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COMPOUNDS & ADVANCED SILICON

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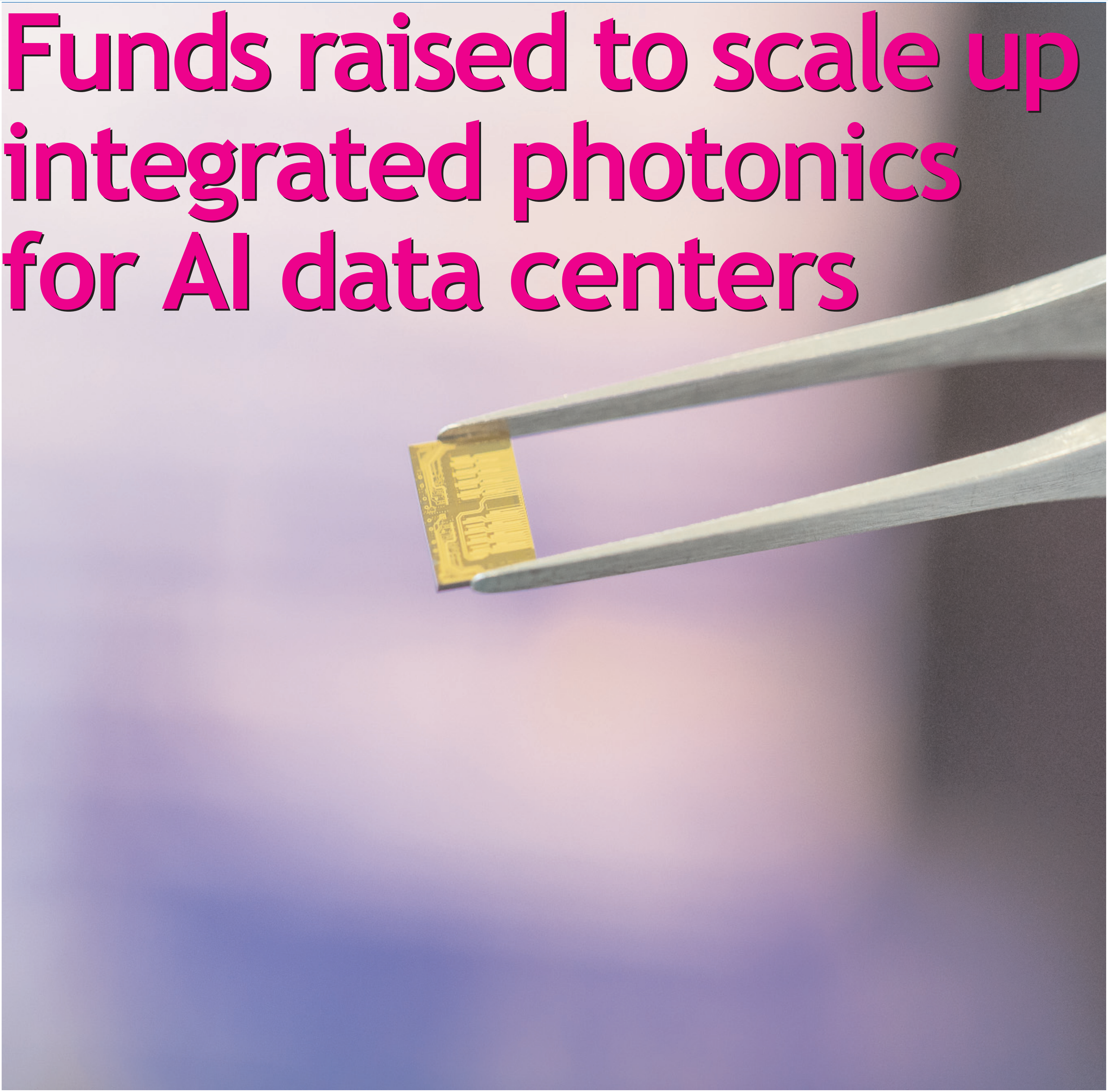
Funds raised to scale up integrated photonics for AI data centers



Wolfspeed restructuring approved • Toshiba & SICC sign MoU •
UW-Madison opens ultrawide-bandgap semiconductor MOCVD Lab

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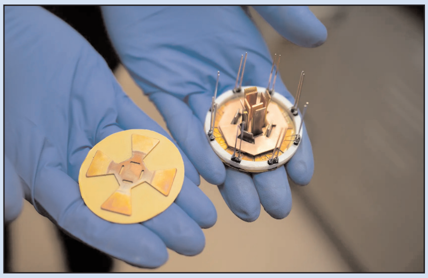
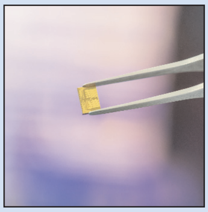


p13 NREL has created a silicon carbide-based power module with what is said to be record efficiency, power density, and low-cost manufacturability.

p14 Toshiba and Chinese supplier SICC have signed an MoU to collaborate on improving the characteristics and quality of silicon carbide power semiconductor wafers.



Cover image: The LEAF Light IC of Grenoble-based Scintil, which has raised $58m — while California-based OpenLight has raised $34m, and Ayar Labs and Alchip have teamed on co-packaged optics — all targeting the scale up of integrated photonics for AI data-center infrastructure. **p46**

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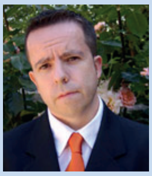

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***Semiconductor Today* covers the R&D and manufacturing of compound semiconductor and advanced silicon materials and devices** (e.g. GaAs, InP and SiGe wafers, chips and modules for microelectronic and optoelectronic devices such as RFICs, lasers and LEDs in wireless and optical communications, etc).

Regular issues contain:
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- technology, applications & markets);
- feature articles (technology, markets,
- regional profiles);
- conference reports;
- event calendar and event previews;
- suppliers' directory.

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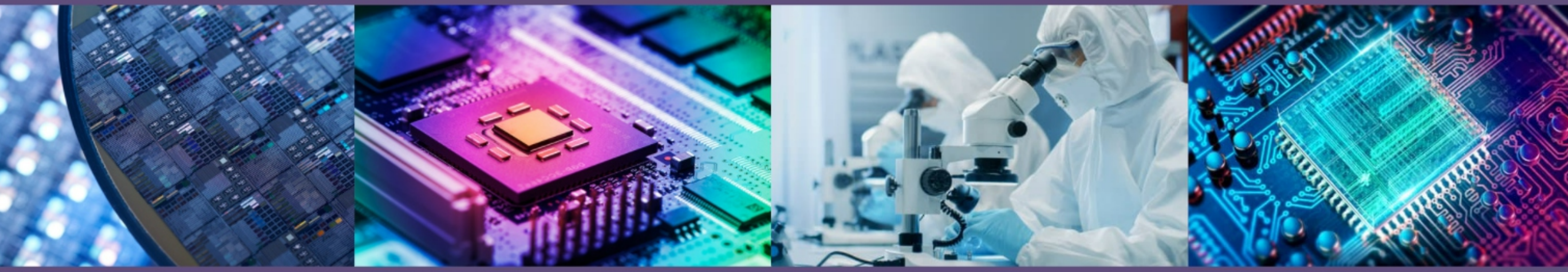


Smartphone production rises 4% in Q2 to 300 million

Brands such as Oppo and Transsion recover after inventory adjustments

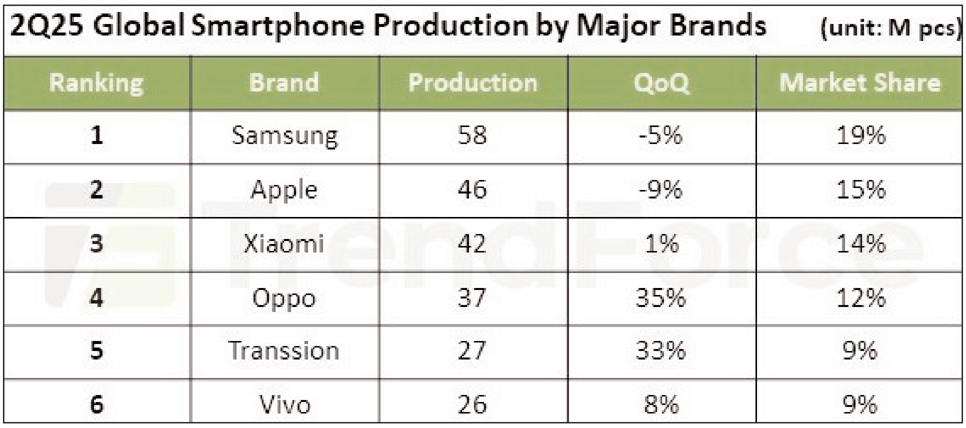
Global smartphone production reached 300 million units in second-quarter 2025, up 4% quarter-on-quarter and 4.8% year-on-year, driven by seasonal demand and the recovery of brands such as Oppo and Transsion following inventory adjustments, according to market analyst firm TrendForce.

While macroeconomic headwinds continue to dampen demand for consumer electronics, the upcoming peak season and e-commerce promotions are expected to support sequential growth through second-half 2025.

China's smartphone subsidy program in first-quarter 2025 provided a short-term boost to mid- and low-end sales and helped to accelerate inventory clearance, notes TrendForce. However, given the limited size of the subsidies and the narrow range of eligible products, the impact on full-year 2025 sales is expected to remain modest.

Looking at brand performance in Q2/2025, the top six vendors collectively maintained around 80% market share.

Samsung remained the largest producer, but output fell by 5% quarter-on-quarter to 58 million units (falling from 22% market share to 19%) as momentum for new flagship models eased.



2Q25 Global Smartphone Production by Major Brands (unit: M pcs)

Ranking	Brand	Production	QoQ	Market Share
1	Samsung	58	-5%	19%
2	Apple	46	-9%	15%
3	Xiaomi	42	1%	14%
4	Oppo	37	35%	12%
5	Transsion	27	33%	9%
6	Vivo	26	8%	9%

Apple was second with 46 million units, down 9% quarter-on-quarter (falling from 17% market share to 15%) due to seasonal weakness between model transitions, but still up 4% year-on-year thanks to the iPhone 16e's strong performance earlier in the year. To revive sales in China, Apple introduced deeper discounts than in other regions in May which, combined with local subsidies, allowed its performance in the market to hold steady year-on-year.

Xiaomi (including Redmi and POCO) ranked third with 42 million units maintaining 14% market share), supported by expansion in Latin America and Africa along with China's subsidy policy.

Oppo (including OnePlus and Realme) rebounded strongly after completing inventory adjustments, with production climbing by 35% quarter-on-quarter to nearly 37 million units, holding fourth place but increasing market share from 9% to 12%).

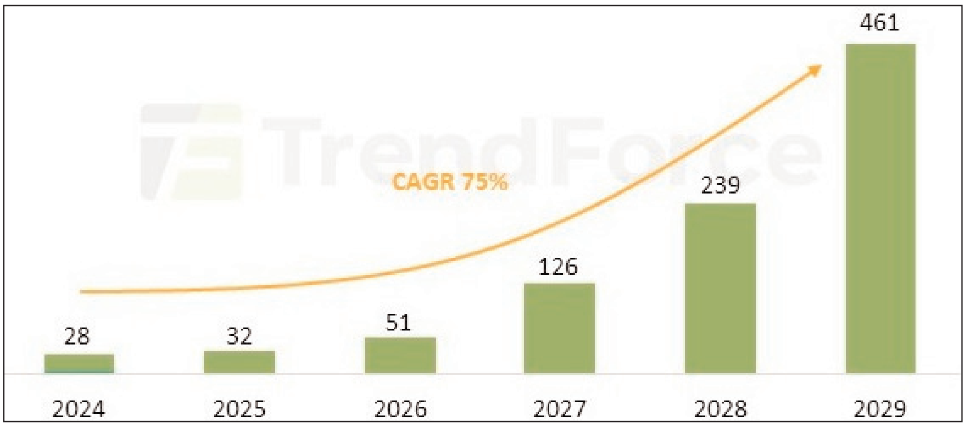
Transsion (including TECNO, Infinix and itel), focused on emerging markets, also saw production recover to over 27 million units, up 33% quarter-on-quarter (growing from 7% to 9% market share, rising to fifth rank) and up 15.7% year-on-year.

Vivo (including iQOO) benefited from overseas growth and China's subsidy support, raising output by 8% quarter-on-quarter to 26 million units (growing from 8% to 9% market share, but falling behind Transsion to sixth rank).

www.trendforce.com

Micro-LED chip market to surpass $461m by 2029, driven by adoption in smartwatches

Commercialization in TVs, smartwatches and automotive displays to be joined by near-eye displays



The penetration of micro-LEDs into consumer electronics is accelerating, notes market analyst firm TrendForce. Following South Korea-based Samsung's launch of its 140-inch micro-LED TV in 2023, Garmin is set to introduce the Fenix 8 Pro smartwatch with micro-LEDs in 2025, alongside Japan-based Sony Honda's planned 30-inch automotive display in its Afeela model at the end of this year. These milestone products mark the micro-LED's entry into key application segments. TrendForce believes that their rollout will gradually boost the micro-LED chip market, rising at a compound annual growth rate (CAGR) of 75% from just $28m in 2024 to $461m by 2029.

Despite these advances, the high power consumption and cost of micro-LEDs remain significant challenges, limiting their ability to compete in the short term with more mature and cost-effective organic light-emitting diode (OLED) technology. Nevertheless, micro-LEDs offer unique advantages for outdoor sports watches, such as extreme brightness and strong potential for integrating sensors, laying the groundwork for future product innovation and differentiation.

For the Garmin Fenix 8 Pro, Taiwan-based AUO plays a central role in the supply chain, supported by PlayNitride (equivalent to ~15µm x 30µm micro-LED chips) and Raydium Semiconductor Corp (micro-LED driver ICs). AUO's proprietary image calibration technology further enhances the 1.39-inch display. This collaboration illustrates how early investments in the micro-LED ecosystem are beginning to take hold and, as adoption expands, the technology's maturity and cost competitiveness are expected to advance significantly, says TrendForce.

Commercialization of micro-LEDs is gradually materializing across TVs, smartwatches and automotive displays, with each flagship launch representing a fresh technological breakthrough, notes the firm. Due to their superior brightness and contrast, micro-LEDs have already been adopted by some next-generation smart glasses startups.

Looking ahead, as global tech giants enter the market and micro-LED light source suppliers push forward, the technology is poised to gain momentum in near-eye displays, further enhancing overall industry value, forecasts Trendforce.

www.trendforce.com

Skyworks names Phil Carter as CFO

Former corporate controller & principal accounting officer rejoins from AMD

Skyworks Solutions Inc of Irvine, CA, USA (which manufactures analog and mixed-signal semiconductors) says that Philip Carter has been appointed senior VP & chief financial officer, effective 8 September, responsible for financial strategy, investor relations, treasury and leadership of the global finance and information technology organizations.

Carter joins Skyworks from Advanced Micro Devices Inc (AMD), where he was corporate VP & chief accounting officer since November 2024, overseeing its comprehensive accounting operations.

Prior to AMD, Carter was Skyworks' VP, corporate controller & principal accounting officer. For over seven years at Skyworks he led enterprise-wide strategic operational initiatives, including financial transformation, operational scalability and the implementation of robust reporting systems to support the company's growth.

Skyworks' new CFO Phil Carter.

Previously, he spent over eight years at Broadcom Inc. where he helped transform their accounting organization in terms of people, process and systems during a period of rapid growth. He began his career at Ernst & Young LLP. He received his bachelor's degree in accounting from California State University, Fullerton, a master's degree in business administration from the University of Southern California and is a certified public accountant (CPA) in California, as well as a Chartered Financial Analyst (CFA).

"We're pleased to welcome back a well-respected financial leader with deep experience in the semiconductor industry," said

"Philip brings a proven track record of driving strong financial results, instilling operational discipline, and leading with clarity and purpose," comments Skyworks' CEO & president Phil Brace. "His strategic insight and ability to scale complex global finance functions, while embracing innovation across systems, processes and people, make him a critical addition to our leadership team," he adds.

"I'd like to thank Rob Schriesheim, a member of our board of directors who has served as interim CFO since May 2025, for his leadership in guiding the finance team through a critical period of transition."

www.skyworksinc.com

Altum RF showcasing products and expertise at EuMW

European Microwave Week to see new components for satcom, telecoms, radar and test & measurement

Altum RF of Eindhoven, The Netherlands (which designs RF, microwave and millimeter-wave semiconductors) is showcasing its featured products and technical expertise in booth #B084B at European Microwave Week (EuMW 2025) in Jaarbeurs Utrecht, The Netherlands (21–26 September).

With over 40+ gallium arsenide (GaAs) and gallium nitride (GaN) monolithic microwave integrated circuits (MMICs) from X-band to over 100GHz, Altum RF is featuring several products at EuMW, including new components for satcom, telecommunications (with E-band), radar, and test & measurement markets.

Specifically, there is a live demonstration of the following amplifiers:

- the 22–31.5GHz ARF1200Q2, with 22dB gain, 1.6dB noise figure, 8dBm P1dB, 3.3V bias voltage and 15mA bias current;
- the 22–31.5GHz ARF1201Q2, with 24dB gain, 2.4dB noise figure, 15dBm P1dB, 3.3V bias voltage and 40mA bias current;
- the 37–43.5GHz ARF1202Q2, with 21.5dB gain, 2.5dB noise figure, 7dBm P1dB, 3.3V bias voltage and 15mA bias current;
- the 37–43.5GHz ARF1203Q2, with 21dB gain, 2.7dB noise figure, 12.5dBm P1dB, 3.3V bias voltage and 40mA bias current;
- the 13–25GHz ARF1205Q2, with 23dB gain, 1.9dB noise figure, 16dBm P1dB, 4V bias voltage and 65mA bias current;
- the 6–14GHz ARF1211Q3, with 25dB gain, 1.7dB noise figure, 20dBm P1dB, 5V bias voltage and 60mA bias current;
- the 22–26GHz ARF1218Q2, with 29dB gain, 2.6dB noise figure, 9dBm P1dB, 3.3V bias voltage and 6mA bias current.

All amplifiers are provided in a 2.5x2.5 QFN package, apart from the ARF1211Q3, which is provided in a 3x3 QFN package.

www.altumrf.com

Northrop Grumman opens up Microelectronics Center access to external aerospace & defense firms

Business model strengthens US manufacturing infrastructure and assures microelectronics supply chain

US-based aerospace & defense technology company Northrop Grumman Corp says that its Microelectronics Center is now open for external aerospace & defense companies to access its three US government-accredited semiconductor manufacturing facilities, expanding the secure production of defense microelectronics on US soil.

The open-access business model allows:

- external entities (including commercial businesses, aerospace & defense companies, the US Government, academia, federally funded R&D centers and others) to design, manufacture, package and test microelectronics domestically for commercial and defense applications;
- access to end-to-end US-based advanced packaging facilities with reliable semiconductor design, post-processing, assembly and test for current- and future-generation technologies;
- purchase of Northrop Grumman-produced semiconductor products and components via an online storefront.

"By opening our defense-grade manufacturing facilities to partners, Northrop Grumman is expanding and strengthening the resilience of America's semiconductor industry and supply chain," says Vern Boyle, VP of the Northrop Grumman Microelectronics Center. "We are providing partners with unprecedented access to design and develop domestic chips as well as the ability to directly purchase from us, enhancing collaboration across the broader defense industrial base."

Northrop Grumman's Microelectronics Center

Northrop Grumman's Microelectronics Center consists of three manufacturing facilities: two US government-accredited semiconductor foundries in California and Maryland and an advanced packaging facility in Florida.

The advanced packaging facility is capable of 100–300mm wafer bumping, probing and dicing, which allows multiple smaller, specialized chips to be combined into a single, more powerful electronics package. Unlike traditional methods that place multiple chips side-by-side into a system, advanced packaging integrates multiple specialized chips together with high-density connections into a 3D chip stack. This approach is crucial for meeting the demands of next-generation devices.

According to industry research, 98% of advanced packaging needs are sent offshore, which poses a risk to threats from global impacts. Northrop Grumman is one of few defense companies that can package chips within the USA.

The firm designs, manufactures, assembles, tests and packages millions of microelectronics annually to support next-generation defense and commercial systems in the USA, ensuring that the US supply chain is protected and sustainable to strengthen national defense infrastructure. From design, fabrication, to field, the firm says that its mission-tailored microelectronics serve as the crucial intelligence powering next-generation military and commercial systems and are foundational to mission success.

With nearly 100,000 staff and over 30 million square feet of manufacturing space, Northrop Grumman says that it has capacity, scale and agility, so that its manufacturing approaches can accelerate and enhance the entire process from design and development to production and testing. The firm has invested in US infrastructure, R&D, staffing and its supply chain to deliver the country's national security needs.

www.northropgrumman.com/what-we-do/mission-solutions/microelectronics

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Wolfspeed's reorganization plan approved by court

Firm expects to emerge from Chapter 11 within weeks

Wolfspeed Inc of Durham, NC, USA — which makes silicon carbide (SiC) materials and power semiconductor devices — has received court approval for its plan of reorganization.

Wolfspeed hence expects to emerge from Chapter 11 protection in the next several weeks. Upon emergence, the firm expects to reduce its debt by about 70%, better positioning it to execute on its strategic priorities.

Court approval "clears the path for us to complete our restructuring process in the coming weeks," says CEO Robert Feurle. "Strengthening our capital structure will help us to shape Wolfspeed into a leader in its industry, and we look forward to emerging with the financial flexibility to move swiftly on our strategic priorities and reinforce our leadership in silicon carbide," he believes. "I would like to thank our talented team for their continued focus and hard work, our customers and vendors for their ongoing cooperation, and the lending group who supported our plan of reorganization."

www.wolfspeedforward.com
https://dm.epiq11.com/Wolfspeed
www.wolfspeed.com

Wolfspeed's quarterly revenue rebounds by 6%, led by 10% growth in Power Products

Full-year revenue falls by 6% as Materials Products shrink by 12.3%

For its fiscal full-year (for continuing operations, to end-June), Wolfspeed has reported a 6% drop in revenue from $807.2m for 2024 to $757.6m for 2025.

This was mainly due to Materials Products revenue shrinking by 12.3% from $391.6m to $343.6m.

Power Product revenue fell only slightly, from $415.6m to $414m.

Fiscal fourth-quarter revenue was $197m, down slightly on $200.7m a year ago but up 6% on $185.4m last quarter.

Materials Products are still down year-on-year, by 18.4% from $96.1m a year ago, but have rebounded slightly from $77.9m last quarter to $78.4m.

In contrast, following a low of $90.8m in fiscal Q2/2025, Power Products revenue has rebounded further, by 10.3% from $107.5m last quarter to $118.6m (up 13.4% on $104.6m a year ago). Of this, the Mohawk Valley Fab in Marcy, NY (which was opened in April 2022 to produce SiC power devices on larger, 200mm wafers) contributed $94.1m, rising further from $78m last quarter and more than doubling year-on-year from $41m.

On a non-GAAP basis, gross margin was –1%, compared with +2% last quarter and +5% a year ago. This includes the impact of underutilization costs (mainly from production start-up at the Mohawk Valley Fab). Full-year gross margin has hence fallen from 13% to 2%.

Quarterly loss was $119.8m ($0.77 per share) in fiscal Q4/2025, up from $110.8m last quarter ($0.72 per share) and $112m ($0.89 per share) a year ago. Full-year loss hence rose from $325.9m ($2.59 per share) for 2024 to $469m ($3.32 per share) for 2025.

Quarterly operating cash flow was –$242.5m, up from –$142.1m last quarter and slightly worse than –$239.5m a year ago.

Capital expenditure (CapEx) was $211.6m (cut from $645.8m a year ago, which mainly comprising investment into The JP — the John Palmour Manufacturing Center for Silicon Carbide — materials facility in Siler City, NC), helping to halve full-year CapEx year-on-year to $1031m.

Quarterly free cash outflow has hence improved, from –$885.3m a year ago to –$454m.

Cash, cash equivalents, and short-term investments have more than halved from $2174.6m a year ago and $1329.6m to $955.4m.

"With our world-class greenfield and vertically integrated facility footprint, recent additions to the senior leadership team, and robust IP portfolio, Wolfspeed is well-positioned to be the global leader in silicon carbide technology," says CEO Robert Feurle. The next important milestone is to emerge from Chapter 11 "with a much stronger financial structure".

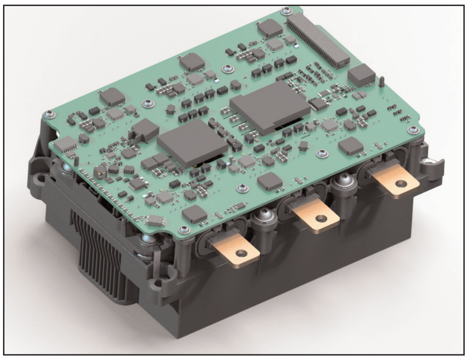
www.wolfspeed.com

ROHM's SiC MOSFETs in mass production in Schaeffler's inverter brick for Chinese car maker

As part of their strategic partnership (initiated in 2020), Japan's ROHM Co Ltd and Germany-based automotive supplier Schaeffler (formerly Vitesco Technologies) have started mass production of a new high-voltage inverter brick incorporating ROHM's fourth-generation silicon carbide (SiC) MOSFET bare chips. The inverter brick is intended for a major Chinese car manufacturer.

The Schaeffler inverter subassembly is the essential power device building block (brick) to control the electric drive via logic signals. For the inverter brick now being produced, Schaeffler increased the output by increasing the maximum possible battery voltage to much more than the usual 800V — and with RMS currents of up to 650A, which turn the sub-module into a compact power pack.

"Through our strategic approach of incorporating scalability and modularity into our e-mobility solutions — from individual components to a highly integrated electric axle — we developed the readily integrated inverter brick," says Thomas Stierle, CEO of Schaeffler's E-Mobility Division. "Based on our generic platform development, it took us just one year to bring this optimal product for the popular X-in-1 architectures to volume production readiness."



High-voltage inverter brick.

Modularity and scalability key to easy integration

As a core component of an inverter, the brick has to meet strict requirements. The characteristics of the sub-module are indicative of the factors behind the current sales success and start of volume production: ROHM's SiC power semiconductors enable the frame-mounted sub-module with high power density to be compact, efficient and readily integrated into various inverters through its modular and scalable design. The sub-module incorporates the power module for pulse width modulation (PWM) of the current pulses, the DC link capacitor, a DC link and a cooler. Moreover, the brick has a DC boost function, thanks to which a vehicle with 800V architecture can also be charged at a 400V charging station at a charging speed of 800V.

"With our SiC technology we are making a substantial contribution to increasing the efficiency and performance of electric cars," says Dr Kazuhide Ino, board member & managing executive officer at ROHM. "Working with Schaeffler as our partner, we are thus fostering innovation and sustainability in the automotive industry."

www.schaeffler.com/en/group
www.rohm.com/products/sic-power-devices

Wolfspeed announces commercial launch of 200mm SiC

Extension follows response to initial offering to select customers

Wolfspeed has announced the commercial launch of its 200mm SiC materials products, marking a milestone in its mission to accelerate the industry's transition from silicon to silicon carbide. After initially offering 200mm SiC to select customers, the firm says that the positive response and benefits warranted a commercial release to the market.

Wolfspeed is also offering 200mm SiC epitaxy for immediate qualification which, when paired with its 200mm bare wafers, delivers what is claimed to be breakthrough scalability and improved quality, enabling the next generation of high-performance power devices.

"Wolfspeed's 200mm SiC wafers are more than an expansion of wafer diameter — it represents a materials innovation that empowers our customers to accelerate their device roadmaps with confidence," says Dr Cengiz Balkas, chief business officer. "By delivering quality at scale, Wolfspeed is enabling power electronics manufacturers to meet growing demand for higher-performing, more efficient silicon carbide solutions."

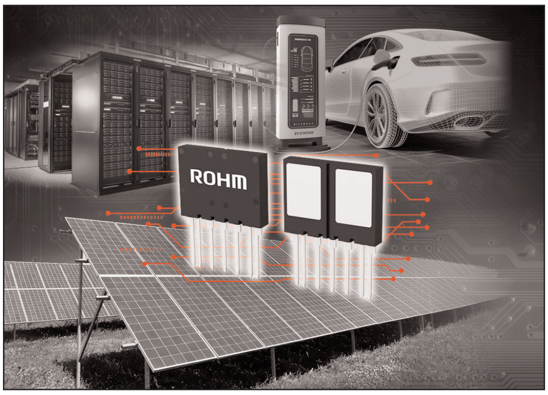
The improved parametric specifications of the 200mm SiC bare wafers at 350μm thickness and what is claimed to be enhanced, industry-leading doping and thickness uniformity of the 200mm epitaxy enables device makers to improve MOSFET yields, accelerate time-to-market, and deliver more competitive solutions across automotive, renewable energy, industrial and other high-growth applications, says Wolfspeed. These product and performance advancements for 200mm SiC can also be applied to continuous learnings for 150mm SiC materials products, the firm adds.

"This advancement reflects Wolfspeed's long-standing commitment to pushing the boundaries of silicon carbide materials technology," says Balkas. "This launch demonstrates our ability to anticipate customer needs, scale with demand, and deliver the materials foundation that makes the future of more efficient power conversion possible."

www.wolfspeed.com

ROHM launches DOT-247 2-in-1 SiC molded module

Combining two TO-247 packages allows high design flexibility and power density



Japan-based ROHM has developed the DOT-247, a 2-in-1 silicon carbide (SiC) molded module (SCZ40xxDTx, SCZ40xxKTx), suitable for industrial applications such as photovoltaic (PV) inverters, uninterruptible power supply (UPS) systems, and semiconductor relays. The module retains the versatility of the widely adopted TO-247 package while achieving high design flexibility and power density.

The DOT-247 features a combined structure consisting of two TO-247 packages. This design enables the use of large chips, which were structurally difficult to accommodate in the TO-247 package, and achieves low on-resistance through a unique internal structure. Additionally, through optimized package structure, thermal resistance has been reduced by about 15% and inductance by about 50% compared with the TO-247. This enables a power density 2.3 times higher than the TO-247 in a half-bridge configuration, achieving the same power conversion circuit in about half the volume.

The new products featuring the DOT-247 package are available in two topologies: half-bridge and common-source. Currently, two-level inverters are the mainstream in PV inverters, but there is growing demand for multi-level circuits such as three-level NPC (neutral point clamped), three-level T-NPC (T-type neutral point clamped), and five-level ANPC (active neutral point clamped) to meet the need for higher voltages. In the switching sections of these circuits, topologies such as half-bridge and common-source are mixed, making custom products necessary in many cases when using conventional SiC modules.

To address this challenge, ROHM has developed each of these two topologies — the smallest building blocks of multi-level circuits — into a 2-in-1 module. This enables flexibility to support various configurations such as NPC circuits and DC–DC converters, while significantly reducing the number of components and mounting area, and achieving circuit miniaturization compared to discrete components.

