AN

APPLICATION NOTE

New methods for **assessing** and **improving safety**

The problem

To develop new methods of evaluation and safety improvements for integrated circuits concernning an imaging technique that uses a laser as a heat source to face the constant progress of test and integration technologies and the spread of attacks tools that are increasingly accessible.

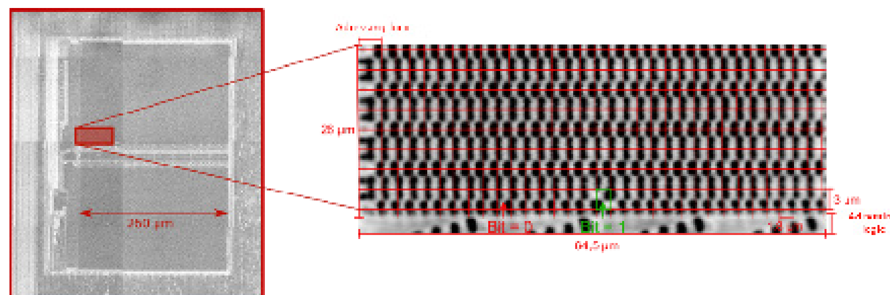
This work was carried out as part of the **ASCRIPT** project (**Safety Analysis of Integrated Circuits by PhotoThermal Effects**), in partnership with **Serma Safety & Security** and funded by the **Agence de l'Innovation de Défense**.

SERMA Safety & Security was responsible for preparing the targets, defining the attack scenarios and analyzing the results.

The solution

The TLS technique (Thermal Laser Stimulation) relies on the use of a laser beam focused on a target transistor, which generates a localized heat source. This rise in temperature leads to variations in electrical consumption of the order of a few teans of nA (nanoamps), the amplitude of which depends on the state of the transistor. Then, by scanning each transistor making up a memory, it becomes possible to retrieve its content.

The integration of a galvanometric scanner on a microscope station, combined with a laser source and software solution, reduced acquisition time by a factor of 40 and improved mechanical stability. Post-processing was simplified, eliminating the need for frequent data realignments.



Results of a TLS measurement on part of the SRAM of an MSP430 microcontroller. All the bits are set to 0 except for one (highlighted in green). This is reflected in the results by an inversion of the checkerboard pattern for this bit.

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