

Total Dose Radiation Test Report
MSK120RH
Radiation Hardened Voltage Comparator

May 21, 2010

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I. Introduction:

The total dose radiation test plan for the MSK120RH was developed to qualify the device as radiation tolerant up to 100 Krad(Si). The testing was performed beyond 100 Krad(Si) to show trends in device performance as a function of total dose. The test does not classify maximum radiation tolerance of the hybrid, but simply offers designers insight to the critical parameter-shifts beyond the specified total dose level.

MIL-STD-883 Method 1019.7 and ASTM F1892-06 were used as guidelines in the development and implementation of the total dose test plan for the MSK120RH.

II. Radiation Source:

Total dose was performed at the University of Massachusetts, Lowell, using a cobalt 60 radiation source. Dosimetry was performed prior to device irradiation and the dose rate was determined to be 139 rads(Si)/sec. The total dose schedule can be found in Table I.

III. Test Setup:

All test samples were subjected to Group A Electrical Test in accordance with the device data sheet. In addition, all devices received 320 hours of burn-in per MIL-STD-883 Method 1015 and were electrically tested prior to irradiation. For test platform verification, one control device was tested at 25°C.

The devices were vertically aligned with the radiation source and enclosed in a Pb/Al container during irradiation to minimize dose enhancement effects. Five devices were kept under bias during irradiation. Five devices had all leads grounded during irradiation for the unbiased condition.

After each irradiation, the device leads were shorted together and were transported to the MSK automatic electrical test platform and tested IAW MSK device data sheet. Testing was performed on irradiated devices, as well as the control device, at each total dose level. Electrical tests were completed within one hour of irradiation.

IV. Data:

All performance curves are averaged from the test results of the biased and unbiased devices respectively. If required, full test data can be obtained by contacting M.S. Kennedy Corporation.

V. Summary:

Total dose irradiation and testing of the MSK120RH resulted in most test parameters showing very little change up to 100Krad(Si) and beyond. All parameters remained within pre-irradiation limits during testing to 100 Krad(Si).

Both biased and grounded devices demonstrated a notable increase in Input Bias Current at all dose levels. However, at the 100Krad(Si) dose point, all devices passed pre-irradiation limits.

MSK120RH Biased/Unbiased Dose Rate Schedule

Dosimetry Equipment
Bruker Biospin # 0141

Irradiation Date
5/21/2010

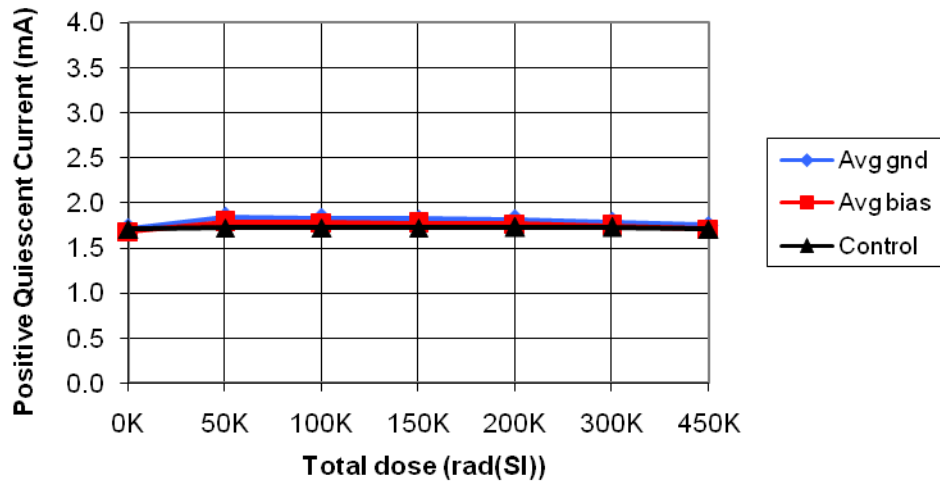
Exposure Length (min:sec)	Incremental Dose rads(Si)	Cumulative Dose rads(Si)
6:11	51,569	51,569
6:11	51,569	103,138
6:11	51,569	154,707
6:11	51,569	206,276
12:22	103,138	309,414
18:33	154,707	464,121

