Semiconductor Laser Equipment Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

Market Report | 2023-01-23 | 120 pages | Mordor Intelligence

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Report description:

The semiconductor laser equipment market is expected to register an approximate CAGR of 5.6% throughout the forecast period. Increasing demand for semiconductors from end-use sectors such as machine tools, microelectronics, automotive, and industrial is expected to drive the semiconductor laser equipment market.

Key Highlights
The semiconductor manufacturing process has a wide range of laser applications. Several laser technologies have begun integrating into main semiconductor operations, such as laser cutting, welding, bonding, drilling, debonding, marking, patterning, measuring, and deposition. These are utilized in fabricating semiconductor devices, modular and high-capacity interconnect printed circuit boards, and especially in packaging integrated circuits (ICs).
as different semiconductors have different applications. Lasers are widely used during the manufacturing process for marking the wafers, indicating which item is suitable for which application. Furthermore, lasers not only cut into a wafer's surface but also re-arrange the surface particles, creating marks that are easily readable despite being minutely shallow.
Semiconductor lasers have become more important in modern life, with several uses in industry, communication, and the military. Furthermore, the emergence of new use cases is driving further investments in the studied market. For instance, in February 2022, the Defense Advanced Research Projects Agency (DARPA) submitted proposals for scalable, high-energy laser (HEL) technologies to develop a novel era of laser combat systems. The planned five-year, USD 60 million Modular Efficient Laser Technology (MELT) effort removes all current technology development. It also plans to leverage cutting-edge semiconductor manufacturing processes, coherent beam combining, photonic integration, and three-dimensional (3D) connectivity and packaging. Such investments are expected to increase semiconductor demand across military and defense applications, contributing to market development.
Increasing demand for semiconductor chips is also driving investments in manufacturing equipment worldwide, which in turn is

creating a favorable market scenario for the growth of the studied market during the forecast period. For instance, according to Semiconductor Equipment and Materials International (SEMI), the spending on semiconductor equipment in South Korea amounted to USD 24.98 billion, in Taiwan, to USD 24.94 billion, and in China, to USD 29.62 billion in 2021.
However, high initial investment, complex procedures, technical knowledge, and skills are among the major factors expected to restrain the semiconductor laser equipment market's growth over the forecast period.
The COVID-19 pandemic had a notable impact on the growth of the studied market as the widespread lockdown imposed across various countries significantly disrupted the semiconductor industry's supply chain, resulting in a slowdown in demand for related equipment. However, the pandemic-led growth in the adoption of digital technologies was expected to grow in the post-COVID period as well, driving the demand for semiconductor chips, which in turn will encourage the chip manufacturers to invest in equipment such as lasers to drive production, creating opportunities in the studied market.

Semiconductor Laser Equipment Market Trends

Increasing Demand for Semiconductor Chips To Support The Market Growth

The rising demand for semiconductor chips throughout various end-user sectors creates a favorable market setting for the semiconductor laser equipment market's growth. For example, according to IEEE, semiconductor demand in the automotive sector has been continuous, owing to a significant improvement in cutting-edge technologies such as vehicle-to-everything communication, advanced driver-assistance systems (ADAS), and power management in electric cars, including navigation, dashboard cameras, smart keys, as well as a highly anticipated image processor.
According to the China Association of Automobile Manufacturers (CAAM), the total number of automobiles manufactured in China in 2021 was around 26.1 million. Furthermore, the automobile sector is expected to increase steadily in 2022. For example, in September 2022, the country sold around 2.6 million automobiles. The growth in the automobile sector is expected to increase demand for automotive-grade semiconductor chips, driving investments in semiconductor equipment such as semiconductor lasers.
Growth in the consumer electronics industry is also expected to contribute to the demand for semiconductor chips over the forecast period as a result of the increasing demand for smart and multifunctional devices. This demand growth is encouraging vendors to expand their operations and invest in new manufacturing facilities. For instance, in July 2022, Samsung revealed plans to invest USD 500 million to increase the manufacture of household appliances at its two plants in Mexico. Such investments are expected to propel semiconductor chip demand, contributing to the market's growth.
Driven by an increasing demand for semiconductor chips, manufacturers are increasing their investments in new chip manufacturing facilities and equipment, creating a favorable market scenario for the studied market. For instance, according to SEMI, semiconductor manufacturing equipment spending increased from USD 64.42 billion in 2018 to USD 102.64 billion in 2021.

Asia Pacific is Expected to Grow Significantly Over the Forecast Period

Asia-Pacific is expected to grow considerably throughout the forecast period due to increased government expenditures and efforts coupled with the region's high production and industrialization, increasing the demand for semiconductors. Also, strong growth in the communications sector in countries like India, China, Japan, Korea, and Taiwan, among others, and the presence of major smartphone manufacturers across the region are expected to create growth opportunities in the region over the next few years.
Increasing investments by major players and rising government initiatives in end-uses are expected to boost product demand over the coming years. For example, Kyocera plans to spend twice as much on semiconductor manufacturing and other industries

as it did in the three years before December 2022. This will bring total spending on capital expenditures, research and technology to JPY 1.3 trillion (USD 9.78 billion) during the three fiscal years until March 2026.
Similarly, in November 2021, the Japanese government unveiled its plans to allocate JPY 600 billion (USD 4.5 billion) of its fiscal 2021 supplementary budget to help fund advanced semiconductor manufacturing. In 2021, the Japanese government approved a USD 338 million chip research project where TSMC could develop new chip technology. The company, along with rivals like Intel and Samsung, is taking advantage of generous state subsidies as nations face the current chip shortage and concerns about domestic supplies in the future. Over the next few years, the semiconductor laser equipment market is expected to grow because of changes in how semiconductors are made.
Furthermore, the Asia-Pacific region is also home to some of the biggest semiconductor chip manufacturers, such as TSMC, SMIC, SK Hynix, etc. These vendors are spending a lot of money on semiconductor equipment to increase production at their existing plants and move into new markets. This is creating a good market situation for the growth of the studied market in the Asia-Pacific region.

Semiconductor Laser Equipment Market Competitor Analysis

The semiconductor laser equipment market is moderately competitive, with the presence of numerous players such as Hamamatsu Photonics K.K., Applied Materials, DISCO Corporation, Delphi Laser, and Sumitomo Heavy Industries, Ltd., among others. These players are continuously adopting strategies such as product launches, product development, partnerships, and collaboration, among others, to increase their global share and expand their market presence.

In November 2022, researchers from LP3 Laboratory, France, developed a light-based technique that supports local material processing anywhere in the three-dimensional space of semiconductor chips. The direct laser writing facilitated by this technology opens the possibility of exploiting the sub-surface space for higher integration densities and additional functionalities.

In September 2022, Ushio introduced its novel 405 nm, 600 mW (CW) laser diodes, the HL40173MG and HL40175MG, with a lifetime almost double that of traditional products. The light source need for mask-less (direct imaging) exposure devices that expose high-definition circuit designs on the substrate has increased dramatically in parallel with customer demand for compact and more powerful smartphones. There is also a growing need for 405 nm laser diodes, which are frequently utilized as light supplies in the biomedical, measuring, and 3D printing industries and require additional advancements in stability and operational life.

Additional Benefits:

The market estimate (ME) sheet in Excel format
3 months of analyst support

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