

Technology Sector

October 2006

China Semiconductor Sector Review

Moving Up the Semiconductor Value Chain

Highlights

With over 130 private companies currently engaged in semiconductor design, manufacturing, packaging and testing in China, we anticipate significant consolidation in the sector beginning in 2007

- Considerable venture funding has been committed to semiconductor startups over the past two years.
 - Successful firms are now focused on establishing relationships with strategic partners that can provide distribution capacity, technology and complementary product offerings.
- Private company valuations in China remain high relative to their non-China peers on a revenue multiple basis; however Chinese semiconductor firms generally achieve profitability at an earlier stage due to their lower cost structure.
- Government tax incentives and rapidly increasing domestic demand continue to drive the growth of the semiconductor industry in China.
- With a significant presence established in foundries and packaging & test, multinational firms are increasingly investing in IC design capability in China.
 - Intellectual property concerns and a lack of analog design talent are two factors limiting M&A activity in the design sector.

Beijing

Suite 11J, Oriental Kenzo Plaza
48 Dongzhimen Wai Avenue
Beijing 100027, China
+86 (10) 8447 7398

Hong Kong

Suite 3518, Jardine House
One Connaught Place
Central, Hong Kong
+852 2973 5311

San Francisco

Suite 3330, 50 California Street
San Francisco, CA 94111, USA
+1 (415) 692 0088

Shanghai

5F Crystal Century Tower
567 Weihai Road, Jingan District
Shanghai 200040, China
+86 (21) 6288 6555

info@latitudecapital.com
www.latitudecapital.com

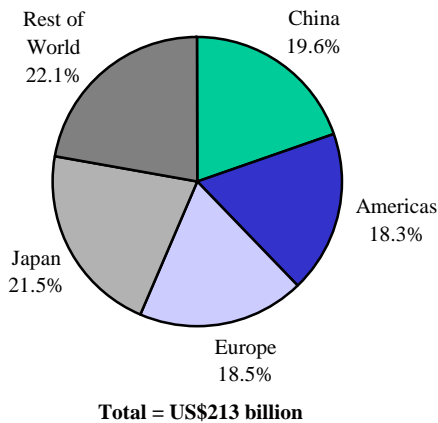
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Industry Overview

By 2010, the Chinese semiconductor market is projected to become the leading market for semiconductors globally, accounting for over 30 percent of the US\$318 billion worldwide market, according to Gartner Dataquest. At the end of 2004, China already accounted for nearly 20 percent of the worldwide semiconductor market, gaining almost 2 percent over its 2003 levels and surpassing both the Americas and Europe.¹

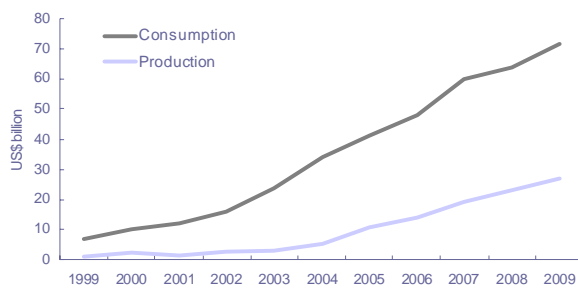
World Semiconductor Market



Source: CSIA, CCID, 2005

The growth rate of semiconductor consumption is increasing at a faster pace than the production rate of semiconductors in China. Of the approximate 1.3 billion people in China, roughly 80 million are active new users of consumer technology,² driving up overall demand for ICs. Domestic demand is expected to increase annually by 30 percent over the next few years.

China IC Consumption vs. Production



Source: CCID, CSIA, PWC 2005 China Semiconductor Report

Government Support

The Chinese government is determined to develop a competitive domestic Chinese semiconductor industry through favorable tax policies and improving intellectual property protection.

As of June 16, 2006, the China Semiconductor Industry Association (CSIA) became a member of the World Semiconductor Council (WSC). The accession will enhance cooperation in both the global and Chinese semiconductor industries. Now that China has officially joined the WSC, it will enable all major players to share best practices on critical industry matters such as intellectual property protection issues and trade barriers.

