Win-Win Collaboration & Partnership in Semiconductor Ecosystem From Foundry Perspective

GSA Forum at SEMICON Japan 2013

Optimizing Ecosystem through Win-Win Collaboration & Partnership

Dr. TY Chiu, CEO, SMIC
December 4th, 2013
Table of Contents

1. Semiconductor Trends & Challenges
2. Business Collaboration Model
3. SMIC’s Offerings and Win-Win Strategies
Worldwide Semiconductor Revenue
Shipment Based

Rapid Growth in APAC, In Particular in China

- Strong correlation in between Foundry and Fabless growth in Asia
- 3 of Top-4 Foundries are located in Asia; growing numbers of Fabless in Asia

$Bn CAGR (Y12-Y17)

<table>
<thead>
<tr>
<th>Region</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldwide</td>
<td>3.9%</td>
</tr>
<tr>
<td>Americas</td>
<td>2.8%</td>
</tr>
<tr>
<td>EMEA</td>
<td>2.9%</td>
</tr>
<tr>
<td>Japan</td>
<td>0.6%</td>
</tr>
<tr>
<td>APAC-China</td>
<td>8.3%</td>
</tr>
<tr>
<td>APAC-Other</td>
<td>-0.5%</td>
</tr>
</tbody>
</table>

Source: iSuppli, IHS, Worldwide AMFT; Pureplay Foundry 3Q13, MKT Team Analysis,
Fabless & Foundry Growth Will Continue to Thrive

- Fabless revenue will reach ~$105B by Y17F, (~29% of WW market)
- Rapid Foundry growth
  - Driven by growth in Fabless & IDM O/S

Source: iSuppli, IHS, Worldwide AMFT; Pureplay Foundry 3Q13, MKT Team Analysis, Estimation on Y17 WW Fabless
China Strategy of Top Worldwide IDM & Fabless

Top Tier Players Leveraging China Resources to Gain Market Share

- Top Logic IC Manufacturer: Intel
- Top Memory IC Manufacturer: Samsung, Hynix
- Top Analog IC Manufacturer: TI
- Top Foundry Players: TSMC, UMC
- Top Fabless: Qualcomm, Broadcom

1H13 & Y12 Top 10 IC Companies

<table>
<thead>
<tr>
<th>1H13 Ranking</th>
<th>Y12 Ranking</th>
<th>Top 10 IC Company</th>
<th>Headquarter</th>
<th>Fab in China</th>
<th>Industry Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Intel</td>
<td>U.S.</td>
<td>12&quot;</td>
<td>Advanced Logic</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Samsung</td>
<td>South Korea</td>
<td>12&quot;</td>
<td>Advanced Memory</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Qualcomm</td>
<td>U.S.</td>
<td>Fabless*</td>
<td>Advanced Logic</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>SK Hynix</td>
<td>South Korea</td>
<td>12&quot;</td>
<td>Advanced Memory</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Toshiba</td>
<td>Japan</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>TI</td>
<td>US</td>
<td>8&quot;</td>
<td>Advanced Analog</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>Micron</td>
<td>US</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>STM</td>
<td>Europe</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>Broadcom</td>
<td>U.S.</td>
<td>Fabless*</td>
<td>Advanced Logic</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>Renesas</td>
<td>Japan</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

*Fabless players leverage China foundry production capability

Source: IC Insights, iSuppli, Gartner (2Q13)
Japanese IDMs Have Influential Position in Worldwide Semi Market

- Japan has ~28% of WW IDMs’ capacities (8”-eq.)
- Well-established eco-system from IC designs to set manufacturing.
- Strong R&D foundation and product development practices.
- Strict design and manufacturing standards and qualification cycles.

<table>
<thead>
<tr>
<th>Wafer Size</th>
<th>RoW IDMs</th>
<th>Japan IDMs</th>
<th>WW IDMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>50mm</td>
<td>67</td>
<td>43</td>
<td>37</td>
</tr>
<tr>
<td>75mm</td>
<td>556</td>
<td>519</td>
<td>37</td>
</tr>
<tr>
<td>100mm</td>
<td>1,197</td>
<td>547</td>
<td>37</td>
</tr>
<tr>
<td>125mm</td>
<td>1,496</td>
<td>845</td>
<td>37</td>
</tr>
<tr>
<td>150mm</td>
<td>2,290</td>
<td>1,163</td>
<td>1,126</td>
</tr>
<tr>
<td>200mm</td>
<td>2,323</td>
<td>1,126</td>
<td>731</td>
</tr>
<tr>
<td>300mm</td>
<td>2,593</td>
<td>731</td>
<td>3,324</td>
</tr>
</tbody>
</table>

