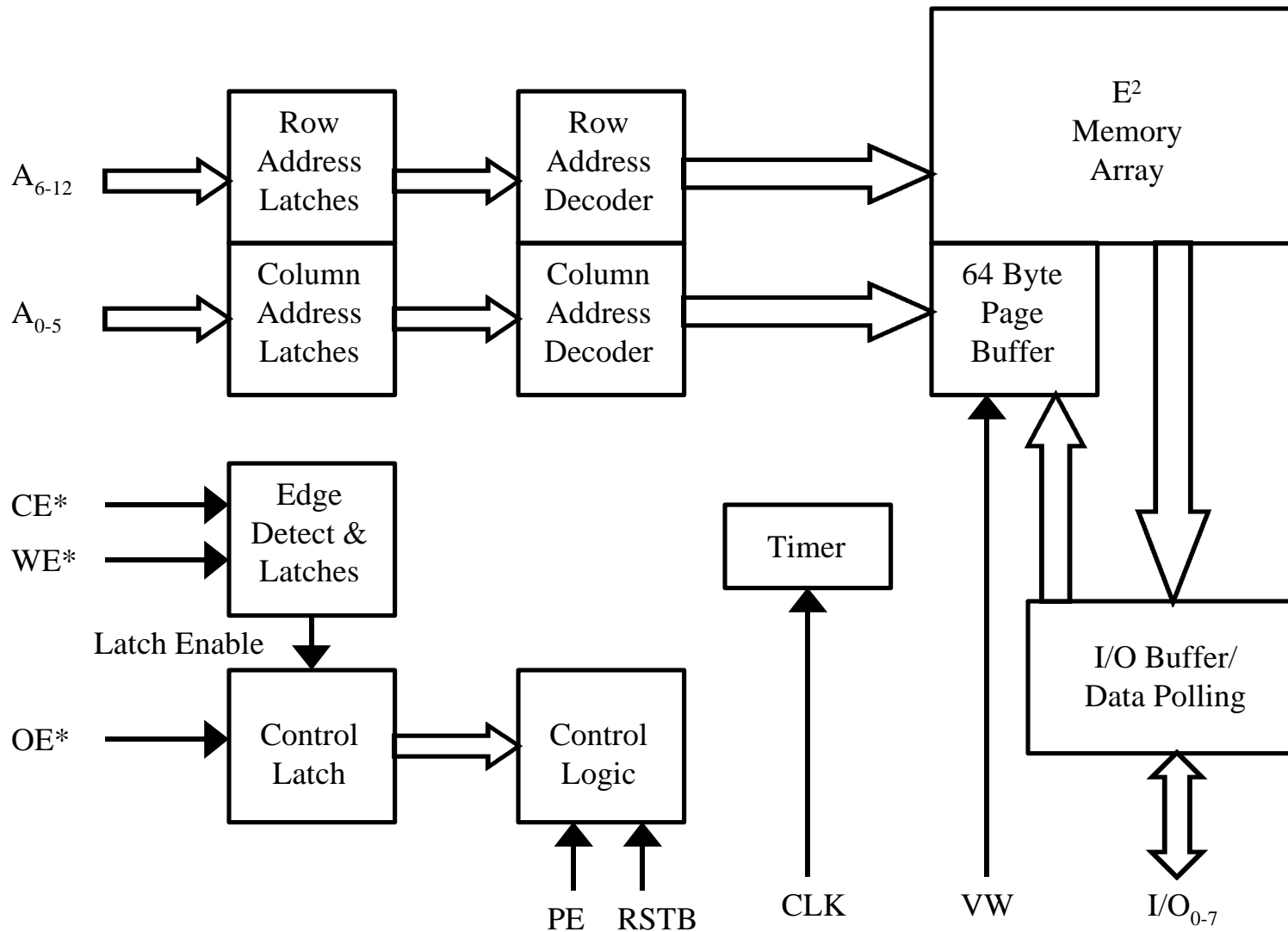


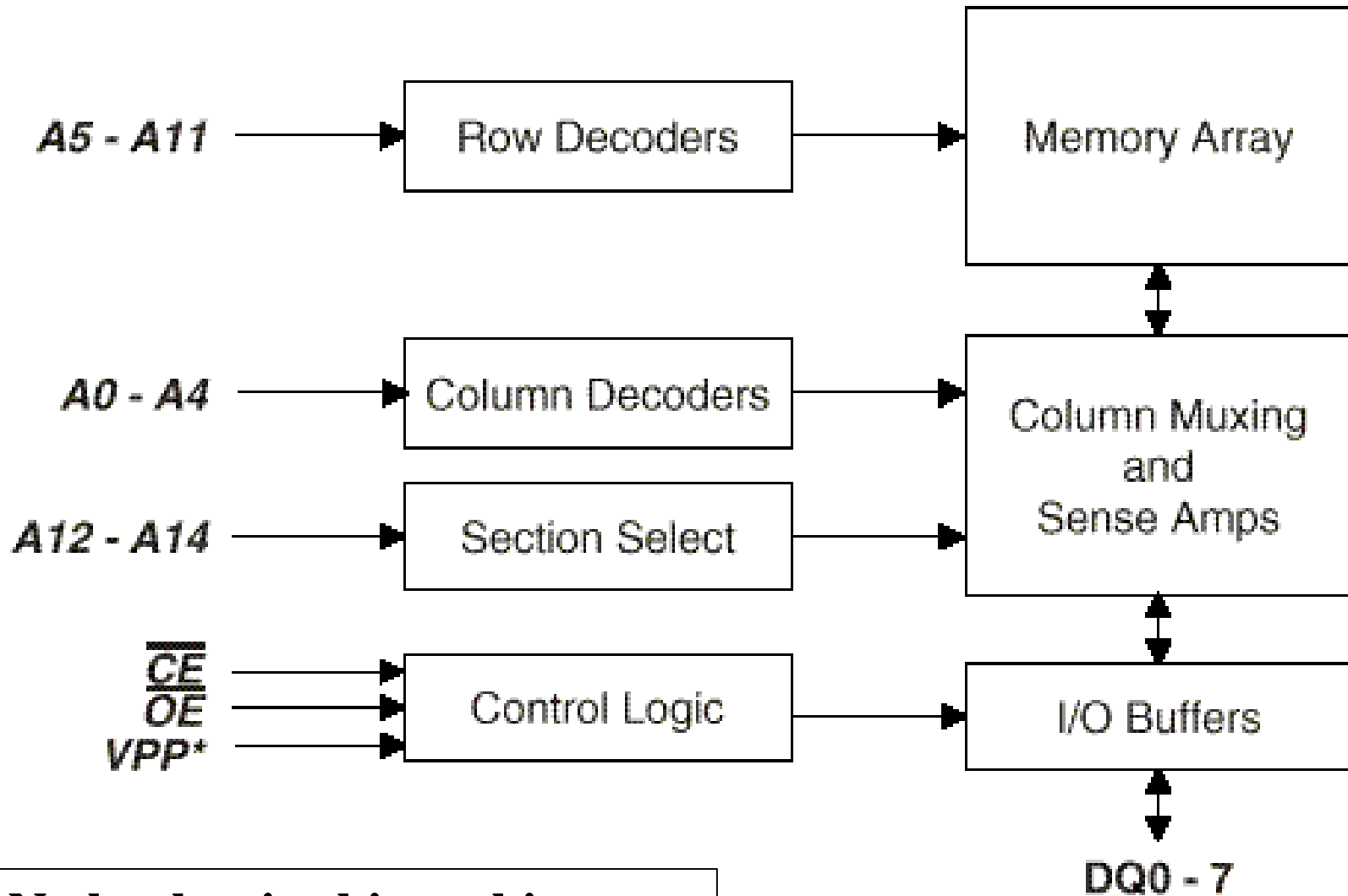
Memory Architecture and Performance

W28C64 EEPROM

Simplified Block Diagram



Rad-Hard PROM Architecture



