Cree® XLamp® XQ-E LEDs

XQ-E High Density LEDs

XQ-E High Intensity LEDs

PRODUCT DESCRIPTION

The XLamp® XQ-E LEDs are available in two versions: high density and high intensity. The XQ-E High Density LED enables lighting manufacturers to significantly reduce the size and total cost of their LED luminaires versus similar performance 3.5-mm footprint LEDs, without sacrificing lumen output, efficacy or reliability. The XQ-E's combination of optical symmetry, consistent design across all configurations and tiny 1.6 mm X 1.6 mm footprint simplifies manufacturing and design while providing excellent color mixing.

The new XQ-E High Intensity LED uses an innovative primary optic design optimized to deliver maximum candela, especially through narrow-beam secondary optics.

FEATURES

- Cree's smallest lighting class LED: 1.6 mm X 1.6 mm
- Available in high-density & high-intensity versions for design flexibility
- Available in 70, 80, & 90 CRI white, royal blue, blue, PC blue, green, PC amber, red-orange, red & high efficiency (HE) photo red
- Maximum drive current: 1 A (high density & high intensity)
- Reflow solderable - JEDEC J-STD-020C compatible
- Unlimited floor life at ≤ 30 °C/85% RH
- RoHS and REACh compliant
- UL® recognized component (E349212)

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CHARACTERISTICS

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point - High Density white	°C/W		6	
Thermal resistance, junction to solder point - High Intensity white	°C/W		7	
Thermal resistance, junction to solder point - royal blue	°C/W		4	
Thermal resistance, junction to solder point - blue, PC blue	°C/W		6	
Thermal resistance, junction to solder point - green, PC amber	°C/W		7	
Thermal resistance, junction to solder point - red-orange, red, HE photo red	°C/W		5	
Viewing angle (FWHM) - High Density white	degrees		110	
Viewing angle (FWHM) - High Density royal blue, blue, green, PC amber	degrees		125	
Viewing angle (FWHM) - High Density red-orange, red, HE photo red	degrees		130	
Viewing angle (FWHM) - High Intensity white	degrees		120	
Viewing angle (FWHM) - High Intensity royal blue, blue, PC blue, green	degrees		130	
Viewing angle (FWHM) - High Intensity PC amber	degrees		120	
Viewing angle (FWHM) - High Intensity red-orange, red	degrees		125	
Temperature coefficient of voltage - white, royal blue, blue, PC blue	mV/°C		-1.2	
Temperature coefficient of voltage - green	mV/°C		-1.2	
Temperature coefficient of voltage - PC amber	mV/°C		-1.2	
Temperature coefficient of voltage - red-orange, red	mV/°C		-1.8	
Temperature coefficient of voltage - HE photo red	mV/°C		-2.8	
ESD withstand voltage (HBM per Mil-Std-883D)- High Density	V			8000
ESD classification (HBM per Mil-Std-883D) - High Intensity			Class 3A	
DC forward current	mA			1000
Reverse voltage	V			5
Forward voltage (@ 350 mA, 85 °C) - white	V		2.84	3.25
Forward voltage (@ 350 mA, 25 °C) - royal blue,	V		2.9	3.5
Forward voltage (@ 350 mA, 25 °C) - blue	V		2.95	3.5
Forward voltage (@ 350 mA, 25 °C) - PC blue	V		3.0	3.5
Forward voltage (@ 350 mA, 25 °C) - green	V		2.85	3.25
Forward voltage (@ 350 mA, 25 °C) - PC amber	V		2.9	3.6
Forward voltage (@ 350 mA, 25 °C) - High Density red-orange, red	V		2.18	2.6
Forward voltage (@ 350 mA, 25 °C) - High Intensity red-orange, red	V		2.2	2.6
Forward voltage (@ 350 mA, 25 °C) - HE photo red	V		2.17	2.6
LED junction temperature	°C			150

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH DENSITY WHITE (T_J = 85 °C)

The following tables provide order codes for XLamp XQ-E High Density white LEDs. For a complete description of the order-code nomenclature, please consult the Bin and Order Code Formats section (page 43).

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA			Calculated Minimum Luminous Flux (lm) @ 85 °C**		Order Codes	
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	700 mA	1.0 A	No Minimum CRI	70 CRI Minimum
ANSI Cool White (5000 K – 8300 K)								
51	6200 K	R4	130	150	224	288	XQEAWT-00-0000-00000LG51	XQEAWT-00-0000-00000BG51
		R3	122	141	210	270	XQEAWT-00-0000-00000LF51	XQEAWT-00-0000-00000BF51
		R2	114	132	196	252	XQEAWT-00-0000-00000LE51	XQEAWT-00-0000-00000BE51
53	6000 K	R4	130	150	224	288	XQEAWT-00-0000-00000LG53	XQEAWT-00-0000-00000BG53
		R3	122	141	210	270	XQEAWT-00-0000-00000LF53	XQEAWT-00-0000-00000BF53
		R2	114	132	196	252	XQEAWT-00-0000-00000LE53	XQEAWT-00-0000-00000BE53
50	6200 K	R4	130	150	224	288	XQEAWT-00-0000-00000LG50	XQEAWT-00-0000-00000BG50
		R3	122	141	210	270	XQEAWT-00-0000-00000LF50	XQEAWT-00-0000-00000BF50
		R2	114	132	196	252	XQEAWT-00-0000-00000LE50	XQEAWT-00-0000-00000BE50
E1	6500 K	R4	130	150	224	288	XQEAWT-00-0000-00000LGE1	XQEAWT-00-0000-00000BGE1
		R3	122	141	210	270	XQEAWT-00-0000-00000LFE1	XQEAWT-00-0000-00000BFE1
		R2	114	132	196	252	XQEAWT-00-0000-00000LEE1	XQEAWT-00-0000-00000BEE1
E2	5700 K	R4	130	150	224	288	XQEAWT-00-0000-00000LGE2	XQEAWT-00-0000-00000BGE2
		R3	122	141	210	270	XQEAWT-00-0000-00000LFE2	XQEAWT-00-0000-00000BFE2
		R2	114	132	196	252	XQEAWT-00-0000-00000LEE2	XQEAWT-00-0000-00000BEE2

Notes:

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 45).
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 70.
- Typical CRI for Neutral White (3700 K – 5300 K CCT) is 75.
- Typical CRI for Warm White (2700 K – 3500 K CCT) is 80.
- Minimum CRI for 70-CRI White is 70.
- Minimum CRI for 80-CRI White is 80.
- Minimum CRI for 90-CRI White is 90.

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

** Calculated flux values at 700 mA and 1 A are for reference only

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH DENSITY WHITE (T_J = 85 °C) - CONTINUED

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA			Calculated Minimum Luminous Flux (lm) @ 85 °C**		Order Codes		
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	700 mA	1.0 A	70 CRI Minimum	75 CRI Typical	80 CRI Minimum
ANSI Neutral White (3700 K – 5000 K)									
E3	5000 K	R4	130	150	224	288	XQEAWT-00-0000-00000BGE3		
		R3	122	141	210	270	XQEAWT-00-0000-00000BFE3		
		R2	114	132	196	252	XQEAWT-00-0000-00000BEE3	XQEAWT-00-0000-00000LEE3	
		Q5	107	107	124	184		XQEAWT-00-0000-00000LDE3	
		Q4	100	100	116	172		XQEAWT-00-0000-00000LCE3	
F4	4750 K	R4	130	150	224	288	XQEAWT-00-0000-00000BGF4		
		R3	122	141	210	270	XQEAWT-00-0000-00000BFF4		
		R2	114	132	196	252	XQEAWT-00-0000-00000BEF4	XQEAWT-00-0000-00000LEF4	
		Q5	107	124	184	237		XQEAWT-00-0000-00000LDF4	
		Q4	100	116	172	221		XQEAWT-00-0000-00000LCF4	
		Q3	93.9	109	162	208		XQEAWT-00-0000-00000LBF4	
E4	4500 K	R4	130	150	224	288	XQEAWT-00-0000-00000BGE4		
		R3	122	141	210	270	XQEAWT-00-0000-00000BFE4		
		R2	114	132	196	252	XQEAWT-00-0000-00000BEE4	XQEAWT-00-0000-00000LEE4	
		Q5	107	124	184	237		XQEAWT-00-0000-00000LDE4	
		Q4	100	116	172	221		XQEAWT-00-0000-00000LCE4	
		Q3	93.9	109	162	208		XQEAWT-00-0000-00000LBE4	
F5	4250 K	R4	130	150	224	288	XQEAWT-00-0000-00000BGF5		
		R3	122	141	210	270	XQEAWT-00-0000-00000BFF5		
		R2	114	132	196	252	XQEAWT-00-0000-00000BEF5	XQEAWT-00-0000-00000LEF5	XQEAWT-00-0000-00000HEF5
		Q5	107	124	184	237		XQEAWT-00-0000-00000LDF5	XQEAWT-00-0000-00000HDF5
		Q4	100	116	172	221		XQEAWT-00-0000-00000LCF5	XQEAWT-00-0000-00000HCF5
E5	4000 K	R4	130	150	224	288	XQEAWT-00-0000-00000BGE5		
		R3	122	141	210	270	XQEAWT-00-0000-00000BFE5		
		R2	114	132	196	252	XQEAWT-00-0000-00000BEE5	XQEAWT-00-0000-00000LEE5	XQEAWT-00-0000-00000HEE5
		Q5	107	124	184	237		XQEAWT-00-0000-00000LDE5	XQEAWT-00-0000-00000HDE5
		Q4	100	116	172	221		XQEAWT-00-0000-00000LCE5	XQEAWT-00-0000-00000HCE5

Notes:

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 45).
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 70.
- Typical CRI for Neutral White (3700 K – 5300 K CCT) is 75.
- Typical CRI for Warm White (2700 K – 3500 K CCT) is 80.
- Minimum CRI for 70-CRI White is 70.
- Minimum CRI for 80-CRI White is 80.
- Minimum CRI for 90-CRI White is 90.

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

** Calculated flux values at 700 mA and 1 A are for reference only

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH DENSITY WHITE (T_J = 85 °C) - CONTINUED

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA			Calculated Minimum Luminous Flux (lm) @ 85 °C**		Order Codes		
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	700 mA	1.0 A	80 CRI Typical	80 CRI Minimum	90 CRI Minimum
ANSI Warm White (2700 K - 3750 K)									
F6	3750 K	R2	114	132	196	252	XQEAWT-00-0000-00000LEF6	XQEAWT-00-0000-00000HEF6	
		Q5	107	124	184	237	XQEAWT-00-0000-00000LDF6	XQEAWT-00-0000-00000HDF6	
		Q4	100	116	172	221	XQEAWT-00-0000-00000LCF6	XQEAWT-00-0000-00000HCF6	
E6	3500 K	R2	114	132	196	252	XQEAWT-00-0000-00000LEE6	XQEAWT-00-0000-00000HEE6	
		Q5	107	124	184	237	XQEAWT-00-0000-00000LDE6	XQEAWT-00-0000-00000HDE6	
		Q4	100	116	172	221	XQEAWT-00-0000-00000LCE6	XQEAWT-00-0000-00000HCE6	
F7	3250 K	R2	114	132	196	252	XQEAWT-00-0000-00000LEF7	XQEAWT-00-0000-00000HEF7	
		Q5	107	124	184	237	XQEAWT-00-0000-00000LDF7	XQEAWT-00-0000-00000HDF7	
		Q4	100	116	172	221	XQEAWT-00-0000-00000LCF7	XQEAWT-00-0000-00000HCF7	
E7	3000 K	R2	114	132	196	252	XQEAWT-00-0000-00000LEE7	XQEAWT-00-0000-00000HEE7	
		Q5	107	124	184	237	XQEAWT-00-0000-00000LDE7	XQEAWT-00-0000-00000HDE7	
		Q4	100	116	172	221	XQEAWT-00-0000-00000LCE7	XQEAWT-00-0000-00000HCE7	
		Q3	93.9	109	162	208	XQEAWT-00-0000-00000LBE7	XQEAWT-00-0000-00000HBE7	
		Q2	87.4	101	150	193			XQEAWT-00-0000-00000UAE7
		P4	80.6	93.3	139	178			XQEAWT-00-0000-00000U9E7
		P3	73.9	85.5	127	163			XQEAWT-00-0000-00000U8E7
F8	2850 K	Q5	107	124	184	237	XQEAWT-00-0000-00000LDF8	XQEAWT-00-0000-00000HDF8	
		Q4	100	116	172	221	XQEAWT-00-0000-00000LCF8	XQEAWT-00-0000-00000HCF8	
		Q3	93.9	109	162	208	XQEAWT-00-0000-00000LBF8	XQEAWT-00-0000-00000HBF8	
		Q2	87.4	101	150	193			
		P4	80.6	93.3	139	178			XQEAWT-00-0000-00000U9F8
		P3	73.9	85.5	127	163			XQEAWT-00-0000-00000U8F8
		P2	67.2	77.8	116	149			XQEAWT-00-0000-00000U7F8

Notes:

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 45).
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 70.
- Typical CRI for Neutral White (3700 K – 5300 K CCT) is 75.
- Typical CRI for Warm White (2700 K – 3500 K CCT) is 80.
- Minimum CRI for 70-CRI White is 70.
- Minimum CRI for 80-CRI White is 80.
- Minimum CRI for 90-CRI White is 90.

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

** Calculated flux values at 700 mA and 1 A are for reference only

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH DENSITY WHITE (T_J = 85 °C) - CONTINUED

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA			Calculated Minimum Luminous Flux (lm) @ 85 °C**		Order Codes		
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	700 mA	1.0 A	80 CRI Typical	80 CRI Minimum	90 CRI Minimum
ANSI Warm White (2700 K - 3750 K)									
E8	2700 K	Q5	107	124	184	237	XQEAWT-00-0000-00000LDE8	XQEAWT-00-0000-00000HDE8	
		Q4	100	116	172	221	XQEAWT-00-0000-00000LCE8	XQEAWT-00-0000-00000HCE8	
		Q3	93.9	109	162	208	XQEAWT-00-0000-00000LBE8	XQEAWT-00-0000-00000HBE8	
		Q2	87.4	101	150	193			
		P4	80.6	93.3	139	178			XQEAWT-00-0000-00000U9E8
		P3	73.9	85.5	127	163			XQEAWT-00-0000-00000U8E8
		P2	67.2	77.8	116	149			XQEAWT-00-0000-00000U7E8

Notes:

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 45).
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 70.
- Typical CRI for Neutral White (3700 K – 5300 K CCT) is 75.
- Typical CRI for Warm White (2700 K – 3500 K CCT) is 80.
- Minimum CRI for 70-CRI White is 70.
- Minimum CRI for 80-CRI White is 80.
- Minimum CRI for 90-CRI White is 90.

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

** Calculated flux values at 700 mA and 1 A are for reference only

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH DENSITY COLOR (T_J = 25 °C)

The following tables provide order codes for XLamp XQ-E High Density color LEDs. For a complete description of the order-code nomenclature, please consult the Bin and Order Code Formats section (page 43).

Royal Blue		Minimum Radiant Flux (mW) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Order Codes
Kit	Dominant Wavelength (nm)	Code	Flux (mW)		
01	450 - 465	37	625	2.37	XQEROY-00-0000-000000R01
		36	600	2.27	XQEROY-00-0000-000000Q01
		35	575	2.18	XQEROY-00-0000-000000P01
		34	550	2.08	XQEROY-00-0000-000000N01
		33	525	1.99	XQEROY-00-0000-000000M01
02	450 - 460	37	625	2.37	XQEROY-00-0000-000000R02
		36	600	2.27	XQEROY-00-0000-000000Q02
		35	575	2.18	XQEROY-00-0000-000000P02
		34	550	2.08	XQEROY-00-0000-000000N02
		33	525	1.99	XQEROY-00-0000-000000M02
03	455 - 465	35	575	2.18	XQEROY-00-0000-000000P03
		34	550	2.08	XQEROY-00-0000-000000N03
		33	525	1.99	XQEROY-00-0000-000000M03

Color	Minimum Luminous Flux (lm) @ 350 mA		Dominant Wavelength (nm)				Order Codes
			Minimum		Maximum		
	Group	Flux (lm)	Group	DWL (nm)	Group	DWL (nm)	
Blue	M3	45.7	B3	465	B6	485	XQEBLU-00-0000-000000301
			B3	465	B5	480	XQEBLU-00-0000-000000302
			B4	470	B5	480	XQEBLU-00-0000-000000305
	M2	39.8	B3	465	B6	485	XQEBLU-00-0000-000000201
			B3	465	B5	480	XQEBLU-00-0000-000000202
			B4	470	B5	480	XQEBLU-00-0000-000000205
	K3	35.2	B3	465	B6	485	XQEBLU-00-0000-000000Z01
			B3	465	B5	480	XQEBLU-00-0000-000000Z02
			B4	470	B5	480	XQEBLU-00-0000-000000Z05

Note

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH DENSITY COLOR (T_J = 25 °C) - CONTINUED

Color	Minimum Luminous Flux (lm) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Dominant Wavelength (nm)				Order Codes
				Minimum		Maximum		
	Group	Flux (lm)		Group	DWL (nm)	Group	DWL (nm)	
Green	S3	156	1.53	G2	520	G4	535	XQEGRN-00-0000-000000K01
				G2	520	G3	530	XQEGRN-00-0000-000000K02
				G3	525	G4	535	XQEGRN-00-0000-000000K03
	S2	148	1.45	G2	520	G4	535	XQEGRN-00-0000-000000J01
				G2	520	G3	530	XQEGRN-00-0000-000000J02
				G3	525	G4	535	XQEGRN-00-0000-000000J03
	R5	139	1.36	G2	520	G4	535	XQEGRN-00-0000-000000H01
				G2	520	G3	530	XQEGRN-00-0000-000000H02
				G3	525	G4	535	XQEGRN-00-0000-000000H03
	R4	130	1.27	G2	520	G4	535	XQEGRN-00-0000-000000G01
				G2	520	G3	530	XQEGRN-00-0000-000000G02
				G3	525	G4	535	XQEGRN-00-0000-000000G03

Color	Color Bin	Minimum Luminous Flux (lm) @ 350 mA		Order Codes
		Group	Flux (lm)	
PC Amber	Y2	Q2	87.4	XQEAPA-00-0000-000000A01
		P4	80.6	XQEAPA-00-0000-000000901
		P3	73.9	XQEAPA-00-0000-000000801

Color	Minimum Luminous Flux (lm) @ 350 mA		Dominant Wavelength (nm)				Order Codes
			Minimum		Maximum		
	Group	Flux (lm)	Group	DWL (nm)	Group	DWL (nm)	
Red-Orange	Q3	93.9	O3	610	O4	620	XQERDO-00-0000-000000B01
			O3	610	O3	615	XQERDO-00-0000-000000B02
	Q2	87.4	O3	610	O4	620	XQERDO-00-0000-000000A01
			O3	610	O3	615	XQERDO-00-0000-000000A02
	P4	80.6	O3	610	O4	620	XQERDO-00-0000-000000901
			O3	610	O3	615	XQERDO-00-0000-000000902
			O4	615	O4	620	XQERDO-00-0000-000000903

Note

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH DENSITY COLOR (T_J = 25 °C) - CONTINUED

Color	Minimum Luminous Flux (lm) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Dominant Wavelength (nm)				Order Codes
				Minimum		Maximum		
	Group	Flux (lm)		Group	DWL (nm)	Group	DWL (nm)	
Red	P3	73.9	1.92	R2	620	R3	630	XQERED-00-0000-000000801
				R2	620	R2	625	XQERED-00-0000-000000802
	P2	67.2	1.75	R2	620	R3	630	XQERED-00-0000-000000701
				R2	620	R2	625	XQERED-00-0000-000000702
	N4	62	1.61	R2	620	R3	630	XQERED-00-0000-000000601
				R2	620	R2	625	XQERED-00-0000-000000602

Color	Minimum Radiant Flux (mW)@ 350 mA		Calculated Minimum PPF (µmol/s)*	Peak Wavelength (nm)				Order Codes
				Minimum		Maximum		
	Group	Flux (mW)		Group	PWL (nm)	Group	PWL (nm)	
HE Photo Red	26	350	1.93	P2	650	P5	670	XQEEPR-00-0000-000000901
	27	375	2.06	P2	650	P5	670	XQEEPR-00-0000-000000A01
	28	400	2.20	P2	650	P5	670	XQEEPR-00-0000-000000B01

Note

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH INTENSITY WHITE (T_J = 85 °C)

The following tables provide order codes for XLamp XQ-E High Intensity white LEDs. For a complete description of the order-code nomenclature, please consult the Bin and Order Code Formats section (page 43).

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA			Calculated Minimum Luminous Flux (lm) @ 85 °C**		Order Codes	
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	700 mA	1.0 A	No Minimum CRI	70 CRI Minimum
ANSI Cool White (5000 K – 8300 K)								
51	6200 K	R3	122	136	213	276	XQEAWT-H0-0000-00000LF51	XQEAWT-H0-0000-00000BF51
		R2	114	127	199	258	XQEAWT-H0-0000-00000LE51	XQEAWT-H0-0000-00000BE51
53	6000 K	R3	122	136	213	276	XQEAWT-H0-0000-00000LF53	XQEAWT-H0-0000-00000BF53
		R2	114	127	199	258	XQEAWT-H0-0000-00000LE53	XQEAWT-H0-0000-00000BE53
50	6200 K	R3	122	136	213	276	XQEAWT-H0-0000-00000LF50	XQEAWT-H0-0000-00000BF50
		R2	114	127	199	258	XQEAWT-H0-0000-00000LE50	XQEAWT-H0-0000-00000BE50
E1	6500 K	R3	122	136	213	276	XQEAWT-H0-0000-00000LFE1	XQEAWT-H0-0000-00000BFE1
		R2	114	127	199	258	XQEAWT-H0-0000-00000LEE1	XQEAWT-H0-0000-00000BEE1
E2	5700 K	R3	122	136	213	276	XQEAWT-H0-0000-00000LFE2	XQEAWT-H0-0000-00000BFE2
		R2	114	127	199	258	XQEAWT-H0-0000-00000LEE2	XQEAWT-H0-0000-00000BEE2

Notes:

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 45).
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 70.
- Typical CRI for Neutral White (3700 K – 5300 K CCT) is 75.
- Typical CRI for Warm White (2700 K – 3500 K CCT) is 80.
- Minimum CRI for 70-CRI White is 70.
- Minimum CRI for 80-CRI White is 80.
- Minimum CRI for 90-CRI White is 90.

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

** Calculated flux values at 700 mA and 1 A are for reference only

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH INTENSITY WHITE (T_J = 85 °C) - CONTINUED

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA			Calculated Minimum Luminous Flux (lm) @ 85 °C**		Order Codes		
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	700 mA	1.0 A	70 CRI Minimum	75 CRI Typical	80 CRI Minimum
ANSI Neutral White (3700 K – 5000 K)									
E3	5000 K	R3	122	136	213	276	XQEAWT-H0-0000-00000BFE3		
		R2	114	127	199	258	XQEAWT-H0-0000-00000BEE3	XQEAWT-H0-0000-00000LEE3	
		Q5	107	119	187	242		XQEAWT-H0-0000-00000LDE3	
F4	4750 K	R3	122	136	213	276	XQEAWT-H0-0000-00000BFF4		
		R2	114	127	199	258	XQEAWT-H0-0000-00000BEF4	XQEAWT-H0-0000-00000LEF4	
		Q5	107	119	187	242	XQEAWT-H0-0000-00000BDF4	XQEAWT-H0-0000-00000LDF4	
		Q4	100	111	175	226		XQEAWT-H0-0000-00000LCF4	
E4	4500 K	R3	122	136	213	276	XQEAWT-H0-0000-00000BFE4		
		R2	114	127	199	258	XQEAWT-H0-0000-00000BEE4	XQEAWT-H0-0000-00000LEE4	
		Q5	107	119	187	242	XQEAWT-H0-0000-00000BDE4	XQEAWT-H0-0000-00000LDE4	
		Q4	100	111	175	226		XQEAWT-H0-0000-00000LCE4	
F5	4250 K	R3	122	136	213	276	XQEAWT-H0-0000-00000BFF5		
		R2	114	127	199	258	XQEAWT-H0-0000-00000BEF5	XQEAWT-H0-0000-00000LEF5	
		Q5	107	119	187	242	XQEAWT-H0-0000-00000BDF5	XQEAWT-H0-0000-00000LDF5	
		Q4	100	111	175	226		XQEAWT-H0-0000-00000LCF5	
E5	4000 K	R3	122	136	213	276	XQEAWT-H0-0000-00000BFE5		
		R2	114	127	199	258	XQEAWT-H0-0000-00000BEE5	XQEAWT-H0-0000-00000LEE5	XQEAWT-H0-0000-00000HEE5
		Q5	107	119	187	242	XQEAWT-H0-0000-00000BDE5	XQEAWT-H0-0000-00000LDE5	XQEAWT-H0-0000-00000HDE5
		Q4	100	111	175	226		XQEAWT-H0-0000-00000LCE5	XQEAWT-H0-0000-00000HCE5

Notes:

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 45).
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 70.
- Typical CRI for Neutral White (3700 K – 5300 K CCT) is 75.
- Typical CRI for Warm White (2700 K – 3500 K CCT) is 80.
- Minimum CRI for 70-CRI White is 70.
- Minimum CRI for 80-CRI White is 80.
- Minimum CRI for 90-CRI White is 90.

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

** Calculated flux values at 700 mA and 1 A are for reference only

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH INTENSITY WHITE (T_J = 85 °C) - CONTINUED

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA			Calculated Minimum Luminous Flux (lm) @ 85 °C**		Order Codes		
Kit	CCT	Code	Flux (lm) @ 85 °C	Flux (lm) @ 25 °C*	700 mA	1.0 A	80 CRI Typical	80 CRI Minimum	90 CRI Minimum
ANSI Warm White (2700 K - 3750 K)									
F6	3750 K	Q5	107	119	187	242	XQEAWT-H0-0000-00000LDF6	XQEAWT-H0-0000-00000HDF6	
		Q4	100	111	175	226	XQEAWT-H0-0000-00000LCF6	XQEAWT-H0-0000-00000HCF6	
		Q3	93.9	105	164	213	XQEAWT-H0-0000-00000LBF6	XQEAWT-H0-0000-00000HBF6	
E6	3500 K	Q5	107	119	187	242	XQEAWT-H0-0000-00000LDE6	XQEAWT-H0-0000-00000HDE6	
		Q4	100	111	175	226	XQEAWT-H0-0000-00000LCE6	XQEAWT-H0-0000-00000HCE6	
		Q3	93.9	105	164	213	XQEAWT-H0-0000-00000LBE6	XQEAWT-H0-0000-00000HBE6	
F7	3250 K	Q5	107	119	187	242	XQEAWT-H0-0000-00000LDF7	XQEAWT-H0-0000-00000HDF7	
		Q4	100	111	175	226	XQEAWT-H0-0000-00000LCF7	XQEAWT-H0-0000-00000HCF7	
		Q3	93.9	105	164	213	XQEAWT-H0-0000-00000LBF7	XQEAWT-H0-0000-00000HBF7	
E7	3000 K	Q5	107	119	187	242	XQEAWT-H0-0000-00000LDE7	XQEAWT-H0-0000-00000HDE7	
		Q4	100	111	175	226	XQEAWT-H0-0000-00000LCE7	XQEAWT-H0-0000-00000HCE7	
		Q3	93.9	105	164	213	XQEAWT-H0-0000-00000LBE7	XQEAWT-H0-0000-00000HBE7	
		Q2	87.4	101	150	193			XQEAWT-H0-0000-00000UAE7
		P4	80.6	89.9	141	182			XQEAWT-H0-0000-00000U9E7
		P3	73.9	82.4	129	167			XQEAWT-H0-0000-00000U8E7
F8	2850 K	Q4	100	111	175	226	XQEAWT-H0-0000-00000LCF8	XQEAWT-H0-0000-00000HCF8	
		Q3	93.9	105	164	213	XQEAWT-H0-0000-00000LBF8	XQEAWT-H0-0000-00000HBF8	
		Q2	87.4	101	150	193			XQEAWT-H0-0000-00000UAF8
		P4	80.6	89.9	141	182			XQEAWT-H0-0000-00000U9F8
		P3	73.9	82.4	129	167			XQEAWT-H0-0000-00000U8F8
E8	2700 K	Q4	100	111	175	226	XQEAWT-H0-0000-00000LCE8	XQEAWT-H0-0000-00000HCE8	
		Q3	93.9	105	164	213	XQEAWT-H0-0000-00000LBE8	XQEAWT-H0-0000-00000HBE8	
		Q2	87.4	101	150	193	XQEAWT-H0-0000-00000LAE8	XQEAWT-H0-0000-00000HAE8	
		P4	80.6	89.9	141	182			XQEAWT-H0-0000-00000U9E8
		P3	73.9	82.4	129	167			XQEAWT-H0-0000-00000U8E8

Notes:

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and ±2 on CRI measurements. See the Measurements section (page 45).
- Typical CRI for Cool White (5000 K – 8300 K CCT) is 70.
- Typical CRI for Neutral White (3700 K – 5300 K CCT) is 75.
- Typical CRI for Warm White (2700 K – 3500 K CCT) is 80.
- Minimum CRI for 70-CRI White is 70.
- Minimum CRI for 80-CRI White is 80.
- Minimum CRI for 90-CRI White is 90.

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

** Calculated flux values at 700 mA and 1 A are for reference only

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH INTENSITY COLOR (T_J = 25 °C)

The following tables provide order codes for XLamp XQ-E High Intensity color LEDs. For a complete description of the order-code nomenclature, please consult the Bin and Order Code Formats section (page 43).

Royal Blue		Minimum Radiant Flux (mW) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Order Codes
Kit	Dominant Wavelength (nm)	Code	Flux (mW)		
01	450 - 465	36	600	2.27	XQEROY-H0-0000-000000Q01
		35	575	2.18	XQEROY-H0-0000-000000P01
		34	550	2.08	XQEROY-H0-0000-000000N01
		33	525	1.99	XQEROY-H0-0000-000000M01
02	450 - 460	36	600	2.27	XQEROY-H0-0000-000000Q02
		35	575	2.18	XQEROY-H0-0000-000000P02
		34	550	2.08	XQEROY-H0-0000-000000N02
		33	525	1.99	XQEROY-H0-0000-000000M02
03	455 - 465	35	575	2.18	XQEROY-H0-0000-000000P03
		34	550	2.08	XQEROY-H0-0000-000000N03
		33	525	1.99	XQEROY-H0-0000-000000M03

Color	Minimum Luminous Flux (lm) @ 350 mA		Dominant Wavelength (nm)				Order Codes
			Minimum		Maximum		
	Group	Flux (lm)	Group	DWL (nm)	Group	DWL (nm)	
Blue	M3	45.7	B3	465	B6	485	XQEBLU-H0-0000-000000301
			B3	465	B5	480	XQEBLU-H0-0000-000000302
			B4	470	B5	480	XQEBLU-H0-0000-000000305
	M2	39.8	B3	465	B6	485	XQEBLU-H0-0000-000000201
			B3	465	B5	480	XQEBLU-H0-0000-000000202
			B4	470	B5	480	XQEBLU-H0-0000-000000205
	K3	35.2	B3	465	B6	485	XQEBLU-H0-0000-000000Z01
			B3	465	B5	480	XQEBLU-H0-0000-000000Z02
			B4	470	B5	480	XQEBLU-H0-0000-000000Z05
	K2	30.6	B3	465	B6	485	XQEBLU-H0-0000-000000Y01
			B3	465	B5	480	XQEBLU-H0-0000-000000Y02

Note

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH INTENSITY COLOR (T_J = 25 °C) - CONTINUED

Color	Color Bin	Minimum Luminous Flux (lm) @ 350 mA		Order Codes
		Group	Flux (lm)	
PC Blue	N4B & N5B	N2	51.7	XQEAPB-H0-0000-000000401
		M3	45.7	XQEAPB-H0-0000-000000301

Color	Minimum Luminous Flux (lm) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Dominant Wavelength (nm)				Order Codes
				Minimum		Maximum		
	Group	Flux (lm)		Group	DWL (nm)	Group	DWL (nm)	
Green	S3	156	1.53	G2	520	G4	535	XQEGRN-H0-0000-000000K01
				G2	520	G3	530	XQEGRN-H0-0000-000000K02
				G3	525	G4	535	XQEGRN-H0-0000-000000K03
	S2	148	1.45	G2	520	G4	535	XQEGRN-H0-0000-000000J01
				G2	520	G3	530	XQEGRN-H0-0000-000000J02
				G3	525	G4	535	XQEGRN-H0-0000-000000J03
	R5	139	1.36	G2	520	G4	535	XQEGRN-H0-0000-000000H01
				G2	520	G3	530	XQEGRN-H0-0000-000000H02
				G3	525	G4	535	XQEGRN-H0-0000-000000H03
	R4	130	1.27	G2	520	G4	535	XQEGRN-H0-0000-000000G01
				G2	520	G3	530	XQEGRN-H0-0000-000000G02
				G3	525	G4	535	XQEGRN-H0-0000-000000G03

Color	Color Bin	Minimum Luminous Flux (lm) @ 350 mA		Order Codes
		Group	Flux (lm)	
PC Amber	Y2	P4	80.6	XQEAPA-H0-0000-000000901
		P3	73.9	XQEAPA-H0-0000-000000801
		P2	67.2	XQEAPA-H0-0000-000000701

Note

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

ORDER CODES SUGGESTED FOR NEW DESIGNS - HIGH INTENSITY COLOR (T_J = 25 °C) - CONTINUED

Color	Minimum Luminous Flux (lm) @ 350 mA		Dominant Wavelength (nm)				Order Codes
			Minimum		Maximum		
	Group	Flux (lm)	Group	DWL (nm)	Group	DWL (nm)	
Red-Orange	P3	73.9	O3	610	O4	620	XQERDO-H0-0000-000000801
			O3	610	O3	615	XQERDO-H0-0000-000000802
	P2	67.2	O3	610	O4	620	XQERDO-H0-0000-000000701
			O3	610	O3	615	XQERDO-H0-0000-000000702
			O4	615	O4	620	XQERDO-H0-0000-000000703
	N4	62	O3	610	O4	620	XQERDO-H0-0000-000000601
			O3	610	O3	615	XQERDO-H0-0000-000000602
			O4	615	O4	620	XQERDO-H0-0000-000000603

Color	Minimum Luminous Flux (lm) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Dominant Wavelength (nm)				Order Codes
				Minimum		Maximum		
	Group	Flux (lm)		Group	DWL (nm)	Group	DWL (nm)	
Red	N2	51.7	1.35	R2	620	R3	630	XQERED-H0-0000-000000401
				R2	620	R2	625	XQERED-H0-0000-000000402
	M3	45.7	1.19	R2	620	R3	630	XQERED-H0-0000-000000301
				R2	620	R2	625	XQERED-H0-0000-000000302
	M2	39.8	1.04	R2	620	R3	630	XQERED-H0-0000-000000201
				R2	620	R2	625	XQERED-H0-0000-000000202

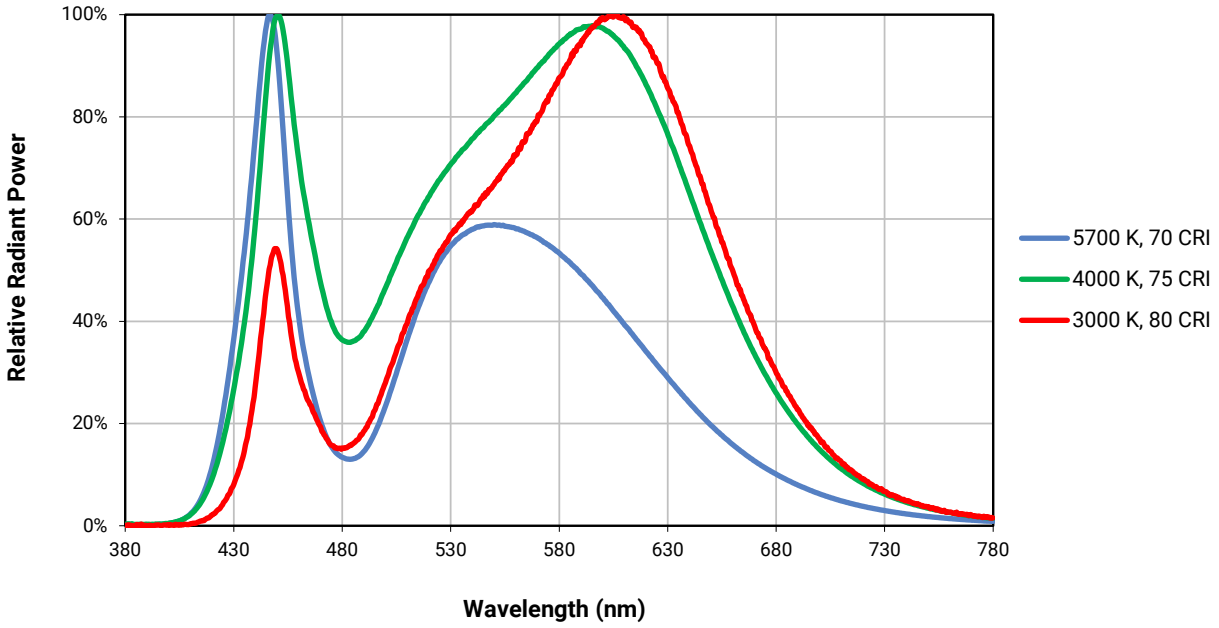
Note

- For additional order codes NOT recommended for new designs please see the Appendix section starting on page 52 .
- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

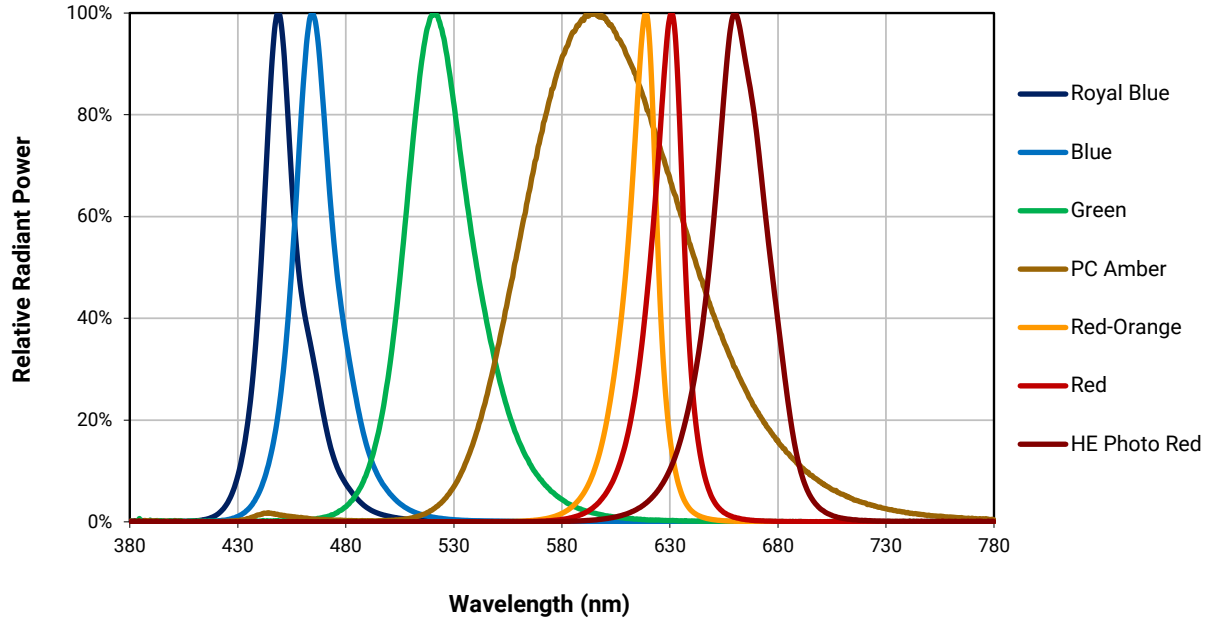
* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

RELATIVE SPECTRAL POWER DISTRIBUTION

High Density

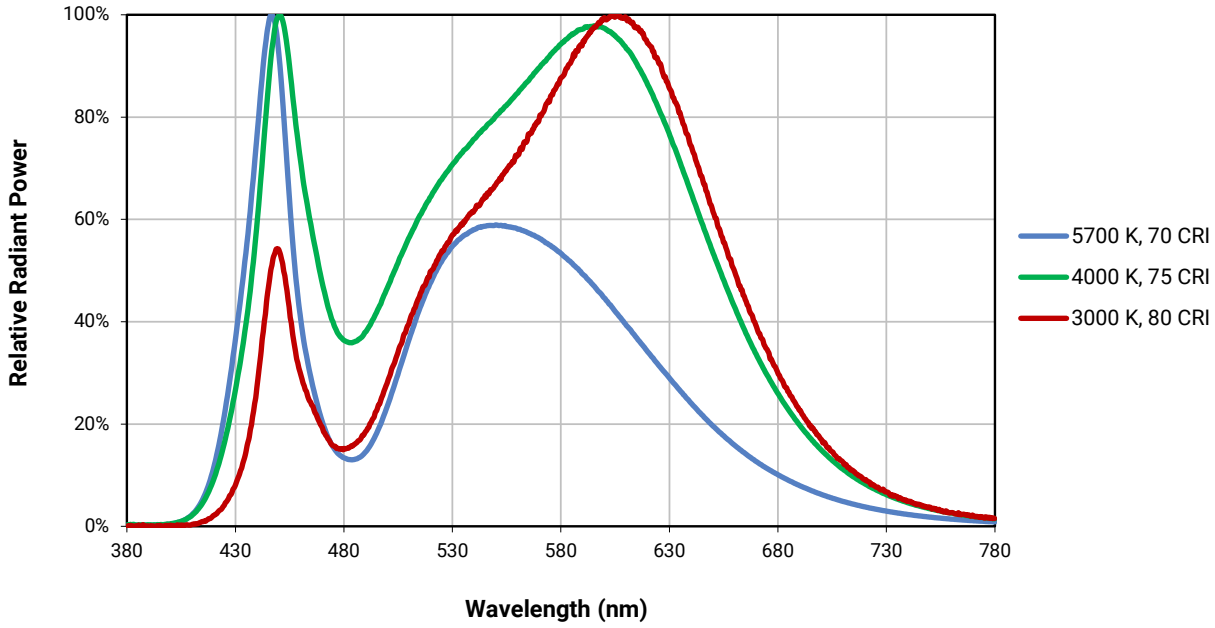


High Density Color



RELATIVE SPECTRAL POWER DISTRIBUTION - CONTINUED

High Intensity



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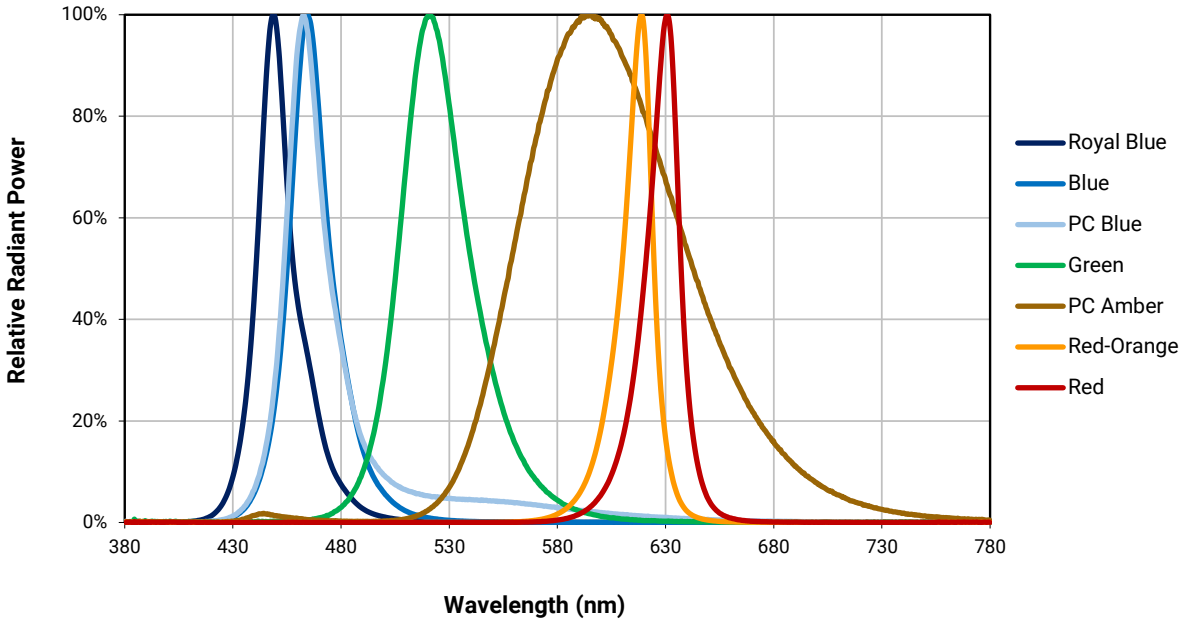
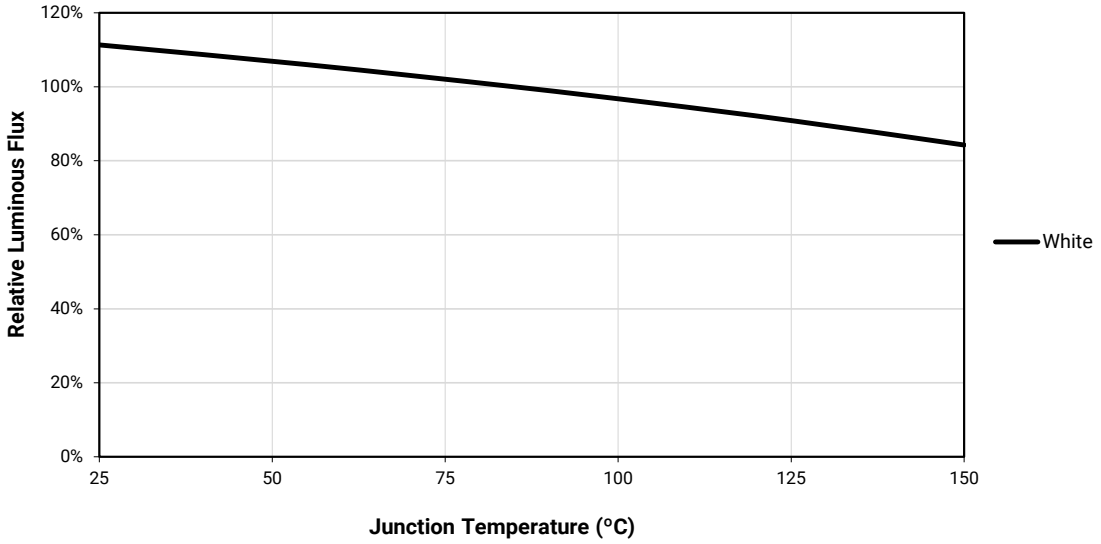


