

Global Automotive Grade MOSFETs Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Automotive Grade MOSFETs market size is expected to reach \$ 3966 million by 2032, rising at a market growth of 6.1% CAGR during the forecast period (2026-2032).

Automotive Grade MOSFETs refer to discrete metal-oxide-semiconductor field-effect transistors specifically designed, qualified and commercialized for automotive electronic systems requiring high reliability, extended operating temperature capability, electrical ruggedness and long service life. The research scope covers automotive-qualified silicon (Si) MOSFETs and silicon carbide (SiC) MOSFETs, spanning low-voltage devices rated at ≤ 60 V, medium-voltage devices at >60 –200 V, high-voltage devices at >200 –650 V and ultra-high-voltage devices above 650 V. Products are supplied in bottom-side-cooled surface-mount, top-side-cooled surface-mount, leaded power and bare-die forms. Automotive Grade MOSFETs perform high-frequency switching, load control, power conversion, motor control and protection functions across automotive body electronics and power distribution, electrified powertrain and power conversion, chassis and braking systems, thermal-management and auxiliary motor drives, and ADAS, infotainment and connectivity power management. Automotive qualification, low RDS(on), switching efficiency, thermal performance, avalanche ruggedness and package reliability are key product attributes.

Key Findings

Silicon MOSFETs remain the principal volume technology for 12 V, 24 V and rapidly expanding 48 V automotive electrical architectures

SiC MOSFETs are increasing their value contribution in high-voltage automotive power conversion as electrified vehicle platforms expand

Global electric car sales exceeded 20 million units in 2025, strengthening structural demand for automotive power semiconductors

Nexperia launched AEC-Q101-qualified 1200 V SiC MOSFETs in 2025 and expanded top-side-cooled SiC products in 2026

Market Trends

Automotive Grade MOSFETs are evolving along three parallel directions: lower conduction loss, higher power density and stronger thermal-management capability. In conventional 12 V and increasingly important 48 V vehicle electrical networks, silicon trench MOSFET development is emphasizing ultra-low RDS(on), higher current capability, smaller footprints and reduced package parasitics. Infineon's current automotive portfolio extends from 30–40 V products through 55–100 V devices for 12 V and 48 V networks and into 120–300 V applications, while top-side-cooled formats have become part of its mainstream automotive package architecture. Packaging is becoming a major competitive dimension: copper-clip interconnects, wettable flanks, dual-side cooling and top-side cooling improve thermal paths and enable smaller ECUs. ST has introduced automotive MOSFETs in compact dual-side-cooled packages, while ROHM began mass production of new 40 V and 60 V automotive MOSFETs using a compact high-reliability package in late 2025. At higher voltages, SiC devices are expanding the technology mix, particularly where switching efficiency, thermal performance and system compactness justify higher semiconductor cost.

Market Dynamics

Drivers

The primary demand driver is the rising semiconductor content per vehicle rather than vehicle production alone. Electrification of mechanical functions is increasing the number of electronically controlled pumps, fans, lighting systems, steering actuators, braking functions, seats and power-distribution nodes, each requiring efficient switching devices. Migration toward zonal electrical architectures and 48 V subsystems further increases the need for 80 V, 100 V and higher-voltage low-resistance MOSFETs

capable of handling higher power with lower cable weight and reduced conduction losses. Infineon already positions 80–100 V automotive MOSFETs for 48 V auxiliary motors, zonal DC-DC conversion, zone control units and battery protection. Electrified vehicle adoption provides an additional structural driver: electric car sales exceeded 20 million units globally in 2025, approximately one-quarter of new-car sales, materially expanding demand for automotive power conversion and power-management semiconductors.

Restraints

Automotive Grade MOSFETs face significantly higher qualification and lifecycle requirements than general-purpose power MOSFETs. Manufacturers must control wafer-process variation, gate-oxide reliability, avalanche capability, thermal cycling, package integrity and long-term electrical drift while meeting AEC-Q101 and customer-specific reliability standards. Automotive programs also involve long design-in and validation cycles, meaning new process technologies or packages may require several vehicle-development cycles before generating substantial revenue. Cost is another constraint at the high-voltage end. SiC MOSFETs provide attractive efficiency and thermal advantages but require more expensive substrates, epitaxial processes and specialized manufacturing compared with mainstream silicon devices, making system-level cost optimization critical. At the low-voltage end, intense supplier competition and continuing reductions in RDS(on) create sustained price pressure. Vehicle-platform volatility, semiconductor inventory corrections and changes in EV incentive policies can additionally affect short-term order patterns even when long-term semiconductor content per vehicle continues to increase.

