

Total Ionizing Dose Radiation Test Report
MSK5061RH,
RAD HARD Low Voltage 10A Switching Regulator with Current Share

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B. Horton
N. Kresse

MSK Products, Anaren, Inc.

I. Introduction:

The Total Ionizing Dose radiation test plan for the MSK 5061RH was developed to qualify the devices as RAD Hard to 100KRADS(Si). 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 MSK5061RH.

II. Radiation Source:

Total ionizing dose testing was performed at the University of Massachusetts, Lowell, using a cobalt 60 radiation source. The dose rate was determined to be 91 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 a minimum of 160 hours of burn-in per MIL-STD-883 Method 1015. 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 +5 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 MSK Products, Anaren, Inc.

V. Summary:

Based on the test data recorded during radiation testing and statistical analysis, the MSK5061RH qualifies as 100 KRad(Si) radiation hardened devices. SS Pin Charging Current exhibited the most significant shifts with irradiation. One device exhibited higher SS PIN CHARGING CURRENT at all test points and was excluded as an outlier from the statistical analysis for this parameter only. CURRENT LIMIT RUNNING data at the 50krad and 100krad test points is invalid due to a misconfigured power supply but was corrected at the 150krad test point, assuring performance at intermediate test points. Test platform variability obscured any shift with irradiation for CURRENT LIMIT SOFTSTART and CURRENT SHARING RATIO, limits will be reassessed after the next Total Ionizing Dose test to 300Krad. All parameters stayed well within specification up to the maximum tested level of 150KRad(Si).

MSK5061RH Biased/Unbiased Dose Rate
Schedule

Dosimetry Equipment
Bruker Biospin # 0162

Irradiation Date
10/11/16

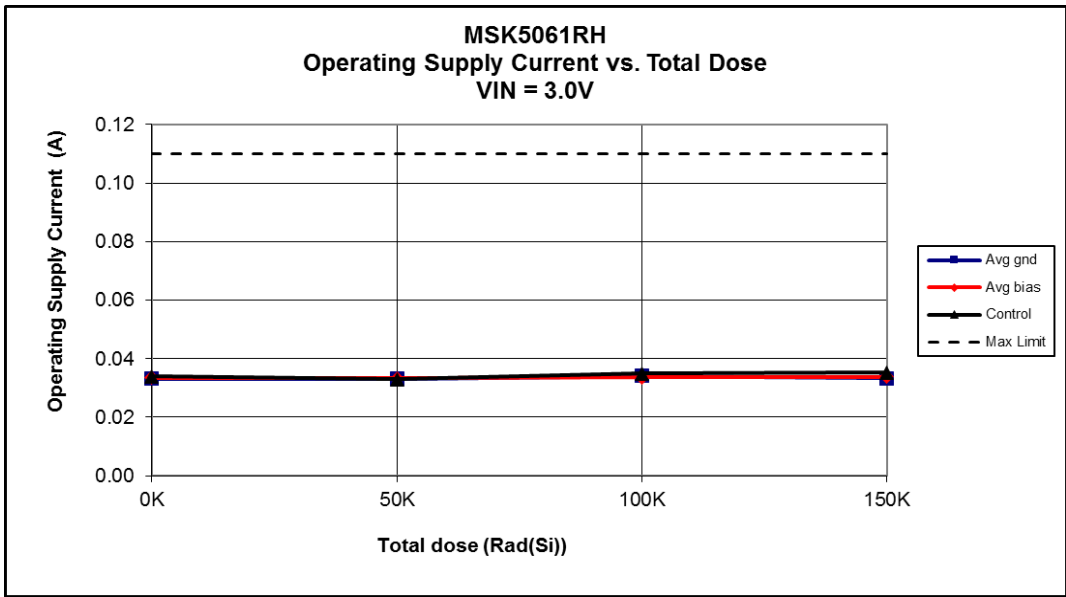
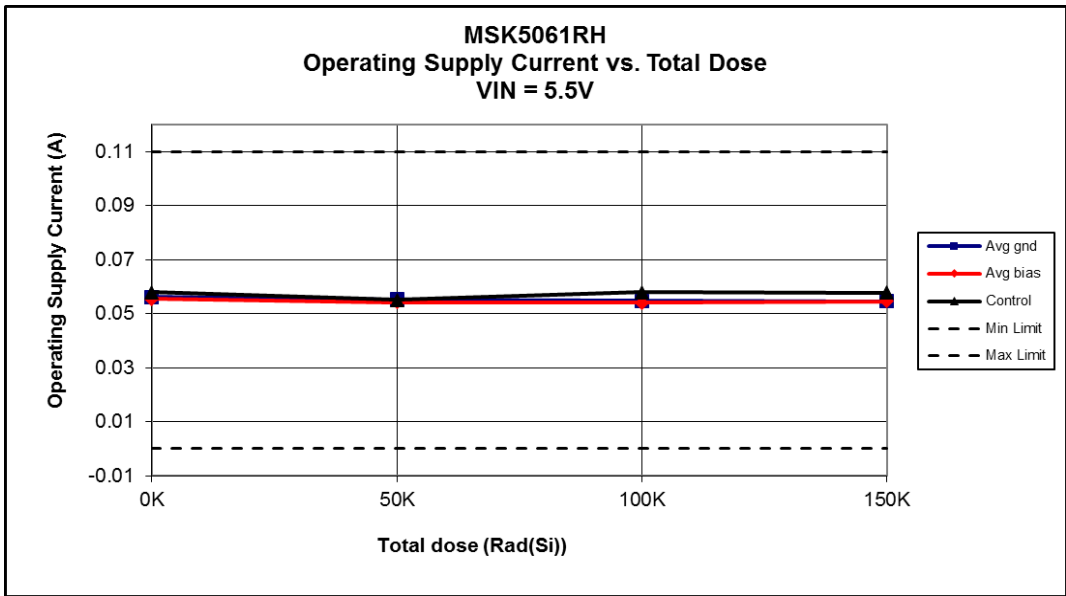
Exposure Length (min:sec)	Incremental Dose (Rads(Si))	Cumulative Dose (Rads(Si))
09:24	09:24	51,500
09:24	09:24	103,500
09:24	09:24	154,500

