ISL7119RH

SEE Testing

TR001
Rev.0.00
September 23, 2014

Description

SEE testing of the ISL7119RH was performed at Texas A&M University (TAMU) March 8, 2010. This report provides a brief summary of the results. These tests were carried out to determine SEL/SEB susceptibility and to assess the basic SET characteristics of the part. They were not intended to provide an exhaustive characterization of the part.

SEE Test Results

Single-Event Latch-Up and Single-Event Breakdown

No latch-up or breakdown was observed up to an LET of 108MeV.cm^2/mg at +125°C with V_{DD} = ±18V.

Single-Event Transient Performance

First, SET tests were performed to a fluence of 2 x 10^6 cm^{-2} with a comparator input overdrive of 0.1V at +25°C and ±15V supplies. The input overdrive (OD) is defined as the differential input voltage applied to the comparator. The SET rate for a given LET is expected to be a direct function of the input OD. For test purposes, the definition of SET was a rising transient in excess of 0.8V or a falling transient in excess of 4.6V.

- LET of 86.4MeV.cm^2/mg . . . . . ~420 SET events
- LET of 42.8MeV.cm^2/mg . . . . . ~215 SET events
- LET of 16.8MeV.cm^2/mg . . . . . ~120 SET events
- LET of 8.4MeV.cm^2/mg . . . . . ~15 SET events

Next, SET tests were performed to a fluence of 2 x 10^6 cm^{-2} with a comparator input overdrive (OD) of 0.7V at +25°C and ±15V supplies. The definition of SET again was a rising transient in excess of 0.8V or a falling transient in excess of 4.6V.

- LET of 42.8MeV.cm^2/mg . . . . . ~20 SET events
- LET of 16.8MeV.cm^2/mg . . . . . ~0 SET events
- LET of 8.4MeV.cm^2/mg . . . . . ~0 SET events

Figures 1 through 3 show representative SET waveforms at an LET of 42.84MeV.cm^2/mg, with an approximate pulse width of 5µs. This SET event vs. LET data was then plotted in a cross section vs. LET curve, see Figure 4.

