



Samsung System LSI Business

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Samsung Electronics



DISCLAIMER

The materials in this report include forward-looking statements which can generally be identified by phrases such as Samsung Electronics (SEC) or its management "believes," "expects," "anticipates," "foresees," "forecasts," "estimates" or other words or phrases of similar implications. Similarly, such statements that describe the company's business strategy, outlook, objectives, plans, intentions or goals are also forward-looking statements. All such statements are subject to certain risks and uncertainties that could cause actual results to differ materially from those in the presentation files above.

For us, particular uncertainties which could adversely or positively affect our future results include:

- The behavior of financial markets including fluctuations in exchange rates, interest rates and commodity prices
- Strategic actions including dispositions and acquisitions
- Unanticipated dramatic developments in our major businesses including CE (Consumer Electronics), IM (IT & Mobile communications), DS (Device Solutions)
- Numerous other matters at the national and international levels which could affect our future results

These uncertainties may cause our actual results to be materially different from those expressed in this report.

System Semiconductor Industry

Samsung System LSI : Now

Looking Forward

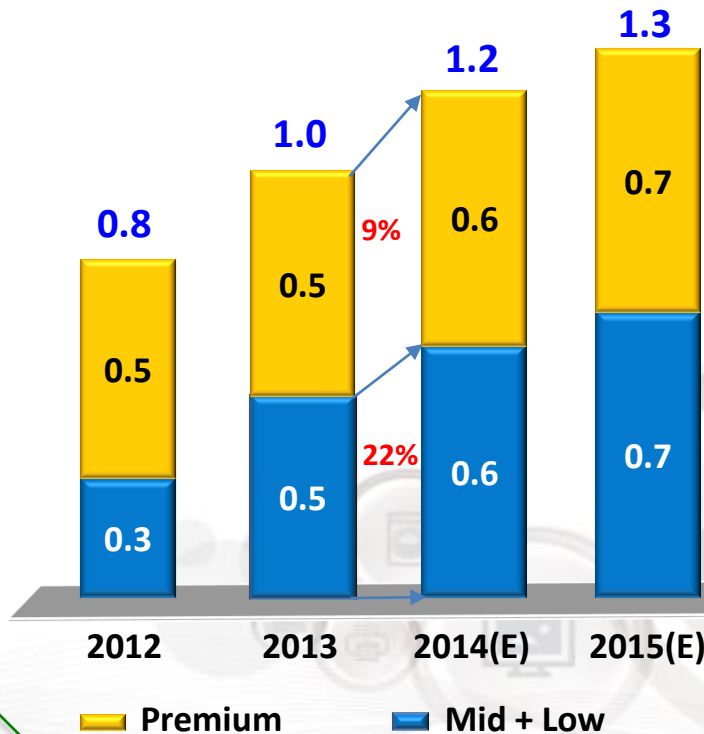
The Samsung logo, consisting of the word "SAMSUNG" in white, uppercase letters inside a blue oval.

SAMSUNG

Market of Mobile Device

Smartphone

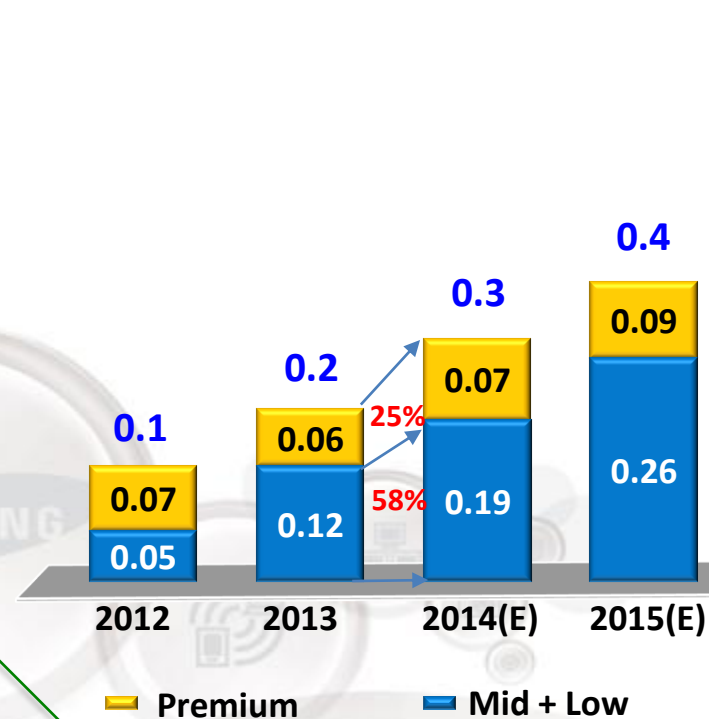
(billion units)



* Source : Gartner, Strategy Analytics, 2013 3Q

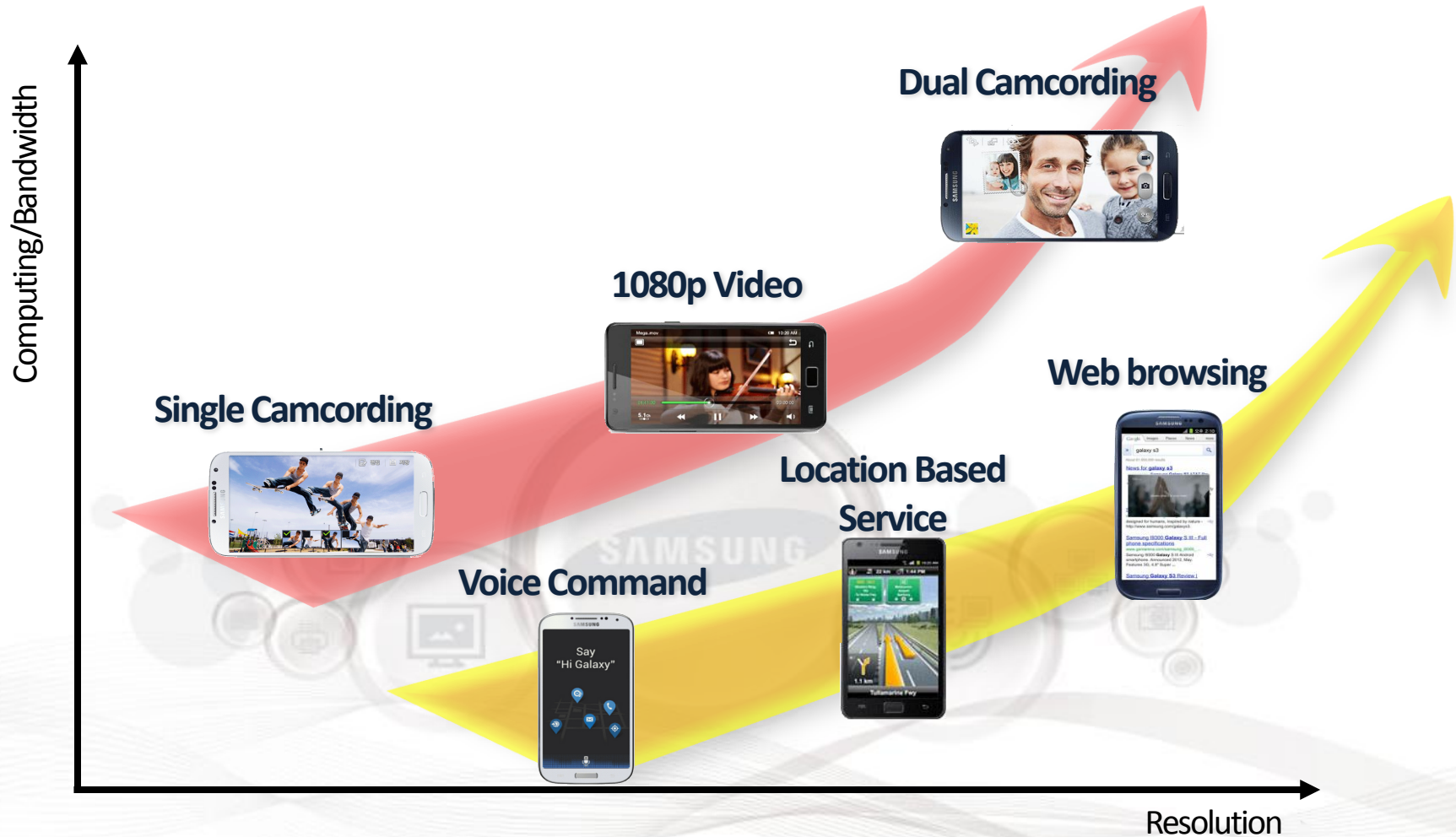
Tablet

(billion units)

