Intelligent Power Module (IPM) - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

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Report description:

The Intelligent Power Module Market size is estimated at USD 2.33 billion in 2025, and is expected to reach USD 3.73 billion by 2030, at a CAGR of 9.87% during the forecast period (2025-2030).

Industries like consumer electronics, industrial automation, renewable energy, automotive, and more frequently use intelligent power modules. They provide advantages such as increased power efficiency, smaller and lighter size and weight, higher reliability, and easier circuit design.

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.
- 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 factors supporting the growth of the studied market as IPMs deliver significant efficiency gains with the latest generation of power semiconductors.
- 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.

- According to the IEA, in order to achieve the Net Zero Scenario, the supply of renewable energy is anticipated to continue growing by roughly 13 percent annually throughout the years 2022-2030. Additionally, global annual renewable energy investment must more than triple to around USD 4 trillion by 2030 to achieve net zero emissions by 2050. These elements will increase demand for a variety of semiconductor devices, creating a substantial market for IPMs.
- Several government programs throughout the world aimed at reducing carbon emissions and preserving the environment are driving the adoption of new 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 air conditioners, washing machines, vacuum cleaners, 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.
- Additionally, factors such as a higher cost and the growing design complexity as the application area and performance requirement from intelligent power modules expand further are also anticipated to challenge the studied market's growth.

Intelligent Power Module (IPM) 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. These benefits make IPMs 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 designed to encourage the use of renewable energy. By 2040, solar and wind energy are estimated to meet one-third of worldwide power needs.
- The International Energy Agency (IEA) estimates that by 2023, global investments in clean energy will reach USD 1.7 trillion, with solar energy production expected to surpass that of oil for the first time. Additionally, it is anticipated that annual investments in clean energy will increase by 24 percent between 2021 and 2023, led by renewables and electric cars, as opposed to a 15 percent increase in investments in fossil fuels during the same time frame. Such expenditures will propel the renewable energy industry, creating several opportunities for IPM manufacturers to improve their products and meet demand.
- In the upcoming years, the market for intelligent power modules is anticipated to expand due to the rising number of renewable energy projects taking place around the world. As an illustration, Apple Inc. declared in February 2023 that it would increase its investments in solar and wind projects in Europe and urged its suppliers to decarbonize processes related to the production of iPhones and other products.
- 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, in 2023, Latin America and the Caribbean led the charge in renewable electricity generation, with renewables making up over 60% of their energy. Oceania followed with 43%.
- Furthermore, 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 and the

Solar Energy Corporation of India Limited (SECI) signed an agreement with the World Bank for a USD 150 million IBRD loan, including a USD 28 million Clean Technology Fund (CTF) loan, and a USD 22 million CTF grant to help 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 Contribute Significantly to the Market's Growth

- The North American region is expected to remain among the most critical regions in the global intelligent power module market owing to the high usage of renewable energy in end-user industries, higher penetration of advanced consumer electronic products, and rising E.V. usage. Higher consumer awareness about using energy-efficient products is also among the key driving factors 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 automotive marketplaces. According to the U.S. Department of Energy, in 2022, about 13.84 million units of light-duty 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, A.C. compressors, etc., such trends are supporting the studied market's growth.
- The demand for intelligent power modules is also significantly expanding as electric and hybrid car adoption rates rise in the North American region. According to the Argonne National Laboratory, in July 2023, about 103,623 HEVs and 119,853 plug-in vehicles (PHEVs) were sold in the United States. Cumulatively, a total of 780,294 BEVs and PHEVs were sold in 2023 till July.
- Consumer electronics is another significant segment wherein the demand for IPM is 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 485 billion in retail sales revenue in 2023.
- 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 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 (IPM) Industry Overview

The Intelligent Power Module (IPM) market is semi-consolidated because few companies provide IPM solutions. Some major companies are Fuji Electric Co. Ltd., Infineon Technologies AG, Mitsubishi Electric Corp., ROHM Co., Ltd., Semiconductor Corporation, and others. The market has become moderately consolidated due to these businesses' dominance. However, the growing demand is anticipated to attract more players in the market, which will drive competition among the market players.

In July 2023, onsemi, a provider of intelligent power and sensing technologies, and Magna, a mobility technology company, announced a long-term supply agreement for Magna to integrate Onsemi□s EliteSiC intelligent power solutions into its eDrive systems.

In May 2022, Sensitron announced the SPG025N035P1B GaN Half Bridge Intelligent Power Module (IPM) module, which employed 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.

Additional Benefits:

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

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