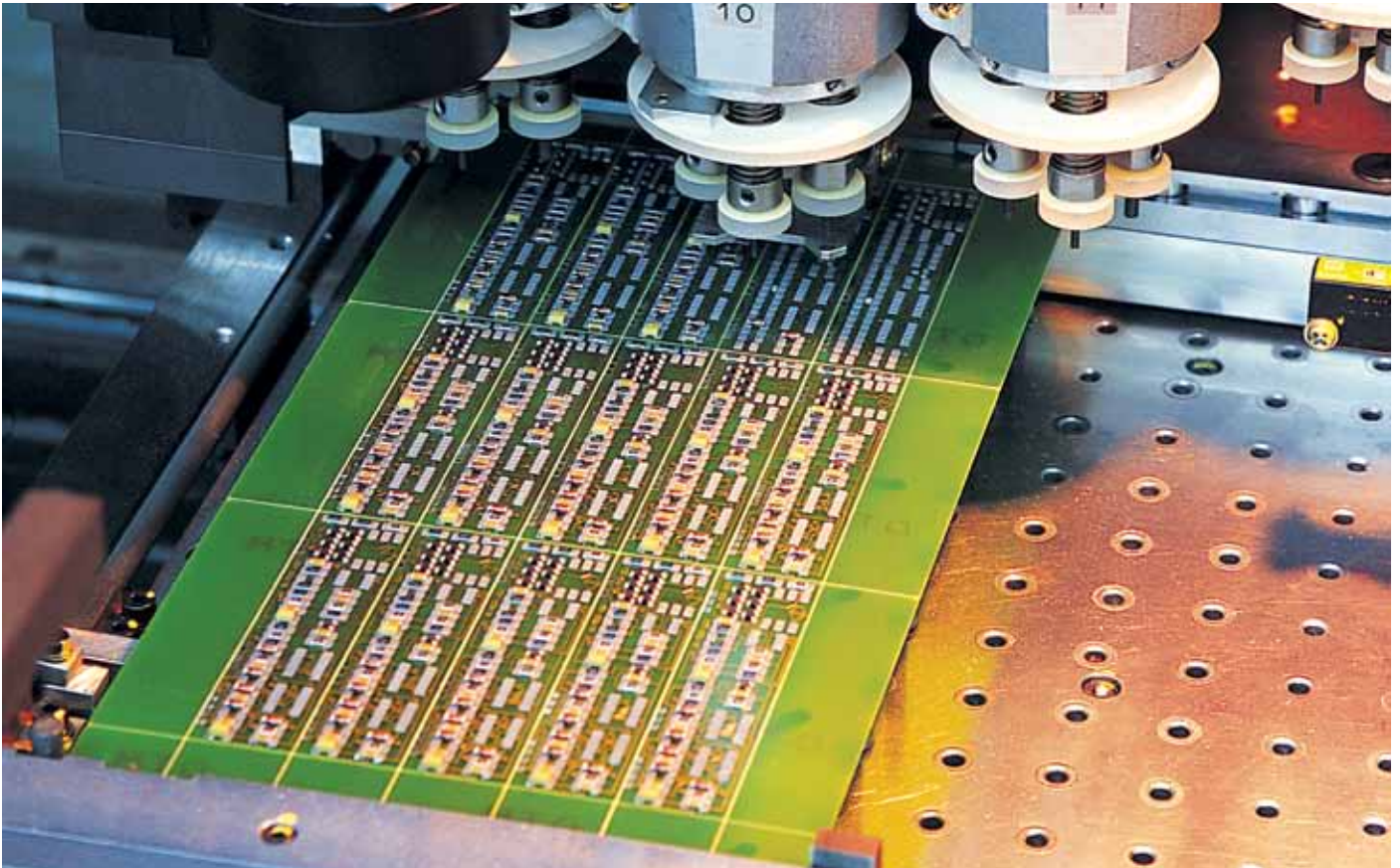


Careers@Singapore: Electronics Industry

Contact
Singapore 



Singapore's vision for this industry

The electronics industry is one of the most vibrant and globally competitive industries in Singapore. It achieved record growth of 26.9% in manufacturing output in 2010, about three times the global industry's average and the highest in Singapore's history for the past twenty years. As the largest manufacturing industry in Singapore, electronics accounted for 7% of Singapore's GDP and employed more than 80,000 people in 2010.

Over the years, the electronics industry has transformed to manufacture higher value-added products and R&D. This is illustrated through two main sectors – semiconductors and data storage. Singapore's semiconductor industry posted a nominal growth of 49.8%, outpacing the global semiconductor industry's 32.5% growth in 2010.

Singapore's manufacturing output share of global semiconductor revenues increased from 6.3% in 2001 to 13.5% in 2010. The data storage industry also saw a 25% increase in the volume of hard disk media produced in 2010. Today, about 40% of the world's hard disk media is made in Singapore.

