ISSN 1752-2935 (online)

semiconductorTODAY

COMPOUNDS & ADVANCED SILICON

Vol. 20 • Issue 4 • May 2025

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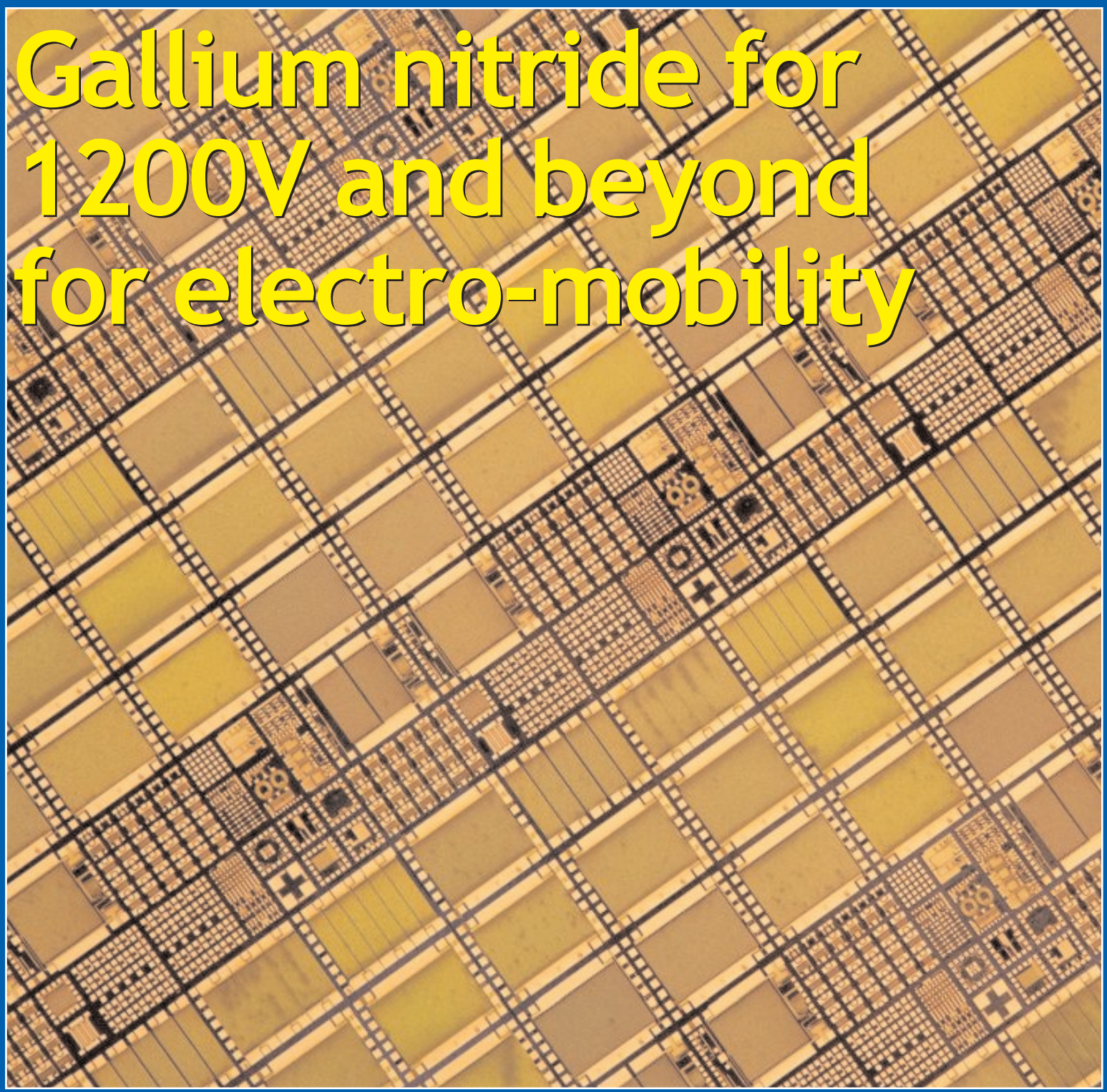

Gallium nitride for 1200V and beyond for electro-mobility

Wolfspeed's CFO departs • Infineon collaborating with NVIDIA
Finwave raises $8.2m • KLA opens $138m plant in Wales

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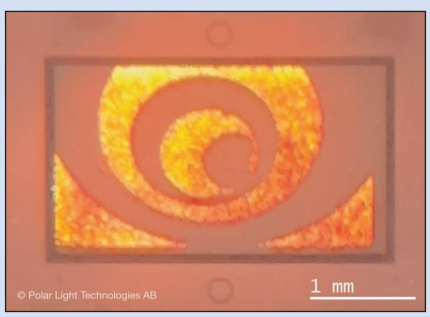
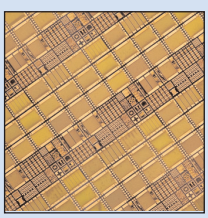
p42 KLA has opened its new $138m R&D and manufacturing center in Newport, Wales, UK.



p48 Polar Light Technologies has fabricated its first micro-display prototype built on its proprietary pyramidal micro-LED technology.



Cover image: At PCIM 2025, Fraunhofer IAF presented results on bidirectional 1200V gallium nitride switches with integrated free-wheeling diodes using GaN-on-insulator technology, funded by the German government-funded GaN4EmoBiL project. **p25**

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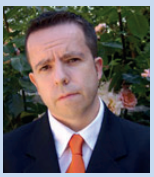

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***Semiconductor Today* covers the R&D and manufacturing of compound semiconductor and advanced silicon materials and devices** (e.g. GaAs, InP and SiGe wafers, chips and modules for microelectronic and optoelectronic devices such as RFICs, lasers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

Regular issues contain:

- news (funding, personnel, facilities,
- technology, applications & markets);
- feature articles (technology, markets,
- regional profiles);
- conference reports;
- event calendar and event previews;
- suppliers' directory.

***Semiconductor Today* (ISSN 1752-2935) is published free of subscription charge** in a digital format 10 times per year by Juno Publishing and Media Solutions Ltd, Suite no. 133, 20 Winchcombe Street, Cheltenham GL52 2LY, UK.
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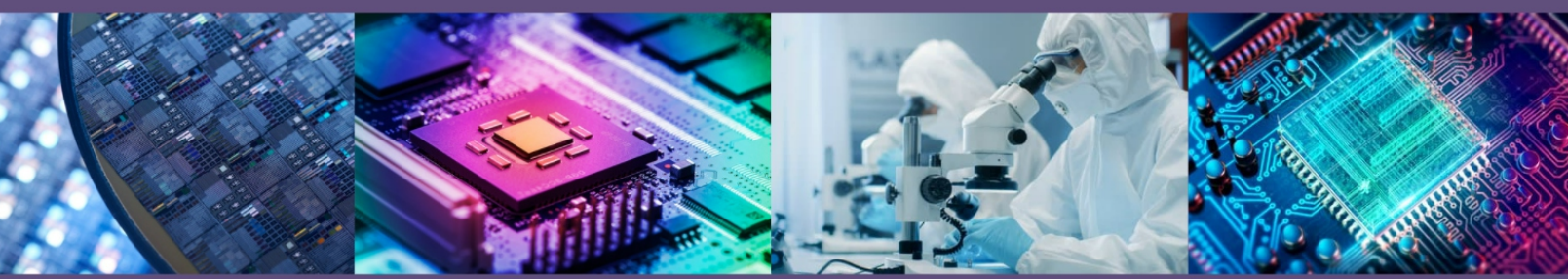

CSconnected is home to the world’s first regional ecosystem based on the manufacture of compound semiconductor enabled hardware, located in south Wales

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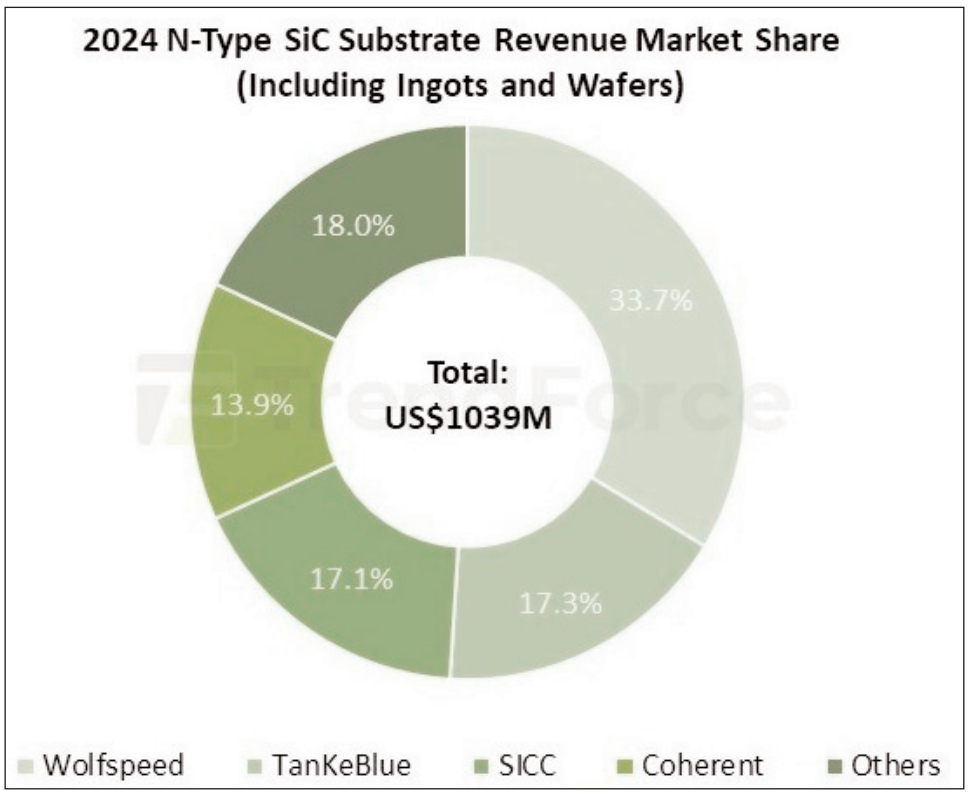
news

Silicon carbide substrate revenue falls 9% to $1.04bn in 2024, says TrendForce

But long-term demand prospects remain strong; 8-inch substrates to comprise over 20% of shipments by 2030

Weakening demand in the automotive and industrial sectors slowed shipment growth for silicon carbide (SiC) substrates in 2024, notes market research firm TrendForce. At the same time, intensifying market competition and sharp price declines have pushed global revenue for N-type SiC substrates down 9% year-on-year to US$1.04bn.

In 2025, the SiC substrate market will continue to face dual pressures of soft demand and oversupply. However, long-term growth prospects remain promising, reckons TrendForce. As production costs gradually decline and semiconductor device technology advances, SiC applications are expected to expand, particularly in diverse industrial segments. Moreover, heightened competition is accelerating industry consolidation and reshaping the market landscape.



Four major players control 82% market share; Wolfspeed remains the leader

Wolfspeed maintained its position as the top supplier in 2024 with a 33.7% market share, despite ongoing operational challenges. The firm remains a key force in the SiC materials market and continues to lead the industry's transition to 8-inch wafers

Chinese vendors TanKeBlue and SICC have rapidly emerged as major players, claiming market shares of 17.3% and 17.1% respectively, placing them in second and third place. TanKeBlue is the largest domestic SiC substrate supplier for China's power electronics market, while SICC leads in the 8-inch SiC wafer segment. Coherent, by contrast, dropped to fourth place with a share of 13.9%.

Although 6-inch SiC substrates will remain dominant in the near term — due to their steep price declines and the technical challenges of scaling 8-inch front-end processes — 8-inch wafers are seen as essential for further cost reduction and advancing chip performance. This is driving aggressive investment across the industry.

TrendForce forecasts that 8-inch SiC substrates will account for over 20% of total shipments by 2030, signaling a pivotal shift in the technology roadmap.

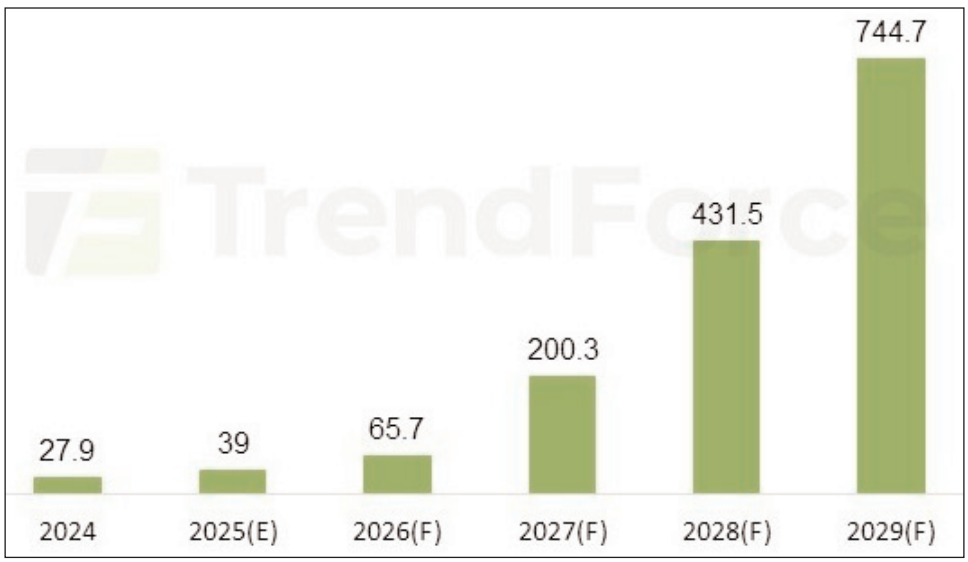
www.trendforce.com

Micro-LED display chip market growing at 93% CAGR to US$744.7m in 2029

Micro-LED expands beyond displays, unlocking new opportunities in transparent and non-display applications

The chip market for micro-LED display applications is rising at a compound annual growth rate (CAGR) of 93% from US$27.9m in 2024 and US$39m in 2025 to US$744.7m by 2029, forecasts TrendForce.

The market research firm's latest report '2025 Micro LED Display and Non-Display Application Market Analysis' shows that current development of micro-LED technology in the display sector focuses on two key challenges: optimizing manufacturing costs through design and production improvements, and identifying unique niche markets.



Estimated chip market for micro-LED display applications (US$m).

Cost improvements continue for large-sized displays

Presently, the bulk of the display-related micro-LED market is driven by large-sized displays, where Samsung holds a leading position. Future growth will rely not only on breakthroughs across several critical manufacturing processes but also on collaborations between Chinese chipmakers and brand manufacturers to push chip miniaturization. This will further enhance cost advantages for mass-produced micro-LED large-sized displays, says TrendForce.

Additionally, as artificial intelligence (AI) broadens the application scenarios for head-mounted devices and as smart driving ecosystems drive up demand for advanced automotive displays, these two sectors are expected to become major pillars of the micro-LED display market in the years ahead.

TrendForce notes that the industry standard for micro-LED large-sized displays is typically 4K resolution or higher. However, the currently commercialized, mass-producible pixel pitch remains at 0.5mm. Continued efforts to reduce pixel pitch are essential to further differentiate micro-LED from mini-LED video walls, along with overcoming challenges like low yield rates in driver connections and issues with panel seams.

Cost optimization is also shifting toward the backplane, where simplifying the manufacturing process can improve yields, and reducing the number of seams can cut down assembly steps. This contributes to overall cost reductions.

Transparent displays hold great promise; non-display applications open new doors

Micro-LED technology also shows strong potential in transparent display applications. These can be categorized into direct-view and micro-projection systems, with the key differences lying in viewing angles and focal distance management. In terms of use case, transparent direct-view displays are better suited for public environments where multiple people view content, and the combination of high brightness and high transparency makes micro-LED technology ideal, says TrendForce.

Meanwhile, micro-projection systems hold greater promise in privacy-sensitive personal electronic devices, where micro-LED technology offers ultra-miniaturized light engine solutions and is seen as the best option for micro-display technology in augmented-reality (AR) applications. Overall, micro-LED technology has significant room for expansion across diverse transparent display segments by developing both TFT and CMOS backplane platforms.

TrendForce emphasizes that the immediate priority for the micro-LED industry is to scale up the market quickly in order to realize economic efficiencies. As a result, non-display sectors have increasingly become important avenues for growth in addition to focusing on display applications.

These non-display opportunities span a wide range, including optical communication applications accelerated by AI, biotechnology-related medical uses, and industrial production areas such as 3D printing and photopolymerization. Ongoing innovations in these areas are adding further momentum to micro-LED market expansion.

www.trendforce.com

Compound semiconductors essential to unlocking the UK's AI action plan, says CSA Catapult

Compound semiconductors to enable new applications, helping to achieve net zero and a resilient telecoms network

Compound semiconductors will be critical to helping the UK achieve its AI action plan, driving economic growth and significant benefits for society, according to a report by Compound Semiconductor Applications (CSA) Catapult.

With the global market for AI set to grow to over $1.5 trillion by 2030, the report outlines the significant upgrade in hardware capability needed to cope with the increased computational and energy demands of AI technology. It also reckons that the UK is well positioned to lead the AI transformation through its recently published AI Opportunities Action Plan. But to realise this vision, it states that the UK must capitalize on its expertise in compound semiconductors.

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.

Offering greater energy efficiency, faster data processing and better reliability, compound semiconductors are superior to traditional silicon in areas such as power electronics, photonics and radio frequency (RF) communications — vital for infrastructure such as data centers. Also, as AI models grow and get more sophisticated, their power consumption also significantly increases. The data centers that power AI are already using 1% of global electricity. This is expected to grow to 8% by 2030. The need for a shift to faster and more efficient hardware is therefore clear.

Compound semiconductor-based photonic devices can also dramatically increase the speed at which computers process and transmit data, significantly reducing latency in AI applications.

Meanwhile, RF technologies leveraging compound semiconductors can improve the speed and efficiency of data transfer in AI applications, edge computing, and the Internet of Things (IoT), which is expected to connect over 32 billion devices worldwide by 2030.

"Silicon-based technologies are reaching their limits in terms of energy efficiency and performance. Compound semiconductors enable faster data processing, greater energy efficiency, and enhanced performance, making them essential for next-generation AI applications," says CSA Catapult's chief technology officer Nick Singh. "By leveraging the unique capabilities of compound semiconductors, the UK can build a future where AI not only drives economic growth but also delivers transformative benefits to society."

www.csa.catapult.org.uk

SMD opens R&D Innovation Hub at CSA Catapult

Wales–Sarawak collaboration to design, develop and innovate technology for edge AI devices

A Malaysian semiconductor firm has opened a new R&D Innovation Hub in Wales and signalled its intent to work with UK companies on designing next-generation semiconductor chips.

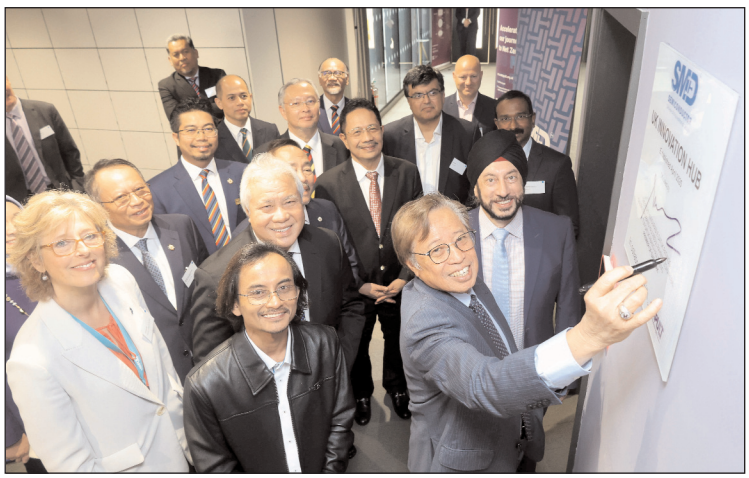
Sarawak Microelectronics Design (SMD) Semiconductor, an entity of the Sarawak Government established in September 2022 under State Financial Secretary Incorporation (SFS Inc), will be located at the Compound Semiconductor Applications (CSA) Catapult's Innovation Centre in Newport, Wales.

The hub was officially opened by the Premier of Sarawak at a special ceremony attended by delegates from the Sarawak, UK and Welsh governments, as well as industry partners.

During the ceremony, SMD Semiconductor and CSA Catapult signed and exchanged a formal agreement to collaborate on developing new compound semiconductor chips for AI and edge devices (such as sensors and cameras, performing data processing at the location of the device instead of sending it to the cloud, making them quicker, more energy efficient, more secure, and enabling real-time data processing, critical for applications in defence, healthcare, surveillance and robotics).

SMD Semiconductor focuses on advanced technology R&D, with an emphasis on chip design and the development of integrated circuit products. It is seeking to expand its capabilities into compound semiconductors and take advantage of the expertise of both CSA Catapult and UK industry.

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.



In 2024, CSA Catapult and SMD signed a memorandum of understanding (MoU) that laid the initial foundation for collaboration in the design, prototyping and manufacturing of next-generation chips.

"Advances in AI computing are already rapidly spreading from data centers to edge devices. However, to unlock the full potential of edge AI will require new and bold approaches to semiconductor devices," says CSA Catapult's head Raj Gawera. "We're delighted to have SMD Semiconductor locate with us at our Innovation Centre in Newport and to kickstart a program of activity that will see us design, develop and innovate technology to enable the next generation of edge AI devices. This formal partnership strengthens ties between the UK, Sarawak and Malaysian governments and is another example of how international partnerships are helping the UK grow its semiconductor industry and create strong, resilient supply chains for the future," he adds.

"Through our strategic partnerships with CSA Catapult, we are building a collaborative ecosystem that connects Sarawak with some of the most advanced semiconductor innovators in the world," says SMD Semiconductor's CEO Shariman Jamil. "The agreement is more than symbolic as they are actionable commitments to co-create breakthrough technologies, accelerate R&D, and open new markets. With the opening of our R&D Innovation Hub in UK, we are positioning ourselves on the world stage in driving future-ready chip design and innovation"

www.smdsemiconductor.com
www.csa.catapult.org.uk

Skyworks appoints Robert Schriesheim as interim CFO

Previous appointee Mark Dentinger not joining firm

Skyworks Solutions Inc of Irvine, CA, USA (which manufactures analog and mixed-signal semiconductors) says that, due to an unforeseen medical condition, Mark Dentinger will not be joining it as chief financial officer. It had been announced on 7 May that on 2 June he would be succeeding Kris Sennesael, who has stepped down as CFO to pursue another opportunity.

Instead, Robert Schriesheim, a member of the board of directors, has been appointed interim CFO while Skyworks conducts a comprehensive search for a successor.

"We are pleased that Rob has stepped into this interim role and are confident in his ability to guide our financial strategy and team during this transition," states CEO & president Phil Brace.

Schriesheim has been a director since 2006 and is currently chairman of Truax Partners LLC, partnering with CEOs, boards and institutional investors as a private investor and director. He has extensive financial, strategic and governance expertise, having served on 12 public boards ranging from under $1bn in revenue to Fortune 500 in size. He has served as CFO of four public companies with revenue from $1bn to $40bn, including Sears Holdings, Hewitt Associates and Lawson Software. His experience has been in the software, communications, semiconductor, information technology, financial services and retail sectors. He also serves as an adjunct associate professor of finance at The University of Chicago Booth School of Business, focused in the area of Corporate Governance and Activism. Schriesheim currently serves as lead independent director of Houlihan Lokey and as a director of Alight Solutions.

www.skyworksinc.com

Todd Lepinski appointed as senior VP, sales & marketing

Skyworks has appointed Todd Lepinski as senior VP, sales & marketing, effective 2 June. He succeeds Carlos Bori, who will remain with the firm in an advisory role for several months to ensure a smooth transition.

Lepinski is a "proven leader" and "accomplished executive" who brings "valuable knowledge and business acumen," comments CEO & president Phil Brace. He provides the "requisite skills and expertise needed to ensure Skyworks continues to deliver operational excellence and essential technologies and products to our customers while capturing new opportunities across a range of markets," he adds.

As a sales & marketing executive with experience driving global revenue growth and building high-performance teams in the semiconductor sector, Lepinski was most recently senor VP of worldwide sales & marketing at Synaptics. Prior to joining Synaptics in June 2021, he was VP of sales at ARM from April 2016 to June 2021. Previously, he held several sales management roles at Broadcom in the USA and Europe from 2004 to 2016. He has a bachelor's degree in electrical, electronics and communications engineering from the University of Wisconsin – Madison.

Altum RF showcasing products and expertise at IMS 2025

Highlights include new E-band family of power amplifiers and LNAs

Altum RF of Eindhoven, The Netherlands (which designs RF, microwave and millimeter-wave semiconductors) is showcasing its featured products and technical expertise in booth #966 at the IEEE MTT-S International Microwave Symposium (IMS 2025) in Moscone Center, San Francisco, CA, USA (15–20 June).

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

Highlights include the firm's new E-band family of power amplifiers and low-noise amplifiers supporting demanding mmWave telecom and SATCOM applications by offering high output power and gain for longer-range links. The E-band power amplifiers include an on-chip integrated power detector.

Product highlights are as follows:

- ARF1018: a 71–76GHz E-band power amplifier, 1.8W P_{sat}, bare die;
- ARF1019: an 81–86GHz E-band power amplifier, 1.6W P_{sat}, bare die;
- ARF1206: a 71–86GHz low-noise amplifier, 2.5–3.5dB NF from 71–86GHz, bare die;
- ARF1303: a DC–60GHz distributed amplifier, 15dB gain, 24dBm output P_{sat};
- ARF1200Q2: a 22–31.5GHz low-noise amplifier, 1.6dB NF, 2.5x2.5 QFN package;
- ARF1202Q2: a 22–31.5GHz low-noise amplifier, 2.5dB NF, 2.5x2.5 QFN package;
- ARF1020Q5: a 9–11GHz X-band power amplifier, 42dBm, 5x5 QFN package.

www.ims-ieee.org
www.altumrf.com

imec's 300mm RF silicon interposer platform for chiplet-based heterogeneous integration demonstrates record low insertion loss at frequencies up to 325GHz

Flexible integration of digital, analog, RF-to-sub-THz CMOS and III/V chiplets on a single carrier paves way for high-performance RF and mixed-signal applications

At the IEEE's 75th Electronic Components and Technology Conference (ECTC 2025) in Dallas, TX, USA (27–30 May), nano-electronics research center imec of Leuven, Belgium is highlighting the performance and flexibility of its 300mm RF silicon interposer platform, which enables seamless integration of RF-to-sub-THz CMOS and III/V chiplets on a single carrier, achieving a record-low insertion loss of just 0.73dB/mm at frequencies up to 325GHz. This is said to pave the way for compact, low-loss and scalable next-generation RF and mixed-signal systems.

For advanced applications — from wireless data centers and high-resolution automotive radar to pluggable optical transceivers and ultra-high-speed wireless USB solutions for short-range device-to-device communications — industry momentum is rapidly shifting to mmWave (30–100GHz) and sub-THz (100–300GHz) frequency bands.

However, unlocking the potential of these higher frequencies requires components that combine the high output power and drive capabilities of III/V materials with the scalability and cost-efficiency of CMOS technology — all integrated on a single carrier. This is where chiplet-based heterogeneous systems, built on RF silicon interposer technology, make the difference, enabling seamless integration of digital and RF components, says imec.

imec's 325GHz RF silicon interposer platform for advanced chiplet-based heterogeneous systems.

A 300mm RF silicon interposer with record-low insertion loss of 0.73dB/mm at 325GHz

At last year's IEDM, imec reported a breakthrough in the hetero-integration of InP chiplets on a 300mm RF silicon interposer — at frequencies up to 140GHz. Now, at ECTC 2025, imec's new milestone uses the same silicon interposer platform to demonstrate a record low insertion loss of just 0.73dB/mm at frequencies up to 325GHz.

"What sets our approach apart is the ability to mix and match digital, RF-to-sub-THz CMOS technology nodes with a wide variety of III/V chiplets — not limited to InP [indium phosphide], but also including SiGe [silicon germanium], GaAs [gallium arsenide], and others," says Xiao Sun, principal member of technical staff at imec.

The platform's digital interconnects benefit from copper (Cu) damascene back-end-of-line (BEOL) processing, while mmWave signal paths employ transmission lines on a low-loss RF polymer layer. Additionally, high-quality passive components — such as inductors — are integrated directly onto the RF silicon interposer, reducing the active chip area, lowering costs, and ensuring compact, low-loss RF interconnects for improved performance.

Imec's technology combines RF/microwave links (with 5µm line-width and 5µm spacing), with high-density digital interconnects (with 1µm/1µm line/spacing), and a fine flip-chip pitch of 40µm — with efforts underway to scale down to 20µm. Together, these features enable high integration density and a compact footprint.

The path forward: opening the platform to partners for prototyping

As a next step, Xiao Sun and her team are preparing to augment the platform with additional features, including through-silicon vias, back-side redistribution layers, and MIMCAPs for supply decoupling. In parallel, imec is preparing to open its RF interposer R&D platform to partners for early assessment, system validation, and prototyping — amongst others by making it accessible via NanoIC, imec's sub-2nm pilot line as part of the EU Chips Act.

At ECTC 2025, his research was discussed on 27 May during the special session 'Advancements in mmWave and Sub-THz Packaging for Communication & Radar Applications', followed by a detailed presentation of the results on 28 May during ECTC's 'Session 5: Advanced Design for Heterogeneous Integration'.

www.ectc.net
www.imec-int.com

Wolfspeed's CFO Neill Reynolds leaves firm

Wolfspeed Inc of Durham, NC, USA — which makes silicon carbide (SiC) materials and power semiconductor devices — mutually agreed with Neill Reynolds to conclude his role as executive VP & chief financial officer at the end of May.

"Neill has been an important partner as we navigate our liability-management initiatives and position Wolfspeed for its next phase," says executive chairman Thomas Werner. "We appreciate his commitment to staying on to support our efforts to strengthen the company's balance sheet," he adds.

Wolfspeed has initiated a search with a leading executive-search firm to evaluate internal and external candidates for a permanent CFO.

www.wolfspeed.com

Board gains finance, accounting & restructuring experts, aiding ongoing discussions with lenders

Wolfspeed has added Paul Walsh and Mark Jensen to its board of directors, as members of the Audit Committee.

"Both bring invaluable industry experience and deep expertise in accounting, finance and restructuring," says chairman Tom Werner. "Their backgrounds position them well to help the board and company navigate ongoing discussions with lenders and reach a comprehensive solution to address our balance sheet. Guidance from both Paul and Mark will be critical to our efforts in reaching an outcome that will support our long-term success."

Walsh was most recently chief financial officer and senior VP, finance & administration of fabless firm Allegro Microsystems (a designer and developer of sensor integrated circuits and application-specific analog power ICs) from 2014 to 2022. Previously he was CFO of Rocket Software and held finance roles at Silicon Laboratories, ultimately serving as senior VP & CFO. He is currently on the boards of Kopin Corp and Semtech Corp.

Jensen has extensive experience in finance and accounting, having most recently served as US managing partner, Technology Industry, at Deloitte from 2001 to 2012. Previously, he was CFO at Redleaf Group and managing partner at Arthur Andersen. Jensen currently serves on the boards of 23andMe and Lattice Semiconductor.

Wolfspeed creates role of chief operating officer

Wolfspeed has appointed David Emerson Ph.D. as executive VP & chief operating officer, a newly created role for overseeing operational excellence across the firm's 200mm facility footprint, reducing customer lead times, and manufacturing leading silicon carbide solutions for Wolfspeed's customers. He will be responsible for the firm's Operations, Supply Chain, and Quality divisions.

As the former executive VP of the LED Products division, Emerson has a track record of transforming complex, global operations into scaled and high-performing businesses in emerging technologies. While at Wolfspeed (then named Cree Inc), Emerson gained an in-depth understanding of both the devices and materials businesses and helped guide the firm during a time of raised US government scrutiny on global trade practices and fair competition.

"Having previously led our LED business through market disruption and global expansion, Dave brings a wealth of industry expertise and strategic insight which positions him well to drive operational excellence at Wolfspeed," comments CEO Robert Feurle. "His ability to directly confront complex challenges aligns with our ambitions at this critical stage in Wolfspeed's lifecycle. I look forward to collaborating with him as we work to reaccelerate revenue growth, work to achieve profitability, complete our 200mm transition, and ultimately advance Wolfspeed's global leadership in silicon carbide."

"After spending a sizable portion of my career at Cree overseeing the development of SiC-powered LED solutions, I am eager to contribute to Wolfspeed's forward momentum," says Emerson. "I am impressed by the company's sustained leadership in silicon carbide and its vertically integrated, greenfield 200mm facility footprint. "Wolfspeed is increasingly focused on serving the fastest-growing areas of the SiC market, and these strategic verticals necessitate high-performance, high-quality solutions. My experience driving operational excellence has equipped me with the skills to help develop best-in-class solutions for our blue-chip customers, all while working to accelerate the company's path to profitability."

Wolfspeed says adding the COO role to the executive leadership team underscores its commitment to operational excellence as it scales its 200mm SiC manufacturing platform. The COO will play a key role in driving manufacturing quality and efficiency. Emerson will also be responsible for accelerating time-to-market and ensuring consistent delivery of innovative, high-performance SiC solutions to customers worldwide. As Wolfspeed continues to expand capacity to serve the expected growth in demand across automotive, industrial and energy markets, the role is central to enhancing operational agility and achieving growth.

Singapore's A*STAR's inaugural Innovate Together event launches first industry-grade 200mm SiC Open R&D Line

New facility to accelerate innovation and collaboration for SiC devices

At SEMICON Southeast Asia 2025, Singapore's Agency for Science, Technology and Research (A*STAR) hosted the inaugural Innovate Together event — designed as a convergence point for industry, academia and the public sector — where it unveiled initiatives, strategic global partnerships, and new research platforms.

"Singapore's semiconductor ecosystem is built on strong collaborations between public agencies, academia, and industry partners," notes professor Yeo Yee Chia, deputy chief executive (Innovation & Enterprise) at A*STAR. "The Innovate Together event exemplifies our commitment to fostering these partnerships and accelerating innovation to address industry challenges and capture new opportunities in the global semiconductor landscape."

Innovate Together featured expertise from leading institutions on key technological areas that are considered to be key to the future of Singapore's semiconductor industry. Speakers from A*STAR, National University of Singapore (NUS), Nanyang Technological University, Singapore (NTU Singapore), and the National Semiconductor Translation and Innovation Centre (NSTIC) shared the latest insights on advanced packaging, photonics, MEMS, and mmWave and beyond.

First industry-grade 200mm silicon carbide open R&D line

At the heart of Innovate Together was the launch by the A*STAR Institute of Microelectronics (A*STAR IME) of the world's first industry-grade 200mm silicon carbide (SiC) open R&D line. Designed to enable and accelerate joint SiC innovation between researchers and companies (from materials growth and defect analysis to device fabrication and testing), the facility is intended to strengthen Singapore's capabilities in wide-bandgap semiconductor research and address future demands for high-power applications.

The Open R&D Line addresses key challenges faced in the development of SiC devices, including the high cost of industry-grade tools, limited access to advanced technologies, complex and fragmented development processes, and the lack of collaboration and knowledge sharing.

It is reckoned that, by offering a complete suite of SiC development and pilot manufacturing capabilities under one roof, the Open R&D Line increases the speed of R&D by eliminating the fragmented R&D processes that previously required researchers and companies to work with multiple facilities.

The Open R&D Line should enable the development of advanced technologies by having a close partnership with key equipment OEMs and materials suppliers — ASM, centrotherm, Nissin, Soitec and Toray — who have contributed their latest technologies and are co-developing their next-generation products with A*STAR:

- ASM's PE1O8 tool for depositing high-quality SiC epitaxial layers;
- centrotherm's c.ACTIVATOR 200 and c.OXIDATOR 200 tools for high-temperature SiC annealing and oxidation;
- Nissin's first and only in-situ x-ray diffraction capability for the SiC ion implantation process;
- Soitec's SmartSiC semiconductor engineered substrate technology;
- Toray's innovative materials for SiC power module packaging products.

Several global and local companies have partnered with A*STAR IME to utilize the Open R&D Line's capabilities, highlighting strong industry demand for such collaborative platforms:

- STMicroelectronics is leveraging engineering capabilities and tools to develop ways to streamline its manufacturing processes and improve the quality of its SiC devices;
- One of the world's top foundries is developing key process technologies through the Open R&D Line, with the intention to scale up production of advanced SiC devices;
- WaferLead, a local start-up, is using the Open R&D Line to develop, evaluate and enhance the performance and reliability of its wafers.

Advancing semiconductor talent and technologies through global collaborations

To kickstart international collaborations in semiconductor training and R&D, A*STAR IME has signed memoranda of understanding (MOUs) with key partners, including the Uzeltexsanoat Association representing Uzbekistan's electronics sector, the Singapore Semiconductor Industry Association (SSIA), the Indian Institute of Technology, Kharagpur (IIT KGP), and the Fraunhofer Institute for Electronic Nano Systems ENAS. These partnerships pave the way for internship programs, joint research projects, and knowledge exchange through training and knowledge sharing activities.

At the sidelines of the SEMICON Southeast Asia event, A*STAR also formalized its partnerships with GlobalFoundries and Nearfield Instruments, to expand capabilities in advanced packaging and to drive innovation in semiconductor metrology technologies.

Under an MOU, GlobalFoundries will gain access to A*STAR's advanced R&D facilities, capabilities and technical support for technology development in advanced packaging and workforce skills enhancement. The multi-year research collaboration between A*STAR IME and semiconductor metrology firm Nearfield Instruments aims to accelerate the development of advanced metrology solutions that enable efficient chip production.

www.a-star.edu.sg/ime/Research/power-electronics

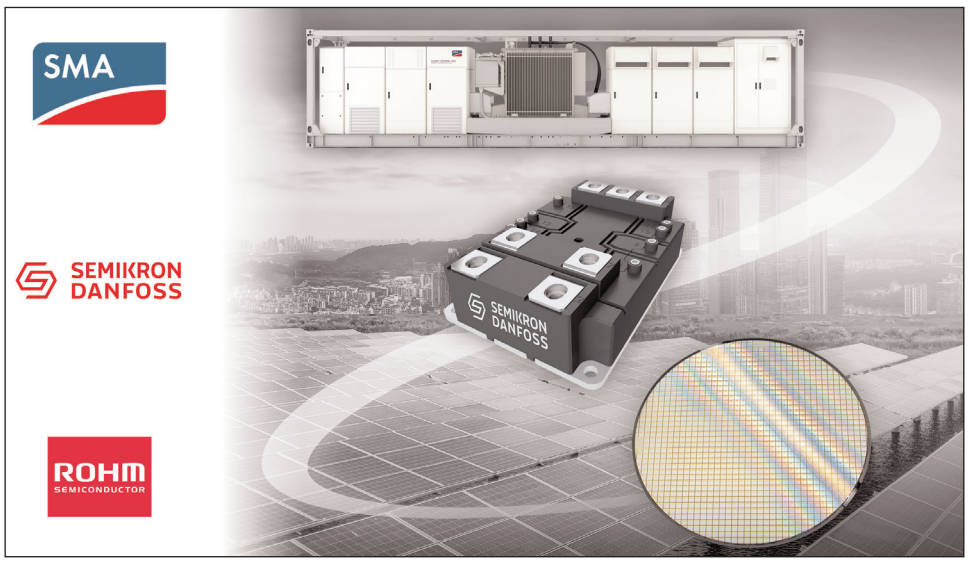
Semikron Danfoss' module with ROHM's latest 2kV SiC MOSFETs integrated into SMA's large-scale solar system

SEMITRANS 20 module targeted at 1500V_{DC} applications

SMA Solar Technology AG (a global specialist in photovoltaic and storage system technology) has adopted Germany-based power electronics firm Semikron Danfoss' SEMITRANS 20 module with ROHM's latest 2kV silicon carbide (SiC) MOSFETs inside its new large-scale solar system Sunny Central FLEX, a modular platform designed to streamline and enhance grid connections for large-scale photovoltaic installations, battery storage systems, and emerging technologies.

"ROHM's new 2kV-class SiC MOSFETs are designed to enable simple and highly efficient converter topologies for 1500V DC-links. It is developed with high-reliability targets and cosmic radiation robustness – addressing the stringent conditions and extended converter lifetime requirements of the photovoltaic sector and beyond," says Wolfram Harnack, president at Germany-based ROHM Semiconductor GmbH. "The technology of our SiC device structure and integrated on-chip gate resistance eases device paralleling and simplifies high-power module designs," he adds. "Mass production has started."

Designed for high-power applications and fast switching operation, Semikron Danfoss' SEMITRANS 20 is the next generation of power modules for large converters. SEMITRANS 20 with ROHM's 2kV SiC MOSFETs is an integral part of SMA's Sunny Central FLEX. "Semikron Danfoss and ROHM have collaborated for over a decade, focusing primarily on the implementation of silicon carbide (SiC) in power modules. More recently, we have teamed up to integrate silicon IGBTs as well," says Peter Sontheimer, senior VP of Semikron Danfoss' Industry division. "The new SEMITRANS 20 offers simple, efficient solutions for 1500V_{DC} applications. These modules are ideal for solar and energy storage inverters. Upcoming high-power electric truck chargers, as well as wind converters, will also benefit," he adds.



"The cooperation between SMA, Semikron Danfoss and ROHM is proof of how the seamless integration of innovative technologies creates the conditions for future-oriented energy projects," says Bernd Gessner, product manager Power Conversion Systems at SMA. "The demands on these solutions are higher than ever," he adds. "SMA has decades of expertise and fulfills the highest requirements in terms of performance, reliability, durability and flexibility. The fact that Sunny Central FLEX meets these highest future-proof standards is also the result of the excellent cooperation with our partners," he adds.

www.semikron-danfoss.com
www.rohm.com/products/sic-power-devices
www.sma.de/en

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For sales, product & distributor information, please visit americas.fujielectric.com/UL-Plug-In

or contact us: x-fea-fuji-dc@fujielectric.com

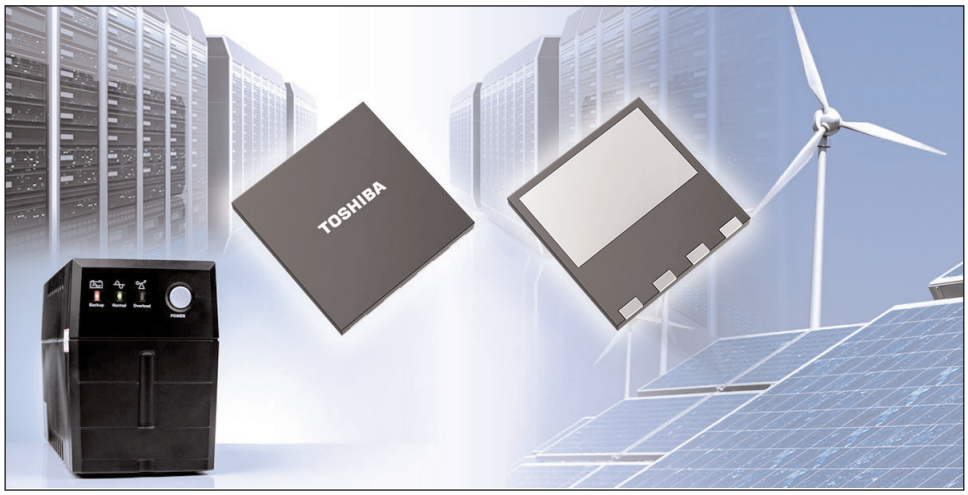
Toshiba releases 650V third-generation SiC MOSFETs in DFN8x8 package

New devices boost efficiency and power density of industrial equipment

Toshiba Electronic Devices & Storage Corp of Kawasaki, Japan has begun volume shipments of four new 650V silicon carbide MOSFETs (TW031V65C, TW054V65C, TW092V65C and TW123V65C), equipped with its latest third-generation SiC MOSFET chips and housed in a compact 8mm x 8mm x 0.85mm DFN8x8 package.

The new products are the first third-generation SiC MOSFETs to use the small surface-mount DFN8x8 package, which reduces volume by over 90% compared with lead-inserted packages such as TO-247 and TO-247-4L(X) and improves equipment power density.

Surface mounting also allows the use of parasitic impedance components smaller than those of lead-inserted packages, reducing switching losses. DFN8x8 is a 4-pin package (with a signal-source pin connected close to the FET chip), allowing use of a Kelvin connection of its 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 TW054V65C, it cuts turn-on loss by about 55% and turn-off loss by about 25% compared with existing Toshiba products (a 650V third-generation SiC MOSFET with equivalent voltage and on-resistance that uses the TO-247 package without Kelvin connection), helping to reduce power loss in equipment.



Toshiba's first 650V third-generation SiC MOSFETs in a DFN8x8 package.

The new devices are suitable for industrial equipment such as SMPS (switched-mode power supplies) in servers, data centers, communications equipment etc, uninterruptible power supplies (UPS), and power conditioners for photovoltaic inverters and EV charging stations.

Toshiba says that 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

CISSOID and EDAG partner to accelerate development of silicon carbide traction inverters

CISSOID's SiC power modules and control solutions combine with EDAG's design, integration and validation of electric powertrains

High-reliability power semiconductor solutions provider CISSOID of Mont-Saint-Guibert, Belgium and EDAG Group of Wiesbaden, Germany (an independent engineering services provider for the mobility industry) have announced a strategic partnership to accelerate the development of next-generation silicon carbide (SiC) traction inverters for electric mobility applications.

The collaboration brings together CISSOID's expertise in SiC power semiconductor modules and control solutions with EDAG's engineering know-how in the design, integration and validation of electric powertrains. By combining their complementary strengths, the two firms aim to offer e-mobility OEMs and equipment suppliers unmatched technical support and complete solutions for the efficient, reliable and functionally safe development of SiC-based traction inverters.

Benefits of the partnership are:

- joint development and integration of SiC inverter platforms optimized for high efficiency, high power density, and extended operating life;
- comprehensive engineering services spanning inverter system design, thermal management, mechanical integration, functional safety and EMC compliance;
- accelerated time-to-market through access to ready-to-implement, proven hardware and software solutions;
- end-to-end technical support, from concept design to prototyping and vehicle integration.

"This partnership with EDAG enables us to jointly address the growing demand for high-performance, SiC-based traction inverters," says CISSOID's chief technology officer Pierre Delatte. "Together, we will help manufacturers harness the full potential of silicon carbide technology, making electric vehicles more efficient, compact, and reliable," he adds.

"By partnering with CISSOID, we expand our capabilities in power electronics, offering our customers integrated solutions for the next generation of electric drivetrains," says Lennart Benthele, head of Drivetrain & Thermal Development at EDAG.

The collaboration is described as a step forward in supporting the fast-evolving electric mobility market, where high-efficiency, compact and robust inverter solutions are crucial to unlocking the full performance potential of modern EVs.

www.cissoid.com
www.edag.com

Hyperdrives selects CISSOID's inverter control modules

Hyperdrives of Munich, Germany has chosen CISSOID's silicon carbide Inverter Control Modules (ICMs) to power its hollow-conductor cooled electric motors. This collaboration aims to set new standards in power density, efficiency and performance in the electric vehicle industry and beyond.

Hyperdrives' approach utilizes a direct cooling system that dissipates heat at its source by channelling cooling fluid through hollow conductor windings. This design enhances heat dissipation by a factor of ten, allowing for continuous currents three times higher than traditional systems and resulting in motors that are twice as power-dense. The automotive flagship product, Hyperdrives One, exemplifies this technology, offering what are claimed to be exceptional peak and continuous power and torque density while reducing material costs by up to 40%.

To complement this motor design, Hyperdrives has integrated CISSOID's 3-phase 1200V/550A SiC inverter control module. Combining high efficiency with robust control, the CXT-ICM3SA series integrates SiC power modules, gate driver boards, and control boards featuring Intel Automotive's T222 Adaptive Control Unit (ACU) with its accompanying control software. The combination ensures rapid development and deployment of high-performance e- mobility drivetrains. Motor drive developers can also leverage CISSOID's SiC Inverter Reference Designs to further accelerate their design cycle.

"Finding an inverter solution that matches the extreme power density of our hollow-conductor cooled motors was a real challenge – but with CISSOID's SiC Inverter Control Module we found exactly that," says Hyperdrives' co-founder Benjamin Hengstler. "The result is an ultra-compact, ready-to-install EDU that is second-to-none in gravimetric and volumetric power density. The great feedback from our customers in automotive, aviation and marine is a testament to this long-standing collaboration," he adds.

"Partnering with Hyperdrives is an exciting opportunity to push the boundaries of electric drive systems," says CISSOID's chief technology officer Pierre Delatte. "Our SiC inverter technology is designed to meet the highest standards in power conversion, and together with Hyperdrives' cutting-edge motors, we are enabling a new era of electrification."

www.hyperdrives.de

Infineon and electronics supplier Visteon collaborate on power conversion systems for EVs

CoolGaN & CoolSiC devices to be incorporated into powertrain systems

Infineon Technologies AG of Munich, Germany and automotive cockpit electronics supplier Visteon Corp of Van Buren Township, MI, USA have signed a memorandum of understanding (MOU) to advance the development of next-generation electric vehicle powertrains.

The firms will collaborate and integrate power conversion devices based on Infineon semiconductors, with particular emphasis on wide-bandgap device technologies, which provide significant advantages in power conversion applications compared with silicon-based semiconductors. These include greater power density, efficiency and thermal performance, which contribute to improved efficiency and reduced system costs for next-generation power conversion modules for the automotive sector.

Future Visteon EV powertrain applications incorporating Infineon CoolGaN (gallium nitride) and CoolSiC (silicon carbide) devices may include battery junction boxes, DC–DC converters and on-board chargers. The resulting powertrain systems will conform to the highest efficiency, robustness and reliability, the firms say.

"Working with Infineon allows us to integrate cutting-edge semiconductor technologies that are essential in improving power conversion efficiency and overall system capability of next-generation electric vehicles," says Dr Tao Wang, head of Visteon's Electrification product line. "This collaboration will advance technologies that accelerate the transition to a more sustainable and efficient mobility ecosystem," he adds.

"Visteon is a recognized innovator and an early adopter of new technologies, making them an ideal partner for us," comments Peter Schaefer, Infineon's chief sales officer Automotive.

www.visteon.com

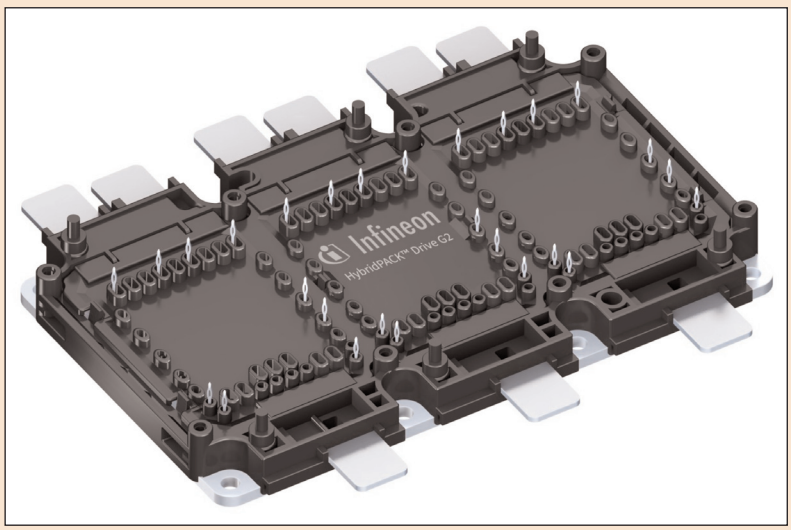
Infineon to supply power modules for electric vehicle traction inverters in Rivian's R2 platform

HybridPACK Drive G2 silicon carbide and silicon module supply to start in 2026

Infineon is to supply silicon carbide (SiC) and silicon (Si) power modules from its HybridPACK Drive G2 family for traction inverters in the R2 platform of electric vehicle (EV) manufacturer Rivian Automotive Inc of Irvine, CA, USA. Supply is expected to start in 2026. Infineon will also supply other products for the platform, including AURIX TC3x micro-controllers and power management ICs.

HybridPACK Drive is Infineon's power module family for electric vehicles, with more than 10.5 million units sold since 2017.

"We are committed to enhancing the performance and range of electric vehicles jointly with innovative automotive companies like Rivian," says Stefan Obersriebnig, head of the product line for high-voltage modules in Infineon's Automotive Division. "Our dedication for innovation and zero-defect quality has made us the preferred partner of the automotive industry," he claims. "With our broad product portfolio, system expertise and manufacturing capabilities, we are a key enabler of emission-free, sustainable mobility."



Infineon's HybridPACK Drive G2 power module.

With the expansion of its Kulim fab in Malaysia, Infineon is building a 200mm SiC power fab and further strengthening its role as a high-volume supplier to the automotive industry. As 'Infineon One Virtual Fab' for wide-bandgap (WBG) technologies, the firm's production sites in Kulim and Villach share technologies and processes. This is said to allow fast ramping and smooth and highly efficient operations in SiC and gallium nitride (GaN) manufacturing.

www.infineon.com

Infineon collaborates with NVIDIA on industry-first 800V power delivery architecture for AI data-center server racks

New high-voltage direct current distribution ensures reliable and more efficient power delivery

In collaboration with NVIDIA of Santa Clara, CA, USA, Infineon Technologies AG of Munich, Germany is developing the next generation of power systems for AI data centers based on a new power delivery architecture with central power generation of 800V high-voltage direct current (HVDC).

The new system architecture significantly increases energy-efficient power distribution across the data center and allows power conversion directly at the AI chip (graphic processing unit, GPU) within the server board. Infineon reckons that its expertise in power conversion solutions from grid to core based on all relevant semiconductor materials silicon (Si), silicon carbide (SiC) and gallium nitride (GaN) is accelerating the roadmap to a full-scale HVDC architecture.

This step paves the way for the implementation of advanced power delivery architectures in accelerated computing data centers and will further enhance reliability and efficiency, it is expected.

As AI data centers already are going beyond 100,000 individual GPUs, the need for more efficient power delivery is becoming increasingly important. AI data centers will require power outputs of 1MW and more per IT rack before the end of the decade. The HVDC architecture, coupled with high-density multi-phase solutions, will therefore set a new standard, Infineon reckons, driving the development of high-quality components and power distribution systems.

"The combination of Infineon's application and system know-how in powering AI from grid to core, combined with NVIDIA's world-leading expertise in accelerated computing, paves the way for a new standard for power architecture in AI data centers to enable faster, more efficient and scalable AI infrastructure," reckons Adam White, division president Power & Sensor Systems at Infineon.

"The new 800V HVDC system architecture delivers high-reliability, energy-efficient power distribution across the data center," says Gabriele Gorla, VP of system engineering at NVIDIA. "Through this innovative approach, NVIDIA is able to optimize the energy consumption of our advanced AI infrastructure, which supports our commitment to sustainability while also delivering the performance and scalability required for the next generation of AI workloads."

At present, the power supply in AI data centers is decentralized, so the AI chips are supplied with power by a large number of power supply units (PSU). The future system architecture will be centralized, making the best possible use of the constraint space in a server rack. This will increase the importance of leading-edge power semiconductor solutions using fewest power conversion stages and allowing upgrades to even higher distribution voltages, says Infineon.

As a provider of power semiconductors and systems integration, Infineon expects the proportion of power semiconductors in a centralized HVDC architecture to be similar or higher than in the existing AC distribution architecture. In addition to the scaling of the HVDC power architecture, Infineon continues to support state-of-the-art DCDC multi-phase solutions and intermediate architectures for hyperscalers and AI data-center operators with a broad product portfolio based on all relevant semiconductor materials along the entire power flow.

www.nvidia.com

Infineon introduces new CoolSiC JFET technology for smarter and faster solid-state power distribution

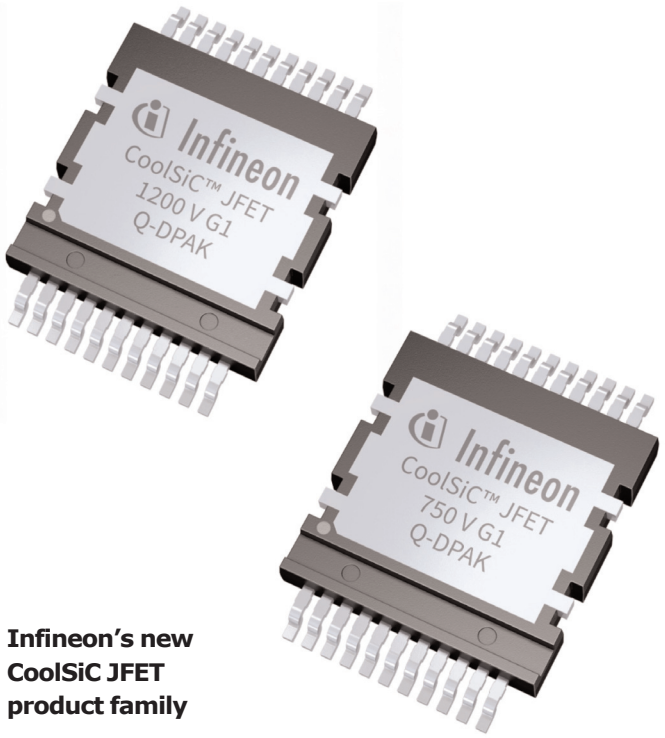
Engineering samples available in 2025, for volume production in 2026

To enable the next generation of solid-state power distribution systems, Infineon Technologies AG of Munich, Germany is expanding its silicon carbide (SiC) portfolio with the new CoolSiC JFET product family.

The new devices are said to deliver minimized conduction losses, solid turn-off capability, and high robustness, making them suitable for advanced solid-state protection and distribution. With robust short-circuit capability, thermal stability in linear mode, and precise overvoltage control, CoolSiC JFETs are claimed to enable reliable and efficient system performance in a wide range of industrial and automotive applications, including solid-state circuit breakers (SSCBs), AI data-center hot-swaps, eFuses, motor soft starters, industrial safety relays, and automotive battery disconnect switches.

"With CoolSiC JFET, we are addressing the growing demand for smarter, faster and more robust power distribution systems," says Dr Peter Wawer, division president Green Industrial Power at Infineon. "This application-driven power semiconductor technology is specifically designed to provide our customers with the tools they need to solve the complex challenges in this rapidly evolving space," he adds. "We are proud to introduce devices that achieve best-in-class $R_{DS(ON)}$, setting a new standard for SiC performance."

The first generation of CoolSiC JFETs features ultra-low $R_{DS(ON)}$ starting at 1.5mΩ (750V_{BDss}) and 2.3mΩ (1200V_{BDss}), significantly reducing conduction losses. The bulk-channel optimized SiC JFET offers high robustness under short-circuit and avalanche failure conditions. Housed in a Q-DPAK top-side-cooled package, the devices support easy paralleling and scalable current handling, enabling compact, high-power systems with flexible layout and integration options. Their predictable switching behavior under thermal stress, overload and fault conditions provides maximum long-term reliability in continuous operation.



Infineon's new CoolSiC JFET product family

To meet the thermal and mechanical challenges of harsh application environments, CoolSiC JFETs leverage Infineon's advanced .XT interconnection technology with diffusion soldering. This significantly improves transient thermal impedance and robustness under pulsed and cyclic loads typical of industrial power systems. Tested and qualified under real-world operating conditions of solid-state power switches and based on the industry-standard Q-DPAK package, the devices enable quick and seamless design integration in both industrial and automotive applications.

Engineering samples of the new CoolSiC JFET family will be available later in 2025, with volume production starting in 2026. The product portfolio will be further expanded with a variety of packages and modules.

The product family was demonstrated at the Power Electronics, Intelligent Motion, Renewable Energy and Energy Management (PCIM 2025) Expo & Conference in Nuremberg, Germany (6–8 May).

www.infineon.com/jfet
www.mesago.de/en/PCIM

Infineon introduces trench-based SiC superjunction technology

Initial 1200V ID-PAK products targeted at automotive traction inverters

As a pioneer in the market introduction of silicon carbide (SiC) power devices and trench technology for SiC MOSFETs (combining what is claimed to be excellent performance with high robustness), Infineon Technologies AG of Munich, Germany says that its CoolSiC product line now spans from 400V to 3.3kV and covers a broad range of applications including automotive drivetrains, EV charging, solar energy systems, energy storage, and high-power traction inverters. Building on a track record in SiC business development and leveraging its position as the innovator of charge-compensating devices in silicon (CoolMOS), Infineon is now introducing a trench-based SiC superjunction (TSJ) technology concept.

"With the introduction of the TSJ concept, we are significantly expanding the technological capabilities of silicon carbide," claims Peter Wawer, president of Infineon's Green Industrial Power Division. "The combination of trench and superjunction technology enables higher efficiency and more compact designs — an important step for applications requiring the highest levels of performance and reliability."

Infineon is gradually expanding its CoolSiC product portfolio, leveraging SiC TSJ technology. This expansion will encompass a diverse range of package types, including discretes, molded and frame-based modules, as well as bare dies. The extended portfolio will cater to a broad spectrum of applications, targeting both the automotive and industrial sectors.

The first products based on the new technology will be 1200V in Infineon ID-PAK packages for automotive traction inverters and combine the advantages of trench technology and superjunction design, capitalizing on Infineon's more than 25 years of experience in SiC and silicon-based superjunction technology (CoolMOS). This scalable package platform supports power levels of up to 800kW, enabling a high degree of system flexibility. Key benefits of the technology include increased power density, achieved through an up to 40% improvement in $R_{DS(on)}$*A, allowing for more compact designs within a given power class. Additionally, the 1200V SiC trench-superjunction concept in ID-PAK enables up to 25% higher current capability in main inverters without compromising short-circuit capability.

This advance also results in enhanced overall system performance, delivering improved energy efficiency, reduced cooling requirements, and higher reliability for demanding automotive and industrial applications. Moreover, the system benefits from reduced parallelization requirements, simplifying the design process and lowering overall system costs. The Infineon ID-PAK package equipped with SiC TSJ technology hence contributes to the development of more efficient and cost-effective traction inverter designs for automotive applications.

"Our new trench-based SiC superjunction technology brings further value to electric vehicle drivetrains, enabling higher efficiency and system design simplicity," says Peter Schiefer, president of Infineon's Automotive Division.

As an early customer, Hyundai Motor Company development teams will engage with Infineon's trench-superjunction technology, leveraging its benefits to enhance their EV offerings. This partnership is expected to drive the development of more efficient and compact EV drivetrains.

Initial ID-PAK 1200V samples are now available for selected automotive drivetrain customers. The SiC TSJ-based ID-PAK 1200V package is expected to be ready for volume production in 2027.

www.infineon.com

Infineon launches CoolSiC MOSFET 750V G2 technology

Ultra-low $R_{DS(on)}$ suits automotive and industrial power electronics

Infineon Technologies AG of Munich, Germany has launched CoolSiC MOSFET 750V G2 technology, designed to deliver improved system efficiency and increased power density in automotive and industrial power conversion applications. The CoolSiC MOSFETs 750V G2 technology offers a granular portfolio with typical $R_{DS(on)}$ values up to 60mΩ at 25°C, making it suitable for a wide range of applications, including on-board chargers (OBCs), DC–DC converters, auxiliaries for electric vehicles (xEVs) as well as industrial applications in EV charging, solar inverter, energy storage systems, telecom and SMPS.

The ultra-low $R_{DS(on)}$ values 4mΩ and 7mΩ enable what is claimed to be outstanding performance in static-switching applications, making the MOSFETs suitable for applications such as eFuse, high-voltage battery disconnect switches, solid-state circuit breakers, and solid-state relays. The best-in-class lowest $R_{DS(on)}$ 4mΩ is featured in Infineon's top-side cooled Q-DPAK package, which is designed to provide optimal thermal performance and reliability.

Infineon's new CoolSiC 750V G2.

The technology also exhibits what are claimed to be excellent $R_{DS(on)}$ x Q_{OSS} and best-in-class $R_{DS(on)}$ x Q_{fr}, contributing to reduced switching loss in both hard-switching and soft-switching topologies with superior efficiency in hard-switching user cases. With reduced gate charge, the technology allows for faster switching and reduces gate drive losses, making them more efficient in high-frequency applications.

Additionally, the CoolSiC MOSFETs 750V G2 offer a combination of high threshold voltage $VG_{S(th)}$, typical of 4.5V at 25°C and ultra-low Q_{GD}/Q_{GS} ratio, which reinforce robustness against parasitic turn-on (PTO). Furthermore, the technology allows for extended gate-driving capabilities, supporting static gate voltages of up to −7V and transient gate voltages of up to −11V. This enhanced voltage tolerance provides engineers with greater design margins and best compatibility with other devices in the market.

The CoolSiC 750V G2 delivers what is claimed to be unparalleled switching performance, ease-of-use and superior reliability with firm adherence to AEC Q101 standards for automotive-grade parts and JEDEC standard for industrial-grade parts. It enables a more efficient, compact and cost-effective designs to fulfill the ever-growing market needs and underscores its commitment to reliability and longevity in safety-critical automotive applications.

Infineon's CoolSiC MOSFET 750V G2 Q-DPAK 4/7/16/25/60mΩ samples are available to order.

www.infineon.com/coolsic-750v

Infineon launches CoolGaN bidirectional switch 650V G5

Monolithic gate injection transistor technology yields enhanced efficiency and reliability for power systems

Infineon Technologies AG of Munich, Germany is introducing the CoolGaN bidirectional switch (BDS) 650V G5, a gallium nitride (GaN) switch capable of actively blocking voltage and current in both directions. Featuring a common-drain design and a double-gate structure, it leverages Infineon's robust gate injection transistor (GIT) technology to deliver a monolithic bidirectional switch, enabled by Infineon's CoolGaN technology. The device serves as a highly efficient replacement for traditional back-to-back configurations commonly used in converters.

The bidirectional CoolGaN switch is said to offer several key advantages for power conversion systems. By integrating two switches in a single device, it simplifies the design of cycloconverter topologies, enabling single-stage power conversion, eliminating the need for multiple conversion stages. This leads to improved efficiency, increased reliability, and a more compact design. BDS-based micro-inverters also benefit from higher power density and reduced component count, which simplifies manufacturing and reduces costs. Additionally, the device supports advanced grid functions such as reactive power compensation and bidirectional operation.

As a result, the solution is said to hold significant potential across a wide range of applications, including:

Microinverters: The CoolGaN bidirectional switch enables simpler and more efficient micro-inverter designs, reducing both size and cost. This makes micro-inverters more attractive for residential and commercial solar installations.

Energy storage systems (ESS): In ESS applications such as battery chargers and dischargers, the switch allows for more efficient and reliable energy storage and release.

Electric vehicle (EV) charging: In EV charging systems, the BDS switch supports faster, more efficient charging while also enabling vehicle-to-grid (V2G) functionality, where energy stored in the vehicle battery can be fed back into the grid.

Motor control: The CoolGaN BDS is suitable for use in current source inverters (CSI) for industrial motor drives. Compared with traditional voltage source inverters (VSI), CSIs offer benefits such as:

- Producing a sinusoidal output voltage, which supports longer cable runs, reduced losses, and improved fault tolerance.
- Replacing the DC-link capacitor with an inductor, improving high-temperature performance and short-circuit protection.
- Higher efficiency at partial loads, lower EMI, inherent buck-boost capability for voltage variation, and scalability for parallel operation.

These features make CSIs a more robust and efficient alternative for industrial motor applications.

AI data centers: In AI server power supplies, bidirectional switches like CoolGaN support higher switching frequencies and power density in architectures such as Vienna rectifiers and H4 PFCs. A single CoolGaN BDS can replace two conventional switches, reducing component count, cost, size, and overall power losses.

The CoolGaN bidirectional switch (BDS) 650V G5 is available for ordering now as well as samples of the 110mΩ product.

www.infineon.com/cms/en/product/power/gallium-nitride/gan-bidirectional-switch/hv-gan-bidirectional-switch

Infineon adds EasyPACK CoolGaN power modules for high-voltage applications

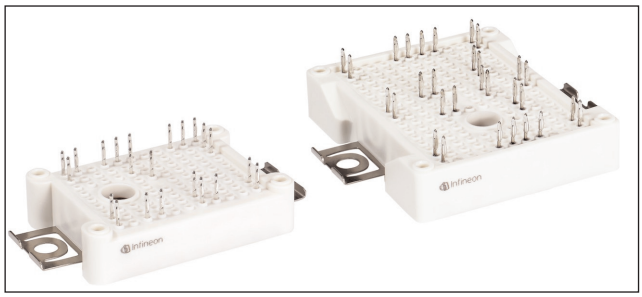
CoolGaN Transistor 650V integrated into EasyPACK module

With the rapid growth of AI data centers, the increasing adoption of electric vehicles, and the ongoing trends in global digitalization and reindustrialization, global electricity demand is expected to surge.

To address this challenge, Infineon Technologies AG of Munich, Germany is introducing the EasyPACK CoolGaN Transistor 650V module, adding to its growing GaN power portfolio. Based on the Easy Power Module platform, the module has been specifically developed for high-power applications such as data centers, renewable energy systems, and DC electric vehicle charging stations. It is designed to meet the growing demand for higher performance while providing maximum ease of use, helping customers to accelerate their design processes and shorten time-to-market.

"The CoolGaN-based EasyPACK power modules combine Infineon's expertise in power semiconductors and power modules," says Roland Ott, senior VP & head of Infineon's Green Energy Modules and Systems business unit. "This combination offers customers a solution that meets the increasing demand for high-performance and energy-efficient technologies in applications such as data centers, renewable energy, and EV charging."

The EasyPACK CoolGaN module integrates 650V CoolGaN power semiconductors with low parasitic inductances, achieved through compact die packing, enabling fast and efficient switching. Delivering up to 70kW per phase with just a single module, the design supports compact and scalable high-power systems. Furthermore, by combining Infineon's .XT interconnect technology with CoolGaN options, the module is said to enhance both performance and reliability. The .XT technology is implemented on a high-performance substrate, significantly reducing thermal resistance,



CoolGaN power semiconductors in the EasyPACK package.

which in turn translates to higher system efficiency and lower cooling demands. This results in increased power density and excellent cycling robustness, even under demanding operating conditions. With support for a broad range of topologies and customization options, the EasyPACK CoolGaN module addresses diverse requirements in industrial and energy applications.

EasyPACK modules

Infineon has sold well over 70 million EasyPACK modules with various chipsets for a wide range of industrial and automotive applications. With the introduction of the CoolGaN power semiconductors in this package, Infineon is now expanding the application range of GaN as its use creates more demand into very high kilowatt applications. The EasyPACK series leverages Infineon's PressFIT contact technology, which ensures highly reliable and durable electrical connections between the module and the PCB. By utilizing a cold-welding process, PressFIT delivers gas-tight, solder-free joints that guarantee long-term mechanical stability and electrical conductivity, even under demanding thermal and mechanical conditions. This advanced design reduces manufacturing time and eliminates potential solder-related defects, offering a robust solution for high-reliability applications. Additionally, with its compact design, EasyPACK modules occupy up to 30% less PCB surface area than other conventional discrete layouts, resulting in a very cost-effective solution.