Biased S/N – 2005, 2006, 2007, 2010, 2011

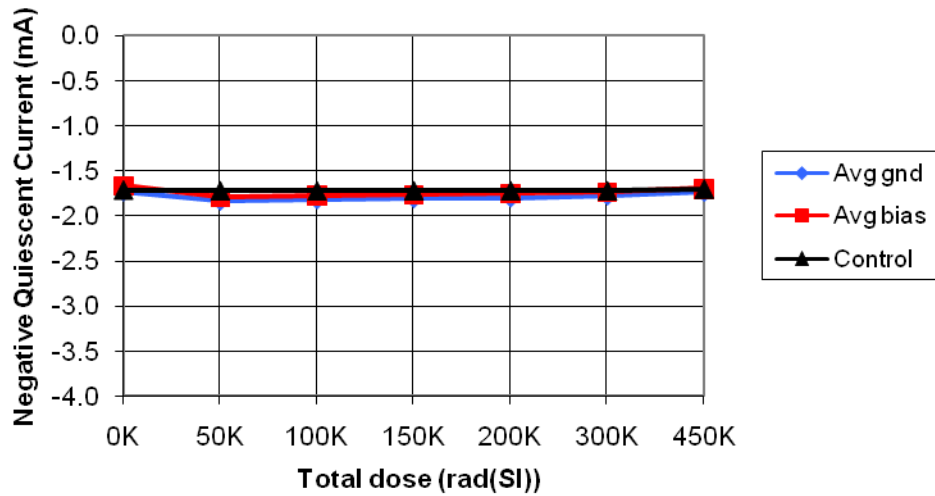
Unbiased S/N – 2012, 2013, 2014, 2015, 2016

Table 1
Dose Time, Incremental Dose and Total Cumulative Dose

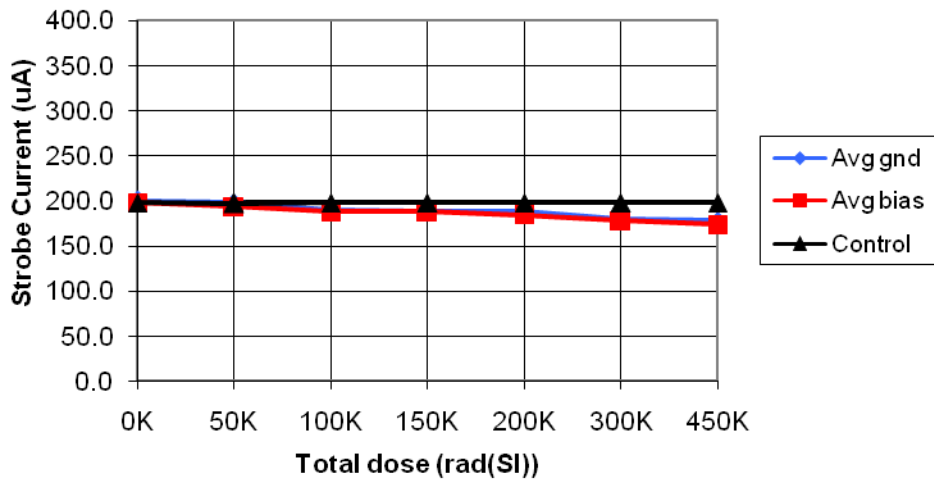
MSK120RH
Positive Quiescent Current vs. Total Dose



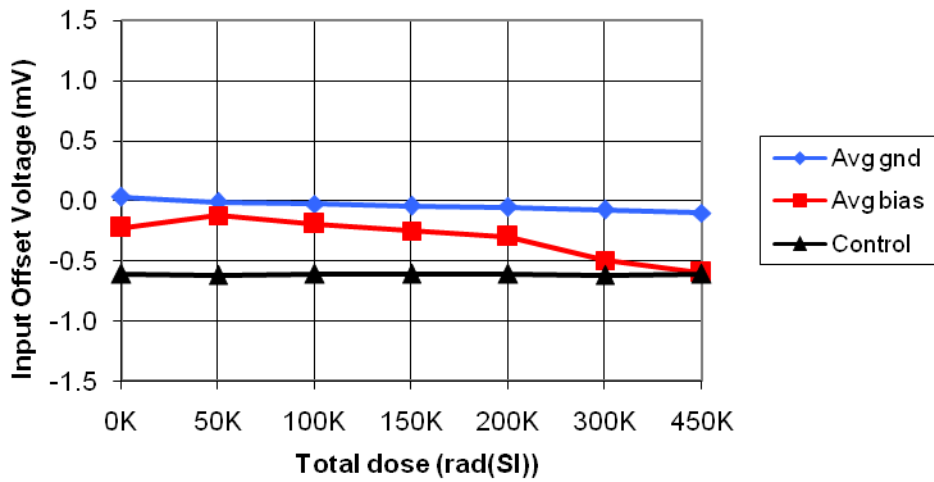
MSK120RH
Negative Quiescent Current vs. Total Dose

