

# Samsung Welcomes OCP's ODSA

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Craig Orr— Sr. Director of D/C, AI, Networking segments, Samsung Foundry | March 28, 2019

**SAMSUNG**

# Topics

1. **You are here** (where DSA fits within Samsung)
2. **FYI on Samsung foundry** (expansion from mobile → HPC)
3. **My personal interest in chiplets**

Disclaimer: contents represent the author's personal views, not official views of Samsung Electronics

# SAMSUNG CONSISTS OF MANY COMPANIES



## MACHINERY & HEAVY INDUSTRIES

C&T Construction  
Heavy Industries  
Engineering



## FINANCIAL SERVICES

Life Insurance  
Fire & Marine Insurance  
Card  
Securities  
Asset Management  
Venture Investment



## TRADE & SERVICES

C&T Trading  
Hotel Shilla  
Cheil Worldwide  
S-1 Corporation  
Medical Center  
Biologics  
Bioepis



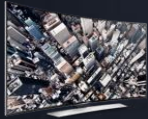
## ELECTRONICS

Consumer Electronics  
IT & Mobile  
Device Solutions  
Power / Battery  
Electro-Mechanics  
Services  
Display

# SAMSUNG ELECTRONICS



## CONSUMER ELECTRONICS



VISUAL DISPLAY

DIGITAL APPLIANCES



PRINTING SOLUTIONS

HEALTH & MEDICAL EQUIPMENT



SAMSUNG



## IT & MOBILE COMMUNICATIONS



MOBILE COMMUNICATIONS



NETWORKS



MEDIA SOLUTION CENTER

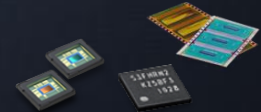


## DEVICE SOLUTIONS 3 Independent divisions



MEMORY

SYSTEM LSI



LED

# DSA= DEVICE SOLUTIONS AMERICAS

## SAMSUNG



CONSUMER  
ELECTRONICS



IT & MOBILE  
COMMUNICATIONS



DEVICE  
SOLUTIONS



DEVICE  
SOLUTIONS  
AMERICAS



SALES &  
MARKETING



RESEARCH &  
DEVELOPMENT



MEMORY



FOUNDRY



S.LSI



LED



DISPLAY



SAMSUNG



# Foundry Key words: full service, most trusted



**Flexible business models, Strengthened IP portfolio, Robust tool compatibility**

# Key differentiators

## Vertical integration



Design services  
IP  
Process  
Package  
Design flow

## Economies of scope



World 1<sup>st</sup> EuV (DRAM, FNDRY)  
3D TSV production (HBM, CIS)  
1<sup>st</sup> to market with HBM2e IP

## Economies of scale



'18 ~\$23B DS Capex<sup>1</sup> Largest  
semiconductor company in  
the world by rev., #2 in  
Foundry rev.

# Success in large, high performance chips

SF Design Services

Design Partners

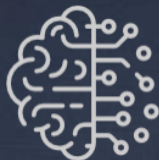
Design  
Services+



Computer  
Vision



D/C A.I.  
Train/Infer.



D/C Video  
Encoding



Network  
Switch/Router



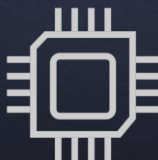
Pure  
Foundry



GPU



FPGA



5G Infra



Network  
Switch/Router



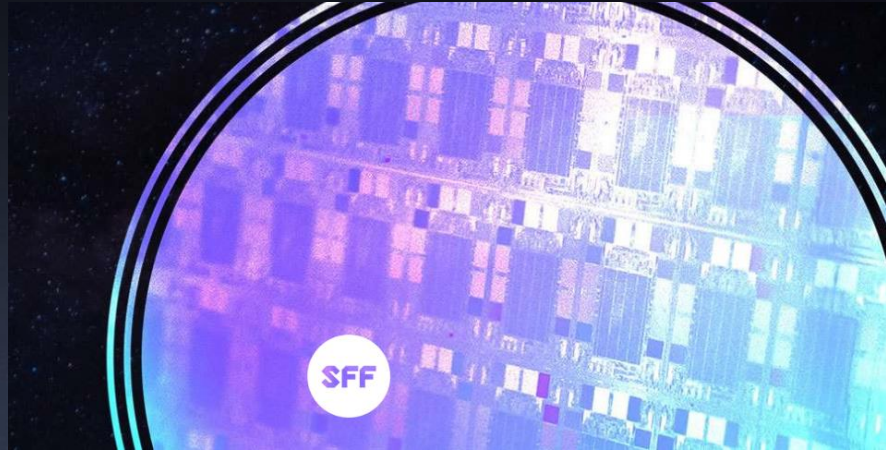
Success up to 780mm<sup>2</sup> from 7nm to 28nm; various biz models



# Samsung Foundry Forum

May 14<sup>th</sup>, 2019, 1:00pm -7:00pm

Santa Clara Marriott, Santa Clara



Come join us at our 4<sup>th</sup> Annual Foundry Forum and learn about the latest innovations in:

*Process and Packaging Technology, IP and Design Solutions and Design Services*

Sign up now as seats are limited:

<http://www.samsungfoundryforum.com/2019/>

# My interest in chiplets?

## 1. Seeing a lot of interest in the field

- Making chips bigger in X,Y, and/or Z directions e.g. AI driven by hardware...larger models
- Future-proofing e.g. SerDes chiplets that can be swapped out for photonics
- Temporal or process node de-coupling
- New applications e.g. 3D stacking/hybrid bonding

## 2. Moore & the Economics of shrink

- Higher costs = fewer customers per node. Lowering costs = more customers? Chiplets = lower costs?

