

# California Firm Defends Key Chip Patents From Chinese Rivals (1)

By Christopher Yasiejko

Deep Dive

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- Next-generation devices offer improved efficiency, less space
- Calif.-based EPC fights China's Innoscience on multiple fronts

A small California company is wielding patents in court and at a US trade agency to fortify its position in the battle for global supremacy over next-generation power semiconductor devices.

Efficient Power Conversion Corp. scored a first-round win earlier this month in its effort to block imports of China-based Innoscience (Zhuhai) Technology Co.'s gallium nitride-based, or GaN-based, power semiconductor devices. A trade judge at the US International Trade Commission upheld the validity of two EPC patents and found Innoscience's devices infringe one of those, US Patent No. 8,350,294.

EPC's parallel federal lawsuit, filed in May 2023 over Innoscience's alleged infringement of four patents—including the two at issue in the ITC case—is on hold until the agency has issued its final decision, which has a target date of Nov. 5.

GaN-based technologies are changing the semiconductors game by offering improved performance across a wide range of applications including artificial intelligence and self-driving vehicles while reducing energy consumption and the required physical space compared to conventional silicon-based technologies. The market share for GaN-based technology is growing as it relates to the broader global semiconductor business, according to Grand View Research reports.

But even if Innoscience's infringement is "a dead-cert bet" that results in ITC and court victories, the US company's ability to parlay that to slow the competitor's "global ambitions is another matter entirely," said Malcolm Penn, CEO of the British semiconductor-analyst firm Future Horizons.

That's because China's GaN-based power semiconductor devices are of good quality and cheaper than their Western counterparts, Penn said. And any ITC import ban tied to infringement of EPC technology will be inherently isolated to the US.

"Sometimes, the market speaks louder than the rules," Penn said.

## **GaN-based Semiconductors**

GaN technology represents a significant leap forward in semiconductor capabilities, allowing electronic devices to handle higher voltages, switch faster, and be more efficient and compact compared to traditional silicon-based technology.

EPC has spent 17 years and more than \$200 million developing its GaN-based technology, according to Alex Lidow, its CEO and co-founder. He said the technology will steadily replace aging power switches and many power-related circuits currently dominating the technological landscape, expanding the marketplace.

"It's growing in part thanks to GaN products opening new applications such as AI, autonomous vehicles, and humanoid vehicles," Lidow said.

The US market for GaN-based semiconductors was \$711.3 million in 2023 and is forecast to reach \$3.51 billion by 2030, driven by the increasing adoption of electric vehicles, according to a Grand View Research report. The global GaN semiconductors market, estimated at \$2.56 billion in 2023, is projected to reach \$12.47 billion in 2030, according to another recent Grand View report.

## **Foreign Competition**

EPC, Innoscience, and the German chip maker Infineon Technologies AG are among the sector's dominant players. Other major players include Wolfspeed Inc.—formerly Cree Inc.—and Qorvo Inc., both headquartered in North Carolina; Netherlands-based NXP Semiconductors NV; and Japan's Fujitsu Ltd. and Toshiba Corp.

The incumbent silicon technology is EPC's main competition, Lidow said. But as production costs of GaN devices drop comparatively, the company is "able to compete not just on the performance and size advantages offered by GaN, but also on price."

The US leads in GaN-related research, according to a May 20 commentary by Sujai Shivakumar, who directs the Center for Strategic & International Studies' Renewing American Innovation Project. But global competition is increasing.

The "geopolitical stakes are higher than ever," Shivakumar wrote.

Between Infineon and EPC, Penn said, "there's not many patents wannabe power integrated-circuit makers won't be infringing, making licensing deals inevitable."

An Infineon unit in March sued Innoscience in California federal court alleging 30 GaN devices infringe one of its patents. That same month, the US Patent and Trademark Office's administrative tribunal launched a validity review for each of EPC's four asserted patents based on requests filed in September by Innoscience, which last month filed for an initial public offering in Hong Kong. Innoscience's June request that the Patent Trial and Appeal Board review the validity of Infineon's US Patent No. 9,899,481 is pending.

Innoscence said in a statement that the Infineon disputes “only concern a small fraction” of its GaN transistors.

“Innoscence’s success has not gone unnoticed by its competitors, such as EPC and Infineon, who have resorted to falsely accusing Innoscence of patent infringement in an attempt to challenge Innoscence’s market dominance,” the company said, adding that it’s “confident it will prevail in the pending lawsuits,” denies all allegations, and disputes the asserted patents’ validity.

The PTAB’s final decisions are expected within a year of institution. Meanwhile, EPC in April emerged intact from the Chinese rival’s challenges to the validity of several counterpart patents at the China National Intellectual Property Administration.

“EPC and Infineon’s legal actions reveal a deeper narrative,” Innoscence said in its statement. “Innoscence’s innovations in the GaN industry are significant threats to EPC and Infineon’s market position in the semiconductor space. By initiating the lawsuits in multiple venues such as the ITC, Northern District of California, and Germany, it is clear the legal battles with EPC and Infineon are not just about patents—they are strategic maneuvers for market control and efforts to diminish Innoscence’s success in the GaN space”

#### **ITC’s ‘Crucial’ Role**

The ITC’s role is “especially crucial” in cases involving emerging technologies that could be “foundational to driving economic growth in the US,” as opposed to the agency’s role in disputes over mere “widgets,” said Beau Jackson, a lawyer who leads Husch Blackwell LLP’s international trade practice. Jackson, who declined to discuss the merits of EPC’s trade case and hasn’t reviewed the asserted patents, said such a challenge is “potentially huge” for a complainant like EPC.

“As a policy matter, this is exactly what the ITC is for: to provide border protection, marketplace protection, for genuine US innovators who otherwise couldn’t get that sort of relief against a foreign company,” he said.

China wants “to dominate critical and emerging technologies,” Jackson said, adding this company “might be one of” the next Chinese companies to shape a global industry.

Innoscence, which said its innovations are “the result of 9 years of research and development” said it would challenge the trade judge’s initial findings and “request modification by the full commission of the ITC.” “

If the ITC opts to review the first-round decision and ultimately declines to block Innoscence imports, Jackson said, EPC will “probably continue to lose market share to a company that they feel ripped them off.”

The agency's power to issue an injunction is especially valuable, he said, because district courts rarely award such relief. Federal court cases against foreign companies also tend to ignite fights over jurisdiction and discovery, Jackson said, and enforcing any damages awarded against a Chinese company "can be tricky."

It remains to be seen whether patent-related legal victories would offset the fact that GaN-based technology "is a natural for China's chip firms," Penn said, adding that power semiconductors "are a declared key target area for the Chinese government to address and conquer."

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