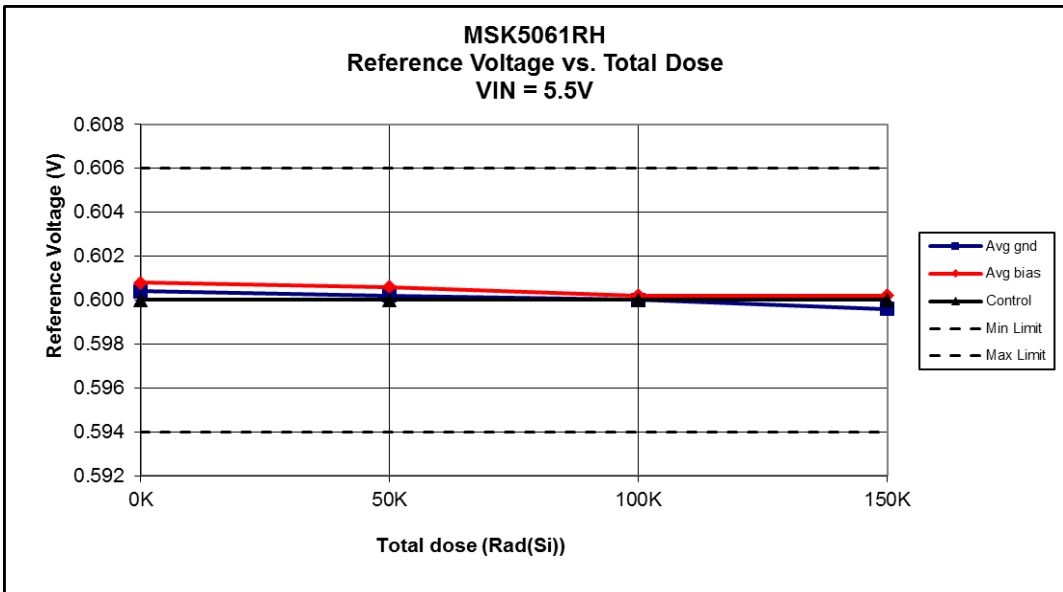
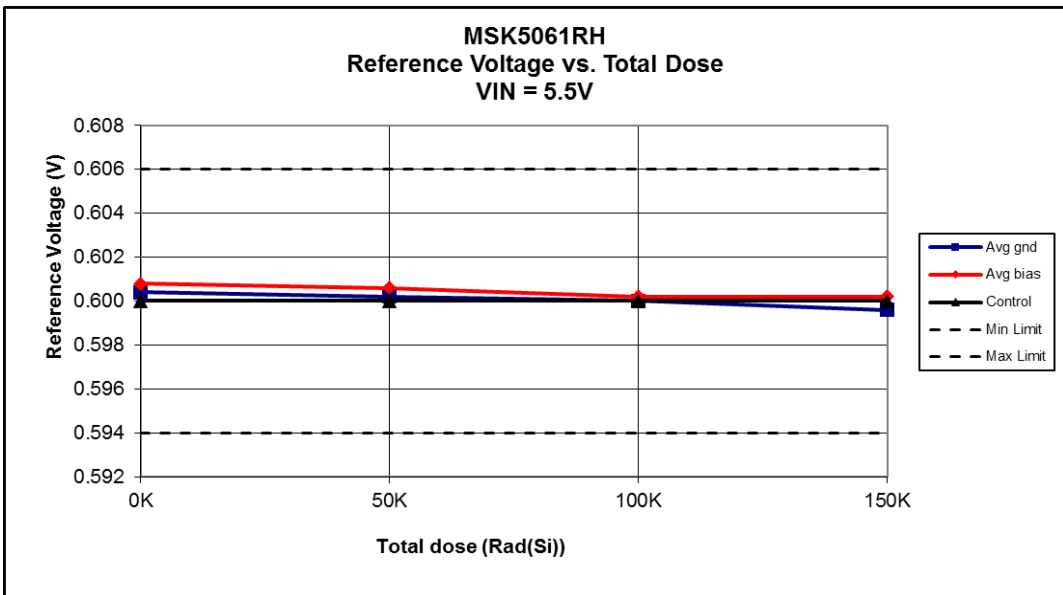
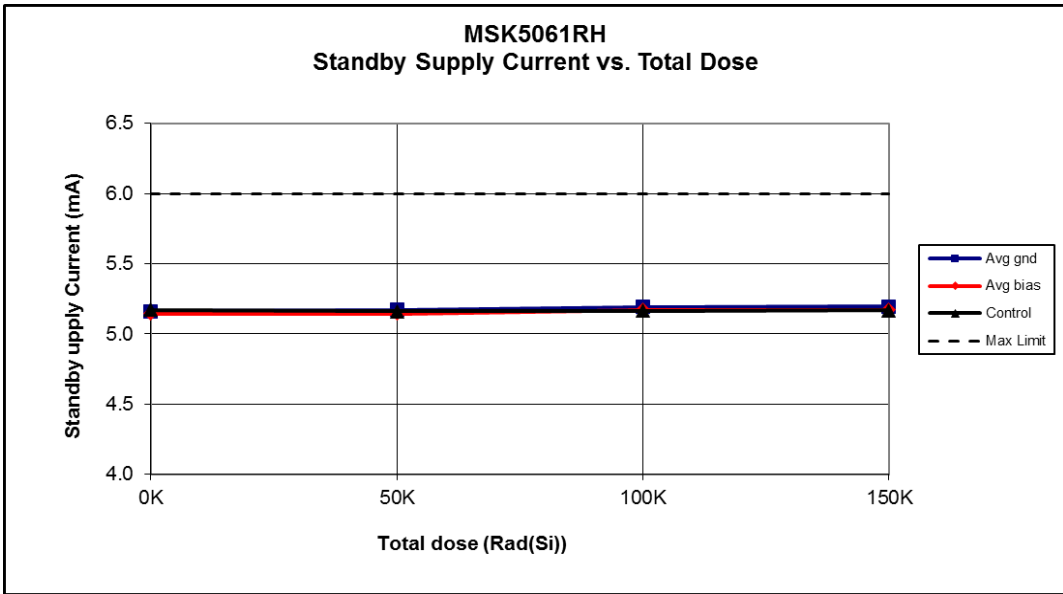
Biased S/N – 0024, 0025, 0026, 0027, 0028

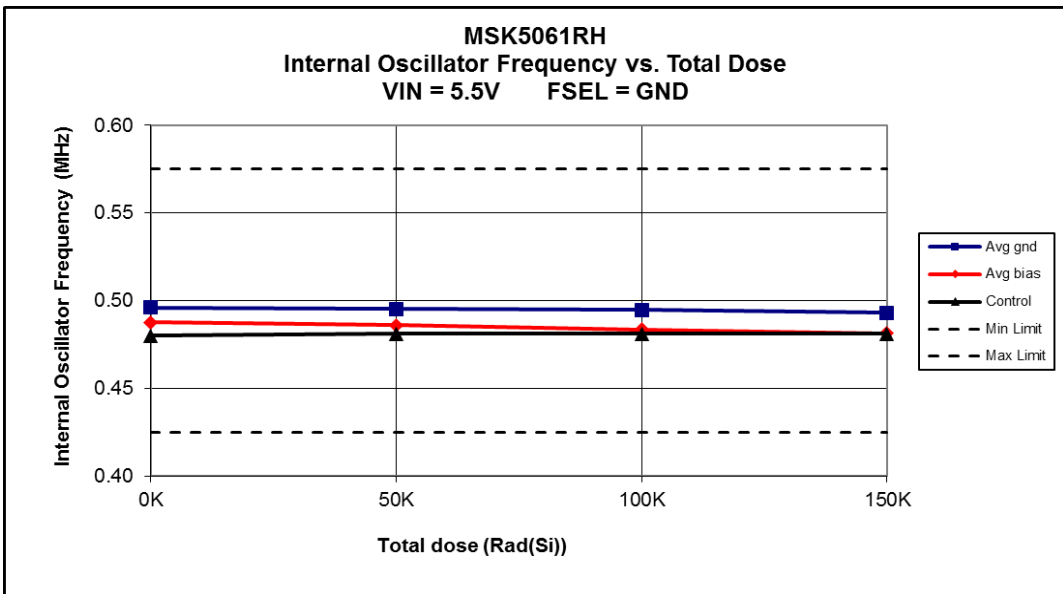
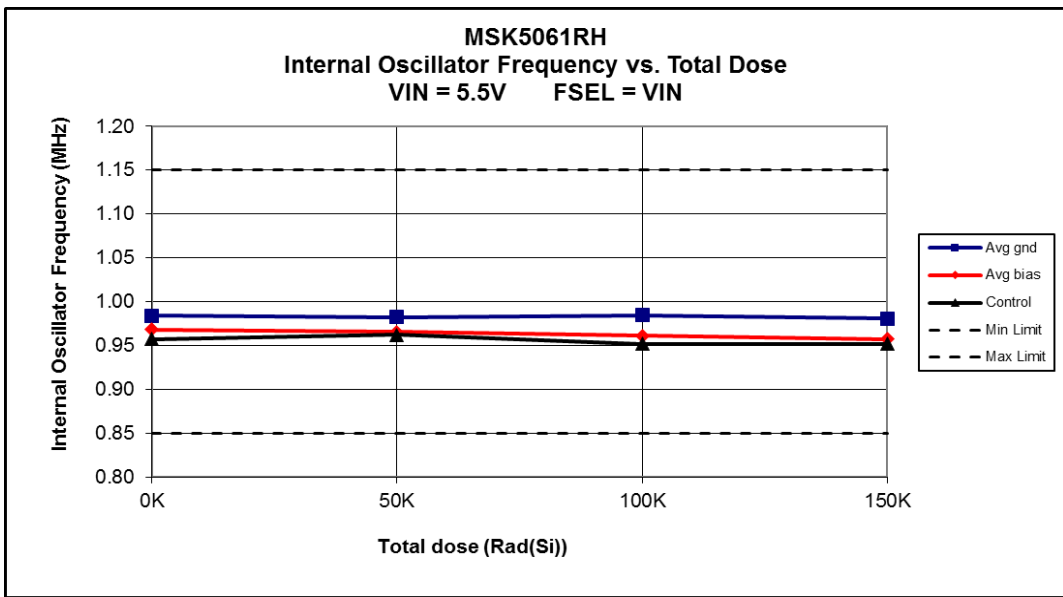
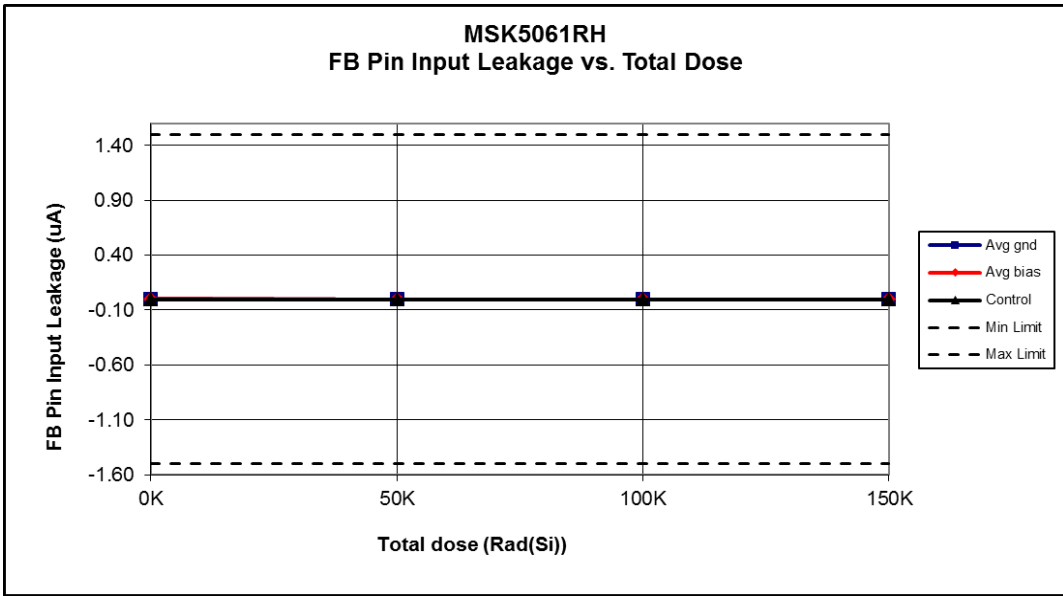
Unbiased S/N – 0029, 0030, 0031, 0032, 0033

