

# IC Advanced Packaging Industry Report, 2009

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## Abstracts

The semiconductor industry is in the era of 32nm process, and it is expected that it will meet 16nm around 2019. Designing a 45nm SoC costs USD20-50 million except labor cost, and the design of a 32nm SoC costs USD75-120 million, while it is less than USD5 million for 130nm. Therefore, even if the IC design companies with annual revenue of over USD2 billion probably can not afford such high cost, and there are no more than ten such companies all over the world, which means that the majority of IC design companies are disqualified to enter 45nm or 32nm era. Perhaps the semiconductor industry will develop at the pace of Moore's Law. Having made up for the bottleneck of process shrinkage, the packaging industry will yield unusually brilliant results in post-Moore's Law era.

In practice, the packaging industry has become increasingly important since 2000, and the debut of BGA, FC and CSP has sped up the progression of semiconductor industry. However, the front-end of semiconductor manufacturing has been in stagnancy, still in the era of 12-inch wafer, and it is likely that 15-inch wafer era will not come. Currently, a revolutionary packaging, TSV packaging presents itself, which is so called 3D IC. The technology will dramatically improve chip transistor density, cubic density rather than plane density, and make semiconductor industry surpass the development pace of Moore's Law. Not only packaging companies and wafer OEMs, but also nearly all global prominent semiconductor companies such as IBM, Samsung, Intel and Qualcomm are all actively developing TSV technology. TSV has been in large shipment in image sensor and MEMS field, and it will rapidly expand to memory field in the future, and to DSP, RF IC, cell phone baseband, processor, CPU and GPU in 2013. Furthermore, TSV market size will rise to over US\$2 billion from less than US\$ 300 million currently, which will be the rapidest growing field in semiconductor industry.

In the meantime, the advanced packaging has an increasingly powerful driving force. IC advanced packaging mainly refers to IC substrate packaging, including BGA, CSP, FC

and LGA, and it mainly applies for cell phone, memory, PC (CPU, GPU and Chipset), network communications, and consumer electronics. In addition, the network communications include high-speed switch, router and base station. Consumer electronics are as the followings such as game console, IPOD, ITOUCH, and high-end PMP. The cell phone has more and more powerful functions, thinner and thinner in size; and the smart phones have covered a rising ratio. In the field of memory, DDR3 has become the mainstream, with the rate increased to over 1GHz; CPU has multi-cores, and the number of pins has exceeded 1,200. China's 3G and the world's 4G network distribution has boosted up the sales of base stations. The stay-at-home economy has made game machine shipment increase sharply as well.

Japan and Taiwan have almost dominated IC packaging industry. Among the global top 12 companies, seven of which are from Taiwan, two from Japan, two from the United States, and one from South Korea.

## Contents

### **1 STATUS QUO AND FUTURE OF IC ADVANCED PACKAGING**

- 1.1 IC Packaging Overview
- 1.2 IC Packaging Types
  - 1.2.1 SOP
  - 1.2.2 QFP and LQFP
  - 1.2.3 FBGA
  - 1.2.4 TEBGA
  - 1.2.5 FC-BGA
  - 1.2.6 WLCSP
- 1.3 Future Star – TSV Packaging
  - 1.3.1 TSV Intro
  - 1.3.2 Why is TSV rather than SoC
  - 1.3.3 TSV Development
  - 1.3.4 TSV Industry and Market

### **2 IC ADVANCED PACKAGING MARKET**

- 2.1 Cell Phone IC Advanced Packaging Market
- 2.2 Cell Phone Baseband Packaging
  - 2.2.1 Cell Phone Baseband Industry
  - 2.2.2 Cell Phone Baseband Packaging
- 2.3 Cell Phone (Mobile) Application Processor
  - 2.3.1 Definition
  - 2.3.2 Market and Industry
- 2.4 Smart Phone Processor Industry and Packaging
- 2.5 Cell Phone Embedded Memory
  - 2.5.1 Overview
  - 2.5.2 Cell Phone Memory Development
  - 2.5.3 Cell Phone Memory Industry and Packaging
- 2.6 Cell Phone RF IC
  - 2.6.1 Market
  - 2.6.2 Industry
  - 2.6.3 3G/4G-era Cell Phone RF IC Packaging
- 2.7 Other Cell Phone IC
- 2.8 Cell Phone Market and Industry
  - 2.8.1 Market

