Semiconductor Equipment Components: The Cornerstone of the Semiconductor Industry

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HONG KONG, CHINA, June 30, 2023 /EINPresswire.com/ -- Component Parts Indirectly Drive Iterative Upgrades in the Semiconductor Industry"

Moore's Law propels iterative progress in the semiconductor industry, and semiconductor equipment is key to continuing that trend. Semiconductor manufacturing requires hundreds of processes and dozens of equipment types to construct its production flow. In the hundreds of layers that make up a chip's structure, each layer must undergo important steps such as "deposition, coating, exposure, development, etching, ion implantation, and removal of glue." These semiconductor equipment determine the critical parameters of a chip's process, performance, power consumption, and more. The production capacity of semiconductor equipment is safeguarded by its component parts. It can be said that semiconductor equipment components are the "cornerstone" of the entire semiconductor industry.

Semiconductor Equipment and Component Industry Chain

The upstream of the semiconductor equipment and component industry chain includes material and component factories, the midstream is equipment factories, and the downstream is wafer factories. Components include both hardware that equipment factories produce for integrated modules or systems and consumables that wafer factories purchase for chip production. Considering that semiconductor equipment factories typically prefer to operate in a light asset model, most of their critical technologies need to be embodied in precision components or achieved in the form of precision components as a carrier. Advanced chip manufacturing depends on high-end equipment, which in turn relies on high-precision components. The precision, cleanliness, quality, and other critical parameters of components determine the performance of semiconductor equipment. Compared with ordinary industrial equipment, semiconductor equipment has higher requirements for raw material purity, corrosion resistance, breakdown voltage resistance, surface smoothness, cleanliness, and other parameters. In fact, the iterative upgrades of semiconductor equipment largely depend on breakthroughs in precision component technology.

Mainland China's Wafer Manufacturing Plants Expand Production Against the Trend

According to IC Insight data, in 2018, the wafer manufacturing capacity in mainland China was approximately 1.08 million pieces/month (converted to 12 inches), accounting for approximately 13% of the global total capacity. It is expected that by 2022, the wafer manufacturing capacity in mainland China will be approximately 1.82 million pieces/month (converted to 12 inches), accounting for approximately 17% of the global total capacity. Mainland China is increasing its planning and construction of wafer manufacturing capacity. According to JW Insight data, as of early 2022, there were 23 12-inch wafer fabs in operation in mainland China with a total capacity of approximately 1.04 million pieces/month, an increase of about 18% from early 2021. The planned capacity of these 23 wafer fabs is 1.57 million pieces/month, with further room for capacity expansion. From 2022 to 2026, mainland China will add 25 new 12-inch wafer fabs, with a total planned capacity of approximately 1.6 million pieces/month. JAK Electronics believes that the average annual new capacity of only 12-inch wafer fabs in mainland China will reach 400,000 to 500,000 pieces/month from 2022 to 2026. According to JW Insight's estimation, by 2026, mainland China's total 12-inch wafer manufacturing capacity will exceed 3 million pieces/month, which is twice as much as 2022.

Currently, the semiconductor industry is in a downward cycle. According to media reports such as company conferences and Cailian Press, international wafer manufacturing giants such as TSMC, Samsung, SK Hynix, and Micron may reduce their capital expenditures in 2023. However, SMIC will still maintain its 2023 capital expenditure at around CNY 43 billion, which is basically the same as 2022. We are optimistic about mainland China's wafer manufacturing companies expanding against the trend in this cycle of the semiconductor industry, which will inject confidence into the stable growth of the mainland China semiconductor equipment market.

Global Semiconductor Equipment Component Market Reaches Billions of Dollars

According to SEMI data, the global semiconductor equipment market reached $107.6 billion in 2022, and the mainland China semiconductor equipment market reached $28.3 billion in 2022, accounting for approximately 26% of the global semiconductor equipment market. Mainland China has become an important market for the global semiconductor equipment industry. Considering that the semiconductor industry is in a downward cycle in 2023, SEMI predicts that global spending on wafer fab equipment will slow down in 2023 and recover in 2024.

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