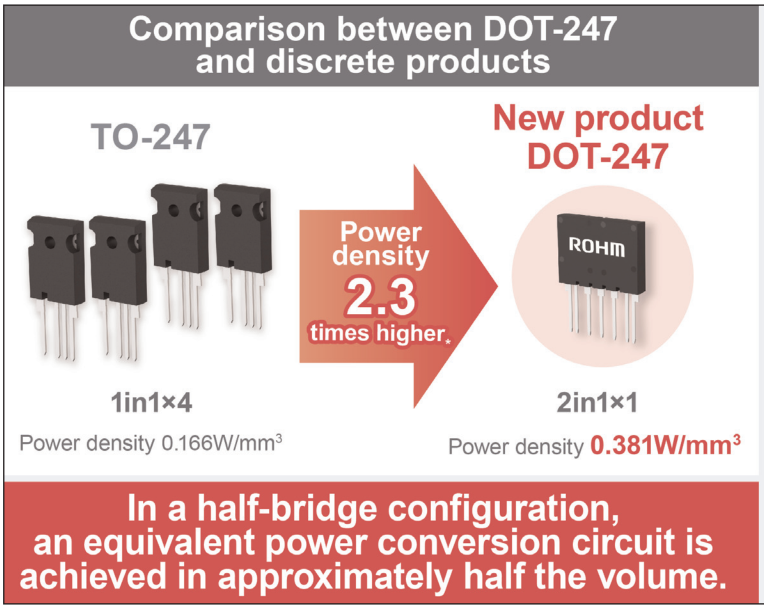
Evaluation boards will also be made available progressively to facilitate evaluation during application design.

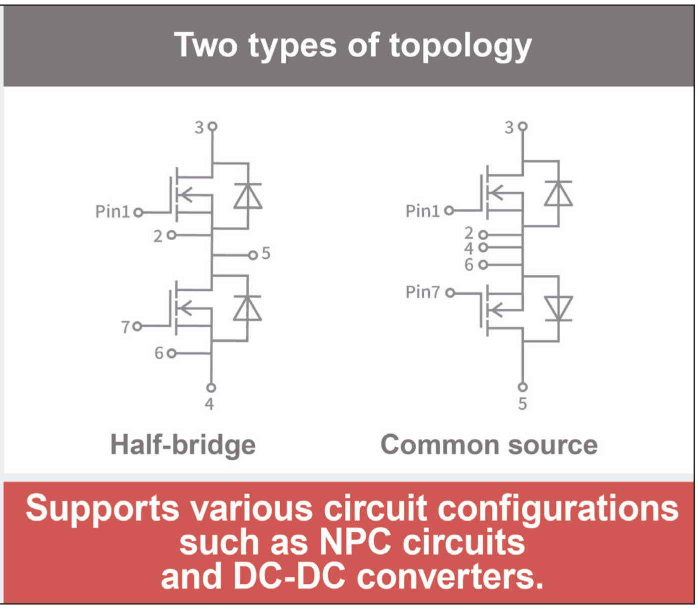
In addition, products compliant with the AEC-Q101 automotive reliability standard are scheduled to begin sample shipments in October.

Application-level support

ROHM says that it is committed to providing application-level support, including the use of in-house motor testing equipment. A variety of supporting materials is also offered, such as simulations and thermal designs that enable quick evaluation and adoption of DOT-247 products. An evaluation kit for double-pulse testing is already available, allowing immediate testing, while an evaluation kit for 3-phase inverters is currently under preparation, with reference designs scheduled to be released from November.

www.rohm.com/products/sic-power-devices/sic-power-module





NREL’s silicon carbide-based ULIS power module claims record efficiency, power density & low-cost manufacturability

Ultra-Low Inductance Smart power module adaptable to gallium nitride and gallium oxide

The US National Renewable Energy Laboratory (NREL) has created a silicon carbide (SiC)-based power module with what is claimed to be record efficiency, power density, and low-cost manufacturability.

The 1200V, 400A Ultra-Low Inductance Smart (ULIS) power module can achieve five times greater energy density than predecessor designs in a smaller package, making it possible for manufacturers to build and power more efficient, compact and lighter technologies, suitable for use in data centers, power grids, micro-reactors, and even heavy-duty vehicles such as next-generation aircraft and military vehicles.

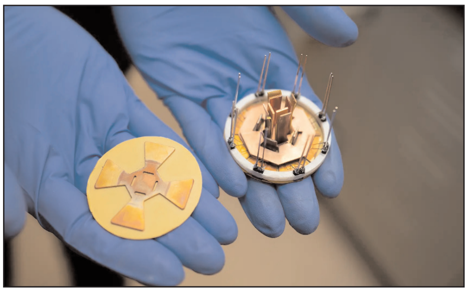
Most importantly, ULIS boasts parasitic inductance 7–9 times lower than any existing state-of-the-art SiC power module, it is reckoned. Its ultrafast, ultra-efficient switching allows it to get more usable power out of the electricity supply.

“It’s a future-proofed, ultra-fast power module that will make the next generation of power converters more affordable, efficient, and compact,” says chief power electronics researcher Faisal Khan, the principal investigator for the project.

Furthermore, ULIS is uniquely suited for high-intensity applications (like aviation and military operations), because the powerful, lightweight module also monitors its own state of health and can predict component failure before it occurs, says Khan. For planes flying 30,000ft above sea level or military vehicles traveling through combat zones, that level of reliability can mean the difference between life and death, it is noted.

Entirely new, low-cost design

Many of ULIS’ features are made possible by its wholly new design. Unlike typical power modules, which assemble semiconductor devices inside a brick-like package, ULIS winds its circuits around a flat, octagonal design. The disk-like shape allows more devices to be housed in a smaller area, making the overall package smaller and lighter. At the same time, novel current routing allows for maximum magnetic flux cancellation, contributing to the power module’s clean, low-loss electrical output, i.e. ultra-high efficiency.



NREL’s ULIS power module. Photo by Brooke Buchan, NREL.

“Our biggest concern was that the device switches off and on very quickly, and we needed a layout that wouldn’t create a chokepoint within the design,” says Shuofeng Zhao, an NREL power electronics researcher who designed ULIS’ flux cancellation architecture.

One of the original layouts looked like a flower with a semiconductor at the tip of each petal, says Zhao. Another idea was to create a hollow cylinder with components wired to the inside. Every idea was either too expensive or too difficult to fabricate — until the team stopped thinking in three dimensions and flattened the design into nearly two dimensions. Sarwar Islam (another NREL power electronics researcher on the ULIS team) came up with the 2D structure, which made it possible to build the module balancing complexity with cost and performance. “Suddenly we had a low-cost, high-performing design that was much easier to fabricate,” says Zhao.

NREL power electronics researcher Joshua Major devised several fabrication innovations to build ULIS’ intricate architecture inexpensively using only NREL tools and labs.

The balance that the team found between the high electrical performance of a 3D design and a flat, fabrication-friendly layout unlocked ULIS’ full potential.

Second, where conventional power modules rely on bulky and inflexible materials, ULIS takes a new approach. Traditional designs call for power modules to conduct electricity and dissipate excess heat by bonding copper sheets directly to a ceramic base — an effective, but rigid, solution. ULIS bonds copper to the flexible polymer Temprion to create a thinner, lighter, more configurable design.

Because the material bonds easily to copper using just pressure and heat, and because its parts can be machined using widely available equipment, ULIS can be fabricated quickly and inexpensively. Manufacturing costs total hundreds, rather than thousands, of dollars.

A third breakthrough allows ULIS to function wirelessly, as an isolated unit that can be controlled and monitored without external cables. That modular nature means that it can slot into machines as different as data-center servers, advanced aircraft, and military vehicles. The patent for this low-latency wireless communication protocol is pending.

Finally, while the silicon carbide powering ULIS represents the existing state of the art, the ULIS team has ‘future proofed’ the design. ULIS can scale to accommodate advances in semiconductor devices using silicon carbide, gallium nitride and even gallium oxide.

In pursuit of steadier, lower-cost electricity, high-performance AI, and advanced vehicle technologies, ULIS is now available to license.

www.nrel.gov

Toshiba and SICC sign MOU on silicon carbide power semiconductor wafer collaboration

SICC to improve wafer quality and reliability for silicon carbide power semiconductor manufacturers

Toshiba Electronic Devices & Storage Corp of Kawasaki, Japan and Chinese silicon carbide (SiC) supplier SICC Co Ltd have signed a memorandum of understanding (MOU) to explore collaboration in improving the characteristics and quality of silicon carbide (SiC) power semiconductor wafers developed and manufactured by SICC, and expanded supply of stable, high-quality wafers from SICC to Toshiba. The two firms will discuss the scope of their joint efforts and mutual support.

Toshiba develops, manufactures and sells SiC power semiconductors for railways, and is currently accelerating the development of SiC devices for applications including server power supplies and the automotive segment. It aims to further reduce power losses in the devices and to improve their reliability and efficiency in future high-efficiency power conversion applications. Collaboration with SICC is expected to drive forward optimal solutions for various applications and accelerate business expansion.

(Left) SICC's chairman Zong Yanmin and (right) Noriyasu Kurihara, director, vice president of Semiconductor Division, at Toshiba Electronic Devices & Storage Corp.

Since its founding in 2010, SICC has focused on the development and production of single-crystal SiC wafers. Following its initial public offering in 2022 (the first in China to focus on SiC), SICC has achieved vertical expansion in global business and market share. In 2024, it introduced the first 12-inch SiC wafer, and in 2025 it announced 12-inch wafers for all products, including n-type, semi-insulating, and p-type.

In the proposed collaboration with Toshiba, SICC aims to link SiC power semiconductor manufacturers' requirements and expectations for SiC wafer technology to improved wafer quality and reliability, and to contribute to the expansion of the SiC power semiconductor market.

www.sicc.cc/en
www.toshiba.semicon-storage.com/ap-en/company/news/news-

Toshiba launches 650V third-generation SiC MOSFETs in TOLL package

New devices boost efficiency & power density for industrial equipment

Toshiba has launched three 650V silicon carbide (SiC) MOSFETs equipped with its latest third-generation SiC MOSFET chips and housed in general-purpose surface-mount TOLL packages.

Shipping in volume now, the new TW027U65C, TW048U65C and TW083U65C devices are suitable for industrial equipment, such as switched-mode power supplies (in servers, data centers, communications equipment etc), uninterruptible power supplies, EV charging stations, and power conditioners for photovoltaic inverters.

The 9.9m x 11.68mm x 2.3mm surface-mount TOLL package reduces device volume by more than 80% compared with through-hole packages such as TO-247 and TO-247-4L(X), and improves equipment power density.

The TOLL package also offers lower parasitic impedance than through-hole packages, which helps to reduce switching losses. As a 4-terminal package, a Kelvin connection can be used as the signal source terminal for the gate drive. This reduces the influence of inductance in the source wire within the package, achieving high-speed switching performance; in the case of TW048U65C, turn-on loss and turn-off loss are about 55% and 25% lower, respectively, than in existing Toshiba products (a 650V third-generation SiC MOSFET with equivalent voltage and on-resistance that uses the TO-247 package without Kelvin connection), which will contribute to lower equipment power loss.

Toshiba's 650V third-generation SiC MOSFETs in a TOLL package.

Toshiba says that in future it will continue to expand its lineup to contribute to improved equipment efficiency and increased power capacity.

www.toshiba.semicon-storage.com/ap-en/semiconductor/product/power-semiconductors.html

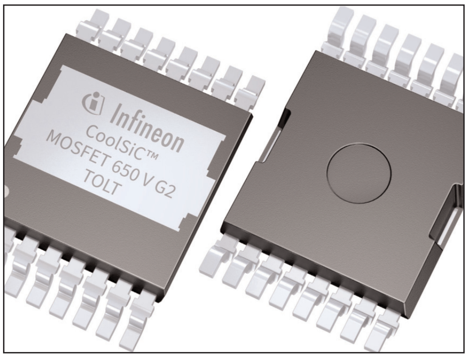
Infineon introduces 75mΩ CoolSiC MOSFETs 650V G2 for medium-power applications with high power density

Packages span TOLL, ThinTOLL 8x8, TOLT, D2PAK, TO247-3, TO247-4

Infineon Technologies AG Munich, Germany is expanding its CoolSiC MOSFETs 650V G2 portfolio with new 75mΩ variants to meet the demand for more compact and powerful systems.

The devices are available now in multiple package options, including TOLL, ThinTOLL 8x8, TOLT, D2PAK, TO247-3 and TO247-4. The family hence supports both top-side cooling (TSC) and bottom-side cooling (BSC) approaches and offers developers a high degree of flexibility.

The devices are suitable for high- and medium-power switching-mode power supplies (SMPS) in different applications, including AI servers, renewable energy, electric vehicle and e-mobility chargers, humanoid robot chargers, televisions, and drives.



The CoolSiC MOSFETs 650V G2 are based on the second-generation (G2) of CoolSiC technology and offer improved figures of merit, higher reliability, and enhanced ease of use compared with the previous generation.

The different packages offer various advantages: TOLL and ThinTOLL 8x8 packages provide high thermal-cycle stability on the PCB and enable compact system designs. When used in SMPS, they reduce the space requirements on the PCB and lower manufacturing costs at the system level. The list of target applications for TOLL and ThinTOLL 8x8 has been expanded, enabling PCB designers to address cost-reduction challenges.

The addition of the TOLT package strengthens Infineon's growing TSC product family, which also includes CoolMOS 8, CoolSiC, CoolGaN and Optimos. The TSC variants allow up to 95% direct heat dissipation and enable designers to use both sides of the PCB, improving space utilization and reducing parasitic effects.

www.infineon.com/coolsic-650v

Infineon releases 12kW high-density PSU reference design for AI data centers and servers

Reference design uses silicon, silicon carbide and gallium nitride

Infineon is introducing a 12kW reference design for high-performance power supply units (PSUs), specifically designed for AI data centers and server applications, and targeted at R&D engineers, hardware designers, and developers of power electronics systems. Leveraging all relevant semiconductor materials silicon (Si), silicon carbide (SiC) and gallium nitride (GaN), the reference design is said to offer high efficiency and high power density.

"In the ongoing quest of the increased energy demand of artificial intelligence, Infineon's contribution is to provide power solutions with the highest conversion efficiency to preserve every single possible Watt," says Richard Kuncic, senior VP & general manager Power Switches at Infineon. "Our new 12kW high-density power supply unit reference design is using advanced power conversion topologies and therefore utilizing CoolMOS, CoolSiC and CoolGaN, which allows the PSU to release the full potential in energy efficiency, reliability and power density."

To achieve high-performance levels, the design leverages advanced power conversion topologies in both the AC/DC and DC/DC power stages. The front-end AC/DC converter features a 3-level flying capacitor interleaved power factor correction (PFC) topology, delivering peak efficiency above 99% while reducing magnetic component volume. This is achieved by using Infineon's CoolSiC technology, which offers high switching performance and excellent thermal properties, it is claimed. The isolated DC/DC converter features a full-bridge LLC resonant converter and offers peak efficiency above 98.5%, enabled by using two planar high-frequency transformer and Infineon's CoolGaN technology. These architectures, combined with Infineon's latest wide-bandgap technologies, achieve a power density of up to 113W/in^3.

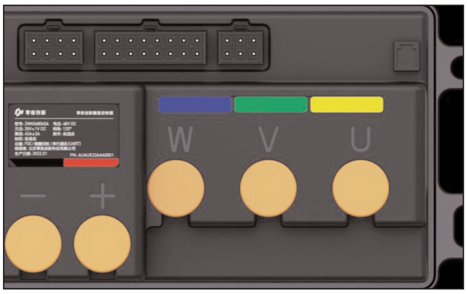
Another key feature of the 12kW PSU reference design is the bidirectional energy buffer, which is integrated into the overall power supply topology. This converter enables compliance with hold-up time requirements while significantly reducing capacitance requirements. Furthermore, the energy buffer provides a grid-shaping function, improving system reliability and limiting both fluctuations and the rate of change of power drawn from the grid during transient events.

www.infineon.com/technology/ai/we-power-ai/psu

Infineon signs MoU with China's Lingji Innovation

Inverters for light EVs to be based on CoolGaN G5 power transistors

Infineon Technologies AG Munich, Germany and electrical component maker Lingji Innovation Technology Co Ltd (a subsidiary of Beijing-based Ninebot Ltd) have signed a memorandum of understanding (MoU) to further drive gallium nitride (GaN) technology in the area of light electric vehicles (LEV). Infineon provides GaN products supporting Lingji to develop high-performance electric two-wheeler inverter systems based on its new-generation CoolGaN G5 power transistors to drive advances in energy efficiency and performance.



Specializing in smart control technologies, Lingji will leverage the high-switching frequency and high-efficiency performance of Infineon's CoolGaN G5 power semiconductors, combined with its self-developed intelligent algorithms, to target improved drivetrain efficiency, breakthrough power density levels, and compliance with official requirements for range and size. Considering China's new standard (that e-Scooter's plastic mass shall not exceed 5.5% of vehicle mass) GaN became a preferred choice as it can reduce the number of passive components for space optimization. The MoU aims to design GaN motor drive technologies to optimize solutions for 48V–72V wide-voltage adaptation and inverter control, providing compact, highly compatible core components for high-end models and shared mobility scenarios.

"With our cutting-edge GaN solutions, we enable customers to achieve more compact designs, reduced system weight, and higher efficiency in LEV inverters," says Peter Schaefer, executive VP & chief sales officer Automotive at Infineon. "In addition, we deliver a comprehensive system solution that helps our customers accelerate time-to-market while minimizing design-in efforts," he adds.

For consumers, LEVs is an affordable and accessible entry point into electric mobility. Unlike cars, LEVs typically do not rely on extensive charging infrastructure, as removable batteries allow users to charge at home using standard electrical sockets. Industry analysts estimate that this market will reach $340bn by 2030.

www.infineon.com/products/power

DB HiTek begins customer enablement for 650V GaN HEMT process

Dedicated GaN MPW program to be offered at end of October

The 8-inch specialty foundry DB HiTek of Seoul, South Korea says it is in the final stages of development of its 650V E-mode gallium nitride (GaN) high-electron-mobility transistor (HEMT) process for power semiconductor applications. Also, at the end of October, the firm is offering a dedicated GaN multi-project wafer (MPW) program.

Compared with traditional silicon-based power devices, GaN-based semiconductors deliver superior performance under high-voltage, high-frequency and high-temperature operating conditions, offering exceptional power efficiency. In particular, 650V E-mode GaN HEMT stands out for its high-speed switching performance and robust operational stability, making it well suited for electric vehicle EV charging infrastructure, power conversion systems in hyperscale data centers, and advanced 5G network equipment.

In 2022, DB HiTek identified GaN and SiC as key growth drivers and has since invested significantly in process development. "DB HiTek is already recognized worldwide for its leadership in silicon-based power semiconductor technologies, including the development of the industry's first 0.18µm BCDMOS process," claims the firm. "By adding GaN process capabilities, we are expecting to enhance the company's competitiveness with a broad technology portfolio."

Following completion of the 650V GaN HEMT process, DB HiTek plans to roll out a 200V GaN process and a 650V GaN process optimized for IC integration by the end of 2026. Looking ahead, it aims to expand its GaN platform across a wider voltage spectrum, aligned with market needs and customer requirements.

To support these initiatives, DB HiTek is expanding the cleanroom facilities of Fab2 in Chungcheong-buk-do to boost capacity by about 35,000 8-inch wafers per month, supporting production of GaN, BCDMOS, and SiC processes. Upon completion, DB HiTek's total monthly wafer capacity will rise by 23%, from 154,000 to 190,000 wafers.

Meanwhile, DB HiTek participated in the 22nd International Conference on Silicon Carbide and Related Materials (ICSCRM 2025) at BEXCO in Busan, South Korea (15–18 September), where it highlighted progress in SiC process development alongside its GaN and BCDMOS technologies.

www.icscrm2025.org
www.dbhitek.com/en

SweGaN, Ericsson, Saab and Chalmers collaborate on 6G GaN power amplifier project

Vinnova-funded GaN6G+ to develop high-efficiency GaN-based power amplifiers for 6G

SweGaN AB of Linköping, Sweden — a manufacturer of custom gallium nitride on silicon carbide (GaN-on-SiC) epitaxial wafers, based on proprietary growth technology — is coordinator of the project 'GaN6G+: Unlocking Performance and Efficiency in Future 6G Power Amplifiers', partnered by communications network provider Ericsson, defense and security company Saab and Chalmers University of Technology in Gothenburg, Sweden. Funded by Swedish innovation agency Vinnova and lasting from September 2025 to August 2027, the project aims to revolutionize GaN-based power amplifier (PA) technology for next-generation 6G networks.

The project targets the 7–15GHz frequency range (X/Ku bands), a critical spectrum for future 6G applications. By leveraging SweGaN's proprietary QuanFINE epitaxial GaN-on-SiC solutions, the collaboration aims to deepen understanding of the material properties and the HEMT device characteristics and to develop high-efficiency PA circuits that support energy-efficient, high-capacity wireless systems.

"We're combining world-class expertise from telecom, defense and academia to unlock the full potential of our QuanFINE materials for 6G," says SweGaN's CEO Jr-Tai Chen. The project ensures vertical integration across materials, device processing and system-level design, and it follows a dual-track approach:

- Academic Track:
focuses on the influence and process variations on HEMT device-level performance by advanced modeling. The goal is to extract empirical models and define design boundaries for optimal PA efficiency.
- Industrial Track:
centers on PA design, fabrication and benchmarking using state-of-the-art foundry processes. Industry partners will supply high-performance devices for modeling and validation, ensuring alignment with real-world system needs.

The collaboration should deliver insights into how epitaxial design, processing, and circuit architecture impact device and system-level performance.

"This collaboration strengthens the bridge between civilian and defense technologies," notes Johan Carlert, Saab's head of Microwave and Antenna Design. "By working closely with leading partners across the value chain, we accelerate the development of RF technologies that will have real-world impact in both defense and civilian domains," he adds.

"We're thrilled to contribute our modeling and device expertise to a project with such high industrial relevance," comments professor Christian Fager of Chalmers University of Technology.

www.swegan.se

Baylin's Advantech receives CDN$665,000 purchase order for 200W S-band GaN SSPAs

US contractor to integrate solid-state power amplifiers into battlefield terminals for Department of Defense

Wireless technology company Baylin Technologies Inc of North York, Ontario, Canada (which provides passive and active RF and satellite communications products and services) says that its subsidiary Advantech Wireless Technologies Inc of Kirkland, Quebec, has received a CDN$665,000 purchase order from a US-based system integrator for its 200W outdoor S-band gallium nitride (GaN) solid-state power amplifiers (SSPA). The amplifiers will be integrated into the US Department of Defense (DOD) battlefield terminals to support US warfighters.

The solid-state amplifiers provide what is claimed to be unparalleled reliability. The CAN-Bus operating platform supports component-level diagnostics along with the ability to modify features and operations parameters remotely.

"Being trusted by defense contractors to support battlefield terminals for the US DOD demonstrates the quality of our technology and its reliability," says Baylin's CEO Leighton Carroll. "Our strategy has been upgrading the legacy Advantech technology, not only to include more features but to also have higher configurability and resiliency," he adds. "By moving to our new modular architecture, we are also simplifying supply chain and production, thereby needing fewer resources to produce what we're great at. Over time this will not only lead to competitive differentiation, but will also drive margin improvement."

www.advantechwireless.com
www.baylintech.com

X-FAB offering GaN-on-Si foundry, via open-access MPW, prototyping and production for XG035 dMode projects

Patterned 8-inch GaN-on-silicon wafers made at X-FAB Dresden

Analog/mixed-signal and specialty foundry X-FAB Silicon Foundries SE of Tessenderlo, Belgium is building on its expertise in gallium nitride (GaN) processing technology for high-power applications by introducing GaN-on-silicon foundry services for dMode devices as part of its XG035 technology platform. The move further leverages X-FAB's capabilities as a pure-play foundry that now offers a set of processing technologies for GaN and other wide-bandgap (WBG) materials — including silicon carbide (SiC) — to help fabless semiconductor companies.

X-FAB provides GaN-on-Si technology from its 8-inch fab in Dresden, one of six production facilities that it operates worldwide. The Dresden fab hosts a wide range of specialized processing equipment, measurement tools and technologies that are optimized for GaN development and production, together with analog CMOS, in an automotive-qualified fab environment. Tools on site have been optimized to handle the thicker GaN-on-Si wafers required by customers in sectors such as automotive, data center, industrial, renewable energy, medical and others.

Due to high-voltage GaN expertise over several years, in-house expertise now extends to GaN-on-Si foundry services for depletion-mode (dMode) devices following the recent release of the firm's XG035 dMode technology as an open foundry platform. The process includes dMode high-electron-mobility transistors (HEMTs, scalable from 100V to 650V), which are often used in power conversion applications. In addition, X-FAB offers customer-specific GaN technologies including dMode, enhancement-mode (eMode) HEMTs as well as Schottky barrier diodes, which are popular for high-frequency rectification, power supply, and solar panel applications, among others.

Global demand is growing for charging applications, electric vehicles, advanced energy management systems and more powerful data centers, notes X-FAB. Regarding the latter, AI training and deployment is driving the need for more computational resources, which translates into higher power demand and more efficient power delivery and conversion.

GaN-on-Si technology achieves high-frequency switching and low R_{DS} (resistance between drain and source terminals) in the 'on' state. With its small footprint and high-voltage capability, GaN-on-Si completes X-FAB's offer for WBG chip processes, enabling customers to design products that improve energy efficiency from the grid down to the car battery or GPU level.

"Thanks to our 30+ years of experience in automotive CMOS technologies — including 350nm CMOS, shared tool-sets, and shared BEOL [back-end-of-line] —our GaN offering comes with built-in quality and a significantly lower barrier to entry," says Michael Woittennek, CEO of X-FAB Dresden. "Having developed customer-specific technologies over many years, we're now opening up our XG035 dMode technology for general prototyping projects at our Dresden fab – in the heart of Silicon Saxony. The flexibility of our 350nm tool-set also enables us to quickly scale to volume production, giving customers a fast and reliable path to market," he adds.

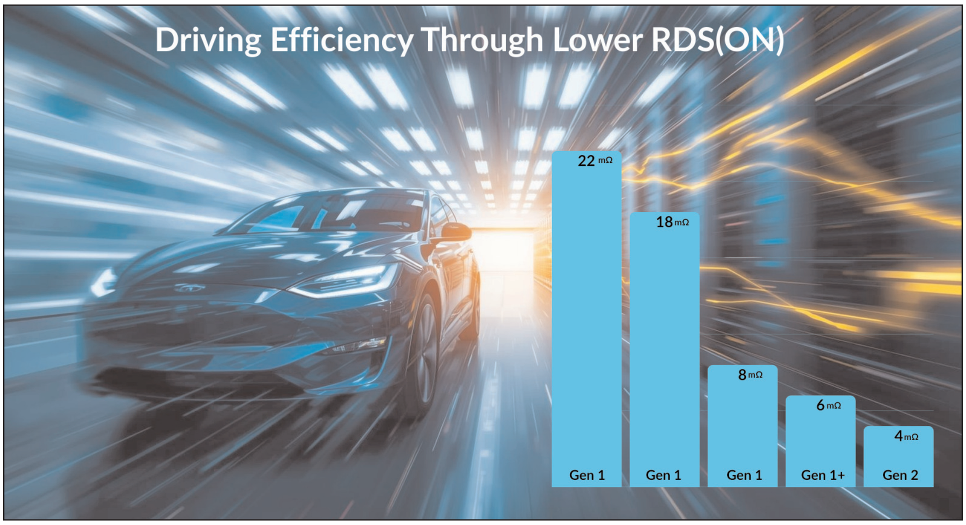
"As the GaN supplier landscape evolves, X-FAB is stepping up as a dedicated GaN foundry partner," says Luigi Di Capua, VP product marketing. "Our 8-inch GaN-on-Si platform helps customers secure their supply chain and scale their designs with confidence."

A process design kit (PDK) that eases the design process for customers and achieves faster on-boarding is available. In addition, a public multi-project wafer (MPW) shuttle service will be available from fourth-quarter 2025, allowing multiple customers to share a single silicon wafer for chip fabrication. These steps further lower the barrier to entry for prototyping and small-volume production.

www.xfab.com/technology/

VisIC unveils Gen 2 D^{3}GaN 650V power devices

Efficiency increased by reducing $R_{DS(ON)}$ from Gen 1's 22–8mΩ through Gen 1+'s 6mΩ to Gen 2's 4mΩ



After the introduction of its first-generation (Gen 1) D^{3}GaN 650V devices, followed by Gen 1+, and now second-generation (Gen 2) products, VisIC Technologies Ltd of Ness Ziona, Israel — a fabless supplier of power conversion devices based on gallium nitride (GaN) transistors — says that it has created a roadmap for achieving maximum energy efficiency through optimized $R_{DS(ON)}$ performance.

Gen 1 – proven efficiency

VisIC says that its Gen 1 devices established the foundation for GaN adoption in automotive and industrial applications. With $R_{DS(ON)}$ values ranging from 22mΩ to 8mΩ, Gen 1 products delivered significant switching speed and efficiency over silicon-based solutions. These devices proved the potential of GaN for compact, high-power systems and were the first step toward mass-market adoption.

Gen 1+ – optimized performance

To meet growing market demands for higher efficiency, VisIC introduced Gen 1+ devices. By reducing $R_{DS(ON)}$ to as little as 6mΩ, the 650V Gen 1+ improved conduction losses without compromising switching energy and enabled more power-dense, reliable designs. This generation bridged the gap between the early adoption of GaN and the high-volume needs of automotive OEMs, offering engineers an enhanced balance of efficiency, scalability and manufacturability. With 98mm.sq., the GaN bare dice V06DI065R1X13 is one of the biggest dies in the industry to deliver at 650V a current of 170A per device and which makes it suitable to be paralleled inside power modules and deliver power from 50kW to 150kW.

Beyond automotive, such performance directly addresses the surging demand for efficient power delivery in AI-driven data centers, where massive computing loads require compact, high-efficiency solutions. As a standalone GaN die, it provides the power density needed to meet the energy thirst of modern, AI-populated data centers while reducing losses and optimizing thermal performance.

By reducing $R_{DS(ON)}$ with each new generation, we help our customers design systems that are not only more efficient but also more compact and cost-effective

Gen 2 – next-level efficiency

VisIC's 650V Gen 2 devices represent a 33% shrink of die size compared with Gen 1+ and 50% compared with Gen 1 and is a major leap forward in performance, the firm notes. With $R_{DS(ON)}$ values as low as 4mΩ, Gen 2 delivers what is claimed to be unprecedented conduction efficiency, minimizing power losses and reducing system thermal stress. These D^{3}GaN devices are engineered for next-generation electric vehicles (EV) inverters, on-board chargers, and high-performance power converters, enabling auto-makers to achieve higher driving ranges, smaller cooling systems, and overall lower system costs.

The new high-power bare dice V04DI065R2X21 650V/4mΩ can be soldered or sintered on AMB/DBC substrates to increase reliability and performance. With a current capability of 230A, the device can be used to increase power density in power modules for EV drive-train inverters.

