

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 $108\text{MeV.cm}^2/\text{mg}$ at $+125^\circ\text{C}$ with $V_{DD} = \pm 18\text{V}$.

Single-Event Transient Performance

First, SET tests were performed to a fluence of $2 \times 10^6 \text{ cm}^{-2}$ with a comparator input overdrive of 0.1V at $+25^\circ\text{C}$ and $\pm 15\text{V}$ 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 $86.4\text{MeV.cm}^2/\text{mg}$ ~420 SET events
- LET of $42.8\text{MeV.cm}^2/\text{mg}$ ~215 SET events
- LET of $16.8\text{MeV.cm}^2/\text{mg}$ ~120 SET events
- LET of $8.4\text{MeV.cm}^2/\text{mg}$ ~15 SET events

Next, SET tests were performed to a fluence of $2 \times 10^6 \text{ cm}^{-2}$ with a comparator input overdrive (OD) of 0.7V at $+25^\circ\text{C}$ and $\pm 15\text{V}$ 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 $42.8\text{MeV.cm}^2/\text{mg}$ ~20 SET events
- LET of $16.8\text{MeV.cm}^2/\text{mg}$ ~0 SET events
- LET of $8.4\text{MeV.cm}^2/\text{mg}$ ~0 SET events

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

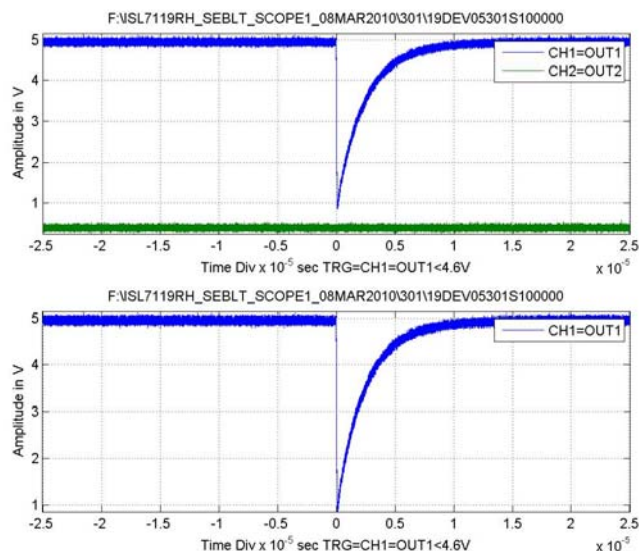


FIGURE 1. REPRESENTATIVE SET WAVEFORM, LET OF $42.84\text{MeV.cm}^2/\text{mg}$

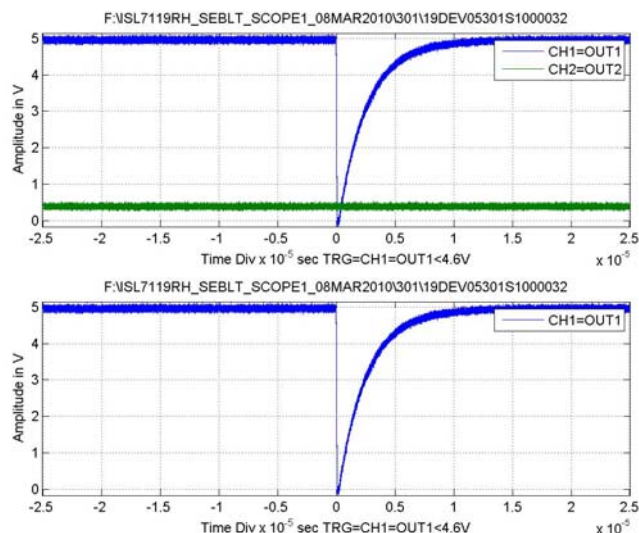


FIGURE 2. REPRESENTATIVE SET WAVEFORM, LET OF $42.84\text{MeV.cm}^2/\text{mg}$

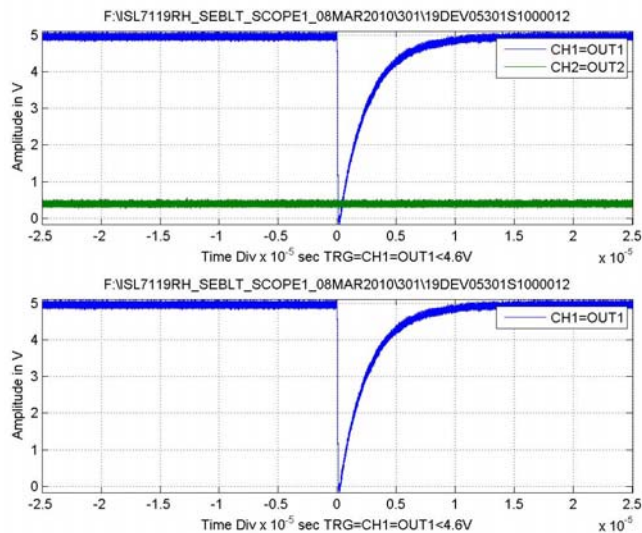


FIGURE 3. REPRESENTATIVE SET WAVEFORM, LET OF $42.84 \text{ MeV.cm}^2/\text{mg}$

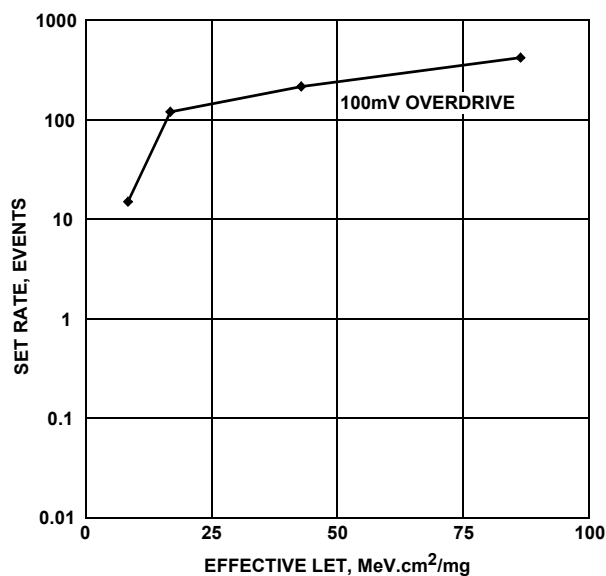


FIGURE 4. SET EVENT vs LET DATA

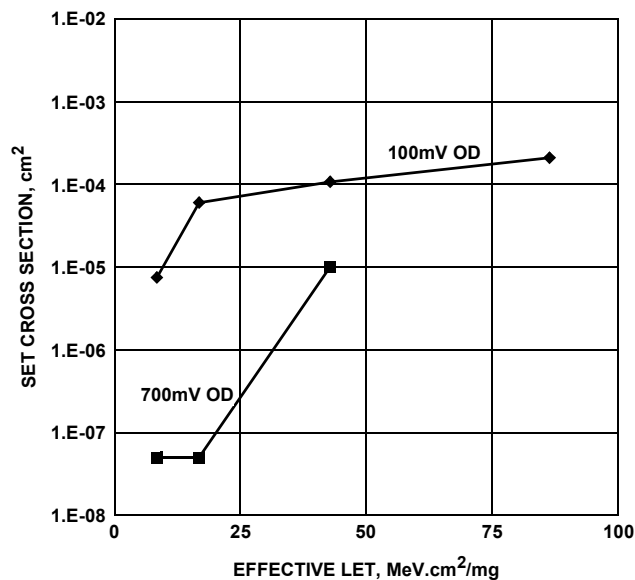


FIGURE 5. SET CROSS SECTION vs EFFECTIVE LET CURVE

[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 $108 \text{ MeV.cm}^2/\text{mg}$ at worst-case conditions of $+125^\circ\text{C}$ ambient temperature and $\pm 18\text{V}$ 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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