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Opportunities and Challenges of the Chinese Test & Burn-in Socket Market

Lin Fu
VLSI Research Europe
Contents ---- Global Market

• Global IC Market
  1. What’s happening in the long-term?
  2. What’s happening now?
  3. What does this mean for socket suppliers?

• Global Test and Burn-in Socket Market
  1. Market size
  2. Region of consumption
  3. Top vendors and market shares
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Obviously, the IC market is on a trend of continuous growth.
5 Virtuous Cycles of Demand

Exponential Growth: Tens to Billions in 60 years
IC Revenues in 2017

4 fast growing segments

Memory
---- DRAM (27%)
---- NAND Flash (22%)

MOS Logic
---- MPU (5%)
---- Other Logic (6%)

Overall growth > 10%
IC Revenues in 2021

4 fast growing segments

Memory
- DRAM (41%)
- NAND Flash (55%)

MOS Logic
- MPU (25%)
- Other Logic (29%)
2017 - IC Manufacturing in Good Health

• 5 to 6 weeks inventory – normal

• Inventories are growing, but in line with market size

• Strong chip prices

• High utilization rates
Week-Over-Year IC Sales Growth Trends

IC Recovery Started in March 2016

Opportunities and Challenges of the Chinese Test & Burn-in Socket Market
IC Growth drives test & burn-in
Socket Growth

Test & Burn-in Socket Growth vs. IC Growth, %

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Test & Burn-in Socket Market

Test sockets growing quicker than burn-in sockets

Test sockets:
--- Revenue 16: $631M
--- CAGR 16-21: 4.4%

Burn-in sockets:
--- Revenue 16: $406M
--- CAGR 16-21: 3.6%

Total socket market in 2016: $1037M

Opportunities and Challenges of the Chinese Test & Burn-in Socket Market
• China consumed 11% Test & Burn-in Sockets in 2016
• Chinese share of market up by 4.5% in last 5 years, and expected to account for 15% to 17% by 2021
Public companies including ISC, LEENO, Yamaichi, Enplas, Sensata, had strong performance in Q1 and Q2 2017. (Q1 2017 revenues for these companies were 15% higher than Q1 2016 revenues)
Industry Consolidation in 2016

Test and Burn-in Sockets Industry Consolidation Profile 2016

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Test socket --- fragmented  Burn-in socket: concentrated
Top 3 burn-in socket vendors owned more than 50% market share
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  ---- present status
  ---- further development

• Emergence of Chinese semiconductor test
  ---- Top OSATS
  ---- Chinese socket market / socket vendors

• Challenges of Chinese semiconductor test market
  ---- For local vendors
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Chinese Semiconductor Industry and Market Status

- **58.5%** ---- China’s share of global semiconductor consumption
- **16.2%** ---- China’s share of global semiconductor production
- **7.5%** ---- China’s share of global IC design industry
- **13.9%** ---- China’s share of global wafer fab capacity
- **715** ---- Number of Chinese IC design enterprises

Data from PwC (China’s impact on the semiconductor industry: 2016 update)
### Foreign Investment in China

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Data from IC Insights
Chinese semiconductor objectives (1)

- **13th five-year plan (2016-2020)**
  
  ------ Wafer Fabrication: 16/14 nm process technology can achieve mass production

  ------ Package and Testing: reach same level with international first-tier factories

  ------ Equipment and Material: enter into international purchasing supply chain

  ------ IC Design: based on the sustainable development of IC design technology in mobile communication and Internet communication, enter into cloud, IoT, big data field
Chinese semiconductor Objectives (2)

• Made in China 2025

------ Global brand owners in semiconductor industry including equipment & material, IC design & manufacture, electronic components and end-user products

------ The "Made in China 2025" clearly outlines that the nation is aiming to raise its self-sufficiency rate for ICs to 40% in 2020 and 70% in 2025
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Top OSATs

Top OSATS for 2017 (Provisional Ranking)

- ASE & SPII, Taiwan
- Amkor, North America
- JCET & STATS ChipPAC, China
- Powertech, Taiwan
- Tianshui Huatian, China
- Tongfu Microelectronics, China
- KYEC, Taiwan
- ChipMOS, Taiwan

- JCET acquired STATS ChipPAC in 2016, among the top 3 OSATS
- 3 Chinese companies among the top 10 OSATS.
Chinese test and burn-in socket market in 2016

- 6% ---- Chinese suppliers’ share of global market
  Main sales region: China (>80%), Taiwan and North America

- $120M ---- Sockets consumed in China
  65% ---- test sockets ($78M)
  35% ---- burn-in sockets ($42M)

  40% ---- supplied by local vendors
  60% ---- supplied by foreign vendors
Top Chinese local socket vendors

- **TwinSolution**: One of the largest Chinese socket vendors
  - Focus on the high performance test sockets
  - International competitiveness

- **Other top / emerging socket vendors**
  - Kaizhitong Microelectronics (KZT)
  - Junrensi Electronic Technology (JRS)
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Challenges for local vendors

• Foreign chipmakers with manufacturing in China still mostly buying sockets from outside China

• A small amount of government subsidy or help for Chinese socket vendors

• Chinese socket vendors mostly focusing on low-end products

• New products with high performance will be necessary for improving competitiveness in both local and international market
Challenges for foreign vendors

- Increased number of purchase decisions will be made by Chinese chip designers and OSATS in next five years

- First round competition for close cooperation with Chinese decision makers may be over: long-term relationships may already have been formed and difficult to break
Conclusion

- Chip making in China set to grow - driven by strong global IC market and increased market share

- Increased importance of China as a region for semiconductor test

- Chinese socket market expected to grow from 11% in 2016 to 15% - 17% in 2021