Efficiency by design

Lower $R_{DS(ON)}$ directly translates to higher system efficiency and reduced energy losses. Across its product roadmap, VisIC says that each generation of D^{3}GaN devices provides measurable benefits in performance, power density and total cost of ownership. Both products are available now as bare dice for customer evaluation.

Single-chip top-side-cooled TC packages will be available before the end of 2025. Also, VisIC is working on a half-bridge power module with parallel dice. which will come soon.

"From our first-generation devices to our latest Gen 2 GaN, VisIC has consistently focused on one clear goal: enabling the most efficient power electronics for electric vehicles and industrial applications," says CEO Tamara Baksht. "By reducing $R_{DS(ON)}$ with each new generation, we help our customers design systems that are not only more efficient but also more compact and cost-effective."

www.visic-tech.com

Enphase Energy opens US pre-orders for its first GaN-based microinverters

IQ9N-3P Commercial Microinverter targets 480V three-phase systems

Enphase Energy Inc of Fremont, CA, USA (which supplies microinverter-based solar and battery systems) has opened US pre-orders for the new IQ9N-3P Commercial Microinverter. This is Enphase's first microinverter powered by gallium nitride (GaN) technology and designed for three-phase 480Y/277V (wye) grid configurations, without using external transformers.

The IQ9N-3P is said to simplify design complexity, lower installation and balance-of-system costs, and improve system efficiency for 480V commercial projects. The GaN technology replaces traditional silicon-based components from previous product generations to enable faster switching, cooler operation, enhanced reliability, and what is claimed to be industry-leading efficiency of 97.5%. Its compact, high-performance design can manage a continuous DC current of 16A and deliver up to 427VA of peak output power, supporting high-power solar panels up to 600W.

The new microinverter meets rigorous grid compliance standards, including UL 1741-SB and IEEE 1547-2018, and features rapid shutdown, phase balancing, voltage/frequency ride-through, and loss-of-phase detection for grid safety and system reliability. Additionally, by converting direct current (DC) to alternating current (AC) at each panel, Enphase microinverter systems avoid the long high-voltage DC runs found in traditional centralized (string) designs, offering a safe, all-AC architecture on the roof.

IQ9N-3P Commercial Microinverters can be deployed on small systems (less than 100kW) or large systems (hundreds of kW) and provide the flexibility to start small and expand the system size over time without any redesign. Enphase microinverter technology also enables increased energy production at the panel level under shading and uneven roof conditions, making the product suitable for commercial rooftops with HVAC obstructions, skylights and multi-tenant layouts. Enphase microinverter systems can reduce long-term operational costs for asset owners by eliminating single points of failure in the installation, providing easy replacement support, and improving fleet visibility with per-panel monitoring via the Enphase App.

"The IQ9N-3P Microinverter opens up the vast 480V commercial market segment with a breakthrough design powered by gallium nitride, a wide-bandgap semiconductor widely used in advanced radar systems and increasingly adopted in medical power and imaging electronics," says Aaron Gordon, senior VP & general manager of the systems business unit at Enphase Energy. "By bringing this innovation to commercial energy management — and manufacturing it in the United States to help projects qualify for key federal requirements and tax credits — we are giving asset owners a solution that offers Enphase's bankability, an industry-leading 25-year warranty, and proven reliability that's already powering nearly five million solar energy systems across the globe."

Enphase showcased both the IQ9N-3P Commercial Microinverter and IQ Gateway Commercial Pro at RE+ 2025 in Las Vegas, Nevada (8–11 September).

www.enphase.com

CGD appoints Robin Lyle as vice president of R&D

Experience of higher-power systems, modules and gate drivers

Fabless firm Cambridge GaN Devices Ltd (CGD) — which was spun out of the University of Cambridge in 2016 to design, develop and commercialize power transistors and ICs that use GaN-on-silicon substrates — has appointed Robin Lyle, a 30-year veteran of the power semiconductor industry, as vice president of R&D.

"In my previous positions I worked on higher-power systems, modules and gate drivers, all of which are beginning to enjoy the size, efficiency and speed benefits that GaN brings," says Lyle. "GaN will enable applications that haven't been possible before, and our ICeGaN ICs – by integrating the driver interface circuitry and protection features on the same GaN chip as the switch – make implementing GaN-based designs very easy."

With a background in analog and power semiconductor technology, most recently at power module company Dynex, Lyle's experience is expected to prove invaluable as CGD develops its product portfolio to address the power-hungry demands of data centers, higher-power industrial power supplies and EV applications such as DC-to-DC converters, on-board chargers and even traction inverters. Lyle is also closely connected with academia, including a formal position at the University of Nottingham where he is part of the industrial advisory board for electronic engineering, helping to shape the syllabus and working with the under-graduates.

"CGD is a company founded on new ideas and innovation and this appointment strengthens our capabilities in high-power systems," says founder & CEO Dr Giorgia Longobardi.

"Our focus is to continue to develop innovative GaN solutions that address the challenges customers face as they move up in power, and to make GaN easy to use," says Lyle.

www.camgandevices.com

Navitas names Chris Allexandre as president & CEO

Gallium nitride (GaN) power IC and silicon carbide (SiC) technology firm Navitas Semiconductor Corp of Torrance, CA, USA has appointed Chris Allexandre as president & CEO. He also joins the board of directors.

Allexandre succeeds Navitas' co-founder Gene Sheridan, who has stepped down as president & CEO and board member.

"Chris is joining Navitas at a pivotal moment in its evolution," notes chairman Richard J. Hendrix. "We believe his track record of driving transformation and delivering sustainable and profitable growth, operational excellence and business leadership in power semiconductor markets makes him the right leader for the next chapter of Navitas," he adds.

"On behalf of the board of directors, I'd like to thank Gene Sheridan for his vision in creating and leading Navitas over the last decade," comments Hendrix. "Gene has established an exceptional company that stands ready to pursue the next phase of electrification in higher-power applications ideally suited for Navitas' portfolio of GaN and SiC solutions. We deeply appreciate Gene's leadership and impact, and his invaluable contributions to the board's succession planning and recruiting efforts, which have brought Navitas to this important transition point," he adds.

"Building the industry's only next-gen, pure-play power semi company has been the privilege of a lifetime," says Sheridan, reflecting on his 11-year tenure at the company.

Allexandre has more than 25 years of experience in the semiconductor industry. Most recently, he served in senior executive roles at Renesas Electronics Corp, including senior VP & general manager of its Power Division from October 2023. Allexandre oversaw Renesas' $2.5bn power management business and led the pivot and execution of its power strategies toward the cloud infrastructure, automotive and industrial markets, including Renesas' acquisition and integration of GaN solutions provider Transphorm Inc in June 2024. He was previously Renesas' chief sales & marketing officer from 2019 to 2023.

"With power demand growing in AI data-center and critically needed energy infrastructure, I see promising opportunities to drive expansion in these important markets," says Allexandre.

Prior to his tenure at Renesas, Allexandre held executive roles at Integrated Device Technology Inc (IDT) (acquired by Renesas in 2019) as senior VP of sales & marketing; at NXP Corp as senior VP, worldwide sales for mass market; and at Fairchild Semiconductor International Inc as senior VP of worldwide sales, marketing and business operations. He began his career at Texas Instruments Inc, beginning in its New College Graduate rotation program and, over 16 years, progressing in leadership through a series of business and sales roles based in Europe and China, becoming TI's VP of sales for EMEA and a member of TI's strategic leadership team in 2012.

Allexandre's management experience spans analog, power, mixed-signal and digital products across cloud, industrial, mobile, consumer, telecom, and automotive markets.

He holds a Master of Science in Electrical Engineering from the Institut Supérieur de l'Électronique et du Numérique (ISEN) in Lille, France.

www.navitassemi.com

Wise Integration appoints former Intel exec as CEO

CEO & co-founder Thierry Bouchet to serve as CTO & general manager

Fabless company Wise-integration of Hyeres, France — which was spun off from CEA-Leti in 2020 and designs and develops digital control for gallium nitride (GaN) and GaN IC-based power supplies — has appointed Ghislain Kaiser as chief executive officer. He succeeds CEO & co-founder Thierry Bouchet, who will continue to serve as chief technology officer & general manager, leading worldwide R&D and driving the technological vision.

With a proven track record in growing and leading global teams in the semiconductor industry, Kaiser has experience in scaling deep-tech ventures. In 2006, he co-founded Docea Power, a French electronic design automation (EDA) startup pioneering full-chip, system-level power and thermal modelling, with the vision of addressing the growing power-consumption and thermal challenges in IC and platform design.

As CEO, he led the firm to its acquisition by Intel in 2015. He then joined Intel, where for the next decade he held senior director roles, most recently overseeing system-simulation engineering and worldwide customer-enablement organization. Those programs tackled the most critical power, thermal and performance challenges in designing consumer, data-center and AI systems.

Wise Integration's new CEO Ghislain Kaiser and its CTO Thierry Bouchet.

Kaiser began his career at STMicroelectronics, where he held technical and leadership positions across test and product engineering, design, and architecture teams.

With Kaiser's appointment, Wise Integration is positioning itself to scale globally and capitalize on booming markets such as data centers powering artificial intelligence (AI), and electric vehicles (EV) — which demand more efficient, compact and digitally controlled power architectures.

"This marks a major milestone for the company as it transitions from a CEA-Leti spinout into a pioneering force in GaN and digital power management innovation with strong growth potential," says board chairman Patrick Boulaud. "Ghislain's background makes him a natural choice as the CEO to guide the company through this next stage of growth," he believes.

"Ghislain's arrival begins a new chapter for Wise Integration," Bouchet says. "With our WiseGan devices and WiseWare digital control, we've built a strong foundation in consumer markets. Now it's time to scale our innovations and tackle the next big challenges — bringing unmatched efficiency and power density to AI servers, data centers and tomorrow's automotive systems."

www.wise-integration.com

Filtronic secures record order from SpaceX

First order for E-band GaN SSPAs

Filtronic plc of Sedgefield and Leeds, UK — which designs and manufactures RF and millimeter-wave (mmWave) transmit & receive components and subsystems — has secured its largest ever contract, valued at £47.3m ($62.5m), with its long-standing customer SpaceX, for the Starlink high-speed internet service.

The contract is the first order for Filtronic's gallium nitride (GaN)-powered solid-state power amplifier (SSPA) in E-band frequency.

The new E-band GaN SSPA solution delivers a significant step up in performance, offering higher output power, improved efficiency, and enhanced thermal management. These advantages are critical to applications in satellite communications and aerospace & defence, where system reliability and performance are paramount, says Filtronic.

The product will play a vital role in supporting the Starlink constellation, underlining the transformative potential of high-frequency SSPA technology in the ground segment of low Earth orbit (LEO) communications.

In developing the technology for high-frequency and high-power mmWave systems, Filtronic's engineering team addressed the complex challenges of advanced packaging, thermal management, and high-frequency integration. Filtronic claims that the SSPA products hence establish a new industry benchmark for size, weight, power and cost (SWaP-C) at mmWave frequencies.

Filtronic says that the contract forms part of a multi-year growth strategy, positioning its GaN SSPA at the core of future developments across satellite communications, aerospace and defence, highlighting its strategic focus on delivering next-generation solutions for the most demanding global communications and connectivity applications.

www.filtronic.com

University of Wisconsin-Madison opens Ultra-Wide Bandgap Semiconductor MOCVD Lab

Lab to be cornerstone UW-Madison's focus on III–nitrides

The University of Wisconsin-Madison's Engineering Centers Building on 5 August hosted the grand opening of the Ultra-Wide Bandgap Semiconductor Metal-Organic Chemical Vapor Deposition (MOCVD) Laboratory, attended by university and national R&D leaders including UW-Madison's vice chancellor for research Dorota Grejner-Brzezinska; College of Engineering Dean Devesh Ranjan; and Vivek Prasad, VP for design engineering ecosystem enablement at NatCast (a nonprofit that operates the National Semiconductor Technology Center). They joined Susan Hagness, chair of the Department of Electrical and Computer Engineering and ECE assistant professor Shubhra Pasayat, who oversees the new facility as the lab's principal investigator.

The facility will serve as the cornerstone of the College of Engineering-led focus at UW-Madison on III–nitride semiconductors. Pasayat cites applications including deep ultraviolet LEDs; high-power radar; high-voltage power electronics, motors, and vehicles; as well as nuclear reactors and applications in other extreme conditions like space."

As they allow for smaller, faster, more efficient electronic devices that can handle much higher energies and frequencies, the electronics industry is already rapidly adopting wide-bandgap semiconductors such as silicon carbide (SiC) and gallium nitride (GaN) for use in fast chargers, radar systems, LED lighting and microchips. As fabrication techniques improve and costs decrease, wide-bandgap semiconductors are expected to become more commonplace.

But researchers are already looking past these wide-bandgap semiconductors to ultrawide-bandgap materials, including the III–nitride semiconductors aluminium gallium nitride and aluminum nitride, which are even more robust, and able to survive conditions ranging from the extreme temperatures found in hypersonic jets to radiation in modular nuclear reactors. They can also handle the wide frequency switching in 6G communications and beyond, among other emerging applications.

At the grand opening of the new lab, Shubhra Pasayat (right) gave tours to faculty and staff including (left to right) UW-Madison vice chancellor for research Dorota Grejner-Brzezinska; College of Engineering Dean Devesh Ranjan; Vivek Prasad, vice president for design engineering ecosystem enablement at NatCast; associate vice chancellor for research Amy Wendt; and ECE chair Susan Hagness. Photos: Todd Brown.

At the moment, fabricating and characterizing these ultrawide-bandgap semiconductors is challenging because they require expensive equipment and deep expertise in MOCVD or other advanced commercialization-friendly deposition techniques.

When she first joined UW-Madison in 2021, Pasayat set up a commercial Aixtron MOCVD reactor, which can grow wide-bandgap materials like gallium nitride and low-aluminium aluminum gallium nitride (AlGaN).

Now, the new facility — which took years of planning and cooperation among UW-Madison, the College of Engineering and the Department of Electrical and Computer Engineering — takes that research to the next level. The newly installed Agnitron Agilis 100 system can handle even higher temperatures and lower pressures, allowing Pasayat and her students to design and precisely synthesize high-quality 2-inch-diameter wafers of high-aluminium-content AlGaN, AlN and other ultra-wide bandgap materials.

Pasayat says this capability is already opening up a huge number of collaborations with researchers across campus and is drawing industry partners to UW-Madison. It is also an opportunity for students who will enter the workforce trained on some of the most advanced fabrication equipment available and with hands-on knowledge of next-generation materials, she adds.

Pasayat's lab is at the center of UW-Madison's III–nitride ecosystem. The onsite faculty's broad expertise in chip design and architecture, materials characterization, fabrication, advanced packaging, and systems integration means that these ultrawide-bandgap semiconductors can go from the drawing board to the motherboard all on one campus — streamlining and improving the research process.

https://engineering.wisc.edu/departments/electrical-computer-engineering/

Nagoya University produces gallium oxide pn diodes with double current-handling capacity

New method uses standard industrial processes to achieve higher voltage, increased stability, and energy efficiency

Gallium oxide (Ga_2O_3) can make electronic devices much more energy efficient than existing silicon-based technology. For electronic diodes, researchers have been able to reliably produce n-type gallium oxide layers but struggled to create stable p-type layers because gallium oxide's crystal structure naturally resists the atoms needed for these layers. This limitation resulted in gallium oxide semiconductors with poor performance and reliability issues.

Now, researchers at Japan's Nagoya University claim to have solved this manufacturing challenge and created the first functional pn diodes using gallium oxide (Shimizu et al, 'p-type layer formation study for Ga_2O_3 by employing Ni ion implantation with two-step oxygen plasma and thermal annealing', Journal of Applied Physics (2025), 138(6). DOI: 10.1063/5.0282789). Their method enables the use of gallium oxide for improved semiconductors and energy-efficient devices. In addition, the new pn diodes can carry twice as much electrical current as previous gallium oxide diodes.

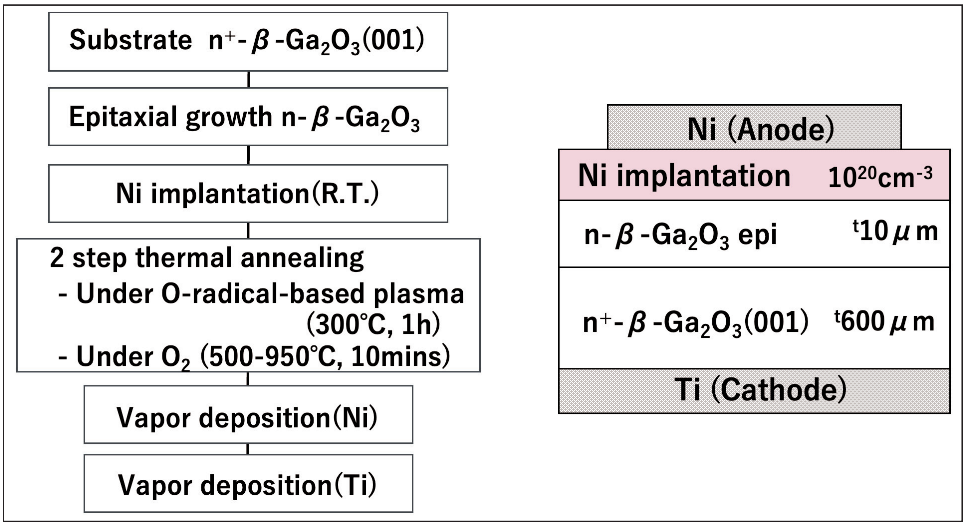


Illustration of the new fabrication process: ion implantation of nickel atoms, followed by low-temperature plasma treatment and high-temperature annealing to create stable p-type layers in gallium oxide. Credit: Center for Low-Temperature Plasma Sciences, Nagoya University.

Quest to produce a stable p-type gallium oxide layer

Existing silicon-based pn diodes can handle high voltages but waste a lot of energy as heat, especially in energy-intensive applications such as electric vehicles and renewable energy power grids.

Gallium oxide pn diodes can handle twice the current capacity of previous gallium oxide devices and waste less energy than silicon-based diodes, notes Nagoya. This makes them suitable for demanding applications and translates to decreased cooling requirements, better energy efficiency in high-power systems, and lower operating costs.

The problem was that gallium oxide's crystal structure easily accepts the atoms needed to create n-type layers but rejects the atoms required for p-type layers. Prior methods to force them in either failed or required temperatures that destroyed the material. Without both types working together, Ga_2O_3 remained limited for practical applications.

Since this method uses standard industrial equipment and processes, it can be scaled up for mass production. Implications for future energy efficiency and costs are substantial, particularly for EV and renewable energy industries

To address this, the researchers implanted nickel atoms into the gallium oxide layer. They then heated the material twice, first at 300°C with activated oxygen radicals (given extra energy using proprietary plasma treatment) and then at 950°C in oxygen gas. This converted the embedded nickel into nickel oxide and properly integrated it with the gallium oxide crystal structure.

Future impact and innovation

"Since this method uses standard industrial equipment and processes, it can be scaled up for mass production," notes professor Masaru Hori at the Center for Low-Temperature Plasma Sciences at Nagoya University. "The implications for future energy efficiency and costs are substantial, particularly for electric vehicle and renewable energy industries."

The gallium oxide semiconductor market is projected to reach ¥14.9bn annually by 2035. This new manufacturing process is reckoned to solve a fundamental problem that previously limited industrial applications. Nagoya University spin-off company NU-Rei is now working to bring these advances to market.

www.plasma.nagoya-u.ac.jp

https://pubs.aip.org/aip/jap/article/138/6/065701/3358329/p-type-layer-formation-study-for-Ga2O3-by

UMass Lowell's Anhar Bhuiyan wins two US NSF grants worth $797,000 for gallium oxide research

$200,000 to research producing thicker films and diodes; $597,000 to test devices under extreme conditions

University of Massachusetts Lowell says that Electrical Engineering assistant professor Anhar Bhuiyan (who joined the faculty in fall 2023) is leading two US National Science Foundation (NSF) grants totaling $797,000 for research into next-generation power components for satellites and spacecraft — as well as for electronics on Earth.

The first grant, for $200,000, supports Bhuiyan's research into methods of producing thicker films of gallium oxide (which can handle much higher voltages than conventional materials such as silicon, silicon carbide and gallium nitride) and developing advanced techniques for making devices from it.

Bhuiyan will also explore new approaches to fabricating gallium oxide (Ga_2O_3) devices such as diodes. Fundamental research into such fabrication is an essential step to enable future manufacturing on a larger scale, he says.

"This is a unique opportunity to develop an emerging semiconductor material and devices that not only meet the needs of high-power systems here on Earth — like electric vehicles and the electrical grid — but also enable robust electronics for space, defense and nuclear applications where conventional devices simply fail," says Bhuiyan.

In addition to its ability to handle high voltages, gallium oxide offers superior stability in extreme environments like space, including the capacity to function reliably under high temperatures and radiation, with electrical properties that can be carefully controlled to suit different applications.

"Satellites or autonomous space vehicles require very high power to operate, so we are trying to fabricate and protect those power modules with our material," says Bhuiyan. "They need to be very small and lightweight; they also need to operate energy efficiently," he says. "Gallium oxide technology can provide all these advantages – high energy, high power – and devices based on this are very lightweight and small."

UMass Lowell's Electrical Engineering assistant professor Anhar Bhuiyan.

However, the material is not good at dissipating the heat that builds up in high-power components, damaging the device, reducing its efficiency and limiting its ability to operate in harsh environments. Bhuiyan is trying to solve that problem by adding a layer of diamond to high-voltage diodes made from gallium oxide.

"We proposed making multi-kilovolt diodes that will have enhanced thermal management by integrating diamond," Bhuiyan says. "Diamond also could make them more radiation-tolerant."

Bhuiyan and professor Uttam Singisetti of the State University of New York at Buffalo are both principal investigators on that research under a pair of three-year NSF grants totalling $597,000, with UMass Lowell serving as the lead institution. They will use UMass Lowell's radiation laboratory, among other resources, to test gallium oxide under extreme conditions. They also plan to demonstrate devices that can operate reliably and efficiently in the harsh environment of space without the need for bulky external shielding.

"To support future missions in space or high-radiation environments on Earth, we need electronics that survive and keep performing at high levels," Bhuiyan says. "That means rethinking how we build and cool these devices from the ground up."

Both NSF-funded projects emphasize hands-on research opportunities for undergraduate and graduate students at UMass Lowell. Through partnerships with local high schools, community colleges and industry, Bhuiyan and his team also plan to introduce K-12 students and members of industry to cutting-edge topics in microelectronics.

"Our research is as much about workforce development as it is about scientific discovery," Bhuiyan says. "These technologies are at the heart of how we generate, distribute and use energy in the 21st century."

In June, Bhuiyan won a Ralph E. Powe Junior Faculty Enhancement Award from Oak Ridge Associated Universities, which provides seed funding for early-career faculty to pursue innovative research.

He also receives research support from Draper Laboratory, which recently selected a doctoral student in his lab, Ahmed Ibreljic, as a Draper Scholar. Ibreljic will receive full funding for his doctoral studies from Draper Laboratory, which is an anchor partner in the Lowell Innovation Network Corridor (LINC), a public–private–academic initiative on East Campus.

www.uml.edu/engineering/electrical-computer/faculty/bhuiyan-a-f-m-anhar-uddin.aspx
www.nsf.gov/awardsearch/showAward?AWD_ID=2501623

CSA Catapult appoints Caroline O’Brien as CEO

Kubos’ CEO joins, as interim CEO Raj Gawera reverts to non-executive director

Compound Semiconductor Applications (CSA) Catapult has appointed Caroline O’Brien as its new chief executive officer, joining in late September.

Established in 2018 by government agency Innovate UK, CSA Catapult is a not-for-profit center of excellence with labs and offices across the UK that specializes in the measurement, characterization, integration and validation of compound semiconductor technology spanning power electronics, advanced packaging, radio frequency and microwave, and photonics applications.

Semiconductor industry specialist O’Brien is currently CEO of micro-LED material technology company Kubos Semiconductors Ltd (which was spun out of the UK’s University of Cambridge in 2017) and has over 30 years of experience in the technology sector, where she has developed a broad knowledge of working with venture capital-backed businesses and blue-chip multi-nationals. She has held senior commercial and executive positions in several companies, focusing on developing and commercializing new technologies and products. O’Brien holds a B.Eng in Electronics and Electrical Engineering and an MBA from the University of Bath.

CSA Catapult’s new CEO Caroline O’Brien.

Martin McHugh stepped down as CEO of CSA Catapult in March and Raj Gawera, who joined the board in 2021, was appointed CEO on an interim basis from 1 April and will return to his previous role as non-executive director.. “I return to the board with much better insight into how to steer the Catapult to growth and greater success,” he says.

“I would like to thank Raj Gawera for leading the Catapult at such an important time and guiding the organization to meet the challenges of commercialization and the mobilization of the UK Semiconductor Centre,” says Jonathan Flint, chair of CSA Catapult’s board of directors. “He has brought fresh perspectives, drawing on his extensive industrial experience and made a significant contribution to the future potential of the Catapult. This will help to deliver a smooth transition as Caroline takes on the leadership of the Catapult.

“Caroline brings extensive industry experience, deep technical expertise, and valuable perspectives of leading and growing a semiconductor company,” comments Flint. “Caroline’s experience in commercialization and scaling a business will be crucial as the Catapult supports the UK’s Industrial Strategy and the new UK Semiconductor Centre. Her background will help the Catapult become more commercial, enhance support for SMEs, and deliver technical excellence to new partners. This is an important time for the semiconductor sector globally, and there are significant opportunities and partnerships for the Catapult to capitalize on and help grow the UK economy,” he adds.

“I look forward to working with the highly qualified and talented team, in order to navigate the business through the next phase of commercialization and beyond,” says O’Brien. “Together, we can embrace the opportunities for growth, across a number of semiconductor markets, and thus increase revenue, help deliver the UK industrial strategy and develop economic prosperity,” she adds.

“Caroline joins at a pivotal time, as the UK accelerates its position as a global lead in commercializing compound semiconductor technologies as part of our industrial strategy,” notes Gary Cutts, Innovate UK’s executive director for Digital and Technologies.

www.csa.catapult.org.uk

Metallium awarded first SBIR contract from US DoD

Flash Joule Heating to recover gallium from LED scrap and other gallium-rich waste streams

Metallium Ltd of Subiaco, Western Australia says that its US subsidiary Flash Metals USA Inc off Houston, TX, USA has been awarded a Phase I Small Business Innovation Research (SBIR) contract by the US Department of Defense (DoD) through the Defense Logistics Agency. Valued at AUS$100,000, the award will apply Metallium's proprietary Flash Joule Heating (FJH) process to recover gallium from waste streams, including LED scrap and gallium-rich waste streams. These feedstocks also contain germanium and other valuable metals, broadening the project's strategic impact. The work is expected to be completed within six months.

Metallium is pioneering a low-carbon, high-efficiency approach to recovering critical and precious metals from mineral concentrates and high-grade waste streams. Developed at Rice University, patented Flash Joule Heating (FJH) technology enables extraction of high-value materials (including gallium, germanium, antimony, rare-earth elements, and gold) from feedstocks such as refinery scrap, e-waste and monazite. Metallium recently secured its first commercial site in Texas via Flash Metals USA, with two additional sites optioned in Massachusetts and Virginia.

"This award, although small in terms of dollar value, is significant as it represents our first funding from the US Department of Defense," says Metallium's managing director & CEO Michael Walshe. "By demonstrating our technology for gallium recovery, we continue to build US-based solutions that can reduce reliance on foreign supply chains and directly support national security priorities."

The program will be executed by Flash Metals Texas as prime contractor, with Rice University's Tour Group engaged under a resource and cost-sharing arrangement. Upon completion of this Phase I effort, Metallium and Flash Metals plan to apply immediately for Phase II funding of up to US$1m to advance pilot-scale deployment at Metallium's existing Chambers County site in Texas, with a goal of commencing a Phase III commercial implementation to reinforce US supply chain resilience for gallium and other critical metals.

Gallium is a US-designated critical material essential for defense, semiconductors and communications. "Current supply is dominated by non-allied nations, creating national security risks," nots Walshe. "Our project provides a domestic pathway for gallium recovery while also building infrastructure to recover additional high-value metals such as germanium."

www.metalliuminc.com

Western Australia's Nimy appoints Tony Tang as technical advisor on extractive metallurgy

Mining exploration company Nimy Resources Ltd of Perth, Western Australia has appointed Tony Tang as technical advisor – Extractive Metallurgy. He will lead the metallurgical test work and flow sheet development for the economic extraction of gallium from the Block 3 gallium resource at the Mons Project in Western Australia, including the development of an intermediate gallium product to support strategic objectives in critical minerals.

Tang has over 30 years of experience in the resources sector, including more than 25 years of professional expertise in the full life-cycle of mineral processing, extraction, refining, and complex chemical projects. His capabilities span concept development, test work, engineering design, construction, commissioning, ramp-up, and steady-state production operations.

Tang is currently chair of the Australasian Institute of Mining and Metallurgy (AusIMM) Perth Branch, where he advocates for professional development and recognition within Western Australia's minerals sector.

Tang is focused on developing innovative and sustainable solutions for critical minerals and energy challenges, actively collaborating with academic and research institutions as a Professor of Practice and Technical Research Leader.

He recently led the AUS$15m Stage 2 program for the Future Battery Industries Cooperative Research Centre (FBICRC) at Curtin University, where he and his team developed and optimized precursor cathode active material (pCAM) production for various NCM co-precipitation chemistries used in lithium batteries.

"His extensive expertise in metallurgical processes and proven track record in delivering innovative solutions for critical minerals will be invaluable as we advance our gallium resource extraction program," believes managing director Luke Hampson. "Tony's leadership and collaborative approach will strengthen our technical capabilities and support our commitment to sustainable resource development, including the collaboration with Curtin University, CSIRO and external consulting groups in Australia and US."

www.nimy.com.au

IQE expanding strategic review to potential sale of firm

Full-year 2025 revenue of £90–100m to be down almost 20% on 2024

In a trading update for full-year 2025, epiwafer and substrate maker IQE plc of Cardiff, Wales, UK says that, as previously noted, trading in first-half 2025 was impacted by macroeconomic uncertainty and, as a result, some end-customer demand was fulfilled with existing inventory. The firm has continued to experience weakness in wireless markets, due mainly to softness in mobile handset sales, and this is expected to persist through 2025. In addition, delays to federal funding cycles in US military and defence sectors are resulting in the deferral of orders into 2026.

Accordingly, revenue for 2025 is expected to be £90–100m (down 19.5% on 2024's £118m). Adjusted EBITDA should be between –£5m to £2m (down from 2024's £8m). First-half 2025 revenue is expected to be at least £44m (down by a third on first-half 2024's £66m), with –£0.4m adjusted EBITDA (compared with +£6.6m in first-half 2024). IQE will report its interim first-half 2025 results on 23 September.

Strategic review

IQE continues to believe that there is significant market opportunity because of its leading position in providing advanced compound semiconductors across several market verticals and to a base of global marque customers. The board is now expanding the scope of the previously announced strategic review to also incorporate the potential sale of the company and is seeking buyers. IQE says that it is in receipt of an approach from a potential offeror.