Initially, China provided a Value Added Tax (VAT) rebate to chip manufacturers within China. After protests by the U.S. of discriminatory treatment, China cut back on this rebate program. Instead, China now employs a number of different incentives to encourage investments in the semiconductor industry, including:

- Five years of tax-free status, instead of the usual two years enjoyed by other foreign-invested manufacturers
- Additional five years of 50 percent tax reductions
- Tax credits for research and development expenses
- Tax exemptions for fixed-asset investments
- Up to 50 percent of R&D funding³

China Landscape

Currently, there is a 10-year cost differential in excess of US\$1 billion between building and operating a fabless⁴ foundry in Asia versus the United States.

The savings derived from establishing capacity in China are driven primarily by governmental tax benefits, as well as low land and labor costs.

Seventy percent of China's semiconductor cost advantage is due to tax benefits. Because of the capital and technology intensive requirements of semiconductor production, an 80 percent differential in wage results in barely a 10 percent difference in final costs. Taxes and other incentives are the primary drivers of lower expense ratios for China produced ICs. In IC design however, China's low labor costs remain a major contributor to the growth of the industry.

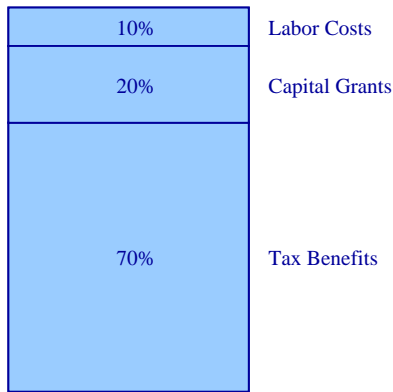
¹ Source: PricewaterhouseCoopers, China Center for Information Industry Development and China Semiconductor Industry Association, 2005

² Source: US-China Economic and Security Review Commission and International Data Corporation

³ Effective as of April 2005, the Chinese Ministry of Finance (MOF), Ministry of Information Industries (MII), and the National Development and Reform Commission (NDRC) jointly announced the "Temporary Measures of Special Funds in R&D in the Semiconductor Industry", which can pay up to 50 percent of R&D costs. Source: US-China Economic and Security Review Commission and Semiconductor Industry Association

⁴ Fabless companies have no wafer fabs of their own, instead contracting with foundries for this purpose

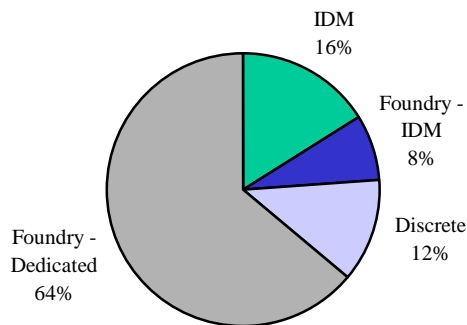
Cost Breakdown



Market Segment

Most Chinese foundries have entered into or are in the process of entering into technology licensing agreements with leading semiconductor companies in Taiwan, the U.S., Japan and Europe, according to the Semiconductor Industry Association (SIA). SIA forecasts that by 2006, Chinese foundry capacity will be approximately 28 percent of the global total⁵. Current fab capacity is broken down as follows:

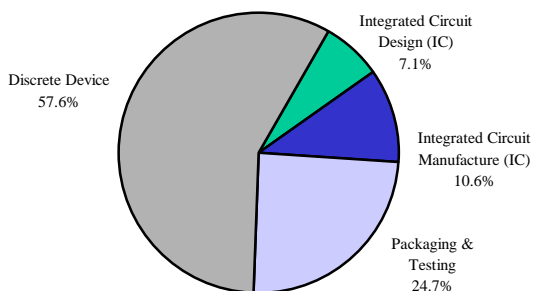
Committed Wafer Fab Capacity



Source: CSIA, CCID, 2005

The China semiconductor sector is broken down into the following segments:

