

GaN Substrate Market Opportunity, Growth Drivers, Industry Trend Analysis, and Forecast 2024 – 2032

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Abstracts

The Global GaN Substrate Market was valued at USD 241.4 million in 2023 and is projected to grow at a CAGR of 10% from 2024 to 2032. Gallium Nitride (GaN) substrates play a pivotal role in power electronics, boasting superior electrical properties such as faster switching speeds, higher breakdown voltage, and reduced on-resistance when compared to common silicon substrates. The rising demand for energy-efficient power devices across sectors like automotive, industrial, and consumer electronics is propelling the adoption of GaN substrates. These substrates facilitate more compact, efficient, and robust power solutions. The overall GaN substrate industry is classified based on product type, wafer size, end-use, application, and region.

The market categorizes products into GaN-on-SiC (Silicon Carbide), GaN-on-Si (Silicon), GaN-on-Sapphire, bulk GaN substrates, and others. The GaN-on-SiC segment is projected to surpass USD 150 million by 2032. The GaN-on-SiC (Silicon Carbide) segment is highly sought after for its exceptional thermal conductivity and capability to handle high power, making it a prime choice for RF devices and high-power electronics. Its traction in telecommunications and defense underscores the demand for high-performance materials. With its efficiency at elevated frequencies and temperatures, GaN-on-SiC is becoming the preferred material for 5G infrastructure and radar systems, propelling its market growth.

Applications of GaN substrates span across power electronics, LEDs, RF devices, photodetectors, MEMS, laser diodes, solar cells, and sensors. The power electronics segment is emerging as the fastest-growing area, with a projected CAGR of over 14% from 2024 to 2032. LEDs stand out as a primary application for GaN substrates, driven by the global push for energy-efficient lighting and advanced displays. GaN's superior properties make it ideal for high-brightness LEDs, prevalent in consumer electronics, automotive lighting, and general illumination. The trend towards sustainable technologies and the rise of smart lighting systems further bolster GaN's role in LED

manufacturing, with continuous innovations leading to more efficient products. In 2023, North America led the GaN substrate market with a share exceeding 29%. The region's robust growth is fueled by its emphasis on advanced technologies in telecommunications, automotive, and defense. The U.S. stands out due to its hefty investments in 5G infrastructure and the rising adoption of electric vehicles. The presence of major tech firms and a strong semiconductor industry further amplifies the demand for GaN substrates. Moreover, initiatives from the government promoting energy efficiency and sustainable technologies are poised to bolster North America's market expansion.

Contents

Report Content

CHAPTER 1 METHODOLOGY & SCOPE

- 1.1 Market scope & definition
- 1.2 Base estimates & calculations
- 1.3 Forecast calculation
- 1.4 Data sources
 - 1.4.1 Primary
 - 1.4.2 Secondary
 - 1.4.2.1 Paid sources
 - 1.4.2.2 Public sources

CHAPTER 2 EXECUTIVE SUMMARY

- 2.1 Industry 360° synopsis, 2021 - 2032

CHAPTER 3 INDUSTRY INSIGHTS

- 3.1 Industry ecosystem analysis
- 3.2 Vendor matrix
- 3.3 Profit margin analysis
- 3.4 Technology & innovation landscape
- 3.5 Patent analysis
- 3.6 Key news and initiatives
- 3.7 Regulatory landscape
- 3.8 Impact forces
 - 3.8.1 Growth drivers
 - 3.8.1.1 Rising demand for high-efficiency power electronics
 - 3.8.1.2 Advancements in 5G technology
 - 3.8.1.3 Expansion of the electric vehicle (EV) market
 - 3.8.1.4 Increased adoption in renewable energy systems
 - 3.8.1.5 Growing applications in aerospace and defense
 - 3.8.2 Industry pitfalls & challenges
 - 3.8.2.1 High manufacturing costs
 - 3.8.2.2 Technical challenges in large-scale production
- 3.9 Growth potential analysis