RELATIVE FLUX VS. JUNCTION TEMPERATURE (I_F = 350 mA)

High Density



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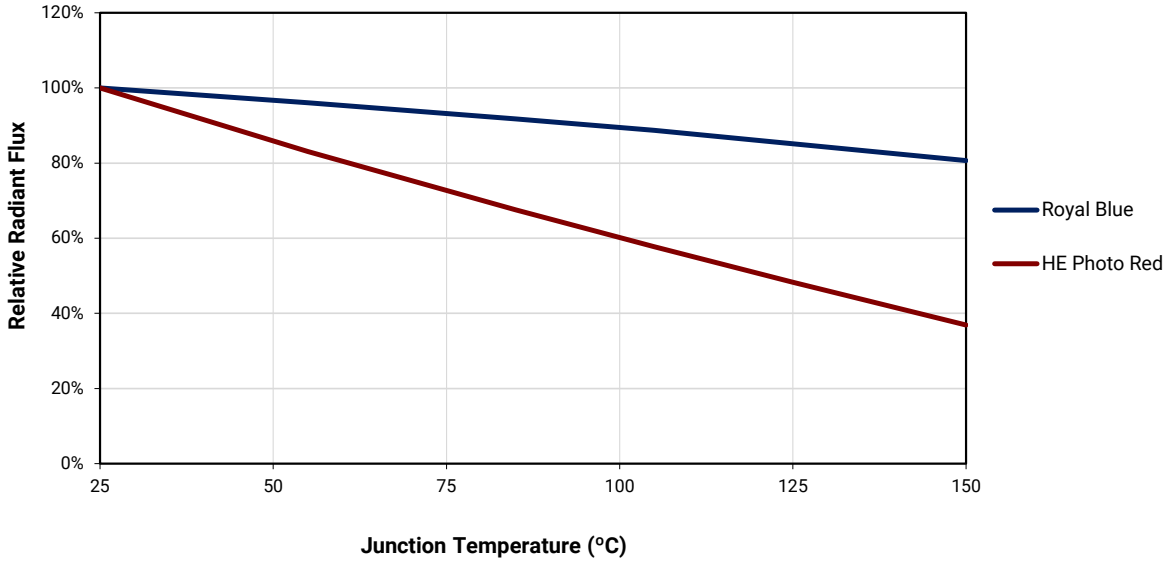
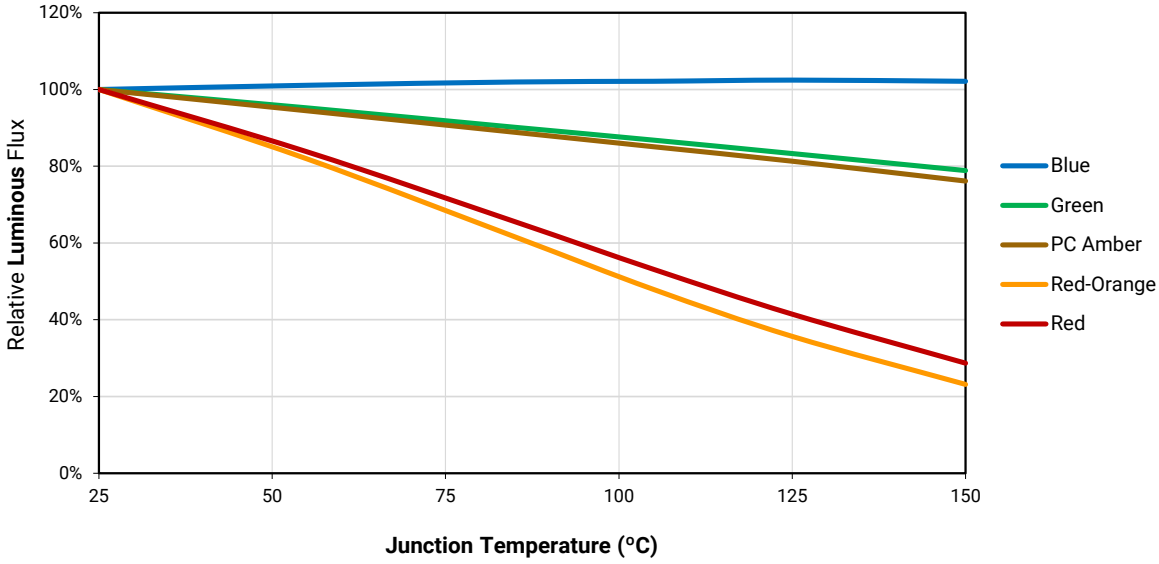


RELATIVE FLUX VS. JUNCTION TEMPERATURE (I_F = 350 mA) - CONTINUED

High Density Color



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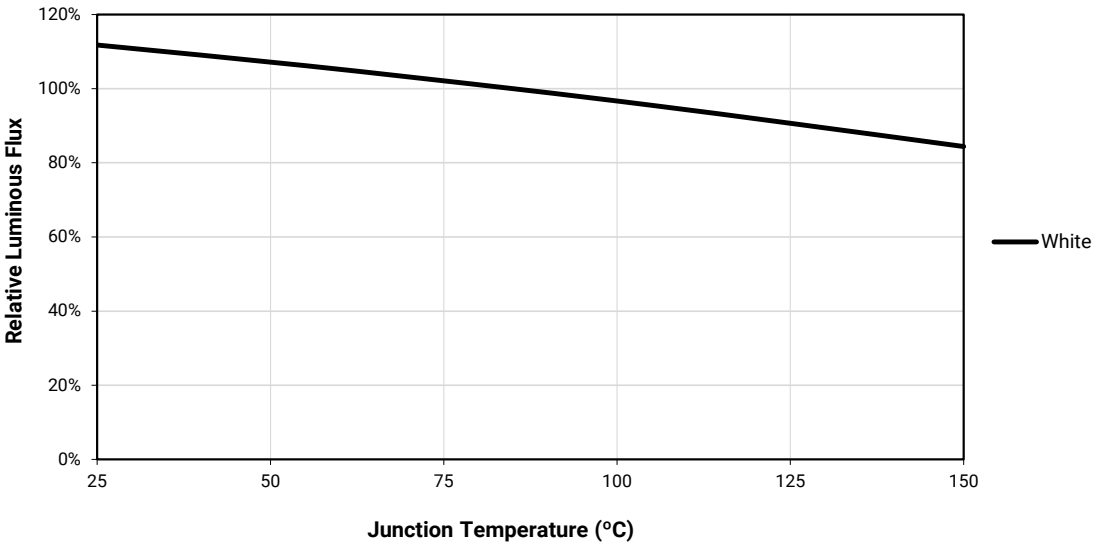
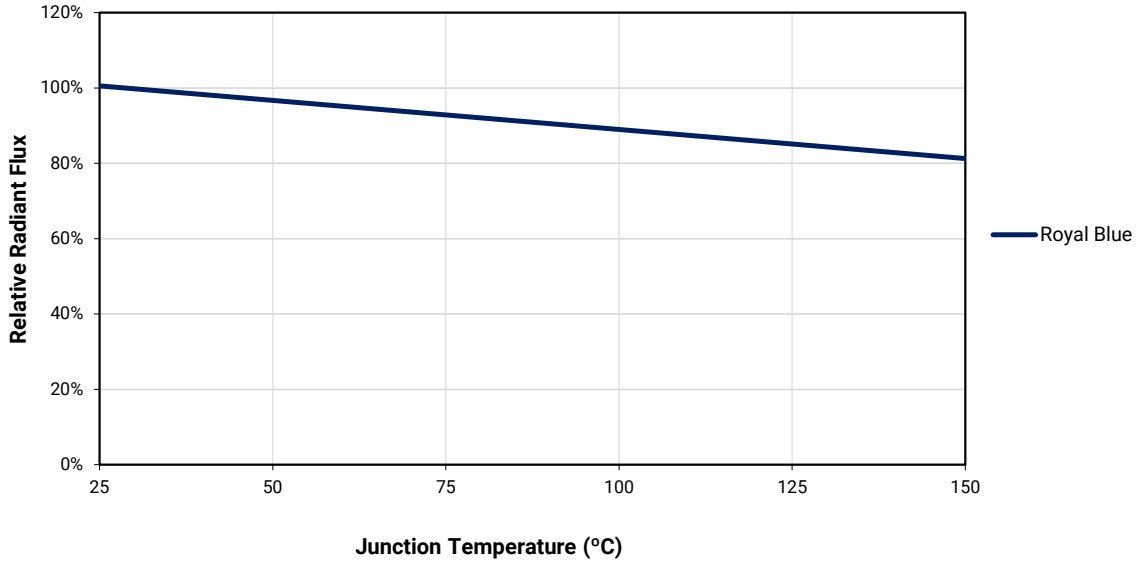


RELATIVE FLUX VS. JUNCTION TEMPERATURE (I_F = 350 mA) - CONTINUED

High Intensity Color



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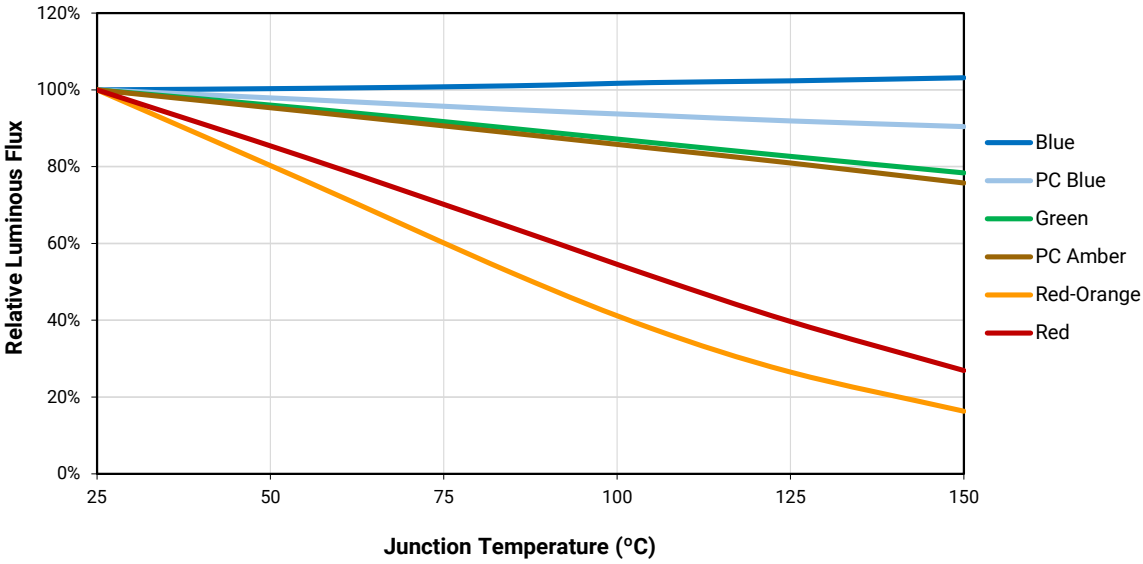

ELECTRICAL CHARACTERISTICS (T_J = 85 °C)

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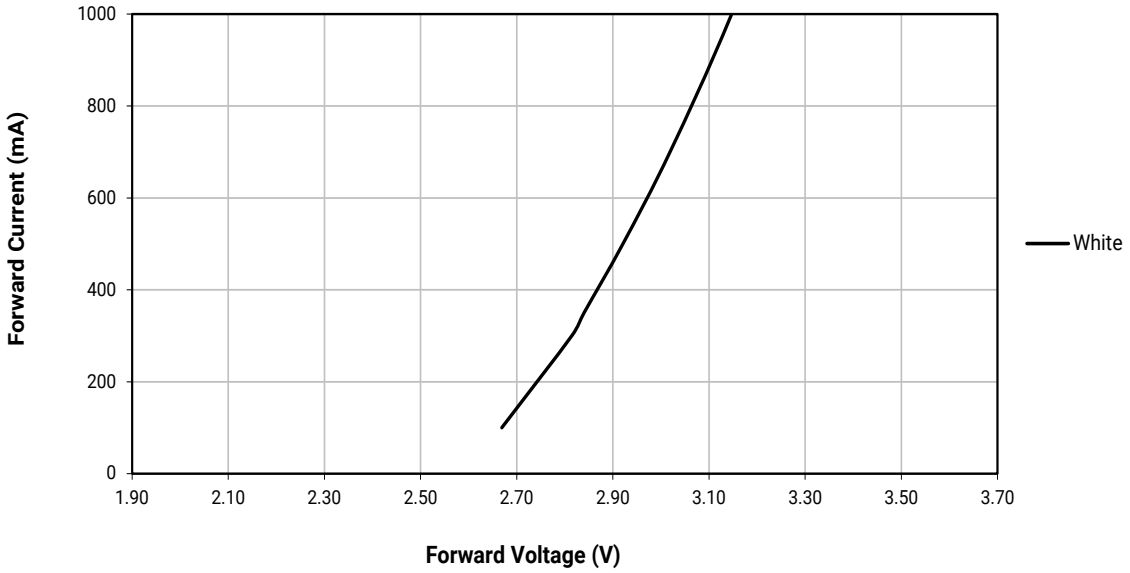
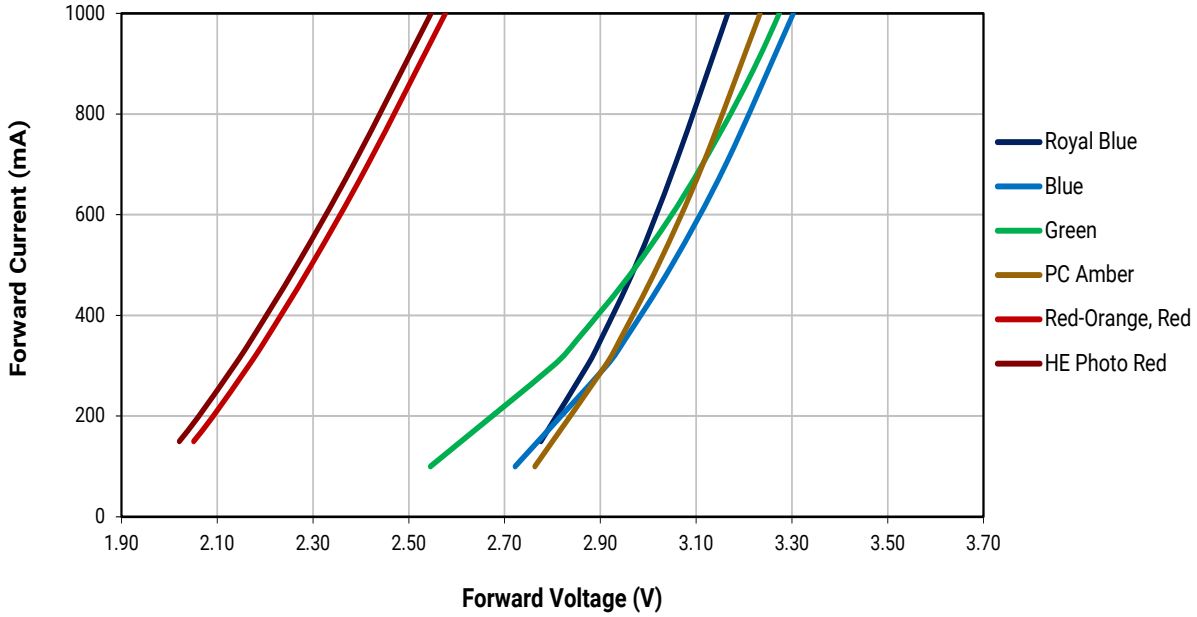
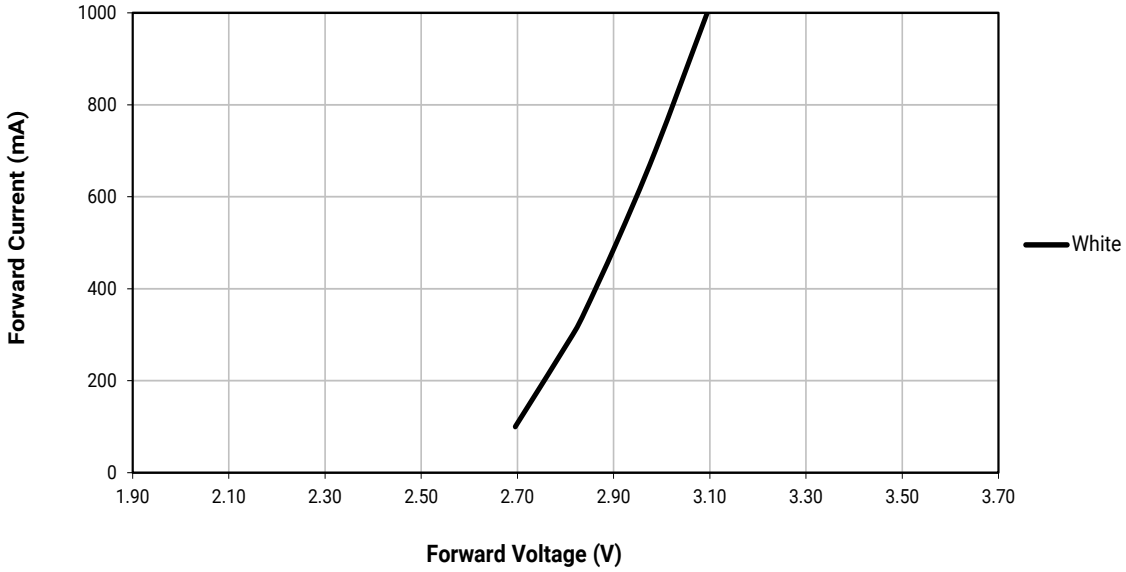