While the strategic review process remains ongoing, IQE is progressing negotiations with multiple parties for the sale of Taiwan operations. Should this sale be concluded, it is expected that the proceeds will be used to fully repay the revolving credit facility with HSBC Bank and convertible loan notes issued in March, as well as providing IQE with cash to invest in its core operations.

"We have updated our expectations for the full year to adjust for the deferral of certain contracts in our Wireless and Photonics segments," says CEO Jutta Meier. "This is a result of continued global and macro uncertainty which has impacted the unwinding of customer inventory levels pre-built in 2023 and 2024, the sale of new mobile handsets and the release of budgetary spending across the US military and defence sector," she adds. "Looking ahead, while the strategic review remains ongoing, I am encouraged by the progress we are making and remain confident in our ability to unlock value for all of our stakeholders."

www.iqep.com

AXT's Tongmei receives China export permits to resume shipping InP substrates to certain customers

Several million dollars of revenue to be added to Q3/2025 forecast

AXT Inc of Fremont, CA, USA — which makes gallium arsenide (GaAs), indium phosphide (InP) and germanium (Ge) substrates and raw materials — says that its China-based manufacturing subsidiary Beijing Tongmei Xtal Technology Co Ltd has been informed that it has satisfied the applicable requirements for a permit to export indium phosphide and has received export permits from the Ministry of Commerce of the People's Republic of China to resume shipping indium phosphide substrates to certain additional customers.

AXT believes this will result in several million dollars in revenue that was not included in its third-quarter 2025 forecast, provided on 31 July.

The export control restrictions follow the 4 February announcement by the Ministry of Commerce and the General Administration of Customs of the People's Republic of China to impose export controls on items related to tungsten, tellurium, bismuth, molybdenum, and indium.

www.axt.com

Axcelis launches Purion Power Series+ ion implant platform for SiC power devices

H200+, M+ and XE+ and EXE+ variants target high-energy high-current, medium-energy, and medium-current applications

Ion implantation system maker Axcelis Technologies Inc of Beverly, MA, USA has launched the Purion Power Series+ ion implant product platform, designed specifically to enable improved device performance and increase productivity for next generation power devices, including emerging superjunction architectures.

The new Purion Power Series+ spans the full ion implant market space with new product line extensions and upgrades that include the Purion H200+ SiC for high-current medium-energy applications, Purion M+ SiC for medium-current applications and the Purion XE+ SiC and Purion EXE+ SiC for high-energy applications.

“Axcelis has a long history of collaborating closely with our customers to develop innovative solutions for their high-value challenges,” says executive VP Dr Greg Redinbo. “The Purion Power Series+ family is uniquely suited to address these challenges due to its innovative platform that offers the flexibility to handle multiple wafer sizes (150mm and 200mm), substrate types (including SiC, Si, GaN, and GaAs wafers) and implant temperatures (room temperature, warm and hot). This is accomplished while also delivering the industry’s highest throughput and capital efficiency,” he claims.

Axcelis' new Purion Power Series+ ion implant product platform.

“Axcelis was first to market with a full portfolio of implanters with innovative capabilities specifically to address high-volume manufacturing needs for the power device industry,” says president & CEO Dr Russell Low. “Evolving power device roadmaps are now driving the rapid transition to new technical and production requirements. Axcelis’ Purion Power Series+ platform is the next generation of ion implant solutions designed specifically to meet these challenges across the full spectrum of existing and emerging applications.”

Axcelis at ICSCRM 2025

At the International Conference on Silicon Carbide and Related Materials (ICSCRM 2025) at the Bexco Convention Center in Busan, South Korea (14–19 September), Axcelis promoted the launch of the Purion Power Series+ and GSD Ovation ES platforms, designed specifically to enable improved device capability and productivity for next-generation power devices for all single-wafer and batch applications.

Also, Axcelis technologists and collaborators presented the following topics during the ICSCRM technical forum:

- ‘Path for Superjunction Industrialization by Single Step High Energy Channeling Implant’, presented by Dr Fulvio Mazzamuto of Axcelis;
- ‘Development of High Energy Channeling Implantation Process for SiC Superjunction Devices’, presented by Dr Reza Ghandi of GE Global Research;
- ‘Effect of Silicon and Oxygen Pre-Implantation on Thermal Oxidation of 4H-SiC’, presented by Dr Enrico Sangregorio of CNR IMM.

www.icscrm2025.org
www.axcelis.com

POEM Technology Center inaugurated at University of Copenhagen's Niels Bohr Building

Denmark gains its first 300mm-wafer chip production facility

POEM Technology Center's official launch. From the left: NQCP's CEO Peter Krogstrup, Riber's CEO Annie Geoffroy, and Joachim Mathiesen, head of the Niels Bohr Institute.

With the inauguration of the POEM Technology Center in the new Niels Bohr Building at the University of Copenhagen, Denmark now has its first facility capable of producing chips on 300mm wafers.

As a partnership between the Novo Nordisk Foundation Quantum Computing Programme (NQCP), the Niels Bohr Institute, and Riber S.A. of Bezons, France, the new center provides researchers and engineers with equipment to accelerate progress in semiconductors and quantum technologies.

"The new partnership can accelerate the development of tomorrow's microchips in Denmark and Europe and thereby help address the geopolitical and technological challenges that define the global chip industry," said NQCP's CEO Peter Krogstrup, a professor at the Niels Bohr Institute.

At the heart of the new cleanroom is Riber's molecular beam epitaxy (MBE) technology for developing advanced quantum and photonic chips that are key to future innovations in high-speed communications, optical data processing, and quantum circuits. By integrating wafer production on-site, researchers no longer have to rely on external suppliers, speeding up the transition from experiment to prototype.

The POEM facility is expected to be fully operational within a year. In addition to serving quantum research, it will also be open to industrial partners developing prototype chips for research and innovation purposes.

www.riber.com

Riber receives Taiwanese order for Compact 21 DZ research MBE system

Research Center for Critical Issues to grow III–V-based structures for quantum photonics

Riber has received an order from Academia Sinica, Research Center for Critical Issues (based in Taiwan) for a Compact 21 DZ research MBE system, for delivery in 2026. The research center plans to deploy the new equipment in several research projects focusing on III–V-based structures for quantum photonic applications.

Riber claims that the Compact 21 research system range is the most versatile and comprehensive on the market, enabling the growth of III–V, II–VI, nitride and oxide materials. Compact and flexible, the platform is said to meet the needs of users aiming to enhance their development capabilities in the design of new semiconductor devices for the microelectronics and optoelectronics industries, while optimizing structural load management.

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scia Cluster 200 system launched for ion beam- and plasma-based coating, etching and cleaning

Modular platform provides flexible and scalable thin-film processing for R&D and production of semiconductor and optical device

scia Systems GmbH of Chemnitz, Germany has introduced the all-new scia Cluster 200, a modular platform for coating, etching and cleaning processes based on advanced ion beam and plasma technologies.

Multiple identical process chambers can be combined to increase throughput (by up to 5x) or integrate different process technologies for sequential process steps on a single wafer without a vacuum break.

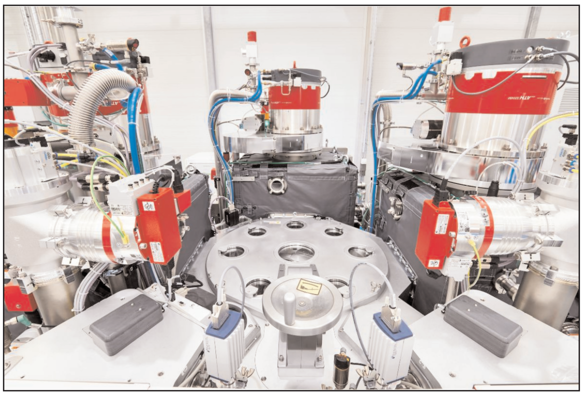
The scia Cluster 200 system can be configured individually according to the customer's application, allowing up to five process chambers and one or more load locks to be installed around the central transfer chamber.

Available processes include:

- ion beam etching (IBE/RIBE/CAIBE);
- ion beam trimming (IBT);
- ion beam deposition (DIBS);
- magnetron sputtering;
- e-beam evaporation;
- atomic layer deposition (ALD);
- plasma-enhanced chemical vapor deposition (PECVD);
- reactive ion etching (RIE).

With this cluster configuration, the scia Cluster 200 also provides reduced total cost of ownership (TCO) compared with an equivalent number of single-chamber process systems due to its smaller footprint, utility consumption, and logistics.

scia Systems' proven control software, used on all tools and 24/7 installations, provides uniform recipe management across all process modules and integrated measurement tools for best usability. By combining high throughput, precision and process flexibility in a single platform, the system is suitable for both R&D and mass-production applications.



The scia Cluster 200 system, configured with multiple process chambers for ion beam etching to increase throughput.

Single-process clusters to increase throughput

scia Systems offers cluster solutions for single-process systems, which are designed for high-volume, high-reliability production environments with critical uptime and throughput requirements. In this configuration, the substrates are processed in identical process chambers simultaneously, which guarantees a consistent quality and uniform process results.

Due to the new system's modularity, the firm says it is easy to add additional chambers (up to five chambers in maximum configuration) with minimal effort to enable higher throughput. This ensures a future-proof production solution for manufacturers that fits into an intelligent and scalable production line and meets the growing demand for flexibility and scalability.

Furthermore, the cluster configuration enables continuous process improvement (CPI) by testing new process recipes in one chamber while maintaining continuous production in another.

Multi-process cluster systems for sequential process steps without a vacuum break

The scia Cluster 200 is also available as a multi-process cluster, suitable for multi-step processing required in high-precision manufacturing of next-generation devices. Various coating, etching and cleaning processes can be performed sequentially in the same system with high consistency and increased efficiency. This ensures a faster turnaround time because there is no need for inter-system transfers, which reduces total process time.

Furthermore, the substrates move between processes without air exposure, preserving surface quality and helping to avoid contamination and oxidation.

Due to the system's modularity, chambers can be changed or upgraded for tailored configurations.

Variety of module combinations for flexibility in application areas

Besides ion beam and plasma processes in MEMS and optical manufacturing, the scia Cluster 200 can be used to produce next-generation devices. Examples include: making Josephson junctions from superconducting materials separated by a thin insulating barrier for quantum devices; fabricating three-dimensional optoelectronic microstructures for photonic integrated circuits PICs such as waveguides and other optical components; and producing photomasks and masters for nanoimprint lithography.

scia Systems at SEMICON West

scia Systems is exhibiting in booth 1261 (Germany Pavillion) on the Lower Level of the Phoenix Convention Center at SEMICON West 2025 in Phoenix, AZ, USA (7–9 October).

www.scia-systems.com/scia-cluster-200

Nagoya spinoff Photo electron Soul's GaN-based e-beam technology targets semiconductor inspection & metrology

Impact on defect detection, yield improvement and root-cause analysis to be evaluated in KIOXIA Iwate's production lines

In late September, Japan-based KIOXIA Iwate Corp will begin evaluating a gallium nitride (GaN)-based electron-beam technology developed through joint research between Nagoya University spinoff Photo electron Soul Inc (PeS) and the Amano–Honda Laboratory at Nagoya University.

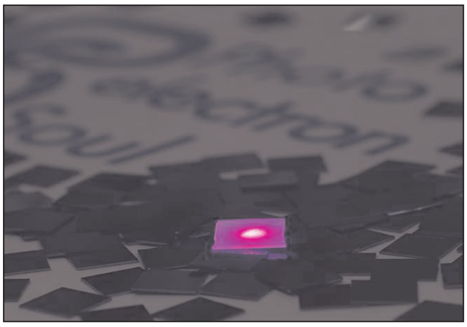
PeS has developed an electron gun specialized for GaN photocathodes and has demonstrated its effectiveness for semiconductor inspection and metrology (I&M), enabling electron microscopy of nanoscale transistors and high-aspect-ratio structures.

The advance is said to open up possibilities for non-contact electrical I&M during the front-end stages of semiconductor manufacturing — previously unattainable with conventional technologies — as well as defect and structural I&M deep inside high-aspect-ratio features, both of which could improve semiconductor manufacturing yield.

KIOXIA Iwate will begin evaluating the technology in its production lines to verify its impact on defect detection, yield improvement, and root-cause analysis.

GaN photocathodes achieve industrial breakthrough

The potential value of photoelectron beam technology from semiconductor photocathodes for semiconductor manufacturing I&M has been recognized for more than a quarter of a century, yet its industrial application has been limited by issues of fragility. To overcome this, Nagoya University has developed GaN photocathodes, achieving more than 20-fold improvement in durability over conventional technologies and realizing a breakthrough toward electron-beam innovation that had been sought for nearly five decades.



Further advances were achieved by PeS, which developed a type of electron gun specialized for GaN photocathodes. This demonstrated the lifetimes and uptime stability necessary for the semiconductor manufacturing environment, reinforcing the industrial viability of GaN photocathodes. Moreover, PeS has focused on pulsed e-beams and invented Digital Selective e-Beaming (DSeB), a technique that synchronizes e-beam scanning in scanning electron microscopy (SEM) with the laser irradiating the photocathode. This enables the delivery of e-beams with controlled intensity to arbitrary pixel-level locations within SEM images, opening up new possibilities for selective e-beam irradiation in semiconductor I&M.

Innovative approach to semiconductor inspection and metrology

While process technologies for device miniaturization and 3D integration are well established, I&M technologies began to reach critical limitations without any solutions in sight for solving yield issues, says KIOXIA Iwate. However, PeS has demonstrated the effectiveness of a new I&M approach that addresses the following two challenges in semiconductor manufacturing:

- **Electrical I&M of nanoscale transistors**

In chips consisting of densely integrated nanoscale transistors, it is extremely difficult to perform electrical testing of individual transistors by conventional contact probing. Using DSeB, specific regions of nanoscale transistors within memory devices were selectively irradiated with the e-beam. By exploiting electron-beam-induced charging to generate gate bias (non-contact switching), PeS observed this electrical behavior in SEM images.

- **I&M of 3D semiconductor devices with high aspect ratios:**

In advanced devices such as 2.5D and 3D chiplets, high-aspect-ratio trench structures with submicron openings are introduced. This makes it challenging to inspect and measure sidewalls, bottom structures, and defects. For deep observation of high-aspect-ratio silicon trenches, DSeB was used to selectively target the trench bottoms, enabling the detection of residues and visualization of bottom structures.

These achievements open up new possibilities not only for non-contact electrical I&M during the front-end stages of semiconductor manufacturing — previously unattainable with conventional technologies — but also for defect and structural I&M in deep high-aspect-ratio regions. Accordingly, this project is expected to provide a novel solution to persistent yield challenges in semiconductor device fabrication.

Significance and outlook

Based on these demonstrations, KIOXIA Iwate will begin evaluating the technology in its production lines with the goal of making it a core technology for future semiconductor manufacturing. The firm will conduct detailed evaluations in actual production processes to determine its impact on yield improvement through enhanced defect detection and root-cause analysis.

www.semicond.nuee.nagoya-u.ac.jp/english

Eulitha ships 6-inch-wafer DUV litho systems to several Asian VCSEL foundries

Demand growing rapidly for applications spanning LiDAR, 3D sensing, data centers and next-gen optical communications

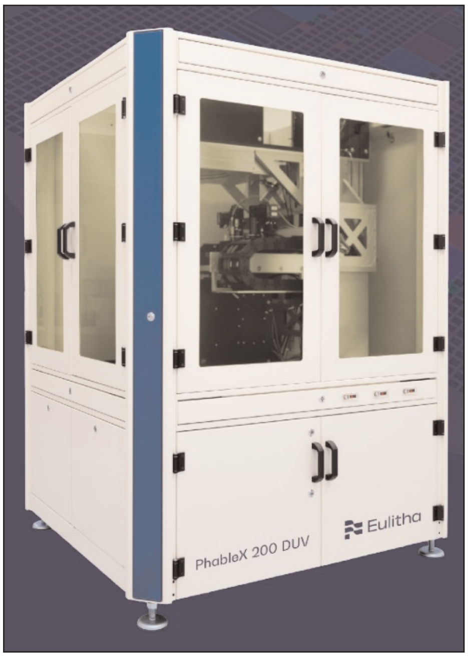
Eulitha AG of Kirchdorf, Switzerland (which provides lithography equipment and services for the nanotechnology, photonics and optoelectronic markets) says that several Asian vertical-cavity surface-emitting laser (VCSEL) foundries have adopted its deep ultraviolet (DUV) patterning platform for 6-inch wafer production. Eulitha recently shipped multiple systems to support the rapidly growing demand for VCSELs used in applications ranging from LiDAR, 3D sensing, data centers, and next-generation optical communications.

Eulitha reckons that the adoption of its technology marks a strategic shift among manufacturers seeking to meet the increasing need for high-resolution patterning that is cost-competitive, particularly as VCSEL designs become more complex.

Growing VCSEL demand drives need for scalable lithography

Additionally, polarized sensing — an emerging capability made possible with specially structured VCSELs — offers improved accuracy and contrast in biometric and industrial sensing, fueling further innovation and market expansion.

This wave of innovation requires patterning techniques that can deliver extremely high resolution, repeatability and throughput, cost effectively on 6-inch wafer formats. Eulitha claims that its technology is uniquely positioned to meet these demands.



Eulitha's PhableX lithography system.

Eulitha's lithography

Eulitha's tool platforms use proprietary non-contact optical lithography technology, known as displacement Talbot lithography (DTL), to deliver a range of advantages. High-resolution, precision patterning is ideal for advanced VCSEL arrays, while its large exposure field covers an entire 6-inch wafer in a single shot, reducing stitching errors and enhancing uniformity. The system supports high-throughput production with consistent results across wafers and production batches.

A key feature of DTL is the large depth of focus (DOF), which allows for patterning on non-flat wafers. Together, these capabilities lead to higher device performance, tighter process control, and reduced cost per die for manufacturers, says Eulitha.

Supporting the future of photonics

After serving the distributed feedback (DFB) laser application market for many years, "VCSEL technology is evolving rapidly, and the market needs lithography tools that can keep up," says CEO Dr Harun Solak. "Our PhableX systems are enabling our customers in Asia to scale up their 6-inch VCSEL production with confidence, delivering the precision and productivity needed to address growing demand in critical sectors like LiDAR and optical interconnects."

With a growing global customer base and a commitment to delivering precision photonics manufacturing, Eulitha reckons that it is poised to play a central role in the future of high-performance optoelectronic devices.

Eulitha exhibited at the China International Optoelectronic Exposition (CIOE 2025) in Shenzhen (10–12 September), and presented on 'Innovative optical lithography for high-resolution patterning in semiconductor laser production'.

www.cioe.cn/en
www.eulitha.com

Photon Design adds application engineers to support growth and expedite new product introductions

Laser and PIC simulation team expanding to serve research using PICWave and HAROLD

Photonic simulation CAD software developer Photon Design Ltd of Oxford, UK is expanding its team to include application engineers, in order to support growth and meet the increasing demand for its photonic simulation products.

“Application engineering is a hybrid role involved in sales, product management, and engineering functions,” notes CEO Dr Dominic Gallagher. “It will facilitate alignment between customer requirements and our software development roadmap,” he adds. “Our application engineers will assist with technical and product support. As experienced software super-users, they have a comprehensive understanding of customer design challenges, offering expert support with simulations. The role will help accelerate the design process, improving performance and boosting productivity for customers. It will also create a structure where feedback is more easily captured to inform Photon Design’s R&D department, to ensure we remain an innovator at the forefront of the worldwide photonic simulation industry.”

Our application engineers will assist with technical and product support

Photon Design will initially apply this approach to their laser simulation products PICWave and HAROLD. By allowing engineers to concentrate on design and product enhancements, new product introductions will be accelerated.
The laser simulation products that have already benefited from this approach include the new quantum dot gain model for entire laser waveguide cross sections; high-power vertical-cavity surface-emitting lasers (VCSELs), for multi-junction devices; and extending quantum dot simulation functionality to include a full 3D time domain.
www.photond.com

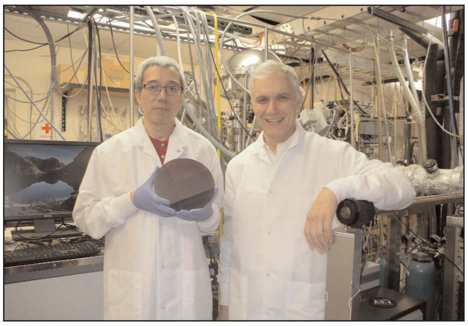
La Luce Cristallina launches 200mm barium titanate

New fab to scale up wafer production to support telecom and data-center demands

La Luce Cristallina Inc of Austin, TX, USA has launched its new 200mm (8-inch) crystal-on-glass barium titanate ($BaTiO_3$) substrate and opened a facility to expand capacity for wafer-scale fabrication, supporting growing demand from data-center, telecoms, sensing, computing and integrated photonics markets. With equipment provided by Finland-based manufacturer DCA Instruments, the fab should enable closer collaboration with partners and customers worldwide through a secure US-based supply chain. La Luce Cristallina is now taking orders for its 200mm wafer, with delivery scheduled for early first-quarter 2026.

With the global optical interconnect market expected to rise at a compound annual growth rate (CAGR) of 14.1% to $34.54bn by 2030, La Luce Cristallina says that its 200mm $BaTiO_3$ platform arrives at a critical inflection point for AI and data-center photonics. The 200mm wafer is said to offer better speed, a smaller size and lower power consumption than silicon photonics modulators while addressing the integration challenges of alternative materials.

La Luce Cristallina's solution delivers a high-performance, foundry-compatible electro-optic platform that supports the capacity demands of AI workloads and high-density optical interconnects. $BaTiO_3$ offers more longevity and multiple generations of device innovation (over 10 years) compared with materials such as lithium niobate, the firm adds, helping customers to prepare for current and future photonics demands while securing quicker and higher returns on their investments. The substrates also support emerging quantum computing, aerospace and defense applications.



Co-founders Agham Posadas (CTO) and Alex Demkov (CEO) with a 200mm $BaTiO_3$ wafer.

La Luce Cristallina leverages RF sputtering to achieve scalable manufacturing, enabling it to produce multiple 200mm wafers per day, far outpacing the manufacturing volume of other methods of producing $BaTiO_3$ on silicon. The firm maintains a secure supply chain, utilizing US-sourced silicon and qualified international partners for silicon-on-insulator (SOI) wafers, ensuring reliable sourcing and mitigating the risks associated with overseas manufacturers. La Luce Cristallina says that its solution integrates cleanly with silicon manufacturing processes and avoids the chemical contamination issues associated with lithium niobate and similar materials. The 200mm wafer is also said to offer better reliability than electro-optic polymers, maintaining optimal performance even under high temperatures, high-frequency operation, radiation and other adverse conditions.

"This new facility represents continued progress in our mission to build a secure US-based supply chain for $BaTiO_3$, helping us serve current and emerging markets across the telecommunications, data-center and defense sectors," says CEO & co-founder Alex Demkov. "Our new 200mm wafer helps our customers unlock innovation by solving the speed, size and production limitations of competing materials, signifying the transformation of decades of academic research into a scalable, practical solution."

La Luce Cristallina notes that its BaTiO_ substrates are backed by university researchers, with scientists at UT Austin reporting the lowest propagation loss in a monolithic $BaTiO_3$ waveguide utilizing the firm's photonic materials. Researchers from the University of Illinois recently achieved an intrinsic quality factor of over 1 million with La Luce Cristallina's low-loss $BaTiO_3$-on-insulator integrated photonics. The firm currently supports customers in integrated photonics, quantum computing and other industries.

"La Luce Cristallina's solutions signify continued technological evolution to support data-center interconnection, AI workloads and other high-capacity use cases," says recent La Luce Cristallina customer Ron Kelly, CEO of Ambature Inc. "The company's recent capability in manufacturing high-quality 200mm silicon wafers will enable Ambature to produce its quantum-based SQUID sensors and HPC processors at scale for data centers and AI in the growing military and commercial markets."

www.dca.fi
www.lalucecristallina.com

Mojo Vision raises $75m in Series B Prime funding round

Firm to expand AI applications of high-performance micro-LED platform

To support commercialization of its micro-LED platform, Mojo Vision Inc of Saratoga, CA, USA has closed its $75m Series B Prime funding round, which was led by Vanedge Capital, joined by existing shareholders including Edge Venture Capital, New Enterprise Associates (NEA), Fusion Fund, Knollwood Capital, Dolby Family Ventures, and Khosla Ventures, plus new shareholders imec.xpand, Keymaker, Ohio Innovation Fund, and Hyperlink Ventures.

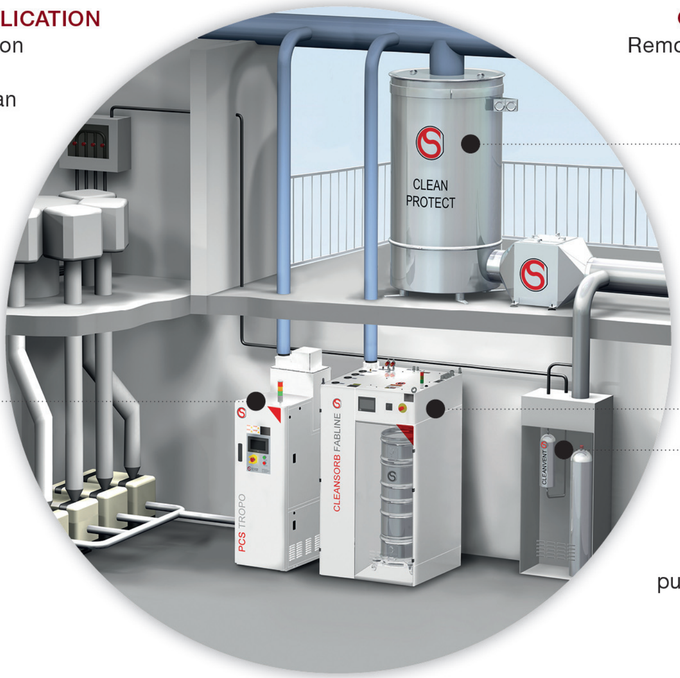
"Mojo has made significant advancements in establishing breakthrough performance standards while laying the foundation for micro-LEDs as a platform for AI innovation in large market segments," says CEO Nikhil Balram. "This oversubscribed funding round and strong industry support mark a new phase in the design and production of our next-generation micro-LED platform. The company is on an accelerated path to commercialize micro-LED applications that can power AI," he adds.

"Mojo Vision has consistently shown over time how it can push the boundaries of what is possible in the development of micro-LEDs," says board member & Vanedge Capital managing partner Moe Kermani. "Mojo's micro-LED platform has the power to transform the performance of AI infrastructure and reach of AI applications," he adds.

Over the last nine years, Mojo Vision has developed a highly flexible wafers-in, wafers-out micro-LED platform that integrates 300mm silicon architecture, GaN-on-silicon emitters, high-performance quantum dots, and micro-lens arrays. This is said to resolve conventional trade-offs between size, brightness, bandwidth density, and power.

"The future of micro-LEDs is reaching an inflection point, where applications are approaching commercial viability thanks to Mojo's technological advances," says board member Dr Achin Bhowmik, currently chief technology officer & executive VP of engineering at Starkey, and former VP & general manager of perceptual computing at Intel. "Nikhil and his team have proven that they can take on big technology challenges with semiconductor solutions that will move the industry forward," he comments. "Micro-LEDs are a once-in-a-generation disruptive semiconductor technology, and its expanded development into new, large markets will widen the scope of possibility for this revolutionary technology, including enabling next-generation AI applications."

www.mojo.vision



Lumileds' LUXEON HL1Z Color Line simplifies multi-color LED application development with chip-scale packaging and uniform focal length

High-power and small LEDs improve color mixing quality, consistency and simplify engineering for spot and directional applications

Lumileds of Amsterdam, The Netherlands says that its new LUXEON HL1Z Color Line is a high-power, chip-scale package (CSP) portfolio of 10 direct and phosphor-converted colors that share a common focal length and footprint. Offered in small color bins and with narrow forward-voltage bins, the LEDs are said to deliver better color uniformity, better efficacy and thermal management and more consistent behavior at operating conditions.

Superior color mixing

The undomed 1.4mm x 1.4mm emitters feature top emission of the light. With or without optics, the top emission prevents cross fading or interference between different colors and therefore better control of the resulting light and color. Their very small size, high-current capability, and 85ºC binning allow for higher-density arrays in a smaller space positioned under single or multiple optics.

Colors, CCT tuning, or color tunable

With direct colors, phosphor-converted colors, unique, non-saturated Fusion colors, and the LUXEON HL1Z white portfolio, it is now easier to create single solutions that deliver color, high-quality white light with a color rendering index (CRI) well above 90, and dynamic lighting that can be purpose-tuned for an interior design or even human-centric lighting. Lumileds engineers have developed implementation tables to make it simple to design the desired illumination.

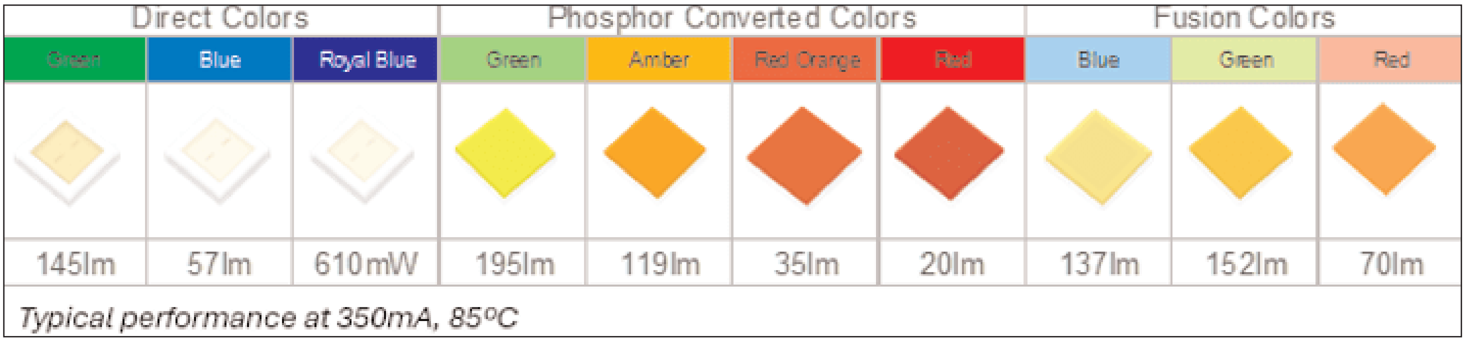
Driven by application requirements

Lumileds notes that every LUXEON Color portfolio serves different application objectives. For example, the new LUXEON HL1Z color emitters are one-sixth the size of a LUXEON 2835 color emitter and deliver three times the power. For entertainment, spot and many other intense color-dependent applications, LUXEON HL1Z will prove to be the only cost- and performance-appropriate solution, Lumileds reckons, although for many strip and linear applications LUXEON 2835 will continue to deliver the best cost/performance option in the market, it adds.

