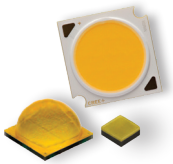
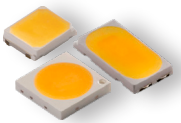
LED COMPONENTS

PRODUCT and APPLICATION GUIDE

2020



CREE® XLAMP® LEDs



CREE® J SERIES® LEDs

CREE® HIGH-BRIGHTNESS LEDs

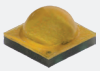
APPLICATIONS

PRODUCTS

Artist: Arlon Bayliss
Fabrication: BoMar Inc.
Photo credit: Jeff Bradley

XLamp® LEDs

- Industry's best lumen density and optical control
- Excellent L90 lifetimes across the entire portfolio
- XP-G3 S Line provides industry's best sulfur resistance and best-in-class efficacy

LEDs		Footprint (mm)	Voltage Class (V)	Typical LPW @ 85 °C	Maximum Drive Current (A)	Maximum Power (W)
	XT-E High Efficacy	3.45	3	169 @ 1 W	1.50	5
	XP-G2 High Efficacy		3	174 @ 1 W	2.00	6
	XP-G3 S Line		3	165 @ 2 W	2.00	6
	XP-L2		3	165 @ 3 W	3.00	10
	XHP35.2		12	165 @ 4 W	1.05	13
	MHB-B	5.00	9 18 36	177 @ 2 W 157@ 4 W	0.700 0.350 0.175	6
	XHP50.2		6 12	148 @ 8 W	3.00 1.50	18
	XHP70.2	7.00	6 12	150 @ 12 W	4.80 2.40	29

J Series® LEDs: Standard

- High-efficacy, low-cost solution with good optical control
- DLC 4 Premium L90 36k hour lifetime @ 1 W

LEDs		Footprint (mm)	Voltage Class (V)	Typical LPW @ 85 °C	Maximum Drive Current (A)	Maximum Power (W)
	JR5050 P Class	5.00	6 24	197 @ 1.0 W 183 @ 2.3 W	1.000 0.240	6

- 70, 80 & 90 CRI options for complete 6500 K–2700 K CCT range
- 3-step color kits aligned to Cree's EasyWhite® bins
- 2200 K CCT and 98 CRI options available

J Series® LEDs: 2835

Voltage Class	Series	Product/Class	Typical Current (mA)	Typical Voltage (V)	4000 K, 80 CRI	3000 K, 90 CRI	Maximum Current (mA)
					Typical LPW	Typical LPW	
3-V	High Efficacy	JB2835B / G	55	2.67	215	171	480
	Standard	JE2835B / N	150	2.93	177	141	240
		JE2835B / P	150	3.00	169	133	240
		JE2835 / R	150	2.95	163	128	240
	Value	JB2835 / W	60	2.95	168	136	150
6-V	Standard	JK2835 / P	150	6.00	173	134	200
	Value	JK2835B / W	150	6.35	150	117	200

J Series® LEDs: 3030

Voltage Class	Series	Product/Class	Typical Current (mA)	Typical Voltage (V)	4000 K, 80 CRI	3000 K, 90 CRI	Maximum Current (mA)
					Typical LPW	Typical LPW	
3-V	High Efficacy	JB3030 / B	65	2.71	207	163	240
		JB3030 / D	65	2.81	198	156	240
6-V		JK3030 / B	150	6.02	169	135	200

J Series® LEDs: 5630

Voltage Class	Series	Product/Class	Typical Current (mA)	Typical Voltage (V)	4000 K, 80 CRI	3000 K, 90 CRI	Maximum Current (mA)
					Typical LPW	Typical LPW	
3-V	High Efficacy	JB5630 / H	65	2.71	217	155	240
	Standard	JB5630 / P	65	2.80	206	152	240

XLamp® LEDs: Discrete

- XLamp XD16 LED is the first LED to surpass the 280 lm/mm² lumen-density mark
- Full portfolio of white and color LED options

LEDs		Footprint (mm)	Maximum Light Output (lm)	Maximum Drive Current (A)	Optical Value
	XQ-E High Intensity	1.60	334	1.00	Smallest high-power optical source Available in full range of colors
	XD16	1.60	726	2.00	Industry's highest lumen density Optimized for use in LED arrays
	XP-G3 Standard	3.45	777	2.00	Compatible with large suite of XP-G optics Industry's best color stability over time
	XP-L High Intensity	3.45	1,095	3.00	Compatible with large suite of XP-G optics

XLamp® LEDs: COB

- Industry's best lumen density & reliability for both ceramic and metal COBs
- Full range of performance, LES & CRI options
- High Fidelity (98 CRI) & Specialty options with up to 50% higher efficacy than similar LEDs

Product Family	LES (mm)							
	4.5	6	9	9.8	12	14	14.5	19
High Density CXBxxxx		1310	1520					
High Current CMAxxxx	1303	1306	1516		1825	1840		2550
High Current CMTxxxx				1420 1412 1407			1945 1930 1925 1922	
Standard Density CXBxxxx		1304	1512 1507		1820 1816	1830		2540 2530

- Industry's highest output and efficiency
- Enables horticulture lights that are more effective than traditional light sources while also using less power

450 nm (Royal Blue)

LEDs		Footprint (mm)	Typical PPF (µmol/J)	Typical PPE (µmol/J)	Maximum Drive Current (A)	Maximum Power (W)
	XP-G3 Royal Blue	3.45	2.8	2.83	2.000	6

660 nm (Photo Red)

LEDs		Footprint (mm)	Typical PPF (µmol/J)	Typical PPE (µmol/J)	Maximum Drive Current (A)	Maximum Power (W)
	XP-E2 Photo Red	3.45	2.4	3.41	1.000	3
	XP-G3 Photo Red		2.9	4.08	1.500	4

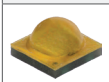
730 nm (Far Red)

LEDs		Footprint (mm)	Typical PF_{FR} (µmol/J)	Typical PF_{FR}/W (µmol/J)	Maximum Drive Current (A)	Maximum Power (W)
	XP-E2 Far Red	3.45	2.2	3.44	1.000	3

Full-Spectrum (4000 K, 70 CRI)

LEDs		Footprint (mm)	Typical PPF (µmol/J)	Typical PPE (µmol/J)	Maximum Drive Current (A)	Maximum Power (W)
	JB2835 3-V High Efficacy G Class	2.8 x 3.5	0.4	2.96	0.300	1.5
	XP-G3 S Line	3.45	2.3	2.40	2.000	6

Full-Spectrum (4000 K, 90 CRI)

LEDs		Footprint (mm)	Typical PPF (µmol/J)	Typical PPE (µmol/J)	Maximum Drive Current (A)	Maximum Power (W)
	JB2835 3-V High Efficacy G Class	2.8 x 3.5	0.4	2.81	0.300	1.5
	XP-G3 Standard	3.45	2.2	2.28	2.000	6

XLamp® COB LEDs: Premium Color

- Industry's best lumen maintenance and color stability over time
- Standard 2-step consistency on most offerings

Fidelity		CCT	Name
On BBL for Halogen Appearance	98 CRI	4000 K	L5A
		3500 K	35H
		3000 K	30H
		2700 K	27H

Specialty		CCT	Name
Below BBL for CMH Appearance	98 CRI	3000 K	L7C
	92 CRI	3100 K	31Q
		3000 K	30Q
		3000 K	30U
	80 CRI	3000 K	L7B

Product Family	LES (mm)									
	4.5	6	9	9.8	12	14	14.5	19	22	23
High Density CXBxxxx		1310	1520							
High Current CMAxxxx	1303	1306	1516		1825	1840		2550		3090
High Current CMTxxxx				1420 1412 1407			1945 1930 1925 1922		2890 2870 2850	
Standard Density CXBxxxx		1304	1512 1507		1820 1816	1830		2540 2530		

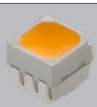
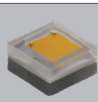
J Series® LEDs

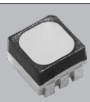
- 3-step color kits aligned to Cree's EasyWhite bins

Fidelity		CCT	Name
On BBL for Halogen Appearance	98 CRI	5000 K	50E
		4000 K	40E
		3000 K	30E
		2700 K	27E

LEDs		Voltage Class	Typical Drive Current (mA)	4000 K, 98 CRI	3000 K, 98 CRI	Maximum Drive Current (mA)
				Typical Efficacy (LPW)	Typical Efficacy (LPW)	
	JE2835 0.5-W Standard	3-V	150	133	122	240
	JB2016 Gen 2 Standard	3-V	60	117	111	120

- Proven technology used in marquee installations around the world
- High Intensity (HI) LEDs provide maximum candela through secondary optics

