



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

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Total Ionizing Dose (TID) Radiation Testing of the RH1965MK 0.9A, Low Noise, Low Dropout Linear Regulator for Linear Technology

Customer: Linear Technology, PO# X76021L

RAD Job Number: 16-0300

Part Type Tested: RH1965MK 0.9A, Low Noise, Low Dropout Linear Regulator, Linear Technology RH1965MK DICE/DWF Datasheet ID No. 16-33-1965, Revision F

Traceability Information: Fab Lot Number: HP202273.1, Lot Number: A21610.1, Wafer Number: 3, Date Code: 1550A. See photograph of unit under test in Appendix A.

Quantity of Units: 11 units received, 5 units for biased irradiation, 5 units for unbiased irradiation and 1 unit for control. Serial numbers 119, 120, 151, 152 and 153 were biased during irradiation, serial numbers 154, 155, 172, 173 and 174 were unbiased during irradiation and serial number 175 was used as control. See Appendix B for the radiation bias connection table.

Radiation and Electrical Test Increments: 50rad(Si)/s ionizing radiation with electrical test increments: pre-irradiation, 10krad(Si), 20krad(Si), 30krad(Si), 50krad(Si) and 100krad(Si).

Pre-Irradiation Burn-In: Burn-In performed by Linear Technology prior to receipt by RAD

Overtest and Post-Irradiation Anneal: No overtest. 24-hour room temperature anneal followed by a 168-hour 100°C anneal. Both anneals were performed in the same electrical bias condition as the irradiations. Electrical measurements were made following each anneal increment.

Radiation Test Standard: MIL-STD-883 TM1019 Condition A and Linear Technology RH1965MK DICE/DWF Datasheet ID No. 16-33-1965, Revision F.

Test Hardware and Software: LTS2020 Automated Tester, Entity ID TS03, Calibration Date: 5/31/2016, Calibration Due: 5/31/2017. LTS2100 Family Board, Entity ID FB01. LTS0606A Test Fixture, Entity ID TF35. RH1965 DUT Board. Test Program: RH1965MK.SRC

Facility and Radiation Source: Aeroflex RAD's, Colorado Springs, CO. Gamma rays provided by JLSA 81-24 Co60 source. Dosimetry performed by Air Ionization Chamber (AIC) traceable to NIST. Aeroflex RAD's dosimetry has been audited by DLA and Aeroflex RAD has been awarded Laboratory Suitability for MIL-STD-750 and MIL-STD-883 TM 1019.

Irradiation and Test Temperature: Room temperature controlled to 24°C±6°C per MIL-STD-883.

High Dose Rate Test Result: PASSED the total ionizing dose test to the maximum tested dose level of 100krad(Si) with all parameters remaining within their datasheet specifications. Further the units do not exhibit ELDRS as defined in the current test method.



1.0. Overview and Background

It is well known that total dose ionizing radiation can cause parametric degradation and ultimately functional failure in electronic devices. The damage occurs via electron-hole pair production, transport and trapping in the dielectric and interface regions. In discrete devices the bulk of the damage is frequently manifested as a reduction in the gain and/or breakdown voltage of the device. The damage will usually anneal with time following the end of the radiation exposure. Due to this annealing, and to ensure a worst-case test condition MIL-STD-883 TM1019 calls out a dose rate of 50 to 300rad(Si)/s as Condition A and further specifies that the time from the end of an incremental radiation exposure and electrical testing shall be 1-hour or less and the total time from the end of one incremental irradiation to the beginning of the next incremental radiation step should be 2-hours or less. The work described in this report was performed to meet MIL-STD-883 TM1019 Condition A.

2.0. Radiation Test Apparatus

The total ionizing dose testing described in this final report was performed using the facilities at Aeroflex RAD's Longmire Laboratories in Colorado Springs, CO. The high dose rate total ionizing dose (TID) source is a JLSA 81-24 irradiator modified to provide a panoramic exposure. The Co-60 rods are held in the base of the irradiator heavily shielded by lead. During the radiation exposures the rod is raised by an electronic timer/controller and the exposure is performed in air. The dose rate for this irradiator in this configuration ranges from <1rad(Si)/s to a maximum of approximately 300rad(Si)/s, determined by the distance from the source. For high-dose rate experiments the bias boards are placed in a radial fashion equidistant from the raised Co-60 rods with the distance adjusted to provide the required dose rate. The irradiator calibration is maintained by Aeroflex RAD Longmire Laboratories using air ionization chamber (AIC) equipment calibrated with traceability to the National Institute of Standards and Technology (NIST). Figure 2.1 shows a photograph of the JLSA 81-24 Co-60 irradiator at Aeroflex RAD's Longmire Laboratory facility.

Aeroflex RAD is currently certified by the Defense Logistics Agency (DLA) for Laboratory Suitability under MIL STD 750 and MIL-STD-883H. Additional details regarding Aeroflex RAD dosimetry for TM1019 Condition A testing are available in Aeroflex RAD's report to DLA entitled: "Dose Rate Mapping of the J.L. Shepherd and Associates Model 81 Irradiator Installed by Radiation Assured Devices".



Figure 2.1. Aeroflex RAD's high dose rate Co-60 irradiator. The dose rate is obtained by positioning the device-under-test at a fixed distance from the gamma cell. The dose rate for this irradiator varies from approximately 300rad(Si)/s close to the rods down to 1rad(Si)/s at a distance of approximately 2-feet.



3.0. Radiation Test Conditions

The RH1965MK 0.9A, Low Noise, Low Dropout Linear Regulator described in this final report were irradiated using a single-sided supply potential of 15V and with all pins tied to ground, that is biased and unbiased. See the TID Bias Table in Appendix B for the full bias circuits. In our opinion, this bias circuit satisfies the requirements of MIL-STD-883 TM1019 Section 3.9.3 Bias and Loading Conditions which states "The bias applied to the test devices shall be selected to produce the greatest radiation induced damage or the worst-case damage for the intended application, if known. While maximum voltage is often worst case some bipolar linear device parameters (e.g. input bias current or maximum output load current) exhibit more degradation with 0 V bias."

The devices were irradiated to a maximum total ionizing dose level of 100krad(Si) with incremental readings at 10krad(Si), 20krad(Si), 30krad(Si) and 50krad(Si). Electrical testing occurred within one hour following the end of each irradiation segment. For intermediate irradiations, the parts were tested and returned to total dose exposure within two hours from the end of the previous radiation increment.

The TID bias board was positioned in the Co-60 cell to provide the required minimum of 50rad(Si)/s and was located inside a lead-aluminum enclosure. The lead-aluminum enclosure is required under MIL-STD-883 TM1019 Section 3.4 that reads as follows: "Lead/Aluminum (Pb/Al) container. Test specimens shall be enclosed in a Pb/Al container to minimize dose enhancement effects caused by low-energy, scattered radiation. A minimum of 1.5 mm Pb, surrounding an inner shield of at least 0.7 mm Al, is required. This Pb/Al container produces an approximate charged particle equilibrium for Si and for TLDs such as CaF₂. The radiation field intensity shall be measured inside the Pb/Al container (1) initially, (2) when the source is changed, or (3) when the orientation or configuration of the source, container, or test-fixture is changed. This measurement shall be performed by placing a dosimeter (e.g., a TLD) in the device-irradiation container at the approximate test-device position. If it can be demonstrated that low energy scattered radiation is small enough that it will not cause dosimetry errors due to dose enhancement, the Pb/Al container may be omitted."

The final dose rate within the high dose rate lead-aluminum enclosure was determined using calibration calculations based on air ionization chamber (AIC) dosimetry performed just prior to beginning the total dose irradiations. The final dose rate for this work was 54.3rad(Si)/s with a precision of $\pm 5\%$.



4.0. Tested Parameters

During the total ionizing dose characterization testing the following electrical parameters were measured pre- and post-irradiation:

1. Adjust Pin Voltage1 (V) @ $V_{IN}=2.1V$, $I_L=1mA$
2. Adjust Pin Voltage2 (V) @ $V_{IN}=20V$, $I_L=1mA$
3. Adjust Pin Voltage3 (V) @ $V_{IN}=2.3V$, $I_L=1mA$
4. Adjust Pin Voltage4 (V) @ $V_{IN}=2.3V$, $I_L=0.9A$
5. Line Regulation (V) @ $\Delta V_{IN}=2.1$ to $20V$, $I_L=1mA$
6. Load Regulation (V) @ $V_{IN}=2.3$, $\Delta I_L=1mA$ to $0.9A$
7. GND Pin Current1 (A) @ $V_{IN}=V_{OUT}+1V$, $I_L=0mA$
8. GND Pin Current2 (A) @ $V_{IN}=V_{OUT}+1V$, $I_L=1mA$
9. GND Pin Current3 (A) @ $V_{IN}=V_{OUT}+1V$, $I_L=100mA$
10. GND Pin Current4 (A) @ $V_{IN}=V_{OUT}+1V$, $I_L=500mA$
11. GND Pin Current5 (A) @ $V_{IN}=V_{OUT}+1V$, $I_L=0.9A$
12. Dropout Voltage1 (V) @ $V_{IN}=V_{OUT}$, $I_L=1mA$
13. Dropout Voltage2 (V) @ $V_{IN}=V_{OUT}$, $I_L=100mA$
14. Dropout Voltage3 (V) @ $V_{IN}=V_{OUT}$, $I_L=500mA$
15. Dropout Voltage4 (V) @ $V_{IN}=V_{OUT}$, $I_L=0.9A$
16. Shutdown Threshold1 (V) @ $V_{OUT}=\text{OFF}$ to ON
17. Shutdown Threshold2 (V) @ $V_{OUT}=\text{ON}$ to OFF
18. Quiescent Current in Shutdown (A) @ $V_{IN}=6V$, $V_{SHDN}=0V$
19. Shutdown Pin Current1 (A) @ $V_{IN}=20V$, $V_{SHDN}=0V$
20. Shutdown Pin Current2 (A) @ $V_{IN}=20V$, $V_{SHDN}=20V$
21. Adjust Pin Bias Current (A) @ $V_{IN}=20V$, $V_{ADJ}=V_{OUT}$
22. Reverse-Output Current (A) @ $V_{IN}=0V$, $V_{OUT}=1.2V$
23. Current Limit (A) @ $V_{IN}=V_{OUT}+1V$, $\Delta V_{OUT}=-0.1V$

Appendix C details the measured parameters, test conditions, pre-irradiation specification and measurement resolution for each of the measurements.

The parametric data was obtained as "read and record" and all the raw data plus an attributes summary are contained in this report as well as in a separate Excel file. The attributes data contains the average, standard deviation and the average with the KTL values applied. The KTL value used in this work is 2.742 per MIL-HDBK-814 using one sided tolerance limits of 90/90 and a 5-piece sample size. The 90/90 KTL values were selected to match the statistical levels specified in the MIL-PRF-38535 sampling plan for the qualification of a radiation hardness assured (RHA) component. Note that the following criteria must be met for a device to pass the total ionizing dose test: following the radiation exposure each of the 5 pieces irradiated under electrical bias shall pass the specification value. The units irradiated without electrical bias and the KTL statistics are included in this report for reference only. If any of the 5 pieces irradiated under electrical bias exceed the device post radiation data sheet



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specification limits, then the lot could be logged as a failure.

Further, MIL-STD-883H, TM 1019 Section 3.13.1.1 Characterization test to determine if a part exhibits ELDRS' states the following: Select a minimum random sample of 21 devices from a population representative of recent production runs. Smaller sample sizes may be used if agreed upon between the parties to the test. All of the selected devices shall have undergone appropriate elevated temperature reliability screens, e.g. burn-in and high temperature storage life. Divide the samples into four groups of 5 each and use the remaining part for a control. Perform pre-irradiation electrical characterization on all parts assuring that they meet the Group A electrical tests. Irradiate 5 samples under a 0 volt bias and another 5 under the irradiation bias given in the acquisition specification at 50-300 rad(Si)/s and room temperature. Irradiate 5 samples under a 0 volt bias and another 5 under irradiation bias given in the acquisition specification at < 10mrad(Si)/s and room temperature. Irradiate all samples to the same dose levels, including 0.5 and 1.0 times the anticipated specification dose, and repeat the electrical characterization on each part at each dose level. Post irradiation electrical measurements shall be performed per paragraph 3.10 where the low dose rate test is considered Condition D. Calculate the radiation induced change in each electrical parameter (Δ_{para}) for each sample at each radiation level. Calculate the ratio of the median Δ_{para} at low dose rate to the median Δ_{para} at high dose rate for each irradiation bias group at each total dose level. If this ratio exceeds 1.5 for any of the most sensitive parameters then the part is considered to be ELDRS susceptible. This test does not apply to parameters which exhibit changes that are within experimental error or whose values are below the pre-irradiation electrical specification limits at low dose rate at the specification dose.

Therefore, the data in this report can be analyzed along with the low dose rate report titled "Enhanced Low Dose Rate Sensitivity (ELDRS) Radiation Testing of the RH1965MK 0.9A, Low Noise, Low Dropout Linear Regulator for Linear Technology" to demonstrate that these parts do not exhibit ELDRS as defined in the current test method.



5.0. Total Ionizing Dose Test Results

Based on this criterion the RH1965MK 0.9A, Low Noise, Low Dropout Linear Regulator (from the lot traceability information provided on the first page of this test report) PASSED the total ionizing dose test to the maximum tested dose level of 100krad(Si) with all parameters remaining within their datasheet specifications.

Figures 5.1 through 5.23 show plots of all the measured parameters versus total ionizing dose while Tables 5.1 - 5.23 show the corresponding raw data for each of these parameters. In the data plots the solid diamonds are the average of the measured data points for the sample irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the units irradiated with all pins tied to ground. The black lines (solid or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the sample irradiated in the biased condition while the shaded lines (solid or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the sample irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.

The control units, as expected, show no significant changes to any of the parameters. Therefore we can conclude that the electrical testing remained in control throughout the duration of the tests and the observed degradation was due to the radiation exposure. Appendix D lists the figures used in this section to facilitate the location of a particular parameter.

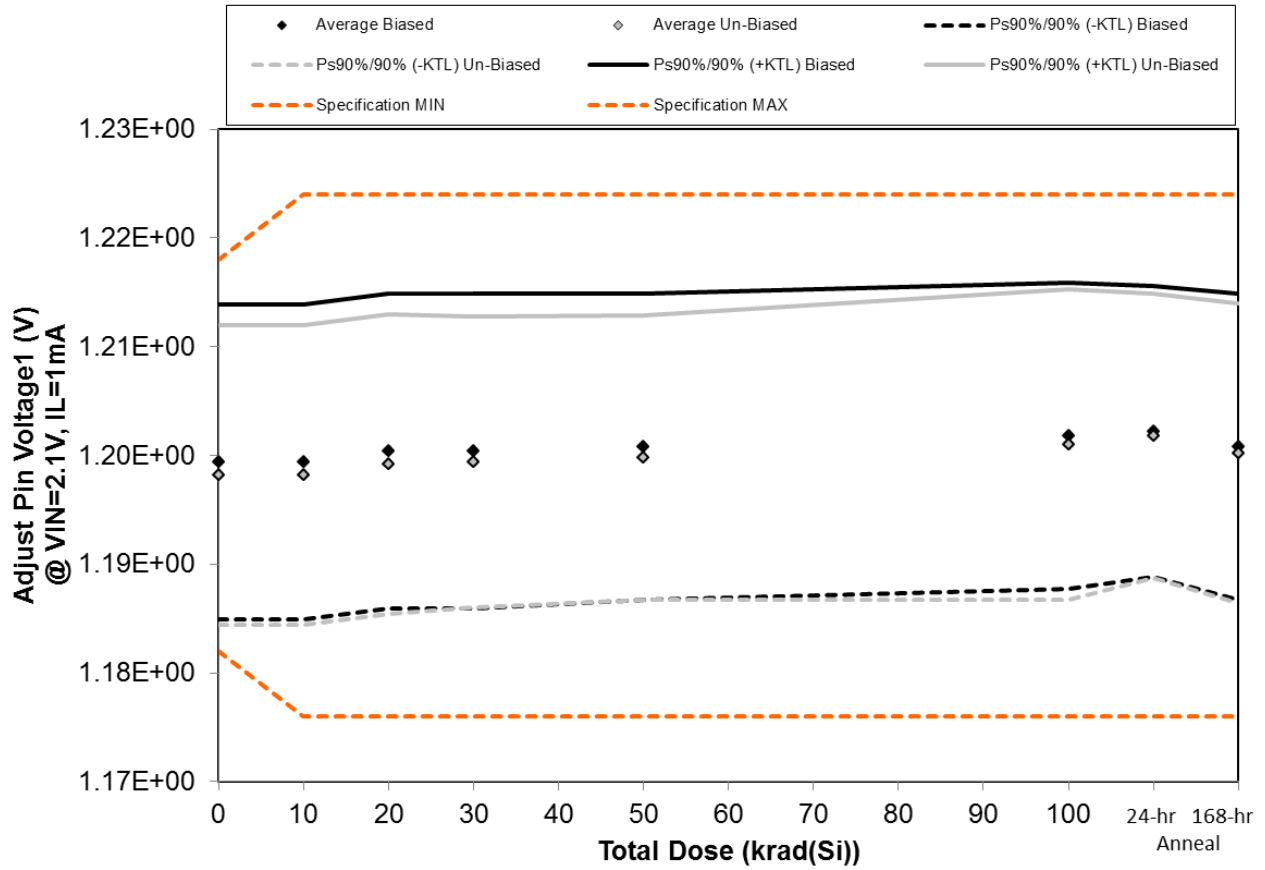


Figure 5.1. Plot of Adjust Pin Voltage1 (V) @ VIN=2.1V, IL=1mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



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Table 5.1. Raw data for Adjust Pin Voltage1 (V) @ VIN=2.1V, IL=1mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Adjust Pin Voltage1 (V) @ VIN=2.1V, IL=1mA	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	1.200E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
120	1.208E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
151	1.198E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
152	1.194E+00	1.19E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
153	1.197E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
154	1.197E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
155	1.195E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
172	1.195E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
173	1.197E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
174	1.207E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
175	1.201E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Biased Statistics								
Average Biased	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Std Dev Biased	5.27E-03	5.27E-03	5.27E-03	5.27E-03	5.12E-03	5.12E-03	4.87E-03	5.12E-03
Ps90%/90% (+KTL) Biased	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.22E+00	1.22E+00	1.21E+00
Ps90%/90% (-KTL) Biased	1.18E+00	1.18E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
Un-Biased Statistics								
Average Un-Biased	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Std Dev Un-Biased	5.02E-03	5.02E-03	5.02E-03	4.88E-03	4.76E-03	5.20E-03	4.76E-03	5.02E-03
Ps90%/90% (+KTL) Un-Biased	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.22E+00	1.21E+00	1.21E+00
Ps90%/90% (-KTL) Un-Biased	1.18E+00	1.18E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
Specification MIN	1.182E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Specification MAX	1.218E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