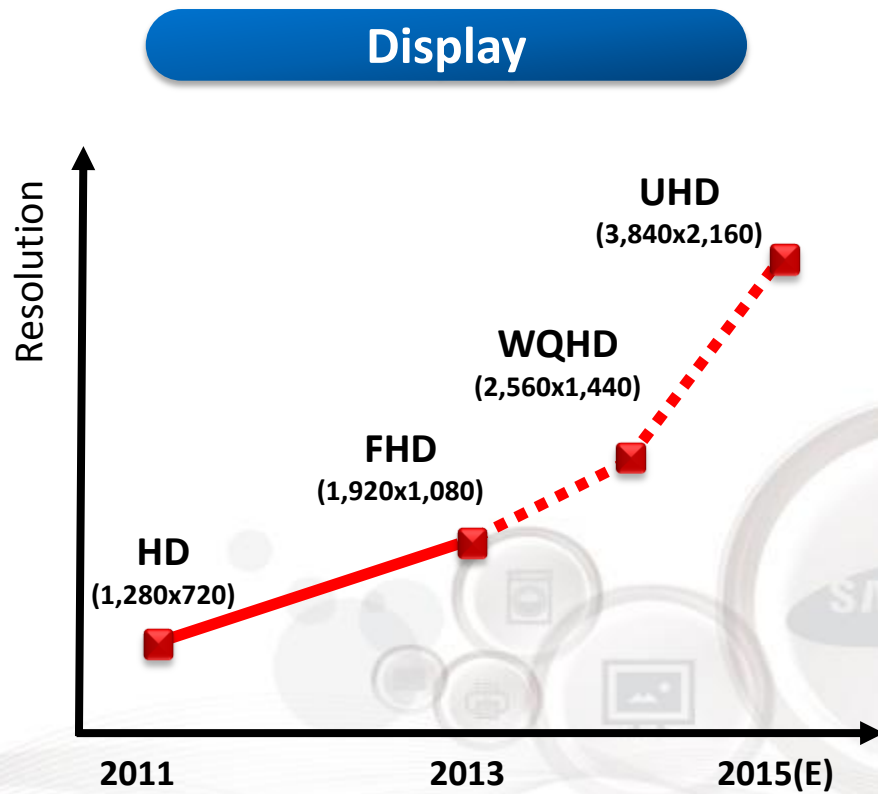


* Source : Gartner, 2013 3Q

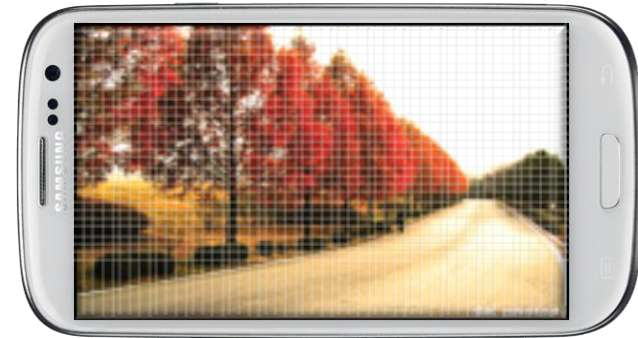
- New applications require higher computing/bandwidth



