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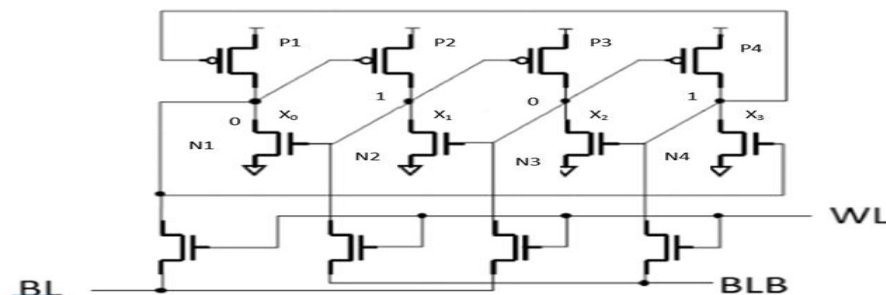
**Title of the circuit:** 12 Transistor DICE SRAM circuit to withstand Ionizing Radiation.

**Theory/Description:** The Dual Interlocked Storage Cell (DICE) is a radiation-hardened memory circuit that improves immunity to soft errors using design-level redundancy. A single bit is stored across four interlocked nodes formed by twelve CMOS transistors. If a radiation-induced transient disturbs one node, the other nodes restore the correct value through self-correction, preventing bit flips below a critical threshold.

**Expected Outcome/outputs:**

- The circuit should store a stable logic '0' or '1' and behave as a typical SRAM.
- When a current pulse is injected on sensitive nodes, the node voltages deviate momentarily and then self-restore or return to their previous logic level.

**Circuit Diagram:**



**Expected Results:** Transient radiation pulse affected waveforms of X0, X1, X2, X3 nodes. Bit Line pulse is opposite of Bit Line Bar; Word line is identical. When X0 (red) has 400mA pulse, X3 (yellow) should fall from 1.8 V to nearly zero then return to original Voltage level.



**Research Paper/Journal/etc. :**

**Title :** Capability of DICE Circuit to Withstand Ionizing Radiations

**Author :** Neha Pannu, Neelam Rup Prakash

**Page No. :** Wireless Personal Communications (2021) 121: 2779–2787

**Link :** <https://link.springer.com/article/10.1007/s11277-021-08848-8>