

Product:		
XLamp® X21 Multi-Color LEDs		
Order Code Format (x=wild)	Status	Product
X21ACL-Hx-xxxx-xxxxxxxxxxxxx	New	XLamp X21 RGBW LEDs
X21ACB-Hx-xxxx-xxxxxxxxxxxxx	New	XLamp X21 RGBW LEDs
X21APA-Hx-xxxx-xxxxxxxxxxxxx	New	XLamp X21 RGB+PC Amber LEDs
X21ABA-Hx-xxxx-xxxxxxxxxxxxx	New	XLamp X21 RGB+PC Amber LEDs
X21APL-Hx-xxxx-xxxxxxxxxxxxx	New	XLamp X21 RGB+PC Lime LEDs
X21ABL-Hx-xxxx-xxxxxxxxxxxxx	New	XLamp X21 RGB+PC Lime LEDs

Launch Status
Planned for late October 2026

Revision	Date	Notes
1	17.09.2026	Initial version

Product Description:

XLamp® X21 Color LEDs are ceramic high power multi-color LEDs that deliver the combination of high lumen output and great color mixing in a small 2.1 x 2.1 mm package. Featuring the widest array of color options in Cree LED's multi-color LED lineup, X21 Color LEDs are ready to improve the intensity and impact of many color-changing lighting designs.

The XLamp X21 Color LEDs feature the smallest possible distance between LED die, creating a small optical source for excellent optical control and efficient color mixing.

Target Applications:

XLamp X21 Color LEDs are optimized for all high-performance multi-color lighting applications, including color-changing, stage, architectural and entertainment.

Name	XLamp X21 RGBW LEDs	XLamp X21 RGB+PC Amber LEDs	XLamp X21 RGB+PC Lime LEDs
Voltage Class	3	3	3
Color	RGBW	RGBA	RGBL
Product Type	SMD Ceramic	SMD Ceramic	SMD Ceramic
Product Family	XLamp X21	XLamp X21	XLamp X21
LES			
Viewing Angle	120°	120°	120°
Color Spec Type	DWL (nm)	DWL (nm)	DWL (nm)
Color Spec Min	Multiple	Multiple	Multiple
Color Spec Max	Multiple	Multiple	Multiple
CRI Options	---	---	---
Optical Characteristics	High Intensity	High Intensity	High Intensity
Current Binning (A)	0.175	0.175	0.175
Temp Binning	25	25	25
Vf Typical	11.3	11.3	11.3
Vf Max			
Power Typical	2	2	2
Optical Units	lm	lm	lm
Optical Bin Typ			
Optical Bin Min			
Typ Lm 4000K-70			
Typ LPW 4000K-70			
Typ Lm 4000K-80			
Typ LPW 4000K-80			
Typ Lm 3000K-80			
Typ LPW 3000K-80			
Typ PPF			
Typ PPE			
Typ Lm 3000K-90			
Typ LPW 3000K-90			
Max Lm 3000K-80			
Max Flux			
Current Max (A)	0.35	0.35	0.35
Power Max (W)	4	4	4
Physical Units	mm	mm	mm
X	2.1	2.1	2.1
Y	2.1	2.1	2.1

Resource	Product	Link	Notes
Product Photo	XLamp X21 RGBW LEDs	https://downloads.cree-led.com/files/i/x/XLamp-X21ACL.png	Links will not work until closer to product launch
Product Photo	XLamp X21 RGB+PC Amber LEDs	https://downloads.cree-led.com/files/i/x/XLamp-X21ABA.png	
Product Photo	XLamp X21 RGB+PC Lime LEDs	https://downloads.cree-led.com/files/i/x/XLamp-X21APL.png	
Data Sheet Link (cree-led.com)		https://downloads.cree-led.com/files/ds/x/XLamp-X21-Color.pdf	
Product Web Page		TBD	
Application Web Page		https://www.cree-led.com/products/applications/architectural-entertainment/	Architectural & Entertainment Application Overview PPT Color LED Portfolio Feature Sheet Multi-Color LEDs PPT
Sales Collateral		https://cree-led.highspot.com/items/66df3e7add81ed8cf5e3efb2?frmrshp.24	
Sales Collateral		https://downloads.cree-led.com/files/fs/Cree-XLamp-Color-Portfolio-Feature-Sheet.pdf	
Sales Collateral		https://cree-led.highspot.com/items/66df4e78c376f03ade76dc18?frmrshp.3	

ITEM_NUMBER	DW	Chromaticity	LfMin	RfMin	PRODUCT_FAMILY
X21ABA-H0-0000-00000A2AAAYS	YES	YS			X21ABA-HI
X21ABA-H0-0000-00000A2AABYS	YES	YS			X21ABA-HI
X21ABA-H0-0000-00000A2ABAYS	YES	YS			X21ABA-HI
X21ABA-H0-0000-00000A2ABBYS	YES	YS			X21ABA-HI
X21ABA-H0-0000-00000A2ACAYS	YES	YS			X21ABA-HI
X21ABA-H0-0000-00000A2ACBYS	YES	YS			X21ABA-HI
X21ABA-H0-0000-00000A2ADDYS	YES	YS			X21ABA-HI
X21ABA-H0-0000-00000A2ADEYS	YES	YS			X21ABA-HI
X21ABA-H0-0000-00000A2AEDYS	YES	YS			X21ABA-HI
X21ABA-H0-0000-00000A2AEEYS	YES	YS			X21ABA-HI
X21ABL-H0-0000-00000A2AAAL3	YES	L3			X21ABL-HI
X21ABL-H0-0000-00000A2AAAL4	YES	L4			X21ABL-HI
X21ABL-H0-0000-00000A2AAALA	YES	LA			X21ABL-HI
X21ABL-H0-0000-00000A2AABLA	YES	LA			X21ABL-HI
X21ABL-H0-0000-00000A2ABALA	YES	LA			X21ABL-HI
X21ABL-H0-0000-00000A2ABBLA	YES	LA			X21ABL-HI
X21ABL-H0-0000-00000A2ACALA	YES	LA			X21ABL-HI
X21ABL-H0-0000-00000A2ACBLA	YES	LA			X21ABL-HI
X21ABL-H0-0000-00000A2ADDLA	YES	LA			X21ABL-HI
X21ABL-H0-0000-00000A2ADELA	YES	LA			X21ABL-HI
X21ABL-H0-0000-00000A2AEDLA	YES	LA			X21ABL-HI
X21ABL-H0-0000-00000A2AEELA	YES	LA			X21ABL-HI
X21ACB-H0-0000-0000BA2AAA1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2AAA2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000BA2AAB1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2AAB2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000BA2ABA1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2ABA2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000BA2ABB1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2ABB2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000BA2ACA1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2ACA2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000BA2ACB1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2ACB2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000BA2ADD1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2ADD2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000BA2ADE1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2ADE2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000BA2AED1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2AED2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000BA2AEE1E	YES	1E			X21ACB-HI
X21ACB-H0-0000-0000BA2AEE2E	YES	2E			X21ACB-HI
X21ACB-H0-0000-0000HA2AAA3G	YES	3G			X21ACB-HI
X21ACB-H0-0000-0000HA2AAA5G	YES	5G			X21ACB-HI
X21ACB-H0-0000-0000HA2AAA7G	YES	7G			X21ACB-HI
X21ACB-H0-0000-0000HA2AAB3G	YES	3G			X21ACB-HI
X21ACB-H0-0000-0000HA2AAB5G	YES	5G			X21ACB-HI
X21ACB-H0-0000-0000HA2AAB7G	YES	7G			X21ACB-HI
X21ACB-H0-0000-0000HA2ABA3G	YES	3G			X21ACB-HI
X21ACB-H0-0000-0000HA2ABA5G	YES	5G			X21ACB-HI
X21ACB-H0-0000-0000HA2ABA7G	YES	7G			X21ACB-HI
X21ACB-H0-0000-0000HA2ABB3G	YES	3G			X21ACB-HI
X21ACB-H0-0000-0000HA2ABB5G	YES	5G			X21ACB-HI
X21ACB-H0-0000-0000HA2ABB7G	YES	7G			X21ACB-HI
X21ACB-H0-0000-0000HA2ACA3G	YES	3G			X21ACB-HI
X21ACB-H0-0000-0000HA2ACA5G	YES	5G			X21ACB-HI
X21ACB-H0-0000-0000HA2ACA7G	YES	7G			X21ACB-HI
X21ACB-H0-0000-0000HA2ACB3G	YES	3G			X21ACB-HI

X21ACL-H0-0000-0000HA2AED5G	YES	5G	X21ACL-HI
X21ACL-H0-0000-0000HA2AED7G	YES	7G	X21ACL-HI
X21ACL-H0-0000-0000HA2AEE3G	YES	3G	X21ACL-HI
X21ACL-H0-0000-0000HA2AEE5G	YES	5G	X21ACL-HI
X21ACL-H0-0000-0000HA2AEE7G	YES	7G	X21ACL-HI
X21APA-H0-0000-00000A2AAAYS	YES	YS	X21APA-HI
X21APA-H0-0000-00000A2AABYS	YES	YS	X21APA-HI
X21APA-H0-0000-00000A2ABAYS	YES	YS	X21APA-HI
X21APA-H0-0000-00000A2ABBYS	YES	YS	X21APA-HI
X21APA-H0-0000-00000A2ACAYS	YES	YS	X21APA-HI
X21APA-H0-0000-00000A2ACBYS	YES	YS	X21APA-HI
X21APA-H0-0000-00000A2ADDYS	YES	YS	X21APA-HI
X21APA-H0-0000-00000A2ADEYS	YES	YS	X21APA-HI
X21APA-H0-0000-00000A2AEDYS	YES	YS	X21APA-HI
X21APA-H0-0000-00000A2AEEYS	YES	YS	X21APA-HI
X21APL-H0-0000-00000A2AAAL3	YES	L3	X21APL-HI
X21APL-H0-0000-00000A2AAAL4	YES	L4	X21APL-HI
X21APL-H0-0000-00000A2AAALA	YES	LA	X21APL-HI
X21APL-H0-0000-00000A2AABLA	YES	LA	X21APL-HI
X21APL-H0-0000-00000A2ABALA	YES	LA	X21APL-HI
X21APL-H0-0000-00000A2ABBLA	YES	LA	X21APL-HI
X21APL-H0-0000-00000A2ACALA	YES	LA	X21APL-HI
X21APL-H0-0000-00000A2ACBLA	YES	LA	X21APL-HI
X21APL-H0-0000-00000A2ADDLA	YES	LA	X21APL-HI
X21APL-H0-0000-00000A2ADELA	YES	LA	X21APL-HI
X21APL-H0-0000-00000A2AEDLA	YES	LA	X21APL-HI
X21APL-H0-0000-00000A2AEELA	YES	LA	X21APL-HI

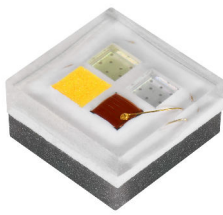
[illegible]

[illegible]

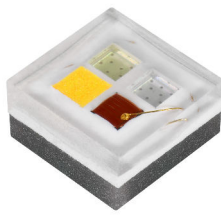
[illegible]

XLamp® X21A Multi-Color LEDs

PRELIMINARY



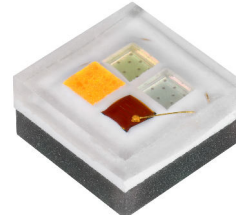
X21ACL



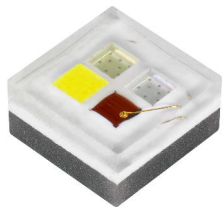
X21ACB



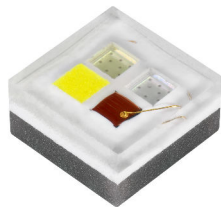
X21APA



X21ABA



X21APL



X21ABL

PRODUCT DESCRIPTION

XLamp® X21 Color LEDs are multi-color (RGBW or RGB+PC Amber or RGB+PC Lime LEDs) that deliver the combination of high lumen output and great color mixing in a small 2.1 x 2.1 mm package. The XLamp X21 Color LEDs feature the smallest possible distance between LED die, creating a small optical source for excellent optical control and efficient color mixing. XLamp X21 Color LEDs are optimized for all high-performance multi-color lighting applications, including color-changing, stage, architectural and entertainment

FEATURES

- Available in RGB + color configurations in a single package
- Maximum drive current per LED die: 350mA
- Individually addressable LEDs
- Reflow solderable – JEDEC J-STD-020
- RoHS and REACH compliant
- UL® recognized component (E349212)



Cree LED / 4001 E. Hwy. 54, Suite 2000 / Durham, NC 27713 USA / +1.919.313.5330 / www.cree-led.com

TABLE OF CONTENTS

X21ACL

Characteristics	3
Characteristics — Per LED Die	3
Flux Characteristics	4
Relative Spectral Power Distribution	5
Relative Flux Characteristics	6
Forward Voltage Characteristics	7
Typical Spatial Distribution	8
Thermal Design	9
Chromaticity Bins	10
Performance Groups	11

X21ACB

Characteristics	12
Characteristics — Per LED Die	12
Flux Characteristics	13
Relative Spectral Power Distribution	14
Relative Flux Characteristics	15
Forward Voltage Characteristics	16
Typical Spatial Distribution	17
Thermal Design	18
Chromaticity Bins	19
Performance Groups	20

X21APA

Characteristics	21
Characteristics — Per LED Die	21
Flux Characteristics	22
Relative Spectral Power Distribution	23
Relative Flux Characteristics	24
Forward Voltage Characteristics	25
Typical Spatial Distribution	26
Thermal Design	27
Chromaticity Bins	28
Performance Groups	29

X21ABA

Characteristics	30
Characteristics — Per LED Die	30
Flux Characteristics	31
Relative Spectral Power Distribution	32

Relative Flux Characteristics	33
Forward Voltage Characteristics	34
Typical Spatial Distribution	35
Thermal Design	36
Chromaticity Bins	37
Performance Groups	38

X21APL

Characteristics	39
Characteristics — Per LED Die	39
Flux Characteristics	40
Relative Spectral Power Distribution	41
Relative Flux Characteristics	42
Forward Voltage Characteristics	43
Typical Spatial Distribution	44
Thermal Design	45
Chromaticity Bins	46
Performance Groups	47

X21ABL

Characteristics	48
Characteristics — Per LED Die	48
Flux Characteristics	49
Relative Spectral Power Distribution	50
Relative Flux Characteristics	51
Forward Voltage Characteristics	52
Typical Spatial Distribution	53
Thermal Design	54
Chromaticity Bins	55
Performance Groups	56

X21

Reflow Soldering Characteristics	57
Order Code Description	58
Bin Code Description	59
Mechanical Dimensions	60
Circuit Diagram	61
Tape and Reel	64
Reel Specifications	65
Packaging	66
Notes	67

CHARACTERISTICS – X21ACL COMPLETE PACKAGE

The following table lists the product characteristics for the XLamp X21 Multi-Color LED package, measured with all LED dies on simultaneously and each LED die connected to independent drive circuits at 175 mA.

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point $R_{\theta s}$ †	°C/W	-	7.0	-
Viewing angle (FWHM) – High Intensity	degrees	-	120	-
LED junction temperature	°C	-	-	150

† $R_{\theta s}$ Thermal resistance measurement was performed per the JEDEC JESD51-14 standard. See the [Thermal Resistance Measurement](#) application note for more details.

CHARACTERISTICS – PER LED DIE

The following table lists the product characteristics for each LED die within the XLamp X21 Multi-Color LED package.

Characteristics	Unit	Minimum	Typical	Maximum
Temperature coefficient of voltage – red	mV/°C	-	-1.5	-
Temperature coefficient of voltage – green	mV/°C	-	-1.0	-
Temperature coefficient of voltage – royal	mV/°C	-	-1.1	-
Temperature coefficient of voltage – white	mV/°C	-	-1.1	-
DC forward current – red, green, royal, white	mA	-	-	350
Forward voltage (@ 175 mA, 25 °C) – red	V	-	2.5	2.7
Forward voltage (@ 175 mA, 25 °C) – green	V	-	2.8	3.0
Forward voltage (@ 175 mA, 25 °C) – royal, white	V	-	3.0	3.2

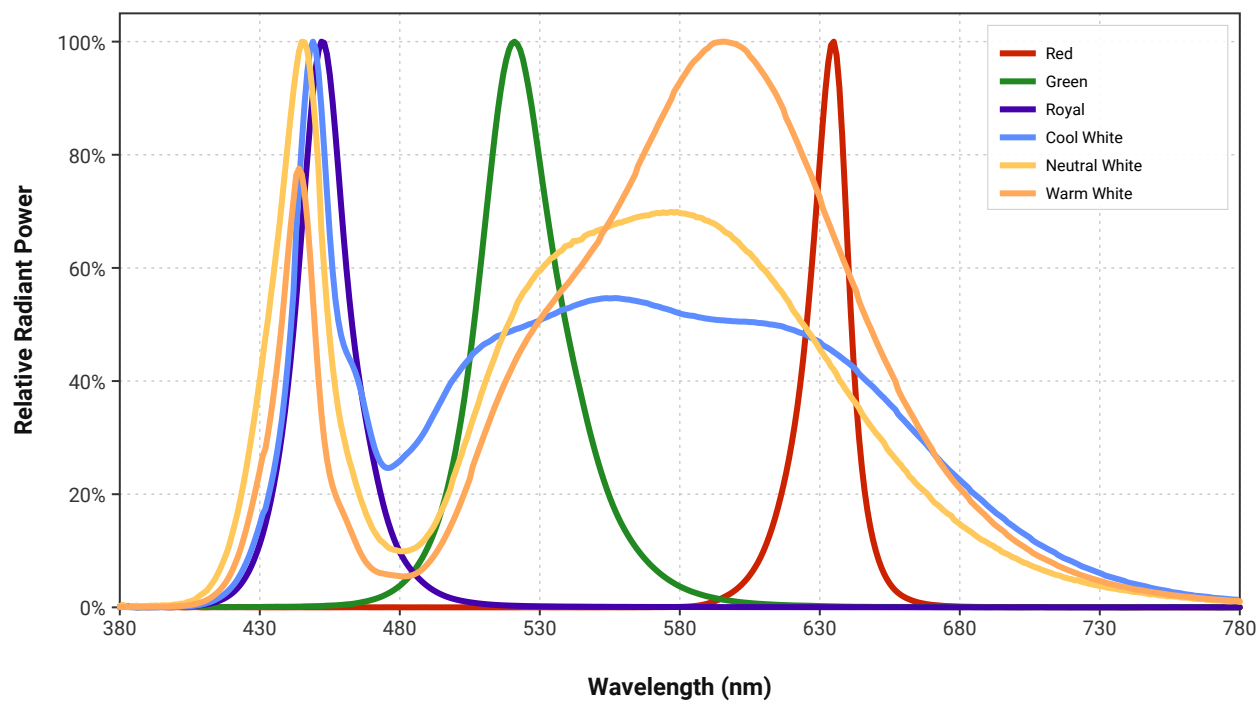
FLUX CHARACTERISTICS – HIGH INTENSITY ($T_j = 25\text{ }^{\circ}\text{C}$)

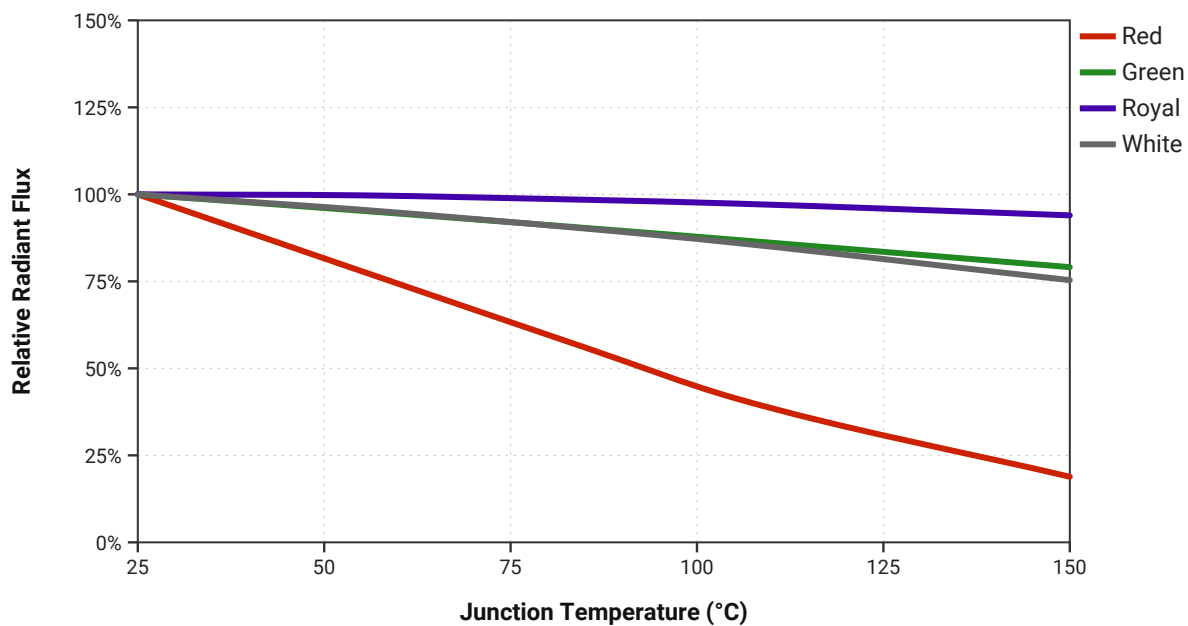
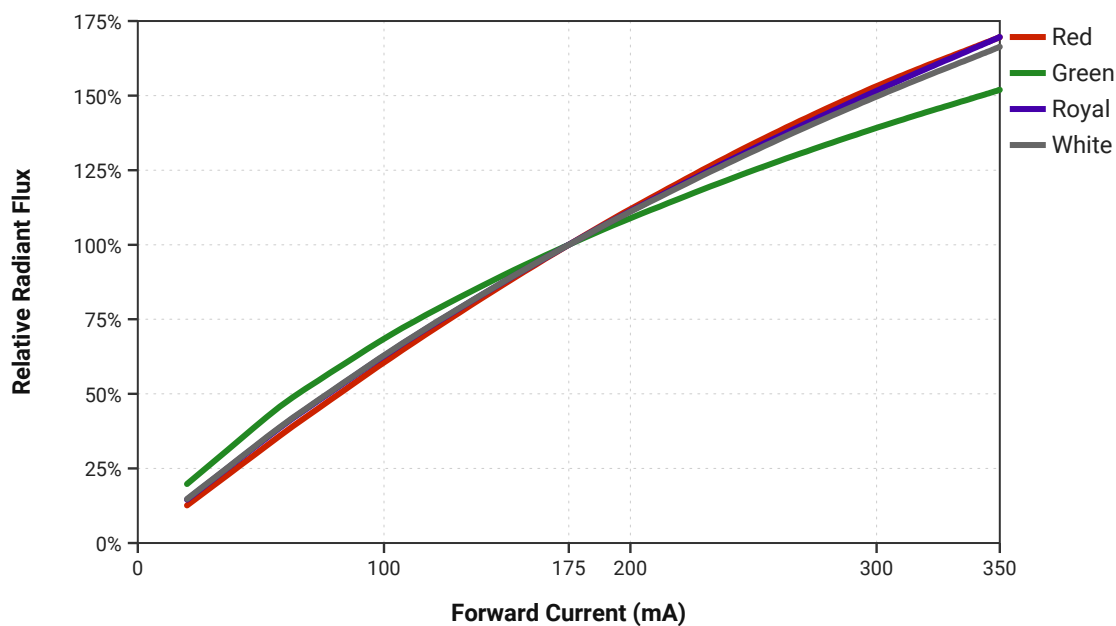
The following table lists the minimum and typical luminous flux for each LED die within the XLamp package at 175 mA per die, measured at $T_j = 25\text{ }^{\circ}\text{C}$.

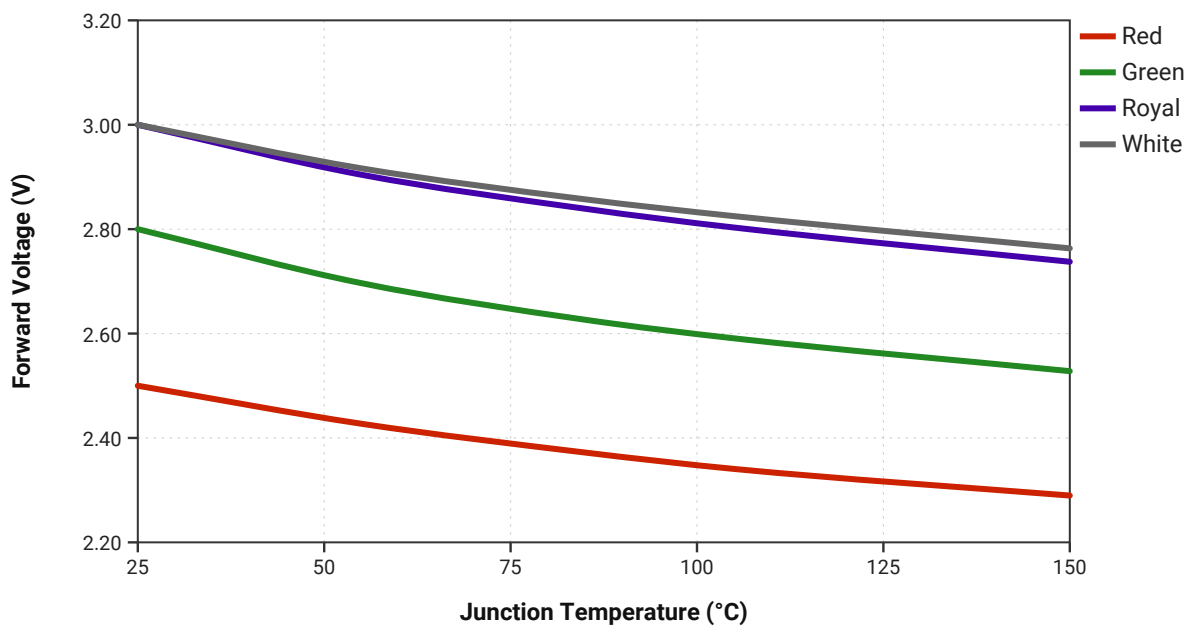
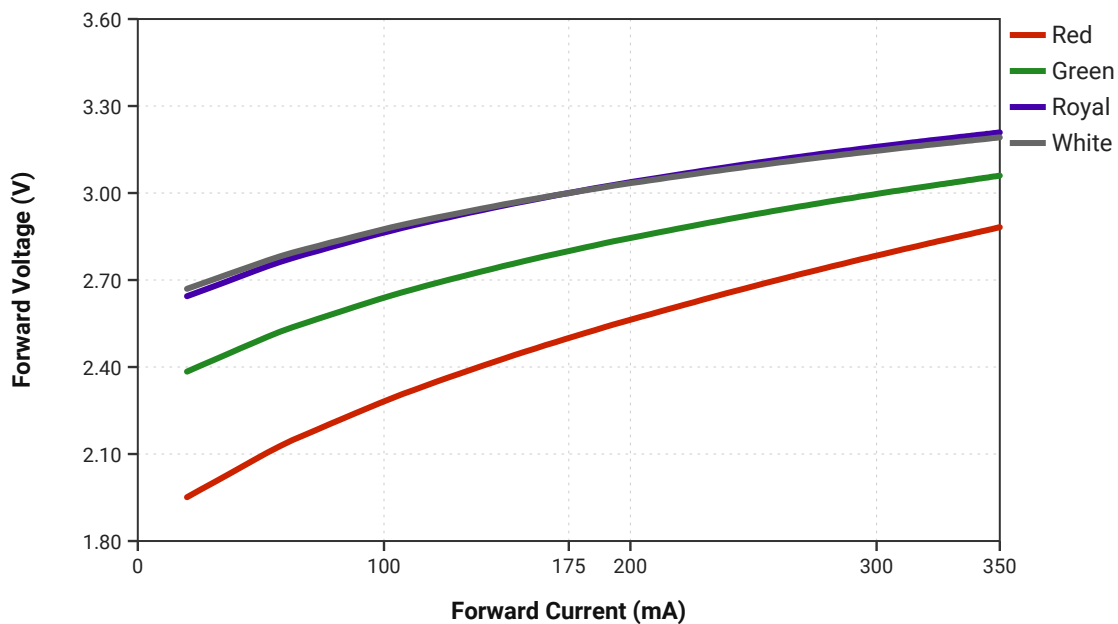
Color		Chromaticity Bins / Dominant Wavelength Range		Minimum Luminous Flux @ 175 mA		Typical Luminous Flux @ 175 mA	Order Code
		Minimum	Maximum	Group	Flux (lm)	Flux (lm)	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACL-H0-0000-0000BA2AAA1E
	Green	520 nm	535 nm		40	55	
	Royal Blue	450 nm	465 nm		5	10	
	Cool White 70CRI	6500K			40	60	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACL-H0-0000-0000BA2AAA2E
	Green	520 nm	535 nm		40	55	
	Royal Blue	450 nm	465 nm		5	10	
	Cool White 70CRI	5700K			40	65	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACL-H0-0000-0000HA2AAA3G
	Green	520 nm	535 nm		40	55	
	Royal Blue	450 nm	465 nm		5	10	
	Neutral White 80CRI	5000K			40	60	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACL-H0-0000-0000HA2AAA5G
	Green	520 nm	535 nm		40	55	
	Royal Blue	450 nm	465 nm		5	10	
	Neutral White 80CRI	4000K			40	58	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACL-H0-0000-0000HA2AAA7G
	Green	520 nm	535 nm		40	55	
	Royal Blue	450 nm	465 nm		5	10	
	Warm White 80CRI	3000K			40	55	

- Cree LED maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity measurements and ± 2 on CRI measurements.
- XLamp X21ACL LED order codes specify only a minimum flux bin and not a maximum. Cree LED may ship reels in flux bins higher than the minimum specified without advance notice.

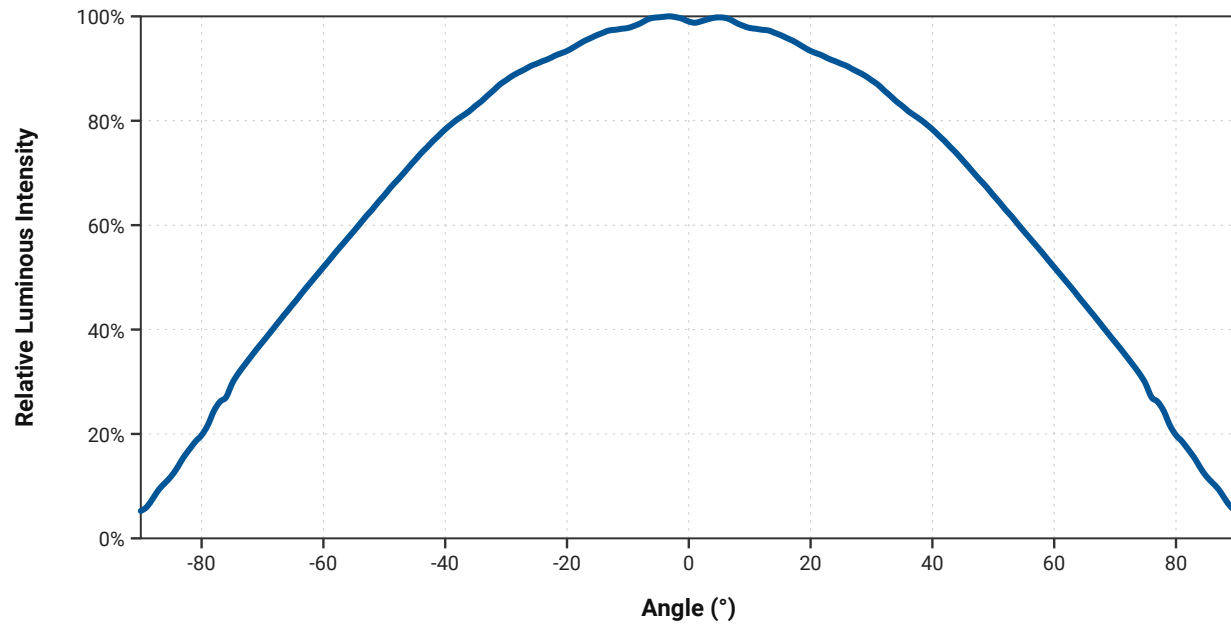
RELATIVE SPECTRAL POWER DISTRIBUTION



RELATIVE FLUX VS. JUNCTION TEMPERATURE – X21ACL ($I_F = 175 \text{ mA}$)RELATIVE FLUX VS. FORWARD CURRENT – X21ACL ($T_J = 25 \text{ °C}$)

FORWARD VOLTAGE VS. JUNCTION TEMPERATURE – X21ACL ($I_f = 175 \text{ mA}$)FORWARD VOLTAGE VS. FORWARD CURRENT – X21ACL ($T_j = 25 \text{ °C}$)

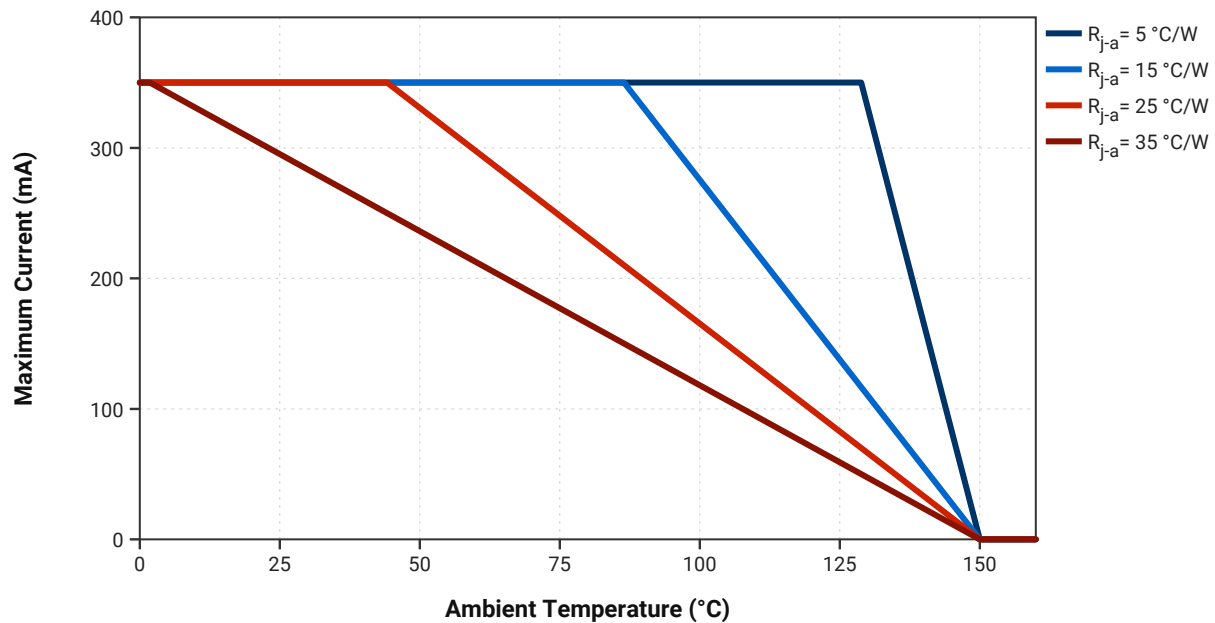
TYPICAL SPATIAL DISTRIBUTION



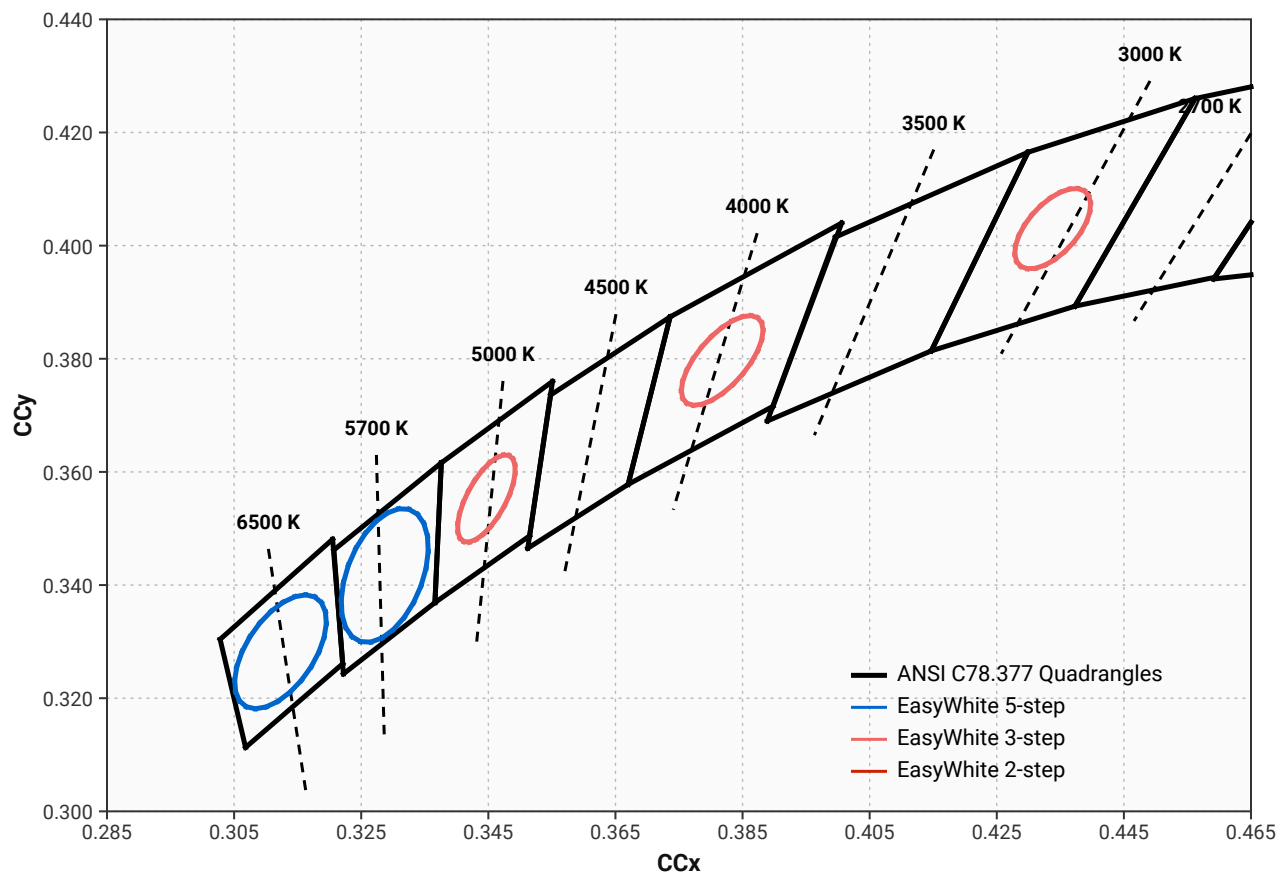
THERMAL DESIGN

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.

Please refer to the Characteristics table on [page 3](#) for this product's thermal resistance and maximum junction temperature.



CHROMATICITY BINS – EASYWHITE BINS



PERFORMANCE GROUPS

XLamp X21A LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

Color Bin (3-Step MacAdam Ellipses)						
Bin Code	CCT (K)	Center x	Center y	Major Axis (a)	Minor Axis (b)	Rotation (°)
3G	5000	0.3447	0.3553	0.0084	0.0031	65.00
5G	4000	0.3818	0.3797	0.0094	0.0040	53.70
7G	3000	0.4338	0.4030	0.0083	0.0041	53.20

Color Bin (5-Step MacAdam Ellipses)						
Bin Code	CCT (K)	Center x	Center y	Major Axis (a)	Minor Axis (b)	Rotation (°)
1E	6500	0.3123	0.3282	0.0111	0.0055	61.00
2E	5700	0.3287	0.3417	0.0123	0.0060	72.00

XLamp X21A White LEDs tested for luminous flux are placed into one of the following luminous flux groups.

Group Code	Min Luminous Flux (lm)	Max Luminous Flux (lm)
1	20	40
2	40	60
3	60	80
4	80	100
5	100	120

CHARACTERISTICS – X21ACB COMPLETE PACKAGE

The following table lists the product characteristics for the XLamp X21 Multi-Color LED package, measured with all LED dies on simultaneously and each LED die connected to independent drive circuits at 175 mA.

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point $R_{\theta s}$ †	°C/W	-	7.0	-
Viewing angle (FWHM) – High Intensity	degrees	-	120	-
LED junction temperature	°C	-	-	150

† $R_{\theta s}$ Thermal resistance measurement was performed per the JEDEC JESD51-14 standard. See the [Thermal Resistance Measurement](#) application note for more details.

CHARACTERISTICS – PER LED DIE

The following table lists the product characteristics for each LED die within the XLamp X21 Multi-Color LED package.

Characteristics	Unit	Minimum	Typical	Maximum
Temperature coefficient of voltage – red	mV/°C	-	-1.5	-
Temperature coefficient of voltage – green	mV/°C	-	-1.0	-
Temperature coefficient of voltage – blue	mV/°C	-	-1.1	-
Temperature coefficient of voltage – white	mV/°C	-	-1.1	-
DC forward current – red, green, blue, white	mA	-	-	350
Forward voltage (@ 175 mA, 25 °C) – red	V	-	2.5	2.7
Forward voltage (@ 175 mA, 25 °C) – green	V	-	2.8	3.0
Forward voltage (@ 175 mA, 25 °C) – blue, white	V	-	3.0	3.2

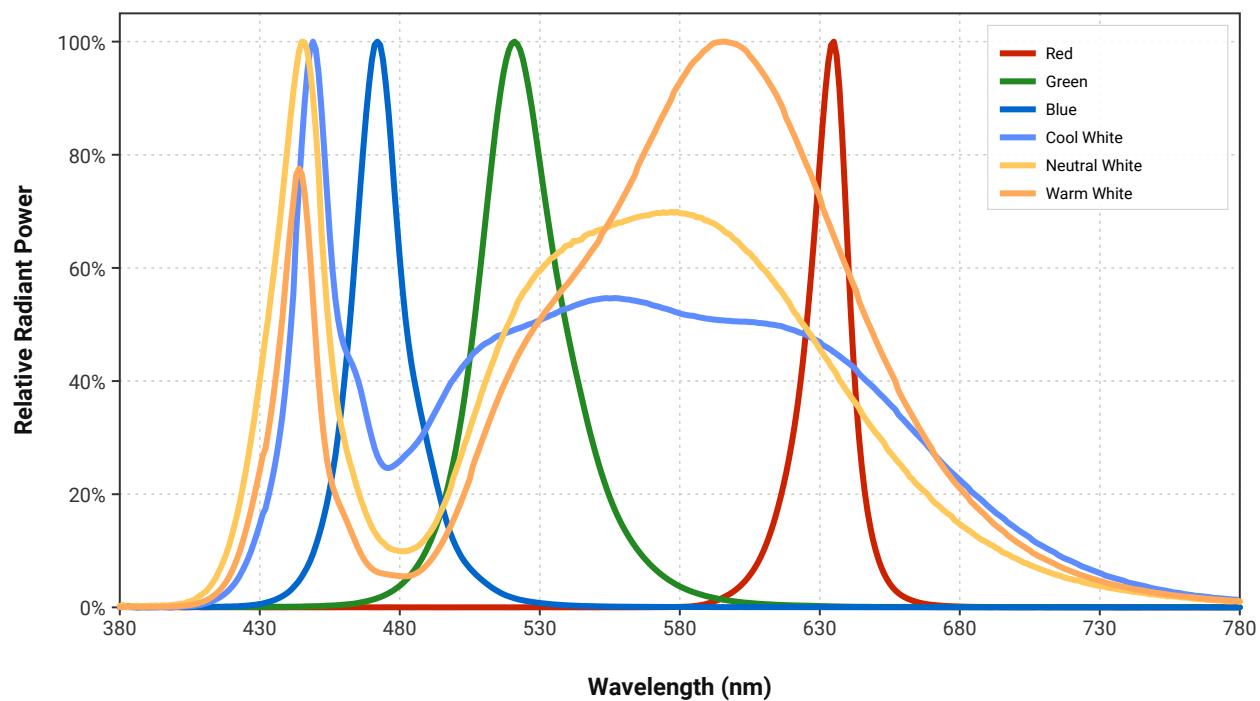
FLUX CHARACTERISTICS – HIGH INTENSITY ($T_j = 25\text{ }^{\circ}\text{C}$)

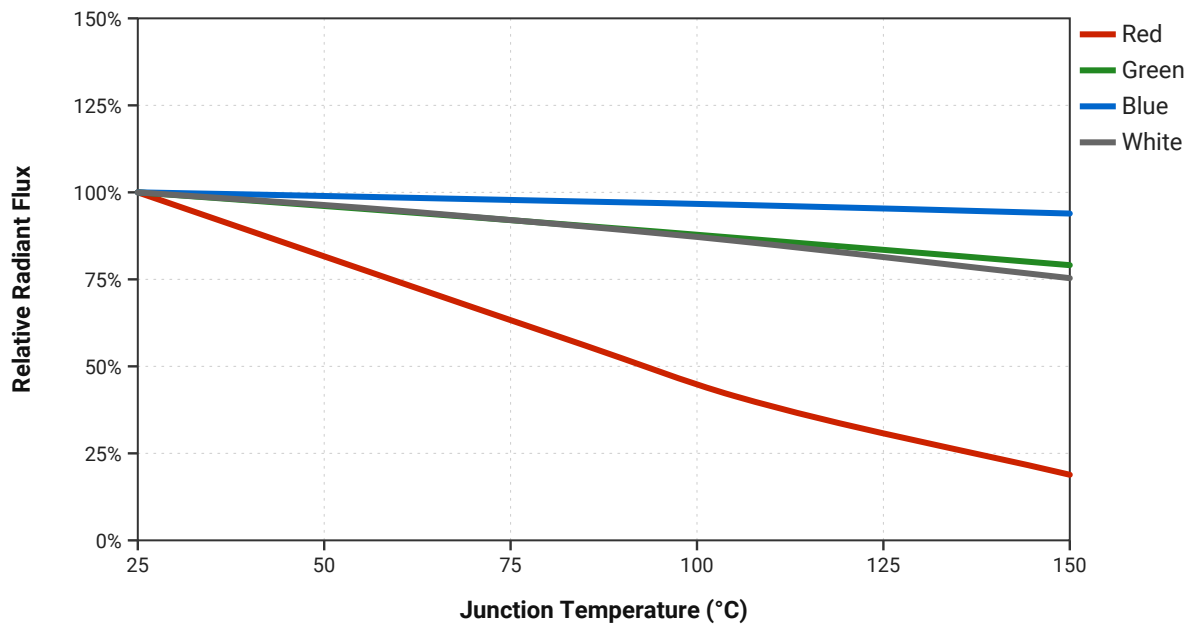
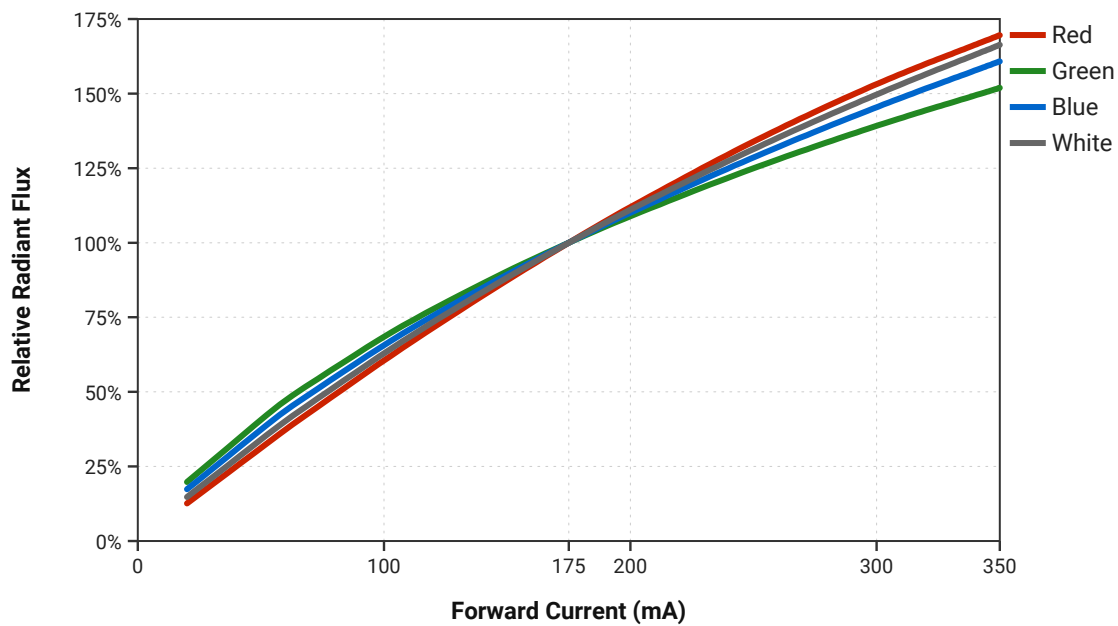
The following table lists the minimum and typical luminous flux for each LED die within the XLamp package at 175 mA per die, measured at $T_j = 25\text{ }^{\circ}\text{C}$.

