The Rise of China IC Industry
- Innovation and Investment Forum

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President, SEMI China
July 11, 2017
China Strategic Innovation and Investment Forum: The Rise of China IC Industry

While the global semiconductor industry continues its consolidation through large-scale mergers and acquisitions, China’s semiconductor industry is embarking on a new round of expansion with heavy investment from public and private funding. At this forum, IC and investment community executives will share their views on the industry’s evolution and offer insights on investment, M&A, and innovation trends in China. With informative presentations and multiple networking opportunities, the China Strategic Innovation and Investment Forum is one of the most influential China-focused platform where markets, technology, talent, and funding meet.

Date: Tuesday, Jul 11  Time: 13:30 – 17:05  Venue: Yerba Buena Center for the Arts, San Francisco, USA
产业人才
Industry Talent

先进技术
Innovation Tech

行业资本
PE / VC

专业咨询
Advisory Consulting

汇聚先进技术及全球产业资本
聚焦中国 FOCUS CHINA
搭建专业权威的产业投资平台
连接全球 CONNECT GLOBAL
Mission & Objectives 使命与愿景

• Help Foster Sustainable Growth of IC Industry
  推进半导体产业可持续发展
• Provide Access to Global Technology and Investment Opportunities
  提供全球技术与投资对接机遇
• Provide Open Communication platform between China and global IC communities
  为中国与全球半导体产业提供开放的交流平台
• Promote collaborations between China and global partners
  促进中国与全球合作伙伴的协作
• Help match funds with company growth/expansion and start-up needs.
  帮助初创企业及企业扩张所需资金的对接
"Tech Investment Forum", bringing together worldwide industry and investment leaders, has become a widely recognized international platform for investment in semiconductor industry. With China's new IC policy, the leaders of China's National IC Fund, municipal IC funds and the global leading investment institutions will explore the hot topics of investment opportunities and the latest trends in semiconductor applications such as artificial intelligence.

Date: Wednesday, March 15, 2017  
Time: 09:00 – 16:35  
Venue: Pudong Ballroom 5+6+7, Kerry Hotel Pudong, Shanghai  
Chinese and English Simultaneous Interpretation will be provided.
SIIP (SEMI Innovation Investment Platform)

SEMI产业投资平台持续关注 摩尔定律 • 工业4.0 • 智能制造 • 超越摩尔 • 物联网技术
Keeping pace with Moore’s Law • Industry 4.0 • Smart Manufacturing • More-than-Moore • Rise of IoT Technologies

制造领域涉及大半导体产业
Semiconductors
光电 LED
平板 FPD
光伏 Photonics
传感器 Sensors
微机电 MEMS
柔性电子 FHE
等等 Etc.

终端应用领域
Industry 4.0
汽车电子
Cloud Storage
移动技术
等等

系统集成
System Integration
器件制造 Device Manufacturing
封装测试 Packaging Test
健康产业 Healthcare

SIIP CHINA
SEMI产业创新投资平台
SEMI Innovation Investment Platform
产业投资平台 推动行业发展

- Theme discussion 专题项目讨论会
- Matchmaking Session 深度对接闭门会
- Quarterly industry investment Gathering 定期投资交流会
- Delegation 国际交流访问团
China: Largest and Growing Share of WW IC Market

Worldwide Semiconductor Consumption by Region

Sales (billions of USD)

- 2014: $343
- 2015: $335
- 2016: $333
- 2017: $351
- 2018: $367
- 2019: $379
- 2020: $391

Regional Sales of Total Market (%)
- China: 45.8%
- Americas: 26.9%
- Europe: 12.3%
- Japan: 9.4%
- ROW: 5.6%

Source: Gartner, 2016.03
China Continues to Outpace the Rest of World in IC Industry Growth
Growth in all Segments

IC Design:
Package/Test
IC Mfg
But Dominated by Imports –
Semiconductor: #1 Import and Huge Trade Deficit

China IC Import/Export Comparison

Source: China Customs, 2016.04
Big Gap Between Local IC Supply and Demand
China IC Market: Heavy Dependency on Imports

China IC Market vs. China IC Production Trends

IC Production Share of China IC Market:
2009: 7.8%
2015: 12.7%
2020F: 18.1%

Source: IC Insights

数据来源: SEMI 2016年8月
The Shift of Global Electronics Industry to Asia Pac

Electronics Mfg: US/EU/JP→SE Asia→TW, China
Semiconductor Mfg: US/EU→JP→KR, TW, → China(?)