Many of the industry leaders which started off with production activities had moved along the value chain to conduct R&D and corporate headquarters functions in Singapore. The electronics industry in Singapore will continue to evolve and grow to meet the challenges of a new age. Riding on its existing strengths, Singapore aims to create new businesses and opportunities through emerging growth areas such as Bioelectronics, Green Electronics, Printed Electronics and Security.



Semiconductor industry

Today, the semiconductor industry has developed into a vibrant ecosystem, with activities in various parts of the value chain, from the early design stages to fabrication to backend assembly and test.

These activities are complemented by a strong supporting industry of equipment and materials suppliers as well as research and development support from various research institutes, universities and industry associations.

Singapore is the second largest city in the world in terms of wafer fabrication capacity. The city-state plays home to:

- nine of the top 10 global IC design companies and the top three foundries in the world;
- 20 assembly and test operations;
- three of the world's top five outsourced semiconductor assembly and test companies; and
- the world's top three wafer foundries.

Many of these multinational companies have also chosen Singapore as the group's pan-Asia headquarters outside their home country.

Leading semiconductor players

The main activities of the semiconductor sector can be classified into Integrated Circuit (IC) design, wafer fabrication and assembly and test.

Integrated Circuit (IC) design

Broadcom Singapore Pte Ltd

Broadcom is one of the world's largest fabless semiconductor companies. It provides the industry's broadest portfolio of state-of-the-art, system-on-a-chip and software solutions to manufacturers of computing

and networking equipment, digital entertainment and broadband access products, and mobile devices.

The company designs and develops its products in labs and design centres in the US and around the world and then works closely with independent chip-making facilities to manufacture those products.

Infineon Technologies Asia Pacific Pte Ltd

Infineon Technologies focuses on the three central challenges facing modern society: energy efficiency, communications and security, and offers semiconductors and system solutions for automotive and industrial electronics, chip card and security applications as well as applications in communications.

The company's Development Centre in Singapore provides IC and system development solutions in the areas of communication, automotive and industry as well as security systems in this region. Singapore remains as the hub for Infineon's research and development



(R&D) operations in Asia-Pacific, and has dedicated responsibilities for coordination of regional setup and competence portfolios. Today, it plays a leading role in a significant share of products rolled out from Infineon.

MediaTek

MediaTek Inc. is a leading fabless semiconductor company for wireless communications and digital multimedia solutions. The company is a market leader and pioneer in cutting-edge system-on-chip (SOC) system solutions for wireless communications, high-definition TV (HDTV), optical storage, DVD and Blu-ray products.

Founded in 1997 and listed on the Taiwan Stock Exchange, MediaTek is headquartered in Taiwan and has sales and research subsidiaries in Singapore, Mainland China, India, US, Japan, Korea, Denmark and England.

Xilinx Asia Pacific Pte Ltd

Xilinx is a world leader in the semiconductor industry with programmable solutions from storage networks to communications, HDTV, broadcasting, medical, automotive and more. The company has major facilities in California, Colorado, Ireland and Singapore, and 30+ offices throughout North America, Europe, Asia and in Japan.

Wafer foundries

Globalfoundries

Globalfoundries (formerly Chartered Semiconductor) is one of the key manufacturing and operation sites for the group. With 200mm and 300mm wafer manufacturing



facilities, Globalfoundries Singapore provides a diverse product portfolio to address mainstream technologies and advanced technology down to 40nm processes. In addition to manufacturing, Globalfoundries Singapore houses corporate functions in design enablement, marketing, customer engineering, enterprise IT, and customer support.

Systems on Silicon Manufacturing Co. Pte Ltd (SSMC)

SSMC is a joint venture of NXP B.V. (NXP) and Taiwan Semiconductor Manufacturing Company Ltd (TSMC). Offering flexible and cost effective semiconductor fabrication solutions through the utilisation of leading CMOS, embedded flash, analogue and mixed signal, RF and BCD process technologies, SSMC has gained recognition from its global customers for consistently delivering semiconductor wafers of high quality and reliability.

TECH Semiconductor

TECH Semiconductor Singapore is a leading multi-million dollar joint-venture 300mm wafer fabrication plant between Micron Technology Inc, Canon and HP Singapore. Situated on a 23-acre spread at the Woodlands Wafer Fab Park, the company's two state-of-the-art wafer fabrication plants produce 512-Megabit Dynamic Random Access Memory (DRAM) chips on 200mm wafers using 95nm technology and 1-Gigabit DRAM chips on 300mm wafers using 78nm technology.

United Microelectronics Corporation (UMC), Singapore

UMC is the world's foundry technology leader, consistently first-to-market on advanced processes and possessing the highest number of semiconductor patents in the industry. It is a 300mm manufacturing leader with two advanced 300mm fabs in operation. The company's 300mm fab, Fab 12i in Singapore is its second in the world. This second-generation 300mm facility is in volume production with capacity at 33,000 wafers per month.

