Power GaN 2022
Market and Technology
Product Brochure
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EXECUTIVE SUMMARY

Consumer power supplies, datacom/telecom and automotive applications are driving the GaN market to a $2B business:

High volumes in the GaN market are today a reality. GaN fast chargers are growing rapidly in the handset market. Since 2020, Yole has seen an increasing number of fast chargers featuring GaN devices from several players, like Power Integrations, Navitas, and GaN Systems. Now Innoscience also contributes to this market with high volumes. The consumer power supply market will be worth more than $315.6M by 2027, with a Compound Annual Growth Rate for 2021-2027 (CAGR2021-2027) of 52%. For datacom/telecom, we expect an increase in GaN penetration in the mid-term as regulations become stricter. The interest in adopting 48V-Point-Of-Load systems in datacenters to reduce power consumption and cabling volume will favor GaN for low-voltage applications. An increasing number of power suppliers are adopting GaN in their systems. Transphorm, EPC, Texas Instruments, Infineon, and GaN Systems have all announced several design wins. Therefore, the GaN market for datacom/telecom is expected to have a CAGR2021-2027 of 69%, becoming worth more than $617.8M by 2027. At a lower penetration level, automotive DC-DC converters and On-Board Chargers (OBCs) will be part of the next wave of growth during the forecasted period. According to feedback we have received, there are ever more collaborations between GaN device players, who are accelerating the automotive qualification of their products, and the Tier-1 and OEMs, who are evaluating automotive GaN solutions. The GaN automotive market is expected to exceed $227M by 2027, with a CAGR2021-2027 of 99%.

This report details the penetration of GaN devices in different applications from the system point of view, and forecasts that penetration from device to wafer level with different granularities.

Dynamic supply chain with new entrants and significant investments:

Since the release of our last GaN Power 2021 report, Yole has witnessed the entry of new players to the supply chain. Notably, Rohm is offering a 150V GaN product for telecom/datacom applications. BelGaN, a new GaN foundry based in Belgium, has recently acquired onsemi’s fab in Oudenaarde. And on the fundraising front, Navitas went public through a Special Purpose Acquisition Company (SPAC) business combination after an agreement valued at $1.04B with Live Oak Acquisition Corp.

Focusing on the Chinese ecosystem, we are seeing ever more investment from GaN players supported by the government. It is noteworthy that Innoscience, a privately owned company, is investing more than US$400 million to expand its 8-inch wafer capacity from 10k to 70k wafers per month by 2025. A domestic supply chain for GaN power is well developed, especially for the consumer market.

The transition to the 8-inch platform and the consolidation of the supply chain with more players at each level are driving towards lower manufacturing cost. Especially at the epitaxy step, which constitutes the biggest part of a GaN device cost structure. In fact, one of the big questions is also around the use of in-house epitaxy and outsourced epitaxy for future high volumes.

We invite you to read our Power GaN 2022 report for comprehensive analyses of market dynamics, supply chain evolution, and the latest technology trends for various applications.
WHAT’S IN THE REPORT

WHAT’S NEW

• The forecast has been extended to the 2021-2027 period.
• GaN power wafer demand in 6" equivalent units by voltage added.
• Class D audio amplifier application separated from others and over voltage protection in smartphones added as new applications. Updated market trends and design wins.
• Supply chain updated, new players, recent investments, and acquisitions.
• Analysis of the different scenarios for the fabless business model.
• Analysis of the impact of Chinese investments on the power GaN industry.
• Manufacturing process flows and inspection tools have been added.
• Commercially available devices have been updated, with a highlight on some devices such as MasterGaN and EPC half-bridge.

KEY FEATURES

• Deep understanding of GaN’s penetration in applications of consumer power supply, automotive and e-mobility, datacom and telecom infrastructure, industrial power supply and motor drives, PV, and Class D audio amplifier.
• Comprehensive analysis on GaN supply chain
• Description of the power GaN industrial landscape from materials to systems, and discussion of power GaN market dynamics.
• Power GaN market value projections to 2027, including device split by device type, package type and voltage; wafer and epiwafer, split by wafer size
• Power GaN industry roadmap and technology trends

Yours needs are out of the report’s scope?