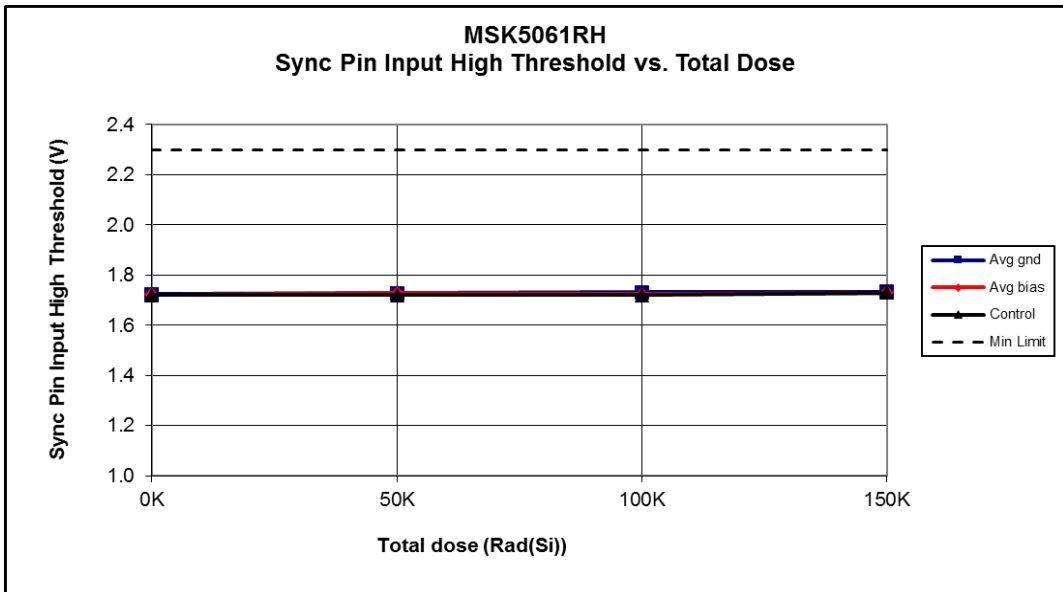
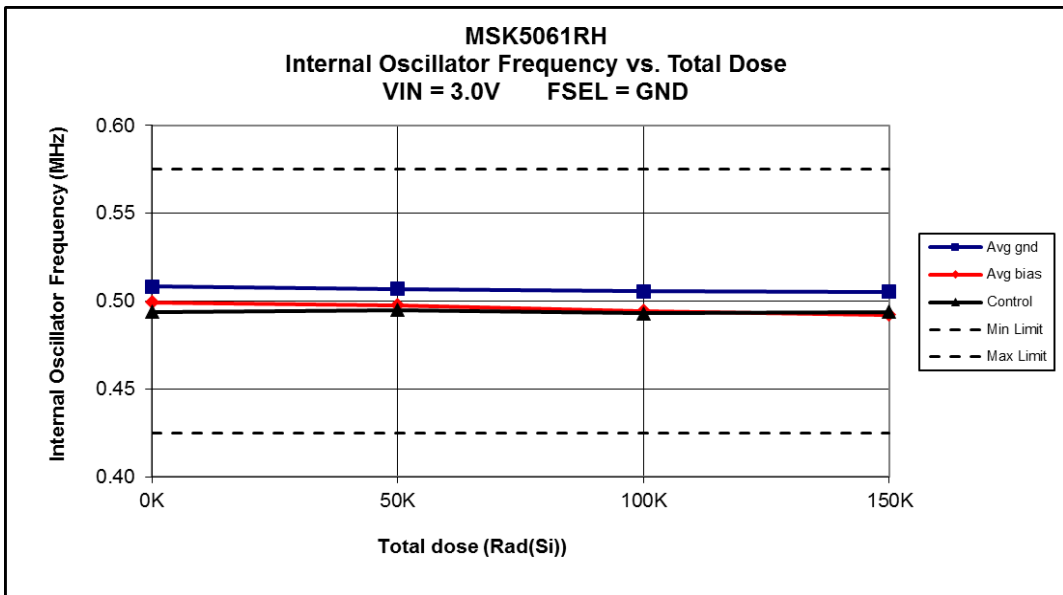
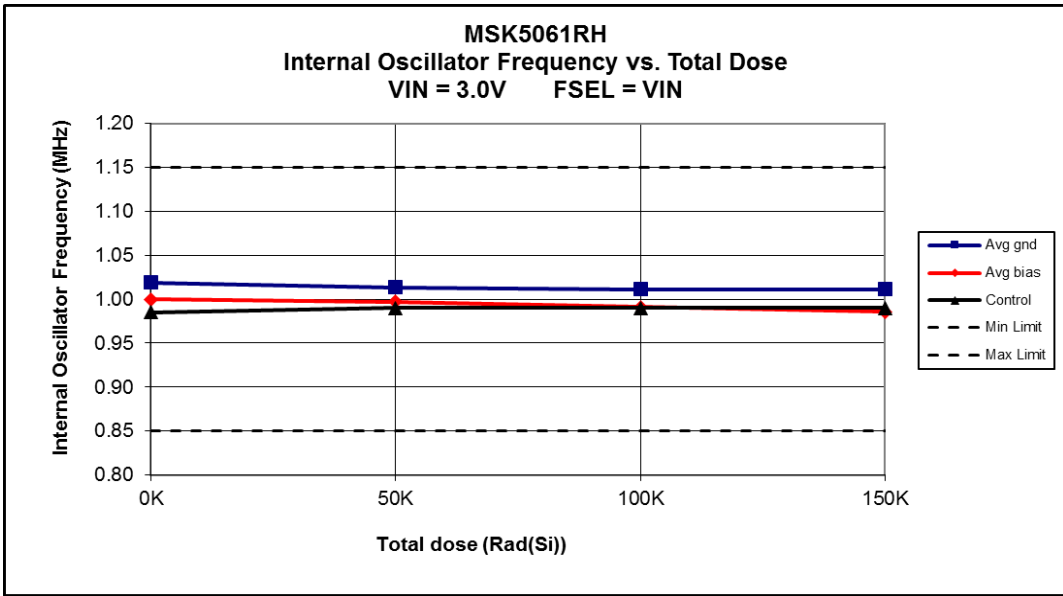
Table 1

