

*“A Company of Good People”*

# Seoul Semiconductor

Aug, 2011



**SEOUL SEMICONDUCTOR**

- I. Company Introduction
- II. Product Line
- III. What Is Different?
- IV. Success Story



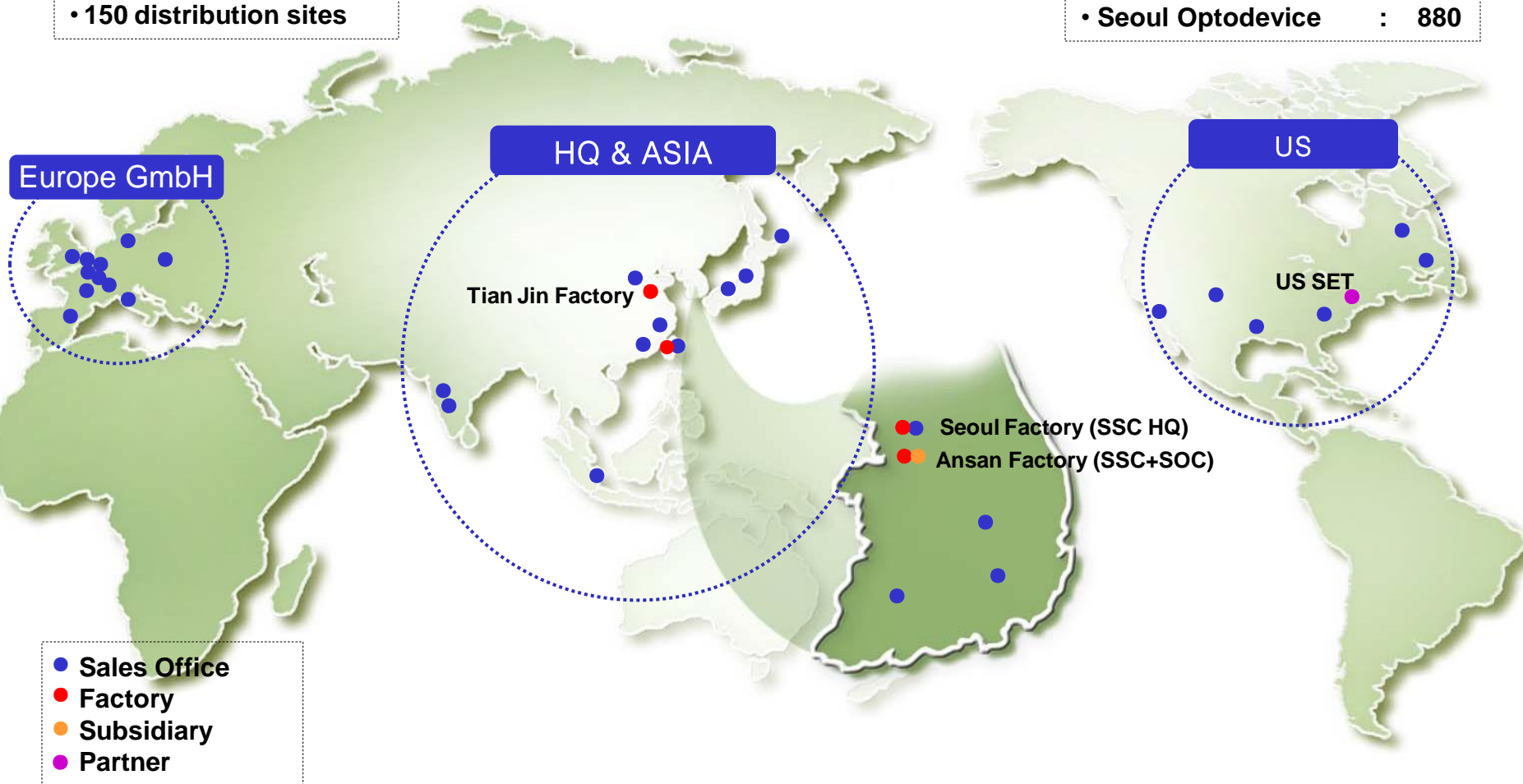
# I. Company Introduction

## 1. Global Production Platform & Sales Network

- 3 corporate locations
- 40 sales offices
- 150 distribution sites

<Korea>

- Seoul Semiconductor : 1,653
- Seoul Optodevice : 880



## 2. Company Information

Foundation	Feb. 24. 1992
Sales (FY2010)	<div style="text-align: right;">(unit: Million USD)</div> ✓ SSC 840 ✓ SOC 250
Employees	Total 2,533 ✓ SSC 1,653 ✓ SOC 880

