

Total Dose Radiation Test Report

MSK 5044RH

RAD Hard 3.5A Switching Regulator

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(MSK5044RH – 1st test)

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I. Introduction:

The total dose radiation test plan for the MSK 5044RH was developed to qualify the devices as RAD Hard to 100 KRADS(Si). The testing was performed beyond 100 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 MSK 5044RH.

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 130 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 fully screened IAW MIL-PRF-38534 Class K. For test platform verification, one control device was 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 +15 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 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 M.S. Kennedy Corporation.

V. Summary:

Based on the test data recorded during radiation testing and statistical analysis, the MSK5044RH qualified as a 100 Krad(Si) radiation hardened device. Switching Frequency and Current Limit exhibited the most significant shift due to irradiation. At 100Krad(Si), Switching Frequency decreased 5.5% while Current Limit increased 17%. All performance curves stayed within the post irradiation requirements up to 150Krad(Si).

MSK 5044RH Biased/Unbiased Dose Rate
Schedule

Dosimetry Equipment
Bruker Biospin # 0162

Irradiation Date
11/19/10

Exposure Length (min:sec)	Incremental Dose rads(Si)	Cumulative Dose rads(Si)
0:13:12	102,960	102,960
0:6:36	51,480	154,440
0:19:48	154,440	308,880

Biased S/N – 0033, 0034, 0035, 0037, 0038

Unbiased S/N – 0039, 0040, 0041, 0042, 0043

Table 1

Dose Time, Incremental Dose and Total Cumulative Dose









