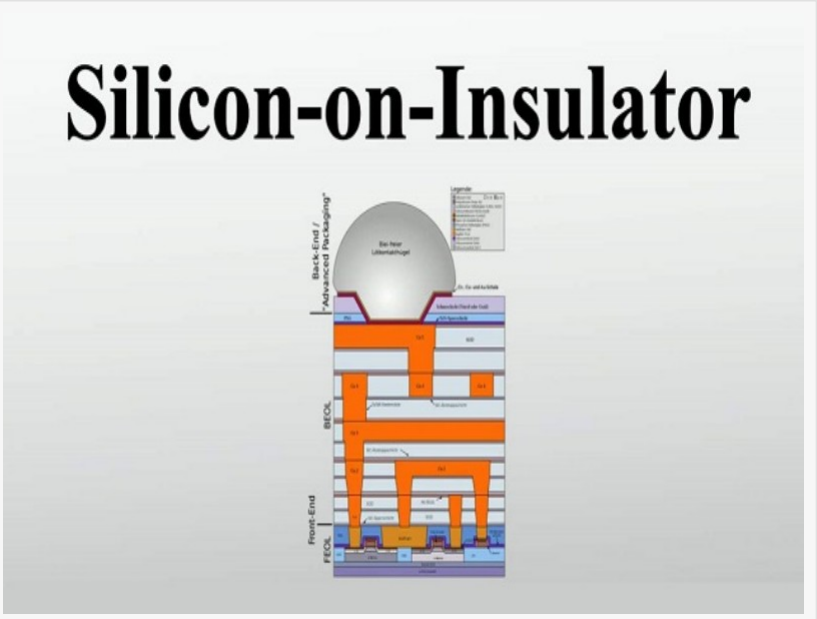
Silicon on Insulator Market to Grow at a CAGR of 14.5% from 2024 to 2031 | DataM Intelligence

Silicon on Insulator technology powers next-gen 5G, RF, and IoT devices with improved performance, lower power consumption, and enhanced connectivity



Silicon on Insulator Market

TEXAS, TX, UNITED STATES, August 29, 2025 /EINPresswire.com/ -- The global Silicon on Insulator (SOI) market is experiencing robust growth, projected to expand at a CAGR of 14.5% from 2024 to 2031. This growth is driven by rising demand across automotive, consumer electronics, and industrial sectors, alongside escalating adoption of 5G technology and advanced AI/ML-enabled applications.

SOI technology involves a layered silicon-insulator-silicon substrate, which improves performance and energy efficiency of semiconductor devices compared to traditional bulk silicon. SOI wafers offer benefits such as reduced parasitic capacitance, lower power consumption, improved speed, and enhanced device isolation. These attributes make SOI essential in manufacturing advanced integrated circuits, RF devices, MEMS sensors, and high-performance processors, especially for emerging high-speed, low-power applications.

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United States: Recent Industry Developments

 In December 2024, the U.S. Department of Commerce finalized $406M in grants for Global Wafers to expand 300 mm and SOI wafer production in Texas and Missouri—backing nearly $4B in new facilities and generating 2,580 jobs.
 In July 2025, Global Wafers inaugurated a new 300 mm wafer facility in Sherman, Texas—the

first of its kind in years in the U.S.—which includes SOI wafer capacity to strengthen local semiconductor infrastructure.
 In 2025, Soitec introduced silicon-photonics SOI products for AI/datacenter optics, and formed strategic U.S. partnerships to support SOI supply chain and ecosystem readiness.

Japan: Recent Industry Developments

 In 2025, Resonac (ex-Hitachi Chemical/Showa Denko) announced plans for acquisitions to consolidate capabilities in semiconductor materials, signaling potential long-term impact on Japan's SOI landscape.

Latest Strategic Investments and Developments

• Companies like STMicroelectronics lead with advanced FD-SOI and RF-SOI platforms, enabling automotive-grade solutions such as microcontrollers for ADAS and other vehicle systems.
• Cadence Design Systems, in collaboration with Tower Semiconductor Ltd, introduced RF-SOI reference design flows accelerating 5G and wireless infrastructure chipset development.
• Industry players invest heavily in integrating SOI wafers into designs for next-generation mobile devices, AI accelerators, and semiconductor manufacturing innovations.
• Market participants pursue mergers, acquisitions, and partnerships to enhance wafer production capacities and expand geographic footprints.

Market Players

Key global companies active in the SOI market include:
• GlobalWafers Co., Ltd.
• GlobalFoundries
• Sumco Corporation
• Murata Manufacturing
• NXP Semiconductors
• Shin-Etsu Chemical
• Soitec
• STMicroelectronics
• Tower Semiconductor Ltd.
• Shanghai Simgui Technology

These companies lead innovation in FD-SOI, RF-SOI, MEMS, and associated semiconductor components.

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Market Dynamics

Drivers
• The surge in 5G deployments boosts the demand for RF-SOI wafers to enable low-loss, high-frequency communication components.
• Enhanced power efficiency, miniaturization, and performance in FD-SOI wafers drive adoption across IoT, automotive, and consumer electronics applications.
• Growing AI and ML workloads necessitate SOI-based semiconductor processes that deliver improved switching speeds and energy savings.

Restraints
• Challenges such as self-heating effects, floating body issues, and reduced breakdown voltage in SOI devices can limit performance in certain high-power scenarios.
• Complex manufacturing processes and associated costs currently restrict broader adoption, especially among smaller fabs.

Opportunities
• Expanding use of FD-SOI in automotive electronics for power management, ADAS, and infotainment systems.
• Growing investments in semiconductor manufacturing capacity in Asia-Pacific, spearheading SOI wafer production.
• Development of advanced MEMS sensors and integration with SOI technology for industrial automation and consumer devices.

Challenges
• Overcoming thermal and electrical challenges inherent in SOI devices without compromising device reliability.
• Managing supply chain complexities amid geopolitical tensions impacting semiconductor material access.

Market Segments

The market is segmented by product (MEMS, RF-SOI, memory devices, others), wafer type (RF-SOI, FD-SOI, others), and end-user (automotive, consumer electronics, industrial). The automotive segment is expected to register fastest growth, propelled by requirements for high-performance, low-power chips in autonomous, connected vehicles.

Regional Analysis

Asia-Pacific dominates the SOI market, led by major semiconductor manufacturing hubs such as Taiwan, South Korea, China, and Japan. The region benefits from extensive production capacity and increasing domestic electronics demand. North America and Europe maintain strategic importance as R&D centers and specialty application markets.

Conclusion

The global SOI market is positioned for substantial growth, driven by 5G adoption, growing automotive electronics demand, and ongoing innovation in semiconductor fabrication. Market leaders that can address SOI device challenges while expanding production and ecosystem partnerships will capitalize on expanding opportunities through 2031.

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The global SiC power semiconductor market is growing at a CAGR of 33.10% during the forecast period (2024-2031).

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