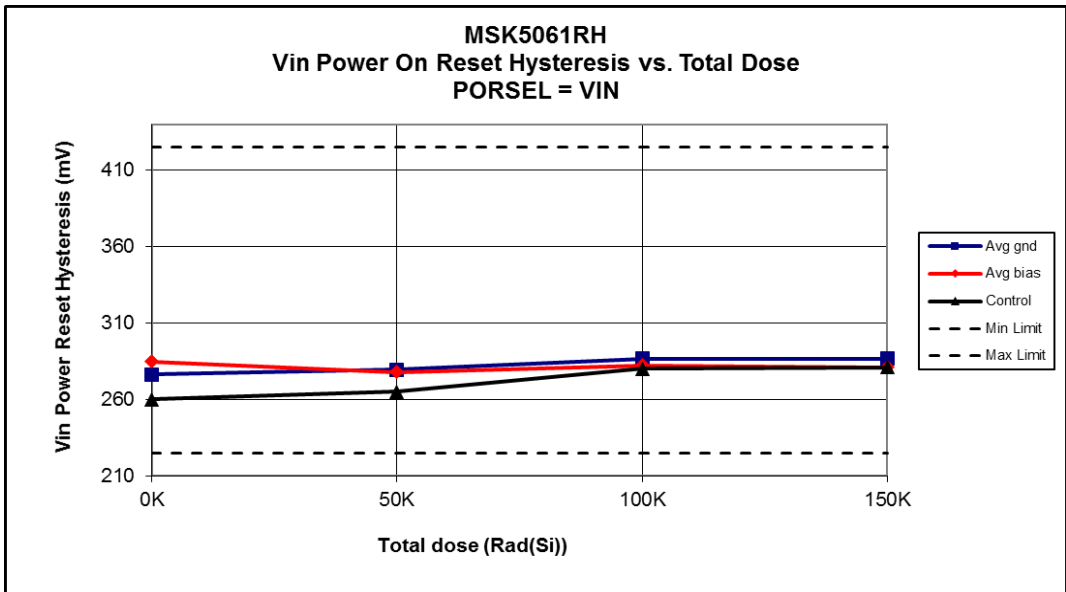
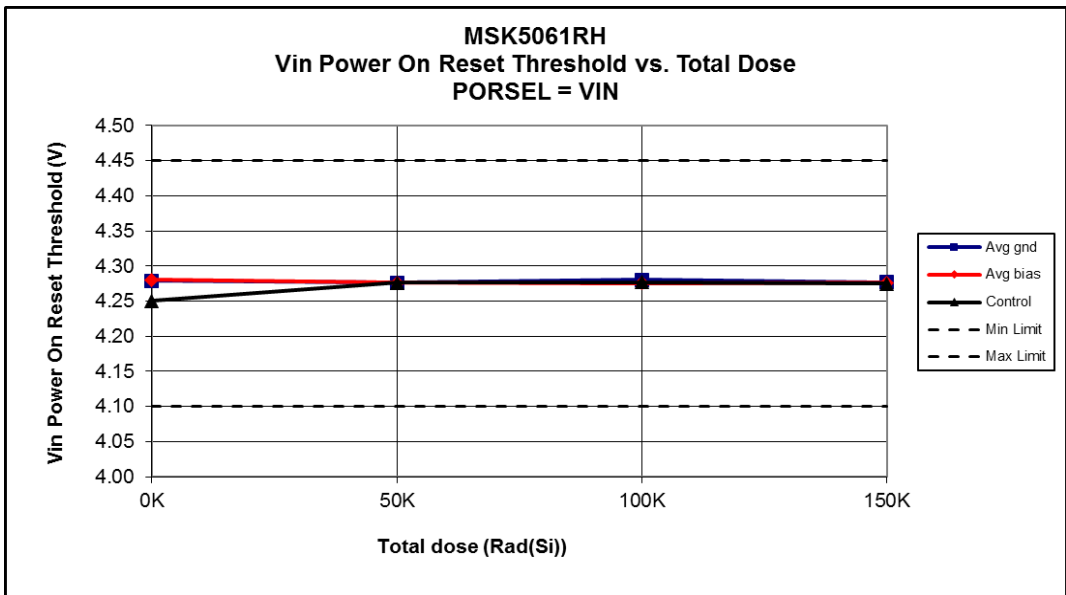
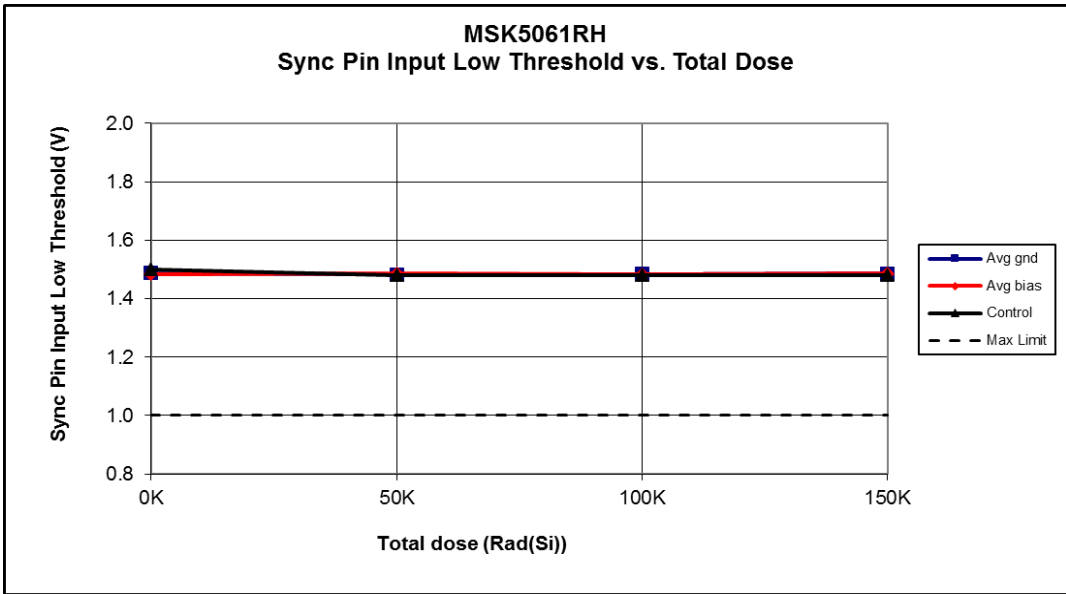
Dose Time, Incremental Dose and Total Cumulative Dose

