

Probe Card - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2024 - 2029)

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Abstracts

The Probe Card Market size is estimated at USD 2.05 billion in 2024, and is expected to reach USD 3.74 billion by 2029, growing at a CAGR of 10.60% during the forecast period (2024-2029).

Key Highlights

Increased semiconductor production and continuous government and key vendor investment in establishing semiconductor foundries are driving the growth of the market.

The advancement in packaging technology further boosts the demand for highly efficient probe cards to test semiconductor chips. MEMS technology gained traction in the probe card market due to the benefits and accuracy it offers during testing. The augmented use of semiconductor chips in several industry verticals, including automotive, communication, consumer electronics, and healthcare, is also increasing the growth of the market.

However, the high cost associated with the probe cards restricts the growth of the market. An increase in the prices of raw materials enhances the production cost of probe cards, which, in turn, restricts the growth of the market.

The increased demand for semiconductor memory chips, mainly DRAM and Foundry and Logic ICs, across consumer electronics, automotive and robotics, and other applications creates a huge demand for probe cards to test the chips' functionality. Due to growing consumer demand, exponential growth in semiconductor manufacturing drives the DRAM, foundry, and logic IC market.

The high cost associated with probe cards presents multiple challenges that are restricting the growth of the market. Significant initial investment requirements, increased production and maintenance costs, reduced scalability and flexibility, slower adoption of new technologies, and barriers to entry for smaller players are some of the factors that result in higher costs for probe cards.

The ongoing trade tensions between China and the United States have significantly impacted the growth of the memory market. From a Chinese standpoint, the commercial restrictions imposed by the US Department of Commerce in October 2022 created uncertainty regarding the expansion of memory production. As a result, the combined wafer capacities of the top memory companies, YMTC and CXMT, are expected to be limited to approximately 180kWpm over the next five years.

Probe Card Market Trends

MEMS to Dominate the Technology Segment

The demand for MEMS probe cards is increasing. They are essential components in the semiconductor testing process, as they facilitate accurate and dependable electrical connection between the semiconductor device and the testing equipment.

MEMS probe cards consist of tiny probes that establish contact with the pads on a semiconductor device, facilitating electrical testing. These probes are manufactured utilizing semiconductor fabrication methods, which allow for their small dimensions and exceptional functionality.

MEMS technology allows for the production of probes that contact the I/Os and power connections on ICs at micron-level perfection. Due to their accuracy, MEMS probes are suitable for supporting the fine-pitch and high-pin count requirements of advanced packaging and advanced semiconductor process nodes.

However, not all MEMS probes are created equal. MEMS probe cards are at the forefront of these developments, addressing issues with advanced 2.5/3D packages, the wide temperature ranges needed to test ICs for the automotive industry, the emerging requirements for high bandwidth and efficient signal integrity in RF applications, and lowering the cost to test thousands of DRAM memory devices in a single touch down.

Over the years, the integrated circuit (IC) content in automobiles has consistently

increased. The continuous development of automotive applications, such as mobile connectivity, automotive safety, and electrically powered vehicles, is anticipated to push the semiconductor content to unprecedented levels. Particularly, the advancements in automotive safety and electrical power will necessitate exceptional performance and reliability, even in challenging operating conditions, which create high demand for MEMS probe cards.

With the increasing stringency in the implementation of driver assistance systems, the demand for MEMS probe cards is expected to grow. In addition, electric vehicles are gaining traction due to government support and increased fuel prices.

For instance, the International Energy Agency (IEA) projected that electric vehicle (EV) sales will make up approximately 65% of total car sales by 2030 in the Net Zero Scenario. In order to achieve this, there must be an annual growth rate of around 25% in EV sales from 2023 to 2030. Such an exponential growth in EV sales creates a huge demand for ADAS systems and infotainment systems, resulting in increased demand for MEMS probe cards.

According to OICA, in 2023, approximately 94 million motor vehicles were produced worldwide. Indicating an increase of around 10% compared to the previous year. China, Japan, and Germany were among the largest producers of cars and commercial vehicles.

Asia Pacific Expected to Witness Significant Growth

Considering the changing dynamics of various regional industries, Asia-Pacific is anticipated to remain among the prominent contributors to the market's growth. The region has well-known semiconductor manufacturers, major semiconductor materials suppliers, advanced equipment, and specialized semiconductors, primarily in China and Japan.

South Korea's competitive advantage in the global high-bandwidth memory (HBM) and dynamic random-access memory (DRAM) markets is another driving force behind the probe card market. The integration of semiconductors into automotive electronics for safety, automation, electrification, and security purposes also contributes to the growth of the probe card market in the region.

The region is highly investing in its automotive industry, owing to a newer and sustainable future. This creates a high demand for IGBT semiconductors, AC-DC converters, automotive ICs, etc., thus propelling the demand for probe cards in the region. The Chinese automotive and mobility industry is globally renowned for its strong performance in the domestic market and promising prospects. The Chinese Ministry of Industry and Information Technology forecasts that the country's vehicle production is expected to hit 35 million by 2025, solidifying its position as the top car manufacturer worldwide.

According to a report from Invest Korea, the South Korean government expanded electric vehicle (EV) subsidies until the end of 2023. By 2030, the government of Korea aims to increase the share of hydrogen and electric vehicles in new vehicle sales by 33%.

According to NITI Ayog, India's EV finance industry is expected to reach USD 50 billion by 2030. The Indian government has set ambitious targets for EV adoption, aiming for 30% for private cars, 40% for buses, 70% for commercial vehicles, and 80% for two-wheelers by 2030, as stated in the NITI Ayog report. According to SMEV data, India witnessed a remarkable surge in the sale of four-wheel electric vehicles, with 90,432 units sold in FY 2024, showcasing a significant increase compared to the previous fiscal year.

China is at the forefront of 5G infrastructure development. As reported by MIIT, China had 3.38 million 5G base stations in FY 2023. The widespread availability of internet services increases the demand for smartphones, laptops, and tablets, further creating a conducive environment for the growth of the country's market.

For instance, according to the National Bureau of Statistics of China, the sales of consumer electronics and household appliances in China increased to CNY 130.95 billion (USD 18.08) in January/February 2024, compared to CNY 77.25 billion (USD 10.67) in December 2023.

Probe Card Industry Overview

The Probe Card market is highly fragmented due to the presence of global players and small and medium-sized enterprises. Some of the major players in the market are Formfactor Inc., Technoprobe SpA, Micronics Japan Co Ltd, Japan Electronic Materials

Corporation, and Mpi Corporation. Players in the market are adopting strategies such as partnerships and acquisitions to enhance their product offerings and gain sustainable competitive advantage.

May 2024 - FormFactor announced that it has been acknowledged again for its outstanding performance in TechInsight's customer satisfaction survey.

Semiconductor manufacturers globally assess their suppliers on customer service, high performance, and product quality through this survey. FormFactor has been consistently selected as a leading provider of Test Subsystems for eleven consecutive years, particularly in producing probe cards.

March 2024 - MJC Europe GmbH, a German subsidiary of Micronics Japan Co. Ltd, decided to move to a new office in January 2024. This strategic relocation aims to enhance sales prospects for probe cards and test sockets designed for logic chips, specifically focusing on the automotive sector in Europe. The company's new office in Munich is strategically positioned within the semiconductor industry hubs of Europe.

Additional Benefits:

The market estimate (ME) sheet in Excel format

3 months of analyst support

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