



Presentation Bridgelux Seminaire Angers, 15 Octobre 2013

15/10/2013

Leading developer of technologies and solutions for the multi-billion dollar SSL industry

Company Overview

■ Technology innovation

- Founded in 2002
- LED die products in 2004
- LED COB arrays introduced in 2009
- GaN-on-Si commercial ramp in 2013

■ World class R&D

- Market leading LED Epi and processing technology
- World leader in GaN-on-Si technology development
- LED chip technology, COB LED array
- Over 550 patents filed or issued globally

■ Key Strategic Partnerships

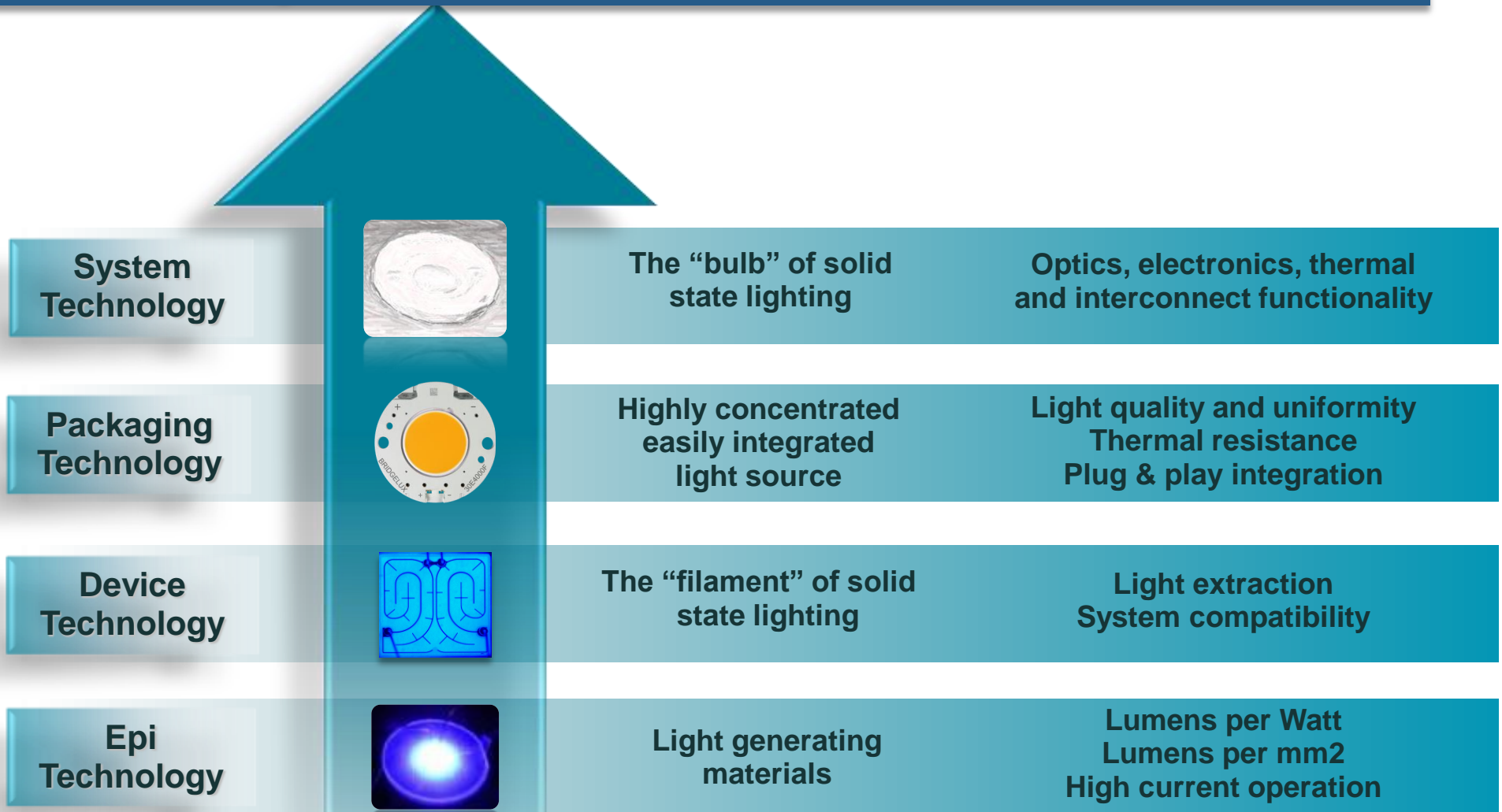
- Toshiba, Epistar: Chip
- Molex: Package