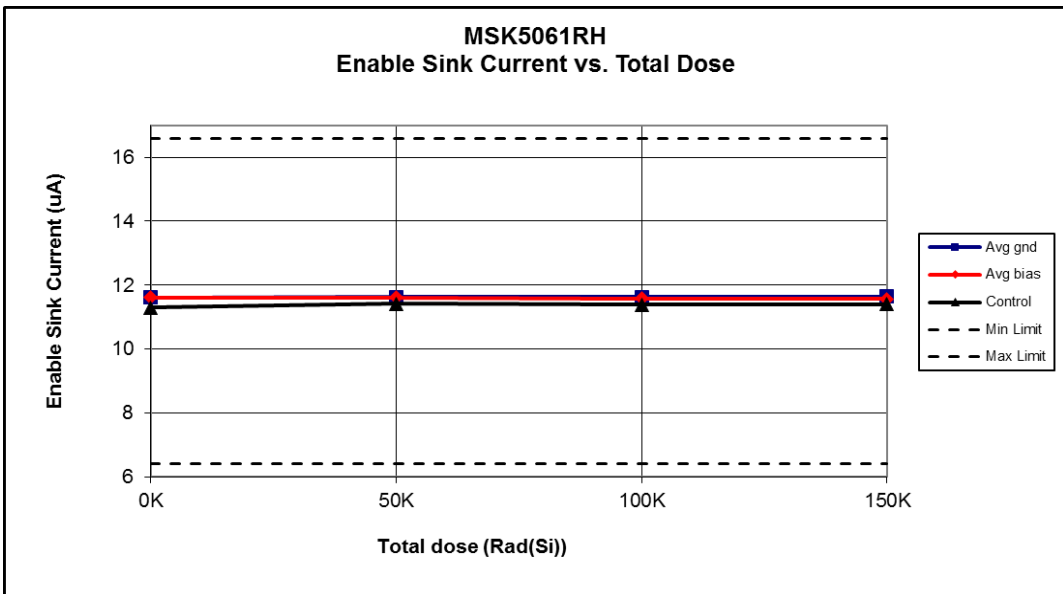
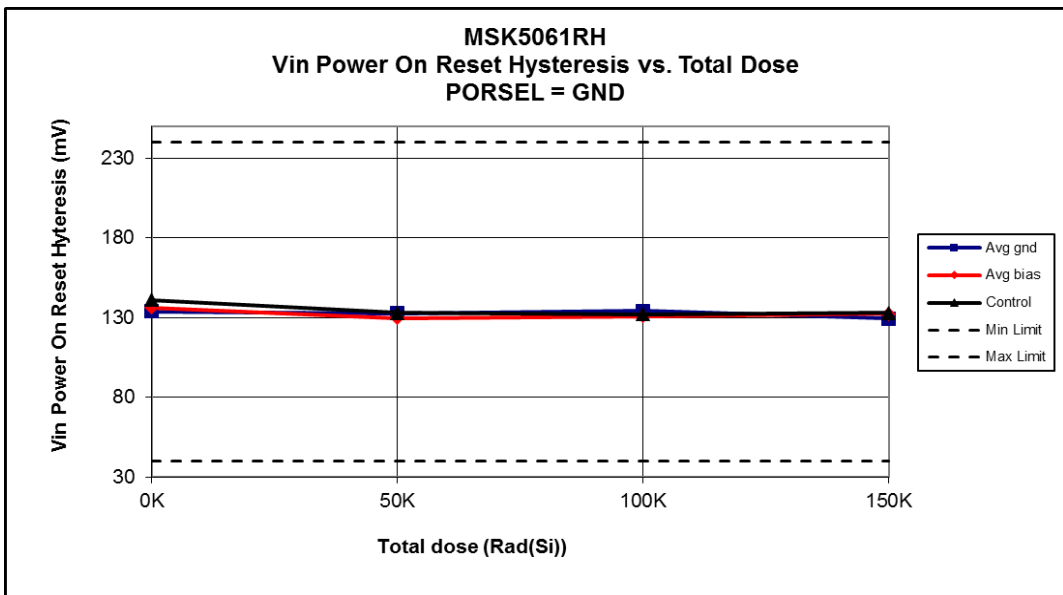
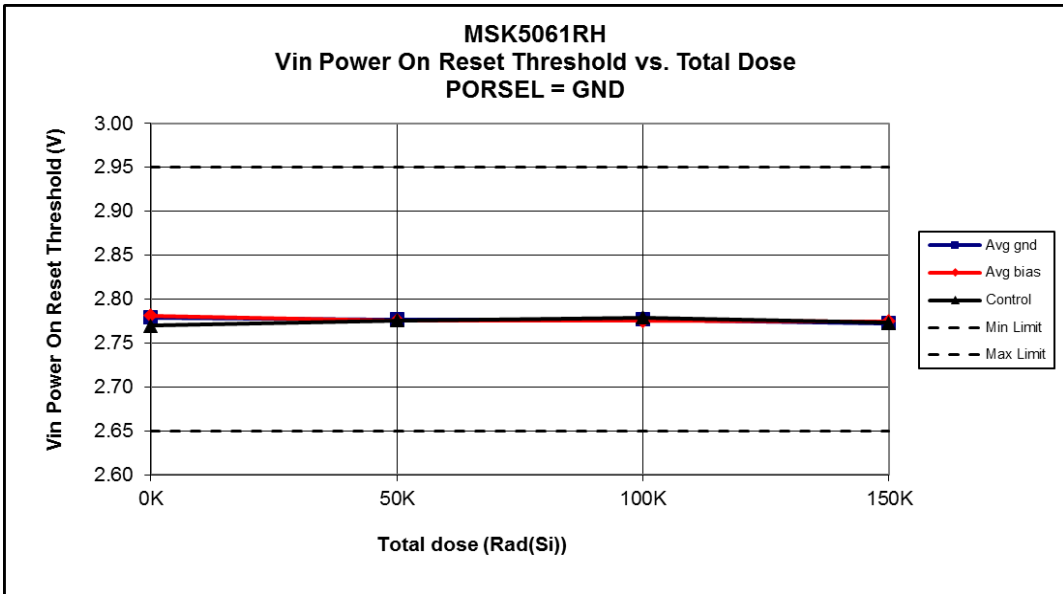