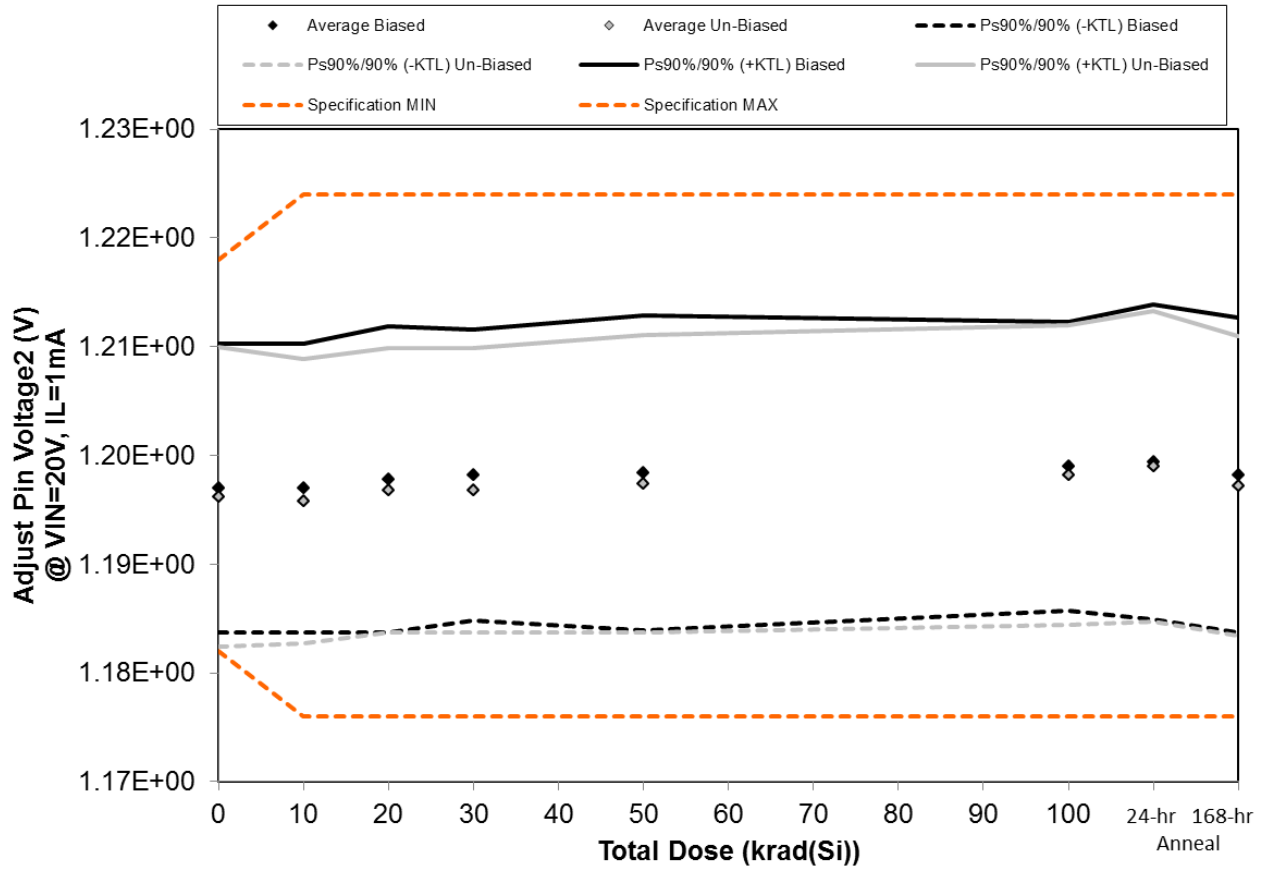


Figure 5.2. Plot of Adjust Pin Voltage2 (V) @ VIN=20V, IL=1mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



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Table 5.2. Raw data for Adjust Pin Voltage2 (V) @ VIN=20V, IL=1mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Adjust Pin Voltage2 (V) @ VIN=20V, IL=1mA	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	1.197E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
120	1.205E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
151	1.196E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
152	1.192E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
153	1.195E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
154	1.195E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
155	1.193E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.20E+00	1.20E+00	1.19E+00
172	1.193E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.20E+00	1.20E+00	1.19E+00
173	1.195E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
174	1.205E+00	1.20E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
175	1.199E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Biased Statistics								
Average Biased	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Std Dev Biased	4.85E-03	4.85E-03	5.12E-03	4.87E-03	5.27E-03	4.85E-03	5.27E-03	5.26E-03
Ps90%/90% (+KTL) Biased	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
Ps90%/90% (-KTL) Biased	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.19E+00	1.18E+00	1.18E+00
Un-Biased Statistics								
Average Un-Biased	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Std Dev Un-Biased	5.02E-03	4.76E-03	4.76E-03	4.76E-03	4.98E-03	5.02E-03	5.20E-03	5.02E-03
Ps90%/90% (+KTL) Un-Biased	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
Ps90%/90% (-KTL) Un-Biased	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00
Specification MIN	1.182E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Specification MAX	1.218E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

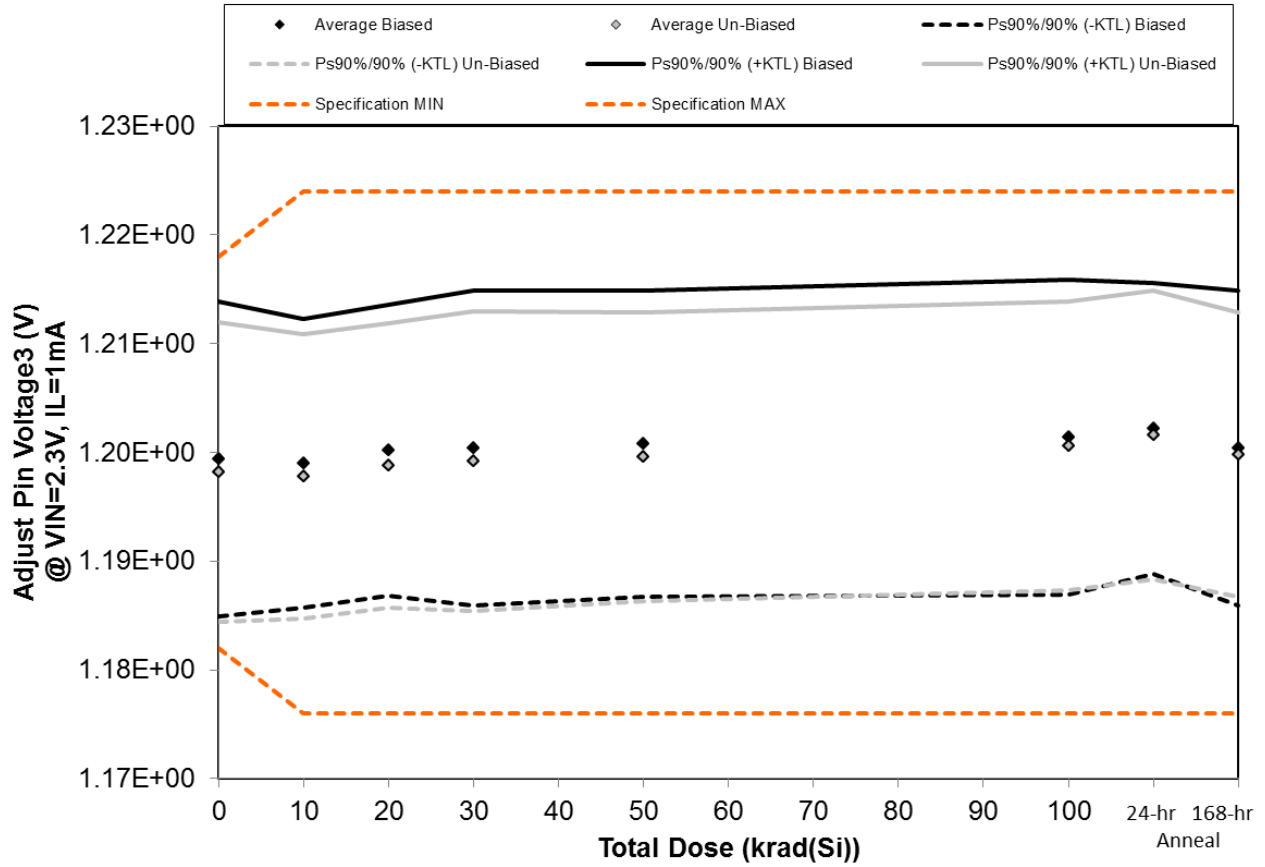


Figure 5.3. Plot of Adjust Pin Voltage3 (V) @ VIN=2.3V, IL=1mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



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Table 5.3. Raw data for Adjust Pin Voltage3 (V) @ VIN=2.3V, IL=1mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Adjust Pin Voltage3 (V) @ VIN=2.3V, IL=1mA	Total Dose (krad(Si))						24-hr	168-hr
	0	10	20	30	50	100	Anneal	Anneal
Device								
119	1.200E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
120	1.208E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
151	1.198E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
152	1.194E+00	1.19E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
153	1.197E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
154	1.197E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
155	1.195E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
172	1.195E+00	1.19E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
173	1.197E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
174	1.207E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
175	1.201E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Biased Statistics								
Average Biased	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Std Dev Biased	5.27E-03	4.85E-03	4.87E-03	5.27E-03	5.12E-03	5.27E-03	4.87E-03	5.27E-03
Ps90%/90% (+KTL) Biased	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.22E+00	1.22E+00	1.21E+00
Ps90%/90% (-KTL) Biased	1.18E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
Un-Biased Statistics								
Average Un-Biased	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Std Dev Un-Biased	5.02E-03	4.76E-03	4.76E-03	5.02E-03	4.83E-03	4.83E-03	4.83E-03	4.76E-03
Ps90%/90% (+KTL) Un-Biased	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
Ps90%/90% (-KTL) Un-Biased	1.18E+00	1.18E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
Specification MIN	1.182E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Specification MAX	1.218E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