2000年全球半导体产能按地区分布

2015年全球半导体产能按地区分布

数据来源: SEMI 2016年8月
# High Lights of 2014 China Government National IC Development Guidelines

<table>
<thead>
<tr>
<th>Key Words</th>
<th>Development Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design</strong></td>
<td></td>
</tr>
<tr>
<td>1. Supply Chain Collaboration</td>
<td>Near Term: Mobile Smart Terminal and Network Communication: Mobile terminal, Digital TV, Network Communication, Smart Wearable and OS</td>
</tr>
<tr>
<td><strong>Mfg</strong></td>
<td></td>
</tr>
<tr>
<td>1. Capex</td>
<td>Speed up the 45/40nm foundry capacity ramp up and 32/28nm line set up, 3D process R&amp;D, capability set up of 22/20nm and 16/14nm foundry production capability. Excel the specialized production line such as Analog and mix circuit, MEMS, high voltage and RF</td>
</tr>
<tr>
<td>2. Advanced Node</td>
<td></td>
</tr>
<tr>
<td><strong>Pkg/test</strong></td>
<td></td>
</tr>
<tr>
<td>1. M&amp;A</td>
<td>CSP, WLP, TSV and 3D Stack</td>
</tr>
<tr>
<td>2. Evolution</td>
<td></td>
</tr>
<tr>
<td><strong>Equipment Material</strong></td>
<td>R&amp;D in key equipment such as Lithography, Etching, and Implant R&amp;D of key material such as Photoresist and large wafer</td>
</tr>
<tr>
<td>1. Key Equipment and Material Break-through</td>
<td></td>
</tr>
<tr>
<td>2. Manufacturing Synergy</td>
<td></td>
</tr>
</tbody>
</table>

Source: SEMI 2016.8
China National IC Industry Development Guideline  
- Highlights of Key Goals in 2020

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Revenue</strong></td>
<td>&gt;350 Billion RMB</td>
<td>&gt;870 Billion RMB (CAGR &gt; 20%)</td>
</tr>
<tr>
<td><strong>IC Manufacture</strong></td>
<td>32/28nm mass production</td>
<td>16/14nm mass production</td>
</tr>
<tr>
<td><strong>IC Design</strong></td>
<td>Part of key area technologies approach international first class level (e.g. mobile smart terminal, network communication)</td>
<td>Key area technologies achieve international leading edge. (e.g., mobile smart terminal, network communication, cloud computing, IOT, big data, etc.)</td>
</tr>
<tr>
<td><strong>Packaging &amp; Test</strong></td>
<td>Mid- to high-end revenue &gt; 30% revenue</td>
<td>Technology to achieve international leading edge</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>12 inch silicon wafer into production line.</td>
<td>Enter global supply chain</td>
</tr>
<tr>
<td><strong>Equipment</strong></td>
<td>65-45nm key equipment into production line.</td>
<td>Enter global supply chain</td>
</tr>
</tbody>
</table>
纲要的两个重点

Sino IC (Big) Fund
集成电路产业基金

兼并重组
M&A

Estimated Initial Phase amount: RMB300Billion (including local government)