Lumileds CSP innovation

Lumileds notes that its engineers pioneered CSP technology in 2013 with its LUXEON Flip Chip and has continued development over the last 12 years. The firm's CSP LEDs do not require an additional sub-mount or substrate, are smaller than comparable LEDs with the same size chip, and can be directly attached to level 2 boards. Particularly useful in directional applications, LUXEON CSP LEDs offer better thermal contact, higher current densities, very high reliability, superior long-term color stability, and easy surface-mount assembly with standard equipment, the firm adds.

www.lumileds.com/products/color-leds/luxeon-hl1z-color-line-fusion



Direct Colors			Phosphor Converted Colors				Fusion Colors		
Green	Blue	Royal Blue	Green	Amber	Red Orange	Red	Blue	Green	Red
145lm	57lm	610mW	195lm	119lm	35lm	20lm	137lm	152lm	70lm

Typical performance at 350mA, 85ºC

Korea's Supreme Court upholds ruling on Everlight stealing Seoul Semi's LED technology

Lower court convicted Everlight of bribing former Seoul Semi staff

South Korean LED maker Seoul Semiconductor Co Ltd says that the Supreme Court of Korea has recently upheld a lower court ruling convicting Taiwan-based LED maker Everlight Electronics Co Ltd of violating the Act on Prevention and Protection of Industrial Technology for misappropriating Seoul Semiconductor's patented LED technology.

Seoul Semiconductor says that Everlight was indicted for bribing three former employees to misappropriate core technologies developed over decades of R&D, including the world's first No-wire second-generation LED technology and advanced UV LED technologies. The former Seoul Semiconductor employees were also sentenced to prison terms.

Although Everlight initially appealed its first-trial conviction for trade secret infringement, the appellate court determined that Seoul Semiconductor's technologies went beyond ordinary trade secrets and qualified as advanced national industrial technologies under Korea's Industrial Technology Protection Act, adding further charges. Last week the Supreme Court upheld the lower court's ruling, making the conviction final.

Seoul Semiconductor says the decision confirms that Korea's criminal jurisdiction can be effectively applied to foreign companies and that, under the principle of dual liability, both individuals and corporations can be held accountable. The ruling serves as a warning to both domestic and overseas companies attempting to steal technology, either directly or indirectly, the firm adds. At the same time, it is expected to encourage fair competition and creative innovation.

In addition to the technology theft litigation, Seoul Semiconductor has also pursued what it has alleged are patent infringements by Everlight. Over the past seven years, it has won all 16 patent lawsuits across five countries, securing court orders prohibiting sales and mandating the recall of infringing products. Seoul Semiconductor says it is closely tracking the enforcement of the rulings and making sure that companies are not disregarding them to save costs.

"We will respond resolutely, even at all costs, against companies that infringe on our patents," says Seoul Semiconductor's founder Lee Chung-hoon.

www.everlight.com
www.SeoulSemicon.com

ams OSRAM's EVIYOS HD25 multi-pixel micro-LED matrix integrated into Marelli module for NIO's ET9 EV

ams OSRAM GmbH of Premstaetten, Austria and Munich, Germany, in cooperation with Marelli, has partnered with the Chinese EV maker NIO to integrate its EVIYOS HD25 intelligent multi-pixel LED solution used in Marelli's h-Digi micro-LED modules into the NIO ET9 executive sedan. The collaboration is said to mark the evolution of automotive lighting to offering OEMs a high-performance platform for intelligent, adaptive and interactive headlamp systems.

At the core of the EVIYOS HD25 is a micro-LED matrix comprising 25,600 individually controllable light-emitting pixels. This architecture enables real-time adaptive beam shaping, allowing precise light distribution that dynamically adjusts to driving conditions. The system also supports road-surface projections, enabling the display of safety symbols and guidance cues directly onto the pavement. These capabilities transform the headlamp from a passive lighting element into an active communication interface between the vehicle, its driver and the surrounding environment.

For automotive OEMs, the EVIYOS HD25 offers strategic advantages that go beyond illumination. It provides a platform for brand differentiation through customizable light signatures and interactive projection features. The system enhances safety by improving visibility and enabling predictive lighting functions that respond to real-time data such as vehicle speed, steering angle, and road conditions. Furthermore, the solution is designed with future readiness in mind, supporting software-defined lighting features that can be updated over-the-air, allowing manufacturers to introduce new functionalities post-sale. Its modular design ensures compatibility with a wide range of vehicle architectures and segment classes, making it versatile for both premium and upper-mid-range models.

Enhanced by EVIYOS's high brightness and wide illumination range, the ET9's headlights extend their maximum projection distance from the conventional 350–400m to 500m, improving safety at high speeds. For mid- to low-speed driving (20–60km/h), where high beams are not an option but enhanced low-beam visibility is essential, the low beam ground brightness is increased by 50%, with the illumination range extending from 50m to 70m. This ensures safer driving in high-traffic urban environments.

On expressways, the ET9's headlights can project a tracking light carpet that predicts the vehicle's trajectory based on speed, steering angle, and road conditions ahead. This real-time projection of the vehicle's path helps the driver to intuitively stay centered in the lane, aids in navigating narrow roads, and enhances lane illumination, improving driving safety.

At the end of 2024 a team of experts led by Dr Norwin von Malm and Stefan Grötsch from ams OSRAM were honored with the German Future Award 2024 for the 'Digital Light' — an LED matrix technology that turns car headlights into projectors. The first LED pixel arrays from ams OSRAM factories are being built into a new light sources for adaptive driving beam (ADB) car headlamps, the EVIYOS system. The LED technology developed by the team opens up new possibilities for innovative designs due to its high-resolution light distribution and its energy efficiency. As part of their Digital Light project, the researchers and their teams have completely rethought intelligent LED technology and established a basic technology that enables numerous new applications.

www.ams-osram.com

Nichia launches µPLS Mini and DominoPLS at ISAL 2025

Pixelated Light Source family now caters for all ADB headlamp classes, from premium to mass market

At the International Symposium on Automotive Lighting (ISAL 2025) in Darmstadt, Germany (22–24 September), Nichia Corp of Tokushima, Japan — the world's largest gallium nitride (GaN)-based light-emitting diode/laser diode (LED/LD) manufacturer and inventor of high-brightness blue and white LEDs — is presenting its portfolio of Pixelated Light Source (PLS) solutions for adaptive driving beam (ADB) headlamps.

The Pixelated Light Source family has grown to include the µPLS alongside two new additions — the µPLS Mini and DominoPLS — enabling car makers and system integrators to scale glare-free headlighting from entry-level ADB applications to high-definition projection.

The PLS lineup spans three tiers, enabling the right balance of performance and cost for every vehicle class. DominoPLS, for example, is a simplified modular platform designed to support popular small cars transitioning from halogen or conventional LED systems. Its plug-in 'Domino' LEDs enables more advanced dynamic beam control and reduced optical stack height, allowing designers to upgrade to ADB without needing to retool entire lamp housings. Indeed, the tile-like structure of DominoPLS emitters supports thin, customizable headlamp designs such as integration directly into bumpers.

The µPLS Mini (MicroPLS Mini) combines a proprietary 3000+ pixel-range micro-LED matrix with Infineon's LITIX driver ASIC, based on the same technology as the first µPLS (MicroPLS). The product enables individually addressable pixel dimming, higher brightness and symbol projection compared with low- and mid-LED-count ADB solutions. Additional electronic interfaces are included for simplification of the integration in existing electronic architectures. Therefore, MicroPLS Mini brings digital ADB capabilities to a broader car market while maintaining a cost-effective bill of materials.

Nichia's compact MicroPLS is already used in vehicles such as the Porsche Cayenne. First introduced in 2023, the high-definition (HD) light engine is suitable for headlamps developed in premium and upper-mid-range vehicles. The device is capable of sophisticated image projection using over 16,000 individually addressable pixels. This level of precision enables the headlamp to create sharp, glare-free cut-outs around oncoming traffic while maintaining full illumination elsewhere on the road, as well as enabling dynamic light projections, including on-road symbols and personalized 'welcome home' lighting scenarios — blending safety and innovation.

"By extending our PLS technology to both lower-end and higher applications, we are empowering every automaker to deliver the safety of glare-free lighting and the communication possibilities of road projection, whether they are building a flagship EV or a cost-sensitive city hatchback," says Yusuke 'Karl' Yamazaki, VP of automotive at Nichia Europe GmbH. "With the introduction of DominoPLS and MicroPLS Mini, we now offer OEMs a road-tested path to fit the appropriate ADB headlamp to match their performance and budget needs, all supported by a proven technology stack."

Headlamp performance is determined by more than pixel count alone, notes Nichia. Factors such as optical efficiency, driver-IC bandwidth, thermal management, and manufacturing yield are vital to achieve glare-free performance at an affordable cost. For example, the DominoPLS family achieves what is claimed to be class-leading efficiency by pairing larger die with on-board phosphor to minimize light losses. The MicroPLS Mini leverages a digital driver to power only the LEDs in use, cutting idle power consumption in half during city driving. This integrated control system allows microsecond-level switching, uniform brightness, and native connectivity to automotive communication protocols such as CAN-FD and SPI.

Nichia's expanded portfolio directly addresses key market trends such as the growing adoption of glare-free lighting. The technology's low profile and energy efficiency also benefit electric and autonomous vehicles by freeing up fascia real-estate for sensors plus saving weight and power to extend driving range and contribute to meeting sustainability goals. Furthermore, it supports the industry's shift toward software-defined lighting, enabling over-the-air updates for new projection functionality, says Nichia.

At ISAL 2025, Nichia is featuring Pixelated Light Sources — including the DominoPLS, µPLS (MicroPLS) and its new mini version, the µPLS Mini (MicroPLS Mini) — in booth 2 in the Darmstadtium Congress Center.

www.lichttechnik.tu-darmstadt.de/fachgebiet_lichttechnik_lt/isal_lt
www.nichia.com

ams OSRAM launches its first high-power multi-die laser package

Vegalas Power PLPM7_455QA produces 42W in short-pulse cycles with 45% wall-plug efficiency

ams OSRAM GmbH of Premstaetten, Austria and Munich, Germany has introduced the first product in its new Vegalas Power series of high-power laser diodes, targeting increasing popular projector applications such as immersive home movie experiences, automotive head-up displays or industrial machine vision. The firm now offers the full range of optoelectronic components required for projection: from light sources in various colors and power classes to sensors. In addition to projection, other application areas also benefit from the new laser diodes, including weed control or stage lighting.

LEDs are frequently used as light sources in diverse projection applications in the consumer, automotive and industrial sectors. Yet, in high-power applications, more than a third of the projectors sold today still rely on conventional lamps, like high-pressure discharge incandescent lamps. Laser light sources outperform these traditional solutions, says ams OSRAM, as they support a more efficient and sustainable use of resources: First, laser-based projectors can achieve up to 50% higher light output than lamp-based models with the same power consumption. Second, they offer a lifespan up to ten times longer, with a minimum of 20,000 hours. This ensures that brightness — and therefore superior image quality — is maintained for a long time, so regular lamp replacements are no longer required. In addition, laser-based projectors are also low noise.


The Vegalas Power PLPM7_455QA laser

ams OSRAM is now introducing its Vegalas Power PLPM7_455QA. With multiple power lasers combined in a single module, this new laser achieves a high optical power output of 42W in short-pulse cycles and about 45% wall-plug efficiency (WPE). Marking the debut of a new series of high-performance laser light sources, this positions the firm as a one-stop-shop provider of emitters and sensors for projection applications, based on three pillars: LEDs, lasers and sensors.

ams OSRAM thus offers LEDs in various colors, available in surface-mount technology (SMT) and metal core board (MCB) packages optimized for efficient heat dissipation. The sensor portfolio ranges from direct time-of-flight (dToF) modules for distance measurement to photodetectors. The firm's new laser segment now leverages high-power gallium nitride (GaN) laser technology in the visible wavelength range. Products are available in both single- and multi-die packages.

ams OSRAM says that, due to its comprehensive portfolio, it provides everything required for the development of next-generation projection applications, including professional and home projectors designed for large-screen viewing. Offering from 65% up to 75% lower cost per projection surface than LCDs or OLEDs, these projectors can replace conventional flat-panel displays. For projection applications in the automotive area, the firm provides specifically certified variants of its LEDs.

The Vegalas Power PLPM7_455QA laser is available now. More products from the series will be presented in the coming months.

www.ams-osram.com/products/lasers/color-lasers-eel/osram-plpm7-455qa-ll

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BluGlass appoints US-based entrepreneur, investor and corporate lawyer Omer Granit to board

Appointment strengthens ability to navigate global capital markets, deepens ties with US defence primes and advances commercial roadmap

BluGlass Ltd of Silverwater, Australia — which develops and manufactures gallium nitride (GaN) visible laser diodes based on its proprietary low-temperature, low-hydrogen remote-plasma chemical vapor deposition (RPCVD) technology — has appointed Omer Granit to its board of directors to accelerate its commercialization roadmap.

US-based Granit is an entrepreneur, investor and lawyer with expertise across capital markets, mergers and acquisitions (M&A), advanced manufacturing, and strategic governance. He has over 20 years of experience in sourcing, executing and managing complex transactions across the USA, Europe, and Israel.

Granit currently serves on the board of Amaero International Ltd, a leader in advanced manufacturing and high-performance materials for the defence, aerospace, nuclear and energy sectors. In this role, he has been instrumental in driving strategic investments and governance initiatives that have materially supported the company's growth ambitions and financial position. Granit is a major investor in Amaero and Beonic, which are both listed on the Australian Stock Exchange (ASX).

Granit is partner at EnPar Capital in New York, where he is investing across both private and public markets. He is an active investor in the re-shoring of supply and production chains, with a focus on driving long-term strategic value. Previously, he was the founder & CEO of high-end co-working company MIXER and the founder & CEO of UK-regulated hedge fund West 4 Capital. He has also served as CEO & head of investments at a London-based family office, managed alternative investments for a major institutional investor, and began his career as an M&A attorney at the New York office of law firm White & Case. Granit has expertise in M&A, capital markets, and governance, with a track record in sourcing and executing complex transactions. He holds an LLM in Corporate Law from NYU, where he was Valedictorian, and dual degrees in Law and Finance from Reichman University. He is admitted to both the New York and Israel Bars.


BluGlass' new board member Omer Granit.

"Having engaged directly with industry leaders, I see a clear and compelling commercial opportunity for BluGlass' GaN laser capability," says Granit. "These lasers are critical to the future of defence, delivering the high power and precision required to enable next-generation quantum sensing for geo-location targeting and safer aerospace navigation, secure communications, underwater LiDAR, as well as next-generation computing," he adds. "BluGlass is one of only a few companies manufacturing GaN lasers globally, and is uniquely positioned as the newest and nimblest player in the field, yet consistently punching above its weight. I'm impressed at the speed BluGlass has built a fantastic reputation within the industry, including securing a coveted spot with the US Department of Defence Microelectronics Commons," Granit continues. "I'm excited to help guide BluGlass' executive team through this next phase as it transitions into a major commercial partner to global tier 1 companies and defence primes."

"Omer in an exceptional addition to our team, bringing a deep understanding of both the US technology and defence landscape and ASX-listed companies navigating cross-border growth," comments BluGlass' chair James Walker. "He is well connected across the North American investment community and with defence contractors. Omer complements existing board skills and the technical expertise of our advisory team, bringing the investment know-how and networks needed to scale. His track record in closing complex deals and guiding negotiations with major defence primes makes him a tremendous asset at this pivotal time for the company. His appointment materially strengthens our commercialization strategy and positioning in the US — our most important market — adding both tactical credibility and opening doors to strategic customers, the global defence industry and capital markets," he adds.

"Omer replaces Vivek Rao, who is stepping down as non-executive director," Walker notes. "On behalf of the board, I thank Vivek for his long-standing, valuable contribution and guidance over the past decade as the company transitioned from its research and development heritage to a global commercialization company."

www.bluglass.com.au

NUBURU completes public offering, raising $12m

New funds to accelerate strategic transformation in defense tech sector

NUBURU Inc of Centennial, CO, USA — which was founded in 2015 and developed and previously manufactured high-power industrial blue lasers — has completed its previously announced $12m public offering.

The public offering involved the issuance and sale of $12m in common stock and pre-funded warrants in lieu of shares (at a subscription price of $0.1428 per share, and $0.1427 per pre-funded warrant), representing 32,373,536 common shares and 51,660,075 pre-funded warrants. Additionally, the firm issued 126,050,417 common warrants to purchase up to 150% of the aggregate number of shares and pre-funded warrants (with an exercise price of $0.1714 per warrant share), which common warrants are immediately exercisable and expire five years from their date of issuance. The pre-funded warrants have an exercise price of $0.0001 per pre-funded warrant share, are immediately exercisable, and expire when exercised in full.

NUBURU received total gross proceeds of $12m, before placement agent fees and other expenses. Net proceeds are expected to fuel the firm's phased acquisition plan and growth initiatives, positioning it to deliver solutions in defense and operational resilience. Key initiatives include:

● Delivery capital support to Tekne, underpinning the phased acquisition: NUBURU has recently secured a first-stage 3% equity interest, with the remaining 67% interest in Tekne anticipated in a second stage by the end of 2025. The capital support provided to Tekne, also by leveraging Supply@ME's Inventory Monetization platform (in which NUBURU holds a strategic investment), is expected to be converted to equity ownership of Tekne, once the investment is approved by the Italian government and NUBURU can then exercise its option right to complete the second stage. Tekne has an existing portfolio valued at about $500m, comprising 152 orders. The target addressable market in the electronic warfare sector alone is projected to reach $19.4bn by 2028, indicating significant growth potential in this space.

● Fund the working & growth capital of Tekne US Joint Venture, unlocking $7.5m of Tekne's existing APAC orders:
The newly formed US-based joint venture (Tekne US JV), owned 80% by Nuburu Defense LLC and 20% by Tekne, is expected to drive innovation and growth in the Americas' defense market. The joint venture will focus on developing advanced defense products tailored for the Americas, manufacturing and selling existing Tekne products in the region, and managing direct sales to non-Italian clients. The capital raised is expected to unlock $7.5m of Tekne's existing orders, potentially generating up to 15% in net profit for the Tekne US JV. Additionally, the funds will support a supply chain financing strategy to strengthen the partnership between Tekne and Flyer Defense, a US company collaborating with Tekne to produce the Flyer 72-Heavy Duty (Flyer 72-HD) vehicle. This collaboration will focus on developing products that enhance mobility and defense capabilities for NATO allies.

● Strengthen defense & security market positioning by incorporating scalable Software as a Service (SaaS) businesses:
In line with the vision to establish a defense & security hub announced on 21 February, NUBURU will pursue a controlling interest in Orbit S.r.l., a SaaS startup that specializes in operational resilience. Orbit already has an existing portfolio made of 18 clients and 2000 daily users. SaaS business models are highly scalable, with an anticipated EBITDA exceeding 40% and a projected target addressable market of $1.1bn in 2033. As NUBURU's executive chairperson holds a controlling interest in Orbit, this transaction has been negotiated and approved by independent board members.

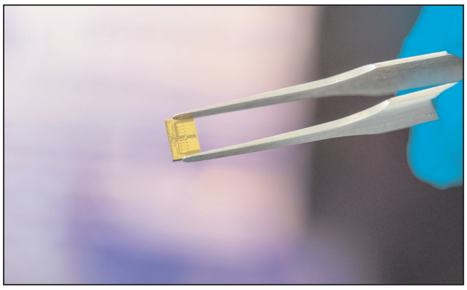
● Explore opportunistic blue laser partnerships: NUBURU's team has been working to target potential M&A transactions in the blue laser sector to enhance synergies and solidify its leadership in defense technology innovation.

www.nuburu.net

Scintil's Series B funding round raises $58m to scale integrated photonics for AI factories

Scintil Photonics of Grenoble, France (a fabless firm developing and commercializing silicon photonic integrated circuits with integrated lasers for AI data centers) has completed a $58m (€50m) Series B funding round led by Yotta Capital Partners and NGP Capital with strategic participation from NVIDIA. The round includes new participation from BNP Paribas Développement, alongside existing investors including Supernova Invest, Bpifrance Digital Venture, Innovacom, Bosch Ventures, and Applied Ventures ITIC Innovation Fund (AVITIC).

The funding enables Scintil to expand its hiring in France and internationally (including the USA), accelerate production, and deepen its international presence as it delivers what it says is the industry's first single-chip dense wavelength division multiplexing (DWDM) light engine, integrating multi-wavelength lasers with silicon photonics, aligned with next-generation co-packaged optics (CPO). Scintil's solutions are purpose-built to meet the high-bandwidth, low-latency and high-density demands for next-generation AI infrastructure, delivering the scale, efficiency and performance required for future, powerful GPU clusters.



Scintil's LEAF Light IC, the first single-chip DWDM-native light engine, delivering high-density, low-power optical connectivity for next-generation AI factories.

"This investment marks a pivotal moment for Scintil as we move to full-scale deployment," says CEO Matt Crowley. "Our SHIP [Scintil Heterogeneous Integrated Photonics] technology enables integrated photonic solutions with the scalability, energy efficiency, and integration density required to power next-generation compute infrastructure. This efficiency not only reduces data-center operating costs but also contributes to lowering the carbon footprint of AI infrastructure. With LEAF Light entering high-volume production, we're expanding from our base in Grenoble into the international markets, including the USA, to support the world's most advanced AI factories," he adds.

"We developed our LEAF Light integrated circuit in close collaboration with our customers," says Scintil's founder & chief technology officer Sylvie Menezo. "Used as an external laser source for CPO (co-packaged optics) transmissions, it is a key component for the next generation of AI data centers. Its uniqueness lies in a single-chip solution that monolithically integrates precisely spaced DFB [distributed feedback] lasers on silicon photonic circuits, produced through a robust commercial supply chain. Our SHIP technology provides a strong and disruptive foundation to expand our portfolio of integrated photonic circuit solutions for the coming decades," she adds.

"Scintil exemplifies the kind of innovation leaders we look for, combining advanced manufacturing, deep-tech leadership, and meaningful impact on the energy demands of AI infrastructure," comments Vincent Deltrieu, managing partner at Yotta Capital Partners. "Scintil's integrated photonics platform is essential to scale the next generation of AI factories. We're excited to support their global growth as they move to high-volume shipments," he adds.

"Integrated photonics is becoming a foundation of all AI infrastructure, and Scintil is turning that future into reality," comments Bo Ilsoe, managing partner at NGP Capital. "Their technology delivers the bandwidth density and energy efficiency AI factories require with global scalability," he adds.

"As the number of XPUs and AI bandwidth grows, scale-up fabrics will need to transition away from copper to optical-based solutions," notes Alan Weckel, co-founder & technology analyst at 650 Group. "AI data centers will move toward co-packaged optics and external DWDM light sources. Scale-up networking is an incremental opportunity for vendors, with the market set to exceed $25bn in 2029. By the end of the decade, the whole AI networking opportunity will approach $100bn per year. Scintil stands out for bringing a manufacturable, foundry-aligned platform into the mix. Reliability and quickly scaling to volume are the only way hyperscalers can scale to the AI demand they plan to deploy this decade," he adds.

"DWDM co-packaged optics is a differentiator that supports connecting thousands of GPUs at the bandwidth density requirements of next-gen AI infrastructure," notes Daryl Inniss, thought lead of Optical Components and Advanced Fiber at industry analyst firm Omdia. "Scintil's single-chip DWDM laser source, based on a heterogeneous integrated photonics process, demonstrates how this can be delivered in a manufacturable and scalable platform. This capability is important as AI factories push toward larger clusters and higher throughput."

Purpose-built for the optical backbone of AI

Scintil's proprietary SHIP (Scintil Heterogeneous Integration Photonics) process technology enables the integration of multiple optical devices, including lasers, photodiodes and modulators, on a single chip. SHIP allows Scintil to replace dozens of traditionally separate parts with a single-chip solution that delivers previously unattainable performance, efficiency and integration density.

Scintil originates from micro/nanotechnology R&D center CEA-Leti, giving Scintil a head start in disruptive heterogeneous integration on silicon. Since its inception, Scintil has developed the SHIP platform on a commercial supplychain with mass-manufacturing capabilities.

The Series B funding supports the commercial ramp of LEAF Light, the industry's first DWDM-native light engine, aligned with next-generation co-packaged optics (CPO). DWDM-native means that this single-chip device can output many precisely spaced and multiplexed wavelengths, dramatically increasing bandwidth and decreasing energy requirements. By lowering power per bit, LEAF Light contributes to reducing the carbon footprint of AI data centers.

Built on Scintil's SHIP platform, LEAF Light enables low-power, high-density optical connectivity, delivering 6.4Tbps/mm edge bandwidth density today, at roughly one-sixth the power consumption of conventional pluggable solutions. It is designed for scale-up GPU clusters and emerging AI systems, with reference packaging and integration support to accelerate deployment.

Global expansion from innovation hub

The funding round enables Scintil to expand hiring in France and internationally (including the USA) from its strategic base in Grenoble, one of the world's foremost hubs for photonics and semiconductor innovation. Located at the heart of Europe's advanced semiconductor ecosystem, Scintil reckons that it benefits from its proximity to institutions such as CEA-Leti and leading global semiconductor companies operating in the area, providing access to a deep talent pool and a collaborative innovation environment.

As part of its growth strategy, Scintil is establishing a US-based presence to serve hyperscale and AI infrastructure partners more directly. The firm is hiring across engineering, operations and customer integration roles to support increasing product demand and enable high-volume delivery.

www.scintil-photonics.com

Ayar Labs and Alchip to scale AI infrastructure with co-packaged optics

Collaboration to equip hyperscalers with scalable, power-efficient optical engines for next-generation AI workloads

Silicon photonics-based chip-to-chip optical connectivity firm Ayar Labs of San Jose, CA, USA — which is pioneering co-packaged optics (CPO) for large-scale AI workloads — and high-performance ASIC design firm Alchip Technologies Ltd of Taipei, Taiwan have announced a strategic partnership to accelerate AI scale-up infrastructure. The collaboration fulfills hyperscaler demands for advanced AI accelerators and platforms that deliver enhanced performance, efficiency and scalability.

This new partnership brings together Ayar Labs' CPO technology, Alchip's advanced packaging expertise, and TSMC's advanced packaging and process technologies to build a robust ecosystem to accelerate the production and adoption of optical engines.

"Ayar Labs' co-packaged optics technology unlocks the next era of AI infrastructure by removing the limitations of copper interconnects," says the firm's CEO & co-founder Mark Wade. "By combining our optical I/O innovation with Alchip's deep expertise in advanced packaging, we're building an ecosystem to accelerate the transition to power-efficient, high-performance AI systems."

Since traditional copper-based interconnects can no longer keep pace with AI workloads, the new partnership helps to overcome legacy performance bottlenecks to enable multi-rack scale-up system architectures by implementing Ayar Labs' optical I/O technology into Alchip's high-performance ASICs. This unlocks high-bandwidth, low-latency connectivity for extended memory and computing resources across larger systems and data centers, improving interactivity while reducing power consumption.

"Current and future AI workloads require innovative and often collaborative advanced packaging design expertise and production-ready solutions. Alchip has proven to the market that it has the entire skill set to serve tier 1 hyperscale customers," says Alchip's chairman & CEO Johnny Shen. "We're working with Ayar Labs to bring leading-edge optical I/O technology to demanding high-performance next-gen designs, helping hyperscalers achieve new levels of data throughput and energy efficiency."

Using TSMC's packaging and silicon technologies, including COUPE, TSMC-SoIC, and advanced process nodes, Ayar Labs and Alchip are addressing critical data movement bottlenecks and enabling new system architectures. The result is a scalable, repeatable path for next-generation AI infrastructure CPO adoption.

www.ayarlabs.com
www.alchip.com/en

OpenLight raises $34m in Series A funding round to scale integrated photonics for AI data centers

Firm to expand PDK library and ramp up standard-based reference PICs at 1.6Tb/s and 3.2Tb/s

Photonic application-specific integrated circuit (PASIC) chip designer and manufacturer OpenLight of Santa Barbara, CA, USA (which launched as an independent company in June 2022, introducing the first open silicon photonics platform with heterogeneously integrated III-V lasers, modulators, amplifiers and detectors) has closed its oversubscribed $34m Series A fundraising round, which was co-led by Xora Innovation and Capricorn Investment Group. Other participants include Mayfield; Juniper Networks (now part of HPE); Lam Capital (the corporate venture arm of Lam Research Corp); New Legacy Ventures; and K2 Access.

This round of financing completes OpenLight's transition from a Synopsys subsidiary to a venture-backed company positioned to address the growing demand for faster and more energy-efficient data movement in AI data-center networks. As the shift from electrical to optical interconnects accelerates to support AI-scale workloads, integrated photonics is emerging as a core enabler of next-generation data-center infrastructure. Additional applications for OpenLight's technology include telecom, automotive and industrial sensing, IoT sensing, healthcare and quantum computing.

OpenLight says that its process design kit (PDK), based on the heterogeneous integration of indium phosphide and silicon photonics, gives customers access to a library of passive and active components spanning integrated lasers, modulators, amplifiers and detectors. The PDK has been validated at leading photonics foundry Tower Semiconductor, ensuring that designs are production-ready from day one. This enables customers to create custom PASICs using proven building blocks, simplifying advanced chip development and accelerating time-to-market. OpenLight currently holds more than 360 patents covering its PDK and the manufacturing of heterogeneously integrated III-V photonics. The OpenLight PDK is already being used by over 20 companies to design and fabricate PASICs across a wide spectrum of applications.

With the new capital injection, OpenLight will expand its PDK library of active and passive photonics components, including its leading-edge 400Gb/s modulator and indium phosphide heterogeneously integrated on-chip laser technology. OpenLight will also ramp up its standard-based reference PICs at 1.6Tb/s and 3.2Tb/s to provide customers with what is claimed to be the most flexible and leading-edge component design library available in the market. In addition, the firm will scale its team to support customers as they transition to volume production over the next 12 months.

"As we enter this next phase of our company's growth, we are excited to be adding such strong investors with deep roots and expertise in the semiconductor and photonics industry," comments chief technology officer Dr Adam Carter. "With this strong syndicate of investors, we can push the boundaries of innovation and deliver transformative solutions to our customers. This funding will allow us to scale our operations, deepen our R&D efforts and bring our groundbreaking products to market faster," he adds.

"The field of photonics is going to see exponential growth in the coming years, and III-V heterogeneous integration is one of the foundational capabilities that will enable this growth," reckons Xora managing partner & chief investment officer Phil Inagaki. "We see OpenLight not only as a technology leader in this field but also as a company positioned to quickly scale manufacturing with foundry partners. One of the critical challenges for the photonics industry in the back half of this decade will be achieving scale, and we see OpenLight's PDK as an important part of the solution," he adds.

