0005	0.0004	0.0002	0.0004	0.0003	0.0002
11	0.4559	0.4110	2759	2700	0.0009	0.0006	0.0005	0.0009	0.0011	0.0009	0.0009	0.0008	0.0005	0.0004
12	0.4555	0.4109	2763	2700	0.0009	0.0007	0.0006	0.0009	0.0011	0.0011	0.0011	0.0009	0.0008	0.0007
13	0.4587	0.4120	2728	2700	0.0024	0.0022	0.0025	0.0017	0.0017	0.0017	0.0020	0.0019	0.0022	0.0022
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4566**	**0.4115**	**2754**		**0.0013**	**0.0011**	**0.0012**	**0.0013**	**0.0013**	**0.0013**	**0.0013**	**0.0013**	**0.0011**	**0.0011**
Median	0.4565	0.4117	2753		0.0011	0.0012	0.0010	0.0012	0.0014	0.0015	0.0014	0.0013	0.0011	0.0011
σ	0.0012	0.0007	13		0.0007	0.0006	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006
Min.	0.4544	0.4102	2728		0.0002	0.0002	0.0003	0.0004	0.0002	0.0003	0.0002	0.0004	0.0003	0.0002
Max.	0.4587	0.4123	2779		0.0024	0.0022	0.0025	0.0022	0.0026	0.0024	0.0022	0.0021	0.0022	0.0022

XLAMP CMT1420 36-V STANDARD @ 85 °C, 1050 mA

Lamp #	Initial (0 hrs)				Chromaticity (CCx)									
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
1	0.4579	0.4123	2741	2700	0.4560	0.4557	0.4564	0.4573	0.4576	0.4575	0.4570	0.4570	0.4562	0.4562
2	0.4555	0.4109	2763	2700	0.4588	0.4580	0.4584	0.4591	0.4589	0.4589	0.4587	0.4587	0.4579	0.4578
3	0.4558	0.4121	2769	2700	0.4566	0.4556	0.4562	0.4570	0.4574	0.4572	0.4571	0.4569	0.4564	0.4566
4	0.4544	0.4108	2779	2700	0.4578	0.4570	0.4570	0.4585	0.4591	0.4589	0.4585	0.4584	0.4578	0.4578
5	0.4573	0.4123	2750	2700	0.4598	0.4594	0.4592	0.4611	0.4614	0.4609	0.4604	0.4604	0.4598	0.4596
6	0.4567	0.4117	2753	2700	0.4582	0.4574	0.4573	0.4585	0.4583	0.4581	0.4580	0.4584	0.4578	0.4580
7	0.4565	0.4120	2758	2700	0.4582	0.4580	0.4582	0.4587	0.4591	0.4593	0.4590	0.4589	0.4586	0.4586
8	0.4565	0.4102	2746	2700	0.4560	0.4563	0.4561	0.4575	0.4572	0.4569	0.4570	0.4567	0.4566	0.4564
9	0.4577	0.4121	2743	2700	0.4544	0.4540	0.4538	0.4554	0.4550	0.4548	0.4545	0.4542	0.4540	0.4537
10	0.4571	0.4116	2746	2700	0.4568	0.4568	0.4577	0.4579	0.4580	0.4578	0.4575	0.4577	0.4572	0.4573
11	0.4559	0.4110	2759	2700	0.4572	0.4569	0.4567	0.4575	0.4579	0.4576	0.4576	0.4574	0.4569	0.4566
12	0.4555	0.4109	2763	2700	0.4569	0.4565	0.4564	0.4572	0.4575	0.4575	0.4575	0.4573	0.4570	0.4569
13	0.4587	0.4120	2728	2700	0.4544	0.4546	0.4541	0.4557	0.4558	0.4557	0.4553	0.4554	0.4551	0.4549
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4566**	**0.4115**	**2754**		**0.4570**	**0.4566**	**0.4567**	**0.4578**	**0.4580**	**0.4578**	**0.4576**	**0.4575**	**0.4570**	**0.4570**
Median	0.4565	0.4117	2753		0.4569	0.4568	0.4567	0.4575	0.4579	0.4576	0.4575	0.4574	0.4570	0.4569
σ	0.0012	0.0007	13		0.0016	0.0015	0.0016	0.0015	0.0016	0.0016	0.0015	0.0016	0.0015	0.0015
Min.	0.4544	0.4102	2728		0.4544	0.4540	0.4538	0.4554	0.4550	0.4548	0.4545	0.4542	0.4540	0.4537
Max.	0.4587	0.4123	2779		0.4598	0.4594	0.4592	0.4611	0.4614	0.4609	0.4604	0.4604	0.4598	0.4596

Lamp #	Initial (0 hrs)				Chromaticity (CCy)									
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
1	0.4579	0.4123	2741	2700	0.4104	0.4103	0.4108	0.4118	0.4119	0.4117	0.4113	0.4113	0.4111	0.4111
2	0.4555	0.4109	2763	2700	0.4125	0.4120	0.4123	0.4131	0.4132	0.4130	0.4130	0.4128	0.4125	0.4126
3	0.4558	0.4121	2769	2700	0.4110	0.4106	0.4109	0.4119	0.4122	0.4121	0.4118	0.4119	0.4118	0.4117
4	0.4544	0.4108	2779	2700	0.4121	0.4113	0.4116	0.4129	0.4131	0.4132	0.4131	0.4129	0.4126	0.4126
5	0.4573	0.4123	2750	2700	0.4150	0.4144	0.4144	0.4158	0.4159	0.4159	0.4158	0.4158	0.4155	0.4153
6	0.4567	0.4117	2753	2700	0.4095	0.4093	0.4094	0.4105	0.4103	0.4101	0.4102	0.4105	0.4102	0.4104
7	0.4565	0.4120	2758	2700	0.4122	0.4117	0.4122	0.4128	0.4129	0.4131	0.4132	0.4130	0.4131	0.4131
8	0.4565	0.4102	2746	2700	0.4102	0.4103	0.4104	0.4114	0.4112	0.4111	0.4113	0.4112	0.4112	0.4110
9	0.4577	0.4121	2743	2700	0.4097	0.4099	0.4097	0.4109	0.4105	0.4106	0.4105	0.4103	0.4104	0.4103
10	0.4571	0.4116	2746	2700	0.4111	0.4111	0.4116	0.4120	0.4120	0.4118	0.4119	0.4124	0.4121	0.4120
11	0.4559	0.4110	2759	2700	0.4107	0.4111	0.4109	0.4114	0.4118	0.4119	0.4119	0.4120	0.4116	0.4115
12	0.4555	0.4109	2763	2700	0.4111	0.4107	0.4108	0.4115	0.4117	0.4117	0.4117	0.4118	0.4119	0.4116
13	0.4587	0.4120	2728	2700	0.4103	0.4104	0.4101	0.4113	0.4115	0.4113	0.4112	0.4112	0.4113	0.4111
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4566**	**0.4115**	**2754**		**0.4112**	**0.4110**	**0.4112**	**0.4121**	**0.4122**	**0.4121**	**0.4121**	**0.4121**	**0.4120**	**0.4119**
Median	0.4565	0.4117	2753		0.4110	0.4107	0.4109	0.4118	0.4119	0.4118	0.4118	0.4119	0.4118	0.4116
σ	0.0012	0.0007	13		0.0015	0.0012	0.0013	0.0013	0.0014	0.0015	0.0015	0.0014	0.0013	0.0013
Min.	0.4544	0.4102	2728		0.4095	0.4093	0.4094	0.4105	0.4103	0.4101	0.4102	0.4103	0.4102	0.4103
Max.	0.4587	0.4123	2779		0.4150	0.4144	0.4144	0.4158	0.4159	0.4159	0.4158	0.4158	0.4155	0.4153

XLAMP CMA3090 48-V STANDARD @ 105 °C, 2400 mA

General Test Information:

Description of air movement	For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow.
Relative humidity (RH) level	< 65%
Photometric measurement uncertainty	The uncertainty of the light output measurements is U=1.59% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level.
Testing agency identification	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.
Testing agency third-party accreditation	IAS TL-460
Sampling method	The CCT and CRI combinations of samples tested were chosen to provide maximum applicability under the ENERGY STAR LM-80 Guidelines. The results in this report represent the long-term performance of the CCT and CRI combinations tested, and may vary slightly for different CCT and CRI combinations.

Information Required by IES LM-80-15:

DUT Model Number	CMA3090-0000-000Q0H0A30G
Description of DUT	LED array
Drive Current [I_F]	2400 mA
Testing Start Date	April 4, 2018
Testing Completion Date	October 11, 2019
Nominal Case Temperature	105 °C
Nominal Ambient Temperature	105 °C
Test Equipment	SENSING SCD-20008 integrating sphere Hanshenpuyuan HSPY-100-05 DC power supply BACL B25001 DC power supply BACL B3-900 Multilayer aging machine Keithley 2612A DC power supply
Failures observed	None

Additional Information Required by ENERGY STAR© 2017 Guidelines:

Nominal ANSI CCT Target	3000 K
Mean CRI	83
Mean Initial Forward Voltage	48.82 V
Average Input Power	117 W
Nominal LED Die Area	0.702 mm^2
Average Current per LED Die	160 mA
Average Current Density per LED Die	228 mA/mm^2
Average Power per LED Die	0.488 W
Average Power Density per LED Die	0.695 W/mm^2
Minimum Spacing from Die Edge to Die Edge	0.30 mm

XLAMP CMA3090 48-V STANDARD @ 105 °C, 2400 mA

Other LEDs Represented by This Data Set (Per ENERGY STAR Sep 28, 2017 guidelines, Section 4.5.b.iv)

Tested Product	DUT Model Number	Tested Current	Average Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMA3090 48-V Standard	CMA3090-0000-000Q0H0A30G	2400 mA	117 W	240	0.30 mm	0.282 W/mm^2	228 mA/mm^2

Other Products	Applicable Order Codes	Scaled Current	Calc. Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMA1840 36-V Standard	CMA1840-xxxx-xx0Nxxxxxxx	1120 mA	38.6 W	84	0.30 mm	0.251 W/mm^2	228 mA/mm^2
CMA2550 36-V Standard	CMA2550-xxxx-xx0Nxxxxxxx	1920 mA	66.4 W	144	0.40 mm	0.234 W/mm^2	228 mA/mm^2
CMA3090 72-V Standard	CMA3090-xxxx-xx0Rxxxxxxx	1600 mA	115 W	240	0.30 mm	0.282 W/mm^2	228 mA/mm^2
CMT1922 36-V Standard	CMT1922-xxxx-xx0Nxxxxxxx	697 mA	24.0 W	72	0.54 mm	0.145 W/mm^2	228 mA/mm^2
CMT1925 36-V Standard	CMT1925-xxxx-xx0Nxxxxxxx	814 mA	28.0 W	84	0.45 mm	0.170 W/mm^2	228 mA/mm^2
CMT1930 36-V Standard	CMT1930-xxxx-xx0Nxxxxxxx	960 mA	33.3 W	72	0.31 mm	0.202 W/mm^2	228 mA/mm^2
CMT1945 36-V Standard	CMT1945-xxxx-xx0Nxxxxxxx	1280 mA	44.3 W	96	0.30 mm	0.268 W/mm^2	228 mA/mm^2
CMT2850 36-V Standard	CMT2850-xxxx-xx0Nxxxxxxx	2080 mA	72.1 W	156	0.50 mm	0.190 W/mm^2	228 mA/mm^2
CMT2870 54-V Standard	CMT2870-xxxx-xx0Pxxxxxxx	1760 mA	91.1 W	198	0.30 mm	0.240 W/mm^2	228 mA/mm^2
CMT2890 54-V Standard	CMT2890-xxxx-xx0Pxxxxxxx	2050 mA	107 W	234	0.30 mm	0.282 W/mm^2	228 mA/mm^2
CMU1519 36-V Standard	CMU1519-xxxx-xx0Nxxxxxxx	681 mA	23.4 W	72	0.6 mm	0.142 W/mm^2	228 mA/mm^2
CMU1526 36-V Standard	CMU1526-xxxx-xx0Nxxxxxxx	908 mA	31.2 W	96	0.4 mm	0.189 W/mm^2	228 mA/mm^2
CMU1532 36-V Standard	CMU1532-xxxx-xx0Nxxxxxxx	1135 mA	39.0 W	120	0.3 mm	0.236 W/mm^2	228 mA/mm^2
CMU2236 36-V Standard	CMU2236-xxxx-xx0Nxxxxxxx	1249 mA	42.9 W	132	0.7 mm	0.113 W/mm^2	228 mA/mm^2
CMU2239 36-V Standard	CMU2239-xxxx-xx0Nxxxxxxx	1363 mA	46.8 W	144	0.6 mm	0.123 W/mm^2	228 mA/mm^2
CMU2258 54-V Standard	CMU2258-xxxx-xx0Pxxxxxxx	1363 mA	70.2 W	216	0.5 mm	0.185 W/mm^2	228 mA/mm^2

Notes:

- Please see the Reference Information for Array Scaling section for more product details and information on the scaling method.

XLAMP CMA3090 48-V STANDARD @ 105 °C, 2400 mA

Test Results Summary

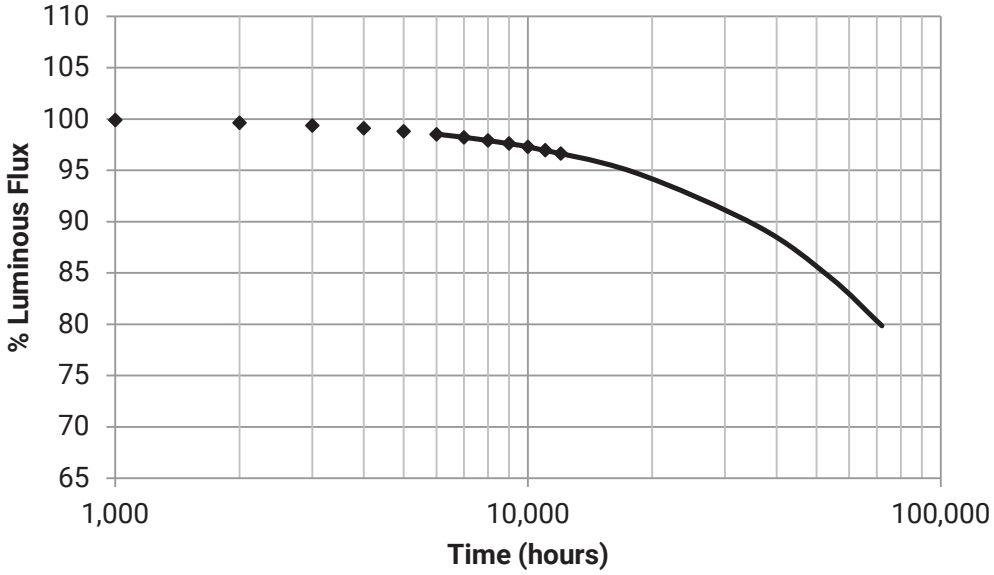
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)
0	100.00%	0.0000	0.0	0.0%
1000	99.89%	0.0002	0.0	0.1%
2000	99.63%	0.0003	0.3	-0.2%
3000	99.37%	0.0005	0.1	-0.6%
4000	99.09%	0.0006	0.0	-1.3%
5000	98.79%	0.0009	0.0	-0.2%
6000	98.49%	0.0013	0.0	-0.7%
7000	98.22%	0.0016	1.3	-0.9%
8000	97.92%	0.0017	1.1	-1.0%
9000	97.61%	0.0018	1.1	-1.5%
10000	97.30%	0.0019	0.9	-1.6%
11000	96.97%	0.0021	0.8	-1.8%
12000	96.63%	0.0022	0.8	-2.0%

Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)