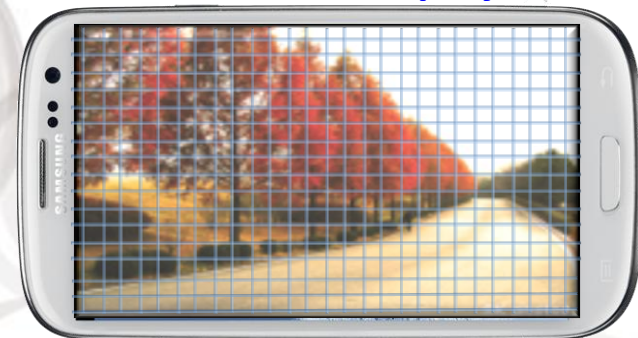
- Higher resolution



FHD-class Display

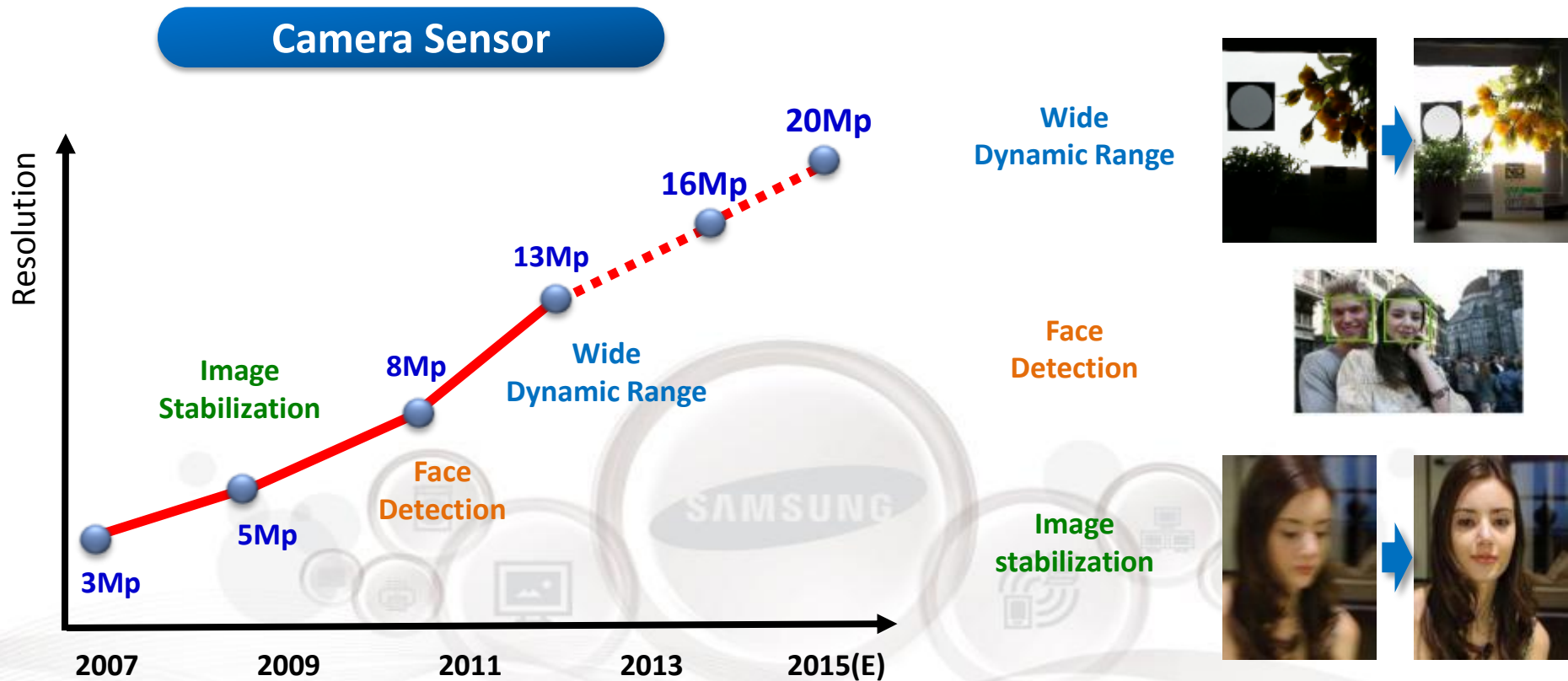


HD-class Display



Camera Sensor Trend

- Image quality enhancement is also improving



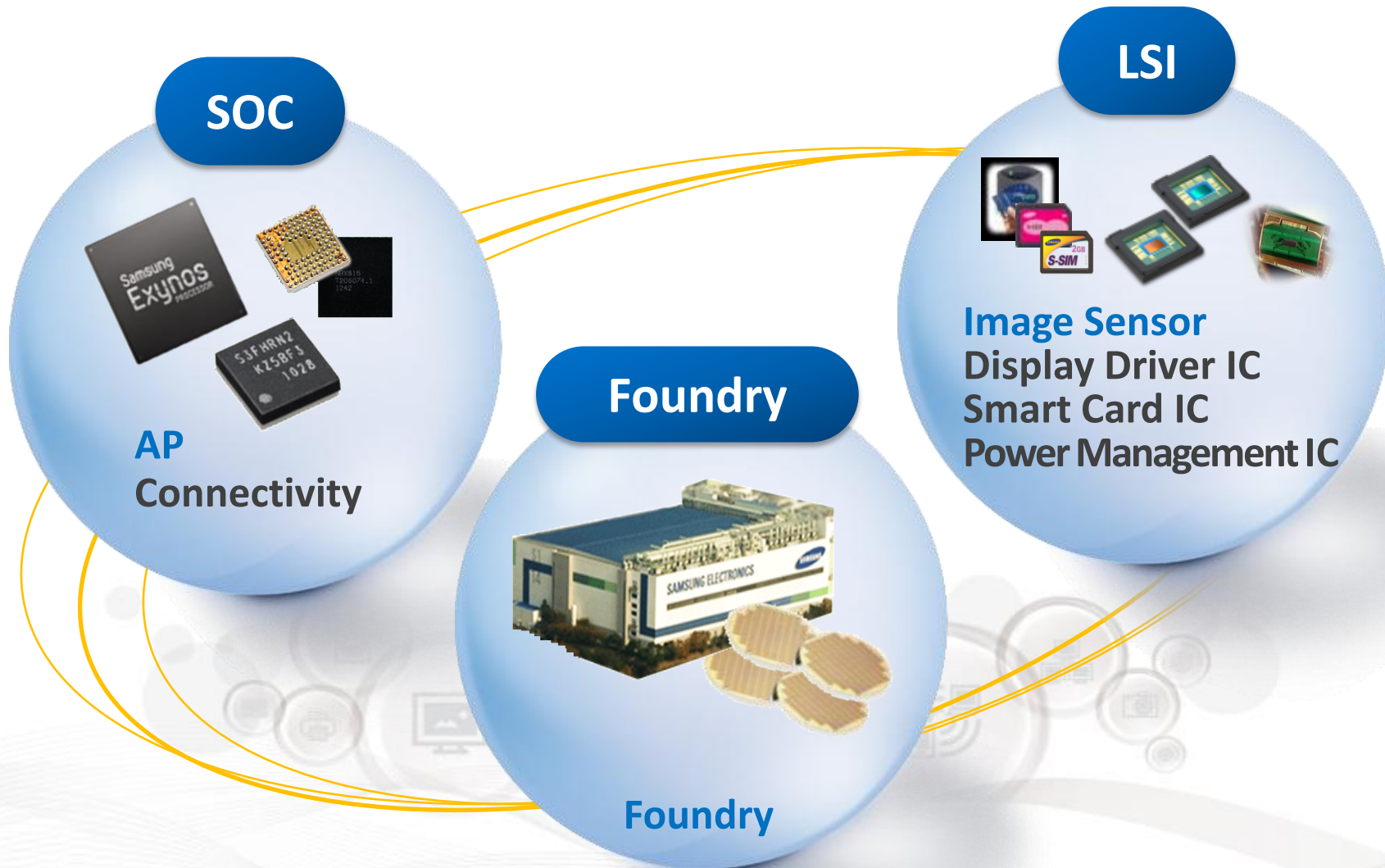
System Semiconductor Industry

Samsung System LSI : Now

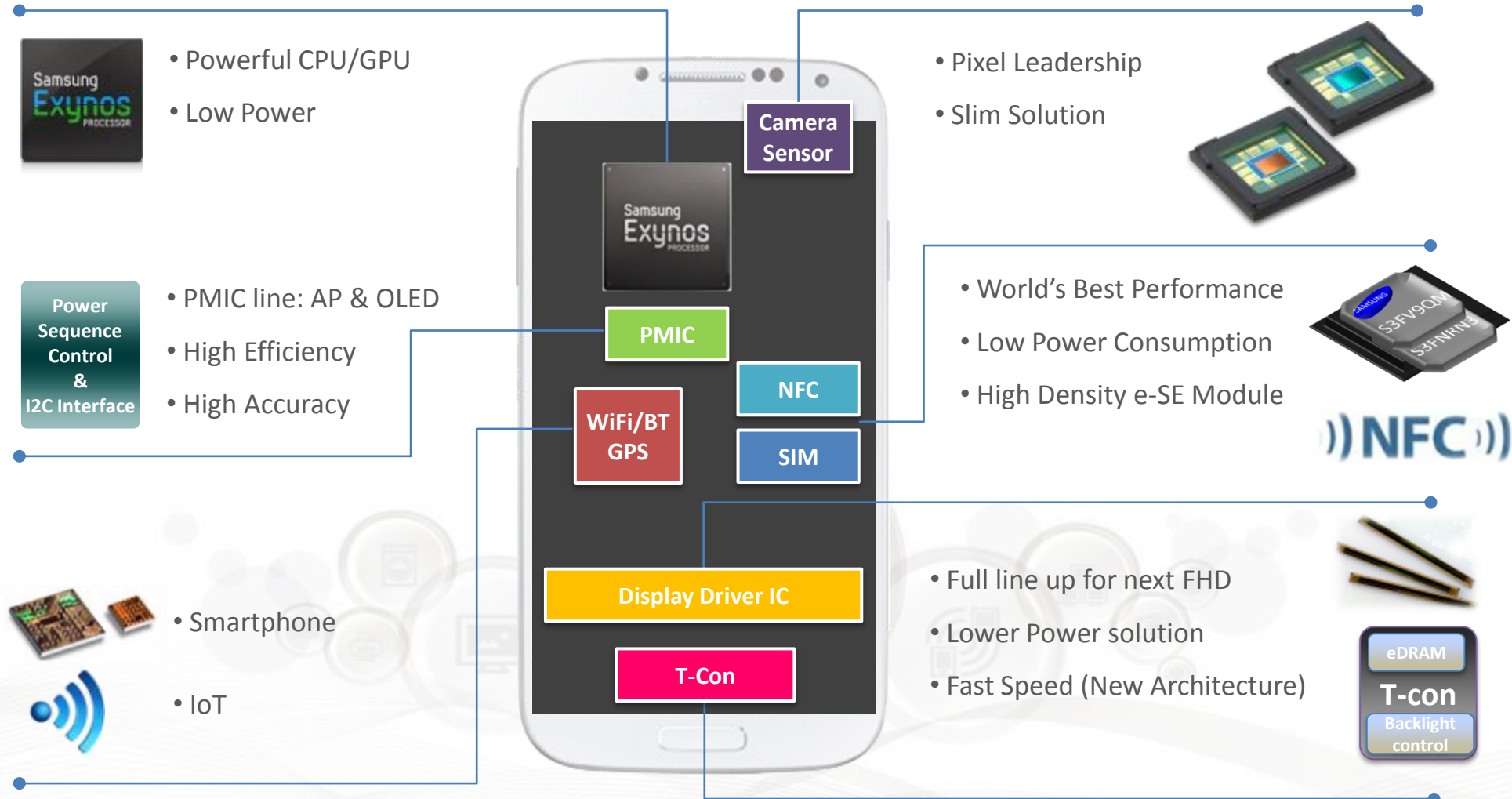
Looking Forward

SAMSUNG

Three business areas



Product Portfolio



1. AP (Application Processor)

- Focusing on high performance with low power consumption

CPU Leadership

*Game changing technology :
big.LITTLE octa core*



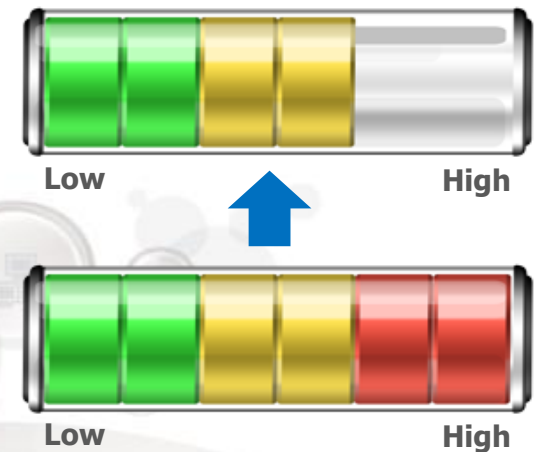
Powerful GPU

*Richer 3D graphics with
