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Semiconductor Bonding Market by Type (Die Bonder, Wafer Bonder, and Flip Chip Bonder), Application (RF Devices, MEMS and Sensors, LED, 3D NAND and CMOS Image Sensors), Process Type, Technology and Region - Global Forecast to 2026

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Abstracts

Semiconductor bonding market was valued at USD 887 million in 2021 and is anticipated to reach USD 1,059 million by 2026, growing at a CAGR of 3.6% between 2021 to 2026. The growing demand for semiconductor bonding in applications such as electric and hybrid vehicles is driving the growth of semiconductor bonding market.

The semiconductor industry plays a vital role in electric and hybrid vehicles. The key components required in electric and hybrid vehicles include power semiconductor devices such as freewheeling diodes, ICs, MEMS, voltage boost DC-DC converters, fuel cell air compressors, motor drives, insulated gate bipolar transistors (IGBTs), and low-voltage power MOSFETs. Innovations in automobiles to build energy-efficient and environment-friendly vehicles have increased the demand for semiconductor devices such as ICs and sensors. Automobile companies also focus on using system on chip (SoC), which offers faster control and secure communication.

To reduce carbon emissions, the use of electric and hybrid vehicles is expanding gradually in some countries because of government support and substantial investments from the automotive industry. Advanced electric cars provided by some of the key car manufacturers, such as Bayerische Motoren Werke AG (BMW) (Germany), Ford Motor Company (US), and Toyota Motor Corporation (Japan), and the initiatives by several countries to reduce carbon emissions have increased the use of hybrid and electric vehicles. As more semiconductor devices are used in electric vehicles, the demand for semiconductor bonding equipment is expected to increase.

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According to the International Energy Agency, the adoption of electric vehicles is continuously increasing across the globe, and their demand is expected to grow rapidly in the coming years. According to the Bloomberg New Energy Finance report, the sales of electric vehicles are estimated to grow to 41 million by 2040, thereby leading to a rise in the demand for electronic components used in electric vehicles.

Advanced systems, such as idling stop systems (ISS), would result in the growth in the semiconductor content in traditional fuel-based vehicles. For instance, in 2014, ROHM Semiconductor developed high-performance microcontrollers for various automotive systems, especially in electric and hybrid vehicles. Such advancements in the automotive sector increase the demand for semiconductor devices, subsequently driving the growth of the semiconductor bonding market.

Growing adoption of IoT and AI in automotive sector

The advent of Industry 4.0 and technologies such as IoT and AI in the automotive sector would contribute significantly toward the growth of the semiconductor bonding market. The increasing demand for vehicle connectivity would encourage new developments in the industry. With ongoing trends such as touch-free human–machine interfaces revolutionizing the automotive sector, there is a growing significance of connected cars. According to a report published by the GSM Association (GSMA) in 2019, the number of IoT connections is projected to reach 24.6 billion globally by 2025. Integration of IoT in automotive safety and communication technologies is one of the major reasons for the anticipated growth of IoT connections. The introduction of technologies such as advanced driver assistance systems (ADAS), adaptive cruise control, and intelligent parking assistance systems would further drive the market growth.

Cellular IoT connectivity and AI play a vital role in automotive and transportation sectors, with major use cases being shared mobility, autonomous vehicles, connected vehicles, telematics, smart public transportation, and C-V2sx vehicles. The development of smart infrastructures such as smart cities and intelligent transportation systems would accelerate the implementation of AI and IoT technologies in automotive and transportation. As per MarketsandMarkets, the connected car market is expected to grow from USD 53.9 billion in 2019 to USD 166 billion by 2025; it is anticipated to register a CAGR of 25.2% during 2020–2025.

The implementation of IoT and AI technologies in automobiles is leading to the integration of a large number of intelligent sensors and actuators, as well as AI chips

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such as ADAS, LiDAR, and neuromorphic chips. These components do not use standard packaging, as different customers have different packaging designs. The manufacturing process of these components comprises high-precision dispensing and stamping of epoxy. Some use eutectic and ultraviolet (UV) processes. This necessitates the demand for flexible multi-die and multi-process die bonding machines with high speed and high accuracy.

Asia Pacific is the fastest-growing region in the semiconductor bonding market

In 2020, APAC accounted for a 62.6% share of the global semiconductor bonding market. The growth of the semiconductor bonding in APAC is attributed to the presence of several OSAT players in China and Taiwan. The region also houses semiconductor fabrication facilities of a few of the major IDMs, such as Intel (US), Micron (US), NXP Semiconductors (Netherlands), SK Hynix (South Korea). Samsung (South Korea), Texas Instruments (US). ASM Pacific Technology Ltd. (Singapore), SHIBUYA CORPORATION (Japan), Kulicke & Soffa (Singapore), and Shinkawa Ltd. (Japan) are among the major players in this market that have their headquarters in APAC.

The breakup of primaries conducted during the study is depicted below:

By Company Type: Tier 1 – 45 %, Tier 2 – 32%, and Tier 3 –23%

By Designation: C-Level Executives – 30%, Directors – 45%, and Others – 25%

By Region: North America– 26%, Europe – 40%, APAC – 22% and ROW – 12%

Research Coverage

The report segments the semiconductor bonding market and forecasts its size, by volume and value, based on region (North America, Europe, Asia Pacific, and RoW), Semiconductor Bonding Market by Type (Die Bonder, Wafer Bonder and Flip Chip Bonder), Application (RF Devices, MEMS and Sensors, LED, 3D NAND and CMOS Image Sensors), Process Type(Die-to-die bonding, Die-to wafer bonding and Wafer-to-wafer bonding), Technology(Die bonding technology (Eutectic Die Bonding (Epoxy Die Bonding, Flip Chip Attachment, Hybrid Bonding (for 3D-NAND)) and Wafer Bonding Technology (Direct Wafer Bonding, Anodic Wafer Bonding, Tcb Wafer Bonding, Hybrid Bonding, Others)). The report also provides a comprehensive review of market drivers, restraints, opportunities, and challenges in the semiconductor bonding market. The

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report also covers qualitative aspects in addition to the quantitative aspects of these markets.

Key Benefits of Buying This Report

This report includes market statistics pertaining to the process type, type, application, technology and region.

An in-depth value chain analysis has been done to provide deep insight into the semiconductor bonding market.

Major market drivers, restraints, challenges, and opportunities have been detailed in this report.

Illustrative segmentation, analyses, and forecasts for the market based on process type, type, application, technology, and region have been conducted to provide an overall view of the semiconductor bonding market.

The report includes an in-depth analysis and ranking of key players.

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MnM View (Key strengths/Right to Win, Strategic Choices Made, and Weaknesses and Competitive Threats) might not be captured in case of unlisted companies.

13 APPENDIX

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