Opportunities

The 48 V transition is creating one of the clearest opportunities for silicon Automotive Grade MOSFETs. Higher-power electric pumps, fans, steering systems, zonal architectures, battery protection and DC-DC conversion increasingly require MOSFETs in the 80–150 V range with very low conduction loss and improved thermal packaging. Nexperia introduced AEC-Q101-qualified 100 V devices in 2025 with on-resistance below 1 m Ω and current capability above 460 A specifically targeting demanding 48 V automotive systems. A second opportunity lies in high-voltage SiC MOSFETs for electrified power conversion, where reduced switching losses can improve system efficiency and power density. Nexperia's automotive-qualified 1200 V SiC portfolio and Microchip's AEC-Q101 variants demonstrate the widening commercial availability of

this category. Advanced thermal packages provide another avenue for value creation because top-side and dual-side cooling allow automotive designers to reduce PCB area, simplify heat extraction and increase current density.

Challenges

The market's principal technical challenge is achieving simultaneously lower resistance, lower switching loss, higher current density and automotive-grade robustness. Shrinking semiconductor and package dimensions improves power density but increases thermal concentration and places greater demands on interconnect reliability, solder joints and PCB design. Automotive suppliers must also balance switching speed against electromagnetic interference and transient ruggedness, particularly in motor, DC-DC and power-distribution circuits exposed to inductive loads. Multi-sourcing requirements create another challenge because vehicle manufacturers increasingly seek comparable devices from more than one supplier, while differences in die characteristics and package parasitics make direct substitution difficult. SiC introduces additional manufacturing-yield, gate-oxide and cost-management requirements. Geopolitical trade restrictions and automotive semiconductor localization strategies also affect wafer sourcing, fabrication and packaging decisions, increasing the strategic importance of geographically diversified manufacturing capacity.

Industry Chain Analysis

The upstream Automotive Grade MOSFETs industry chain comprises silicon wafers, SiC substrates and epitaxial wafers, photoresists, specialty gases, deposition and implantation materials, copper and aluminum interconnect materials, leadframes, molding compounds and packaging substrates. Silicon MOSFET manufacturing benefits from a mature global wafer and process ecosystem, while SiC products have a more specialized upstream structure because substrate quality, epitaxial defects and wafer-processing capability have a stronger impact on device yield and cost. Semiconductor manufacturing equipment and automotive-grade packaging materials are also important indirect inputs, particularly as device architectures move toward lower resistance and higher operating current.

Midstream activities include power-device design, wafer fabrication, trench or superjunction processing where applicable, wafer probing, thinning and back-metal processing, assembly, automotive-grade packaging, burn-in and reliability testing. Value

creation depends heavily on device-cell architecture, RDS(on), gate charge, safe operating area, avalanche ruggedness, thermal impedance and package parasitics. Packaging has therefore moved from a supporting function to a key product differentiator. Downstream demand is generated by Tier 1 automotive electronics suppliers and vehicle manufacturers through body-control units, electronic power distribution, steering and braking systems, thermal-management systems, auxiliary drives and electrified power-conversion electronics. Long design-in cycles and strict qualification create relatively stable supplier relationships once a device is designed into a vehicle platform.

Segment Insights

By semiconductor material, silicon Automotive Grade MOSFETs continue to account for the majority of unit demand because 12 V, 24 V and 48 V vehicle systems require large numbers of low- and medium-voltage switching devices. Low-voltage products at <60 V remain important in traditional body electronics, lighting and auxiliary loads, while the >60–200 V range is becoming strategically more important with the expansion of 48 V architectures. Higher-voltage silicon MOSFETs retain selected automotive power-conversion applications, but SiC increasingly becomes economically attractive as voltage, switching frequency and thermal requirements rise.