UMC employs approximately 12,000 people worldwide and has an extensive network of service offices in Taiwan, Japan, Singapore, Europe and US to meet the needs of its global clientele.

Assembly and testing

ASE Singapore Pte Ltd

ASE Singapore Pte Ltd (formerly known as ISE Labs Singapore) is one of the leading service providers of test solutions in Singapore. ASE Singapore offers technological capabilities on front end testing of IC chips including test development, wafer probe and IC packaged test services.



Its customer base includes some of the world's largest wafer foundries, integrated device manufacturers (IDMs) and fabless companies in US, Europe and Asia. The company's facility houses more than 120 testers occupying about 80,000 sq ft, to cater to its customers' increasing needs.

STATS ChipPAC

STATS ChipPAC is a full service provider for wafer sort, final package test, strip test, wafer bump and all wafer level products. Its Singapore facility features a 594,738 sq ft assembly and test operation with state-of-the-art equipment and a Class 10K clean room environment. The facility offers a broad and comprehensive test capability in support of a broad range of package types.

Additionally, the Singapore test operation is a centre of excellence for testing high-end RF and mixed signal devices as well as high-speed digital devices.

United Test & Assembly Centre Ltd (UTAC)

UTAC is a leading independent provider of test and assembly services for a wide range of semiconductor devices that includes memory, mixed signal/RF and logic integrated circuits. The company is headquartered in Singapore with strong manufacturing footprints in Singapore, Shanghai, Taiwan and Thailand, and a global sales network from Singapore, China, Taiwan, Thailand, Japan, Europe and US.

UTAC's expertise in both memory and non-memory (mixed-signal/RF and logic) semiconductor devices has enabled the Group to offer a wide range of solutions from multi-chip packages that integrate memory and non-memory die.

Exciting developments in the industry

With existing capabilities in IC design, R&D and manufacturing technologies, Singapore's electronics industry also provides the opportunity to develop solutions addressing the challenges of tomorrow, through the new growth areas of green electronics, bioelectronics, security and plastic electronics.

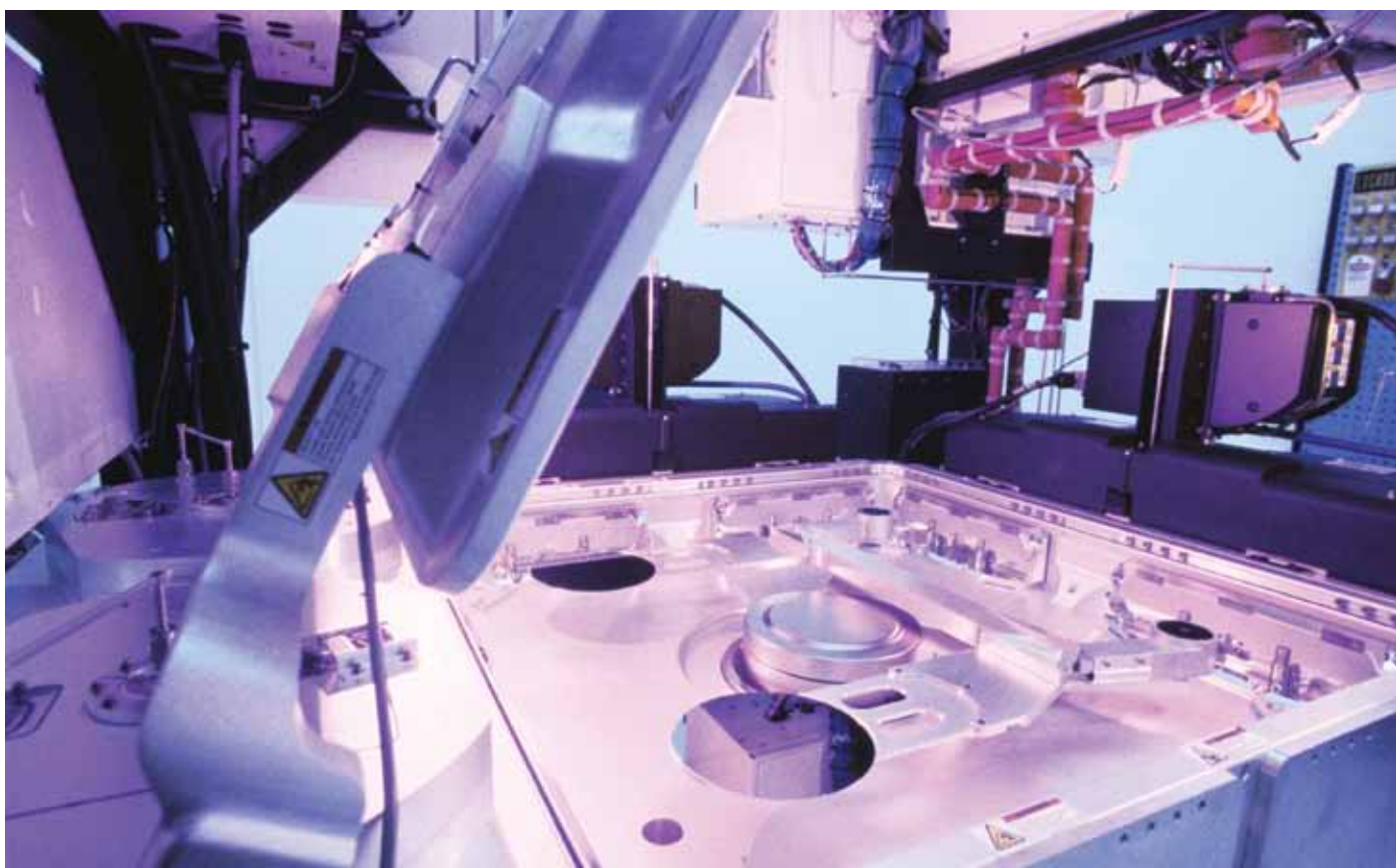
In addition, the manufacturing of finished electronics products creates many spin-offs to other segments of the economy, such as precision component manufacturers, electronic manufacturing systems companies and logistics service providers.

