

# **Total Dose Radiation Test Report**

**MSK5984RH**

**RAD Hard Positive Adjustable Voltage Regulator**

January 12, 2018 (TID, 1<sup>st</sup> Test

Wafer Lot: HP201682.3 #1)

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**I. Introduction:**

The total dose radiation test plan for the MSK5984RH was developed to qualify the devices as RAD Hard to 100 KRads(Si). The testing was performed beyond 300 KRads(Si) to show trends in device performance as a function of total dose. The test does not classify maximum radiation tolerance of the device, but simply offers designers insight to the critical parameter-shifts up to 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 MSK5984RH.

**II. Radiation Source:**

Total dose was performed at the University of Massachusetts, Lowell, using a cobalt 60 radiation source. The dose rate was determined to be 126.7 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 160 hours minimum of burn-in per MIL-STD-883 Method 1015. For test platform verification, one control device was tested at 25°C. Nine devices were then tested at 25°C, prior to irradiation, and were found to be within acceptable test limits.

The devices were vertically aligned with the radiation source and enclosed in a lead/aluminum container during irradiation. Four devices were kept under bias during irradiation. An operating voltage of +25 Volts was used for the bias condition. Five devices had all leads grounded during irradiation for the unbiased condition.

After each irradiation, the device leads were shorted together and the devices were transported to the MSK electrical test platform. Testing was performed in accordance with the MSK device data sheet. Testing was performed on irradiated devices, as well as the control device, at each dose level. Electrical tests were completed within one hour of irradiation. Devices were subjected to subsequent radiation doses within two hours of removal from the radiation field.

**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 MSK Products – Anaren Inc.

**V. Summary:**

Based on the test data recorded during radiation testing and statistical analysis, the MSK5984RH qualifies as a 100 Krad(Si) radiation hardened device.

OUTPUT OFFSET VOLTAGE and LOAD REGULATION ( $\Delta$ SET) had a smaller than normal sample and initial distribution of the bias group unfavorably skewed the 99/90 statistics. The percent change of the bias group and the ground group track well versus the dose (within the precision of the test method).

All other parameters stayed well within specifications up to the maximum tested level of 450Krad.

MSK5984RH Biased/Unbiased Dose Rate Schedule
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Dosimetry Equipment
Bruker Biospin # 0162

Irradiation Date
1/12/18

Exposure Length (min:sec)	Incremental Dose rads(Si)	Cumulative Dose rads(Si)
06:46	51,500	51,500
06:46	51,500	103,000
06:46	51,500	154,500
20:19	154,500	309,000
20:19	154,500	463,500

Biased S/N – 2184, 2186, 2191, 2192
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Unbiased S/N – 2194, 2198, 2202, 2205, 2214
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Table 1

**Dose Time, Incremental Dose and Total Cumulative Dose**