HQ – Livermore, California, USA

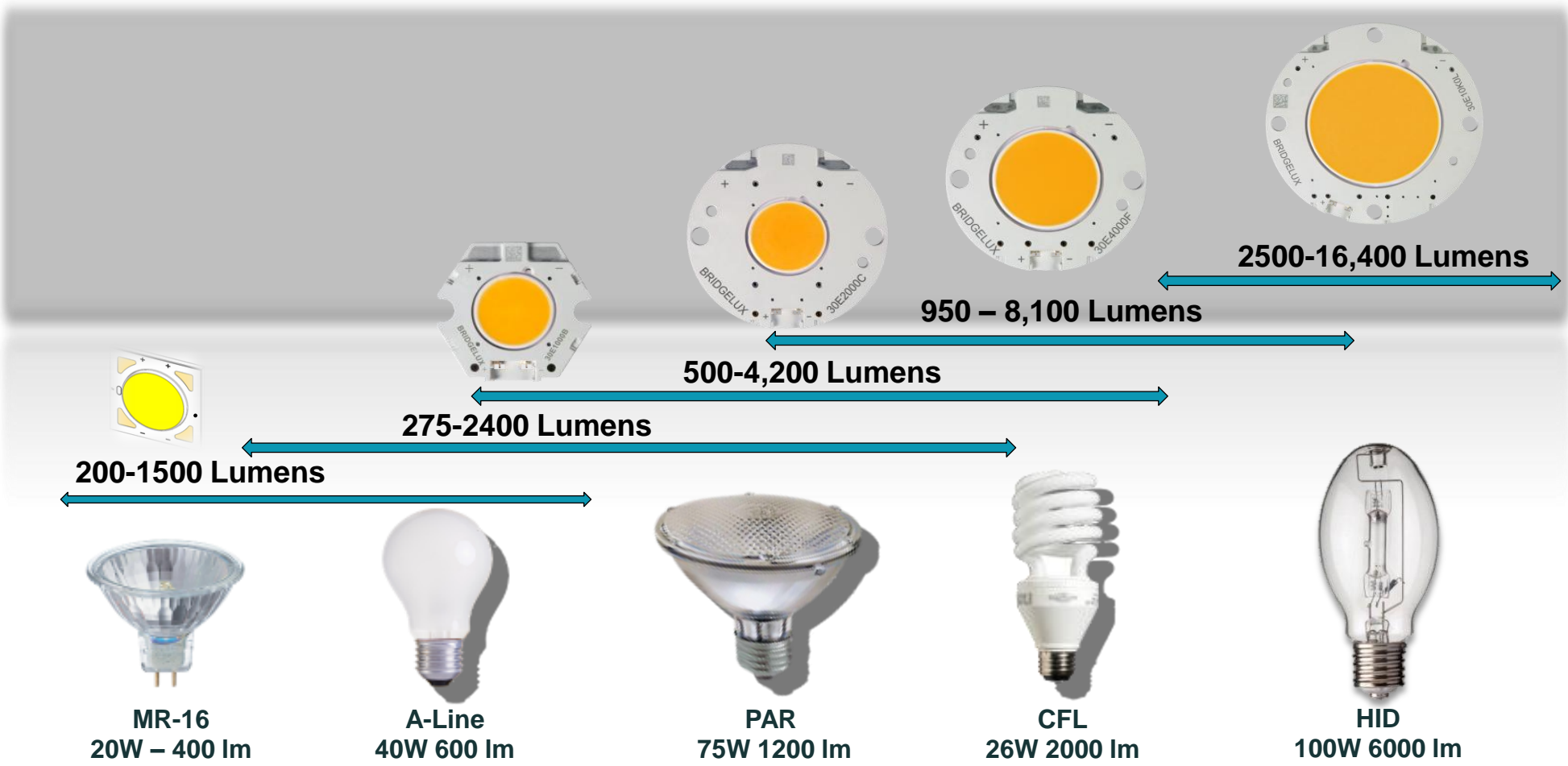


Bridgelux is one of the largest privately-held LED companies in the world.

