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DARE180X: A 0.18 μ m mixed-signal radiation-hardened library for low-power applications

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DARE180X is a mixed-signal library solution for radiation applications implemented in the low-power 0.18 μ m commercial technology from XFAB. This set of libraries comprising core standard cells, digital and analog I/O cells, analog IP and SRAM memory blocks is currently being developed using a guard-ring shielding approach to guarantee TID tolerance higher than 100krad as well as SEL hardening up to 60MeV/cm².mg.

The DARE180X core library aims to offer good SEE hardening and low-power consumption capabilities by combining high density standard cells with SET hardened-by-drive-strength combinational cells and SEU hardened-by-design sequential cells. The DARE180X libraries also include a broad list of digital and analog I/O cells as well as several radiation-hardened analog IP blocks such as bandgap, ADC, DAC, PLL, etc.

This paper details the development of the DARE180X library and analyses its features and simulation measurements. A comprehensive comparison with the existing DARE180 library solution implemented in the UMC 0.18 μ m technology is also presented.

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