Semiconductor Sector Revenue



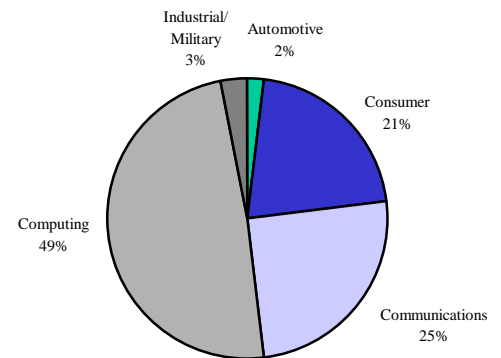
Source: CSIA, CCID, 2005

The majority of foreign investment in China's semiconductor industry today is focused on foundries and packaging and test facilities. The semiconductor application market in China is largely concentrated in the following three fields:

1. Computers
2. Network communications
3. Consumer electronics

A breakdown of semiconductor end uses is shown below. Of these, the domestic market for handheld consumer electronics is growing most rapidly, driven by the explosive growth in China's market for mobile handsets as well as the global market for MP3 players and other entertainment devices.

End Use of Semiconductors in China



Source: CSIA, CCID, 2005

Competitive Landscape

IC Design

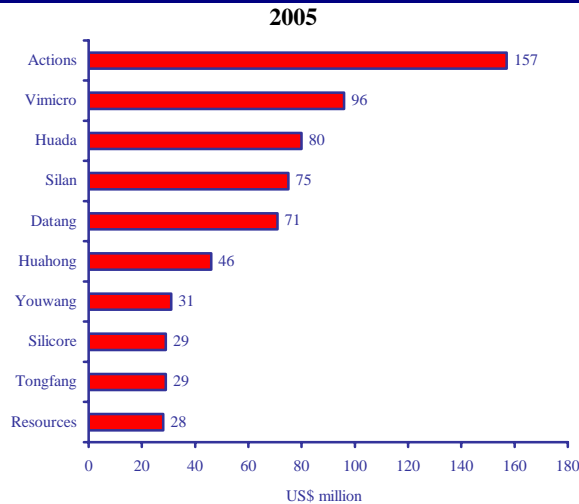
The IC design industry in China includes over 90 firms of which 5 are publicly listed and fewer than five are wholly-owned subsidiary design operations of multinational firms. Design engineers in China are plentiful and inexpensive due to the large number of engineering students.

Annual salaries typically do not exceed US\$50,000 for local designers compared to up to US\$1 million for US based design engineers. Engineering teams in China are most proficient at developing ICs of low to moderate complexity based on digital architectures. Digital IC design has been a stronger emphasis both in industry and on university campuses than analog chips. Analog design talent remains scarce, motivating some multinationals to establish relationships with leading universities to identify promising engineers early on.

Of the top China IC design companies, Actions and Vimicro are already listed on NASDAQ as of 2005. The following is a graphical ranking of IC design companies as of 2005 by revenue.

⁵ Source: Semiconductor Industry Association, 2005

China IC Design Company Ranking by Revenue

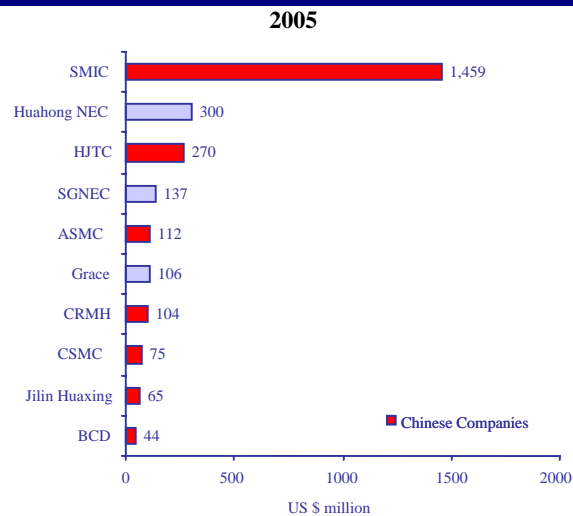


Source: PricewaterhouseCoopers, Latitude Capital Group

IC Foundry

Semiconductor Manufacturing International Corporation (SMIC) is the clear market leader in China in the foundry market. The top 7 players all have revenues in excess of US\$100 million. China based foundries are steadily shifting to state of the art 300 mm wafer production lines.

China IC Foundry Company Ranking by Revenue



Source: PricewaterhouseCoopers, Latitude Capital Group

Semiconductor M&A/Investment Activity in 2005/2006

Overall M&A/investment activity in the semiconductor sector slowed in 2006 after a strong fourth quarter in 2005. Of note was Motorola's investment in Legend Silicon through its venture capital arm Motorola Ventures. This is indicative of Motorola's continuing commitment to the China market. The alliance of the two companies will focus on the design, development and manufacture of demodulator chips for emerging mobile TV businesses. This investment is expected to help Motorola gain a strong foothold in mobile TV, seen as the 'Fifth Media' in the 3G era. In another transaction, NASDAQ-listed ATI

Technologies acquired Shanghai-based Macrosynergy, immediately obtaining a team of highly skilled engineers and increasing its presence in China.

On July 27, 2006 QUALCOMM announced a strategic agreement with SMIC. SMIC will provide integrated circuit manufacturing services to QUALCOMM using specialized BiCMOS process technology at its Tianjin, China facility. This agreement combines SMIC's wafer fabrication capabilities with QUALCOMM's leadership in 3G wireless technologies, with a focus on power management ICs and allows QUALCOMM to leverage the foundry's operation and management expertise in mixed signal technology manufacturing and supply chain management to better serve customers around the world.

Selected China Semiconductor Transactions

Selected Recent China Semiconductor M&A/Investment Transactions

Announcement Date	Lead Investor(s) / Buyer	Target	Transaction Value (US\$ mm)	%	Implied Valuation (US\$ mm)	Description of Target(s)
June 26, 2006	Intel Capital (*)	Montage Technology (China)	NA	NA	NA	Mixed-signal fabless IC design company
June 14, 2006	Qiming, DFJ, IDG, New Frontier, LG, Kibo Technology (*)	Fangtek (U.S.A.)	12.0	NA	NA	Mobile multimedia IC solutions developer
March 15, 2006	Motorola Ventures	Legend Silicon Corporation (Beijing)	NA	NA	NA	Developer of chips for wireless digital broadcasting
March 6, 2006	ATI Technologies (NASDAQ listed)	Macrosynergy (China)	NA	100.0%	NA	Developer of multimedia add-in boards and graphic chips for computers
February 22, 2006	Littelfuse, Inc. (NASDAQ listed)	Concord Semiconductor Corporation (Taiwan)	NA	100.0%	NA	Designer and manufacturer of TVS diodes and other overvoltage circuit protection products for the automotive, consumer electronics, industrial and telecom markets
December 20, 2005	Diodes Inc.	Anachip Corp (Taiwan)	30.0	100%	30.0	A Taiwanese fabless analog IC designer
December 20, 2005	Softbank Asia Investment Fund II	Sicomm Technology Ltd. (China)	10.0	NA	NA	RF system, RFIC and mixed signal IC designer for cellular, WLAN and high-end analog applications
December 20, 2005	Sicomm Technology Ltd.	Hangzhou Shikang Microelectronics (China)	5.7	61.8%	9.2	Integrated Circuit products designer, developer, and manufacturer
December 14, 2005	NVIDIA Corporation	Uli Electronics Inc. (Taiwan)	52.0	100%	52.0	Fabless IC designer and developer of core logic for consumer electronics and computing products
October 4, 2005	GSR Ventures, Mayfield Fund	Shenzhen State Microelectronics (China)	NA	NA	NA	Designer of semiconductors used in modules for digital televisions
October 4, 2005	GSR Ventures, Mayfield Fund	Mobert Semiconductor (China)	NA	NA	NA	Semiconductor designer for mobile applications with operations in Silicon Valley and Shanghai
September 16, 2005 (Private Placement)	Government of Singapore Investment Corp., HSBC, Intel Capital, New Enterprise, Rim Asia Capital, Shanghai Industrial Holdings	Actions Semiconductor Co. Ltd. (China)	\$80.0	NA	NA	China-based chip designer and developer of SOC VLSI products and total system solutions
August 15, 2005 (Private Placement)	CID Equity Partners, Harbinger, HSBC, IDG, iGlobe Partners, Intel, IFC, KTB Ventures, Legend, and WI Harper	VeriSilicon Holdings Co. Ltd. (China)	\$13.5	Series B Financing	NA	A fabless and chipless application-specific integrated circuit design foundry. It provides semiconductor IP and design services, as well as manufacturing, packaging, testing, and delivery services
August 19, 2005	Ezconn Corporation (Taiwan)	Fiber Optics Division of Infineon Technologies AG (Germany)	NA	100.0%	NA	Developer of Bidirectional Transceiver and Optical Sub-Assemblies (OSA)
August 8, 2005	Power Analog Microelectronics Inc. (China)	MicroSilicon Technology Ltd. (China)	NA	100.0%	NA	The company focuses on advanced analog, mixed-signal and power management integrated circuits

* Source: Latitude Capital Research

Selected China Semiconductor Companies

Selected Private China Semiconductor Companies						
Company Name	Private or Public	Sector	IC Type	Chipset Function	Application	Selected Investors
Accel Semiconductor (捷顶微电子(上海)有限公司)	Private	IC Design	Analog, RF	RF, Amplifier, Power Management	Mobile, Network, STB	Walden
Alchip Technologies Ltd. (世芯电子) www.alchip.com Taipei, Taiwan	Private	IC Design	Analog, Digital, Mixed	Processing, Microcontroller, Embedded memory, Codec, Amplifier, Power Management	MP3, PDA, Mobile	SAIF, Investar Capital, Acer Ventures, C Squared Ventures
Anyka (硅谷数模半导体有限公司)	Private	IC Design	Digital, Mixed	Processing	Mobile	Canton Venture, Walden, Asiavest
ApexOne Microelectronics Inc. (埃派克森微电子(上海)有限公司) www.apexonemicro.com Shanghai, China; San Diego, CA	Private	IC Design	Analog, Mixed	Processing, Microcontroller, Embedded memory, Codec, Conversion, Amplifier, Power Management	Mobile, Consumer Electronics	DCM, Walden, Yangtze Venture
Arkmicro Technologies Inc. (深圳艾科创新微电子有限公司) www.arkmicro.com Shenzhen, China	Private	IC Design	Digital	Processing, Microcontroller, Embedded memory, Codec, Amplifier, Power Management	Digital Camera, PDA, LCDTV	JAFCO
Celestial Semiconductor (芯晟(北京)科技有限公司)	Private	IC Design	Digital, RF	Processing, Codec, RF	Mobile, LCD TV	Walden International, ComVentures
Chipsea Technologies (深圳市芯海科技有限公司)	Private	IC Design	Analog, Mixed	Processing, Microcontroller, Embedded memory, Conversion, Interfacing	Consumer Electronics	NA
Chipnuts Technology (智多微电子(上海)有限公司) www.chipnuts.com Shanghai, China	Private	IC Design	Digital	Processing, Conversion, Microcontroller, Embedded memory, Codec, Amplifier, Interfacing, Power Management	Consumer Electronics, Mobile, Networks	Acer Venture, Warburg Pincus,
Comlent Holdings Inc. (鼎芯半导体有限公司)	Private	IC Design	Digital, Mixed, RF	Processing, Amplifier	Mobile, HDTV, Network	3i, Intel Capital, DFJ
Homaa Microelectronics (北京火马微电子技术有限公司)	Private	IC Design	Digital	Codec	EVD (next generation DVD)	Acer
Huaya Microelectronics (华亚微电子有限公司) www.huayamicro.com Shanghai, China	Private	IC Design	Digital	Processing, Microcontroller, Embedded memory, Codec, Power Management	HDTV, LCD-TV, DVD	Carlyle, Chengwei, Pacific Venture Partners
IPCore Technologies (Shanghai) Co., Ltd. (智芯科技(上海)有限公司) www.ipcore.com.cn Shanghai, China	Private	IC Design	Mixed	Processing, Microcontroller, Embedded memory, Codec, Power Management, MCU	Consumer Electronics	Pacific Venture Partners, 3i, Walden, Vertex, Sycamore Ventures
Jade Chip (杰得微电子) www.jadechip.com Shanghai, China	Private	IC Design	Digital	Processing, Microcontroller, Embedded memory, Codec, Power Management	Consumer Electronics	Softbank
JTEK Technology (捷泰科技股份有限公司) www.j-tek.net Taipei, Taiwan	Private	IC Design	Analog, Mixed	Processing, Microcontroller, Embedded memory, Codec, Power Management	Network, Consumer Electronics	Landmark Ventures, Sycamore
Miartech (弥亚微电子有限公司) www.miartech.com Shanghai, China	Private	IC Design	Analog, Mixed, Digital	Microcontroller, Power Management	Electrical facility	DFJ DragonFund, DFJ Element ,DFJ
Montage Techonology (澜起科技(上海)有限公司)	Private	IC Design	Mixed	Processing	PC, Consumer Electronics	Intel Capital
Perception Digital (Perception Digital)	Private	IC Design	Digital	Processing	MP3, Mobile	NA
Power Analog Microelectronics (龙鼎微电子(上海)公司) www.power-analog.com Shanghai, China	Private	IC Design	Analog	Power Management	Consumer Electronics	CVM Capital, H&Q, Venture Tech

