

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

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Report description:

The Dicing Equipment Market is expected to grow by registering a CAGR of 7.4% over the forecast period. The primary factors driving the growth of the dicing equipment market are the increasing demand for smart cards, RFID technology, and automotive power ICs. The increasing consumer electronics market and the inclination toward miniaturization and technology migration has forced market vendors to increase R&D expenditure to reduce the size and improve performance, leading to the emergence of micro-electro-mechanical systems (MEMS) and 3D packaging, which in turn is driving the demand for dicing equipment.

Key Highlights

In electronics manufacturing, IC (integrated circuit) packaging is the final stage of semiconductor device fabrication, in which the tiny block of semiconducting material is encased in a supporting case that prevents physical damage and corrosion. The increasing efforts to make electronic packaging highly resourceful have amplified usage in myriad applications.

The reduction in package size is inversely proportional to the power dissipation. Therefore, players in the market strive to develop semiconductors that can retain power with reduced size. For instance, NXP Semiconductors' MaxQFP package delivers the same I/O in a smaller footprint. While comparing 16x16 mm 172 MaxQFP to 24x24 mm 176 LQFP, the company claims a reduction of about 55% in footprint.

Furthermore, the increasing number of electronic components in vehicles or automobiles is a key driver, particularly in hybrid and electric cars, due to the consumer demand for constant connectivity. For instance, according to the International Energy Agency (IEA), the sales of electric vehicles nearly doubled, reaching 6.6 million. The automotive industry's push to deliver autonomous and electric vehicles in the next decade is also driving the growth of the market studied.

With most RFIDs being integrated into several consumer electronics and identity solutions, such as identification tags and smart cards, end users increasingly demand ultra-smooth surfaces and thinner wafers to incorporate them seamlessly into these devices. Such scenarios, coupled with the strong demand for RFID applications, such as enterprise identity management solutions

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and automobile telematics, are expected to create more demand for thin wafers, thus providing positive growth for dicing equipment during the forecast period.

Blade dicing has been the most widely used process in separating silicon wafers into individual chips/devices, both in MEMS and semiconductor technologies. It is also the low-cost dicing technology in many applications, which is expected to drive its demand during the forecast period.

However, with the miniaturization trend becoming prevalent, the complexity of patterns has increased significantly, increasing the chances of functional defects in manufacturing processes which is among the major factors challenging the growth of the studied market.

COVID-19 and the economic disruption caused by it resulted in the overall decline in the economies of several nations and a drastic fall in business and trade. The semiconductor or wafer market was no exception and suffered major falls in revenue, manufacturing, and expansion due to the pandemic, which had a similar impact on the dicing equipment market. However, with the semiconductor manufacturers focusing on expanding their production capabilities to match the market demand, the studied market is also expected to follow a similar trajectory.

Dicing Equipment Market Trends

Blade Dicing to Hold Significant Market Share

Wafer dicing separates individual silicon chips (die) from one another on a wafer. The wafer is mechanically sawed in the excess spaces between the dies during the dicing process (often referred to as either dicing streets or scribe lines). Mainstream cutting of silicon wafers with a diameter of 200mm or 300mm is currently conceivable, as is a 0.05mm square cut. The standard uses a diamond blade to hold the industrial diamond in the resin. When cutting the silicon wafer, the blade thickness varies depending on the subject material and ranges from 20 μ m to 35 μ m.

The precision and control capabilities of the wafer dicing process are critical. The yield and productivity of the entire process are determined by the rate at which the wafer substrate is fed into the cutting blade. Most industries, therefore, require high-speed, high-cutting dicing machines, which can increase the throughput rate and lower the cost.

There are several vendors offering dicing blades. For instance, SIMAC offers dicing blades for Wafer Dicing, CSP, BGA, GaAs, GaP, LED Package singulation, compound semiconductors, ceramics, glass, crystals, and other materials.

Diamond blades are commonly used in dicing machines, which require a constant supply of coolant. Only in this manner can a uniform cut quality be achieved. Deviations can be caused by uncontrollable causes such as nozzle clogging, nozzle adjustment changes, and blade quality. As a result, a statistical technique is required to monitor blade torque continuously. To ensure process stability, online monitoring of dicing machine performance is critical.

The increasing demand for semiconductor chips is expected to positively impact the demand for blade dicing equipment. For instance, according to Semiconductor Equipment and Materials International (SEMI), the total area of silicon wafers shipped globally reached 14,165 million square inches.

Asia-Pacific to Hold a Major Market Share

In the last few decades, the semiconductor industry witnessed tremendous growth, with countries like China and Taiwan emerging among the leading semiconductor manufacturers. TSMC, Samsung, SK Hynix, etc., are among the region's top manufacturers of semiconductor chips.

China is considered one of the world's fastest-growing semiconductor markets. Significant demand for smartphones and other consumer electronics devices encourages many vendors to set up production establishments in the country. Increasing initiatives,

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such as 'Made in China' by the Chinese government, are increasingly drawing attention from international players to set up local production establishments.?

According to the Semiconductor Industry Association (SIA) forecasts, the Chinese semiconductor industry could generate USD 116 billion in annual revenue by 2024, capturing about 17.4% of the global market share.

Furthermore, China also announced a new and enormous fab development campaign in the foundry, gallium-nitride (GaN), and silicon carbide (SiC) markets, among other steps, to advance its domestic semiconductor industry. According to SEMI, chipmakers worldwide were scheduled to begin construction on 19 new fabs in 2021, with another ten planned for 2022.

The ongoing chip shortage and the growing demand have also encouraged other countries to take the initiative to promote local semiconductor industry. For instance, the government of India took several initiatives to develop its electronics manufacturing cluster. In December last year, the Ministry of Electronics and Information Technology (MeitY) approved a comprehensive PLI scheme involving incentives worth USD 9.2 billion for semiconductor and display manufacturers to be distributed over the next six years.

Dicing Equipment Market Competitor Analysis

The dicing equipment market is competitive and consists of several major players. These players, with a prominent share of the market, are focused on expanding their customer base across foreign countries. They leverage innovations to increase their recognition, market share, and profitability. Some major players operating in the market include Suzhou Delphi Laser Co. Ltd, ASM Laser Separation International (ALSI) BV, and Neon Tech Co. Ltd, among others.

In June 2022, SR, a wafer dicing saw machine maker, announced its plans wherein the company would focus on expanding the wafer dicing saw machine business. As part of its expansion plans, the company focused on supplying many saws to Samsung Electronics to dice camera modules. The company would also focus on expanding its presence to new sectors.

In October 2021, Northrop Grumman, the provider of dicing, backend wafer post-processing capabilities, soldier bumping, passivation, advanced inspection, and test solution, established wafer post-processing and test source tailored for defense applications further to expand its footprint into the defense microelectronics systems sector.

Additional Benefits:

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

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