Introduction

Purpose

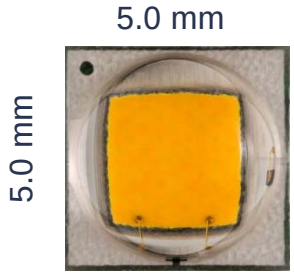
- Provide an overview of Cree XLamp XM-L2 LED

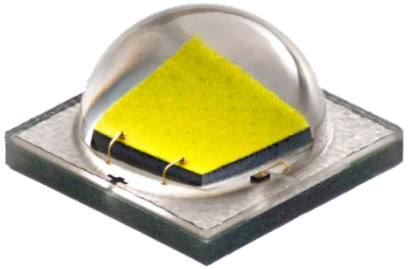
Objective

- Give a brief summary of XM-L2 performance
- Detail XM-L2 characteristics & features
- Compare XM-L2 versus the original XM-L
- Explain where XM-L2 fits in the XLamp Portfolio
- Quantify the value of the higher efficacy of XM-L2
- Highlight XM-L2 retrofit examples
- Review XM-L2 order codes including a cross-reference with XM-L

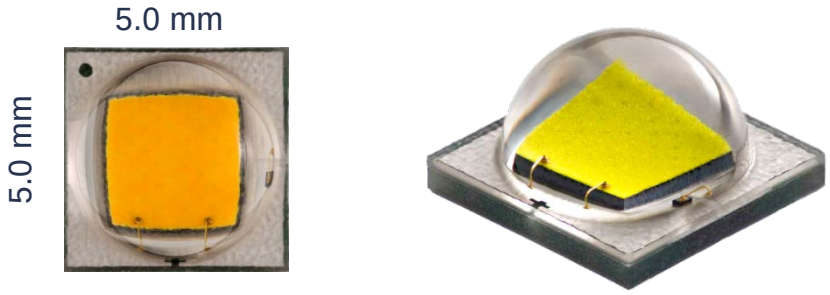
Content

- 11 slides
- 15 minutes





XLamp XM-L2 LEDs



Industry's highest performance single-die LED

- Up to 186 LPW @ 1W; Up to 1198 lm @ 10W

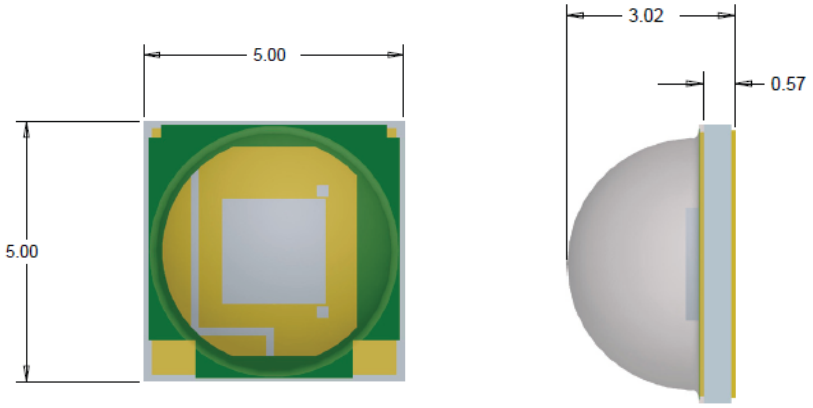
Protects investment in the XM-L package

- Better performance, no redesign: same package
- LM-80 successor to XLamp XM-L

Based on Cree's SC³ technology platform

XLamp XM-L2 Characteristics & Features

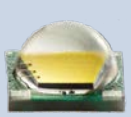
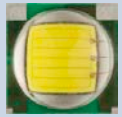
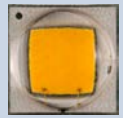
	XM-L2
Max Current	3000 mA
Thermal Resistance	2.5 ºC/W
Viewing Angle	125º
Typ. Vf @ 85 C	2.85 V



