Insulated Gate Bipolar Transistors Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

Market Report | 2023-01-23 | 120 pages | Mordor Intelligence

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Report description:

The Insulated Gate Bipolar Transistors market is expected to register a CAGR of 11.14% during the forecast period. The increasing deployment of power device technologies is expected to strengthen the IGBT Market. IGBT is widely used in inverter applications in home appliances like refrigerators, air conditioners, and industrial motors to improve their efficiency.

Key Highlights
Furthermore, according to WSTS, the semiconductor industry is expected to increase by 10.36% to USD 601 billion, and all product categories will currently grow at an average pace.
The broad application range of IGBTs has attracted several new companies to venture into the market. IGBT activates/modifies electrical energy in several modern appliances, such as cookers, microwaves, electric cars, trains, variable-frequency drives (VFDs), variable speed refrigerators, air conditioners, lamp ballasts, municipal power transmission systems, and stereo systems, which are well-equipped with switching amplifiers.
The rising demand for IGBT in the wind and solar power applications will support market growth in the studied period. The IGBT delivers clear advantages in high-power converters, i.e., 500kW to multi-megawatt, well suited for solar and wind application. The increasing requirement for energy has forced the manufacturers to invent the latest Generation 7 IGBT technology, which has increased the efficiency and lower blocking voltage of the IGBTs. This is expected to reduce the semiconductor losses by about 38% in a wind turbine. This enables significant system cost reductions due to the lower overall current coupled with 40% lower cable losses or cabling costs.
However, IGBT is not preferred for lower voltage ranges (less than 400 V). The Insulated gate bipolar ?transistor does not offer advantages compared to MOSFETs. It is also vulnerable to heat-related issues because it runs at high frequencies and under high power.
With the exponentially growing number of smart devices and increasing digitization, the growing need for energy saving, weight

saving, and equipment downsizing are primarily driving the market for discrete IGBT. Power losses in consumer goods have been identified to be the lowest in the case of discrete IGBTs, which is expected to be a significant factor in driving the growth of IGBTs.
COVID-19 had a significant impact on the global economy, including the IGBT market. The non-availability of the workforce affected the insulated gate bipolar transistor production capacity and market growth. Owing to the enforced lockdown, automobile manufacturers worldwide cut their orders as vehicle sales declined. However, in the second half of the pandemic, the restrictions were normalized, and the demand for power semiconductors returned to normal. Over the coming years, the market is further expected to register significant growth.

Insulated Gate Bipolar Transistors Market Trends

Electric vehicle / Hybrid Electric Vehicles to Drive the Growth of IGBT

The enormous growth in the EV market is anticipated to drive growth in the IGBT market. It is an integral part of electric vehicle power supplies, and developments in the field will decrease the cost and increase the range of electric vehicles.
IGBT applications in electric and hybrid electric vehicles include power usage in powertrains and chargers for delivery and control of power regarding motors. The battery manufacturing capacity is expected to triple by the end of the projected timeframe due to numerous governments' stringent carbon dioxide emission regulations.
Additionally, the development and innovation in the power devices and conversion architecture that fit automotive needs in terms of cost and reliability are expected to propel growth for the studied market. According to IEA, it is estimated that 13% of new cars sold in 2022 will be electric; if the growth experienced in the past two?years is sustained, CO2 emissions from cars can be put on a path in line with the Net Zero Emissions by 2050 Scenario.
The growing utilization of IGBT is propelling the demand for semiconductors which is anticipated to expand into the electrified vehicle. The rising opportunities in vehicle architecture for cooling, improved fuel efficiency, and shrinkage in power converter volume will support market growth. The EV and HEV are still in the initial phase of production, and the manufacturing companies are yet to realize the full potential of these vehicles.
Infineon Technologies AG offers a range of robust 650 V IGBTs that will deliver the highest efficiency required for fast-switching automotive applications. The AEC-Q-qualified TRENCHSTOP 5 AUTO IGBTs are likely to lower power losses and enhance reliability in EV and HEV applications, like on-board charging, power factor correction, and DC/DC and DC/AC conversion.
As a result, the market for IGBTs is expected to witness growth owing to the increasing utilization of these transistors to make EV and HEV more efficient and powerful, with lower power losses and enhanced reliability in EV and HEV applications. This could increase demand for IGBTs from the electric and hybrid electric vehicle segments in the projected timeframe.

Asia-Pacific is Expected to Witness Significant Growth

The Asia-Pacific region will have a significant share of the market during the projected timeframe. The IGBTs market in the Asia-Pacific has developed rapidly. China is expected to dominate the insulated gate bipolar transistor market in the Asia-Pacific region. The reason for domination is the growing demand for electric & hybrid electric vehicles in developing economies.
Rapid EV adoption in weak auto markets has boosted EV shares further. For instance, according to EV-Volumes.com, China has the second highest EV market share, with 21% in H1 2022.
The Asia-Pacific region is also the leading automobile manufacturer, aiming to decrease carbon emissions by enhancing energy and fuel efficiency. The market in China is shifting toward the manufacture of electric & hybrid electric vehicles, which is expected to propel market demand in the forecast period.
Surging infrastructure development is making India an ideal choice for automobile manufacturing. Additionally, favorable

government policies for hybrid vehicles manufacture will help this region maintain its domination in the global insulated gate bipolar transistor market in the estimated period.
Further, the demand for the IGBTs market is driven mainly due to the increasing utilization of IGBTs in numerous applications, such as consumer electronics, medical devices, UPS, industrial systems, inverters, and motor drives. The market is witnessing rapid adoption across industries due to its capability to offer reduced switching losses and higher reliability than power MOSFETs. The reasons mentioned above will support the demand for the region's Insulated gate bipolar transistor market.

Insulated Gate Bipolar Transistors Market Competitor Analysis

The Insulated Gate Bipolar Transistors market is highly competitive, owing to several small and large players operating in domestic and international markets. The players in the market are adopting major strategies, like product innovations, mergers and acquisitions, and strategic partnerships, to widen their product portfolio and expand their geographical reach. Some of the players in the market are Renesas Electronics Corporation, Infineon Technologies AG, and Fuji Electric Co. Ltd, among others.

In August 2022, Renesas Electronics Corporation, a premier supplier of advanced semiconductor solutions, announced the development of a new generation of Si-IGBTs (Silicon Insulated Gate Bipolar Transistors), which will be offered in a small footprint while providing low power losses. Aimed at next-generation electric vehicle (EVs) inverters, AE5-generation IGBTs will be mass-produced starting in the first half of 2023 on Renesas' 200- and 300-mm wafer lines at the company's factory in Naka, Japan.

In March 2022, Infineon Technologies AG launched the new EDT2 IGBTs in a TO247PLUS package. It is optimized for automotive, discrete traction inverters and has also expanded the company's portfolio of discrete high-voltage devices for automotive applications. Owing to their high quality, the IGBTs meet and exceed the industry standard AECQ101 for automotive components.

Additional Benefits:

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

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