Color		Chromaticity Bins / Dominant Wavelength Range		Minimum Luminous Flux @ 175 mA		Typical Luminous Flux @ 175 mA	Order Code
		Minimum	Maximum	Group	Flux (lm)	Flux (lm)	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACB-H0-0000-0000BA2AAA1E
	Green	520 nm	535 nm		40	55	
	Blue	465 nm	480 nm		10	15	
	Cool White 70CRI	6500K			40	60	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACB-H0-0000-0000BA2AAA2E
	Green	520 nm	535 nm		40	55	
	Blue	465 nm	480 nm		10	15	
	Cool White 70CRI	5700K			40	65	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACB-H0-0000-0000HA2AAA3G
	Green	520 nm	535 nm		40	55	
	Blue	465 nm	480 nm		10	15	
	Neutral White 80CRI	5000K			40	60	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACB-H0-0000-0000HA2AAA5G
	Green	520 nm	535 nm		40	55	
	Blue	465 nm	480 nm		10	15	
	Neutral White 80CRI	4000K			40	58	
Color + White	Red	620 nm	630 nm	A2	20	30	X21ACB-H0-0000-0000HA2AAA7G
	Green	520 nm	535 nm		40	55	
	Blue	465 nm	480 nm		10	15	
	Warm White 80CRI	3000K			40	55	

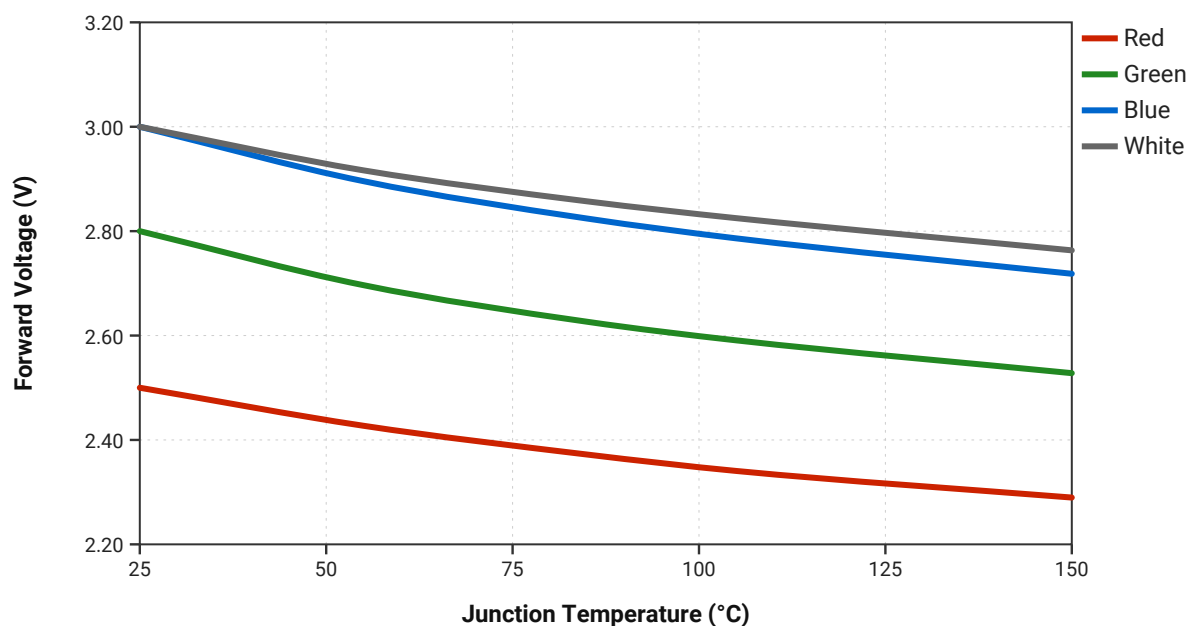
- Cree LED maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity measurements and ± 2 on CRI measurements.
- XLamp X21ACB LED order codes specify only a minimum flux bin and not a maximum. Cree LED may ship reels in flux bins higher than the minimum specified without advance notice.

RELATIVE SPECTRAL POWER DISTRIBUTION

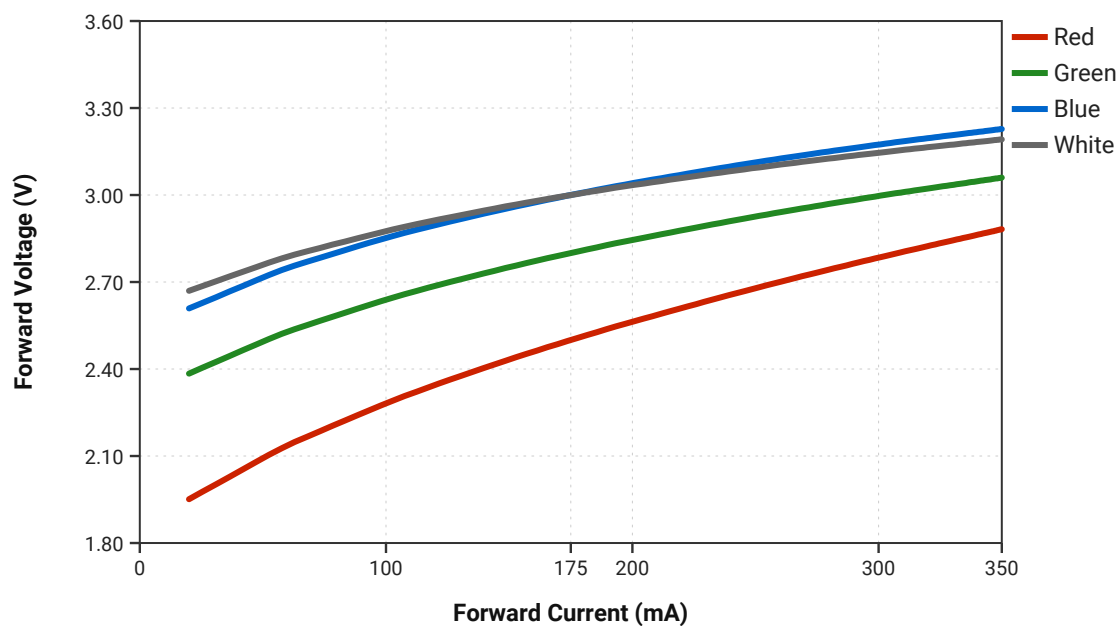


RELATIVE FLUX VS. JUNCTION TEMPERATURE – X21ACB ($I_F = 175 \text{ mA}$)RELATIVE FLUX VS. FORWARD CURRENT – X21ACB ($T_J = 25^{\circ}\text{C}$)

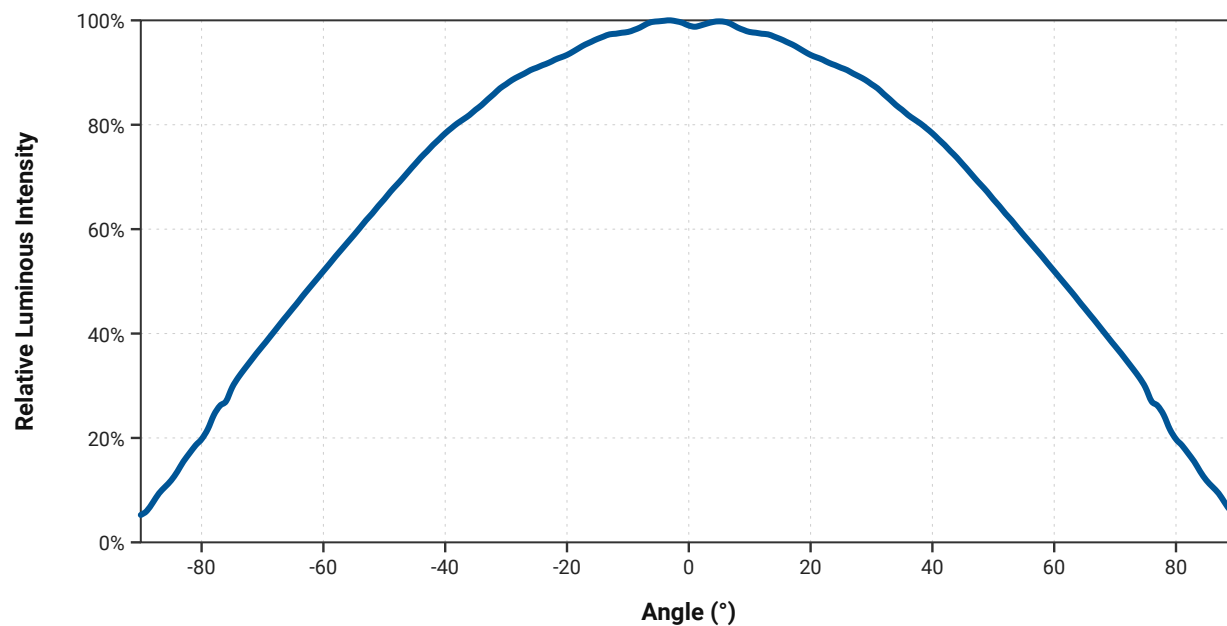
FORWARD VOLTAGE VS. JUNCTION TEMPERATURE – X21ACB ($I_f = 175 \text{ mA}$)



FORWARD VOLTAGE VS. FORWARD CURRENT – X21ACB ($T_j = 25 \text{ °C}$)



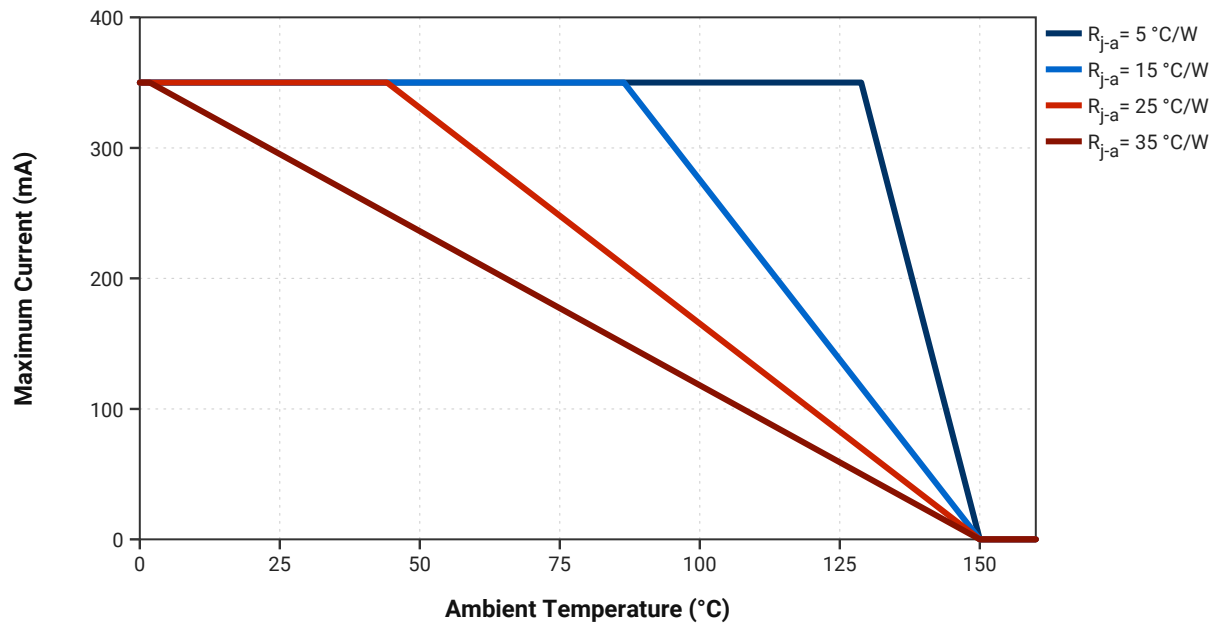
TYPICAL SPATIAL DISTRIBUTION



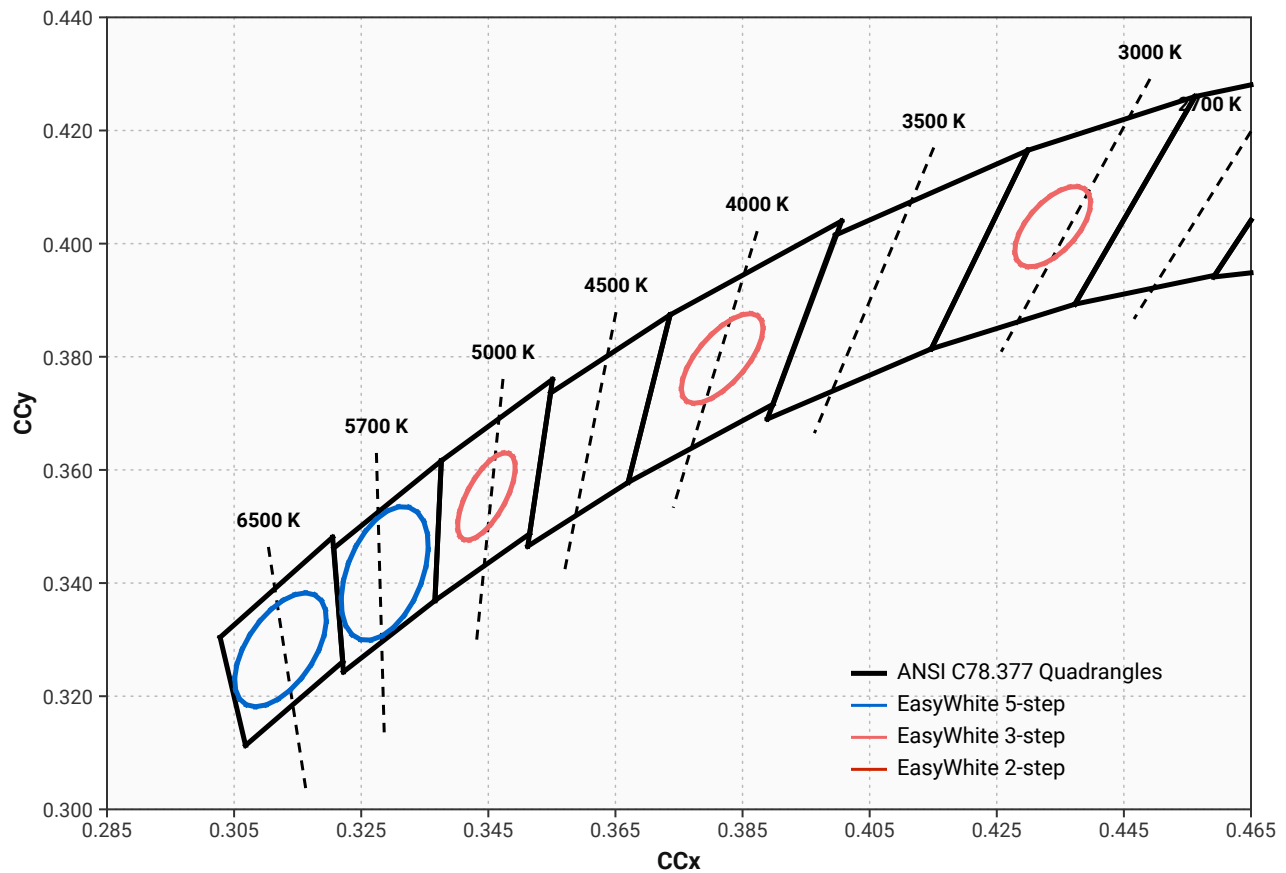
THERMAL DESIGN

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.

Please refer to the Characteristics table on [page 12](#) for this product's thermal resistance and maximum junction temperature.



CHROMATICITY BINS – EASYWHITE BINS



PERFORMANCE GROUPS

XLamp X21A LEDs are tested for chromaticity and placed into one of the regions defined by the following bounding coordinates.

Color Bin (3-Step MacAdam Ellipses)						
Bin Code	CCT (K)	Center x	Center y	Major Axis (a)	Minor Axis (b)	Rotation (°)
3G	5000	0.3447	0.3553	0.0084	0.0031	65.00
5G	4000	0.3818	0.3797	0.0094	0.0040	53.70
7G	3000	0.4338	0.4030	0.0083	0.0041	53.20

Color Bin (5-Step MacAdam Ellipses)						
Bin Code	CCT (K)	Center x	Center y	Major Axis (a)	Minor Axis (b)	Rotation (°)
1E	6500	0.3123	0.3282	0.0111	0.0055	61.00
2E	5700	0.3287	0.3417	0.0123	0.0060	72.00

XLamp X21A White LEDs tested for luminous flux are placed into one of the following luminous flux groups.

Group Code	Min Luminous Flux (lm)	Max Luminous Flux (lm)
1	20	40
2	40	60
3	60	80
4	80	100
5	100	120

CHARACTERISTICS – X21APA COMPLETE PACKAGE

The following table lists the product characteristics for the XLamp X21 Multi-Color LED package, measured with all LED dies on simultaneously and each LED die connected to independent drive circuits at 175 mA.

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point $R_{\theta s}$ †	°C/W	-	7.0	-
Viewing angle (FWHM) – High Intensity	degrees	-	120	-
LED junction temperature	°C	-	-	150

† $R_{\theta s}$ Thermal resistance measurement was performed per the JEDEC JESD51-14 standard. See the [Thermal Resistance Measurement](#) application note for more details.

CHARACTERISTICS – PER LED DIE

The following table lists the product characteristics for each LED die within the XLamp X21 Multi-Color LED package.

