

Radiation Pre-Evaluation of FPGA

ESTEC Contract No. 11407/95/NL/MV, CCN-3, COO-4

TID Radiation Evaluation of Power-up behaviour of Xilinx FPGA XQVR300

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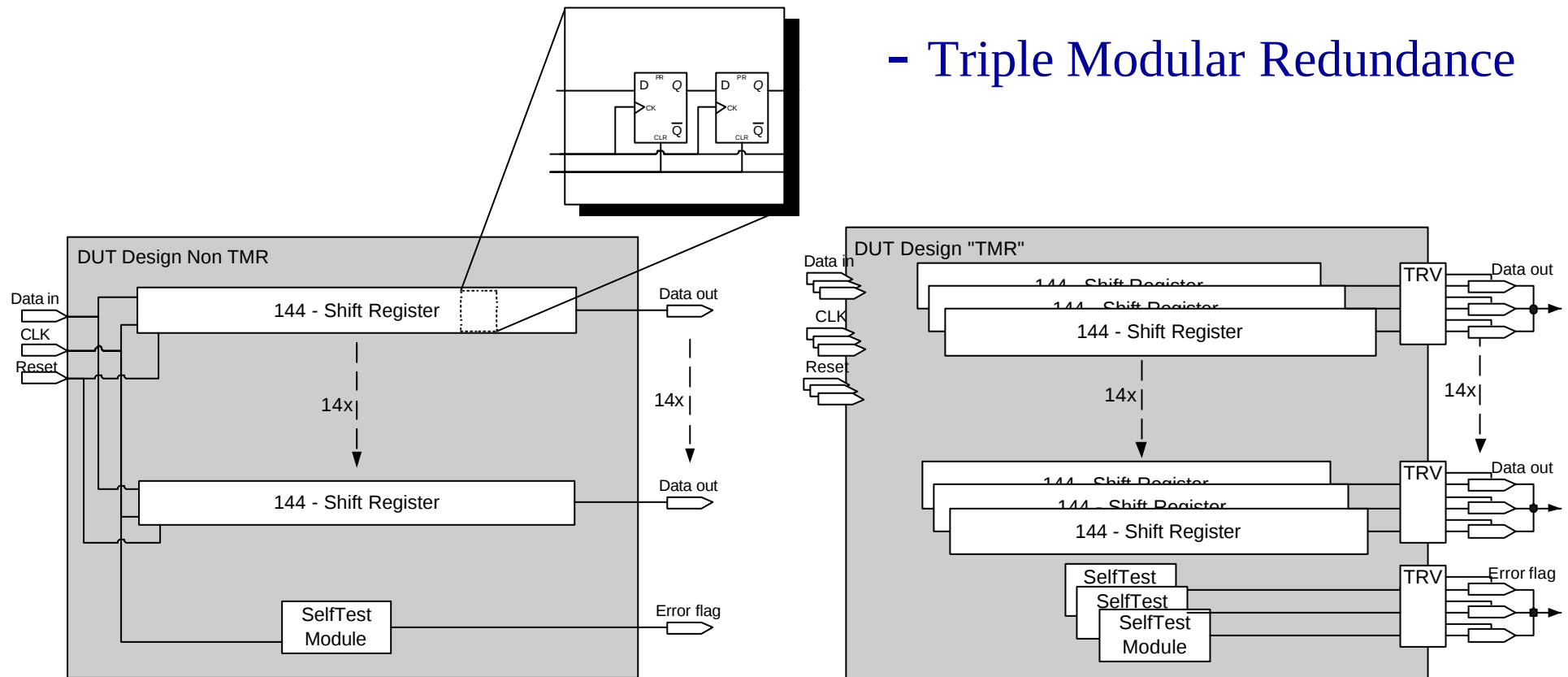
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SEE test on Xilinx Devices

