Introduction

Studies discussed herein were undertaken to determine the effects of high-energy particles on semiconductor devices. The goal was to investigate the response of electronic parts and packaging to spaceflight environments, which includes exposure to heavy ions and neutrons. Interpreting the results of these tests is crucial for understanding the reliability of spaceflight applications.

List of Acronyms

- LDR: Linear Detector Response
- LET: Linear Energy Transfer
- SEU: Single Event Upset
- SEFI: Single Event Functional Interrupt
- SET: Single Event Transient
- SEU: Single Event Effect
- TED: Total Ionizing Dose
- TID: Total Ionizing Dose

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List of Wafer Numbers

- Wafer # 1
- Wafer # 2
- Wafer # 3
- Wafer # 4
- Wafer # 5
- Wafer # 6
- Wafer # 7
- Wafer # 8
- Wafer # 9
- Wafer # 10

Function

- Amplifier
- MOSFET
- Schottky Diode
- Diode
- NAND

Electronic Parts and Packaging (NEP P) Program, NASA Flight Projects, University of California at Davis (UCD) Crocker Nuclear Laboratory, Panasonic, Fuji, Anthony Engineering, and other organizations.

Test Results

- Onset LET for block errors is approximately 5 MeV cm²/mg.
- SEU and SEFI were observed down to LET values of 1.5 MeV cm²/mg.
- SET cross sections are shown in Fig. 1. SET cross sections are typically around 10⁻⁹ cm²/device at LET values of 3 MeV cm²/mg.

References