“Plus growth during last 20 years”

Assets	<div style="text-align: right;">(unit: Million USD)</div> ✓ SSC 820 ✓ SOC 500
Aggregate value of listed stock	<div style="text-align: right;">(unit: Billion USD)</div> ✓ SSC : 2.4



### Global M/S

- ✓ Nikkei Business (2010) : World's No.3
- ✓ Strategies Unlimited (2010) : World's No.4
- ✓ IMS Report (2011) : World's No.4

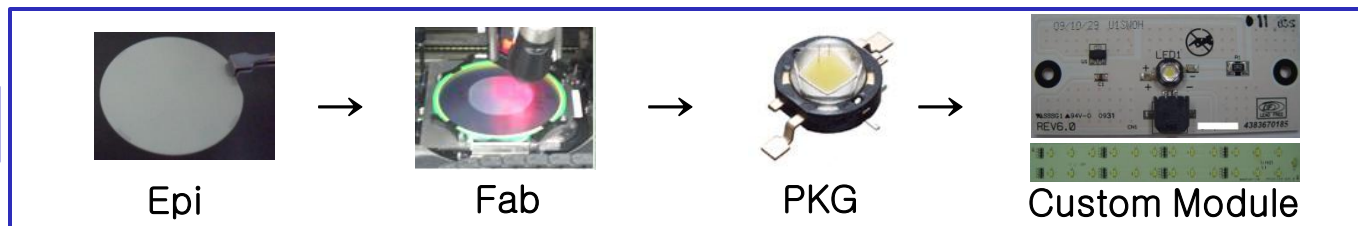
### 3. Factory information

<Korea>



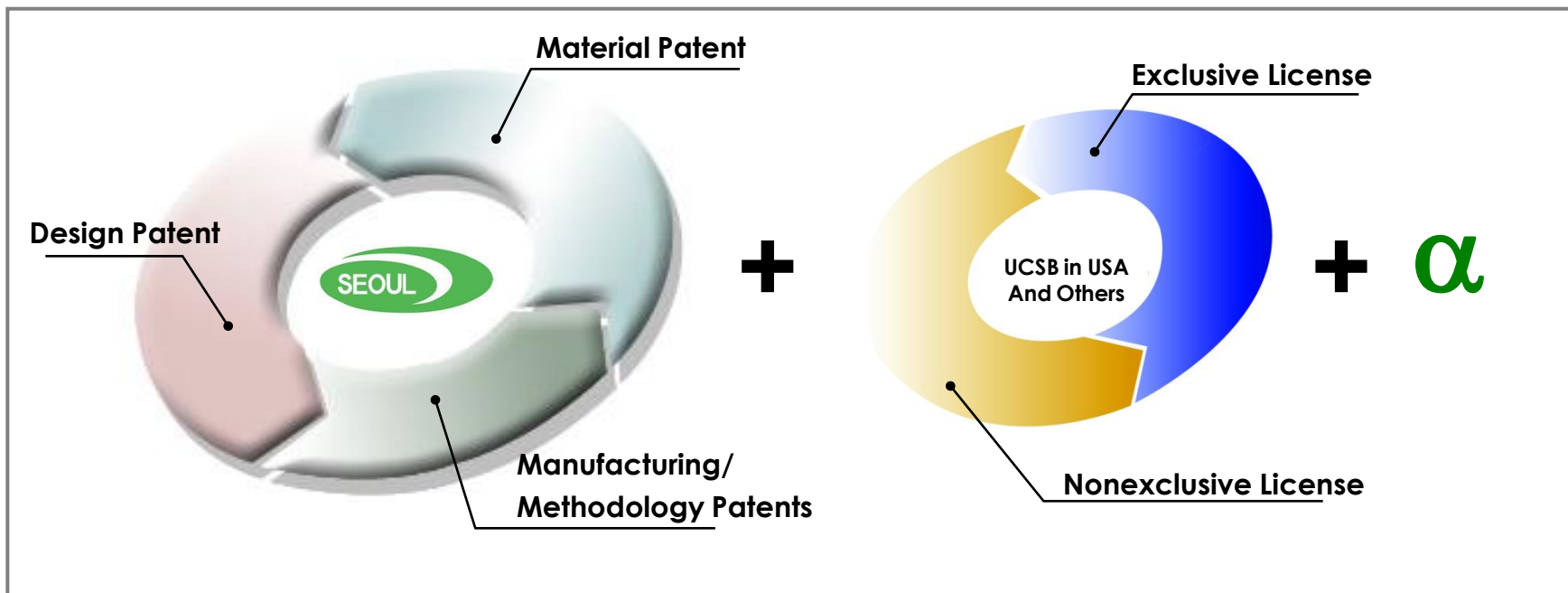
Korea	m <sup>2</sup>	Remark
Seoul	4,816	Chip LED/R&D/Sales
Ansan	82,183	MO-Line / FAB-Line / PKG Line / New factory : July 2011
Overseas	-	-
Total	86,999	

