Samsung Welcomes OCP's ODSA

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

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

IT & MOBILE COMMUNICATIONS

MOBILE COMMUNICATIONS

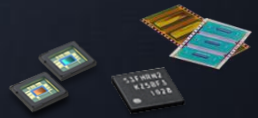
NETWORKS

MEDIA SOLUTION CENTER

DEVICE SOLUTIONS
3 Independent divisions

MEMORY

SYSTEM LSI



LED

DSA= DEVICE SOLUTIONS AMERICAS

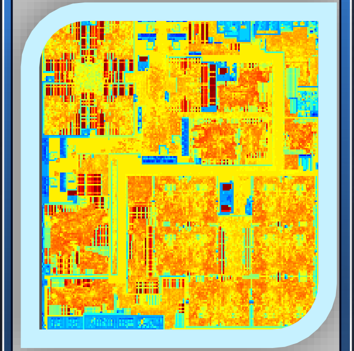
SAMSUNG

- CONSUMER ELECTRONICS
- IT & MOBILE COMMUNICATIONS
- DEVICE SOLUTIONS
  - DEVICE SOLUTIONS AMERICAS
    - SALES & MARKETING
    - RESEARCH & DEVELOPMENT

MEMORY | FOUNDRY | S.LSI | LED | DISPLAY

Foundry Key words: full service, most trusted

Design

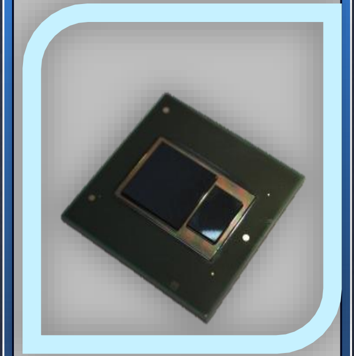


Flexible Design Service

Manufacturing

Assurance of Capacity & Quality

Packaging



Advanced Package Solution

Testing

Fast TAT Test Infrastructure

Flexible business models, Strengthened IP portfolio, Robust tool compatibility

Key differentiators

Vertical integration

Design services
IP
Process
Package
Design flow

Economies of scope

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

Economies of scale

‘18 ~$23B DS Capex[1] Largest semiconductor company in the world by rev., #2 in Foundry rev.

[1] public statement of expectation in ‘18Q3 earnings call

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^2 from 7nm to 28nm; various biz models

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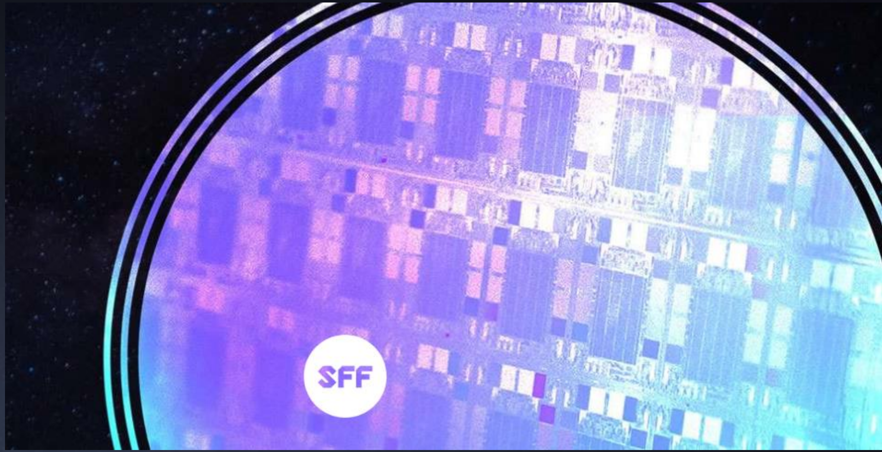
Samsung Foundry Forum

May 14th, 2019, 1:00pm -7:00pm
Santa Clara Marriott, Santa Clara



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

Sign up now as seats are limited:
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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

Mismatch

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)

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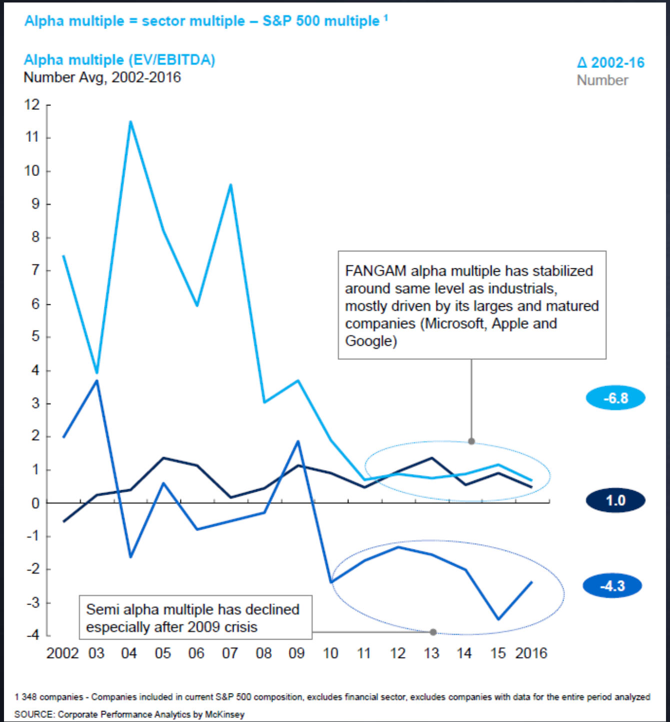
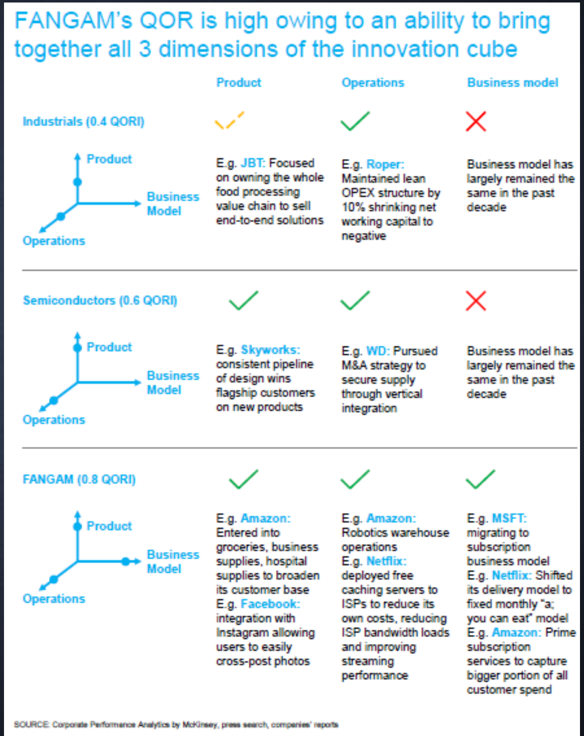
My interest in chiplets- need for new biz models





Source: McKinsey & Co. (2018)

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How will Samsung contribute to ODSA?

TBD


Thank You