- 2.8.2 Industry
- 2.8.3 China's Smart Phone Market
- 2.9 Advanced Packaging in PC Field
  - 2.9.1 DRAM Industry
  - 2.9.2 DRAM Packaging
  - 2.9.3 NAND Flash Industry
  - 2.9.4 NAND Flash Packaging Development
  - 2.9.5 CPU, GPU & North and South Bridge Chipset
- 2.10 Image Sensor

### **3 ADVANCED PACKAGING INDUSTRY**

- 3.1 Industry Scale
- 3.2 Industry Patterns
- 3.3 Comparison of Manufacturers

### **4 ADVANCED PACKAGING MANUFACTURERS**

- 4.1 TESSERA
- 4.2 Greatek
- 4.3 Formosa
- 4.4 ASE
- 4.5 AMKOR
- 4.6 SPIL
- 4.7 STATS ChipPAC
- 4.8 PHOENIX
- 4.9 Nanya
- 4.10 Kinsus
- 4.11 PowerTech
- 4.12 ChipMOS
- 4.13 King Yuan Electronics
- 4.14 IBIDEN
- 4.15 SHINKO
- 4.16 CARSEM
- 4.17 UNISEM
- 4.18 NEPES
- 4.19 STS
- 4.20 SEMCO
- 4.21 Unimicron

4.22 Chipbond

4.23 Changjiang Electronics Technology

## Selected Charts

### SELECTED CHARTS

IC Packaging Development Course, 1980-2010  
SOP and TSSO Outline and Cross-sectional Diagram  
QFP, LQFP, HQFP Packaging Outline and Cross-sectional Diagram  
FBGA Outline and Cross-sectional Diagram  
FBGA Development Roadmap, 2006-2012  
TEBGA Outline and Cross-sectional Diagram  
FC-BGA Outline and Cross-sectional Diagram  
FC-BGA Development Roadmap, 2006-2012  
WL-CSP Outline, Manufacturing Flow and Cross-sectional Diagram  
Via First TSV Sketch-map  
Via Last TSV Sketch-map  
TSV Roadmap, 2005-2015  
TSV Application Roadmap  
TSV Via Size Roadmap  
TSV Industry Layout  
TSV Wafer Shipment by Application, 2006-2014  
Typical Cell Phone Block Diagram  
Market Shares of Global Cell Phone Baseband Manufacturers' Shipment, 2007-2009  
Market Shares of China's Cell Phone Baseband Manufacturers, 2009  
Processor Market Scale Forecast by Type, 2008-2012  
Market Shares of Main Non-Smart Phone Processor Manufacturers by Sum, 2008  
Market Shares of Main Smart Phone Processor Manufacturers, 2009  
Cell Phone Embedded Memory Development Roadmap  
Cell Phone NOR Memory Demand (Mb), 2004-2012  
Cell Phone RAM Memory Demand (Mb), 2004-2012  
Cell Phone NAND Memory Demand (Mb), 2004-2012  
Market Shares of Main Cell Phone Memory Manufacturers, 2009  
Cell Phone Single-chip Memory Packaging Trend, 2007-2010  
SIP Cell Phone Memory Packaging Development Trend, 2007-2011  
PoP Cell Phone Memory Development Trend, 2007-2011  
Global Cell Phone RF Market Scale, 2003-2010E  
Global 3G Cell Phone Distribution by Band Number, 2009-2013  
Market Shares of Global Main Cell Phone RF Transceiver Manufacturers by Shipment, 2008  
Market Shares of Global Main Cell Phone PA Manufacturers by Sum, 2008