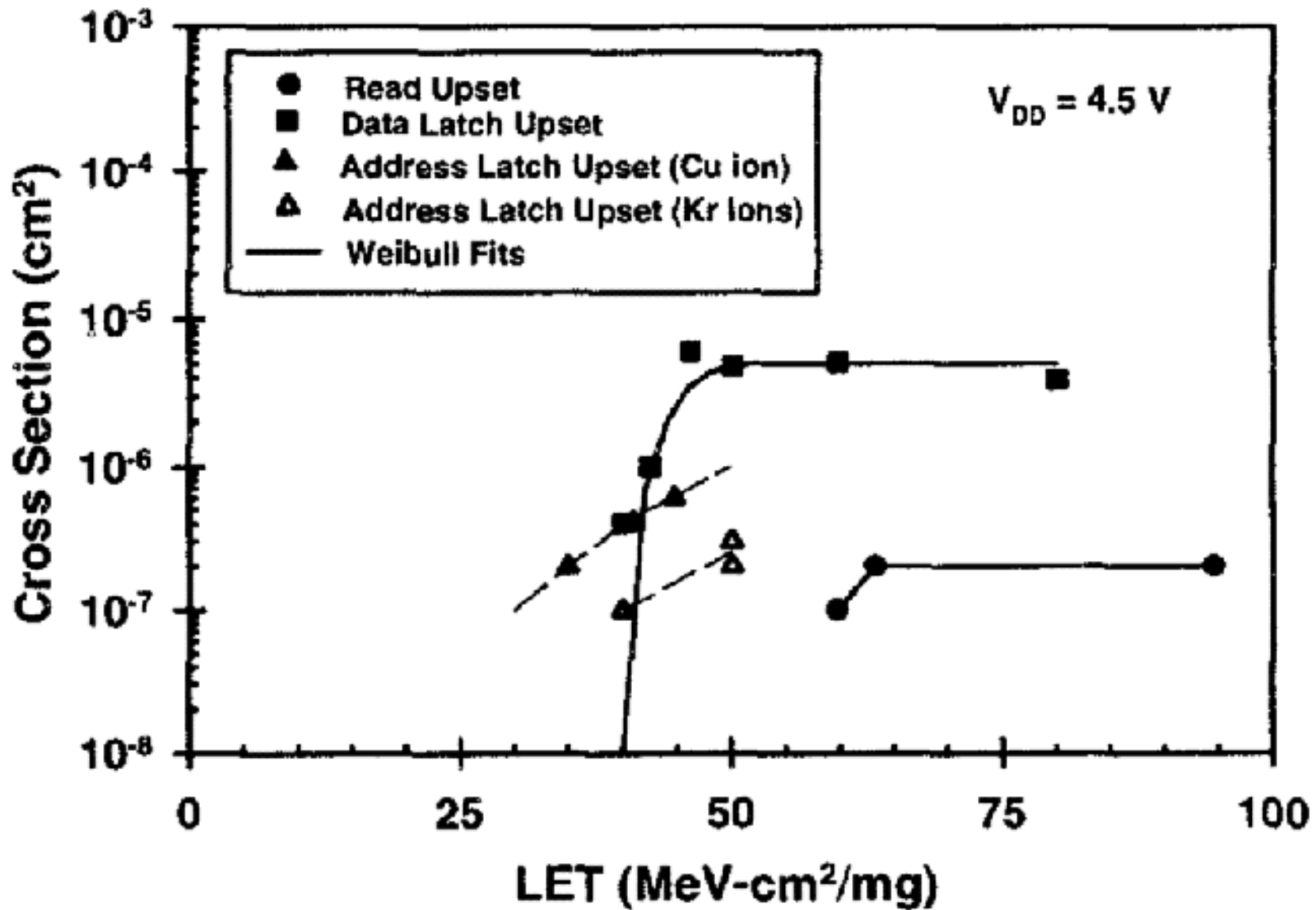
No latches in this architecture

W28C64 8k x 8 EEPROM

Key Characteristics

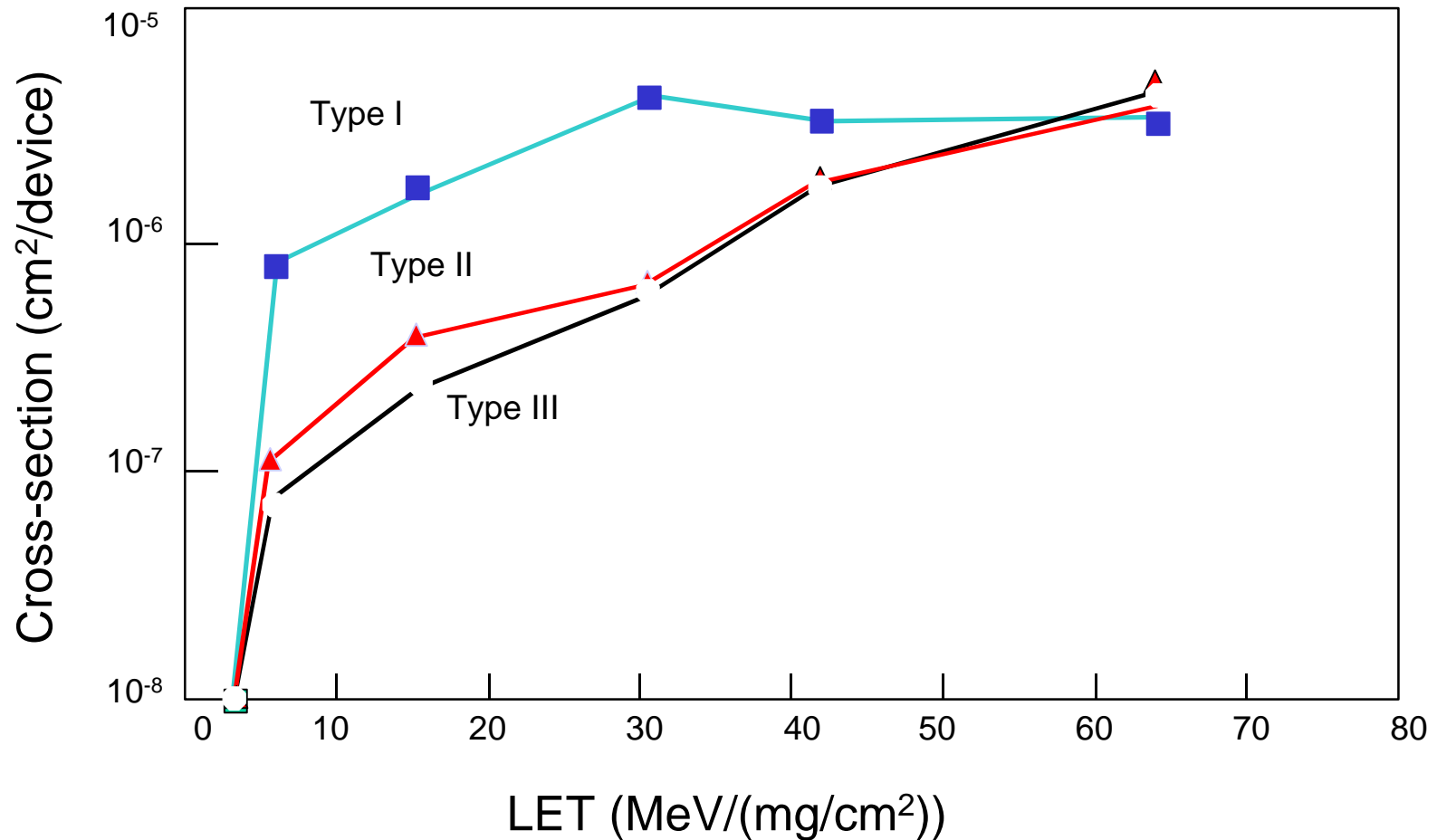
- 300 krad(Si) - refresh every 100 krad(Si)
- Programmable Element: SONOS
 - Silicon-Oxide-Nitride-Oxide-Silicon
- SEU
 - 60 MeV-cm²/mg (Read)
 - 35 MeV-cm²/mg (Address/Data Latches)
 - Damage during write, Atomic Number \geq Krypton
- External Clock (2 MHz) and Write Voltage (-5 V)
- Retention 10 years (may be refreshed - this is simplified)
- Durability (write cycles)
 - 10,000 cycles, 0 to 50 krad(Si)
 - 1,000 cycles, 50 to 100 krad(Si)
- Write cycle time = 10 ms; Access time = 250 ns