"Optical connectivity in data centers has become critical for next-generation scale-up and scale-out AI architectures. OpenLight's heterogeneous integration delivers on all three axes of performance, reliability and cost, which will enable the explosive growth of optical IO," reckons Dipender Saluja, managing partner at Capricorn's Technology Impact Funds.

www.openlightphotonics.com

Xscape and Tower unveil first optically pumped on-chip multi-wavelength laser platform for AI data-center fabrics

Monolithically integrated programmable laser on Tower's PH18 platform enables scalable CWDM/DWDM optical fabrics for disaggregated AI clusters

Specialty analog foundry Tower Semiconductor Ltd of Migdal Haemek, Israel and Xscape Photonics Inc of Fort Lee, NJ and Santa Clara, CA, USA (which is funded by industry leaders such as NVIDIA and Cisco, and develops silicon photonics interconnects for AI data centers) have announced the successful prototyping and validation kit availability of what is claimed to be the industry's first on-chip, optically pumped, multi-wavelength laser source. Built on Tower's mature, high-volume PH18 silicon photonics platform, the solution supports CWDM and DWDM wavelength grids and is tailored for AI data-center fabrics, where bandwidth density, power efficiency and scalability are essential.

The optical interconnect market for AI data centers is expected to grow, driven by the rising demand for high-speed, low-latency connectivity in hyperscale AI deployments. According to market analayst firm LightCounting, sales of optical transceivers and LPO/CPO for AI clusters are expected to double from 2024 to more than $10bn in 2026, then reach $20bn by 2030.

Tower and Xscape says that their latest development enables a path toward high performance, high reliability, lower cost and a simplified supply chain by monolithically embedding programmable multi-color lasers on-chip, pumped optically by a single CW external laser. It also eliminates the need to source multiple externally modulated lasers or require hybrid III-V integration. Xscape's solution simplifies design, reduces latency and component count, and is said to be especially impactful for GPU-to-GPU and GPU-to-HBM optical links in AI clusters. Leveraging Tower's high-volume modular PH18 platform, the solution offers a seamless upgrade path for existing customers, fully compatible with established photonic components such as modulators and detectors.

"Our close collaboration with Tower has allowed us to bring to market a highly differentiated, manufacturable and scalable solution," says Xscape's CEO Vivek Raghunathan. "By building on Tower's proven and qualified high-volume PH18 platform, we've eliminated the need for costly hybrid laser integration and delivered the first monolithically integrated, multi-color laser source directly on-chip. This will transform how AI fabrics are architected going forward," he adds.

Based on its proprietary CombX technology (a programmable laser source device that allows end users — especially those already designing with Tower's PH18 platform — to easily integrate high-performance laser sources, significantly reducing packaging complexity and component count), Xscape is developing the multi-color laser platform ChromX. The laser source is compatible with existing silicon photonic modulators and detectors, opening a seamless path toward fully integrated optical interconnect for AI data-center fabrics.

"Tower's multi-sourced and high-volume silicon photonics platform has once again demonstrated its ability to support advanced custom solutions for AI and data-center customers at scale," says Ed Preisler, VP & general manager of Tower Semiconductor's RF business unit. "This new solution exemplifies how our flexible, modular technology ecosystem enables rapid prototyping and high-volume production adoption for emerging AI and data-driven markets."

www.xscapephotonics.com/technology
www.towersemi.com/technology/rf-and-hpa/silicon-photonics-rf

Mitsubishi Electric selected for JAXA's Space Strategy Fund to develop solar cells for Japanese satellites

Collaboration with PXP to focus on perovskite/CIGS tandem solar cells

Tokyo-based Mitsubishi Electric Corp has been selected as a representative organization for the technology development 'Development of Domestic Solar Cells, Cover Glass, and Solar Arrays' under the 'Development/Verification of Parts/Components for the Establishment of Satellite Supply Chain', which is one of the technology development themes included in the 1st Phase of the Space Strategy Fund operated by the Japan Aerospace Exploration Agency (JAXA). Mitsubishi Electric has signed a contract with JAXA covering this development.

In recent years, with the expansion of the satellite market — including low Earth orbit (LEO) satellite constellations — the demand for solar cells onboard satellites and cover glass to protect solar cells from space radiation has increased, and a global supply shortage has caused high prices and long delivery times.

As part of this project, Mitsubishi Electric will develop low-cost, mass-producible solar cells in collaboration with domestic suppliers who have expertise in solar cells. In addition, the firm will verify the applicability of glass used for ground-based products to the space environment and work toward the mass production of low-cost cover glass. Furthermore, it will develop new solar arrays incorporating the new solar cells and cover glass, aiming to enable their smoothly integrated domestic production. The company aims to help to strengthen the domestic satellite supply chain by reducing the cost of solar arrays and their components and strengthening supply capabilities.

In the development of solar cells, Mitsubishi Electric will collaborate with Japan-based PXP Corp, which possesses cutting-edge solar cell technology and conducts R&D on next-generation photovoltaic conversion elements, including perovskite structures and CIGS (copper indium gallium diselenide). The collaboration will focus on research into the practical application of perovskite/CIGS tandem solar cells in the space environment.

These solar cells have conversion efficiency equivalent to existing conventional mainstream III-V solar cells, and are expected to maintain conversion efficiency while having higher resistance to space radiation than conventional products.

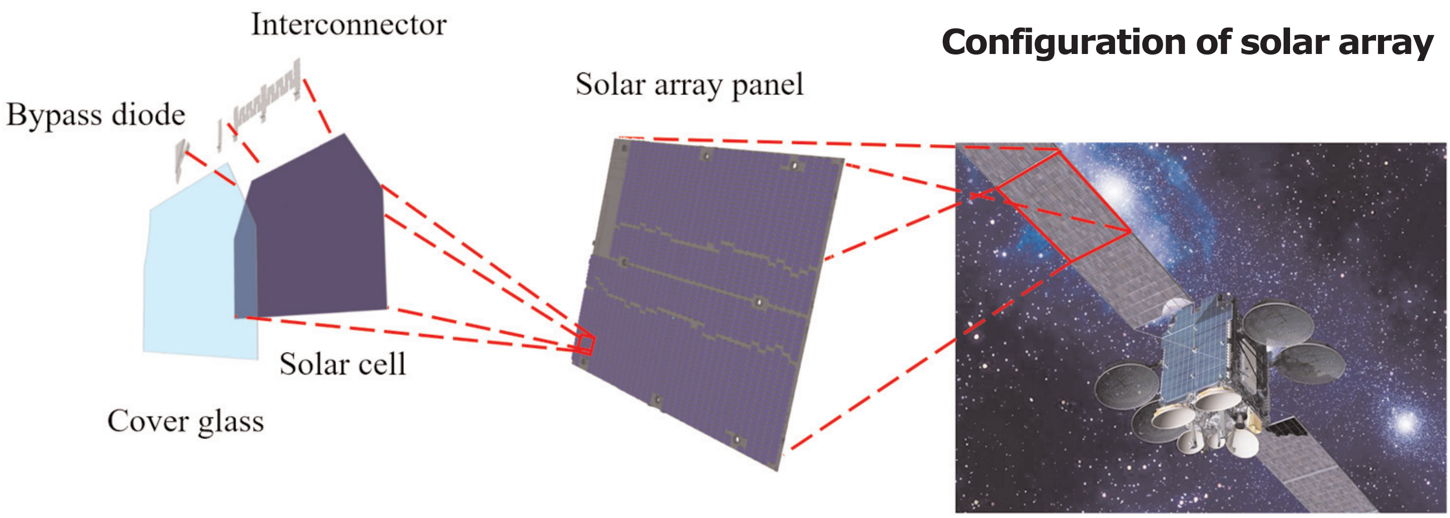
Additionally, both perovskite solar cells and CIGS solar cells can be manufactured more easily, more cheaply and in greater bulk than conventional products.

The combination of PXP's advanced solar cell manufacturing technology and Mitsubishi Electric's extensive satellite system development and manufacturing technology is expected to facilitate the cost-effective mass production of solar cells that maintain high reliability and conversion efficiency, even in space.

"Through the practical implementation of solar arrays equipped with domestically produced solar cells and cover glass that balance low cost and high performance, while ensuring resistance to the space environment and enabling mass production, we will help strengthen Japan's satellite supply chain and enhance the international competitiveness of the country's space industry," says Natsuki Asano, senior manager, Solar Array & Composite Engineering and Project Section, Satellite Mechanical Components Department, at Mitsubishi Electric's Kamakura Works, who will lead the representative organization.

www.mitsubishielectric.com

Configuration of solar array



University of Glasgow reports single-chip laser system with 983Hz linewidth

A topological interface state extended laser with optical injection locking has been integrated on an indium phosphide substrate.

The University of Glasgow has designed and built a narrow-linewidth laser on a single, fully integrated microchip that achieves what is claimed to be record performance in semiconductor lasers of its type (Xiao Sun et al, 'Narrow-linewidth monolithic topological interface state extended laser with optical injection locking', Science Advances, vol.11, issue 37, 10 September 2025). The new laser system could find applications in technologies such as advanced communication systems and unbreakable quantum cryptography.

The 'topological interface state extended laser with optical injection locking' (MOIL-TISE) can produce a linewidth of just 983Hz, which is a significant advance on monolithic distributed feedback (DFB) lasers currently on the market that operate at the MHz range.

Previous high-spectral-purity lasers faced a major challenge: balancing top-level performance with compact design. To achieve efficiency, designers often relied on hybrid integration and bulky external components, which limited their practicality and restricted their potential in on-chip integrated applications.

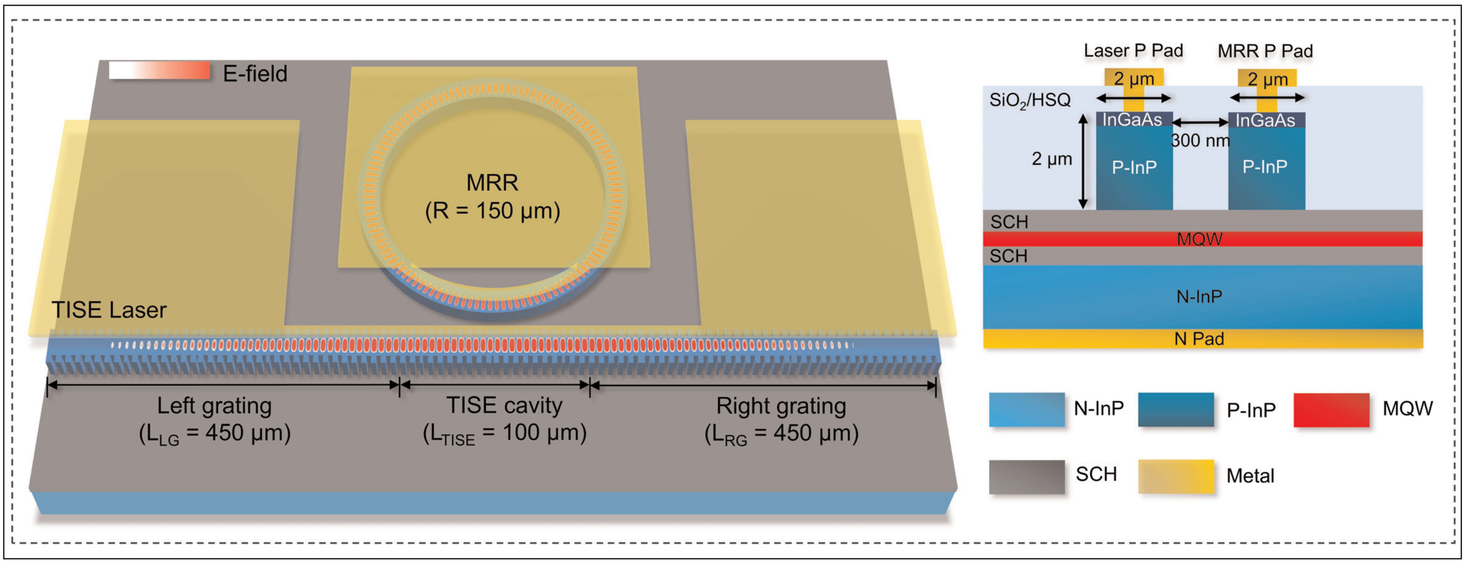
For the development of the MOIL-TISE laser on a single integrated chip, the team used the University of Glasgow's James Watt Nanofabrication Centre to fabricate the device on an indium phosphide substrate.

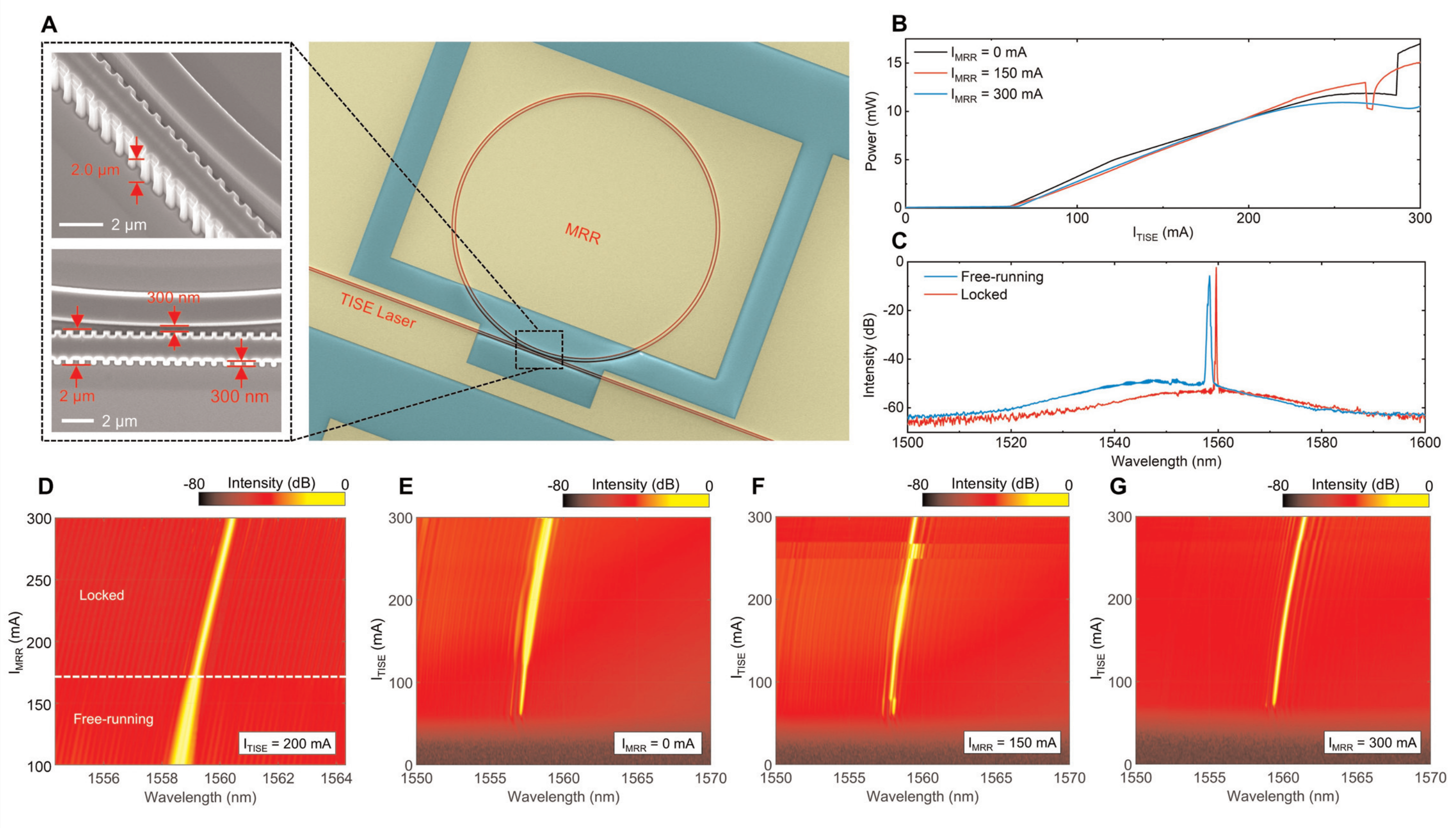
The system's performance is enabled by its uniquely shaped design, which breaks the chip into three regions, each with their own optical phase, specifically tuned to keep the light evenly distributed between them. Combined with a micro-ring resonator integrated into the chip, the system can internally recycle light to stabilize its performance and enable the tightly focused linewidth.

The development of the MOIL-TISE system was supported by the university's Critical Technologies Accelerator (CTA). The CTA is funded through a share of the Glasgow City Region's Innovation Accelerator fund and aims to develop cutting-edge nano-scale technologies for a range of applications.

The CTA's Dr Xiao Sun is the paper's first and corresponding author. "The University of Glasgow is unique in the UK in that it's possible to take a project like this from an initial idea to a fully featured prototype without leaving our campus," notes Sun. "The James Watt Nanofabrication Centre enabled us to design, fabricate and test our MOIL-TISE system, dramatically accelerating the research process," he adds.

"This research represents a great example of the kind of breakthroughs that the Critical Technologies Accelerator is working to make. Being able to fabricate this at the JWNC using technology which is commercially available





shows that industry could easily start to make their own MOIL-TISE-based devices easily affordably in the years to come," Sun states.

"Our MOIL-TISE laser makes three significant breakthroughs and improvements in this field," reckons professor Lianping Hou of the James Watt School of Engineering, who is the paper's co-corresponding author. "It's the first monolithic device of its kind, with every component integrated on a single chip," he adds. "It can create a laser with remarkable frequency purity, the highest ever achieved in a monolithic distributed feedback laser of this kind. It is also capable of easily switching between optical phases, a property required in the quantum key distribution systems which will underpin the unbreakable encryption and communication devices of the future." ■

www.science.org/doi/10.1126/sciadv.ady8963
www.gla.ac.uk

Laser transfer of blue micro-LED arrays

Researchers in Shanghai have used rubber tape as a device carrier before thermo-compression bonding of the flipped chip array to the target substrate.

Shanghai University and Shanghai Key Laboratory of Chips and Systems for Intelligent Connected Vehicle in China have reported on a direct laser transfer process of blue gallium nitride (GaN) micro-LED arrays to a silicon substrate using rubber tape [Zhu Yang et al, Appl. Phys. Lett., v127, p051104 2025].

Micro-LEDs produced in the indium gallium nitride (InGaN) semiconductor family are being widely developed for high-resolution, high-brightness, and high-energy-efficiency application in fields such as augmented reality/virtual reality (AR/VR), wearable devices, and automotive displays.

The researchers comment: "In the micro-LED display manufacturing route, monolithic integration technology is suitable for small-size, high-resolution micro-displays, but there are still problems such as high difficulty in colorization, high cost of CMOS driver, and difficulty in repairing non-bright pixels. However, the mass transfer technology can more conveniently solve the above-mentioned problems and is suitable for the manufacturing of large-sized displays. It has become a technical bottleneck restricting the mass production of micro-LED large-sized display devices."

The material for the micro-LEDs was grown by metal-organic chemical vapor deposition (MOCVD) on 4-inch sapphire (Figure 1). The fabricated LEDs included a magnetron sputtering indium tin oxide (ITO) layer on the p-GaN contact for current spreading. Plasma-enhanced CVD (PECVD) silicon dioxide provided 200nm-thick electrical isolation. The metal electrodes were chromium/platinum/gold. The micro-LEDs measured 15µmx30µm in an array at x, y pitch of 40µm and 120µm, respectively.

The target substrate for the micro-LED array was 4-inch silicon with patterned titanium/nickel/gold, covered by 200nm PECVD silicon dioxide. Indium (In) bumps were deposited as 8µm positive and negative contacts were separated by 20µm. The 30x15 bump array spacing was 84.6µm.

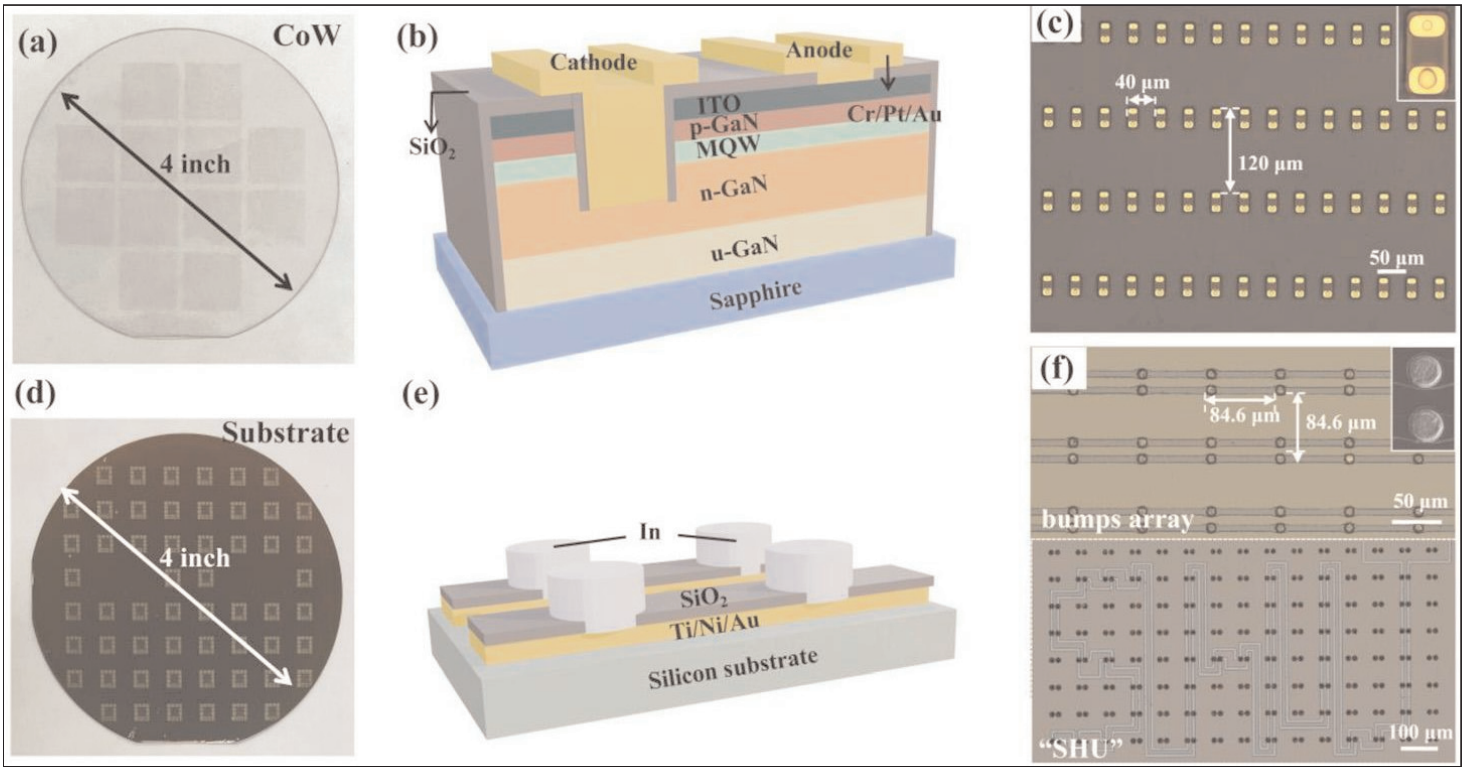


Figure 1. Diagrams of (a) chip-on-wafer (CoW) micro-LED source and (d) target substrate. (b) Micro-LED structure and (e) indium bumps on silicon substrate. Optical images of (c) micro-LED array on sapphire, and (f) indium bump array on silicon, substrates.

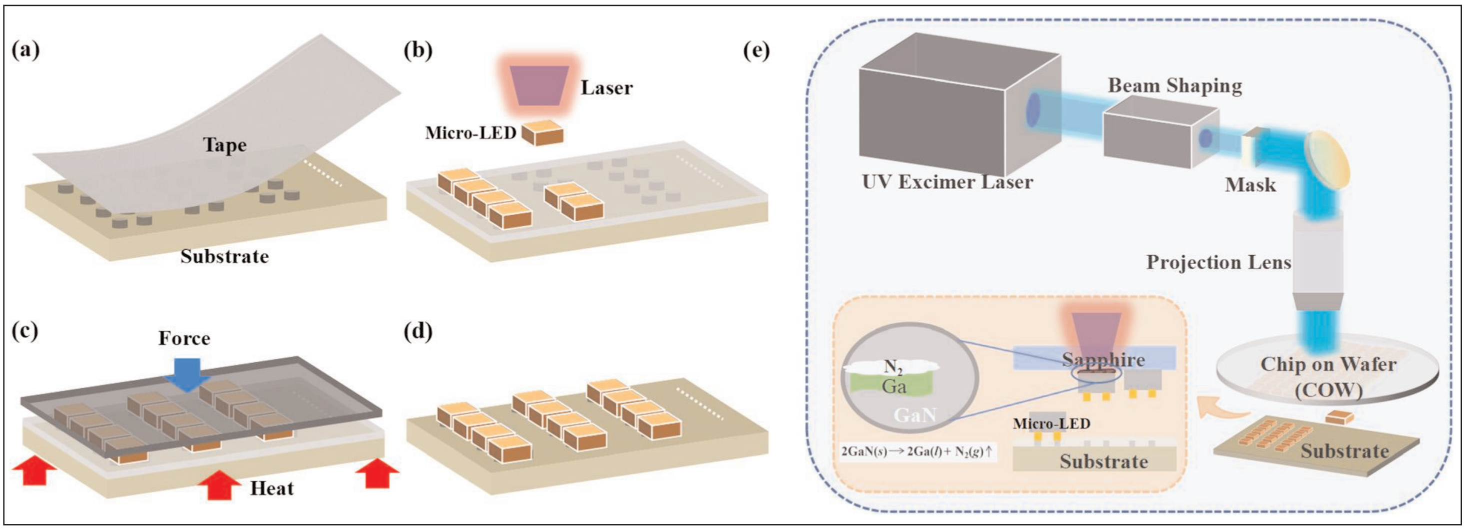


Figure 2. Process scheme: (a) attach rubber tape, (b) laser transfer, (c) thermo-compression bonding, and (d) tape removal. (e) Laser transfer system separating GaN LEDs from sapphire substrate.

The researchers worked with German company TESA to develop the rubber tape used for transferring the micro-LEDs to the target substrate (Figure 2). The desired properties of the tape included ease of die cutting, compatibility with various carrier sizes, superior chip retention, and solvent washability.

The micro-LED dies were separated from the growth substrate by decomposing the interface between the GaN buffer and sapphire substrate by 20ns pulsed 248nm ultraviolet (UV) excimer laser light. The wavelength gave photons with energies above the bandgap of the GaN buffer, but below that of the sapphire substrate. The light was therefore absorbed by the GaN, but not the sapphire.

The researchers explain: "This results in a rapid temperature increase at the GaN–sapphire interface, causing GaN decomposition into liquid gallium (Ga) and nitrogen gas (N_2). Consequently, this decomposition facilitates the detachment of GaN micro-LEDs from the sapphire substrate and their seamless transfer to the target substrate."

The micro-LEDs were transferred on the rubber tape to the target and bonded by a thermo-compressive force of 5kg weight at 160°C for 5 minutes with the tape between the flipped chip array and the target substrate (Figure 3). After attachment, the micro-LEDs were cleaned with ethyl acetate, removing the tape and other residues.

The researchers report: "the micro-LED array exhibits no flipping or off-setting, with electrodes precisely

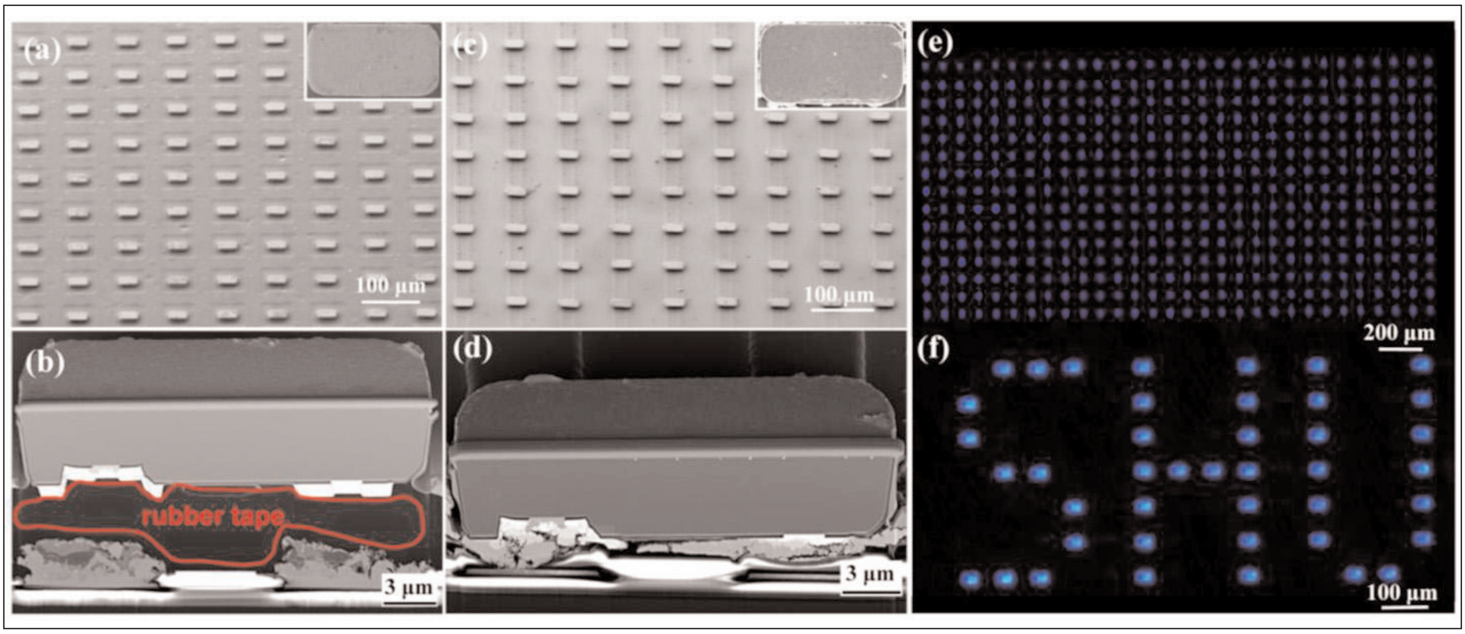


Figure 3. SEM images of micro-LED array after transfer (a), and single micro-LED cross section sliced by focused ion-beam (FIB) (b); images of array and single micro-LED cross section after bonding (c) and removing substrate tape (d); (e) EL images of 30x15 micro-LED display and (f) with "SHU" abbreviation commonly used for Shanghai University.

embedded in the rubber tape and positioned above the bumps."

Scanning electron microscope (SEM) images taken after bonding and removal of the tape showed no chip detachment with the electrodes connected to the indium bumps. "However, minute cracks are visible at the bonding interface," the team adds.

Current–voltage tests of the devices showed "no significant difference between before and after transfer". The team comments that a slight operating voltage increase "may be due to the stress release in the micro-LED after transfer, which attenuates the quantum-confinement Stark effect (QCSE) and improves the radiative compounding efficiency, thus compensating for the increase in the operating voltage."

