Test Report V1
Heavy Ion Single Event Transient (SET) Testing of the MSK5820-1.8KRH Radiation Hardened Ultra Low Drop Out Fixed Positive Linear Voltage Regulator

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I. Introduction

The MSK5820-1.8KRH is a hybrid integrated circuit fixed voltage regulator, which contains controller circuitry that governs a power PNP bipolar transistor. The controller circuitry, manufactured by Linear Technology, is the RH1573K low dropout PNP regulator driver. It uses the same mask set as the LT1573, but has a different passivation. The regulator has been tested at Texas A&M University Cyclotron Single Event Effects Test Facility. Two devices were tested for SEE.

II. Devices to Be Tested

The MSK5820-1.8RH devices were packaged by MSKennedy Corp. They are hybrid devices with active components fabricated in both Bipolar and CMOS processes. All devices were characterized prior to exposure. The two devices tested are from the 1014 Lot Date Code (LDC). Complete package markings for the devices are:

MSK
5820-1.8KRHD
5962F0921610KZA
QML 1014 BeO
1269
Δ 51651 USA

Table 1: Packaging information

These are all 5-pin single inline package. The actual devices are shown in the Figure 1.

Product Datasheet: MSK5820-1.8KRH.pdf

III. Test Facility

Facility:
Texas A&M University Cyclotron Facility (TAMU)

Total Testing Time:

4 hours (TAMU)

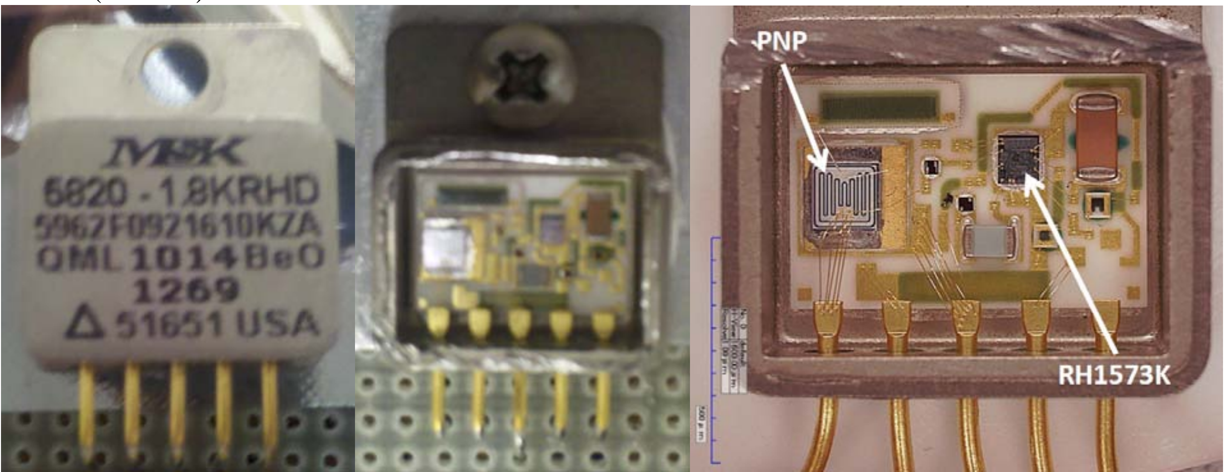

Figure 1: Device at NRL (left/center, TAMU similar setup) and internal structure (right, courtesy of J. Pellish)

IV. Test Methods

Temperature:
Room temperature

Test Voltages:

Test Hardware:
The block diagram shown in Figure 2 shows the test setup that was used to test this part for SET testing.

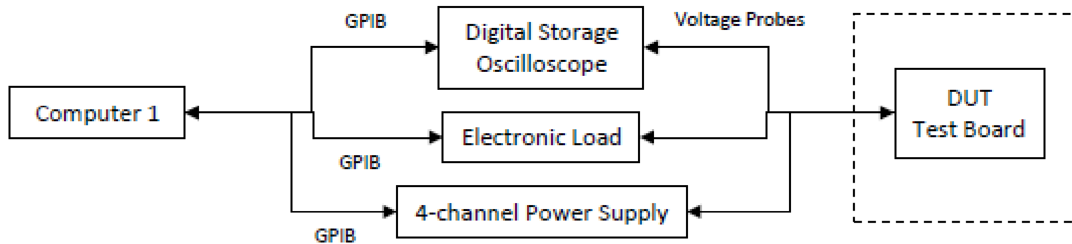

Figure 2: Block diagram of test setup where the dashed line represents the components exposed to the heavy-ion beam.

V. Test Results

Single Event Transients – The only SEE seen throughout the TAMU testing done were transients on the output of the device.

