

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

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Report description:

The Power Semiconductor Market size is estimated at USD 56.87 billion in 2025, and is expected to reach USD 72.34 billion by 2030, at a CAGR of 4.93% during the forecast period (2025-2030).

Power semiconductors are designed to handle or process large currents and power, and they are typically categorized as having a rated current of 1A or greater. These devices are used in a wide range of applications, including home appliances, audiovisual equipment, automobiles, etc.

- Power semiconductors have revolutionized the field of electronics and energy management. One of the key advantages of power semiconductors is their ability to improve energy efficiency significantly. By minimizing energy losses during the conversion and control processes, power semiconductors enable systems to operate more efficiently, reducing energy consumption and saving costs. These devices offer higher power density, lower on-resistance, and reduced switching losses, resulting in higher overall system efficiency.

- Moreover, power semiconductors offer higher power density, allowing more power to be handled within a smaller physical footprint, which is beneficial in applications where space is limited, such as electric vehicles and industrial automation. Power semiconductors enable the development of compact and efficient systems by maximizing power output while minimizing space requirements.

- Rapid technological advancement is one of the primary drivers of the surging demand for consumer electronics and wireless communication. The continuous evolution of technology has led to the introduction of innovative and feature-rich devices that have revolutionized the way an individual interacts with the world. Smarter smartphones, ultra-slim laptops, high-definition

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televisions, and wearable gadgets have become essential tools for both personal and professional purposes. These advancements have enhanced the user experience and contributed to the increasing demand for such devices.

- Silicon wafers are the foundation of power semiconductor manufacturing. These thin, circular discs of crystalline silicon serve as the substrate upon which semiconductor devices are built. Silicon's unique properties, such as its abundance, high thermal conductivity, and excellent electrical properties, make it an ideal material for these applications. The power semiconductor market heavily relies on silicon wafers due to their suitability for high-power applications.

- According to the US Congressional Budget Office, defense spending in the United States is predicted to increase every year until 2033. Defense outlays in the United States amounted to USD 746 billion in 2023. The forecast predicts an increase in defense outlays up to USD 1.1 trillion in 2033. The defense spending would comprise 6% of the country's gross domestic product in 2024, up from 3.9% in 2023 and 2.7% in 2021. The increasing defense budgets globally are expected to offer lucrative opportunities for the growth of the market studied.

Power Semiconductor Market Trends

Automotive Industry to be the Fastest Growing End User

- Analyzing power semiconductors in the automotive segment includes ADAS for adaptive cruise control, lane assistance, collision avoidance, infotainment systems for smooth music playback and accurate GPS functionality, telematics and connected vehicles, and others. Furthermore, they are also used in electric vehicles to coordinate the operations of electric motors.
- Automotive is one of the emerging sectors of the power semiconductors market and is estimated to have a significant share with the increase in the adoption of autonomous vehicles, EVs, and HEVs.
- Power electronics is widely utilized in automotive electrical and electronic systems to enhance fuel efficiency and address thermal concerns. This is achieved by implementing components like silicon-based power MOSFETs and IGBTs, which serve as power electronic switches in the power train system. By employing these technologies, the system's overall size can be reduced while utilizing high power in the kilowatt range.
- Moreover, the Insulated Gate Bipolar Transistor (IGBT) has emerged as an essential component in the development of electric vehicles. In the upcoming years, it is anticipated that the demand for IGBTs will rise significantly due to the rise in EV sales. For instance, according to a recent report from the International Energy Agency, electric car markets experienced robust growth, with sales approaching 14 million in 2023. The market share of electric vehicles surged from approximately 4% in 2020 to 18% by 2023, indicating a significant shift in consumer preferences toward more sustainable transportation options.
- Electric vehicle sales are poised for robust growth through 2024. In the first quarter alone, global sales of electric cars surpassed 3 million, marking a 25% surge compared to 2023. Forecasts suggest a total of approximately 17 million electric vehicles will be sold by the close of 2024, indicating a notable 20%+ year-on-year uptick, with a significant acceleration in new purchases anticipated in the latter half of this year. This surge is largely attributed to a combination of national policies, incentives, and intensifying price competition, all working in tandem to bolster sales and drive the market forward.

China to Witness Major Growth

- Power semiconductors are increasingly prevalent in EVs, as these vehicles demand high-power energy for their electric motors. Components like MOSFETs and IGBT serve as power electronic switches in the vehicles' power train systems. The market's notable growth is fueled by the escalating demand for energy-efficient hybrid electric vehicles, particularly in nations like China, as they combat the effects of mounting environmental pollution.

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- Notably, China stands as the world's premier vehicle market, boasting the highest annual sales and manufacturing output. By 2025, the nation is expected to be on track to achieve a significant milestone, with an estimated 35 million vehicles slated for domestic production.
- Looking ahead, as China aims for carbon neutrality by 2060, the government's initiatives are set to bolster the demand for power electronics. This push aligns with the broader market expansion, especially in the electric vehicle segment. China's Development Plan for the New Energy Automobile Industry (2021-2035) projects that EVs could capture a 25% market share by 2025. Consequently, China is intensifying efforts to incentivize EV purchases, a move expected to further propel the development and adoption of power electronics in the EV landscape.
- In collaboration with its government, China made substantial progress in expanding its 5G network nationwide. The country's major telecom operators, China Mobile, China Unicom, and China Telecom, led the construction of robust 5G infrastructure in urban centers and key regions. This initiative enabled millions of users to access high-speed, reliable internet services across China. The deployment of base stations has now reached a critical stage.
- By the end of 2023, the number of 5G base stations in China amounted to 3.38 million. With extensive infrastructure investments and ambitious rollout plans, China has achieved significant 5G coverage. According to forecasts, the number of base stations is projected to reach over six million by 2024.