Source: Gartner Fab Database 3Q13, MKT Team Analysis
Advantages & Challenges for Japan

- Excellent Manufacturing
- Professional Design Skill
- No. 1 Quality Control
- Marketing in Asia
- Response to Changes
- On-Site Support
- Affordability

How to get the $160B China Market???
Collaboration & Partnership between Japan & China

Joint efforts

In Depth Understanding of Local Market Partnership with System Houses

Faster IP Verification & DS Support
1,100+ IPs Available
In China, Foundry ≠ Manufacturing Only

- Joint Planning for Product Specifications
- IP Preparation for Faster Product Launch
- Joint Marketing with Innovations
  - Automotive, Medical, Industrial & Infrastructures
  - IoT / Cloud
- Joint Development of China Strategy

Time to Market  Time to Product

Profit and Market
Win-Win Strategy, What SMIC Offers to Help Customers

Foundry Service

- Proven Track Records of World-class IDM & Fabless Customers.
- Variety of Technology Offerings

Technology Partnership

- Continuous Investment on Advance Nodes
- Differentiation Technology

China Strategy

- Familiar with China standards
- The Most Preferred Partner in China
- In Depth Market Intelligence

Cost Sensitive Market

- Largest Pure play China Foundry
- Most Advanced Foundry in China, 40nm mass production, 28nm frozen in 4Q.
- Growing in Technology & Capacity

- Ability to meet rigorous design and production cycles
Management Team Delivered Impressive Turnaround

- Revenue from wafer shipments from Wuhan Xinxin was $30.6 million in 3Q13. The Company began phasing out wafer shipments from Wuhan Xinxin in 3Q13.

Note: *Net Income attributable to SMC

When SH 12” fab entered volume production in Q4, all production related costs were removed from R&D expense line and treated as manufacturing costs.

Source: 4Q2012 Earnings Release

---

**Revenue, Utilization Rate (US$mm)**

<table>
<thead>
<tr>
<th></th>
<th>1Q12</th>
<th>2Q12</th>
<th>3Q12</th>
<th>4Q12</th>
<th>1Q13</th>
<th>2Q13</th>
<th>3Q13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue without Wuhan</td>
<td>74</td>
<td>95</td>
<td>92</td>
<td>91</td>
<td>89</td>
<td>99</td>
<td>88</td>
</tr>
<tr>
<td>Wuhan Revenue</td>
<td>22</td>
<td>42</td>
<td>47</td>
<td>49</td>
<td>30</td>
<td>39</td>
<td>31</td>
</tr>
<tr>
<td>Utilization Rate</td>
<td>310</td>
<td>380</td>
<td>414</td>
<td>437</td>
<td>472</td>
<td>502</td>
<td>504</td>
</tr>
</tbody>
</table>

**Gross Profit, Net Income*, Gross Margin (US$mm)**

- Gross profit: 12.0%, 24.1%, 27.5%, 19.9%
- Net Income: 19.9%, 19.6%, 25.0%
- Gross Margin: 21.0%

- Revenue from wafer shipments from Wuhan Xinxin was $30.6 million in 3Q13. The Company began phasing out wafer shipments from Wuhan Xinxin in 3Q13.

Note: *Net Income attributable to SMC
Continuous Growth in Advanced Nodes
Good track record on 40nm Ramp Up

Continuous Growth in Advanced Technology Nodes
(% of Revenue)

40nm Ramp Up & Capacity Plan

Wafer Revenue Breakdown by Technology
Help Customers to Speed Up Design and Manufacturing Ramp Up

- Assembled IP and Design Service partners to enable customers moving faster
- Typical TAT experiences
  - Design Implementation: 2 quarters or less
  - TO to Production: 2 to 3 quarters
  - Shortest TO to PO-in time: 4 months
- Becoming primary foundry for new designs after success of 1st chip
  - Two of the three customers from world top-25 fabless design houses of 2012

Customer A: 1st chip in 55nm
Customer B: 1st chip in 65nm
Customer C: 1st chip in 40nm
Customer C: 3rd chip in 40nm