CoolGaN Transistors 650V G5

The newest 650V CoolGaN generation provides increased performance and figures of merit. Infineon's benchmark data shows that CoolGaN Transistor 650V G5 products provide up to 50% lower energy stored in the output capacitance (E_{oss}), up to 60% improved drain-source charge (Q_{oss}) and up to 60% lower gate charge (Q_g). Combined, these features result in increased efficiencies in both hard- and soft-switching applications. This leads to a significant reduction in power loss compared with traditional silicon technology, ranging from 20% to 60% depending on the specific use-case. The CoolGaN Transistor 650V G5 product family offers a wide range of $R_{DS(on)}$ package combinations. Ten $R_{DS(on)}$ classes are available in various SMD packages, such as ThinPAK 5x6, DFN 8x8, TOLL and TOLT. All products are manufactured on high-performance 8-inch production lines in Villach (Austria) and Kulim (Malaysia). Target applications range from consumer and industrial switched-mode power supplies (SMPS) such as USB-C adapters and chargers, lighting, TV, data center and telecom rectifiers to renewable energy and motor drives in home appliances.

Infineon showcased the EasyPACK modules with CoolGaN at the Power Electronics, Intelligent Motion, Renewable Energy and Energy Management (PCIM 2025) Expo & Conference in Nuremberg, Germany (6–8 May).

www.mesago.de/en/PCIM
www.infineon.com/gan

Fraunhofer IAF presents bidirectional 1200V GaN switch with integrated free-wheeling diodes

Single-gate AlGaN/GaN HEMT used as a bidirectional switch in low-voltage 3-level T-type converter

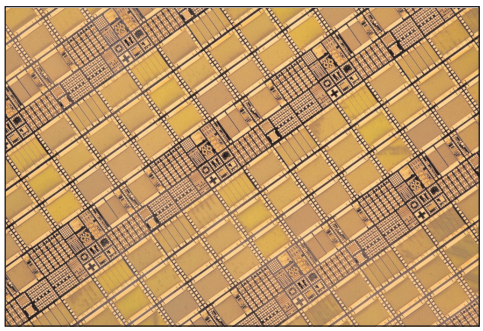
At the Power Electronics, Intelligent Motion, Renewable Energy and Energy Management (PCIM 2025) Expo & Conference in Nuremberg (6–8 May), Fraunhofer Institute for Applied Solid State Physics IAF of Freiburg, Germany presented results achieved as part of the three-year project 'GaN4EmoBiL — GaN power semiconductors for electro-mobility and system integration through bidirectional charging' launched in mid-2023 and funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWK).

1200V monolithic bidirectional switch with integrated free-wheeling diodes

Fraunhofer IAF has developed a gallium nitride (GaN) monolithic bidirectional switch (MBDS) with a blocking voltage of 1200V that contains two free-wheeling diodes. The researchers used Fraunhofer IAF's new GaN-on-insulator technology for manufacturing: highly insulating materials such as silicon carbide (SiC) and sapphire are used as the carrier substrate for the GaN power semiconductor to improve insulation between the components and increase the breakdown voltage.

The MBDS blocks voltage and conducts current in two directions, which saves chip space and reduces conduction losses as there is only one split depletion region. The GaN MBDS can be used in grid-connected power converters for energy generation and storage as well as electric drive systems. In these applications, the MBDS enables the development of systems in the 1200V class.

Developers are working intensively on electric vehicles in this voltage class as increasing blocking voltages offer significant advantages in terms of everyday usability: charging power increases and energy losses during operation decrease as a result of lower resistance. Electric cars with 400V currently dominate the market, but 800V technology is gaining ground. The leap to 1200V has a positive effect on the long-distance capability of electric cars and the utility value of electric trucks.



Monolithic bidirectional 1200V GaN switches (MBDS) with integrated free-wheeling diodes, made at Fraunhofer IAF in a multi-project wafer run using GaN-on-insulator technology (courtesy Fraunhofer IAF).

The 1200V GaN MBDS with integrated peripherals was presented by Dr Michael Basler at the PCIM Conference in the oral session on GaN Devices II, based on Basler's paper 'Highly-Integrated 1200V GaN-Based Monolithic Bidirectional Switch' (to be published in conjunction with PCIM 2025).

Single-gate GaN HEMT as bidirectional switch in the low-voltage range

Fraunhofer IAF has also made progress in multi-level converters with bidirectional switches for blocking voltages up to 48V: Researchers have used a conventional single-gate high-electron-mobility transistor (HEMT) based on a aluminum gallium nitride/gallium nitride (AlGaN/GaN) heterostructure in a low-voltage 3-level T-type converter as a bidirectional switch, achieving simpler control of the transistor than with a bidirectional transistor with two gates for such topologies. Like the 1200V MBDS, this approach enables simpler control in addition to a space-efficient component design.

Daniel Grieshaber presented the paper 'Investigation of a Single-Gate GaN HEMT as Bidirectional Switch in a Low Voltage Multilevel Topology' at the PCIM Conference Poster Session in the GaN Devices I section.

PCIM Expo:

GaN power electronics portfolio along the semiconductor value chain

Fraunhofer IAF is working along the entire semiconductor value chain on materials, components, modules and subsystems for GaN-based power electronics in the voltage classes 48V, 100V, 200V, 600V and 1200V. The current focus is on lateral and vertical components, monolithic integration, and highly insulating substrates such as sapphire or SiC. In addition to the results presented at PCIM 2025, Fraunhofer IAF is already working on components in the 1700V class.

Fraunhofer IAF presented an overview of its R&D portfolio in power electronics at the PCIM Expo. Exhibits included an epitaxial 8" GaN wafer, processed 4" GaN-on-SiC and GaN-on-sapphire wafers, GaN power ICs, integrated lateral and vertical GaN components and GaN-based 600V half-bridge modules.

At the PCIM Conference, Dr Richard Reiner also summarized Fraunhofer IAF's latest power electronics developments in the presentation 'Lateral, Vertical, Bidirectional! Innovations and Progress in GaN Devices and Power ICs' on the Technology Stage.

www.mesago.de/en/PCIM
www.iaf.fraunhofer.de/en/customers/electronic-circuits/power-electronics.html

Nexperia launches automotive-qualified 1200V SiC MOSFETs in D2PAK-7 packaging

AEC-Q101-qualified SMD devices combine thermal stability and easy assembly

Discrete device designer and manufacturer Nexperia of Nijmegen, the Netherlands (which operates wafer fabs in Hamburg, Germany, and Hazel Grove Manchester, UK) has announced a range of highly efficient and robust automotive-qualified silicon carbide MOSFETs with on-resistance ($R_{DS(on)}$) values of 30mΩ, 40mΩ and 60mΩ.

Delivering what is claimed to be industry-leading figures-of-merit (FoM), the devices (namely, the NSF030120D7A0-Q, the NSF040120D7A1-Q, and the NSF060120D7A0-Q) were previously offered in industrial grade and have now been awarded AEC-Q101 certification. This makes them suitable for automotive applications like on-board chargers (OBC) and traction inverters in electric vehicles (EV) as well as for DC–DC converters, and heating ventilation & air-conditioning systems (HVAC). The switches are housed in the increasingly popular surface-mounted D2PAK-7 package, which is more suitable for automated assembly operations than through-hole devices.

$R_{DS(on)}$ is a critical performance parameter for SiC MOSFETs as it impacts conduction losses. However, concentrating on the nominal value neglects the fact that it can increase by more than 100% as device operating temperatures rise,

resulting in a considerable rise in conduction losses. The temperature stability is even more critical when SMD package technologies are used compared with through-hole technology, since devices are cooled through the PCB. Nexperia identified this as a limiting factor in the performance of many currently available SiC devices and leveraged the features of its innovative process technology to ensure that its new SiC MOSFETs offer industry-leading temperature stability, with the nominal value of $R_{DS(on)}$ rising by only 38% over an operating temperature range from 25°C to 175°C. This feature enables customers to address higher output power in their applications, achieved with a higher nominal 25°C-rated $R_{DS(on)}$ from Nexperia compared with other vendors, without sacrificing performance.

"This feature allows to get more power out of the selected Nexperia SiC MOSFET devices compared to similarly rated $R_{DS(on)}$ devices from other vendors, delivering a clear cost advantage for customers on semiconductor level," says Edoardo Merli, senior VP & head of business group Wide Bandgap, IGBT & Modules (WIM). "Additionally, relaxed cooling requirements, more compact passive components, and higher achievable efficiency allow customers more degrees of freedom in their design and lower total cost of ownership," he adds. "These products are now available for the automotive market, where their performance and efficiency benefits can make a real difference in next-generation vehicle designs."

Nexperia is planning to release automotive-qualified versions of its 17mΩ and 80mΩ $R_{DS(on)}$ SiC MOSFETs in 2025.

www.nexperia.com/sic-mosfets

Nexperia reports resilient annual performance and positive outlook amid market headwinds

Firm grows market share and increases R&D spending

Amid persistent macroeconomic uncertainty and cyclical market softness, discrete device designer and manufacturer Nexperia of Nijmegen, the Netherlands (which operates wafer fabs in Hamburg, Germany, and Hazel Grove Manchester, UK) says that in fiscal year 2024 it demonstrated resilience, achieving stable revenues and maintaining profitability through a strong focus on execution and a commitment to innovation.

Revenue was $2.06bn. Market share, in the firm's defined markets, increased from 8.9% in 2023 to 9.7% in 2024.

Net income surpassed Q1/2024 by +$32m (excluding the sale of Newport Wafer Fab).

Nexperia says that during the fiscal year it celebrated key milestones that underscore its commitment to technological innovation and long-term growth. Most notably, it marked the 100th anniversary of its Hamburg site in Germany — a historic hub of engineering excellence — where it made substantial investments in next-generation manufacturing capabilities, specifically in silicon carbide (SiC) and gallium nitride (GaN) technologies.

As part of its long-term strategy, Nexperia also continues to increase its R&D spending, which grew by 6.2% in 2024, underscoring its focus on advancing high-performance semiconductors for automotive, industrial and energy-efficient applications. This investment supports innovation in wide-bandgap technologies such as SiC and GaN, as well as upgrading and expanding the firm's product portfolio in power discretes, modules, analog and power ICs.

In a year of transition and transformation, strategic changes in fiscal 2024 included the realignment of business groups to sharpen focus on innovation and value creation, as well as the addition of new executive leadership to guide the next phase of development.

For fiscal 2025, Nexperia maintains a positive outlook, supported by improving gross margin and cash flow. These positive trends, already evident in Q4/2024 and continuing into Q1/2025, reflect early signs of recovery and renewed operational momentum, adds the firm.

Guidance for the next year acknowledges that the market will continue to present challenges, but Nexperia expects to maintain financial momentum, amplified by ongoing improvements in operational efficiency and a strong position in the automotive sector. Given the essential role of semiconductors in the global megatrends of electrification, digitalization, automation and the green energy transition, Nexperia reckons that it is well positioned to capitalize on long-term demand. For example, driven by the exponential growth of artificial intelligence applications across industries, demand for semiconductors in AI servers is surging. Nexperia therefore sees opportunities in servers, smartphones, computers and industrial automation.

"Shifts in global demand, particularly in the electronics and automotive sectors, will have a greater impact than any direct regulatory measures," believes chief technology officer Stefan Tilger. "As customers reevaluate their production strategies, a flexible response will be essential. While trade dynamics and pricing pressure continue to influence the industry, Nexperia benefits from a robust global infrastructure and experienced teams that consistently deliver with reliability, agility and a focus on innovation. Being externally debt free further strengthens our resilience and ability to invest strategically," he adds.

"Our technology powers the systems that drive energy efficiency, electrification and smarter infrastructure across industries," notes chairman & CEO Zhang Xuezheng (Wing). "As global demand for sustainable solutions continues to grow, our business is uniquely positioned to deliver the innovation, scale and reliability needed to support this transformation," he adds. "We are encouraged by recent positive developments and remain focused on long-term value creation."

Nexperia says it is also committed toward its sustainability goals, ensuring that responsible business practices remain central to its strategy. The firm aims to be carbon neutral for Scope 1 and 2 emissions by 2035.

www.nexperia.com

Navitas launches first automotive 'AEC-Plus'-qualified SiC MOSFETs in HV-T2Pak top-side-cooled package

Reliability and performance with optimized, high-creepage package target automotive and industrial applications

Gallium nitride (GaN) power IC and silicon carbide (SiC) technology firm Navitas Semiconductor Corp of Torrance, CA, USA says that it has introduced a new level of reliability to meet the system lifetime requirements of the most demanding automotive and industrial applications. Navitas' latest generation of 650V and 1200V 'trench-assisted planar' SiC MOSFETs, combined with an optimized, HV-T2Pak top-side-cooled package, delivers what is claimed to be the industry's highest creepage of 6.45mm to meet IEC-compliance for applications up to 1200V.

The HV-T2Pak SiC MOSFETs are said to significantly increase system-level power density and efficiency while improving thermal management and simplifying board-level design and manufacturability. Target applications include electric vehicles (EV) on-board chargers (OBC) and DC-DC converters, data-center power supplies, residential solar inverters and energy storage systems (ESS), EV DC fast chargers, and HVAC motor drives.

AEC-Q101 is an automotive industry standard developed by the Automotive Electronics Council (AEC) to establish common part-qualification and quality-system standards. Navitas has created an industry-first benchmark 'AEC-Plus', indicating parts qualified above and beyond the existing AEC-Q101 and JEDEC product qualification standards. The firm says that this new benchmark showcases its understanding of system-level lifetime requirements and a commitment to enabling rigorously designed and validated products for demanding mission profiles in automotive and industrial applications.

The 'AEC-Plus' qualification standards extend further into rigorous multi-lot testing and qualification. Key additions to the existing AEC-Q101 requirements include:

- dynamic reverse bias (D-HTRB) and dynamic gate switching (D-HTGB) to represent stringent application mission profiles;
- over 2x longer power and temperature cycling;
- over 3x longer duration for static high-temperature, high-voltage tests (e.g. HTRB, HTGB);
- 200°C T_{JMAX} qualification for overload operation capability.

Navitas' HV-T2Pak top-side-cooled package, in an industry-standard compact form factor (14mm x 18.5mm), is optimized with a groove design in the package mold compound that extends the creepage to 6.45mm without reducing the size of the exposed thermal pad and ensuring optimal heat dissipation.

In addition, the exposed thermal pad has a nickel, nickel-phosphorus (NiNiP) plating, as opposed to tin (Sn) plating from existing TSC package solutions, which is critical to preserving the post-reflow surface planarity of the exposed pad and ensuring thermally efficient and reliable attachment to the thermal interface material (TIM).

Navitas says that its GeneSiC 'trench-assisted planar SiC MOSFET technology' offers up to 20% lower on-resistance under in-circuit operation at high temperatures compared with competition and superior switching figure-of-merits that result in the lowest power losses across a wider operating range. All GeneSiC SiC MOSFETs have what is claimed to be the highest-published 100%-tested avalanche capability, excellent short-circuit withstand energy, and tight threshold voltage distributions for easy paralleling.

Lower on-resistance (<15mW) SiC MOSFETs in the HV-T2Pak package will be announced later in 2025

The initial HV-T2Pak portfolio includes 1200V SiC MOSFETs with on-resistance ratings ranging from 18mΩ to 135mΩ and 650V SiC MOSFETs with on-resistance ratings ranging from 20mΩ to 55mΩ. Lower on-resistance (<15mΩ) SiC MOSFETs in the HV-T2Pak package will be announced later in 2025.

www.navitassemi.com

Navitas introduces GaNSense Motor Drive ICs for home appliances and industrial drives up to 600W

Gallium nitride (GaN) power IC and silicon carbide (SiC) technology firm Navitas Semiconductor Corp of Torrance, CA, USA has announced a new family of GaNSense Motor Drive ICs targeting home appliances and industrial drives up to 600W.

Specifically designed for motor drive applications, the fully integrated solution combines two GaN FETs in a half-bridge configuration with drive, control, sensing and autonomous protection. Compared with legacy silicon IGBT solutions, this results in a 4% higher efficiency, 40% PCB footprint reduction, and 15% lower system cost.

Key features include bidirectional lossless current sensing, which measures both positive and negative currents. This is critical in motor drives, given recirculating currents in the reverse direction between switching coil phases. The lossless sensing eliminates the need for external shunt resistors, resulting in higher efficiency, improved reliability, and a more compact design.

Turn-on and turn-off slew rates are fully adjustable, allowing designers to optimize EMI, performance, and maximize efficiency. The autonomous freewheeling function switches on the GaN IC upon the detection of reverse current to reduce conduction losses, maximize efficiency, and reduce the size and cost of heatsinks.

The GaNSense Motor Drive IC range also includes several safety features such as high- and-low-side short-circuit protection, over-temperature protection and 2kV ESD on all pins.

The 650V family starts with NV6257 (2 x 170mΩ, PQFN 6x8), NV6287 (2 x 170mΩ, PQFN 8x10), and NV6288 (2 x 120mΩ, PQFN 8x10), supporting drives up to 600W.

Target applications focus on motor drives up to 600W, including air conditioners, heat pumps, washing machines, dryers, dishwashers, refrigerators, and hair dryers. For low-power industrial drives, applications range from pumps to circulators and fans.

The GaNSense Motor Drive ICs were on display at the recent Power Electronics, Intelligent Motion, Renewable Energy and Energy Management (PCIM 2025) Expo & Conference in Nuremberg, Germany (6–8 May).

www.navitassemi.com

Navitas launches 12kW GaN & SiC platform, achieving 97.8% efficiency for hyperscale AI data centers

PSU 'designed for production' achieves OCP requirements for high-power, high-density server racks, enabled by GaNSafe ICs and Gen-3 Fast SiC MOSFETs

Gallium nitride (GaN) power IC and silicon carbide (SiC) technology firm Navitas Semiconductor Corp of Torrance, CA, USA has announced its latest 12kW power supply unit (PSU) 'designed for production' reference design for hyperscale AI data centers with high-power rack densities of 120kW.

The 12kW PSU complies with Open Rack v3 (ORv3) specifications and Open Compute Project (OCP) guidelines. It utilizes Gen-3 Fast SiC MOSFETs, a novel 'IntelliWeave' digital platform, and high-power GaNSafe ICs configured in 3-phase interleaved TP-PFC and FB-LLC topologies to ensure the highest efficiency and performance, with the lowest component count.

The 3-phase interleaved totem-pole power factor correction (TP-PFC) is powered by Gen-3 Fast SiC MOSFETs with 'trench-assisted planar' technology, which has been enabled by over 20 years of SiC innovation and offers what is claimed to be world-leading performance over temperature, delivering cool running, fast switching and superior robustness to support faster-charging electric vehicles (EVs) and up to 3x more powerful AI data centers.

IntelliWeave digital control provides a hybrid control strategy of both critical conduction mode (CrCM) and continuous conduction mode (CCM) for light-load to full-load conditions, ensuring maximum efficiency while maintaining a simplistic design with low component count. This results in a 30% reduction in power losses compared with existing CCM solutions.

The 3-phase interleaved full-bridge (FB) LLC topology is enabled by fourth-generation high-power GaNSafe ICs, integrating control, drive, sensing and critical protection features that allow what is claimed to be unprecedented reliability and robustness. GaNSafe is said to be the world's safest GaN, with short-circuit protection (350ns maximum latency), 2kV ESD protection on all pins, elimination of negative gate drive, and programmable slew rate control. All these features are controlled with four pins, allowing the package to be treated like a discrete GaN FET, requiring no V_{CC} pin. Suitable for applications from 1kW to 22kW, 650V GaNSafe in TOLL and TOLT packages are available with a range of $R_{DS(ON)typ.}$ from 18mΩ to 70mΩ.

The PSU is 790mm x 73.5mm x 40mm and has an input voltage range of 180–305$V_{AC,}$ outputting up to 50V_{DC} and delivering 12kW when using input voltages above 207$V_{AC,}$ and 10kW below this. Additionally, it implements active current sharing and over-current, over-voltage, under-voltage and over-temperature protections. It has an operating temperature e range of –5ºC to 45ºC, a hold-up time of <20ms at 12kW, and an inrush current of ~3 times the steady-state current below 20ms. Cooling is via the PSU's internal fan.

"The continuation and leadership of Navitas' AI power roadmap has seen a quadrupling in output power — from 2.7kW to 12kW — in just over 24 months," notes CEO & co-founder Gene Sheridan. "This increase in power delivery is vital for the world's data centers to support the exponential power demanded by the latest GPU architectures. The 'designed for production' PSU enables our customers to quickly implement a highly efficient, simple, and cost-effective solution to address the power delivery challenges for AI and hyperscale data centers."

Navitas' AI power roadmap has seen a quadrupling in output power in just over 24 months... vital for the world's data centers to support the exponential power demanded by the latest GPU architectures

The 12kW PSU was presented at Navitas' 'AI Tech Night' on 21 May, alongside the COMPUTEX exhibition in Taipei, Taiwan (20–23 May).

www.navitassemi.com

Navitas strengthens corporate governance

Board member Hendrix made chair; executive steering committee formed to advance growth strategy

To advance its growth strategy, gallium nitride (GaN) power IC and silicon carbide (SiC) technology firm Navitas Semiconductor Corp of Torrance, CA, USA has announced corporate governance enhancements that are said to reflect the board of directors' ongoing commitment to stockholder engagement and value creation for stakeholders.

"We have taken an important step forward by strengthening our corporate governance and further aligning the board's interests with those of our stockholders," believes chief executive officer & co-founder Gene Sheridan. "Our board and leadership team are well positioned to capitalize on Navitas' multi-billion-dollar market opportunities and generate value."

Board and leadership updates

After joining the board as an independent director in 2021, Richard Hendrix — currently chair of the audit committee and a member of the compensation committee — has been appointed as board chair. Hendrix has more than 30 years of capital markets leadership and advisory experience. He succeeds Sheridan, who remains on the board as a director and continues as CEO.

Chief technology officer, chief operating officer & co-founder Daniel Kinzer has resigned from his executive roles and as a member of the board. He will continue to serve in an advisory role supporting technology and product innovation in GaN technology.

"On behalf of the board, I would like to thank Dan for his invaluable vision and leadership in building Navitas into the only pure-play, next-generation power semiconductor company," says Hendrix. "We appreciate his continued contributions as we embark on this next chapter of the company's growth."

In connection with Kinzer's departure from the board, the board intends to appoint an independent director to stand for election as a Class I director at the 2025 annual stockholders' meeting, along with Sheridan and Dr Ranbir Singh.

Formation of executive steering committee

Navitas has also announced the formation of an executive steering committee of the board, responsible for initiatives that include oversight and input on:

- expense management and defining an accelerated path to profitability;
- accelerating the product and technology roadmap;
- enhancing go-to-market and partnership strategies; and
- appointing operating, sales and technology executives.

The committee will work with Sheridan to ensure the effective execution of these strategic priorities. It will be chaired by Singh and include Hendrix and David Moxam (chair of the compensation committee and a member of the audit committee) as members.

In connection, Navitas has entered into a cooperation agreement with Singh following constructive engagement.

www.navitassemi.com

Navitas appoints Cristiano Amoruso to board

Experienced investor brings operating expertise and track record of value creation in tech and renewable energy industries

Navitas Semiconductor has appointed Cristiano Amoruso to its board of directors.

Amoruso most recently served as CEO of Suniva Inc (the largest private US-based manufacturer of solar photovoltaic semiconductors) and as a partner at global investment firm Lion Point Capital L.P. As an investor, he has significant operating expertise and a track record of value creation in the technology and renewable energy industries across public and private companies.

"Cristiano brings meaningful experience driving growth at semiconductor companies, and we are confident he will contribute to our efforts to capture the multi-billion-dollar market opportunity ahead of us," says board chair Richard Hendrix.

New board member Cristiano Amoruso.

"Cristiano's appointment builds on our recent actions to strengthen our corporate governance and accelerate our path to profitability," he adds.

"Navitas' gallium nitride and silicon carbide products have tremendous untapped potential and are accelerating a paradigm shift across the entire technology hardware industry, especially in power-intensive applications like data centers, solar power plants and electric vehicles," Amoruso comments.

Amoruso will stand for election as an independent Class I director at the 2025 annual stockholders' meeting, along with CEO & co-founder Gene Sheridan and Dr Ranbir Singh.

www.navitassemi.com

Innoscience wins ruling from China's Supreme Court after appeal by Infineon

Patent cases to remain jurisdiction of Suzhou rather than Wuxi Court

In January, InnoScience (Suzhou) Technology Holding Co Ltd — which manufactures gallium nitride (GaN) power chips on 8" silicon wafers — and its subsidiary Innoscience (Suzhou) Semiconductor Co Ltd filed complaints (2024) Su 05 Minchu No. 1430 and (2024) Su 05 Minchu No. 1431 (regarding patent numbers 202311774650.7s and 202211387983.X) to the Intermediate People's Court of Suzhou City in Jiangsu Province against Infineon Technologies (China) Co Ltd, its subsidiary Infineon Technologies (Wuxi) Co Ltd, and Suzhou Chipswork Electronics Technologies Co Ltd.

Two objections to the jurisdiction raised by Infineon China and Infineon Wuxi were later rejected by the court in first-instance rulings.

Infineon China and Infineon Wuxi subsequently appealed to the Supreme People's Court, requesting transfer of the cases to the Wuxi Intermediate People's Court for trial. However, this appeal has now been dismissed, as Chipswork was found to be one of the proper defendants in the two Suzhou cases, and is domiciled in Suzhou, so the first-instance court has jurisdiction.

InnoScience says that victory at this stage by winning disputes over jurisdiction has provided solid ground for it to proceed further with the two Suzhou cases. The firm adds that it will continue to prepare evidence and fully promote the development of the cases to defend its rights and interests.

www.infineon.com
www.innoscience.com

CGD's ICeGaN ICs used by Inventchip in 2.5kW CCM totem-pole PFC reference design

Design needs no modification to switch from SiC to GaN

Fabless firm Cambridge GaN Devices (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 — says that Inventchip of Shanghai, China, a provider of silicon carbide (SiC) power devices and ICs, has demonstrated a 2.5kW GaN-based CCM totem-pole PFC reference design using its ICeGaN gallium nitride ICs.

A key feature is said to be ease-of use. ICeGaN ICs integrate interface circuitry and protection on the same GaN die as the HEMT, so any standard driver IC can be used. The Inventchip IVCC1104 totem-pole PFC controller IC is also simple to use, with no programming required. It offers optimized AC zero-crossing control, low THD and high robustness against AC disturbance.

"Inventchip had an existing 2.5kW TPPFC reference design based on its controller and gate drivers using SiC MOSFETs in TO-247 packages," notes CGD's technical marketing & business development director Di Chen. "To evaluate the performance of GaN instead, Inventchip designed a TO-247 adapter board using our P2 25mΩ ICeGaN ICs, and the ICeGaN design works perfectly without any modification of their circuits. It has demonstrated that the ICeGaN can significantly shorten the learning curve and allow engineers to bring new product faster to market," he adds.

"By using a TO247-4 adapter board to solder on a DFN-packaged ICeGaN device for a quick test on our EVM, despite the relatively long gate drive path and the extended drive power supply trace, the board was powered up successfully at the first shot with clean switching waveform," comments Inventchip's chief technology officer Dr Zhong Ye. "No abnormalities or shoot-through was observed from no-load to full-load conditions," he adds. "The CGD GaN device has proven to be very noise-immune, user-friendly and highly efficient."

Having proved its efficiency and power density in low-power charger designs, GaN is now being adopted by makers of server and data-center PSUs, inverters, industrial brick DC/DC converters and LED drivers. Soon, EV inverter drives of over 100kW are expected to transition to GaN too. ICeGaN technology is especially suitable at higher power levels because of its proven reliability and robustness, claims CGD.

www.camgandevices.com

Viper RF joins WIN Alliance Program

Partnership to provide WIN foundry customers with custom design services, including 1–150GHz MMICs

WIN Semiconductors Corp of Taoyuan City, Taiwan — which provides pure-play gallium arsenide (GaAs) and gallium nitride (GaN) wafer foundry services for the wireless, infrastructure and networking markets — has announced the inclusion of microwave & millimeter-wave product firm Viper RF of Newton Aycliffe, UK in its WIN Alliance Program.

Founded in 2008, Viper RF has evolved from a design consultancy into a supplier of GaAs and GaN MMICs as standard MMIC products and custom designs for demanding commercial, defense and space markets. The collaboration will therefore provide WIN customers with trusted, custom design services, including MMIC designs operating at 1–150GHz.

The partnership satisfies WIN customer requests for a trusted design partner well-versed in WIN's innovative technology. This alliance ensures that customers have access to the design solutions they need to optimize performance and maximize their product portfolios.

"Viper RF is pleased to be invited to be part of the WIN Alliance. We have worked with WIN Semiconductors for more than 15 years and have used a full range of their GaN and GaAs technologies in space, defense and telecommunications applications," notes Viper RF's CEO Jim Mayock. "WIN's technologies offer world-class performance and cost-effective solutions for our clients. We look forward to working more closely with WIN to support their clients and accelerate our own product developments and R&D activities."

"The expertise of the Viper RF team and their experience with a broad array of WIN's leading technologies enable customers to quickly and efficiently develop high-performing products and introduce them to the market," says WIN's VP of business development Russ Wagner. "This ensures even customers with limited design resources can take full advantage of WIN's pure-play foundry model." The partnership offers design support for customers seeking trusted custom design solutions from an experienced partner like Viper RF.

www.winfoundry.com

Finwave raises $8.2m in bridge investment

Funding to accelerate revenue generation, expand product portfolio and develop GaN-on-Si technology

Finwave Semiconductor Inc of Waltham, MA, USA has announced a new $8.2m bridge investment round, led by Fine Structure Ventures, Engine Ventures, and Safar Partners, with strategic participation from technology partner GlobalFoundries. Finwave reckons that the new funding signals strong conviction from investors and industry leaders in the market potential of its unique GaN-on-Si technology as it transitions from a technology-centric innovator to a product-driven firm.

Founded in 2012 by researchers at Massachusetts Institute of Technology (MIT) as Cambridge Electronics before being rebranded in June 2022 as Finwave Semiconductor (with offices in San Diego, CA and the Bay Area), the technology firm's portfolio includes gallium nitride (GaN) FinFETs, enhancement-mode (E-mode) MISHEMTs, and high-performance RF switches.

"This funding round validates the years of engineering and innovation behind our proprietary GaN-on-Si technology and provides resources we need to move from the development phase, to delivering differentiated, high-performance products," says CEO Dr Pierre-Yves Lesaicherre.

Finwave will use the investment to accelerate revenue generation, expand its product portfolio and continue developing GaN-on-Si technology for the following targeted market segments: high-power RF switches, power amplifiers for communications infrastructure, and power amplifiers for mobile devices.

"Since our initial investment, Finwave has made remarkable progress towards becoming a leader in GaN-on-Si high-performance RF components," comments Fine Structure Ventures' senior managing director Jennifer Uhrig. "Their strategic foundry partnership with GlobalFoundries and distribution partnership with RFMW have been particularly notable, legitimizing their design capabilities and giving customers confidence in Finwave's ability to bring high-performance, reliable products to market."

Finwave's GaN-on-Si technology is said to improve on the superior performance of GaN solutions while adopting the cost and scale of manufacturing advantages from high-volume CMOS silicon wafers. Its product portfolio includes high-power RF switches, which are now globally available due to Finwave's partnership with RF distributor RFMW, as well as upcoming RF power amplifiers.

"As early investors in Finwave, we've had the privilege of supporting the team as they advanced their MIT RF semiconductor technology, achieving world-record RF performance," notes Engine Ventures' general partner Reed Sturtevant.

"Many industries will benefit a great deal from the Finwave platform in the coming years," adds Safar's managing partner Arunas Chesonis.

With a product roadmap designed to harness the full potential of GaN, Finwave aims to deliver cost-effective RF devices, delivering enhanced performance, and enabling more efficient RF systems. The firm's unique GaN-on-Si RF chips are targeted at RF applications including communications infrastructure (base stations, MIMO, small cells, land mobile radios (LMRs), customer premise equipment (CPE), fixed-wireless access), Wi-Fi routers, satellite, radar, drones, anti-drones, test & measurement equipment, and medical equipment.

www.finwavesemi.com

Raytheon delivers 13th AN/TPY-2 radar for US Missile Defense Agency

First GaN-based version supports hypersonic missile defense

US-based Raytheon (a business of aerospace & defense company RTX of Arlington, VA) has delivered the first AN/TPY-2 radar to the US Missile Defense Agency (MDA) with a complete gallium nitride (GaN)-populated array. The AN/TPY-2 is a missile defense radar that can detect, track and discriminate ballistic missiles in multiple phases of flight.

GaN provides greater sensitivity to increase range, expands surveillance capacity and supports the hypersonic defense mission. The radar also features the latest CX6 high-performance computing software that offers more precise target discrimination and electronic attack protection.

AN/TPY-2 operates in the X-band of the electromagnetic spectrum, enabling it to see targets more clearly and distinguish between a threat and non-threat objects, such as separation debris.

"This is the most advanced version of AN/TPY-2 that Raytheon has built, leveraging years of investment and innovation to produce superior capability at a lower cost to the US armed forces," says Sam Deneke, president of Air and Space Defense Systems at Raytheon. "As demand increases for missile defense of the homeland, the AN/TPY-2 radar is ready to meet the mission."

www.rtx.com/raytheon

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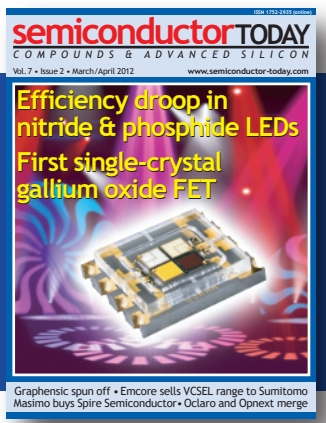

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Fraunhofer ISE and III/V-Reclaim develop 150mm InP-on-GaAs substrates that can replace prime InP wafers

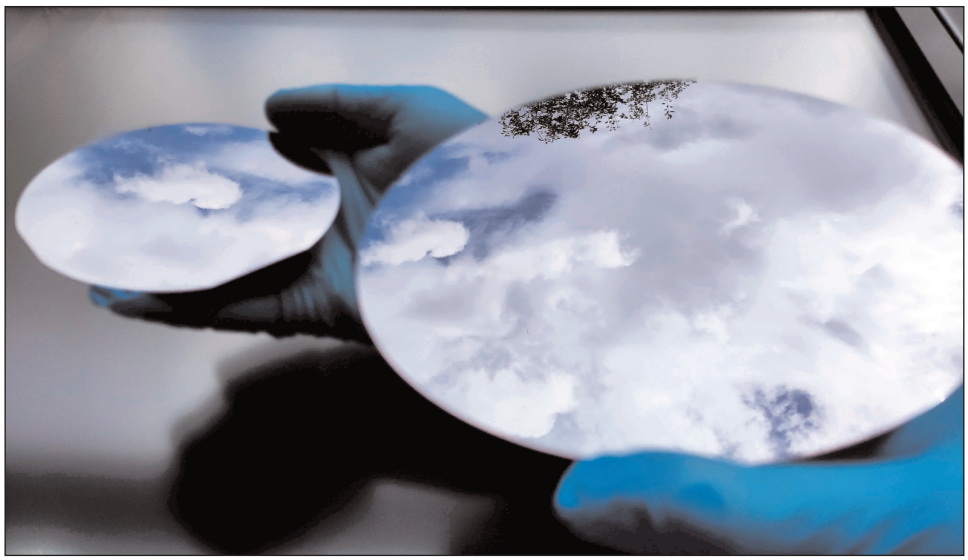
Metamorphic buffer layers and CMP yield low surface roughness and defect densities below $5x10^6cm^{-2}$

Together with wafer recycling firm III/V-Reclaim of Pleiskirchen, Germany, the Fraunhofer Institute for Solar Energy Systems ISE in Freiburg, Germany has produced high-quality indium phosphide on gallium arsenide substrates (InP-on-GaAs wafers) with up to 150mm diameter. The new wafers can effectively replace classic InP in a variety of applications, offering a scalable pathway to lower cost. The research team developed a new process to deposit a thin layer of high-quality InP on GaAs. Following a special surface treatment, these wafers are delivered epi-ready, enabling customers to directly grow III–V epitaxial structures and manufacture high-performance InP-based semiconductor devices.