Contact us for a customized inquiry.
COMPANIES CITED*


*non-exhaustive list
In 2027, consumer applications including power supplies and Class D audio amplifiers will represent 48% of the total GaN market.

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**GAN POWER DEVICE MARKET ($M)**

**Split by end-markets: 2021-2027**

- **Consumer**: $964.7M, **CAGR 52%**
- **Telecom/Datacom**: $617.8M, **CAGR 69%**
- **Industrial**: $86.7M, **CAGR 45%**
- **Energy**: $17.1M, **CAGR 56%**
- **Automotive and mobility**: $308.9M, **CAGR 97%**
- **Defense & Aerospace**: $2M, **CAGR 4%**
- **Others**: $4.2M, **CAGR 10%**

**2021**

- **Industrial**: $9.3M
- **Telecom/Datacom**: $26.7M
- **Consumer**: $79.6M
- **Energy**: $1M
- **Automotive and mobility**: $1.2M
- **Defense & Aerospace**: $5.3M
- **Others**: $2.4M

**2027**

- **Total**: $2B

**CAGR 2021-2027**: +59%
Consumer fast-charger applications will drive the GaN market in the short term, while volume shipments will ramp up in datacenters and EVs/HEVs in the mid- to long term.
CONSUMER APPLICATIONS
System voltage vs. power requirements

Consumer power supply applications

The GaN ‘sweet spot’ (dashed square) could change in the future.
Focus on the GaN Power Foundry Industry

Epitaxy and Fab capacity: Yole’s estimation

From industry feedback, we understand that capacity is more than sufficient to satisfy the current epiwafer demand. In the future, we expect a capacity expansion to meet the increased demand.**

However, we also expect more investments to come to develop next-generation GaN devices, specifically at the epitaxy level.

* TSMC has fully depreciated 6” equipment.

**We expect a total demand of ~87kwpm in 2027 – through investment capacity will increase to meet the demand.
Following the increase of GaN market in accessory and inbox fast chargers, we expect an increase in the share of GaN Systems and Innoscience in 2022.

For more detailed information and analysis of GaN device players’ revenues and strategies please refer to our quarterly updated Compound Semiconductor Monitor Service.
There are more than 200 GaN devices available as of 2022. Many new players from China are providing 650V products that target the booming fast-charger market.

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### GAN Power Device Overview

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YOLE GROUP RELATED PRODUCTS

Reports

- Status of the Power Electronics Industry 2021
- Power SiC 2022
- LiDAR for Automotive and Industrial Applications 2021
- Power Electronics for Automotive – Focus on Passenger and Light Commercial Vehicles
- Silicon MOSFET Market and Technology Trends 2021
- EPC2152 Half Bridge Monolithic GaN IC
YOLE GROUP RELATED PRODUCTS

Reports

STMicroelectronics
MASTERGAN1 Half-Bridge Driver

GaN power transistor
comparison 2020

Nexperia's AEC-Q101 Qualified
650 V GaN-based Power Device

Innoscience's 650V GaN-on-Si
transistor
What is the difference between the GaN Power report and the Compound Semiconductor (CS) Monitor?

While our GaN Power 2022 report includes an annual update on GaN power device, epiwafer and wafer markets as well as the ecosystem and technology aspects, the CS Monitor Service includes:

1. Quarterly updates of market data in terms of volume (Munits), ASP ($) and value ($) in the following deliverables:
   1. PDF slide deck with graphs and comments/analysis covering expected developments
   2. Excel database with all historical and forecast data
2. Analysis of:
   1. Market variations
   2. Main players’ manufacturing and technology evolution/ranking
   3. Changes in the supply chain
   4. Players’ strategies
3. Direct access to the analysts during the subscription period providing an opportunity for on-demand Q&A and discussions regarding trends, analyses, forecasts, and breaking news.
HOW TO USE OUR DATA?

Yole Group, including Yole Intelligence, Yole SystemPlus and PISEO, are pleased to provide you a glimpse of our accumulated knowledge.

Feel free to share our data with your own network, within your presentations, press releases, dedicated articles and more. But before that, contact our Public Relations department to make sure you get up-to-date, licensed materials.

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