## 3. Pace of innovation: H/W vs. S/W at exa-scale D/C

## 4. Need for new business models

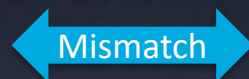
# My interest in chiplets- pace of innovation

## Google search S/W evolution

'04-'13: 16++ major new products in search alone



Techcrunch (2013)



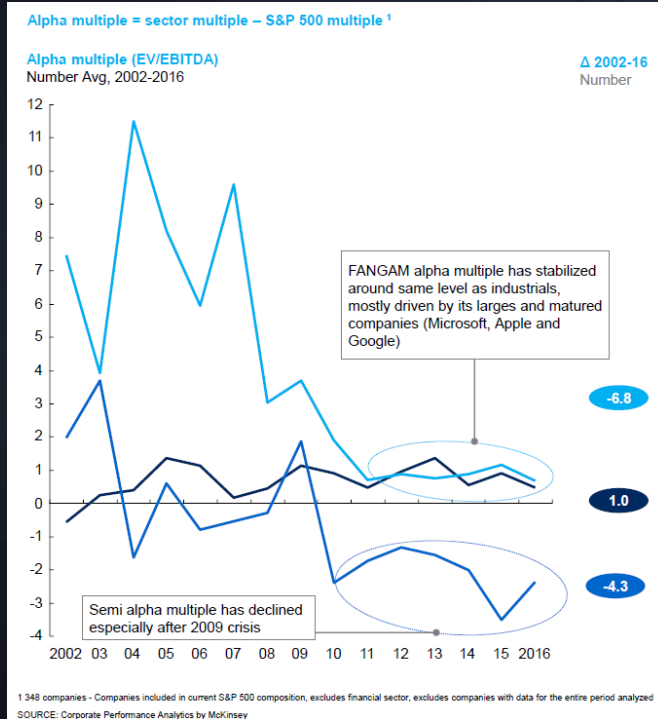
## Google network H/W evolution

'04-'13: 6 new architectures

Datacenter Generation	First Deployed	Merchant Silicon
Four-Post CRs	2004	vendor
Firehose 1.0	2005	8x10G 4x10G (ToR)
Firehose 1.1	2006	8x10G
Watchtower	2008	16x10G
Saturn	2009	24x10G
Jupiter	2012	16x40G

Jupiter Rising, Arjun Sing Et al. (2015)

# My interest in chiplets- need for new biz models



FANGAM's QOR is high owing to an ability to bring together all 3 dimensions of the innovation cube

	Product	Operations	Business model
<b>Industrials (0.4 QOR)</b> 	✓	✓	✗
E.g. JBT: Focused on owning the whole food processing value chain to sell end-to-end solutions		E.g. Roper: Maintained lean OPEX structure by 10% shrinking net working capital to negative	Business model has largely remained the same in the past decade
<b>Semiconductors (0.6 QOR)</b> 	✓	✓	✗
E.g. Skyworks: consistent pipeline of design wins flagship customers on new products		E.g. WD: Pursued M&A strategy to secure supply through vertical integration	Business model has largely remained the same in the past decade
<b>FANGAM (0.8 QOR)</b> 	✓	✓	✓
E.g. Amazon: Entered into groceries, business supplies, hospital supplies to broaden its customer base E.g. Facebook: integration with Instagram allowing users to easily cross-post photos		E.g. Amazon: Robotics warehouse operations E.g. Netflix: deployed free caching servers to ISPs to reduce its own costs, reducing ISP bandwidth loads and improving streaming performance	E.g. MSFT: migrating to subscription business model E.g. Netflix: Shifted its delivery model to fixed monthly "a. you can eat" model E.g. Amazon: Prime subscription services to capture bigger portion of all customer spend

SOURCE: Corporate Performance Analytics by McKinsey, press search, companies' reports

Source: McKinsey & Co. (2018)

**How will Samsung contribute to ODSA?**

**TBD**

A full-page background image showing a view of Earth from space. The sun is rising directly behind the horizon, creating a bright starburst effect and illuminating the sky with a gradient of blue. The Earth's surface is covered in dark blue oceans and white, wispy clouds. The text "Thank You" is centered over the image in a white, italicized serif font.

*Thank You*