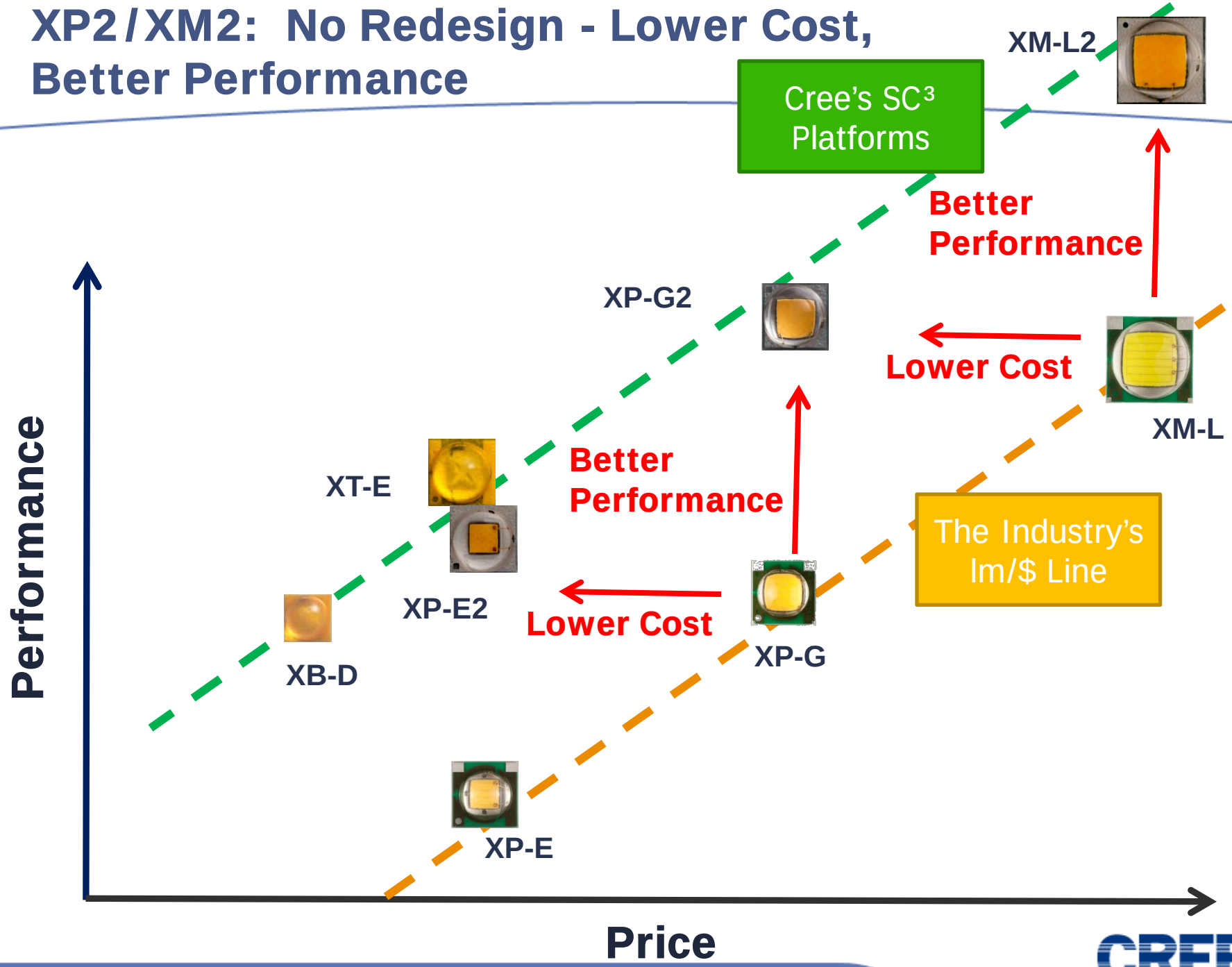
- **Binned at 85°C junction temperature**
- **Unlimited floor life at ≤30ºC / 85% RH**
- **Electrically neutral thermal path**
- **Reflow solderable JEDEC J-STD-020C**
- **RoHS & REACH compliant**