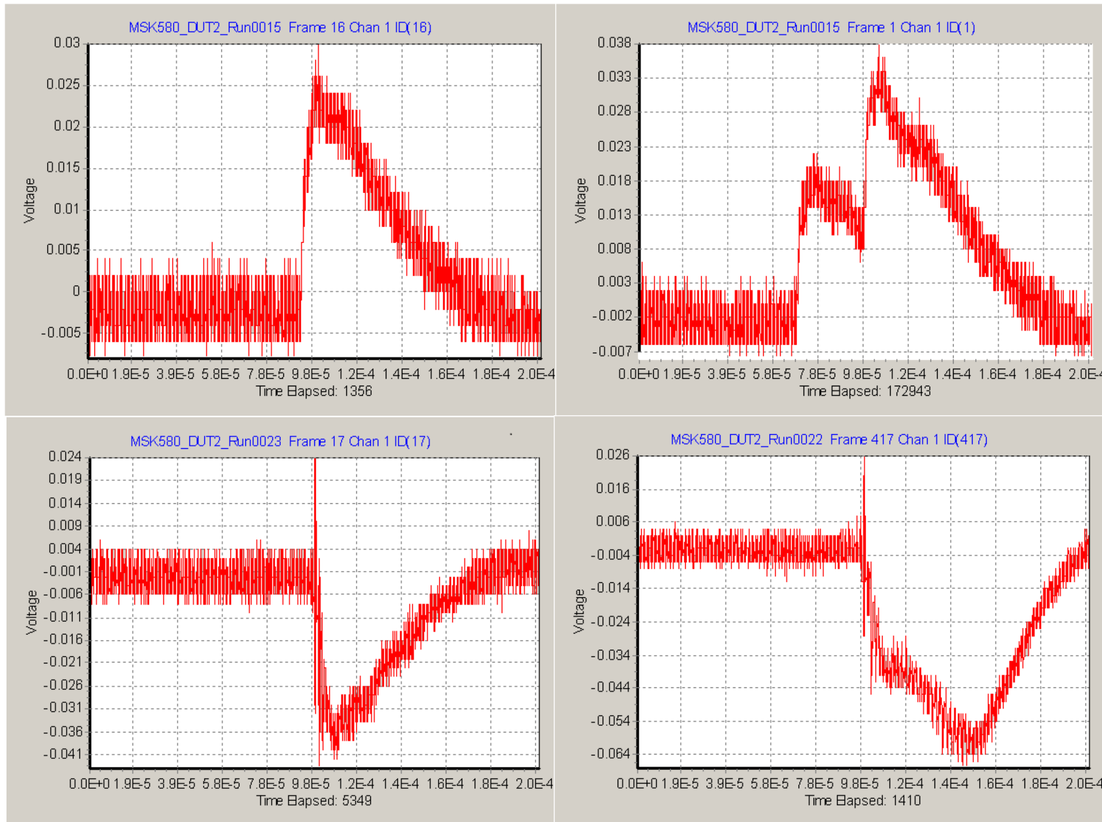

Figure 3: Typical SETs (positive and negative going) where the unexpected voltage output was not the expected value.

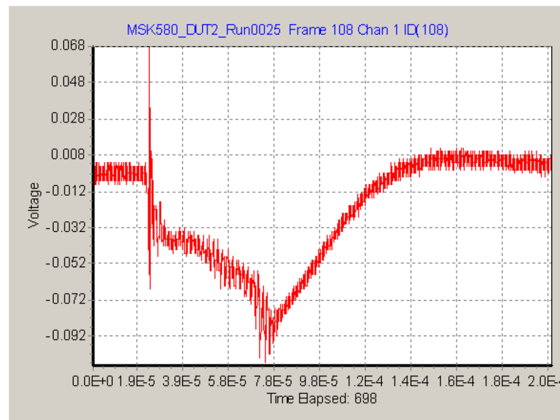

Figure 4: Worst Case SETs (negative going)