Non Redundant

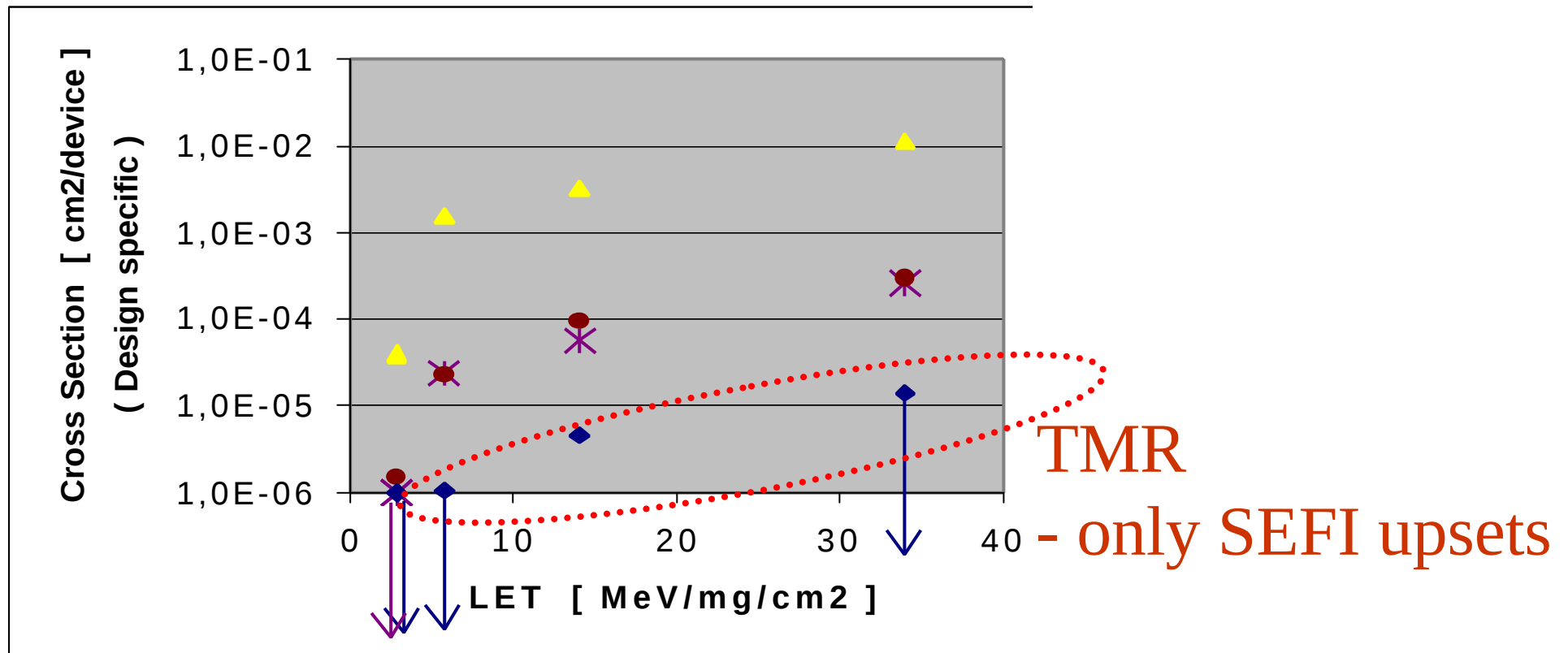
TMR

- Triple Modular Redundance



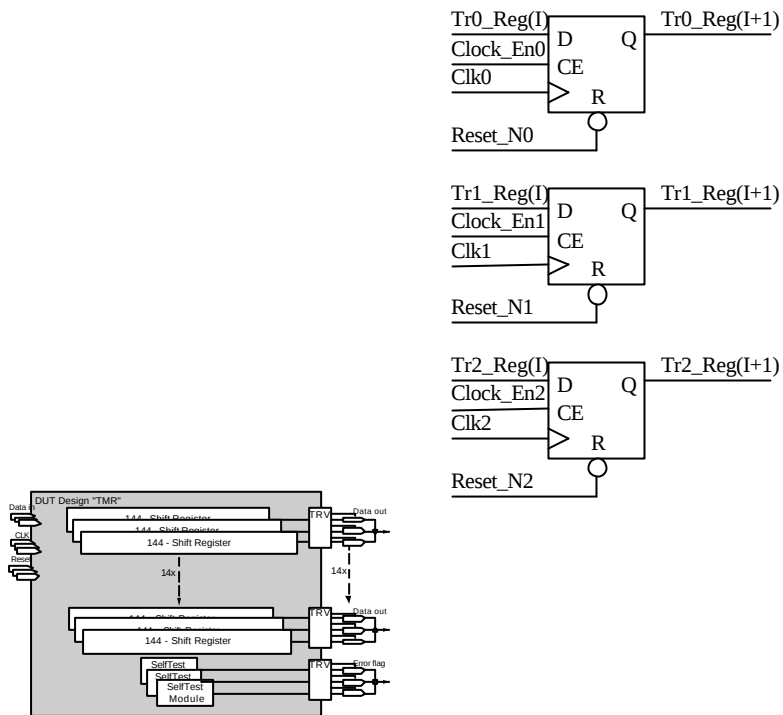
SEE Results

Non Redundant vs TMR

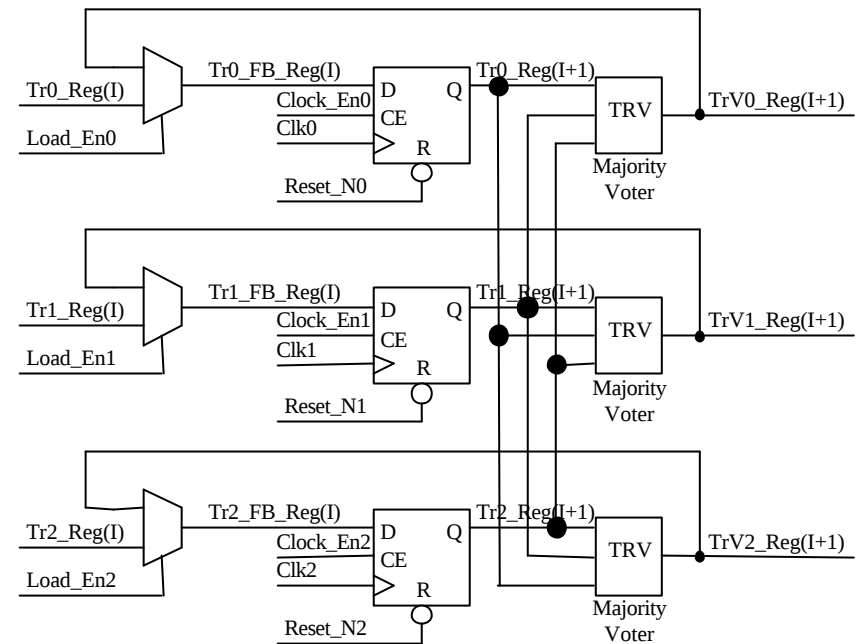