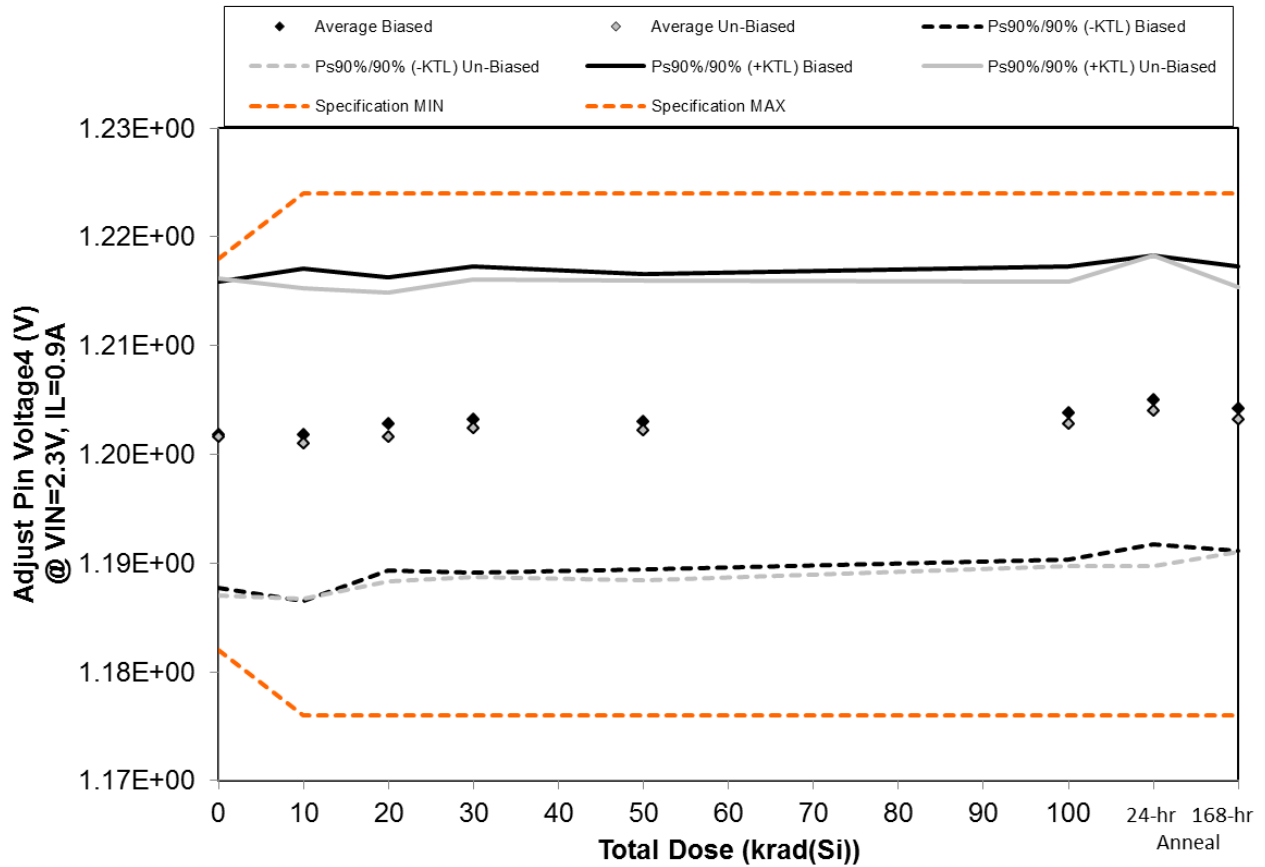


Figure 5.4. Plot of Adjust Pin Voltage4 (V) @ VIN=2.3V, IL=0.9A versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
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Colorado Springs, CO 80919
(719) 531-0800

Table 5.4. Raw data for Adjust Pin Voltage4 (V) @ VIN=2.3V, IL=0.9A versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Adjust Pin Voltage4 (V) @ VIN=2.3V, IL=0.9A	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	1.202E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.21E+00	1.20E+00
120	1.210E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
151	1.201E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
152	1.196E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
153	1.200E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
154	1.200E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
155	1.198E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
172	1.199E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
173	1.200E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
174	1.211E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
175	1.204E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.21E+00	1.20E+00
Biased Statistics								
Average Biased	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.21E+00	1.20E+00
Std Dev Biased	5.12E-03	5.59E-03	4.92E-03	5.12E-03	4.95E-03	4.92E-03	4.85E-03	4.76E-03
Ps90%/90% (+KTL) Biased	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00
Ps90%/90% (-KTL) Biased	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
Un-Biased Statistics								
Average Un-Biased	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00
Std Dev Un-Biased	5.32E-03	5.20E-03	4.83E-03	4.98E-03	5.02E-03	4.76E-03	5.20E-03	4.44E-03
Ps90%/90% (+KTL) Un-Biased	1.22E+00	1.22E+00	1.21E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00
Ps90%/90% (-KTL) Un-Biased	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00	1.19E+00
Specification MIN	1.182E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00	1.176E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Specification MAX	1.218E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00	1.224E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

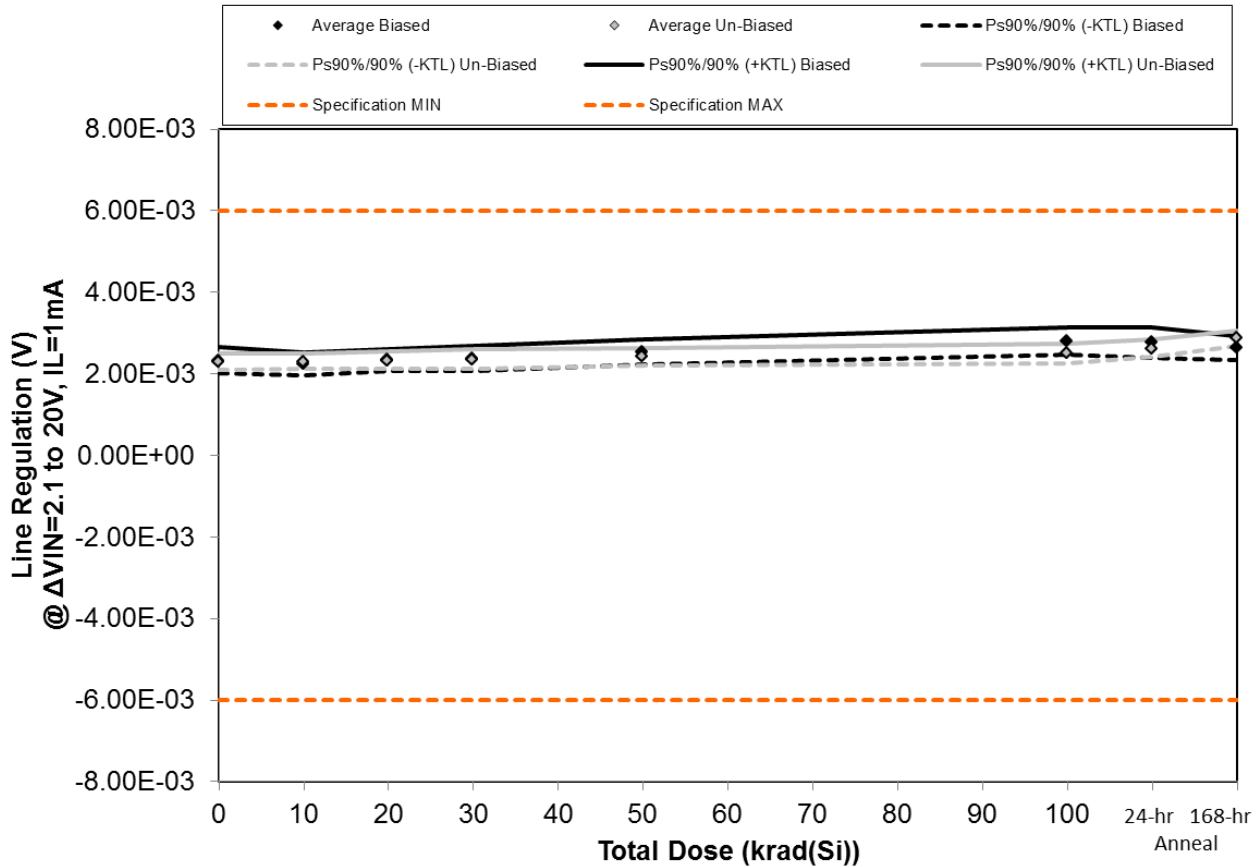


Figure 5.5. Plot of Line Regulation (V) @ $\Delta V_{IN}=2.1$ to 20V, $I_L=1$ mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.5. Raw data for Line Regulation (V) @ $\Delta V_{IN}=2.1$ to 20V, $I_L=1mA$ versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Line Regulation (V) @ $\Delta V_{IN}=2.1$ to 20V, $I_L=1mA$	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	2.41E-03	2.31E-03	2.41E-03	2.43E-03	2.72E-03	2.99E-03	3.00E-03	2.81E-03
120	2.50E-03	2.41E-03	2.48E-03	2.53E-03	2.54E-03	2.72E-03	2.73E-03	2.65E-03
151	2.26E-03	2.16E-03	2.26E-03	2.23E-03	2.42E-03	2.69E-03	2.63E-03	2.52E-03
152	2.22E-03	2.18E-03	2.27E-03	2.30E-03	2.50E-03	2.83E-03	2.78E-03	2.64E-03
153	2.27E-03	2.22E-03	2.28E-03	2.39E-03	2.48E-03	2.76E-03	2.75E-03	2.60E-03
154	2.42E-03	2.37E-03	2.40E-03	2.40E-03	2.48E-03	2.51E-03	2.65E-03	2.89E-03
155	2.35E-03	2.34E-03	2.39E-03	2.44E-03	2.46E-03	2.58E-03	2.71E-03	2.93E-03
172	2.24E-03	2.23E-03	2.25E-03	2.28E-03	2.34E-03	2.40E-03	2.52E-03	2.77E-03
173	2.27E-03	2.24E-03	2.25E-03	2.26E-03	2.33E-03	2.44E-03	2.57E-03	2.88E-03
174	2.25E-03	2.36E-03	2.40E-03	2.43E-03	2.50E-03	2.61E-03	2.68E-03	2.92E-03
175	2.24E-03	2.28E-03	2.24E-03	2.22E-03	2.21E-03	2.20E-03	2.26E-03	2.21E-03
Biased Statistics								
Average Biased	2.33E-03	2.26E-03	2.34E-03	2.38E-03	2.53E-03	2.80E-03	2.78E-03	2.64E-03
Std Dev Biased	1.15E-04	1.03E-04	9.98E-05	1.15E-04	1.14E-04	1.20E-04	1.37E-04	1.06E-04
Ps90%/90% (+KTL) Biased	2.65E-03	2.54E-03	2.61E-03	2.69E-03	2.85E-03	3.13E-03	3.15E-03	2.93E-03
Ps90%/90% (-KTL) Biased	2.02E-03	1.97E-03	2.07E-03	2.06E-03	2.22E-03	2.47E-03	2.40E-03	2.35E-03
Un-Biased Statistics								
Average Un-Biased	2.30E-03	2.31E-03	2.34E-03	2.36E-03	2.42E-03	2.51E-03	2.63E-03	2.88E-03
Std Dev Un-Biased	7.57E-05	6.93E-05	8.19E-05	8.82E-05	8.08E-05	8.87E-05	7.98E-05	6.48E-05
Ps90%/90% (+KTL) Un-Biased	2.51E-03	2.50E-03	2.56E-03	2.60E-03	2.64E-03	2.75E-03	2.84E-03	3.05E-03
Ps90%/90% (-KTL) Un-Biased	2.10E-03	2.12E-03	2.11E-03	2.12E-03	2.20E-03	2.26E-03	2.41E-03	2.70E-03
Specification MIN	-6.00E-03	-6.00E-03	-6.00E-03	-6.00E-03	-6.00E-03	-6.00E-03	-6.00E-03	-6.00E-03
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Specification MAX	6.00E-03	6.00E-03	6.00E-03	6.00E-03	6.00E-03	6.00E-03	6.00E-03	6.00E-03
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