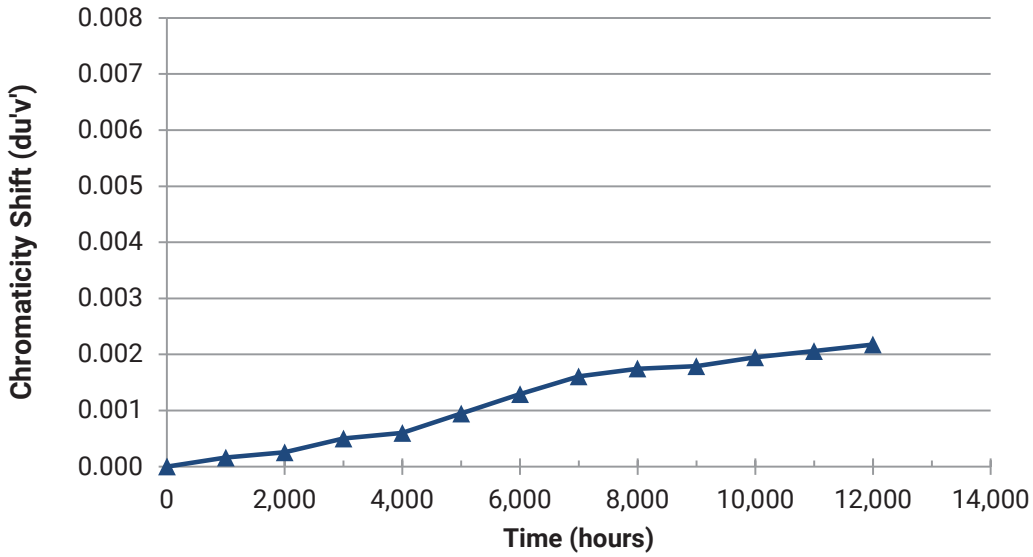
XLAMP CMA3090 48-V STANDARD @ 105 °C, 2400 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	12,000 hours
Test duration used for projection	t=6,000 to t=12,000
α	3.184E-06
β	1.004E+00
Reported Lifetimes	L90(12k) = 34,400 hrs
	L80(12k) > 66,000 hrs
	L70(12k) > 66,000 hrs



Color Shift Graph



XLAMP CMA3090 48-V STANDARD @ 105 °C, 2400 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V_F (V)	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	17083	48.8	2963	3000	99.94	99.85	99.48	99.11	98.87	98.32	98.05	97.69	97.57	96.90	96.49	96.15
2	17030	48.7	2964	3000	99.92	99.70	99.36	99.17	98.82	98.30	98.15	97.83	97.35	97.08	96.83	96.46
3	17110	48.8	2967	3000	99.88	99.60	99.29	99.15	98.82	98.63	98.44	98.23	98.10	97.83	97.65	97.31
4	16904	48.9	2962	3000	99.92	99.53	99.19	98.81	98.56	98.33	97.87	97.64	97.35	97.13	96.73	96.50
5	16971	48.9	2972	3000	99.96	99.51	99.06	98.80	98.61	98.33	98.07	97.82	97.60	97.31	97.15	96.80
6	17209	49.0	2984	3000	99.88	99.61	99.40	99.20	98.84	98.65	98.45	98.11	97.61	97.33	97.05	96.81
7	17196	49.0	2986	3000	99.73	99.58	99.47	99.22	98.93	98.72	98.43	98.15	97.76	97.57	97.25	96.85
8	16792	49.2	2983	3000	99.92	99.60	99.47	99.19	98.88	98.60	98.29	98.03	97.69	97.28	96.72	96.52
9	17050	48.8	2962	3000	99.88	99.71	99.47	99.13	98.82	98.52	98.33	98.05	97.72	97.36	97.11	96.81
10	17017	48.4	2971	3000	99.94	99.62	99.48	99.35	99.03	98.80	98.65	98.33	98.15	97.92	97.53	97.04
11	16858	48.6	2965	3000	99.72	99.45	99.21	98.59	98.22	97.90	97.54	97.24	96.87	96.64	96.22	95.85
12	16990	48.8	2985	3000	99.92	99.77	99.56	99.37	99.06	98.78	98.54	98.16	97.82	97.50	97.13	96.57
13	16918	48.7	2965	3000	99.92	99.68	99.37	99.12	98.86	98.47	98.03	97.67	97.39	97.09	96.75	96.47
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**17010**	**48.8**	**2971**		**99.89**	**99.63**	**99.37**	**99.09**	**98.79**	**98.49**	**98.22**	**97.92**	**97.61**	**97.30**	**96.97**	**96.63**
Median	17017	48.8	2967		99.92	99.61	99.40	99.15	98.84	98.52	98.29	98.03	97.61	97.31	97.05	96.57
σ	124	0.2	10		0.08	0.11	0.14	0.23	0.22	0.25	0.31	0.30	0.34	0.35	0.40	0.38
Min.	16792	48.4	2962		99.72	99.45	99.06	98.59	98.22	97.90	97.54	97.24	96.87	96.64	96.22	95.85
Max.	17209	49.2	2986		99.96	99.85	99.56	99.37	99.06	98.80	98.65	98.33	98.15	97.92	97.65	97.31

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4414	0.4081	2963	3000	0.0002	0.0002	0.0005	0.0009	0.0012	0.0015	0.0023	0.0026	0.0027	0.0029	0.0029	0.0029
2	0.4412	0.4079	2964	3000	0.0002	0.0003	0.0007	0.0006	0.0011	0.0011	0.0016	0.0016	0.0016	0.0016	0.0017	0.0018
3	0.4410	0.4077	2967	3000	0.0001	0.0002	0.0003	0.0008	0.0011	0.0015	0.0018	0.0020	0.0019	0.0021	0.0021	0.0022
4	0.4402	0.4057	2962	3000	0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0020	0.0021	0.0022	0.0024	0.0025	0.0026
5	0.4394	0.4052	2972	3000	0.0001	0.0002	0.0005	0.0010	0.0013	0.0017	0.0019	0.0021	0.0021	0.0022	0.0024	0.0025
6	0.4384	0.4046	2984	3000	0.0001	0.0001	0.0004	0.0001	0.0006	0.0009	0.0014	0.0016	0.0015	0.0014	0.0017	0.0020
7	0.4388	0.4057	2986	3000	0.0001	0.0004	0.0008	0.0008	0.0012	0.0017	0.0018	0.0019	0.0018	0.0022	0.0023	0.0024
8	0.4390	0.4056	2983	3000	0.0002	0.0004	0.0007	0.0009	0.0011	0.0016	0.0017	0.0020	0.0021	0.0023	0.0022	0.0022
9	0.4404	0.4059	2962	3000	0.0001	0.0003	0.0004	0.0006	0.0008	0.0012	0.0013	0.0015	0.0016	0.0018	0.0021	0.0024
10	0.4400	0.4063	2971	3000	0.0000	0.0001	0.0003	0.0002	0.0006	0.0009	0.0011	0.0014	0.0015	0.0017	0.0018	0.0019
11	0.4401	0.4057	2965	3000	0.0002	0.0003	0.0005	0.0007	0.0011	0.0014	0.0016	0.0016	0.0018	0.0018	0.0020	0.0022
12	0.4387	0.4052	2985	3000	0.0001	0.0001	0.0002	0.0000	0.0004	0.0007	0.0010	0.0011	0.0011	0.0014	0.0014	0.0015
13	0.4397	0.4049	2965	3000	0.0001	0.0001	0.0004	0.0000	0.0004	0.0008	0.0012	0.0013	0.0014	0.0015	0.0016	0.0018
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4399**	**0.4060**	**2971**		**0.0002**	**0.0003**	**0.0005**	**0.0006**	**0.0009**	**0.0013**	**0.0016**	**0.0017**	**0.0018**	**0.0019**	**0.0021**	**0.0022**
Median	0.4400	0.4057	2967		0.0001	0.0002	0.0005	0.0007	0.0011	0.0014	0.0016	0.0016	0.0018	0.0018	0.0021	0.0022
σ	0.0010	0.0011	10		0.0001	0.0002	0.0002	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
Min.	0.4384	0.4046	2962		0.0000	0.0001	0.0002	0.0000	0.0004	0.0007	0.0010	0.0011	0.0011	0.0014	0.0014	0.0015
Max.	0.4414	0.4081	2986		0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0023	0.0026	0.0027	0.0029	0.0029	0.0029

XLAMP CMA3090 48-V STANDARD @ 105 °C, 2400 mA

Lamp #	Initial (0 hrs)				Chromaticity (CCx)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4414	0.4081	2963	3000	0.4410	0.4410	0.4404	0.4397	0.4392	0.4388	0.4370	0.4366	0.4364	0.4361	0.4361	0.4361
2	0.4412	0.4079	2964	3000	0.4411	0.4410	0.4401	0.4402	0.4394	0.4391	0.4384	0.4382	0.4383	0.4382	0.4381	0.4379
3	0.4410	0.4077	2967	3000	0.4407	0.4407	0.4404	0.4395	0.4390	0.4383	0.4377	0.4374	0.4375	0.4373	0.4373	0.4372
4	0.4402	0.4057	2962	3000	0.4397	0.4392	0.4386	0.4381	0.4375	0.4369	0.4366	0.4364	0.4363	0.4359	0.4358	0.4356
5	0.4394	0.4052	2972	3000	0.4392	0.4393	0.4385	0.4376	0.4371	0.4364	0.4359	0.4357	0.4355	0.4354	0.4351	0.4349
6	0.4384	0.4046	2984	3000	0.4383	0.4381	0.4376	0.4381	0.4374	0.4368	0.4358	0.4355	0.4357	0.4358	0.4353	0.4348
7	0.4388	0.4057	2986	3000	0.4386	0.4382	0.4374	0.4374	0.4367	0.4358	0.4356	0.4353	0.4355	0.4349	0.4347	0.4344
8	0.4390	0.4056	2983	3000	0.4386	0.4383	0.4378	0.4375	0.4371	0.4362	0.4358	0.4354	0.4352	0.4348	0.4349	0.4350
9	0.4404	0.4059	2962	3000	0.4402	0.4406	0.4397	0.4393	0.4388	0.4381	0.4379	0.4376	0.4375	0.4371	0.4366	0.4360
10	0.4400	0.4063	2971	3000	0.4400	0.4401	0.4395	0.4396	0.4390	0.4383	0.4379	0.4374	0.4372	0.4369	0.4367	0.4366
11	0.4401	0.4057	2965	3000	0.4402	0.4397	0.4392	0.4388	0.4380	0.4375	0.4372	0.4371	0.4368	0.4367	0.4364	0.4361
12	0.4387	0.4052	2985	3000	0.4388	0.4385	0.4384	0.4387	0.4380	0.4374	0.4369	0.4367	0.4367	0.4362	0.4361	0.4360
13	0.4397	0.4049	2965	3000	0.4397	0.4395	0.4390	0.4397	0.4389	0.4382	0.4375	0.4373	0.4371	0.4370	0.4367	0.4364
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4399**	**0.4060**	**2971**		**0.4397**	**0.4396**	**0.4390**	**0.4388**	**0.4382**	**0.4375**	**0.4369**	**0.4367**	**0.4366**	**0.4363**	**0.4361**	**0.4359**
Median	0.4400	0.4057	2967		0.4397	0.4395	0.4390	0.4388	0.4380	0.4375	0.4370	0.4367	0.4367	0.4362	0.4361	0.4360
σ	0.0010	0.0011	10		0.0010	0.0011	0.0010	0.0010	0.0009	0.0010	0.0009	0.0009	0.0010	0.0010	0.0010	0.0010
Min.	0.4384	0.4046	2962		0.4383	0.4381	0.4374	0.4374	0.4367	0.4358	0.4356	0.4353	0.4352	0.4348	0.4347	0.4344
Max.	0.4414	0.4081	2986		0.4411	0.4410	0.4404	0.4402	0.4394	0.4391	0.4384	0.4382	0.4383	0.4382	0.4381	0.4379

Lamp #	Initial (0 hrs)				Chromaticity (CCy)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4414	0.4081	2963	3000	0.4077	0.4077	0.4071	0.4064	0.4060	0.4054	0.4051	0.4047	0.4046	0.4039	0.4039	0.4039
2	0.4412	0.4079	2964	3000	0.4082	0.4082	0.4075	0.4075	0.4075	0.4066	0.4064	0.4059	0.4059	0.4057	0.4055	0.4053
3	0.4410	0.4077	2967	3000	0.4075	0.4078	0.4074	0.4067	0.4061	0.4054	0.4051	0.4047	0.4049	0.4045	0.4042	0.4040
4	0.4402	0.4057	2962	3000	0.4051	0.4048	0.4042	0.4037	0.4034	0.4028	0.4027	0.4025	0.4023	0.4022	0.4020	0.4018
5	0.4394	0.4052	2972	3000	0.4050	0.4055	0.4045	0.4041	0.4038	0.4028	0.4025	0.4023	0.4024	0.4022	0.4020	0.4019
6	0.4384	0.4046	2984	3000	0.4044	0.4044	0.4041	0.4044	0.4040	0.4034	0.4030	0.4026	0.4028	0.4028	0.4025	0.4021
7	0.4388	0.4057	2986	3000	0.4055	0.4052	0.4045	0.4045	0.4039	0.4033	0.4031	0.4030	0.4034	0.4026	0.4024	0.4023
8	0.4390	0.4056	2983	3000	0.4053	0.4051	0.4046	0.4042	0.4038	0.4029	0.4030	0.4027	0.4025	0.4021	0.4024	0.4026
9	0.4404	0.4059	2962	3000	0.4059	0.4065	0.4056	0.4052	0.4049	0.4042	0.4043	0.4039	0.4039	0.4033	0.4027	0.4022
10	0.4400	0.4063	2971	3000	0.4063	0.4065	0.4060	0.4062	0.4059	0.4051	0.4050	0.4045	0.4040	0.4039	0.4037	0.4035
11	0.4401	0.4057	2965	3000	0.4062	0.4059	0.4053	0.4049	0.4045	0.4037	0.4037	0.4038	0.4031	0.4034	0.4028	0.4021
12	0.4387	0.4052	2985	3000	0.4052	0.4050	0.4048	0.4052	0.4047	0.4042	0.4044	0.4042	0.4039	0.4034	0.4034	0.4035
13	0.4397	0.4049	2965	3000	0.4051	0.4047	0.4043	0.4049	0.4044	0.4039	0.4039	0.4037	0.4033	0.4033	0.4029	0.4025
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4399**	**0.4060**	**2971**		**0.4060**	**0.4059**	**0.4054**	**0.4052**	**0.4048**	**0.4041**	**0.4040**	**0.4037**	**0.4036**	**0.4033**	**0.4031**	**0.4029**
Median	0.4400	0.4057	2967		0.4055	0.4055	0.4048	0.4049	0.4045	0.4039	0.4039	0.4038	0.4034	0.4033	0.4028	0.4025
σ	0.0010	0.0011	10		0.0012	0.0013	0.0012	0.0011	0.0012	0.0012	0.0012	0.0011	0.0011	0.0010	0.0010	0.0010
Min.	0.4384	0.4046	2962		0.4044	0.4044	0.4041	0.4037	0.4034	0.4028	0.4025	0.4023	0.4023	0.4021	0.4020	0.4018
Max.	0.4414	0.4081	2986		0.4082	0.4082	0.4075	0.4075	0.4075	0.4066	0.4064	0.4059	0.4059	0.4057	0.4055	0.4053

XLAMP CMA3090 48-V STANDARD @ 85 °C, 3300 mA

General Test Information:

Description of air movement	For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow.
Relative humidity (RH) level	< 65%
Photometric measurement uncertainty	The uncertainty of the light output measurements is U=1.59% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level.
Testing agency identification	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.
Testing agency third-party accreditation	IAS TL-460
Sampling method	The CCT and CRI combinations of samples tested were chosen to provide maximum applicability under the ENERGY STAR LM-80 Guidelines. The results in this report represent the long-term performance of the CCT and CRI combinations tested, and may vary slightly for different CCT and CRI combinations.