Comparison of Main PA Manufacturers' Technology Capabilities  
Intel CPU Development Trend, 2009-2011  
PC Shipment, 2006-2013E  
Early Cell Phone Camera Module Sketch-map  
Cell Phone Camera Module with TSV Packaging  
Cell Phone Camera Module Industry Chain  
CMOS Image Sensor Shipment, 2008-2013  
Market Shares of Main CMOS Image Sensor Manufacturers, 2009  
Market Shares of Cell Phone Camera Module Assembly Manufacturers  
Market Shares of Main Cell Phone Camera Optics Lens Manufacturers  
TSV Roadmap of CMOS Image Sensor  
Global IC Packaging Shipment by Type, 2007  
Global IC Packaging Shipment by Type, 2012  
Global IC Packaging Sum by Type, 2007  
Global IC Packaging Sum by Type, 2012  
Downstream Distribution of Global Advanced Packaging Industry , 2009  
Regional Distribution of Global Advanced Packaging Industry, 2009  
Market Shares of Main Global Advanced Packaging Manufacturers in Cell Phone Field,  
2009  
Market Shares of Main Global Advanced Packaging Manufacturers in Laptop Field,  
2009  
Market Shares of Main Global Advanced Packaging Manufacturers in Memory Field,  
2009  
Market Shares of Main Global Advanced Packaging Manufacturers in Network  
Communication, 2009  
Market Shares of Main Global Advanced Packaging Manufacturers in Consumer  
Electronics, 2009  
TESSERA Business Distribution  
TESSERA's Patent Number, 2000-2009Q2  
TESSERA's Revenue, 2004-2008  
TESSERA's Main Clients  
TESSERA's Presence Worldwide  
Revenue and Gross Profit Margin of Greatek Electronics, 2002-2012  
Organization Structure of Greatek Electronics  
Revenue of Greatek Electronics by Packaging Technology, 2007-2008  
Formosa's Revenue and Gross Profit Margin, 2002-2012  
Formosa's Organization Structure  
Formosa's Revenue by Product, 2009  
ASE's Revenue and Gross Profit Margin, 2001-2010

ASE 's Organization Structure  
ASE's Revenue and Gross Profit Margin, 2007Q1-2009Q2  
ASE's EBITDA and Investment Amount, 2007Q1-2009Q2  
ASE's Packaging Revenue and Gross Profit Margin, 2007Q1-2009Q2  
ASE's Packaging Revenue by Product, 2007Q1-2009Q2  
ASE Test Department's Revenue and Gross Profit Margin, 2007Q1-2009Q2  
ASE Test Department's Revenue by Technology, 2007Q1-2009Q2  
ASE Product Downstream Application, 2005Q4, 2007Q2, 2008Q1 and 2009Q2  
ASE's Core Test Technologies  
Amkor's Revenue and Gross Profit Margin, 2007Q1-2009Q2  
Amkor's Expenditure Ratio by Item, 2007Q1-2009Q2  
Amkor's Revenue by Division, 2008Q1-2009Q2  
Amkor's Product Downstream Application, 2008Q1-2009Q2  
Amkor's IC Shipment by Packaging Type, 2008Q1-2009Q2  
Amkor's Output Utilization Rate and Customer Concentration, 2008Q1-2009Q2  
SPIL's Organization Structure  
SPIL's Revenue and Gross Profit Margin, 2003-2010  
SPIL's Revenue by Region, 2005Q4, 2007Q2, 2009Q1 & 2009Q2  
SPIL's Product Downstream Application Structure, 2005Q4, 2007Q2, 2009Q1 & 2009Q2  
SPIL's Product Structure by Technology Type, 2005Q4, 2007Q2, 2009Q1 & 2009Q2  
StatsChipPAC's Revenue and Gross Profit Margin, 2004-2009  
StatsChipPAC's Revenue by Division, 2006-2009Q2  
StatsChipPAC's Product Downstream Application Ratio, 2006-2009Q2  
StatsChipPAC's Revenue by Region, 2006-2009Q2  
PHOENIX's Organization Structure  
PHOENIX's Revenue and Gross Profit Margin, 2003-2010  
PHOENIX's Product Structure, 2008Q1-2009Q2  
PHOENIX's Product by Layer, 2008Q1-2009Q2  
PHOENIX's Product Downstream Application Ratio, 2008Q1-2009Q2  
PHOENIX's Revenue by Region, 2007Q1-2009Q2  
PHOENIX's Staff Structure  
Nanya's Revenue and Gross Profit Margin, 2003-2010  
Nanya's Circuit Board Revenue Structure, 2007, 2008 & 2009Q2  
Nanya's Circuit Board Product Downstream Application Ratio, 2009Q2  
Kinsus' Revenue and Gross Profit Margin, 2001-2010  
Kinsus' Revenue, Jul, 2008-Jul, 2009  
Kinsus' Product Downstream Application Ratio, Jan-Jul, 2009  
Ratios of Main Clients' Contribution to Kinsus Revenue, 2007H1