Power Semiconductor Industry Overview

The power semiconductor market is fragmented and comprises several global and popular players, such as Infineon Technologies AG, Texas Instruments Inc., STMicroelectronics NV, NXP Semiconductors NV, Qorvo Inc., and others. Furthermore, in a market where the sustainable competitive advantage through innovation is considerably high, the competition is expected only to increase, considering the anticipated surge in demand from new customers from the end-user industries.

- June 2024 - US semiconductor giant Texas Instruments and Taiwanese electronics expert Delta Electronics joined forces to enhance power electronics for electric vehicles. Their initial focus was on crafting a lighter, more cost-efficient 11 kW onboard charger; this marked just the beginning of their partnership. In the long run, the two firms, TI and Delta, will leverage their joint innovation lab in Pingzhen, Taiwan, pooling their expertise in power management and supply. Their goal is to boost power density, enhance performance, and shrink sizes, all in a bid to hasten the arrival of safer, speedier, and more affordable electric vehicles.
- April 2024 - Infineon Technologies AG partnered with FOXESS, which specializes in inverters and energy storage systems. The collaboration was geared toward advancing green energy initiatives. Infineon's contribution includes supplying FOXESS with its cutting-edge CoolSiC MOSFETs rated at 1,200 V. These will be paired with EiceDRIVER gate drivers, tailored explicitly for industrial energy storage applications.

Additional Benefits:

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

Table of Contents:

1 INTRODUCTION

- 1.1 Study Assumptions and Market Definition
- 1.2 Scope of the Study

2 RESEARCH METHODOLOGY

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3 EXECUTIVE SUMMARY

4 MARKET INSIGHTS

- 4.1 Market Overview
- 4.2 Industry Value Chain/supply Chain Analysis
- 4.3 Industry Attractiveness - Porter's Five Forces Analysis
 - 4.3.1 Bargaining Power of Suppliers
 - 4.3.2 Bargaining Power of Buyers
 - 4.3.3 Threat of New Entrants
 - 4.3.4 Intensity of Competitive Rivalry
 - 4.3.5 Threat of Substitutes
- 4.4 Impact of COVID-19 Aftereffects and Other Macroeconomic Factors on the Market
- 4.5 Technology Snapshot

5 MARKET DYNAMICS

- 5.1 Market Drivers
 - 5.1.1 Increasing Demand for Consumer Electronics and Wireless Communications
 - 5.1.2 Growing Demand for Energy-Efficient Battery-powered Portable Devices
- 5.2 Market Restraints
 - 5.2.1 Shortage of Silicon Wafers and Variable Driving Requirement

6 MARKET SEGMENTATION

- 6.1 By Component
 - 6.1.1 Discrete
 - 6.1.1.1 Rectifier
 - 6.1.1.2 Bipolar
 - 6.1.1.3 MOSFET
 - 6.1.1.4 IGBT
 - 6.1.1.5 Other Discrete Components (Thyristor and HEMT)
 - 6.1.2 Modules
 - 6.1.2.1 Thyristor
 - 6.1.2.2 IGBT
 - 6.1.2.3 MOSFET
 - 6.1.3 Power IC
 - 6.1.3.1 Multichannel PMICS
 - 6.1.3.2 Switching Regulators (AC/DC, DC/DC, Isolated and Non-isolated)
 - 6.1.3.3 Linear Regulators
 - 6.1.3.4 BMICs
 - 6.1.3.5 Other Components
- 6.2 By Material
 - 6.2.1 Silicon/Germanium
 - 6.2.2 Silicon Carbide (SiC)
 - 6.2.3 Gallium Nitride (GaN)
- 6.3 By End-user Industry
 - 6.3.1 Automotive
 - 6.3.2 Consumer Electronics
 - 6.3.3 IT and Telecommunication

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- 6.3.4 Military and Aerospace
- 6.3.5 Power
- 6.3.6 Industrial
- 6.3.7 Other End-user Industries
- 6.4 By Geography***
- 6.4.1 United States
- 6.4.2 Europe
- 6.4.3 Japan
- 6.4.4 China
- 6.4.5 South Korea
- 6.4.6 Taiwan

7 COMPETITIVE LANDSCAPE

- 7.1 Company Profiles*
- 7.1.1 Infineon Technologies AG
- 7.1.2 Texas Instruments Inc.
- 7.1.3 Qorvo Inc.
- 7.1.4 STMicroelectronics NV
- 7.1.5 NXP Semiconductors NV
- 7.1.6 ON Semiconductor Corporation
- 7.1.7 Renesas Electronics Corporation
- 7.1.8 Broadcom Inc.
- 7.1.9 Toshiba Corporation
- 7.1.10 Mitsubishi Electric Corporation
- 7.1.11 Fuji Electric Co. Ltd
- 7.1.12 Semikron International
- 7.1.13 Wolfspeed Inc.
- 7.1.14 Rohm Co. Ltd
- 7.1.15 Vishay Intertechnology Inc.
- 7.1.16 Nexperia Holding BV (Wingtech Technology Co. Ltd)
- 7.1.17 Alpha & Omega Semiconductor
- 7.1.18 Magnachip Semiconductor Corp.
- 7.1.19 Microchip Technology Inc.
- 7.1.20 Littelfuse Inc.

8 VENDORS MARKET SHARE ANALYSIS

9 INVESTMENT ANALYSIS

10 FUTURE OF THE MARKET

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