"Companies can use our new InP-on-GaAs substrates to manufacture high-efficiency devices," says Carmine Pellegrino, project manager at Fraunhofer ISE. "However, it costs much less than InP and there are no limitations in terms of scalability to even 8-inch diameter wafers."

The application of indium phosphide on gallium arsenide is challenging because defects occur during the growth of the indium phosphide that can degrade the performance of the final device. The researchers were able to avoid this by incorporating a series of metamorphic buffer layers and by subjecting the fully grown InP-on-GaAs wafer to a special chemical-mechanical polishing (CMP) step. After this, the wafers are shiny with very low surface roughness and defect densities below $5x10^6cm^{-2}$.

The researchers tested the material quality and performance of the new InP-on-GaAs wafers and compared them to standard InP substrates. "The results are extremely promising," says Frank Dimroth, head of the III-V photovoltaics department at Fraunhofer ISE. "Photovoltaic cells fabricated on our engineered wafers achieve open-circuit voltages comparable to reference devices on prime InP wafers. The performance is consistently uniform across the entire 6-inch wafer, enabling reliable, high-yield production."



InP-on-GaAs substrates with 100mm and 150mm diameter, which can be used as a direct replacement for classical InP substrates. (© Fraunhofer ISE/photo: Carmine Pellegrino.)

As part of a series of experiments, the team has so far produced InP-on-GaAs wafers with diameters of 4-inches and 6-inches, with no obstacles foreseen for a future transition to 8-inches. Classic InP substrates, on the other hand, are currently available in sizes from 2-inches to 4-inches, with a 6-inch version only recently becoming available. This is because GaAs substrates are more robust, and formats with a diameter of up to 8-inches are already well established in the semiconductor industry. The higher stability of GaAs also makes it possible to produce thinner wafers, so less material is used and additional costs can be saved.

The production costs of the new substrates are significantly lower than those of InP wafers, with a savings potential up to 80% in mass production, according to our first calculations. In addition, our approach bypasses constraints on the supply of indium phosphide

"Our technology naturally benefits from having gallium arsenide as a basis," says Pellegrino. "The production costs of the new substrates are significantly lower than those of indium phosphide wafers, with a savings potential up to 80% in mass production, according to our first calculations. In addition, our approach bypasses constraints on the supply of indium phosphide.

www.35reclaim.de
www.ise.fraunhofer.de

Nitride Global selected for Plug and Play Semiconductor Accelerator Program

Bulk AlN supplier one of 20 firms chosen from over 600 applicants

Materials supplier Nitride Global of Wichita, KS, USA says it has been accepted into the Plug and Play Semiconductor Accelerator Program. Out of more than 600 applicants, Nitride Global was selected as one of only 20 standout companies chosen to participate in this year's cohort, recognized for driving the future of semiconductor innovation.

Founded in 2009, Nitride Global focuses on next-generation advanced materials in the areas of ultrawide-bandgap (UWBG) semiconductors with its bulk aluminium nitride (AlN) products, and an advanced packaging solution based on its proprietary aluminum oxynitride (AlON), a thermal management, dielectric and passivation coating for use in power electronics and 3D packaging.

Headquartered in Silicon Valley and present in 60+ locations across five continents, Plug and Play is an innovation platform that connects startups, corporations, venture capital firms, universities, and government agencies, offering corporate innovation programs and helping corporate partners in every stage of innovation, from education to execution. It also organizes startup acceleration programs and has built an in-house VC to drive innovation across industries.

Throughout the Plug and Play Semiconductor Accelerator Program, Nitride Global will gain access to vital resources, including specialized workshops, expert mentorship, business development opportunities, potential investment connections, and the opportunity to collaborate with other cohort startups. The program culminates in an Expo Day on 23 October, where Nitride Global will present its technologies to an audience of corporate partners, investors and industry leaders at Plug and Play's NeoCity facility in Osceola County, Florida, an emerging hub for semiconductor innovation and economic growth.

"Our innovations in UWBG materials and next-generation advanced packaging technologies are redefining thermal management, substrate performance, and energy efficiency for next-generation electronic systems," says Nitride Global's CEO Mahyar Khosravi. "We look forward to leveraging this opportunity to accelerate our impact on the semiconductor, aerospace, data-center, electric vehicle, and sustainable energy sectors."

Nitride Global says that, as one of only four companies in the world and the only North American-owned entity in the bulk AlN space, it is establishing fully domestic capabilities in semiconductor innovation, addressing supply chain security, and reducing global carbon footprints across sectors such as electric vehicles, aerospace, and power grids.

"Plug and Play represents a unique platform to collaborate and scale transformational technologies," comments Nitride Global's president Dr Brian Soller.

www.plugandplaytechcenter.com
www.nitrideglobal.com

UK can lead in power electronics for data centers, says CSA

A report by Compound Semiconductor Applications (CSA) Catapult has highlighted how the UK can be a leader in power electronics for data centers and the critical role of compound semiconductors in managing data-center energy consumption.

Established in 2018 by government agency Innovate UK, CSA Catapult is a not-for-profit center of excellence 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.

The report 'Advancing Data Centres: Key Trends and the Rise of Wide Bandgap Solutions' explores the exponential rise in the number of data centers worldwide to meet the growing demand of AI applications. Energy efficiency is paramount for data-center providers, with projections showing they could account for up to 10% of global electricity by 2030.

The report highlights the possible efficiencies that can be achieved by integrating compound semiconductor devices into power distribution networks. In particular, it highlights three areas in which compound semiconductors can play a significant role: power supply units (PSUs), uninterruptible power supplies (UPSs) and solid-state transformers (SSTs).

With over 500 data centers — the third highest amount in the world — and robust engineering and compound semiconductor expertise, it is reckoned that the UK is well positioned to lead in advancing wide-bandgap technologies for data centers. CSA Catapult says that it plays a pivotal role in this innovation landscape, providing capabilities in advanced power electronics design, simulation, optimization and rapid prototyping.

"This report is a timely reminder that, as the UK leverages AI in unlocking growth and consumer data demands continue to rise, compound semiconductors have a vital role to play in managing our future energy needs," says chief technology officer Nick Singh.

www.csa.catapult.org.uk

Nimy completes $2.75m share placement to fund exploration at Western Australia gallium discovery

Mining exploration company Nimy Resources Ltd of Perth, Western Australia says it has received firm commitments for $2.75m in a share placement from professional and otherwise exempt investors.

Proceeds will be used in part to accelerate exploration at its Block 3 gallium discovery, where it is drilling to establish a maiden JORC (Australasian Joint Ore Reserves Committee) Resource. Nimy is also advancing discussions with potential offtake partners. Phase II drilling at Block 3 is well advanced and the first samples have been sent for assay. Samples from the drilling will be used for ongoing metallurgical test work, including technical studies to test gallium extraction methods.

"We are very pleased with the positive market response received," says managing director Luke Hampson. "Nimy is focused on delivering a JORC-compliant gallium resource to underpin the development of our high-grade gallium discovery at Block 3," he adds. "Nimy is positioning to be a major player supplying high-grade gallium into high-growth markets as the US and the EU seek security of supply into gallium-reliant industries such as semiconductor manufacture and defence force applications."

Nimy notes that gallium prices have surged to $1012/kg, driven by China's export ban that has squeezed global semiconductor supply chains.

The placement shares will result in the issue of 32,352,942 new fully paid ordinary shares at an issue price of 8.5 cents each. They will be issued under the company's placement capacity under ASX Listing Rule 7.1 and as approved by shareholders at a general meeting held on 28 February. The placement shares are anticipated to be issued on 27 May. They will rank equally with the existing fully paid ordinary shares on issue.

The placement also includes one free attaching unlisted option for every two placement shares subscribed for (for a total of 16,176,471 options), each with an exercise price of 13.5 cents and expiring three years after issue. The issue of the attaching options is subject to shareholder approval at a general meeting in mid-July.

The issue price of 8.5 cents per placement share represents a 19.05% discount to the last traded closing share price of 10.5 cents per share on 16 May and a 15.62% discount to the 15-day volume-weighted average price (VWAP) of the company's shares prior to the trading halt announced on 19 May.

www.nimy.com.au

Tawazun Council, RTX and EGA sign MOU to explore gallium production in Abu Dhabi

Tawazun Council (an independent government entity that works closely with the Ministry of Defence and security agencies in the United Arab Emirates), aerospace & defense firm RTX of Arlington, VA, USA and Emirates Global Aluminium (EGA, the world's largest producer of 'premium aluminium', and the largest industrial firm in the United Arab Emirates outside the oil and gas industry) have signed a memorandum of understanding (MOU) to establish EGA as a new producer of gallium. EGA is equally owned by Mubadala Investment Company of Abu Dhabi and the Investment Corporation of Dubai, and is the largest company jointly owned by the two Emirates.

The initiative would create gallium extraction and refining capabilities at EGA's alumina refinery in Abu Dhabi and make the United Arab Emirates (UAE) the world's second largest producer of gallium, it is reckoned.

For the defense industry, the supply of gallium is critical as it is a key component of defense products including advanced radars. This new agreement would secure access to this critical mineral for companies including RTX.

"The aerospace and defense industry relies on stable access to rare-earth elements," notes Paolo Dal Cin, senior VP for operations and supply chain at RTX. "Today's agreement puts us on a path towards a reliable supply of gallium, needed for production of critical aerospace and defense solutions."

EGA and RTX anticipate entering into an agreement to conduct a feasibility study for a high-purity gallium plant at EGA's Al Taweelah alumina refinery, which processes bauxite ore into alumina, the feedstock for aluminium smelters.

His Excellency Dr Nasser Humaid Al Nuaimi, Secretary General of Tawazun Council, reckons that the project is a pivotal milestone in developing the UAE's vital industries, positioning the country as a global leader in gallium production.

"Gallium is an important metal for the most advanced electronics systems but remains commercially challenging to produce," says EGA's CEO Abdulnasser Bin Kalban. "This agreement between Tawazun Council, EGA and RTX makes the development of a new source of gallium in the UAE feasible, creating an additional revenue stream for EGA and a new industrial capability for the UAE in line with our nation's industrial growth strategy Operation 300bn."

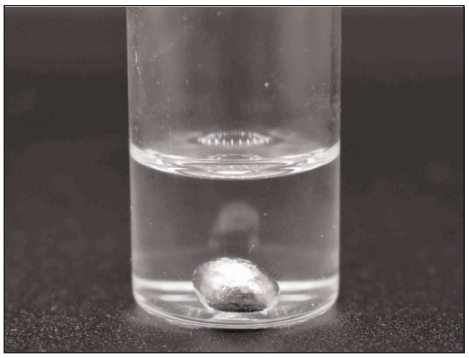
www.rtx.com/raytheon

Indium Corp extracts gallium from feed sourced at Rio Tinto's Quebec aluminium operation

3.5-ton demonstration plant a prelude to 40-ton annual capacity

Reflecting its metallurgical expertise in refining and transforming critical materials, Indium Corp of Clinton, NY, USA (a supplier of refined gallium, germanium, indium and other specialty technology metals) has extracted gallium from feed sourced at the Vaudreuil alumina refinery in Saguenay, Quebec, Canada of global mining group Rio Tinto as the firms collaborate to build a more robust global supply chain for gallium.

Indium Corp designed and developed the gallium extraction process in the USA at its Rome, NY, research and development facility. A strategic North American supply should accelerate the development of the project towards commercialization of gallium-based technologies.



"This milestone is a major step forward in our joint efforts to create a new and robust supply of gallium," says Indium Corp's president & CEO Ross Berntson. "Through this collaboration, we have demonstrated the viability of gallium extraction and laid the groundwork for commercial production to benefit industries worldwide," he adds.

Indium Corp will continue to develop the extraction process at its R&D facility to meet the planned commercial scalability needs for a 3.5-ton demonstration plant to be located in Saguenay, Quebec, and then eventually commercial-scale capacity of 40-tons annually, addressing an estimated 5–10% of global gallium supply.

With gallium playing an increasingly important role in advanced and clean technologies, the collaboration is expected to significantly enhance supply chain diversity and increase global availability.

www.indium.com

Gelest opens new production plant

Focus on precursor chemicals for dry resist EUV lithography

At its global headquarters in Morrisville, PA, USA on 16 May, Mitsubishi Chemical Group company Gelest Inc (which manufactures specialty silicones, organosilanes, metal-organics and acrylate monomers) has opened its new 50,000ft2 production facility in a ribbon-cutting ceremony attended by company executives, local officials, and community members. The new building will increase Gelest's production capabilities and support customer applications from microelectronics and medical devices to advanced thermal coatings and mobility.

"Our main focus will be to develop and manufacture precursor chemicals for use in dry resist EUV lithography, ensuring a robust supply [for the next generation of logic and DRAM technologies]," says Edward Kimble, senior business director/general manager, Gelest.

"The new building signifies Gelest's advancement in increasing capacity to fulfill the growing demand for specialty materials in advanced markets, particularly microelectronics and medical devices," he adds. "This facility not only reflects our continuous investment in Gelest's capabilities and business but also underscores our commitment to catering to the needs of advanced markets and their material application requirements."

Gelest's new 50,000ft^2 building.

Located on a revitalized US EPA Brownfield site, the new production facility will feature equipment designed for analysis, packaging and high-volume manufacturing of highly specialized chemistries to support advanced technology markets. To assure quality and chemical purity, the facility incorporates a 3000ft^2, ISO 7 cleanroom with advanced analytical instrumentation.

"This facility underscores Mitsubishi Chemical Group's commitment to innovation and supporting the both the US and global supply chain for critical materials for current- and next-generation materials and applications," says Jonathan Goff, business VP, Advanced Solutions Domain.

The new production facility underpins Gelest's ongoing expansion in Morrisville. In 2001 the company established its Morrisville headquarters, which now comprises production, R&D and administration operations. The new facility extends Gelest's footprint to nine buildings in Morrisville, eight on-site.

www.gelest.com

Australian National Fabrication Facility orders Riber MBE 412 cluster platform

System to be installed in new lab at University of Western Australia

Molecular beam epitaxy (MBE) system maker Riber S.A. of Bezons, France has received an order for a research MBE 412 cluster platform with an automatic wafer transfer system from a leading Australian research laboratory in order to advance its research in infrared (IR) technologies and to support the development of sovereign IR sensor capabilities in Australia.

Based at the University of Western Australia, the Western Australia Node of the Australian National Fabrication Facility (ANFF WA Node) is the only research center in the country with expertise and device fabrication for IR sensors, including high-density imaging focal-plane arrays.

The dual-chamber cluster platform will play a key role in long-term R&D efforts and is expected to significantly enhance the laboratory's capabilities.

Specially designed for research on next-generation IR imaging devices, the MBE 412 system is fully automated, supports wafers up to 7cm x7cm, and is equipped with Riber's Crystal XE software for state-of-the-art uniformity performance. To meet the customer needs, the system is also Hg-compatible, enabling the growth of HgCdTe (mercury cadmium telluride, MCT) structures. All components — including equipment, pumps, and effusion cells — have been customized to comply with the lab's specific requirements, with comprehensive technical and process support provided.

The system will be installed in 2026 in a new laboratory at the University of Western Australia, adjacent to an existing MBE system.

"We are proud to continue supporting our long-standing partners," states Riber's chairwoman & CEO Annie Geoffroy. "This order, placed 36 years after the acquisition of a first Riber 32P system — still in operation today — illustrates the enduring trust in our technology," she adds. "The MBE 412 platform, equipped with the latest innovations, reaffirms our commitment to delivering high-performance, reliable and safe MBE solutions tailored to the evolving needs of research institutions."

www.anff.org/locations/wa-node
www.riber.com

SMART Photonics buys AIXTRON's G10-AsP system

InP photonic integrated circuit foundry enhancing production abilities

Deposition equipment maker Aixtron SE of Herzogenrath, near Aachen, Germany is supplying its new G10-AsP metal-organic chemical vapor deposition (MOCVD) system for high-volume production of GaAs/InP materials to long-standing customer SMART Photonics, enabling it to increase its capacity and capabilities.

Founded in 2012 in cooperation with the Eindhoven University of Technology, SMART Photonics is an independent indium phosphide (InP) photonic integrated circuit (PIC) foundry. The manufacturer of discrete and integrated photonic components is headquartered at the High Tech Campus in Eindhoven, the Netherlands.

Market analyst firm Yole Group reckons that the InP-based PIC market is rising at a compound annual (CAGR) of 14% from US$3bn in 2023 through to 2027, driven primarily by mega trends like 5G and 6G telecoms, healthcare and artificial intelligence (AI). Sensing technologies such as light detection and ranging (LiDAR) in the automotive sector also play a vital role. InP PICs enhance photonic applications by integrating lasers directly onto the chip, miniaturizing the devices and improving their speed.

AIXTRON says that its G10-AsP system is currently the workhorse for precise and uniform processes essential for high-quality PIC production. The platform is specifically designed for arsenide/phosphide applications and, due to an innovative injector and advanced temperature control, offers up to 4x superior on-wafer-uniformity for critical layers compared with the previous generation. It is fully cassette-to-cassette automated and ensures ultimate process stability through in-situ cleaning, providing consistent and reliable production.

"This purchase underscores the industry's confidence in our cutting-edge technology, which can shorten the launch time for innovative products," says AIXTRON's CEO Dr Felix Grawert. "The G10-AsP will enable SMART Photonics to achieve unparalleled efficiency and precision in manufacturing photonic components for advanced laser devices," he adds.

"The acquisition of AIXTRON's G10-AsP system is a big step for SMART Photonics and will allow us to accelerate our innovation roadmap," comments SMART Photonics' CEO Johan Feenstra. "It enhances our production capabilities with leading-edge epitaxy technology, positioning SMART Photonics at the forefront of innovation in the integrated photonics industry."

www.smartphotonics.nl
www.aixtron.com

AlixLabs secures US patent for formation of nanostructure array

Integrating self-aligned double patterning with atomic layer etching-based pitch splitting yields tenth pending global patent.

Sweden-based AlixLabs AB (which was spun off from Lund University in 2019) says that the US Patent and Trademark Office has issued the notice of allowance for its latest patent application, US20250087487A1 'Formation of an array of nanostructures'.

Internally referred to as the 'Tetris' patent in honor of Alexey Pajitnov, the new patent integrates self-aligned double patterning (SADP) with atomic layer etching (ALE)-based pitch splitting (APS) technology. This approach, industrialized by AlixLabs since its founding in 2019, combines elements of both classical and leading-edge techniques to deliver what is claimed to be superior performance for semiconductor manufacturing.

The invention arose from AlixLabs' efforts to develop a process for precise sidewall angle control in APS, a key component in silicon-based processes. By leveraging plasma etch process selectivity and combining features from complex plasma processes, AlixLabs has pioneered a method that blends the traditional SADP process with the advanced APS technology. This allows the firm to utilize mature industrial technologies while benefiting from the advanced control and improved performance of cyclic processes and topographical selectivity. As a result, AlixLabs' solution offers enhanced ability to address the challenges of patterning at sub-5nm nodes.

This breakthrough is significant for the integration of APS technology into existing semiconductor production workflows, preserving the use of existing process design kits (PDKs). This should reduce the barrier for APS adoption in high-volume manufacturing (HVM), easing the transition to next-generation semiconductor technologies.

The patented innovation is said to provide greater flexibility, offering a new way of fine tuning the APS process for meeting the needs to cut capital expenditure and operational expenditure (CapEx and OpEx) as well as emissions for customers at advanced technology nodes, while allowing for broader compatibility with different materials. The new method further strengthens AlixLabs' core APS patent portfolio, positioning the firm as an enabler of next-generation semiconductor manufacturing.

The invention arose from AlixLabs' efforts to develop a process for precise sidewall angle control in atomic layer etching-based pitch splitting

Moreover, the invention is said to not only support the development of leading-edge logic, memory and photonics but also simplify the semiconductor manufacturing process by reducing CapEx and OpEx for semiconductor fabs.

"We remain committed to advancing semiconductor manufacturing with innovations that significantly enhance the precision, flexibility and efficiency of our technologies," comments co-founder & chief technology officer Dmitry Suyatin. "This patent represents a critical step forward in our mission to drive the next generation of semiconductor processes."

www.alixlabs.com

Veeco announces private exchanges and cancels remaining 3.75% convertible notes due 2027

Transactions provide greater financial flexibility, and reduce ongoing interest expense and outstanding debt

Epitaxial deposition and process equipment maker Veeco Instruments Inc of Plainview, NY, USA has completed separate exchange transactions following privately negotiated exchange agreements with holders of all of its outstanding 3.75% convertible senior notes due 2027.

"Veeco has strengthened our balance sheet by proactively addressing our 2027 notes following the settlement of our 2025 notes at maturity in January," says chief financial officer John Kiernan. "These transactions provide greater financial flexibility, in addition to reducing our ongoing interest expense and outstanding debt."

Prior to the exchanges, the 2027 notes had an aggregate principal amount of $25m, representing about 1.8 million underlying shares of Veeco's common stock based on the conversion ratio of 71.5372 shares per $1000 of the 2027 notes.

In accordance with the terms of the exchanges, the firm exchanged the 2027 notes for about 1.6 million newly issued shares of its common stock and about $5.4m in cash, inclusive of accrued and unpaid interest.

www.veeco.com

KLA opens $138m R&D and manufacturing facility in Newport, Wales

New 237,000ft² facility provides extra production and customer collaboration spaces, including 25,000ft² of R&D cleanrooms and 35,000ft² of manufacturing space and tool demo areas

Process control and inspection systems provider KLA Corp of Milpitas, CA, USA has opened its new $138m R&D and manufacturing center in Newport, Wales, UK, continuing the company's history of regional investment. KLA's Wales-based product division SPTS has been manufacturing semiconductor processing equipment in Wales since 1984, winning multiple Queen's Awards for excellence in R&D and export.

KLA added the SPTS etch and deposition product lines to its portfolio in 2019, bringing together complementary technologies, solutions and services. Reflecting the portfolio strength and growing customer demand, the new 237,000ft^2 Newport facility provides additional production and customer collaboration spaces, including 25,000ft^2 of R&D cleanrooms, 35,000ft^2 of manufacturing space and tool demo areas, all designed to support the development of semiconductor process technologies across advanced packaging, power devices, micro-electro-mechanical systems (MEMS), radio frequency (RF) and photonics sector technology.

"KLA brings together expertise in process and process control, providing customers with the breadth and depth they need to innovate and improve device performance," says Dan Collins, site leader & general manager at KLA. "As industry drivers like AI increase demand for advanced chips, our expansion in Wales and strong product portfolio position us to meet that demand — building on our rich history and investing in new technology, talent and long-term community partnerships."

KLA's new $138m R&D and manufacturing center in Newport, Wales, UK.

With capacity for 750 staff, KLA's new facility is expected to support the continued growth of the electronics ecosystem, serving as a center of engineering and manufacturing excellence, as well as an anchor for the larger community.

"We have a globally renowned compound semiconductor cluster here in Wales and the UK. Government recognizes that this industry is a key driver for economic growth, and the UK Government has recently announced nearly £5m to help build the talent pipeline," says Jo Stevens, Secretary of State for Wales. "KLA's investment in this new facility further strengthens our position as a leader in this vital and growing industry," she adds. "Today's announcement is a celebration of KLA's commitment to innovation and to Wales as a growing hub of technological excellence and leadership."

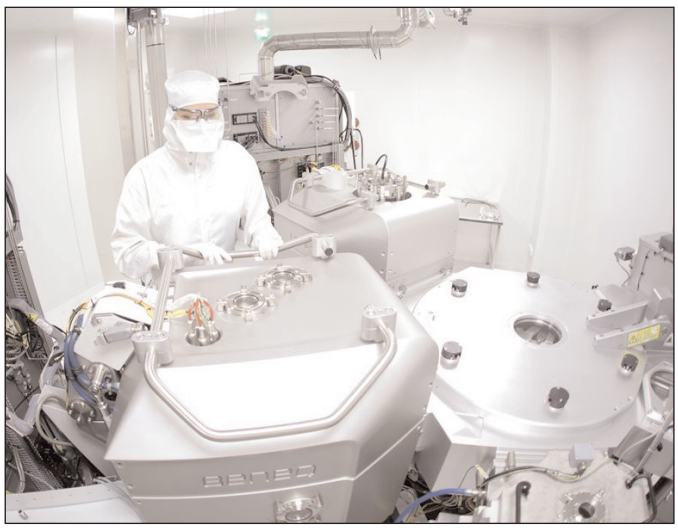
www.spts.com
www.kla.com

Beneq Transform ALD cluster tool qualified for GaN power device production by tier-1 Asian manufacturer

Finland-based firm expands global footprint in GaN device manufacturing

Beneq of Espoo, Finland says that its Transform atomic layer deposition (ALD) cluster tool has been qualified for volume production of gallium nitride (GaN)-based power devices on 8-inch GaN-on-silicon wafers by a tier-1 GaN power device manufacturer in Asia.

The system enables a proprietary three-step process - plasma-based surface pre-cleaning, plasma-enhanced ALD (PEALD) of interfacial layers, and thermal ALD of dielectric films — executed under continuous vacuum. This architecture is said to ensure high-quality interface engineering and process reliability, which is critical for wide-bandgap materials such as GaN and silicon carbide (SiC). Additional capabilities include nitride film deposition (e.g. AlN, SiN) and thermal ALD of films such as Al_2O_3, AlN, SiO_2 and HfO_2, offering flexibility across GaN high-electron-mobility transistors (HEMTs), ICs and vertical devices.



The vacuum-integrated cluster tool design features high throughput and what is claimed to be best-in-class cost-of-ownership while supporting demanding process requirements. Seventeen Beneq Transform tools are now in operation globally for GaN device production and technology development.

"Qualification by a tier-1 GaN power device manufacturer underscores the strength of our Transform platform and its leading role in GaN manufacturing," says Pasi Meriläinen, VP Semiconductor ALD at Beneq. "We remain focused on enabling our customers' production goals through robust, application-driven ALD solutions."

Beneq is further advancing its GaN process capabilities through collaboration with nanoelectronics research center imec of Leuven, Belgium as a member of its Industrial Affiliation Program (IIAP). A recently commissioned Transform tool at imec expands the joint R&D in GaN surface treatments and dielectric integration started two years ago.

www.beneq.com

III-V Epi celebrates fifth anniversary

More than two-thirds of revenue from industrial projects with ongoing supply requirements

As it celebrates its fifth birthday, III–V Epi Ltd of Glasgow, Scotland, UK — which provides a molecular beam epitaxy (MBE) and metal-organic chemical vapor deposition (MOCVD) service for custom compound semiconductor wafer design, manufacturing, test and characterization — says that it has demonstrated consistent growth, establishing its reputation as a trusted supplier of III-V epitaxial structures through MBE and MOCVD.

III-V Epi says it is committed to fast turnaround times and low- to medium-volume production across a range of material systems, uniquely making it a supply partner for devices and services spanning high-growth markets including AI, telecoms, datacoms, additive manufacturing, LiDAR, and sensing.

Calum McGregor.

More than two-thirds of its revenue now comes from industrial projects with ongoing supply requirements, while the remainder is from start-up companies and academic projects, often at the forefront of technical advances in the photonics industry.

"Industrial projects with ongoing supply needs have been core to III-V Epi's growth and success," notes director Calum McGregor. "The specification of the epitaxy layers in a wafer structure is the customer's intellectual property. III-V Epi's expertise is in fabrication know-how, ensuring fast turnaround and reduced development costs. This makes it an essential partner for photonics manufacturing and development within the quantum supply chain and various emerging, high-growth markets. In addition, we work with start-up companies and on academic projects which keep us at the forefront of III-V epitaxial structure design and development."

www.iii-vepi.com

Busch integrates centrotherm clean solutions brand into Pfeiffer Vacuum+Fab Solutions

Vacuum solution provider Busch Group of Maulburg, Baden-Württemberg, Germany says that its brand centrotherm clean solutions of Blaubeuren, Baden-Württemberg will become part of Busch Group firm Pfeiffer Vacuum+Fab Solutions of Aßlar, Germany. From September, the gas abatement systems previously offered under the centrotherm brand will be integrated into the Pfeiffer portfolio and be available under this name in the future, uniting the two members of the global Busch Group.

By consolidating the product portfolio of centrotherm clean solutions under a single, unified brand, customers will benefit from the convenience of sourcing vacuum solutions from a one-stop, trusted supplier, says Busch.

Pfeiffer Vacuum+Fab Solutions is the brand for high and ultra-high vacuum, providing solutions for demanding applications in R&D, analytics, industry and semiconductors. "Bringing our product portfolio for the semiconductor industry together under our strong and well-established brand Pfeiffer Vacuum+Fab Solutions further streamlines our product offering," notes Busch's co-owner & co-CEO Sami Busch. "This enhances our ability to serve semiconductor and related industries with high-quality end-to-end solutions – not only for vacuum generation but also for related critical applications such as leak detection or contamination management."

Portfolio for semiconductors

Busch acquired centrotherm clean solutions in 2023, implementing its gas abatement expertise into its broader portfolio. The products now being integrated into the Pfeiffer brand are primarily used in the semiconductor industry but also, for example, in the production of MEMS, LEDs, solar cells, and flat-panel displays. The range comprises standardized gas abatement systems as well as individual customized systems and overall environmental solutions.

All 350 centrotherm clean solutions staff will retain their positions and contracts, giving continued expertise, seamless service, and uninterrupted availability. The main office and production plant for abatement systems will remain in Blaubeuren.

www.centrotherm-cs.de/en
www.pfeiffer-vacuum.com
www.buschvacuum.com

Pfeiffer Vacuum+Fab Solutions adds CNR series to CenterLine family of vacuum gauges

Pfeiffer Vacuum+Fab Solutions has expanded its CenterLine family of vacuum gauges by launching the CNR series, suited particularly for the harsh operating conditions in the semiconductor industry.

The CenterLine CNR series consists of analog capacitive vacuum gauges that can measure over four decades in the full scale between 0.1Torr and 1000Torr. Available in heated and unheated variants, the CNR series delivers reliable measurements even under the harshest operating conditions. Like the other CenterLine gauges, it provides an optimal cost–performance ratio and allows easy integration into existing installations with measurement technology from other manufacturers, says the firm.

CNR series gauges are ideally used in combination with pressure control valves and can be used for a wide range of applications in the semiconductor industry, such as dry etching, chemical vapor deposition (CVD) and atomic layer deposition (ALD) processes. They can also be implemented for analytics, R&D and various other industries.

Five variants are available (the 36x, 37x, 38x, 39x and 30x, all SEMI S2-compliant), providing options for processes at different temperatures. The 36x is an unheated variant for reliable measurements at ambient temperature with an accuracy of 0.2%. Self-heating versions are available at 45°C, 100°C, 160°C and 200°C. The 45°C variant provides an accuracy of 0.15%, making it suitable for calibration laboratories and high-quality control, says the firm. With an accuracy of 0.4%, the other self-heating versions allow higher accuracy of readings in high-temperature or hot gas processes than comparable gauges, it is claimed.

Resistance to contamination and corrosion

The device has a diaphragm sensor with a stable and resistant ALD-coated ceramic shield that protects it both from exposure to the high temperatures of the process gases and from corrosion. This ensures higher reliability and accuracy, and a longer sensor life, even under harsh plasma, due to minimized contamination. As sensor drift is also reduced, calibration is required less frequently, reducing overall cost of ownership.

Pressure control filter setting

Gauges in the CenterLine CNR series are equipped with a special pressure control filter setting. Designed to be fast and adaptive, this enables them to respond more quickly to pressure changes as well as providing accurate and smooth pressure control. This feature is particularly effective in combination with a pressure control valve.

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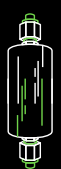
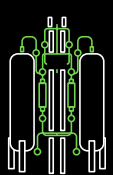
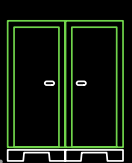


Point-of-Use Purifiers



Frame-Mounted Purifiers



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Seoul Semi closing on second-placed ams OSRAM

Only firm in global top three to sustain both revenue and market share growth during slowdown

South Korea-based LED maker Seoul Semiconductor Co Ltd says that it has narrowed the market share gap with global number-2 player ams OSRAM to just one percentage point, according to the '2024 Global LED Market Share Rankings' issued by market research firm Omdia. Seoul Semiconductor was the only company among the global top three to sustain both revenue and market share, while industry leaders Nichia and ams OSRAM experienced significant revenue declines amid the slowdown in the LED market.

Seoul Semiconductor says that this is underpinned by its robust technological competitiveness, driven by its commitment to innovation even amidst global economic uncertainty. The firm has consistently invested over 10% of its annual revenue in R&D, resulting in a portfolio of more than 18,000 patents worldwide. In the last 20 years Seoul Semiconductor has won over 100 cases in patent litigation across eight countries.

Rank	Country	Company	2024	
			revenue ($M) (YoY)	M/S (YoY)
1	JP	Nichia	1411 (-16%) ↓	12.0% (-1.8%p) ↓
2	DE	ams Osram	833 (-27%) ↓	7.0% (-2.4%p) ↓
3	**KR**	**Seoul Semiconductor**	**722 (0.3%)** ↑	**6.0% (0.1%)** ↑

'2024 Global LED Market Share Rankings' (source: Omdia).

In particular, Seoul Semiconductor's proprietary 'No-wire' technology is a core component of micro-LED displays. The firm has won a patent litigation at the Unified Patent Court (UPC) in Europe, reinforcing the strength and exclusivity of its No-wire technology in the next-generation display market.

According to Omdia, the micro-LED segment is emerging as a key frontier in next-generation display technology and is expected to grow into a market worth about US$80bn by 2040.

Seoul Semiconductor is the world's third-largest global LED company, specializing in LED technology for over 30 years. Seoul Semiconductor spans industries including lighting, automotive, IT (such as backlighting), while its subsidiary Seoul Viosys specializes in micro-LED, UV, sensors, and datacoms.

Some of the technologies developed by Seoul Semiconductor include the world's first no-wire LED technology WICOP, the SunLike LED which replicates the natural sunlight spectrum, the high-voltage LED Acrich, the ultra-bright Pola LED (10 times brighter than conventional LEDs), the RGB one-chip micro-LED WICOP Pixel, and UV sterilization technology Violeds.

www.SeoulSemicon.com

Nichia successful in recalling Dominant LEDs from distributor as result of patent infringement lawsuit

In January, certain automotive LEDs manufactured by Malaysia-based Dominant Opto Technologies Sdn Bhd were recalled from a distributor pursuant to a patent infringement lawsuit filed at the Düsseldorf Local Division of the Unified Patent Court by 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. The below three Dominant LEDs that had been distributed in the market were subject to the lawsuit and the recall: Spice Plus 2120 Multi Color SKRTB-FHG (RGB 3in1), Spice Plus 3030 Multi Color S6RTB-THG (RGB 3in1), Spice Plus 3014 SEW-YZSG.