By package and thermal structure, bottom-side-cooled surface-mount MOSFETs retain the broadest installed base due to established automotive assembly processes and large product availability. Top-side and dual-side cooling are gaining importance in high-current applications because they separate the principal thermal path from the PCB and improve system power density. Infineon, ST and onsemi have all expanded advanced cooled package options, while onsemi released 650 V and 950 V EliteSiC MOSFETs in a top-cooled T2PAK format in December 2025. Bare-die MOSFETs remain relevant where Tier 1 suppliers require customized module or power-stage integration.

Downstream Market Opportunities

Automotive body electronics and power distribution provide the broadest unit-volume opportunity because modern vehicles increasingly replace mechanical relays and conventional fuses with semiconductor-based switching and protection functions. Thermal management and auxiliary motor drives are another substantial demand pool as electric pumps, fans, blowers and compressors proliferate across internal-combustion, hybrid and battery-electric platforms. Chassis, steering and braking

applications offer higher reliability and current-density requirements, making device ruggedness and thermal performance critical purchasing factors. Electrified powertrain and power conversion create the strongest opportunity for higher-value MOSFET technologies, particularly high-voltage SiC devices used in efficient power-conversion architectures. ADAS, infotainment and connectivity add incremental demand through domain controllers, zonal controllers and distributed power-management circuits, supporting continued growth in the number of MOSFETs deployed per vehicle even as individual devices become smaller and more efficient.

Regional Insights

Asia-Pacific is the most important Automotive Grade MOSFETs production and demand region, supported by China's automotive manufacturing scale, Japan's established automotive semiconductor and Tier 1 ecosystem, South Korea's electronics supply chain and rapidly expanding electric-vehicle production across the region. China is particularly important to high-voltage and 48 V demand development: more than 13 million electric cars were sold in China in 2025, representing close to 55% of new-car sales, while Chinese manufacturers supplied around 60% of global electric-car sales and China accounted for nearly three-quarters of global electric-car production. These conditions support both international automotive semiconductor suppliers and expanding domestic Chinese MOSFET manufacturers.

Europe remains a technology-intensive market with strong demand from premium vehicles, electrification, 48 V architectures and stringent efficiency requirements. Electric-car sales in Europe increased by more than 30% in 2025 and represented approximately 28% of regional new-car sales, strengthening demand for power semiconductors. North America combines a large automotive electronics base with significant semiconductor manufacturing investment, although electric-vehicle sales growth has recently been less uniform than in Europe and China. Southeast Asia and Latin America are emerging demand regions as EV sales and local vehicle assembly increase, creating additional opportunities for globally qualified automotive MOSFET platforms.

Competitive Landscape Analysis

Automotive Grade MOSFETs are supplied by a combination of global integrated device manufacturers and specialized power-semiconductor companies, with competition

differing materially between low-voltage silicon and high-voltage SiC products. Infineon Technologies AG has one of the broadest automotive MOSFET portfolios across 30–300 V silicon devices and 600–800 V high-voltage products, with extensive package options for 12 V and 48 V architectures. Nexperia B.V. has a particularly broad low-voltage automotive portfolio of more than 400 devices from 20–100 V and is expanding into automotive-qualified 1200 V SiC. ON Semiconductor Corporation, STMicroelectronics N.V., ROHM Co., Ltd., Toshiba Electronic Devices & Storage Corporation and Renesas Electronics Corporation maintain important positions in automotive silicon power MOSFETs, while Wolfspeed, Microchip Technology Incorporated and other suppliers add competition in SiC. Renesas reports cumulative power MOSFET shipments exceeding 25 billion devices and automotive products qualified to AEC-Q101, reflecting the importance of long operating history in customer qualification. Recent strategic moves emphasize technology, thermal packaging and supply resilience: onsemi and FORVIA HELLA agreed in December 2025 to deploy PowerTrench T10 MOSFET technology across advanced automotive platforms, while Nexperia and Polar Semiconductor announced a U.S. manufacturing partnership in May 2026 for next-generation power MOSFETs serving automotive and other markets. Chinese manufacturers including China Resources Microelectronics Limited, Hangzhou Silan Microelectronics Co., Ltd. and Yangjie Electronic Technology Co., Ltd. are increasing their participation as local automotive semiconductor qualification and supply chains mature, making the competitive landscape progressively more regionalized.