Characteristics	Unit	Minimum	Typical	Maximum
Temperature coefficient of voltage – red	mV/°C	-	-1.5	-
Temperature coefficient of voltage – green	mV/°C	-	-1.0	-
Temperature coefficient of voltage – royal	mV/°C	-	-1.1	-
Temperature coefficient of voltage – PC Amber	mV/°C	-	-1.1	-
DC forward current – red, green, royal, PC Amber	mA	-	-	350
Forward voltage (@ 175 mA, 25 °C) – red	V	-	2.5	2.7
Forward voltage (@ 175 mA, 25 °C) – green	V	-	2.8	3.0
Forward voltage (@ 175 mA, 25 °C) – royal, PC Amber	V	-	3.0	3.2

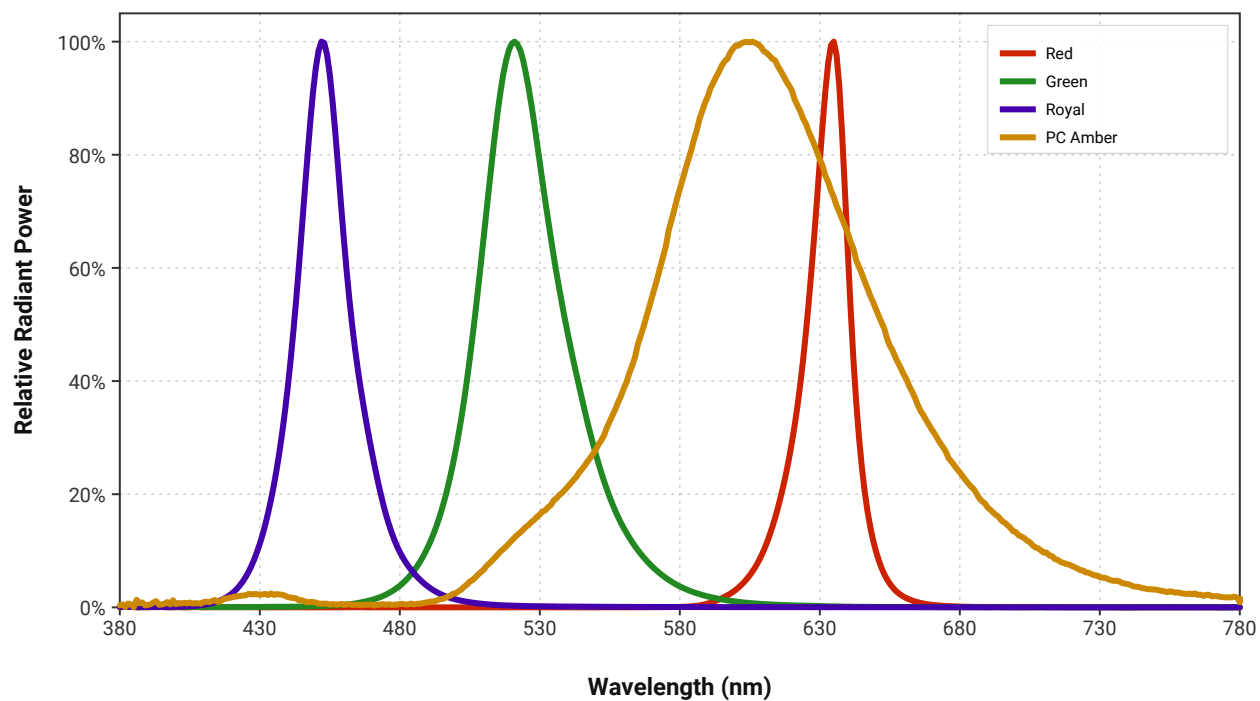
FLUX CHARACTERISTICS – HIGH INTENSITY ($T_J = 25\text{ }^{\circ}\text{C}$)

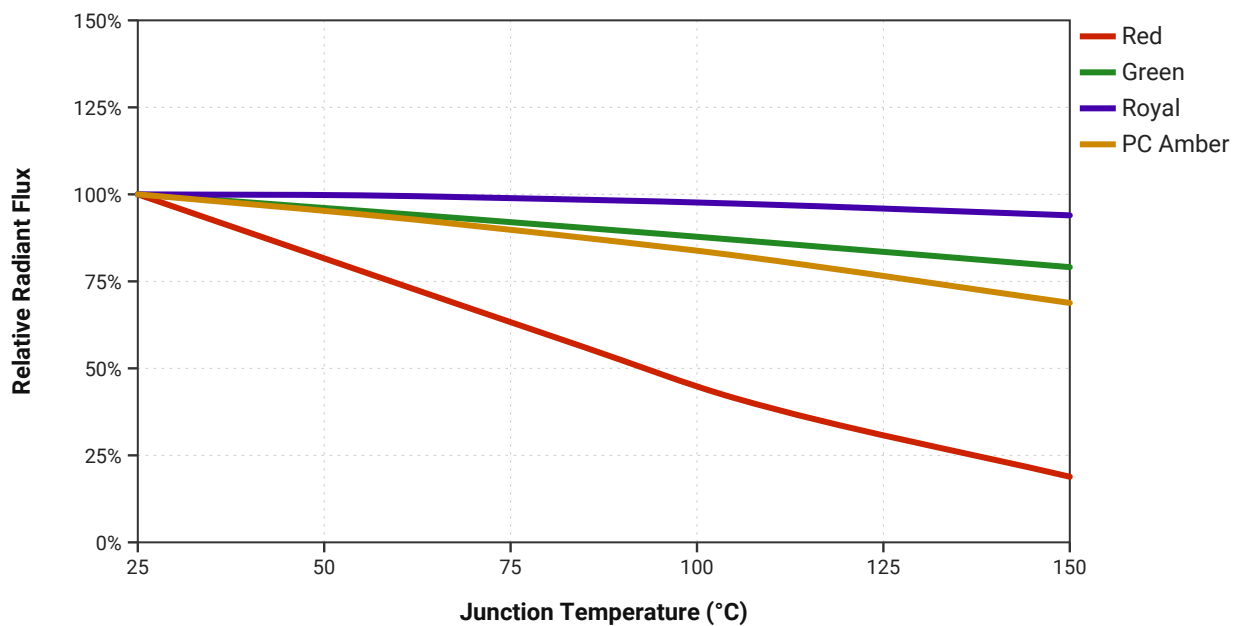
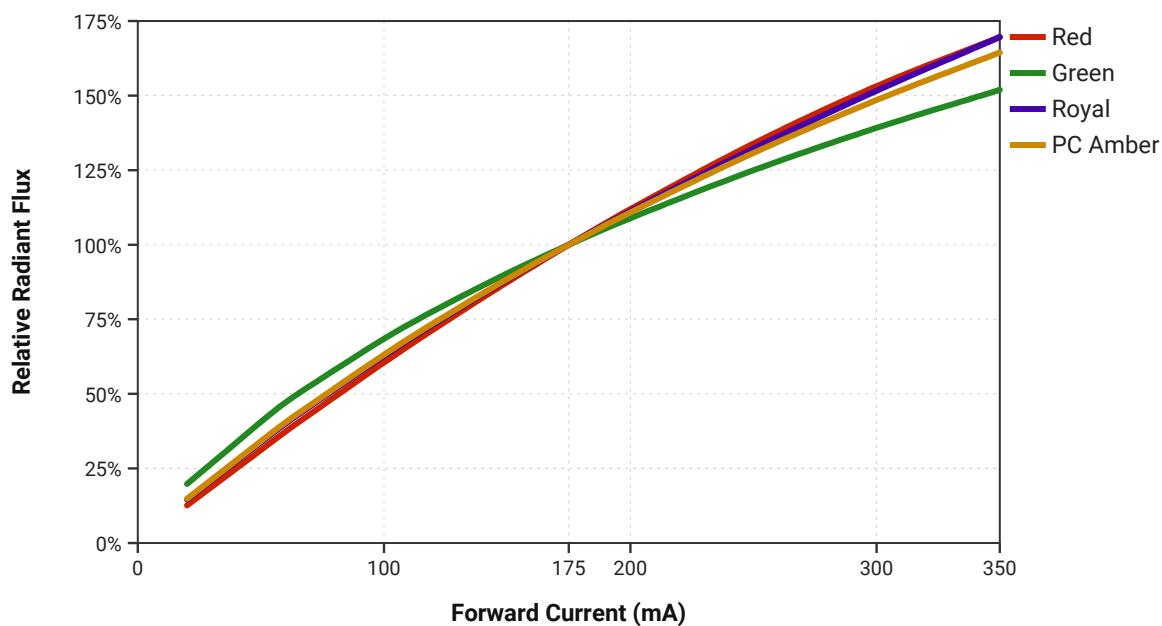
The following table lists the minimum and typical luminous flux for each LED die within the XLamp package at 175 mA per die, measured at $T_J = 25\text{ }^{\circ}\text{C}$.

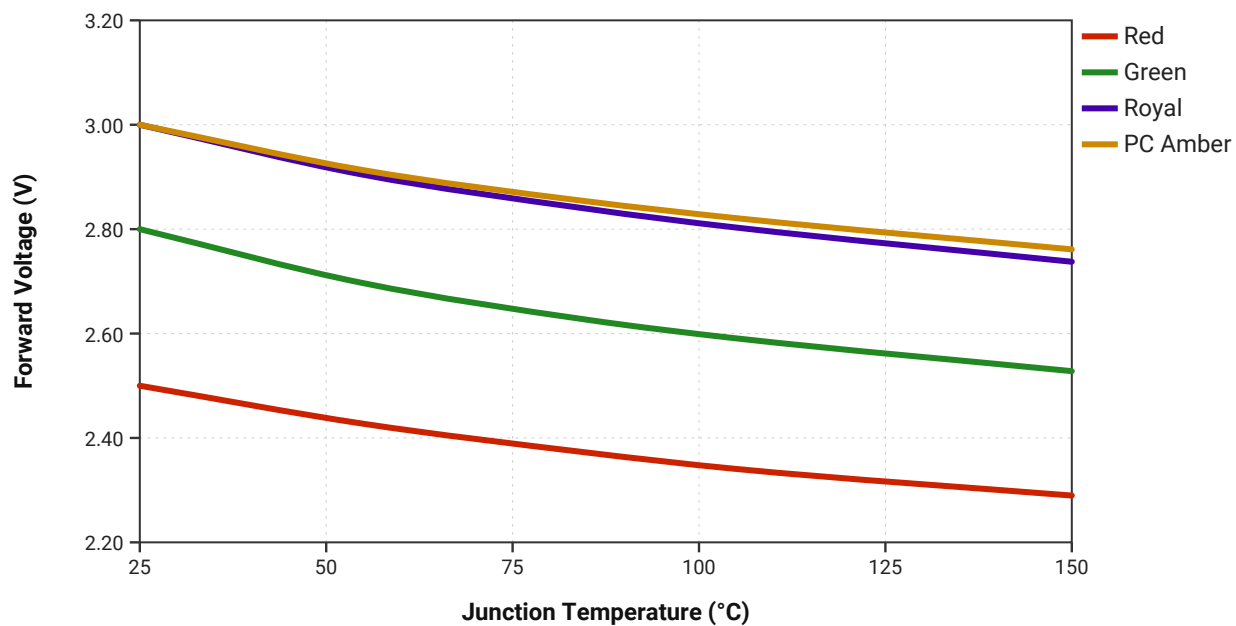
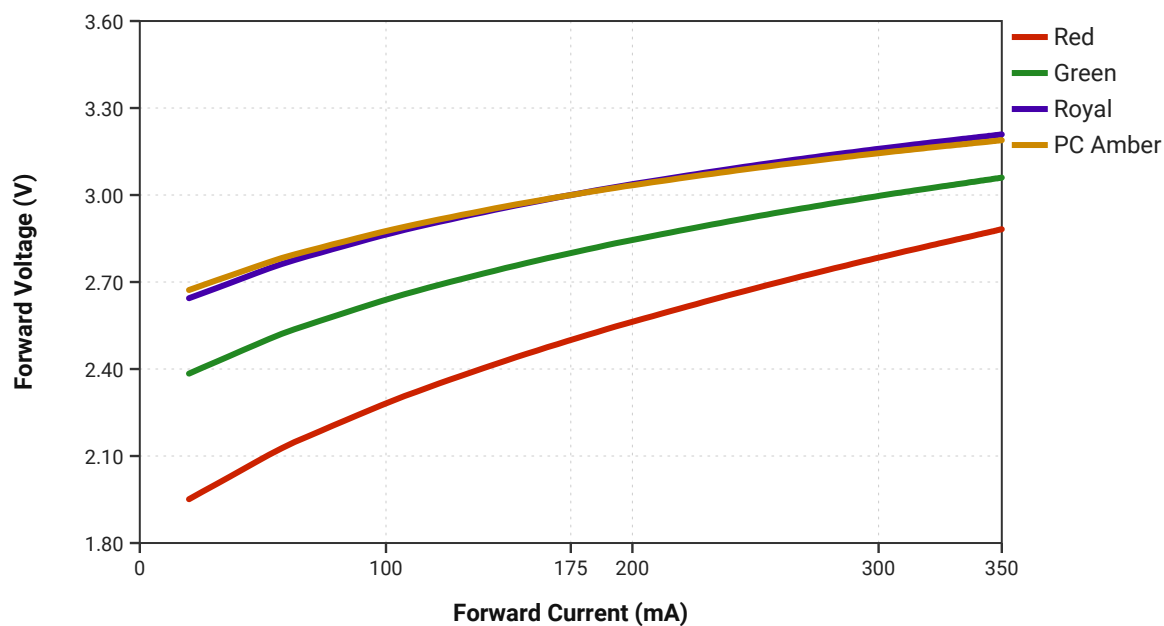
Color		Chromaticity Bins / Dominant Wavelength Range		Minimum Luminous Flux @ 175 mA		Typical Luminous Flux @ 175 mA	Order Code
		Minimum	Maximum	Group	Flux (lm)	Flux (lm)	
Color + PC Amber	Red	620 nm	630 nm	A2	20	30	X21APA-H0-0000-00000A2AAAYS
	Green	520 nm	535 nm		40	55	
	Royal Blue	450 nm	465 nm		5	10	
	PC Amber	Y20			20	35	

- Cree LED maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity measurements and ± 2 on CRI measurements.
- XLamp X21APA LED order codes specify only a minimum flux bin and not a maximum. Cree LED may ship reels in flux bins higher than the minimum specified without advance notice.

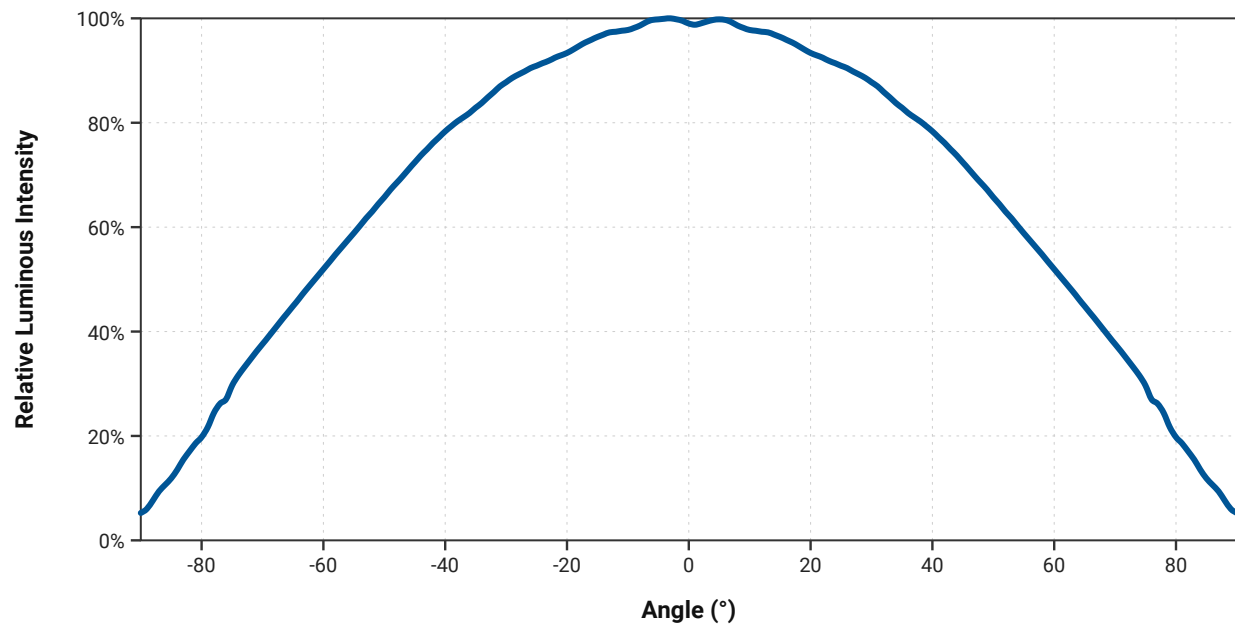
RELATIVE SPECTRAL POWER DISTRIBUTION



RELATIVE FLUX VS. JUNCTION TEMPERATURE – X21APA ($I_F = 175 \text{ mA}$)RELATIVE FLUX VS. FORWARD CURRENT – X21APA ($T_J = 25^{\circ}\text{C}$)

FORWARD VOLTAGE VS. JUNCTION TEMPERATURE – X21APA ($I_f = 175 \text{ mA}$)FORWARD VOLTAGE VS. FORWARD CURRENT – X21APA ($T_j = 25 \text{ °C}$)

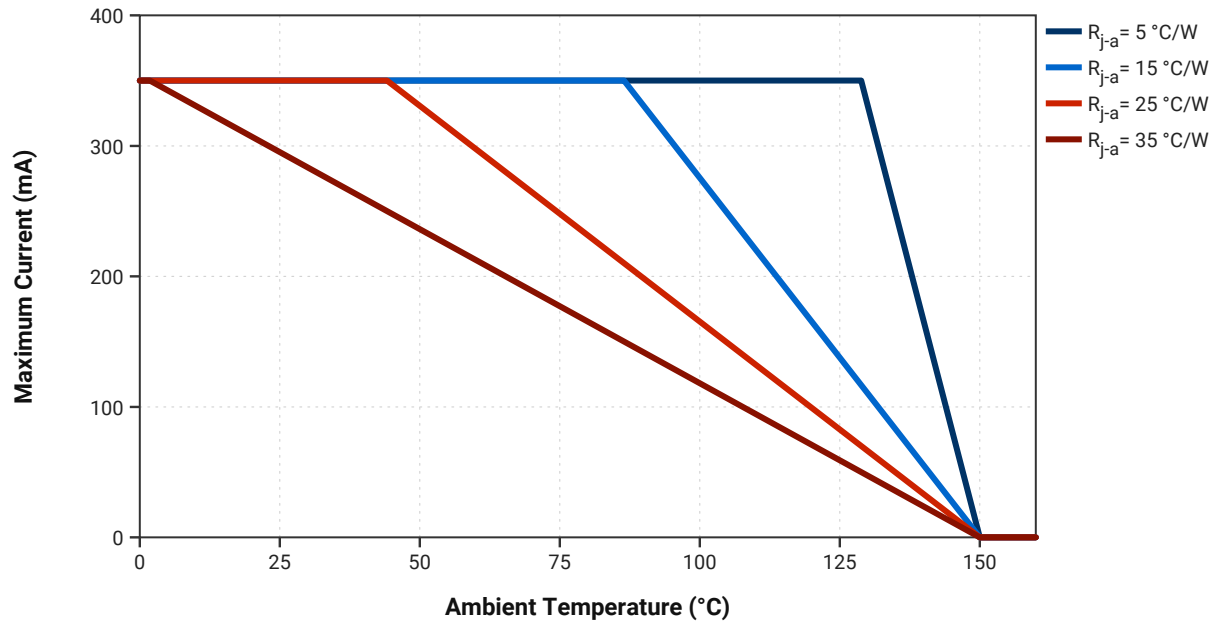
TYPICAL SPATIAL DISTRIBUTION



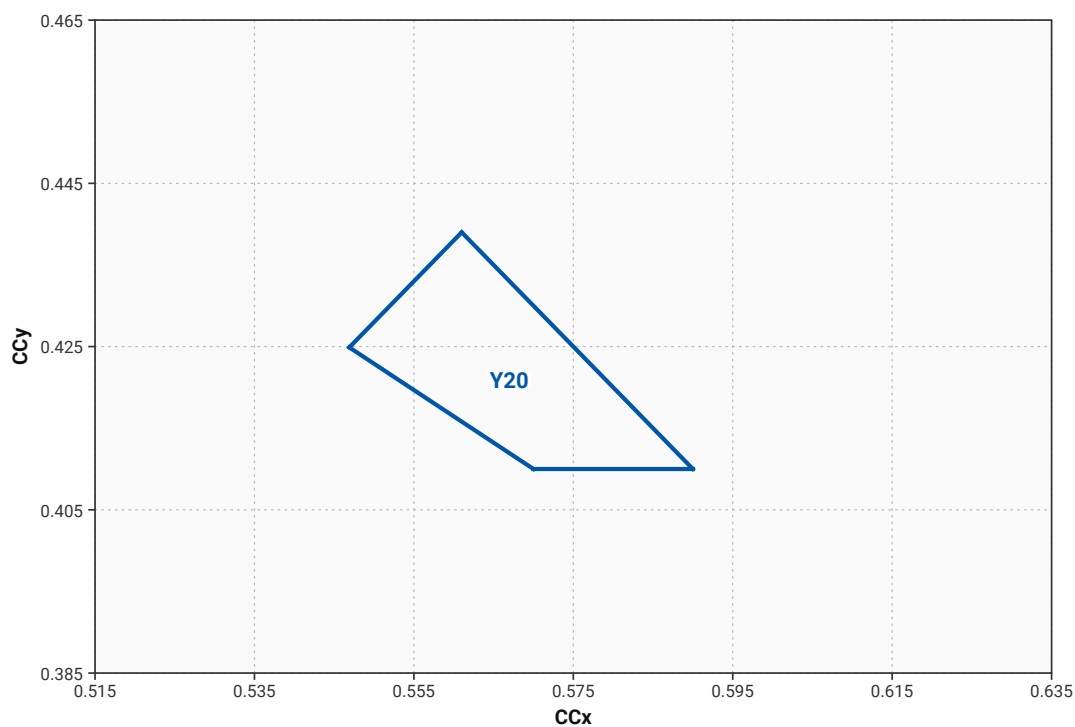
THERMAL DESIGN

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.

Please refer to the Characteristics table on [page 21](#) for this product's thermal resistance and maximum junction temperature.



CHROMATICITY BINS – PC AMBER



Bin	x	y
Y20	0.5469	0.4249
	0.5610	0.4390
	0.5900	0.4100
	0.5700	0.4100

PERFORMANCE GROUPS

XLamp X21A PC Amber LEDs tested for luminous flux are placed into one of the following luminous flux groups.

Group Code	Min Luminous Flux (lm)	Max Luminous Flux (lm)
1	20	40
2	40	60
3	60	80
4	80	100

CHARACTERISTICS – X21ABA COMPLETE PACKAGE

The following table lists the product characteristics for the XLamp X21 Multi-Color LED package, measured with all LED dies on simultaneously and each LED die connected to independent drive circuits at 175 mA.

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point $R_{\theta s}$ †	°C/W	-	7.0	-
Viewing angle (FWHM) – High Intensity	degrees	-	120	-
LED junction temperature	°C	-	-	150

† $R_{\theta s}$ Thermal resistance measurement was performed per the JEDEC JESD51-14 standard. See the [Thermal Resistance Measurement](#) application note for more details.

CHARACTERISTICS – PER LED DIE

The following table lists the product characteristics for each LED die within the XLamp X21 Multi-Color LED package.

Characteristics	Unit	Minimum	Typical	Maximum
Temperature coefficient of voltage – red	mV/°C	-	-1.5	-
Temperature coefficient of voltage – green	mV/°C	-	-1.0	-
Temperature coefficient of voltage – blue	mV/°C	-	-1.1	-
Temperature coefficient of voltage – PC Amber	mV/°C	-	-1.1	-
DC forward current – red, green, blue, PC Amber	mA	-	-	350
Forward voltage (@ 175 mA, 25 °C) – red	V	-	2.5	2.7
Forward voltage (@ 175 mA, 25 °C) – green	V	-	2.8	3.0
Forward voltage (@ 175 mA, 25 °C) – blue, PC Amber	V	-	3.0	3.2

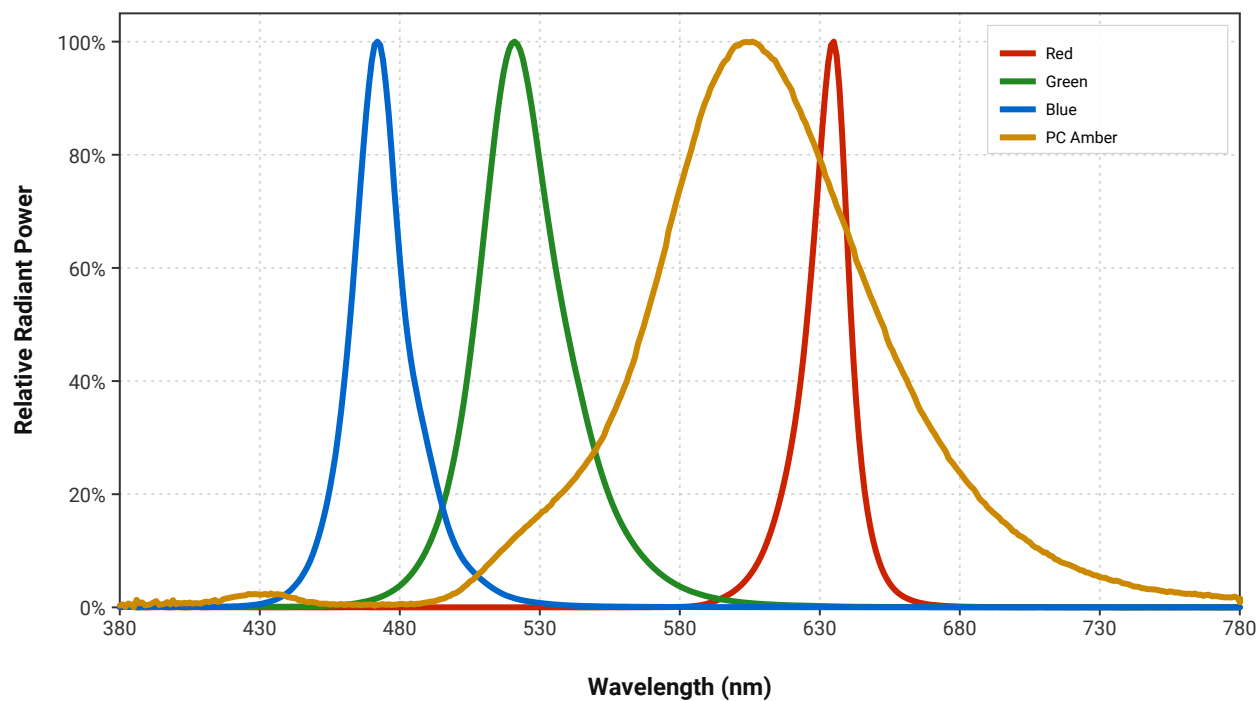
FLUX CHARACTERISTICS – HIGH INTENSITY ($T_J = 25\text{ }^{\circ}\text{C}$)

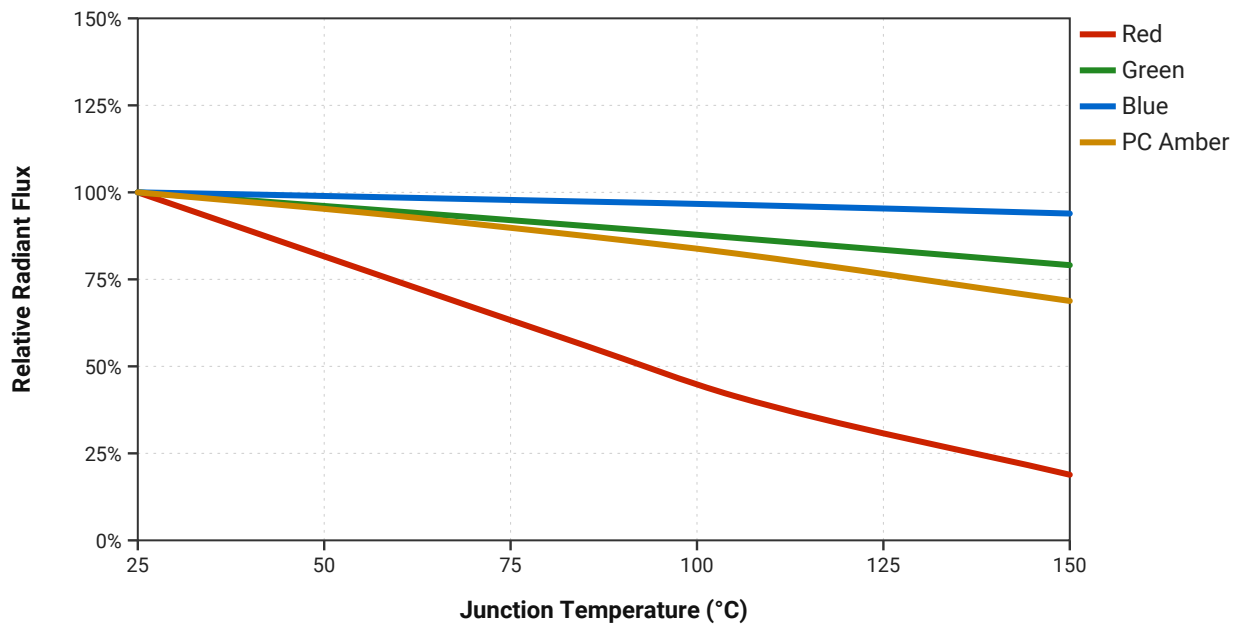
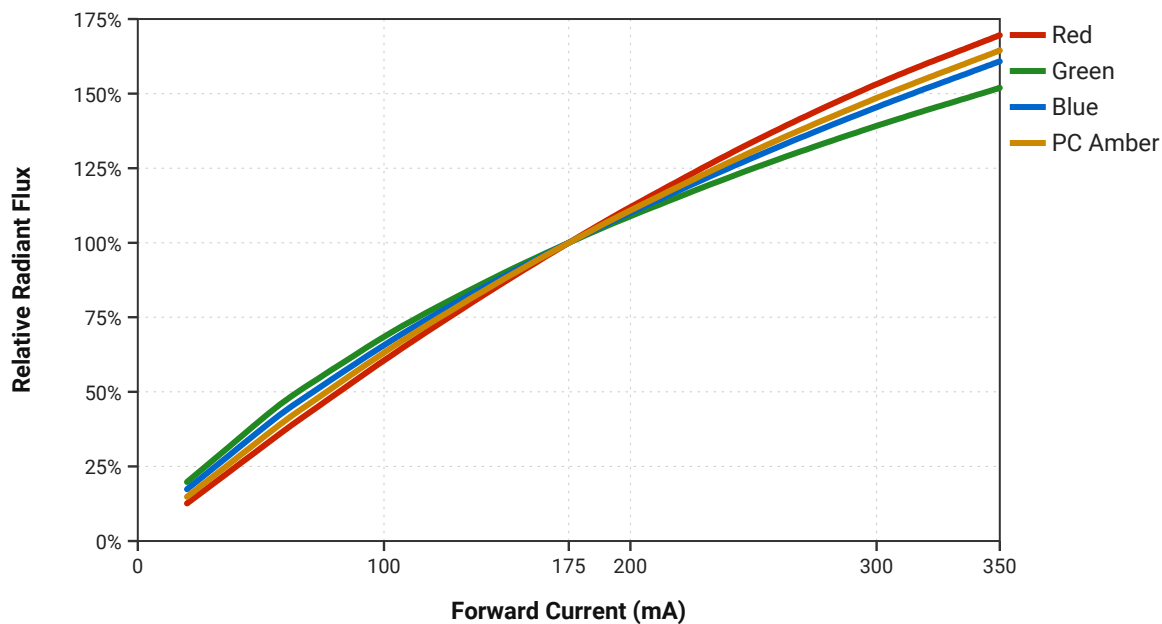
The following table lists the minimum and typical luminous flux for each LED die within the XLamp package at 175 mA per die, measured at $T_J = 25\text{ }^{\circ}\text{C}$.

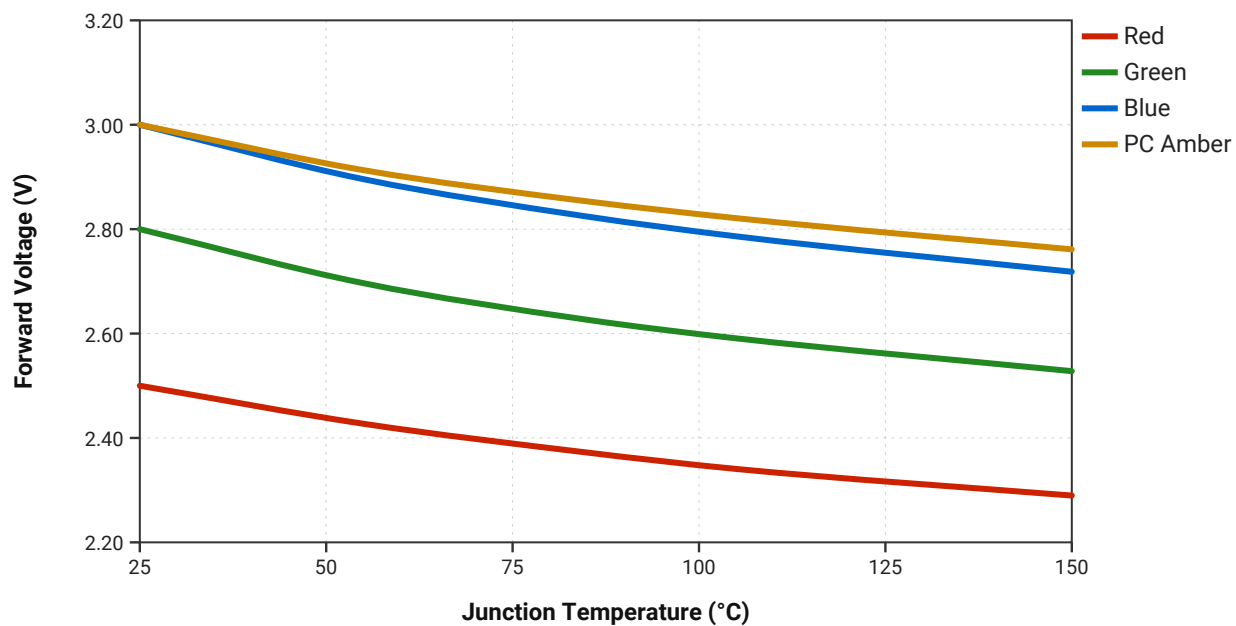
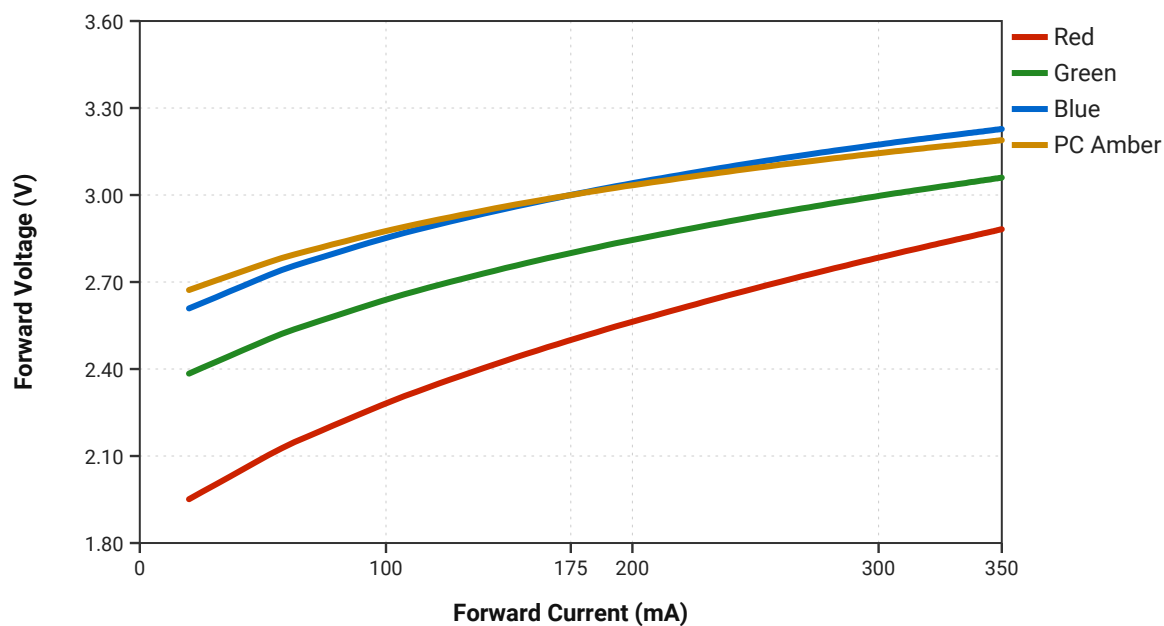
Color		Chromaticity Bins / Dominant Wavelength Range		Minimum Luminous Flux @ 175 mA		Typical Luminous Flux @ 175 mA	Order Code
		Minimum	Maximum	Group	Flux (lm)	Flux (lm)	
Color + PC Amber	Red	620 nm	630 nm	A2	20	30	X21ABA-H0-0000-00000A2AAAYS
	Green	520 nm	535 nm		40	55	
	Blue	465 nm	480 nm		10	15	
	PC Amber	Y20			20	35	

- Cree LED maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity measurements and ± 2 on CRI measurements.
- XLamp X21ABA LED order codes specify only a minimum flux bin and not a maximum. Cree LED may ship reels in flux bins higher than the minimum specified without advance notice.

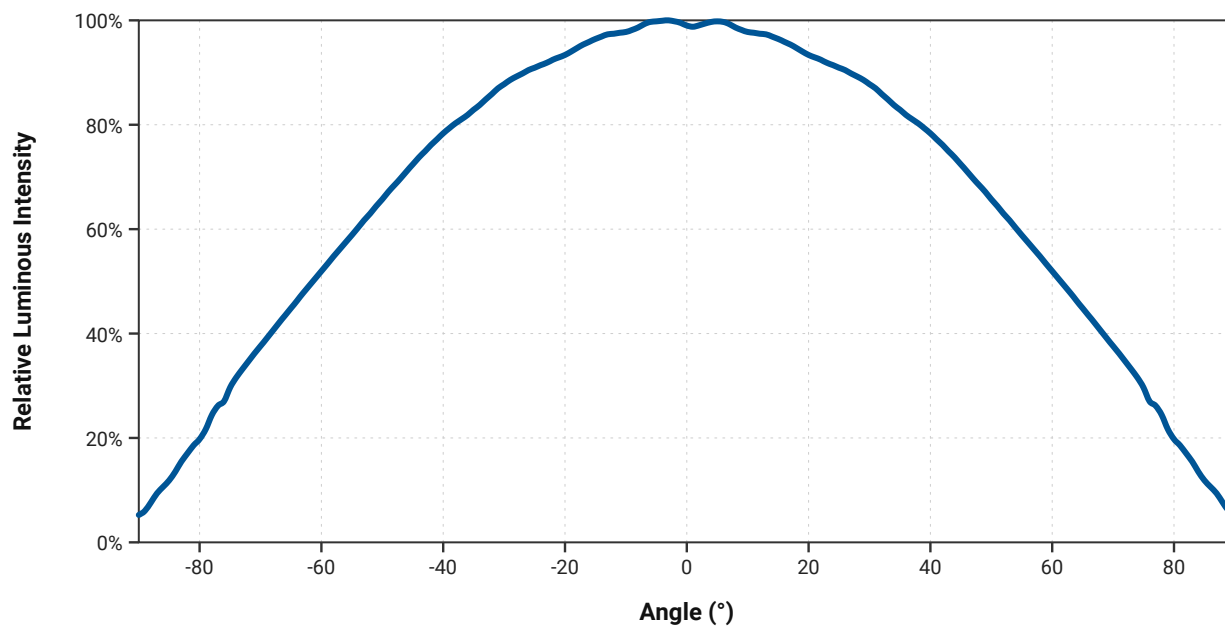
RELATIVE SPECTRAL POWER DISTRIBUTION



RELATIVE FLUX VS. JUNCTION TEMPERATURE – X21ABA ($I_F = 175 \text{ mA}$)RELATIVE FLUX VS. FORWARD CURRENT – X21ABA ($T_J = 25^{\circ}\text{C}$)

FORWARD VOLTAGE VS. JUNCTION TEMPERATURE – X21ABA ($I_f = 175 \text{ mA}$)FORWARD VOLTAGE VS. FORWARD CURRENT – X21ABA ($T_j = 25 \text{ °C}$)

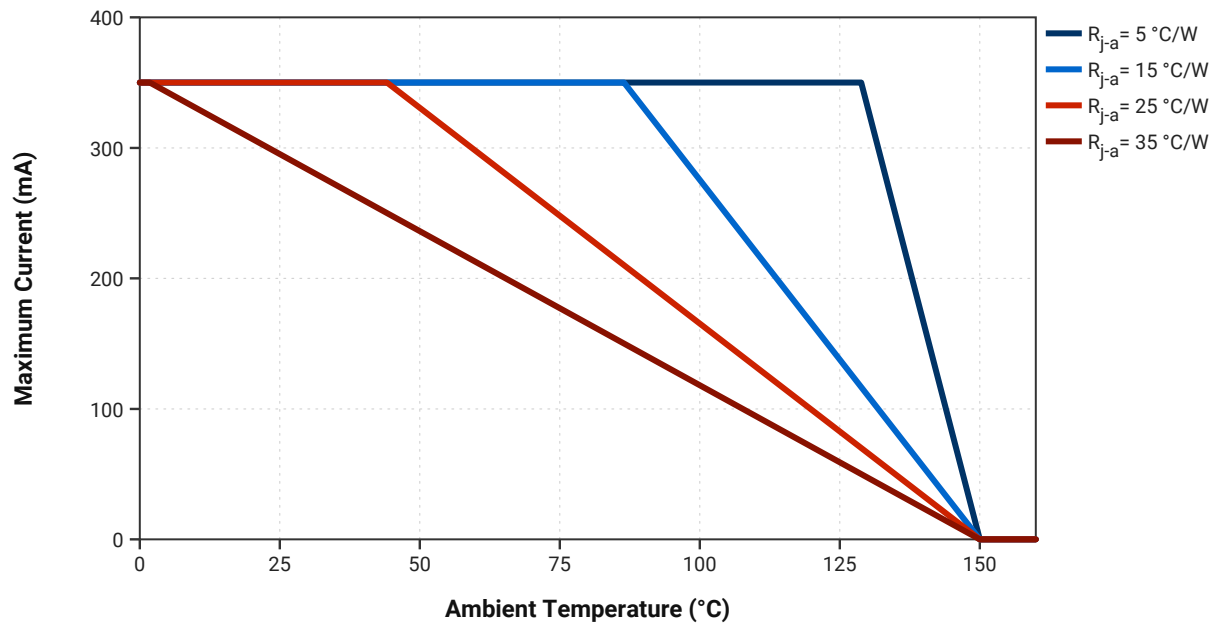
TYPICAL SPATIAL DISTRIBUTION



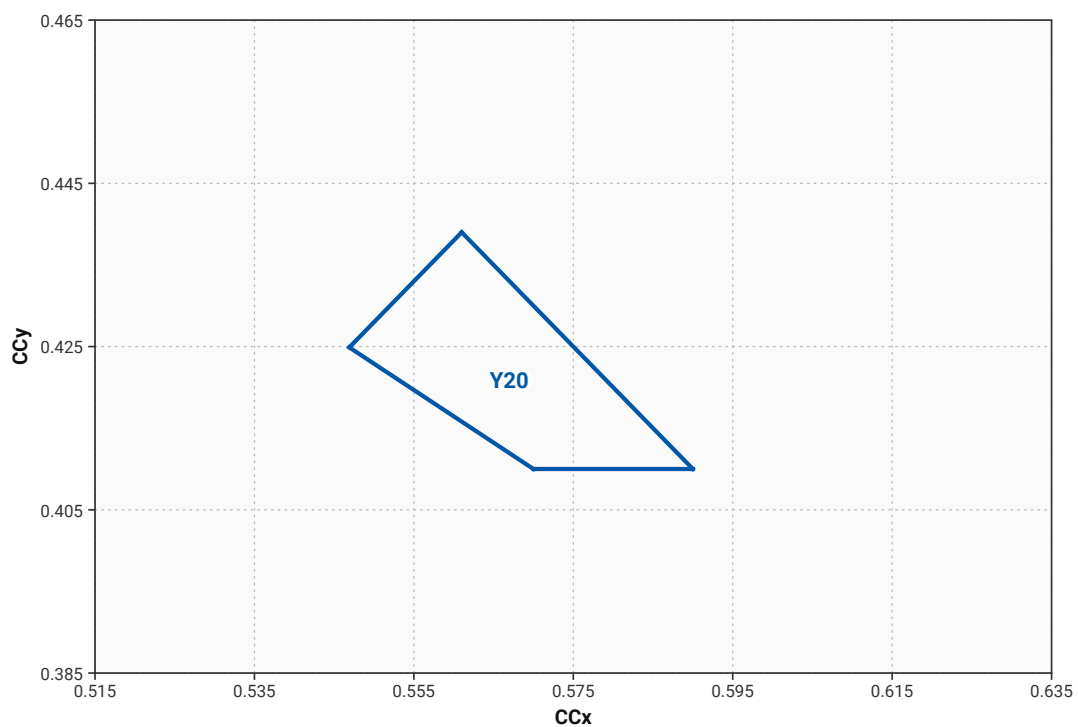
THERMAL DESIGN

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.

Please refer to the Characteristics table on [page 30](#) for this product's thermal resistance and maximum junction temperature.



CHROMATICITY BINS – PC AMBER



Bin	x	y
Y20	0.5469	0.4249
	0.5610	0.4390
	0.5900	0.4100
	0.5700	0.4100

PERFORMANCE GROUPS

XLamp X21A PC Amber LEDs tested for luminous flux are placed into one of the following luminous flux groups.

Group Code	Min Luminous Flux (lm)	Max Luminous Flux (lm)
1	20	40
2	40	60
3	60	80
4	80	100

CHARACTERISTICS – X21APL COMPLETE PACKAGE

The following table lists the product characteristics for the XLamp X21 Multi-Color LED package, measured with all LED dies on simultaneously and each LED die connected to independent drive circuits at 175 mA.

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point $R_{\theta s}$ †	°C/W	-	7.0	-
Viewing angle (FWHM) – High Intensity	degrees	-	120	-
LED junction temperature	°C	-	-	150

† $R_{\theta s}$ Thermal resistance measurement was performed per the JEDEC JESD51-14 standard. See the [Thermal Resistance Measurement](#) application note for more details.

CHARACTERISTICS – PER LED DIE

The following table lists the product characteristics for each LED die within the XLamp X21 Multi-Color LED package.

