

## **Intelligent Power Module (Ipm) Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)**

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### **Report description:**

The Global Intelligent Power Module (IPM) market has registered a CAGR of 7.87% during the forecast period. With the demand for electricity continuing to grow due to staggering population growth, and the electrification of various industries, energy efficiency is a crucial concern. The increasing focus of multiple sectors to develop solutions that can help them reduce power wastage and enhance utilization efficiency is among the primary factor supporting the growth of the studied market as IPMs deliver significant efficiency gains with the latest generation of power semiconductors.

### **Key Highlights**

Intelligent power modules are high-speed, low-loss IGBTs, diode power devices, integrated gate drives, and protective circuits housed in a single enclosure. The many advantages afforded by power electronics technology in motor control applications are driving up demand for these IPMs. The IPM's integrated over-temperature and voltage lock-out protection are also employed to improve system dependability.

Rising demand for renewable energy generation, OEM focus on offering creative and efficient energy and power monitoring modules, and soaring demand for IPMs in the industrial, automotive, and consumer electronics verticals are some of the primary drivers driving the intelligent power module market. Furthermore, trends in the personal computing industry, such as smaller system sizes, faster processors, and the need to support advanced applications, are expected to promote the market's growth, as intelligent power modules' small size results in fewer parts needing to be purchased, stored and put together.

Several government programs throughout the world aimed at reducing carbon dioxide emissions and preserving the environment are driving the adoption of clean energy vehicles such as hybrid plug-in electric vehicles, Electric Vehicles (EVs), and alternate fuel vehicles, wherein IPMs are widely used in oil pumps, AC compressors, onboard charging units, etc. Hence, the growth of the EV industry is expected to support the studied market's growth.

Furthermore, IPMs are widely adopted in consumer appliances such as washing machines, air conditioners, vacuum cleaners,

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refrigerators, etc. For instance, the intelligent power module, SLLIMM, offered by STMicroelectronics, is a compact and highly integrated power molded module that combines smart driving and power switching sections to drive motors from a few watts up to 5 kilowatts in applications such as home appliances, fans, air conditioning inverters, pumps, servo motors, general purpose drives and more.

However, for the rapid growth of the IPM industry, adopting new trends and technologies in IPMs is required. Building a highly efficient control structure is difficult as vendors focus on integrating numerous functionalities into a single chip, acting as a stifling factor for the technological growth of IPMs.

The initial phase of the COVID-19 scenario was characterized by supply chain disruptions, reduced output of numerous end-user OEMs in the stated market, such as industrial, automotive, consumer electronics, aerospace, and so on, as well as the suspension of commercial and industrial activity. As a result, demand for intelligent power modules and other related technologies decreased. However, with the economic recovery, the market has resumed moderate momentum post-2021 and is expected to witness gradual growth during the forecast period.

## Intelligent Power Module Market Trends

### Growing Investments in Renewable Energy to Drive the Market's Growth

The intelligent power modules combine cutting-edge IGBTs, MOSFETs, next-generation Gate Driver ICs, and cutting-edge thermomechanical technology to give increased power density, improved system ruggedness, and system reliability boost system performance and energy efficiency. Owing to these benefits, IPMs are widely used in the renewable energy sector.

Globally, the number of renewable energy projects is increasing, which also adds to market growth. Demand for intelligent power modules is driven by government programs to encourage the use of renewable energy. By 2040, solar and wind energy are estimated to meet one-third of worldwide power needs.

Furthermore, renewable energy is anticipated to grow significantly as more than 100 nations generate electricity from wind, and wind energy production is expected to increase tenfold globally. The market under study is being driven by the expanding use of off-shore wind networks that include direct high-voltage current (HVDC) power transmission systems, a component of which is IPM. According to Ember, the share of renewable energy in global power generation has been witnessing steady growth, increasing from 23.43% in 2015 to 28.32% in 2021.

The increasing government initiatives and investment in the renewable energy segment are also creating a favorable market scenario for the growth of the studied market. For instance, in December 2022, the Government of India, Solar Energy Corporation of India Limited (SECI), signed an agreement with the World Bank for a USD 150 million IBRD loan, a USD 28 million Clean Technology Fund (CTF) loan, and a USD 22 million CTF grant to help India increase its power generation capacity through renewable and cleaner energy sources. This agreement aligns with India's ambitious plans to achieve 500 gigawatts (GW) of renewable energy generation capability by 2030.

### North America is Expected to Hold a Significant Market Share

The North American region is expected to remain among the most important regions in the global intelligent power module market owing to the high usage of renewable energy in end-user industries, and higher penetration of advanced consumer electronic products, along with the rising EV usage. Higher consumer awareness about using energy-efficient products is also among the key driving factor for the studied market's growth in the North American region.

In the North American region, especially in the United States, there are numerous international automotive and automotive part manufacturers such as Ford, General Motors, Fiat Chrysler Automobiles, and Tesla, putting the country among the world's largest

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automotive marketplaces. According to the Bureau of Economic Analysis (BEA), in 2021, about 14.9 million units of light vehicles (including autos, light trucks, etc.) were sold in the United States. As IPMs are widely used in the automotive industry in applications such as powertrains, oil pumps, AC compressors, etc., such trends are supporting the studied market's growth. The demand for intelligent power modules is also greatly expanding as electric and hybrid car adoption rates rise in the North American region. According to the U.S Department of Energy, the sales of new light-duty plug-in electric vehicles, including all-electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs), approximately doubled from 308,000 in 2020 to 608,000 in 2021, wherein EV sales accounted for about 73% of all plug-in electric vehicle sales in 2021.

Consumer electronics is another major segment wherein the demand for IPM's expected to grow as the demand for smart consumer devices continues to remain high in the North American region. For instance, according to the Consumer Technology Association (CTA), the U.S. consumer technology industry is projected to generate over USD 505 billion in retail sales revenue in 2022, representing a 2.8% revenue increase from 2021.

In addition, more industrial activity has been seen as a result of governments putting more emphasis on producing power from renewable sources. This is also anticipated to open up market opportunities. For instance, the 2022 Federal Budget of Canada committed an investment worth USD 250 million that would be spent over four years to support pre-development activities of clean electricity projects of national significance.

### Intelligent Power Module Market Competitor Analysis

The Intelligent Power Module (IPM) market is moderately fragmented because few companies provide IPM solutions. The leading companies are Fuji Electric Co. Ltd., Infineon Technologies AG, Mitsubishi Electric Corp., ROHM Co., Ltd., Fairchild Semiconductors, On Semiconductor Corporation, S.T. Microelectronics NV, and others. The market has become moderately consolidated due to these businesses' dominance. As a result, there is a moderate level of market concentration.

May 2022 - Sensitron announces the SPG025N035P1B GaN Half Bridge Intelligent Power Module (IPM) module, which employs Efficient Power Conversion's 350 V EPC2050 eGaN FET. Sensitron reduced the size of their solution by 60% by replacing typical silicon FETs with EPC's 350 V and EPC2050 GaN FET while also boosting the module's already superb junction-to-case thermal conduction.

May 2022 - Siemens Mobility and Mitsubishi Electric Europe B.V. signed an agreement to collaborate in the field of SiC intelligent power module (IPM) technology to enable efficient and sustainable mobility as well as electrical energy savings in the transportation sector.

### Additional Benefits:

The market estimate (ME) sheet in Excel format  
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