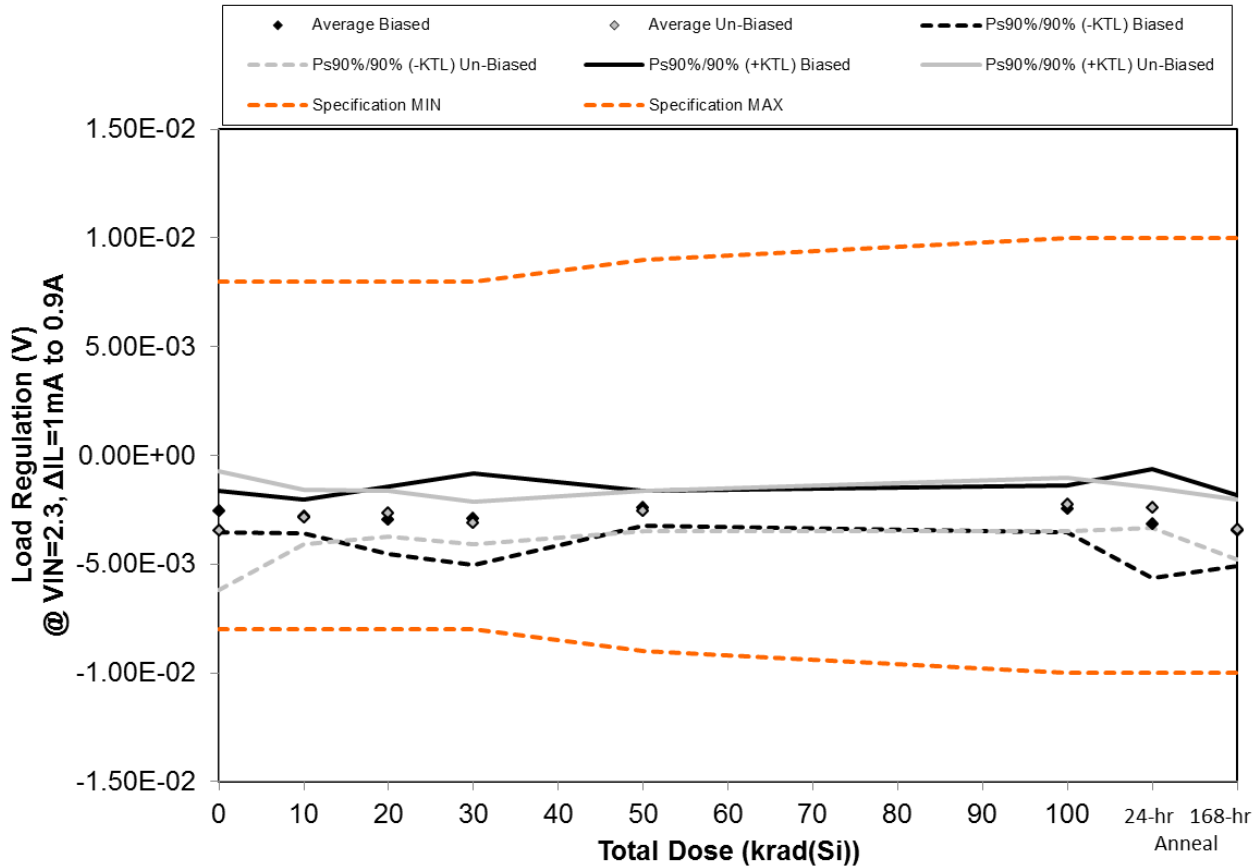


Figure 5.6. Plot of Load Regulation (V) @ VIN=2.3, ΔIL=1mA to 0.9A versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.6. Raw data for Load Regulation (V) @ VIN=2.3, ΔIL=1mA to 0.9A versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Load Regulation (V) @ VIN=2.3, ΔIL=1mA to 0.9A	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	-2.21E-03	-2.77E-03	-2.75E-03	-2.54E-03	-2.50E-03	-2.20E-03	-2.47E-03	-3.09E-03
120	-2.58E-03	-3.25E-03	-3.00E-03	-3.13E-03	-2.32E-03	-2.61E-03	-2.91E-03	-3.03E-03
151	-2.85E-03	-2.46E-03	-2.39E-03	-2.27E-03	-1.96E-03	-1.88E-03	-2.40E-03	-3.27E-03
152	-2.26E-03	-2.77E-03	-3.90E-03	-4.18E-03	-2.60E-03	-2.72E-03	-3.24E-03	-3.35E-03
153	-3.00E-03	-2.88E-03	-2.78E-03	-2.48E-03	-2.73E-03	-2.80E-03	-4.66E-03	-4.48E-03
154	-2.48E-03	-2.50E-03	-2.66E-03	-2.64E-03	-2.04E-03	-2.00E-03	-2.26E-03	-2.92E-03
155	-2.75E-03	-2.77E-03	-2.15E-03	-2.88E-03	-2.68E-03	-1.86E-03	-1.90E-03	-4.20E-03
172	-4.33E-03	-2.60E-03	-3.23E-03	-3.15E-03	-2.87E-03	-2.45E-03	-2.50E-03	-3.53E-03
173	-2.95E-03	-2.71E-03	-2.66E-03	-3.48E-03	-2.42E-03	-2.92E-03	-2.80E-03	-3.21E-03
174	-4.68E-03	-3.63E-03	-2.61E-03	-3.40E-03	-2.75E-03	-1.96E-03	-2.57E-03	-3.09E-03
175	-3.11E-03	-3.48E-03	-2.68E-03	-2.68E-03	-3.19E-03	-3.11E-03	-3.46E-03	-2.92E-03
Biased Statistics								
Average Biased	-2.58E-03	-2.82E-03	-2.97E-03	-2.92E-03	-2.42E-03	-2.44E-03	-3.14E-03	-3.44E-03
Std Dev Biased	3.48E-04	2.82E-04	5.65E-04	7.72E-04	2.98E-04	3.90E-04	9.18E-04	5.92E-04
Ps90%/90% (+KTL) Biased	-1.62E-03	-2.05E-03	-1.42E-03	-8.02E-04	-1.61E-03	-1.37E-03	-6.18E-04	-1.82E-03
Ps90%/90% (-KTL) Biased	-3.53E-03	-3.60E-03	-4.52E-03	-5.04E-03	-3.24E-03	-3.51E-03	-5.65E-03	-5.07E-03
Un-Biased Statistics								
Average Un-Biased	-3.44E-03	-2.84E-03	-2.66E-03	-3.11E-03	-2.55E-03	-2.24E-03	-2.40E-03	-3.39E-03
Std Dev Un-Biased	9.97E-04	4.55E-04	3.84E-04	3.53E-04	3.32E-04	4.45E-04	3.42E-04	5.06E-04
Ps90%/90% (+KTL) Un-Biased	-7.02E-04	-1.59E-03	-1.61E-03	-2.14E-03	-1.64E-03	-1.02E-03	-1.47E-03	-2.00E-03
Ps90%/90% (-KTL) Un-Biased	-6.17E-03	-4.09E-03	-3.71E-03	-4.08E-03	-3.46E-03	-3.46E-03	-3.34E-03	-4.78E-03
Specification MIN	-8.00E-03	-8.00E-03	-8.00E-03	-8.00E-03	-9.00E-03	-1.00E-02	-1.00E-02	-1.00E-02
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Specification MAX	8.00E-03	8.00E-03	8.00E-03	8.00E-03	9.00E-03	1.00E-02	1.00E-02	1.00E-02
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

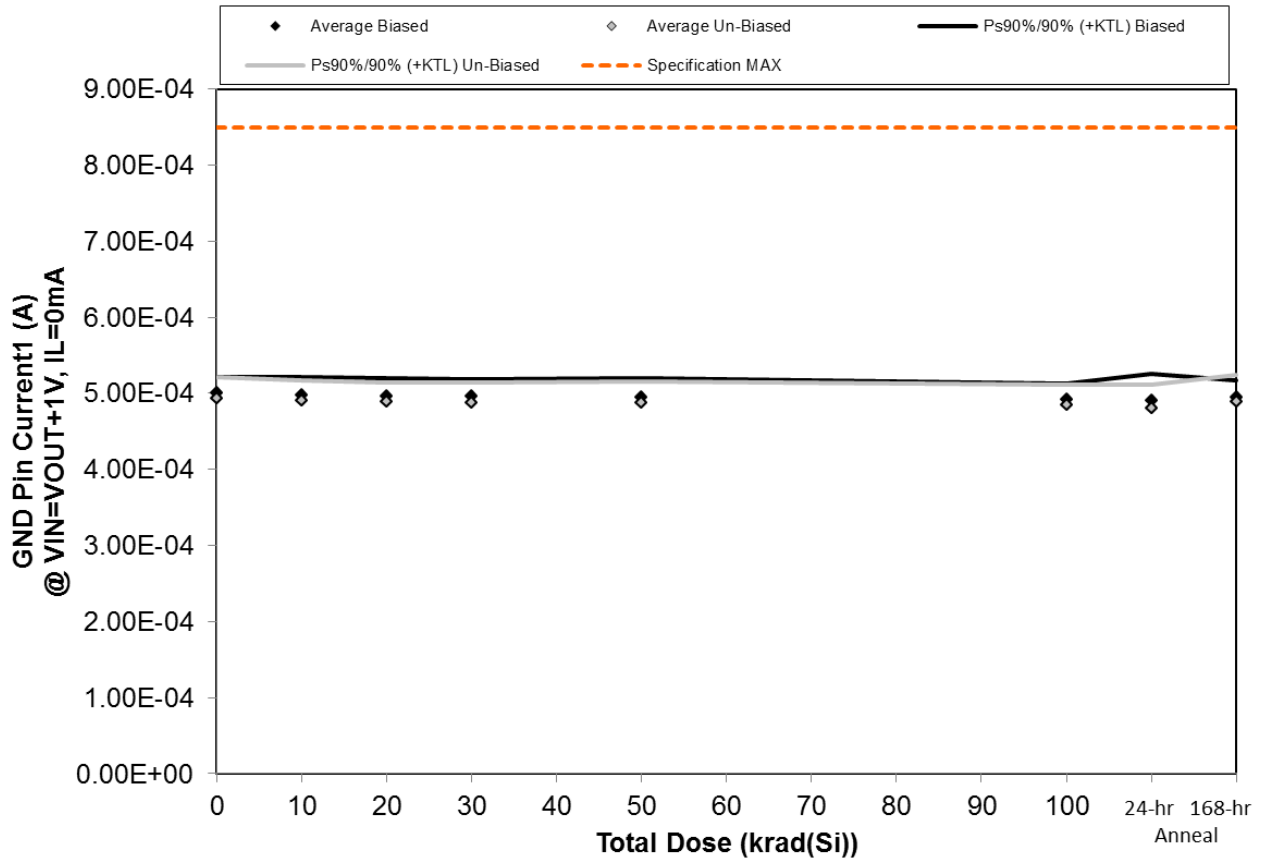


Figure 5.7. Plot of GND Pin Current1 (A) @ VIN=VOUT+1V, IL=0mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.7. Raw data for GND Pin Current1 (A) @ VIN=VOUT+1V, IL=0mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