Characteristics	Unit	Minimum	Typical	Maximum
Temperature coefficient of voltage – red	mV/°C	-	-1.5	-
Temperature coefficient of voltage – green	mV/°C	-	-1.0	-
Temperature coefficient of voltage – royal	mV/°C	-	-1.1	-
Temperature coefficient of voltage – PC Lime	mV/°C	-	-1.1	-
DC forward current – red, green, royal, PC Lime	mA	-	-	350
Forward voltage (@ 175 mA, 25 °C) – red	V	-	2.5	2.7
Forward voltage (@ 175 mA, 25 °C) – green	V	-	2.8	3.0
Forward voltage (@ 175 mA, 25 °C) – royal, PC Lime	V	-	3.0	3.2

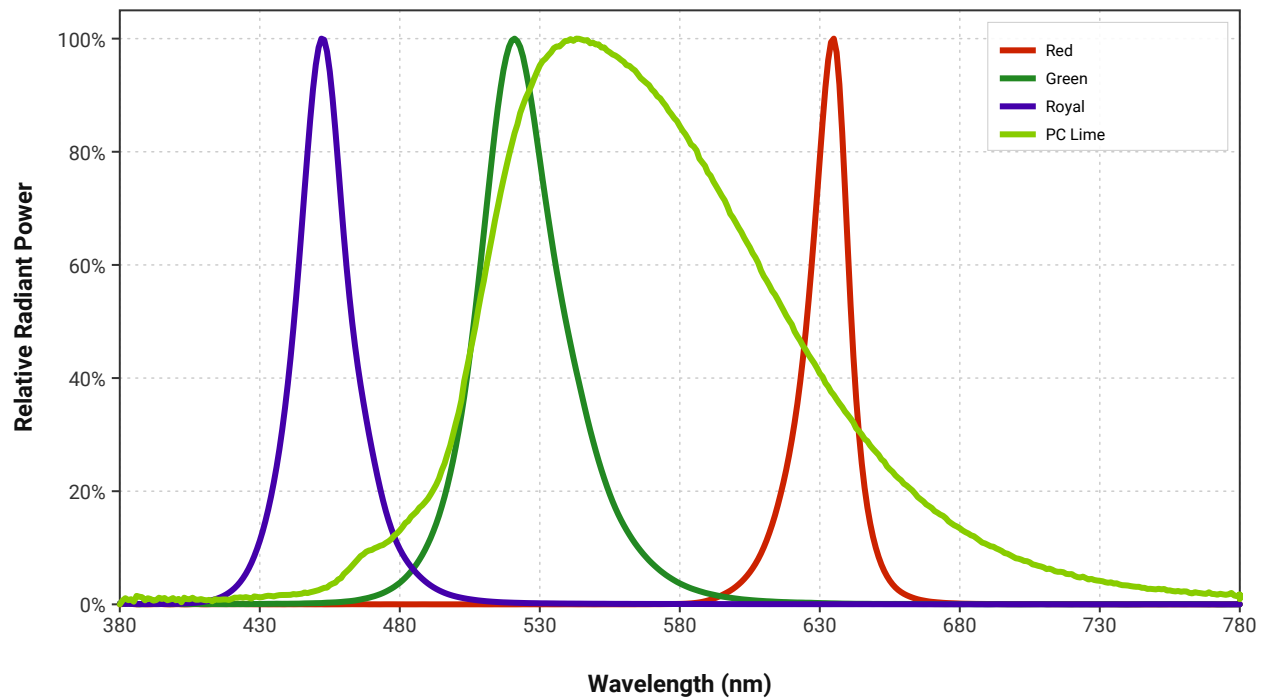
FLUX CHARACTERISTICS – HIGH INTENSITY ($T_j = 25\text{ }^{\circ}\text{C}$)

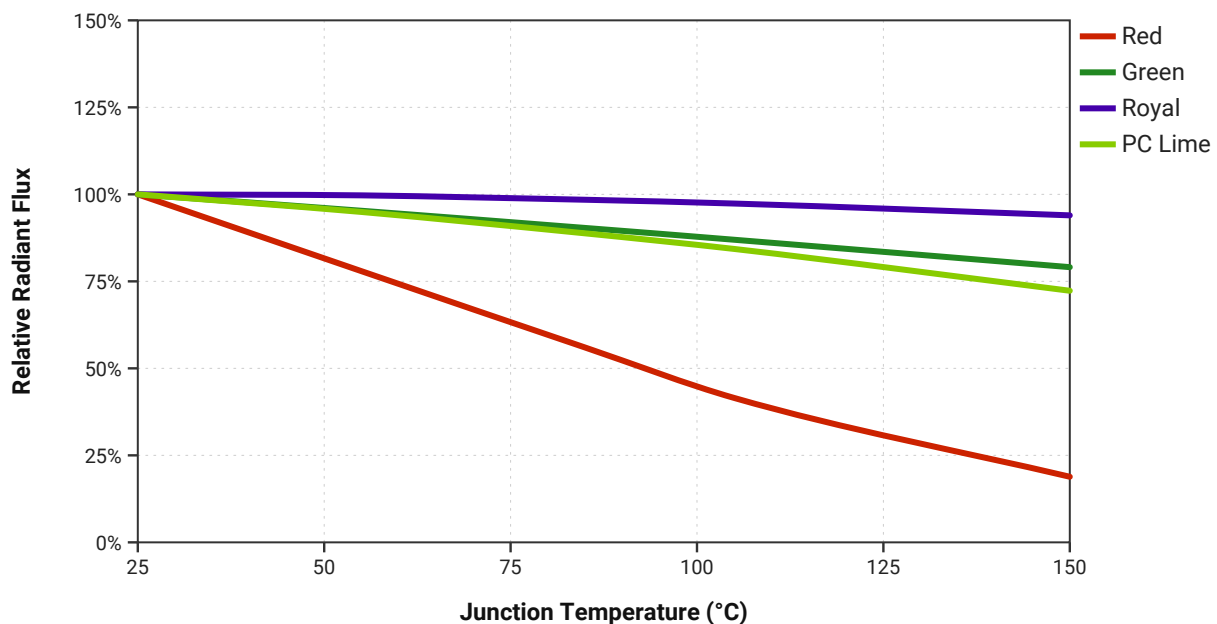
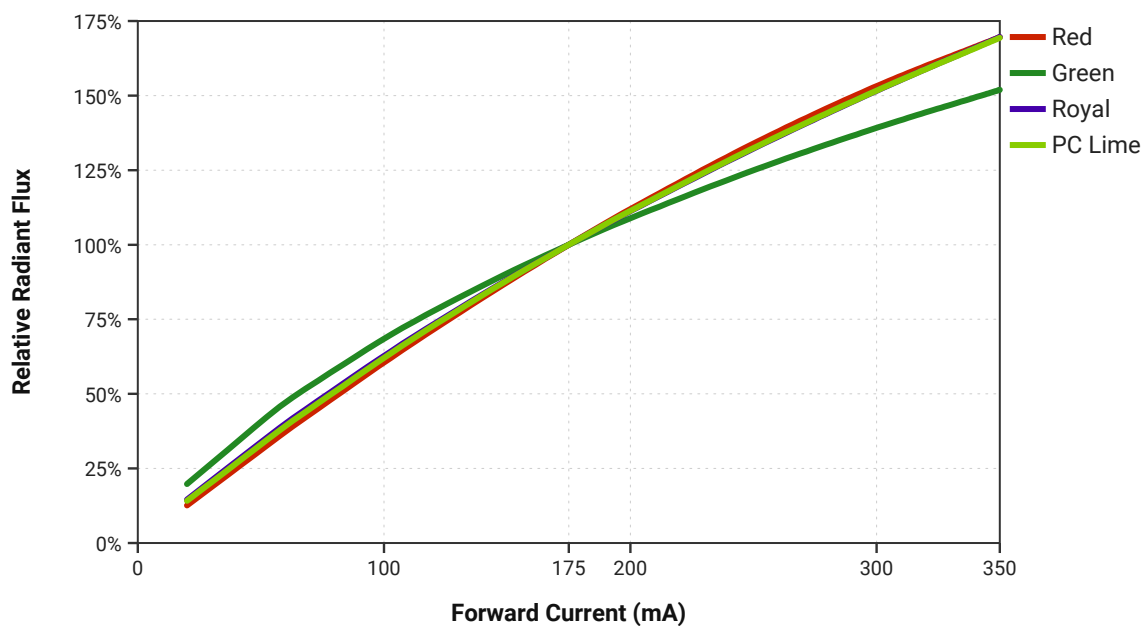
The following table lists the minimum and typical luminous flux for each LED die within the XLamp package at 175 mA per die, measured at $T_j = 25\text{ }^{\circ}\text{C}$.

Color		Chromaticity Bins / Dominant Wavelength Range		Minimum Luminous Flux @ 175 mA		Typical Luminous Flux @ 175 mA	Order Code
		Minimum	Maximum	Group	Flux (lm)	Flux (lm)	
Color + PC Lime	Red	620 nm	630 nm	A2	20	30	X21APL-H0-0000-00000A2AAALA
	Green	520 nm	535 nm		40	55	
	Royal Blue	450 nm	465 nm		5	10	
	PC Lime	PL3, PL4			50	65	

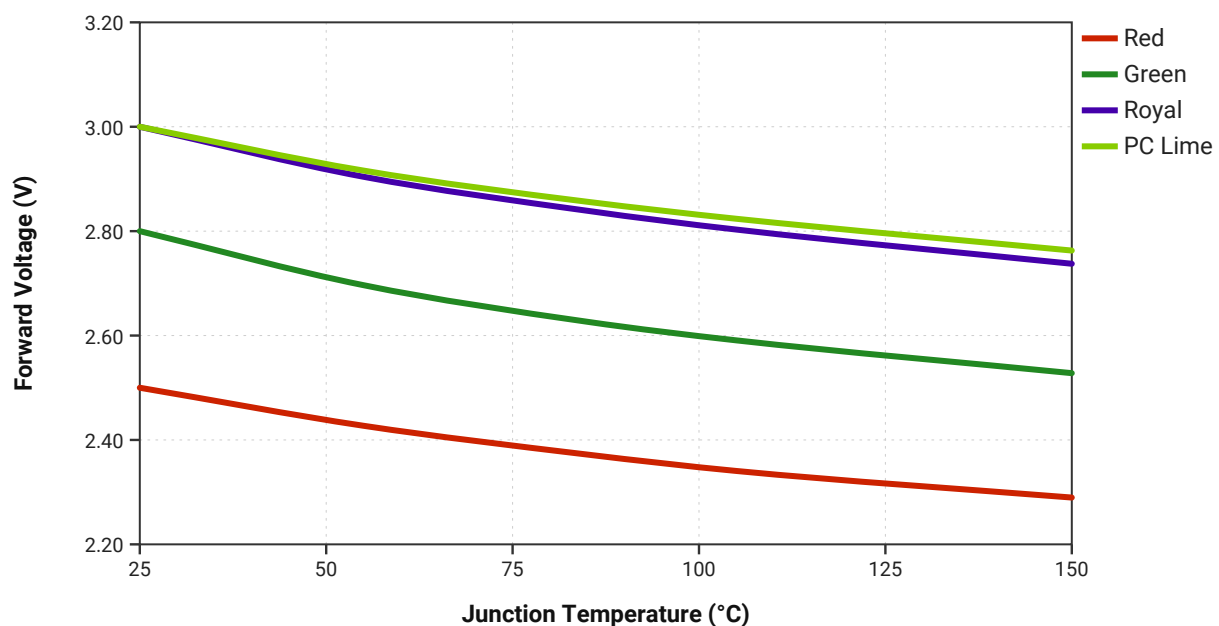
- Cree LED maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity measurements and ± 2 on CRI measurements.
- XLamp X21APL LED order codes specify only a minimum flux bin and not a maximum. Cree LED may ship reels in flux bins higher than the minimum specified without advance notice.

RELATIVE SPECTRAL POWER DISTRIBUTION

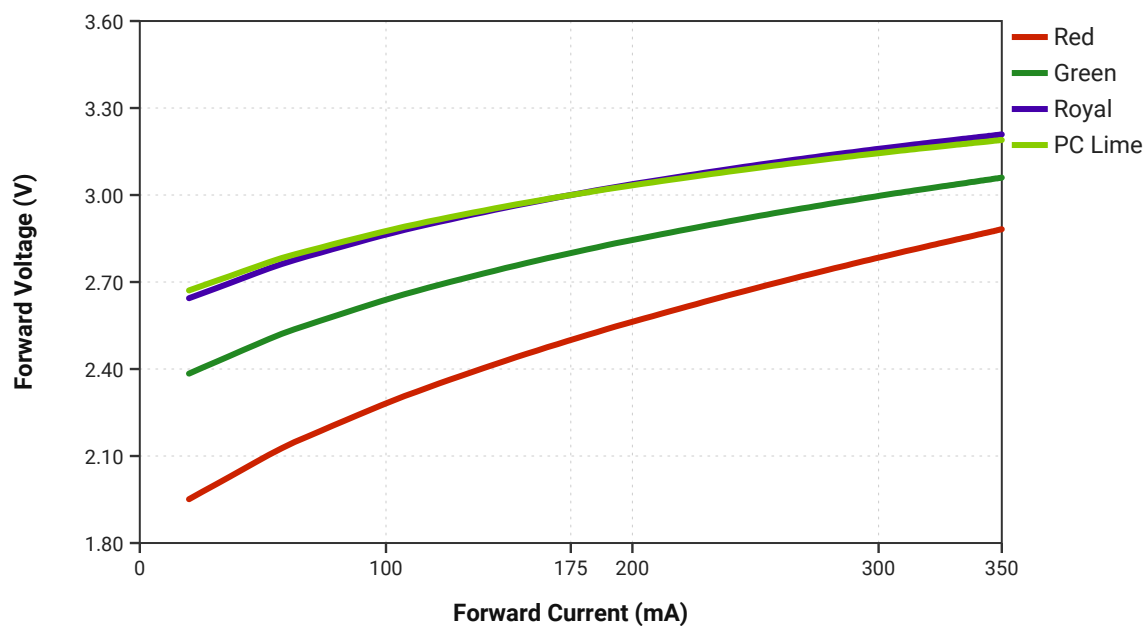


RELATIVE FLUX VS. JUNCTION TEMPERATURE – X21APL ($I_F = 175 \text{ mA}$)RELATIVE FLUX VS. FORWARD CURRENT – X21APL ($T_J = 25 \text{ °C}$)

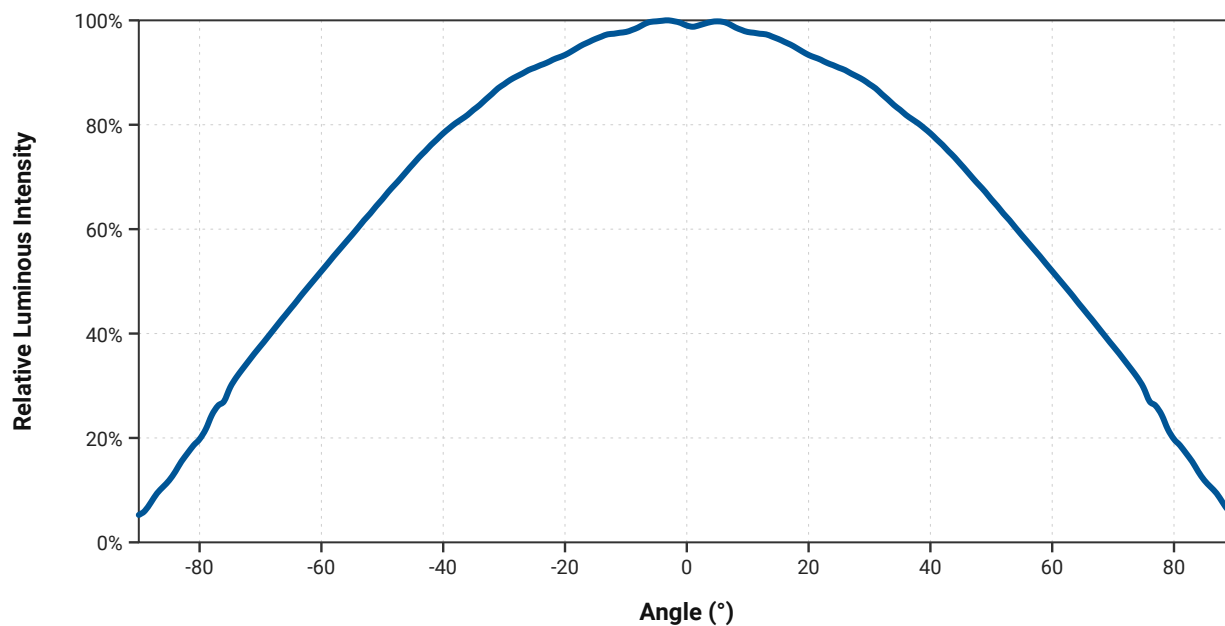
FORWARD VOLTAGE VS. JUNCTION TEMPERATURE – X21APL ($I_F = 175 \text{ mA}$)



FORWARD VOLTAGE VS. FORWARD CURRENT – X21APL ($T_J = 25 \text{ °C}$)



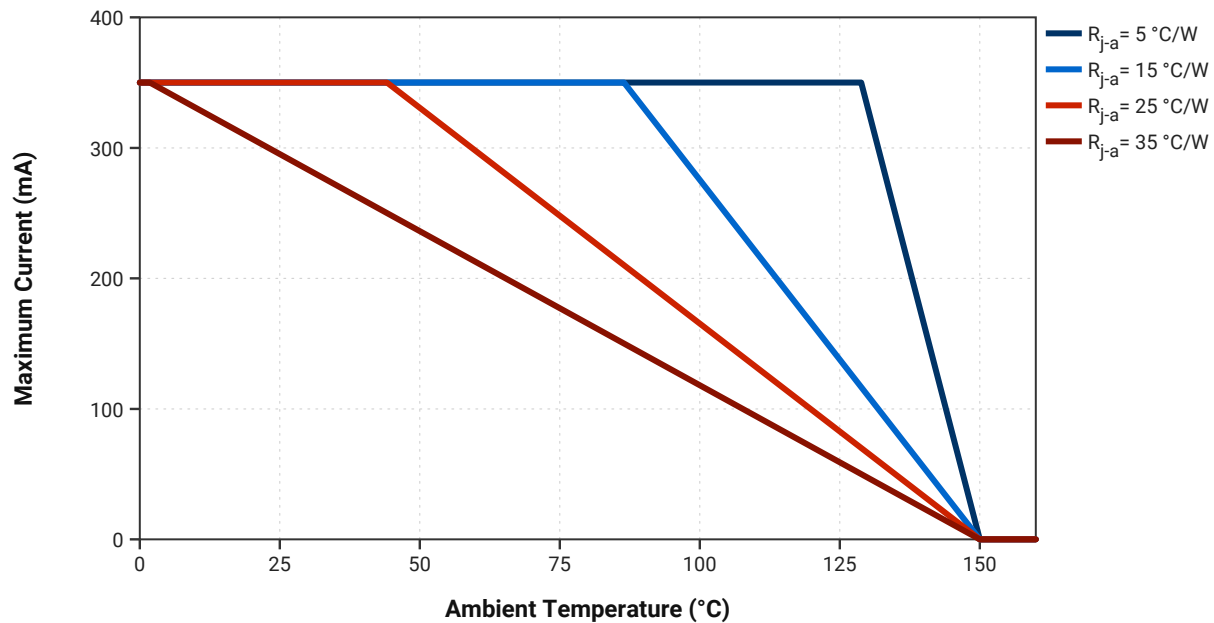
TYPICAL SPATIAL DISTRIBUTION



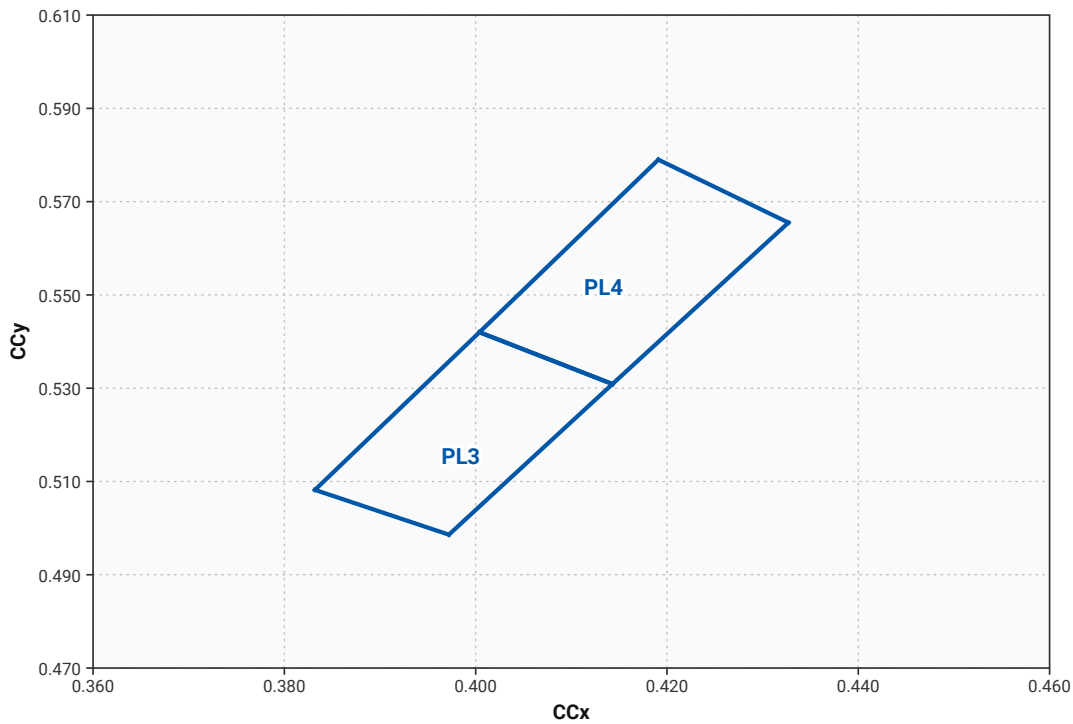
THERMAL DESIGN

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.

Please refer to the Characteristics table on [page 39](#) for this product's thermal resistance and maximum junction temperature.



CHROMATICITY BINS – PC LIME



Bin	x	y
PL3	0.3972	0.4986
	0.3832	0.5082
	0.4004	0.5420
	0.4143	0.5309
PL4	0.4004	0.5420
	0.4143	0.5309
	0.4327	0.5655
	0.4191	0.5790

PERFORMANCE GROUPS

XLamp X21A PC Lime LEDs tested for luminous flux are placed into one of the following luminous flux groups.

Group Code	Min Luminous Flux (lm)	Max Luminous Flux (lm)
1	20	40
2	40	60
3	60	80
4	80	100

CHARACTERISTICS – X21ABL COMPLETE PACKAGE

The following table lists the product characteristics for the XLamp X21 Multi-Color LED package, measured with all LED dies on simultaneously and each LED die connected to independent drive circuits at 175 mA.

Characteristics	Unit	Minimum	Typical	Maximum
Thermal resistance, junction to solder point $R_{\theta s}$ †	°C/W	-	7.0	-
Viewing angle (FWHM) – High Intensity	degrees	-	120	-
LED junction temperature	°C	-	-	150

† $R_{\theta s}$ Thermal resistance measurement was performed per the JEDEC JESD51-14 standard. See the [Thermal Resistance Measurement](#) application note for more details.

CHARACTERISTICS – PER LED DIE

The following table lists the product characteristics for each LED die within the XLamp X21 Multi-Color LED package.