Information Required by IES LM-80-15:

DUT Model Number	CMA3090-0000-000Q0H0A30G
Description of DUT	LED array
Drive Current [I_F]	3300 mA
Testing Start Date	April 24, 2018
Testing Completion Date	October 21, 2019
Nominal Case Temperature	85 °C
Nominal Ambient Temperature	85 °C
Test Equipment	SENSING SCD-20008 integrating sphere Hanshenpuyuan HSPY-100-05 DC power supply BACL B25001 DC power supply BACL B2-270 Multilayer aging machine Everfine WY5015 DC power supply
Failures observed	None

Additional Information Required by ENERGY STAR© 2017 Guidelines:

Nominal ANSI CCT Target	3000 K
Mean CRI	83
Mean Initial Forward Voltage	50.53 V
Average Input Power	167 W
Nominal LED Die Area	0.702 mm^2
Average Current per LED Die	220 mA
Average Current Density per LED Die	313 mA/mm^2
Average Power per LED Die	0.695 W
Average Power Density per LED Die	0.990 W/mm^2
Minimum Spacing from Die Edge to Die Edge	0.30 mm

XLAMP CMA3090 48-V STANDARD @ 85 °C, 3300 mA

Other LEDs Represented by This Data Set (Per ENERGY STAR Sep 28, 2017 guidelines, Section 4.5.b.iv)

Tested Product	DUT Model Number	Tested Current	Average Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMA3090 48-V Standard	CMA3090-0000-000Q0H0A30G	3300 mA	167 W	240	0.30 mm	0.401 W/mm^2	313 mA/mm^2

Other Products	Applicable Order Codes	Scaled Current	Calc. Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMA1840 36-V Standard	CMA1840-xxxx-xx0Nxxxxxxx	1540 mA	55.3 W	84	0.30 mm	0.359 W/mm^2	313 mA/mm^2
CMA2550 36-V Standard	CMA2550-xxxx-xx0Nxxxxxxx	2640 mA	95.1 W	144	0.40 mm	0.335 W/mm^2	313 mA/mm^2
CMA3090 72-V Standard	CMA3090-xxxx-xx0Rxxxxxxx	2200 mA	167 W	240	0.30 mm	0.401 W/mm^2	313 mA/mm^2
CMT1922 36-V Standard	CMT1922-xxxx-xx0Nxxxxxxx	959 mA	34.4 W	72	0.54 mm	0.208 W/mm^2	313 mA/mm^2
CMT1925 36-V Standard	CMT1925-xxxx-xx0Nxxxxxxx	1119 mA	40.1 W	84	0.45 mm	0.243 W/mm^2	313 mA/mm^2
CMT1930 36-V Standard	CMT1930-xxxx-xx0Nxxxxxxx	1320 mA	47.9 W	72	0.31 mm	0.290 W/mm^2	313 mA/mm^2
CMT1945 36-V Standard	CMT1945-xxxx-xx0Nxxxxxxx	1760 mA	63.4 W	96	0.30 mm	0.384 W/mm^2	313 mA/mm^2
CMT2850 36-V Standard	CMT2850-xxxx-xx0Nxxxxxxx	2860 mA	103 W	156	0.50 mm	0.272 W/mm^2	313 mA/mm^2
CMT2870 54-V Standard	CMT2870-xxxx-xx0Pxxxxxxx	2420 mA	130 W	198	0.30 mm	0.343 W/mm^2	313 mA/mm^2
CMT2890 54-V Standard	CMT2890-xxxx-xx0Pxxxxxxx	2824 mA	153 W	234	0.30 mm	0.401 W/mm^2	313 mA/mm^2
CMU1519 36-V Standard	CMU1519-xxxx-xx0Nxxxxxxx	937 mA	33.2 W	72	0.6 mm	0.201 W/mm^2	313 mA/mm^2
CMU1526 36-V Standard	CMU1526-xxxx-xx0Nxxxxxxx	1249 mA	44.3 W	96	0.4 mm	0.268 W/mm^2	313 mA/mm^2
CMU1532 36-V Standard	CMU1532-xxxx-xx0Nxxxxxxx	1561 mA	55.3 W	120	0.3 mm	0.335 W/mm^2	313 mA/mm^2
CMU2236 36-V Standard	CMU2236-xxxx-xx0Nxxxxxxx	1717 mA	60.9 W	132	0.7 mm	0.160 W/mm^2	313 mA/mm^2
CMU2239 36-V Standard	CMU2239-xxxx-xx0Nxxxxxxx	1874 mA	66.5 W	144	0.6 mm	0.175 W/mm^2	313 mA/mm^2
CMU2258 54-V Standard	CMU2258-xxxx-xx0Pxxxxxxx	1874 mA	99.7 W	216	0.5 mm	0.262 W/mm^2	313 mA/mm^2

Notes:

- Please see the Reference Information for Array Scaling section for more product details and information on the scaling method.

XLAMP CMA3090 48-V STANDARD @ 85 °C, 3300 mA

Test Results Summary

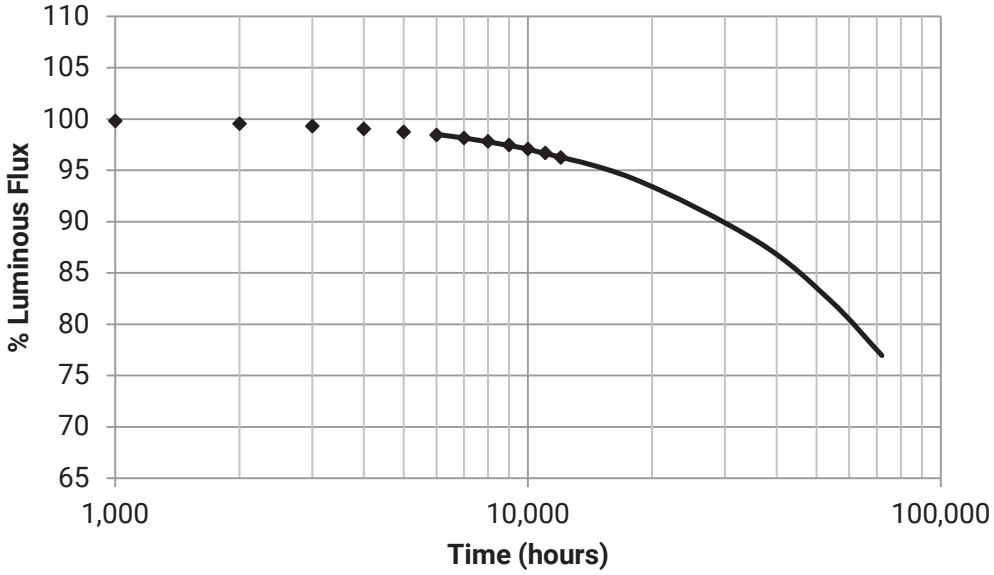
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)
0	100.00%	0.0000	0.0	0.0%
1000	99.82%	0.0002	-0.2	-0.3%
2000	99.55%	0.0003	0.4	0.3%
3000	99.30%	0.0004	0.3	0.2%
4000	99.03%	0.0006	0.2	0.0%
5000	98.74%	0.0008	0.2	0.0%
6000	98.44%	0.0009	0.1	-0.2%
7000	98.14%	0.0010	0.8	-0.2%
8000	97.81%	0.0012	0.7	-0.7%
9000	97.47%	0.0013	0.8	-0.7%
10000	97.08%	0.0014	0.7	-0.7%
11000	96.69%	0.0015	0.6	-1.4%
12000	96.25%	0.0017	0.7	-0.7%

Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)

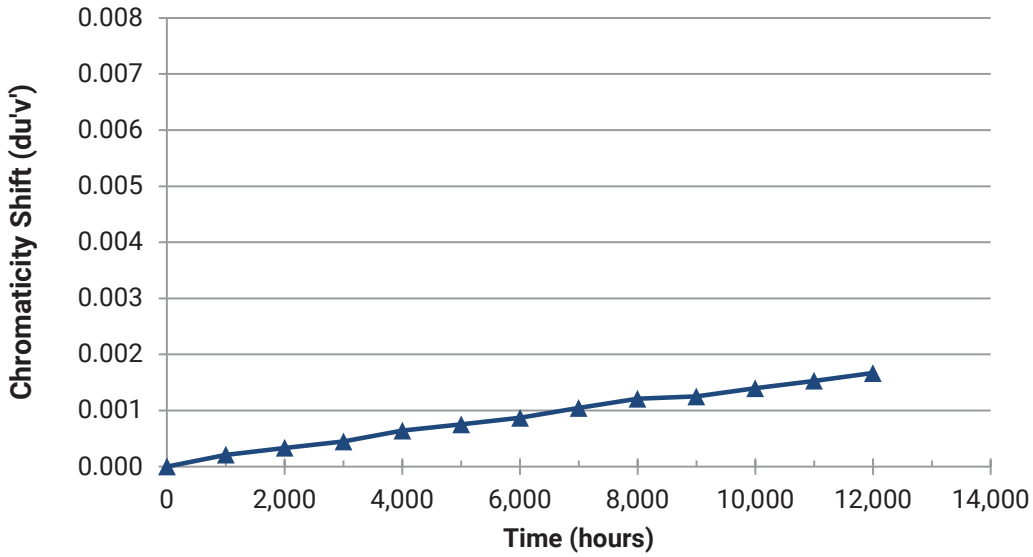
XLAMP CMA3090 48-V STANDARD @ 85 °C, 3300 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	12,000 hours
Test duration used for projection	t=6,000 to t=12,000
α	3.741E-06
β	1.007E+00
Reported Lifetimes	L90(12k) = 30,100 hrs
	L80(12k) = 61,600 hrs
	L70(12k) > 66,000 hrs



Color Shift Graph



XLAMP CMA3090 48-V STANDARD @ 85 °C, 3300 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V_F (V)	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	21564	50.8	2971	3000	99.94	99.72	99.54	99.37	99.04	98.72	98.52	98.25	97.88	97.71	97.11	96.56
2	21677	50.8	2987	3000	99.97	99.65	99.50	99.26	98.92	98.64	98.25	97.90	97.53	97.17	96.76	96.37
3	21657	50.5	2986	3000	99.82	99.41	99.19	98.94	98.82	98.64	98.11	97.81	97.28	96.67	96.43	96.07
4	21630	50.5	2998	3000	99.99	99.65	99.34	99.14	98.86	98.55	98.41	98.04	97.77	97.23	96.98	96.51
5	21630	50.6	3009	3000	99.97	99.77	99.61	99.43	99.23	98.77	98.39	98.21	97.91	97.43	96.86	96.52
6	21855	50.5	3000	3000	99.55	99.29	98.94	98.80	98.44	98.32	97.94	97.54	97.24	96.97	96.38	96.08
7	21915	50.5	3000	3000	99.82	99.66	99.51	99.12	98.83	98.34	98.05	97.76	97.42	97.06	96.63	96.20
8	21776	50.4	3000	3000	99.92	99.56	99.37	99.16	98.86	98.57	98.35	97.93	97.61	97.12	96.82	96.37
9	21994	50.2	3002	3000	99.34	99.02	98.71	98.17	97.85	97.75	97.40	97.03	96.69	96.24	96.01	95.65
10	22021	49.9	3004	3000	99.83	99.49	99.39	99.06	98.88	98.51	98.29	97.98	97.64	97.42	96.94	96.42
11	21021	50.8	2998	3000	99.91	99.79	99.32	99.09	98.82	98.45	98.08	97.72	97.21	96.63	96.21	95.89
12	21518	50.6	3016	3000	99.85	99.58	99.26	98.98	98.58	98.08	97.90	97.49	97.26	97.08	96.70	96.11
13	21968	50.7	3012	3000	99.79	99.49	99.28	98.88	98.53	98.36	98.07	97.92	97.62	97.33	97.09	96.56
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**21710**	**50.5**	**2999**		**99.82**	**99.55**	**99.30**	**99.03**	**98.74**	**98.44**	**98.14**	**97.81**	**97.47**	**97.08**	**96.69**	**96.25**
Median	21677	50.5	3000		99.85	99.58	99.34	99.09	98.83	98.51	98.11	97.90	97.53	97.12	96.76	96.37
σ	268	0.3	12		0.19	0.21	0.25	0.32	0.34	0.28	0.29	0.32	0.33	0.39	0.34	0.28
Min.	21021	49.9	2971		99.34	99.02	98.71	98.17	97.85	97.75	97.40	97.03	96.69	96.24	96.01	95.65
Max.	22021	50.8	3016		99.99	99.79	99.61	99.43	99.23	98.77	98.52	98.25	97.91	97.71	97.11	96.56

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4400	0.4063	2971	3000	0.0002	0.0005	0.0010	0.0012	0.0013	0.0015	0.0018	0.0021	0.0021	0.0023	0.0025	0.0026
2	0.4386	0.4053	2987	3000	0.0004	0.0003	0.0007	0.0005	0.0010	0.0010	0.0012	0.0014	0.0016	0.0013	0.0016	0.0018
3	0.4383	0.4046	2986	3000	0.0001	0.0003	0.0003	0.0006	0.0007	0.0006	0.0009	0.0010	0.0008	0.0007	0.0008	0.0009
4	0.4375	0.4044	2998	3000	0.0002	0.0003	0.0004	0.0006	0.0008	0.0009	0.0010	0.0012	0.0013	0.0014	0.0016	0.0017
5	0.4372	0.4050	3009	3000	0.0001	0.0002	0.0002	0.0005	0.0004	0.0008	0.0011	0.0013	0.0017	0.0019	0.0021	0.0023
6	0.4370	0.4036	3000	3000	0.0002	0.0002	0.0004	0.0006	0.0007	0.0007	0.0007	0.0010	0.0009	0.0012	0.0012	0.0013
7	0.4375	0.4047	3000	3000	0.0001	0.0004	0.0002	0.0006	0.0008	0.0007	0.0008	0.0009	0.0007	0.0011	0.0011	0.0012
8	0.4371	0.4038	3000	3000	0.0003	0.0004	0.0005	0.0007	0.0006	0.0009	0.0012	0.0014	0.0013	0.0013	0.0015	0.0017
9	0.4374	0.4047	3002	3000	0.0002	0.0001	0.0002	0.0006	0.0007	0.0007	0.0008	0.0011	0.0012	0.0015	0.0017	0.0019
10	0.4374	0.4050	3004	3000	0.0002	0.0002	0.0004	0.0002	0.0006	0.0007	0.0006	0.0009	0.0010	0.0012	0.0011	0.0010
11	0.4375	0.4044	2998	3000	0.0002	0.0004	0.0004	0.0007	0.0006	0.0009	0.0011	0.0009	0.0008	0.0012	0.0013	0.0016
12	0.4357	0.4028	3016	3000	0.0002	0.0005	0.0004	0.0007	0.0009	0.0011	0.0012	0.0013	0.0015	0.0017	0.0019	0.0021
13	0.4366	0.4042	3012	3000	0.0001	0.0004	0.0006	0.0009	0.0005	0.0007	0.0011	0.0013	0.0014	0.0015	0.0015	0.0016
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4375**	**0.4045**	**2999**		**0.0002**	**0.0003**	**0.0004**	**0.0006**	**0.0008**	**0.0009**	**0.0010**	**0.0012**	**0.0013**	**0.0014**	**0.0015**	**0.0017**
Median	0.4374	0.4046	3000		0.0002	0.0003	0.0004	0.0006	0.0007	0.0008	0.0011	0.0012	0.0013	0.0013	0.0015	0.0017
σ	0.0010	0.0008	12		0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005
Min.	0.4357	0.4028	2971		0.0001	0.0001	0.0002	0.0002	0.0004	0.0006	0.0006	0.0009	0.0007	0.0007	0.0008	0.0009
Max.	0.4400	0.4063	3016		0.0004	0.0005	0.0010	0.0012	0.0013	0.0015	0.0018	0.0021	0.0021	0.0023	0.0025	0.0026