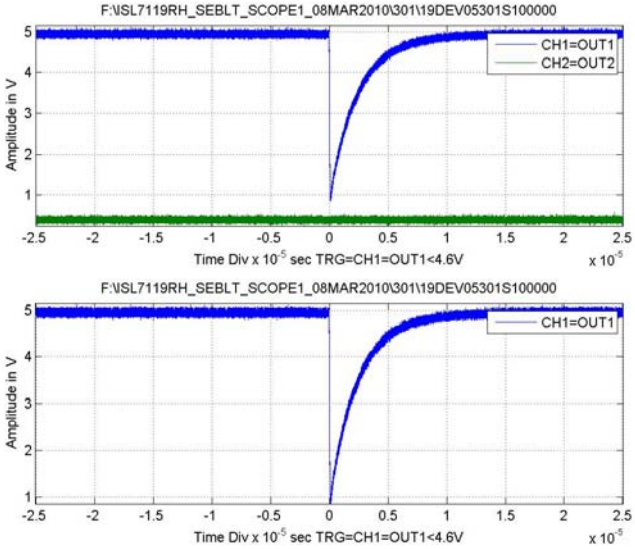

FIGURE 1. REPRESENTATIVE SET WAVEFORM, LET OF 42.84MeV.cm^2/mg

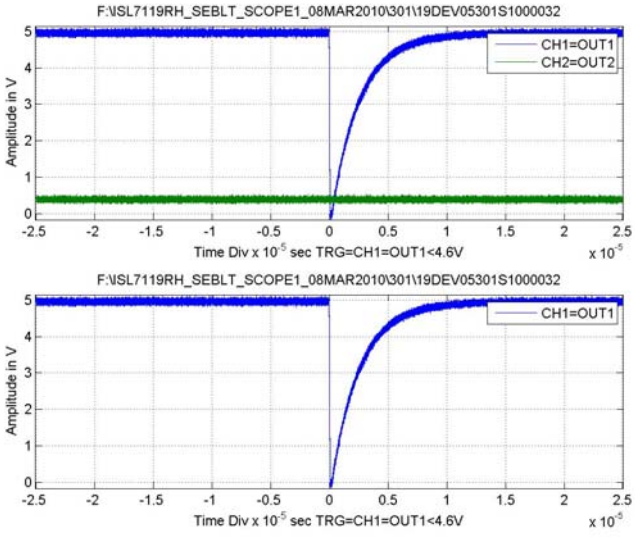

FIGURE 2. REPRESENTATIVE SET WAVEFORM, LET OF 42.84MeV.cm^2/mg

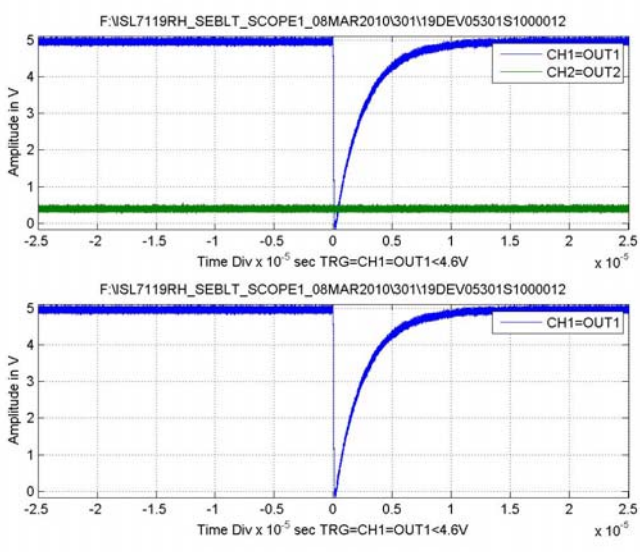

FIGURE 3. REPRESENTATIVE SET WAVEFORM, LET OF 42.84MeV.cm^2/mg

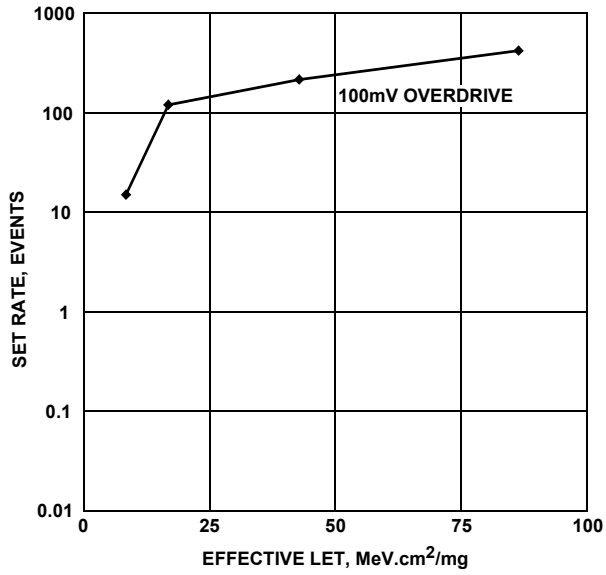

FIGURE 4. SET EVENT vs LET DATA

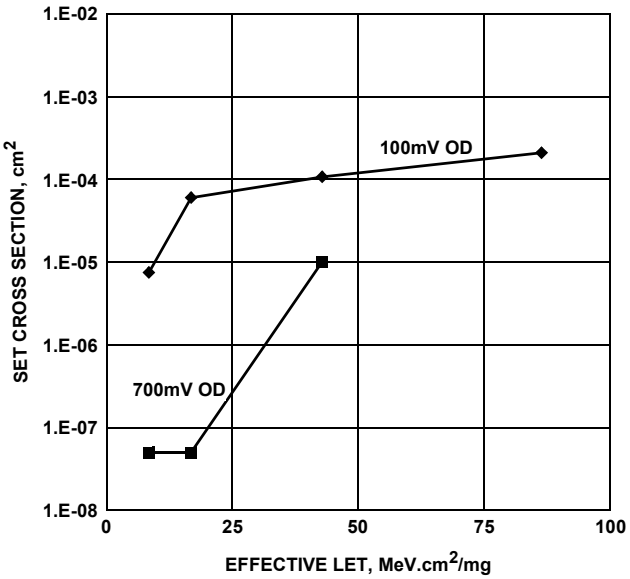

FIGURE 5. SET CROSS SECTION vs EFFECTIVE LET CURVE

Figure 5 ISL7119RH SET cross section as a function of LET and input overdrive (OD). The input OD is defined as the differential input voltage of the comparator. The upper curve represents the 100mV OD results, while the lower curve represents the 700mV OD data. The SET rate for a given LET is a direct function of the input OD.

Summary

The ISL7119RH was found to be free of destructive effects such as single-event latch-up and single-event burnout up to a high LET of 108MeV.cm^2/mg at worst-case conditions of +125°C ambient temperature and ±18V supplies. This was an expected result as the part uses dielectrically isolated fabrication technology. The part showed single-event transients with the SET rate, a function of the input overdrive as expected.

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