Energy efficiency*

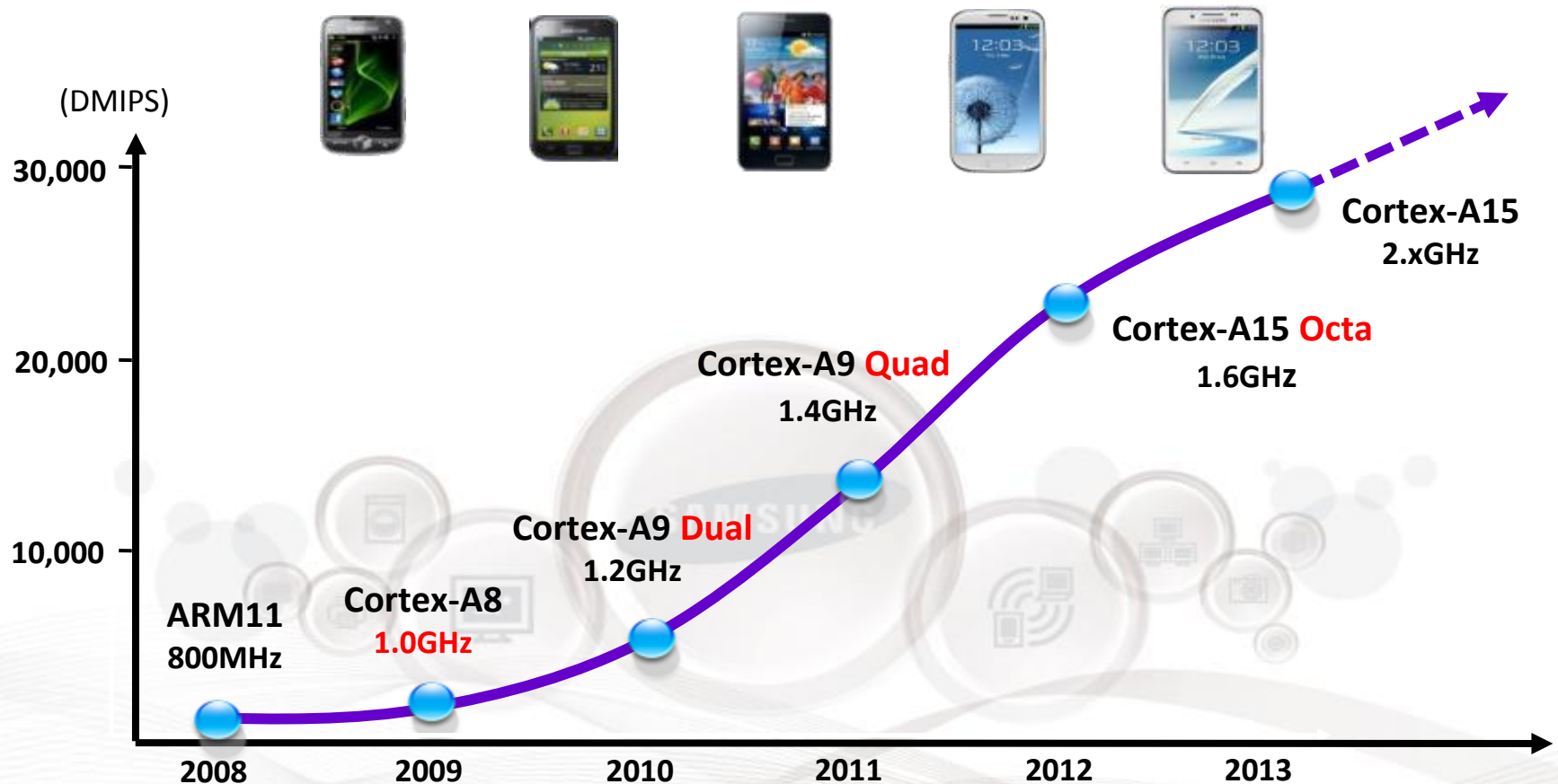


Low Power

*Advanced mobile process &
design methodologies*



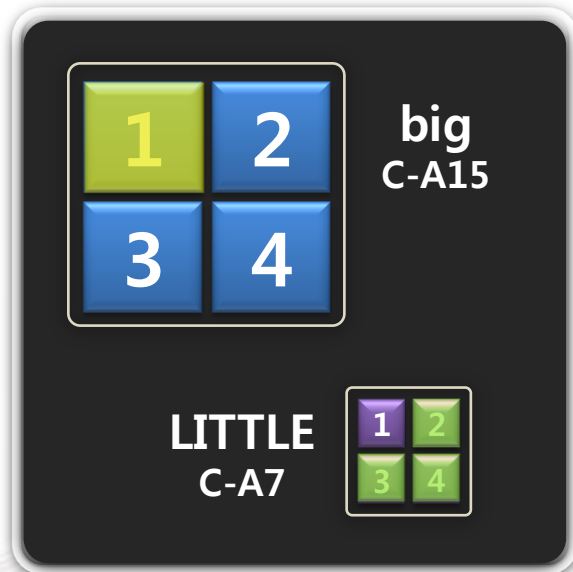
- Has been leading AP industry since 2009
 - Innovation in both Architecture & Silicon Technology



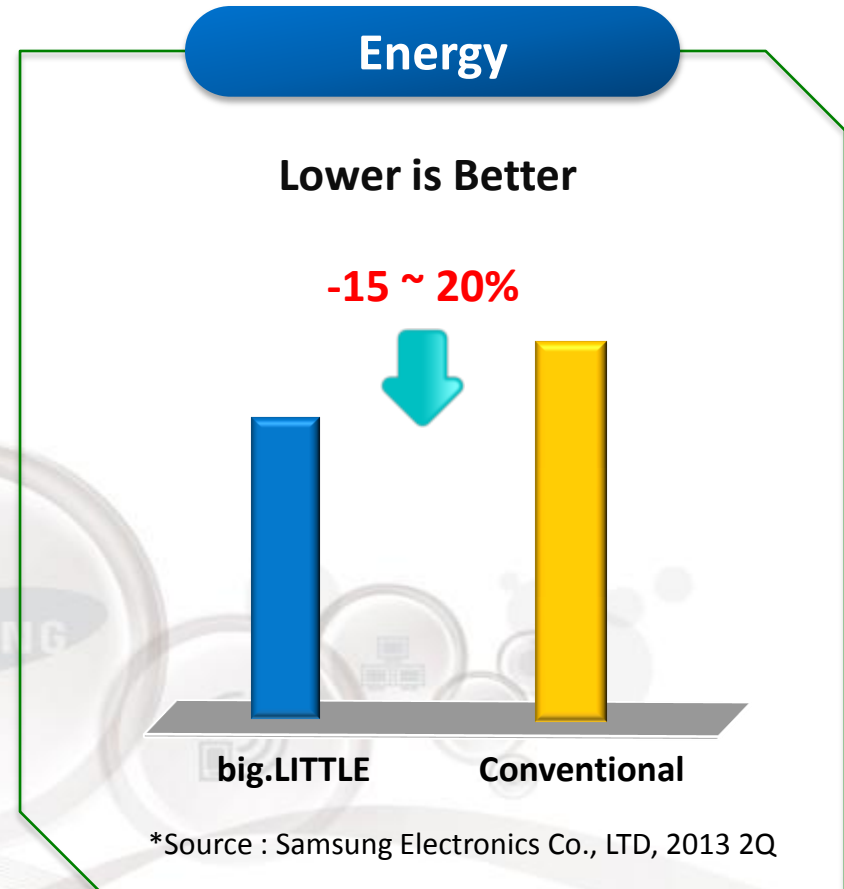
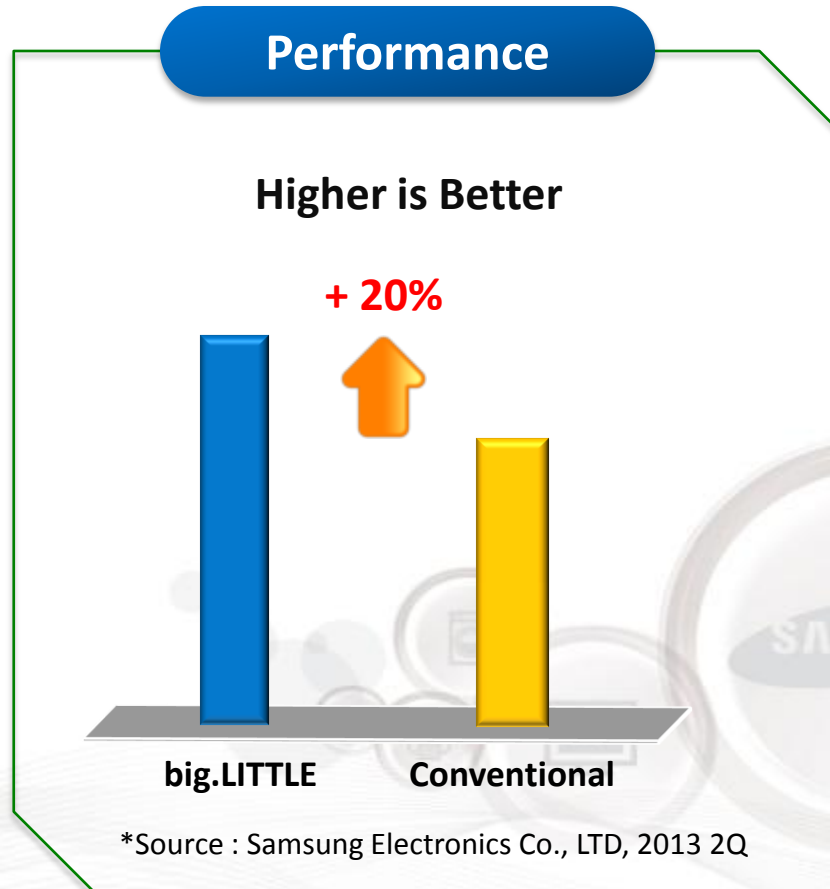
* Source : Samsung Electronics Co., Ltd., ARM

*DMIPS : Dhrystone Million Instructions Per Second

- Best of both worlds: high performance and low energy
 - Heterogeneous architecture for energy efficiency



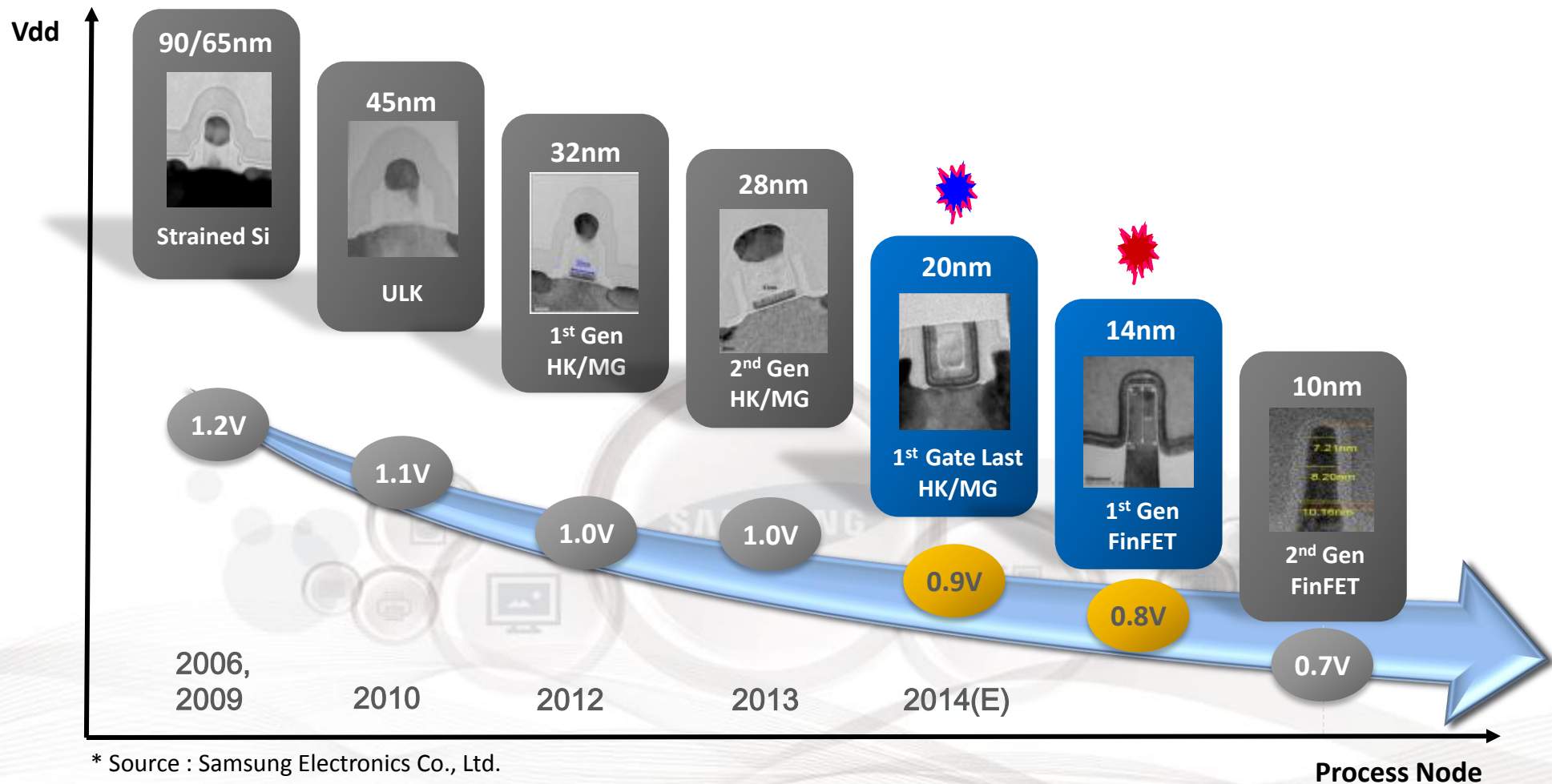
- 20% gain at performance and energy, respectively



