عنوان مقاله:

Ultra-Leaky SRAM Cells Caused by Process Variation: Detection and Leakage Suppression at System-Level

محل انتشار:

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خلاصه مقاله:

Exceptionally leaky transistors are increasingly more frequent in nano-scale technologies due to lower threshold voltage and its increased variation. Such leaky transistors may even change position with changes in the operating voltage and temperature, and hence, static physical redundancy is not sufficient to tolerate such threats to yield. We show that in SRAM cells this leakage depends on the cell value and propose a first softwarebased runtime technique that suppresses such abnormal leakages by storing safe values in the corresponding cache lines before going to standby mode. Analysis shows the performance penalty is, in the worst case, linearly dependent to the number of so-cured cache lines while the energy saving linearly increases by the time spent in standby mode. Analysis and experimental results on commercial processors confirm that the technique is viable if the standby duration is more than a small fraction of a second.

کلمات کلیدی:

Process Variation, Leakage Power, SRAM Cell, Cache, Embedded Systems, System-Level

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