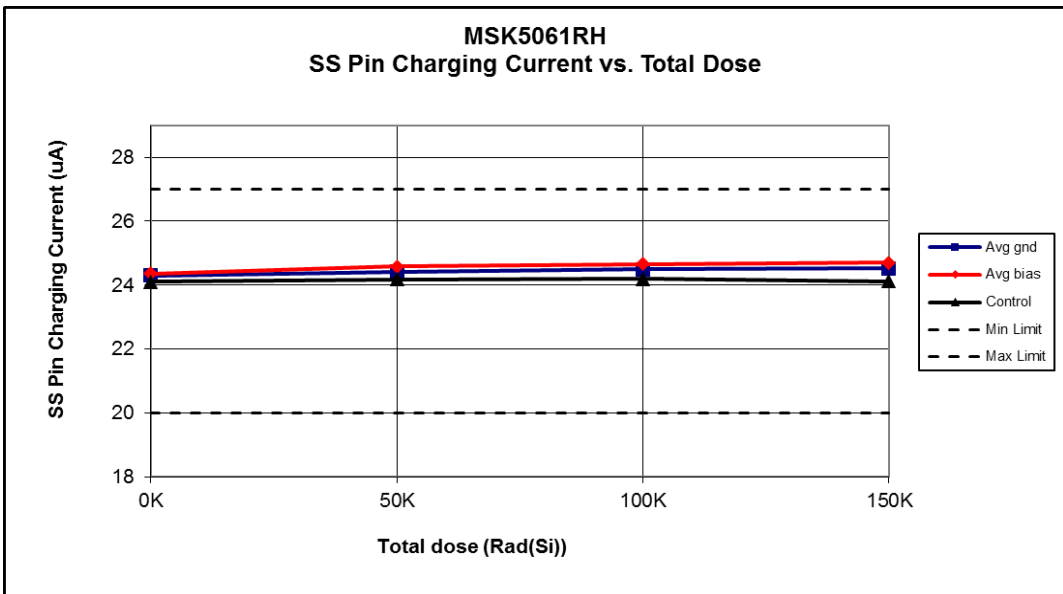
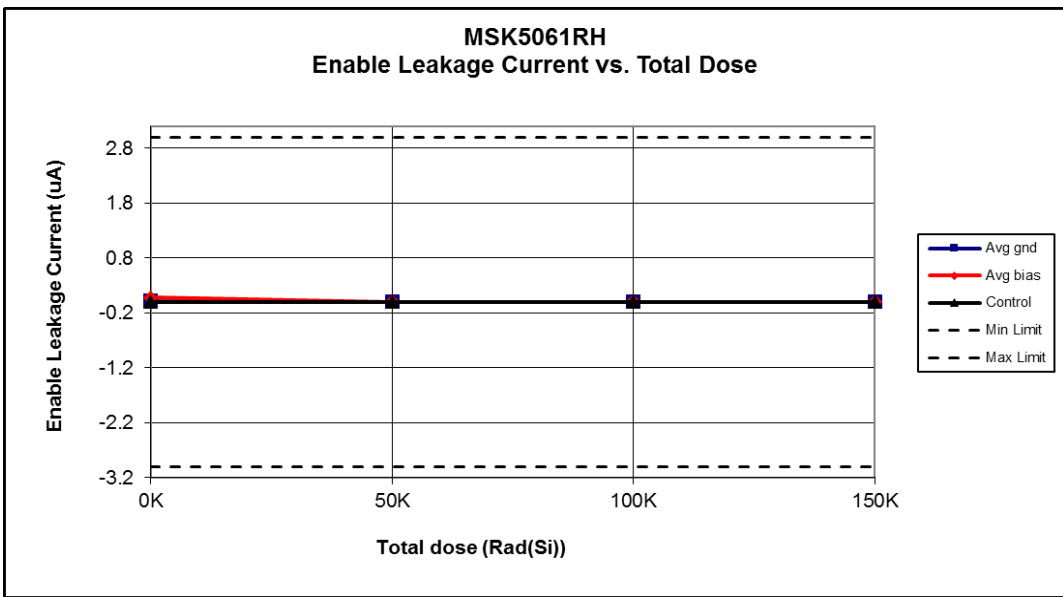
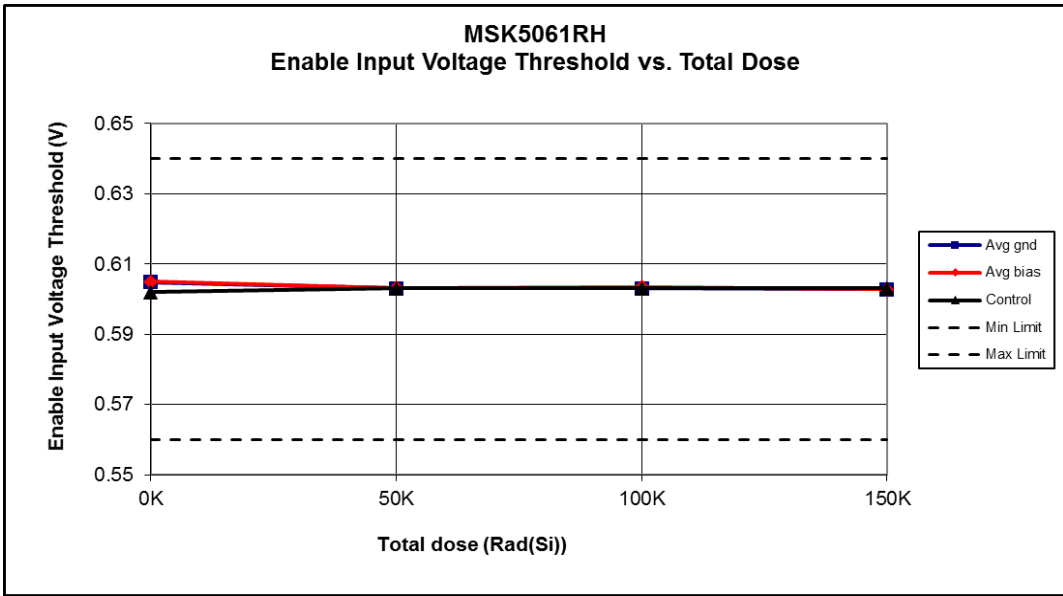


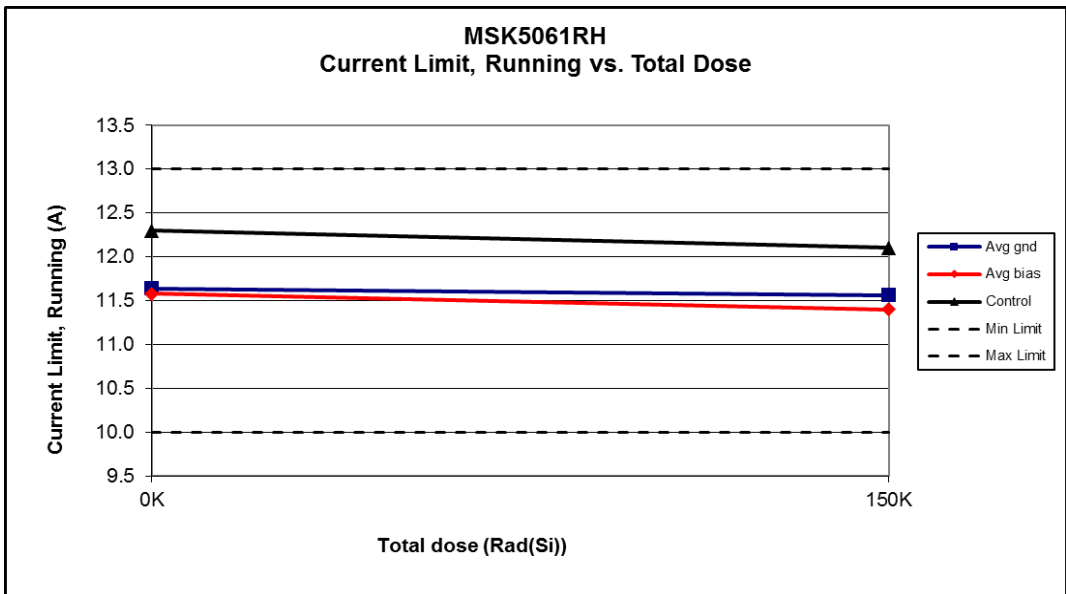
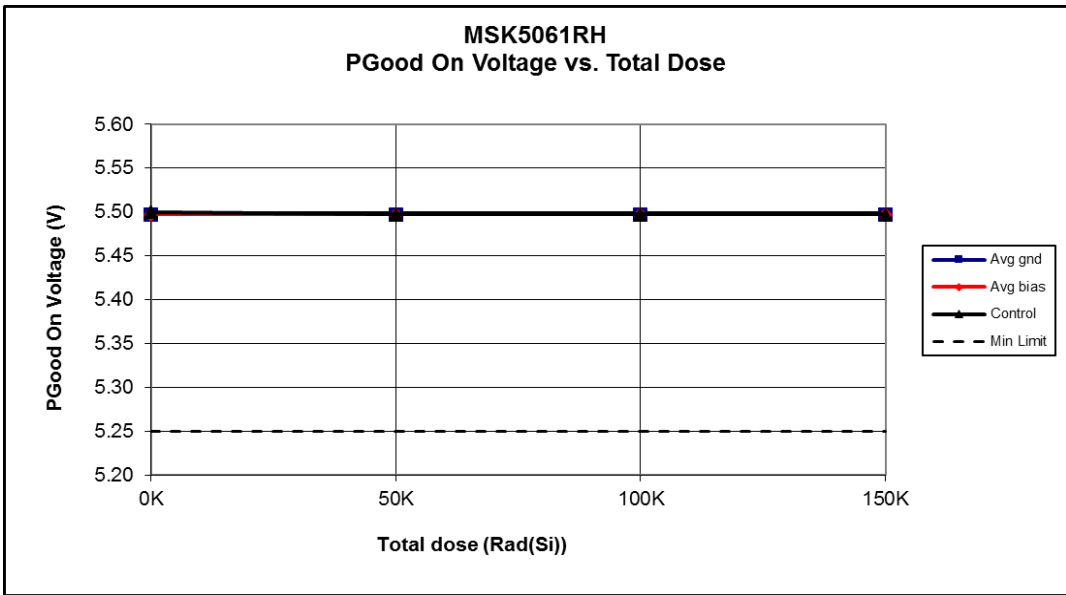
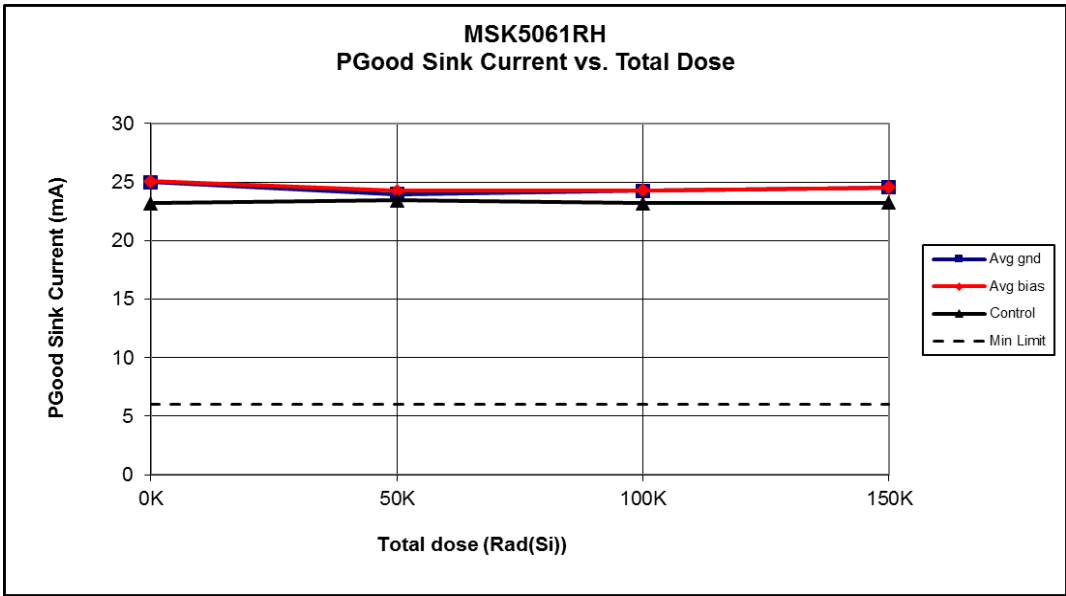


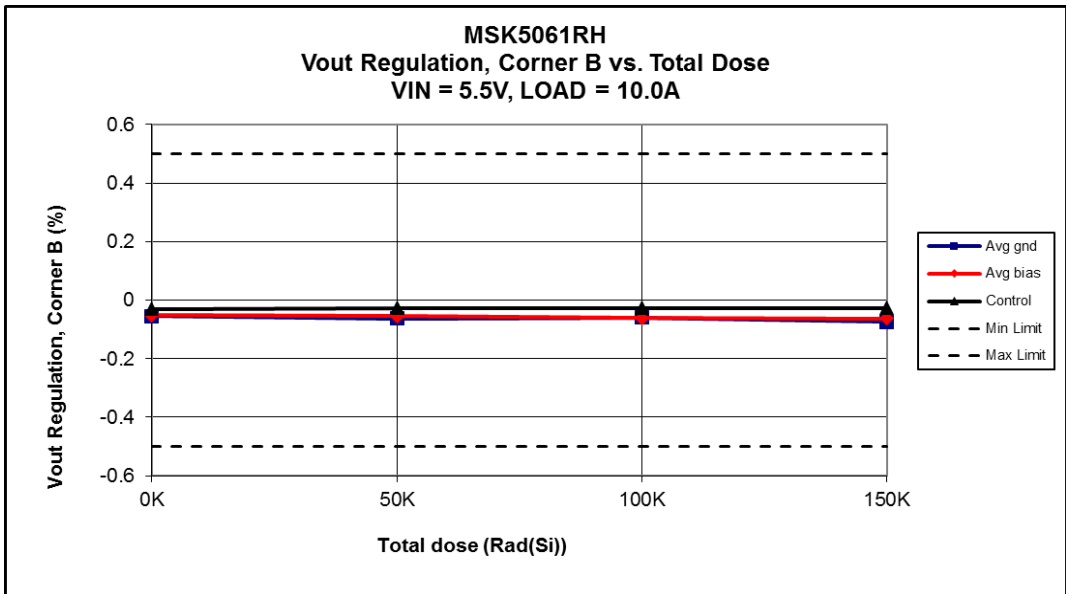
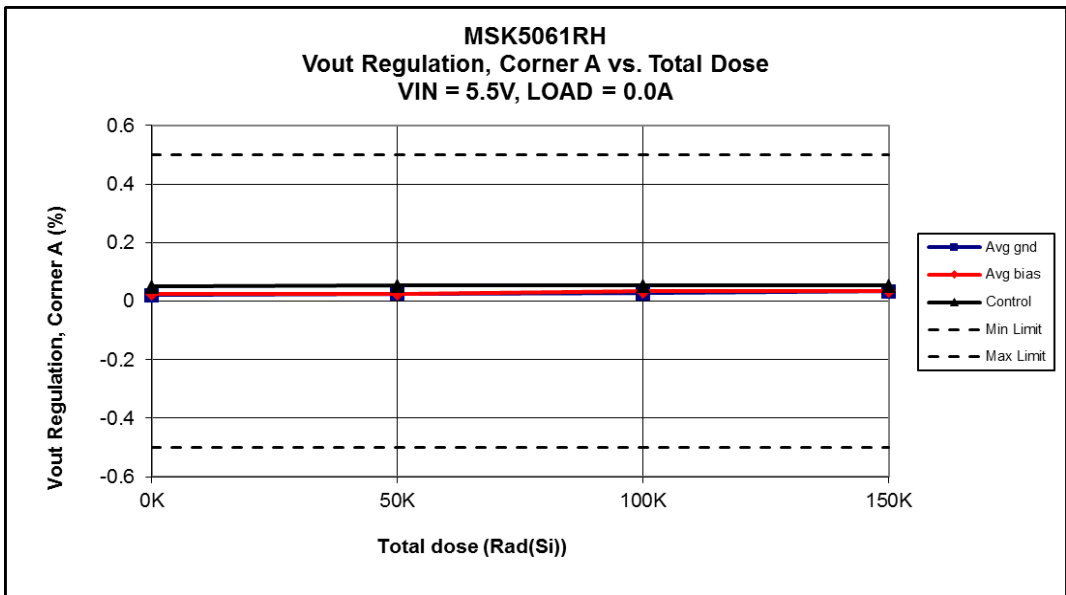
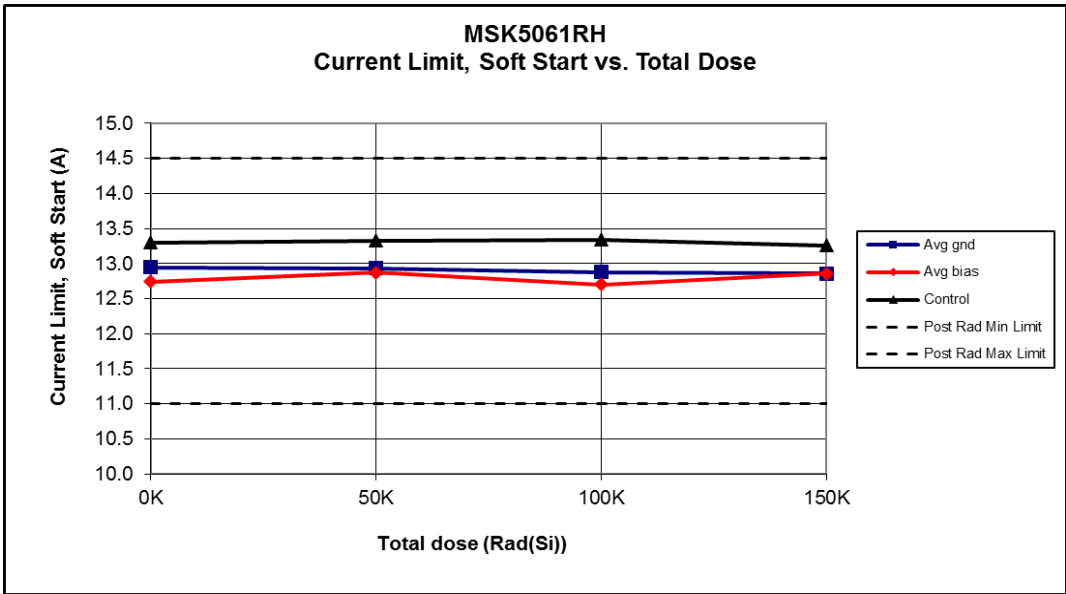


