

Semiconductor Back-End Equipment - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts 2019 - 2029

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Report description:

The Global Semiconductor Back-End Equipment Market was valued at USD 84.6 billion in the previous year and is expected to register a CAGR of 8.5 percent during the forecast period to become USD 138.02 billion by the next five years. The significant expansion of the semiconductor industry, primarily fueled by consumer electronics applications, is one of the primary elements augmenting the growth of the Global Market for semiconductor back-end equipment.

Key Highlights

- The design, front-end, and back-end processes are the three main components of the semiconductor manufacturing process. Back-end semiconductor manufacturing refers to the processes after all features/circuits have been created on the wafer and includes tools for packaging, testing, and assembling integrated circuits. Extreme accuracy, precision, and high throughput make for this exciting technology.
- The growth of smartphones and other devices, such as advanced consumer electronics and automotive development, drives the global semiconductor industry. Technology advancements like wireless technologies (5G) and artificial intelligence drive these industries. As a result, several factors, including the consistent increase in demand for high-performance and affordable semiconductor chips, influence the Market in different ways over the short-, medium-, and long-term horizons. For instance, according to Ericsson Mobility Report, by the end of 2028, there will be 4.6 billion 5G subscriptions globally, accounting for about half of all mobile subscriptions.
- The impact of such trends is evident on the semiconductor sales. For instance, in February 2023, the Semiconductor Industry Association (SIA) announced global semiconductor industry sales totaled USD 574.1 billion in 2022, reporting an increase of 3.3% compared to the previous year's total of USD 555.9 billion. The semiconductor industry's significant growth will also drive the Market for back-end equipment, opening up numerous opportunities during the forecast period.
- Furthermore, the growing investment in the semiconductor equipment value chain also creates a favorable outlook for the growth

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of the studied Market. For instance, according to SEMI, the global sales of semiconductor manufacturing equipment increased 5% from USD 102.6 billion in 2021 to a record of USD 107.6 billion in 2022.

-However, the Market is also witnessing several restraints associated with cost. For instance, one of the most challenging issues with hybrid bonding is cost. This type of processing is seen by chip makers, foundries, and IDMs as an extension of the wafer fab back end of the line. The equipment required is more expensive and automated than other types of packaging, and the standards for process cleanliness are much stricter.

-Further, the ongoing geo-political conflicts such as the US-China trade dispute and the conflict between Russia and Ukraine significantly impact the value chain of the semiconductor industry as these conflicts have resulted in the implementation of various types of sanctions of several countries which in turn impacts the growth of the studied Market. For example, these conflicts have already exacerbated the chip shortages and semiconductor supply chain issues that have affected the industry for some time. The disruption may also result in volatile pricing for critical raw materials such as nickel, palladium, copper, titanium, aluminum, and iron ore, which may obstruct the manufacturing of Semiconductors.

Semiconductor Back-End Equipment Market Trends

Bonding Equipment is Expected to Drive the Market.

- Semiconductor Bonding Equipment finds application due to rising demand for semiconductor chips with higher efficiency, processing power, and smaller footprint, driving demand for the market during the forecast period. The need for semiconductor bonding equipment has also increased due to significant developments in front-end processes.

- One of the main factors assisting the demand for bonding equipment is the growth of consumer electronic and computing device products such as smartphones, wearables, PCs, smart home devices, etc. As these devices use multiple integrated circuits and semiconductor chips, the growing consumption of semiconductor chips/ICs creates a favorable outlook for the studied market's growth. For instance, according to WSTS, the semiconductor-integrated market is anticipated to reach a value of USD 453.04 billion in 2023, compared to USD 276.7 billion in 2016.

- Furthermore, investments in cutting-edge packaging technologies and other applications also drive the demand for bonding equipment solutions. For instance, in March 2022, Intel Corp. invested EUR 80 billion across the entire semiconductor value chain in the European Union, including cutting-edge packaging technologies. Moreover, the manufacturers are also concentrating on improving the semiconductors needed to make the back-end machinery and semiconductor manufacturing equipment (SME). For instance, Qorvo, a significant global provider of connectivity and power solutions, was revealed to have licensed Adeia's hybrid bonding technology in February 2023 by Adeia Inc.

- The growing investments in semiconductor equipment manufacturing facilities also create a favorable outlook for the growth of the studied market. For instance, the chip equipment manufacturer ASML announced in November 2022 that it was to open a new facility in South Korea to produce semiconductor equipment. The company announced that it would spend WON 240 billion (USD 181 million) to build a facility that would be 16,000 square meters. The expected start of operations is in the second half of 2024. These futuristic industry developments are expected to lead to future market opportunities, as bonding is a crucial process in the semiconductor chip manufacturing process.

- Moreover, in the upcoming years, the market is expected to be driven by the demand for bonding equipment for various applications across industries. Primarily due to the rising concerns about the safety of passengers and drivers, automobile manufacturers are also using MEMS and optoelectronics in several passenger safety applications. Bonding equipment can provide the high-precision packaging that these automobile assemblies require.

Asia-Pacific to Witness a Significant Growth

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- The Asia-Pacific Semiconductor Back-End Equipment Market is expected to expand rapidly during the forecast period. The Market is anticipated to be driven by strategic investments made by important domestic suppliers and the expansion of the well-established semiconductor industry. As chip consumption increases in the next four years, the Asia-Pacific semiconductor market is expected to more than triple in size from that of the Americas.
- Furthermore, the region is home to one of the biggest semiconductor manufacturers in the world. According to SIA, East Asia, which includes Taiwan, China, South Korea, and Japan, has 75 percent of the world's capacity for producing semiconductors. Several other countries in the Asia Pacific intend to establish new foundry facilities and draw demand for back-end equipment because of the ongoing global chip shortage.
- According to Semiconductor Equipment and Materials International, in 2022, spending on semiconductor equipment in China amounted to USD 28.27 billion, while in Taiwan, it stood at USD 26.82 billion. The expenditure has increased yearly, which will drive the studied Market. Further, Taiwan is quickly becoming a market player in the production of semiconductors, creating a high demand for manufacturing and back-end machinery. Taiwan (92%) and South Korea (8%), according to SIA, are responsible for all of the world's most sophisticated (below 10nm thickness) semiconductor manufacturing capacities.
- In addition, it is anticipated that China will surpass the United States as the world's significant semiconductor industry powerhouse due to its growing domestic chip demand. According to the Semiconductor Industry Association, the semiconductor market will double in size to reach more than USD 1 trillion by 2030, with China accounting for more than 60% of that growth. Such exponential growth is anticipated to increase demand for semiconductor bonding equipment.
- Furthermore, the Market for equipment used in semiconductor manufacturing in the region is expanding due to the introduction of 5G technology, which is anticipated to provide a significant boost to the digital infrastructure globally, driving the demand for semiconductor chips. For instance, the Mobile Economy Asia-Pacific 2022 report from the GSM Association projects that by 2025, there will be 400 million 5G connections, equivalent to over 14% of all mobile links. In the upcoming years, such developments will fuel the Market in the Asia Pacific region.

Semiconductor Back-End Equipment Industry Overview

The semiconductor back-end equipment market is moderately competitive. Various service providers regularly demand back-end equipment to cope with the ever-increasing semiconductor need. This influx of demand and orders is best managed with the expertise of well-established brands due to extensively high setup and R&D costs. However, government regulation support and company partnerships to boost production are standard in the industry. Some key market players include ASML Holding N.V., Applied Materials, Inc., Tokyo Electron Limited, and Lam Research Corporation, among others.

In August 2023, TSMC, a leading semiconductor foundry, began placing new orders with several advanced packaging equipment suppliers. The company has been working with suppliers such as Gudeng Precision Industrial, Apic Yamada, Disco, and Scientech. The decision to engage with equipment suppliers highlights the company's ongoing efforts to enhance its advanced packaging capabilities.

In June 2023, Lam Research, an American wafer fabrication equipment manufacturer, unveiled Coronus DX, which can, in a single step, deposit a proprietary layer of protective film on both sides of the wafer edge to help prevent damage and defects and damage that occur during advanced semiconductor manufacturing, paving the way for adoption of advanced logic, packaging and chip production processes that weren't feasible before. Such developments are also anticipated to influence the development of advanced back-end equipment.

Additional Benefits:

- The market estimate (ME) sheet in Excel format

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