Type: Equity Fund

Majorly for Fab capacity and M&A

IC Design: M&A under market mechanism

Packaging & Test: M&A and consolidation

数据来源: SEMI 2016年8月
IC Investment Funds Enabled by China Government

<table>
<thead>
<tr>
<th>时间</th>
<th>省市</th>
<th>相关基金</th>
<th>基金规模</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014.9.24</td>
<td>中央</td>
<td>国家集成电路产业投资基金</td>
<td>1387.2亿</td>
</tr>
<tr>
<td>2013.12.19</td>
<td>北京市</td>
<td>集成电路产业发展股权投资基金</td>
<td>300亿</td>
</tr>
<tr>
<td>2015.7.9</td>
<td>北京市</td>
<td>集成电路海外平行基金成立</td>
<td>20亿</td>
</tr>
<tr>
<td>2016.3.9</td>
<td>福建省</td>
<td>厦门国资紫光联合发展基金</td>
<td>160亿</td>
</tr>
<tr>
<td>2016.6.25</td>
<td>福建省</td>
<td>安芯产业投资基金成立</td>
<td>500亿</td>
</tr>
<tr>
<td>2016.6.8</td>
<td>广东省</td>
<td>广东省集成电路产业投资基金</td>
<td>150亿</td>
</tr>
<tr>
<td>2015.8.5</td>
<td>湖北省</td>
<td>湖北集成电路产业投资基金</td>
<td>不低于300亿</td>
</tr>
<tr>
<td>2016.3.12</td>
<td>湖南省</td>
<td>国微集成电路创业投资基金</td>
<td>2.5亿</td>
</tr>
<tr>
<td>2015.7.21</td>
<td>江苏省</td>
<td>南京市浦口区集成电路产业基金</td>
<td>10亿</td>
</tr>
<tr>
<td>2016.12.5</td>
<td>江苏省</td>
<td>南京市集成电路产业专项发展基金</td>
<td>500亿</td>
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<tr>
<td>2016.12.27</td>
<td>江苏省</td>
<td>无锡市集成电路产业投资基金</td>
<td>200亿</td>
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<tr>
<td>2016.6.6</td>
<td>辽宁省</td>
<td>辽宁省集成电路产业投资基金</td>
<td>100亿</td>
</tr>
<tr>
<td>2016.9.12</td>
<td>陕西省</td>
<td>陕西省集成电路产业投资基金</td>
<td>300亿</td>
</tr>
<tr>
<td>2016.2.1</td>
<td>上海市</td>
<td>集成电路产业基金</td>
<td>500亿</td>
</tr>
<tr>
<td>2016.11.15</td>
<td>石家庄市</td>
<td>集成电路产业投资基金</td>
<td>100亿</td>
</tr>
<tr>
<td>2016.5.26</td>
<td>四川省</td>
<td>四川省集成电路和信息安全产业投资基金</td>
<td>120亿</td>
</tr>
<tr>
<td>2014.11.21</td>
<td>天津市</td>
<td>集成电路设计产业促进专项资金</td>
<td>每年2亿</td>
</tr>
</tbody>
</table>

总计  
4651.7亿
All Over the Map. National Fever in Pursuing IC Industry

4 Major Regions
- Yangzi Delta: Design, Manufacturing, OSAT, Equipment
- Beijing/Tianjing/Bohai Area: M&A
- Pan Zhujiang Delta: Design, System and Applications
- Center-West China: Memory and Special Processes
Revenue Target of 2014 Guideline

中国集成电路产业营收和目标
China IC Industry Revenue and Projection

<table>
<thead>
<tr>
<th>$ Billion</th>
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<tbody>
<tr>
<td>2001</td>
</tr>
<tr>
<td>2002</td>
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<tr>
<td>2003</td>
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<tr>
<td>2004</td>
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<td>2013</td>
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<tr>
<td>2014</td>
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<tr>
<td>2015</td>
</tr>
</tbody>
</table>

中标: 1. 营业值为中国所有集成电路企业销售所得，包含IC Fabless、代工厂、IDM和委外封装等企业。
2.2015年营运目标是超过3500亿人民币; 2015-2020年均增速超过20%。

来源: CSIA, SEMI

数据来源: SEMI 2016年8月
### China IC Sales by Segments

<table>
<thead>
<tr>
<th>Year</th>
<th>IC Design</th>
<th>IC Manufacturing</th>
<th>IC Packaging and Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>53</td>
<td>62</td>
<td>54</td>
</tr>
<tr>
<td>2012</td>
<td>95</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>2013</td>
<td>110</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>2014</td>
<td>71</td>
<td>105</td>
<td>71</td>
</tr>
<tr>
<td>2015</td>
<td>90</td>
<td>133</td>
<td>133</td>
</tr>
</tbody>
</table>

### China IC Sales Growth by Segments

Source: CSIA, 2016.04
With Limited Competitiveness, China IC Industry Faces Challenges and Opportunities
Summary

• Why?
  – Concerns of National Security and Trade Deficit
  – Market Driven

• China National IC Development Guideline and Big Fund
  – Necessary, Just Timely, or Maybe too late?

• Opportunities and Challenges
  – Design/Fabless: Mostly Low-Margin Consumer Segments
  – Mfg: 2-3 Generations Behind. Over capacity? Sustainability?
  – Assembly/Test: Improving competitiveness thru R&D and M&A
  – Equipment/Material: Dominated by US/JP/EU.

• 13-5 Plan and Beyond, Not a “Threat” yet.
  – China as a Global Ecosystem Partner
  – Opportunities for US and global players.
  – Low-Cost Mfg -> Solution -> Innovation
Thank You!

Co-organizer:

Sponsors: