

# **Global Power Semiconductor Market: Analysis By Type (Power IC, MOSFET, IGBT, Diode, Thyristor, and BJT), By Application (Automotive, Consumer Electronics, Industrial, Telecommunication, and Other), By Region Size and Trends with Impact of COVID-19 and Forecast up to 2028**

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## **Abstracts**

The global power semiconductor market was valued at US\$46.72 billion in 2022. The market value is expected to reach US\$62.26 billion by 2028. Power semiconductors are used to rectify and amplify electrical signals or turn the flow of electricity on and off. Unlike regular semiconductors, however, these devices are designed to handle high electrical currents and high voltages of up to several gigawatts, which is their main difference from other semiconductor devices.

Based on operating features, power devices are used in power transmission and distribution, automotive and transport, renewable energy, consumer electronics, and other industrial applications. They play a key role in the sustainable and efficient use of energy, and can be used to transport energy over long distances with minimal losses. Moreover, the demand for power management devices such as voltage regulators, power switches, and power drivers is increasing due to the growing complexity of electronic systems, which is further contributing to the power semiconductor market growth. The market is expected to grow at a CAGR of approx. 5% during the forecasted period of 2023-2028.

Market Segmentation Analysis:

By Type: The report provides the bifurcation of the market into six types: Power IC,

MOSFET, IGBT, Diode, Thyristor, and BJT. Power integrated circuits (ICs) held the highest share of the market, whereas MOSFET is expected to be the fastest-growing segment in the forthcoming years. The use of renewable energy sources such as solar and wind power is increasing, and it requires power ICs to convert and control the energy generated by these sources. Hence, with the increasing use of renewable energy, the demand for power ICs is increasing.

**By Application:** The report further provides the analysis based on applications: Automotive, Consumer Electronics, Industrial, Telecommunication, and Others. Automotive held the highest share in the market and is also expected to be the fastest-growing segment in the forecasted period. Electrification has been a major factor in driving technological developments in the automotive industry. The growing use of automotive electronics in modern vehicles necessitates the adoption of power semiconductors in the automotive segment during the forecast period.

**By Region:** The report provides insight into the power semiconductor market based on the regions namely, Asia Pacific, Europe, North America, and the Rest of the World. Asia Pacific held the major share of the market in 2022. China is the world's largest automotive market, and its growth potential remains high. In particular, high rates of growth for electric-powered vehicles make China one of the largest markets for electromobility. With the increasing electrification, the demand for power semiconductors would rise in China in the forthcoming years. Germany has strong semiconductor industries with established research centers and leading semiconductor companies. For example, Germany is known for its expertise in power electronics and semiconductor manufacturing, with companies like Infineon Technologies and Siemens leading the way.

The existing power grid infrastructure in the US is aging and in need of modernization. Smart grids are an upgrade to the traditional power grid, enabling better monitoring and control of the power system, and improved efficiency and reliability. Therefore, the demand for smart grids is increasing in the US which is significantly contributing to the demand for power semiconductors.

#### Market Dynamics:

**Growth Drivers:** The global power semiconductor market growth is predicted to be supported by numerous growth drivers such as increasing demand for electric vehicles (EVs), rising adoption of industrial automation, rising demand for consumer electronics, increasing demand for renewable energy, increasing disposable income, rising smart

grid market, increasing role of power semiconductor in rail transportation, and many other factors. In EVs, due to the transition of the power system from an internal combustion engine to an electric drive system, the power system of the traditional mechanical structure is replaced by an electric motor and electronic control system. The electronic control system requires large amounts of power devices such as IGBT, a DC/AC converter, and an isolator. This has greatly increased the value of power semiconductors in EVs.

**Challenges:** However, the market growth would be negatively impacted by various challenges such as high development cost, supply chain disruptions, power failure, etc.

**Trends:** The market is projected to grow at a fast pace during the forecast period, due to various latest trends such as like increasing auto electrification, the advent of 5G networks, rising inverterization rate of home appliance, rising demand for wide bandgap (WBG) semiconductors, increasing demand for miniaturized power semiconductors, etc. With the deployment of 5G networks, there would be a significant increase in the amount of data that needs to be processed and stored. This would lead to a surge in demand for data centers, which would require high-power and high-efficiency power semiconductors for their power conversion and distribution systems.

**Impact Analysis of COVID-19 and Way Forward:**

The COVID-19 pandemic has had a significant impact on the power semiconductor industry's growth. The pandemic has caused disruptions in global supply chains, making it more difficult to source raw materials and manufacturing equipment. However, as lockdown restrictions were normalized in the second half of 2020, the demand for power semiconductors like IGBT and MOSFET returned to the pre-pandemic level. The pandemic has highlighted the importance of energy efficiency, and there may be an increased demand for power semiconductor products that can help reduce energy consumption and costs. On the hand, the pandemic has accelerated the adoption of digital technologies, and there may be an increased demand for power semiconductor products that can support these technologies, such as wide bandgap semiconductors (e.g. SiC and GaN).

**Competitive Landscape:**

The global power semiconductor market is concentrated. The key players in the global power semiconductor market are:

Infineon Technology

ON Semiconductor Corporation

STMicroelectronics N.V.

Mitsubishi Electric Corporation

Toshiba Corporation

Fuji Electric Co., Ltd.

Vishay Intertechnology, Inc.

Renesas Electronics Corporation

ROHM Semiconductor

Texas Instruments Incorporated

Nexperia

StarPower Semiconductor

The power semiconductor industry is relatively centralized, with the top 10 companies taking up nearly 65% market share. Most power semiconductor industry players, including companies such as Infineon, Fuji Electric, and Mitsubishi, have adopted the IDM production model, handling design, manufacturing, assembly, and testing in-house. An IDM model allows for vertical integration, facilitating supply management. Thus, companies are moving to an IDM model to improve production efficiency and technological know-how. This would further help the companies to grow in the coming years.

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