

Radiation Hardened ARM Microcontroller Module



Small Embedded Computing Platform
(Compute Module) built around SST's
radiation hardened ARM Cortex M0
processor!

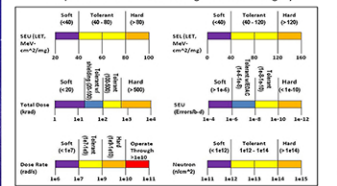
Hierarchical Reliability

Reliability built into each step

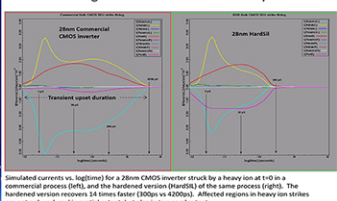
- System Design**
 - Self-contained Compute Module (CM)
 - Integration - Reliability
 - Modular
 - Testing is performed by provider (us) at a higher level of integration, relieving the system designer
- Chip Design**
 - Redundant logic (DICE, TMR)
 - 60 corners
 - Glitch filtering on critical signals
 - Configuration control through I/Os
 - Start loading with cyclic redundancy check (CRC) checking/reloading
 - Memories: EDAC, scrub, physical bit separation, write back
- Manufacturing**
 - Unique process/layout solution for T10
 - Unique process solution to prevent latchup
 - Unique process solution for SETs & SEUs (Single-Event Transients/Upsets)
- Use of scaled commercial process**
 - Enabled by latchup immunity
 - Inherits high uniformity, low defect count, high yield
 - Inherits high lifetime
 - Allows for more complex, more highly integrated circuits

Radiation Tolerance Levels

SST parts are in the "hard" range for each category

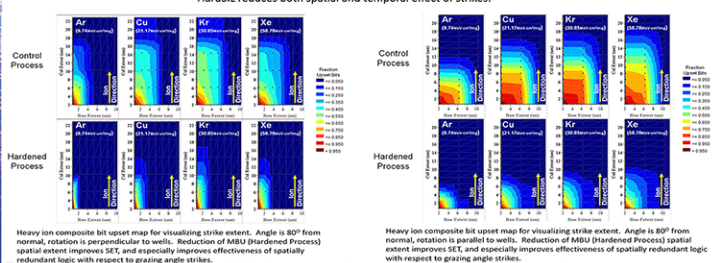


Single Event Transient Recovery



Single-Event Upset

HardSiL reduces both spatial and temporal effect of strikes.

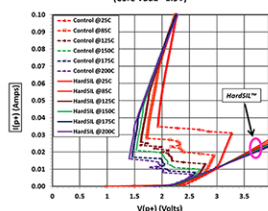


Latchup Immunity

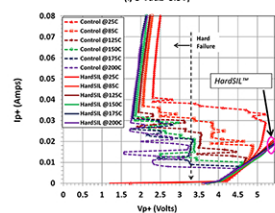
- All attempts to induce latchup or single event latchup have failed.
- Memories have been tested with effective LETs ranging up to 117MeV-cm²/mg.
- The 16Mb SRAM, notably, did not latch under the following set of concurrent challenging conditions:
 - 110% overvoltage
 - Temperature = 150°C
 - Effective LET = 117MeV-cm²/mg
 - 50° angle (rotations of 0° and 90°)
 - All of the above, simultaneously
- HardSiL™ prevents latchup through large increase in trigger current, and by increasing holding voltage to greater than the supply voltage.

Measured Latchup Trigger vs Temperature

(Core Vdd1 = 1.5V)



(I/O Vdd2 = 3.3V)



Compute Module

Compute Module



Cleanroom



SatCOM Room



Satellite test Facility

The Configurable Space Microsystems Innovations and Applications Center (COSMIAC) provide a complete satellite development, testing, and integration capability for Small Satellite Missions

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