Vertical Integration



## 4. Patent Portfolio

Global Leading with over 6,000 patents

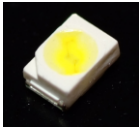







# II. Product Line


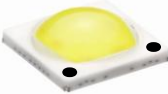

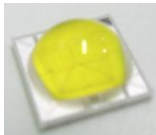


## 1. High Power

Product	Z5 	Z6 	Z7 	Z4 	Z1 	P5- II 
Size	3.5x3.5x2.0	7.0X9.0X1.0	7.0X9.0X3.2	5.0 X 5.0 X 2.2	5.0x6.0x1.2	5.0x6.0x1.0
Flux (lm)	115 85	70	420	102 lm /@1.02W	110	110
CRI	70 80	80	70	85	68	-
R9	-	-	-	65	-	-
R <sub>θ</sub>	9	4	5.5	4.3	14	R: 25 G: 25 B: 22 @ White Balance
LM80	OK	-	-	-	OK	-

## 2. Middle Power

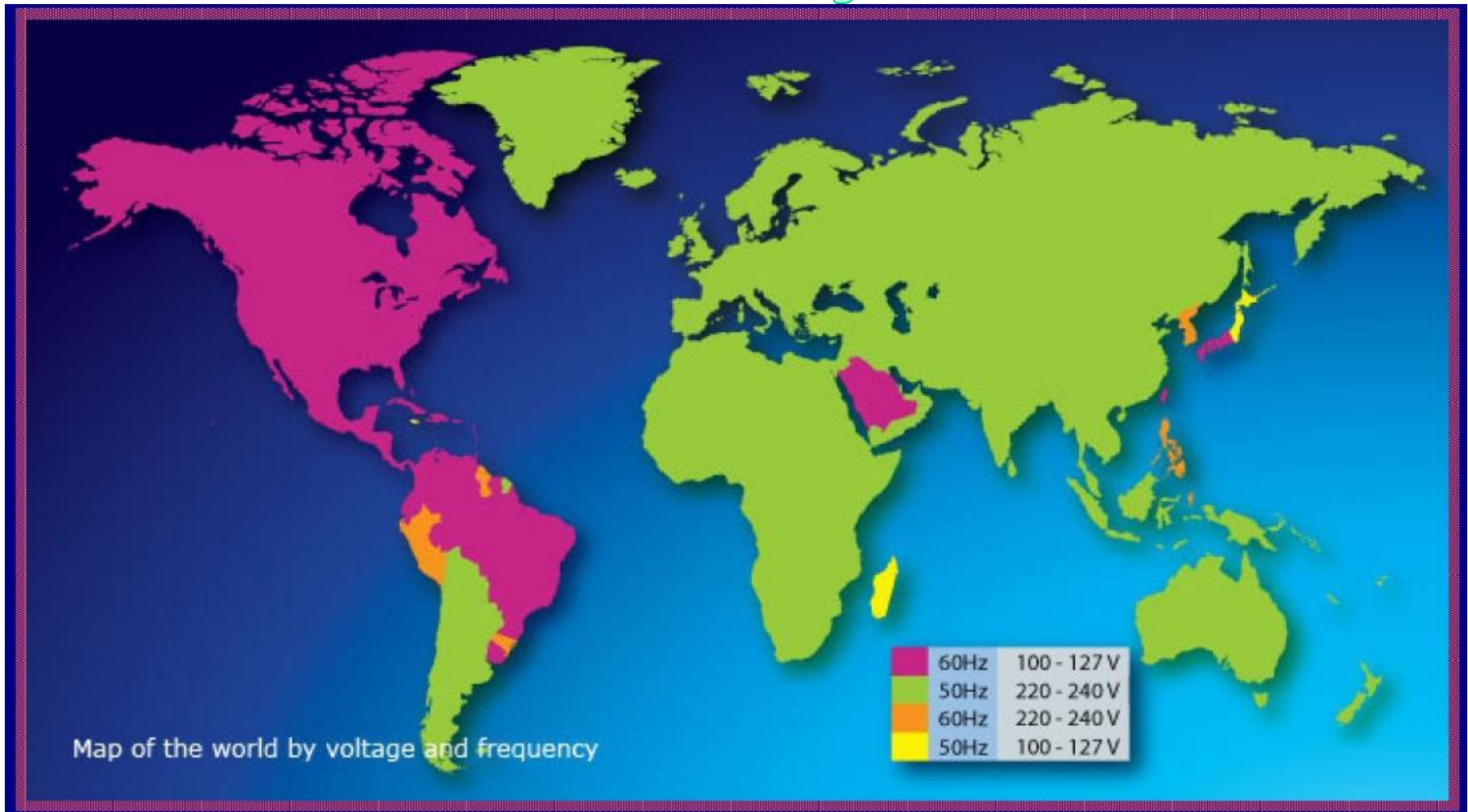
Product	3020 	5630 	5450 	FULL COLOR 	LAMP 	HIGH FLUX LAMP 
Size	3.0*2.0*1.2t	5.6*3.0*0.9t	5.4*5.0*1.4t	5.4*5.0*1.4t 3.5*2.8*0.7t	5mm Lens	3mm Lens
Flux (Cool 기준)	Ra 70_6.9 lm Ra 80_6.3 lm Ra 90_5 lm	Ra 70_35 lm Ra 80_32 lm	Ra 70_20.3 lm Ra 80_19.8 lm Ra 90_18 lm	R: 2 lm B: 0.7 lm G: 3.9 lm	3.5 lm	6.5 lm
CRI	70/80/90	70/80	75/80/90	-	70	70
R9	80	-	80	-	-	-
R <sub>θ</sub>	76	18	22	-	-	-
LM80	OK	OK	OK	-	-	-