XLAMP CMA3090 48-V STANDARD @ 85 °C, 3300 mA

Lamp #	Initial (0 hrs)				Chromaticity (CCx)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4400	0.4063	2971	3000	0.4396	0.4391	0.4382	0.4378	0.4376	0.4374	0.4367	0.4363	0.4363	0.4359	0.4357	0.4354
2	0.4386	0.4053	2987	3000	0.4379	0.4381	0.4373	0.4377	0.4367	0.4367	0.4365	0.4361	0.4357	0.4362	0.4358	0.4354
3	0.4383	0.4046	2986	3000	0.4380	0.4386	0.4379	0.4373	0.4370	0.4371	0.4366	0.4364	0.4368	0.4371	0.4368	0.4366
4	0.4375	0.4044	2998	3000	0.4371	0.4373	0.4372	0.4363	0.4360	0.4358	0.4357	0.4354	0.4353	0.4350	0.4348	0.4345
5	0.4372	0.4050	3009	3000	0.4370	0.4373	0.4369	0.4363	0.4364	0.4357	0.4353	0.4350	0.4344	0.4339	0.4335	0.4331
6	0.4370	0.4036	3000	3000	0.4367	0.4371	0.4363	0.4359	0.4357	0.4357	0.4358	0.4351	0.4353	0.4349	0.4349	0.4349
7	0.4375	0.4047	3000	3000	0.4375	0.4374	0.4374	0.4365	0.4361	0.4362	0.4362	0.4359	0.4362	0.4357	0.4356	0.4354
8	0.4371	0.4038	3000	3000	0.4367	0.4370	0.4363	0.4360	0.4359	0.4354	0.4350	0.4346	0.4348	0.4349	0.4345	0.4341
9	0.4374	0.4047	3002	3000	0.4376	0.4374	0.4370	0.4363	0.4361	0.4361	0.4361	0.4356	0.4354	0.4349	0.4345	0.4341
10	0.4374	0.4050	3004	3000	0.4373	0.4373	0.4366	0.4370	0.4362	0.4361	0.4363	0.4358	0.4357	0.4354	0.4356	0.4357
11	0.4375	0.4044	2998	3000	0.4371	0.4373	0.4370	0.4364	0.4365	0.4358	0.4355	0.4358	0.4361	0.4354	0.4350	0.4347
12	0.4357	0.4028	3016	3000	0.4353	0.4358	0.4349	0.4344	0.4340	0.4337	0.4335	0.4333	0.4331	0.4326	0.4322	0.4318
13	0.4366	0.4042	3012	3000	0.4366	0.4363	0.4356	0.4349	0.4357	0.4353	0.4347	0.4344	0.4341	0.4339	0.4339	0.4339
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4375**	**0.4045**	**2999**		**0.4373**	**0.4374**	**0.4368**	**0.4364**	**0.4361**	**0.4359**	**0.4357**	**0.4354**	**0.4353**	**0.4351**	**0.4348**	**0.4346**
Median	0.4374	0.4046	3000		0.4371	0.4373	0.4370	0.4363	0.4361	0.4358	0.4358	0.4356	0.4354	0.4350	0.4349	0.4347
σ	0.0010	0.0008	12		0.0010	0.0008	0.0009	0.0010	0.0008	0.0009	0.0009	0.0009	0.0010	0.0012	0.0012	0.0012
Min.	0.4357	0.4028	2971		0.4353	0.4358	0.4349	0.4344	0.4340	0.4337	0.4335	0.4333	0.4331	0.4326	0.4322	0.4318
Max.	0.4400	0.4063	3016		0.4396	0.4391	0.4382	0.4378	0.4376	0.4374	0.4367	0.4364	0.4368	0.4371	0.4368	0.4366

Lamp #	Initial (0 hrs)				Chromaticity (CCy)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4400	0.4063	2971	3000	0.4059	0.4058	0.4049	0.4046	0.4044	0.4040	0.4034	0.4031	0.4028	0.4027	0.4023	0.4019
2	0.4386	0.4053	2987	3000	0.4045	0.4052	0.4045	0.4049	0.4039	0.4037	0.4033	0.4029	0.4028	0.4031	0.4028	0.4024
3	0.4383	0.4046	2986	3000	0.4045	0.4053	0.4048	0.4042	0.4041	0.4040	0.4032	0.4030	0.4034	0.4035	0.4034	0.4032
4	0.4375	0.4044	2998	3000	0.4040	0.4047	0.4048	0.4038	0.4035	0.4033	0.4028	0.4027	0.4025	0.4021	0.4019	0.4017
5	0.4372	0.4050	3009	3000	0.4048	0.4055	0.4051	0.4046	0.4043	0.4041	0.4030	0.4028	0.4020	0.4020	0.4016	0.4013
6	0.4370	0.4036	3000	3000	0.4032	0.4040	0.4036	0.4030	0.4028	0.4026	0.4023	0.4020	0.4022	0.4019	0.4016	0.4014
7	0.4375	0.4047	3000	3000	0.4044	0.4052	0.4050	0.4040	0.4039	0.4039	0.4034	0.4032	0.4036	0.4028	0.4029	0.4029
8	0.4371	0.4038	3000	3000	0.4039	0.4043	0.4038	0.4035	0.4032	0.4029	0.4021	0.4017	0.4021	0.4019	0.4015	0.4011
9	0.4374	0.4047	3002	3000	0.4046	0.4050	0.4046	0.4038	0.4037	0.4037	0.4034	0.4029	0.4027	0.4021	0.4017	0.4014
10	0.4374	0.4050	3004	3000	0.4045	0.4052	0.4045	0.4048	0.4041	0.4039	0.4038	0.4035	0.4031	0.4029	0.4031	0.4033
11	0.4375	0.4044	2998	3000	0.4040	0.4050	0.4046	0.4041	0.4040	0.4035	0.4026	0.4030	0.4032	0.4027	0.4028	0.4029
12	0.4357	0.4028	3016	3000	0.4025	0.4038	0.4026	0.4023	0.4017	0.4015	0.4011	0.4009	0.4005	0.4002	0.4001	0.4000
13	0.4366	0.4042	3012	3000	0.4045	0.4046	0.4039	0.4031	0.4038	0.4037	0.4029	0.4023	0.4024	0.4022	0.4020	0.4017
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4375**	**0.4045**	**2999**		**0.4043**	**0.4049**	**0.4044**	**0.4039**	**0.4037**	**0.4034**	**0.4029**	**0.4026**	**0.4026**	**0.4023**	**0.4021**	**0.4020**
Median	0.4374	0.4046	3000		0.4045	0.4050	0.4046	0.4040	0.4039	0.4037	0.4030	0.4029	0.4027	0.4022	0.4020	0.4017
σ	0.0010	0.0008	12		0.0008	0.0006	0.0007	0.0008	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008	0.0009	0.0010
Min.	0.4357	0.4028	2971		0.4025	0.4038	0.4026	0.4023	0.4017	0.4015	0.4011	0.4009	0.4005	0.4002	0.4001	0.4000
Max.	0.4400	0.4063	3016		0.4059	0.4058	0.4051	0.4049	0.4044	0.4041	0.4038	0.4035	0.4036	0.4035	0.4034	0.4033

XLAMP CMU2287 54-V STANDARD @ 105 °C, 2200 mA

General Test Information:

Description of air movement	For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow.
Relative humidity (RH) level	< 65%
Photometric measurement uncertainty	The uncertainty of the light output measurements is U=1.59% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level.
Testing agency identification	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1st Road,Tangxia Town, Dongguan, Guangdong, China.
Testing agency third-party accreditation	IAS TL-460
Sampling method	The CCT and CRI combinations of samples tested were chosen to provide maximum applicability under the ENERGY STAR LM-80 Guidelines. The results in this report represent the long-term performance of the CCT and CRI combinations tested, and may vary slightly for different CCT and CRI combinations.

Information Required by IES LM-80-15:

DUT Model Number	CMU2287-0000-000P0H0A27G
Description of DUT	LED array
Drive Current [I_F]	2200 mA
Testing Start Date	July 31, 2020
Testing Completion Date	March 7, 2022
Nominal Case Temperature	105 °C
Nominal Ambient Temperature	105 °C
Test Equipment	EVERFINE AIS-2 integrating sphere EVERFINE HAAS-2000 spectroradiometer Hanshenpuyuan HSPY-60-03 DC power supply Xinnuoer ATP-5005 DC power supply BACL B3-900 Multilayer aging machine
Failures observed	None

Additional Information Required by ENERGY STAR© 2017 Guidelines:

Nominal ANSI CCT Target	2700 K
Mean CRI	84
Mean Initial Forward Voltage	53.43 V
Average Input Power	118 W
Nominal LED Die Area	0.498 mm^2
Average Current per LED Die	220 mA
Average Current Density per LED Die	442 mA/mm^2
Average Power per LED Die	0.363 W
Average Power Density per LED Die	0.729 W/mm^2
Minimum Spacing from Die Edge to Die Edge	0.3 mm

XLAMP CMU2287 54-V STANDARD @ 105 °C, 2200 mA

Other LEDs Represented by This Data Set (Per ENERGY STAR Sep 28, 2017 guidelines, Section 4.5.b.iv)

Tested Product	DUT Model Number	Tested Current	Average Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMU2287 54-V Standard	CMU2287-0000-000P0H0A27G	2200 mA	118 W	324	0.3 mm	0.309 W/mm^2	246 mA/mm^2

Other Products	Applicable Order Codes	Scaled Current	Calc. Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMA1840 36-V Standard	CMA1840-xxxx-xx0Nxxxxxxx	1206 mA	43.1 W	84	0.30 mm	0.280 W/mm^2	246 mA/mm^2
CMA2550 36-V Standard	CMA2550-xxxx-xx0Nxxxxxxx	2067 mA	74.4 W	144	0.40 mm	0.262 W/mm^2	246 mA/mm^2
CMB1825 36-V Standard	CMB1825-xxxx-xx0Nxxxxxxx	831 mA	29.3 W	72	0.3 mm	0.259 W/mm^2	246 mA/mm^2
CMB1840 36-V Standard	CMB1840-xxxx-xx0Nxxxxxxx	1108 mA	38.9 W	96	0.3 mm	0.252 W/mm^2	246 mA/mm^2
CMB2550 36-V Standard	CMB2550-xxxx-xx0Nxxxxxxx	1662 mA	58.5 W	144	0.3 mm	0.206 W/mm^2	246 mA/mm^2
CMB3090 48-V Standard	CMB3090-xxxx-xx0Qxxxxxxx	2493 mA	117 W	288	0.4 mm	0.282 W/mm^2	246 mA/mm^2
CMB3090 72-V Standard	CMB3090-xxxx-xx0Rxxxxxxx	1662 mA	117 W	288	0.4 mm	0.282 W/mm^2	246 mA/mm^2
CMT1922 36-V Standard	CMT1922-xxxx-xx0Nxxxxxxx	751 mA	26.4 W	72	0.54 mm	0.160 W/mm^2	246 mA/mm^2
CMT1925 36-V Standard	CMT1925-xxxx-xx0Nxxxxxxx	876 mA	30.8 W	84	0.45 mm	0.186 W/mm^2	246 mA/mm^2
CMT1930 36-V Standard	CMT1930-xxxx-xx0Nxxxxxxx	1033 mA	37.5 W	72	0.31 mm	0.227 W/mm^2	245 mA/mm^2
CMT1945 36-V Standard	CMT1945-xxxx-xx0Nxxxxxxx	1378 mA	49.0 W	96	0.30 mm	0.300 W/mm^2	246 mA/mm^2
CMT2850 36-V Standard	CMT2850-xxxx-xx0Nxxxxxxx	2239 mA	80.7 W	156	0.50 mm	0.212 W/mm^2	246 mA/mm^2
CMT2870 54-V Standard	CMT2870-xxxx-xx0Pxxxxxxx	1894 mA	102 W	198	0.30 mm	0.268 W/mm^2	245 mA/mm^2
CMT2890 54-V Standard	CMT2890-xxxx-xx0Pxxxxxxx	2185 mA	118 W	234	0.30 mm	0.309 W/mm^2	240 mA/mm^2
CMU1519 36-V Standard	CMU1519-xxxx-xx0Nxxxxxxx	733 mA	25.3 W	72	0.6 mm	0.153 W/mm^2	245 mA/mm^2
CMU1526 36-V Standard	CMU1526-xxxx-xx0Nxxxxxxx	978 mA	33.8 W	96	0.4 mm	0.205 W/mm^2	246 mA/mm^2
CMU1532 36-V Standard	CMU1532-xxxx-xx0Nxxxxxxx	1222 mA	42.2 W	120	0.3 mm	0.256 W/mm^2	245 mA/mm^2
CMU2236 36-V Standard	CMU2236-xxxx-xx0Nxxxxxxx	1344 mA	46.5 W	132	0.7 mm	0.122 W/mm^2	245 mA/mm^2
CMU2239 36-V Standard	CMU2239-xxxx-xx0Nxxxxxxx	1467 mA	50.7 W	144	0.6 mm	0.133 W/mm^2	246 mA/mm^2
CMU2258 54-V Standard	CMU2258-xxxx-xx0Pxxxxxxx	1467 mA	76.1 W	216	0.5 mm	0.200 W/mm^2	246 mA/mm^2

Notes:

- Please see the Reference Information for Array Scaling section for more product details and information on the scaling method.

XLAMP CMU2287 54-V STANDARD @ 105 °C, 2200 mA

Test Results Summary

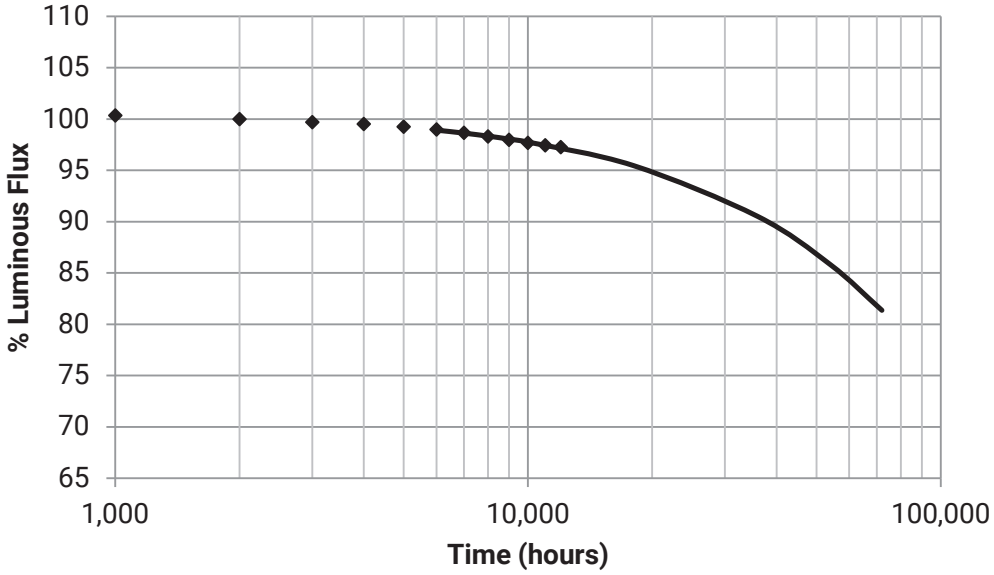
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)
0	100.00%	0.0000	0.0	0.0%
1000	100.33%	0.0002	0.0	0.0%
2000	100.00%	0.0003	0.0	0.1%
3000	99.70%	0.0005	0.0	-0.1%
4000	99.50%	0.0008	0.2	-0.2%
5000	99.24%	0.0006	0.1	-0.8%
6000	98.97%	0.0009	0.2	-0.8%
7000	98.66%	0.0006	0.1	-0.8%
8000	98.29%	0.0007	0.0	-0.9%
9000	97.98%	0.0007	0.0	-0.8%
10000	97.68%	0.0007	0.1	-0.7%
11000	97.45%	0.0010	0.2	-0.6%
12000	97.27%	0.0009	0.2	-0.6%

Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)

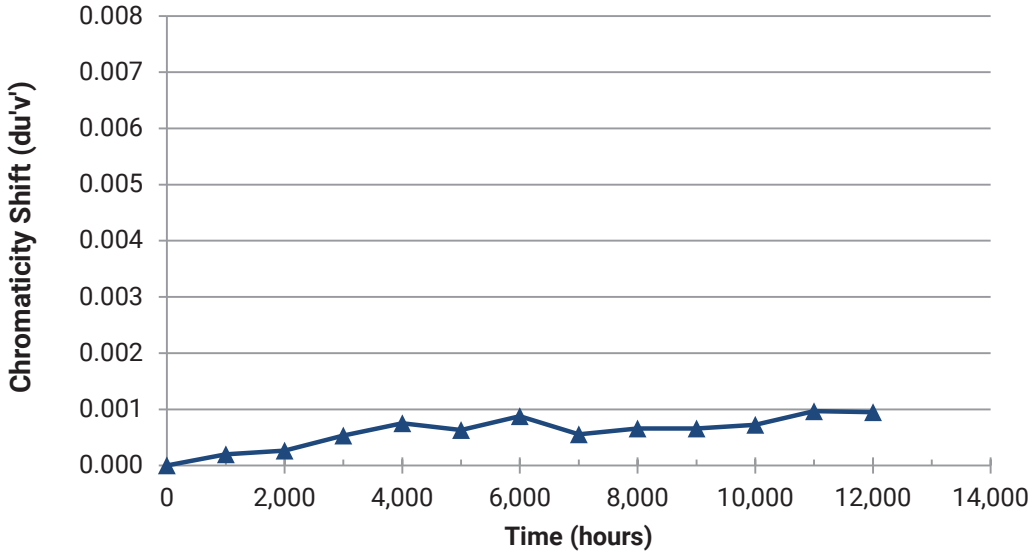
XLAMP CMU2287 54-V STANDARD @ 105 °C, 2200 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	12,000 hours
Test duration used for projection	t=6,000 to t=12,000
α	2.960E-06
β	1.007E+00
Reported Lifetimes	L90(12k) = 37,900 hrs
	L80(12k) > 66,000 hrs
	L70(12k) > 66,000 hrs



