Design of Bulk Built-In Current Sensors to Detect Single Event Effects and Laser-Induced Fault Injection Attempts

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Bulk Built-In Current Sensors (BBICS) are fault detection mechanisms embedded in integrated systems. BBICS are able to monitor anomalous transient currents like the so-called single event effects induced by radiation or even malicious injection sources. This work reviews BBICS principles and introduce new sensor architectures that improve the transient-fault detection sensitivity. In addition, a test chip is presented for the validation of the sensor concept under the laser-induced effects.

Integrated circuits are more and more Transient-Fault (TF) sensitive through new technologies

The today's trend in efficient protections against transient faults:
Concurrent Error Detection (CED) mechanisms
Recovery-based Error Correction Procedures

Mitigation of Transient faults by using CED schemes based on Bulk Built-In Current Sensors (BBICS):

Analysis of laser-induced currents in NMOS and PMOS transistors:

Improving the transient-fault detection sensitivity of BBICS by using triple-well CMOS technology: