Global IP dynamics highlight surging GaN innovation activity in Q3/2025

Of 599 new patent families, 70% originate from Chinese players, notes KnowMade.

KnowMade has released its 'Q3 2025 GaN Patent Monitor', which highlights major gallium nitride (GaN) innovation trends in third-quarter 2025, the evolving competitive IP landscape, and the technological advances shaping future power and RF electronics.

The Q3/2025 patent landscape confirms GaN's accelerating industrial expansion. During the quarter, 599 new patent families were published, maintaining a high innovation pace. Notably, 70% of these originated from Chinese players, demonstrating China's continued drive to lead GaN development.

A detailed application-based breakdown reveals strong momentum in power electronics:

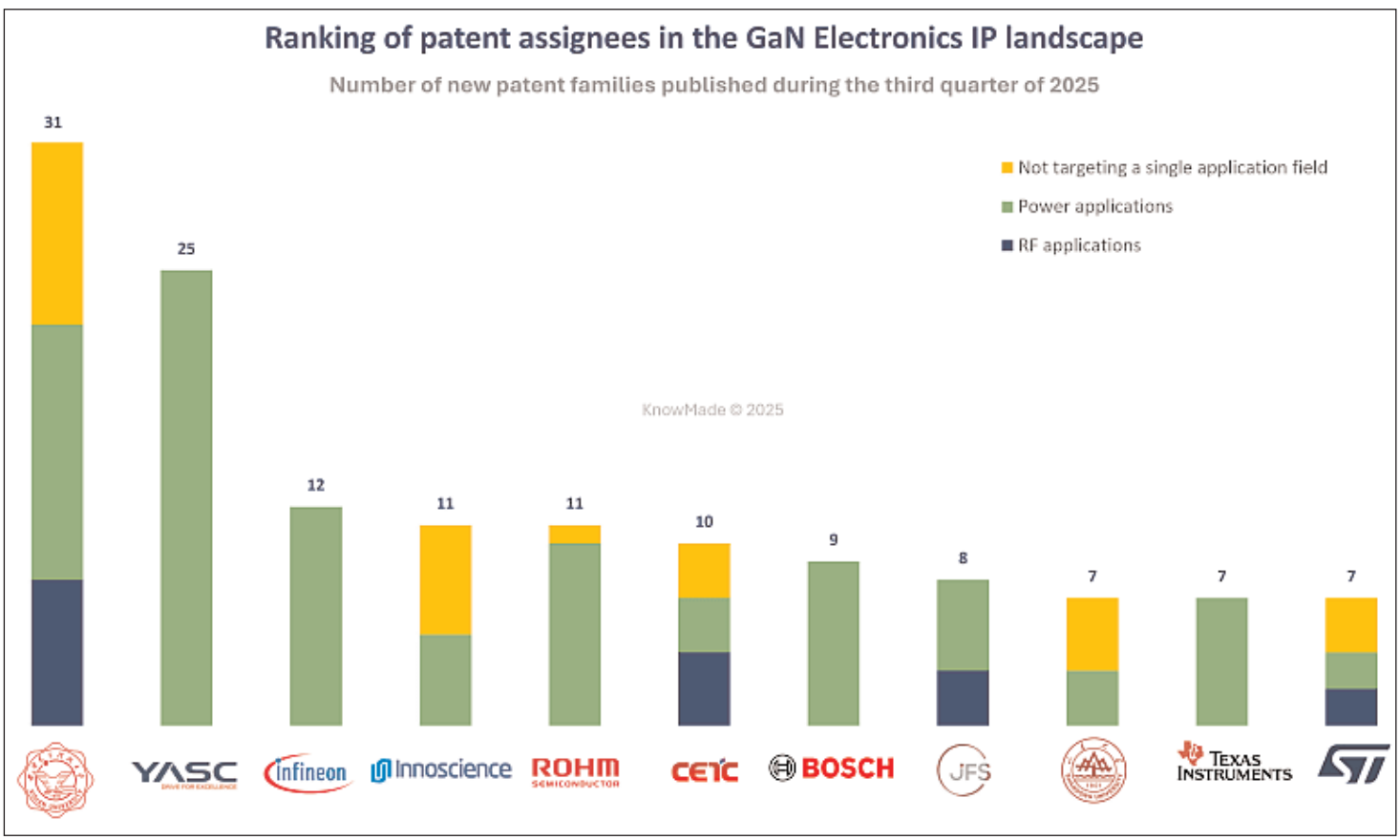
- 376 new patent families targeted power applications, significantly outpacing RF technologies;
- 107 patent families focused on RF applications;
- over 110 patent families addressed multiple application fields, reflecting the transversal relevance of GaN materials and devices.

This sustained IP flow illustrates the robust global interest in GaN technologies across energy efficiency, fast-charging systems, electric vehicle (EV) powertrains, telecom infrastructure, and high-frequency components, all central drivers of Q3/2025 GaN innovation.

Newcomers joining GaN IP landscape

Q3/2025 saw a high number of IP newcomers filing their first GaN-electronics-related patents, most of them being Chinese companies. Several notable non-Chinese new entrants introduced meaningful contributions:

- Alpsemi (in France) disclosed a high-voltage high-electron-mobility transistor (HEMT) epitaxial structure dedicated to advanced power conversion;



- Soth Korea-based SK Foundry introduced a GaN transistor structure designed to mitigate current collapse, improving device reliability;
- Atomera (in USA) unveiled a superlattice structure enabling enhanced stress and strain control in GaN-on-silicon epitaxy while facilitating self-separation from the growth substrate — a key manufacturing advantage.

Breakthrough collaborative innovation

A highlight of Q3/2025 GaN innovation is a prominent US-based academic–military collaboration between the University of California, University of Maryland, University of Virginia, and the US Navy. The partners introduced carbide 'phonon bridge layers', engineered to reduce thermal boundary resistance between an integrated diamond heat spreader and an aluminium gallium nitride (AlGaN) HEMT. This development could unlock dramatic improvements in GaN device thermal management.

Strengthening IP positions among established players

Confirming the competitive consolidation of the GaN ecosystem, Q3/2025 also recorded 426 patent families being granted for the first time, including:

- over 230 newly granted families concerned power applications, versus 90 for RF;
- about 100 newly granted families covered multi-application inventions.

Among the power GaN market players, Infineon stands out as the quarter's strongest GaN IP performer, securing 15 newly granted patent families, well ahead of Innoscience (7) and Rohm (3). Infineon's newly granted patents span GaN transistors, manufacturing methods, low-inductance packaging, power ICs, and DC/DC converter-based systems.

Major foundries also reinforced their IP position:

- UMC obtained eight granted patents;
- TSMC and GlobalFoundries each strengthened their IP portfolios with three additional granted patent families.

This competitive dynamic underscores a rapidly maturing industry in which both integrated device manufacturers (IDMs) and foundries are investing heavily in foundational GaN technologies, concludes KnowMade. ■

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