GND Pin Current1 (A) @ VIN=VOUT+1V, IL=0mA	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	5.01E-04	4.96E-04	4.95E-04	4.94E-04	4.94E-04	4.91E-04	4.89E-04	4.92E-04
120	4.99E-04	4.96E-04	4.96E-04	4.96E-04	4.97E-04	4.95E-04	4.81E-04	4.93E-04
151	4.90E-04	4.84E-04	4.84E-04	4.84E-04	4.81E-04	4.80E-04	4.78E-04	4.84E-04
152	5.03E-04	5.00E-04	5.00E-04	4.99E-04	4.97E-04	4.94E-04	4.98E-04	5.00E-04
153	5.11E-04	5.09E-04	5.07E-04	5.07E-04	5.06E-04	5.01E-04	5.09E-04	5.05E-04
154	4.90E-04	4.88E-04	4.86E-04	4.85E-04	4.84E-04	4.81E-04	4.80E-04	4.84E-04
155	4.85E-04	4.82E-04	4.81E-04	4.80E-04	4.80E-04	4.78E-04	4.74E-04	4.77E-04
172	4.97E-04	4.93E-04	4.92E-04	4.91E-04	4.91E-04	4.88E-04	4.83E-04	4.93E-04
173	5.09E-04	5.06E-04	5.04E-04	5.03E-04	5.04E-04	5.00E-04	4.97E-04	5.09E-04
174	4.84E-04	4.83E-04	4.82E-04	4.81E-04	4.80E-04	4.77E-04	4.66E-04	4.81E-04
175	5.13E-04	5.12E-04	5.13E-04	5.12E-04	5.12E-04	5.12E-04	5.11E-04	5.12E-04
Biased Statistics								
Average Biased	5.01E-04	4.97E-04	4.96E-04	4.96E-04	4.95E-04	4.92E-04	4.91E-04	4.95E-04
Std Dev Biased	7.56E-06	9.00E-06	8.38E-06	8.34E-06	9.03E-06	7.73E-06	1.27E-05	8.04E-06
Ps90%/90% (+KTL) Biased	5.22E-04	5.22E-04	5.19E-04	5.19E-04	5.20E-04	5.13E-04	5.26E-04	5.17E-04
Ps90%/90% (-KTL) Biased	4.80E-04	4.72E-04	4.73E-04	4.73E-04	4.70E-04	4.71E-04	4.56E-04	4.73E-04
Un-Biased Statistics								
Average Un-Biased	4.93E-04	4.90E-04	4.89E-04	4.88E-04	4.88E-04	4.85E-04	4.80E-04	4.89E-04
Std Dev Un-Biased	1.03E-05	9.76E-06	9.43E-06	9.43E-06	1.01E-05	9.52E-06	1.15E-05	1.27E-05
Ps90%/90% (+KTL) Un-Biased	5.21E-04	5.17E-04	5.15E-04	5.14E-04	5.16E-04	5.11E-04	5.12E-04	5.24E-04
Ps90%/90% (-KTL) Un-Biased	4.65E-04	4.64E-04	4.63E-04	4.62E-04	4.60E-04	4.59E-04	4.48E-04	4.54E-04
Specification MAX	8.50E-04	8.50E-04	8.50E-04	8.50E-04	8.50E-04	8.50E-04	8.50E-04	8.50E-04
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

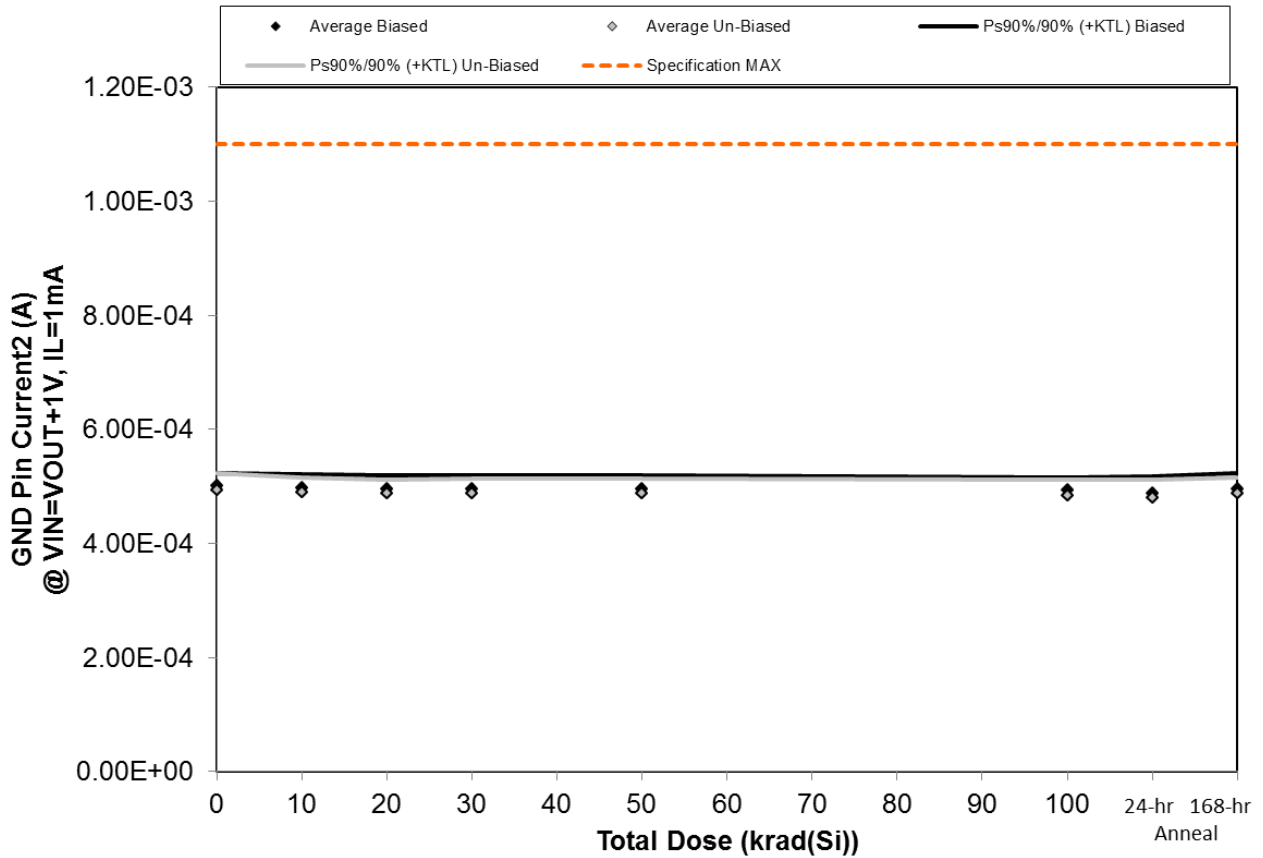


Figure 5.8. Plot of GND Pin Current2 (A) @ VIN=VOUT+1V, IL=1mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.8. Raw data for GND Pin Current2 (A) @ VIN=VOUT+1V, IL=1mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

GND Pin Current2 (A) @ VIN=VOUT+1V, IL=1mA	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	5.01E-04	4.95E-04	4.95E-04	4.94E-04	4.94E-04	4.91E-04	4.89E-04	4.95E-04
120	4.99E-04	4.97E-04	4.96E-04	4.96E-04	4.96E-04	4.95E-04	4.80E-04	4.95E-04
151	4.89E-04	4.84E-04	4.84E-04	4.83E-04	4.82E-04	4.80E-04	4.77E-04	4.83E-04
152	5.03E-04	4.99E-04	4.98E-04	4.99E-04	4.98E-04	4.95E-04	4.93E-04	5.00E-04
153	5.12E-04	5.09E-04	5.08E-04	5.07E-04	5.06E-04	5.03E-04	5.03E-04	5.09E-04
154	4.91E-04	4.88E-04	4.86E-04	4.86E-04	4.84E-04	4.81E-04	4.78E-04	4.85E-04
155	4.85E-04	4.83E-04	4.81E-04	4.81E-04	4.80E-04	4.78E-04	4.74E-04	4.79E-04
172	4.97E-04	4.93E-04	4.92E-04	4.91E-04	4.91E-04	4.88E-04	4.84E-04	4.92E-04
173	5.10E-04	5.05E-04	5.02E-04	5.03E-04	5.02E-04	5.00E-04	4.98E-04	5.04E-04
174	4.84E-04	4.83E-04	4.82E-04	4.81E-04	4.80E-04	4.77E-04	4.67E-04	4.82E-04
175	5.13E-04	5.13E-04	5.13E-04	5.13E-04	5.12E-04	5.12E-04	5.12E-04	5.12E-04
Biased Statistics								
Average Biased	5.01E-04	4.97E-04	4.96E-04	4.96E-04	4.95E-04	4.93E-04	4.88E-04	4.96E-04
Std Dev Biased	8.26E-06	8.96E-06	8.56E-06	8.70E-06	8.67E-06	8.38E-06	1.04E-05	9.42E-06
Ps90%/90% (+KTL) Biased	5.23E-04	5.21E-04	5.20E-04	5.20E-04	5.19E-04	5.16E-04	5.17E-04	5.22E-04
Ps90%/90% (-KTL) Biased	4.78E-04	4.72E-04	4.73E-04	4.72E-04	4.71E-04	4.70E-04	4.60E-04	4.71E-04
Un-Biased Statistics								
Average Un-Biased	4.93E-04	4.90E-04	4.89E-04	4.88E-04	4.87E-04	4.85E-04	4.80E-04	4.88E-04
Std Dev Un-Biased	1.06E-05	9.15E-06	8.65E-06	9.15E-06	9.32E-06	9.52E-06	1.17E-05	9.96E-06
Ps90%/90% (+KTL) Un-Biased	5.23E-04	5.16E-04	5.12E-04	5.14E-04	5.13E-04	5.11E-04	5.12E-04	5.16E-04
Ps90%/90% (-KTL) Un-Biased	4.64E-04	4.65E-04	4.65E-04	4.63E-04	4.62E-04	4.59E-04	4.48E-04	4.61E-04
Specification MAX	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