Vertical Integration Enables Innovation and Cost Effective Solutions



Multiple COB Options to Displace Traditional Lighting

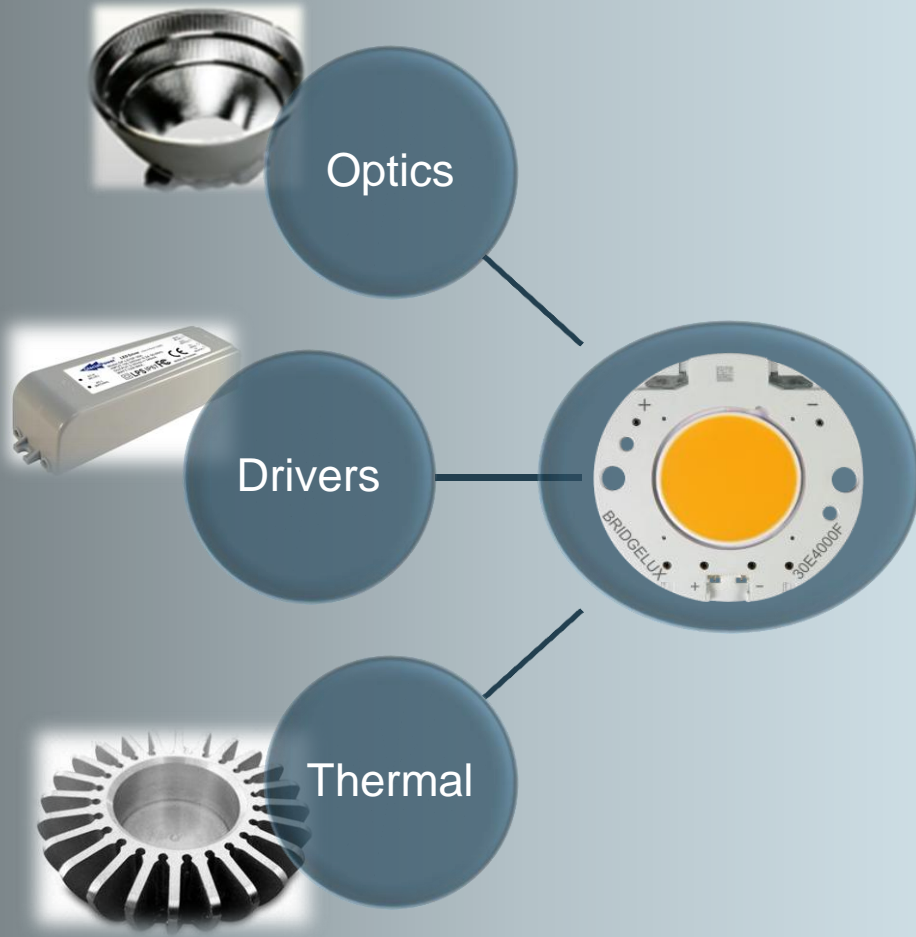


High Quality Light Replacement Options for in Incandescent, Halogen, Fluorescent and HID

