



SOI & ADVANCED SUBSTRATES NEWS

ACCELERATING INDUSTRY GROWTH | Bi-Weekly Newsletter

Share 

FEATURED IN THIS EDITION

SINGLE-CHIP SILICON PHOTONIC ENGINE FOR ANALOG OPTICAL AND MICROWAVE SIGNALS PROCESSING

This work introduces a single-chip silicon photonic engine fabricated on an SOI platform that seamlessly integrates all essential components for processing both optical and microwave signals. This compact and programmable system is a key advancement towards creating more affordable and high-speed microwave photonic solutions.

[Read More](#)

THE ROLE OF PD-PT BIMETALLIC CATALYSTS IN ETHYLENE DETECTION BY CMOS-MEMS GAS SENSOR DUBBED GMOS

This research introduces an SOI-based GMOS gas sensor, leveraging CMOS-SOI-MEMS technology, which achieves enhanced ethylene and ethanol detection. Its optimized Pd-Pt bimetallic catalyst significantly improves sensitivity and lowers ignition temperatures, enabling lower power consumption.

[Read More](#)

EFFICIENT LOW-VOLTAGE PHASE SHIFTER WITH INKJET-PRINTED LIQUID CRYSTAL ON A SILICON ON INSULATOR PLATFORM

This research introduces a novel electro-optic phase shifter on a silicon-on-insulator (SOI) platform, integrating inkjet-printed liquid crystal with doped silicon rail electrodes. This innovative "dual-rail waveguide" architecture enables highly efficient phase shifting at low voltages (2.7 V for 2π phase shift), minimal power consumption (<1 nW), and low optical loss (1 dB).

[Read More](#)

MODELING TOTAL IONIZING DOSE EFFECTS IN FULLY-DEPLETED SILICON-ON-INSULATOR TECHNOLOGY: BRIDGING DEVICE DEGRADATION TO RADIATION-HARDENED CIRCUIT DESIGN

This work significantly advances radiation-hardened circuit design by creating a physics-based model that accurately predicts and mitigates Total Ionizing Dose (TID) effects in FD-SOI MOSFETs. Integrated into the BSIM-IMG compact model, this research ensures the reliability of FD-SOI circuits for demanding radiation-intensive applications, building on its inherent single event effect immunity.

[Read More](#)

SOI ECOSYSTEM NEWS

GLOBALFOUNDRIES ANNOUNCES \$16B U.S. INVESTMENT TO RESHORE ESSENTIAL CHIP MANUFACTURING AND ACCELERATE AI GROWTH

GlobalFoundries announced a \$16 billion investment to expand its U.S. semiconductor manufacturing in New York and Vermont, aiming to reshore essential chip production and accelerate AI growth with support from major tech companies like Apple and SpaceX.

[Read More](#)

CEA-LETI REPORTS CO-INTEGRATION OF GAN MICROLED AND ORGANIC PHOTODETECTORS FOR MULTIFUNCTIONAL DISPLAY APPLICATIONS

CEA-Leti has achieved the co-integration of GaN microLED and organic photodetectors, creating multifunctional displays that combine content display with environmental sensing capabilities. This innovation enables applications like full-display fingerprint sensing, gesture recognition, and bio-monitoring.

[Read More](#)

MODELING AND SIMULATION FOR PREDICTING THERMO-MECHANICAL BEHAVIOR OF WAFER-LEVEL CU-PI RDLS DURING MANUFACTURING

This study develops and validates an accurate cross-scale simulation method for predicting and controlling warpage in wafer-level copper-polyimide redistribution layers (RDLS) during advanced chip manufacturing processes like backgrinding and CMP, offering insights for optimizing design and yield.

[Read More](#)

LOW-LOSS INTEGRATION OF HIGH-DENSITY POLYMER WAVEGUIDES WITH SILICON PHOTONICS FOR CO-PACKAGED OPTICS

This study validates two heterogeneous integration techniques, lithography and flip-chip bonding, for efficient optical coupling between silicon nitride and polymer waveguides in co-packaged optics, though flip-chip bonding faces reproducibility issues from warpage.

[Read More](#)

COMPOUND SEMICONDUCTOR

NUCLEAR SPIN POLARIZATION IN SILICON CARBIDE AT ROOM TEMPERATURE IN THE EARTH'S MAGNETIC FIELD

A research team has achieved efficient room-temperature polarization of ^{29}Si nuclear spins in Silicon Carbide (SiC) using only the Earth's magnetic field. This breakthrough provides a simpler and more scalable method for quantum information processing and enhanced magnetic resonance imaging (MRI).

[Read More](#)

SIMULTANEOUS INFLUENCE OF NANOPSS AND PHOTONIC CRYSTAL ON LIGHT EXTRACTION IN ALGAN 304NM UVB LEDs

This study numerically optimizes nano-patterned sapphire substrates and photonic crystals to achieve significant theoretical light extraction efficiency enhancements (up to 150%) in AlGaN-based UVB LEDs.

[Read More](#)

RAD HARD GAN HEMT TRANSISTORS FOR SPACE DESIGNS

Infineon has launched the industry's first DLA JANS-certified, in-house manufactured radiation-hardened Gallium Nitride (GaN) transistors for critical defense and space applications.

[Read More](#)

JAPANESE TEAM MAKES GAN-HEMT ON 2-INCH DIAMOND SUBSTRATE

A Japanese team from Sumitomo Electric and Osaka Metropolitan University has successfully fabricated a Gallium Nitride (GaN)-HEMT on a 2-inch polycrystalline diamond substrate, leveraging diamond's superior thermal conductivity for enhanced heat dissipation.

[Read More](#)

SEMI BLOG

SMC KOREA 2025 HIGHLIGHTS CUTTING-EDGE MATERIALS DRIVING NEXT-GEN CHIPS BREAKTHROUGHS

SMC Korea 2025 brought together 300 semiconductor industry leaders to discuss advanced materials and innovation roadmaps crucial for next-generation chips, driven by the AI era and demand for HPC/HBM. Discussions focused on materials for 3D DRAM, CFET, advanced packaging, market trends, and supply chain resilience.

[Read More](#)

SEMI NEWS HIGHLIGHT

SEMI REPORTS GLOBAL SEMICONDUCTOR EQUIPMENT BILLINGS INCREASED 21% YEAR-OVER-YEAR IN Q1 2025

SEMI reported that global semiconductor equipment billings increased a robust 21% year-over-year to US\$32.05 billion in Q1 2025. This solid performance reflects future-looking investments in chipmaking capacity, largely driven by the ongoing AI boom and highlighting the industry's resilience amidst geopolitical uncertainties.

[Read More](#)

EVENTS



Thank you for reading this newsletter. For feedback, please email hhoffman@semi.org.

Subscribe