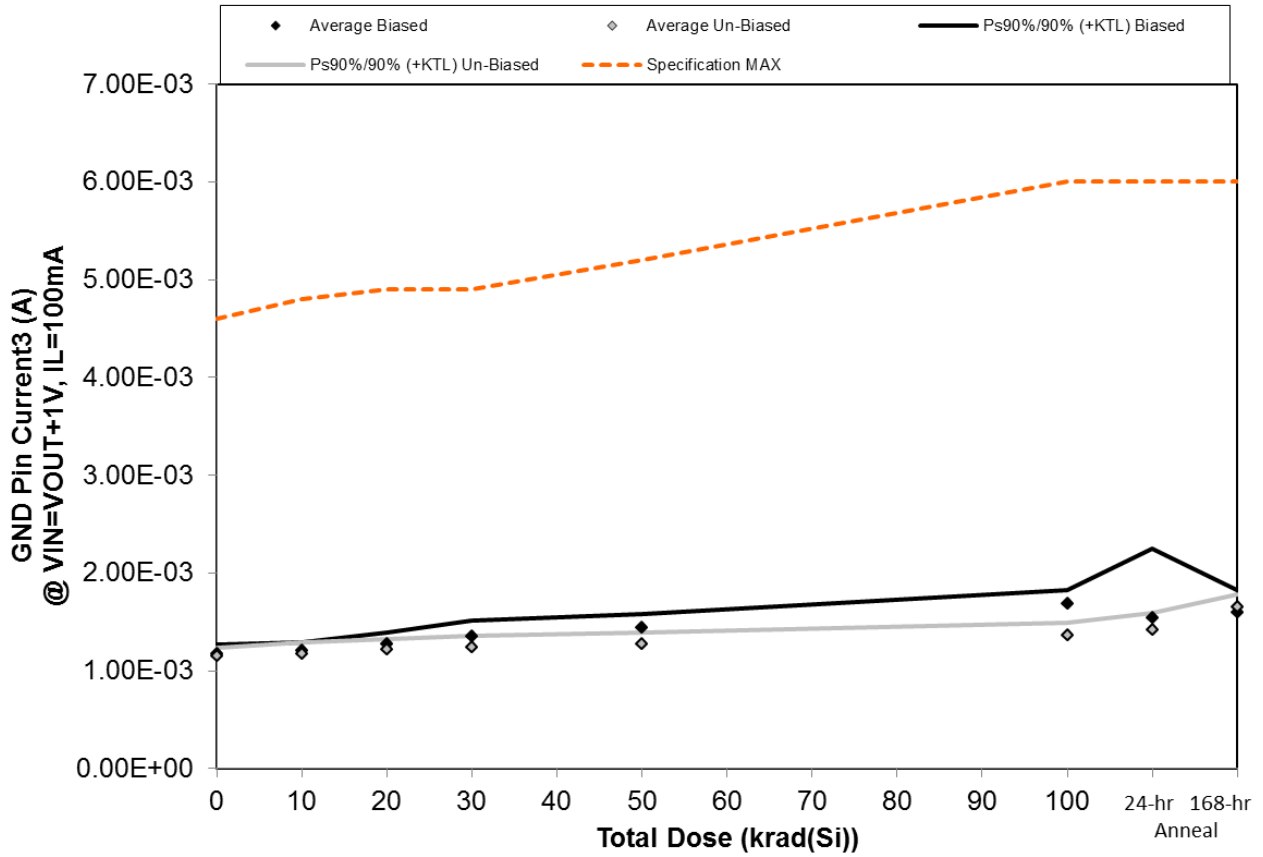


Figure 5.9. Plot of GND Pin Current3 (A) @ VIN=VOUT+1V, IL=100mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.9. Raw data for GND Pin Current3 (A) @ VIN=VOUT+1V, IL=100mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

GND Pin Current3 (A) @ VIN=VOUT+1V, IL=100mA	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	1.15E-03	1.23E-03	1.30E-03	1.37E-03	1.47E-03	1.67E-03	1.68E-03	1.60E-03
120	1.15E-03	1.18E-03	1.26E-03	1.42E-03	1.49E-03	1.70E-03	1.09E-03	1.59E-03
151	1.15E-03	1.16E-03	1.21E-03	1.26E-03	1.36E-03	1.60E-03	1.58E-03	1.47E-03
152	1.20E-03	1.23E-03	1.31E-03	1.36E-03	1.46E-03	1.74E-03	1.72E-03	1.71E-03
153	1.22E-03	1.23E-03	1.29E-03	1.34E-03	1.45E-03	1.70E-03	1.66E-03	1.60E-03
154	1.15E-03	1.16E-03	1.19E-03	1.21E-03	1.24E-03	1.33E-03	1.39E-03	1.65E-03
155	1.12E-03	1.14E-03	1.18E-03	1.20E-03	1.24E-03	1.32E-03	1.39E-03	1.58E-03
172	1.16E-03	1.22E-03	1.25E-03	1.27E-03	1.31E-03	1.39E-03	1.46E-03	1.63E-03
173	1.20E-03	1.22E-03	1.27E-03	1.29E-03	1.33E-03	1.43E-03	1.51E-03	1.71E-03
174	1.12E-03	1.16E-03	1.19E-03	1.21E-03	1.25E-03	1.34E-03	1.37E-03	1.67E-03
175	1.19E-03	1.18E-03	1.18E-03	1.18E-03	1.18E-03	1.18E-03	1.20E-03	1.18E-03
Biased Statistics								
Average Biased	1.17E-03	1.20E-03	1.27E-03	1.35E-03	1.45E-03	1.68E-03	1.55E-03	1.60E-03
Std Dev Biased	3.28E-05	3.33E-05	4.12E-05	5.90E-05	5.10E-05	5.15E-05	2.58E-04	8.54E-05
Ps90%/90% (+KTL) Biased	1.26E-03	1.29E-03	1.39E-03	1.51E-03	1.59E-03	1.83E-03	2.25E-03	1.83E-03
Ps90%/90% (-KTL) Biased	1.08E-03	1.11E-03	1.16E-03	1.19E-03	1.31E-03	1.54E-03	8.38E-04	1.36E-03
Un-Biased Statistics								
Average Un-Biased	1.15E-03	1.18E-03	1.22E-03	1.24E-03	1.27E-03	1.36E-03	1.42E-03	1.65E-03
Std Dev Un-Biased	3.24E-05	3.94E-05	4.10E-05	4.27E-05	4.48E-05	5.00E-05	5.94E-05	4.79E-05
Ps90%/90% (+KTL) Un-Biased	1.24E-03	1.29E-03	1.33E-03	1.35E-03	1.40E-03	1.50E-03	1.59E-03	1.78E-03
Ps90%/90% (-KTL) Un-Biased	1.06E-03	1.07E-03	1.10E-03	1.12E-03	1.15E-03	1.22E-03	1.26E-03	1.52E-03
Specification MAX	4.60E-03	4.80E-03	4.90E-03	4.90E-03	5.20E-03	6.00E-03	6.00E-03	6.00E-03
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

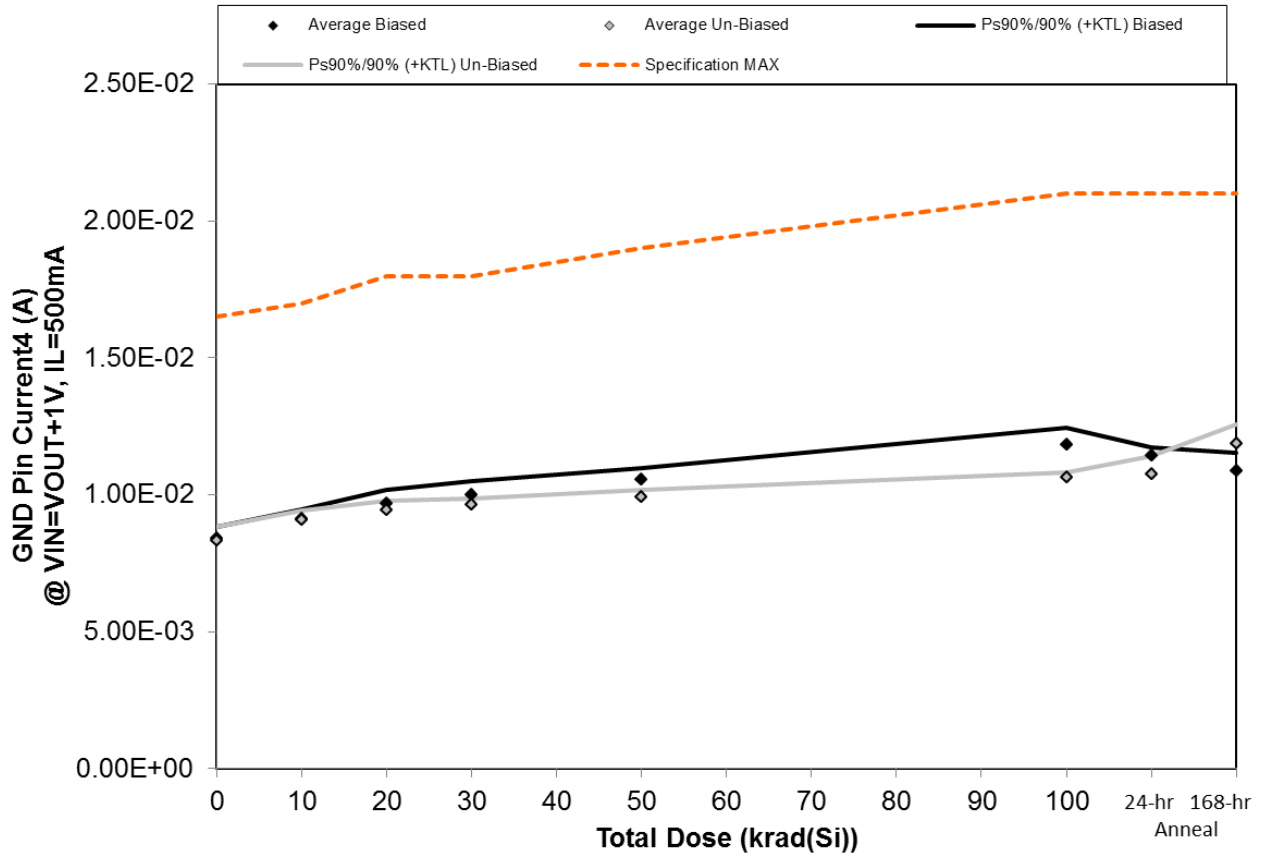


Figure 5.10. Plot of GND Pin Current4 (A) @ VIN=VOUT+1V, IL=500mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.10. Raw data for GND Pin Current4 (A) @ VIN=VOUT+1V, IL=500mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

