

The Global Power Gallium Nitride (GaN) Market 2027-2037

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Abstracts

The global power gallium nitride (GaN) market has moved decisively from technological promise to production reality, establishing itself as one of the most disruptive forces in power electronics. What began as a niche alternative to silicon has matured into a strategically vital semiconductor category, and the market is now on a steep growth trajectory as adoption accelerates across an expanding set of end markets. This report captures the industry's transition from an early-adopter phase dominated by consumer devices into a diversified, application-rich market underpinned by data centers, automotive electrification and robotics.

GaN's core value proposition is enduring: superior switching frequency, higher efficiency, greater power density and better thermal behaviour than silicon, at a cost structure increasingly competitive with both silicon and silicon carbide. Consumer and mobile applications — above all fast chargers — drove the first wave of volume and ecosystem maturity, and remain a substantial share of demand. The next inflection is being catalysed by AI data centers: the industry-wide shift toward high-voltage DC power architectures, anchored by NVIDIA's reference designs, has triggered a wave of qualification activity among leading suppliers including Texas Instruments, Navitas, Infineon, Innoscience, onsemi and Power Integrations. Automotive represents a major growth vertical, with onboard chargers, DC-DC converters and LiDAR pushing adoption, while humanoid robotics has emerged as a credible new demand driver.

The competitive landscape is being reshaped by consolidation and vertical integration. Landmark acquisitions — Infineon–GaN Systems, Renesas–Transphorm, STMicroelectronics–Exagan — have concentrated capability among incumbent IDMs, even as Innoscience retains market leadership from its position as the world's largest 8-inch GaN-focused manufacturer. TSMC's exit from GaN foundry services redistributed

customers and elevated GlobalFoundries, while the transition to larger wafer diameters and engineered-substrate innovation are redrawing the cost curve. Meanwhile, China's rapid domestic build-out, geopolitical trade friction and gallium supply concentration introduce genuine structural risk.

This report provides a comprehensive, data-driven assessment of the market across ten application verticals, every voltage class, and the full value chain from substrate to system. It combines a bottom-up long-range forecast with detailed competitive analysis, scenario modelling and profiles of the companies defining the industry's decisive next decade — spanning device makers, fabless specialists, foundries, and the substrate, epitaxy, equipment and OEM ecosystem that surrounds them. It is designed for strategists, investors, product planners and supply chain leaders who need a defensible view of demand, pricing, capacity and competitive positioning. The report combines granular forecast data, scenario and sensitivity analysis, and detailed profiles of the companies shaping the industry. It is designed for strategists, investors, product planners and supply chain leaders who need a defensible view of demand, pricing, capacity and competitive positioning.

Contents at a glance:

Executive summary — headline findings, winners and losers, bull/base/bear cases

Methodology — bottom-up device model, forecast construction, confidence intervals

Market definition and segmentation — voltage, architecture, product form, application, business model

Technology landscape — e-mode/d-mode/cascode, bidirectional switches, GaN ICs, the high-voltage and vertical GaN race, reliability and qualification

Substrates, epitaxy and wafer economics — substrate options, open vs. captive epi, the transition to larger wafer diameters, global capacity model

Packaging, modules and thermal — cooling, embedded die, OSAT capability

Business models and industry structure — IDM vs. fabless vs. foundry, licensing, distribution

Consolidation, capital and M&A — deal log, funding, subsidy programmes, acquisition outlook

Geopolitics and supply security — export controls, localisation, gallium supply, risk index

Application deep dives — data centers, consumer, automotive, robotics, renewables, telecom, industrial, emerging

Regional analysis — China, Taiwan, North America, Europe, Japan, Korea, India, RoW

Long-range forecast — revenue, units, ASP, wafer and substrate demand, GaN vs. SiC vs. silicon

Scenarios and sensitivities — multi-scenario fan chart, tornado analysis, quarterly indicators

Competitive landscape and company profiles — market share, design-win tracker, comparison matrices

Strategic recommendations by stakeholder type, plus analyst watch list

Appendices — full data workbook, capacity database, deal log, patent analysis, company index

Companies profiles include Aixtron, Allos, Alpha & Omega Semiconductor, AMEC, Amkor, AVL, AGIBOT, Ancora, Apple, ASE, AT&S, Azur Space, BMW, CGD, ChipsK, Cyient Semiconductors, Delta Electronics, Efficient Power Conversion, Enphase, Enkris, EpiGaN, Episil, Epistar, Exagan, Fuji Electric, Figure, GaN Systems, GCD, GlobalWafers, GlobalFoundries, Huawei, IGaN, imec, Infineon, Innoscience, IQE, IVWorks, LG Electronics, Mitsubishi Chemical, Navitas Semiconductor, NexGen, Nuvoton, NVIDIA, NXP, Odyssey Semiconductor, Okmetic, onsemi, Panasonic, Power Integrations, PSMC, Polar Semiconductor, Qromis, Renesas, ROHM, Samsung and more...

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