The lawsuit related to Nichia's patent EP2323178, which covers epoxy resins for LED packages that exhibit excellent heat and light resistance. This technology is of particular importance in automotive lighting applications, where highly reliable LEDs are required.

The Düsseldorf Local Division of the Unified Patent Court has since issued a decision on 28 March confirming a settlement between Nichia and the defendant Endrich Bauelemente Vertriebs GmbH, a German electronic components distributor that sold the Dominant LEDs. The settlement fully confirms Nichia's patent infringement claims in relation to the Dominant LEDs, namely to cease the sales in Germany, France, Italy and the Netherlands, to recall and destroy the products, to provide information and rendering account, and to compensate Nichia for damages.

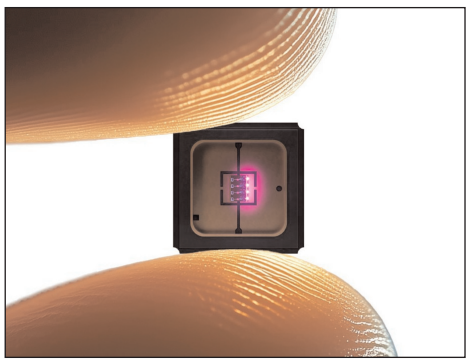
Nichia also holds family patents of EP2323178 in the following countries: Japan, USA, Germany, UK, France, Italy, the Netherlands, China, India, Taiwan, and South Korea.

www.dominant-semi.com
www.nichia.com

Uviquity gains $6.6m seed funding to develop far-UVC technology for human-safe photonic disinfection

Uviquity of Raleigh, NC, USA (a venture-backed start-up pioneering wide-bandgap integrated photonic disinfection technologies) has emerged from stealth after a $6.6m seed-funding round led by Emerald Development Managers (an early-stage venture capital firm specializing in deep tech) with participation from AgFunder and MANN+HUMMEL (specialists in food and agriculture venture capital and advanced filtration solutions, respectively).

Uviquity is developing solid-state far-UVC (200-230nm) semiconductor light sources designed to deliver safe, continuous and chemical-free disinfection for air, food and water applications. The funding will support Uviquity's R&D, accelerating the productization of its core technology — a proprietary photonic integrated circuit that couples blue laser light into frequency-doubling waveguides, enabling a scalable, single-chip far-UVC solution that



can fit on the tip of your finger and integrate into a wide variety of applications using standard photonic packages.

"Far-UVC light is the future of pathogen control — and Uviquity's wide-bandgap semiconductor platform is the key to making it practical, scalable, and safe," believes CEO & co-founder Scott Burroughs. "This funding allows us to bring our vision to life."

Uviquity says that its chip-based semiconductor approach offers a compact, energy-efficient and durable solution that can be integrated into light fixtures, air-handling systems, food packaging and processing equipment, agricultural crop protection systems, water purification systems, and consumer appliances.

Uviquity adds that its solid-state far-UVC platform opens the door to a wide range of applications:

- Air disinfection in public and private spaces, providing invisible, always-on protection from airborne illnesses;
- Pesticide-free crop protection, enabling healthier and more sustainable agriculture;
- Chemical-free water purification, delivering clean water at any scale without harmful byproducts.

"With its proven team and novel technology, Uviquity fits perfectly with our goal to invest in exceptional companies that are solving real problems," comments Cy Schroeder of Emerald Development Managers.

www.uviquity.com

AquiSense closes Series A investment round

AquiSense Inc of Erlanger, KY, USA (which designs and makes UV-C LED water disinfection systems) has secured Series A investment led by Burnt Island Ventures, following a recent management buyout. Additional investment comes from a local Kentucky Capital Fund and returning private seed investors led by Randy Knapmeyer. Funds will be used to accelerate growth in a broad range of water treatment applications including beverage, pharmaceutical, oil & gas and municipal.

Founded in 2014, AquiSense says it was one of the first to commercialize UV-C LED technology for water disinfection applications. It now has over 500,000 installations globally. The firm currently provides UV-C LED disinfection solutions for point-of-use, point-of-entry, laboratory and full-scale industrial and municipal applications.

"UV disinfection has been a star performer in water treatment for the past couple of decades and this investment validates our position that UV-C LED technology isn't a future abstract notion, but the core driver to continue this growth," says founder & CEO Oliver Lawal. "We have strong customer partnerships in the US, Europe and Asia that value the full life-cycle benefits of our products," he adds.

"There are several reasons why we were drawn to AquiSense," says Burnt Island Ventures partner Steve Kloos. "(1) the executive team, led by Oliver, has been together for several years and are highly effective and their pace and quality of decision-making is really good; (2) AquiSense is the clear market and technology leader in LED tech for water and wastewater UV treatment with deep know-how and strong patent IP; (3) UV LED systems offer a wide range of benefits over legacy mercury UVs and are on a Moore's Law-type performance and cost trajectory."

Increasingly users of UV technology are seeking alternatives to traditional mercury-based lamps, as they prioritize sustainability. Currently, the majority of the UV disinfection market uses mercury-based lamp technology, but these face global usage restrictions, with an eventual new mining ban in 2032, as set out by the UN Minamata Convention on Mercury. Adopted in 2013 and in force since 2017, the convention aims to reduce mercury pollution, which is one of the World Health Organization's top 10 chemicals of 'major public concern'.

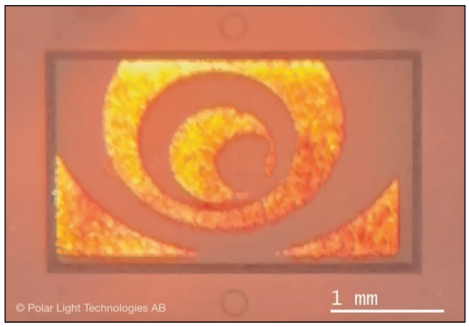
www.aquisense.com

Polar Light demos first pyramidal micro-LED micro-display prototype

Polar Light Technologies AB (PLT) has fabricated its first micro-display prototype built on its proprietary pyramidal micro-LED (μLED), confirming the technology's ability to integrate the pyramidal micro-LED frontplane onto a CMOS backplane.

Polar Light stems from research by founder professor Per-Olof Holtz and his team at Linköping University (with support from the Swedish Foundation for Strategic Research (SFF) and Sweden's innovation agency Vinnova). The firm supplies wafer-level RGB micro-LED arrays that can power the next generation of ultra-compact displays.

The prototype pairs a bottom-up-grown Polar Light monochrome μLED front-plane with a high-performance SAPIEN CMOS backplane. Precision flip-chip bonding was carried out by Finetech of Berlin, Germany (a supplier of sub-micron and high-accuracy die bonding solutions), achieving pixel-accurate alignment across the panel.



"This proof of concept shows that our pyramidal μLEDs can be hybridized to mainstream CMOS drivers, creating a micro-display" notes Polar Light's co-founder Ivan Martinovic. "We thank our partners SAPIEN Semiconductors and Finetech for helping us validate the manufacturability of our platform."

This latest achievement provides a path to monolithic RGB displays, based on the red, green and blue μLEDs previously demonstrated using same material system.

Polar Light cites the following factors for why the development is significant:

- Monolithic RGB: Polar Light's μLEDs, based on the same material system, are paving the way for monolithic RGB displays.
- Integration: The demo display is a stepping stone for Polar Light's μLEDs to be integrated with a CMOS backplane for novel opto products.
- Bottom-up approach: Pyramidal μLEDs manufactured bottom-up without etching are suitable for integration in VR/AR applications.
- Sub-Lambertian emission: A naturally focused light lobe couples efficiently into waveguide, boosting brightness.

Polar Light is pioneering a patented, bottom-up process that grows pyramidal micro-LEDs atom layer by atom layer, eliminating destructive etch steps that conventional methods require. The result is said to be record small pixels, superior brightness and efficiency, and a manufacturing flow that scales cleanly to high-volume wafers.

www.polar-light-technologies.com

Seoul Semi's micro-LED patents infringed, rules court

South Korea-based Seoul Semiconductor Co Ltd says that the Local Division Paris of the Unified Patent Court (UPC), which has jurisdiction across 18 European countries, has issued a judgment that its affiliate's core optical semiconductor patent was infringed by Laser Components SAS of Meudon, France, a global distributor offering electronic components across USA, Europe, and Canada.

The court ordered an immediate ban on sales, as well as the recall and destruction of infringing products.

This ruling is Seoul's second victory at the UPC, following its October 2024 judgment prohibiting the sales of products infringing Seoul's patents across eight countries — said to be a first in the LED industry.

Laser Components was found to have sold products that infringed Seoul's WICOP technology, which provides a robust, no-wire structure for micro-LED applications.

Seoul Semi claims that its WICOP technology is the world's first technology to overcome the structural limitations of conventional manufacturing of LEDs consisting of compound materials like gallium and indium, which require vertical alignment of positive and negative electrodes as well as wires to connect the electrodes. Seoul Semi claims to be the first to solve this problem by creating its 'no-wire' technology, which connects electrodes directly without wires. This improves light emission efficiency and offers a strong, durable structure that resists heat and humidity.

WICOP technology has been adopted across applications requiring miniaturization and high performance, including micro-LEDs, automotive headlamps, smartphone flashes, and backlight units. Its compact yet durable structure has also accelerated its use in advanced packaging products.

With an exclusive focus on optical semiconductors for over 30 years, Seoul Semi has assembled a portfolio of about 18,000 patents worldwide. In the last 20 years, Seoul Semi has won over 100 cases in patent litigation across eight countries. According to Omdia's 2023 report, the firm ranks number-one globally in the UV LED and LCD backlight segments, and third overall in the LED industry.

www.SeoulSemicon.com

VueReal adds industry-specific reference design kit bundles to accelerate micro-LED commercialization

MicroSolid Printing platform powers new automotive and consumer electronics bundles debuting at Display Week

Micro-LED technology firm VueReal Inc of Waterloo, ON, Canada has announced a significant expansion of its reference design kit (RDK) portfolio with new industry-specific bundles. Purpose-built for automotive and consumer electronics, the vertical RDKs are designed to fast-track micro-LED product development and commercialization with unprecedented speed and integration readiness. Debuting in at Display Week 2025 in San Jose, CA, USA (11–16 May), the next-gen bundles validate VueReal's mission to unlock scalable, sustainable micro-LED adoption across global markets.

VueReal says that, by delivering comprehensive, ready-to-integrate kits tailored to the unique requirements of automotive and consumer electronics, it is enabling customers to move from evaluation to product launch faster and with lower risk — while supporting the industry's shift toward more eco-friendly manufacturing.

The firm says that its RDKs are further propeling the micro-LED display market toward a projected $30bn valuation by 2030. The RDK bundles are said to be the first to offer fully integrated, application-optimized micro-LED displays that can be directly incorporated into real-world products. This is enabled by the firm's patented MicroSolid Printing platform, which serves as the technical foundation for high-yield, scalable microdevice integration.

"These new RDKs are more than evaluation kits — they're plug-and-play blueprints for real product development," says founder & CEO Dr Reza Chaji. "By introducing tailored reference design bundles for automotive and consumer electronics, we enable engineering and design to move from concept to scalable production faster and more reliably. This evolution reflects our commitment to making micro-LED and broader micro-semiconductor innovation accessible and practical for real-world applications."

Purpose-built kits for automotive and consumer electronics

Each RDK bundle includes pre-configured, integration-ready micro-LED displays tailored for:

- Automotive applications: intelligent taillights, in-glass applications, AR heads-up displays (HUDs), interior lighting, and infotainment systems.
- Consumer electronics: wearables, embedded smart displays, and AR interfaces.

Unlike traditional demo kits, these new bundles are designed for direct integration. Product teams can evaluate performance, test real-world use cases, and begin scaling with fewer iterations and less guesswork. At the core of every kit is MicroSolid Printing, a cartridge-based platform that transfers millions of microdevices — LEDs, chiplets, and sensors — with unmatched precision, yield and throughput.

By introducing tailored reference design bundles for automotive and consumer electronics, we enable engineering and design to move from concept to scalable production faster and more reliably

Accelerating product development and innovation

With the new vertical RDK bundles, VueReal says that it is helping partners to:

- validate products faster, with ready-to-integrate, application-specific designs;
- reduce development risk, by leveraging proven, production-grade platforms;
- expand design possibilities, due to transparent, ultra-bright and low-power micro-LED options;
- scale efficiently, using a platform that grows with demand without requiring high capital investment.

MicroSolid Printing: solving the transfer problem

Mass transfer has long been the primary challenge of mass adoption of micro-LED. VueReal's MicroSolid Printing is said to solve this through:

- parallel, additive transfer with >99.999% yield;
- up to 5x faster throughput than laser or pick-and-place;
- modular printer architecture for seamless reconfiguration;
- scalable from prototyping to high-volume production;
- compatible with multiple device types (LEDs, chiplets, sensors, photonics).

This platform powers VueReal's own production and is available to OEMs and fabs as a licensable blueprint, enabling localized, cost-effective scaling of advanced microdevice technologies.

www.displayweek.org
www.vuereal.com/tech/platform

CEA-Leti reports co-integration of GaN micro-LEDs and organic photodetectors for multi-functional display applications

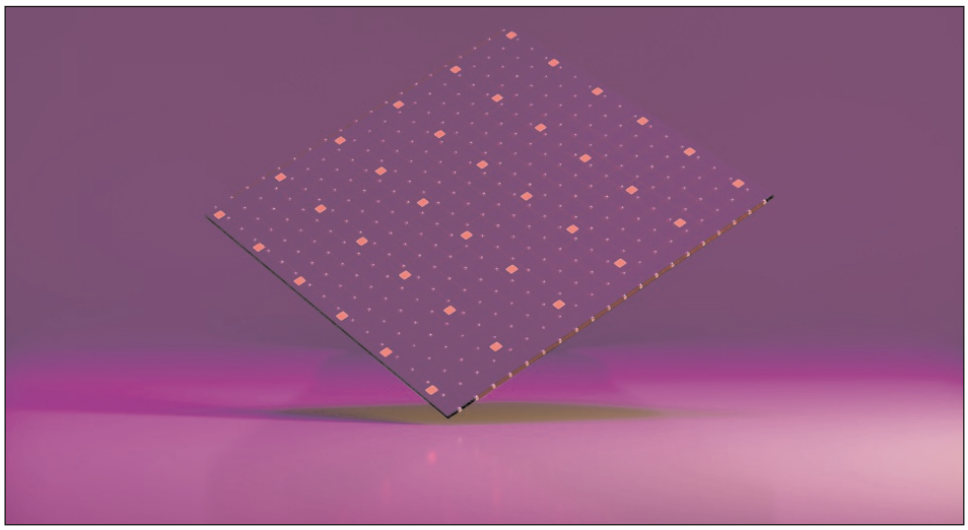
Presentation at Display Week paves way toward displays that show content and sense the environment

At the SID Display Week 2025 conference in San Jose, CA, USA (13–15 May), micro/nanotechnology R&D center CEA-Leti of Grenoble, France presented the paper 'Co-Integration of Organic Photodetector with MicroLED Dedicated to Multifunctional Display Application', representing a step toward multi-functional displays that combine both display and sensing capabilities.

As the demand for innovative and interactive displays continues to grow, micro-LED technology has emerged as a promising contender for future display applications due to its exceptionally high brightness, while maintaining a minimal footprint, leaving room to integrate additional functions. These properties expand the boundaries of traditional displays by making micro-LEDs an ideal candidate for integrating both display and sensing functions. However, achieving seamless co-integration between micro-LEDs and photodetectors has remained a major technical challenge. Few studies have addressed this issue until now.

"Demonstrating the co-integration of micro-LEDs with photodetectors paves the way for multi-functional displays that combine imaging, gesture recognition, and even biometric scanning," says Michaël Pelissier, lead author of the paper. "Micro-LED's high radiance allows us to free up more space on the display panel to incorporate photodetectors, which not only enhances the display experience but also opens up new possibilities for smart, interactive screens."

A major hurdle in integrating micro-LEDs with photodetectors is crosstalk coupling, when the light emitted by the micro-LEDs reaches the photodetector directly before reflecting off the observed scene, leading to interference and diminished sensor performance. Exploring this challenge, the paper presents key insights into how the distance between the illumination source and the photodetector affects crosstalk, providing a deeper understanding of this bottleneck.



Next-generation multi-functional display technology (credit MELTED/CEA).

Applications for health, security and consumer devices

CEA-Leti notes that co-integrating micro-LEDs with organic photodetectors enables promising possibilities for new applications, including:

- Fingerprint sensing across the entire display area: Enables secure access by detecting fingerprints across the entire screen and even extracts detailed images of veins, rather than in specific areas, significantly enhancing security measures for consumer devices.
- Infrared sensing for novel interface: Uses IR sensing to perform gesture recognition in close vicinity to the screen to further improve interactive capabilities.
- Bio-monitoring: Enables the extraction of physiological parameters such as heart rate, blood oxygen levels, and body temperature, supporting further advances in health and wellness applications.

As consumer devices such as smartphones and laptops become more integral to daily life, the demand for multi-functional displays continues to increase, says CEA-Leti. This co-integration allows displays that not only show content but also sense the environment, enabling smart interactions, biometrics and real-time physiological monitoring, all within a single, compact device.

Next steps

Following co-integration of the GaN micro-LEDs and organic photodetectors, CEA-Leti's next phase of the work will focus on exploring the full potential of this technology for specific applications, such as physiological parameter tracking. The researchers also aim to investigate various photodetector technologies that can be co-integrated with micro-LEDs to optimize performance, reduce crosstalk, and further enhance multi-functionality.

www.displayweek.org
www.leti.fr

Porotech leading 'One-Stop AR Solution Alliance' to accelerate AR commercialization

Micro-LED firm exhibits at Display Week with partners Foxconn, Rayprus, GIS and Jorjin

At SID Display Week 2025 (13–15 May), fabless micro-LED company Porotech (a spin off from the Cambridge Centre for Gallium Nitride at the UK's University of Cambridge that has developed porous GaN material and has an R&D center in Hsinchu, Taiwan) led the 'One-Stop AR Solution Alliance' alongside key partners Foxconn, Rayprus, GIS, and Jorjin with a grand showcase in booth 1208 at the San Jose McEnery Convention Center.

The joint exhibition presenteda comprehensive, one-stop augmented-reality (AR) solution spanning materials, optical engines, optical modules, AR glasses full system assembly, and mass production — propelling AR technologies from innovation to commercial reality.

Building a complete AR supply chain

As the alliance's core technology leader, Porotech has pioneered the industry's first 8-inch platform designed specifically for micro-LED applications. It has achieved a breakthrough pixel pitch of just 1.25μm, demonstrating the potential of GaN-on-silicon micro-LED technology.

As part of its drive toward commercialization, Porotech has launched its latest red LED innovation. Not only offering five times the brightness of any other conventional red emitters, SpectraCore also features an ultra-narrow emission spectrum and exceptional color purity, it is claimed. Also, the wavelength remains stable under all driving conditions, showcasing superior thermal stability and long-term reliability.

Porotech has hence overcome one of the biggest barriers to full-color micro-LED displays: the performance and stability of red emitters. By leveraging its proprietary 8-inch wafer platform to ensure scalable mass production, Porotech says it is laying the groundwork for full-color near-eye displays and marking a critical step forward in the commercialization of micro-LED technology.

InGaN Red addresses longstanding challenges in micro-display technologies. Traditional AlInGaP-based red LEDs have faced issues with low efficiency and poor reliability, hindering their adoption in consumer electronics.

Claiming to be the first company to commercialize InGaN-based red LEDs in 2021, Porotech says that its InGaN red LEDs deliver superior efficiency and reliability, with optoelectronic properties closely aligned with InGaN blue and green materials — enabling seamless platform integration.

However, technical challenges like wavelength drift, broad emission linewidth, and limited color purity have persisted.

With SpectraCore, Porotech has launched an InGaN red LED that is said to excel in brightness, efficiency and color purity, advancing the realization of full-color micro-LEDs.

At Display Week, Porotech demonstrated its comprehensive vertical integration capabilities across the micro-LED ecosystem — from material innovation, wafer processing, chip-on-carrier (COC), chip-on-wafer (COW), LED chip fabrication, and final panel applications — solidifying its role as a catalyst for micro-LED commercialization.

Together with its alliance partners, Porotech says it unveiled a blueprint for next-generation AR display technologies.

The AR solution alliance the following partners:

- **Rayprus: High-Performance AR Optical Engine Modules**

Rayprus is presenting its latest AR optical engine technology, featuring high brightness, low power consumption, and precise color management. The modules enable the miniaturization and performance enhancement of advanced AR devices.

- **GIS: Advanced Waveguides and Optical Module Integration**

GIS is showcasing lightweight optical waveguides and optical modules, delivering clear imaging and wide field-of-view designs. With a proven track record of collaborations with global brands, GIS provides complete, high-performance optical solutions for the next generation of AR glasses.

- **Jorjin: AR Glasses Design, Manufacturing & Customization**

Jorjin is displaying its latest AR glasses prototypes, highlighting its integrated optical and electronic engineering expertise and ergonomic design. Jorjin's customized design services empower brands and enterprises to deliver market-ready smart wearable devices, fostering the growth of diverse AR applications.

- **Foxconn: Full-System Assembly and Mass-Production Expertise**

Playing the pivotal role of final integrator within the alliance, Foxconn provides complete AR system assembly and scalable mass-production capabilities, bridging the gap between R&D and market deployment.

With Porotech at the helm and Foxconn providing robust manufacturing support, complemented by the advanced capabilities of Rayprus, GIS and Jorjin, the alliance aims to deliver complete AR solutions, enabling partners to shorten development cycles, reduce integration barriers and transition AR technologies from concept to market reality.

www.displayweek.org
www.porotech.co.uk

NUBURU reveals TEKNE as defense-tech acquisition

Blue laser technology to be integrated in new defense & security hub

NUBURU Inc of Centennial, CO, USA — which was founded in 2015 and develops and manufactures high-power industrial blue lasers — has revealed TEKNE S.p.A. of Milan, Italy (a provider of integrated electronic warfare and cyber capabilities in military vehicles) as its targeted acquisition, as part of its overall plan to create a unique defense & security hub.

NUBURU is still awaiting approval from the Italian government under the 'golden power' regulations, which oversee foreign investments in critical sectors aligned with national security interests. Completion of the acquisition is also subject to the necessary regulatory and stockholders approval.

With annual revenue of $50m and a R&D team of 70 engineers and technicians, TEKNE has expertise in telecoms, electronic and cyber warfare, along with vehicle protection systems. As a pioneer in jammer technology, TEKNE has supplied systems up to 8GHz and is currently developing solutions for satellite systems.

TEKNE also has an established, diverse, global client base, including key national organizations such as ministers, government agencies and other public sector entities, highlighting its role in the defense sector. Furthermore, in 2024 TEKNE entered into a strategic partnership with US Flyer Defense, a provider of tactical ground mobility solutions in the USA. Together, they are set to produce a high-mobility vehicle designed for rapid deployment across a diverse landscape of military operations. Engineered for versatility in military missions, this lightweight tactical vehicle will enhance the capabilities of the Italian Armed Forces and other NATO allies, fostering an environment of interoperability and readiness. On the other side, TEKNE already has commercial and support operations in the USA. The firm plans to further expand its presence in the US market, including the establishment of a technology laboratory focused on serving the specific needs of American customers.

TEKNE's portfolio also includes specialized vehicles designed for various applications, such as the Graelion 4x4 multi-purpose vehicle and the Shield armored vehicle tailored for personnel transport. Additionally, the firm is established in the field of cyber electromagnetic activities (CEMA), a modern approach to electronic warfare that integrates cyber capabilities.

"Our targeted acquisition of TEKNE exemplifies our commitment to expanding within the vital defense sector while enhancing our capabilities to address complex security challenges," says NUBURU's executive chairman Alessandro Zamboni. "By integrating TEKNE's advanced solutions with our blue laser innovations and niche solutions in the operational resilience space, we are poised to deliver cutting-edge products that meet the ever-evolving needs within the $500bn defense industry and the emerging regulatory requirements in the security market," he reckons.

NUBURU believes that, by leveraging TEKNE's existing robust order backlog totaling $309m and the potential synergies with 'platform as a service' business models, it is well positioned to ensure operational efficiencies and accelerate its growth in critical industries.

www.teknespa.it

Funding to eliminate $3.4m in accounts payables

NUBURU has secured funding partners to address up to about $3.4m in accounts payables left from previous management, enabling it to eliminate past debts and enhance its financial flexibility.

This follows strategic investment in Supply@ME Capital Plc (SYME), a $5.15m on-demand convertible funding commitment, which further positions it to pivot towards a capital-light, sustainable growth approach through innovative fintech solutions. The integration of SYME's financial platform will provide liquidity and enable NUBURU to maintain competitive inventory levels as it prepares for growth in the defense and security sectors.

"We are excited to share these strategic updates with our shareholders and underscore our focus on creating significant value through our dual business lines," says executive chairman Alessandro Zamboni. "Material progress on settling our past liabilities, combined with our strategic investments and acquisitions in cutting-edge defense and security technologies, cements NUBURU's position as a leader in high-demand markets," he reckons.

"The next final step will comprise the settlement of the last residual company liabilities. In this regard, we are working on a solution, in the interests of our shareholders, in order to manage the redemption obligations of the company with respect to the outstanding Series A preferred stock."

As part of its growth strategy, NUBURU is on track to finalize the acquisition of a Defense & Security Hub. This hub will focus on delivering products tailored for defense applications, also by leveraging the firm's blue laser expertise, while extending robust security solutions through a software-as-a-service (SaaS) model, addressing critical regulatory requirements in sectors demanding operational resilience.

These acquisitions are projected to contribute over $50m in revenue during 2025, contingent upon regulatory and shareholder approvals.

NUBURU forms working group with targeted defense-tech acquisition

NUBURU has announced the official kick off of the working group formed by the mutual management teams of NUBURU and the defense-tech firm that it aims to acquire (TEKNE). The working group will also oversee R&D of advanced laser-tech-based solutions designed specifically for defense applications, as part of the firm's strategic expansion in the defense sector, under the joint-pursuit agreement signed in March.

As NUBURU continues to study the development and integration of its laser technology with the expertise gained from its defense acquisition, the new comprehensive defense and security group strategy (to be delivered following completion of the acquisition plan) will comprise the enrichment of the portfolio of solutions with customized vehicles and advanced electronic products engineered for defense and civilian applications. The production of specialized vehicles — ranging from armored transport and emergency response vehicles to fuel tankers — leverages proprietary technology and components designed to meet the high-tech demands of modern defense requirements.

"Our strategic trajectory committed to providing advanced defense solutions is exemplified by our efforts to produce a diverse array of special-purpose vehicles, meticulously designed to support our military and civilian clients," says executive chairman Alessandro Zamboni. "Our plans aim at enhancing operational readiness and flexibility while ensuring our solutions are tailored for various mission profiles."

Also, the defense-tech strategic plan aims to fortify the new enlarged group capabilities in electronic products for the defense and security sectors, offering a wide range of system solutions including jammers and telecom networks. Notably, the defense tech business is currently actively developing innovative strategies to protect personnel and infrastructure through the deployment of cutting-edge jamming techniques.

"Our targeted defense tech business has entered into a strategic partnership with a leading provider of tactical ground mobility solutions in the United States," says Zamboni. "Together, they will jointly produce a high-mobility vehicle designed for rapid deployment across a diverse landscape of military operations. Capable of reaching unprecedented levels of speed and range, this lightweight tactical vehicle excels in off-road conditions and is engineered for versatility in military missions," he adds. "This collaboration will enhance the capabilities of the Italian Armed Forces and other NATO allies, fostering an environment of interoperability and readiness. The establishment of local production facilities in Italy will further streamline vehicle delivery and support, ensuring robust supply chain continuity and bolstering national defense initiatives."

The targeted defense tech business currently has a portfolio of about 60 clients across seven countries (including the USA, Italy, and UAE) with a robust backlog of orders totaling $309m, plus options for an additional $181m.

www.nuburu.net

NUBURU unveils strategic initiative to revitalize Blue-Laser business unit

NUBURU has initiated a strategic working group to revitalize its Blue-Laser business unit. The initiative aims to redefine the firm's approach to leveraging laser technology within the defense sector.

In alignment with the joint-pursuit agreement recently signed with a defense-tech company, NUBURU aims to deploy vertical applications that are synergistic with the defense industry. These applications, together with the few other additional verticals which the firm is focusing on, will facilitate cross-selling and up-selling strategies, harnessing NUBURU's existing expertise and network of distributors and clients that have conducted initial pilot projects using blue laser technology.

"By assembling a team of subject matter experts and leveraging our partnership with the defense sector, we are poised to create innovative solutions that not only resonate with our current clientele but also appeal to a broader market," says executive chairman Alessandro Zamboni.

The firm is currently in advanced discussions to engage a senior expert specializing in revenue generation and marketing strategies to develop a robust go-to-market model. This should also allow NUBURU to facilitate collaboration with the defense-tech firm's client portfolio and leverage the partnership with NexGenAI Solutions Group and its AI-driven marketing solutions that will provide market insights and enable targeted marketing campaigns that resonate with potential customers for the blue laser.

As part of this revitalization plan, NUBURU is establishing a new facility encompassing a warehouse, laboratories and office space, serving as the operational hub for the Blue-Laser business unit. The company has already identified a first suitable location.

BluGlass completes $2.3m placement and launches up to $6m share purchase plan

Funds to be used to scale product delivery to fulfil new and existing contracts, additional fab equipment, and working capital

BluGlass Ltd of Silverwater, Australia — which develops and manufactures gallium nitride (GaN) blue laser diodes based on its proprietary low-temperature, low-hydrogen remote-plasma chemical vapor deposition (RPCVD) technology — has received $2.3m in commitments from institutional and sophisticated investors and the board and management via an oversubscribed share placement at an issue price of $0.013 per share. BluGlass is also undertaking a share purchase plan (SPP offer) to enable eligible shareholders in Australia and New Zealand to acquire up to $100,000 worth of shares at the lower of $0.013 or a 2.5% discount to the 5-day volume-weighted average price (VWAP) for shares prior to the closing date for the SPP offer.

Funds will be used to scale and speed production and delivery of BluGlass' visible lasers to fulfil new and existing contracts in global quantum, defence, and aerospace markets. They will also support additional fab equipment, working capital and the development of next-generation products to increase market competitiveness and sales.

"This investment is testament to the company's execution of our strategy, our key industry partnerships, including with the US Department of Defense, combined with the potential of our high-performance precision technology for next-generation applications," says chair James Walker.

"BluGlass has achieved critical milestones over the past 12 months, demonstrating world-record laser performance, strong revenue growth, and strategic customer wins that significantly progress our technical and commercial roadmaps," notes CEO Jim Haden. "This support helps ensure the company is in a strong position to execute on our growing US$90-100m project pipeline, a key foundation to securing large-scale, long-term follow-on revenues; as we work with key industry partners to design-in BluGlass high-fidelity lasers in next-generation laser solutions in quantum sensing, aerospace and defence applications," he adds.

$2.3m placement

The placement comprises an offer of about 180.9 million new fully paid ordinary shares at an issue price of $0.013. This represents an 18.75% discount to the last closing share price on 28 April and a 25.5% discount to the 10-day volume-weighted average share price.

The board and senior management have committed to a total subscription of $90,000 worth of new shares. Of this, a total of $44,000 worth (about 3.5 million new shares) have been subscribed for at the offer price by all the directors under the placement. The director placement is conditional on shareholder approval for the purposes of ASX Listing Rule 10.11.

New shares under the placement will rank equally with BluGlass' existing ordinary shares.

SPP offer

The share purchase plan (SPP) offer aimed to raise up to a further $6m before costs on the same terms as the placement to shareholders with addresses in Australia or New Zealand as at 30 April. Each eligible shareholder may apply for up to $100,000 new fully paid ordinary shares at an offer price being the lower of:

- A$0.013 per share; and
- a 2.5% discount to the VWAP of shares traded on the ASX during the five trading days up to the closing date of the SPP rounded to the nearest tenth of a cent.

Eligible shareholders may take up their entitlement to acquire new shares in full, in part, or not at all.

Institutional funds have committed to subscribe for up to $3m of any shortfall from the SPP offer on the same terms as the SPP offer. The SPP shortfall securities will only be issued if the SPP offer does not raise at least $3m. BluGlass has also agreed to issue 19,500,000 new options and pay $90,000 in cash to institutional investors who have committed to subscribe to SPP shortfall securities.

The issue of SPP shares and all attaching options are subject to shareholder approval at an extraordinary general meeting, on or around 9 June.

www.bluglass.com.au

ams OSRAM boosts cyan laser diode power five-fold

488nm wavelength tailored to life science research and diagnostics

ams OSRAM of Premstaetten, Austria and Munich, Germany is extending its portfolio of high-power lasers: the new cyan-colored laser diode is up to five times brighter than its predecessors.

Designed specifically for life science applications, it emits at a wavelength of 488nm, delivering significantly enhanced performance and greater efficiency than earlier models. These features are crucial for reliable analysis in life science research and diagnostics, such as DNA sequencing and flow cytometry. The new laser diode offers faster, more accurate analysis, increasing diagnostic possibilities in large-scale laboratories. Its launch also paves the way for more compact and cost-efficient diagnostic systems tailored for healthcare facilities, hospitals and nursing homes, adds the firm.

The new PLT5 488HB_EP cyan laser diode achieves 300mW of output power, representing a five-fold increase in optical performance and an improvement in efficiency of more than 40% compared with its predecessor. The increased optical power output enables higher measurement precision and accelerated processing of biological samples.

488nm laser diodes are essential to modern diagnostics and research, powering applications such as blood, serum and plasma analyses, as well as flow cytometry and DNA sequencing. This method for diagnosing genetic conditions involves directing light through a biological sample. Nucleotides, as the building blocks of DNA, can absorb and emit light in a distinct way, allowing their sequence to be accurately determined. A more powerful laser diode enables faster and more accurate analytical results.

"Our 488nm laser diode delivers exceptional optical performance, ensuring reliable analysis while reducing power consumption," says marketing manager Winfried Schwedler. "It is thus the perfect choice for precision-critical applications — whether in laboratories, hospital settings, or forensic facilities," he adds. "This diode stands out due to its low noise, broad modulation bandwidth, and top-notch beam quality."

Cyan light is highly effective at stimulating fluorescent dyes used in diagnostic devices such as flow cytometers and blood testing equipment. Engineered for precise wavelength control of ±2nm and a high light intensity of 300mW, the diode is suitable for life science applications that demand exceptional visibility and high precision. Its high modulation bandwidth allows for the precise control of light intensity, significantly boosting both signal quality and the speed of analytical processes.

The new diode also has low thermal resistance, ensuring dependable operation even at high temperatures. An integrated photodiode for output control and an ESD protection diode further enhance the robustness and reliability of the cyan laser diode.

While suitable for life science research, the cyan laser diode offers versatile potential for a broad spectrum of other applications. By broadening the color gamut in stage and stadium lighting, for example, it is said to create vibrant, eye-catching visual effects. In the field of fluorescence microscopy, the specific 488nm wavelength offers improved visibility, enabling clearer visualization of fine details that may be difficult to detect with conventional light sources.

www.ams-osram.com/products/lasers/color-lasers-eel/osram-

imec and TNO launch Holst Centre Photonics Lab

Boosting R&D for integrated photonics in the Netherlands

Nanoelectronics research centre imec of Leuven, Belgium and research institute TNO (the Netherlands Organization for Applied Scientific Research in Delft) have officially launched the Holst Centre Photonics Lab, sited at the High Tech Campus Eindhoven. The Holst Centre was established in 2005 by imec and TNO, gathering expertise in wireless sensor technologies and flexible electronics under one roof.