*Conventional : big CPU only

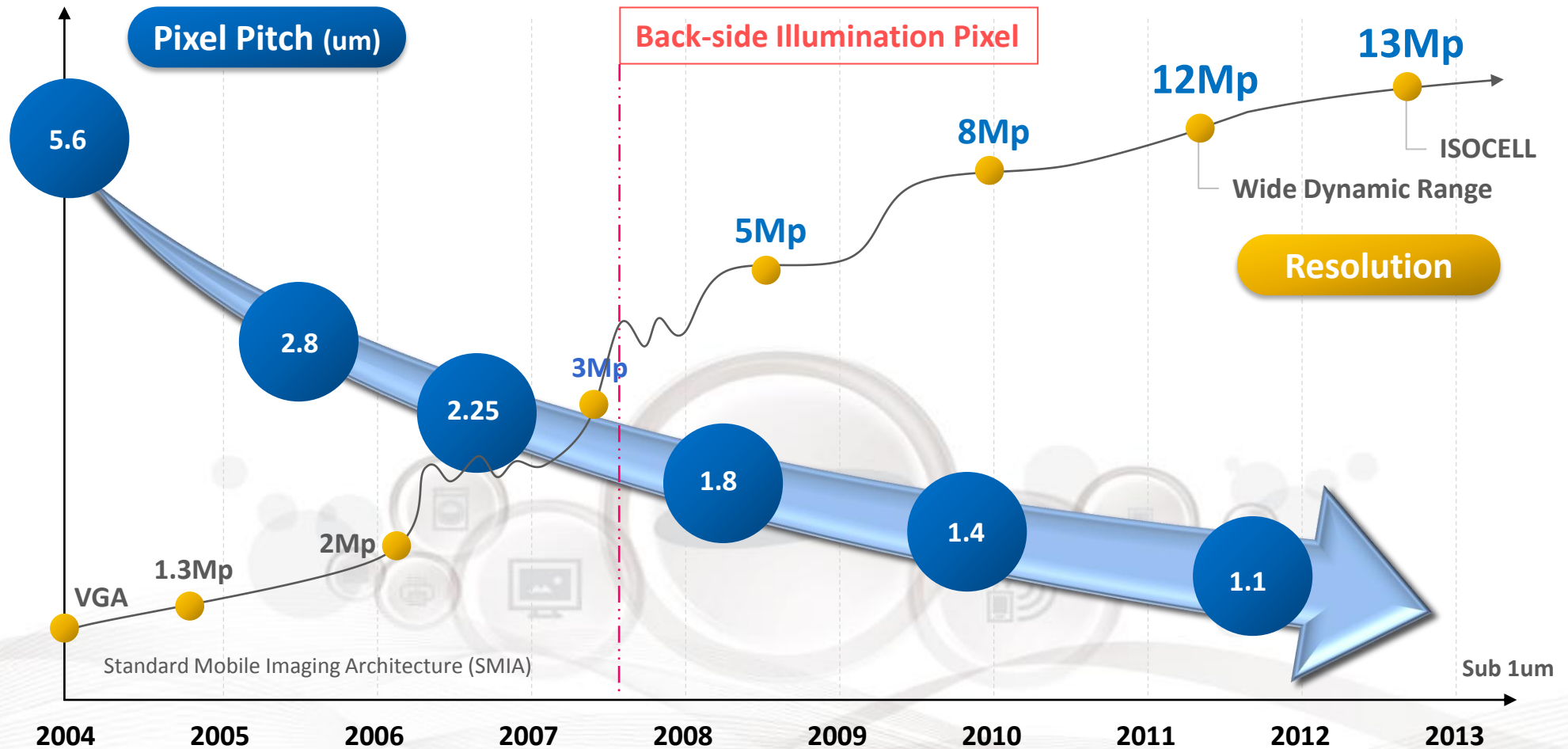
Advanced Silicon Process

- Leadership in low-power, advanced silicon process



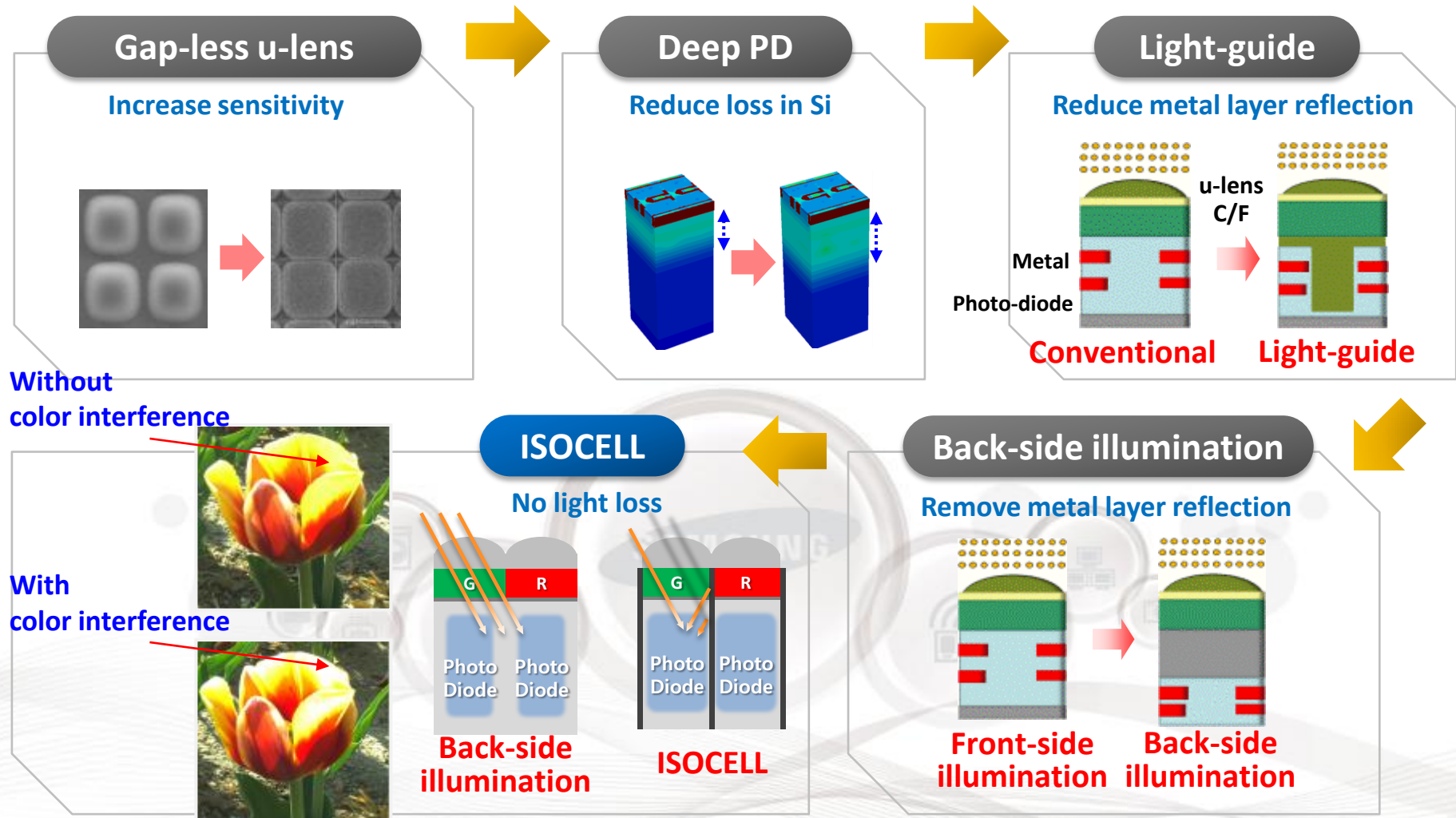
2. Image Sensor

- Higher resolution & smaller pixel have driven sensor industry



* Source : Samsung Electronics Co., Ltd.

