



SOI & ADVANCED SUBSTRATES NEWS
ACCELERATING INDUSTRY GROWTH | Bi-Weekly Newsletter

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SUSPENDED SLOT MEMBRANE WAVEGUIDE BASED ON GERMANIUM-ON-SILICON-ON-INSULATOR

In this work, a novel suspended slot membrane waveguide (SSMW) utilizing a germanium-on-silicon-on-insulator (Ge-on-SOI) platform is proposed for carbon dioxide (CO₂) gas-sensing applications. Integrating Ge with the mature **SOI** technology leverages existing silicon photonic fabrication processes, ensuring scalability and cost-effectiveness.

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CRYOGENIC CMOS TRANSISTORS SET TO BOOST QUANTUM COMPUTING

Authors from SemiQon published a paper Millikelvin Si-MOSFETs for Quantum Electronics which details characterization of transistors with a subthreshold swing of 0.3 mV/dec at 420mK. The transistors are MOSFETs made on a fully depleted silicon-on-insulator (**FDSOI**) wafer.

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OPTIMIZED HIGH-VOLTAGE ANALOG SWITCH AND ITS CONTROL CIRCUIT BASED ON SILICON-ON-INSULATOR TECHNOLOGY

This paper uses a super junction MOSFET (SJ-MOS) with a 0.18 μm **SOI** process and a solid-state relay (SSR) structure to implement a high-voltage analog switch. Compared with traditional high-voltage analog switches, it achieves higher performance with a smaller area.

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ROLE OF FD-SOI IN POWERING AI-DRIVEN IOT APPLICATIONS

As IoT devices become more integrated into our daily lives, the benefits of **FD-SOI** will be increasingly important in powering smart, efficient and reliable AI solutions across various domains. By addressing the unique demands of AI IoT systems, FD-SOI is set to play a pivotal role in the future of connected and intelligent devices.

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SOI ECOSYSTEM NEWS

INFINEON AND QUANTINUUM ANNOUNCE PARTNERSHIP TO ACCELERATE QUANTUM COMPUTING TOWARDS MEANINGFUL REAL-WORLD APPLICATIONS

Infineon and Quantinuum announced a strategic partnership to develop the future generation of ion traps. This partnership will drive the acceleration of quantum computing and enable progress in fields such as generative chemistry, material science, and AI.

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COHERENT LAUNCHES HIGH-SPEED PHOTODIODES FOR 1.6T TRANSCEIVERS

Coherent announced the production release of high-speed indium phosphide (InP) photodiodes. The photodiode arrays are available in two different flip-chip pad configurations for compatibility with high-performance TIAs and are engineered to meet the demanding requirements of longwave fiber-optic communication systems.

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INAS ON INSULATOR: A NEW PLATFORM FOR CRYOGENIC HYBRID SUPERCONDUCTING ELECTRONICS

In this work, researchers emphasized that InAsOI resembles the highly successful silicon-on-insulator (SOI) architecture and constitutes a promising candidate for implementing the superconducting counterpart of classic semiconducting electronics made on SOI.

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III-V-ON-Si3N4 WIDELY TUNABLE NARROW-LINEWIDTH LASER BASED ON MICRO-TRANSFER PRINTING

Heterogeneous integration of III-V gain elements on silicon nitride (Si₃N₄) is one of the most critical steps to fully leverage its advantages. In this study, researchers based in Belgium and France have used micro-transfer printing to integrate indium phosphide (InP) laser gain material on a silicon nitride photonics platform.

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COMPOUND SEMICONDUCTOR

VALEO USES SiC MODULE FROM ROHM FOR ELECTRIC DRIVES

Tier One supplier Valeo is to use a silicon carbide (SiC) module from Rohm Semiconductor for its next generation of power modules for EV motor inverters. The two will propose and optimize the modules, starting with Rohm's 2-in-1 TRCDRIVE pack SiC molded module.

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£51M FOR VISHAY NEWPORT FAB

Vishay Intertechnology is to invest £51 million in the wafer fab in Newport, Wales. The investment will support new lines for the power device production and a shift to silicon carbide (SiC) power devices.

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GAN BOOST FROM PCB PACKAGED POWER PROJECT

A project in the UK is developing packaged power functions such as a half bridge with pre-packaged gallium nitride (GaN) devices for lower cost, weight and size. It is noted that the approach can also be applied to other semiconductor materials such as Silicon Carbide or even silicon.

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ROOM-TEMPERATURE WAVEGUIDE INTEGRATED QUANTUM REGISTER IN A SEMICONDUCTOR PHOTONIC PLATFORM

Recent research published in Nature Communications details the successful integration of entangled quantum registers into silicon-carbide-on-insulator (SiCOI) waveguides. This achievement highlights the potential of the SiCOI platform for future quantum photonic applications.

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SEMI BLOG

INDUSTRY FUN FACTS – CALIFORNIA'S COOLEST PRODUCT 2024, UNLOCKING THE FULL SPECTRUM, INNOVATING MATERIALS AND SMART BUILDINGS

Northrop Grumman's "World's Fastest Microchip" won the 2024 "Coolest Thing Made in California" contest. NIST scientists have successfully created a compact, full-spectrum laser covering the green-yellow-orange wavelengths, long considered challenging to produce. At the 2024 ITF World conference, AMD CEO Lisa Su spotlighted a new goal: a 100x boost in computing efficiency by 2027. As shrinking transistor sizes yield diminishing returns, materials innovation has become essential for boosting performance and efficiency.

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SEMI NEWS HIGHLIGHT

GLOBAL SEMICONDUCTOR MANUFACTURING INDUSTRY RECORDS STRONG GROWTH IN Q3 2024, SEMI REPORTS

The global semiconductor manufacturing industry in the third quarter of 2024 showed strong momentum with all key industry indicators performing positive quarter-on-quarter (QoQ) increases for the first time in two years. The growth is fuelled by seasonal factors and strong demand from investments in AI data centers, however, the consumer, automotive, and industrial segments are experiencing a slower pace of recovery. The growth trend is expected to continue into the fourth quarter of 2024.

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