Characteristics	Unit	Minimum	Typical	Maximum
Temperature coefficient of voltage – red	mV/°C	-	-1.5	-
Temperature coefficient of voltage – green	mV/°C	-	-1.0	-
Temperature coefficient of voltage – blue	mV/°C	-	-1.1	-
Temperature coefficient of voltage – PC Lime	mV/°C	-	-1.1	-
DC forward current – red, green, blue, PC Lime	mA	-	-	350
Forward voltage (@ 175 mA, 25 °C) – red	V	-	2.5	2.7
Forward voltage (@ 175 mA, 25 °C) – green	V	-	2.8	3.0
Forward voltage (@ 175 mA, 25 °C) – blue, PC Lime	V	-	3.0	3.2

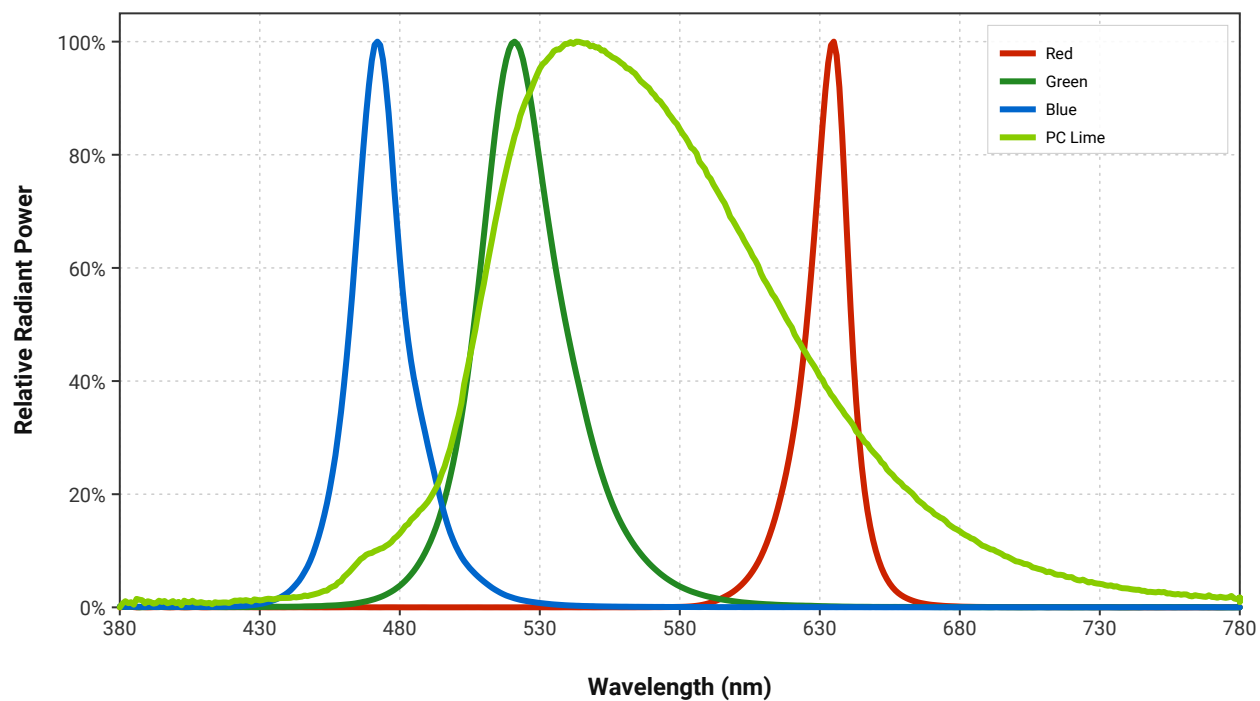
FLUX CHARACTERISTICS – HIGH INTENSITY ($T_j = 25\text{ }^{\circ}\text{C}$)

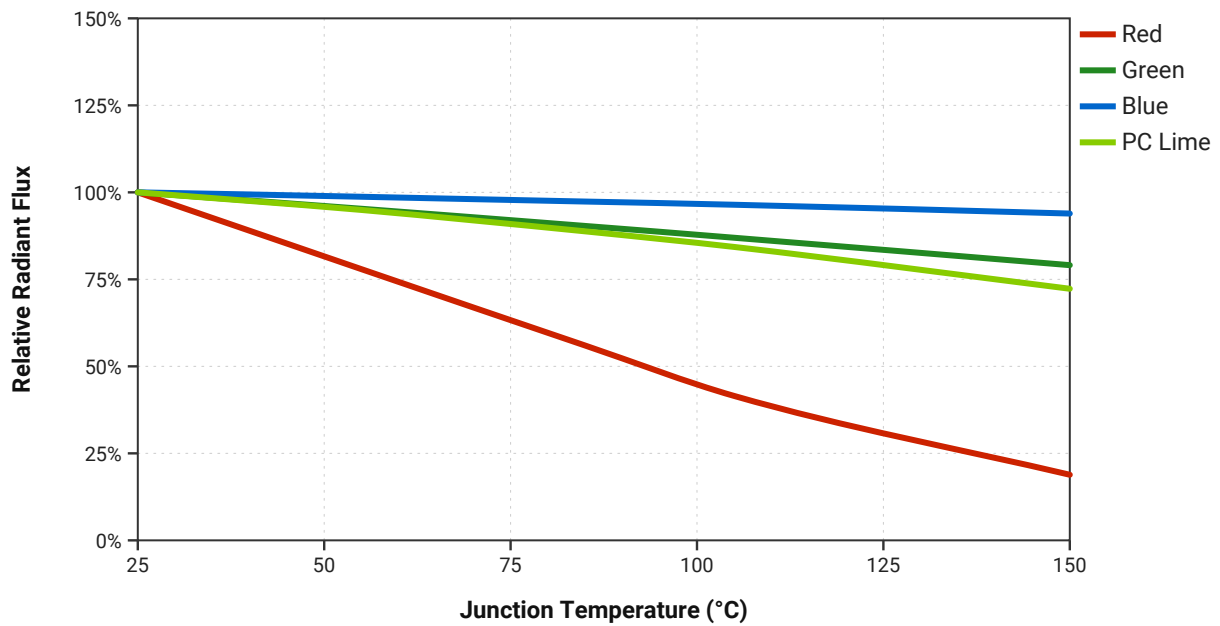
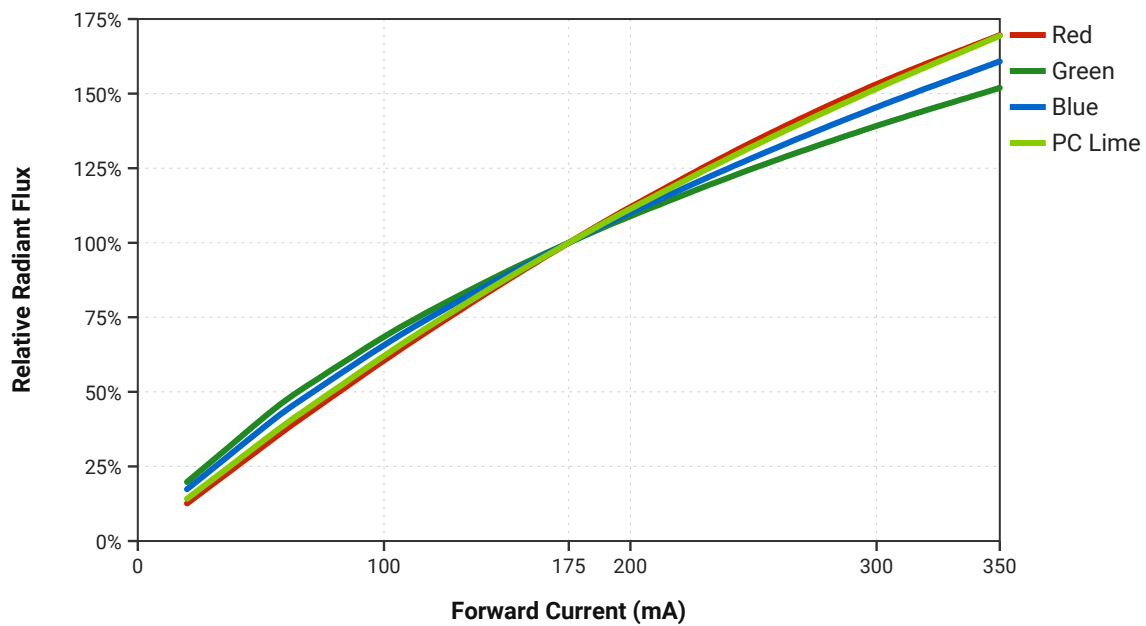
The following table lists the minimum and typical luminous flux for each LED die within the XLamp package at 175 mA per die, measured at $T_j = 25\text{ }^{\circ}\text{C}$.

Color		Chromaticity Bins / Dominant Wavelength Range		Minimum Luminous Flux @ 175 mA		Typical Luminous Flux @ 175 mA	Order Code
		Minimum	Maximum	Group	Flux (lm)	Flux (lm)	
Color + PC Lime	Red	620 nm	630 nm	A2	20	30	X21ABL-H0-0000-00000A2AAALA
	Green	520 nm	535 nm		40	55	
	Blue	465 nm	480 nm		10	15	
	PC Lime	PL3, PL4			50	65	

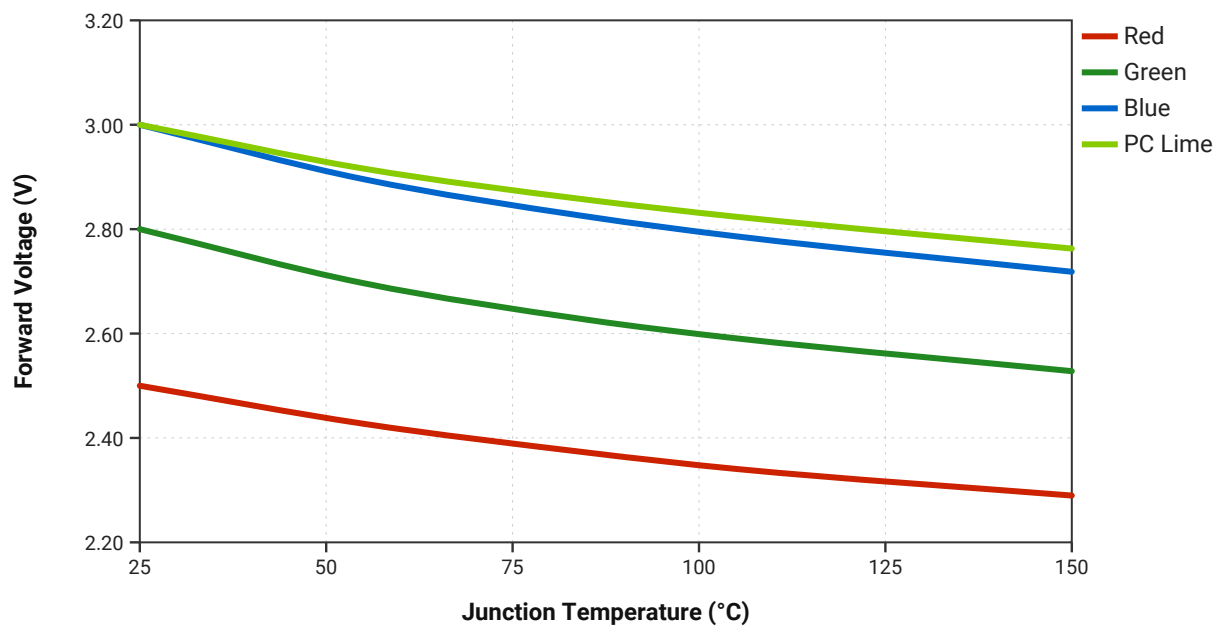
- Cree LED maintains a tolerance of $\pm 7\%$ on flux and power measurements, ± 0.005 on chromaticity measurements and ± 2 on CRI measurements.
- XLamp X21ABL LED order codes specify only a minimum flux bin and not a maximum. Cree LED may ship reels in flux bins higher than the minimum specified without advance notice.

RELATIVE SPECTRAL POWER DISTRIBUTION

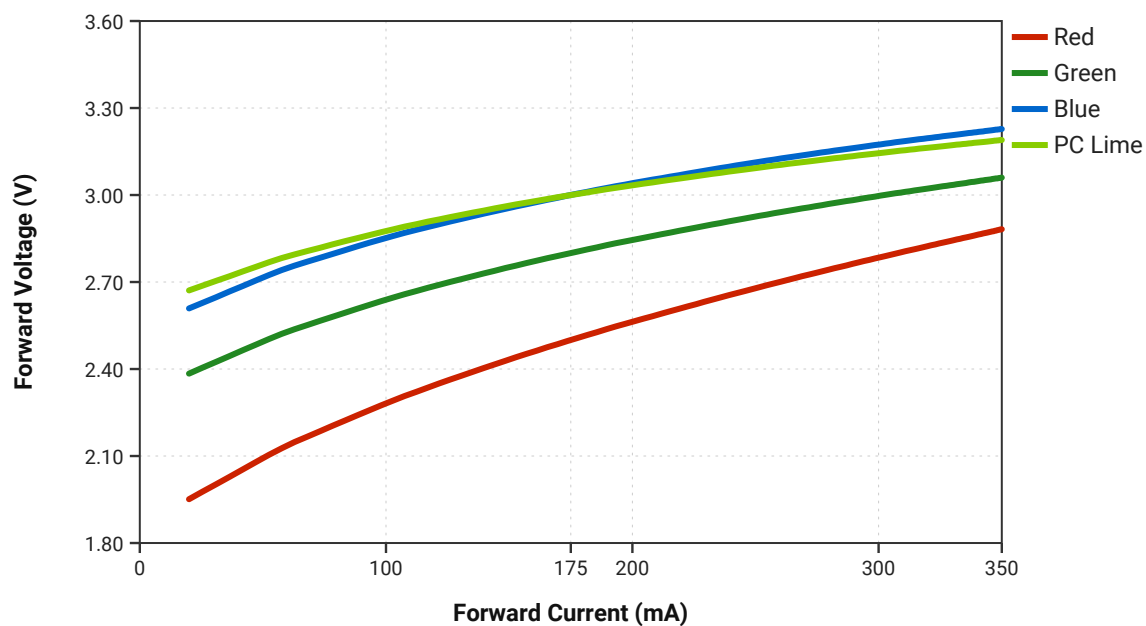


RELATIVE FLUX VS. JUNCTION TEMPERATURE – X21ABL ($I_f = 175 \text{ mA}$)RELATIVE FLUX VS. FORWARD CURRENT – X21ABL ($T_j = 25^{\circ}\text{C}$)

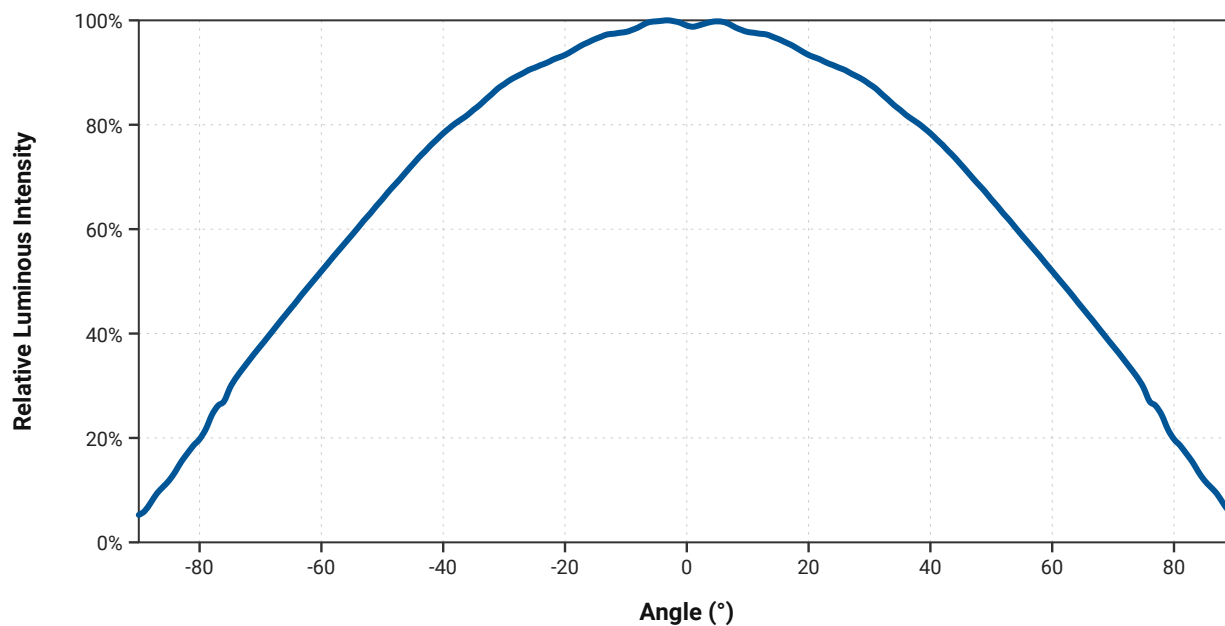
FORWARD VOLTAGE VS. JUNCTION TEMPERATURE – X21ABL ($I_F = 175 \text{ mA}$)



FORWARD VOLTAGE VS. FORWARD CURRENT – X21ABL ($T_J = 25 \text{ °C}$)



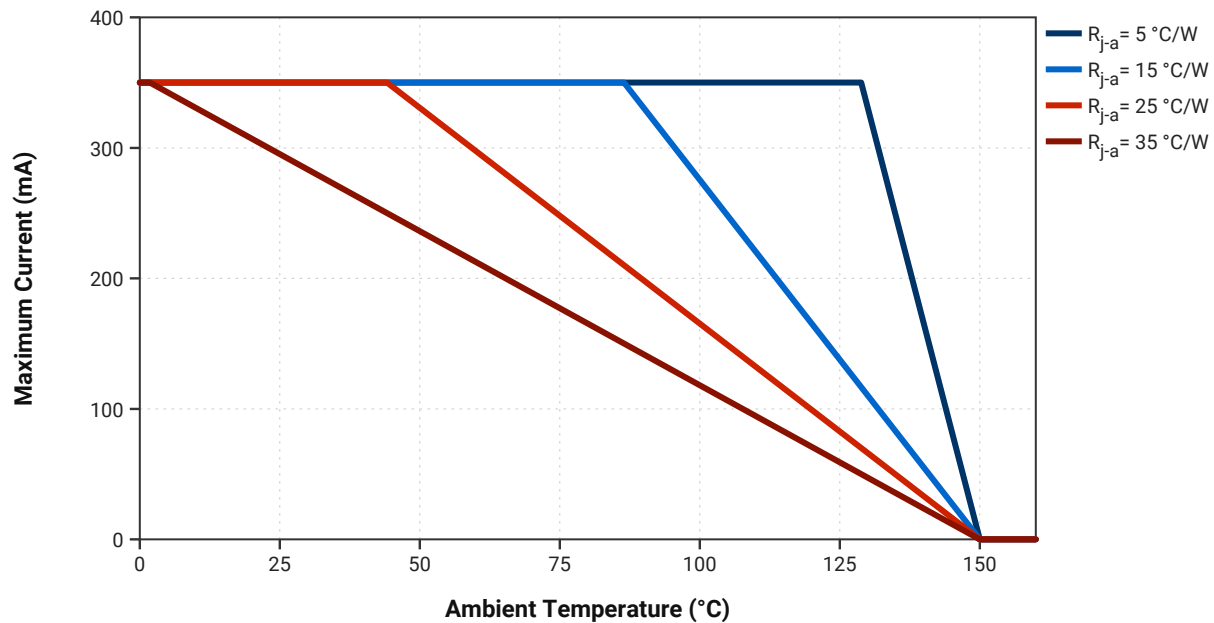
TYPICAL SPATIAL DISTRIBUTION



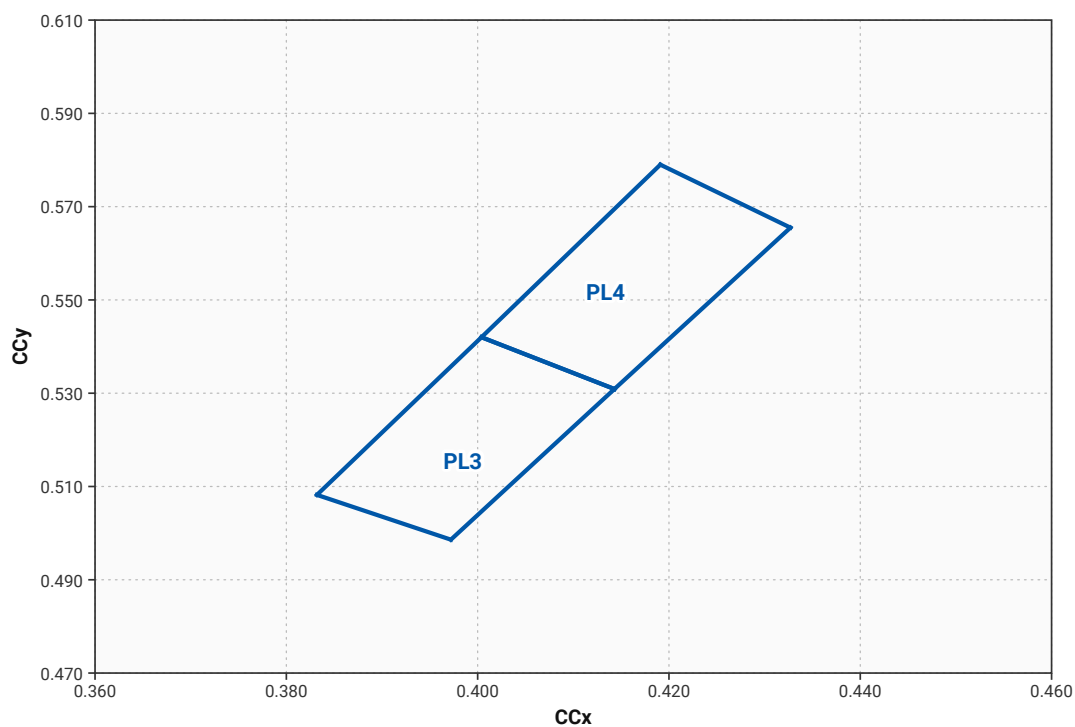
THERMAL DESIGN

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.

Please refer to the Characteristics table on [page 48](#) for this product's thermal resistance and maximum junction temperature.



CHROMATICITY BINS – PC LIME



Bin	x	y
PL3	0.3972	0.4986
	0.3832	0.5082
	0.4004	0.5420
	0.4143	0.5309
PL4	0.4004	0.5420
	0.4143	0.5309
	0.4327	0.5655
	0.4191	0.5790

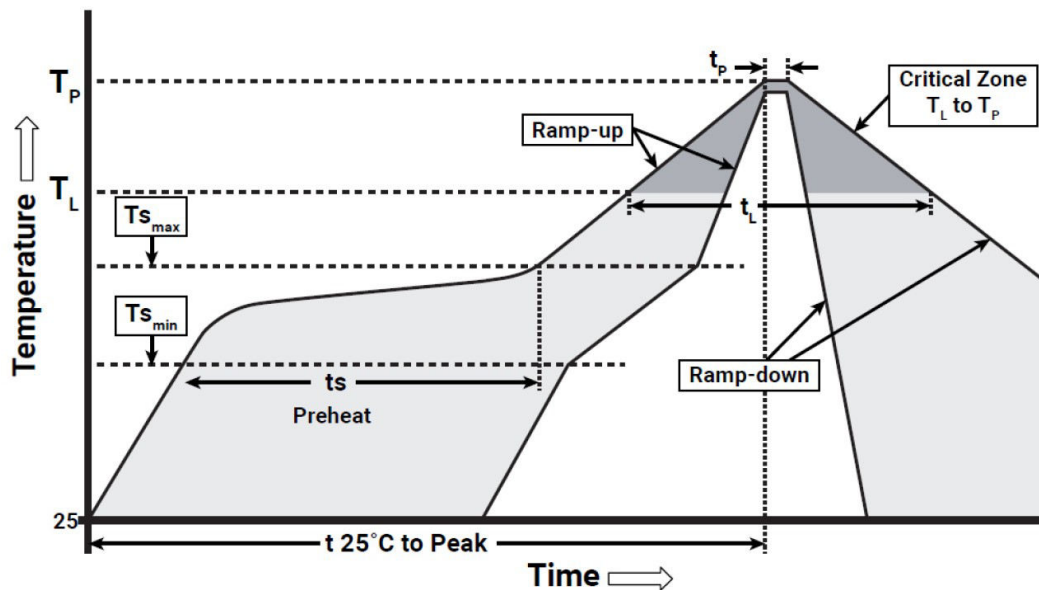
PERFORMANCE GROUPS

XLamp X21A PC Lime LEDs tested for luminous flux are placed into one of the following luminous flux groups.

