

3D Ic Packaging Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

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Report description:

The Global 3D IC Packaging Market is expected to register a CAGR of 16.8% during the forecast period (2022-2027). The growing adoption of advanced technologies such as AI, IoT, 5G, and high-performance computing is escalating the demand for 3D ICs, which deliver enhanced performance and bandwidth with lower latency. As such, the demand for 3D IC packaging will register significant growth over the forecast period.

Key Highlights

The growing microelectronics and semiconductor industry is developing a trend for vertically stacked integrated circuits (ICs), emerging as a viable solution for providing high performance, increased functionality, and reducing power consumption to fulfill electronic device requirements. The surging need for advanced architecture in electronic products such as connected devices, tablets, and smartphones to increase their energy efficiency and performance to do more than just texting and calling. Such factors are expected to bolster the growth of the 3D IC packaging market.

As a result of the growing semiconductor applications, the slowdown in CMOS scaling and escalating costs have forced the industry to depend on packaging advancements for ICs. 3D stacking technologies have emerged as lucrative solutions that meet the required performance of applications such as machine learning, AI, and data centers. Therefore, the growing need for high-performance computing applications drives the 3D-TSV (Through Silicon Via) market over the forecast period.

The increasing miniaturization of electronics devices is also anticipated to drive market growth. Growing demand for advanced architecture in tablets, smartphones, and gaming devices, along with surging usage of advanced wafer-level packaging technologies in sensors and MEMS, is expected to provide growth prospects for the 3D IC packaging market during the forecast period. According to WSTS, the IC market for semiconductors reached USD 463 billion in revenue in 2021 and is expected to grow by over 10% to USD 510.96 billion in 2022.

The COVID-19 pandemic has significantly impacted various industries and has simultaneously propelled the development of

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advanced medical equipment and devices across the globe. Various medical equipment manufacturing companies announced to increase in the production of several new equipment and devices post the pandemic outbreak. As the applications of 3D IC packaging are numerous within the medical and healthcare industry, the increased manufacturing initiatives are expected to boost the demand for 3D IC packaging. However, the high Initial Investment and Increasing Complexity of Semiconductor IC Designs are expected to restrain the evolution of the market.

3D IC Packaging Market Trends

IT & Telecommunication is Expected to Witness Significant Growth

3D IC Packaging is an essential part of semiconductor manufacturing and design. It directly affects performance, power, and cost on a macro level and the basic functionality of all chips on a micro level.

The increasing investment in 5G infrastructure and the growing number of data center servers coupled with IoT connections and networking devices are the factors propelling the growth of 3D IC packaging in the IT and telecommunication sector. For instance, mobile operators in Korea such as KT, LG Uplus, and SK Telecom agreed to invest a total of KRW 25.7 trillion through 2022 to support 5G infrastructure across the country. The additional investment is focused on enhancing the 5G quality in Seoul and six other cities.

The expansion of data centers provides a growth opportunity for the vendors in the 3D IC packaging studied. According to Cisco Systems, the amount of big data in data center storage global is anticipated to reach 403 exabytes in 2021, with a significant share in the US. Hyperscale data centers reached 700 in 2021, compared to 259 in 2015.

Moreover, the growing IoT market and surging demand for wireless technologies, wherein reduced footprint and enhanced efficiency are critical, are expected to develop the market for 3D IC packaging. According to Ericson, wide-area IoT devices will reach 5.2 billion by 2027 from 2.1 billion in 2021.

Asia-Pacific is Expected to Witness Significant Growth Rate

Asia Pacific is home to some of the biggest semiconductor chip manufacturers and companies like TSMC, SMIC, UMC, and South Korea's Samsung. Taiwan's leading chip foundry is teaming up with Japanese suppliers in the race to lead the crucial 3-nanometer chip market. For instance, in February 2021, TSMC announced that the company plans to establish an R&D center in Japan's science city of Tsukuba to develop 3D IC packaging materials in cooperation with its Japanese suppliers.

Also, in May 2021, Japan's Ministry of Economy, Trade, and Industry and its subsidiary, the National Institute of Advanced Industrial Science and Technology, announced that approximately 20 Japanese companies would work with TSMC Japan's 3D IC R&D Center.

The Asia Pacific region also holds a significant share in the 3D IC packaging market due to a considerable number of semiconductor manufacturing operations happening in the region, along with the presence of major market players such as Samsung Electronics Co., Ltd., Toshiba Corp, ASE Group, and United Microelectronics Corp. among others.

The Asia Pacific region is known for its robust Automotive manufacturing capabilities. Moreover, the growing commercialization of 5G technology in the automotive industry will provide a new revenue stream for the vendors operating in the studied market. The advent of 5G NR-based C-V2X is anticipated to offer unique capabilities for the autonomous vehicle. Thus, it can propel the need for higher levels of autonomy and predictability and other ADAS sensor technologies in the vehicle.

Additionally, market players in the region are forcing on Next-gen chip technology, which could unlock new potential with 3D packaging tools. For instance, Japanese tool-making company Disco focuses on 3D chip packaging by stacking integrated circuits

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on silicon wafers of near-transparent thinness. As Moore's Law nears its physical limits, chipmakers seek new designs and materials to get better performance out of next-generation hardware. Such trends are expected to propel growth in the region. In the current scenario of smart devices and the connected world, customers demand next-generation devices that are more compact, multi-functional, offer better performance, and consume less power. This has propelled the demand for cost-efficient and high-performance IC. For instance, STAR's Institute of Microelectronics has partnered with leading semiconductor companies to develop cost-effective 3D wafer-level integrated circuit packaging solutions. The company has launched chip-on-wafer consortium II and the cost-effective Interposer consortium to advance chip packaging solutions for high-volume manufacturing. The industry-focused consortium will address key challenges in wafer-level packaging to low overall manufacturing costs to accelerate time-to-market for next-generation electronics devices.

3D IC Packaging Market Competitor Analysis

The Global 3D IC Packaging Market is fragmented due to the presence of significant players such as Amkor Technology Inc., ASE Group, and Siliconware Precision Industries Co. Ltd (SPIL), among others. The market players must constantly innovate advanced and comprehensive products to stay relevant.

In May 2021: Intel plans to invest USD 3.5 billion to upgrade its Rio Rancho plant and increase its headcount by more than 35% at the sprawling complex, one of its three largest US manufacturing hubs. It is expanding its New Mexico operations to manufacture new generations of chips based on its Foveros 3D packaging technology, which could aid the company's attempts to regain its leadership status in the semiconductor industry.

Additional Benefits:

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

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