Partly funded by PhotonDelta, the Holst Centre Photonics Lab is dedicated to integrated photonics R&D in the Netherlands. By advancing photonics research and fostering collaboration between industry and academia, the lab aims to bridge the gap between innovation and industrialization for applications in sectors such as automotive, healthcare and data communications.

Accelerating photonics innovation

Building on the PhotonDelta National Growth Fund plan initiative, which has propelled integrated photonics R&D in the Netherlands for over 2.5 years, the lab establishes a foundation for research and aims to foster strategic collaboration between industry and academia.

By combining imec's expertise in areas such as tape-out validation, on-chip laser development, system testing and application validation with TNO's strengths in laser characterization, free-space optics, and photonic chip integration, the lab brings together complementary capabilities across the full innovation chain. By enabling close collaboration from early research to real-world applications, the partnership is set to raise photonics R&D in the Netherlands to a new level.

Photo 1: Laser development & thermal characterization.

Strengthening the Dutch photonics ecosystem

Integrated photonics is at the core of a wide range of emerging applications, from LiDAR in autonomous vehicles (AVs) and non-invasive medical diagnostics to ultra-fast data communications and environmental sensing. The Holst Centre Photonics Lab offers the infrastructure needed to drive innovation in technologies such as connectivity and quantum, and in sectors including healthcare, agri-food, data communication and automotive.

"We're taking an important step toward strengthening the Dutch integrated photonics ecosystem," says Jesse Robbers, director imec at Holst Centre. "By combining our complementary expertise with TNO and working closely with PhotonDelta, we hope to create an environment where photonics innovations can move more effectively from lab to market," he adds.

"Having a dedicated R&D centre like Holst Centre Photonics Lab, is a key proof point of integrated photonics emerging as a critical enabling technology," comments PhotonDelta's CEO Eelko Brinkhoff. "It provides the essential infrastructure to accelerate the development and deployment of photonic chip-based applications, a vital step from innovation to market-ready solutions."

www.holstcentre.com
www.imec.be
www.tno.nl/en

SMART launches interdisciplinary research group WISDOM to develop 3D sensing technologies

Wafer-scale Integrated Sensing Devices based on Optoelectronic Metasurfaces

The Singapore–MIT Alliance for Research and Technology (SMART, Massachusetts Institute of Technology's research enterprise in Singapore) has launched a new interdisciplinary research group (IRG) focused on developing next-generation 3D sensing technologies for practical use across industries such as automotive, consumer electronics, aerospace and healthcare, among others.

Jointly led by faculty from MIT and Nanyang Technological University, Singapore (NTU Singapore), the Wafer-scale Integrated Sensing Devices based on Optoelectronic Metasurfaces (WISDOM) IRG will focus on developing ultra-thin, scalable sensing devices – systems that allow machines such as autonomous vehicles (AVs) and robots to perceive depth, shape and spatial detail safely and with more versatility, much like human vision.

As a multi-million-dollar, three-and-a-half-year program to advance Singapore's optoelectronics and photonics capabilities and semiconductor industry, WISDOM aims to develop compact solutions that are high performance, and enable optoelectronic metasurfaces to be manufactured using standard semiconductor processes and ready for mass-market adoption.

WISDOM will be led by co-lead principal investigators Juejun Hu (professor of Materials Science and Engineering at MIT) and Tan Chuan-Seng (professor of Electronic Engineering at the School of Electrical and Electronic Engineering at NTU Singapore).

"We're putting together pieces that haven't been combined before – to benefit a ton of industries and use cases," says Juejun Hu. "For example, think how a super light and powerful LiDAR system could make trips to planets beyond Mars a reality. It's like having a whole new set of eyes for exploration, and about making the seemingly impossible, possible."

World-first approach to pioneering 3D-sensing and next-generation applications

WISDOM is expected to capitalize on wafer-scale integration using standard silicon complementary metal-oxide-semiconductor (CMOS) processes to revolutionize how meta-optical systems are produced. This is reckoned to be the first time a program has been put together to study the combination of these three separate elements: optical metasurfaces, optoelectronic devices with a focus on light-emitting diodes (LEDs) and vertical-cavity surface-emitting laser arrays (VCSELs); and silicon CMOS electronics.

At the heart of WISDOM's research is their world-first approach that integrates the three elements into a wafer-scale platform. This tri-element integration aims to unlock entirely new functionalities in optical metasurface technology, enabling next-generation sensing systems with multi-modal illumination and detection, advanced displays with built-in high-speed communication, and biomedical devices with versatile light sources for diagnostics and therapeutics.

WISDOM's work to bridge these complementary technologies is expected to pioneer a new frontier in integrated optoelectronics, creating solutions that were previously unattainable with conventional approaches.

WISDOM represents a paradigm shift in how meta-optical systems are integrated – from discrete assembly to wafer-scale packaging

WISDOM's inaugural project aims to develop a high-performance, metasurface-enabled LiDAR prototype, addressing key challenges in scalability, integration and performance. By combining metasurface optics, optoelectronic devices, and CMOS electronics on a single silicon substrate, WISDOM seeks to redefine the capabilities of LiDAR systems. This promises to enhance detection accuracy, extend range and field-of-view, and reduce motion artifacts, with implications for industries such as automotive, healthcare, robotics and unmanned aerial vehicles (UAVs). Beyond improving safety in autonomous vehicles and navigation in drones, it also opens doors to applications like glasses-free 3D displays and high-speed optical communication, laying the groundwork for smarter, more efficient technologies.

"WISDOM represents a paradigm shift in how meta-optical systems are integrated – from discrete assembly to wafer-scale packaging… enabling transformative sensing technologies for mass-market applications," says Juejun Hu. "WISDOM is designed to streamline manufacturing by eliminating costly and intricate die-to-die assembly, significantly improving throughput," he adds.

"By combining NTU's two decades of expertise in electronics engineering and wafer packaging with MIT's strengths in optical systems, we aim to create a new platform for large-scale manufacturing of optical metasurfaces using industry-standard CMOS processes," says Tan Chuan-Seng. "We are well-placed to deliver innovations that are both scalable and commercially viable, while also training the next generation of engineers to lead in areas like augmented reality, robotics and consumer technology."

https://smart.mit.edu

SuperLight partners with Singapore-based distributor Precision Technologies

Footprint expanded to Singapore, Malaysia, Indonesia and Thailand

SuperLight Photonics of Enschede, the Netherlands — a spin-off from the University of Twente that is developing a photonic integrated circuit (PIC) wideband laser light source for measurement and detection applications — has partnered with Singapore-based photonics distributor Precision Technologies Pte Ltd.

The collaboration marks a step in strengthening SuperLight's presence in the Southeast Asia region, ensuring better access to its laser and photonics technologies for customers in Singapore, Malaysia, Indonesia and Thailand.

As demand for next-generation photonics solutions continues to grow, the partnership aims to provide Singapore's high-tech industries with direct access to SuperLight's products. It will also facilitate tailored solutions and localized technical support to meet the evolving needs of Singapore's key sectors such as precision manufacturing. SuperLight says it addresses the need for laser technologies that require the unique combination of wide bandwidth, low noise and small form factor, enabling higher-resolution, -contrast and -throughput applications.

"We view SuperLight Photonics' ultra-compact supercontinuum source as a significant advancement in integrated photonics solutions," says Rick Tan, division sales director at Precision Technologies. "Its high spectral brightness, broad wavelength coverage and PIC-level scalability address critical demands in sensing, metrology and imaging that match perfectly to Southeast Asia's growing demand," he adds.

"Singapore is a dynamic hub for technology and innovation, making it a key market for our expansion," notes SuperLight's chief commercial officer Jeroen Biesterbos. "Partnering with Precision Technologies allows us to provide local expertise and enhanced support to our customers, reinforcing our commitment to delivering high-performance PIC solutions worldwide."

With Precision Technologies' established network and industry expertise, SuperLight will be able to offer its laser technologies to a wider range of industries, including semiconductor manufacturing and ultra-precise material processing, advanced metrology, (bio-) medical applications, and scientific research.

www.pretech.com.sg
www.superlightphotonics.com

SPRINTER project gains €6m from EU to develop new networks for ultra-connected smart factories

Hybrid photonic/wireless transceivers to power ultra-fast, energy-efficient industrial internet

A new European project supported by the Photonics Partnership that aims to power the digital backbone of modern industry is laying the foundations for ultra-connected smart factories.

With a €6m investment from the European Commission, the SPRINTER project is developing optical and wireless technology that could replace slow, power-hungry industrial networks with fast, laser-driven communications systems.

The new industrial internet promises instant, wired and wireless connections between machines, rooms or even buildings, making it suitable for the fast, flexible demands of future smart factories.

Currently, factories and industrial sites rely on a mixture of copper cables, unreliable Wi-Fi, and switching systems.

For real-time, AI-driven future factories and warehouses that deploy automated robots, sensors, machine learning and 5G-controlled systems, existing setups are too slow and power-hungry. But, relying on its expertise in high-speed networks, the SPRINTER team is redesigning the 'nervous system' of modern industry, creating a dependable wireless communication network that continues to operate seamlessly in harsh, dynamic and extremely complicated environments.

"Industry 5.0 demands faster, smarter, and more robust networks," says Efstathios Andrianopoulos, a researcher on the ICCS team that leads SPRINTER. "Our goal is to make Europe the world leader in industrial photonics — providing the tools to support the next generation of automation, robotics and intelligent systems."

At the heart of the initiative are high-speed optical transceivers operating at a data rate of up to 200Gb/s. These are designed to be cheap, reliable and ultra-efficient, offering a considerable improvement in performance.

Reliability in harsh environments

The new SPRINTER hybrid (photonic/wireless) transceivers are being developed to switch from light to mmWave radio signals in order to offer more flexibility and backup, ensuring immunity against any interference such as dust, smoke, or a passing bird blocking the beams of light.

"Factories are full of moving parts, dust, and interference — a nightmare for traditional WiFi. That's why we are developing hybrid 'free-space optical and mmWave' transceivers that combine laser and radio technologies to maintain wireless connections, even in the noisiest settings," says Andrianopoulos. "We are building a unified network platform that supports time-sensitive networking systems where delays of even milliseconds can mean the difference between smooth automation and a factory shutdown."

We are developing hybrid 'free-space optical and mmWave' transceivers that combine laser and radio technologies to maintain wireless connections, even in the noisiest settings. We are building a unified network platform that supports time-sensitive networking systems where delays of even milliseconds can mean the difference between smooth automation and a factory shutdown

Four prototypes

As part of its mission to transform industrial connectivity, SPRINTER is developing four advanced prototypes tailored to the demands of next-generation smart factories. As well as the ultra-fast 200Gb/s optical transceivers for high-capacity core networks and hybrid free-space optical and mmWave transceivers, SPRINTER is developing wavelength-tunable 10Gb/s transceivers that can dynamically adapt to changing conditions in real-time.

To boost flexibility and efficiency, the project is also building a reconfigurable optical add-drop multiplexer (ROADM) optimized for space-division multiplexing, enabling intelligent data routing across complex networks to vastly increase the reliability and robustness of existing infrastructure.

Funded via the European Union's Horizon Europe program, SPRINTER gathers research centers and industry experts, including specialists in photonics, telecoms, and industrial automation.

Led by the Institute of Communication and Computer Systems (ICCS) in Athens, the SPRINTER project gathers 11 partners from across Europe and one from Israel, combining research institutes with industry players. Key contributors include Fraunhofer (Germany), imec (Belgium), LioniX International (Netherlands), and Universidad Carlos III de Madrid (Spain), alongside global tech firms like Ericsson (Italy) and Mellanox Technologies (Israel). Agile SMEs such as PHIX, CUMUCORE, and FILL GmbH add specialized expertise in photonic packaging, 5G networking, and smart manufacturing. Swiss partner CSEM also supports the project, contributing expertise in microtechnology and system integration.

www.horizon-de-sprinter.eu

Scintil Photonics appoints Jim Theodoras as VP of product development

Firm scales operations to meet surging demand for photonics products for AI data centers

Scintil Photonics of Grenoble, France (a fabless firm developing and commercializing silicon photonic integrated circuits with integrated lasers for AI data centers) has appointed Jim Theodoras as VP of product development. This strategic hire comes, as the firm scales operations to support exponentially increasing volume demands for advanced photonics in AI data centers.

Theodoras has over 35 years of industry experience in electronics and optics, with skills in project management and strategic partnerships, as well as in the design, qualification and high-volume production of advanced photonic technologies. The firm reckons that his expertise in optical communications, coupled with his relationships with ecosystem partners, equip him with a unique combination of capabilities to drive growth and innovation.

"As we innovate to address the challenges in the AI data center infrastructure, his extensive experience in bringing industry-leading photonic products to market makes him the perfect fit," says CEO Matt Crowley. "Scintil is well-positioned to move forward on its next growth phase," he adds.

New VP of product development Jim Theodoras.

"I am delighted to join Scintil Photonics to help bring LEAF Light, our single-chip, multi-wavelength external laser source for co-packaged optics for AI data centers to volume production," says Theodoras. "Scintil's unique SHIP process, that integrates III–V materials into standard silicon photonics, is poised to disrupt the AI data-center market."

Theodoras has held increasingly senior management roles in telecoms and optical networking. He started out in 1987 at Texas Instruments, holding positions in hardware engineering for 11 years. He then spent ten years at Cisco, where he led the team responsible for a new Ethernet switch. From 2008 to 2017, he worked for ADVA Optical Networking, first in technical marketing and then as VP of global business development. After that, he spent six years at transceiver manufacturer HGGenuine as VP of research & development. There, he launched a full 400G and 800G product line based on both EML (electro-absorption modulated laser) and silicon photonics (SiPh) technology. He was most recently VP of engineering at QXP Technologies, where he led passive and active teams at this PLC manufacturer with multiple fabs, factories and production lines.

Theodoras earned an MS in Electrical Engineering from the University of Texas in 1992 and holds a BS in Electrical Engineering from the University of Dayton, 1987.

Theodoras is the latest of several executive appointments that Scintil has made during the last 12 months as it prepares for commercial product launch. Other recent hires include US-based CEO Matt Crowley (who arrived in November 2024) and chief operating officer Olivier Potavin(who joined CTO & founder Sylvie Menezo to support Scintil's growth and operational scaling).

www.scintil-photonics.com

Aeluma and Thorlabs unveil large-diameter wafer manufacturing platform for quantum computing and communication

Demo shows promise for high-performance, mass-manufacturable quantum photonic circuits on silicon

Aeluma Inc of Goleta, CA, USA — which develops compound semiconductor materials on large-diameter substrates — has announced an advance in silicon photonics that could accelerate the adoption of quantum computing and communication at commercial scale, it is reckoned.

Aeluma's large-diameter wafer platform combines the performance of compound semiconductors with the scale of mainstream silicon manufacturing, enabling cost-effective solutions across high-growth markets including mobile, AI, defense & aerospace, automotive, and quantum computing.

Silicon photonics is a promising technology for quantum computing and communication. Aeluma says that its ability to incorporate quantum dot sources and highly nonlinear electro-optic materials unlocks new high-performance functionality for this platform.

Collaborating with vertically integrated photonics products maker Thorlabs Inc of Newton, NJ, USA, and with support from the US Office of Secretary of Defense, Aeluma demonstrated wafer-scale integration of the nonlinear optical material aluminum gallium arsenide (AlGaAs) onto CMOS silicon photonics standard 200mm-diameter wafers, providing a path for scaling complex quantum photonic circuits.

The nonlinear optical material enables entangled photon pair generation and modulation, which are key building blocks for quantum photonic systems. Compared with other materials like silicon nitride or lithium niobate, AlGaAs offers significantly improved efficiency for next-generation quantum photonic circuits.

"Scalable photonic integration is essential to move quantum technologies out of the lab and into real-world systems," says Matthew Dummer Ph.D., director of technology at Aeluma. "By merging the performance of compound semiconductors with the scalability of silicon photonics, we are pushing the boundaries of what's possible in quantum and AI."

This combination of advanced materials and CMOS silicon substrates, using manufacturing methods compatible with mainstream fabs, marks a step toward volume production, which could move quantum technologies out of research labs and into mass-market products, says Aeluma.

"This successful collaboration was enabled by the large-area epitaxial growth capabilities of Aeluma and the direct wafer bonding expertise at Thorlabs," says Garrett Cole Ph.D., manager of Thorlabs Crystalline Solutions of Santa Barbara, CA, USA. "The heterogeneous integration of compound semiconductor materials on silicon is broadly applicable and now shows significant promise for quantum photonics," he adds.

The demonstration complements Aeluma's work with quantum dot materials in 300mm silicon photonics, aimed at optical interconnects for AI infrastructure and advanced sensing. It directly addresses a long-standing challenge in scaling quantum photonic systems and could provide a meaningful step forward for quantum system integrators pursuing scalable, production-ready solutions, reckons Aeluma.

www.thorlabs.com
www.aeluma.com

POET grows non-recurring engineering revenue in Q1

Product launches at OFC and transition of production from SPX to Malaysian partner Globetronics to boost revenue in second-half 2025

For first-quarter 2025, POET Technologies Inc of Toronto, Ontario, Canada — designer and developer of the POET Optical Interposer, photonic integrated circuits (PICs) and light sources for the hyperscale data-center, telecom and artificial intelligence (AI) markets — has reported non-recurring engineering (NRE) and product revenue of $166,760, up from $29,032 last quarter and just $8710 a year ago. Historically, the firm has provided NRE services to multiple customers for unique projects that are being addressed utilizing the capabilities of the POET Optical Interposer. The firm only had small product revenue in Q1/2025.

Business highlights included:

- Shipping final design samples of the POET Infinity transmit product line for 400G and 800G applications to three major technology leaders. The products include 400G FR4, 800G 2xFR4 and 800G DR8 transmit formats, all assembled at the firm's high-volume production facility in Malaysia.
- Demonstrating its latest innovations, POET Teralight (a line of 1.6T highly integrated transmit and receive optical engines) and the new POET Blazar light source at the Optical Fiber Communication Conference & Exposition (OFC 2025) in San Francisco at the beginning of April.
- Partnering with South Korean optical solution provider Lessengers to offer a differentiated 800G DR8 transceiver.

Net income was $6.3m ($0.08 per share), versus net losses of $30.2m ($0.50 per share) last quarter and $5.7m ($0.13 per share) a year ago. This was despite R&D costs rising from $1.9m a year ago and $3.4m last quarter to $4.3m, as the firm transitions from technology development to product development.

The largest component of income was from the non-cash gain in fair value adjustment to a derivative warrant liability of $15.4m in Q1/2025, versus losses of $12.4m last quarter and $630,000 a year ago. This non-cash item relates to warrants issued in a foreign currency and is periodically remeasured.

Other non-cash expenses included stock-based compensation of $0.8m and depreciation & amortization of $0.7m, versus $1.4m and $0.5m respectively last quarter and $0.9m and $0.5m respectively a year ago. Non-cash finance costs have risen further, from $20,000 a year ago and $32,000 last quarter to $33,000.

Other income, including interest, rose further, from $52,000 a year ago and $511,000 last quarter to $528,000.

Cash flow from operating activities was –$8.9m, compared with –$8.7m last quarter and –$4.6m a year ago.

During fourth-quarter 2024, POET acquired the remaining 24.8% interest of China-based joint venture Super Photonics Xiamen (SPX) from Quanzhou Sanan Optical Communication Technology Co Ltd (SAIC), resulting in a non-cash loss of $6,852,687. However, there was no impact of the acquisition transaction in first-quarter 2025.

"We continued to build momentum across multiple fronts — technology innovation, commercial progress, strategic partnerships and production capacity — positioning the company for accelerated revenue growth in the second half of the year," says chairman & CEO Dr Suresh Venkatesan.

"The transition out of SPX in China into Malaysia was a timely and energizing event for the company. Opening a 10,000ft^2 cleanroom filled with wafer-level production tools at our partner, Globetronics, was the indispensable next step to accepting volume orders from AI and cloud data-center customers," he adds.

"As we look ahead, we are building on the strong foundation of innovative products introduced at OFC, and the reaction of customers and partners, reinforces our conviction that POET is on the cusp of a meaningful revenue inflection later this year," concludes Venkatesan.

www.poet-technologies.com

POET appoints Ghazi Chaoui as senior VP – global manufacturing & digital transformation

Optical engine manufacturing operational at Globetronics in Malaysia; POET Technologies Snd Bhd established as subsidiary

POET Technologies Inc of Toronto, Canada — designer and developer of the POET Optical Interposer, photonic integrated circuits (PICs) and light sources for the hyperscale data-center, telecom and artificial intelligence (AI) markets — has appointed Ghazi M. Chaoui PhD MBA as its senior VP of global manufacturing & digital transformation. An industry veteran of nearly 40 years, Chaoui recently concluded a multi-year assignment as chief procurement officer of Coherent Corp.

POET is gearing up manufacturing in Penang, Malaysia, where Ghazi will be stationed, reporting to chairman & CEO Dr Suresh Venkatesan. He will plan, direct, coordinate and oversee all operations tied to order fulfillment, and ensure the development and implementation of efficient operations and cost-effective systems to meet the high demand for 800G and 1.6T transceivers needed by hyperscalers and AI cluster operators. Sundar Natarajan Yoganandan, POET's director of external manufacturing and NPI (also a resident of Malaysia) will report directly to Ghazi.

"Our relationship with Globetronics in Malaysia is off to a strong start, with a suite of wafer-level assembly and test equipment installed and operational," says Venkatesan. "With full production capacity expected to be on line this quarter, this is the ideal time for Ghazi and Sundar to staff an organization in Penang and establish the systems we need to ensure delivery of optical engines to customers," he adds. "We have established POET Technologies Sdn Bhd as a wholly owned subsidiary and have begun resourcing it accordingly."

Ghazi will plan, direct, coordinate and oversee all operations tied to order fulfillment, and ensure the development and implementation of efficient operations and cost-effective systems to meet the high demand

Ghazi holds PhD and MS degrees in mechanical and electrical engineering and an MBA. He began his career as an R&D lead designer and manager with AT&T Bell Labs and AT&T Microelectronics in Reading, PA. Over the next 40 years Ghazi held key manufacturing and supply chain roles in several countries with Lucent Technologies, Corvis Corp/Broadwin Communications, Infinera, Oclaro, Teraxion, Kaiam Corp and Macom Technology Solutions Holdings.

"I am pleased to be joining POET at this time to help build a great company in photonics and optoelectronics, serving many customers that I know well and interacting with many suppliers with whom I have strong relationships," comments Chaoui. "By semiconductorizing optical engine assembly, I am confident we can supply high-performance optical engines at high volumes on time to customers."

www.poet-technologies.com

Midsummer receives US$14.8m order for CIGS PV production line

15MW line first stage of factory, to be expanded in future

Midsummer AB of Järfälla, near Stockholm, Sweden — a developer and manufacturer of flexible, lightweight copper indium gallium diselenide (CIGS) thin-film solar cells and roofs for building-integrated photovoltaics (BIPV) as well as equipment for their production — has received an order worth SEK143.5m (€13.1m; US$14.8m) from a Swedish industrial and defense group for a turnkey production line for the manufacturing of thin-film solar cells.

With an annual capacity of 15MW, this is the first stage of a factory for the production of thin-film solar cells in a non-European country with the intention of adding capacity at a later stage. The bulk of the order value is expected to be recorded as income in 2025.

Midsummer has previously expressed ambitions to sell entire scalable turnkey solar cell 'mega factories' with annual capacities of up to 200MW to players in several different countries.

"We see a very large potential to provide turnkey production lines and solar cell factories to customers who wish to quickly implement a green energy transition and electrify their respective markets, who see a value in local production of the world's most environmentally friendly solar cells that can also be installed on the many roofs around the world that are too weak for silicon panels," says CEO Eric Jaremalm.

"Our technology is proven and we can establish complete factories in a short time, provide all equipment, manage the entire project, and also assist in subsequent ongoing operation, service and sales of produced panels," he adds.

www.midsummer.se/en

Reducing thresholds for L-band quantum dot lasers

Researchers claim record low 69A/cm^2 threshold per QD layer.

Researchers based in the UK and France claim the lowest threshold current per quantum dot (QD) layer reported for C-/L-band indium arsenide (InAs) QD lasers on (001) indium phosphide (InP) substrate [Jae-Seong Park et al, Optics Express, v33, p19158, 2025].

The team from University College London and Cardiff University in the UK and University Grenoble Alpes, France, report: "The fabricated seven-stack as-cleaved lasers (15μmx2000μm) under pulsed injection exhibit a record-low threshold current density (J_{th}) of 69A/cm^2 per QD layer, surpassing previously reported values for C-/L-band InAs/InP QD lasers on (001) InP, and a maximum operating temperature of 130°C."

The maximum temperature of 130°C is also claimed to be the highest so far for as-cleaved InAs/InP QD laser diodes on (001) InP. The neighboring conventional (C) and long-wavelength (L) optical fiber communication bands cover the ranges 1530–1565–1625nm, respectively.

The researchers comment: "The development of high-performance and reliable C-/L-band semiconductor lasers as light sources is of critical importance for optical communication systems due to the ever-growing data traffic demand, which has been further accelerated by recent advancements in artificial intelligence and machine learning applications."

It is hoped that by using self-assembled QDs rather than quantum wells as an optical gain medium laser diodes with lower thresholds and better thermal stability can be fabricated. However, QD formation is somewhat inhibited due to the lower 3.2% lattice mismatch between InAs and InP, relatively to the 7.2% InAs mismatch to gallium arsenide (GaAs), suitable for 'original' (O)-band (1260–1360nm) laser diodes. The higher mismatch for the InAs/GaAs combination reduces the dot size dispersion, improving laser diode performance parameters.

The molecular beam epitaxy (MBE) structure for the laser diodes was grown on sulfur-doped n-InP substrate (Figure 1). The main waveguide layers consisted of lattice-matched indium aluminium gallium arsenide material: $In_{0.524}Al_{0.476}As$ and $In_{0.528}Al_{0.238}Ga_{0.234}As$, grown at 500°C and 485°C, respectively. On the bottom n-type side the material was doped with silicon (Si). For the p-type top layers, beryllium (Be) provided the doping.

The seven layers of quantum dots were grown on the InAlGaAs layers by first applying 6.8 monolayers (MLs) of InAs at 485°C. A 10s growth interruption under arsenic pressure enabled the QD formation with reduced size dispersion.

The QDs were first capped with 2nm strained $In_{0.359}Al_{0.323}Ga_{0.318}As$, followed by temperature elevation to 515°C under arsenic over-pressure for 3 minutes. The second 33nm $In_{0.528}Al_{0.238}Ga_{0.234}As$ cap/spacer layer was then grown at 485°C.

The researchers comment: "This indium-flush technique ensures the high-quality stacking of the QDs by manipulating the morphology and the strain around the QDs."

The MBE was completed with Be-doped InAlGaAs, InAlAs, and 10nm $In_{0.532}Ga_{0.468}As$. The final protection

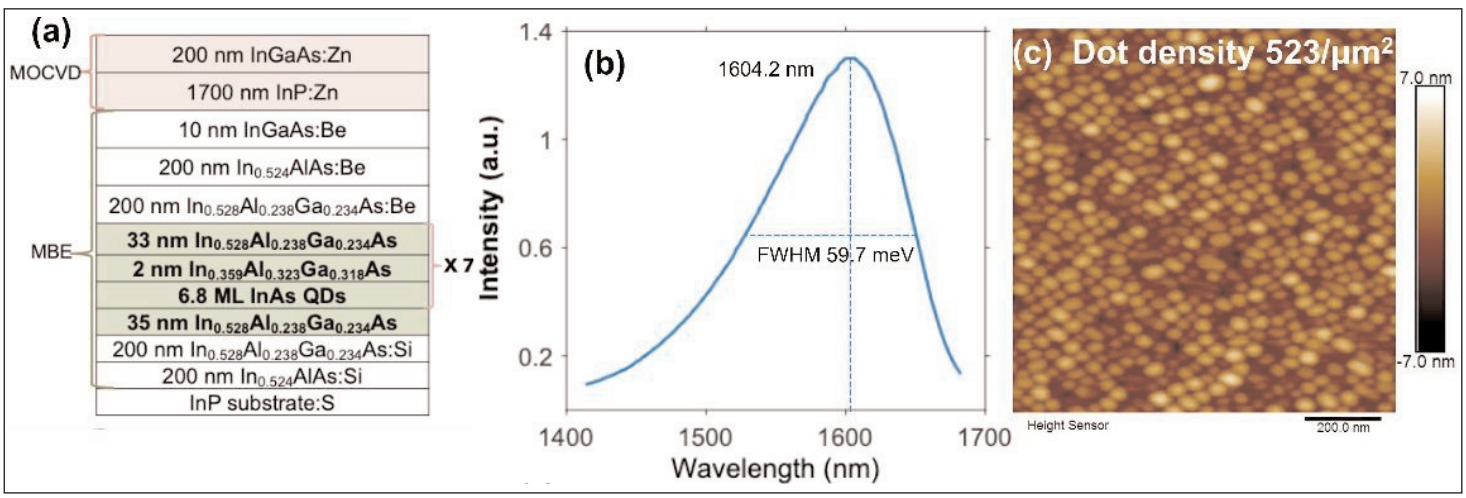


Figure 1. (a) Epitaxial scheme for InAs/InP QD laser. (b) Room-temperature photoluminescence spectrum of 7-layer InAs/InP QD laser material. (c) Atomic force microscopy (AFM) image of uncapped InAs/InP QDs.

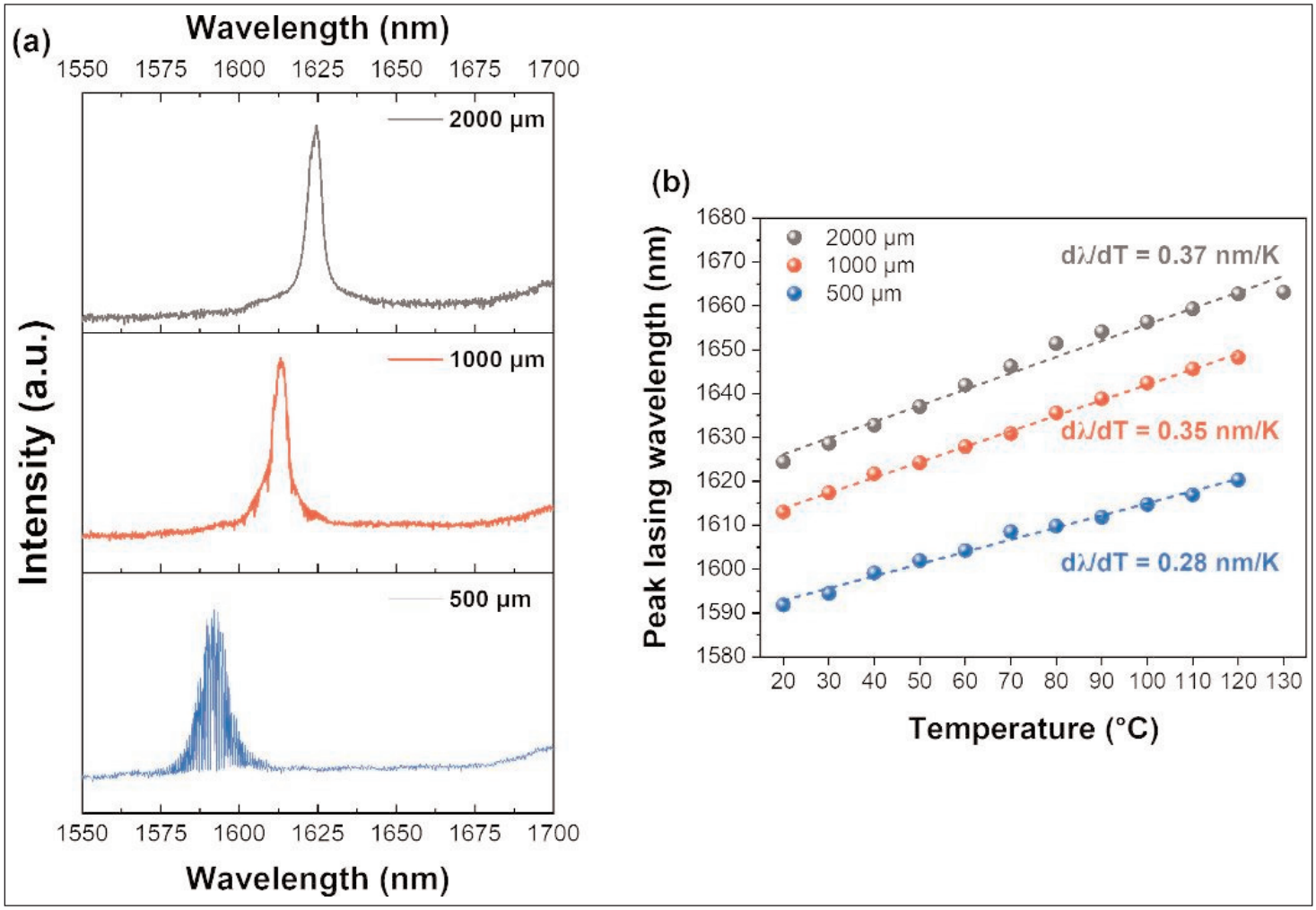


Figure 2. (a) RT lasing spectra at injection current of 1.1xI_{th} and (b) temperature-dependent peak lasing wavelengths with cavity lengths of 2000µm, 1000µm and 500µm.

layer reduced oxidation during transfer to the metal-organic chemical vapor deposition (MOCVD) equipment, where the zinc (Zn)-doped InP cladding, and InGaAs contact layers were grown.

The researchers fabricated the material into Fabry–Pérot laser diodes with 15µm ridge width. The etched ridges were passivated with 400nm silicon dioxide (SiO_2). The p-type electrodes consisted of titanium/gold. The n-metal contact was deposited on the backside of the wafer, consisting of nickel/gold-germanium/nickel/gold layers. The samples were annealed at 380°C to give ohmic contact at the metal/semiconductor interfaces. The laser cavity length was defined by cleaving. The facets were not coated.

The lowest threshold pulsed current density of 483A/cm^2 was achieved from a laser diode with 2000µm cavity length. This translates to 69A/cm^2 per QD layer. The researchers believe that the threshold could be further reduced with high-reflectivity facet coatings. This device continued operating as a laser up to 130°C, "the highest operation temperature reported so far for an as-cleaved InAs/InP QD laser on (001) InP", according to the team. Facet coating, again, could increase this, as demonstrated by other reports of lasing above 130°C.

Shorter 1000µm- and 500µm-long laser diodes had a slightly lower maximum temperature of 120°C.

The researchers calculated characteristic temperatures (Table b) over the temperature ranges 20–70°C and 70–110°C. Higher characteristic temperatures indicate better thermal stability of the relevant parameters, threshold current and slope efficiency. The researchers mainly attribute the stronger degradation of T_0 for shorter-cavity laser diodes at higher temperature to "increased mirror losses, which lead to higher carrier densities and thus increased non-radiative recombination, as well as reduced heat dissipation."

The team comments: "At lower temperatures (20–70°C), longer-cavity devices exhibit higher T_1 values due to lower mirror losses and reduced carrier leakage, leading to better slope efficiency retention. However, at higher temperatures (70–110°C), the longest cavity (2000µm) shows a noticeable degradation in T_1, indicating a pronounced decline in slope efficiency. This is predominantly driven by thermally activated carrier escape from QDs, which is more detrimental in longer cavity lengths due to their inherently lower carrier density."

Table 1. Characteristic temperatures for threshold current (T_0) and slope efficiency (T_1).