Bridgelux Eco-System

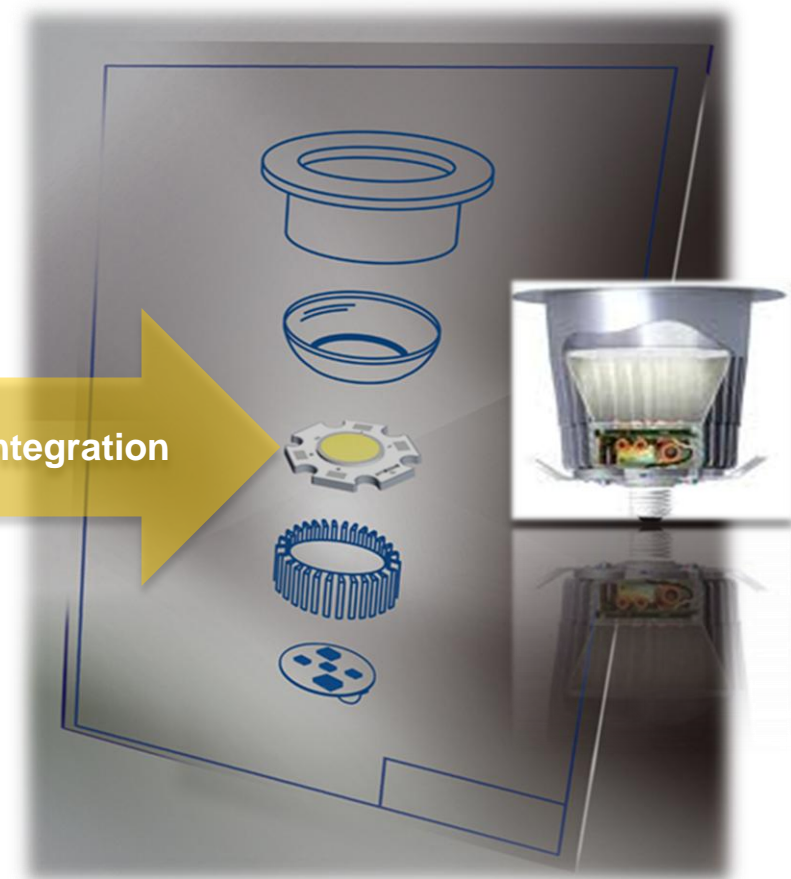
Reducing Costs, Accelerating Time-to-Market

