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Power Discrete and Modules Market Opportunity, Growth Drivers, Industry Trend Analysis, and Forecast 2025 - 2034

https://marketpublishers.com/r/PB4338A3A5ADEN.html
Date: May 2025
Pages: 180
Price: US$ 4,850.00 (Single User License)
ID: PB4338A3A5ADEN

Abstracts

The Global Power Discrete And Modules Market was valued at USD 29.8 billion in 2024 and is estimated to grow at a CAGR of 6.1% to reach USD 53.4 billion by 2034, fueled by rising demand from high-growth industries such as consumer electronics, data centers, and 5G infrastructure. Adopting advanced power electronics has become critical in these applications to support efficiency, miniaturization, and performance. As devices become smarter and power-dense, components like IGBTs, MOSFETs, and power modules are essential to managing energy use, thermal efficiency, and switching speed.

Trade tariffs enacted during the Trump administration placed pressure on US-based semiconductor manufacturers by raising import costs for critical materials and components. Many companies operating in the US market responded by localizing production, reengineering their supply chains, and investing in regional wafer fabrication facilities. Global players, particularly in Asia, also ramped up R&D around GaN and SiC technologies to reduce foreign dependency. These geopolitical shifts significantly influenced procurement patterns, pricing strategies, and innovation timelines across the industry. Moreover, the continued rise of consumer electronics, from personal devices to smart appliances, reinforces the role of discrete power solutions in high-frequency, compact environments.

In 2024, the power module segment generated USD 12.4 billion. Its high demand stems from superior heat dissipation, compact design, and power-handling capability critical in EVs, industrial drives, and renewable energy systems. With the continued development of wind turbines, solar farms, and EV charging networks, the deployment of high-voltage power modules, especially those based on SiC, is expanding rapidly.

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MOSFETs segment in the power discrete and modules market accounted for USD 8.7 billion in 2024 due to their high efficiency and reliability in low- to mid-power applications. Their prominence in consumer gadgets, automotive control units, and fast-charging technologies reflects their versatility and ongoing innovation in form factor and switching performance. GaN-based variants push growth in applications requiring compact high-speed switching.

U.S. Power Discrete and Modules Market was valued at USD 7.9 billion in 2024, driven by rising EV demand, large-scale investments in solar and wind infrastructure, and increased use of power modules in defense and aerospace applications. Industrial automation is another key driver, where discrete components enable power-efficient, responsive smart factory systems. The country's shift toward clean energy and electrified mobility has accelerated the integration of high-performance power devices, particularly in applications like EV charging stations, battery management systems, and renewable inverters.

Key players in the industry include Powerex, Littelfuse, Infineon Technologies, Danfoss, STMicroelectronics, Fuji Electric, Texas Instruments, ROHM Semiconductor, Renesas Electronics, Semikron, Microchip Technology, Toshiba, ON Semiconductor, Vishay Intertechnology, Wolfspeed, Mitsubishi Electric, and Sanken Electric. To maintain a competitive edge, leading firms are advancing wide-bandgap technology (SiC/GaN), enhancing product efficiency and thermal performance. They are also expanding fabrication capacity, forming supply chain alliances, and pursuing strategic mergers to strengthen vertical integration and serve high-growth regional markets.

Companies Mentioned

Danfoss, Fuji Electric, Infineon Technologies, Littelfuse, Microchip Technology, Mitsubishi Electric, ON Semiconductor, Powerex, Renesas Electronics, ROHM Semiconductor, Sanken Electric, Semikron, STMicroelectronics, Texas Instruments, Toshiba, Vishay Intertechnology, Wolfspeed

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CHAPTER 10 COMPANY PROFILES

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