3Q10 4Q10 1Q11 2Q11 3Q11 4Q11 1Q12 2Q12 3Q12 4Q12 1Q13 2Q13 3Q13

T/O Shipping
3 more NTOs by Q4’11

T/O PO Shipping
4 new 55/40nm NTOs

T/O
Shipping
TO on 1/1/13
W/O on 2/16/13
Test going well

Customer C: 3rd chip in 40nm
SMIC Offers One-Stop Solution
Shorten Time-To-Market, Time-To-Money

One Stop Solution

Design Enablement & IP Support

Mask Manufacturing

Wafer Manufacturing

Wafer Probing

Wafer Bumping

Assembly & Final Test
TOPPAN SMIC Electronics Shanghai (TSES)  
凸版中芯彩晶電子（上海）有限公司  
TSES manufactures On-chip Color Filter & Micro Lens for CMOS Image Sensor  
(QVGA CIF VGA SVGA XGA SXGA 2M 3M 5M 8M 12M)  
- Ground Breaking: November, 2004  
- Mass Production: January, 2006  
- Capacity: 22k→27kWPM  
- 100+ Employees  

Success Stories:  
- Seamless Technology Transfer with Localized Engineering/Sales/Marketing  
- TSES represents ~50% of Toppan’s 8” Capacity as of Y2013  
- Captured One of the Largest CIS Customers for China Market  
- Accessed and Penetrated China’s Low/Mid-end Market segments  
- Applied Cost Reduction with Localized Sourcing, Lower than in Japan
## SMIC’s Technology Portfolio
### Continuous Innovation

<table>
<thead>
<tr>
<th></th>
<th>CIS</th>
<th>BCD</th>
<th>HV</th>
<th>MS/RF</th>
<th>Logic</th>
<th>eFlash</th>
<th>e-EEPROM</th>
<th>NOR/PCM/NAND-Flash</th>
<th>CMOS MEMS</th>
<th>TSV</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/14nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40/45nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65nm</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90nm</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.11µm</td>
<td></td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.13µm</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.16/0.153µm</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.18µm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.25µm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.35µm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **In Production**
- **Major Focus** (close to or in early production)
- **Future Plan**
<table>
<thead>
<tr>
<th>Category</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Management</td>
<td>PMIC, PMU, Discrete Power</td>
</tr>
<tr>
<td>Wire-line Communication</td>
<td>Flash Controller, USB, Bridge IC, TCON, Audio, Video</td>
</tr>
<tr>
<td>Image &amp; Display</td>
<td>Mobile Phone CIS, DSC/DV/DPF, NB/PCCAM</td>
</tr>
<tr>
<td>MCU</td>
<td>Touchpad controller, MCU</td>
</tr>
<tr>
<td>Smart Card</td>
<td>Financial Card, Bank Card, ID Card, Transportation Card, ePassport, etc…</td>
</tr>
<tr>
<td>Wireless Connectivity</td>
<td>Wi-Fi, Bluetooth, GPS, AM/FM, NFC, etc…</td>
</tr>
<tr>
<td>Mobile Computing</td>
<td>Mobile Phone, Tablets, Application Processors, Baseband, SoC</td>
</tr>
<tr>
<td>Memory</td>
<td>NOR Flash, NAND Flash, eNVM</td>
</tr>
<tr>
<td>Digital Home</td>
<td>TV, Set-Top Box, Game Consoles, Projector</td>
</tr>
</tbody>
</table>

Diversified Technology Offerings on Various Applications
SMIC’s Application Portfolio Meeting Market’s Demands

<table>
<thead>
<tr>
<th></th>
<th>Power Mgmt</th>
<th>Wireline Comm.</th>
<th>Image &amp; Display</th>
<th>MCU</th>
<th>Wireless Connectivity</th>
<th>Smart Card</th>
<th>Mobile Computing</th>
<th>NOR/NAND PCM/Memory</th>
<th>Digital Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/14nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28nm</td>
<td></td>
<td>○</td>
<td></td>
<td></td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38nm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40/45nm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55nm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65nm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90nm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.11µm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.13µm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.16/0.153µm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.18µm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.25µm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.35µm</td>
<td></td>
<td>○</td>
<td>○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **In Production**
- **Major Focus** (close to or in early production)
- **Future Plan**
SMIC & Brite Success Story
Launch of ARM Core Chipsets in China