Worldwide Partners + Bridgelux Light Sources

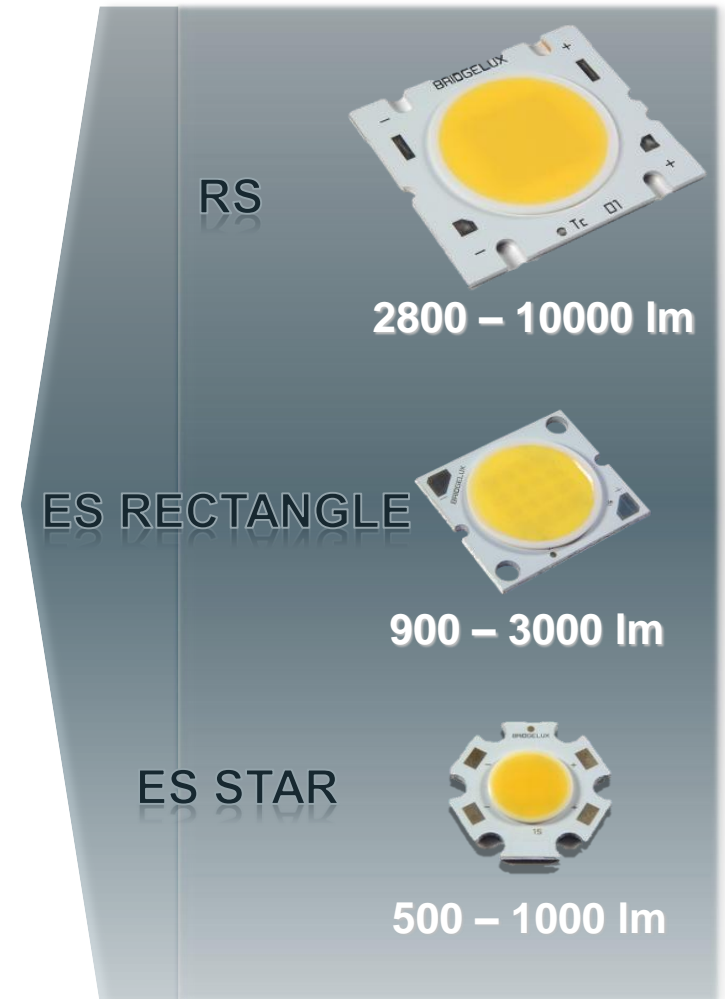


Customer Product Development




System Integration



- **Wide range of light sources**
 - Three mechanical form factors
 - Wide range of lumen outputs
 - 500 to 10,000 lumens
- **Fully engineered and optimized platform**
 - Consistent optical and mechanical properties
 - Thermally optimized for reliability
- **Color (CCT) options**
 - 2700K, 3000K, 3500K, 4000K, 5000K and 5600K
 - 3 SDCM standard for 2700K – 4000K
- **Color Quality (CRI) options**
 - 90 CRI option for 2700K and 3000K with R9 >50
 - 97 CRI for stunning realism
- **Fully qualified and reliability proven**
 - Complete LM80 data for all form factors



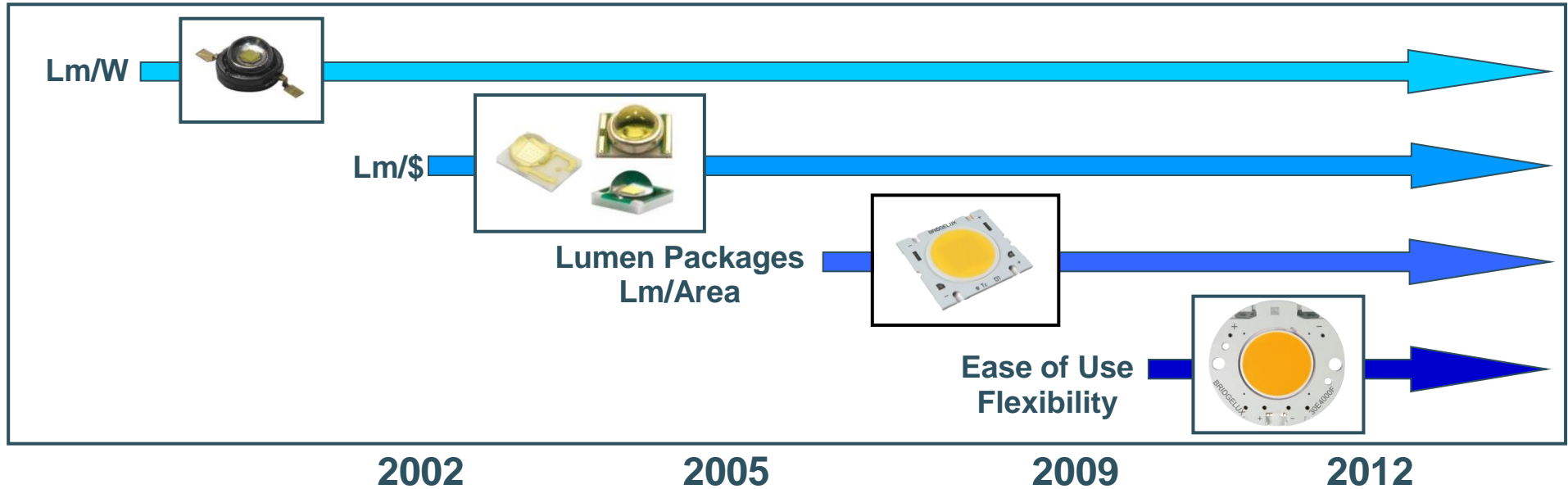
The Quantity of Light Required for Lighting

		Hot Lumen Performance Options		
Nominal CCT	CRI (min)	ES SERIES		RS SERIES
				
2700K 3000K	80	540 lm	900 lm	2800 lm
	90	740 lm	1320 lm 2100 lm	4300 lm 6900 lm
3500K 4000K	70	500 lm	980 lm	3100 lm
	80	860 lm	1430 lm 2250 lm	5000 lm 7800 lm
5000K 5600K	70	700 lm	1180 lm	3580 lm
		1000 lm	1725 lm 2760 lm	5575 lm 8800 lm