### 3. Acriche

Product	1W	2W	4W			12W
	A4	A5	A3	A7	A1	A8
Size	 7 x 7 x 2.95	 7 x 7 x 2.95	 12 pi x 6.54	 8.0 x 8.0 x 3.7	 23 pi x 2.8	 37 x 25 x 2
Flux (lm)	C: 80 N: N.A. W:70	C: 105 N: 85 W: 75	C: 280 N: 220 W: 195	C: 300 N: 240 W: 210	W: 300	W: 800
CRI	C: 70 W: 80	C: 70 N,W: 80	C: 70 N,W: 80	C: 70 N,W: 80	W: 80	W: 80
Power(W)	0.83	1.66	3.3	3.2	3.6	10
$R_{\theta}$	10	8	6	-	3~4	-
LM80	OK	-	OK	-	-	-
Remark	One direction Ceramic type Acriche IC	Bi-direction Ceramic type	Bi-direction Lead type	One direction Ceramic type Acriche IC	One direction COB type Acriche IC	One direction COB type Acriche IC

#### 4. Why AC?

# AC is Everywhere!!

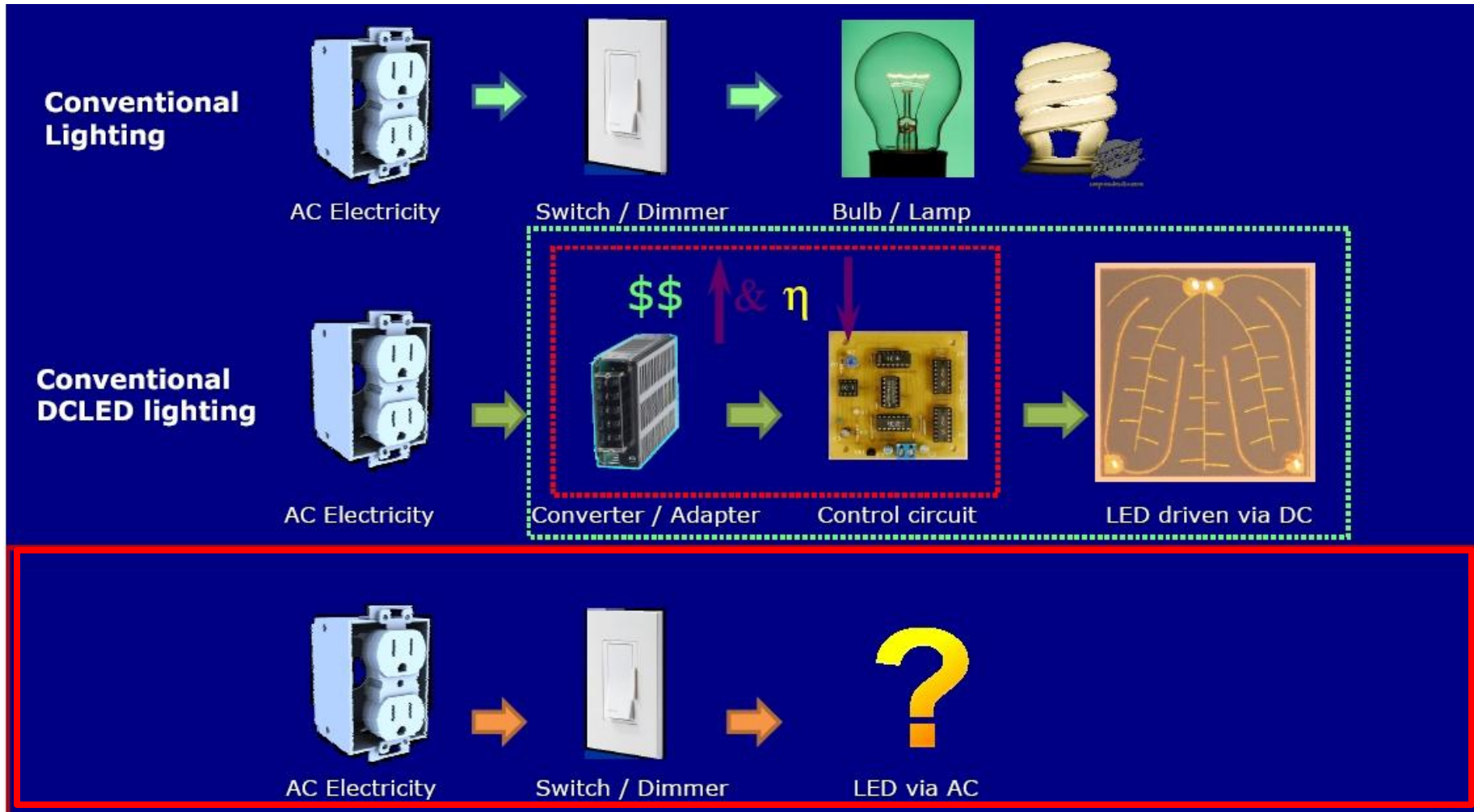


## 5. Acriche vs. DC LED

More economical Acriche with higher cost reduction effect




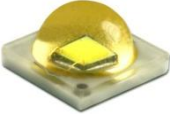
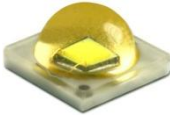

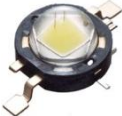

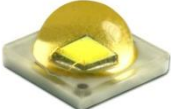
	Acriche	LED
Components	<p>AC power source</p> <p>Acriche is only component</p>	<p>AC power source</p> <p>AC/DC Converter (AC파워공급 AC/DC컨버터)</p> <p>Requires converter and driver</p>
Cost		<p>Cost of components such as converters, assembly and design</p>
Lifetime	<ul style="list-style-type: none"> <li>• 35,000 hrs of lifetime not reduced by converter</li> <li>• More reliable solution</li> </ul>	<ul style="list-style-type: none"> <li>• Lifetime limited by converter</li> <li>• Shorter lifetime under heat and challenging condition</li> </ul>
Efficiency	<ul style="list-style-type: none"> <li>• No conversion loss</li> </ul>	<ul style="list-style-type: none"> <li>• Converter must be installation</li> <li>• AC/DC converter losses up to 30%</li> </ul>
Others	<p>Acriche-IC</p> <ul style="list-style-type: none"> <li>• Eco friendly</li> <li>• Ease of lighting design</li> <li>• Power efficiency 90% ↑</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental pollution caused by converter</li> <li>• Additional space needed for converter</li> <li>• Fire hazard and low reliability caused by heat emission and converter</li> </ul>

## 6. How simple AC?

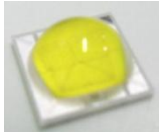
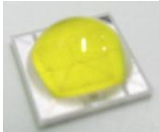



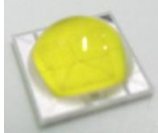


# III. Product Recommendations




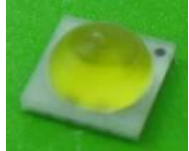
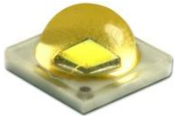
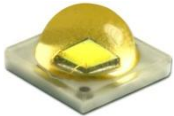
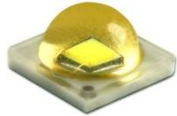
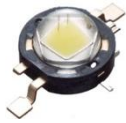
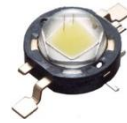
## 1. Outdoor (Power, Top)

Application		Street/Part light	High Bay light	Architectural
Option #1	Product	Z7 	Z7 	P5-II 
	Characteristics	- 400lm@4W - 4 in 1 product, 1 PKG 4W ~ 8W Operation, Module design Simple		- R,G,B 3 in 1, full color range - slim form, available in thin area
Option #2	Product	Z5 	Z5 	Z6 
	Characteristics	- 120lm@1W, Cool White - small size, High efficiency with second lens		- R,G,B,W 4 in 1 full color range - slim form, available in thin area
Option #3	Product	P4 	5630 	Z5 
	Characteristics	- 120lm@1W, Cool White - Low $R_{\theta}$ , Easy thermal management	-Power [W] : 0.3W -Efficiency [lm/W] : 102 lm/W	- 120lm@1W, Cool White - High efficiency with second lens









## 1-2. Outdoor (Acriche)

Application		Street/Security lamp	High Bay light	Down light
Option #1	Product	A7 	A7 	A8 
	Characteristics	<ul style="list-style-type: none"> <li>- Ceramic PKG, Long lifetime</li> <li>- Minimize Maintenance cost from converter/driver lifetime</li> </ul>		<ul style="list-style-type: none"> <li>- High W, 800~1000 lm in 1 PKG</li> <li>- Simple thermal management (COB)</li> </ul>
Option #2	Product	A3 	A3 	A7 
	Characteristics	<ul style="list-style-type: none"> <li>- Simple circuit</li> <li>- Minimize Maintenance cost from converter/driver lifetime</li> </ul>		<ul style="list-style-type: none"> <li>- Ceramic PKG Long lifetime</li> <li>- Minimize Maintenance cost</li> </ul>



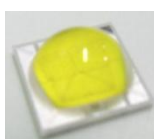
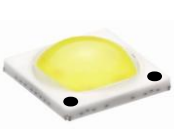
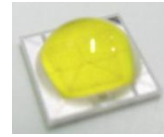
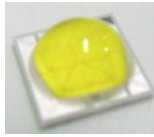





## 2. Indoor (Power, Top)

Application		A19 Bulb Lamp	MR Lamp	PAR Lamp
Option #1	Product	5630 	Z7 	Z7 
	Characteristics	- Power [W] : 0.3W - Efficiency [lm/W] : 102 lm/W	- 400lm@4W - 4 in 1 product, 1 PKG 4W ~ 8W Operation, Module design Simple	
Option #2	Product	Z4 	Z5 	Z5 
	Characteristics	-Good efficacy by Red chip (warm) -Low current(120mA)&High VF(8.5V)	- 120lm@1W, Cool White - small size, High efficiency with second lens	
Option #3	Product	Z5 	P4 	P4 
	Characteristics	- 120lm@1W, Cool White - High efficiency with second lens	- 120lm@1W, Cool White - Low R <sub>θ</sub> , Easy thermal management	