The brightness of the LEDs was reduced after transfer, "but still remains at the same order of magnitude". The team reports: "At 1mA, the average brightness is 1.17×10^6cd/m^2 and 1.03×10^6cd/m^2 before and after transfer, respectively, indicating a 12.3% reduction."

The transfer process also introduced a slight blue-shift: "The peak wavelength shifted from 454.1nm to 449.4nm at 30μA and from 444.2nm to 443.0nm at 1mA, respectively. This shift can be attributed to stress relief in the epitaxial layer after transfer, weakening the QCSE and widening the bandgap. Additionally, laser-induced defects in the GaN thin-film lattice during transfer may contribute to wavelength variations."

The width of the peak was also reduced by transfer. The array was also subjected to shear tests, demonstrating an average 64.67MPa. This is described as comparable to other reports of Au–In bonding in flip-chip micro-LEDs subjected to thermo-compression at 160°C under 5kg force.■

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Foundry fabricated AlN-buffer HEMTs

Significant step towards industrial AlN/GaN/AlN transistors.

Soctera Inc and Qorvo Inc in the USA have demonstrated high-electron-mobility transistors (HEMTs) fabricated in an RF foundry process with the gallium nitride (GaN) channel sandwiched between ultrawide-bandgap (UWBG) aluminium nitride (AlN) top and back barrier/buffer layers [Reet Chaudhuri et al, Appl. Phys. Express, v18, p076501, 2025]. Such devices have previously been demonstrated in academic laboratory settings, but the researchers report: "These results represent a significant step towards technology maturity for the AlN/GaN/AlN HEMTs by demonstrating their compatibility with current GaN foundry processes."

They add: "Analogous to how the GaN HEMT technology made the jump from academic research laboratories in the 1990s to the market in the 2000s, this work represents a significant step for the AlN-buffer HEMT technology in taking it closer to being a mature, production-ready candidate for UWBG RF electronics platform of the future."

The team highlights its work as particularly significant for power amplification systems aimed at Ka-band radio frequencies operating at 27–40GHz, as used in satellite communications networks and high-resolution, close-range targeting radars. The Soctera/Qorvo team also point to potential for 5G cellular networking and data-center deployment.

Another feature of the AlN/GaN/AlN heterostructure profile that could be attractive for these applications is the higher thermal conductivity of AlN: 30% higher compared with GaN. In high-power-density amplification, thermal management becomes a critical factor.

A metal-polar heterostructure (Figure 1) was grown using metal-organic chemical vapor deposition (MOCVD) on commercial 100mm silicon carbide (SiC) wafers, typical for GaN-on-SiC RF industrial production. The GaN channel layer was less than 200nm thick. SiC is attractive as a substrate due to its high thermal conductivity, better epitaxial compatibility with the III–nitride material system, and availability in large wafer diameters up to 200mm.

According to TLM measurements, the average sheet resistance R_{sh} in the two-dimensional electron gas (2DEG) that formed near the AlN barrier layer was 434Ω/□ with a low standard deviation of less than 2%. The result for Lehighton contactless resistance mapping

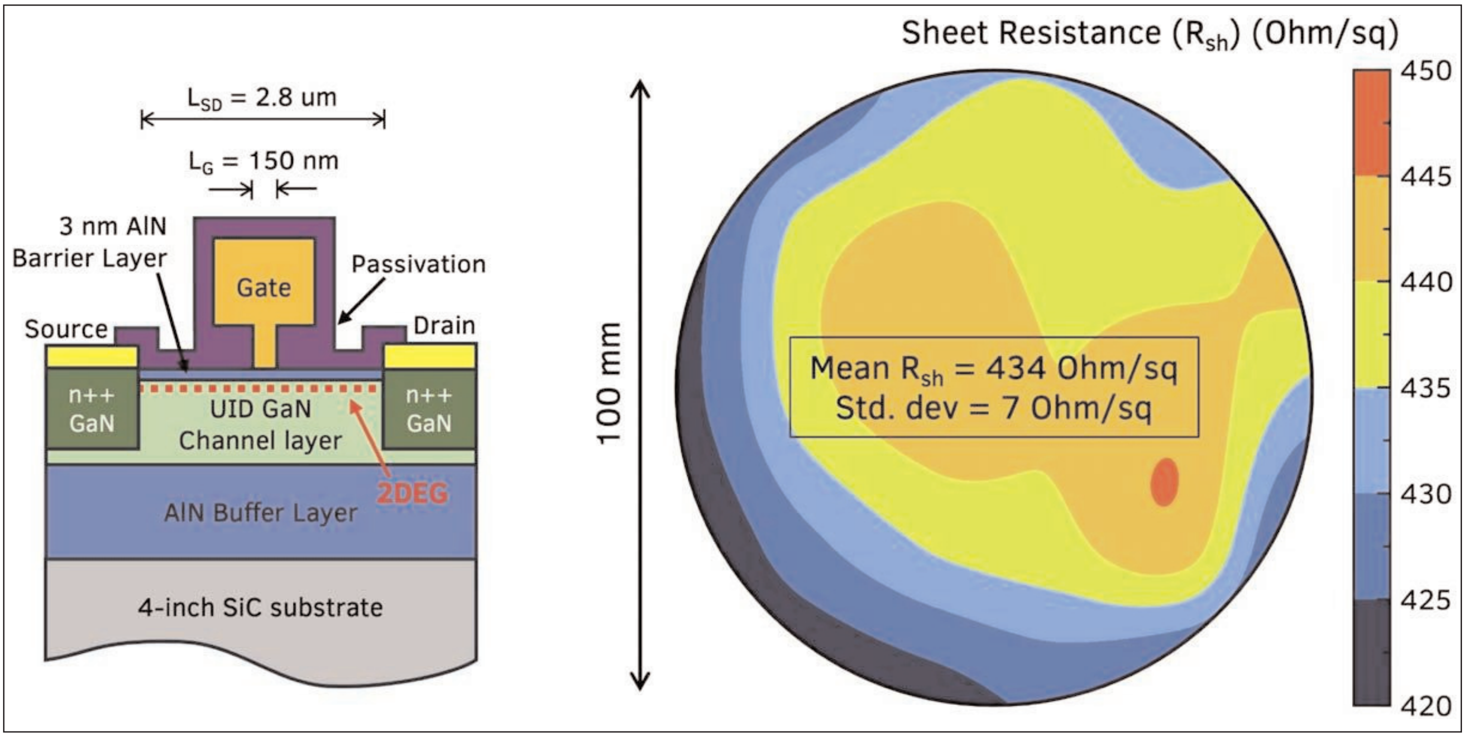

Figure 1. (a) Cross-section scheme for AlN/GaN/AlN HEMT. (b) Uniform sheet resistance map across 100mm wafer measured using transmission line models (TLMs).

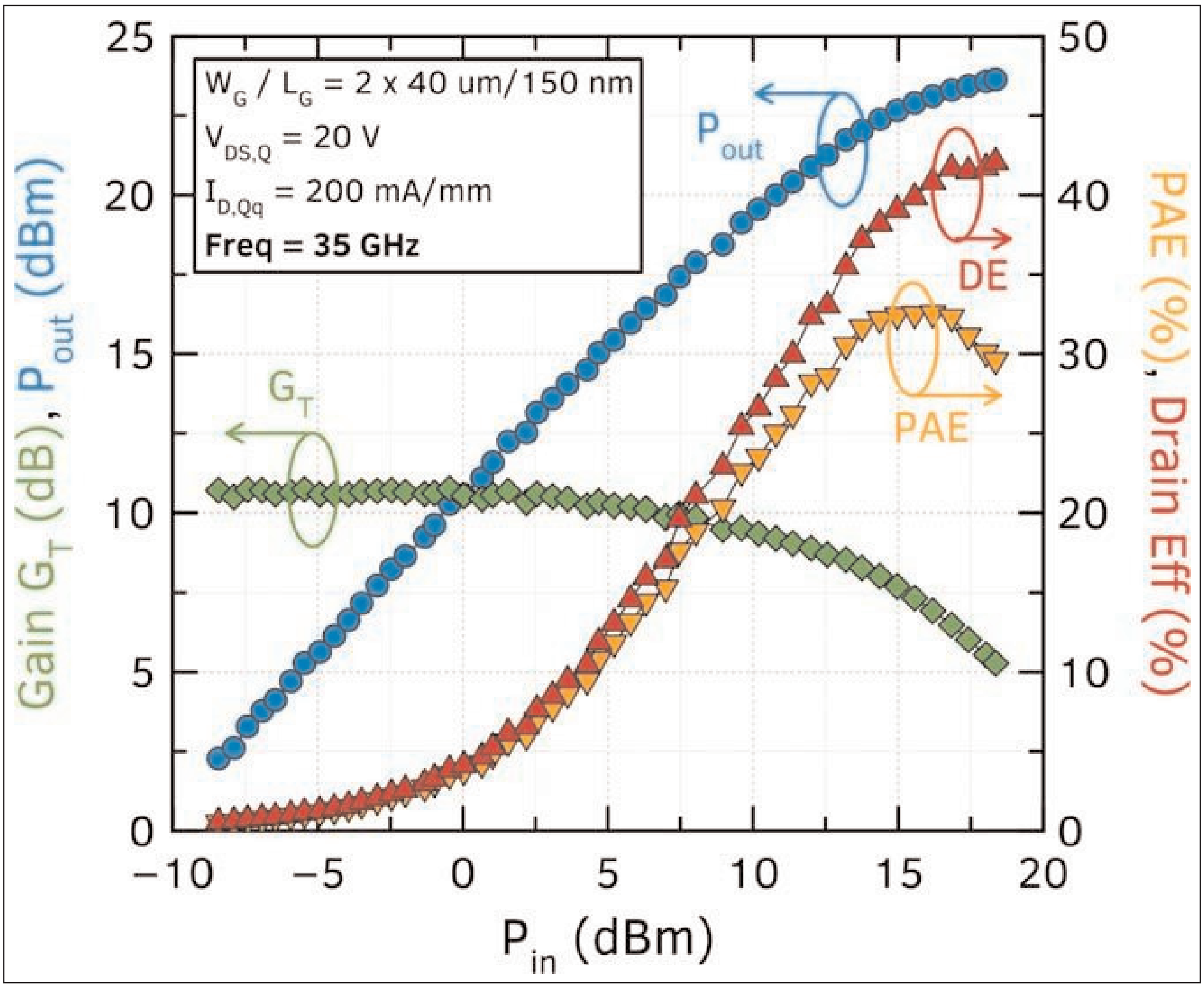

Figure 2. Large-signal load-pull measurement results on AlN/GaN/AlN HEMT.

was slightly higher at 442Ω/❑ with less than 1.5% variation. Hall measurements reported a $1.26x10^{13}/cm^2$ carrier concentration and mobility of 124^8cm^2/V-s mobility.

The researchers fabricated a 150nm gate-length (L_G) HEMT with MOCVD-regrown heavily silicon-doped n^{++}-GaN source/drain contact regions with a view to reducing the access resistance to the 2DEG channel to 0.09Ω-mm. The width consisted of two 40μm gate fingers (2x40μm).

The devices achieved an on/off current ratio of order 10^6 with 643mS/mm peak transconductance (g_m). "The maximum value of g_m measured on the wafer was 736mS/mm, which is among the highest transconductance values reported in III–nitride semiconductor HEMTs with L_G ~150nm, as per authors' knowledge," the researchers report. Pinch-off was at −2V, and the maximum drain current was around 1.5A/mm.

The team comments: "The high on-off ratio coupled with the large gm together demonstrate the potential of the 3nm AlN barrier layer for achieving high efficiency, mm-wave operation in RF transistors through vertical and horizontal device scaling."

Stress testing at 20V drain bias and 0V gate for up to an hour showed a 10% degradation in drain current from around 100mA/mm. The researchers comment: "Preliminary testing showed the devices exhibit minimal degradation, and do not blow-up, indicating the robustness of the AlN/GaN/AlN material."

The performance under pulsed conditions was similar to reports from academic laboratory studies with current collapse of order 36%, and "substantial drain lag". The researchers suggest that optimization of the silicon nitride (SiN) passivation could reduce dispersion to around 5% by reduction of surface carrier trapping.

The team adds: "The effect of the surface states on the RF performance could be reduced by moving the surface away from the 2DEG channel, either by growing a thin GaN passivation layer or a crystalline AlN passivation layer." These and other methods would need careful study to optimize the various trade-offs.

Small-signal frequency measurements reported cut-off (f_T) and maximum oscillation (f_{max}) frequencies of 45GHz and 174GHz, respectively.

Large-signal load-pull measurements (Figure 2) used to assess RF power performance showed 32% power-added efficiency (PAE), 2.68W/mm associated power density (P_{out}), 7.3dB gain (G_T) when tuned for peak efficiency. The drain efficiency (DE) reached 42%. Academic demonstrations of the AlN/GaN/AlN HEMTs have previously reported 2.5W/mm power density in the 30GHz range.

The researchers comment: "These are comparable to previously reported Ka-band power output performance from the AlN/GaN/AlN HEMTs. With an uncompressed G_T of 11dB, the output power of the HEMT is limited by early onset gain compression from the dispersion from surface states." ■

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Author: Mike Cooke

D-band GaN power HEMTs on silicon

Researchers report the highest-frequency device performance so far.

Researchers based in Singapore have reported the first gallium nitride (GaN) high-electron-mobility transistors on silicon (Si) substrates designed to operate in the D-band (110–170GHz) radio frequency (RF) range at the sub-THz level above 0.1 terahertz (100GHz) [Hanchao Li et al, IEEE Electron Device Letters, published online 21 July 2025]. They comment: "This demonstration marks the highest frequency (and the first-time reaching D-band) in power amplification among published GaN-on-Si HEMTs."

The team — variously associated with Singapore's Nanyang Technological University, the National Semiconductor Translation and Innovation Centre for Gallium Nitride (NSTIC (GaN)), Institute of Microelectronics (IME), National University of Singapore, and Singapore–MIT Alliance for Research and Technology — comments: "This work pushes the boundaries of GaN-on-Si HEMT technology by demonstrating its feasibility for D-band power amplification, for the first time."

Potential advantages of using silicon substrates include large wafer diameter availability, cost-effectiveness, and compact integration with silicon CMOS. Such devices are strong candidates for low-cost sub-THz 6G cellular infrastructure. Other sub-THz applications include atmospheric remote sensing, and THz power sources based on frequency multiplier chains.

The material for the HEMT (Figure 1) was grown by metal-organic chemical vapor deposition (MOCVD) on high-resistivity (HR) silicon substrate, and included a 4nm in-situ SiN layer. A double-heterostructure channel of 4nm/150nm/100nm AlN/GaN/$Al_{0.08}Ga_{0.92}N$ was designed to suppress short-channel effect, enabling high-frequency performance.

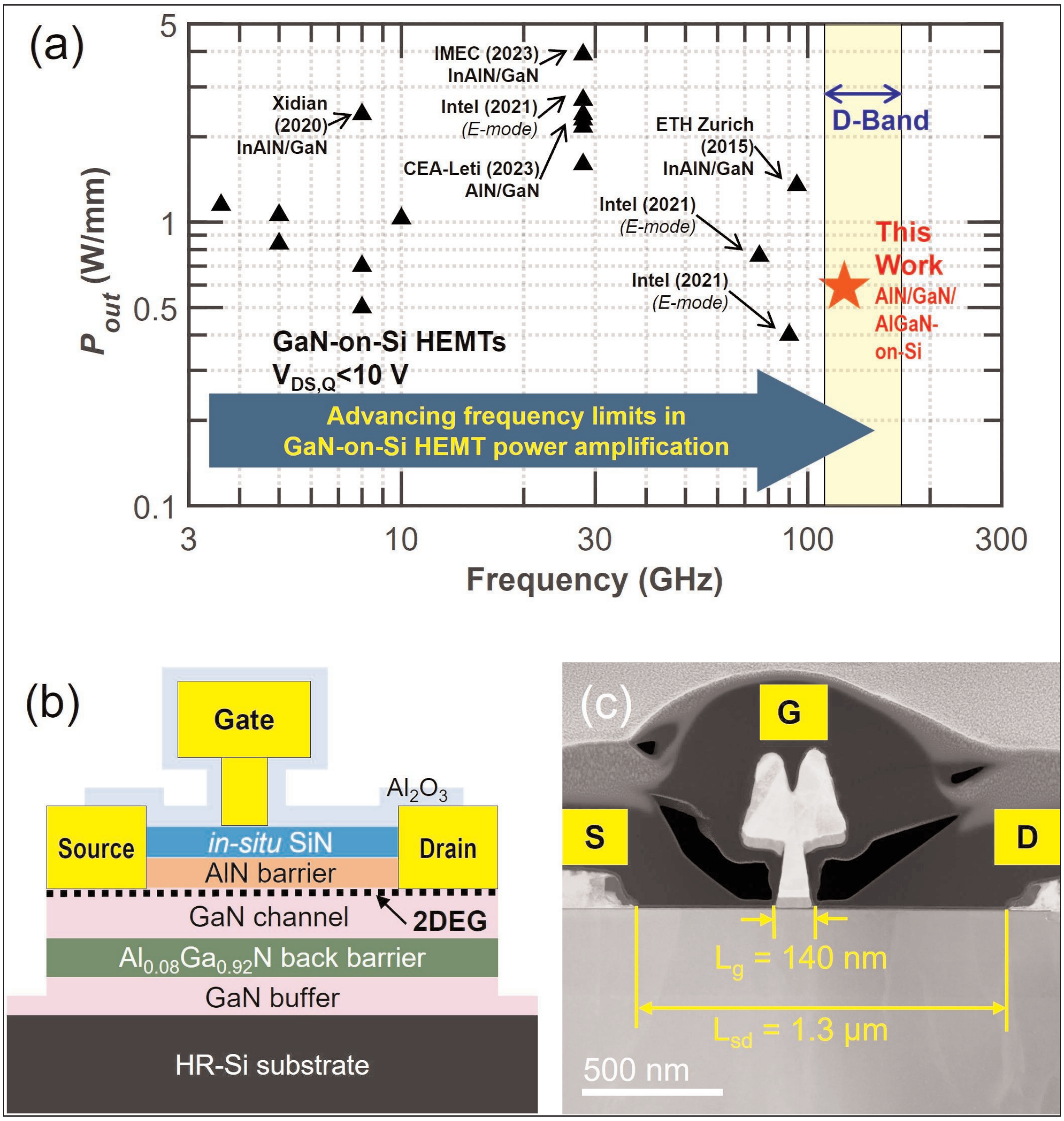

Figure 1. (a) Benchmark of output power (P_{out}) at drain bias (V_{ds}) up to 10V against frequency of GaN-on-Si HEMTs. (b) AlN/GaN/AlGaN-on-Si MIS-HEMT scheme. (c) Cross-sectional transmission electron microscopy (TEM) image of fabricated device.

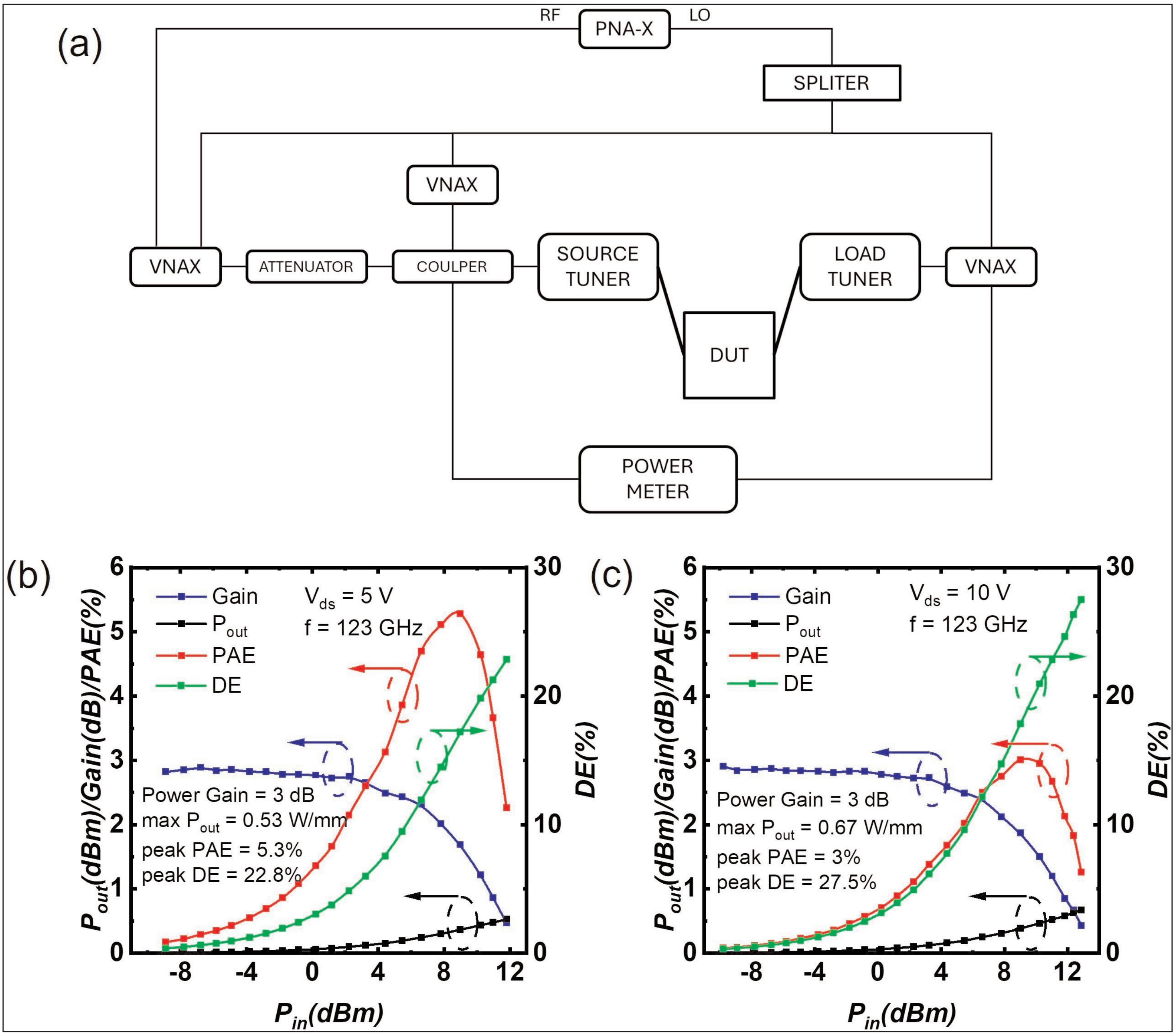

Figure 2. RF large-signal performance at 123GHz continuous wave (CW). (a) Measurement setup with tuning at fundamental frequency. (b) Power sweep results at 5V V_{ds}. (c) Power sweep results at 10V V_{ds}.

The use of AlN as top barrier, rather than AlGaN, increased the carrier density in the two-dimensional electron gas (2DEG) channel that forms near the AlN/GaN interface, due to a larger conduction-band offset and stronger polarization effects. Hall-effect measurements reported $1.7 \times 10^{13}/cm^2$ sheet charge density, and $1400cm^2/V$-s mobility. The sheet resistance was 260Ω/❑.

The fabrication process included mesa isolation by inductively coupled plasma reactive-ion etching, annealed titanium/aluminium/nickel/gold deposition for the ohmic source/drain contacts, nickel/gold T-gate formation, and atomic layer deposition of aluminium oxide (Al_2O_3) passivation.

The in-situ SiN layer was preserved throughout the fabrication process, serving in the final HEMT as a gate dielectric, and minimizing interface contamination (e.g. protecting the Al in the top barrier from oxidation) and defect formation. The researchers also point out that the thin (14nm) SiN/Al_2O_3 stack minimized parasitic capacitances.

The gate length (L_g) was 140nm. The placement of the gate was 480nm from the source (L_g), and 680nm from the drain (L_{gd}). The total source–drain distance (L_{sd}) was thus 1.3μm. The gate width consisted of two fingers of 16μm (2x16μm).

The team comments: "The small finger width was intended to minimize signal propagation delay ('transverse delay') while maintaining low gate resistance, which is critical for minimizing RF signal attenuation along the gate finger and improving the maximum oscillation frequency (f_{max})."

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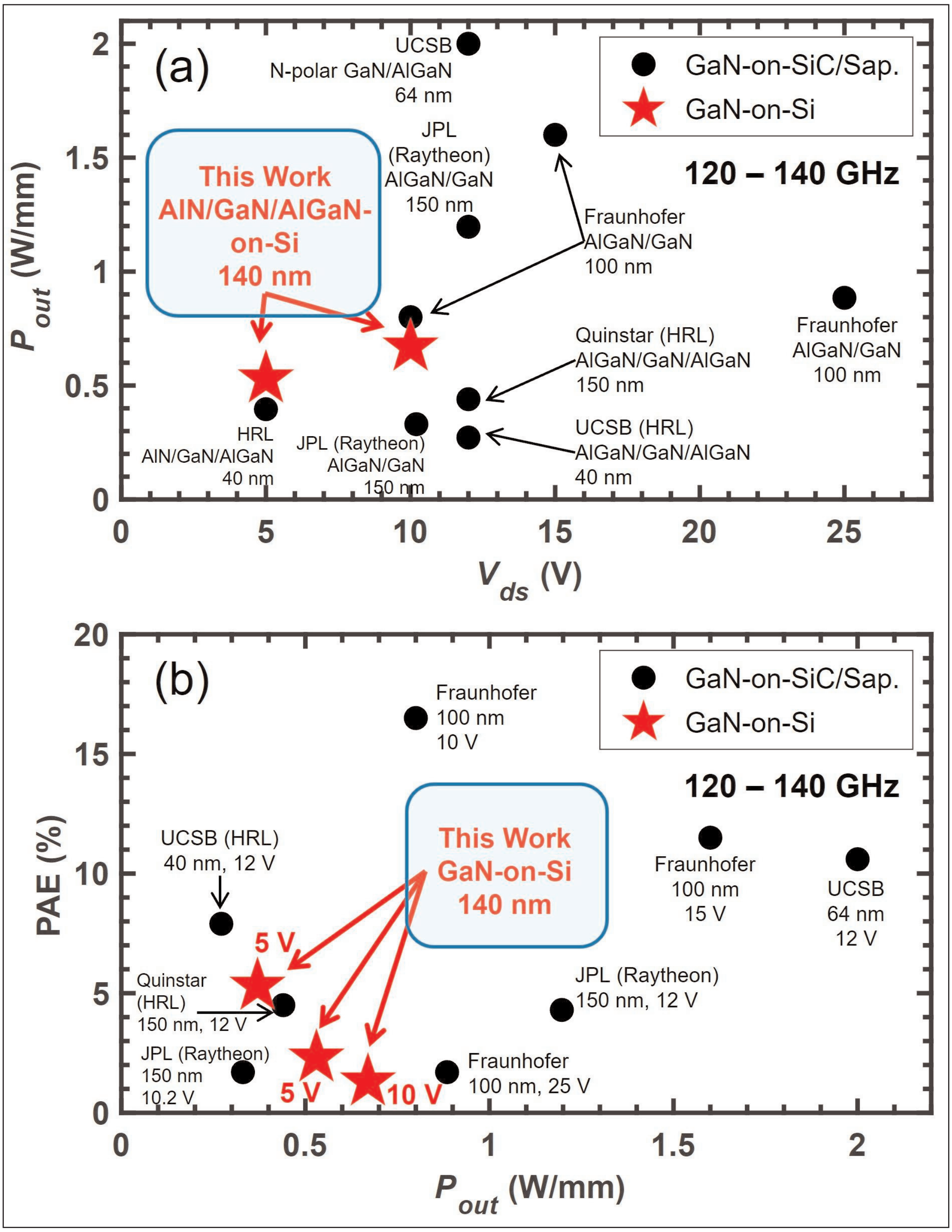

Figure 3. RF large-signal benchmarks against GaN on SiC or sapphire: (a) P_{out} versus V_{ds}; (b) PAE versus P_{out}. Foundries, if used, appear in parentheses.

DC characterization resulted in 2.0A/mm maximum drain current density, 1.1Ω-mm on-resistance, −2V threshold voltage, 10^5 on/off current ratio, and 0.65S/mm peak transconductance.

The three-terminal breakdown occurred at 35V, attributed to ionization of carriers at the drain edge of the gate, leading to a sudden increase in both drain and gate currents.

Current collapse was assessed in pulsed measurements with −5V gate pulses superimposed on the quiescent state (V_{gq}), and simultaneous gate/drain pulses of −5V/5V, respectively. The gate pulsing resulted in 8.6% collapse, and the combined pulsing in 15.2%.

Small-signal RF characterization showed a cut-off frequency (f_T) of 112GHz, while fmax came in at 205GHz.

The RF large-signal performance was tested using an on-wafer D-band passive load-pull system (Figure 2). The peak power-added efficiency (PAE) of 5.3% was achieved at 0.36W/mm output power with 5V drain bias. The maximum output power was 0.67W/mm at 10V drain bias.

The team also compare their work with HEMTs in pre-matched monolithic microwave ICs (MMICs) on silicon carbide (SiC) or sapphire (Figure 3). The researchers admit that this is not completely fair since these devices are often the result of trade-offs designed to achieve certain other aims at the expense of efficiency or output power, adding that their purpose is "to provide technological context rather than a direct performance benchmark". Even so, the plots show competitive performance relative to devices on the more expensive alternative substrates.

The team suggests the relatively low PAE was mainly due to "parasitic losses induced by melt-back etching into the silicon substrate during epitaxial growth". Improvements could be delivered by regrown contacts, optimized passivation, the use of active tuning, or multi-finger gates. According to the team, multi-finger gates would be needed to scale up output power while maintaining efficiency. ■

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E-mode GaN HEMT breakdown beyond 10kV

An optimized RESURF structure enables an improved breakdown voltage–on-resistance trade-off.

Researchers based in the USA, China and the UK have reported 10kV performance from enhancement (E)-mode gallium nitride (GaN) high-electron-mobility transistors (HEMTs) with a standard highly doped p-GaN gate [Yijin Guo et al, Appl. Phys. Lett., v127, p042102, 2025]. The p-GaN layer used for the gate also allowed construction of a reduced-surface-field (RESURF) structure to massage the electric (E)-field for access of greater breakdown voltages. The 10kV GaN HEMT had a 69mΩ-cm^2 specific on-resistance ($R_{ON,SP}$), which is lower than reported silicon carbide (SiC) metal-oxide-semiconductor field-effect transistors (MOSFETs) with the same voltage rating.

Although other 10kV GaN transistors have been reported, these used unconventional epitaxial structures, with features such as multiple channels, silicon (Si) delta-doping, or unintentional p-GaN doping, which limit the ability to achieve E-mode operation. E-mode is often preferred, especially in high-voltage situations, since the off-state occurs at 0V gate potential with benefits in terms of power efficiency and fail-safe operation.

The multi-national team came from Virginia Polytechnic Institute and State University in the USA, the University of Hong Kong and Xidian University in China, Cambridge GaN Devices Ltd in the UK, Enkris Semiconductor Inc in China, the USA's Oak Ridge National Laboratory, Virginia Tech in the USA, and the UK's University of Cambridge.

