China IGBT (Rail Transit/Electric Vehicle/Wind Power/Photovoltaic/Home Appliance) Industry Report, 2016-2020

Description:
An IGBT is a complex device with the Darlington configuration. Using GTR as the dominant component and MOSFET as the drive component, IGBT combines the merits of BJT and MOSFET, such as low drive power, low saturation voltage and the like.

With the development of IGBT chip technology, the maximum operating junction temperature and power density of chips keep increasing. In future, the IGBT module technology will be improved in two aspects - chip backside welding & fixing and front electrode interconnection: 1) the technology without welding, wire bonding or liner/substrate packaging; 2) internally integrated temperature sensors, current sensors, driving circuits and other functional components.

Benefiting from the electric vehicle market and the mature IGBT technology, the global IGBT market will grow at a compound annual rate of 9% during 2014-2020 and reach USD6.5 billion in 2020. The market share of IGBTs used for consumer and white goods will gradually decrease, while IGBTs for power grid, PV, uninterruptible power supply (UPS) as well as electric vehicle will be a major growth engine in the next five years.

Thanks to the rapid development of distributed energy, new energy vehicle, charging piles and rail transit, China's potential IGBT demand is huge. In 2015, Chinese IGBT market size hit about RMB8.5 billion, accounting for about one-third of the global market. By 2020, Chinese IGBT market will garner over RMB20 billion with a CAGR of 19.4%, equivalent to nearly half of the global market.

Market Competition Pattern
In recent years, China's IGBT industry has developed rapidly under the guide of national policies and the market, and has shaped a complete industrial chain with IDM and OEM models. However, Chinese IGBT supply market is mainly controlled by foreign companies, for example, all of the top five suppliers were foreign vendors who enjoyed the combined market share of 51.9% in 2015.

The advantages of European and American companies (such as Infineon, Semikron, Fairchild, etc.) are mainly reflected in power, electronics and communications, while Japanese brands (such as Mitsubishi, FUJI, Toshiba, etc.) target home appliances. China seized 1/3 of the global IGBT market share in 2015 and will master nearly 1/2 by 2020, with the AAGR of about 19%.

Subdivision of Applications:
The current saturated Chinese home appliance market will see limited incremental space in the next five years. Among white household electrical appliances, inverter refrigerators with low permeability will generate the fastest growing demand for IGBT in the next five years.

Affected by the government's development plan, China's wind power and PV industries may follow different development paths in the next five years. By 2020, China's PV installed capacity will cumulate to above 160GW, which means the IGBT demand will value RMB1 billion or so. Given the serious wind energy curtailment, China's total wind power installed capacity is planned to be 210GW by 2020, which indicates that China's additional wind power installed capacity will witness sharp drop in the next five years, so that the demand for IGBTs will shrink.

The major cities in China plan to invest RMB3.18 trillion in rail transit in 2010-2021. As for high-speed rail, China will own over 4,300 CRH trains by 2020, which will need 1.2 million IGBTs, four times that in 2015.

With the development of new energy electric vehicles, the proportion of electronic devices in a vehicle has jumped from less than 20% to over 50%, and the application of IGBTs and other power device modules has been intensified obviously. Fairchild, Infineon and ST enjoy superiority in the automotive market. BYD and Advanced Semiconductor Manufacturing Co., Ltd (ASMC) cooperate in IGBTs. By 2020, China's electric vehicle (including EV, PHEV, HEV, electric bus / truck) sales volume is expected to exceed 3 million, which will
stimulate the IGBT demand to go beyond RMB6 billion.

The report covers the followings:

- Overview, technology development course and trends, and applications of IGBT;
- Status quo and IGBT demand trends of Chinese IGBT application market segments (including rail transit, wind power, PV, electric vehicle, UPS, home appliances, etc.)
- Size, competition pattern and supply chain of Global and Chinese IGBT markets;
- Development, operation and IGBT technology/business of 16 Chinese IGBT companies (including IDM, modules, OEM);
- Operation and IGBT technology / business of 9 global IGBT vendors.

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