SEE test on New Design

TMR



TMR with Feedback

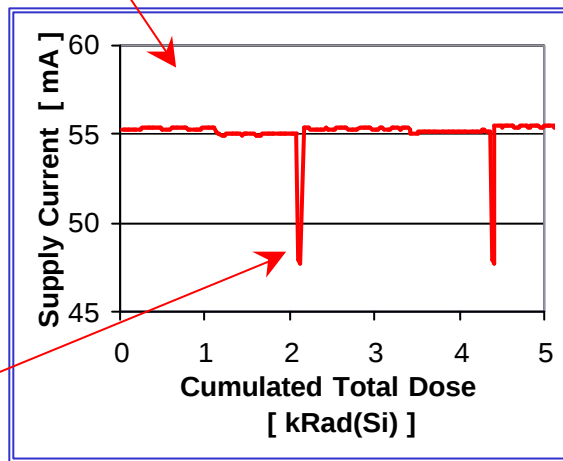


Failed at Cf-252 tests

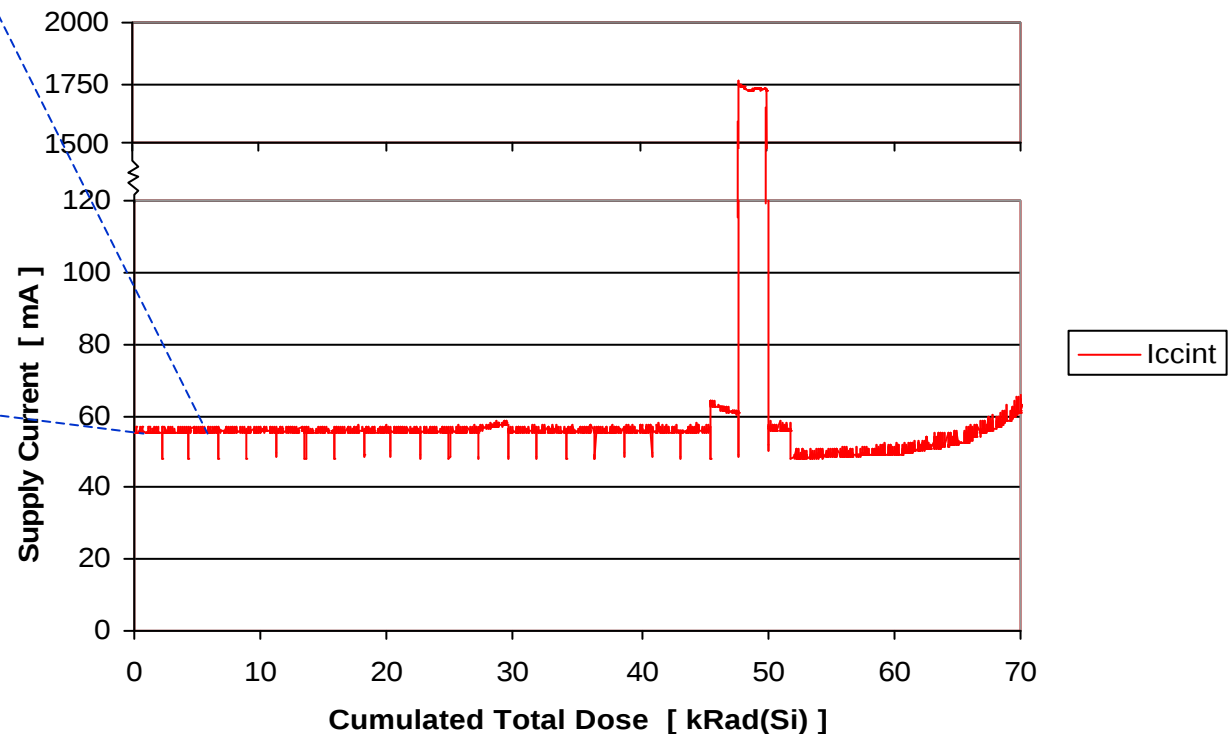


Total Ionizing Dose Test

1 MHz Dynamic Operation



