



Press Release

X-FAB Announces Upgrade to its Substrate Coupling Analysis Tool to Include BCD-on-SOI Process

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X-FAB Silicon Foundries SE, the leading analog/mixed-signal and specialty foundry, has expanded the scope of its SubstrateXtractor tool, via which unwanted substrate coupling effects can be examined. It is the first foundry worldwide to offer this analysis function for a BCD-on-SOI process. With the company's [XT018 180 nm BCD-on-SOI technology](#) now being supported, X-FAB complements the XH018 and XP018 180 nm bulk CMOS processes that the tool was originally designed for. Through use of the new SubstrateXtractor version, accelerated SOI-related product development can be achieved, avoiding the need for multiple iterations.

The initial SubstrateXtractor, which X-FAB developed in collaboration with EDA partner [PN Solutions](#) (and is based on its widely used PNAware product), was released in 2019. Using it, customers have been able to address the coupling issues caused by interactions between active and passive elements within semiconductor substrates (whether these elements are part of the circuit itself or present parasitically). This has been highly advantageous, resulting in quicker time to market for customer projects. Support for SOI processes is built on the [PNAwareRC tool](#) by PN Solutions and further increases the capabilities of the platform and broadens its appeal.

The BOX/DTI features of X-FAB's XT018 process enable isolation of constituent functional blocks on the chip from each other. This can apply to sensitive analog blocks needing to be decoupled from digital blocks, or low noise amplifiers that must be isolated from high-voltage driver circuits. It also makes multi-channel implementations much easier, as circuits in XT018 are effectively placed in their own separate substrate, thereby reducing crosstalk.

The ability of SubstrateXtractor to analyze substrate couplings in SOI-based integrated circuits will be invaluable. Though active silicon islands in SOI processes can be completely dielectrically isolated by BOX and DTI, passive R and C couplings may still be present. Using this updated tool, a passive RC network can be extracted for lateral and vertical coupling paths resulting from DTI and BOX. These passive coupling networks can be simulated, in order to assess what impact they will



have on the integrated circuit. Key applications for this additional post-layout extraction will be the high-current and high-voltage devices used in industrial and automotive systems.

"Mitigation of substrate coupling is a challenging task, and through support for the extraction of parasitic elements relating to our XT018 BCD-on-SOI process, customers will be able to simulate the coupling of circuit blocks and identify interferences that will be detrimental to performance," states Lars Bergmann, Director of Design Support at X-FAB. "This will be of particular interest in situations where there are very large interference voltages involved or for high frequencies in the single-digit GHz range."

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About X-FAB

X-FAB is the leading analog/mixed-signal and MEMS foundry group manufacturing silicon wafers for automotive, industrial, consumer, medical and other applications. Its customers worldwide benefit from the highest quality standards, manufacturing excellence and innovative solutions by using X-FAB's modular CMOS and SOI processes in geometries ranging from 1.0 μm to 130 nm, and its special silicon carbide and MEMS long-lifetime processes. X-FAB's analog-digital integrated circuits (mixed-signal ICs), sensors and micro-electro-mechanical systems (MEMS) are manufactured at six production facilities in Germany, France, Malaysia and the U.S. X-FAB employs more than 4,000 people worldwide. www.xfab.com

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Acronyms

BOX	Buried Oxide
BCD	Bipolar CMOS DMOS
DTI	Deep Trench Isolation
EDA	Electronic Design Automation
RC	Resistor-Capacitor
SOI	Silicon-on-Insulator