

**Total Dose Radiation Test Report**

**MSK5965RH**

**Rad Hard Positive Low Noise LDO**

June 29, 2017 (HDR, 1<sup>st</sup> Test, Lot HP202273.2 Wf# 3)

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**I. Introduction:**

The total dose radiation test plan for the MSK5965RH was developed to qualify the devices as Rad Hard 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 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 MSK5965RH.

**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 144 rad(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 burn-in per MIL-STD-883 Method 1015 and were fully screened IAW MIL-PRF 38534 Class K. For test platform verification, two control devices were tested at 25°C. Ten 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. Five devices were kept under bias during irradiation. An operating voltage of +16 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 manual 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 devices at each total 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 Anaren, Inc. - MSK Products.

**V. Summary:**

Based on the test data recorded during radiation testing and statistical analysis, the MSK5965RH qualified as a 100 Krad(Si) radiation hardened device.

Load Regulation, Current Limit and Ground Pin Current exhibited the most significant change with irradiation, however all performance curves stayed within post irradiation specifications up to 300 Krad(Si).

|   |
|---|
| MSK5965RH Biased/Unbiased Dose Rate<br>Schedule |
|---|

|                       |
|-----------------------|
| Dosimetry Equipment   |
| Bruker Biospin # 0162 |

|                  |
|------------------|
| Irradiation Date |
| 6/29/17          |

| Exposure<br>Length<br>(min:sec) | Incremental<br>Dose<br>rads(Si) | Cumulative<br>Dose rads(Si) |
|---------------------------------|---------------------------------|-----------------------------|
| 5:57                            | 51,500                          | 51,500                      |
| 5:57                            | 51,500                          | 103,000                     |
| 5:57                            | 51,500                          | 154,500                     |
| 17:51                           | 154,500                         | 309,000                     |
| 17:51                           | 154,500                         | 463,500                     |

|   |
|---|
| Biased S/N – 0062, 0064, 0065, 0066, 0067 |
|---|

|   |
|---|
| Unbiased S/N – 0068, 0070, 0071, 0072, 0073 |
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Table 1

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



