Xilinx tests ~100 krad



- Standby Current Measurement
- Power Off/On
- Function Test



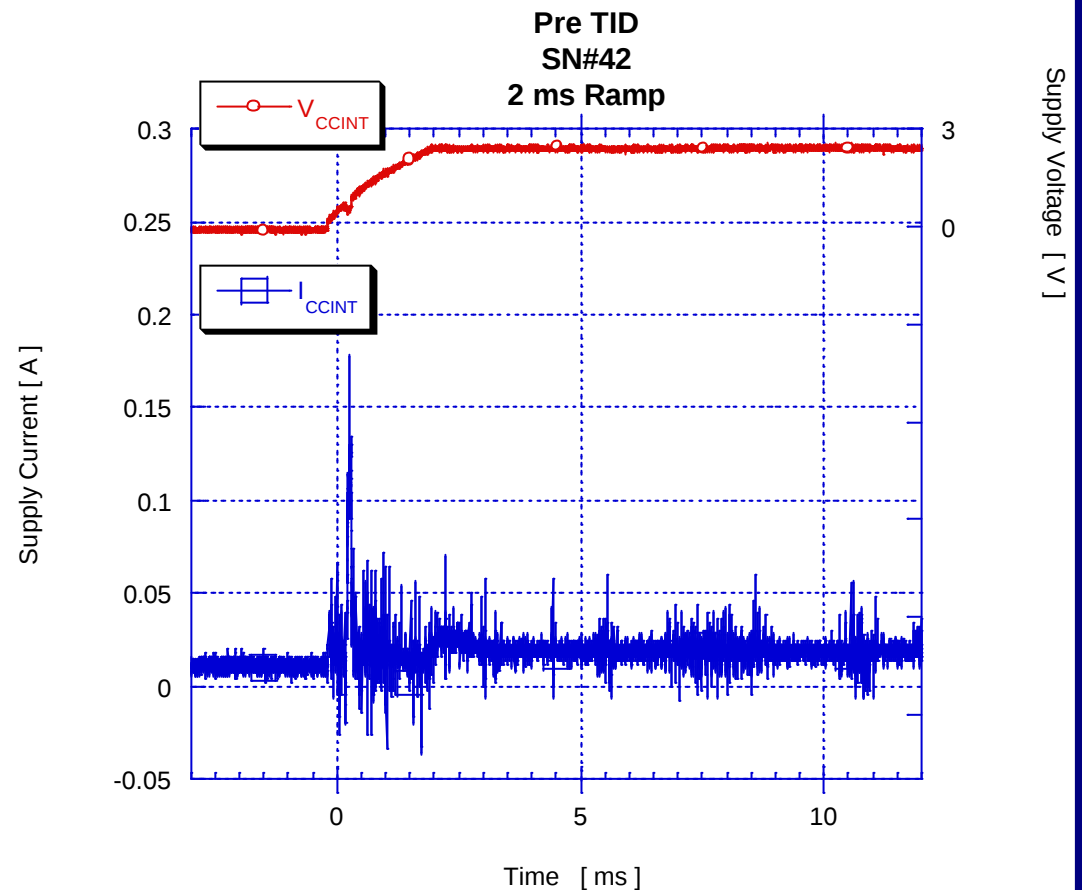
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New TID test study