Enabling Innovation in Luminaire Design

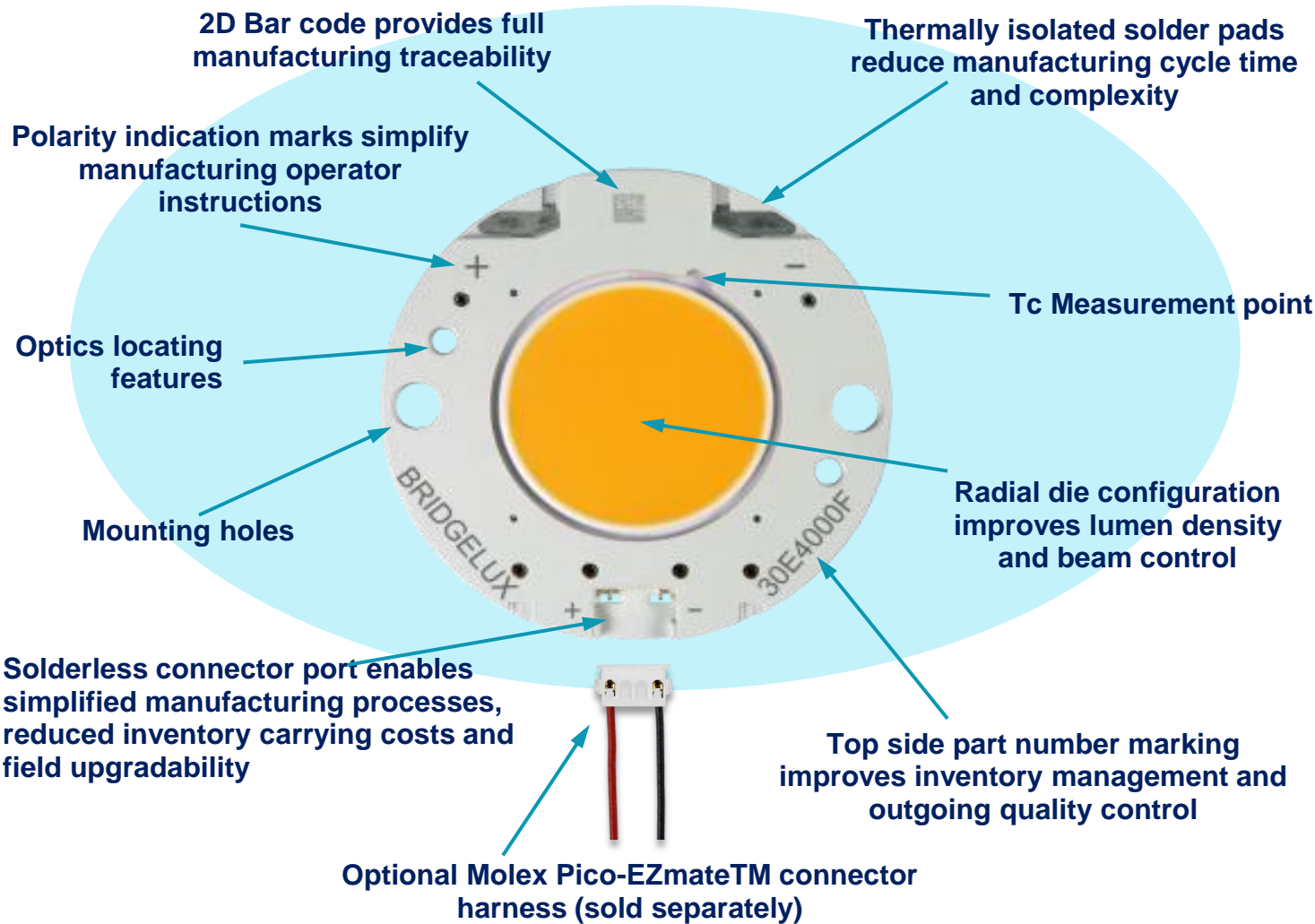


The Evolution of SSL Industry Needs



- Technology and metrics of merit have evolved over the past decade
 - New metrics in addition to prior metrics of merit
- All metrics are important to enable mass adoption
- Bridgelux is focused on addressing ease of use with Vero
 - While still delivering upon lm/W, lm/\$ and lm/area market requirements