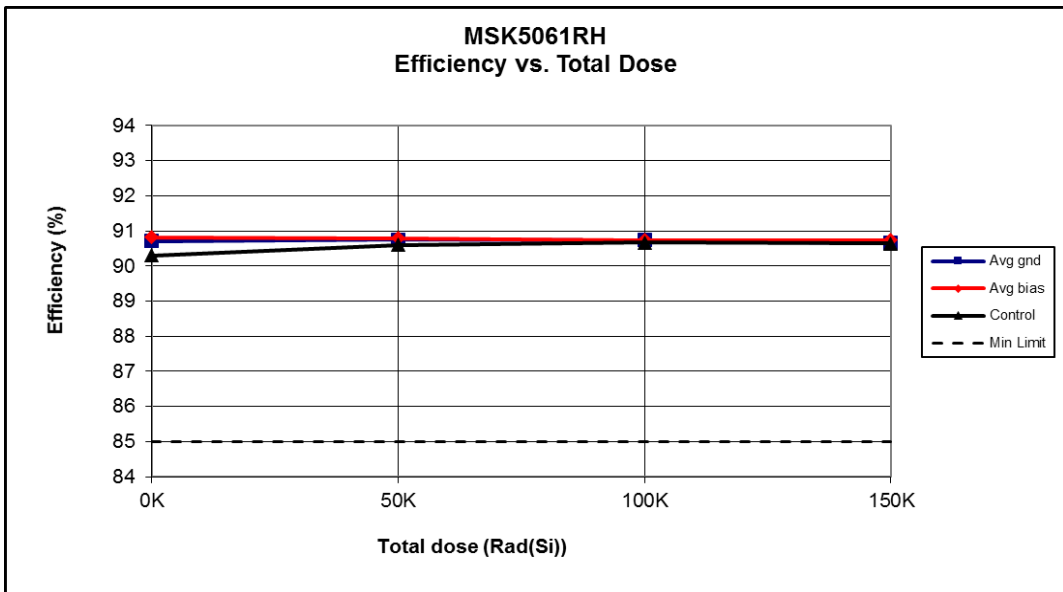
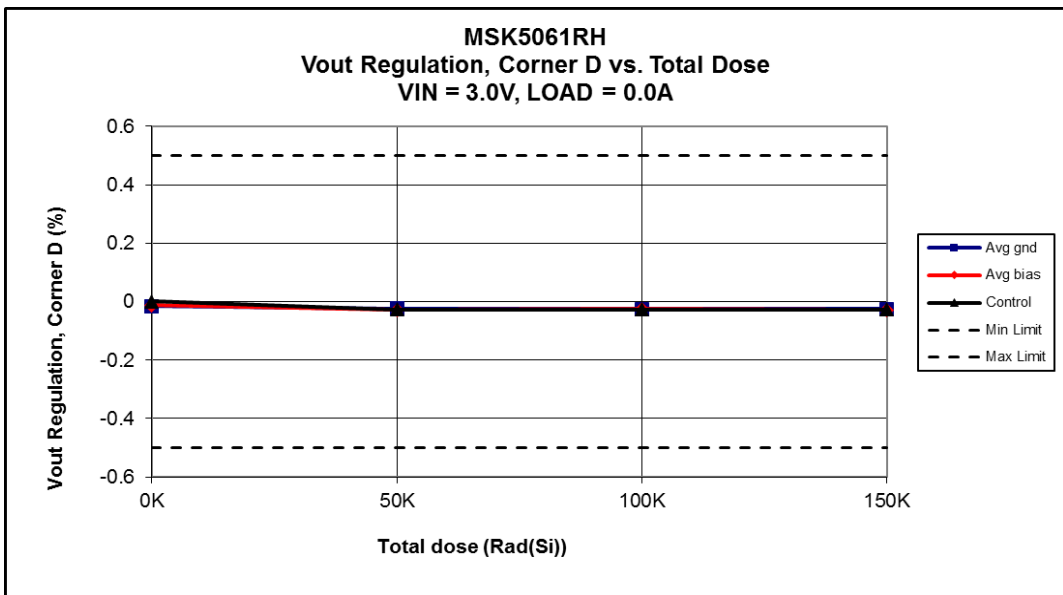
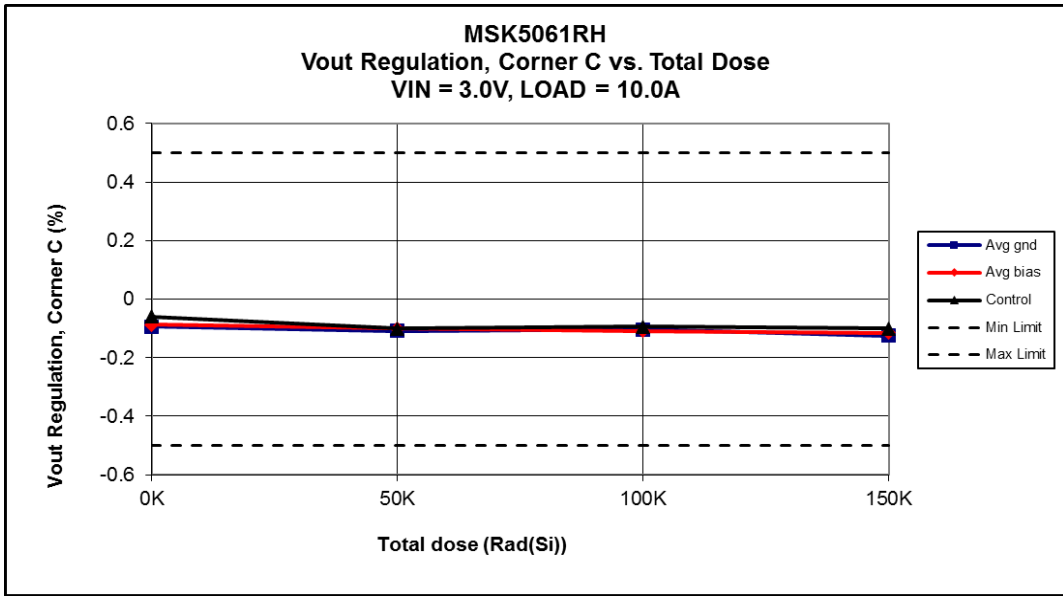












MSK5061RH
Current Sharing Ratio vs. Total Dose

