

RF GaN Technology

Patent Landscape Analysis - August 2026

Mapping innovation, IP leadership and strategic opportunities across the RF GaN ecosystem



RF GaN Technology

- Type: Patent Landscape Analysis
- Publication: August 2026
- Reference: KM26005

Deliverables

- Database (>5,300 patent families)
- Report (>270 slides)
- Interactive dashboard (optional)

Pricing

- €4,990 - Report+Database
- €7,990 - Report+Database+Dashboard

KEY FEATURES

- **Global patenting trends**, including time evolution of patent publications, countries of patent filings, etc.
- **Main patent assignees and IP newcomers** by countries and segments.
- Key players' **IP position** and the relative **strength** of their patent portfolio.
- Focus on key players' IP portfolios.
- **IP profile of 15 key players** (patent portfolio overview, technical coverage, geographical coverage, recent notable innovations, etc.).
- Patents categorized by **supply chain/technical segments** (wafers & epiwafers, devices, modules & packaging, circuits, current collapse, GaN-on-Silicon, monolithic integration, thermal management, etc.). For each segment: **IP dynamics**, ranking of **main patent assignees**, **IP newcomers**, **key IP players**, **recent innovations**.
- **Excel database** containing all patents analyzed in the report, including **patent segmentations** and hyperlinks to an **updated online database**.
- **Interactive dashboard** enabling dynamic exploration of the patent landscape, allowing users to instantly drill down into key insights and tailor the analysis to their specific needs.

RELATED PATENT MONITOR

- [RF GaN Technology Patent Monitor](#)

RF GaN Enters a New Phase of Growth and Strategic Competition

The RF GaN market is entering a new growth cycle, driven not only by telecom infrastructure but increasingly by **defense, electronic warfare, counter-drone systems and satellite communications**. The device market is projected to reach **\$2.4 billion by 2031**, while defense-related RF GaN revenues alone are expected to rise from **\$592 million in 2025 to \$1.06 billion in 2031**.

At the technology level, **GaN-on-SiC remains the reference platform** for high-power telecom, radar and electronic-warfare applications thanks to its power density, thermal performance and established qualification track record. At the same time, **GaN-on-Si is progressing toward industrialization**, supported by 8-inch manufacturing and emerging opportunities in lower-power radio architectures and future FR3 and 6G applications.

Innovation is also expanding across the entire RF GaN value chain from **semi-insulating substrates and epitaxy to transistor architectures, thermal management, advanced packaging, heterogeneous integration and RF circuits**. Emerging platforms such as GaN-on-diamond and GaN-on-AlN could further reshape performance limits over the longer term.

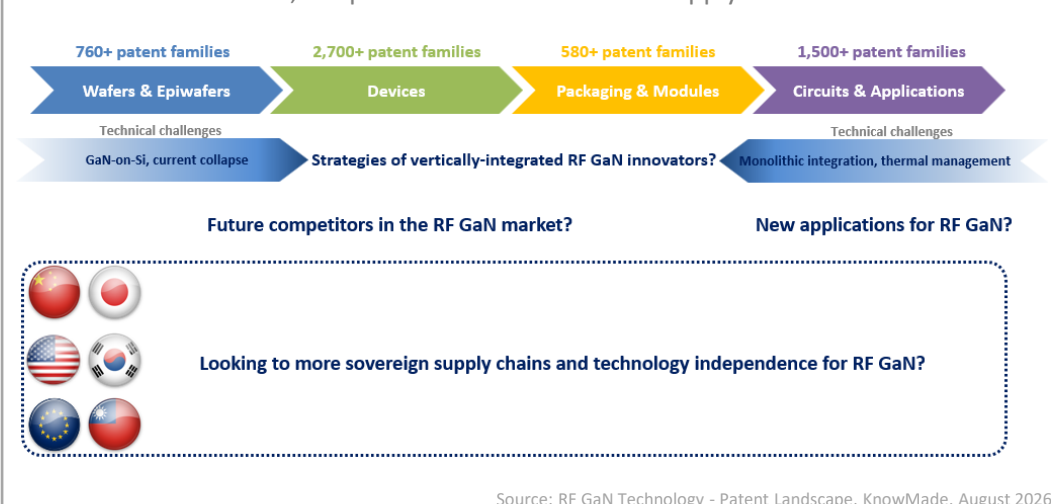
Meanwhile, consolidation, licensing, portfolio repositioning and geopolitical tensions are transforming the competitive landscape. **Manufacturing sovereignty, access to critical substrates, control of process IP and technology-transfer restrictions are becoming as strategically important as device performance itself**.