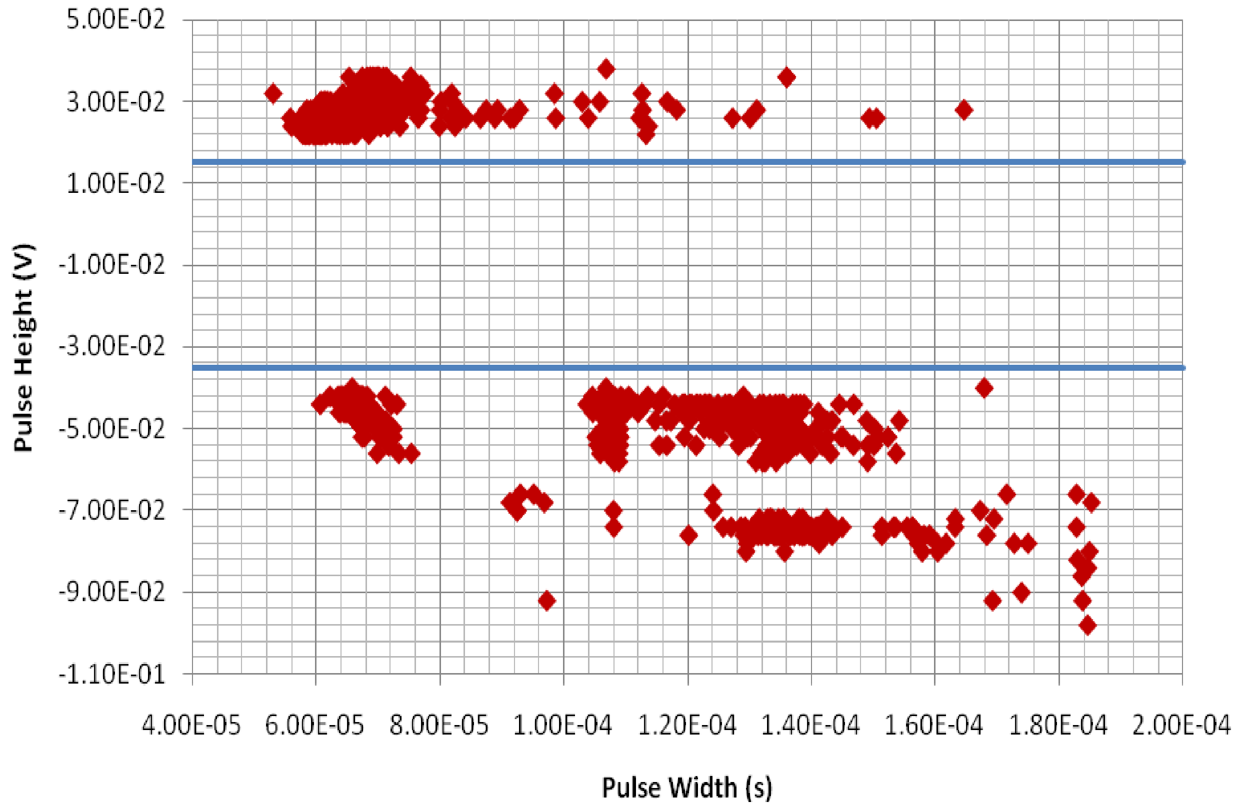

Figure 5: Pulse Height vs. Pulse Width for all testing

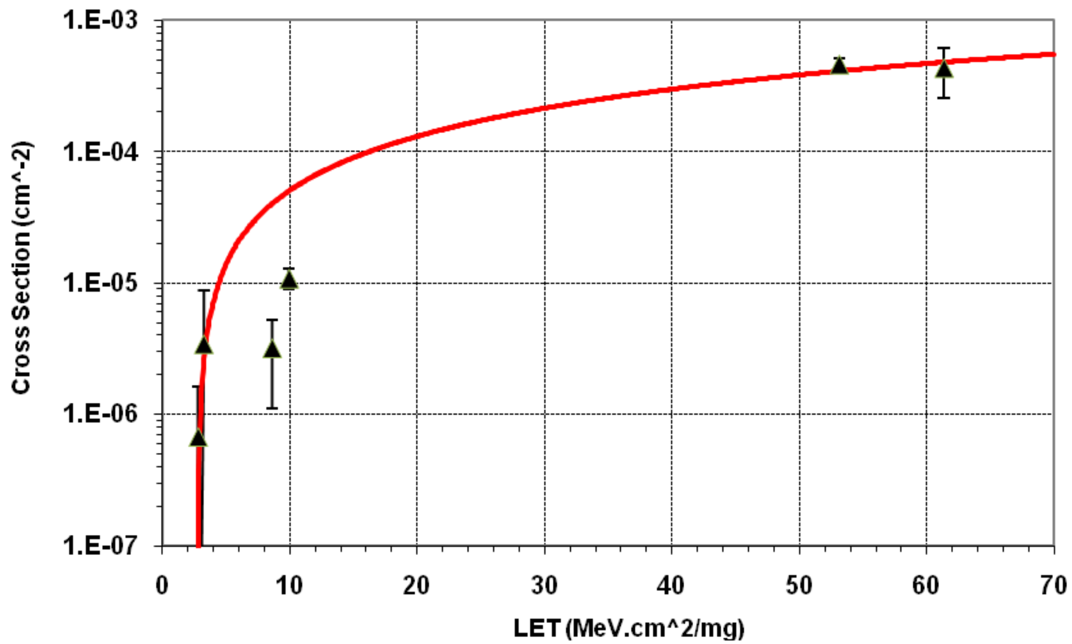

Figure 6: Device Cross Section with Weibull fit

VI. Result Synopsis