Color Shift Graph



XLAMP CMU2287 54-V STANDARD @ 105 °C, 2200 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V_F (V)	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	13300	53.5	2654	2700	100.21	99.70	99.55	99.34	99.05	98.94	98.80	98.55	98.38	98.26	98.14	97.98
2	14001	53.8	2686	2700	100.94	100.69	100.39	100.38	100.19	99.81	99.65	99.01	98.85	98.22	97.71	97.51
3	14017	53.7	2679	2700	100.56	100.26	99.66	99.65	99.49	99.22	98.61	97.99	97.37	96.86	96.77	96.68
4	13959	53.4	2669	2700	100.08	100.02	99.89	99.77	99.36	99.23	99.07	98.85	98.62	98.54	97.86	97.80
5	13992	53.5	2677	2700	100.99	100.50	100.34	100.04	99.86	99.51	98.82	98.48	98.36	97.79	97.63	97.51
6	13567	53.7	2671	2700	100.41	99.82	99.34	99.23	98.72	98.59	98.18	97.63	97.52	97.49	97.44	97.27
7	13739	53.5	2639	2700	100.62	100.60	100.35	100.07	99.95	99.51	99.04	98.89	98.25	98.17	98.02	97.37
8	13662	53.5	2654	2700	99.13	98.54	98.35	98.24	97.94	97.48	97.44	97.22	97.09	97.05	96.71	96.49
9	13561	52.8	2654	2700	99.88	99.65	99.17	99.07	98.75	98.73	98.38	97.76	97.65	97.52	97.35	97.22
10	13731	52.9	2656	2700	100.47	100.40	99.91	99.58	99.28	98.73	98.38	98.17	97.87	97.55	97.17	97.01
11	13945	53.2	2685	2700	100.48	100.11	99.86	99.60	99.20	99.05	98.67	98.11	97.80	97.12	96.81	96.60
12	13711	53.6	2663	2700	100.31	99.78	99.42	99.06	98.95	98.67	98.61	98.49	98.02	97.91	97.87	97.78
13	13923	53.5	2655	2700	100.15	99.95	99.89	99.43	99.41	99.20	98.89	98.62	97.97	97.41	97.36	97.23
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**13778**	**53.4**	**2665**		**100.33**	**100.00**	**99.70**	**99.50**	**99.24**	**98.97**	**98.66**	**98.29**	**97.98**	**97.68**	**97.45**	**97.27**
Median	13739	53.5	2663		100.41	100.02	99.86	99.58	99.28	99.05	98.67	98.48	97.97	97.55	97.44	97.27
σ	219	0.3	14		0.48	0.56	0.56	0.55	0.59	0.58	0.52	0.54	0.51	0.52	0.48	0.47
Min.	13300	52.8	2639		99.13	98.54	98.35	98.24	97.94	97.48	97.44	97.22	97.09	96.86	96.71	96.49
Max.	14017	53.8	2686		100.99	100.69	100.39	100.38	100.19	99.81	99.65	99.01	98.85	98.54	98.14	97.98

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4634	0.4114	2654	2700	0.0003	0.0002	0.0004	0.0009	0.0007	0.0009	0.0005	0.0006	0.0007	0.0007	0.0010	0.0009
2	0.4614	0.4120	2686	2700	0.0003	0.0002	0.0005	0.0009	0.0008	0.0009	0.0006	0.0007	0.0007	0.0007	0.0010	0.0010
3	0.4618	0.4118	2679	2700	0.0002	0.0004	0.0004	0.0008	0.0007	0.0010	0.0006	0.0007	0.0007	0.0009	0.0011	0.0009
4	0.4629	0.4124	2669	2700	0.0003	0.0003	0.0005	0.0009	0.0007	0.0011	0.0008	0.0007	0.0006	0.0007	0.0010	0.0009
5	0.4621	0.4120	2677	2700	0.0001	0.0003	0.0005	0.0009	0.0007	0.0006	0.0004	0.0007	0.0007	0.0007	0.0009	0.0010
6	0.4621	0.4114	2671	2700	0.0002	0.0003	0.0006	0.0008	0.0006	0.0009	0.0006	0.0007	0.0007	0.0007	0.0009	0.0009
7	0.4642	0.4111	2639	2700	0.0002	0.0002	0.0005	0.0006	0.0007	0.0009	0.0004	0.0006	0.0006	0.0007	0.0009	0.0009
8	0.4631	0.4110	2654	2700	0.0001	0.0002	0.0005	0.0007	0.0006	0.0009	0.0005	0.0008	0.0007	0.0007	0.0009	0.0010
9	0.4638	0.4123	2654	2700	0.0001	0.0002	0.0007	0.0007	0.0006	0.0008	0.0006	0.0006	0.0005	0.0008	0.0009	0.0008
10	0.4633	0.4115	2656	2700	0.0002	0.0002	0.0006	0.0007	0.0006	0.0008	0.0004	0.0005	0.0006	0.0006	0.0009	0.0009
11	0.4604	0.4100	2685	2700	0.0002	0.0001	0.0005	0.0007	0.0006	0.0009	0.0005	0.0005	0.0005	0.0006	0.0009	0.0009
12	0.4623	0.4108	2663	2700	0.0001	0.0004	0.0006	0.0006	0.0005	0.0009	0.0005	0.0006	0.0006	0.0006	0.0008	0.0009
13	0.4643	0.4132	2655	2700	0.0001	0.0003	0.0005	0.0006	0.0004	0.0007	0.0007	0.0007	0.0007	0.0009	0.0011	0.0011
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4627**	**0.4116**	**2665**		**0.0002**	**0.0003**	**0.0005**	**0.0008**	**0.0006**	**0.0009**	**0.0006**	**0.0007**	**0.0007**	**0.0007**	**0.0010**	**0.0009**
Median	0.4629	0.4115	2663		0.0002	0.0002	0.0005	0.0007	0.0006	0.0009	0.0005	0.0007	0.0007	0.0007	0.0009	0.0009
σ	0.0012	0.0008	14		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Min.	0.4604	0.4100	2639		0.0001	0.0001	0.0004	0.0006	0.0004	0.0006	0.0004	0.0005	0.0005	0.0006	0.0008	0.0008
Max.	0.4643	0.4132	2686		0.0003	0.0004	0.0007	0.0009	0.0008	0.0011	0.0008	0.0008	0.0007	0.0009	0.0011	0.0011

XLAMP CMU2287 54-V STANDARD @ 105 °C, 2200 mA

Lamp #	Initial (0 hrs)				Chromaticity (CCx)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4634	0.4114	2654	2700	0.4630	0.4631	0.4638	0.4617	0.4622	0.4618	0.4626	0.4628	0.4628	0.4627	0.4617	0.4619
2	0.4614	0.4120	2686	2700	0.4611	0.4612	0.4620	0.4597	0.4600	0.4597	0.4607	0.4606	0.4607	0.4607	0.4598	0.4598
3	0.4618	0.4118	2679	2700	0.4617	0.4614	0.4622	0.4604	0.4606	0.4600	0.4611	0.4609	0.4612	0.4610	0.4602	0.4603
4	0.4629	0.4124	2669	2700	0.4626	0.4626	0.4633	0.4613	0.4617	0.4611	0.4620	0.4621	0.4624	0.4623	0.4615	0.4615
5	0.4621	0.4120	2677	2700	0.4621	0.4617	0.4628	0.4605	0.4609	0.4609	0.4616	0.4612	0.4613	0.4613	0.4607	0.4607
6	0.4621	0.4114	2671	2700	0.4620	0.4624	0.4629	0.4609	0.4611	0.4606	0.4617	0.4616	0.4618	0.4618	0.4609	0.4609
7	0.4642	0.4111	2639	2700	0.4641	0.4641	0.4647	0.4632	0.4631	0.4627	0.4639	0.4637	0.4637	0.4635	0.4627	0.4627
8	0.4631	0.4110	2654	2700	0.4630	0.4633	0.4636	0.4619	0.4621	0.4614	0.4626	0.4623	0.4625	0.4625	0.4619	0.4617
9	0.4638	0.4123	2654	2700	0.4639	0.4640	0.4647	0.4627	0.4628	0.4626	0.4634	0.4637	0.4635	0.4634	0.4628	0.4629
10	0.4633	0.4115	2656	2700	0.4630	0.4632	0.4636	0.4620	0.4622	0.4618	0.4632	0.4630	0.4627	0.4628	0.4619	0.4617
11	0.4604	0.4100	2685	2700	0.4600	0.4604	0.4611	0.4591	0.4593	0.4587	0.4598	0.4599	0.4599	0.4599	0.4590	0.4590
12	0.4623	0.4108	2663	2700	0.4625	0.4623	0.4632	0.4611	0.4614	0.4608	0.4619	0.4619	0.4619	0.4619	0.4611	0.4609
13	0.4643	0.4132	2655	2700	0.4642	0.4641	0.4649	0.4633	0.4635	0.4630	0.4636	0.4637	0.4637	0.4634	0.4627	0.4627
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4627**	**0.4116**	**2665**		**0.4626**	**0.4626**	**0.4633**	**0.4614**	**0.4616**	**0.4612**	**0.4622**	**0.4621**	**0.4622**	**0.4621**	**0.4613**	**0.4613**
Median	0.4629	0.4115	2663		0.4626	0.4626	0.4633	0.4613	0.4617	0.4611	0.4620	0.4621	0.4624	0.4623	0.4615	0.4615
σ	0.0012	0.0008	14		0.0012	0.0012	0.0011	0.0013	0.0012	0.0013	0.0012	0.0012	0.0012	0.0011	0.0012	0.0012
Min.	0.4604	0.4100	2639		0.4600	0.4604	0.4611	0.4591	0.4593	0.4587	0.4598	0.4599	0.4599	0.4599	0.4590	0.4590
Max.	0.4643	0.4132	2686		0.4642	0.4641	0.4649	0.4633	0.4635	0.4630	0.4639	0.4637	0.4637	0.4635	0.4628	0.4629

Lamp #	Initial (0 hrs)				Chromaticity (CCy)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4634	0.4114	2654	2700	0.4116	0.4115	0.4123	0.4105	0.4111	0.4107	0.4115	0.4119	0.4122	0.4120	0.4113	0.4112
2	0.4614	0.4120	2686	2700	0.4121	0.4120	0.4130	0.4113	0.4115	0.4113	0.4122	0.4123	0.4125	0.4125	0.4118	0.4116
3	0.4618	0.4118	2679	2700	0.4121	0.4122	0.4127	0.4113	0.4115	0.4112	0.4121	0.4121	0.4126	0.4127	0.4119	0.4116
4	0.4629	0.4124	2669	2700	0.4128	0.4128	0.4136	0.4120	0.4121	0.4121	0.4130	0.4130	0.4131	0.4132	0.4127	0.4125
5	0.4621	0.4120	2677	2700	0.4122	0.4121	0.4130	0.4113	0.4116	0.4114	0.4122	0.4123	0.4125	0.4125	0.4120	0.4122
6	0.4621	0.4114	2671	2700	0.4117	0.4121	0.4127	0.4111	0.4113	0.4110	0.4121	0.4122	0.4123	0.4123	0.4116	0.4116
7	0.4642	0.4111	2639	2700	0.4114	0.4114	0.4122	0.4107	0.4108	0.4107	0.4115	0.4116	0.4116	0.4116	0.4109	0.4109
8	0.4631	0.4110	2654	2700	0.4111	0.4115	0.4122	0.4107	0.4109	0.4104	0.4115	0.4116	0.4118	0.4118	0.4112	0.4113
9	0.4638	0.4123	2654	2700	0.4126	0.4128	0.4138	0.4120	0.4122	0.4120	0.4130	0.4132	0.4130	0.4133	0.4127	0.4127
10	0.4633	0.4115	2656	2700	0.4116	0.4118	0.4127	0.4109	0.4111	0.4110	0.4120	0.4121	0.4120	0.4122	0.4115	0.4113
11	0.4604	0.4100	2685	2700	0.4099	0.4103	0.4110	0.4095	0.4096	0.4094	0.4102	0.4104	0.4104	0.4107	0.4100	0.4098
12	0.4623	0.4108	2663	2700	0.4110	0.4114	0.4120	0.4102	0.4106	0.4104	0.4112	0.4115	0.4115	0.4115	0.4108	0.4108
13	0.4643	0.4132	2655	2700	0.4132	0.4135	0.4143	0.4128	0.4130	0.4126	0.4137	0.4139	0.4139	0.4138	0.4133	0.4133
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4627**	**0.4116**	**2665**		**0.4118**	**0.4119**	**0.4127**	**0.4111**	**0.4113**	**0.4111**	**0.4120**	**0.4122**	**0.4123**	**0.4123**	**0.4117**	**0.4116**
Median	0.4629	0.4115	2663		0.4117	0.4120	0.4127	0.4111	0.4113	0.4110	0.4121	0.4121	0.4123	0.4123	0.4116	0.4116
σ	0.0012	0.0008	14		0.0009	0.0008	0.0008	0.0009	0.0008	0.0009	0.0009	0.0009	0.0009	0.0008	0.0009	0.0009
Min.	0.4604	0.4100	2639		0.4099	0.4103	0.4110	0.4095	0.4096	0.4094	0.4102	0.4104	0.4104	0.4107	0.4100	0.4098
Max.	0.4643	0.4132	2686		0.4132	0.4135	0.4143	0.4128	0.4130	0.4126	0.4137	0.4139	0.4139	0.4138	0.4133	0.4133

XLAMP CMU2287 54-V STANDARD @ 85 °C, 3000 mA

General Test Information:

Description of air movement	For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow.
Relative humidity (RH) level	< 65%
Photometric measurement uncertainty	The uncertainty of the light output measurements is U=1.59% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level.
Testing agency identification	Bay Area Compliance Laboratories Corp. (Dongguan). No.12, Pulong East 1st Road,Tangxia Town, Dongguan, Guangdong, China.
Testing agency third-party accreditation	IAS TL-460
Sampling method	The CCT and CRI combinations of samples tested were chosen to provide maximum applicability under the ENERGY STAR LM-80 Guidelines. The results in this report represent the long-term performance of the CCT and CRI combinations tested, and may vary slightly for different CCT and CRI combinations.