Vero: Next Generation Package Technology



Best in class efficacy

Broadest lumen portfolio

Revolutionary connectivity

Optimized for OEM design flexibility

Vero is an example of how Bridgelux's robust product roadmap enables customers to improve their designs

Complete application coverage with limited form factors and SKUs

- Star form factor for smaller LOP applications
- 36mm form factor with two LES options delivering 500 to 8,200 lumens
- Largest form factor 50mm
- High drive voltage at industry standard currents enables higher efficiency drivers



Vero 10
20mm OD
10mm LES
275-2,420 lm



Vero 13
36mm OD
13mm LES
500-4,400 lm



Vero 18
36mm OD
18mm LES
950-8,200 lm



Vero 29
50mm OD
29mm LES
2,500-16,300 lm

Notes: Lumen values are ranged from 2700K-5000K configurations

Flexibility to Meet Design Requirements



Vero 10

Vero 13

Vero 18

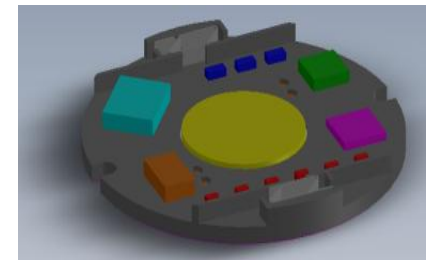
Vero 29

2700K 80/90/97 CRI
3000K 80/90/97 CRI
3500K 80 CRI
4000K 80 CRI
5000K 70 CRI

2700K 80/90 CRI
3000K 80/90 CRI
3500K 80 CRI
4000K 80 CRI
5000K 70 CRI

Next Generation LED Solutions Enable

- **Accelerated time to market**
 - Design in process simplified
- **Reduced Costs**
 - Streamlined supply chain
 - Reduced manufacturing costs
 - Improved inventory management
- **Enhanced design flexibility**
 - Broader range of operating conditions
 - Increased flux density enables miniaturized designs and enhanced optical control
- **Simplified adoption of technology enhancements**
 - Platform stability reduces market risk
 - Easy adoption of next generation technology
 - A path toward the future of smart lighting





Separation of “engine” from “body”

Allows improved design optimization

Redesigned COB architecture

Improved thermal uniformity enables higher current operation

Significantly higher lumen density for precision lighting

Molded plastic component enables new design features

3D Capable to imbed additional interconnect features

Enhanced traceability and inventory management features possible

Platform enables future generations with enhanced integration

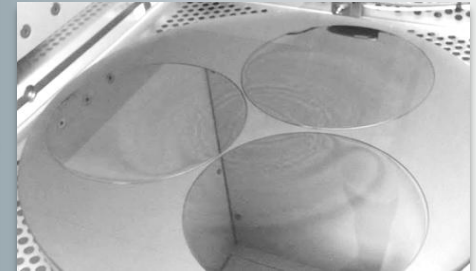
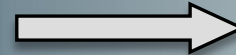
Flexibility In Design

- Separating the “Engine” from the “Body” enables new levels of flexibility
 - Variability in market needs can be more readily addressed
- Different features and can be included on different models while maintaining interface features
 - Simplifies design integration efforts to leverage improvements in technology



