

Summary Radiation Test Report

Part Type : 1 Megabit PROM

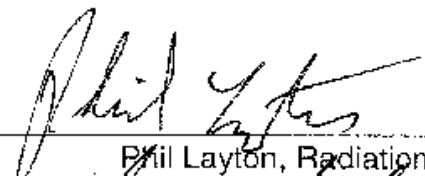
Manufacturer : Hitachi

Die Part No. : HN27C101A


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Analysis By: 
Phil Layton, Radiation Scientist

Date: 8/16/02

Management: 
Larry Longden, Sr. Director R&D

Date: 8/16/02

QA: 
Dean Hulett, Quality Assurance

Date: 8/16/02



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I. Purpose

This report presents a summary of radiation data on the Hitachi HC27C101A 1 Meg (128k x 8 bit) PROM die used in Maxwell's 256k, 512k and 1 Meg PROM products. Maxwell Technologies part numbers covered by the report include: 27C256T, 27C1512T, 27C512T and 27C010T. Single Event and Total Dose data summarized are from various sources.

II. Data Summary

Single Event Effects

ESA January March 1995.

ESA performed heavy ion and total dose testing of the PROM in 1993 and 1994. The internal ESTAC working paper No. 1859 by R Harboe-Srensen and R Muller describes the results of those tests. The proms were programmed prior to testing and checked in the read mode. Following testing the functionality and memory was checked. The testing was performed at Brookhaven National Laboratories Tandem Van de Graaff accelerator. The highest LET level for Single Event testing use was ^{197}Au ions at 341 MeV and a fluence of 5.0 E6 ions/cm². No Single Event Latchups (SEL) or Single Event Upsets (SEU) were seen up to the maximum tested LET of 81.8 MeV-cm²/mg. One transient was seen at 81.8 MeV-cm²/mg and one at 59.7 MeV-cm²/mg with cross-sections of 1E-7 cm² and 2E-7 cm², respectively.

Total Ionizing Dose (TID)

ESA March 1995

In the same paper described above, ESA performed testing at the ESTEC GammaBEAM 150C Co-60 facility at a dose rate of between 0.9 and 2.2 krad(Si)/hour between 1992 and 1994. Four devices were tested with the lowest functional failure occurring between 14.2 and 14.6 krad(Si). The parts started exceeding ICC specifications at 7 krad(Si).

Maxwell, 2001

Die lot D70088 was tested from May 23 to June 15, 2001 at 0.0166 rad(Si)/sec. Seven devices were tested with 2 controls and 5 devices under irradiation. The parts were tested to 6 krad(Si), 11.2 krad(Si), 15.4 krad(Si), and 18 krad(Si). All devices passed functionally and parametrically up to 11.2 krad(Si). At 15.4 krad(Si), two devices (serial numbers 2 and 3) exceeded specifications for VCC standby current and device number 3 exceeded TCE. At 18 krad(Si) all five irradiated DUTs exceeded parametric specification (either TCE or VCC standby current) and 3 parts failed functionally. Rebound testing after 18 krad(Si) shows no Time Dependent Effects (TDE) at this level.

III. Conclusion

The PROM has SEL and SEU thresholds greater than 81.8 MeV-cm²/mg. The PROM fails functionally between the total dose levels of 15.4 krad(Si) and 18 krad(Si). The PROM experiences parametric failures between the total dose levels of 11.2 krad(Si) and 15.4 krad(Si).