The researchers comment on their ability to achieve high voltages with the relatively simple RESURF structure: "By analyzing devices with varying RESURF thickness (t_R), we identify the key physical mechanism that enables the breakdown voltage (BV) upscaling with device length. We find that the BV upscaling is only viable when t_R is below 21nm and reaches peak effectiveness at a t_R of 17nm — deviating from predictions based on ideal polarization superjunction theory. This suggests the presence of donor trap states that balance the acceptors in p-GaN. Additionally, the low Mg doping near the p-GaN/AlGaN interface, naturally formed in epitaxial growth, relaxes the precision required for t_R control to maintain charge balance."

The high-voltage (HV, ≥1.7kV) sector includes deployments in power grid, renewable energy processing,

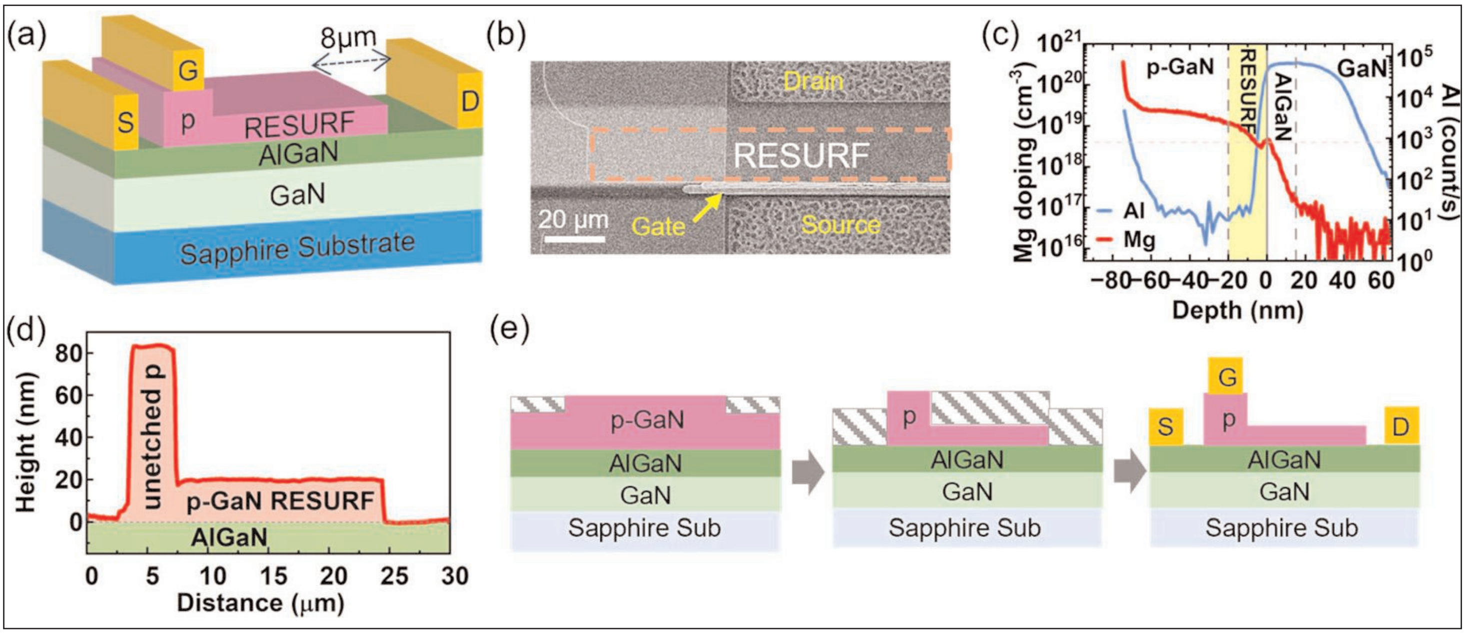

Figure 1. (a) RESURF HEMT 3D schematic diagram. (b) Top-view scanning electron microscope (SEM) image of edge region of fabricated device. (c) Secondary-ion mass spectroscopy (SIMS) profiles for Al and Mg elements in p-GaN/AlGaN/GaN structure. RESURF region (about 20nm above AlGaN surface) marked. (d) Surface morphology profile before contact formation. (e) Main fabrication process steps.

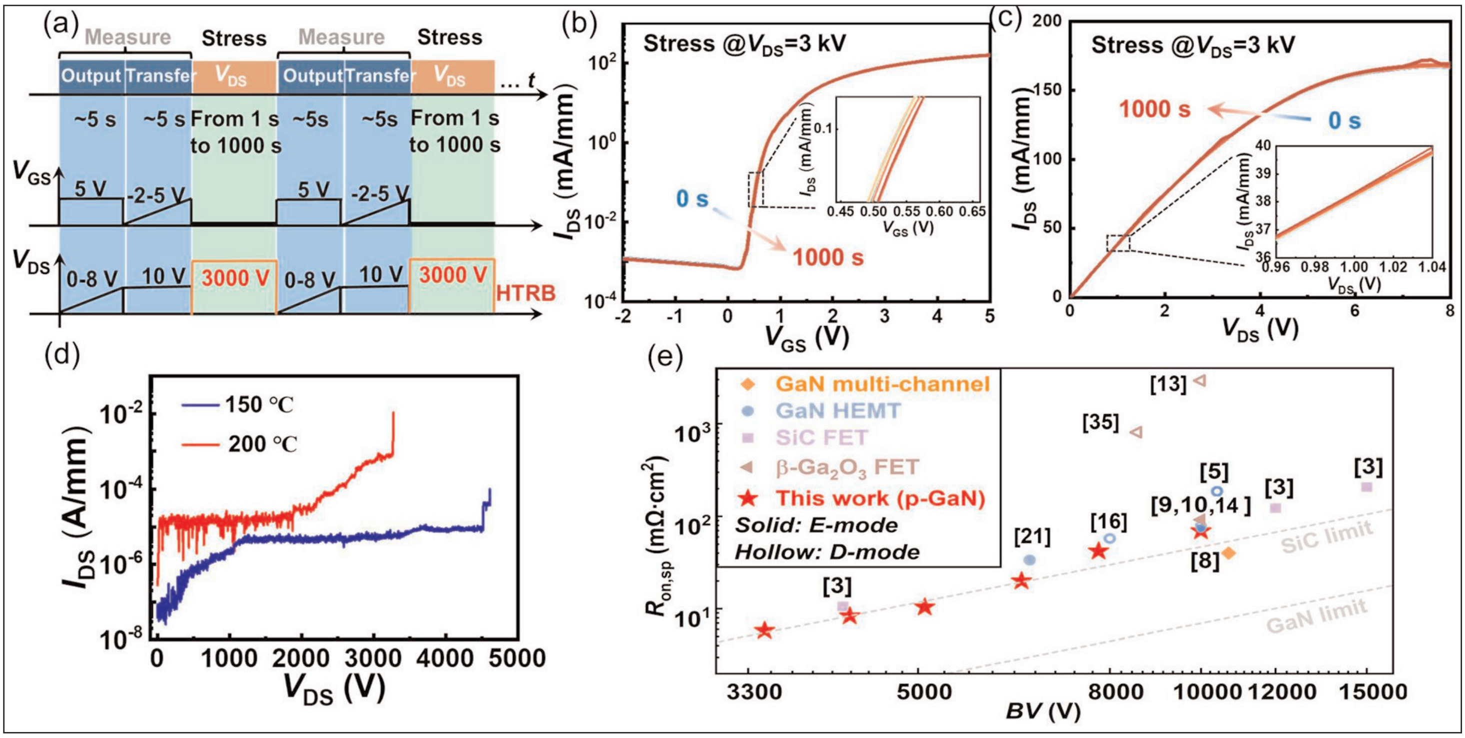

Figure 2. (a) Modified HTRB stress test scheme. Evolution of (b) transfer and (c) output current–voltage (I–V) characteristics during HTRB test. (d) Blocking characteristics of GaN RESURF HEMT at 150°C and 200°C right after HTRB test, 35μm L_{GD} and 17nm t_{RES}. (e) $R_{ON,SP}$–BV trade-off of state-of-the-art SiC, GaN and Ga_2O_3 transistors with BV above 3.3kV.

and HV power supply applications. Commercial HV devices include 6.5kV silicon bipolar transistors, and 3.3kV SiC unipolar devices. Although silicon offers at present the higher voltage rating, the devices suffer from low switching speeds and reduced efficiency, compared with SiC. It is hoped that SiC, or other wide- or ultrawide-bandgap materials, such as GaN or gallium oxide (Ga_2O_3), will meet these challenges, with reported laboratory demonstrations having reached beyond 10kV.

The researchers comment: "Compared to HV SiC MOSFETs, GaN HEMTs can be fabricated on 6-inch sapphire substrates without requiring thick epitaxial layers, offering significant cost advantages. However, the upscaling of breakdown voltage (BV) in GaN HEMTs remains challenging due to the inherently non-uniform electric field (E-field) distribution in lateral devices."

With non-uniform E-fields, breakdown occurs where there is a peak value. One aim of the complicated transistor structures described above is to reduce E-field variation, allowing higher voltages to be reached.

The device material was grown by metal-organic chemical vapor deposition (MOCVD) on sapphire (Figure 1). The device layers consisted of a 200nm GaN channel, 15nm AlGaN (20% Al) barrier, and 80nm p-GaN for the gate/RESURF structure. The 1.5μm GaN buffer layer was carbon doped. Nucleation/transition from the sapphire was provided by a thin AlN layer.

A number of devices with different RESURF dimensions were fabricated. The gate (L_G) length was 1.5μm, while the gate–source distance (L_{GS}) was 3.5μm. The drain (D) was separated from the RESURF structure by a distance of 8μm.

The p-GaN was sculpted into the gate/RESURF structure by a two-step dry etch, followed by wet treatments. The first dry etch step was in the source/drain/spacer regions; the second included sulfur hexafluoride (SF_6) in the recipe to make the process self-terminating on reaching the AlGaN layer. The wet treatments consisted of tetramethylammonium hydroxide (TMAH) and buffered oxide etch (BOE) rinses designed to reduce surface roughness. The source/drain metals were annealed titanium/aluminium/nickel/gold.

The devices were completed with mesa etching, nickel/gold gate deposition, and passivation with photoresist.

The breakdown voltage for a 17nm-thick RESURF layer (t_{RES}) increased with gate–drain distance, from 810V for 10μm up to 5086V for 35μm. The leakage before the destructive breakdown remained below 0.1μA/mm. The researchers comment that the average breakdown electric field around 1.45MV/cm "is higher than the usual E_{ave} of ~1MV/cm in the field-plate GaN HEMTs, verifying the effectiveness of the RESURF structure for E-field management."

The 17nm thickness gave the best performance of the fabricated devices. The team reports: "When $t_{RES} \leq 21$nm, BV shows good scalability with the increased L_{GD}, and the highest E_{ave} is observed for t_{RES} = 17nm. When

t_{RES} ≥ 26nm, BV can be barely upscaled by L_{GD}, suggesting the presence of a highly non-uniform E-field crowding that leads to premature breakdown and limits breakdown voltage upscaling."

Extending L_{GD} to 100µm enabled a BV greater than 10kV, the measurement limit of the experimental setup. At this limit, the leakage was still less than 1µA/mm. "These devices can survive repetitive sweeps up to 10kV," the team adds.

As L_{GD} increases, so naturally does the on-resistance (R_{ON}): 17.5Ω-mm for 25µm up to 64.2Ω-mm for 100µm devices. The respective specific on-resistances ($R_{ON,SP}$) were calculated, taking account of the contacts and so on, at 5.9mΩ-cm^2 and 69mΩ-cm^2, respectively. The sheet resistance in the RESURF region was estimated at 620Ω/❑, compared with 450Ω/❑ in non-RESURF regions, as calculated from transmission-line model (TLM) measurements. The researchers comment: "This incremental sheet resistance increase is relatively insignificant compared to the substantial breakdown voltage improvement enabled by the RESURF structure."

The team also performed high-temperature reverse-bias (HTRB) tests to gauge reliability (Figure 2). The researchers claim this as the first report of reliability data for multi-kilovolt GaN transistors. The HTRB used intermittent fast forward I–V sweeps to look for performance degradation. "The device exhibited minimal shifts in both V_{TH} and R_{ON} throughout the stress period," the team reports. After the testing, the breakdown voltage was measured at 150°C and 200°C: 4.5kV and 3.2kV, respectively. "The high-bias leakage current at 150°C is about 20 times higher than the room-temperature counterpart," the researchers add.

In terms of the on-resistance-breakdown trade-off, the devices showed performance near or beyond the theoretical limit of silicon carbide.

The researchers comment: "Our GaN-on-sapphire RESURF HEMT shows a superior figure-of-merit than SiC and Ga_2O_3 transistors, at the same time offering a lower wafer cost. In all 10kV GaN devices, our device features an E-mode gate, compatibility with an industry-standard wafer, and the second lowest $R_{ON,SP}$ in single-channel HEMTs." ■

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1200V fully vertical GaN-on-silicon MOSFETs

Fluorine-ion implant termination enables high breakdown.

Shandong University and Huawei Technologies Co Ltd in China have used fluorine (F)-ion implantation termination (FIT) to achieve 1200V breakdown performance in fully vertical gallium nitride (GaN)-on-silicon (Si) trench metal-oxide-semiconductor field-effect transistors (MOSFETs) [Yuchuan Ma et al, IEEE Electron Device Letters, published online 8 July 2025].

Typically, mesa etching termination (MET) is used to electrically isolate GaN semiconductor devices. However, this results in relatively sharp corners where electric fields tend to crowd, causing premature breakdown. MET-MOS fully vertical MOSFETs have breakdown voltages around 650V.

Power GaN devices are competing with silicon carbide (SiC) transistors. While GaN has good performance in the 100–650V class, SiC tends to be commercially favored for 1200V applications. Achieving 1200V in devices on low-cost silicon substrates could tip the commercial balance towards GaN.

The fully vertical transistors (Figure 1) were fabricated using GaN/silicon metal-organic chemical vapor deposition (MOCVD) epitaxial material with a buried p-GaN layer.

The researchers comment: "The conductive buffer layer, composed of AlGaN/AlN multi-layers, enables a fully vertical current path while eliminating the need for a complex substrate engineering process to achieve the fully vertical configuration."

The buffer also provided compressive stress, compensating for tensile stress in the overlying GaN layers that can build up during cooling after high-temperature MOCVD. Such tensile stress can lead to cracks without compensation. The researchers used x-ray analysis to estimate a threading dislocation density of $3.0 \times 10^8/cm^2$. The corresponding estimate from cathodoluminescence was $1.4 \times 10^8/cm^2$.

The gate trench was etched first. The p-GaN was activated by thermal annealing. The researchers also repaired the gate trench dry etch damage by tetra methyl ammonium hydroxide (TMAH) treatment.

The F-ion implantation was carried out at three energies (and doses): 240keV (4×10^{14}), 140keV (2×10^{14}) and 80keV ($1.2 \times 10^{14}/cm^2$), respectively.

Atomic layer deposition (ALD) silicon dioxide (SiO_2) was used as gate dielectric. The source contact windows were opened by reactive-ion etch. The source and gate metals were both chromium/gold. The drain contact consisted of the low-resistivity silicon substrate. The researchers also fabricated a device with a convention MET process for comparison purposes.

The FIT-MOS demonstrated enhancement-mode operation with a positive threshold voltage (V_{TH}) of 3.3V. The on/off current ratio was of order 10_7. The on-state current density was $8kA/cm^2$. The specific on-resistance ($R_{on,sp}$) was $5.6m\Omega\text{-}cm^2$,

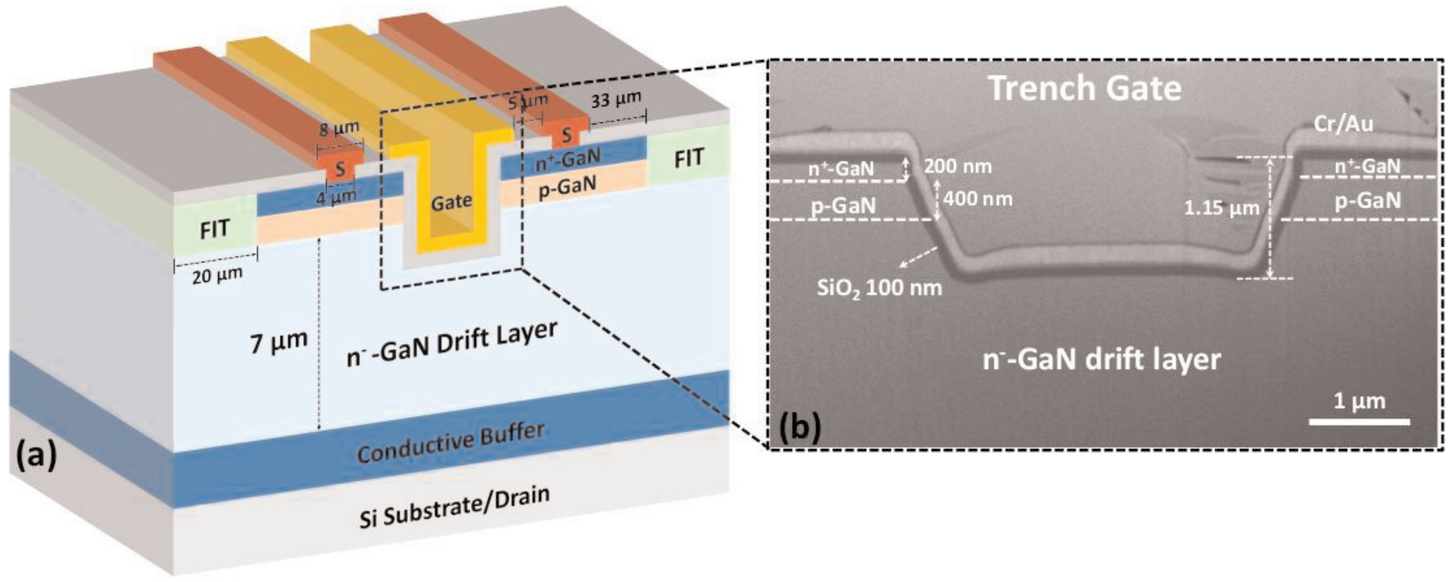

Figure 1. (a) Schematic structure and (b) cross-sectional scanning electron microscope (SEM) image (trench gate region) of fully vertical GaN-on-Si trench MOSFETs with fluorine implanted termination (FIT-MOS).

described as “relatively low”.

The breakdown voltage (BV) was 1277V, compared with 567V for the comparison MET-MOS (Figure 2). The team comments: “The FIT-MOS exhibits a larger OFF-state current density at low V_{DS} than that of the MET-MOS due to the additional vertical leakage path associated with the FIT structure.”

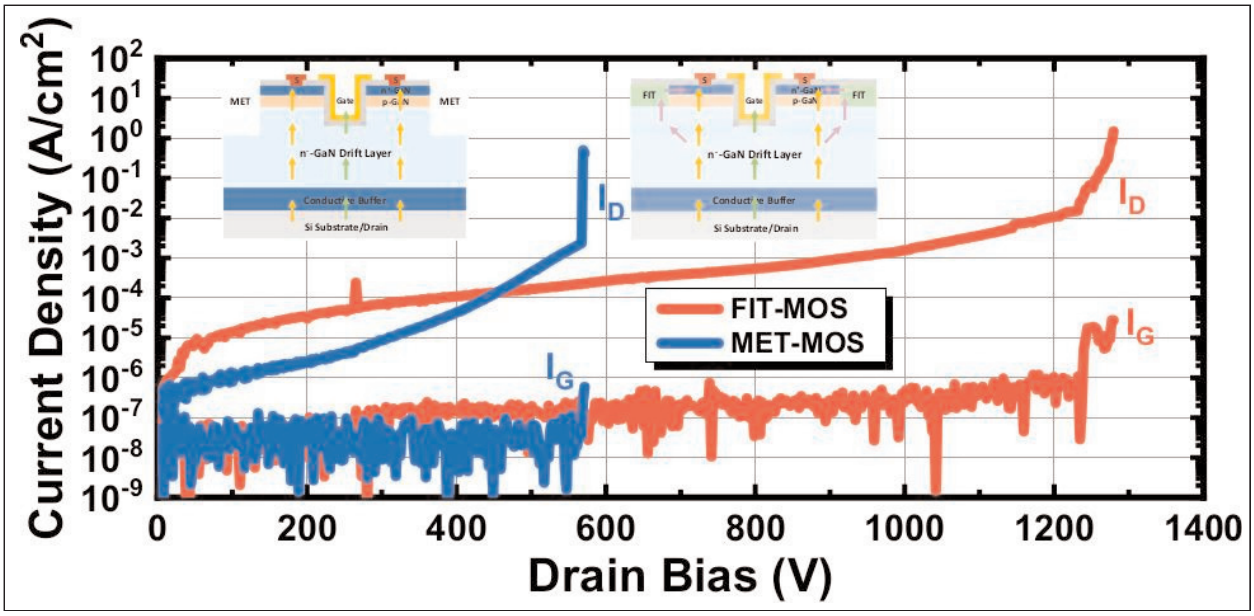

Figure 2. OFF-state breakdown current–voltage (I–V) characteristics at 0V gate potential (V_{GS}) of fabricated fully vertical GaN-on-Si FIT- and MET-MOS. Inset: potential leakage paths of FIT- and MET-MOS.

The researchers also suggest that the F ions could diffuse through Ga vacancies and subsequently escape from the transistor material negatively impacting thermal stability. “Adopting an optimized post-implantation annealing process can efficiently reduce the OFF-state leakage current density as well as enhance the thermal reliability of the FIT-MOS,” the team writes.

Simulations by the researchers suggest that the FIT structure reduces electric field crowding, such as occurs at the corners of the mesa in MET-MOS transistors. The FIT simulation did show crowding near the gate trench. This could be ameliorated with gate shielding.

The researchers also compare the $R_{on,sp}$, BV and drift layer thickness (T_{drift}) performance of their FIT device against previously reported vertical GaN transistors (Figure 3). Combining the breakdown and on-resistance results in the $BV^2/R_{on,sp}$ Baliga figure of merit (BFOM) gave a value of 291MW/cm^2, comparable to the value of devices fabricated on much more expensive native GaN substrates. At the same time, the FIT-MOS gave similar BV performance with a thinner drift layer, compared with such expensive GaN/GaN transistors (7μm, versus more than 10μm for 1200V BV). ■

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Author: Mike Cooke

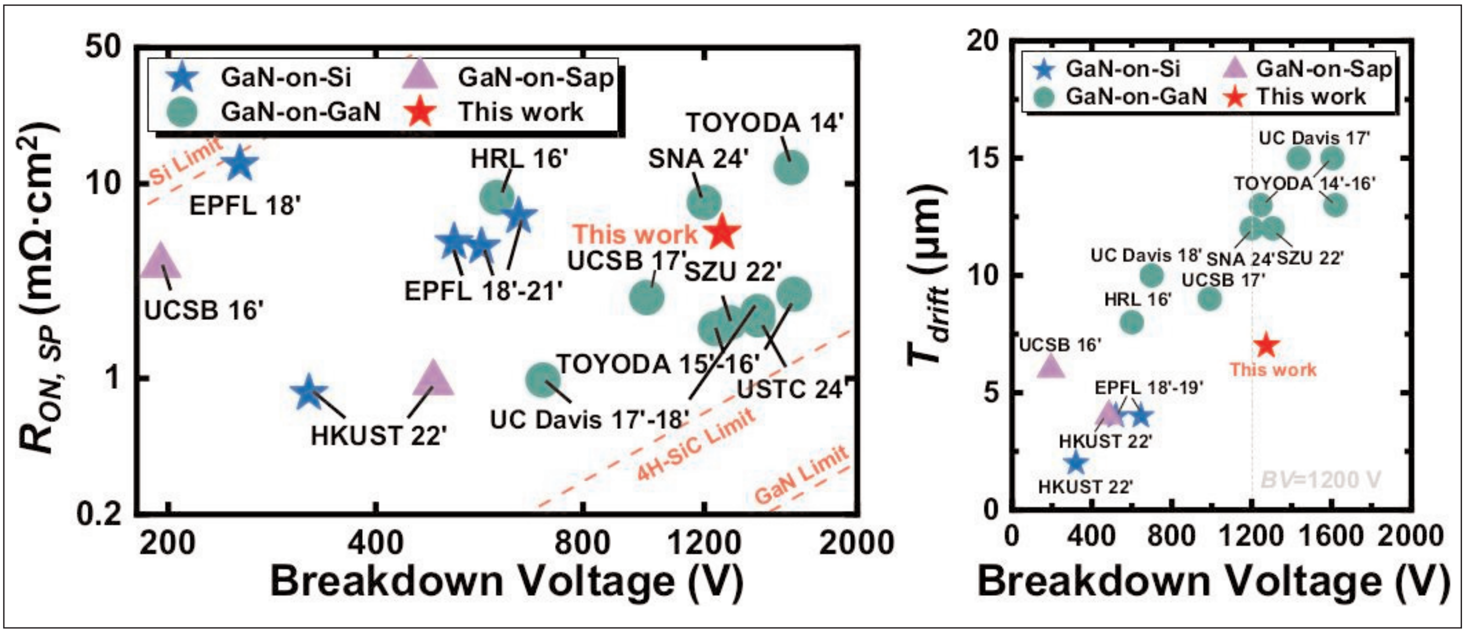

Figure 3. Benchmarks of (a) $R_{on,sp}$ versus BV, and (b) drift-layer-thickness (T_{drift}) versus BV, for fully vertical FIT-MOS against reported GaN vertical trench MOSFETs on silicon, sapphire (Sap), and GaN substrates.

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www.tecdia.com

24 Resources

Al Shultz Advertising Marketing for Advanced Technology Companies
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Tel: +1 408 289 9555
www.alshuktz.com

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USA
Tel: +1 408 943 6900
www.semi.org

Yole Développement
69006 Lyon,
France
Tel: +33 472 83 01 86
www.yole.fr

event calendar

If you would like your event listed in *Semiconductor Today*'s Event Calendar, then please e-mail all details to the Editor at mark@semiconductor-today.com

21–24 September 2025

8th International Workshop on Ultra-Wide Bandgap Materials and Devices (IWUMD-2025)

Congress Centre, Wroclaw University of Science and Technology (WUST),
Wroclaw, Poland
E-mail: iwumd2025@pwr.edu.pl
https://iwumd2025.pwr.edu.pl/

21–26 September 2025

28th European Microwave Week (EuMW 2025)

Jaarbeurs, Utrecht, The Netherlands
E-mail: eumwreg@itnint.com
www.eumweek.com

22–26 September 2025

42nd European Photovoltaic Solar Energy Conference and Exhibition (EU PVSEC 2025)

BEC Bilbao Exhibition Centre, Bilbao, Spain
E-mail: pv.conference@wip-munich.de
www.eupvsec.org

24–25 September 2025

Microelectronics UK

Excel, London
E-mail: Enquiries@microelectronicsuk.com
www.microelectronicsuk.com

24–26 September 2025

International Exhibition and Conference for Power Electronics, Intelligent Motion, Renewable Energy and Energy Management (PCIM Asia Shanghai 2025)

Shanghai New International Expo Centre,
Shanghai, China
E-mail:pcimasia@china.messefrankfurt.com
www.pcimasia-expo.com

28 September – 2 October 2025

ECOC 2025: 51st European Conference on Optical Communication

Bella Center, Copenhagen, Denmark
E-mail:ecoc2025@cap-partner.eu
www.ecoc2025.org

7–9 October 2025

SEMICON West 2025

Phoenix, AZ, USA
E-mail: semiconwest@semi.org
www.semiconwest.org

7–11 October 2025

48th International Semiconductor Conference — CAS 2025

Hotel Sinaia,
Sinaia, Romania
E-mail: cas@imt.ro
www.imt.ro/cas

8–10 October 2025

23rd International Symposium on POWER ELECTRONICS Ee2025

Novi Sad/Belgrade, Serbia
E-mail: dee@uns.ac.rs
www.dee.uns.ac.rs

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12–15 October 2025

2025 IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)

Scottsdale, AZ, USA
E-mail: cs@cshawevent.com
www.bcicts.org

10–12 November 2025

12th IEEE Workshop on Wide Bandgap Power Devices & Applications (WiPDA 2025)

Fayetteville, AR, USA
E-mail: admin@wipda-europe.org
https://wipda.org/

18–21 November 2025

SEMICON Europa 2025

Messe München, Munich, Germany
E-mail: semiconeuropa@semi.org
www.semiconeuropa.org

30 November – 5 December 2025

2025 Materials Research Society (MRS) Fall Meeting & Exhibit

Hynes Convention Center,
Boston, MA, USA
E-mail: info@mrs.org
www.mrs.org/meetings-events/fall-meetingsexhibits/2024-mrs-fall-meeting

6–10 December 2025

71st annual IEEE International Electron Devices Meeting (IEDM 2025)

Hilton San Francisco Union Square Hotel,
San Francisco, CA, USA
E-mail: iedm-info@ieee.org
www.ieee-iedm.org

4–6 February 2026

Asia Photonics Expo (APE 2026)

Level 1, Sands Expo & Convention Centre
(Marina Bay Sands),
Singapore
E-mail: visitors-ape@informa.com
www.asiaphotonicsexpo.com

11–13 February 2026

SEMICON Korea 2026

Korea World Trade Tower,
Seoul, South Korea
E-mail: semiconkorea@semi.org
www.semiconkorea.org/en

15–19 February 2026

2026 IEEE International Solid- State Circuits Conference (ISSCC 2026)

San Francisco, CA USA
E-mail: Issccinfo@yesevents.com
www.isscc.org

15–19 March 2026

OFC 2026 (Optical Fiber Communication Conference and Exhibition)

Los Angeles Convention Center, Los Angeles, CA, USA
E-mail: custserv@optica.org
www.ofcconference.org

22–26 March 2026

IEEE Applied Power Electronics Conference and Exposition (APEC 2026)

Henry B Gonzalez Convention Center,
San Antonio, TX, USA
E-mail: apec@apec-conf.org
www.apec-conf.org

3–8 May 2026

SID Display Week 2026

Los Angeles, CA, USA
E-mail: registration@sid.org
www.displayweek.org

17–21 May 2026

2026 Conference on Lasers & Electro-Optics (CLEO)

Charlotte, NC, USA
E-mail: info@cleoconference.org
www.cleoconference.org

26–29 May 2026

IEEE 76th Electronic Components and Technology Conference (ECTC 2026)

JW Marriott & Ritz-Carlton Grande Lakes Resort,
Orlando, FL, USA
E-mail: borabal@ieee.org
www.ectc.net

31 May–4 June 2026

International Power Electronics Conference (IPEC-Nagasaki 2026- ECCE Asia)

Dejima Messe Nagasaki, Nagasaki, Japan
E-mail: ipec2026@or.knt.co.jp
www.ipec2026.org

7–12 June 2026

2026 IEEE/MTT-S International Microwave Symposium (IMS 2026)

Boston, MA, USA
E-mail: exhibits@horizonhouse.com
www.ims-ieee.org/about-ims/past-and-future-ims

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