- First ARM Cortex-A9, Dual Core @ SMIC 40nm
  - Sign off 900Mhz @ SS corner, 1.08v/125c
  - Achieve silicon >1.3G @TT high performance with SMIC PEK

- China Top-10 IC Design Company
  - ARM Cortex-A7, Quad Core
  - CPU performance >1.0GHz
  - Adopt Unified Power Format (UPF) flow design

- First SMIC 40nm SoC production
  - ARM Cortex-A5, Single Core
  - Ultra Low Power methodology, including multi-power domain, multi-voltage
  - Complex at speed DFT implementation
SMIC & VeriSilicon Success Story
Serving Specialty Products to Customers

• Collaborate Closely on Goal Setting and Targeted Market
• Technical Breakthroughs and Improve Operation Efficiency

**Success Story:** MEMS, Video Sensors, Bank Card, Touch Controller

- Tier-1 and Whitebox Smartphone
- System-in-Package (SiP) with MEMS die, SoC/Controller
- Field Return Rate: Zero, Reported by VeriSilicon

- Next Generation Project on SMIC 65nm LL process has obtained 1st Silicon Success
- Collaborate with Tier-1 System Makers

- Developed ULP Standard Cell Libraries
- Touch Controller IC for Smartphone, Tablets, Monitors
- 5~10 points Multi-Touch Function
- Tier-1 Computer Vendor Design Win & TW OEM

**MEMS**

**Contact-Less Bank Card**

**Video Sensor**

**Touch Controller IC**
Well Established IP, EDA and DS Network to Service Customers

Combinations of worldwide leading and local positioning
Combinations of excellence and flexibility

IP Alliance

EDA Alliance

DS Alliance
Ramping Up
MP ready since 4Q12

Finalizing Development
Technology Readiness
End/4Q13

Development in Preparation
Step Stone 20nm HKMG;
Deliver 14nm FinFET by End/2Q16

20/14nm

28nm

45/40nm

Pushing Forward on the Development of Advance Technology
28nm HKMG TEM Cross Section
FEOL

Cu Pillar

NMG

PMG

SiGe

SiGe
Integrated module – FEOL

- Shallow Trench Isolation (STI) development
- Gate spacer development
- Sigma shaped SiGe development
- Contact development
SMIC is #1 Foundry in China
Largest & Most Advanced

Beijing 12” Fab B1
36kWPM (0.15µm~55nm)
(AI 1k + Cu 35k)

Beijing 12” Fab B2
(under construction)

Tianjin 8” Fab F7
39kWPM (0.35µm~0.13µm)

Shanghai 12” Fab F8
15kWPM (45/40nm~28nm)

Shenzhen 8” Fab 15/16
(under development)

Shanghai 8” Fab S1
94kWPM (0.35µm~0.11µm)
(AI 72k + Cu 22k)

Source: 2013 Capacity Planning, Company Data

* kWPM – 1,000 Wafers per Month
SMIC BJ B1&B2 Facility (Milestone)

B1
- Technology Offer: 0.153μm ~ 55nm
- 2002 Sep: Piling work began
- 2004 Jun: Equipment move in Fab B1A
- 2004 Jul: Commenced pilot production
- 2004 Sep: B1A Grand Opening Ceremony

B2
- Technology Offer: 40nm ~ 28nm PolySiON/HKMG
- 2013 End: Complete Construction
- 2014’Q1: Equipment move in
- 2014’2H: Risk production 6K
- 2015: 15K
- 2016: 25K
- 2017: 35K
B2 Engineering Construction Progress
(Photographed on 2013/11/22)
Your Preferred Partner for Building All-Win Strategies in China and Worldwide

- Experienced Teams
- Quality, Service, Speed, Precision

The Right Team

#1 Foundry In China
Proven Records
Complete Eco-System
Shorten Time to Market

Manufacturing Excellence

- Your Partner in China
- Local Access
- Application Driven

The Right Market

- #1 Foundry In China
- Proven Records
- Complete Eco-System
- Shorten Time to Market

Technology Span & IP Investment

- Enriched IP Portfolio & Strict IP Protection
- Wide Tech Span with Value-added Service
- Mature & Advanced Technologies:

SMIC
Thank you!

GSA Forum at SEMICON Japan 2013
Optimizing Ecosystem through Win-Win Collaboration & Partnership