- 3.10 Porter's analysis
 - 3.10.1 Supplier power
 - 3.10.2 Buyer power
 - 3.10.3 Threat of new entrants
 - 3.10.4 Threat of substitutes
 - 3.10.5 Industry rivalry
- 3.11 PESTEL analysis

CHAPTER 4 COMPETITIVE LANDSCAPE, 2023

- 4.1 Introduction
- 4.2 Company market share analysis
- 4.3 Competitive positioning matrix
- 4.4 Strategic outlook matrix

CHAPTER 5 MARKET ESTIMATES & FORECAST, BY PRODUCT TYPE, 2021 - 2032 (USD MILLION)

- 5.1 Key trends
- 5.2 GaN-on-SiC (Silicon Carbide) substrates
- 5.3 GaN-on-Si (Silicon) substrates
- 5.4 GaN-on-Sapphire substrates
- 5.5 Bulk GaN substrates
- 5.6 Others

CHAPTER 6 MARKET ESTIMATES & FORECAST, BY WAFER SIZE, 2021 - 2032 (USD MILLION)

- 6.1 Key trends
- 6.2 2-inch wafers
- 6.3 4-inch wafers
- 6.4 6-inch wafers
- 6.5 8-inch wafers and above

CHAPTER 7 MARKET ESTIMATES & FORECAST, BY END USE INDUSTRY, 2021 - 2032 (USD MILLION)

- 7.1 Key trends
- 7.2 Consumer electronics

- 7.3 Telecommunications
- 7.4 Automotive
- 7.5 Aerospace & defense
- 7.6 Healthcare
- 7.7 Industrial
- 7.8 Energy & power
- 7.9 Data center
- 7.10 Others

CHAPTER 8 MARKET ESTIMATES & FORECAST, BY APPLICATION, 2021 - 2032 (USD MILLION)

- 8.1 Key trends
- 8.2 LEDs
- 8.3 Power electronics
- 8.4 Radio frequency (RF) devices
- 8.5 Laser diodes
- 8.6 Photodetectors
- 8.7 MEMS
- 8.8 Solar cells
- 8.9 Sensors

CHAPTER 9 MARKET ESTIMATES & FORECAST, BY REGION, 2021 - 2032 (USD MILLION)

- 9.1 Key trends
- 9.2 North America
 - 9.2.1 U.S.
 - 9.2.2 Canada
- 9.3 Europe
 - 9.3.1 UK
 - 9.3.2 Germany
 - 9.3.3 France
 - 9.3.4 Italy
 - 9.3.5 Spain
 - 9.3.6 Rest of Europe
- 9.4 Asia Pacific
 - 9.4.1 China
 - 9.4.2 India

- 9.4.3 Japan
- 9.4.4 South Korea
- 9.4.5 ANZ
- 9.4.6 Rest of Asia Pacific
- 9.5 Latin America
 - 9.5.1 Brazil
 - 9.5.2 Mexico
 - 9.5.3 Rest of Latin America
- 9.6 MEA
 - 9.6.1 UAE
 - 9.6.2 South Africa
 - 9.6.3 Saudi Arabia
 - 9.6.4 Rest of MEA

CHAPTER 10 COMPANY PROFILES

- 10.1 Aixtron SE
- 10.2 Broadcom Inc.
- 10.3 DOWA Electronics Materials Co., Ltd.
- 10.4 EpiGaN
- 10.5 Galanz
- 10.6 II-VI Incorporated
- 10.7 Infineon Technologies
- 10.8 Jasper Display Corp.
- 10.9 LED Engin (a division of OSRAM)
- 10.10 Mitsubishi Electric
- 10.11 Nichia Corporation
- 10.12 NXP Semiconductors
- 10.13 Qorvo
- 10.14 Rohm Semiconductor
- 10.15 Samsung Electronics
- 10.16 STMicroelectronics
- 10.17 Sumitomo Electric Industries, Ltd.
- 10.18 TDK Corporation
- 10.19 Wolfspeed

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