Cavity length	T_0, T < 70°C	T_0, T > 70°C	T_1, T < 70°C	T_1, T > 70°C
500µm	55.3K	37.2K	91.2K	22.9K
1000µm	50.9K	39.0K	107.1K	47.3K
2000µm	48.2K	44.9K	151.1K	27.4 K

The strong degradation of T_1 for the 500µm laser diode is apparently related to "excessive mirror losses, which significantly increase carrier density and lead to enhanced non-radiative recombination." The team adds: "This mechanism becomes a major contributor to T_1 degradation in shorter cavities at high temperatures, contrasting with the thermal carrier escape that primarily affects longer cavities."

The peak wavelengths at RT were 1624nm, 1613nm and 1592nm for 2000µm, 1000µm and 500µm cavity length, respectively (Figure 2). The blue-shift to shorter wavelengths in the shorter cavities is attributed to "increased threshold gain requirement due to higher mirror losses, which forces preferential lasing at shorter wavelengths where the QD ensemble provides higher gain".

The researchers comment: "The reduced temperature sensitivity in shorter cavities can be ascribed to two factors: (i) suppressed mode hopping due to larger longitudinal mode spacing, which relatively stabilizes the wavelength shift, leaving only the dominant intrinsic red-shifts from bandgap shrinkage and temperature-induced refractive index change, and (ii) enhanced contribution of smaller QDs and/or higher-order transitions, driven by higher mirror losses that increase threshold gain requirements."

The team also reports that a 3000µm-cavity laser diode achieved a threshold of 440A/cm^2, or 63A/cm^2 per QD layer, but at a cost of reducing the maximum operating temperature to 110°C, along with "evidence of mode hopping in the temperature-induced wavelength shift — namely, thermal and spectral instabilities".

Some preliminary work on RT continuous-wave (CW) operation resulted in a threshold of 187.1A/cm^2 per QD layer for 2000µm-cavity-length laser diodes. The peak wavelength shift was 0.76nm/K, and the maximum operating temperature 35°C. ■

https://doi.org/10.1364/OE.561471

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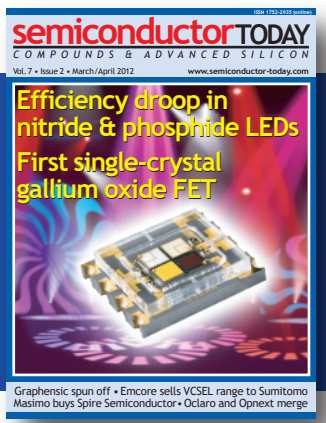

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GaN HEMT hits 85.2% PAE record at 2.45GHz

Fujitsu reduces the silicon and carbon contamination on free-standing substrate surface and in channel layer.

Japan-based Fujitsu Ltd has reported gallium nitride (GaN) high-electron-mobility transistors (HEMTs) on free-standing GaN substrates operating at 2.45GHz in the industrial, scientific & medical (ISM, 2.4–2.5GHz) reserved band with 85.2% power-added efficiency (PAE) and 89.0% drain efficiency (DE) [Toshihiro Ohki et al, Appl. Phys. Express, p18, p034004, 2025].

The team reports: "To the best of our knowledge, our device sets a new record for the highest power-added efficiency and drain efficiency among discrete GaN HEMTs, highlighting the superior potential of GaN-on-GaN HEMTs for highly efficient RF power amplifiers." Fujitsu had also claimed the previous record set in 2021 of 82.8% PAE at 2.45GHz.

The researchers believe the methods used to boost efficiency could benefit performance at other frequencies, even in the 100GHz sub-terahertz range. The team particularly focused on reducing silicon and carbon contamination on the substrate surface and in the channel regions, respectively, which have delayed expected performance benefits of using free-standing GaN substrates.

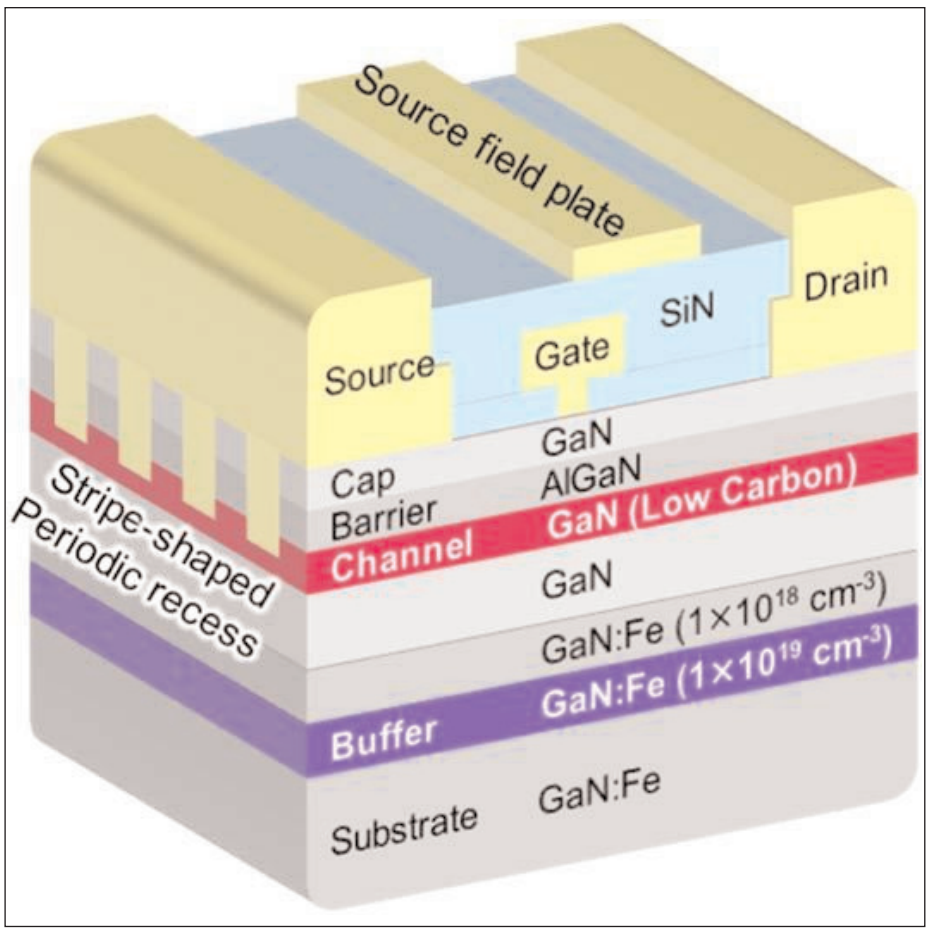

Figure 1. Schematic of GaN-based HEMT on free-standing GaN substrate.

The researchers explain: "GaN-based HEMTs on free-standing GaN substrates (GaN-on-GaN HEMTs) can effectively suppress electron trapping at crystal defects during high-frequency and high-power operation, owing to their low dislocation density and the elimination of nucleation layers through homoepitaxy."

GaN HEMTs are widely used in wireless communications and radar systems, and more recently for power conversion applications, including for electric vehicles.

The researchers grew the epitaxial material for the HEMTs (Figure 1) on 4-inch free-standing semi-insulating GaN through metal-organic vapor phase epitaxy (MOVPE). The GaN substrate had a dislocation density less than $5x10^6/cm^3$. Before the epitaxy, silicon (Si) residue was removed from the substrate surface by a hydrofluoric acid pre-treatment. The trace Si level was reduced by two orders of magnitude with the aim of reducing lateral leakage currents at the epi/substrate interface in the final HEMT devices.

The initial iron (Fe)-doped GaN layers were further features designed to reduce leakage currents, ensuring high power-added efficiency.

The channel layer was grown with a view to reducing the carbon content, which was achieved by increasing the V/III ratio from 1600 to 8200. The higher ratio increase reduced the relative carbon-containing group-III metal-organic concentration in the precursor mix. The effectiveness of this strategy was evidenced by a photoluminescence study, which showed yellow luminescence associated with carbon incorporation decreasing by a factor of 0.075 by increasing the V/III ratio.

The HEMT epitaxy was completed with a 31% aluminium (Al)-content AlGaN barrier, and GaN cap.

The fabricated HEMTs had ohmic source and drain electrodes that used periodically etched recesses that allowed the metals direct contact with the channel layer. The source/drain metals were annealed titanium/aluminium. The contact resistance was thus reduced from 0.38Ω-mm to 0.25Ω-mm.

The team comments: "This structure provides a more stable lower contact resistance than a planar-type recessed structure because the electrodes contact the 2DEG directly without an intervening barrier layer and because a thin barrier layer is not required, preventing reduction in the 2DEG beneath the electrodes. Furthermore, the stripe-shaped recess structure also reduces the thermal budget, which can be an origin of electron traps, compared with a process involving a regrowth layer made of highly Si-doped GaN."

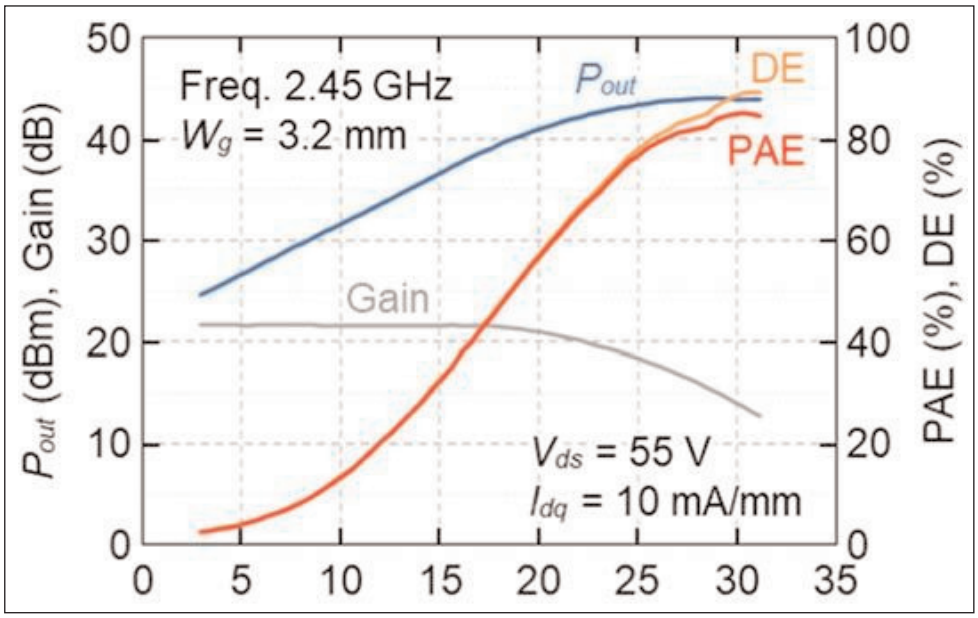

Figure 2. Input–output power (P_{in}–P_{out}) characteristics of GaN-on-GaN HEMT at 2.45GHz with fundamental and harmonic impedance set to PAE-matching conditions.

The 0.5μm-long gate consisted of nickel/gold. Passivation was provided by plasma-enhanced CVD silicon nitride (SiN). The HEMT design also included source and gate field plates.

Three-terminal DC studies showed 390Ω/❑ sheet resistance of the two-dimensional electron gas (2DEG) channel, 853mA/mm maximum drain current, and 4.74Ω-mm on-resistance with +2V gate potential. At 10V drain bias, the maximum transconductance and threshold voltage were 288mS/mm and –1.77V, respectively.

Load-pull measurements in the 2.45GHz ISM band gave cut-off frequency (f_T) and maximum oscillation frequency (f_{max}) of 11.5GHz and 20.3GHz, respectively, with 55V drain bias, and 10mA drain current. The total gate periphery W_g was 3.2mm (10x320μm).

A 85.2% maximum PAE and 89.0% drain efficiency were extracted from input–output power measurements (Figure 2). The peak 44.04dBm output power corresponds to a power density of 7.9W/mm.

The researchers comment: "These results surpass those of previous reports and are attributable to both the reduction in electron-trapping phenomena through improved channel quality and the suppression of substrate-side leakage current via a reduction in residual silicon at the sub/epi interface during high-power operation."

The researchers also present a benchmark plot comparing their load-pull results with discrete GaN-based HEMTs reported in a frequency range of 2–3GHz (Figure 3). ■

https://doi.org/10.35848/1882-0786/adbc79

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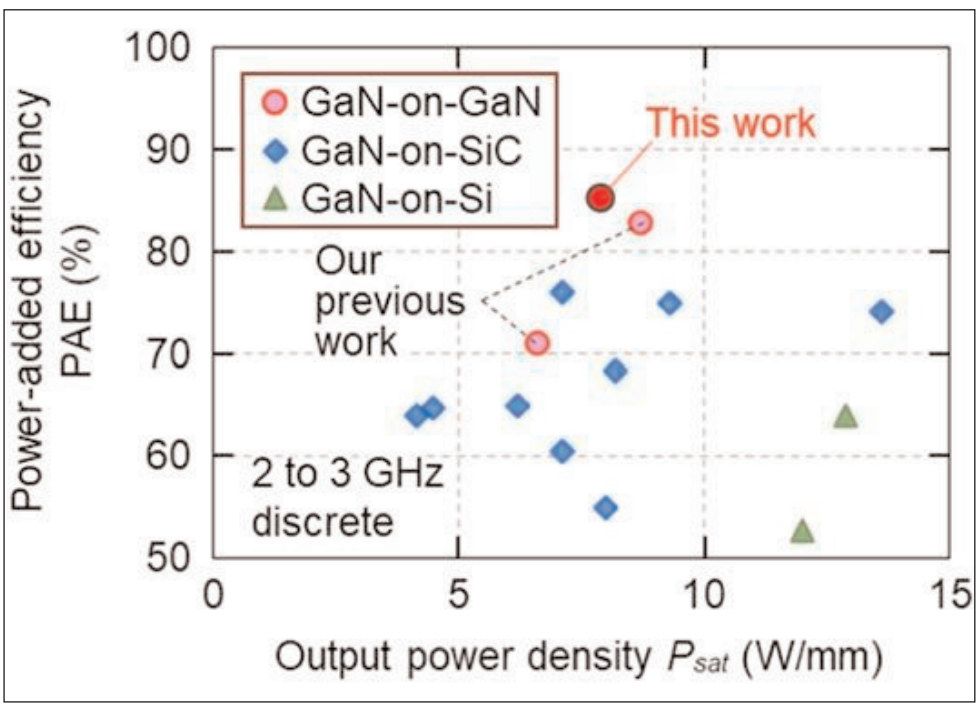

Figure 3. Comparison of load-pull measurement results of discrete GaN-based HEMTs in 2.45GHz ISM band.

First post-process diamond on GaN HEMT

Top-side heat extraction provides an alternate path for thermal management.

Stanford University and University of California Santa Barbara (UCSB) in the USA have claimed the first post-process diamond integration on a radio frequency (RF) gallium nitride (GaN) high-electron-mobility transistor (HEMT) [Rohith Soman et al, Appl. Phys. Express, v18, p046503, 2025]. The researchers see this as "a valuable platform for the thermal management of X-band GaN HEMTs using diamond heat spreaders."

The team comments: "Self-heating causes the channel temperature to peak at the drain edge of the gate electrode, resulting in reduced channel mobility and shorter lifetime. This necessitates device-level cooling methods for reducing junction/channel temperature in RF power amplifiers, alongside conventional package-level cooling techniques."

The X-band covers frequencies in the range 7–12GHz with applications in communications and radar. GaN HEMTs can suffer from performance degradation and poor reliability when temperatures increase due to insufficient heat dissipation of the high input power. It is hoped that high-thermal-conductivity diamond can be used to transmit the heat away from the device structure.

The researchers report: "We integrated diamond on the top and sidewalls of the device active area. The top-side heat extraction method provides an alternate path for heat dissipation through the deposited diamond bypassing the high resistance of the buffer/nucleation layers in the growth stack. Additionally, N-polar devices have an AlGaN barrier layer placed below the GaN channel layer; hence the top diamond is within 10nm of the hot spot and can be extremely efficient.

GaN RF device development is particularly targeted at high power density to enable longer transmission distances and better signal quality with low noise.

The GaN HEMT with an aluminium gallium nitride (AlGaN) barrier, and in-situ silicon nitride (SiN), structure (Figure 1) was grown on 2-inch semi-insulating silicon carbide (SiC) substrate by metal-organic chemical vapor deposition (MOCVD). The researchers used a N-polar rather than Ga-polar III–nitride structure, since such materials result in enhanced power densities, two-dimensional electron gas (2DEG) profiles, and scaling performance.

Before the diamond deposition, a metal-insulator-semiconductor (MIS)HEMT was fabricated with MOCVD regrown heavily doped n+-GaN source/drain contacts, MOCVD SiN_x gate dielectric, and molybdenum (Mo) gate electrode. The individual devices were electrically isolated by mesa etching. The device was capped with an atomic layer deposition (ALD) silicon dioxide (SiO_2) protection layer for the diamond deposition process. The source/drain distance was 1μm (L_{SD}), the gate was 150nm long (L_G), and the gate–drain spacing was 400nm (L_{GD}).

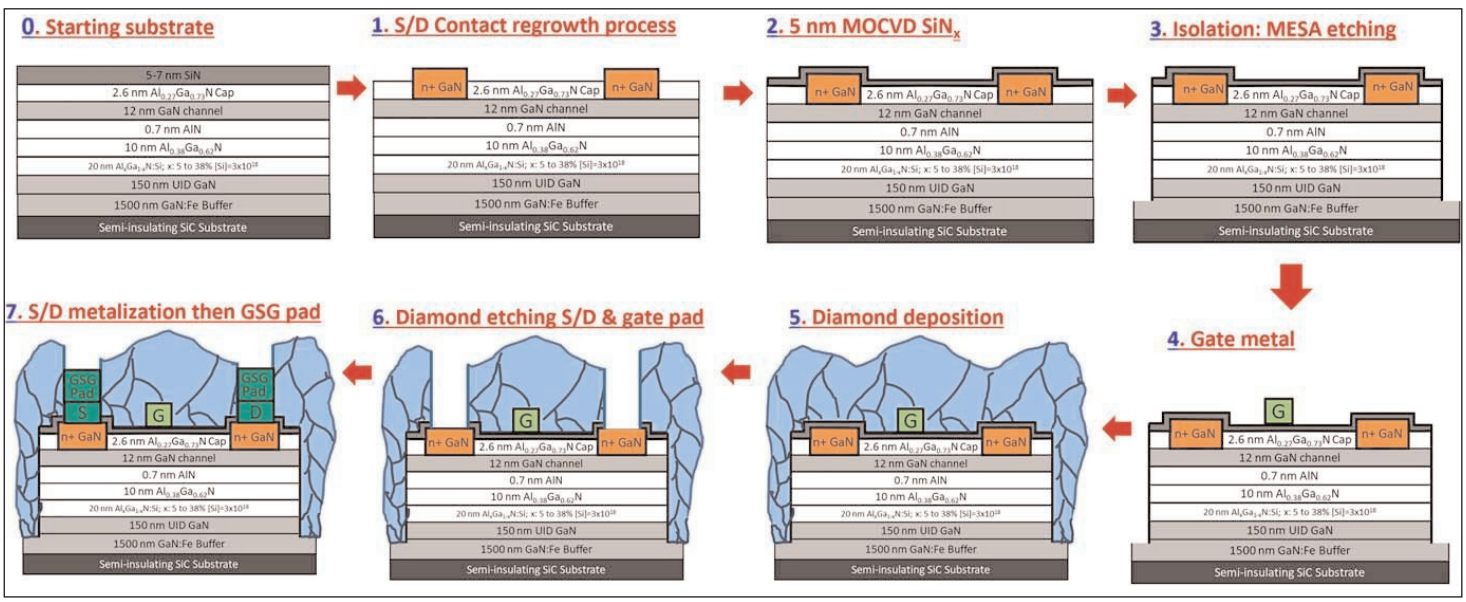

Figure 1. Sequence of steps followed in fabrication of all-around diamond integrated N-polar GaN HEMT device with 'device first' approach.

The all-around diamond covered the whole device including the mesa sidewalls, and etched surfaces away from the mesas. The diamond was deposited in a microwave plasma CVD system. The average diamond grain size depended on the growth temperature: 350nm for 500°C, and 700nm at 700°C.

The growth temperature also affected the S/D contact resistance: 1.4Ω-mm and 0.24Ω-mm for 500°C and 700°C, respectively. The corresponding sheet resistances of the 2DEG channel between the source and drain regions were 250Ω/❑ and 225Ω/❑ for 500°C and 700°C, respectively. These values match the sheet resistances of samples without the diamond.

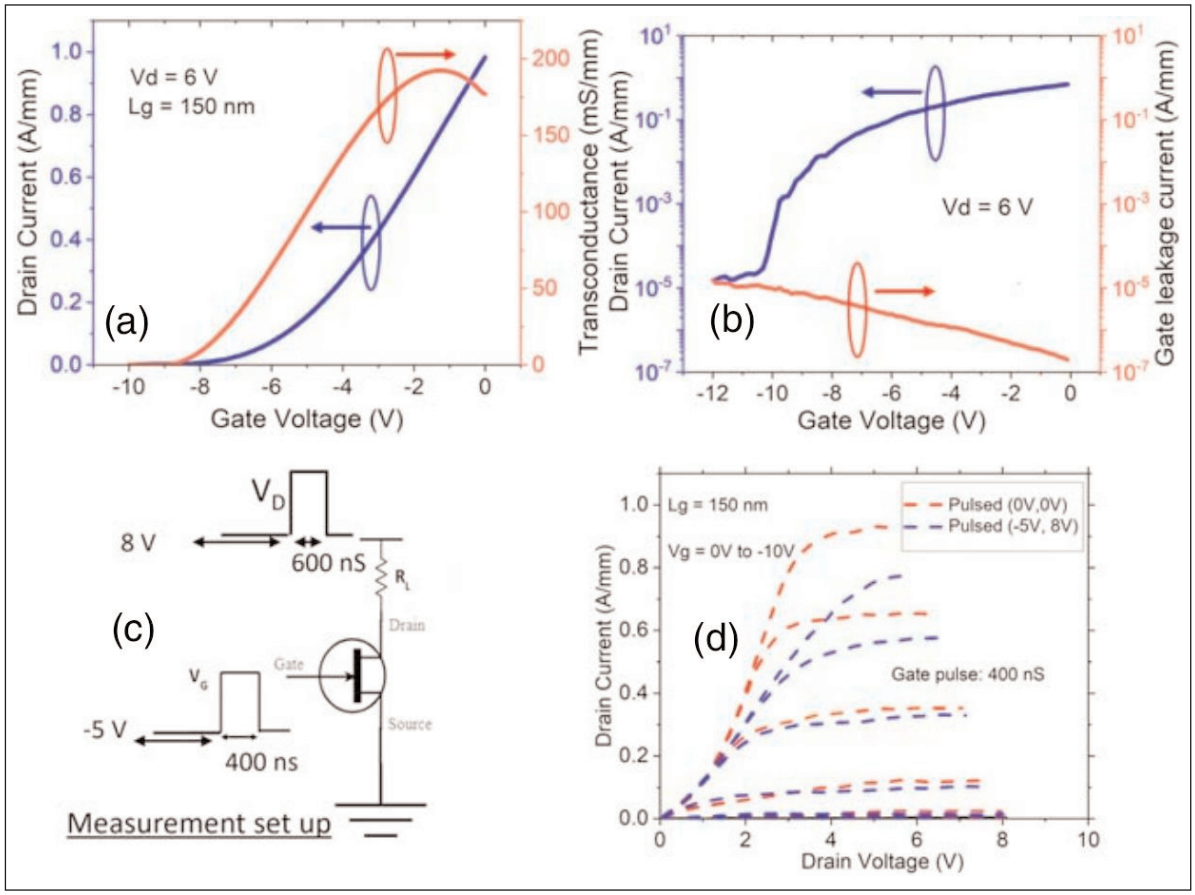

Figure 2. Transfer characteristics of the fabricated device with diamond deposited at 500°C in (a) linear scale and (b) semi-logarithmic scale. Measurement set-up (c) for comparison of output characteristics at DC and pulsed condition (d).

The higher contact resistance of the 500°C sample was blamed on "damage made on the n^+ regrown GaN during the diamond etching process". The team says that the etch processing is being further optimized to overcome this issue.

Access to the source/drain and gate was etched through the 300nm diamond layer, followed by metal-electrode deposition of titanium/gold (Ti/Au) for ohmic source/drain contacts. Further layers of Ti/Au provided ground–signal–ground (GSG) pads. The diamond reactive-ion etch process was optimized for selectivity against etching the underlying device layers. Patterning was provided by a plasma-enhanced CVD SiO_2 hard mask.

The researchers report: "It was found that reducing the damage in the source/drain contact region is critical in achieving lower contact resistance... Diamond etching from the gate pad region and source/drain n^+GaN regions is done separately to better control the diamond etching process."

The diamond deposition was void-free and conformal, which the team says was crucial for better cooling of the device. "An overhanging of source/drain metal on to diamond layer is provided in the device for better heat flow between the metal and diamond layer," they add.

Although the 700°C etch process resulted in low S/D contact resistance, the gate suffered from a high leakage current that did not modulate the current, making it useless as a transistor.

For the lower 500°C diamond layer the transistor had a −8V gate threshold (normally-on/depletion mode) and 190mS/mm peak transconductance (Figure 2). The on/off current ratio was 10^5, and the gate leakage was only 10μA/mm.

The researchers comment: "This shows the importance of low-temperature deposition technique for the successful demonstration of 'device first' all-around diamond integrated devices for device-level cooling solutions."

The researchers used pulsed modes to assess the dispersion/current collapse performance of the MISHEMTs. The drain and gate pulse widths were 400ns and 600ns, respectively. The pulse period was 5ms. The drain saturation current was 0.96A/mm. The dispersion at the knee current level was around 20%.

The team comments: "The dispersion in this device is due to the lack of a deep recess structure with GaN cap layer and the absence of a field-plate structure." ■

https://doi.org/10.35848/1882-0786/adcb87

Enhancing GaN diode performance with p-oxides

Combining p-NiO and p-LiNiO yields low on-resistance and high breakdown voltage.

Ecole Polytechnique Fédérale de Lausanne (EPFL) in Switzerland has reported significant improvement in p-oxide/gallium nitride (GaN) heterojunction (HJ) PiN bipolar diodes by inserting a crystalline p-type lithium-doped nickel oxide (p-LiNiO) layer between the drift layer and high-hole-density p-type amorphous nickel oxide layer [Zheng Hao et al, IEEE Electron Device Letters,volume 7, issue 5 (May 2025), p729]. The full device achieved 1.7V turn-on (V_{ON}), low 1.15mΩ-cm^2 specific on-state resistance ($R_{ON,sp}$), and high 1065V breakdown voltage (BV).

The team reports comparable performance to GaN homojunction PiN diodes but with simpler fabrication and greater design flexibility. The researchers comment: "Our findings show the potential of p-NiO/LiNiO to replace p-GaN for effective localized p-doped regions in GaN power devices."

Homojunction GaN devices are usually processed by metal-organic chemical vapor deposition (MOCVD) with the p-type layers doped with magnesium. Unfortunately, the doping has a high activation energy and is difficult to activate effectively, resulting in low hole concentrations.

The researchers comment: "Developing highly conductive and high-quality p-layers that can be deposited with great flexibility is crucial to enable advanced device concepts, such as junction barrier Schottky (JBS) diodes, ring terminations, field plates, among others."

The vertical p-NiO heterojunction diode structures on the same GaN chip with three combinations of p-NiO and p-LiNiO as p-region (Figure 1). The anode and cathode metal electrodes were nickel/gold (Ni/Au) and chromium/gold (Cr/Au), respectively. The intrinsic GaN (i-GaN) drift layer was 6μm thick. Patterning was supplied by a 300nm silicon dioxide hard mask.

The p-LiNiO was applied using 400°C pulsed laser deposition (PLD) on a LiNiO target with 9% Li content. The target was ablated using a 248nm krypton fluoride (KrF) excimer laser. The p-NiO deposition was by room-temperature RF sputtering. The 2μm cathode n-GaN and i-GaN drift layers were deposited by MOCVD on 2-inch freestanding GaN from Enkris Semiconductor Inc. A 6.3μm-deep mesa etch was used to isolate the devices. A Schottky barrier diode (SBD) reference was created by depositing the anode metals directly on the i-GaN drift layer.

In pre-fabrication material characterization, the researchers demonstrated p-NiO layers with Hall carrier concentration and mobilities of 2x10^{19}/cm^3 and 0.3cm^2/V-s, respectively. The resulting resistivity was 0.94Ω-cm. The team comments: "It is worth noticing that although the hole mobility in p-NiO is lower than in p-GaN, this is not relevant for applications where the

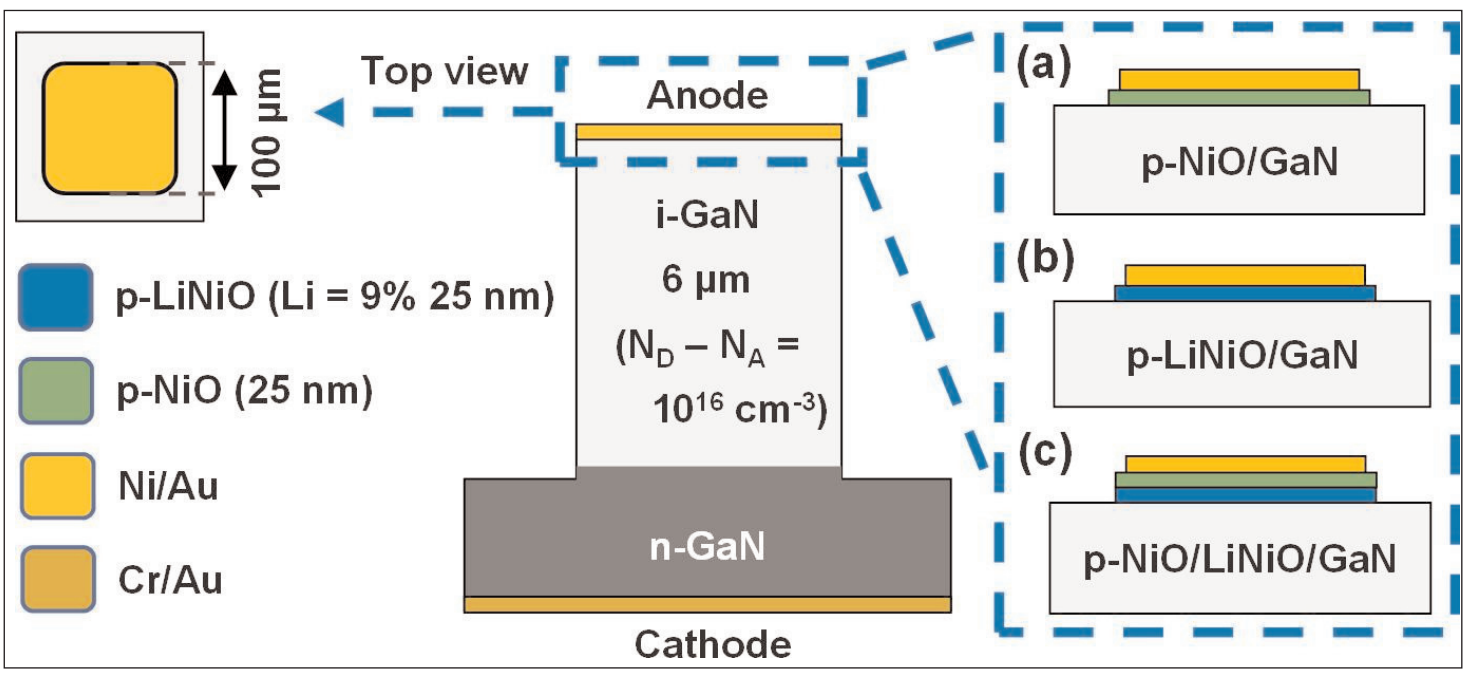

Figure 1. Three p-(Li)NiO/GaN heterojunction diodes schemes: (a) p-NiO (25nm), (b) p-LiNiO (25nm), and (c) p-NiO/LiNiO (25nm/25nm) — p-type regions deposited and patterned on the GaN surface.

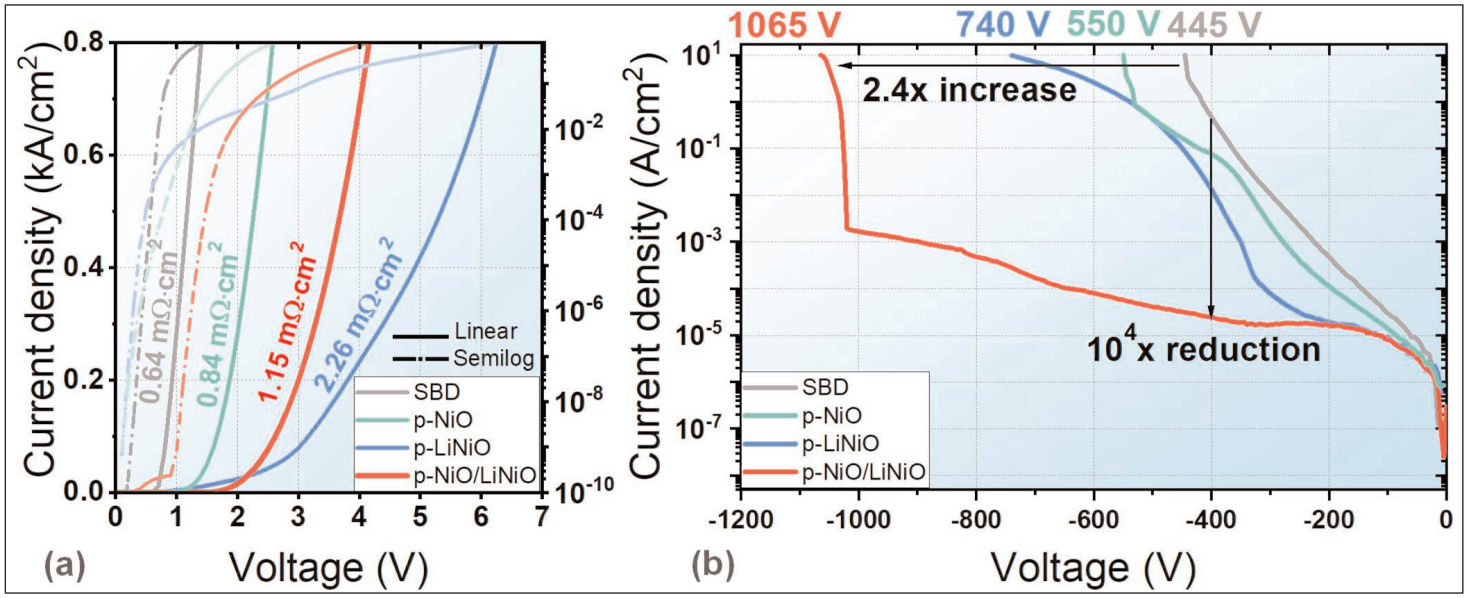

Figure 2. (a) Forward and (b) reverse current–voltage (I–V) curves measured from p-(Li)NiO/GaN heterojunction diodes and reference SBD.

p-layers are not aimed for conducting current, but for band-structure engineering. This is the case in localized p-pockets for junction termination extensions and electric field management, as well as in achieving enhancement mode in lateral devices, for which the high hole concentration is a more important feature."

The resistivity of p-LiNiO was much larger at 5kΩ-cm. The researchers suggest the carrier density was of order 10^{15}–10^{17}/cm^3, based on an expected mobility in the range 0.01–1cm^2/V-s. X-ray analysis showed the p-LiNiO to be crystalline, while the p-NiO was amorphous.

The researchers proposed the p-NiO/p-LiNiO structure as effectively combining high hole concentration in the p-NiO with superior p-LiNiO film quality. The team explains: "This approach compensates for the poor quality of sputtered p-NiO while retaining a high hole density, thereby improving the p-n heterojunction performance."