Future in IC Design

Analogue IC design is the key enabling capability for power management and energy harvesting. To pre-position the nation in advanced analogue and mixed-signal design capabilities, Singapore's new IC Design Centre of Excellence, VIRTUS, was launched.

The S\$50 million jointly funded centre by Nanyang Technological University (NTU) and the Singapore Economic Development Board aims to be a world-class IC design house, developing key technologies required to design integrated circuits and systems for applications in medical technology, clean technology and consumer electronics.

The centre's research activities can be broadly divided into the following major areas: analogue, mixed-signal, power management and data converters; energy harvesting; low-power RF and mm-wave ICs; and new



technology directions such as 3D-integration and physical design, 3D RF and mixed-signal circuits, and terahertz IC.

Apart from its primary focus in design, innovation and enterprise, VIRTUS is also committed to train more than 100 postgraduate students and researchers in the next five years.

Expansion of Singapore's Semiconductor Association (SSIA)

On 30 April 2010, MIDAS, previously known as Microelectronics IC Design and System Association, expanded to become SSIA. Established in 2005, MIDAS promotes the growth of a vibrant IC and system design industry in Singapore, particularly in areas of manpower, market requirements, technology and infrastructure. With its new charters, SSIA replaces MIDAS to be the collective voice of the semiconductor industry of Singapore.

The expansion of SSIA as a strong industry representative underlines the importance of the semiconductor industry for the Singaporean economy itself. Its mission is to focus on the following key areas: voice of the Singapore semiconductor industry; cover the whole value chain with members from manufacturing, design, R&D, etc.; support business growth; support cutting edge technology and capability development; talent and manpower development; and communication and networking facilitation.

Where do you fit into the picture?

Singapore is working to develop into a world-class electronics hub, creating manufacturing solutions and producing high value-added components for the global market. We aim to ride on Asia's manufacturing wave through more advanced technology and services, to create new business and opportunities.

As we position Singapore as the choice location for companies to create and manage new markets, products and processes, technologies and applications, top talent is required to move the industry forward. There is a large variety of career opportunities within the semiconductor industry in Singapore:

- Analogue/ Mixed-signal/ RF IC designer
- IC Layout designer
- Process Engineer (lithography, etch, thin film, etc.)
- Product Engineer
- Test Verification Engineer
- Test Development Engineer

There is no better time to be in Singapore than now – the city-state is growing economically, with a constant bustle of activity while keeping the perfect balance of East and West. Couple these factors with the city's superb physical infrastructure, sophisticated IT network, great variety of living, dining and entertainment options, and you have one of the most liveable cities around.





Contact Singapore now!

Contact Singapore is an alliance of the Singapore Economic Development Board and Ministry of Manpower. It aims to attract global talent to work, invest and live in Singapore.

With offices in Asia-Pacific, Europe and North America, Contact Singapore is the one-stop centre for those who wish to pursue a rewarding career in Singapore, as well as individuals and entrepreneurs who are keen to invest in or initiate new business activities here.

Contact Singapore actively links Singapore-based employers with global talent and provides updates

on career opportunities and industry developments in Singapore. We work with private sector partners to facilitate the interests of potential individual investors in Singapore.

To find out more about the career opportunities in Singapore, log on to **www.JobsAtSingapore.sg**.

For more information on working, investing and living in Singapore, please visit **www.contactsingapore.sg**.

Email us at **singapore@contactsingapore.sg**.