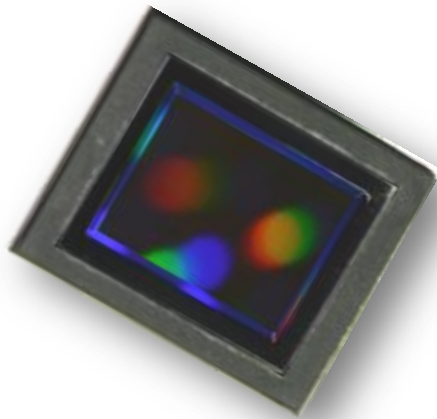
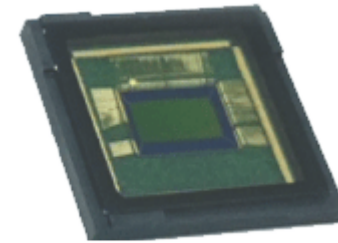
- To increase sensitivity and decrease light loss & crosstalk



- **16Mp ISOCELL Sensor with 1.12um pixels**



- Main sensor for smartphones
- Wide dynamic range & Auto focus

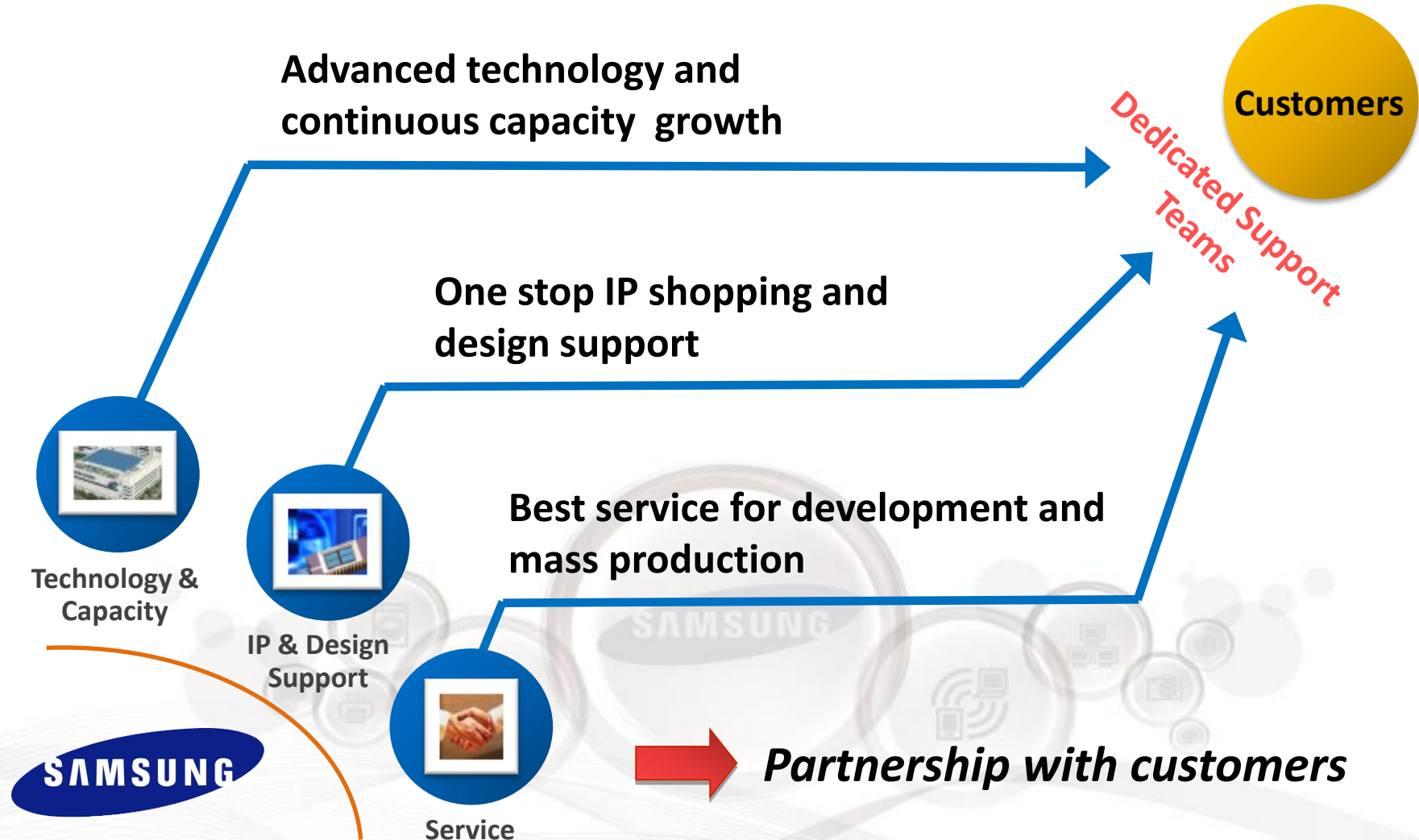


- **Next APS-C sensor**

- Sensor for mirror-less cameras

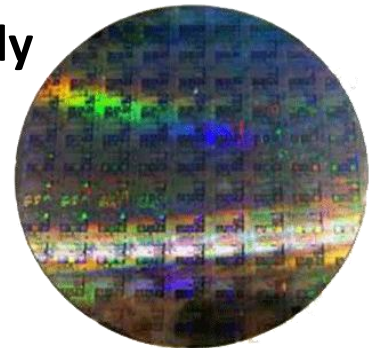


3. Foundry



- World's leading 14nm FinFET solution via collaboration

- **Samsung : 14nm FinFET test sample & Design Infrastructure ready**



- **ARM , Cadence, Synopsys & Mentor**

- FinFET Design Enablement Platform
- First Cortex-A7 implementation

EE Times EE Life

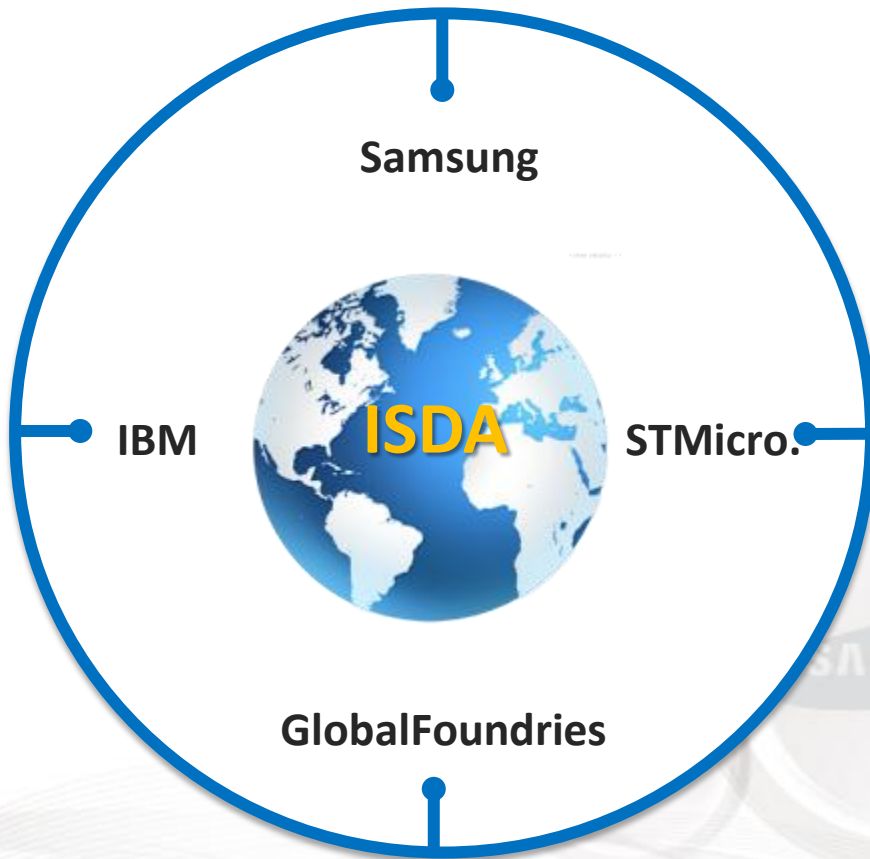
Samsung and partners create 14nm FinFET test chips

Brian Bailey

12/21/2012 11:45 AM EST

Over the past couple of days there have been a string of press releases related to the tape-out of a test chip from Samsung at 14nm using FinFETs. This is a condensation of those releases from Samsung, ARM, Cadence, Synopsys and Mentor.

Samsung announced that a milestone in the development of 14-nanometer (nm) FinFET process technology with the successful tape-out of multiple development vehicles in collaboration with its key design and IP partners. In addition, Samsung has signed an agreement with ARM® for 14nm physical IP and libraries. As part of



Giheung, KR



Austin, Texas, USA



Hwaseong, KR

* ISDA : International Semiconductor Development Alliance

System Semiconductor : Introduction

Samsung System LSI : Now

Looking Forward

The Samsung logo, consisting of the word "SAMSUNG" in white, uppercase letters inside a dark blue oval.

