China: Semiconductor industry

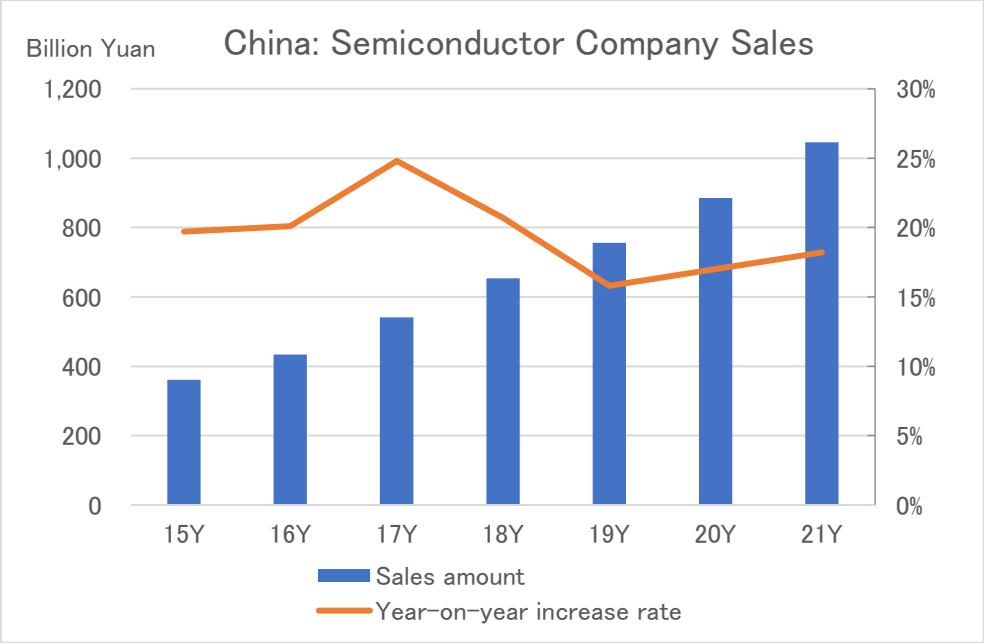
＜Industry overview＞ Market size exceeds 1 trillion yuan

China has grown into the world's largest semiconductor consuming nation in the last few years, and its demand for semiconductors continues to grow strongly. The background is China has become the "world's factory" and the shift in production of electronic devices has advanced. According to local media, China's share of global semiconductor consumption value as of the year 2000 was only 7% but grew significantly to 26% in 2006. By 2020, it had risen to more than 50%.

In line with this, sales of domestic semiconductor companies also continue to expand, currently hitting the 1 trillion-yuan mark. According to the China Semiconductor Industry Association, sales in 2021 grew to 1.05 trillion yuan, up 18.2% from the prior year, maintaining double-digit growth. The rate of increase accelerated by 1.2 percentage points from the previous year's 17.0%. The Covid-19 pandemic triggered the spread of telework and online education, which boosted demand for personal computers and tablet devices, leading to an expansion in global demand for semiconductors. The spread of 5G-compatible smartphones and electric vehicles (EVs) is also contributing to increased demand for semiconductors.

By sector, design firms posted a 19.6% increase in sales to 451.9 billion yuan, manufacturing firms a 24.1% increase to 317.63 billion yuan, and back-end process (Outsourced Semiconductor Assembly and Test: OSAT) firms a 10.1% increase to 276.3 billion yuan, almost all sectors showing high growth.

The industry's growth trend continues into 2022, amid the continuation of the global semiconductor shortage. According to the China Semiconductor Industry Association, sales of domestic semiconductor companies expanded to 476.35 billion yuan in the first half of 2022, up 16.1% year-on-year. However, it has been pointed out that the full-year growth rate may slow from the previous year due to the impact of China's "Zero Covid" policy and other factors.