W28C64 8k x 8 EEPROM

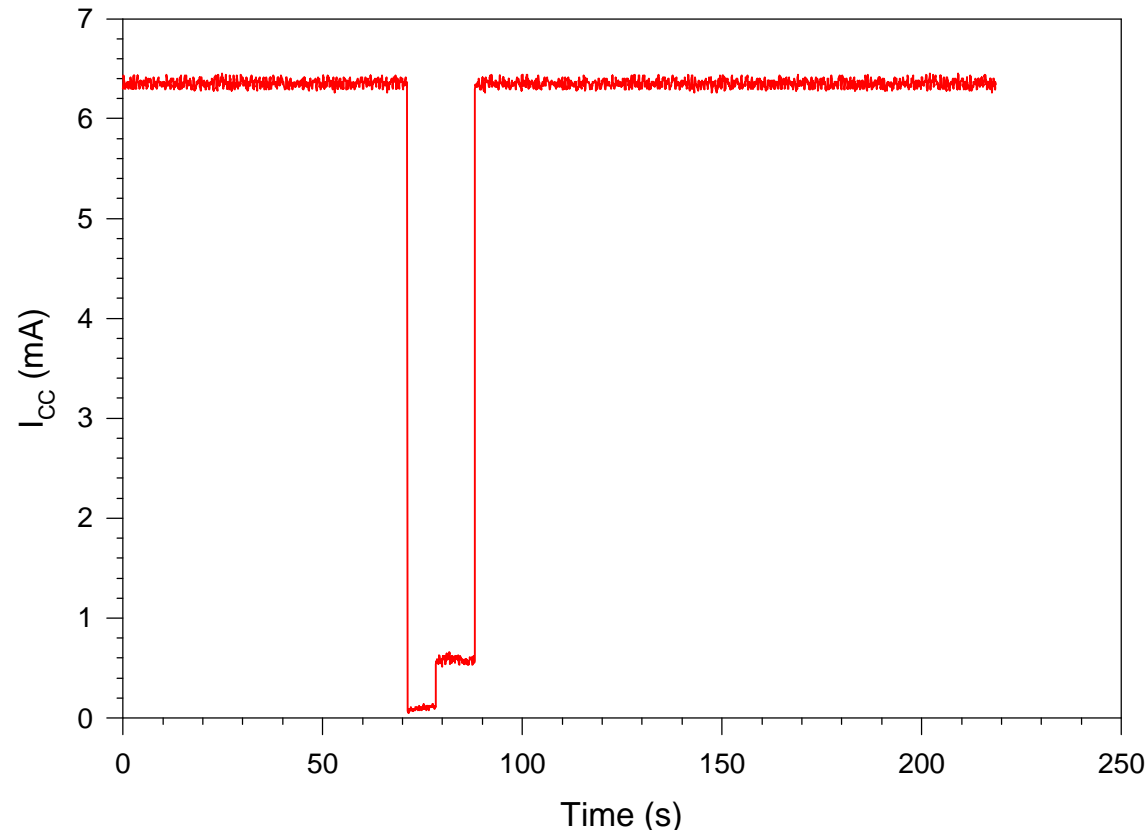


SEE Results - Loss of Functionality

Atmel AT28C010 EEPROM, D/ C 9706

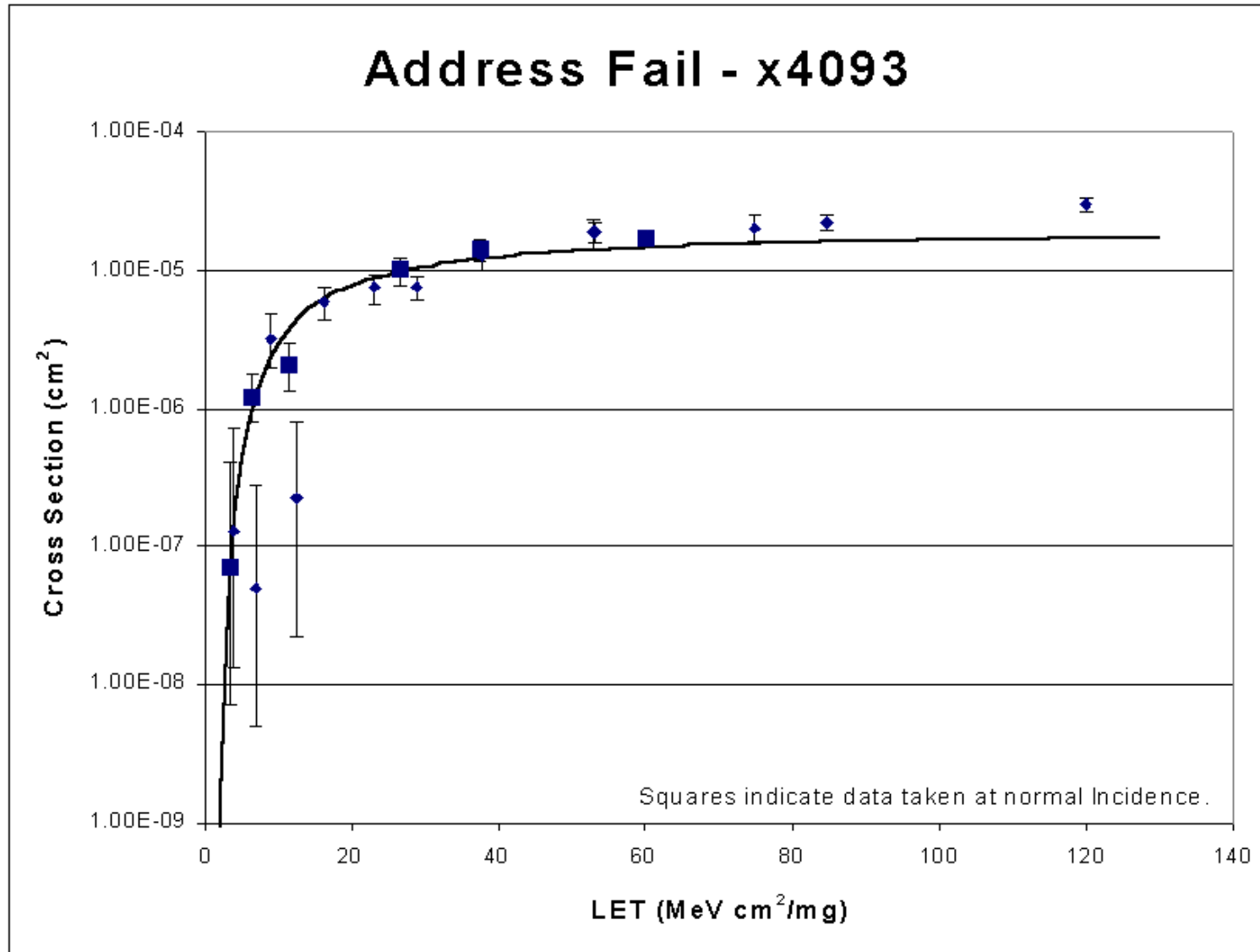


FRAM Memory Functionality Loss During Heavy Ion Test

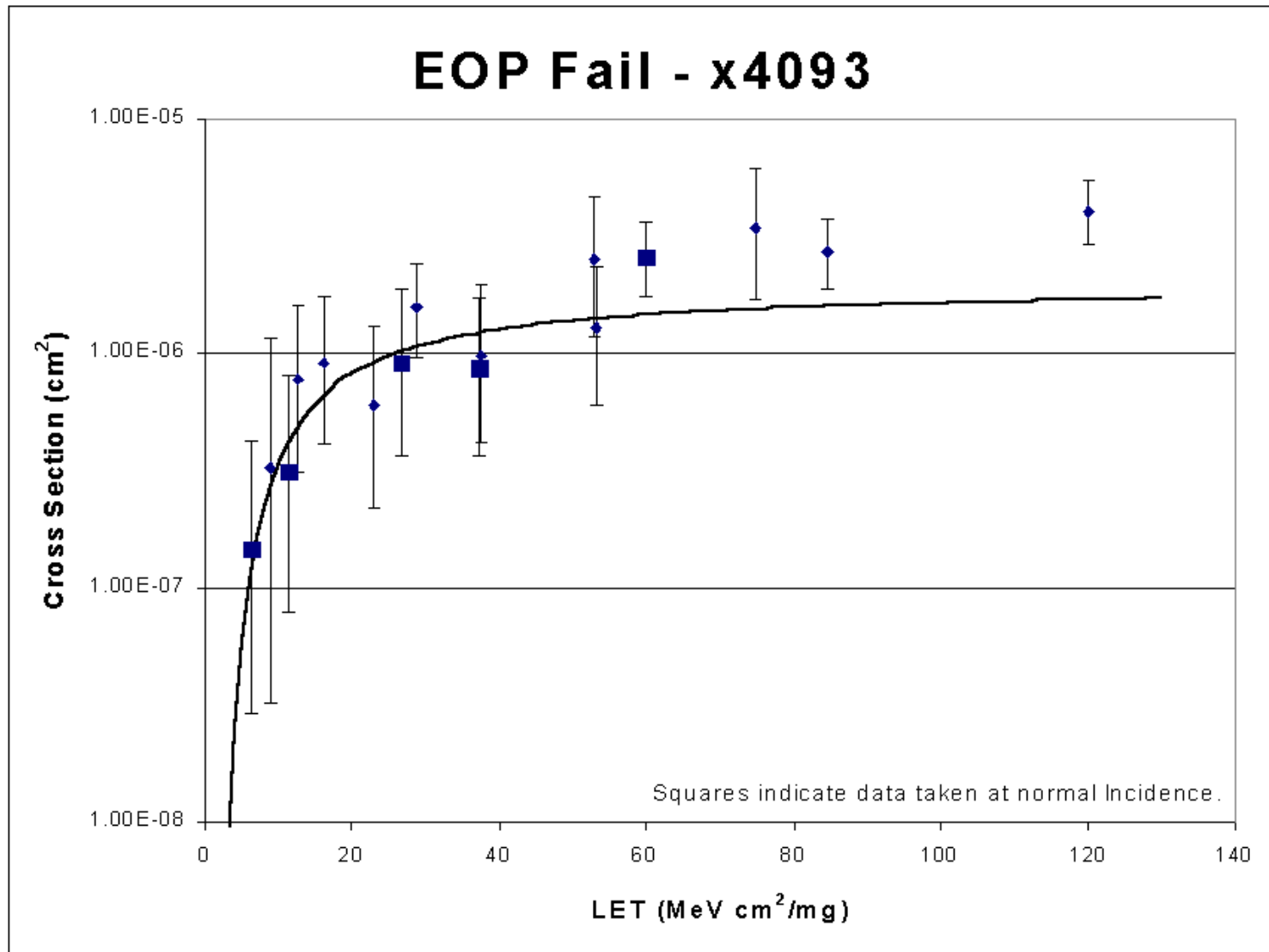


Strip chart of FM1608 (research fab) current during heavy ion irradiation. The device lost functionality during the test while the current decreased from it's normal dynamic levels of approximately 6.3 mA to it's quiescent value, near zero. The device recovered functionally and operated normally throughout the latter part of the test. This effect was seen at least three times during the limited testing of this device.

1701 Heavy Ion Results (1 of 3)



1701 Heavy Ion Results (2 of 3)



1701 Heavy Ion Results (3 of 3)