Information Required by IES LM-80-15:

DUT Model Number	CMU2287-0000-000P0H0A27G
Description of DUT	LED array
Drive Current [I_F]	3000 mA
Testing Start Date	July 31, 2020
Testing Completion Date	March 7, 2022
Nominal Case Temperature	85 °C
Nominal Ambient Temperature	85 °C
Test Equipment	EVERFINE AIS-2 integrating sphere EVERFINE HAAS-2000 spectroradiometer Hanshenpuyuan HSPY-60-03 DC power supply Maisheng MP6020D DC power supply BACL B3-900 Multilayer aging machine
Failures observed	None

Additional Information Required by ENERGY STAR© 2017 Guidelines:

Nominal ANSI CCT Target	2700 K
Mean CRI	84
Mean Initial Forward Voltage	55.17 V
Average Input Power	166 W
Nominal LED Die Area	0.498 mm^2
Average Current per LED Die	300 mA
Average Current Density per LED Die	603 mA/mm^2
Average Power per LED Die	0.511 W
Average Power Density per LED Die	1.026 W/mm^2
Minimum Spacing from Die Edge to Die Edge	0.3 mm

XLAMP CMU2287 54-V STANDARD @ 85 °C, 3000 mA

Other LEDs Represented by This Data Set (Per ENERGY STAR Sep 28, 2017 guidelines, Section 4.5.b.iv)

Tested Product	DUT Model Number	Tested Current	Average Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMU2287 54-V Standard	CMU2287-0000-000P0H0A27G	3000 mA	166 W	324	0.3 mm	0.435 W/mm^2	335 mA/mm^2

Other Products	Applicable Order Codes	Scaled Current	Calc. Power	# LED Die	Min. Die Edge to Die Edge Spacing	Electrical Power Density	Average Current Density per LED Die
CMA1840 36-V Standard	CMA1840-xxxx-xx0Nxxxxxxx	1644 mA	60.7 W	84	0.30 mm	0.394 W/mm^2	335 mA/mm^2
CMA2550 36-V Standard	CMA2550-xxxx-xx0Nxxxxxxx	2818 mA	105 W	144	0.40 mm	0.369 W/mm^2	335 mA/mm^2
CMB1825 36-V Standard	CMB1825-xxxx-xx0Nxxxxxxx	1133 mA	41.2 W	72	0.3 mm	0.364 W/mm^2	335 mA/mm^2
CMB1840 36-V Standard	CMB1840-xxxx-xx0Nxxxxxxx	1511 mA	54.6 W	96	0.3 mm	0.355 W/mm^2	335 mA/mm^2
CMB2550 36-V Standard	CMB2550-xxxx-xx0Nxxxxxxx	2266 mA	82.2 W	144	0.3 mm	0.290 W/mm^2	335 mA/mm^2
CMB3090 48-V Standard	CMB3090-xxxx-xx0Qxxxxxxx	3399 mA	165 W	288	0.4 mm	0.398 W/mm^2	335 mA/mm^2
CMB3090 72-V Standard	CMB3090-xxxx-xx0Rxxxxxxx	2266 mA	165 W	288	0.4 mm	0.398 W/mm^2	335 mA/mm^2
CMT1922 36-V Standard	CMT1922-xxxx-xx0Nxxxxxxx	1024 mA	37.1 W	72	0.54 mm	0.225 W/mm^2	335 mA/mm^2
CMT1925 36-V Standard	CMT1925-xxxx-xx0Nxxxxxxx	1194 mA	43.2 W	84	0.45 mm	0.262 W/mm^2	335 mA/mm^2
CMT1930 36-V Standard	CMT1930-xxxx-xx0Nxxxxxxx	1409 mA	52.9 W	72	0.31 mm	0.320 W/mm^2	335 mA/mm^2
CMT1945 36-V Standard	CMT1945-xxxx-xx0Nxxxxxxx	1879 mA	69.8 W	96	0.30 mm	0.422 W/mm^2	335 mA/mm^2
CMT2850 36-V Standard	CMT2850-xxxx-xx0Nxxxxxxx	3053 mA	114 W	156	0.50 mm	0.299 W/mm^2	335 mA/mm^2
CMT2870 54-V Standard	CMT2870-xxxx-xx0Pxxxxxxx	2583 mA	144 W	198	0.30 mm	0.378 W/mm^2	335 mA/mm^2
CMT2890 54-V Standard	CMT2890-xxxx-xx0Pxxxxxxx	2980 mA	166 W	234	0.30 mm	0.435 W/mm^2	327 mA/mm^2
CMU1519 36-V Standard	CMU1519-xxxx-xx0Nxxxxxxx	1000 mA	35.7 W	72	0.6 mm	0.216 W/mm^2	335 mA/mm^2
CMU1526 36-V Standard	CMU1526-xxxx-xx0Nxxxxxxx	1333 mA	47.6 W	96	0.4 mm	0.288 W/mm^2	335 mA/mm^2
CMU1532 36-V Standard	CMU1532-xxxx-xx0Nxxxxxxx	1667 mA	59.5 W	120	0.3 mm	0.360 W/mm^2	335 mA/mm^2
CMU2236 36-V Standard	CMU2236-xxxx-xx0Nxxxxxxx	1833 mA	65.5 W	132	0.7 mm	0.172 W/mm^2	335 mA/mm^2
CMU2239 36-V Standard	CMU2239-xxxx-xx0Nxxxxxxx	2000 mA	71.4 W	144	0.6 mm	0.188 W/mm^2	335 mA/mm^2
CMU2258 54-V Standard	CMU2258-xxxx-xx0Pxxxxxxx	2000 mA	107 W	216	0.5 mm	0.281 W/mm^2	335 mA/mm^2

Notes:

- Please see the Reference Information for Array Scaling section for more product details and information on the scaling method.

XLAMP CMU2287 54-V STANDARD @ 85 °C, 3000 mA

Test Results Summary

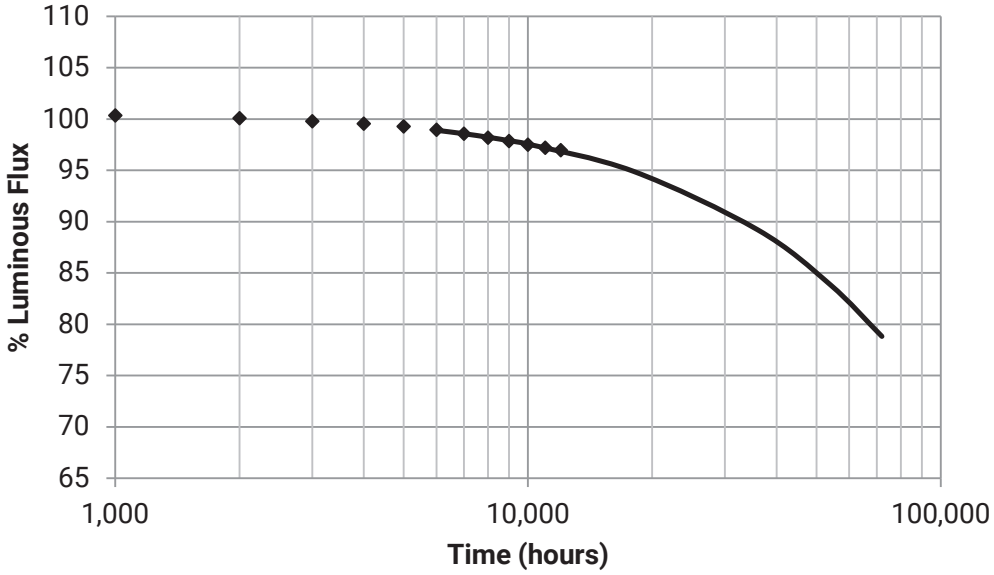
Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)
0	100.00%	0.0000	0.0	0.0%
1000	100.34%	0.0001	0.0	0.3%
2000	100.07%	0.0002	-0.1	-1.0%
3000	99.79%	0.0004	-0.1	-0.8%
4000	99.55%	0.0007	0.1	-0.8%
5000	99.29%	0.0005	0.1	0.0%
6000	98.96%	0.0008	0.1	-0.9%
7000	98.56%	0.0005	0.0	-0.8%
8000	98.19%	0.0007	0.0	-0.8%
9000	97.86%	0.0010	0.0	-0.7%
10000	97.51%	0.0010	0.0	-0.7%
11000	97.20%	0.0010	0.2	-0.4%
12000	96.95%	0.0010	0.2	-0.4%

Test Duration (hrs)	Relative Luminous Flux	Relative Color Shift (Δu'v')	Relative CRI Shift (ΔRa)	Relative Voltage Shift (%ΔV_F)

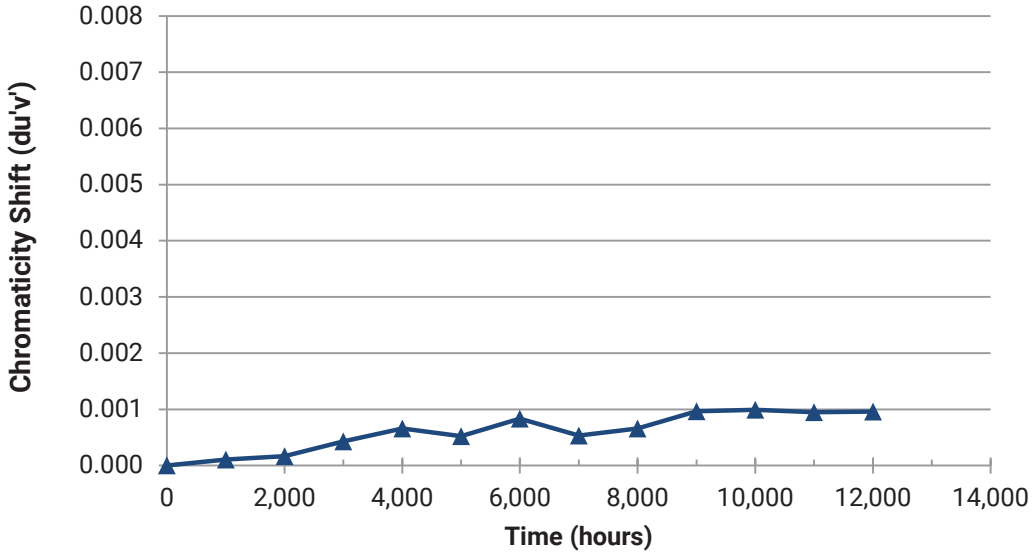
XLAMP CMU2287 54-V STANDARD @ 85 °C, 3000 mA

TM-21 Projection from Cree's Internal Calculator

Test duration	12,000 hours
Test duration used for projection	t=6,000 to t=12,000
α	3.439E-06
β	1.010E+00
Reported Lifetimes	L90(12k) = 33,400 hrs
	L80(12k) > 66,000 hrs
	L70(12k) > 66,000 hrs



Color Shift Graph



XLAMP CMU2287 54-V STANDARD @ 85 °C, 3000 mA

Lamp #	Initial (0 hrs)				Lumen Maintenance (%)											
	LF (lm)	V_F (V)	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	18383	55.0	2703	2700	100.80	100.76	100.63	100.18	100.08	99.41	99.04	98.91	98.61	98.45	98.26	98.07
2	18170	55.4	2662	2700	100.63	100.50	100.43	100.36	100.08	99.53	99.29	98.76	98.23	97.79	97.58	97.48
3	18279	54.8	2656	2700	100.28	100.05	99.70	99.54	99.06	98.97	98.29	98.22	98.03	97.33	97.24	97.14
4	18334	55.5	2652	2700	100.06	99.61	99.45	99.16	99.00	98.49	98.02	97.86	97.83	97.50	97.14	96.98
5	18040	55.4	2655	2700	100.67	100.50	100.24	100.08	99.83	99.71	99.38	98.78	98.73	98.12	97.99	97.90
6	18475	55.3	2699	2700	100.78	100.32	100.14	99.99	99.63	99.07	98.71	98.68	98.57	98.08	97.47	97.37
7	18080	54.7	2694	2700	99.42	98.73	98.37	98.34	98.08	97.73	97.36	96.85	96.10	95.78	95.33	94.83
8	18361	54.7	2662	2700	100.25	99.50	98.91	98.83	98.69	98.32	98.18	98.03	97.57	97.02	96.61	96.37
9	18392	55.0	2681	2700	100.55	100.53	100.33	99.55	99.52	99.47	98.87	98.19	98.10	98.09	97.55	97.05
10	18375	55.5	2641	2700	100.65	100.60	99.96	99.68	99.10	98.85	98.21	97.76	97.15	97.14	96.76	96.08
11	18294	55.2	2707	2700	100.51	100.28	100.14	99.89	99.63	99.57	99.12	98.50	98.41	98.09	97.57	97.42
12	18466	55.4	2673	2700	100.02	99.93	99.85	99.55	99.51	99.25	99.03	98.25	97.54	97.45	97.36	97.00
13	18543	55.4	2672	2700	99.85	99.57	99.14	99.02	98.50	98.10	97.83	97.68	97.32	96.81	96.74	96.59
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**18322**	**55.2**	**2674**		**100.34**	**100.07**	**99.79**	**99.55**	**99.29**	**98.96**	**98.56**	**98.19**	**97.86**	**97.51**	**97.20**	**96.95**
Median	18361	55.3	2672		100.51	100.28	99.96	99.55	99.51	99.07	98.71	98.22	98.03	97.50	97.36	97.05
σ	150	0.3	21		0.41	0.58	0.66	0.58	0.61	0.63	0.63	0.57	0.73	0.72	0.74	0.85
Min.	18040	54.7	2641		99.42	98.73	98.37	98.34	98.08	97.73	97.36	96.85	96.10	95.78	95.33	94.83
Max.	18543	55.5	2707		100.80	100.76	100.63	100.36	100.08	99.71	99.38	98.91	98.73	98.45	98.26	98.07

Lamp #	Initial (0 hrs)				Chromaticity Shift (Δu'v')											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4599	0.4113	2703	2700	0.0000	0.0001	0.0004	0.0007	0.0007	0.0009	0.0005	0.0007	0.0009	0.0009	0.0009	0.0011
2	0.4635	0.4127	2662	2700	0.0001	0.0001	0.0003	0.0006	0.0004	0.0008	0.0004	0.0005	0.0007	0.0008	0.0008	0.0008
3	0.4639	0.4126	2656	2700	0.0001	0.0002	0.0002	0.0006	0.0004	0.0011	0.0006	0.0005	0.0009	0.0009	0.0010	0.0010
4	0.4641	0.4125	2652	2700	0.0001	0.0002	0.0003	0.0007	0.0006	0.0008	0.0003	0.0006	0.0009	0.0009	0.0010	0.0008
5	0.4630	0.4108	2655	2700	0.0002	0.0001	0.0005	0.0006	0.0004	0.0007	0.0004	0.0006	0.0009	0.0009	0.0009	0.0008
6	0.4600	0.4110	2699	2700	0.0001	0.0000	0.0005	0.0006	0.0006	0.0007	0.0004	0.0006	0.0008	0.0009	0.0009	0.0009
7	0.4605	0.4113	2694	2700	0.0002	0.0003	0.0004	0.0008	0.0005	0.0009	0.0005	0.0007	0.0009	0.0009	0.0010	0.0009
8	0.4635	0.4127	2662	2700	0.0002	0.0003	0.0004	0.0007	0.0006	0.0008	0.0006	0.0008	0.0010	0.0010	0.0009	0.0011
9	0.4618	0.4121	2681	2700	0.0001	0.0002	0.0004	0.0007	0.0008	0.0009	0.0007	0.0005	0.0010	0.0011	0.0010	0.0009
10	0.4650	0.4126	2641	2700	0.0001	0.0001	0.0005	0.0005	0.0003	0.0007	0.0005	0.0005	0.0010	0.0010	0.0009	0.0009
11	0.4596	0.4114	2707	2700	0.0001	0.0001	0.0005	0.0005	0.0001	0.0006	0.0006	0.0006	0.0011	0.0012	0.0011	0.0012
12	0.4620	0.4115	2673	2700	0.0000	0.0001	0.0004	0.0006	0.0004	0.0007	0.0006	0.0007	0.0011	0.0009	0.0008	0.0010
13	0.4626	0.4123	2672	2700	0.0000	0.0002	0.0006	0.0008	0.0009	0.0012	0.0007	0.0010	0.0013	0.0014	0.0011	0.0011
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4623**	**0.4119**	**2674**		**0.0001**	**0.0002**	**0.0004**	**0.0007**	**0.0005**	**0.0008**	**0.0005**	**0.0007**	**0.0010**	**0.0010**	**0.0010**	**0.0010**
Median	0.4626	0.4121	2672		0.0001	0.0001	0.0004	0.0006	0.0005	0.0008	0.0005	0.0006	0.0009	0.0009	0.0009	0.0009
σ	0.0018	0.0007	21		0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001
Min.	0.4596	0.4108	2641		0.0000	0.0000	0.0002	0.0005	0.0001	0.0006	0.0003	0.0005	0.0007	0.0008	0.0008	0.0008
Max.	0.4650	0.4127	2707		0.0002	0.0003	0.0006	0.0008	0.0009	0.0012	0.0007	0.0010	0.0013	0.0014	0.0011	0.0012