(Data compiled by Ashu Research based on the China Semiconductor Industry Association)

＜Market trends＞ Self-sufficiency rate remains low

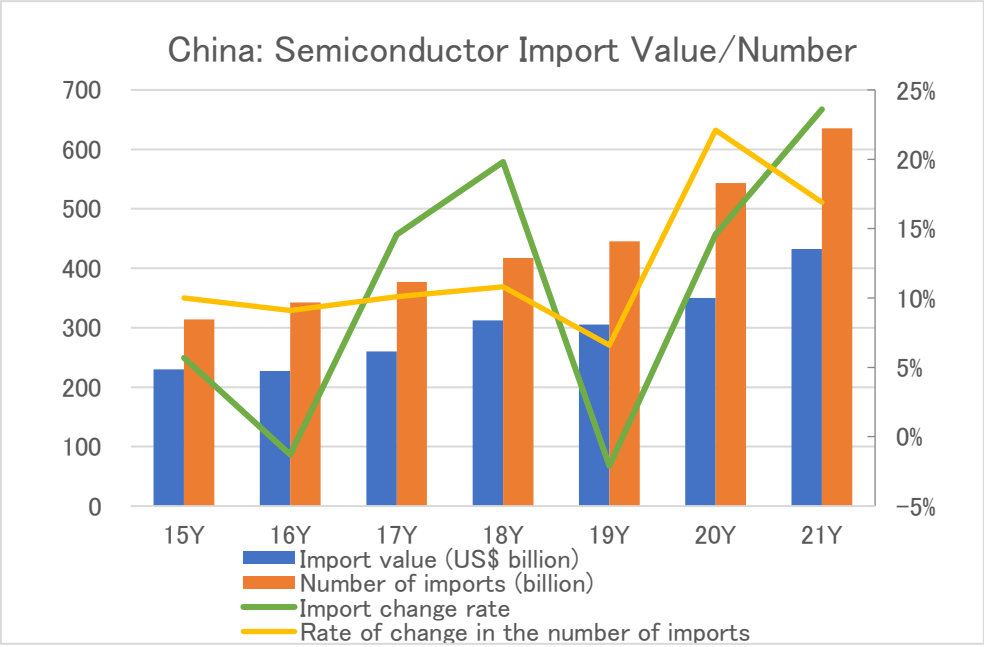
While the market size continues to expand, China's semiconductor self-sufficiency rate remains low. China still relies on imports for the majority of its semiconductor demand. The Chinese government has long supported the development of its own semiconductor industry, but since 2018, amid intensifying trade and high-tech friction with the United States, it has reaffirmed the urgent need for "domestic production" to secure a stable supply.

According to a US research firm, China's semiconductor self-sufficiency rate is at about 17% in 2021, a level that has remained largely stagnant since 2015. The research firm's forecast for 2026 (released in June 2022) is for it to remain at about 20%. The Chinese government has set a goal of raising its self-sufficiency rate to 75% by 2025, but there is much skepticism among industry insiders that this will be achieved.

When limited to automotive semiconductors, for which demand has been growing in recent years, import dependence is even more serious. According to data from a US research firm, China's self-sufficiency rate in in-vehicle semiconductors was less than 5% as of 2021. In the midst of a global shortage of semiconductors, the industry group pointed out that increasing self-sufficiency is an important issue.

Meanwhile, according to the General Administration of Customs of China (GACC: China Customs), semiconductor imports in 2021 grew to 432.55 billion US dollars, up 23.6% from the prior year, with the growth rate accelerating 9.0 percentage points from 14.6% the previous year. The trade deficit reached 278.77 billion US dollars, widening by 45.3 billion US dollars from the prior year. In terms of volume, the size of imports also expanded by 16.9% to 635.4 billion pieces. The

increase in imports since 2020 was due to demand expansion and active inventory accumulation by domestic companies to avoid the impact of the Covid pandemic and friction with the United States. In 2021, the main semiconductor import sources were Taiwan, South Korea, Malaysia, Japan, and Vietnam.



(Data compiled by Ashu Research based on the GACC)

＜Policy trends＞ No change in policy of development support

The Chinese government has not changed its stance on supporting the development of the semiconductor industry and promoting “domestic production.” It continues to invest in domestic semiconductor-related companies through the China Integrated Circuit Industry Investment Fund, an Industrial & Infrastructure Fund Investment launched in September 2014. With the investment from this fund, SMIC, China’s largest semiconductor foundry, and other companies are accelerating capital spending. They are rushing to raise the self-sufficiency rate.