Kinsus' Products by Technology, 2007-2009  
PowerTech's Revenue and Gross Profit Margin, 2005-2010  
ChipMOS Organization Structure  
ChipMOS Revenue and Gross Profit Margin, 2001-2009  
ChipMOS Revenue by Region, 2006-2008  
ChipMOS Revenue by Division, 2006-2008  
ChipMOS Memory Revenue, 2001-2007Q3  
ChipMOS Flash Memory Revenue, 2006Q1-2007Q3  
ChipMOS LCD Driver IC Revenue, 2001-2007Q3  
Revenue and Gross Profit Margin of King Yuan Electronics, 2003-2010  
Organization Structure of King Yuan Electronics  
Revenue of King Yuan Electronics by Process, 2007Q3  
Revenue of King Yuan Electronics by Product, 2007Q3  
Product Downstream Applications of King Yuan Electronics, 2007Q3  
IBIDEN's Revenue and Operation Profit Margin, 2004-2008FY  
IBIDEN's Revenue by Division, 2004-2008FY  
IBIDEN's Revenue by Region, 2004-2008FY  
IBIDEN's FC Substrate Output Capability Expansion Plan  
IBIDEN's FC Packaging Product Shipment, 2006-2012  
Shinko's Revenue and Operating Profit Margin, 2005-2010  
Shinko's Total Liabilities and Shareholder's Equities, 2005-2009FY  
Shinko's Net Profit, 2005-2009FY  
Shinko's Capital Expenditure, 2005-2009FY  
Shinko's Revenue by Division, 2005-2009FY  
Shinko's Product Tree  
Unisem's Revenue and Gross Profit Margin, 2004-2009  
Nepes' Revenue and EBITDA, 2007-2011E  
Nepes' Revenue by Division, 2008Q1-2009Q4  
STS Revenue and EBITDA, 2004-2008  
STS Revenue by Product, 2009Q1-2010Q4  
Unimicron's Organization Structure  
Unimicron's Revenue and Gross Profit Margin, 2000-2010  
Unimicron's Plants  
Unimicron's Output Capability by Product, 2007-2009  
Unimicron's Revenue by Product, 2009Q1 vs. 2009Q2  
Unimicron's Revenue by Downstream Application, 2009Q1 vs. 2009Q2  
Unimicron's Revenue by Product, 2008 vs. 2009H1  
Unimicron's Revenue by Downstream Application, 2008 vs. 2009H1  
Chipbond's Revenue and Gross Profit Margin, 2003-2010

Chipbond's Revenue by Technology, 2006-2010  
Chipbond's Clients, 2005-2009  
Revenue and Operating Profit Margin of Changjiang Electronics Technology, 2006-2009  
Staff Structure of Changjiang Electronics Technology by the end of 2008  
Revenue of Global Main Cell Phone Baseband Manufacturers, 2008  
Packaging Technology Development Forecast of Global Main Cell Phone Baseband Manufacturers, 2008-2013  
Comparison of 12 Typical Baseband Packaging Types  
Packaging Comparison of Typical Cell Phone Processors  
Packaging Technologies of Global Typical Cell Phone Processors, 2009  
Comparison of 12 Typical PA Packaging  
Comparison of 13 Typical RF Transceivers' Packaging  
Other Typical Cell Phone IC Packaging Technologies  
Shipment of Global Top 13 Brand Manufacturers, 2008  
Top 25 Cell Phone Manufacturers in China by Output, 2008  
ASE's Top Ten Clients, 2006Q1, 2008Q1 & 2009Q2  
SPIL's Output Capacity, 2006Q1, 2007Q2&Q3 and 2009Q1&Q2  
Nanya's Circuit Board Output Capacity, 2007-2009  
M&A Events of ChipMOS  
Output Capacity of ChipMOS Shanghai Base  
FC Packaging Revenue, 2006-2009FY  
Chipbond's Output Capacity, 2009-2010

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