SAMSUNG

1 ***“Widcon” & TSV (Through Silicon Via)***

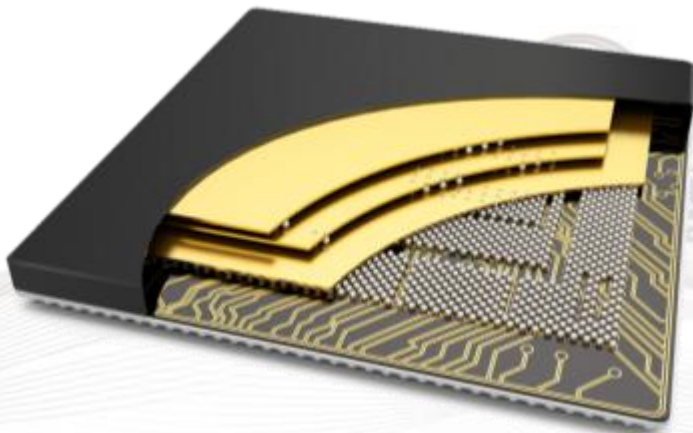
2 ***64-bit CPU***

3 ***FinFET Process***

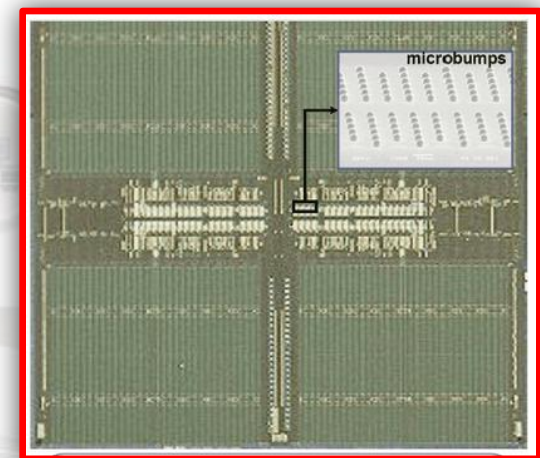
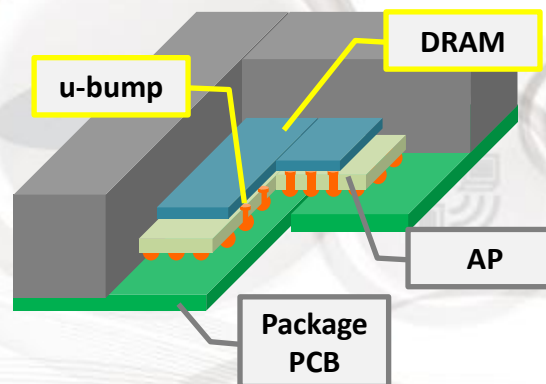
- Wide connection between logic and memory
 - Higher bandwidth, lower power consumption

Memory Stacking with TSV

Short Connection with TSV

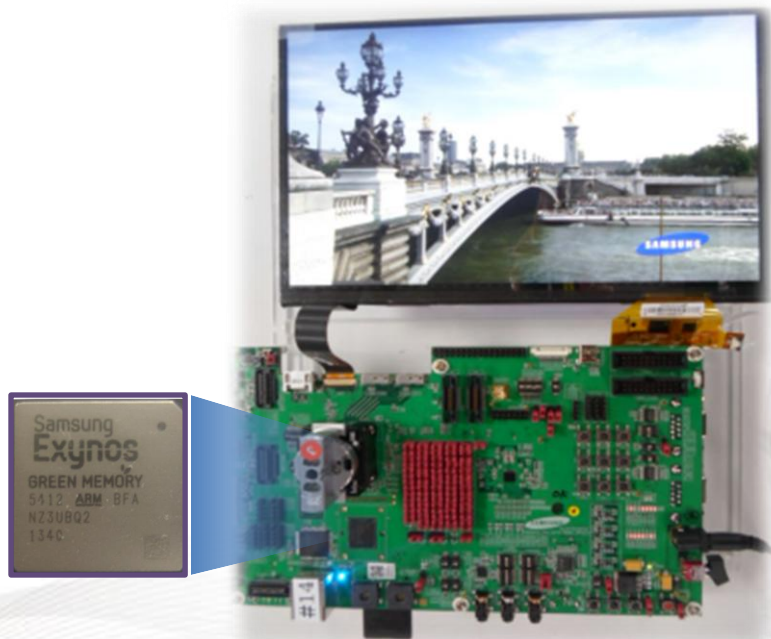


Micro Bump

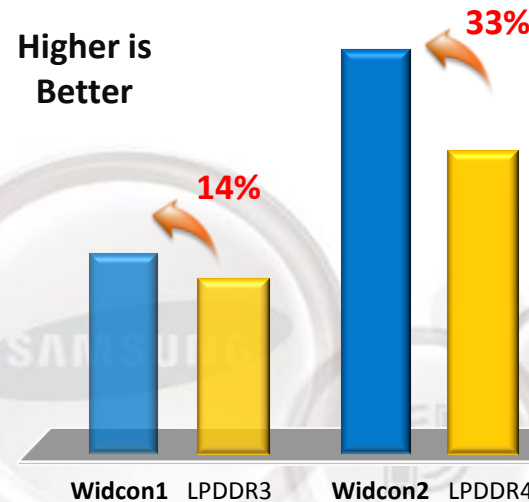


Widcon in reality

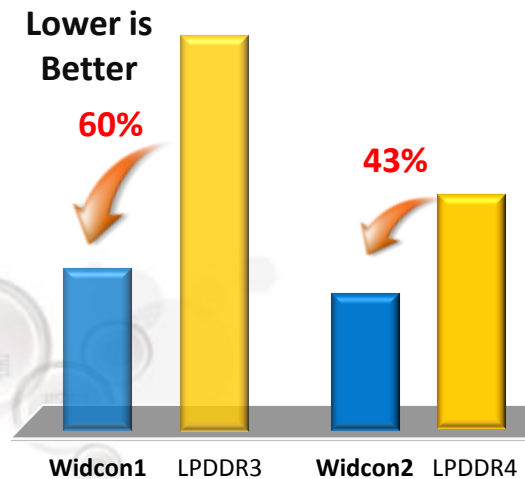
- World's 1st AP using Widcon & TSV



Performance



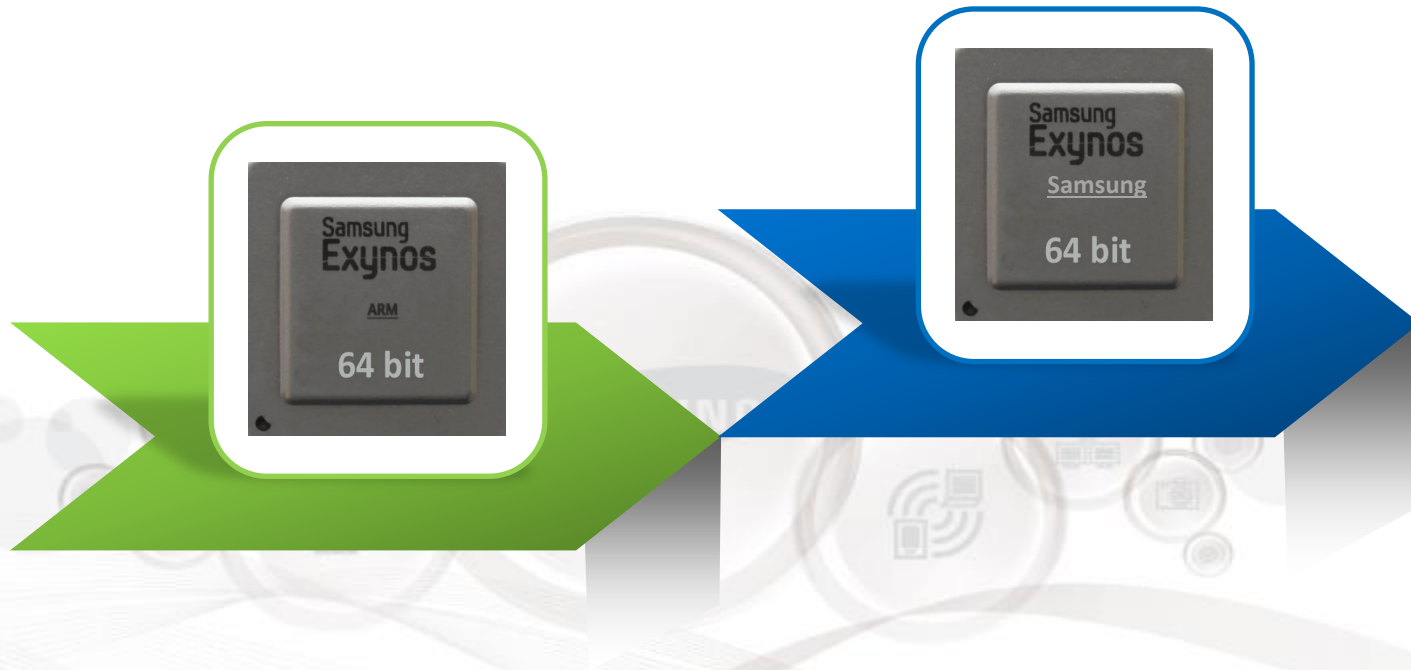
Power



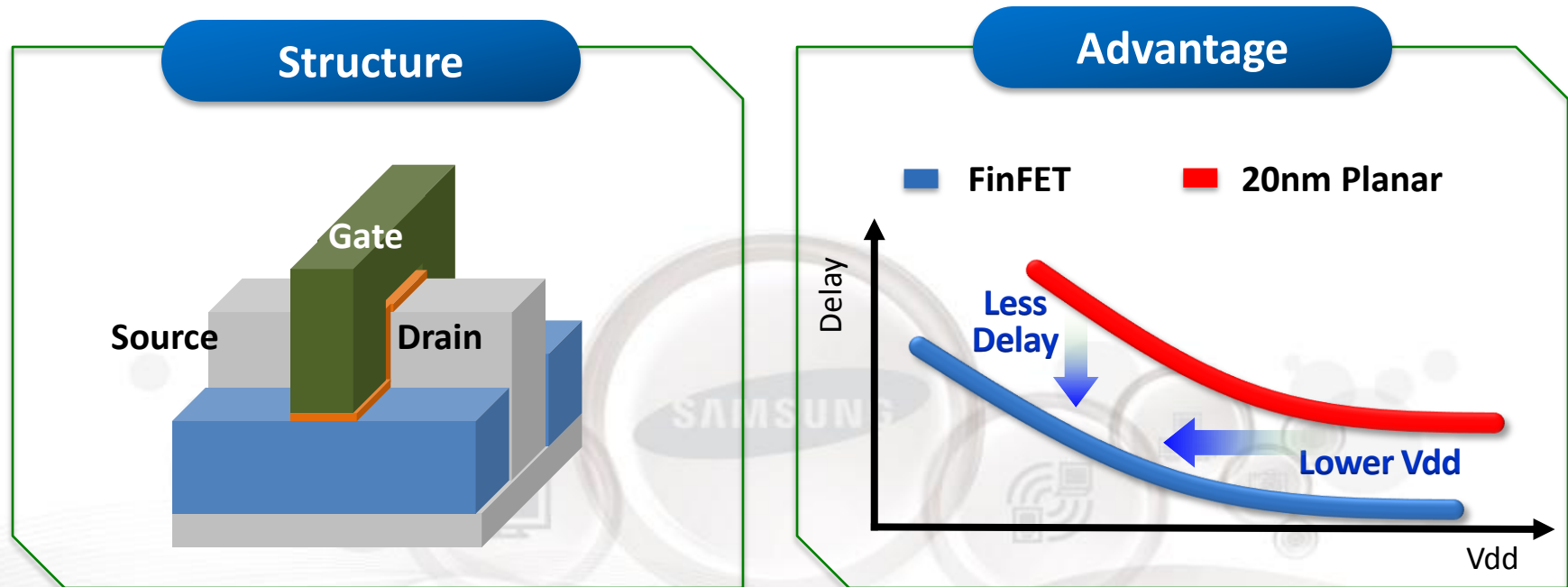
*Source : Samsung Electronics Co., Ltd., JEDEC, 2013 1Q

64-bit CPU core for Smart Devices

- **2-step approach:**
 - AP with ARM's 64-bit core
 - AP with Samsung's own 64-bit core



- **FinFET technology leadership**
 - Lower Vdd and delay than a planar process



1 *ModAP (Cellular Modem + AP)*

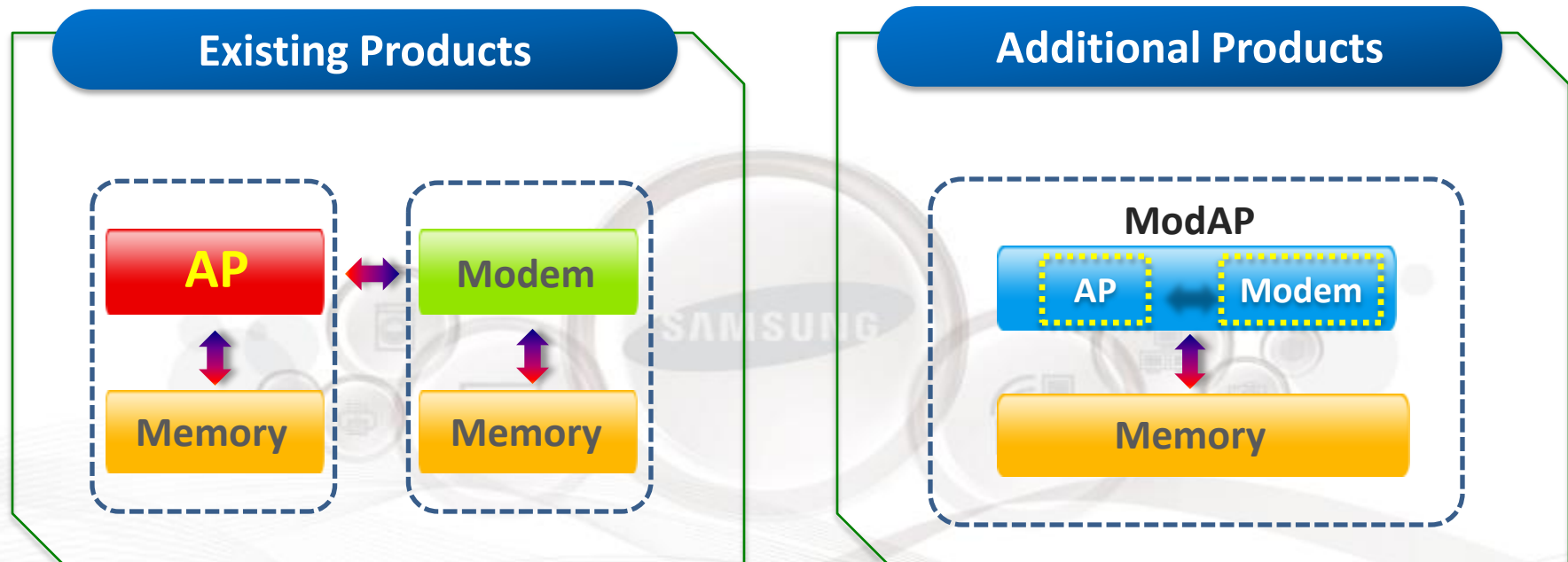
2 *IoT*

3 *Foundry 2.0*

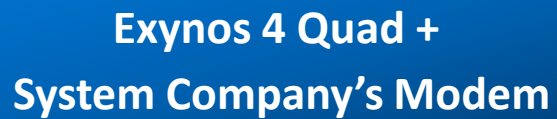
1. ModAP (Modem + AP)

- **Dual tracks for modem collaboration**

- High-end : 2-chip strategy with Tier-1 modem suppliers
- Mid/low-end : ModAP using system company's modem



-

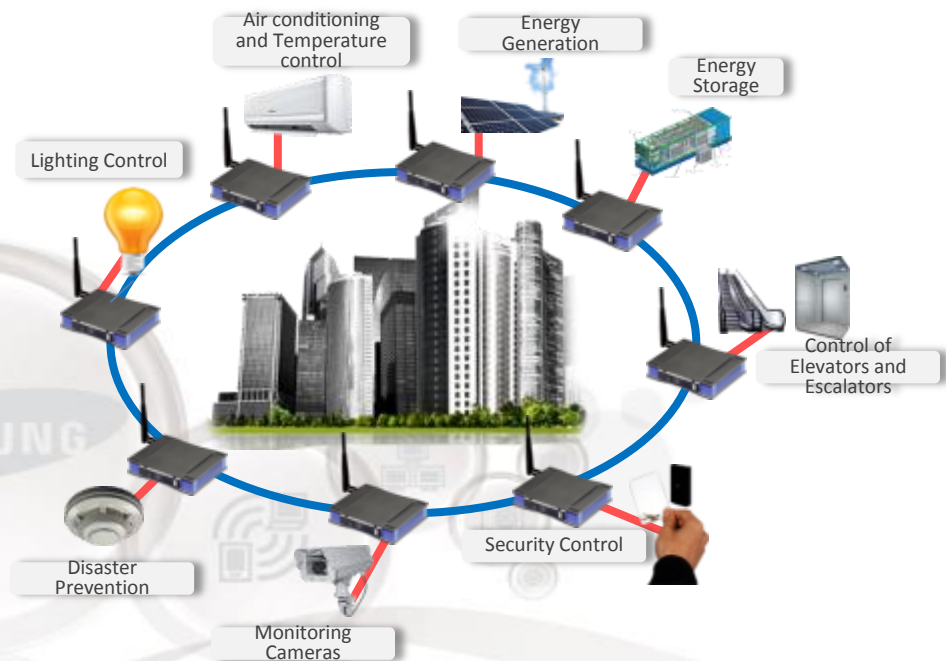


2. IoT (Internet of Things)

- Smart building, Smart community, ...
- Total connectivity solutions



Total Solutions



3. Foundry 2.0

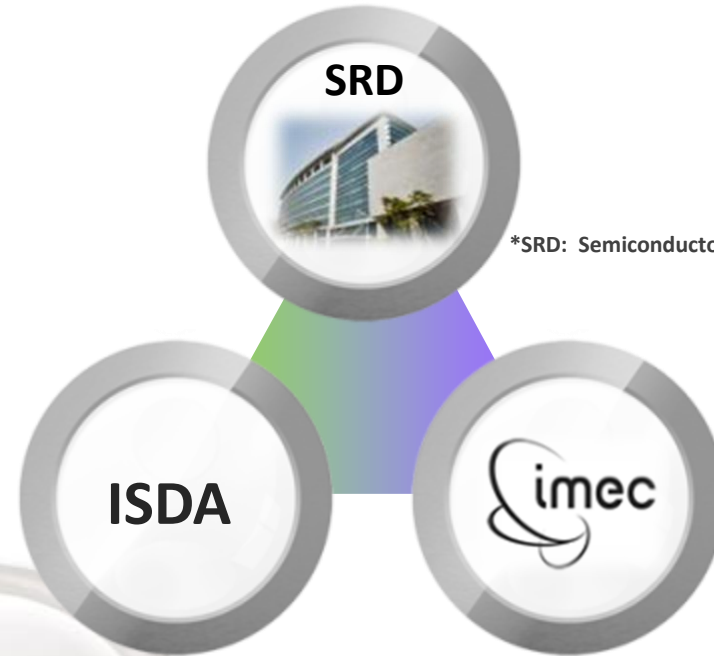
- Technical leadership ... 14FF and beyond

Foundry 2.0

- 1 Follower → Technology *Leadership*
- 2 Tier 1 only → Tier 1 + *Tier 2/3*
- 3 Silicon → Silicon + *IP* Provider

- **10nm FinFET Leadership**

- Schedule
- Performance, power and area



- **Early EUV Adoption**



Concluding Remarks

- Samsung S.LSI provides **total solution for connected world**
 - Mobile AP (Application Processor)
 - Image Sensor
 - **ModAP**
 - **IoT**
- Samsung S.LSI offers **attractive foundry solution**
 - **Leading-edge technology: 14FF**
 - **Capacity**