As RF GaN moves into this new phase of market growth, **the competitive implications remain far from settled**. Which technology platforms are attracting the strongest innovation efforts? Which players are building defensible positions in emerging areas such as GaN-on-Si, advanced epitaxy, thermal management and packaging? How are US, Chinese, Japanese and European companies adapting their IP strategies as supply chains become more regionalized and access to critical technologies more strategic?

Patent analysis provides a unique lens through which to address these questions, revealing not only where innovation is taking place, but also who is investing, where they are seeking protection, how competitive positions are evolving, and which technology areas may become future sources of differentiation, dependency or confrontation.

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> 5,300 patent families across the supply chain



What the Patent Landscape Shows

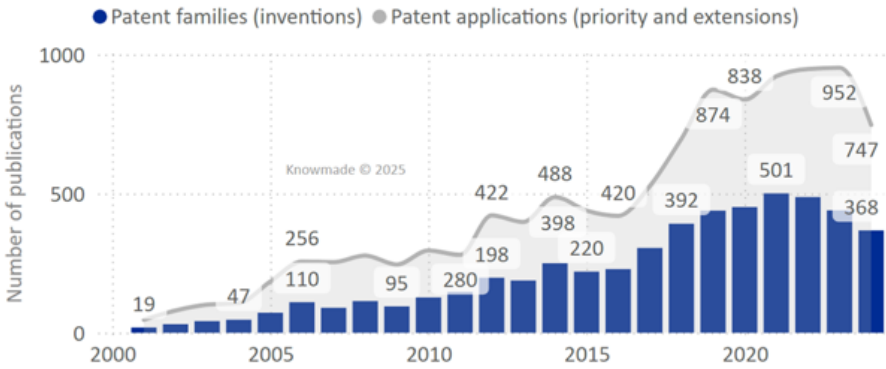
The RF GaN patent landscape is evolving in two directions at once: **overall patenting activity is slowing as the technology matures, while competition is intensifying in selected technologic and geographic areas.**

The analysis highlights a competitive landscape in which the **US and China increasingly shape the global IP balance**, Europe is becoming a more strategic patent jurisdiction, and Japanese companies are broadening their international protection strategies. At the same time, focused areas such as **RF GaN wafer and epiwafer technologies** continue to generate meaningful shifts in competitive positioning.

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A maturing technology landscape with slowing patenting activity

Time evolution of patent publications



Source: RF GaN Technology - Patent Landscape, KnowMade, August 2026

RF GaN IP Competition Intensifies Across the Value Chain

Across the RF GaN supply chain, competitive IP positions remain concentrated around a limited number of established players, but the balance is shifting. **Japanese companies continue to hold strong IP positions in wafers and epiwafers**, with **Sumitomo Electric** and **NGK Insulators** among the established leaders and **Shin-Etsu** emerging as a significant challenger. In devices and downstream technologies, US players retain a particularly strong position. Following the transfer of **Wolfspeed’s** RF business and related patent assets, **MACOM** now stands out through the breadth of its IP position across RF GaN devices, packaging and circuits, giving it one of the most comprehensive portfolios across the value chain.

Competition is also taking increasingly distinct regional forms. **China’s leading RF GaN patent positions remain largely driven by state-backed organizations**, notably **CETC** and **Xidian University**, with Xidian University emerging as the leading domestic player in RF GaN devices. At the same time, industrial companies such as **Huawei**, **Enkris** and **Hanhua Semiconductor** are becoming more visible, suggesting a gradual broadening of China’s innovation base beyond institutional applicants.

Meanwhile, IP strategies are becoming increasingly international. **US companies are extending their patent protection more strongly into Europe and, increasingly, China**, while **Japanese players have expanded their filings in the United States and China since 2022**. The RF GaN IP landscape is therefore moving toward more direct competition across both technology segments and jurisdictions, with portfolio breadth and international patent coverage becoming increasingly important dimensions of IP leadership.

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IP leadership across regions highlights Macom’s global IP presence



Source: RF GaN Technology - Patent Landscape, KnowMade, August 2026

This report includes an extensive **Excel database** with all patents analyzed in this study, including:

- [illegible]

Optional add-on: One-year access to the interactive dashboard for unlimited authorized users within your organization.