XLAMP CMU2287 54-V STANDARD @ 85 °C, 3000 mA

Lamp #	Initial (0 hrs)				Chromaticity (CCx)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4599	0.4113	2703	2700	0.4599	0.4600	0.4606	0.4586	0.4587	0.4582	0.4592	0.4593	0.4588	0.4588	0.4583	0.4581
2	0.4635	0.4127	2662	2700	0.4637	0.4634	0.4641	0.4623	0.4627	0.4619	0.4629	0.4630	0.4625	0.4624	0.4621	0.4622
3	0.4639	0.4126	2656	2700	0.4637	0.4636	0.4640	0.4627	0.4631	0.4619	0.4630	0.4633	0.4626	0.4625	0.4622	0.4622
4	0.4641	0.4125	2652	2700	0.4642	0.4644	0.4645	0.4628	0.4631	0.4627	0.4639	0.4635	0.4630	0.4630	0.4624	0.4627
5	0.4630	0.4108	2655	2700	0.4634	0.4630	0.4637	0.4619	0.4623	0.4618	0.4628	0.4624	0.4619	0.4619	0.4616	0.4618
6	0.4600	0.4110	2699	2700	0.4597	0.4600	0.4609	0.4589	0.4589	0.4586	0.4596	0.4595	0.4590	0.4589	0.4586	0.4584
7	0.4605	0.4113	2694	2700	0.4602	0.4603	0.4608	0.4590	0.4596	0.4589	0.4600	0.4603	0.4597	0.4598	0.4591	0.4594
8	0.4635	0.4127	2662	2700	0.4634	0.4631	0.4638	0.4622	0.4625	0.4621	0.4628	0.4627	0.4623	0.4623	0.4620	0.4617
9	0.4618	0.4121	2681	2700	0.4617	0.4617	0.4623	0.4605	0.4605	0.4601	0.4611	0.4615	0.4606	0.4603	0.4601	0.4603
10	0.4650	0.4126	2641	2700	0.4652	0.4652	0.4657	0.4641	0.4645	0.4637	0.4645	0.4647	0.4638	0.4638	0.4635	0.4635
11	0.4596	0.4114	2707	2700	0.4595	0.4596	0.4602	0.4587	0.4593	0.4584	0.4590	0.4592	0.4583	0.4582	0.4578	0.4577
12	0.4620	0.4115	2673	2700	0.4620	0.4619	0.4627	0.4608	0.4614	0.4607	0.4614	0.4612	0.4605	0.4609	0.4607	0.4603
13	0.4626	0.4123	2672	2700	0.4626	0.4625	0.4629	0.4612	0.4612	0.4607	0.4619	0.4615	0.4610	0.4609	0.4608	0.4608
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4623**	**0.4119**	**2674**		**0.4622**	**0.4622**	**0.4628**	**0.4611**	**0.4614**	**0.4607**	**0.4617**	**0.4617**	**0.4611**	**0.4610**	**0.4607**	**0.4607**
Median	0.4626	0.4121	2672		0.4626	0.4625	0.4629	0.4612	0.4614	0.4607	0.4619	0.4615	0.4610	0.4609	0.4608	0.4608
σ	0.0018	0.0007	21		0.0019	0.0018	0.0017	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0019
Min.	0.4596	0.4108	2641		0.4595	0.4596	0.4602	0.4586	0.4587	0.4582	0.4590	0.4592	0.4583	0.4582	0.4578	0.4577
Max.	0.4650	0.4127	2707		0.4652	0.4652	0.4657	0.4641	0.4645	0.4637	0.4645	0.4647	0.4638	0.4638	0.4635	0.4635

Lamp #	Initial (0 hrs)				Chromaticity (CCy)											
	CCx	CCy	Calc. CCT	ANSI Target	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1	0.4599	0.4113	2703	2700	0.4113	0.4112	0.4120	0.4107	0.4109	0.4106	0.4115	0.4120	0.4117	0.4117	0.4111	0.4109
2	0.4635	0.4127	2662	2700	0.4129	0.4125	0.4133	0.4119	0.4122	0.4118	0.4127	0.4132	0.4128	0.4129	0.4122	0.4124
3	0.4639	0.4126	2656	2700	0.4124	0.4122	0.4130	0.4120	0.4121	0.4115	0.4126	0.4128	0.4128	0.4126	0.4122	0.4122
4	0.4641	0.4125	2652	2700	0.4124	0.4124	0.4131	0.4119	0.4121	0.4117	0.4128	0.4130	0.4129	0.4129	0.4121	0.4120
5	0.4630	0.4108	2655	2700	0.4112	0.4111	0.4118	0.4104	0.4108	0.4105	0.4114	0.4113	0.4112	0.4112	0.4106	0.4110
6	0.4600	0.4110	2699	2700	0.4108	0.4110	0.4119	0.4106	0.4106	0.4102	0.4114	0.4117	0.4113	0.4114	0.4107	0.4105
7	0.4605	0.4113	2694	2700	0.4114	0.4116	0.4122	0.4105	0.4111	0.4106	0.4117	0.4124	0.4121	0.4123	0.4115	0.4117
8	0.4635	0.4127	2662	2700	0.4130	0.4129	0.4136	0.4122	0.4126	0.4122	0.4130	0.4133	0.4132	0.4132	0.4125	0.4124
9	0.4618	0.4121	2681	2700	0.4121	0.4124	0.4129	0.4115	0.4118	0.4114	0.4126	0.4127	0.4125	0.4124	0.4117	0.4119
10	0.4650	0.4126	2641	2700	0.4128	0.4128	0.4137	0.4122	0.4126	0.4121	0.4131	0.4133	0.4131	0.4131	0.4125	0.4125
11	0.4596	0.4114	2707	2700	0.4114	0.4116	0.4124	0.4109	0.4112	0.4108	0.4118	0.4121	0.4119	0.4119	0.4113	0.4111
12	0.4620	0.4115	2673	2700	0.4115	0.4115	0.4122	0.4106	0.4112	0.4107	0.4120	0.4118	0.4118	0.4119	0.4112	0.4111
13	0.4626	0.4123	2672	2700	0.4123	0.4126	0.4135	0.4118	0.4123	0.4120	0.4128	0.4130	0.4129	0.4130	0.4122	0.4122
n	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Mean	**0.4623**	**0.4119**	**2674**		**0.4120**	**0.4120**	**0.4127**	**0.4113**	**0.4116**	**0.4112**	**0.4123**	**0.4125**	**0.4123**	**0.4123**	**0.4117**	**0.4117**
Median	0.4626	0.4121	2672		0.4121	0.4122	0.4129	0.4115	0.4118	0.4114	0.4126	0.4127	0.4125	0.4124	0.4117	0.4119
σ	0.0018	0.0007	21		0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0006	0.0007	0.0007	0.0007	0.0007	0.0007
Min.	0.4596	0.4108	2641		0.4108	0.4110	0.4118	0.4104	0.4106	0.4102	0.4114	0.4113	0.4112	0.4112	0.4106	0.4105
Max.	0.4650	0.4127	2707		0.4130	0.4129	0.4137	0.4122	0.4126	0.4122	0.4131	0.4133	0.4132	0.4132	0.4125	0.4125

REFERENCE INFORMATION FOR ARRAY SCALING - CMA/CMB

Additional Product Information Used for Array Scaling Calculations

Product	Applicable Order Codes	# LED Die	# Die / String (in Series)	# Strings / LED (in Parallel)	Nominal LED Die Area	LES Diameter	LES Area
CMA1303 9-V Standard	CMA1303-xxxx-xx0Cxxxxxxx	12	12	1	0.488 mm^2	4.5 mm	15.9 mm^2
CMA1303 18-V Standard	CMA1303-xxxx-xx0Fxxxxxxx	12	6	2	0.488 mm^2	4.5 mm	15.9 mm^2
CMA1303 36-V Standard	CMA1303-xxxx-xx0Nxxxxxxx	12	3	4	0.488 mm^2	4.5 mm	15.9 mm^2
CMA1306 9-V Standard	CMA1306-xxxx-xx0Cxxxxxxx	12	12	1	0.702 mm^2	6.0 mm	28.3 mm^2
CMA1306 18-V Standard	CMA1306-xxxx-xx0Fxxxxxxx	12	6	2	0.702 mm^2	6.0 mm	28.3 mm^2
CMA1306 36-V Standard	CMA1306-xxxx-xx0Nxxxxxxx	12	3	4	0.702 mm^2	6.0 mm	28.3 mm^2
CMA1516 36-V Standard	CMA1516-xxxx-xx0Nxxxxxxx	48	12	4	0.510 mm^2	9.0 mm	63.6 mm^2
CMA1825 36-V Standard	CMA1825-xxxx-xx0Nxxxxxxx	60	12	5	0.702 mm^2	12.0 mm	113 mm^2
CMA1840 36-V Standard	CMA1840-xxxx-xx0Nxxxxxxx	84	12	7	0.702 mm^2	14.0 mm	154 mm^2
CMA2550 36-V Standard	CMA2550-xxxx-xx0Nxxxxxxx	144	12	12	0.702 mm^2	19.0 mm	284 mm^2
CMA3090 48-V Standard	CMA3090-xxxx-xx0Qxxxxxxx	240	16	15	0.702 mm^2	23.0 mm	416 mm^2
CMA3090 72-V Standard	CMA3090-xxxx-xx0Rxxxxxxx	240	24	10	0.702 mm^2	23.0 mm	416 mm^2
CMB1304 9-V Standard	CMB1304-xxxx-xx0Cxxxxxxx	12	3	4	0.490 mm^2	6.0 mm	28.3 mm^2
CMB1304 18-V Standard	CMB1304-xxxx-xx0Fxxxxxxx	12	6	2	0.490 mm^2	6.0 mm	28.3 mm^2
CMB1304 36-V Standard	CMB1304-xxxx-xx0Nxxxxxxx	12	12	1	0.490 mm^2	6.0 mm	28.3 mm^2
CMB1306 18-V Standard	CMB1306-xxxx-xx0Fxxxxxxx	24	6	4	0.490 mm^2	6.0 mm	28.3 mm^2
CMB1306 36-V Standard	CMB1306-xxxx-xx0Nxxxxxxx	24	12	2	0.490 mm^2	6.0 mm	28.3 mm^2
CMB1507 18-V Standard	CMB1507-xxxx-xx0Fxxxxxxx	24	6	4	0.564 mm^2	9.0 mm	63.6 mm^2
CMB1507 36-V Standard	CMB1507-xxxx-xx0Nxxxxxxx	24	12	2	0.564 mm^2	9.0 mm	63.6 mm^2
CMB1510 18-V Standard	CMB1510-xxxx-xx0Fxxxxxxx	36	6	6	0.564 mm^2	9.0 mm	63.6 mm^2
CMB1510 36-V Standard	CMB1510-xxxx-xx0Nxxxxxxx	36	12	3	0.564 mm^2	9.0 mm	63.6 mm^2
CMB1516 36-V Standard	CMB1516-xxxx-xx0Nxxxxxxx	48	12	4	0.564 mm^2	9.0 mm	63.6 mm^2
CMB1818 36-V Standard	CMB1818-xxxx-xx0Nxxxxxxx	60	12	5	0.564 mm^2	12.0 mm	113 mm^2
CMB1825 36-V Standard	CMB1825-xxxx-xx0Nxxxxxxx	72	12	6	0.564 mm^2	12.0 mm	113 mm^2
CMB1840 36-V Standard	CMB1840-xxxx-xx0Nxxxxxxx	96	12	8	0.564 mm^2	14.0 mm	154 mm^2
CMB2550 36-V Standard	CMB2550-xxxx-xx0Nxxxxxxx	144	12	12	0.564 mm^2	19.0 mm	284 mm^2
CMB3090 48-V Standard	CMB3090-xxxx-xx0Qxxxxxxx	288	16	18	0.564 mm^2	23.0 mm	416 mm^2
CMB3090 72-V Standard	CMB3090-xxxx-xx0Rxxxxxxx	288	24	12	0.564 mm^2	23.0 mm	416 mm^2

Notes on Array Scaling Methodology

- In reference to ENERGY STAR Sep 28, 2017 guidelines, Section 4.5.b.iv.3, Cree LED has used the light emitting surface (LES) area as the area for electrical power density calculations. LES area values for each product are shown in the table above.
- All scaling calculation values shown in this document are rounded and may not yield exactly the same result if the calculation is repeated with the rounded values.
- Cree LED used the internally-developed Product Characterization Tool (PCT) to perform the current-to-power and power-to-current conversions that are required for the array scaling calculations.

REFERENCE INFORMATION FOR ARRAY SCALING - CMT/CMU

Additional Product Information Used for Array Scaling Calculations

Product	Applicable Order Codes	# LED Die	# Die / String (in Series)	# Strings / LED (in Parallel)	Nominal LED Die Area	LES Diameter	LES Area
CMT1407 36-V Standard	CMT1407-xxxx-xx0Nxxxxxxx	24	12	2	0.510 mm^2	9.8 mm	75.4 mm^2
CMT1412 36-V Standard	CMT1412-xxxx-xx0Nxxxxxxx	36	12	3	0.510 mm^2	9.8 mm	75.4 mm^2
CMT1420 36-V Standard	CMT1420-xxxx-xx0Nxxxxxxx	60	12	5	0.510 mm^2	9.8 mm	75.4 mm^2
CMT1922 36-V Standard	CMT1922-xxxx-xx0Nxxxxxxx	72	12	6	0.510 mm^2	14.5 mm	165 mm^2
CMT1925 36-V Standard	CMT1925-xxxx-xx0Nxxxxxxx	84	12	7	0.510 mm^2	14.5 mm	165 mm^2
CMT1930 36-V Standard	CMT1930-xxxx-xx0Nxxxxxxx	72	12	6	0.702 mm^2	14.5 mm	165 mm^2
CMT1945 36-V Standard	CMT1945-xxxx-xx0Nxxxxxxx	96	12	8	0.702 mm^2	14.5 mm	165 mm^2
CMT2850 36-V Standard	CMT2850-xxxx-xx0Nxxxxxxx	156	12	13	0.702 mm^2	22.0 mm	380 mm^2
CMT2870 54-V Standard	CMT2870-xxxx-xx0Pxxxxxxx	198	18	11	0.702 mm^2	22.0 mm	380 mm^2
CMT2890 54-V Standard	CMT2890-xxxx-xx0Pxxxxxxx	234	18	13	0.702 mm^2	22.0 mm	380 mm^2
CMU1003 36-V Standard	CMU1003-xxxx-xx0Nxxxxxxx	12	12	1	0.498 mm^2	9.8 mm	75.4 mm^2
CMU1006 36-V Standard	CMU1006-xxxx-xx0Nxxxxxxx	24	12	2	0.498 mm^2	9.8 mm	75.4 mm^2
CMU1010 36-V Standard	CMU1010-xxxx-xx0Nxxxxxxx	36	12	3	0.498 mm^2	9.8 mm	75.4 mm^2
CMU1013 36-V Standard	CMU1013-xxxx-xx0Nxxxxxxx	48	12	4	0.498 mm^2	9.8 mm	75.4 mm^2
CMU1516 36-V Standard	CMU1516-xxxx-xx0Nxxxxxxx	60	12	5	0.498 mm^2	14.5 mm	165 mm^2
CMU1519 36-V Standard	CMU1519-xxxx-xx0Nxxxxxxx	72	12	6	0.498 mm^2	14.5 mm	165 mm^2
CMU1526 36-V Standard	CMU1526-xxxx-xx0Nxxxxxxx	96	12	8	0.498 mm^2	14.5 mm	165 mm^2
CMU1532 36-V Standard	CMU1532-xxxx-xx0Nxxxxxxx	120	12	10	0.498 mm^2	14.5 mm	165 mm^2
CMU2236 36-V Standard	CMU2236-xxxx-xx0Nxxxxxxx	132	12	11	0.498 mm^2	22.0 mm	380 mm^2
CMU2239 36-V Standard	CMU2239-xxxx-xx0Nxxxxxxx	144	12	12	0.498 mm^2	22.0 mm	380 mm^2
CMU2258 54-V Standard	CMU2258-xxxx-xx0Pxxxxxxx	216	18	12	0.498 mm^2	22.0 mm	380 mm^2
CMU2287 54-V Standard	CMU2287-xxxx-xx0Pxxxxxxx	324	18	18	0.498 mm^2	22.0 mm	380 mm^2

Notes on Array Scaling Methodology

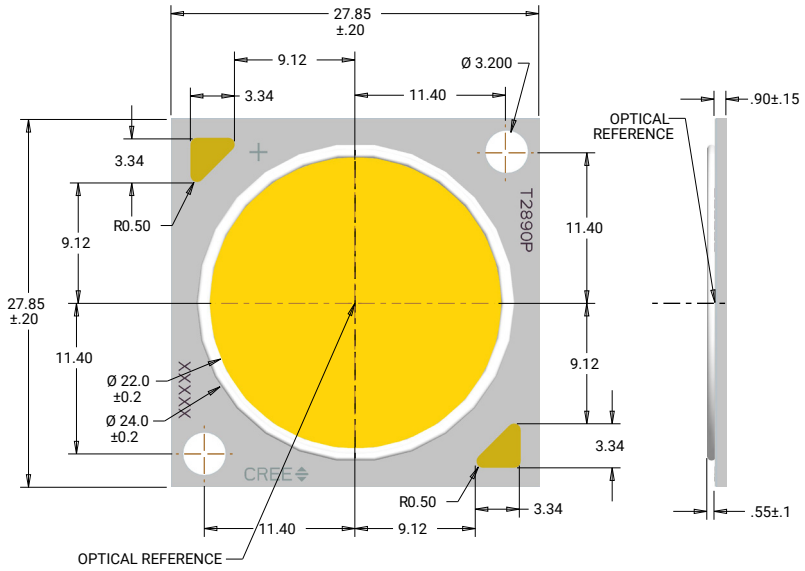
- In reference to ENERGY STAR Sep 28, 2017 guidelines, Section 4.5.b.iv.3, Cree LED has used the light emitting surface (LES) area as the area for electrical power density calculations. LES area values for each product are shown in the table above.
- All scaling calculation values shown in this document are rounded and may not yield exactly the same result if the calculation is repeated with the rounded values.
- Cree LED used the internally-developed Product Characterization Tool (PCT) to perform the current-to-power and power-to-current conversions that are required for the array scaling calculations.

MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT

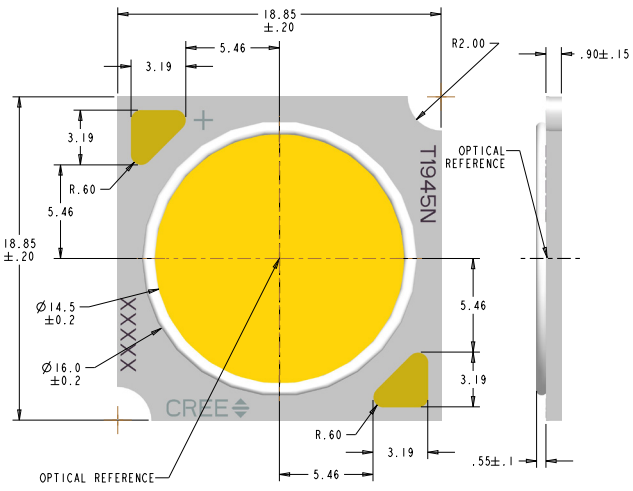
Dimensions are in mm. Tolerances unless otherwise specified: ±.13, x° ± 1°

Tc measurement point for all CM Family LEDs: either the anode or cathode solder pad

CMT28xx

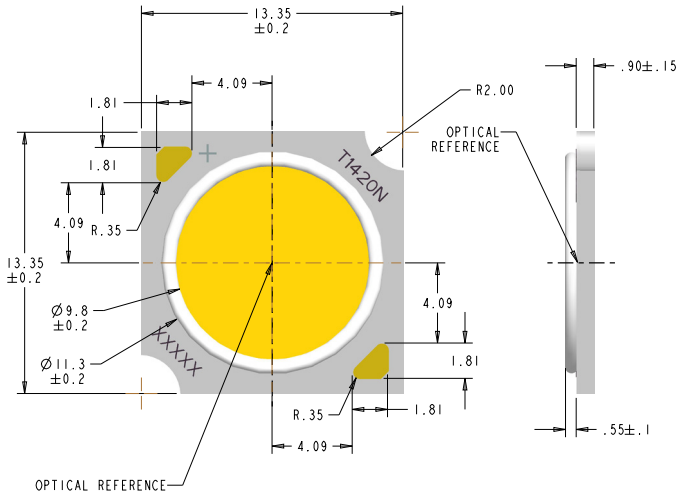


CMT19xx

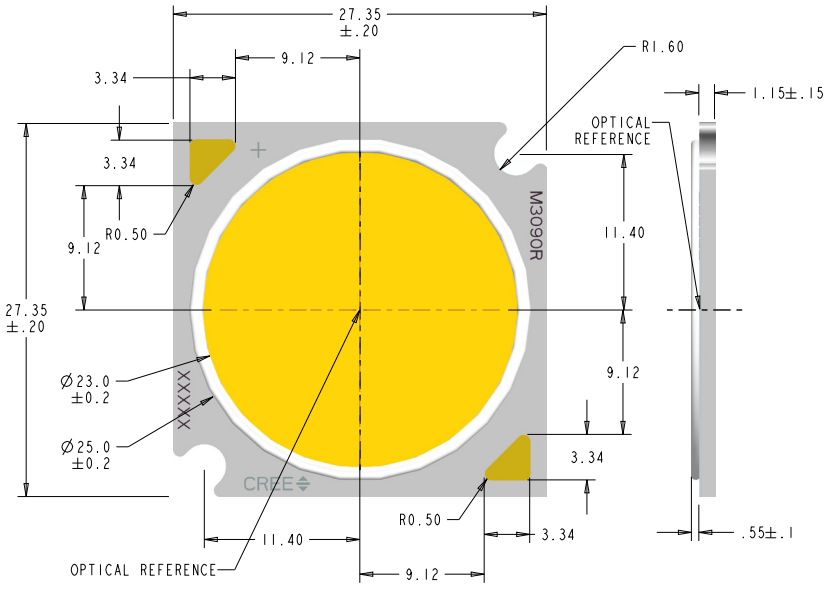


MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT - CONTINUED

CMT14xx

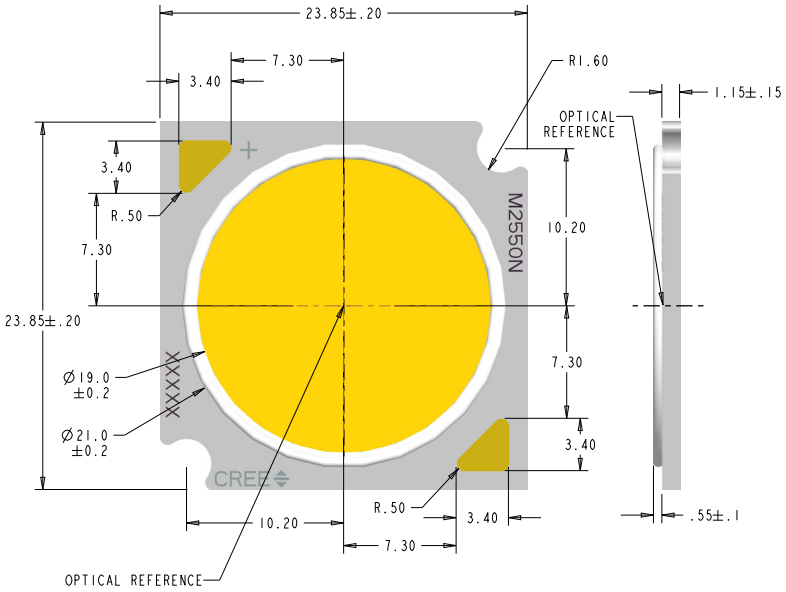


CMx3090

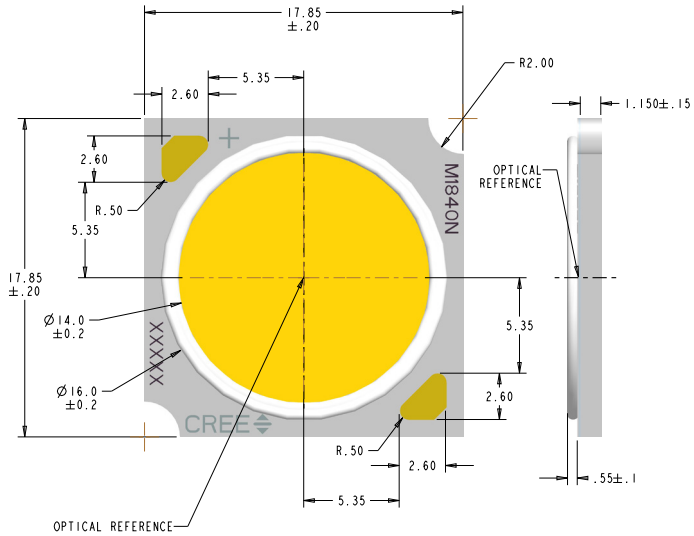


MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT - CONTINUED

CMx2550

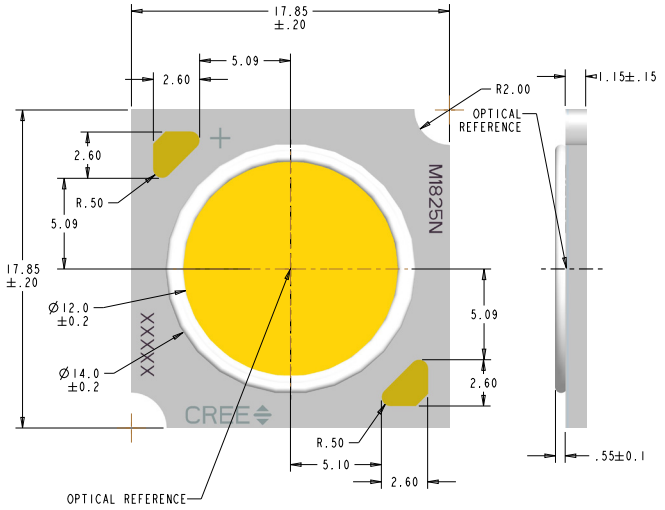


CMx1840

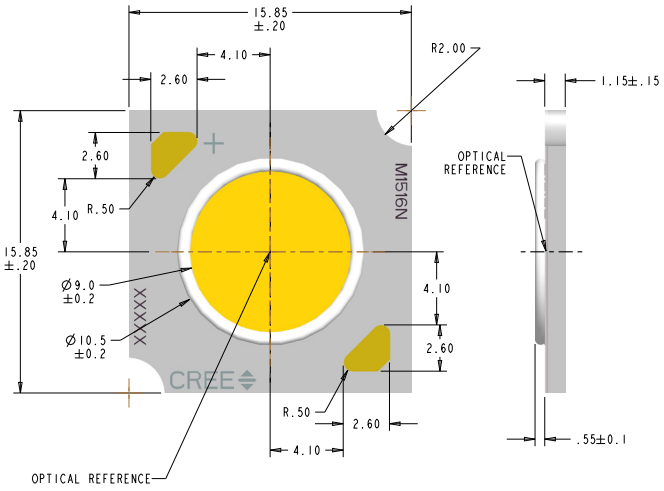


MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT - CONTINUED

CMx1825, CMB1818

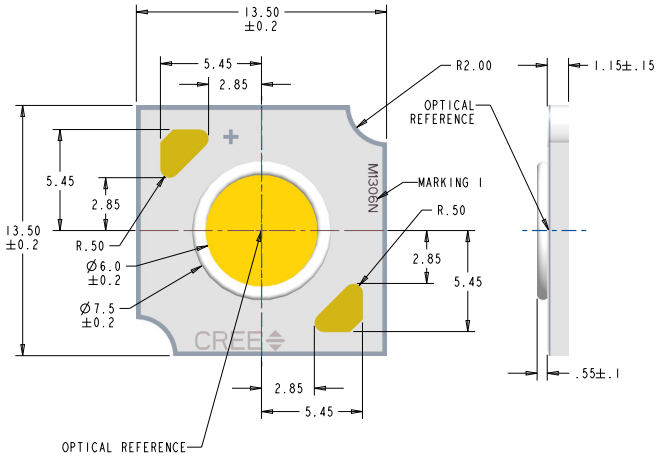


CMx1516, CMB1510, CMB1507

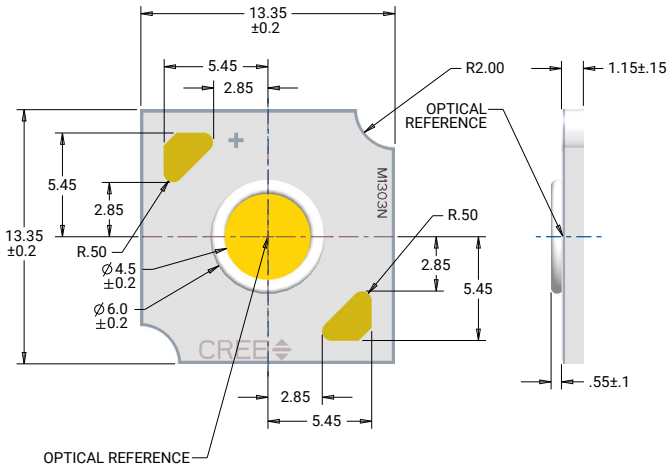


MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT - CONTINUED

CMx1306, CMB1304

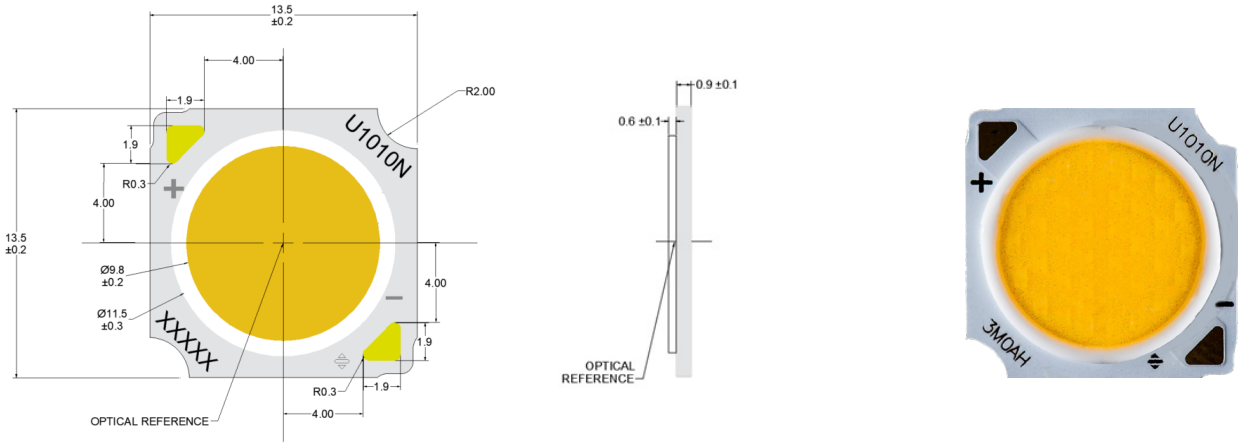


CMA1303

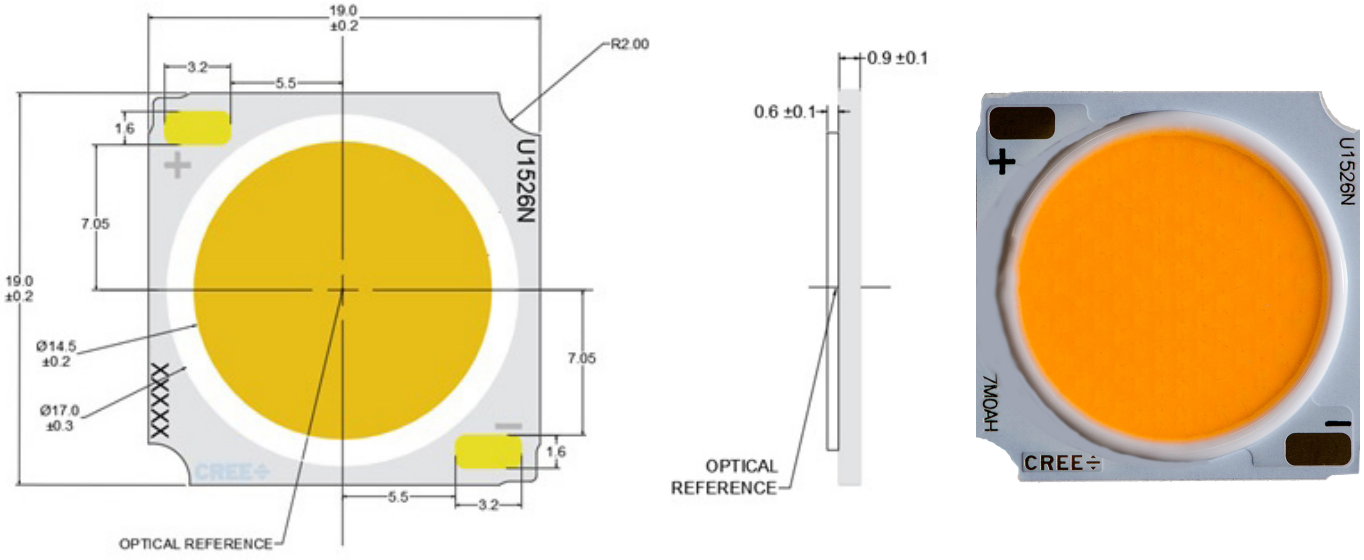


MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT - CONTINUED

CMU10xx



CMU15xx



MECHANICAL DIMENSIONS & TEMPERATURE MEASUREMENT POINT - CONTINUED

CMU22xx