## 2-1. Indoor (Power, Top)

Application		Tube	Flat Panel (Direct Type)	Flat Panel (Edge Type)
Option #1	Product	5450 	5450 	5630 
	Characteristics	- Power [W] : 0.2W - Efficiency [lm/W] : 109lm/W	- Power [W] : 0.2W - Efficiency [lm/W] : 109lm/W	- Power [W] : 0.3W - Efficiency [lm/W] : 102 lm/W
Option #2	Product	5630 	5630 	3020 
	Characteristics	- Power [W] : 0.3W - Efficiency [lm/W] : 102 lm/W	- Power [W] : 0.3W - Efficiency [lm/W] : 102 lm/W	- Power [W] : 0.1W - Efficiency [lm/W] : 98.4 lm/W
Option #3	Product	3020 	3020 	
	Characteristics	- Power [W] : 0.1W - Efficiency [lm/W] : 98.4 lm/W	- Power [W] : 0.1W - Efficiency [lm/W] : 98.4 lm/W	

## 2-2. Indoor (Acriche)

Application		A19 Bulb	MR Lamp	PAR Lamp	Candle lamp
Option #1	Product	A4 	A1 	A7 	A5 
	Characteristics	- High efficiency (lm/W) - Ceramic PKG	- MR16 - COB type, Good R $\theta$	- Ceramic PKG - Small form factor	- Candle PKG - Small form factor
Option #2	Product	A7 	A7 	A1 	A3 
	Characteristics	- Ceramic PKG - Small form factor	- Ceramic PKG - Small form factor	-High lm/W Warm white -COB type, Good R $\theta$	- Simple circuit - Good lm/\$
Option #3	Product	A3 	A3 	A3 	
	Characteristics	- Simple circuit - Good lm/\$	- Simple circuit - Good lm/\$	- Simple circuit - Good lm/\$	

# IV. Differences of SSC

## 1) Vertical integration From chip to package/module

EPI Growing → FAB (Fabrication) → PKG → Custom Module

## 2) Experience

20 years of LED packing experience and know-how



## 3) Full line up



Acriche, Z-Power LED, Side View LED, Top View LED, Lamp LED, Chip LED, High Flux LED, Custom Module

## 4) Patents

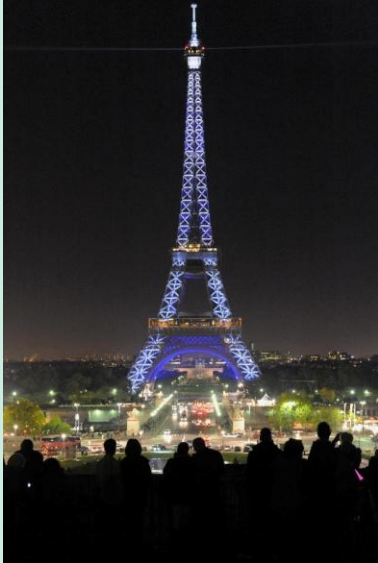

Global Leading with over 6,000 patents / Cross license



# V. Success Stories

Region	Product	Remark	Pictures
China	P4 R,G,B,W	<ul style="list-style-type: none"><li>2008 Beijing Olympic . Opening / Closing ceremony</li><li>Decorative lighting</li></ul>	
China	P4 R,G,B,W	<ul style="list-style-type: none"><li>2010 Guangzhou Asian game . Opening / Closing ceremony</li><li>Decorative lighting</li></ul>	

Region	Product	Remark	Pictures
India	P4 W	<ul style="list-style-type: none"> <li>□ Akshar Dham temple . Illumination</li> </ul>	
Korea	KWT728	<ul style="list-style-type: none"> <li>□ Hyundai Department store . Main signage</li> </ul>	

Region	Product	Remark	Pictures
Korea	P4 (S42180)	<ul style="list-style-type: none"> <li>□ JW Medical Corporation . Operating light</li> </ul>	
Korea	C9WT728	<ul style="list-style-type: none"> <li>□ Plaza Hotel . Hallway light</li> </ul>	 <p style="text-align: right; color: orange;">2010 11 03</p>

Region	Product	Remark	Pictures
France	P4 R,G,B	<ul style="list-style-type: none"> <li>□ Eiffel Tower</li> <li>· Decorative lighting</li> </ul>	
Italy	P4, R,G,B	<ul style="list-style-type: none"> <li>□ Foro Romano</li> <li>· Decorative lighting</li> </ul>	

Region	Product	Remark	Pictures
USA	STW8Q2PA	<ul style="list-style-type: none"> <li>□ GE . Refrigerator light</li> </ul>	
USA	A3	<ul style="list-style-type: none"> <li>□ Energy Saving Homes constructed by ZEBRA (Zero Energy Building Research Alliance) . Down light</li> </ul>	

**Thank you!**