Key features:

- Dynamically explore the patent landscape based on your priorities
- Access clear, interactive visualizations for immediate insights
- Filter and analyze data by players, technologies, countries, dates, and legal status
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- Tailor insights to the needs of each team (R&D, IP, strategy, business development)

- Get immediate answers to your key questions
- Save time and accelerate decision-making
- Focus on the insights that matter most

Easily filter the data

Landscape at a glance

Assess technology segment impact

Deep dive by publication country

Understand IP dynamics

Identify key players and newcomers by country and technology segment

Key IP players

IP newcomers

Browse patent families and spot key patents

List of patent families

Select a player to view its IP profile

Select a patent family and explore it in depth

Patent full text + Geographic coverage + Citations analysis

Companies mentioned in the report (non-exhaustive)

INDUSTRIALS: CETC, Sumitomo Electric, Macom, Mitsubishi Electric, Toshiba, Fujitsu, Wolfspeed, Intel, Qorvo, Panasonic, NXP, NTT, RTX Corporation, HiWAFER, San'an, HRL, Dynax Semiconductor, Samsung, Northrop Grumman, Hatchip, Huawei, Murata, NEC, RFHIC, NGK Insulators, Shin Etsu, Akoustis, Ampleon, Hanhua Semiconductor, Qualcomm, ZTE, Sony, SpaceX, WIN Semiconductors, Broadcom, BAE Systems, Infineon, Skyworks, Sumitomo Chemical, Analog Devices, OnMicro Electronics, Thales, Lockheed Martin, Enkris, IQE, Nuvoton, and more.

R&D LABORATORIES: Xidian University, SCUT, IMECAS, UESTC, Institute of Semiconductors (CAS), ETRI, SINANO (CAS), University of California, KETI, KNU - Kyungpook National University, SUSTech, Fraunhofer, MIT, Shanghai Institute of Microsystem & Information Technology (CAS), imec, Cornell University, Shandong University, Sun Yat-sen University, Suzhou University of Science and Technology, AIST, CEA, and more.

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- Patent search strategy and methodology

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- Take away messages
- IP activities in the different ecosystems (Japan, China, US, Europe, etc.)
- IP activities across the supply Chain

RF GaN PATENT LANDSCAPE **20**

- **Patent landscape overview** **21**
 - Who is driving the patenting activity?
 - The global supply chain from a patent perspective
 - Most active IP players and new entrants
 - Main technical challenges (dynamic on-resistance, e-mode, GaN-on-Si, vertical devices, monolithic integration, thermal management, etc.)
- **Patent landscape analysis by country/geographical area**

– US patent landscape	35
– Japanese patent landscape	69
– European patent landscape	98
– Chinese patent landscape	120
– Taiwanese patent landscape	159
– South Korean patent landscape	177

For each country: time evolution of patenting activity, supply chain from a patent perspective, status of players' IP activity, main patent assignees,

most active IP players, new entrants, main technical challenges addressed by IP players, IP strategies of players, current legal status of their patents (pending, granted, protected countries, etc.), recent IP collaborations (patent co-filings) and IP transfers (change in ownership), focus on key players' patent portfolio.

- **Patent landscape analysis by supply chain segments**

– Wafers & epiwafers for RF applications	196
– GaN RF devices	213
– RF modules & packaging	231
– RF circuits & applications	248

For each segment: Time evolution of patent publications from US players, Japanese players, European players, etc., main patent assignees, most active IP players, new entrants, current legal status of their patents (pending, granted), technical challenges addressed by IP players, main patent assignees and new entrant by technical challenge.

ANNEX **265**

- Terminology

KNOWMADE PRESENTATION **268****AUTHORS****Dr. Rémi Comyn**

Rémi works for Knowmade in the field of Compound Semiconductors and Electronics. He holds a PhD in Physics from the University of Nice Sophia-Antipolis (France) in partnership with CRHEA-CNRS (Sophia-Antipolis, France) and the University of Sherbrooke (Québec, Canada). Rémi previously worked in compound semiconductors research laboratory as Research Engineer.

Contact: remi.comyn@knowmade.fr

**Dr. Nicolas Baron**

Nicolas is CEO and co-founder of KnowMade. He manages the development and strategic orientations of the company and personally leads Semiconductors and Energy departments. He holds a PhD in Physics from the University of Nice Sophia-Antipolis, and a Master of Intellectual Property Strategies and Innovation from the European Institute for Enterprise and Intellectual Property (IEEPI) in Strasbourg, France.

Contact: nicolas.baron@knowmade.fr

ABOUT KNOWMADE

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BIC or SWIFT code: CCBPFRPPMAR

IBAN: : FR76 1460 7003 6360 6214 5695 139

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