High Density Color

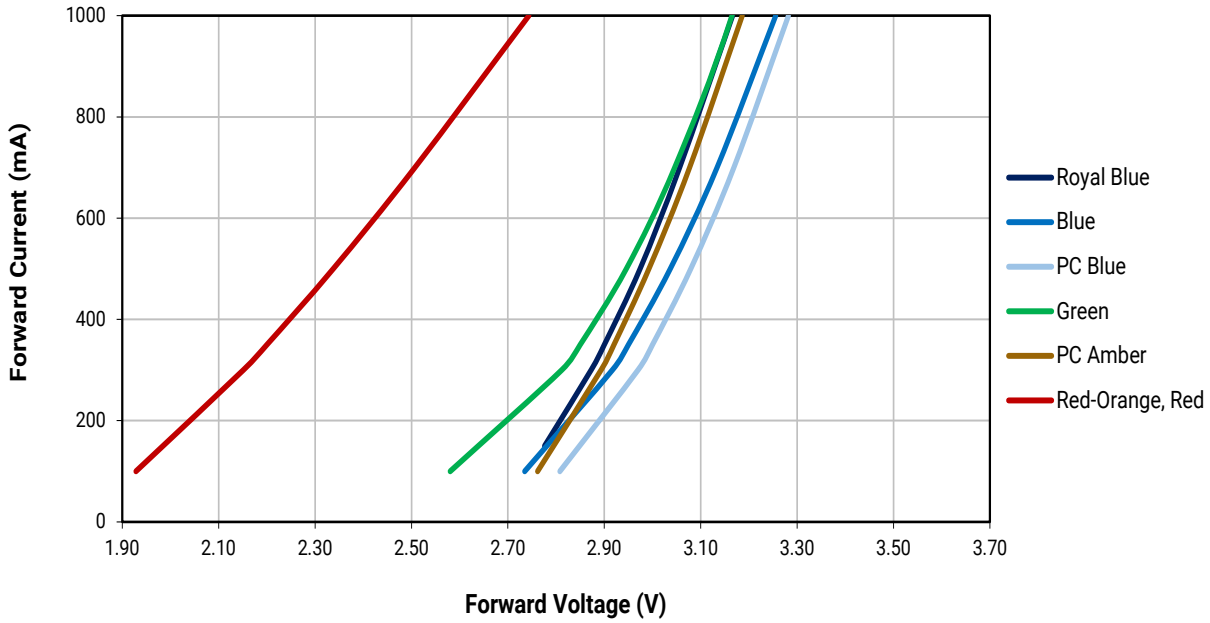


ELECTRICAL CHARACTERISTICS (T_J = 25 °C) - CONTINUED

High Intensity

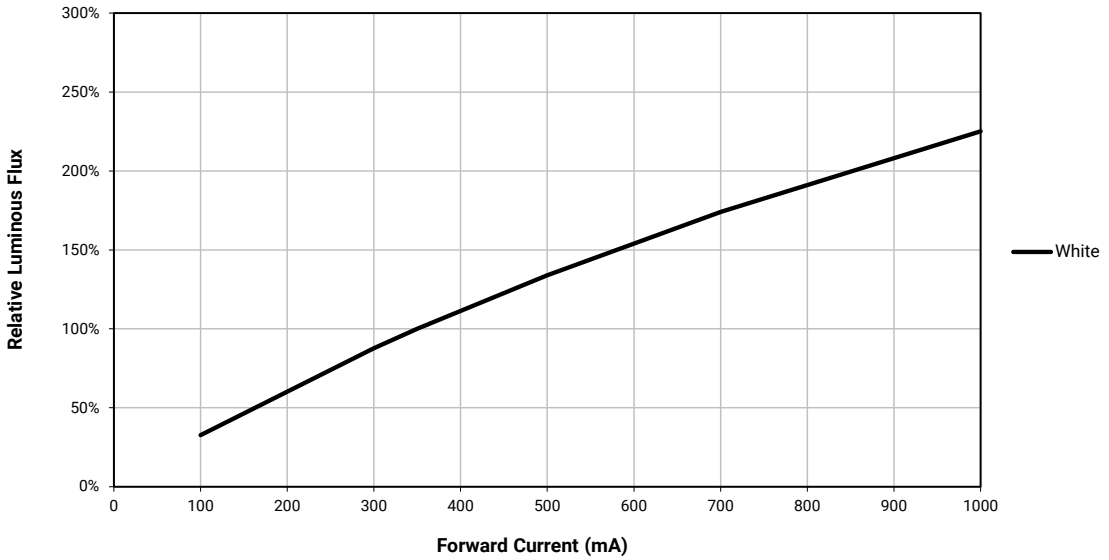


High Intensity Color



RELATIVE FLUX VS. CURRENT (T_J = 85 °C)

High Density



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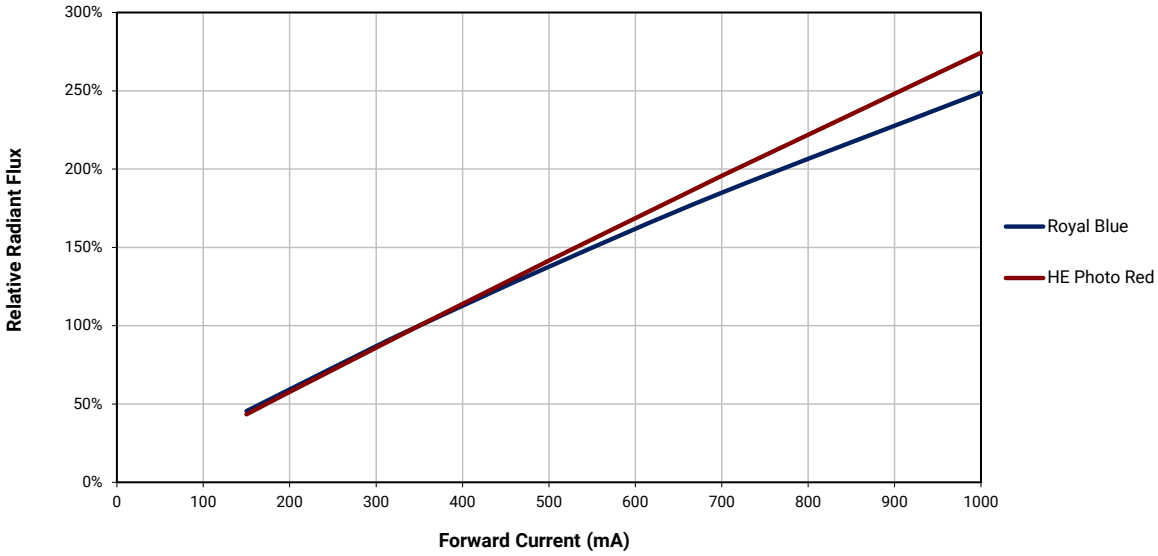
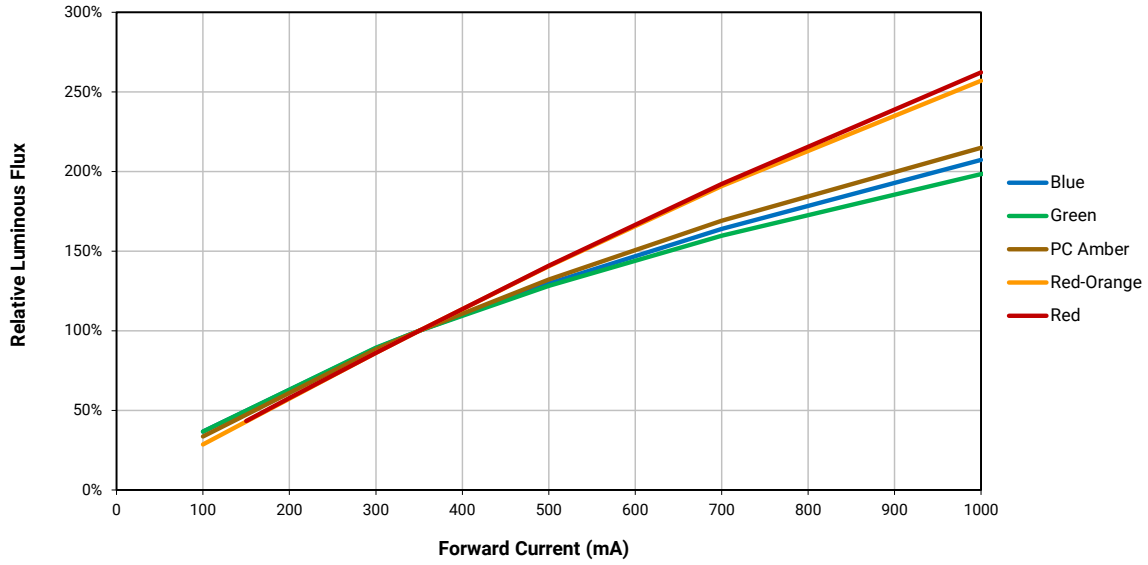
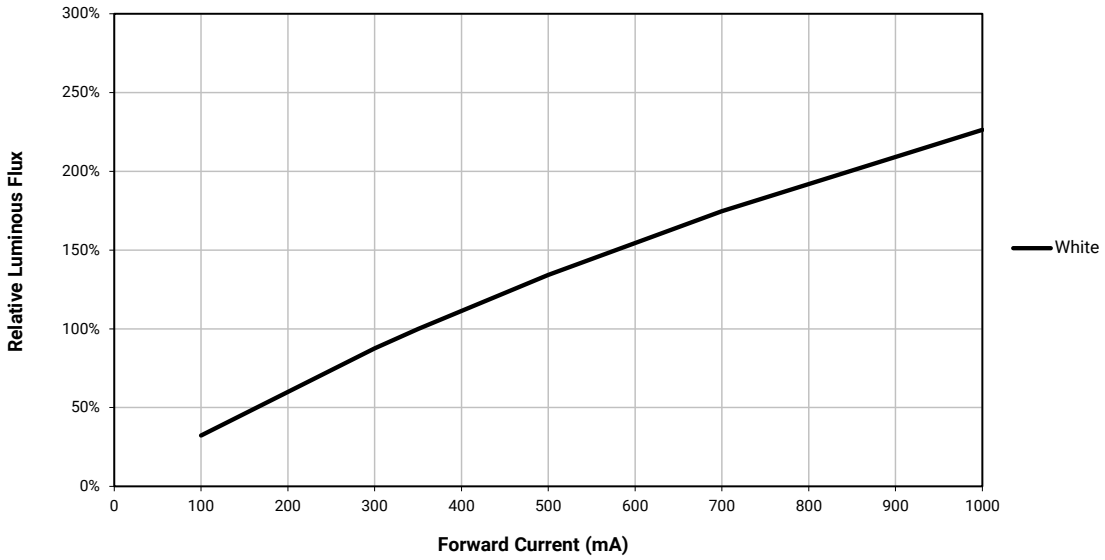


RELATIVE FLUX VS. CURRENT (T_J = 25 °C) - CONTINUED

High Density Color

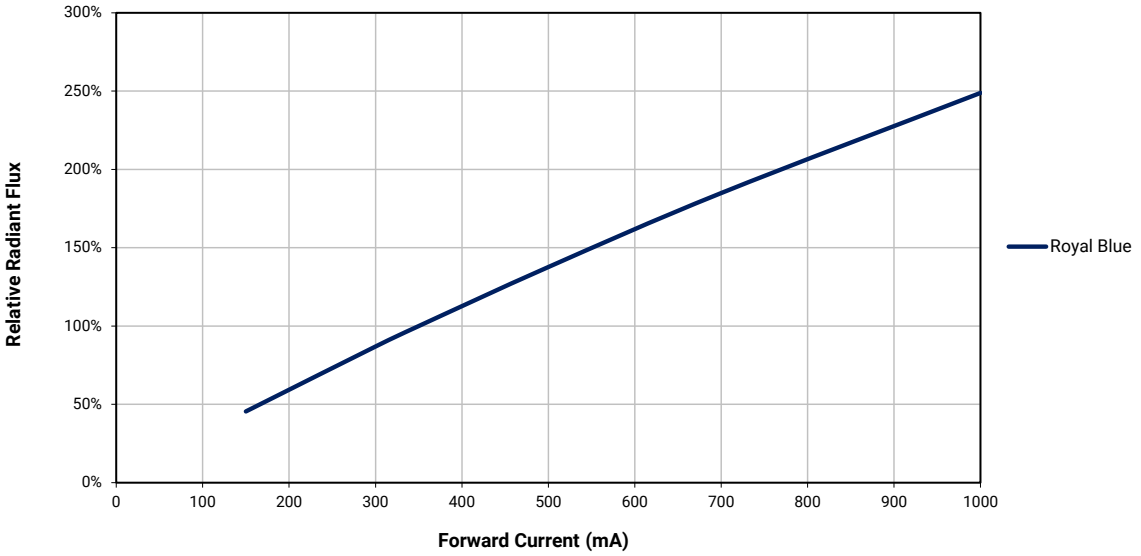


High Intensity

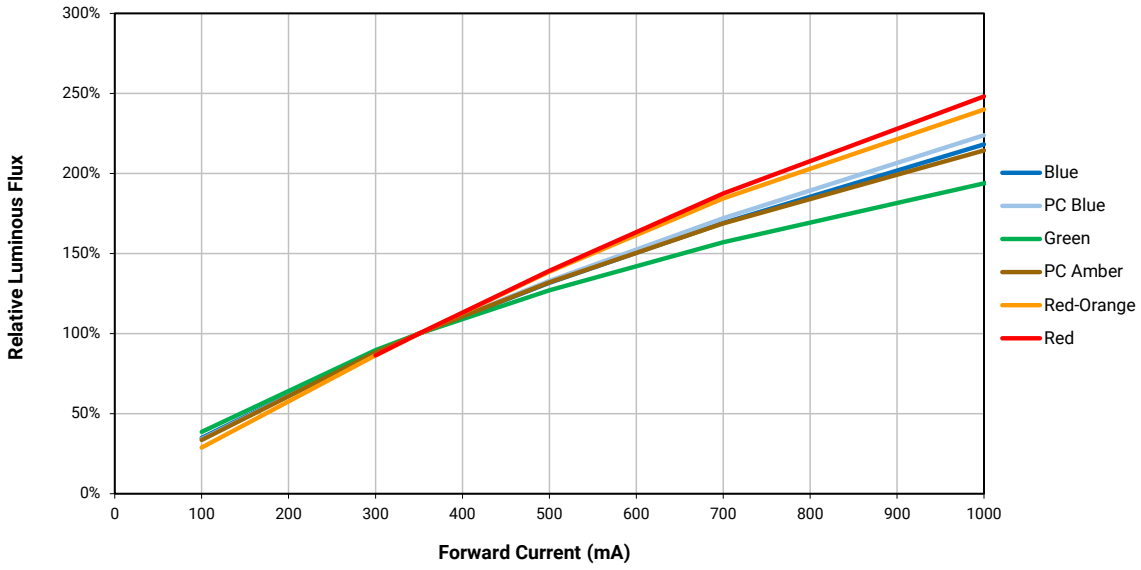


RELATIVE FLUX VS. CURRENT (T_J = 25 °C) - CONTINUED

High Intensity Color

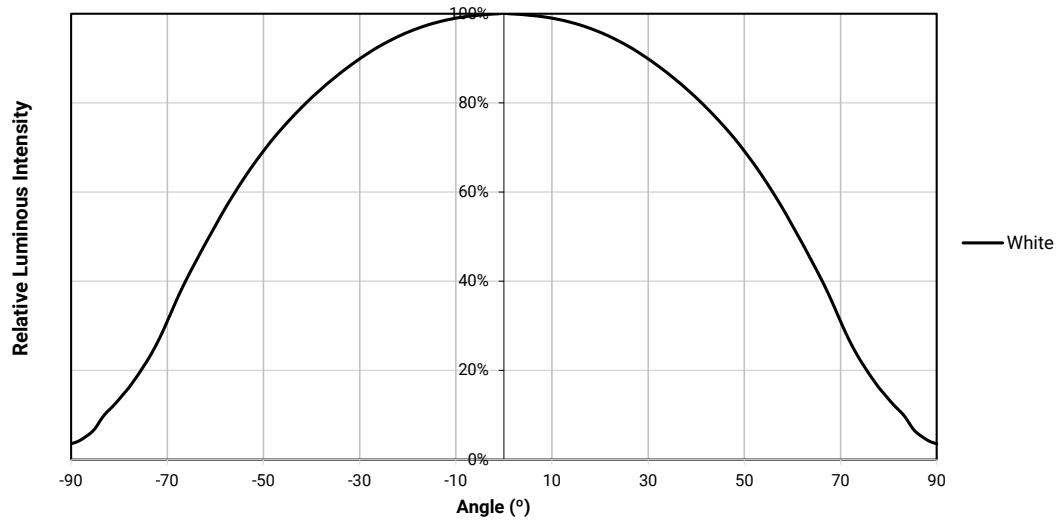


High Intensity Color

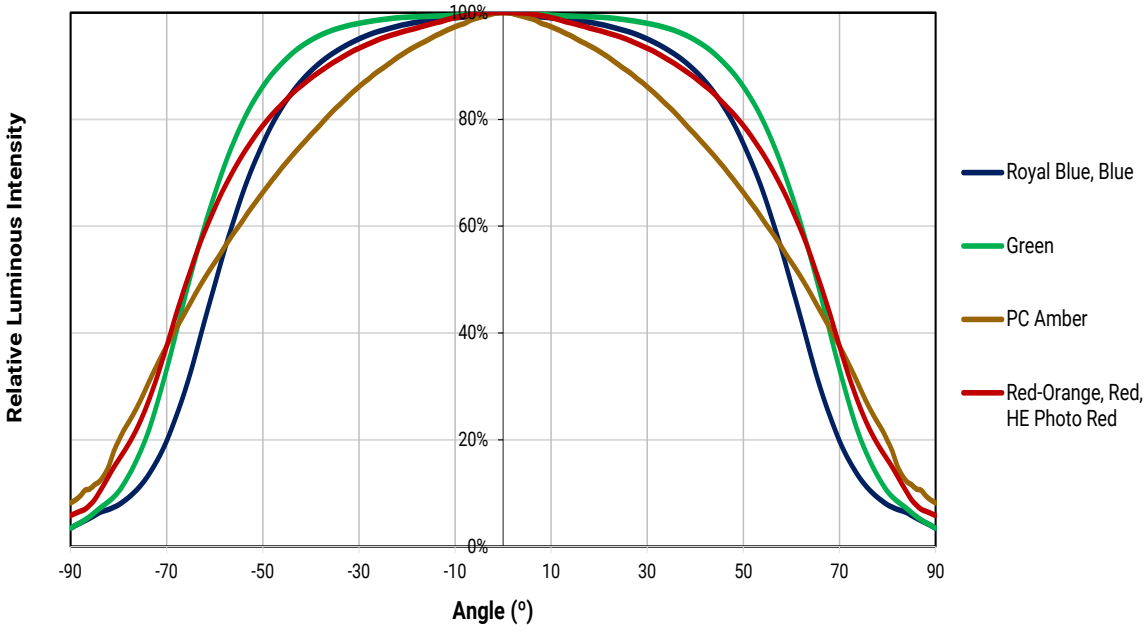


TYPICAL SPATIAL DISTRIBUTION

High Density

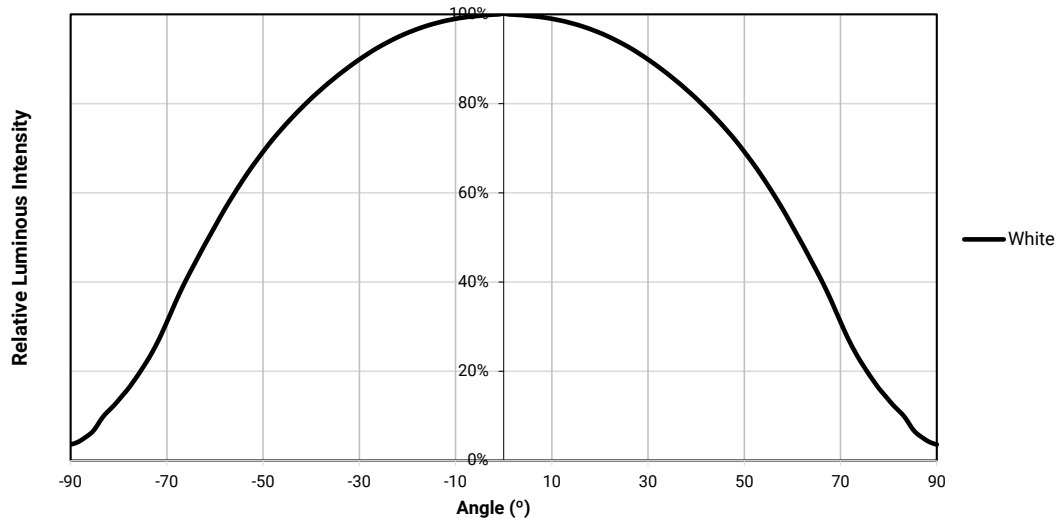


High Density Color

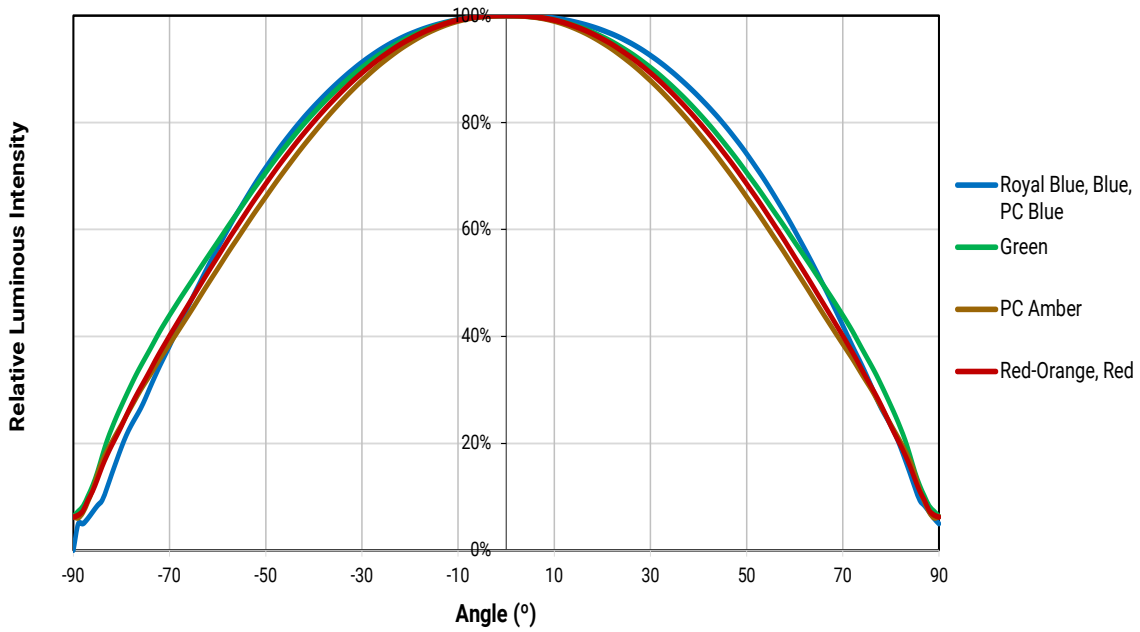


TYPICAL SPATIAL DISTRIBUTION - CONTINUED

High Intensity



High Intensity Color

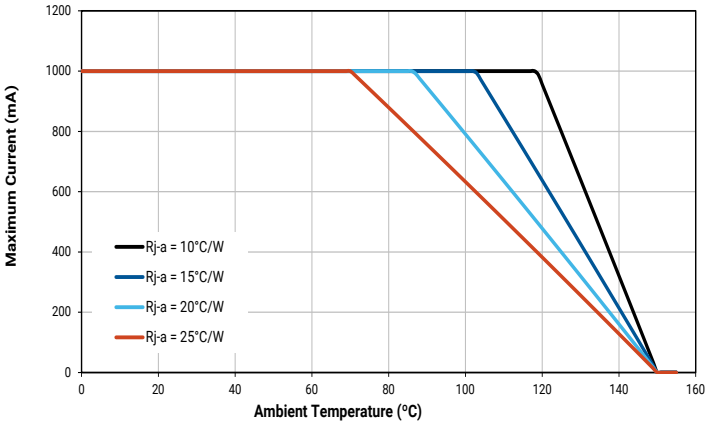


THERMAL DESIGN

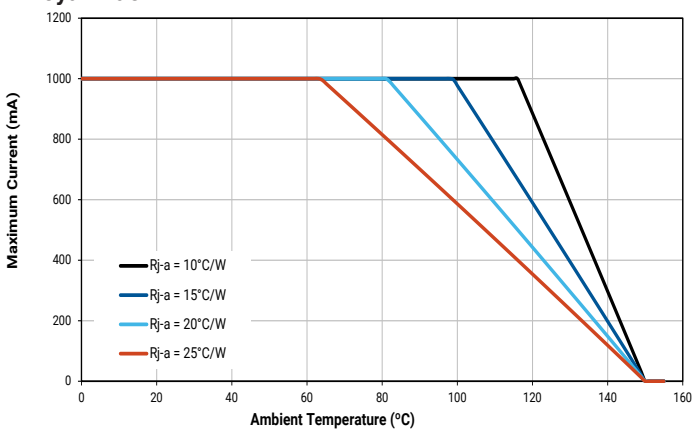
The maximum forward current is determined by the thermal resistance between the LED junction and ambient. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.