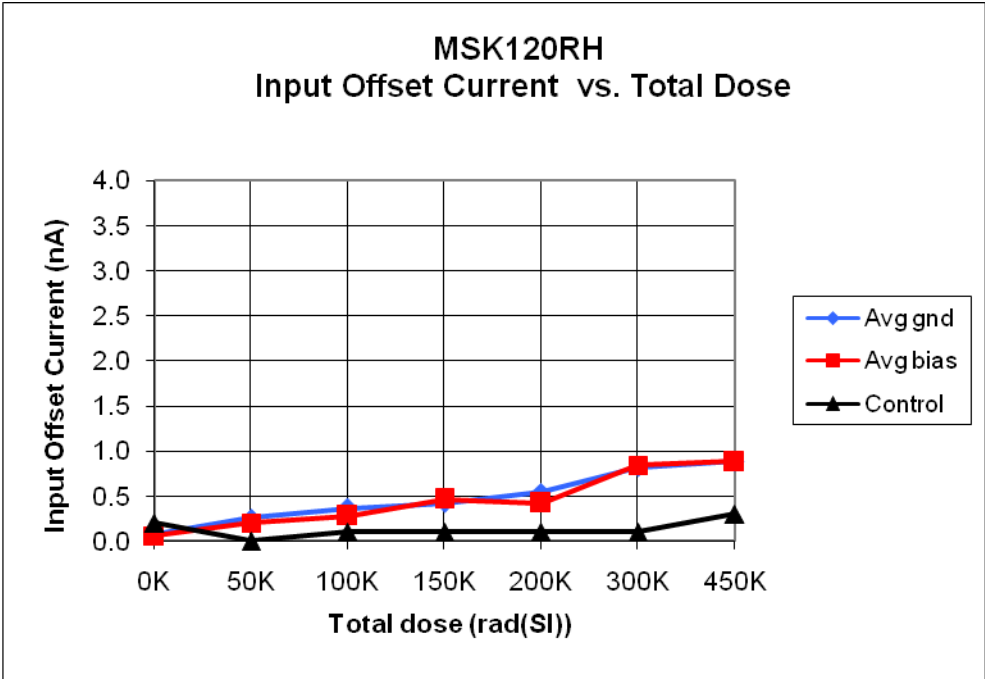
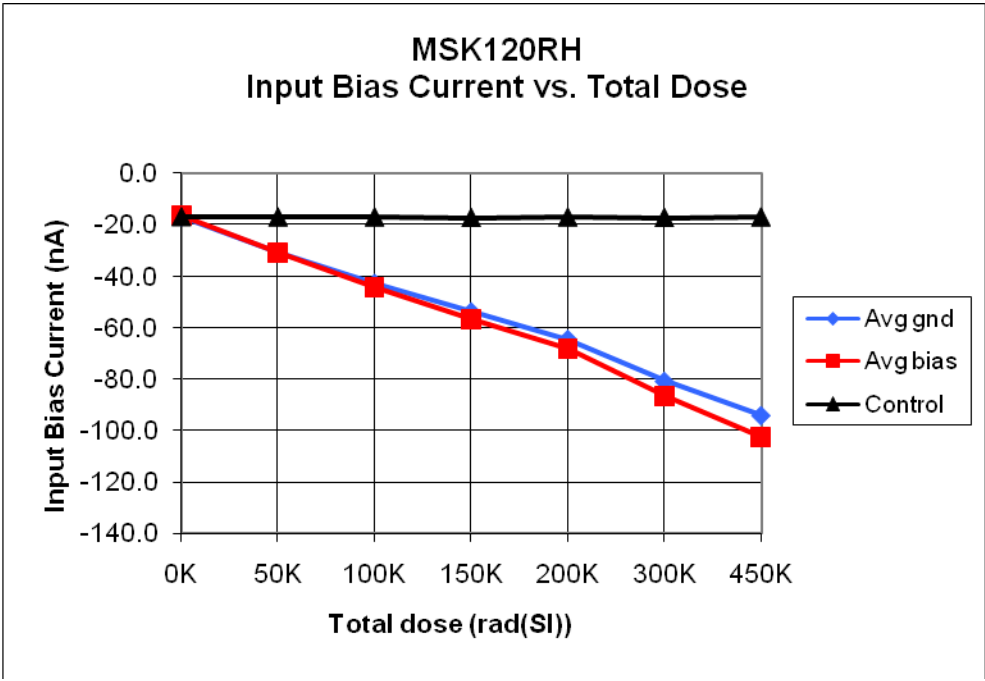


MSK120RH
Strobe Current vs. Total Dose

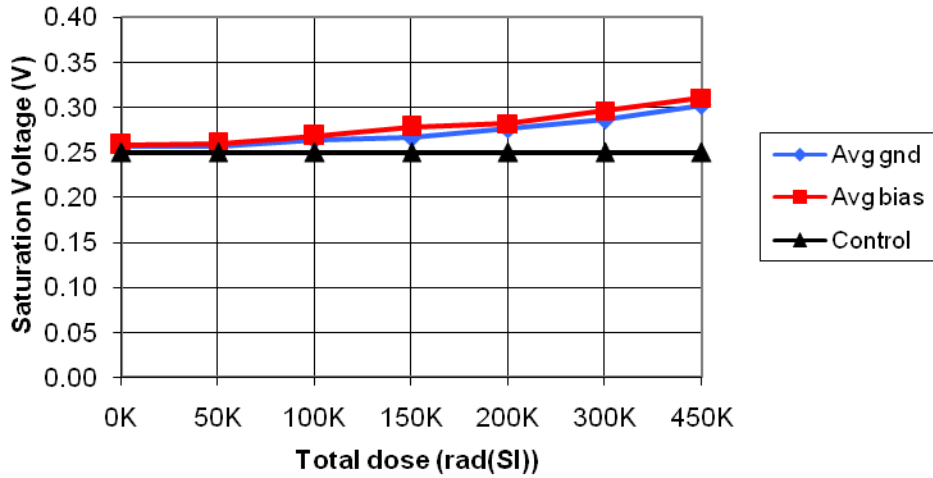


MSK120RH
Input Offset Voltage vs. Total Dose

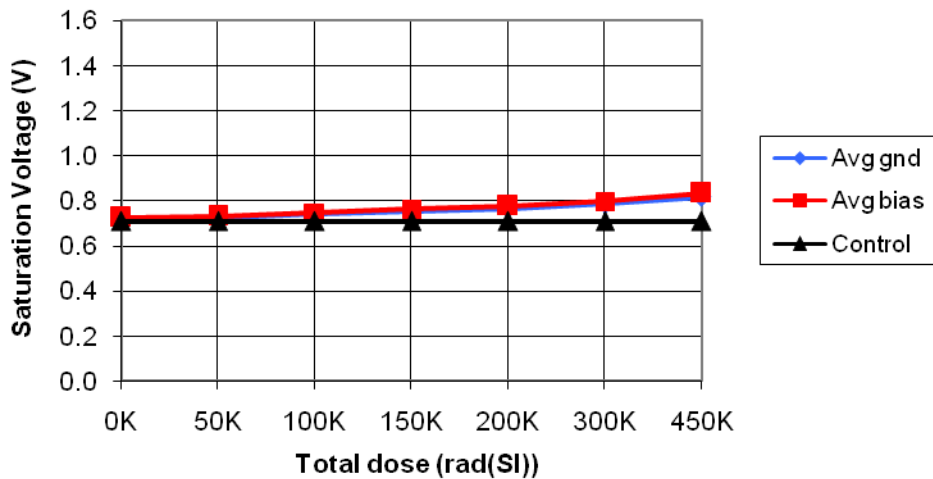




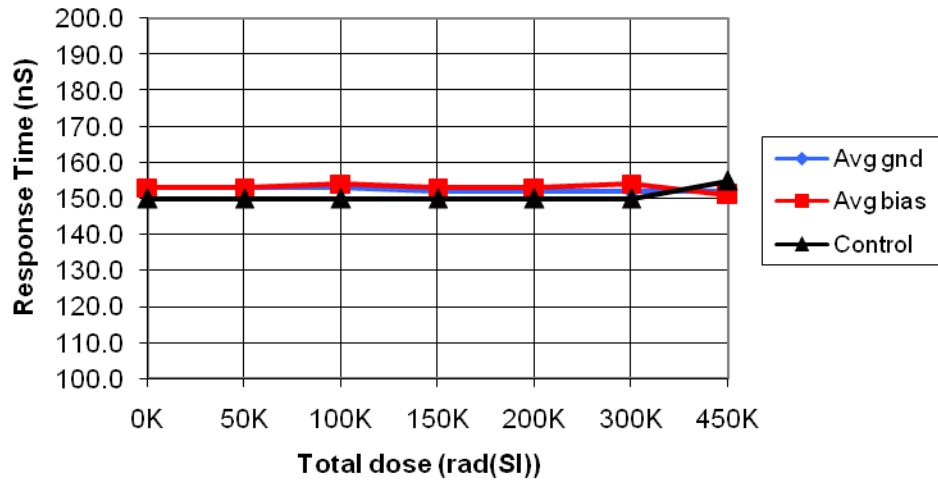
MSK120RH
Saturation Voltage $I_{sink} = 8 \text{ mA}$ vs. Total Dose



MSK120RH
Saturation Voltage $I_{sink} = 50 \text{ mA}$ vs. Total Dose



MSK120RH
Response Time vs. Total Dose



MSK120RH
Output Leakage vs. Total Dose