GaN on Si Value Proposition

1. Breakthrough in Manufacturing cost and scale using existing 8-inch silicon fabs



2. Thin-film LED performance, superior overdrive capability

3. Large wafers enable larger die, potential for increased integration



1000lm Array 2011



1000lm Array
2012



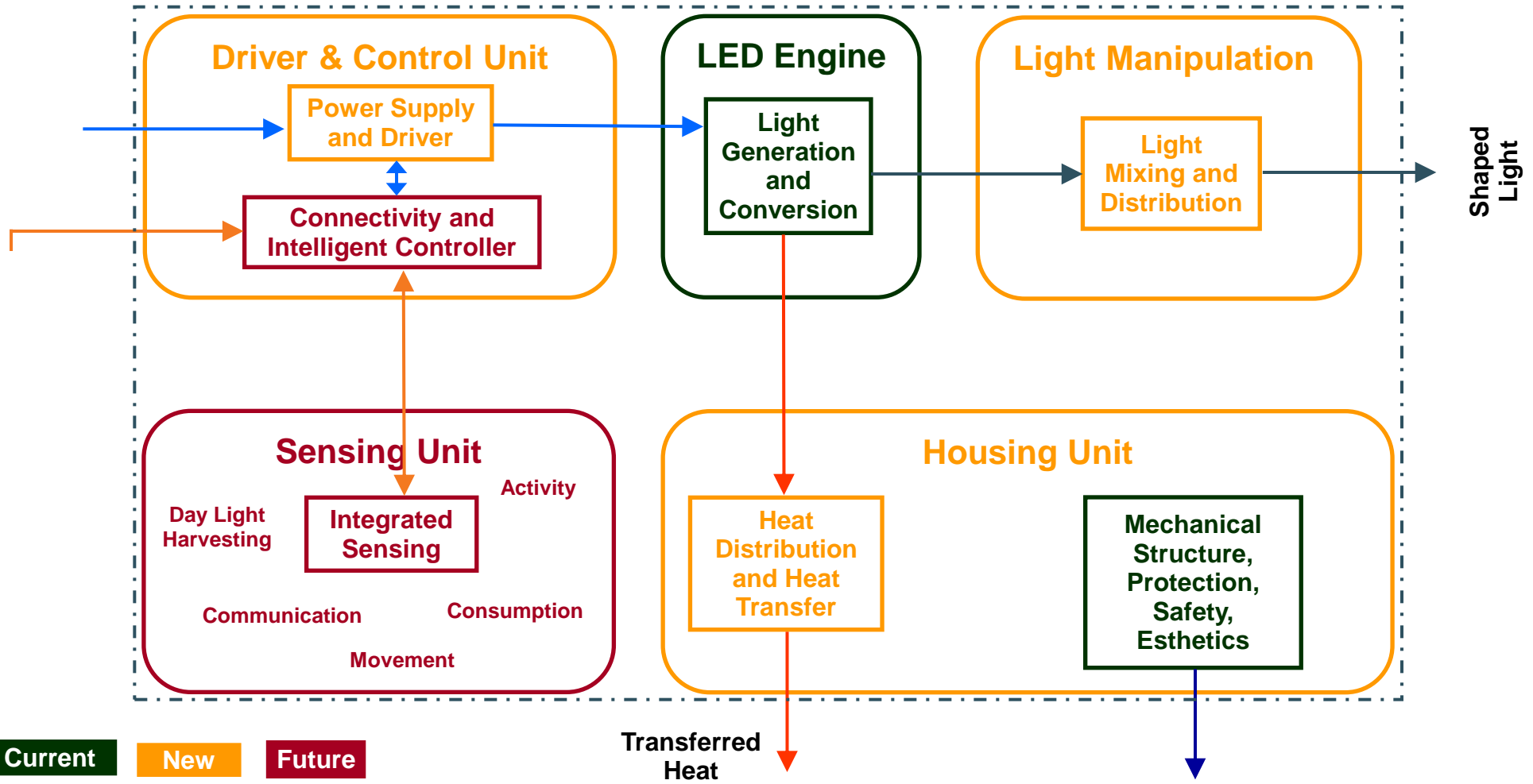
1000lm
GaN on Si

4. Will enable new product concepts and capabilities

New chip architectures, embedded features and functionality



Tomorrow's LED Package?



Wireless Mesh: Creating a Lighting Network

- Every fixture, sensor, and switch becomes part of a large-scale, high-reliability wireless communications network.
 - Proliferation of LED modules driving “*network backbone*” build-out.
 - Add non-lighting devices simply through open standards technology (ZigBee).



Conclusions

- LED Technology is maturing
- LED light source solutions have evolved based on market requirements
- LED performance is reaching a tipping point of “good enough” for many applications
- Luminaire OEMs are moving toward innovative designs
- Functional integration and convergence will expand the value proposition and enable new market opportunities
- Smart lighting is beginning to emerge



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BRIDGELUX®

The Magic of Light®

Thank you