The p-NiO/LiNiO diode structure enabled (Figure 2) a high hole density injected from the p-NiO layer through the high film quality of p-LiNiO, achieving small $R_{ON,sp}$ with more than 1000V high BV.

The p-NiO/p-LiNiO bipolar diode was found to combine a relatively low on-resistance with more than 1000V $_{BV}$ (Table c). The researchers comment: "Compared to the large V_{ON} (>3V) in regular GaN homojunction PiN diodes, the smaller V_{ON} (1.7V) of p-NiO/LiNiO-GaN heterojunction PiN diode is advantageous for reducing conduction losses. Additionally, double-sweep I–V characteristics performed on the p-NiO/LiNiO-GaN diode showed negligible hysteresis leading to a stable switching operation."

The team attributes the higher BV for the p-NiO/LiNiO-GaN diode to lower defect level in the heterojunction from the crystalline epitaxial p-LiNiO layer inserted between the high-hole-concentration p-NiO and GaN drift layer, increasing the electron tunneling barrier and reducing leakage.

The researchers also compare their diodes with other reports (Table d), showing their latest "p-NiO/LiNiO-GaN heterojunction PiN diode achieves competitive $R_{ON,sp}$ and BV values comparable to GaN homojunction PiN diodes, and larger BV compared to other p-oxide/GaN HJ PiN diodes." ■

https://doi.org/10.1109/LED.2025.3549252

http://en.enkris.com/

Author: Mike Cooke

Table 1. Characteristics of EPFL variant diode structures.

Device	V_{ON}	$R_{ON,sp}$	BV
SBD	0.7V	0.64mΩ-cm^2	445V
p-NiO	1.1V	0.84mΩ-cm^2	550V
p-LiNiO	1.0V	2.26mΩ-cm^2	740V
p-NiO/p-LiNiO	1.7V	1.15mΩ-cm^2	1065V

Table 2. Comparison of EPFL p-NiO/LiNiO-GaN HJ PiN diode to other reported GaN PiN diodes.

Institution & year	V_{ON}	$R_{ON,sp}$	BV	Diode type
Nagoya Univ. 19	~3.2V	1.2mΩ-cm^2	905V	p-GaN epi
Virginia Tech. 23	~3V	0.8mΩ-cm^2	1700V	p-GaN epi
Cornell 16	~3V	0.55mΩ-cm^2	1700V	p-GaN epi
ASU 19	~3V	0.8mΩ-cm^2	1270V	p-GaN regrowth
Cornell 17	>3.2V	3.9mΩ-cm^2	1136V	p-GaN regrowth
EPFL 21	1.6V	1.6mΩ-cm^2	387V	p-oxide
NPU 21	2.3V	1.42mΩ-cm^2	350V	p-oxide
Latest EPFL work 25	1.7V	1.15mΩ-cm^2	1065V	p-oxide

ALE surface treatment for AlGaN Schottky barrier diodes

Using an atomic layer etching process significantly increases breakdown voltage and reduces current leaks.

Saudi Arabia's King Abdullah University of Science and Technology (KAUST) reports on using atomic layer etching (ALE) to improve the performance of aluminium-rich III–nitride (III–N) Schottky barrier diodes (SBDs) [Tingang Liu et al, Appl. Phys. Lett., v126, p152109, 2025]. In particular, SBDs fabricated using ALE demonstrated breakdown voltages of 1205V, compared with just 308V for SBDs processed without ALE.

The team comments: "By reducing interface traps and eliminating native oxide, ALE leads to lower leakage current and a more uniform Schottky barrier."

Compared with metals like gallium (Ga), aluminium (Al) has a faster oxidation rate, giving aluminium pots and pans a rather dull finish. AlGaN semiconductor metal-organic chemical vapor deposition (MOCVD) epitaxial structures frequently use a GaN cap layer to protect the underlying material from oxidation.

The KAUST team explains: "In AlGaN materials, the native oxide is typically around 1–3nm thick. The excess oxide layer is likely due to a high density of defects, which makes the surface more susceptible to oxidation. The defective surface layer forms at the end of the MOCVD growth process during chamber cool-down, where residual MO sources in the chamber contribute to its continuous growth at a lower temperature."

The defective layer tends to encourage unwanted oxidation during processes such as the rapid thermal annealing of metal contacts. The ALE process reduces surface defectivity, reducing oxidation in later fabrication steps. The ALE also removes any native oxide that forms on the Al-rich materials on exposure to air.

By removing these layers, the KAUST team hopes to show the way to "enhancing the performance and reliability of AlGaN-based power devices for next-generation high-voltage applications".

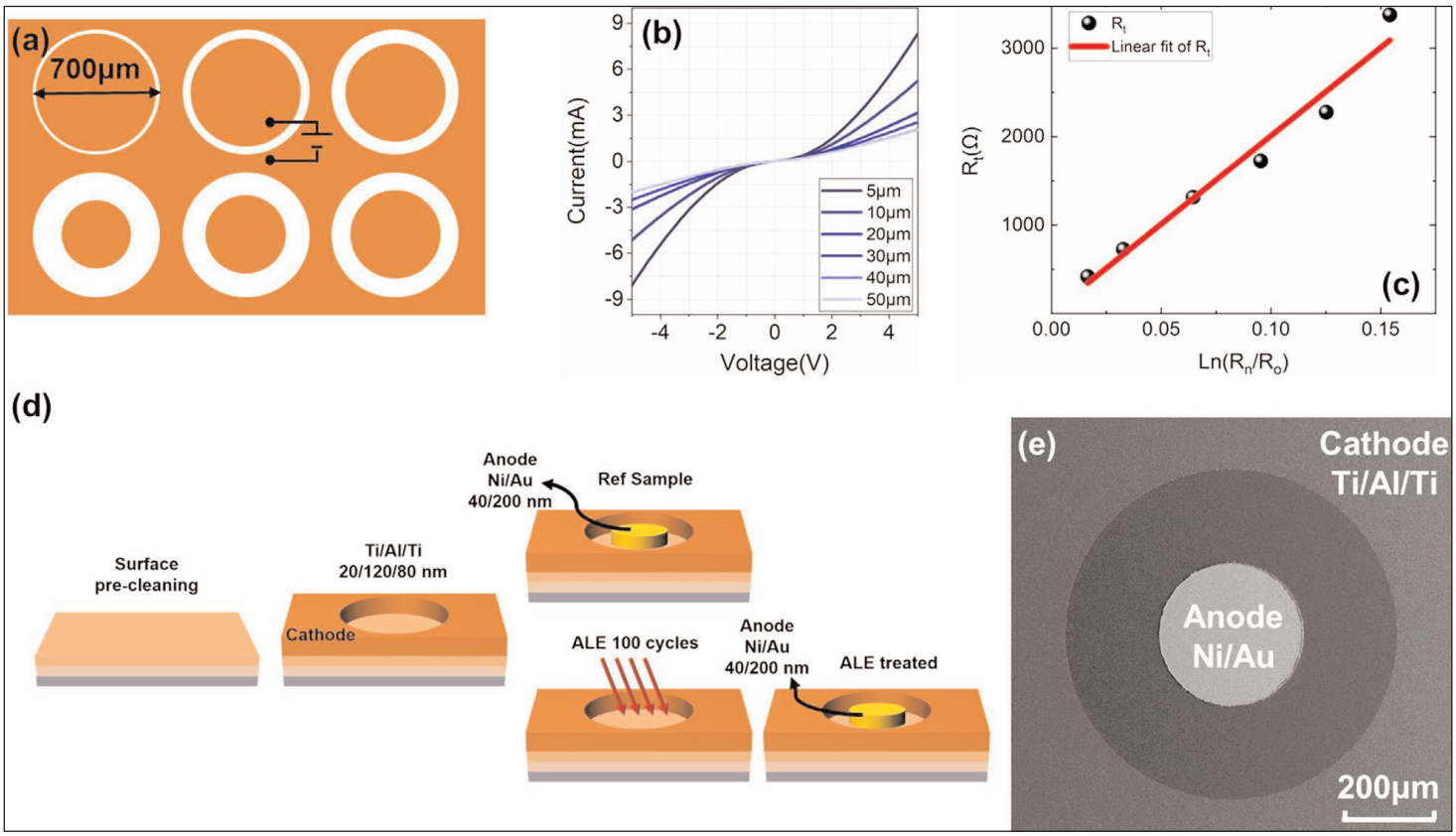

Figure 1. (a) Schematic view of CTLM patterns. (b) and (c) CTLM measurement results and linear fit for contact resistivity calculation. (d) Fabrication processes of reference and ALE-treated samples; red arrows show position of treatment. (e) Scanning electron microscope (SEM) view of fabricated device.

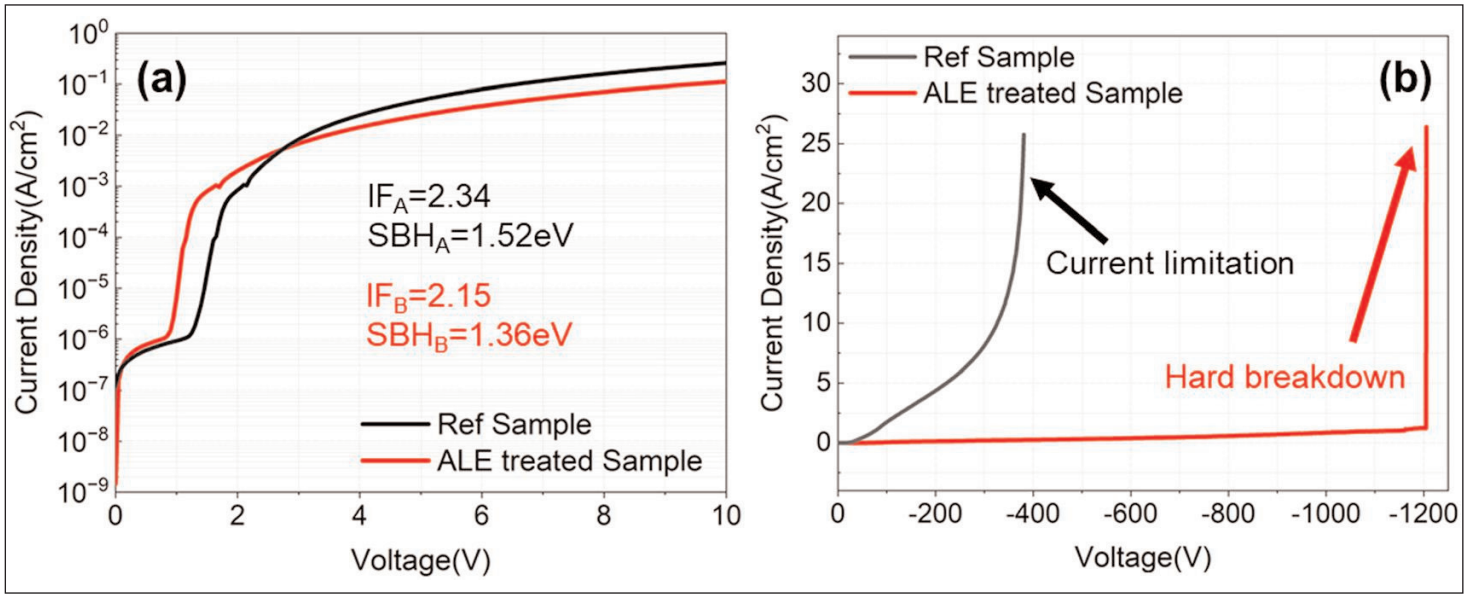

Figure 2. (a) Forward and (b) reverse current–voltage characteristics of reference and ALE-treated samples.

The researchers describe the benefits: "Atomic layer etching (ALE) technology is an etching strategy that removes materials with atomic accuracy. Unlike conventional reactive ion etching (RIE), which normally operates with high RF power (usually over 300W), plasma ALE usually gently removes materials with low ion energy (~10eV) after a specific chemical treatment at a low speed. The self-limited process allows ALE to achieve precise thickness control and minimal surface damage."

Increasing the Al-content of the III–N semiconductor material should increase the bandgap from the 3.4eV of GaN nearer to the 6.2eV of AlN. A wider bandgap is associated with a higher critical electric field for breakdown, which should allow high voltages to be reached in smaller structures, as needed in power-handling devices. By mitigating surface defects, ALE could advance performance in other power device types such as field-effect transistors and p–n diodes.

The researchers used 2-inch AlN/sapphire templates to grow 500nm epitaxial 1300°C AlN, followed by 200nm 1150°C silicon-doped $Al_{0.86}Ga_{0.14}N$, both through MOCVD. The AlN template layer was 1µm thick. The screw- and edge-dislocation densities in the epitaxial layers were estimated to be $2.79x10^7/cm^2$ and $3.41x10^8/cm^2$, respectively, based on x-ray analysis.

The team fabricated its SBDs (Figure 1) on 1cm x 1cm pieces cut from the epitaxial material by laser. Before fabrication, the pieces were cleaned in a sulfuric acid/hydrogen peroxide 'piranha' solution and in a buffered oxide etchant consisting of hydrofluoric acid and ammonium fluoride (NH_4F) solutions.

The team explains: "These cleaning steps were employed to eliminate impurities generated during laser cutting and to remove most contamination present on the sample surfaces."

To assess the contact resistivity of the ohmic contacts circular transmission line measurement (CTLM) structures were fabricated, using patterned and annealed sputtered titanium/aluminium/titanium (Ti/Al/Ti) metal stacks. The contact resistivity was estimated at $2.01x10^5\Omega$-cm^2. Hall measurement showed the AlGaN layer to have sheet resistance, carrier concentration, and mobility of 421kΩ/❑, $4.3x10^{16}/cm^3$, and $17.4cm^2$/V-s, respectively.

The ohmic metal cathode of the SBDs was the same as used in the CTLM structures. The nickel/gold Schottky anode was deposited with or without ALE. The SBD without ALE served as a reference sample. The Schottky metals were deposited by electron-beam evaporation.

The ALE was carried out using equipment from Oxford Instruments. The etch cycle consisted of a chlorine dose (0.03s), followed by a purge (10s), etch (5s), and spacer (0.4s). The cycle was repeated 100 times, to give an estimated etch depth of 10nm, based on atomic force microscope (AFM) measurements. The SBD featured 300µm-diameter anode and 200µm gap distance to the cathode.

The on/off current ratio of the ALE SBD and reference was 10^6 for both (Figure 2). The measurement points were 10V on and −5V off. The ideality for the ALE SBD was 2.15, compared with 2.34 for the reference. The Schottky barrier heights were 1.36eV and 1.52eV for the ALE and reference SBDs, respectively. Capacitance–voltage (C–V) measurements gave higher barrier heights of 4.85eV for ALE samples and 5.05eV for the reference.

The researchers comment: "The discrepancy between the C–V SBH and I–V SBH probably arises from the high density of interface states in the surface oxide layer of the Ref sample and plasma-chemical process-induced interface states at the surface of the ALE-treated sample, respectively. ALE improved the ideality

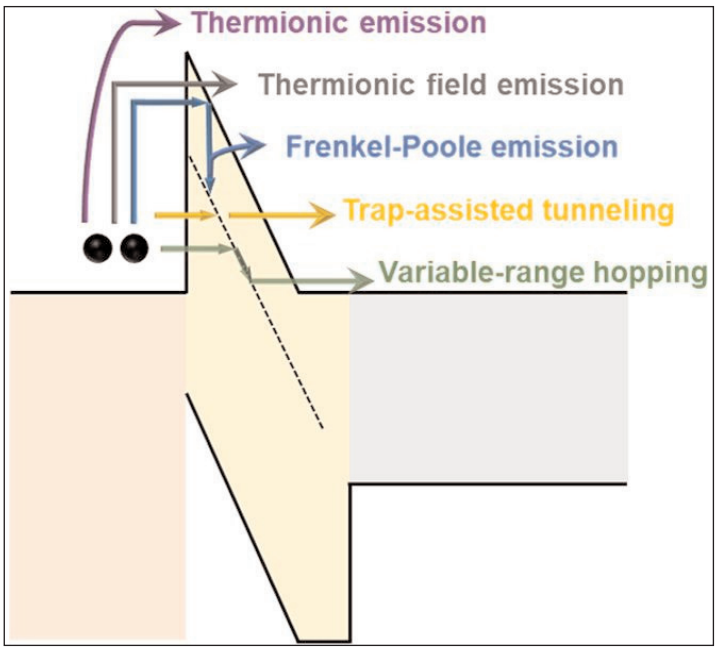

Figure 3. Current flow and breakdown mechanisms through Schottky barrier.

factor of SBDs but resulted in a slightly decreased Schottky barrier height."

The breakdown characteristics of the devices were significantly different at 308V for the reference and 1205V for the ALE SBD. Also, the breakdown mode was different: the reference broke the leakage current limitation, while the ALE SBD underwent sudden hard breakdown.

The researchers used temperature-dependent measurements to analyze the current leakage and breakdown mechanisms (Figure 3). Although the ALE SBD had improved reverse-bias performance over the reference, the leakage current magnitude was too high for it to be attributed to thermionic or thermionic field emission effects. Rather than these conventional electrode-limited conduction mechanisms, the team suggests that defect-assisted conduction is to blame for carriers sneaking through the barrier through trap-assisted tunneling (TAT) or variable range hopping (VRH). The temperature analysis suggested that TAT was less of a factor in the ALE SBD compared with the reference. The VRH component was thought to be comparable in both device types. The team concludes that the ALE treatment mainly improved the high-field carrier transport performance. ■

https://doi.org/10.1063/5.0251499

https://plasma.oxinst.com/products/icp-etching/plasmapro-100-cobra-icp

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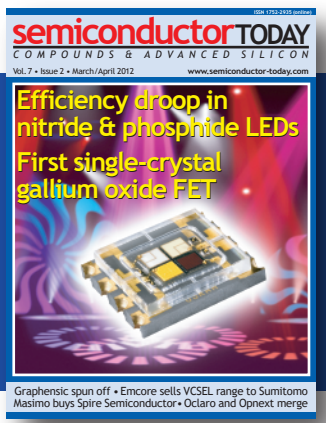

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Toshiba and Global Power Technology accelerate SiC power device patent filings

Over 840 new patent families filed globally in Q1/2025, says Knowmade.

According to data from the SiC Patent Monitor of technology intelligence and IP strategy consulting company KnowMade, power silicon carbide (SiC) technology saw robust patenting activity in first-quarter 2025, with over 840 new patent families filed globally.

The patenting activity is marked by the acceleration of Toshiba in the SiC power device patent landscape, totaling the same number of new inventions as that disclosed by Chinese company Global Power Technology in Q1/2025. The latter has been a regular top patent applicant in the last four quarters, focusing almost exclusively on the design of SiC MOSFET structures.

Interestingly, more than 420 patent families were granted for the first time during the last quarter. The ranking of patent assignees highlights five Japanese companies (Denso/Toyota, Fuji Electric, Sumitomo Electric, Mitsubishi Electric) alongside the prominent Chinese contender Global Power Technology, whose position is due to a high number of utility models registered during the same period. Meanwhile, over 120 patents expired or were abandoned during the quarter, nearly 20% of which originated from Wolfspeed.

The quarter also saw about 40 patent transfers, with several patent reassignments from Qorvo to United Silicon Carbide following its acquisition by onsemi in January. Furthermore, collaborative IP activities exceeded 15, predominantly national partnerships between research institutes and domestic enterprises, although the cross-border Nissan–Renault alliance targeting enhanced gate reliability of trench SiC MOSFETs (featuring an electric-field relaxation region beneath the gate trench) stood out.

No new patent litigation was identified in the SiC landscape in Q1/2025. Instead, a US litigation case between Purdue University and Wolfspeed concluded. The SiC patent landscape welcomed over 15 newcomers in Q1/2025 (i.e. entities publishing their first SiC-related patents), most of them coming from China. Finally, four key IP leaders — Rohm Semiconductor, Wolfspeed, Toshiba and STMicroelectronics — have been identified for in-depth analysis in the latest quarterly report of Knowmade's SiC patent monitoring service.

Main IP players driving the IP activity in each segment of the supply chain have been identified according the number of their new patent families (inventions) published during the quarter

Notable innovations across the silicon carbide supply chain

SICC remains one of the most prolific patent applicants in the SiC substrate patent landscape and is still among the few Chinese companies seeking patent protection for SiC innovations outside China. Its recent PCT applications target enhanced crystal quality by reducing the residual internal stress and by achieving a more uniform stress distribution across large-diameter SiC wafers.

Microchip Technology has resumed its patenting activity in the SiC power device patent landscape, disclosing three inventions related to a SiC/Si hybrid channel power MOSFET to provide for increased carrier mobility and other potential benefits in terms of switching losses, power density etc. Meanwhile, Purdue University this quarter introduced a SiC MOS-based power device with ultra-short channel lengths, having ultra-low specific on-resistance.

Diving into next-generation SiC devices, Knowmade's Q1/2025 report highlights companies publishing new patent applications targeting SiC superjunction structures (Rohm, Toshiba), SiC JFET (onsemi) and SiC IGBT (Hitachi, GlobalFoundries, Rohm, Toshiba). In a newly published patent application, Hitachi considers the use of semi-insulating SiC substrates for medium-voltage (MV) applications (>10kV), with a view to reducing manufacturing costs of the corresponding SiC devices (e.g. a PiN-diode or an IGBT).

Moreover, the integration of SiC devices into MV power modules (e.g. 15kV) has been considered in a new patent publication from Aalborg University, aiming to reduce the maximum electric field in the trench between high-voltage and ground pads (a reduction in the triple-point maximum electric field).

Notable companies have published new patent applications in the module and packaging space this quarter, such as onsemi (flip-chip and pre-molded clip power modules), Hitachi (die-attach featuring high bonding reliability at high temperatures) and Semikron Danfoss (three-level power module having low-inductance layout).

Down the SiC supply chain, patenting activity related to circuits and applications remained quantitatively dominated by Chinese research organizations in Q1/2025. Notable patent applications relate to SiC device implementation in different application fields such as EV/HEV (e.g. controlled active DC bus discharge, Allegro Microsystems), offroad vehicles (e.g. portable MW charging systems, Caterpillar), space or nuclear applications (e.g. measurement systems, Hitachi), and energy storage (e.g. grid-connected battery systems, Siemens). ■

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RISC processor based on 2D semiconductor FETs

Researchers combine 5900 MoS_2 transistors in a 32-bit device.

Fudan University and Shaoxin Laboratory in China have reported "one of the most complex functional circuits based on 2D semiconductors to date", consisting of 5900 molybdenum disulfide (MoS_2) field-effect transistors (FETs) combined into a RISC-V 32-bit reduced instruction set computer [Mingrui Ao et al, Nature, published 2 April 2025].

The researchers see their basic two-dimensional (2D) MoS_2 transistor structure as competitive and well aligned with the 2022 IEEE International Roadmap for Devices and Systems (IRDS) targets.

The team comments on future prospects: "Silicon integrated circuit designs are well established, but they may not be adaptable to emerging fields such as edge computing and intelligent sensing, where 2D semiconductors are expected to excel."

Edge computing refers to distributed computing models where computation is performed closer to the data source, somewhat like reflex responses not needing a stimulus signal to reach the brain before eliciting a reaction.

In addition to the RV32-WUJI RISC-V 32-bit microprocessor, the team has developed 25 logic units for a complete standard cell library. It may or may not be relevant but wuji is a concept in Chinese philosophy meaning variously and tentatively "ultimateless", "limitless", "the ultimate of nothingness", and "non-polar" ("wu" = "nothingness", "ji" = "pole").

The researchers comment: "The architecture of this arithmetic logic unit with a 32-bit serial data path was designed to reduce static power consumption and hardware overhead to address power efficiency and cost concerns rather than performance requirements, thereby making it suitable for use in scenarios such as edge-embedded environments for small Internet of Things devices."

The microprocessor integrated circuit consisted of 5900 MoS_2 FETs and a maximum logic path of 17 stages of cascaded logic elements positioned between flip-flops. The supply voltage was 4V. The interconnection of the transistors was through 4 connect layers: the source, drain, gate (M0); logic (M1); and module (M2–3).

The three-atom-thick MoS_2 for the FETs was deposited on 4-inch insulating sapphire substrate. The sources for the MoS_2 was a sponge-like mix of molybdenum oxide (MoO_3) and graphene oxide, and sulfur. The sponge and sulfur precursors were heated to 700°C and 220°C, respectively, in a 200mm-diameter quartz tube furnace and deposited on an inverted sapphire substrate for 15 minutes at 0.02Pa pressure. Shenzhen Six Carbon Technology Inc supplied most of the MoS_2/sapphire substrates used by the team.

The sapphire insulation provided complete isolation of the individual transistors making up the RV32-WUJI processor. The researchers liken the use of the sapphire substrate to the silicon-on-insulator technology used in present-day advanced silicon electronics, aiming to reduce parasitic capacitance and current leakage.

The team adds: "The MoS_2 channel is only three atoms thick and is free of dangling bonds in the plane, making it more favorable for electrostatic control in a planar transistor structure."

The basic unit of the RV32-WUJI was top-gate n-type metal–oxide–semiconductor (MOS) FETs (Figure 1). The use of ion implantation to control the threshold voltage (V_{TH}), as in conventional silicon electronics, is excluded for atom-level transistors such as MoS_2 FETs, so alternative strategies had to be implemented.

In the RV32-WUJI the threshold was controlled by using different gate metals, aluminium (Al, load) or

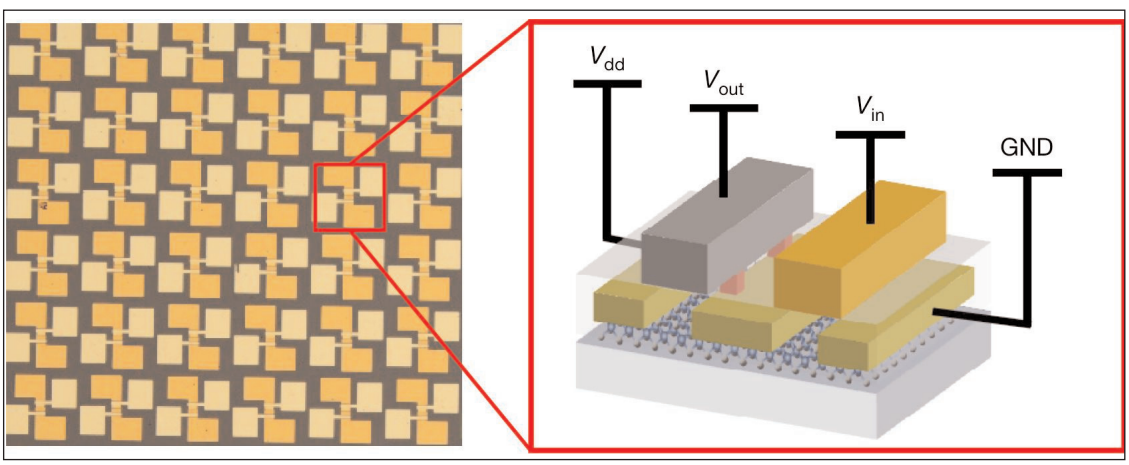

Figure 1. Transistor scheme for enhancement- and-depletion-mode inverter.

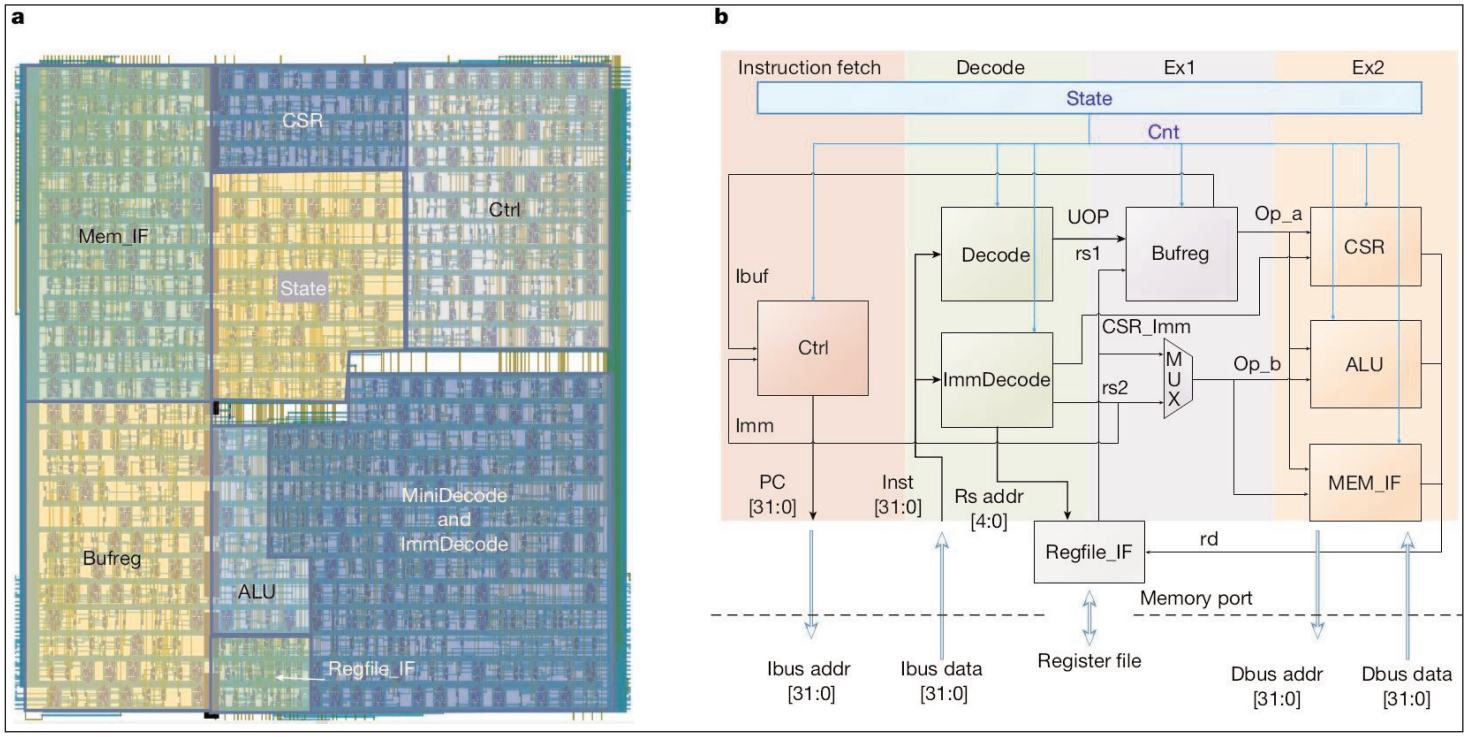

Figure 2. a, RV32-WUJI core architecture with nine basic modules. b, Schematic data path.

gold (Au, drive), and by seeding-layer optimization of the high-k dielectric insulation between the metal gate and MoS_2 channel. The researchers comment: "Such combined strategies can efficiently tune the V_{TH} of MoS_2 FETs for circuit-level matching and optimization in M1 and the gate layer."

The dielectric gate insulation/passivation was seeded with 1nm amorphous silicon dioxide on which 15nm of high-k hafnium oxide was grown by atomic layer deposition.

Wafer-scale fabrication posed many challenges, considering the delicate nature of the basic transistor. The team adopted systematic co-optimization along with machine learning methods to meet the device performance needed for high wafer-level transistor yields of 99.92%. The inverter yield was 99.77%.

The researchers comment: "Inverters are the basis of all logic units. Based on the above inverter characteristics, we built a 2D process design kit with a complete basic logic-unit library."

Of course, as the complexity of the circuits increased, yields decreased, falling to 7% for a 64-bit register with 1152 transistors. The team writes: "This can reasonably be attributed to factors such as the relatively low grade of the cleanroom in our laboratory (compared to an industrial-grade cleanroom) and the stability of the processing tools used. It is, therefore, necessary to further optimize and improve the manufacturing process of VLSI 2D integrated circuits in a more industrial manner."

The final RV32-WUJI chip (Figure 2) consisted of a 1-bit arithmetic logic unit (ALU) for performing operations, a control status register module (CSR), an instruction-decoding module, an immediate-number-decoding module and a control module (Ctrl) with the program counter. Intermediate results were stored in a buffer register, and a small state machine monitored instruction execution. Interface modules connected memory and register sections.

The researchers performed a sequence of operations, "1946+25=1971", and then "1971+53=2025" at 1kHz clock rate with0.43mW power consumption. The team explains the significance of these figures: "Here, 1946 and 1971 represent the years in which ENIAC (the first general-purpose programmable electronic digital computer) and the Intel 4004 (the first commercially produced silicon microprocessor) were created."

The researchers used n-type transistors with relatively long 3μm channel lengths, rather than the complementary p/n-type structure favored in mainstream electronics. The use of just n-type transistors impacted dynamic performance and power consumption of the MoS_2 FETs, compared with CMOS.

The team comments: "A more suitable circuit architecture, such as pass-transistor logic, may be a compromise solution for circuits using single-polarity transistors. In the long run, we anticipate that further optimization and innovation in processing and materials will facilitate the realization of 2D CMOS in the short-channel regime. By then, the full potential of 2D semiconductors will be unlocked." ■

https://doi.org/10.1038/s41586-025-08759-9

https://irds.ieee.org/

https://en.wikipedia.org/wiki/Wuji_(philosophy)

https://www.6carbon.com/index-en.php

Author: Mike Cooke

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2025 Symposium on VLSI Technology & Circuits – 'Cultivating the VLSI Garden: From Seeds of Innovation to Thriving Growth'
Rihga Royal Hotel, Kyoto, Japan
www.vlsisymposium.org

22–25 June 2025
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E-mail: sud70@psu.edu
https://2025.deviceresearchconference.org

15–17 June 2025
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E-mail: support@mtt.org
www.rfic-ieee.org

15–20 June 2025
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10–12 September 2025
China International Optoelectronic Exposition (CIOE 2025)
Shenzhen World Exhibition and Convention Center, Shenzhen, Guangdong, China
E-mail: cioe@cioe.cn
www.cioe.cn/en

14–19 September 2025
22nd International Conference on Silicon Carbide and Related Materials (ICSCRM 2025)
BEXCO,
Busan, South Korea
E-mail: icscrm2025@benepeople.co.kr
www.icscrm2025.org

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
PCIM Asia – 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

15–19 February 2026
2026 IEEE International Solid- State Circuits Conference (ISSCC 2026)
San Francisco, CA USA
E-mail: Isscinfo@yesevents.com
www.isscc.org

3–8 May 2026
SID Display Week 2026
Los Angeles, CA, USA
E-mail: registration@sid.org
www.displayweek.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

9–11 June 2026
PCIM 2026 (Expo & Conference on Power Electronics, Intelligent Motion, Renewable Energy and Energy Management)
Nuremberg, Germany
E-mail: pcim_visitors@mesago.com
www.mesago.de/en/PCIM/main.htm

8 June – 1 July 2026
ALD/ALE 2026: AVS 26th International Conference on Atomic Layer Deposition (ALD 2026), featuring the 13th International Atomic Layer Etching Workshop (ALE 2026)
Tampa, FL, USA
E-mail: della@avs.org
https://ald2026.avs.org

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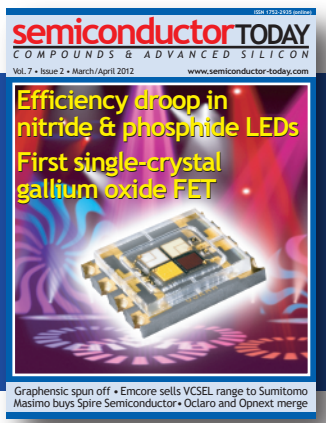

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