Report Scope

This report studies the global Automotive Grade MOSFETs production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Automotive Grade MOSFETs and provides market size (US\$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Automotive Grade MOSFETs that contribute to its increasing demand across many markets.

Highlights and key features of the study

Global Automotive Grade MOSFETs total production and demand, 2021-2032,
(K Pcs)

Global Automotive Grade MOSFETs total production value, 2021-2032, (USD Million)

Global Automotive Grade MOSFETs production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (K Pcs), (based on production site)

Global Automotive Grade MOSFETs consumption by region & country, CAGR, 2021-2032 & (K Pcs)

U.S. VS China: Automotive Grade MOSFETs domestic production, consumption, key domestic manufacturers and share

Global Automotive Grade MOSFETs production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (K Pcs)

Global Automotive Grade MOSFETs production by Type, production, value, CAGR, 2021-2032, (USD Million) & (K Pcs)

Global Automotive Grade MOSFETs production by Application, production, value, CAGR, 2021-2032, (USD Million) & (K Pcs)

This report profiles key players in the global Automotive Grade MOSFETs market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Infineon Technologies AG, Nexperia B.V., ON Semiconductor Corporation, STMicroelectronics N.V., ROHM Co., Ltd., Toshiba Electronic Devices & Storage Corporation, Renesas Electronics Corporation, Vishay Intertechnology, Inc., Wolfspeed, Inc., Microchip Technology Incorporated, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Automotive Grade MOSFETs market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US\$ Millions), volume (production, consumption) & (K Pcs) and average price (US\$/Pcs) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Automotive Grade MOSFETs Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Market Segmentation

Global Automotive Grade MOSFETs Market, Segmentation by Type:

Silicon (Si) Automotive MOSFETs

Silicon Carbide (SiC) Automotive MOSFETs

Global Automotive Grade MOSFETs Market, Segmentation by Thermal Structure Types:

Bottom-Side-Cooled Surface-Mount MOSFETs

Top-Side-Cooled Surface-Mount MOSFETs

Global Automotive Grade MOSFETs Market, Segmentation by Drain-Source Voltage Rating Types:

Low-Voltage MOSFETs (<60 V)

Medium-Voltage MOSFETs (60–200 V)

High-Voltage MOSFETs (>200 V)

Global Automotive Grade MOSFETs Market, Segmentation by Application:

Automotive Body Electronics and Power Distribution (Electronic Fuses, Load Switches, Lighting, Doors, and Seats)

Electrified Powertrain and Power Conversion (On-Board Chargers, DC-DC Converters, and Battery Systems)

Chassis, Steering, and Braking Systems (EPS, Electronic Braking, and Active Suspension)

Thermal Management and Auxiliary Motor Drives (Pumps, Fans, Blowers, and Compressors)

ADAS, Infotainment, and Connectivity Power Management

Others

Companies Profiled:

Infineon Technologies AG

Nexperia B.V.

ON Semiconductor Corporation

STMicroelectronics N.V.

ROHM Co., Ltd.

Toshiba Electronic Devices & Storage Corporation

Renesas Electronics Corporation

Vishay Intertechnology, Inc.

Wolfspeed, Inc.

Microchip Technology Incorporated

FUJI ELECTRIC CO., LTD.

Magnachip Semiconductor Corporation

Shindengen Electric Manufacturing Co., Ltd.

China Resources Microelectronics Limited

Hangzhou Silan Microelectronics Co., Ltd.

Yangjie Electronic Technology Co., Ltd.

Key Questions Answered

1. How big is the global Automotive Grade MOSFETs market?
2. What is the demand of the global Automotive Grade MOSFETs market?
3. What is the year over year growth of the global Automotive Grade MOSFETs market?
4. What is the total value of the global Automotive Grade MOSFETs market?
5. Who are the Major Players in the global Automotive Grade MOSFETs market?

6. What are the growth factors driving the market demand?

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