

Summary of Proton Test on
the Quick Logic QL3025 at
Indiana University

June, 1998

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Test Facility

A pAsic3 QL3025 was tested at the Indiana University Cyclotron Facility (IUCF). The proton energy was ~ 193 MeV and the flux was set at approximately 1×10^9 p/cm²/sec. The total fluence for the run was 5.12×10^{11} p/cm² corresponding to a total dose of 32.1 kRads (Si). The device was irradiated normal to the beam.

Device Under Test

The device was in a PQFP208 package and was active during irradiation. Upsets and currents were monitored in real-time with the device active at 1 MHz. The stimulation pattern was a 500 kHz square wave. Both internal hard-wired flip-flops and I/O module flip-flops were tested. This pattern contains 500 internal flip-flops with 300 in a TMR configuration and 200 in a shift register. 50 I/O module flip-flops were tested.

Test Results

No upsets were detected for this one sample, consistent with our quick-look heavy ion data, taken at an LET of 18.8 MeV-cm²/mg. The total fluence for the heavy ion data was limited and complicated by the device's latchup characteristics. No evidence of latchup or any unusual current disturbances were observed.

The device showed a moderate increase in current at approximately 20 kRads (Si) and a current runaway at approximately 31 kRads (Si). This is thought to be a consequence of a charge pump failure. The total dose data, shown in the chart below, is comparable to our Cobalt-60 data where the device exhibited runaway at approximately 37 kRads (Si), while dosed at the relatively low rate of 0.5 kRads (Si)/hour in a static configuration. Dose rate during the proton irradiation was at the much higher rate of ~ 247 kRads (Si)/hour.

**QL3025 Proton Irradiation
S/N QL6
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Indiana University Cyclotron
NASA/GSFC**