Standard White	Cool White	Neutral White	Warm White
CCT (K)	8,300K – 5,000K	5,000K – 3,700K	3,700K – 2,600K
CRI (typ)	65	75	80
Minimum CRI Options		4,200K – 3,700K	3,700K - 2,600K
		80 min	80, 85, 90 min

XLamp XM-L/XM-L2 Comparison

Product Comparison		
	XM-L (Typical)  	XM-L2 (Typical) 
Flux output (3000K), 85°C	192	**224 (+17%)**
Flux output (4000K), 85°C	225	**252 (+12%)**
Flux output (5700K), 85°C	250	**275 (+10%)**
Viewing Angle	125	
Thermal Resistance	2.5°C/W	
Color Temperatures	2700K-7000K, ANSI/16	
Vf (DC), 85°C, 700mA	2.8V	
Footprint (mm)	5.0 x 5.0mm	
Lens radius (mm)	2.19mm	
Lifetime	>50,000 hrs	

XP2/XM2: No Redesign - Lower Cost, Better Performance

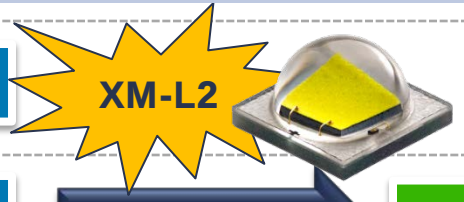


Breaking Barriers for High Power White LEDs

	R&D Result	High Volume	$ Optimized
254 LPW	2012		
231 LPW	2011		
208 LPW	2010		
186 LPW	2009	2012	2012
160 LPW	2008	2010	2012
131 LPW	2006	2009	2011
100 LPW		2008	2010
90 LPW		2007	2009

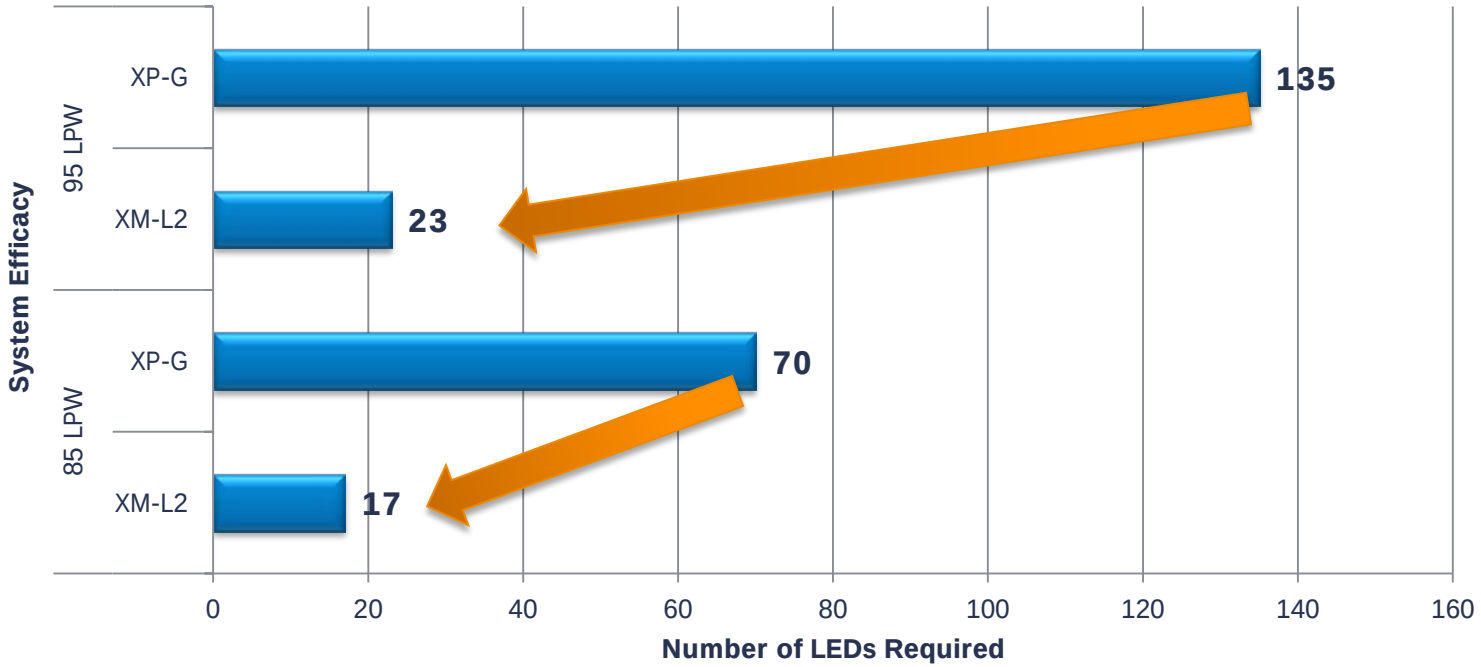
Value of high efficacy LEDs:

