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Gallium Nitride (GaN) EV Charger Market Opportunity, Growth Drivers, Industry Trend Analysis, and Forecast 2025 - 2034

https://marketpublishers.com/r/G1FAFA424DC1EN.html
Date: November 2025
Pages: 190
Price: US$ 4,850.00 (Single User License)
ID: G1FAFA424DC1EN

Abstracts

The Global Gallium Nitride (GaN) EV Charger Market was valued at USD 297 million in 2024 and is estimated to grow at a CAGR of 15.5% to reach USD 1.5 billion by 2034.

The market is transitioning from standalone discrete devices to integrated half-bridge stages and modules that combine GaN switches with drivers and protection features. This integration reduces layout sensitivity and EMI while improving thermal performance. Public-private initiatives have accelerated the commercialization of wide-bandgap (WBG) technologies, driving the adoption of integrated GaN solutions for onboard chargers (OBCs) and electric vehicle power systems. Automakers are increasingly integrating multifunctional power domains, which support higher levels of device integration. Demonstrations of OBC converters indicate that GaN can increase power density by 170% and reduce weight by 79% compared to silicon-based systems, achieving peak efficiencies of 99% in a 6.6 kW dual active bridge prototype. GaN devices can switch at higher frequencies with lower conduction losses than silicon, allowing smaller magnetics and cooling systems while reducing losses by 60–80% in advanced EV converters. Design teams are also optimizing switching frequencies to balance converter performance with motor parasitic losses. Research has shown that 1.2 kV GaN MOSFETs using high HfO2 gate dielectrics achieve very low gate leakage and higher current density. This positions vertical GaN devices to compete with SiC for 1.2 kV applications once substrate and process technologies mature. However, automotive qualification for 800 V+ and 150 kW traction applications remains under development, with readiness expected toward the end of the decade due to cost and reliability considerations.

The lateral GaN devices segment held 70% share and is forecasted to grow at a CAGR

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of 16.1% from 2025 to 2034. Lateral GaN devices dominate EV power electronics for OBCs, DC–DC converters, and auxiliary systems up to 650 V. Their AlGaN/GaN HEMT structure on silicon provides high electron mobility and critical field strength, delivering low on-resistance at high blocking voltages compared to silicon.

The medium voltage segment (100–650 V) accounted for a 67% share in 2024 and is projected to grow at a CAGR of 16% through 2034. Mid-voltage GaN devices are widely deployed because most OBCs (400 V today, rising to 800 V) and many DC–DC converters fall within this range. GaN's high-frequency performance directly boosts efficiency and power density in power factor correction and LLC or resonant converter stages in 6.6–19.2 kW OBC systems.

China Gallium Nitride (GaN) EV Charger Market generated USD 73.4 million in 2024. Accounting for nearly two-thirds of global EV sales, China's scale generates the largest addressable market for GaN devices, as every EV requires onboard chargers, DC–DC converters, and compatible charging infrastructure. This production volume positions China far ahead of other regional markets like Japan, South Korea, and India.

Key players in the Global Gallium Nitride (GaN) EV Charger Market include Transphorm, Navitas, Texas Instruments, GaN Systems, EPC, STMicroelectronics, ROHM Semiconductor, Infineon Technologies, Innoscience, and Power Integrations. Companies are strengthening their position by investing in R&D to improve GaN device performance, efficiency, and reliability. Strategic collaborations with automakers and charger manufacturers accelerate adoption. Expanding product portfolios with medium- and high-voltage solutions, securing automotive qualification certifications, and developing integrated modules enhances market penetration. Firms also focus on reducing costs through substrate innovations, scaling production capacity, and optimizing supply chains.

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