Power-up behaviour

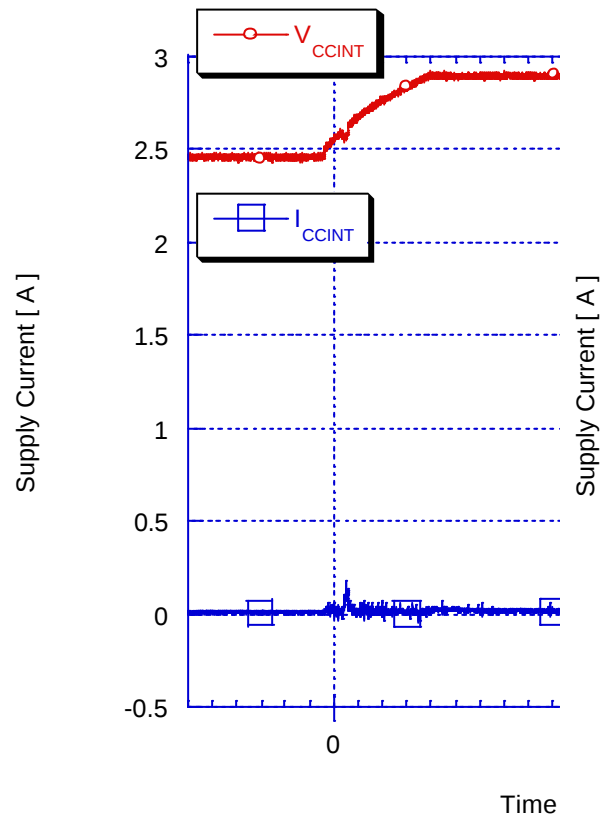
Xilinx FPGAs:

- Power-up ramp 2-50ms
- Up to 2 Ampere Transient

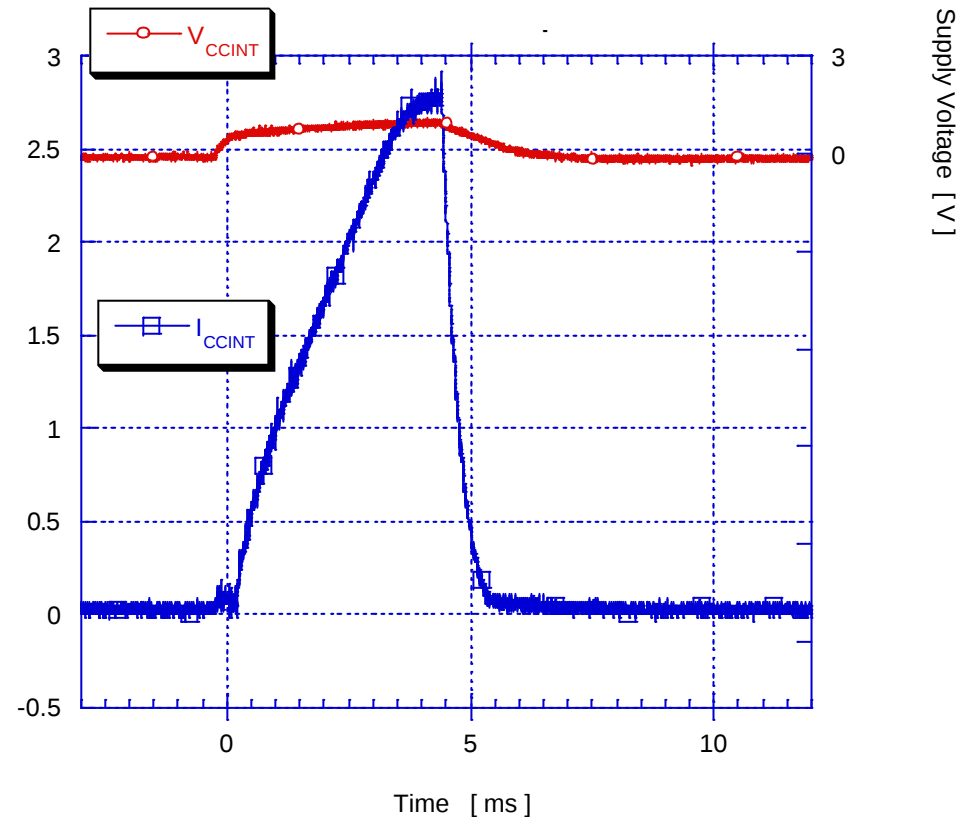


Results for Power-up behaviour

Pre-Irradiation



45 krad



Summary

- 6 Samples tested
 - All failed before 50 krad in the Power-up
- No other parameters failed before 80 krad
- Xilinx TID test claims 100 krad
 - No power-cycling
 - In Non-operation during irradiation
 - Un-biased I/Os