Single-Color LEDs			
	CLX6F 3.5 mm 0.3 W	**XQ-E HD/HI 1.6 mm 3 W**	**XP-E2 3.45 mm 5 W**
White		•	•
Blue	•	•	•
Green	•	•	•
Amber	•		•
PC Amber	•	•	•
Red	•	•	•

Full-Color LEDs			
	CLX6F 3.5 mm 0.3 W	**CLQ6A 5.0 mm 2 W**	**XM-L® Color 5.00 mm 10 W**
RGBW		•	•
RGB	•		

XLamp® LEDs: Lumen Optimized

- Optimized for maximum lumen output at high drive current

LEDs		Footprint (mm)	Voltage Class (V)	Lumens @ Maximum Current	Lumens @ Overdrive Current
	XT-E High Efficacy	3.45	3	629 @ 1.5 A	1,000 @ 3.0 A
	XP-G2 High Efficacy		3	822 @ 2.0 A	1,350 @ 4.0 A
	XP-L2		3	1,300 @ 3.0 A	2,000 @ 5.0 A
	XHP50.2	5.00	3	2,654 @ 6.0 A	---
	XHP70.2	7.00	6	4,292 @ 4.8 A	---

XLamp® LEDs: Beam Distance Optimized

- Optimized for maximum beam distance

LEDs		Footprint (mm)	Voltage Class (V)	Lumens @ Maximum Current	Lumens @ Overdrive Current
	XP-G2 Standard	3.45	3	658 @ 1.5 A	1,100 @ 3.0 A
	XP-L High Intensity		3	1,100 @ 3.0 A	1,850 @ 5.0 A
	XM-L2	5.0	3	1,275 @ 3.0 A	1,900 @ 5.0 A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MARRIOTT MARQUIS
I SPEAK MY TRUTH IN #MYCALVINS
CALVIN KLEIN
SEPHORA
KING KONG
EXPRESS

- Brightest signage LEDs available on the market
- Application optimized: IPX8 waterproofing, matte surface for contrast, small size
- Proven lifetime for displays that last under all viewing conditions

Pixel Pitch (mm)	LEDs		Package Size (mm)	Typical Green Intensity (mcd)	IPX8 Waterproof
< 3		UHD1110	1.0 x 1.0	106	
3–6		CLMUD	1.5 x 1.5	180	
		CLMVC	2.0 x 2.0	225	
6–22		CLX6E	3.5 x 3.4	950	•
		CLX6F	3.5 x 3.4	2,100	•
		CLY6C	2.8 x 2.8	900	•
		CLY6D	2.8 x 2.8	1,350	•
> 20		C4SMB	P2 4 mm	7,500	

Photo: Prismview, A Samsung Electronics Company

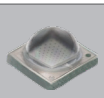
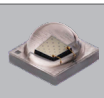
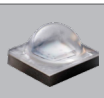
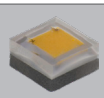
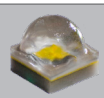
- Small form factor enables compact and more-aerodynamic light bars
- Industry's best lumen density and optical control
- Available in PC Blue for higher lumens and more sparkle
- Common package design for color and white LEDs simplifies design

LEDs		Footprint (mm)	White	Color			
				PC Blue	Amber	PC Amber	Red
	XQ-A High Density	1.6	•	•		•	•
	XQ-E High Density		•			•	•
	XQ-E High Intensity		•	•		•	•
	XP-E2	3.45	•		•	•	•

- High-power LEDs that deliver the industry's highest lumen density and efficacy
- Application-optimized solutions to enable differentiated products and lower system cost
- Excellent L90 lifetimes across the entire portfolio

LEDs		Footprint (mm)	Voltage Class (V)	Maximum Light Output (lm)	Maximum Drive Current (A)	Maximum Power (W)
	XQ-E High Density & High Intensity	1.6	3	334	1.00	3
	XD16		3	726	2.00	6
	XT-E High Efficacy	3.45	3	629	1.50	5
	XP-G2 High Efficacy		3	822	2.00	6
	XP-G3 Standard & S Line		3	854	2.00	6
	XP-L2		3	1,300	3.00	10
	XHP35.2		12	1,718	1.05	13
	MHB-B	5.00	9 18 36	1,044	0.700 0.350 0.175	6
	XHP50.2		6 12	2,654	3.00 1.50	18
	XHP70.2	7.00	6 12	4,292	4.80 2.40	29

- Largest portfolio of color High-Power LEDs
- Leading performance for all major color-lighting applications
- Industry's best options for small optical source sizes

						
	XM-L 5.0 mm 13 W	**XP-G3 3.45 mm 3 W**	**XP-E2 3.45 mm 3 W**	**XB-D 2.45 mm 3 W**	**XQ-E HD/HI 1.6 mm 3 W**	**XQ-A 1.6 mm 1 W**
White	•	•	•	•	•	•
Royal Blue		•	•	•	•	
PC Blue					• (HI only)	•
Blue			•	•	•	•
Green			•	•	•	•
PC Amber			•	•	•	•
Amber			•	•		
Red-Orange			•	•	•	•
Red			•	•	•	•
Photo Red		•	•		• (HD only)	
Far Red			•			
RGBW	•					

- Industry-leading performance and reliability for ceramic-based COBs
- Premium color options: Fidelity (98 CRI) and Specialty (Below BBL)

High Density

- Industry's highest lumen density COBs deliver maximum punch through small optics

CXB LEDs	LES (mm)	Voltage Options (V)	Maximum Power (W)	4000 K, 70 CRI, Tj = 85 °C		3000 K, 80 CRI, Tj = 85 °C		3000 K, 90 CRI, Tj = 85 °C	
				Typ. Flux (lm)	Max. Flux (lm)	Typ. Flux (lm)	Max. Flux (lm)	Typ. Flux (lm)	Max. Flux (lm)
CXB1310	6	18 36	24	1,718	3,085	1,520	2,730	1,269	2,279
CXB1520	9	36	49	2,559	6,179	2,265	5,469	1,891	4,566

Standard Density

- Highest efficacy COB LEDs available: up to 168 LPW @ 85 °C

CXB LEDs	LES (mm)	Voltage Options (V)	Maximum Power (W)	4000 K, 70 CRI, Tj = 85 °C (Standard)		3000 K, 80 CRI, Tj = 85 °C (Standard)	
				Typ. Flux (lm)	Typ. LPW (lm/W)	Typ. Flux (lm)	Typ. LPW (lm/W)
CXB1304	6	9 18 36	9.5	567	164	500	145
CXB1507	9	18 36	14	1,152	167	1,015	147
CXB1512		18 36	22	1,982	165	1,746	145
CXB1816	12	36	34	2,537	161	2,236	142
CXB1820		36	40	3,235	168	2,850	148
CXB1830	14	36	53	4,712	168	4,152	148
CXB2530	19	36	61	4,560	163	4,018	143
CXB2540		36	79	6,267	164	5,522	144
CXB3050	23	36	93	8,092	166	7,129	146
CXB3070		36	106	11,054	162	9,739	142
CXB3590	30	36 72	137	14,079	163	12,404	144

- Optimized for best-in-class lumen output, efficacy and reliability at high drive currents

XLamp® CMA High-Current LED Arrays (Cree CXA/CXB Compatible)

CMA LEDs	LES (mm)	Voltage Options (V)	Maximum Power (W)	4000 K, 70 CRI, Tj = 85 °C (Standard)		3000 K, 80 CRI, Tj = 85 °C (Standard)	
				Typ. Flux (lm)	Typ. LPW (lm/W)	Typ. Flux (lm)	Typ. LPW (lm/W)
CMA1303	4.5	9 18 36	15	885	135	780	119
CMA1306	6	9 18 36	16	1,037	144	914	127
CMA1516	9	36	41	2,439	155	2,150	137
CMA1825	12	36	61	3,823	158	3,370	139
CMA1840	14	36	87	6,012	158	5,300	139
CMA2550	19	36	122	7,770	163	6,850	144
CMA3090	23	48 72	174	13,295	163	11,720	144

XLamp® CMT High-Current LEDs (Citizen Compatible)

CMT LEDs	LES (mm)	Voltage Options (V)	Maximum Power (W)	4000 K, 70 CRI, Tj = 85 °C (Standard)		3000 K, 80 CRI, Tj = 85 °C (Standard)	
				Typ. Flux (lm)	Typ. LPW (lm/W)	Typ. Flux (lm)	Typ. LPW (lm/W)
CMT1407	9.8	36	19	1,117	163	985	122
CMT1412		36	28	1,917	159	1,690	140
CMT1420		36	49	2,961	156	2,610	138
CMT1922	14.5	36	57	3,324	162	2,930	143
CMT1925		36	64	3,834	160	3,380	141
CMT1930		36	77	4,447	162	3,920	142
CMT1945		36	94	6,477	156	5,710	137
CMT2850	22	36	130	7,997	169	7,050	149
CMT2870		24	153	10,720	150	9,450	133
CMT2890		24	181	13,249	162	11,680	143

- High-volume, cost-optimized LEDs for all lighting applications
- 70, 80 & 90 CRI options for complete 6500 K–2700 K CCT range
- 3-step chromaticity kits aligned with Cree's EasyWhite bins

J Series® LEDs: High Power 5050

Voltage Class	Series	Product/Class	Typical Current (mA)	Typical Voltage (V)	4000 K, 70 CRI Typical LPW	3000 K, 80 CRI Typical LPW	Maximum Current (mA)
6-V	Standard	JR5050 / P	400	5.77	192	171	1000
		JR5050 / Q	400	5.8	183	166	1000
9-V	Standard	JR5050 / Q	260	8.6	183	164	660
24-V	Standard	JR5050 / P	100	23.08	192	171	240
		JR5050 / Q	100	23.5	179	162	240
36-V	Standard	JR5050 / Q	65	34.5	183	164	165

J Series® LEDs: Mid Power 3030

Voltage Class	Series	Product/Class	Typical Current (mA)	Typical Voltage (V)	4000 K, 70 CRI Typical LPW	3000 K, 80 CRI Typical LPW	Maximum Current (mA)
3-V	High Efficacy	JB3030 / B	65	2.71	217	194	240
		JB3030 / D	65	2.81	208	185	240
6-V		JK3030 / B	150	6.02	177	158	200

J Series® LEDs: Mid Power 2835

Voltage Class	Series	Product/Class	Typical Current (mA)	Typical Voltage (V)	4000 K, 70 CRI Typical LPW	4000 K, 80 CRI Typical LPW	Maximum Current (mA)
3-V	High Efficacy	JB2835B / G	55	2.67	224	215	480
	Standard	JE2835B / N	150	2.93	189	177	240
		JE2835B / P	150	3.00	178	169	240
		JE2835 / R	150	2.95	167	163	240
	Value	JB2835 / W	60	2.95	---	168	150
6-V	Standard	JK2835 / P	150	6.00	173	168	200
	Value	JK2835B / W	150	6.35	150	144	200
9-V	Value	JK2835B / W	100	9.2	148	142	120
18-V	Value	JK2835B / W	50	18.2	145	138	60

J Series® LEDs: Mid Power 5630

Voltage Class	Series	Product/Class	Typical Current (mA)	Typical Voltage (V)	4000 K, 70 CRI Typical LPW	4000 K, 80 CRI Typical LPW	Maximum Current (mA)
3-V	High Efficacy	JB5630 / H	65	2.71	217	209	240
	Standard	JB5630 / P	65	2.80	206	200	240

J Series® LEDs: Mid Power 2016

Voltage Class	Series	Product/Class	Typical Current (mA)	Typical Voltage (V)	4000 K, 80 CRI Typical LPW	3000 K, 90 CRI Typical LPW	Maximum Current (mA)
3-V	Standard	JB2016B / P	60	3.0	154	128	120

- Broadest portfolio of LEDs optimized for signage, architectural and gaming
- Leading technology: IPX8 waterproofing, matte surface for contrast, small size, black body
- Proven lifetime for displays that last under all viewing conditions

Full-Color Signs

Pixel Pitch (mm)	LEDs	Package Size (mm)	Typical Green Intensity (mcd)	IPX8 Waterproof
< 3	UHD1110	1.0 x 1.0	106	
3–6	CLMUD	1.5 x 1.5	180	
	CLMVC	2.0 x 2.0	225	
6–22	CLX6E	3.5 x 3.4	950	•
	CLX6F	3.5 x 3.4	2,100	•
	CLY6C	2.8 x 2.8	900	•
	CLY6D	2.8 x 2.8	1,350	•
> 20	C4SMB	P2 4 mm	7,500	

Roadway Signs

LEDs		Size (mm)	Angle (°)	Blue	Green	Cyan	Amber	Red
	CLM2D	3.2 x 2.8	30	•	•	•	•	•
	C503B	5 (P2)	15 30	•	•		•	•
	C566D	5 (P2)	70/30	•	•		•	•

Architectural Lighting

LEDs		Blue	Green	PC Amber	Amber	Red	RGBW	RGB
	CLX6F 3.5 mm 0.3 W	•	•	•	•	•		•
	CLQ6A 5.0 mm 2 W						•	

Gaming

LEDs		Size (mm)	Angle (°)	Typical Intensity (mcd)	RGB
	QLS6B	4.7 x 1.5 x 1.3	120	900–2,800	•

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