In addition, at the local government level, there continues to be a movement to position semiconductors as a priority industry and to actively attract semiconductor-related companies to the region. For example, in January 2022, Shanghai City announced the setting of a goal to increase the number of new energy vehicles (NEVs) produced in the city to more than 1.2 million units by 2025. At the same time, to achieve the target, they have announced a policy to strengthen the production of in-vehicle semiconductors. In line with this, SAIC Motor Corporation (SAIC), a municipal government-affiliated company, announced in the same month the launch of a multi-billion yuan fund dedicated to promoting the domestic production of in-vehicle semiconductors.

Furthermore, in recent years, there has been a renewed awareness of the importance of “domestic production” as trade and high-tech friction with the United States intensifies. Huawei, the main

target of sanctions by the US, has struggled in its smartphone business in a situation where semiconductor procurement from the US is blocked.

Against this backdrop, foreign press reported (as of December 2022) that "the Chinese government intends to provide more than 1 trillion yuan in support to the semiconductor industry," to boost domestic production of semiconductor devices. Measures considered include subsidies and a preferential tax system, to inject support for the purchase of domestically produced semiconductor equipment by semiconductor foundries. It was later reported that the support measures may be postponed due to the financial pressures caused by the Covid pandemic, but that the authorities are considering alternative measures.

＜Industry map＞ SMIC and other companies have a presence in the global market

Although Taiwan Semiconductor Manufacturing Company (TSMC) continues to occupy the leading position in the global semiconductor manufacturing market, Chinese companies are also increasing their presence. With policy support as a tailwind, SMIC and others are focusing on expanding production capacity and raising the level of technology.

SMIC is China's largest semiconductor foundry, and its largest shareholder is the central government-owned Datang Telecom Technology (DDT). The second largest shareholder includes the Industrial investment fund "China Integrated Circuit Industry Investment Fund" as mentioned above. Other leading Chinese companies include Shanghai based Hua Hong Semiconductor. The company's major shareholders are Shanghai Alliance Investment Company, a Shanghai City government-affiliated company, and China Electronics Corporation (CEC), a central government-affiliated company, which has also accepted an investment from NEC.

Nevertheless, there is still a large gap in manufacturing technology between TSMC, the world leader, and Chinese companies such as SMIC. Demand for cutting-edge semiconductors is projected to increase with the spread of 5G mobile communication services in many countries and the shift to car electronics, but the supply of these products is currently dependent on TSMC and Samsung Electronics of South Korea. The technology of Chinese foundries such as SMIC is more than one lap behind, and the Chinese semiconductor industry is facing a major challenge to improve its technology level as well as domestic production.

Meanwhile, in response to sanctions imposed by the US and the shortage of semiconductors, manufacturers of smartphones, home appliances, automobiles, and other products in China are expanding their own semiconductor production and partnerships with other domestic companies. In the consumer electronics industry, Gree Electric Applications (Gree), Midea Group (Midea), Hisense Group (Hisense), and others are focusing on semiconductor development for their own products. In the automotive industry, BYD, a major new energy vehicles (NEVs) supplier, has been restructuring its semiconductor division since 2020, indicating plans to focus on sales outside the company.

World: 10 Largest Semiconductor Foundries （Q4 2021）

	Manufacture	Nationality
1	Taiwan Semiconductor Manufacturing Company （TSMC）	Taiwan
2	Samsung Electronics	South Korea
3	United Microelectronics Corporation （UMC）	Taiwan
4	GlobalFoundries	US
5	Semiconductor Manufacturing International Corporation （SMIC）	China
6	Hua Hong Semiconductor	China
7	Powerchip Semiconductor Manufacturing Corp. （PSMC）	Taiwan
8	Vangurad International Semiconductor Corporation （VIS）	Taiwan
9	Tower Semiconductor	Israel
10	Nexchip Semiconductor Corporation	China Taiwan

（Data compiled by Ashu Research based on news materials）

（Ashu Research: January 2023）