



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

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DESIGNING AN OPTICAL ROUTER
BASED ON A MULTIMODE-
INTERFERENCE SILICON-ON-
INSULATOR COUPLER WITH
TUNABLE POWER TRANSMITTANCE

Optical routers and multiplexers show high potential for transferring data between optical nodes with speeds matching the high-speed data transmission through optical fibers. In this study, two integrated SOI-based optical router designs were demonstrated and analyzed using conventional multimode interferometer and angled multimode interferometer.

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BURIED INGAS/INP QUANTUM
WELLS SELECTIVELY GROWN ON
SOI FOR LATERAL MEMBRANE
LASER DIODES

The monolithic integration of energy-efficient and high-speed III–V lasers on SOI platform in a cost-effective and scalable manner is the crux for the ubiquitous application of Si photonics in various applications. Aiming for lateral p-i-n membrane laser diodes, this study reports the growth of InGaAs/InP multi-quantum wells buried inside InP membranes on (001) SOI wafers using the lateral aspect ratio trapping method.

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HIGH-Q AND HIGH FINESSE SILICON
MICRORING RESONATOR

Based on the local oxidation of silicon method and combined with the design of an adiabatic microring resonator geometry, this study demonstrates a chip scale high Q microring resonator in silicon on insulator (SOI) platform. The high Q factor along with large free spectral range has led to a high finesse of about 1100 which is the highest reported for SOI devices until now.

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STMICROELECTRONICS REVEALS
FLEXIBLE SYNCHRONOUS
RECTIFIER FOR EFFICIENT SILICON
OR GAN CONVERTERS

STMicroelectronics' SRK1004 synchronous-rectifier controller eases the design and enhances the efficiency of converters built with silicon or GaN transistors, including industrial power supplies, portable-device chargers, and AC/DC adapters. The controller is fabricated in ST's silicon-on-insulator (SOI) process, which ensures robust performance while permitting a tiny 2mm x 2mm DFN-6L package.

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SOI ECOSYSTEM NEWS

GLOBALFOUNDRIES JOINED BY
VERMONT GOVERNMENT OFFICIALS
TO CELEBRATE ANNOUNCEMENT OF
CHIPS AND SCIENCE ACT AND STATE
FUNDING TO MODERNIZE ESSEX
JUNCTION FACILITY

An additional \$4.5 million in planned funding was announced to support creating the first U.S. facility capable of high-volume manufacturing of next-generation gallium nitride (GaN) semiconductors for use in electric vehicles, power grids, data centers, 5G and 6G smartphones and other critical technologies.

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SCALABLE AND EFFICIENT GRATING
COUPLERS ON LOW-INDEX
PHOTONIC PLATFORMS ENABLED
BY CRYOGENIC DEEP SILICON
ETCHING

With fully etched grating couplers patterned on a 330 nm thick SiN film, researchers achieved a coupling efficiency up to ~ 0.55 dB at telecom wavelength, a value comparable with state-of-the art gratings implemented in silicon photonics.

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RENESAS UNVEILS POWERFUL
SINGLE-CHIP RZ/V2H MPU FOR
NEXT-GEN ROBOTICS WITH VISION
AI AND REAL-TIME CONTROL

Renesas has expanded its popular RZ Family of microprocessors (MPUs) with a new device targeting high-performance robotics applications. The device comes with a new generation of Renesas proprietary AI accelerator, DRP (Dynamically Reconfigurable Processor)-AI3, delivering 10 TOPS/W power efficiency, an impressive 10-fold improvement over previous models.

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SILICON NITRIDE BENT ASYMMETRIC
COUPLED WAVEGUIDES WITH
PARTIAL EULER BENDS

Waveguide geometries combining bent asymmetric coupled structures and adiabatic transitions shaped as partial Euler bends are put forward and theoretically analysed in this work. Designs aiming to reduce the radiation loss, with application in curved waveguide sections and Q-enhanced microresonators, and polarization selection geometries, both for the silicon nitride platform, are studied using highly accurate numerical techniques.

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COMPOUND SEMICONDUCTOR

NEW PROGRESS OF SANAN'S TWO
MAJOR SIC PROJECTS

It is reported that Sanan Semiconductor is accelerating the construction of two SiC projects in Chongqing. 1/ Sanan & STMicroelectronics' SiC epitaxy and chip projects: It is expected to be fully completed in 2027, with an annual output of 520,000 automotive-grade chips. 2/ SiC substrate project: Sanan will build two SiC substrate production lines, with an annual output of 520,000 substrates after reaching capacity.

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INSIGHTS INTO STRUCTURAL
DEFECT FORMATION IN INDIVIDUAL
INP/ZNSE/ZNS QUANTUM DOTS
UNDER UV OXIDATION

This study investigates the formation of structural defects in single InP/ZnSe/ZnS core/shell/shell QDs, which exhibits emission quenching from ultraviolet (UV)-facilitated oxidation, using atomically resolved transmission electron microscopy (TEM).

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TAIWAN'S AMBITIOUS GAN-ON-QST
INNOVATION PROJECT POISED TO
REVOLUTIONIZE HIGH-POWER
SEMICONDUCTOR INDUSTRY

The project, led by Vanguard International Semiconductor (VIS), is focused on gallium nitride epitaxial crystal growth on 200-mm QST substrate (GaN-on-QST) and intends to lead the development of state-of-the-art compound semiconductor technology.

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DETERMINATION OF OPTICAL BAND
GAP, TRANSMITTANCE, AND
DIELECTRIC CONSTANT
PARAMETERS OF INDIUM
PHOSPHIDE/ZINC SULFIDE
QUANTUM DOT DOPED
CHOLESTERIC LIQUID CRYSTALS

Nanomaterial doped cholesteric liquid crystal (CLC) composites have become important due to the improvement of their physical properties. In this study, the change of Indium Phosphide/Zinc Sulfide (InP/ZnS) quantum dot (QD) concentration in the optical, electro-optical, and dielectric parameters of CLC was examined.

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SEMI BLOG

SECURING THE CHIP DESIGN FLOW
TO TACKLE CYBER THREATS AND
ENSURE HARDWARE INTEGRITY

Hardware design threats can be introduced at various stages of the design flow including specification, architecture, RTL, gate, circuit, or layout. Addressing these threats during semiconductor design will require the industry to acknowledge the issues and re-think how designs are conceptualized and developed. On March 14, industry experts will dissect the challenges, propose solutions, and chart the path forward during a webinar panel discussion presented by the ESD Alliance and Silicon Assurance. [Registration](#) is now open for this free event.

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SEMI NEWS HIGHLIGHT

SEMICON KOREA 2024 TAKEAWAYS:
KEYNOTES, SEMICONDUCTOR
MARKET FORECAST, SUPPLIER
SEARCH AND TALENT

The near-term semiconductor industry cyclical downturn has come to an end, and the industry is on course for a gradual 2024 recovery driven by improvements in end demand and the normalization of inventory, said Clark Tseng, Senior Director of the Market Intelligence Team (MIT) at SEMI, said at the SEMICON Korea market research press conference. Tseng noted that AI, HPC and automotive applications remain among the key drivers of semiconductor industry growth, with global chip sales expected to experience double-digit growth this and next year.

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