- Fewer LEDs & optics = lower cost
- Enables higher efficacy systems
- Enables new applications



Value Of High Efficacy LEDs: Lower Cost

Fewer LEDs & optics for the same system



- **Enables high lumen 100+ LPW systems**
  - **Previously required too many LEDs to be feasible**

Value Of High Efficacy LEDs: New Applications

50W MR16 @ 5W using a single-die LED!

Narrow MR16 (3000K, 80 CRI)	Beam Angle	CBCP	Single Source?	Lumens	Power	Efficacy
Lamp Based on 1 XLamp XM-L2*	**9°**	**7,800 cd**	**Yes**	369 lm	**5W**	75 LPW
	17°	4,500 cd	Yes	528 lm	9W	59 LPW
Competitor #1	15°	3,560 cd	No	435 lm	10W	44 LPW
Competitor #2	25°	2,325 cd	No	525 lm	8W	65 LPW
Competitor #3	15°	3,700 cd	No	390 lm	7W	56 LPW
Competitor #4	14°	4,050 cd	Yes	N/A	11W	N/A

* Calculated results: Tsp=70°C, 90% Optical & 85% Elect. Efficiency

- **Smallest optical source = tightest beam**
- **Highest efficacy LED = lowest power consumption**

XLamp XM-L2 → XM-L Cross-Reference

(Standard White)

XLamp XM-L2 Order Codes (@ 700 mA, 85°C)							
XM-L2 Flux @ 85°C	Cool White	5000K	4000K	3500K	3000K	2700K	XM-L Flux @ 25°C
U2	300						
T6	280	280					U3 320
T5	260	260	260				U2 300
T4		240	240	240			T6 280
T3			220	220	220		T5 260
T2					200	200	T4 240
S6						182	T3 220
							T2 200
							S6 182

Minimum luminous flux @ 700mA, 85°C (lm)

Example: **XM-L2 T5 flux bin** (260 lm @ 700 mA, 85°C) has similar light output to **XM-L U2 flux bin** (300 lm @ 700 mA, 25°C) at the same operating condition

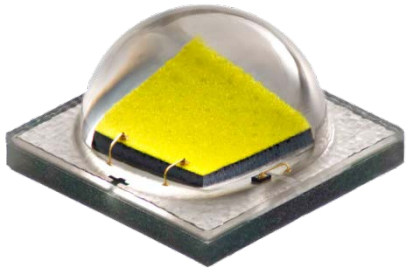
XLamp XM-L White Standard Order Codes

For a more accurate comparison between Cree products, Cree recommends using the Product Characterization Tool (PCT)

XLamp XM-L2 – Summary

XLamp XM-L2 LED

- Industry's highest performing single die LED
- Commercial availability of 186 LPW
- Reaffirms Cree's record turning R&D results to commercially available products
- 10-17% brighter than XM-L
- Investment protection for XM designs
- Unique combination of very high efficacy + high lumen output @ very high drive currents
- Delivering up to 1198 lumens at 116 LPW at 10W



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