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SINOSUN (兆日科技) www.sinosun.com.cn Shenzhen, China	Private	IC Design	Digital	Security chips, Core encryption, Authentication technologies	Consumer Electronics	Granite Global Ventures, JAFCO
Shenzhen IC Design Incubation Co.,Ltd. (深圳集成电路设计创业发展有限公司) www.southic.com Shenzhen, China	Private	IC Design	Analog, Mixed	Processing, Amplifier, Interfacing, Power Management	Consumer Electronics	Shenzhen Leaguer Capital
SMIT (深圳国微技术有限公司) www.smit.com.cn Shenzhen, China	Private	IC Design	Digital	Microcontroller, Amplifier	MP3, DVD	Walden
Superpix Micro Technology (北京视信源科技发展有限公司)	Private	IC Design	Discrete, Mixed	CMOS sensor	VGA Camera	Techfaith and Japanese strategics
Verisilicon (芯原微电子(上海)有限公司) www.verisilicon.com Shanghai, China	Private	IC Design	Analog, Digital, Mixed, RF	Processing, Microcontroller, Embedded memory, Codec, Amplifier, Interfacing, Power Management, WLAN, RF	Consumer Electronics	WI Harper, IDG, Intel Capital China Technology, HSBC Private Equity, CID

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Beijing

Suite 11J Oriental Kenzo Plaza
48 Dongzhimen Wai Avenue
Beijing 100027, China

Tel +86 (10) 8447 7398
Fax +86 (10) 8447 7396

Hong Kong

Suite 3518 Jardine House
One Connaught Place
Central, Hong Kong

Tel +852 2973 5311
Fax +852 2295 3979

San Francisco

Suite 3330, 50 California Street
San Francisco, CA 94111
USA

Tel +1 (415) 692 0088
Fax +1 (415) 366 1408

Shanghai

5F Crystal Century Tower
567 Weihai Road, Jingan District
Shanghai 200040, China

Tel +86 (21) 6288 6555
Fax +86 (21) 6288 6585

info@latitudecapital.com

www.latitudecapital.com

 **LATITUDE**
CAPITAL GROUP