High Density

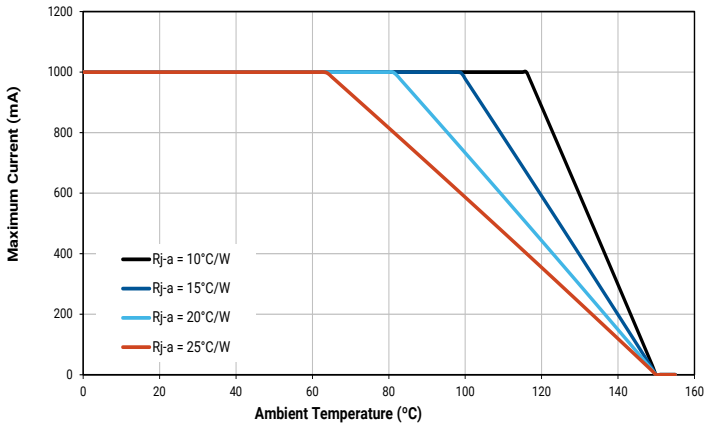
White



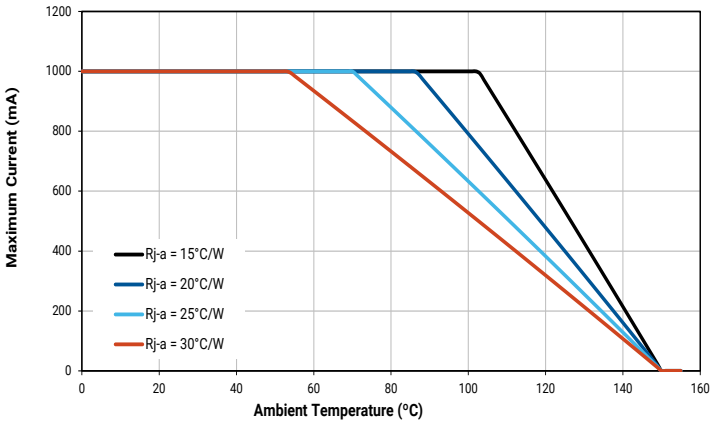
Royal Blue



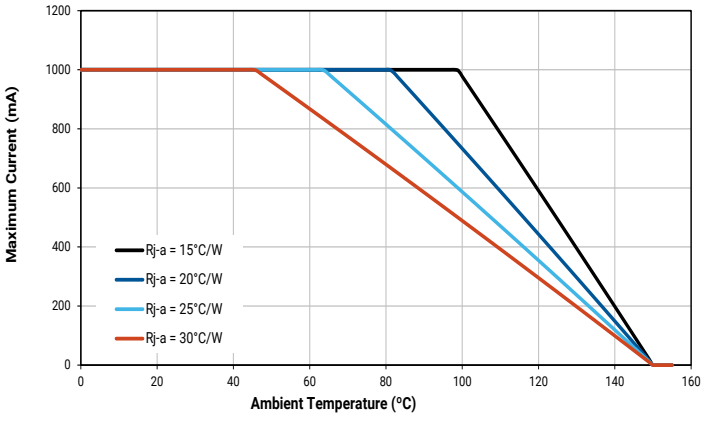
Blue



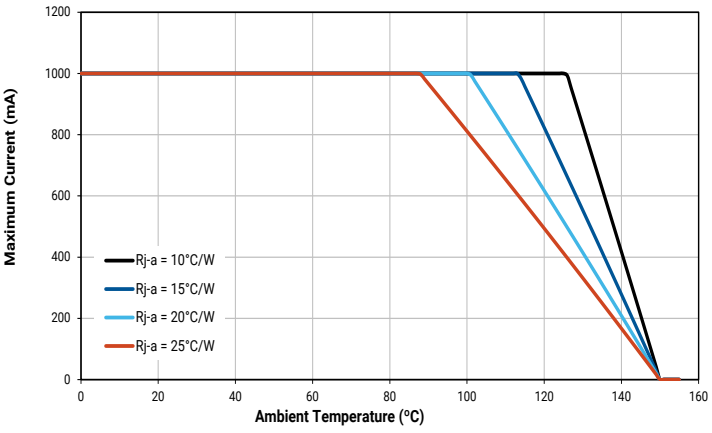
Green



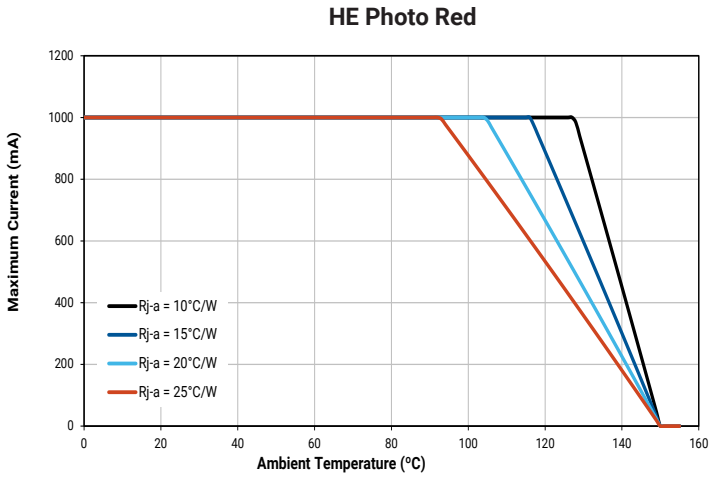
PC Amber



Red-Orange, Red



THERMAL DESIGN - CONTINUED

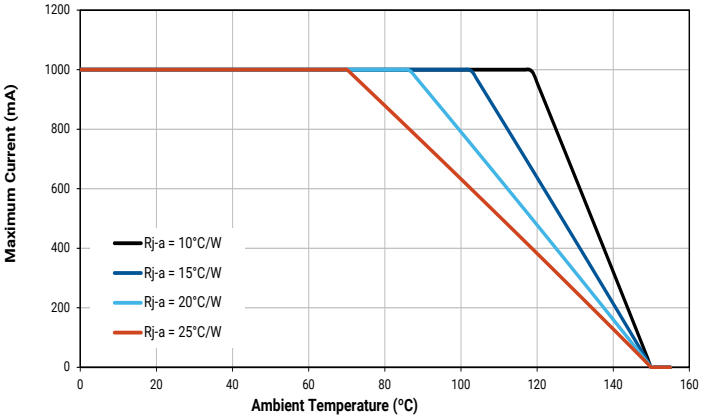


THERMAL DESIGN - CONTINUED

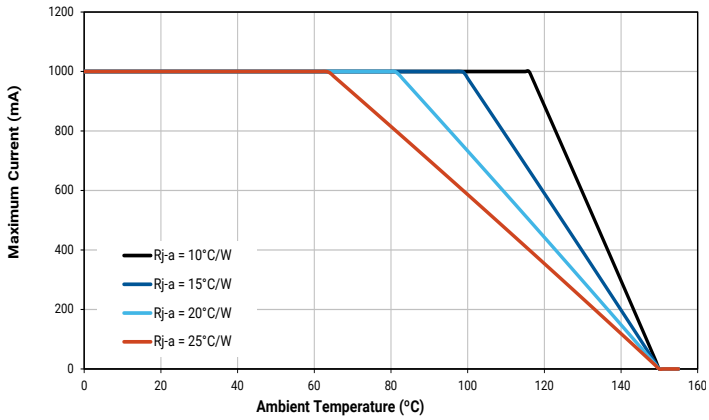
The maximum forward current is determined by the thermal resistance between the LED junction and ambient. It is crucial for the end product to be designed in a manner that minimizes the thermal resistance from the solder point to ambient in order to optimize lamp life and optical characteristics.

High Intensity

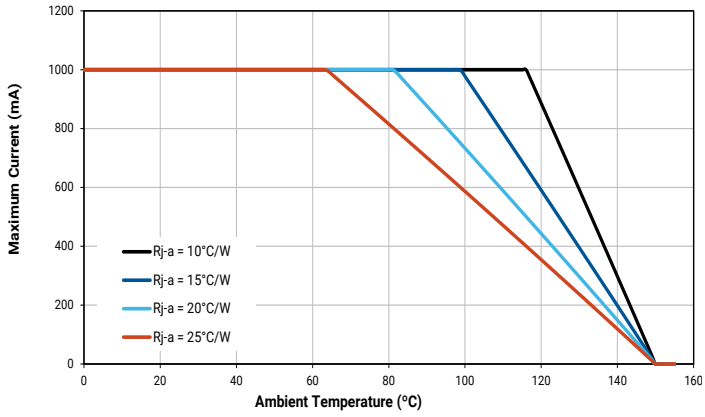
White



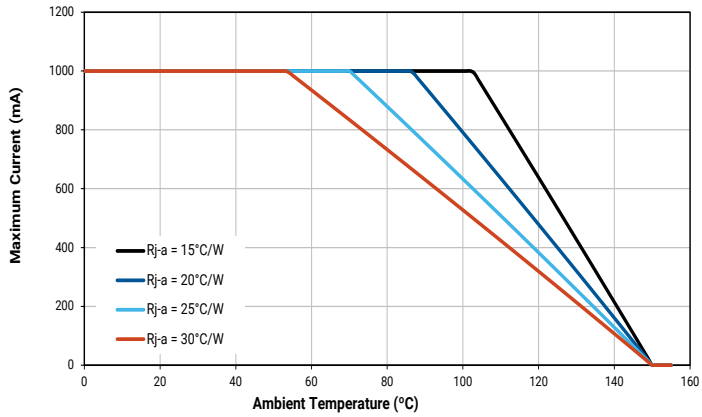
Royal Blue



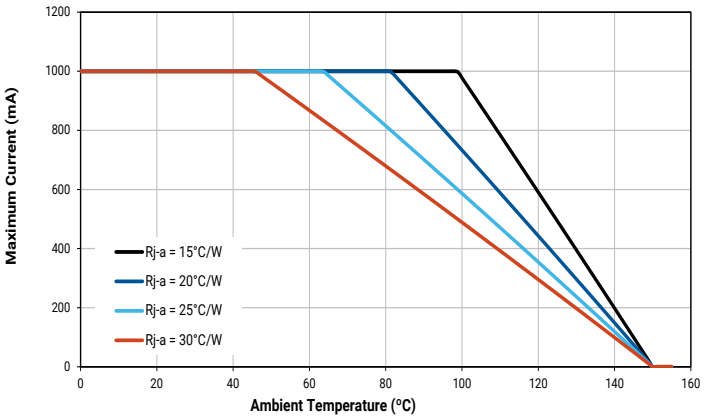
Blue, PC Blue



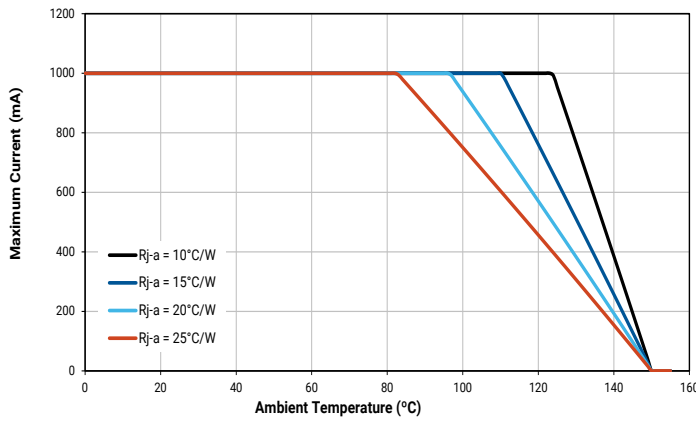
Green



PC Amber



Red-Orange, Red



PERFORMANCE GROUPS – LUMINOUS FLUX

XLamp XQ-E white LEDs are tested for luminous flux and placed into one of the following luminous-flux groups. These group codes, with a 0 appended, are used in the Bin Code “Luminous flux group.”

Group Code	Minimum Luminous Flux (lm)	Maximum Luminous Flux (lm)
F2	10.7	12.3
F3	12.3	13.9
G2	13.9	15.8
G3	15.8	18.1
H0	18.1	23.5
H2	18.1	20.6
H3	20.6	23.5
J2	23.5	26.8
J3	26.8	30.6
K2	30.6	35.2
K3	35.2	39.8
M2	39.8	45.7
M3	45.7	51.7
N2	51.7	56.8
N3	56.8	62
N4	62	67.2
P2	67.2	73.9
P3	73.9	80.6
P4	80.6	87.4
Q2	87.4	93.9
Q3	93.9	100
Q4	100	107
Q5	107	114
R2	114	122
R3	122	130
R4	130	139
R5	139	148
S2	148	156
S3	156	164

PERFORMANCE GROUPS – RADIANT FLUX (T_J = 25 °C)

XLamp XQ-E royal blue and HE photo red LEDs are tested for radiant flux and placed into one the following bins.

Group	Minimum Radiant Flux (mW) @ 350 mA	Maximum Radiant Flux (mW) @ 350 mA
26	350	375
27	375	400
28	400	425
29	425	450
30	450	475
31	475	500
32	500	525
33	525	550
34	550	575
35	575	600
36	600	625
37	625	650
38	650	675

PERFORMANCE GROUPS – DOMINANT WAVELENGTH

XLamp XQ family color LEDs are tested for dominant wavelength (DWL) and sorted into one of the DWL bins defined below.

Color	DWL Group	Minimum DWL (nm) @ 350 mA	Maximum DWL (nm) @ 350 mA
Royal Blue	D36	450	452.5
	D37	452.5	455
	D46	455	457.5
	D47	457.5	460
	D56	460	462.5
	D57	462.5	465
Blue	B3	465	470
	B4	470	475
	B5	475	480
	B6	480	485
Green	G2	520	525
	G3	525	530
	G4	530	535
Red-Orange	O3	610	615
	O4	615	620
Red	R2	620	625
	R3	625	630

PERFORMANCE GROUPS – PEAK WAVELENGTH

XLamp XQ-E HE photo red LEDs are tested for peak wavelength (PWL) and sorted into one of the PWL bins defined below.

Color	PWL Group	Minimum PWL (nm) @ 350 mA	Maximum PWL (nm) @ 350 mA
HE Photo Red	P2	650	655
	P3	655	660
	P4	660	665
	P5	665	670

PERFORMANCE GROUPS – FORWARD VOLTAGE

XLamp XQ-E red-orange, red and HE photo red LEDs are tested for forward voltage and sorted into one of the forward voltage bins defined below.

Forward Voltage Group	Minimum Forward Voltage @ 350 mA	Maximum Forward Voltage @ 350 mA
B	1.75	2.0
C	2.0	2.25
D	2.25	2.5
E	2.5	2.75
F	2.75	3.0
G	3.0	3.25
H	3.25	3.5
J	3.5	3.75

PERFORMANCE GROUPS – CHROMATICITY

XLamp XQ Family white LEDs are tested for luminous flux and placed into one of the following chromaticity groups. These group codes are used in the Bin Code “Chromaticity bin.” Two-digit group codes are appended with a 0.

Region	x	y	Region	x	y	Region	x	y	Region	x	y
0A	0.2950	0.2970	0B	0.2920	0.3060	0C	0.2984	0.3133	0D	0.2984	0.3133
	0.2920	0.3060		0.2895	0.3135		0.2962	0.3220		0.3048	0.3207
	0.2984	0.3133		0.2962	0.3220		0.3028	0.3304		0.3068	0.3113
	0.3009	0.3042		0.2984	0.3133		0.3048	0.3207		0.3009	0.3042
0R	0.2980	0.2880	0S	0.2895	0.3135	0T	0.2962	0.3220	0U	0.3037	0.2937
	0.2950	0.2970		0.2870	0.3210		0.2937	0.3312		0.3009	0.3042
	0.3009	0.3042		0.2937	0.3312		0.3005	0.3415		0.3068	0.3113
	0.3037	0.2937		0.2962	0.3220		0.3028	0.3304		0.3093	0.2993

PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

Region	x	y	Region	x	y	Region	x	y	Region	x	y
1A	0.3048	0.3207	1B	0.3028	0.3304	1C	0.3115	0.3391	1D	0.3130	0.3290
	0.3130	0.3290		0.3115	0.3391		0.3205	0.3481		0.3213	0.3373
	0.3144	0.3186		0.3130	0.3290		0.3213	0.3373		0.3221	0.3261
	0.3068	0.3113		0.3048	0.3207		0.3130	0.3290		0.3144	0.3186
1R	0.3068	0.3113	1S	0.3005	0.3415	1T	0.3099	0.3509	1U	0.3144	0.3186
	0.3144	0.3186		0.3099	0.3509		0.3196	0.3602		0.3221	0.3261
	0.3161	0.3059		0.3115	0.3391		0.3205	0.3481		0.3231	0.3120
	0.3093	0.2993		0.3028	0.3304		0.3115	0.3391		0.3161	0.3059
2A	0.3215	0.3350	2B	0.3207	0.3462	2C	0.3290	0.3538	2D	0.3290	0.3417
	0.3290	0.3417		0.3290	0.3538		0.3376	0.3616		0.3371	0.3490
	0.3290	0.3300		0.3290	0.3417		0.3371	0.3490		0.3366	0.3369
	0.3222	0.3243		0.3215	0.3350		0.3290	0.3417		0.3290	0.3300
2R	0.3222	0.3243	2S	0.3196	0.3602	2T	0.3290	0.3690	2U	0.3290	0.3300
	0.3290	0.3300		0.3290	0.3690		0.3381	0.3762		0.3366	0.3369
	0.3290	0.3180		0.3290	0.3538		0.3376	0.3616		0.3361	0.3245
	0.3231	0.3120		0.3207	0.3462		0.3290	0.3538		0.3290	0.3180
3A	0.3371	0.3490	3B	0.3376	0.3616	3C	0.3463	0.3687	3D	0.3451	0.3554
	0.3451	0.3554		0.3463	0.3687		0.3551	0.3760		0.3533	0.3620
	0.3440	0.3427		0.3451	0.3554		0.3533	0.3620		0.3515	0.3487
	0.3366	0.3369		0.3371	0.3490		0.3451	0.3554		0.3440	0.3427
3R	0.3366	0.3369	3S	0.3381	0.3762	3T	0.3480	0.3840	3U	0.3440	0.3428
	0.3440	0.3428		0.3480	0.3840		0.3571	0.3907		0.3515	0.3487
	0.3429	0.3307		0.3463	0.3687		0.3551	0.3760		0.3495	0.3339
	0.3361	0.3245		0.3376	0.3616		0.3463	0.3687		0.3429	0.3307
4A	0.3530	0.3597	4B	0.3548	0.3736	4C	0.3641	0.3804	4D	0.3615	0.3659
	0.3615	0.3659		0.3641	0.3804		0.3736	0.3874		0.3702	0.3722
	0.3590	0.3521		0.3615	0.3659		0.3702	0.3722		0.3670	0.3578
	0.3512	0.3465		0.3530	0.3597		0.3615	0.3659		0.3590	0.3521
5A1	0.3670	0.3578	5A2	0.3686	0.3649	5A3	0.3744	0.3685	5A4	0.3726	0.3612
	0.3686	0.3649		0.3702	0.3722		0.3763	0.3760		0.3744	0.3685
	0.3744	0.3685		0.3763	0.3760		0.3825	0.3798		0.3804	0.3721
	0.3726	0.3612		0.3744	0.3685		0.3804	0.3721		0.3783	0.3646
5B1	0.3702	0.3722	5B2	0.3719	0.3797	5B3	0.3782	0.3837	5B4	0.3763	0.3760
	0.3719	0.3797		0.3736	0.3874		0.3802	0.3916		0.3782	0.3837
	0.3782	0.3837		0.3802	0.3916		0.3869	0.3958		0.3847	0.3877
	0.3763	0.3760		0.3782	0.3837		0.3847	0.3877		0.3825	0.3798
5C1	0.3825	0.3798	5C2	0.3847	0.3877	5C3	0.3912	0.3917	5C4	0.3887	0.3836
	0.3847	0.3877		0.3869	0.3958		0.3937	0.4001		0.3912	0.3917
	0.3912	0.3917		0.3937	0.4001		0.4006	0.4044		0.3978	0.3958
	0.3887	0.3836		0.3912	0.3917		0.3978	0.3958		0.3950	0.3875

PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

Region	x	y	Region	x	y	Region	x	y	Region	x	y
5D1	0.3783	0.3646	5D2	0.3804	0.3721	5D3	0.3863	0.3758	5D4	0.3840	0.3681
	0.3804	0.3721		0.3825	0.3798		0.3887	0.3836		0.3863	0.3758
	0.3863	0.3758		0.3887	0.3836		0.3950	0.3875		0.3924	0.3794
	0.3840	0.3681		0.3863	0.3758		0.3924	0.3794		0.3898	0.3716
6A1	0.3889	0.3690	6A2	0.3915	0.3768	6A3	0.3981	0.3800	6A4	0.3953	0.3720
	0.3915	0.3768		0.3941	0.3848		0.4010	0.3882		0.3981	0.3800
	0.3981	0.3800		0.4010	0.3882		0.4080	0.3916		0.4048	0.3832
	0.3953	0.3720		0.3981	0.3800		0.4048	0.3832		0.4017	0.3751
6B1	0.3941	0.3848	6B2	0.3968	0.3930	6B3	0.4040	0.3966	6B4	0.4010	0.3882
	0.3968	0.3930		0.3996	0.4015		0.4071	0.4052		0.4040	0.3966
	0.4040	0.3966		0.4071	0.4052		0.4146	0.4089		0.4113	0.4001
	0.4010	0.3882		0.4040	0.3966		0.4113	0.4001		0.4080	0.3916
6C1	0.4080	0.3916	6C2	0.4113	0.4001	6C3	0.4186	0.4037	6C4	0.4150	0.3950
	0.4113	0.4001		0.4146	0.4089		0.4222	0.4127		0.4186	0.4037
	0.4186	0.4037		0.4222	0.4127		0.4299	0.4165		0.4259	0.4073
	0.4150	0.3950		0.4186	0.4037		0.4259	0.4073		0.4221	0.3984
6D1	0.4017	0.3751	6D2	0.4048	0.3832	6D3	0.4116	0.3865	6D4	0.4082	0.3782
	0.4048	0.3832		0.4080	0.3916		0.4150	0.3950		0.4116	0.3865
	0.4116	0.3865		0.4150	0.3950		0.4221	0.3984		0.4183	0.3898
	0.4082	0.3782		0.4116	0.3865		0.4183	0.3898		0.4147	0.3814
7A1	0.4147	0.3814	7A2	0.4183	0.3898	7A3	0.4242	0.3919	7A4	0.4203	0.3833
	0.4183	0.3898		0.4221	0.3984		0.4281	0.4006		0.4242	0.3919
	0.4242	0.3919		0.4281	0.4006		0.4342	0.4028		0.4300	0.3939
	0.4203	0.3833		0.4242	0.3919		0.4300	0.3939		0.4259	0.3853
7B1	0.4221	0.3984	7B2	0.4259	0.4073	7B3	0.4322	0.4096	7B4	0.4281	0.4006
	0.4259	0.4073		0.4299	0.4165		0.4364	0.4188		0.4322	0.4096
	0.4322	0.4096		0.4364	0.4188		0.4430	0.4212		0.4385	0.4119
	0.4281	0.4006		0.4322	0.4096		0.4385	0.4119		0.4342	0.4028
7C1	0.4342	0.4028	7C2	0.4385	0.4119	7C3	0.4449	0.4141	7C4	0.4403	0.4049
	0.4385	0.4119		0.4430	0.4212		0.4496	0.4236		0.4449	0.4141
	0.4449	0.4141		0.4496	0.4236		0.4562	0.4260		0.4513	0.4164
	0.4403	0.4049		0.4449	0.4141		0.4513	0.4164		0.4465	0.4071
7D1	0.4259	0.3853	7D2	0.4300	0.3939	7D3	0.4359	0.3960	7D4	0.4316	0.3873
	0.4300	0.3939		0.4342	0.4028		0.4403	0.4049		0.4359	0.3960
	0.4359	0.3960		0.4403	0.4049		0.4465	0.4071		0.4418	0.3981
	0.4316	0.3873		0.4359	0.3960		0.4418	0.3981		0.4373	0.3893
8A1	0.4373	0.3893	8A2	0.4418	0.3981	8A3	0.4475	0.3994	8A4	0.4428	0.3906
	0.4418	0.3981		0.4465	0.4071		0.4523	0.4085		0.4475	0.3994
	0.4475	0.3994		0.4523	0.4085		0.4582	0.4099		0.4532	0.4008
	0.4428	0.3906		0.4475	0.3994		0.4532	0.4008		0.4483	0.3919

PERFORMANCE GROUPS – CHROMATICITY (CONTINUED)

Region	x	y	Region	x	y	Region	x	y	Region	x	y
8B1	0.4465	0.4071	8B2	0.4513	0.4164	8B3	0.4573	0.4178	8B4	0.4523	0.4085
	0.4513	0.4164		0.4562	0.4260		0.4624	0.4274		0.4573	0.4178
	0.4573	0.4178		0.4624	0.4274		0.4687	0.4289		0.4634	0.4193
	0.4523	0.4085		0.4573	0.4178		0.4634	0.4193		0.4582	0.4099
8C1	0.4582	0.4099	8C2	0.4634	0.4193	8C3	0.4695	0.4207	8C4	0.4641	0.4112
	0.4634	0.4193		0.4687	0.4289		0.4750	0.4304		0.4695	0.4207
	0.4695	0.4207		0.4750	0.4304		0.4813	0.4319		0.4756	0.4221
	0.4641	0.4112		0.4695	0.4207		0.4756	0.4221		0.4700	0.4126
8D1	0.4483	0.3919	8D2	0.4532	0.4008	8D3	0.4589	0.4021	8D4	0.4538	0.3931
	0.4532	0.4008		0.4582	0.4099		0.4641	0.4112		0.4589	0.4021
	0.4589	0.4021		0.4641	0.4112		0.4700	0.4126		0.4646	0.4034
	0.4538	0.3931		0.4589	0.4021		0.4646	0.4034		0.4593	0.3944

XLamp XQ-E High Intensity PC blue LEDs are placed into the regions defined by the following bounding coordinates.

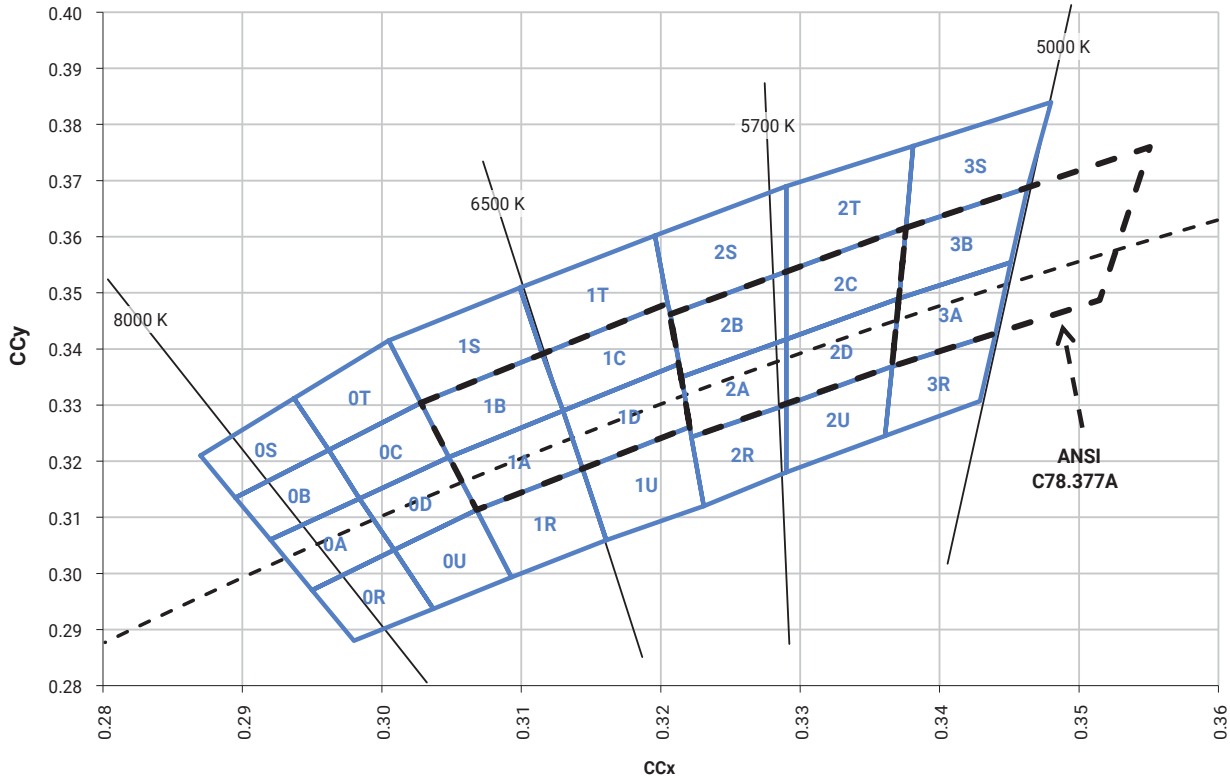
Region	x	y	Region	x	y
N4B	0.1379	0.0915	N5B	0.1312	0.1106
	0.1562	0.1142		0.1527	0.1343
	0.1598	0.0922		0.1562	0.1142
	0.1447	0.0712		0.1379	0.0915

XLamp XQ-E PC amber LEDs are placed into the region defined by the following bounding coordinates.

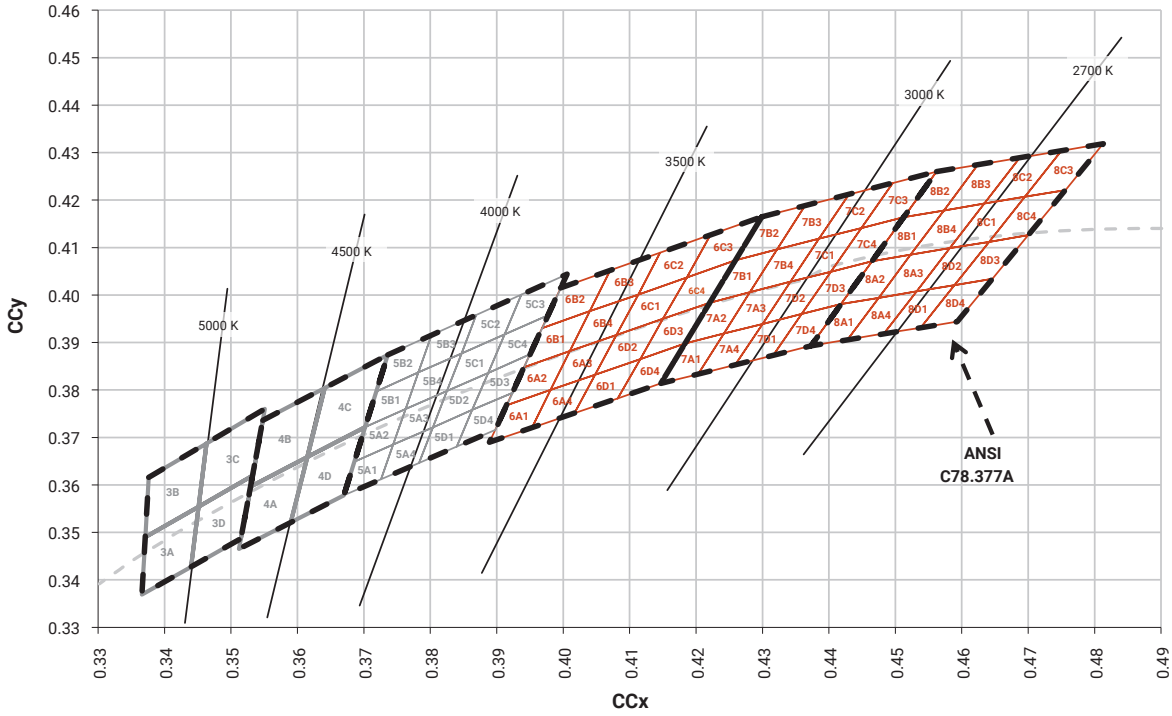
Region	x	y
Y2	0.5469	0.4249
	0.5700	0.4100
	0.5900	0.4100
	0.5610	0.4390

CREE'S STANDARD WHITE CHROMATICITY REGIONS PLOTTED ON THE 1931 CIE CURVE

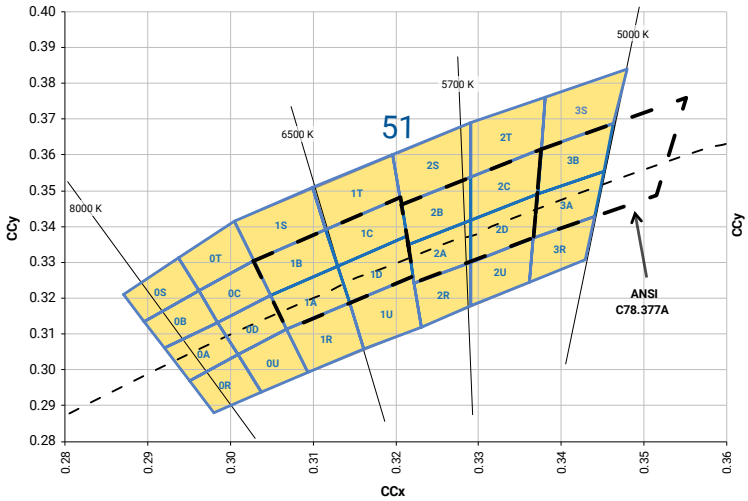
ANSI Cool White

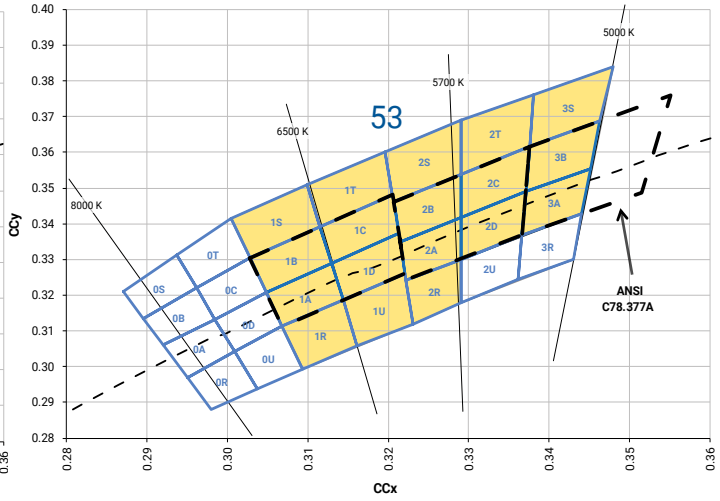


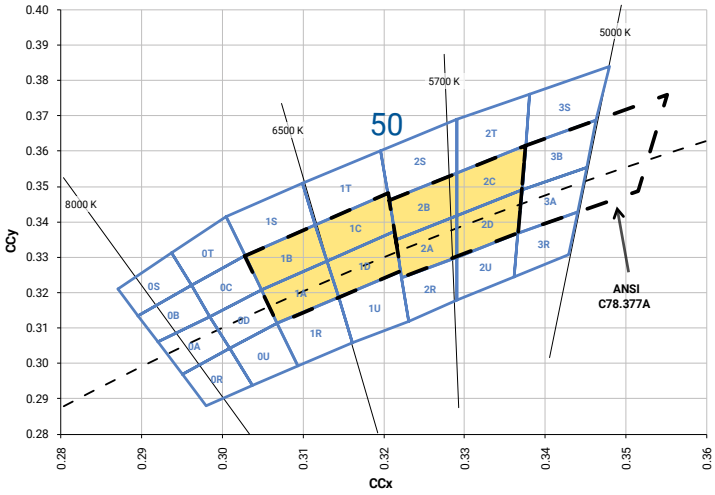
ANSI Neutral White and ANSI Warm White

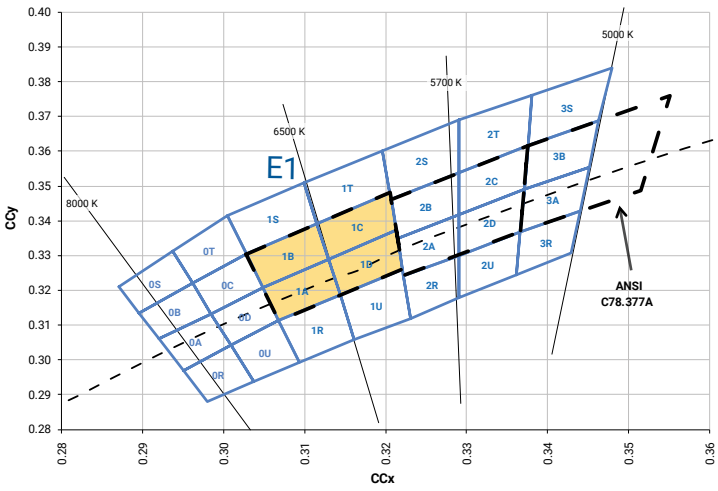


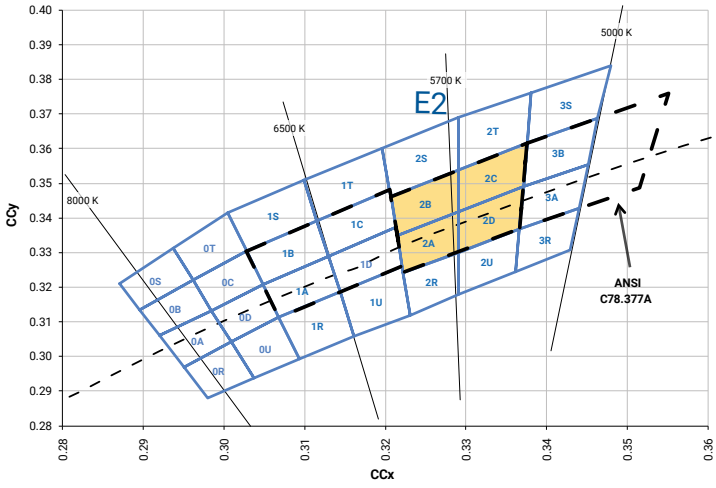
CREE'S STANDARD COOL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS



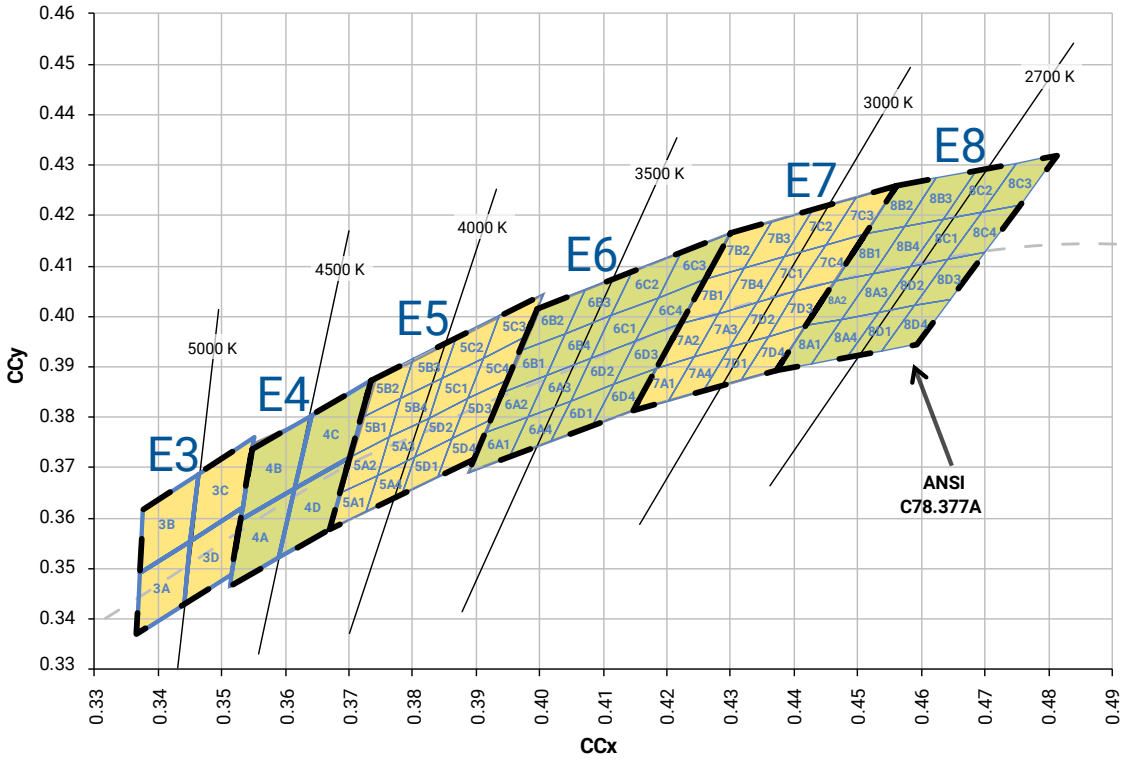


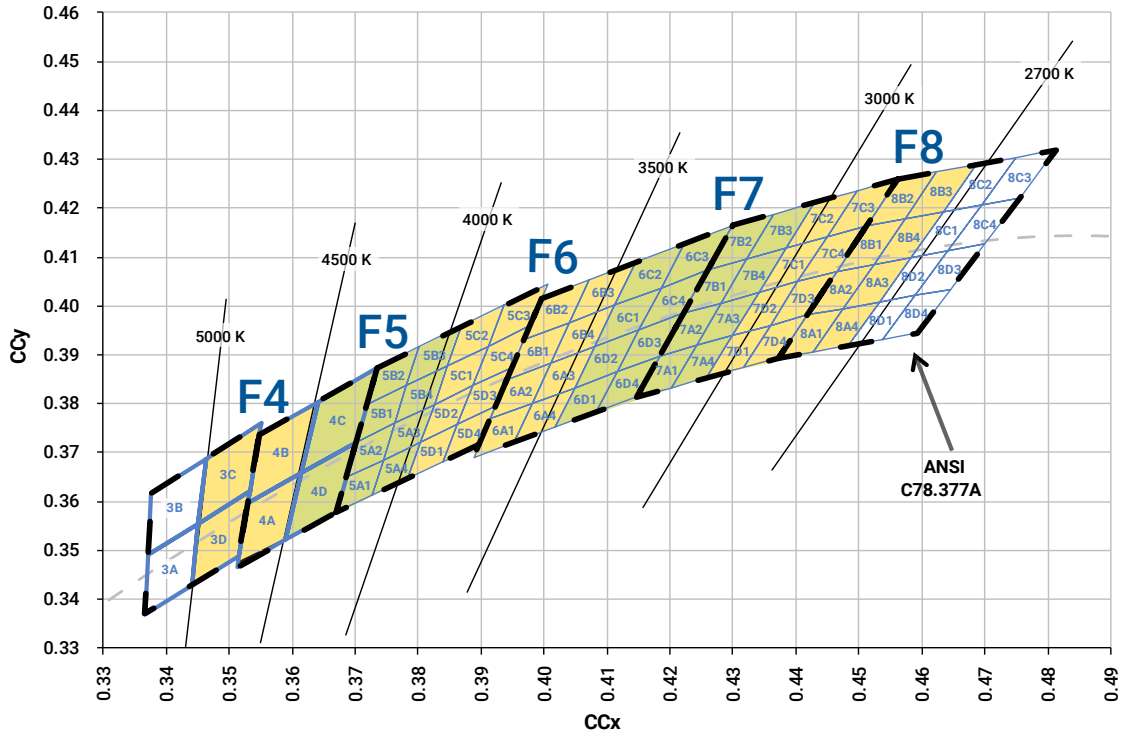




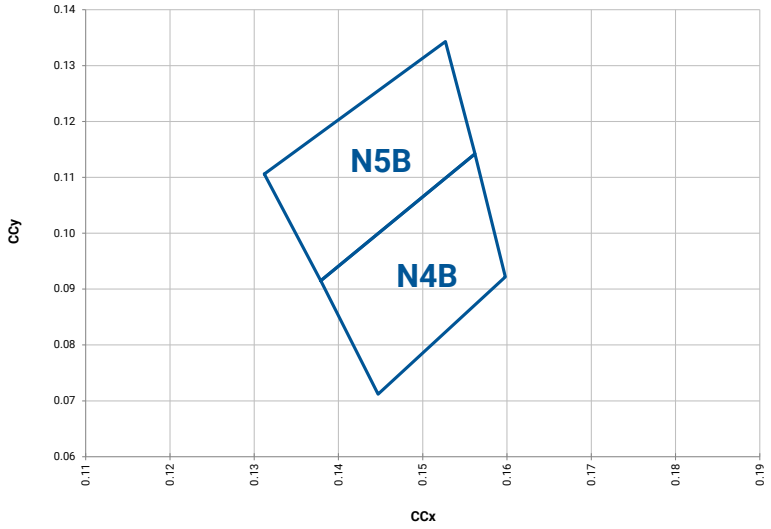


CREE'S STANDARD WARM AND NEUTRAL WHITE KITS PLOTTED ON ANSI STANDARD CHROMATICITY REGIONS

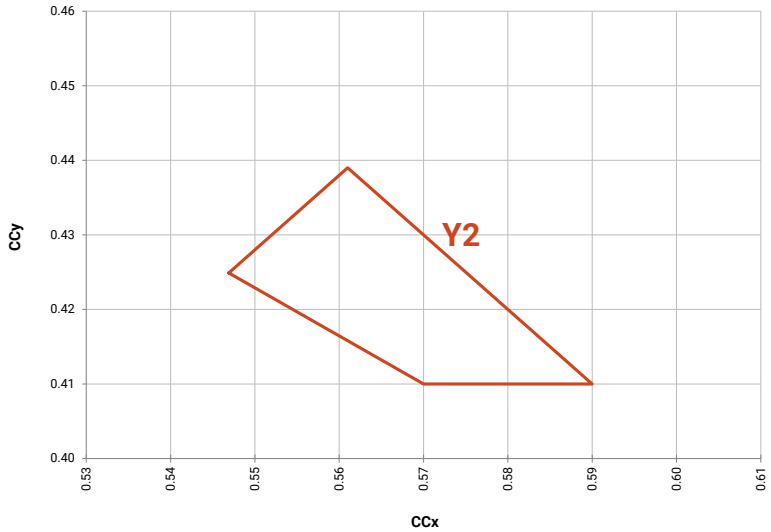




CREE'S PC BLUE KITS PLOTTED ON THE 1931 CIE CURVE



CREE'S PC AMBER KIT PLOTTED ON THE 1931 CIE CURVE



CREE'S STANDARD CHROMATICITY KITS

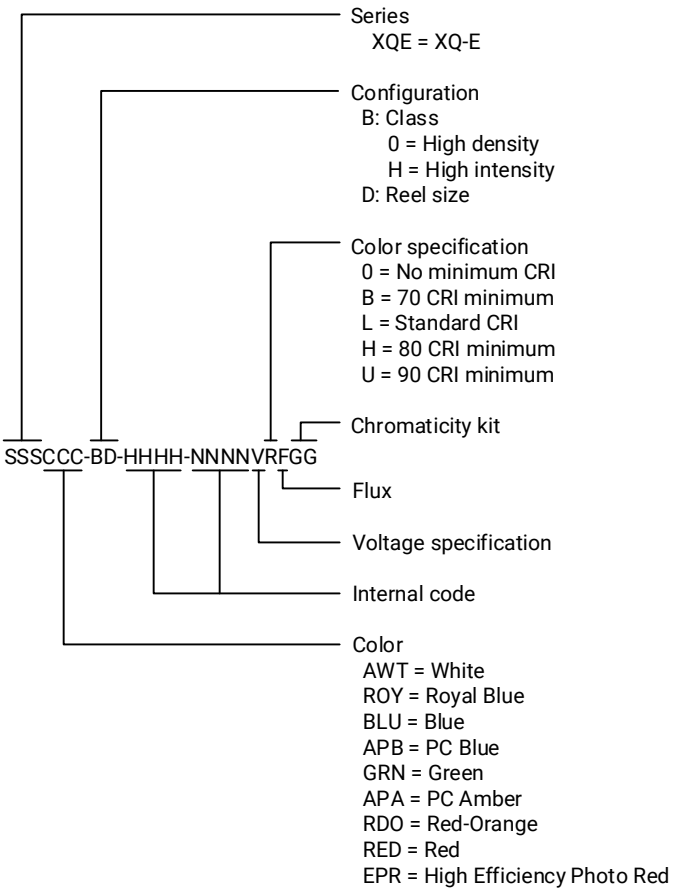
The following table provides the chromaticity bins associated with chromaticity kits.

Color	CCT	Kit	Chromaticity Bins
Cool White	6200 K	51	0A, 0B, 0C, 0D, 0R, 0S, 0T, 0U, 1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U, 2A, 2B, 2C, 2D, 2R, 2S, 2T, 2U, 3A, 3B, 3R, 3S
	6000 K	53	1A, 1B, 1C, 1D, 1R, 1S, 1T, 1U, 2A, 2B, 2C, 2D, 2R, 2S, 2T, 3A, 3B, 3S
	6200 K	50	1A, 1B, 1C, 1D, 2A, 2B, 2C, 2D
	6500 K	E1	1A, 1B, 1C, 1D
	5700 K	E2	2A, 2B, 2C, 2D
Neutral White	5000 K	E3	3A, 3B, 3C, 3D
	4750 K	F4	3C, 3D, 4A, 4B
	4500 K	E4	4A, 4B, 4C, 4D
	4250 K	F5	4C, 4D, 5A1, 5A2, 5A3, 5A4, 5B1, 5B2, 5B3, 5B4
	4000 K	E5	5A1, 5A2, 5A3, 5A4, 5B1, 5B2, 5B3, 5B4, 5C1, 5C2, 5C3, 5C4, 5D1, 5D2, 5D3, 5D4
Warm White	3750 K	F6	5C1, 5C2, 5C3, 5C4, 5D1, 5D2, 5D3, 5D4, 6A1, 6A2, 6A3, 6A4, 6B1, 6B2, 6B3, 6B4
	3500 K	E6	6A1, 6A2, 6A3, 6A4, 6B1, 6B2, 6B3, 6B4, 6C1, 6C2, 6C3, 6C4, 6D1, 6D2, 6D3, 6D4
	3250 K	F7	6C1, 6C2, 6C3, 6C4, 6D1, 6D2, 6D3, 6D4, 7A1, 7A2, 7A3, 7A4, 7B1, 7B2, 7B3, 7B4
	3000 K	E7	7A1, 7A2, 7A3, 7A4, 7B1, 7B2, 7B3, 7B4, 7C1, 7C2, 7C3, 7C4, 7D1, 7D2, 7D3, 7D4
	2850 K	F8	7C1, 7C2, 7C3, 7C4, 7D1, 7D2, 7D3, 7D4, 8A1, 8A2, 8A3, 8A4, 8B1, 8B2, 8B3, 8B4
	2700 K	E8	8A1, 8A2, 8A3, 8A4, 8B1, 8B2, 8B3, 8B4, 8C1, 8C2, 8C3, 8C4, 8D1, 8D2, 8D3, 8D4

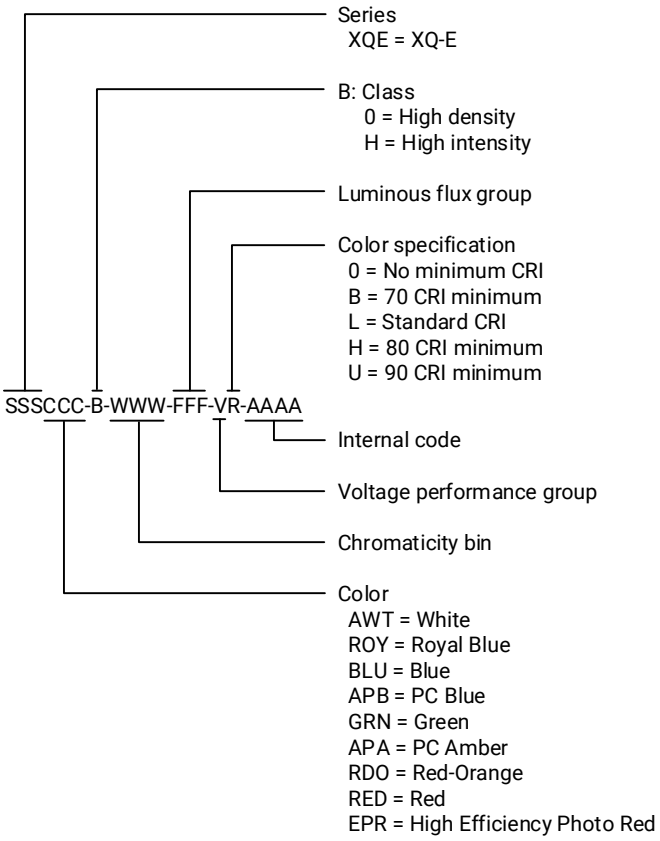
BIN AND ORDER CODE FORMATS

Bin codes and order codes for XQ LEDs are configured in the following manner:

Order Code



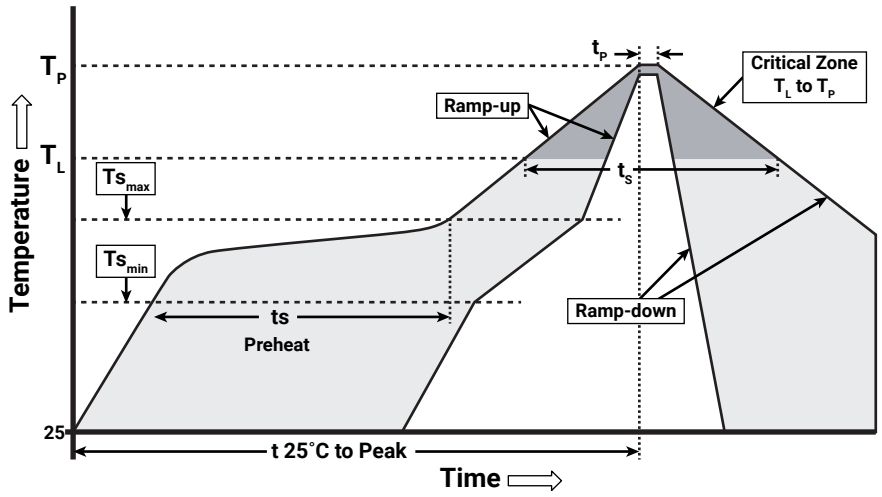
Bin Code



REFLOW SOLDERING CHARACTERISTICS

In testing, Cree has found XLamp XQ-E LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used, and therefore it is the lamp or luminaire manufacturer's responsibility to determine applicable soldering requirements.

Note that this general guideline may not apply to all PCB designs and configurations of reflow soldering equipment.



IPC/JEDEC J-STD-020C

Profile Feature	Lead-Free Solder
Average Ramp-Up Rate (Ts_{max} to Tp)	1.2 °C/second
Preheat: Temperature Min (Ts_{min})	120 °C
Preheat: Temperature Max (Ts_{max})	170 °C
Preheat: Time (ts_{min} to ts_{max})	65-150 seconds
Time Maintained Above: Temperature (T_L)	217 °C
Time Maintained Above: Time (t_L)	45-90 seconds
Peak/Classification Temperature (Tp)	235 - 245 °C
Time Within 5 °C of Actual Peak Temperature (tp)	20-40 seconds
Ramp-Down Rate	1 - 6 °C/second
Time 25 °C to Peak Temperature	4 minutes max.

Note: All temperatures refer to topside of the package, measured on the package body surface.

NOTES

Measurements

The luminous flux, radiant power, chromaticity, forward voltage and CRI measurements in this document are binning specifications only and solely represent product measurements as of the date of shipment. These measurements will change over time based on a number of factors that are not within Cree's control and are not intended or provided as operational specifications for the products. Calculated values are provided for informational purposes only and are not intended or provided as specifications.

Pre-Release Qualification Testing

Please read the LED Reliability Overview for details of the qualification process Cree applies to ensure long-term reliability for XLamp LEDs and details of Cree's pre-release qualification testing for XLamp LEDs.

Lumen Maintenance

Cree now uses standardized IES LM-80-08 and TM-21-11 methods for collecting long-term data and extrapolating LED lumen maintenance. For information on the specific LM-80 data sets available for this LED, refer to the public LM-80 results document.

Please read the Long-Term Lumen Maintenance application note for more details on Cree's lumen maintenance testing and forecasting. Please read the Thermal Management application note for details on how thermal design, ambient temperature, and drive current affect the LED junction temperature.

Moisture Sensitivity

Cree recommends keeping XLamp LEDs in the provided, resealable moisture-barrier packaging (MBP) until immediately prior to soldering. Unopened MBPs that contain XLamp LEDs do not need special storage for moisture sensitivity.

Once the MBP is opened, XLamp XQ-E LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of ≤ 30 ºC/85% relative humidity (RH). Regardless of storage condition, Cree recommends sealing any unsoldered LEDs in the original MBP.

RoHS Compliance

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented January 2, 2013. RoHS Declarations for this product can be obtained from your Cree representative or from the Product Ecology section of the Cree website.

REACh Compliance

REACh substances of very high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, please contact a Cree representative to insure you get the most up-to-date REACh SVHC Declaration. REACh banned substance information (REACh Article 67) is also available upon request.

NOTES - CONTINUED

UL® Recognized Component

This product meets the requirements to be considered a UL Recognized Component with Level 1 enclosure consideration. The LED package or a portion thereof has not been investigated as a fire enclosure or a fire and electrical enclosure per ANSI/UL 8750.

Vision Advisory

WARNING: Do not look at an exposed lamp in operation. Eye injury can result. For more information about LEDs and eye safety, please refer to the LED Eye Safety application note.

MECHANICAL DIMENSIONS

Thermal vias, if present, are not shown on these drawings.

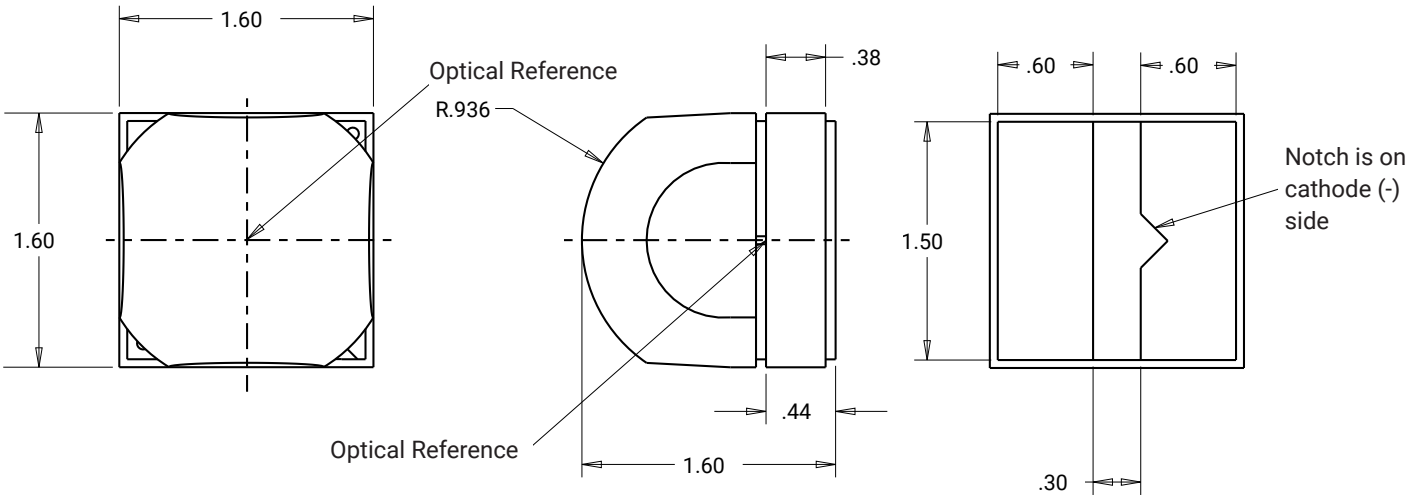
All dimensions in mm.

Measurement tolerances unless indicated otherwise: ±.13 mm

High Density

XQEAWT-**0**x-xxxx-xxxxxxxxx

XQ-E High Density

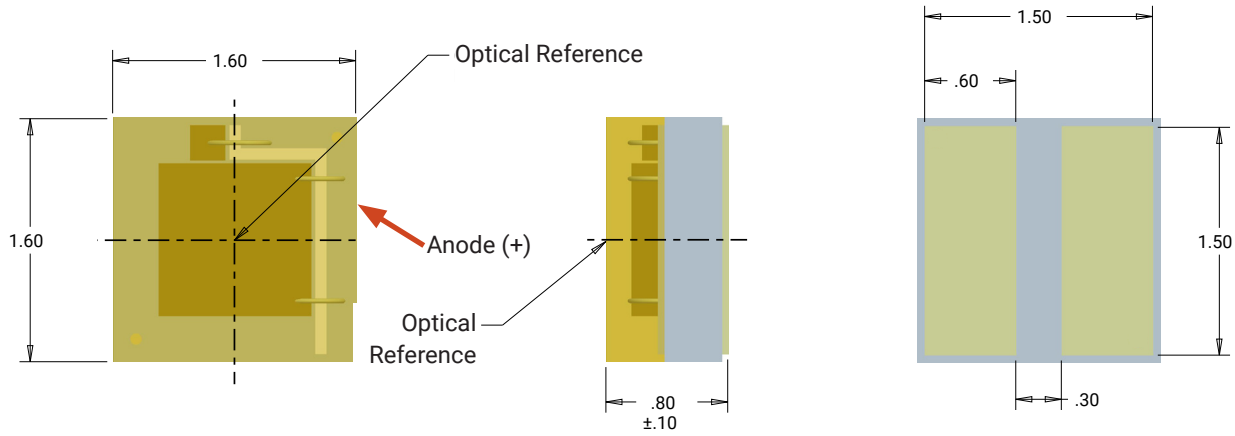


Top View **Side View** **Bottom View**

High Intensity

XQEAWT-**H**x-xxxx-xxxxxxxxx

XQ-E High Intensity

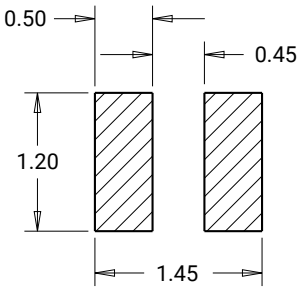


Top View **Side View** **Bottom View**

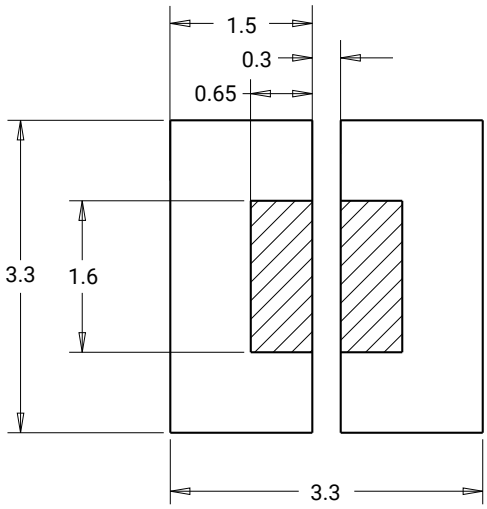
.

MECHANICAL DIMENSIONS - CONTINUED

High Density & High Intensity



Recommended Stencil Pad



Recommended PC Board Solder Pad and Trace Layout

TAPE AND REEL

All Cree carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard.

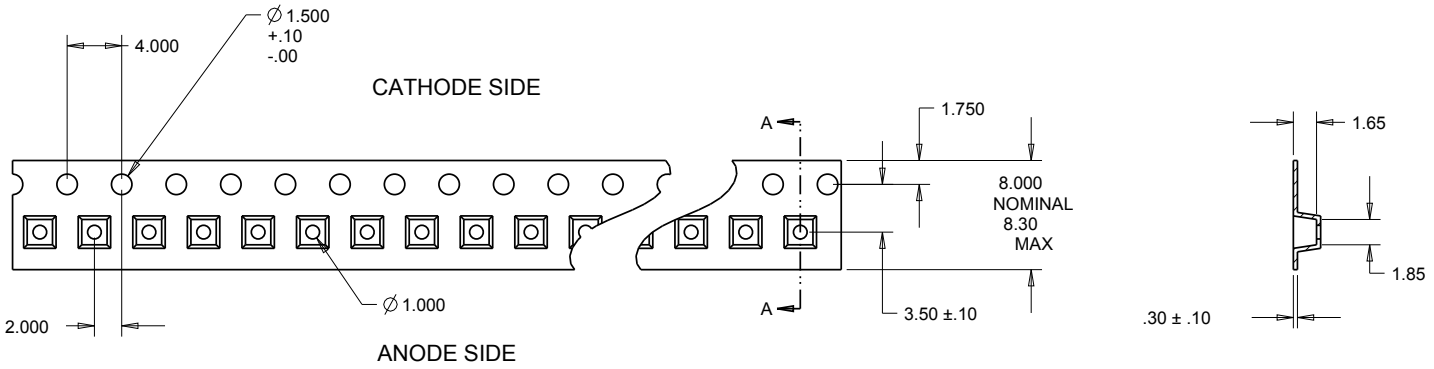
Except as noted, all dimensions in mm [in].

Measurement tolerances unless indicated otherwise: .xx = ±.10 mm

High Density

XQEAWT-**0**x-xxxx-xxxxxxxxx

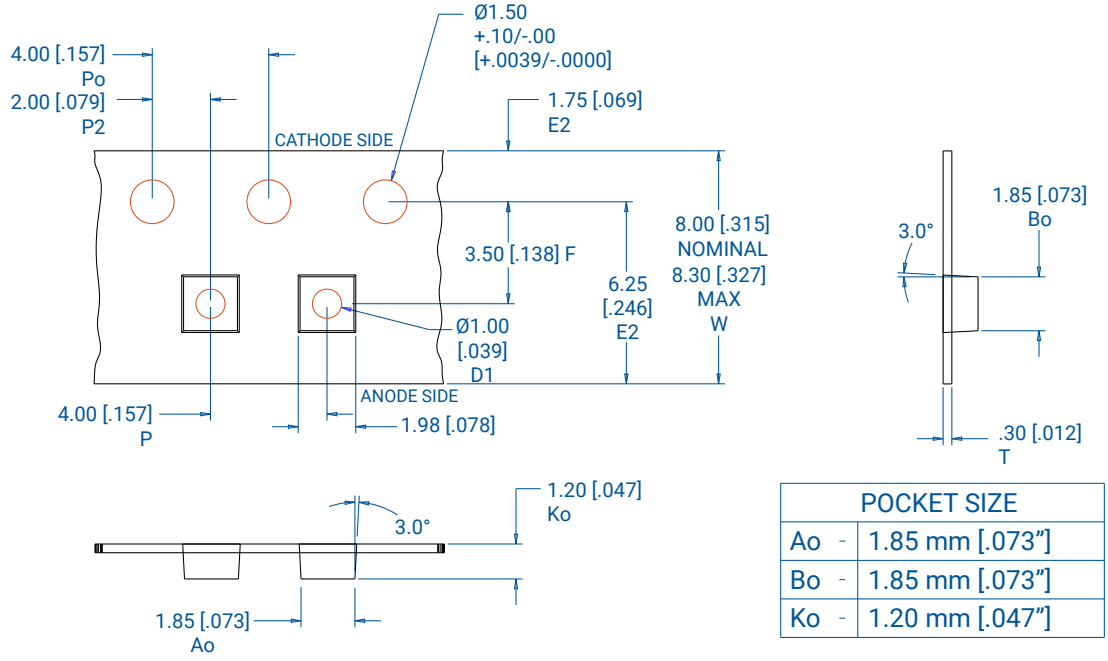
XQ-E High Density



High Intensity

XQEAWT-**H**x-xxxx-xxxxxxxxx

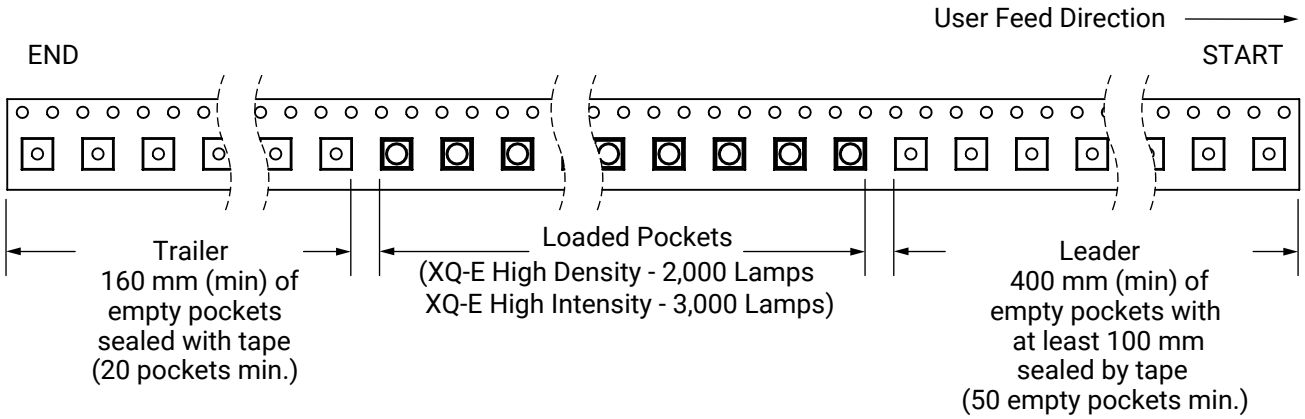
XQ-E High Intensity

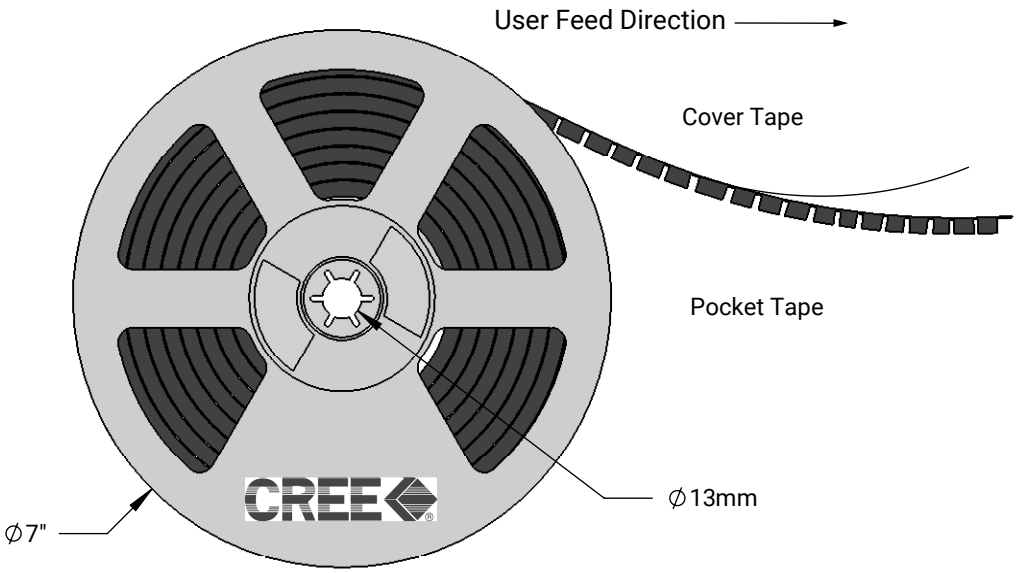


POCKET SIZE		
Ao	-	1.85 mm [.073”]
Bo	-	1.85 mm [.073”]
Ko	-	1.20 mm [.047”]

TAPE AND REEL - CONTINUED

High Density & High Intensity

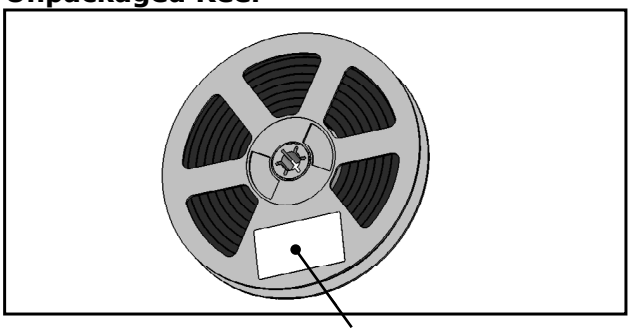




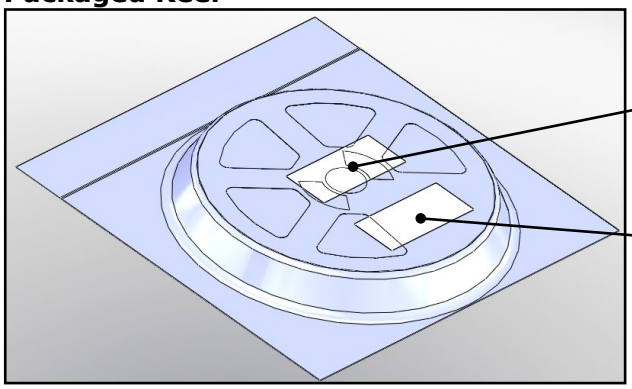
PACKAGING

The diagrams below show the packaging and labels Cree uses to ship XLamp XQ-E LEDs. XLamp XQ-E LEDs are shipped in tape loaded on a reel. Each box contains only one reel in a moisture barrier bag.

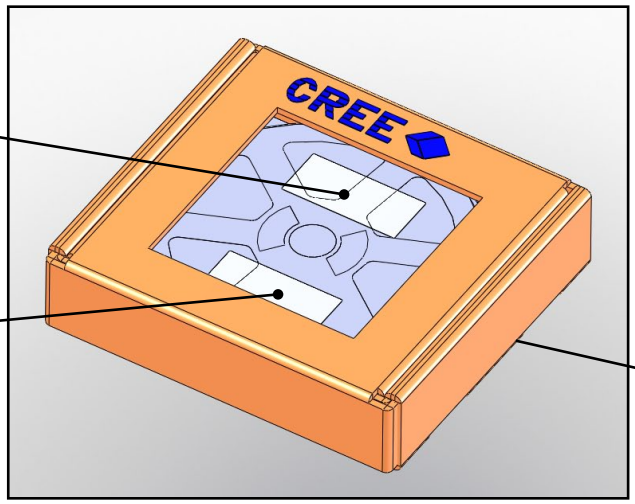
Unpackaged Reel



Packaged Reel



Boxed Reel



APPENDIX - ORDER CODES NOT FOR NEW DESIGNS

The following order codes are active and valid order codes, but higher performance options are also available. Please see page 4 - page 5 for order codes of XLamp XQ-E High Density white LEDs that could serve as alternatives for the order codes set forth below.

XQ-E High Density ANSI Cool White, T_J = 85 °C

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA		Order Codes	
Kit	CCT	Code	Flux (lm)	No Minimum CRI	70 CRI Minimum
ANSI Cool White (5000 K – 8300 K)					
51	6200 K	Q5	107	XQEAWT-00-0000-00000LD51	XQEAWT-00-0000-00000BD51
53	6000 K	Q5	107	XQEAWT-00-0000-00000LD53	XQEAWT-00-0000-00000BD53
50	6200 K	Q5	107	XQEAWT-00-0000-00000LD50	XQEAWT-00-0000-00000BD50
E1	6500 K	Q5	107	XQEAWT-00-0000-00000LDE1	XQEAWT-00-0000-00000BDE1
E2	5700 K	Q5	107	XQEAWT-00-0000-00000LDE2	XQEAWT-00-0000-00000BDE2

XQ-E High Density Neutral White, T_J = 85 °C

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA		Order Codes		
Kit	CCT	Code	Flux (lm)	70 CRI Minimum	75 CRI Typical	80 CRI Minimum
ANSI Neutral White (3700 K – 5000 K)						
E3	5000 K	Q5	107	XQEAWT-00-0000-00000BDE3		
F4	4750 K	Q5	107	XQEAWT-00-0000-00000BDF4		
		Q4	100	XQEAWT-00-0000-00000BCF4		
E4	4500 K	Q5	107	XQEAWT-00-0000-00000BDE4		
		Q4	100	XQEAWT-00-0000-00000BCE4		
F5	4250 K	Q5	107	XQEAWT-00-0000-00000BDF5		
		Q4	100			
		Q3	93.9		XQEAWT-00-0000-00000LBF5	XQEAWT-00-0000-00000HBF5
E5	4000 K	Q5	107	XQEAWT-00-0000-00000BDE5		
		Q4	100			
		Q3	93.9		XQEAWT-00-0000-00000LBE5	XQEAWT-00-0000-00000HBE5

Note

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

APPENDIX - ORDER CODES NOT FOR NEW DESIGNS - CONTINUED

The following order codes are active and valid order codes, but higher performance options are also available. Please see page 6 - page 7 for order codes of XLamp XQ-E High Density white LEDs that could serve as alternatives for the order codes set forth below.

XQ-E High Density Warm White, T_J = 85 °C

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA		Order Codes		
Kit	CCT	Code	Flux (lm)	80 CRI Typical	80 CRI Minimum	90 CRI Minimum
ANSI Warm White (2700 K - 3750 K)						
F6	3750 K	Q3	93.9	XQEAWT-00-0000-00000LBF6	XQEAWT-00-0000-00000HBF6	
		Q2	87.4	XQEAWT-00-0000-00000LAF6	XQEAWT-00-0000-00000HAF6	
E6	3500 K	Q3	93.9	XQEAWT-00-0000-00000LBE6	XQEAWT-00-0000-00000HBE6	
		Q2	87.4	XQEAWT-00-0000-00000LAE6	XQEAWT-00-0000-00000HAE6	
F7	3250 K	Q3	93.9	XQEAWT-00-0000-00000LBF7	XQEAWT-00-0000-00000HBF7	
		Q2	87.4	XQEAWT-00-0000-00000LAF7	XQEAWT-00-0000-00000HAF7	
		P4	80.6	XQEAWT-00-0000-00000L9F7	XQEAWT-00-0000-00000H9F7	
E7	3000 K	Q2	87.4	XQEAWT-00-0000-00000LAE7	XQEAWT-00-0000-00000HAE7	
		P4	80.6	XQEAWT-00-0000-00000L9E7	XQEAWT-00-0000-00000H9E7	
		P3	73.9			
		P2	67.2			XQEAWT-00-0000-00000U7E7
		N4	62			XQEAWT-00-0000-00000U6E7
F8	2850 K	Q2	87.4	XQEAWT-00-0000-00000LAF8	XQEAWT-00-0000-00000HAF8	
		P4	80.6	XQEAWT-00-0000-00000L9F8	XQEAWT-00-0000-00000H9F8	
		P3	73.9			
		P2	67.2			
		N4	62			XQEAWT-00-0000-00000U6F8
		N3	56.8			XQEAWT-00-0000-00000U5F8
E8	2700 K	Q2	87.4	XQEAWT-00-0000-00000LAE8	XQEAWT-00-0000-00000HAE8	
		P4	80.6	XQEAWT-00-0000-00000L9E8	XQEAWT-00-0000-00000H9E8	
		P3	73.9			
		P2	67.2			
		N4	62			XQEAWT-00-0000-00000U6E8
		N3	56.8			XQEAWT-00-0000-00000U5E8

Note

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

APPENDIX - ORDER CODES NOT FOR NEW DESIGNS - CONTINUED

The following order codes are active and valid order codes, but higher performance options are also available. Please see page 8 - page 9 for order codes of XLamp XQ-E High Density color LEDs that could serve as alternatives for the order codes set forth below.

XQ-E High Density Color, T_J = 25 °C

Royal Blue		Minimum Radiant Flux (mW) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Order Codes
Kit	Dominant Wavelength (nm)	Code	Flux (mW)		
01	450 - 465	32	500	1.90	XQEROY-00-0000-000000L01
		31	475	1.80	XQEROY-00-0000-000000K01
		30	450	1.71	XQEROY-00-0000-000000J01
02	450 - 460	32	500	1.90	XQEROY-00-0000-000000L02
		31	475	1.80	XQEROY-00-0000-000000K02
		30	450	1.71	XQEROY-00-0000-000000J02
03	455 - 465	32	500	1.90	XQEROY-00-0000-000000L03
		31	475	1.80	XQEROY-00-0000-000000K03
		30	450	1.71	XQEROY-00-0000-000000J03

Color	Minimum Luminous Flux (lm) @ 350 mA		Dominant Wavelength (nm)				Order Codes
			Minimum		Maximum		
	Group	Flux (lm)	Group	DWL (nm)	Group	DWL (nm)	
Blue	K2	30.6	B3	465	B6	485	XQEBLU-00-0000-000000Y01
			B3	465	B5	480	XQEBLU-00-0000-000000Y02
			B4	470	B5	480	XQEBLU-00-0000-000000Y05

Color	Minimum Luminous Flux (lm) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Dominant Wavelength (nm)				Order Codes
				Minimum		Maximum		
	Group	Flux (lm)		Group	DWL (nm)	Group	DWL (nm)	
Green	Q5	107	0.98	G2	520	G4	535	XQEGRN-00-0000-000000D01
				G2	520	G3	530	XQEGRN-00-0000-000000D02
				G3	525	G4	535	XQEGRN-00-0000-000000D03
	Q4	100	0.91	G2	520	G4	535	XQEGRN-00-0000-000000C01
				G2	520	G3	530	XQEGRN-00-0000-000000C02
				G3	525	G4	535	XQEGRN-00-0000-000000C03
	Q3	93.9	0.86	G2	520	G4	535	XQEGRN-00-0000-000000B01
				G2	520	G3	530	XQEGRN-00-0000-000000B02
				G3	525	G4	535	XQEGRN-00-0000-000000B03

Note

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

APPENDIX - ORDER CODES NOT FOR NEW DESIGNS - CONTINUED

The following order codes are active and valid order codes, but higher performance options are also available. Please see page 9 - page 10 for order codes of XLamp XQ-E High Density color LEDs that could serve as alternatives for the order codes set forth below.

Color	Color Bin	Minimum Luminous Flux (lm) @ 350 mA		Order Codes
		Group	Flux (lm)	
PC Amber	Y2	P2	67.2	XQEAPA-00-0000-000000701

Color	Minimum Luminous Flux (lm) @ 350 mA		Dominant Wavelength (nm)				Order Codes
			Minimum		Maximum		
	Group	Flux (lm)	Group	DWL (nm)	Group	DWL (nm)	
Red-Orange	P3	73.9	O3	610	O4	620	XQERDO-00-0000-000000801
			O3	610	O3	615	XQERDO-00-0000-000000802
			O4	615	O4	620	XQERDO-00-0000-000000803
	P2	67.2	O3	610	O4	620	XQERDO-00-0000-000000701
			O3	610	O3	615	XQERDO-00-0000-000000702
			O4	615	O4	620	XQERDO-00-0000-000000703

Color	Minimum Luminous Flux (lm) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Dominant Wavelength (nm)				Order Codes
				Minimum		Maximum		
	Group	Flux (lm)		Group	DWL (nm)	Group	DWL (nm)	
Red	N3	56.8	1.48	R2	620	R3	630	XQERED-00-0000-000000501
				R2	620	R2	625	XQERED-00-0000-000000502

Note

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.

APPENDIX - ORDER CODES NOT FOR NEW DESIGNS - CONTINUED

The following order codes are active and valid order codes, but higher performance options are also available. Please see page 13 for order codes of XLamp XQ-E High Intensity white LEDs that could serve as alternatives for the order codes set forth below.

XQ-E High Intensity Warm White, T_J = 85 °C

Chromaticity		Minimum Luminous Flux (lm) @ 350 mA		Order Codes		
Kit	CCT	Code	Flux (lm)	80 CRI Typical	80 CRI Minimum	90 CRI Minimum
ANSI Warm White (2700 K - 3750 K)						
E7	*3000 K*	*P2*	*67.2*			*XQEAWT-H0-0000-00000U7E7*
F8	*2850 K*	*P2*	*67.2*			*XQEAWT-H0-0000-00000U7F8*
E8	*2700 K*	*P2*	*67.2*			*XQEAWT-H0-0000-00000U7E8*

Note

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

APPENDIX - ORDER CODES NOT FOR NEW DESIGNS - CONTINUED

The following order codes are active and valid order codes, but higher performance options are also available. Please see page 14 - page 15 for order codes of XLamp XQ-E High Intensity color LEDs that could serve as alternatives for the order codes set forth below.

XQ-E High Intensity Color, T_J = 85 °C

Color	Minimum Luminous Flux (lm) @ 350 mA		Dominant Wavelength (nm)				Order Codes
			Minimum		Maximum		
	Group	Flux (lm)	Group	DWL (nm)	Group	DWL (nm)	
Blue	*K2*	*30.6*	*B4*	*470*	*B5*	*480*	*XQEBLU-H0-0000-000000Y05*

Color	Color Bin	Minimum Luminous Flux (lm) @ 350 mA		Order Codes
		Group	Flux (lm)	
PC Blue	*N4B & N5B*	*M2*	*39.8*	*XQEAPB-H0-0000-000000201*

Color	Minimum Luminous Flux (lm) @ 350 mA		Calculated Minimum PPF (µmol/s)*	Dominant Wavelength (nm)				Order Codes
				Minimum		Maximum		
	Group	Flux (lm)		Group	DWL (nm)	Group	DWL (nm)	
Green	*R2*	*114*	*1.11*	*G2*	*520*	*G4*	*535*	*XQEGRN-H0-0000-000000E01*
	Q5	*107*	*0.98*	*G2*	*520*	*G4*	*535*	*XQEGRN-H0-0000-000000D01*
				G2	*520*	*G3*	*530*	*XQEGRN-H0-0000-000000D02*
				G3	*525*	*G4*	*535*	*XQEGRN-H0-0000-000000D03*
	Q4	*100*	*0.91*	*G2*	*520*	*G4*	*535*	*XQEGRN-H0-0000-000000C01*
				G2	*520*	*G3*	*530*	*XQEGRN-H0-0000-000000C02*
				G3	*525*	*G4*	*535*	*XQEGRN-H0-0000-000000C03*
	Q3	*93.9*	*0.86*	*G2*	*520*	*G4*	*535*	*XQEGRN-H0-0000-000000B01*
				G2	*520*	*G3*	*530*	*XQEGRN-H0-0000-000000B02*
				G3	*525*	*G4*	*535*	*XQEGRN-H0-0000-000000B03*
	Q2	*87.4*	*0.80*	*G2*	*520*	*G4*	*535*	*XQEGRN-H0-0000-000000A01*
				G2	*520*	*G3*	*530*	*XQEGRN-H0-0000-000000A02*
				G3	*525*	*G4*	*535*	*XQEGRN-H0-0000-000000A03*
	P4	*80.6*	*074*	*G2*	*520*	*G4*	*535*	*XQEGRN-H0-0000-000000901*
				G2	*520*	*G3*	*530*	*XQEGRN-H0-0000-000000902*
				G3	*525*	*G4*	*535*	*XQEGRN-H0-0000-000000903*

Note

- Cree maintains a tolerance of ±7% on flux and power measurements, ±0.005 on chromaticity (CCx, CCy) measurements and a tolerance of ±2 on CRI measurements. See the Measurements section (page 45).

* Photosynthetic Photon Flux (PPF) values are calculated and for reference only.