Group Code	Min Luminous Flux (lm)	Max Luminous Flux (lm)
1	20	40
2	40	60
3	60	80
4	80	100

REFLOW SOLDERING CHARACTERISTICS

In testing, Cree LED has found XLamp X21A LEDs to be compatible with JEDEC J-STD-020C, using the parameters listed below. As a general guideline, Cree LED 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.



Profile Feature	Lead-Free Solder
Average Ramp-Up Rate (T _{smax} to T _p)	1.2 °C/second
Preheat: Temperature Min (T _{smin})	120 °C
Preheat: Temperature Max (T _{smax})	170 °C
Preheat: Time (t _{smin} to t _{smax})	65 - 150 seconds
Time Maintained Above: Temperature (T _L)	217 °C
Time Maintained Above: Time (t _L)	45 - 90 seconds
Peak/Classification Temperature (T _p)	235 - 245 °C
Time Within 5 °C of Actual Peak (t _p)	20 - 40 seconds
Ramp-Down Rate (max)	2 °C/second
JEDEC Compatible	Yes

ORDER CODE DESCRIPTION

SSSPPP - KL - TTTT - 0000RFGABCDD

SSS - Product Family		PPP - Series		K - Configuration	
X21	X21	ACL	Red, Green, Royal Blue, White	H	High Intensity
L - Reel Size		ACB	Red, Green, Blue, White	0000 - Internal Code	
0	Default packaging by part	APA	Red, Green, Royal Blue, PC Amber	Internal / product-defined	
R - CRI		ABA	Red, Green, Blue, PC Amber	ABC - Dominant Wavelength	
B	70 minimum	APL	Red, Green, Royal Blue, PC Lime	A	Red
H	80 minimum	ABL	Red, Green, Blue, PC Lime	B	Green
0	No CRI for PC Amber, PC Lime	TTTT - Internal Code		C	Blue or Royal Blue
DD - Chromaticity Kit		FG - Minimum Flux			
See performance groups		Internal / product-defined			

BIN CODE DESCRIPTION

SSSPPP - K - FGHIJ - 0000 - ABCDDDRZZZZ

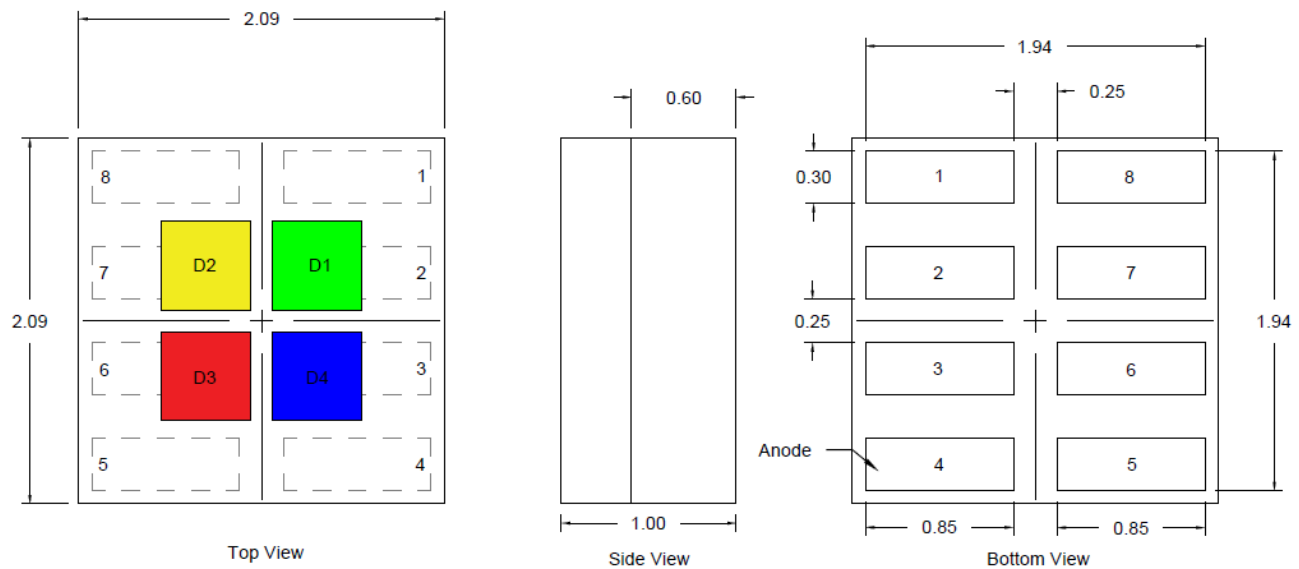
SSS - Product Family		PPP - Series		K - Configuration	
X21	X21	ACL	Red, Green, Royal Blue, White	H	High Intensity
		ACB	Red, Green, Blue, White		
FGHIJ - Flux Bin		APA	Red, Green, Royal Blue, PC Amber	ABC - Dominant Wavelength	
See performance groups		ABA	Red, Green, Blue, PC Amber	A	Red
DDD - Chromaticity Kit		APL	Red, Green, Royal Blue, PC Lime	B	Green
See performance groups		ABL	Red, Green, Blue, PC Lime	C	Blue or Royal Blue
		0000 - Internal Code		ZZZZ - Internal Code	
		Internal / product-defined		Internal / product-defined	
		R - CRI			
		B	70 minimum		
		H	80 minimum		
		0	No CRI for PC Amber, PC Lime		

MECHANICAL DIMENSIONS

The red diode (labeled D3) is used for orientation purposes when describing the mechanical dimensions and circuit diagram.

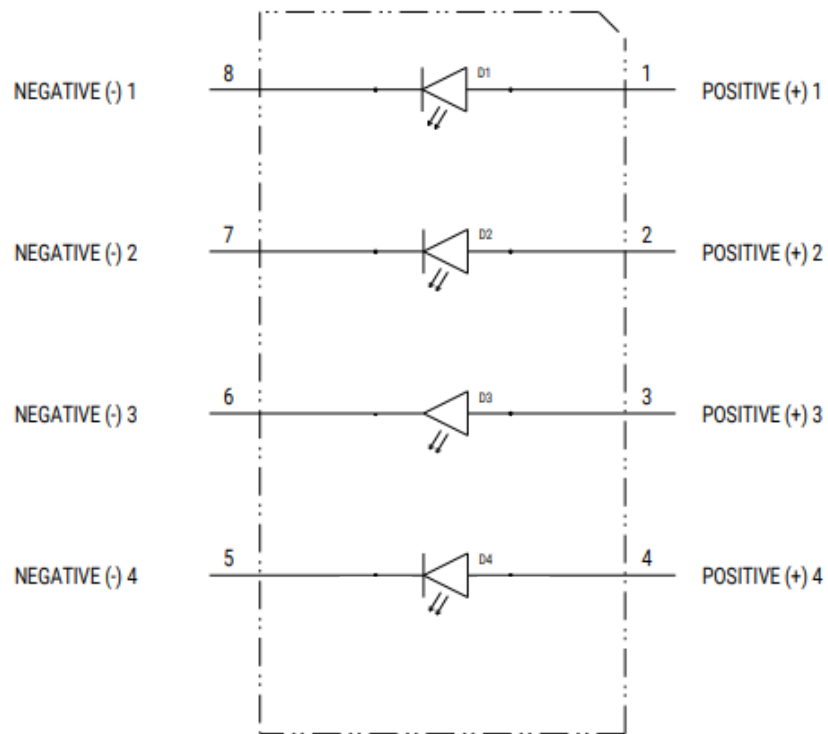
Applies to: X21ACL, X21ACB, X21APA, X21ABA, X21APL, X21ABL

All measurements are ± 0.13 mm unless otherwise indicated.



CIRCUIT DIAGRAM

COLOR:
D1: GREEN
D2: WHITE
D3: RED
D4: BLUE



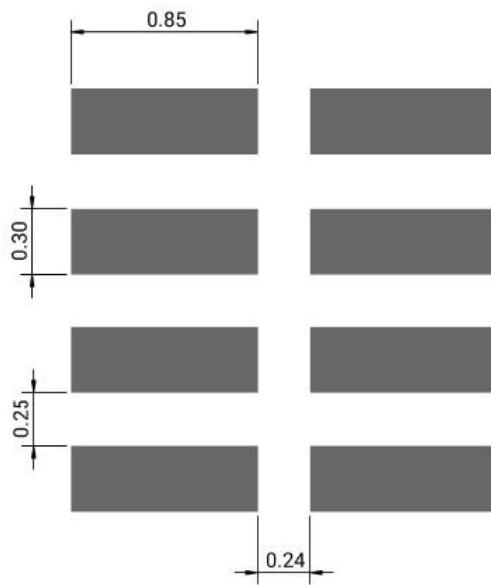
MECHANICAL DIMENSIONS (CONTINUED)

Color	Width / Length	Height	Substrate Thickness	Lens Radius / Lens Height
X21ACL	2.10	1.00	0.38	0.00
X21ACB	2.10	1.00	0.38	0.00
X21APA	2.10	1.00	0.38	0.00
X21ABA	2.10	1.00	0.38	0.00
X21APL	2.10	1.00	0.38	0.00
X21ABL	2.10	1.00	0.38	0.00

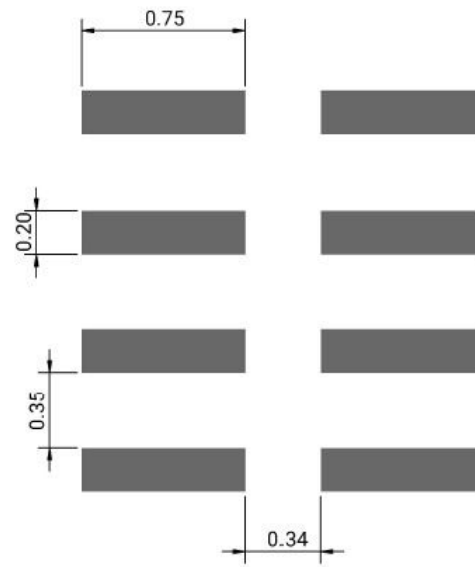
* Dimensions are +/- 0.13 unless otherwise noted.

MECHANICAL DIMENSIONS (CONTINUED)

PCB / Stencil Drawing



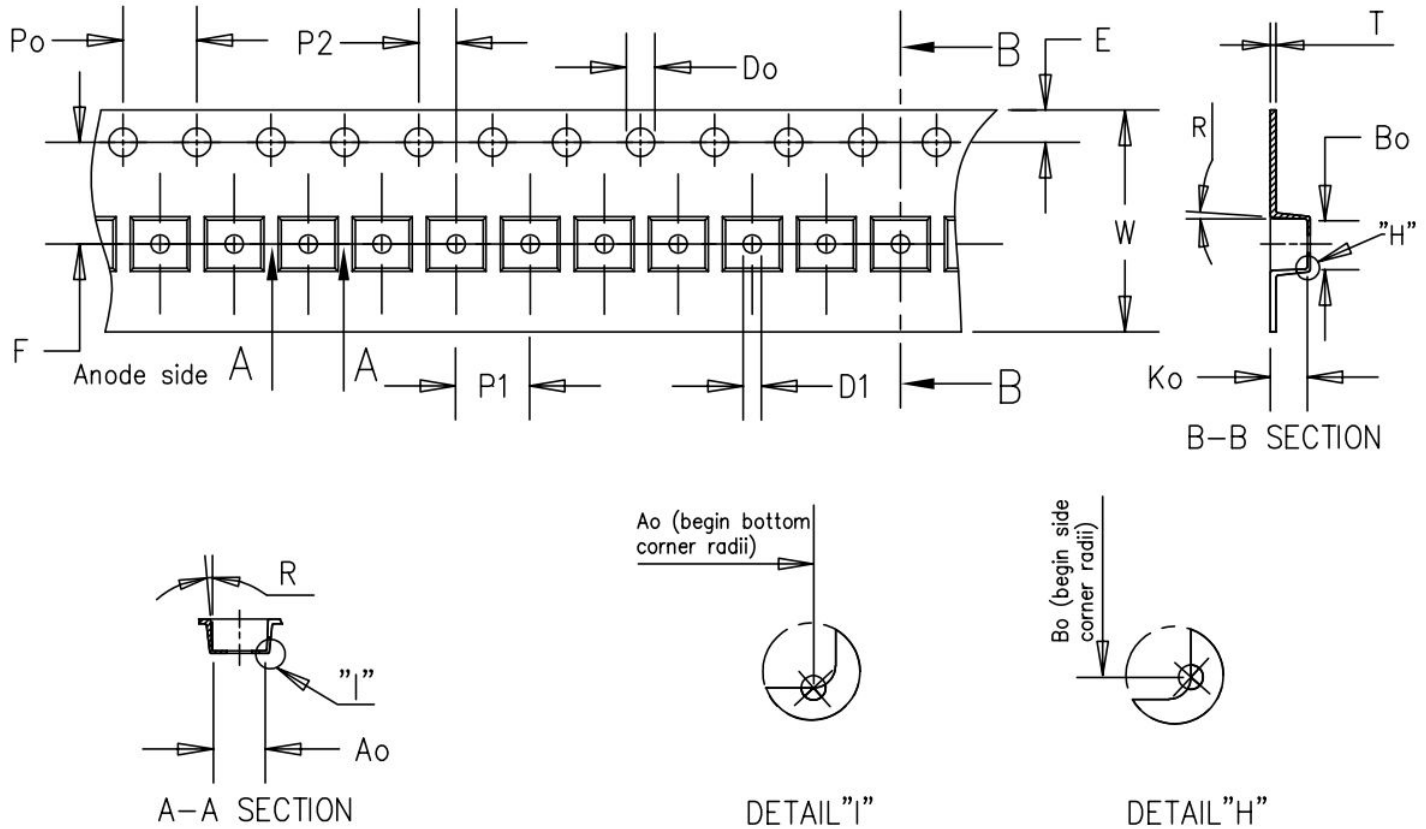
Recommended PCB Footprint



Recommended Stencil Openings

TAPE AND REEL

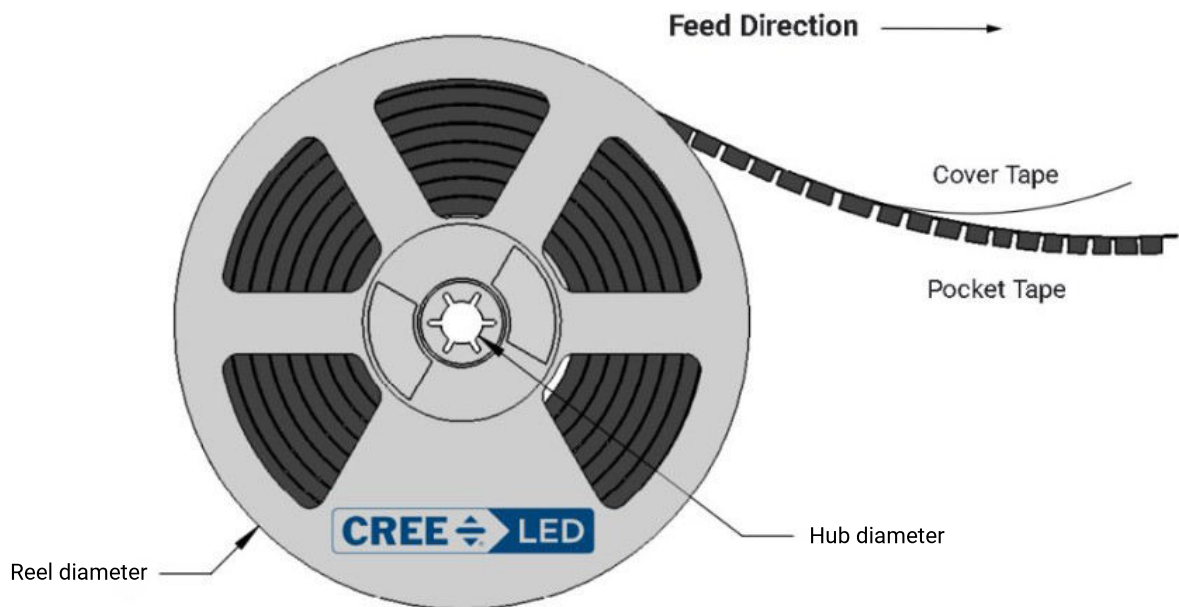
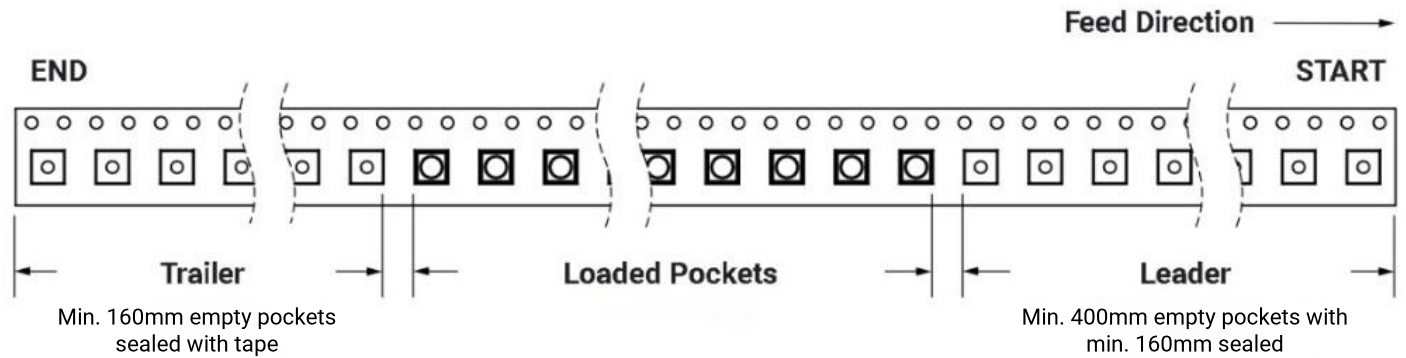
All Cree LED carrier tapes conform to EIA-481D, Automated Component Handling Systems Standard. Except as noted, all dimensions are in mm, and measurement tolerances unless indicated otherwise: .xx = ± 0.15 mm.



The following tape parameters apply to: X21ABA, X21ABL, X21ACB, X21ACL, X21APA, X21APL

A_0	B_0	K_0	P_0	P_1	P_2	T	E	F	D_0	D_1	W
2.35	2.35	1.20	4.00	8.00	2.00	0.30	1.75	3.50	1.50	1.00	8.00

REEL SPECIFICATIONS

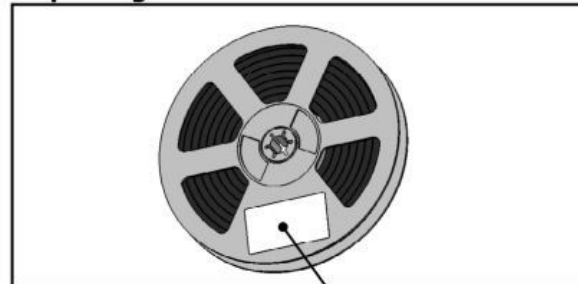


The following reel specifications apply to: X21ABA, X21ABL, X21ACB, X21ACL, X21APA, X21APL

Parameter	Value
Hub Diameter	13 mm
Reel Diameter	7 inches
Pockets per Reel (Loaded)	1000
Leader (mm)	400
Trailer (mm)	160

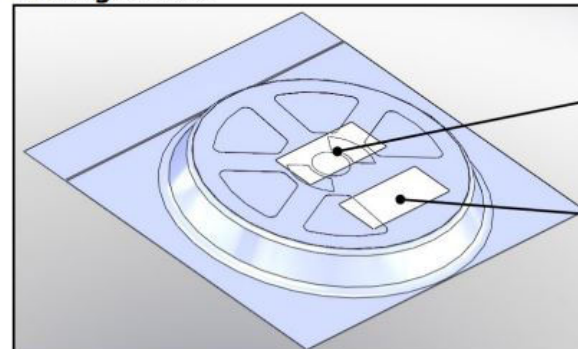
PACKAGING

Unpackaged Reel



Label with Cree LED Bin Code, Quantity, Reel ID

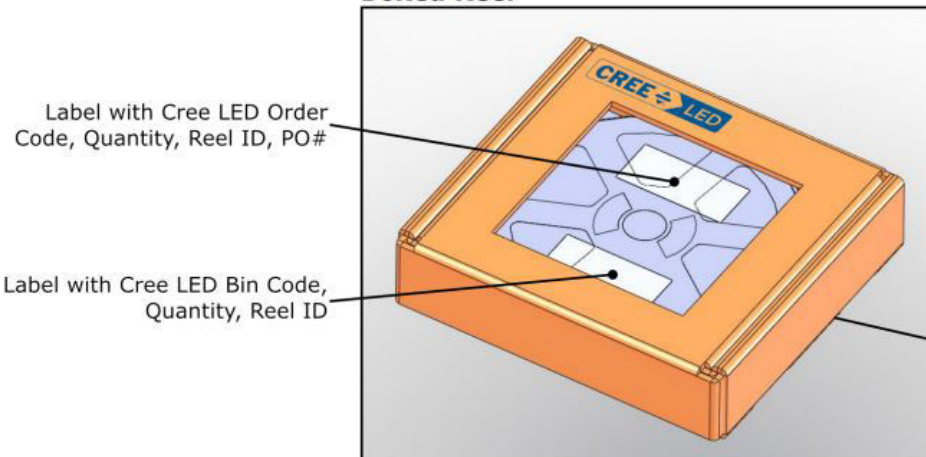
Packaged Reel



Label with Cree LED Order Code, Quantity, Reel ID, PO#

Label with Cree LED Bin Code, Quantity, Reel ID

Boxed Reel



Label with Cree LED Order Code, Quantity, Reel ID, PO#

Label with Cree LED Bin Code, Quantity, Reel ID

Patent Label (on bottom of box)

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 LED'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 LED applies to ensure long-term reliability for XLamp LEDs and details of Cree LED's pre-release qualification testing for XLamp LEDs.

Lumen Maintenance

Cree LED 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 LED'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 LED 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 X21A LEDs may be stored as MSL 1 per JEDEC J-STD-033, meaning they have unlimited floor life in conditions of $\leq 30^{\circ}\text{C}/85\%$ relative humidity (RH). Regardless of storage condition, Cree LED 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 LED representative or from the [Product Ecology](#) section of the Cree LED 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 LED representative to ensure 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.