GND Pin Current4 (A) @ VIN=VOUT+1V, IL=500mA	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	8.27E-03	9.02E-03	9.61E-03	9.96E-03	1.05E-02	1.16E-02	1.14E-02	1.08E-02
120	8.36E-03	9.21E-03	9.92E-03	1.03E-02	1.08E-02	1.22E-02	1.12E-02	1.12E-02
151	8.18E-03	8.90E-03	9.39E-03	9.73E-03	1.03E-02	1.16E-02	1.13E-02	1.05E-02
152	8.36E-03	9.07E-03	9.59E-03	9.92E-03	1.04E-02	1.17E-02	1.15E-02	1.08E-02
153	8.62E-03	9.25E-03	9.70E-03	1.00E-02	1.06E-02	1.18E-02	1.15E-02	1.10E-02
154	8.45E-03	9.11E-03	9.52E-03	9.72E-03	9.92E-03	1.06E-02	1.09E-02	1.20E-02
155	8.05E-03	8.85E-03	9.24E-03	9.47E-03	9.70E-03	1.05E-02	1.07E-02	1.15E-02
172	8.54E-03	9.21E-03	9.56E-03	9.67E-03	9.96E-03	1.06E-02	1.09E-02	1.21E-02
173	8.30E-03	9.07E-03	9.41E-03	9.59E-03	9.96E-03	1.07E-02	1.09E-02	1.17E-02
174	8.18E-03	9.03E-03	9.39E-03	9.52E-03	9.87E-03	1.06E-02	1.03E-02	1.20E-02
175	8.70E-03	8.72E-03	8.67E-03	8.65E-03	8.62E-03	8.63E-03	8.71E-03	8.81E-03
Biased Statistics								
Average Biased	8.36E-03	9.09E-03	9.64E-03	9.98E-03	1.05E-02	1.18E-02	1.14E-02	1.08E-02
Std Dev Biased	1.64E-04	1.44E-04	1.94E-04	1.97E-04	1.62E-04	2.45E-04	1.35E-04	2.51E-04
Ps90%/90% (+KTL) Biased	8.81E-03	9.48E-03	1.02E-02	1.05E-02	1.10E-02	1.25E-02	1.17E-02	1.15E-02
Ps90%/90% (-KTL) Biased	7.91E-03	8.69E-03	9.11E-03	9.44E-03	1.01E-02	1.11E-02	1.10E-02	1.02E-02
Un-Biased Statistics								
Average Un-Biased	8.30E-03	9.05E-03	9.42E-03	9.59E-03	9.88E-03	1.06E-02	1.07E-02	1.18E-02
Std Dev Un-Biased	1.97E-04	1.31E-04	1.26E-04	1.03E-04	1.10E-04	8.32E-05	2.52E-04	2.64E-04
Ps90%/90% (+KTL) Un-Biased	8.85E-03	9.42E-03	9.77E-03	9.88E-03	1.02E-02	1.08E-02	1.14E-02	1.26E-02
Ps90%/90% (-KTL) Un-Biased	7.76E-03	8.69E-03	9.08E-03	9.31E-03	9.58E-03	1.04E-02	1.00E-02	1.11E-02
Specification MAX	1.65E-02	1.70E-02	1.80E-02	1.80E-02	1.90E-02	2.10E-02	2.10E-02	2.10E-02
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

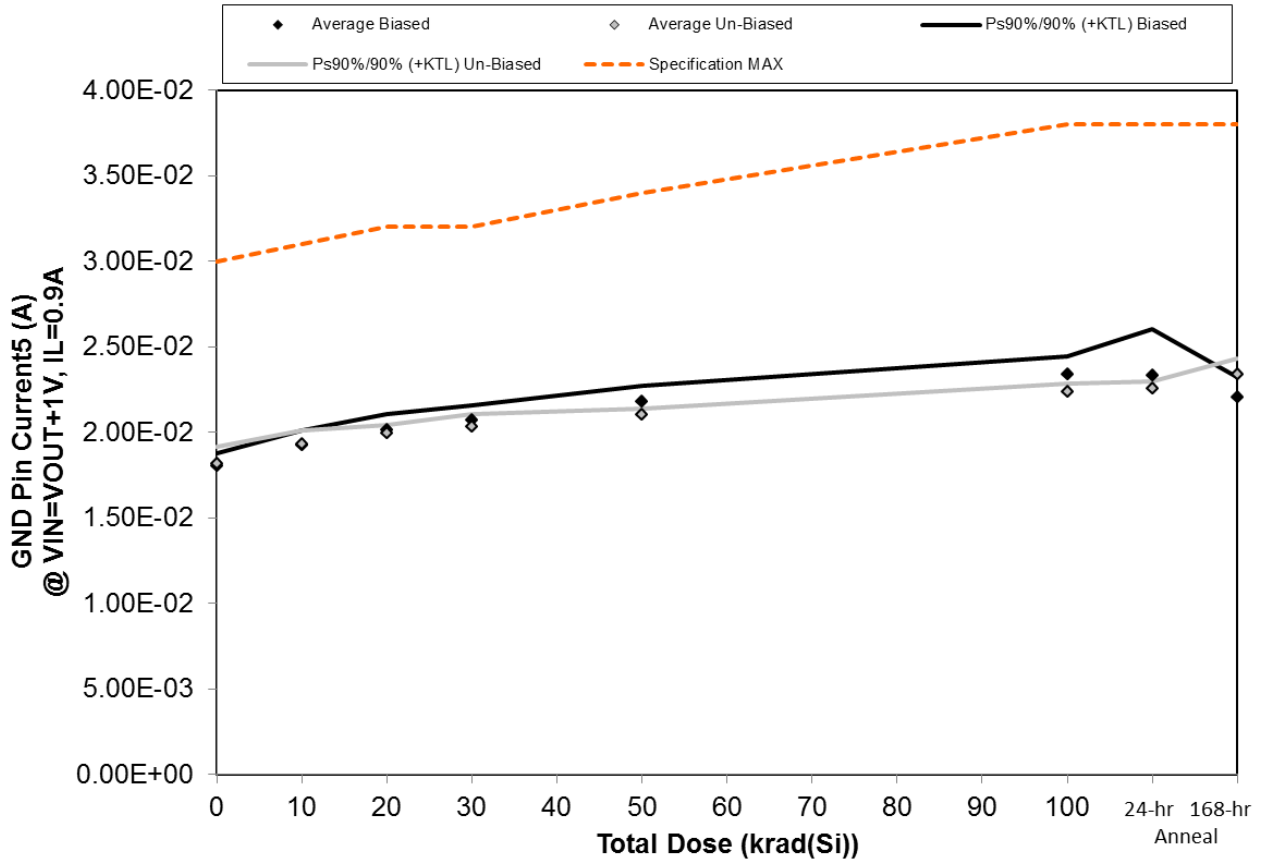


Figure 5.11. Plot of GND Pin Current5 (A) @ VIN=VOUT+1V, IL=0.9A versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.11. Raw data for GND Pin Current5 (A) @ VIN=VOUT+1V, IL=0.9A versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

GND Pin Current5 (A) @ VIN=VOUT+1V, IL=0.9A	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	1.79E-02	1.90E-02	2.01E-02	2.06E-02	2.17E-02	2.32E-02	2.28E-02	2.19E-02
120	1.82E-02	1.96E-02	2.06E-02	2.12E-02	2.23E-02	2.40E-02	2.50E-02	2.26E-02
151	1.78E-02	1.90E-02	1.99E-02	2.04E-02	2.15E-02	2.31E-02	2.27E-02	2.17E-02
152	1.79E-02	1.90E-02	1.98E-02	2.06E-02	2.15E-02	2.32E-02	2.29E-02	2.15E-02
153	1.85E-02	1.96E-02	2.03E-02	2.08E-02	2.20E-02	2.36E-02	2.34E-02	2.24E-02
154	1.85E-02	1.96E-02	2.01E-02	2.06E-02	2.12E-02	2.24E-02	2.26E-02	2.34E-02
155	1.78E-02	1.89E-02	1.97E-02	2.01E-02	2.08E-02	2.22E-02	2.24E-02	2.29E-02
172	1.86E-02	1.96E-02	2.01E-02	2.07E-02	2.11E-02	2.27E-02	2.28E-02	2.38E-02
173	1.79E-02	1.92E-02	1.98E-02	2.01E-02	2.09E-02	2.23E-02	2.27E-02	2.32E-02
174	1.82E-02	1.94E-02	2.00E-02	2.03E-02	2.10E-02	2.24E-02	2.26E-02	2.36E-02
175	1.90E-02	1.90E-02	1.90E-02	1.90E-02	1.90E-02	1.90E-02	1.90E-02	1.89E-02
Biased Statistics								
Average Biased	1.81E-02	1.92E-02	2.01E-02	2.07E-02	2.18E-02	2.34E-02	2.33E-02	2.20E-02
Std Dev Biased	2.71E-04	3.12E-04	3.50E-04	3.19E-04	3.45E-04	3.73E-04	9.79E-04	4.38E-04
Ps90%/90% (+KTL) Biased	1.88E-02	2.01E-02	2.11E-02	2.16E-02	2.27E-02	2.44E-02	2.60E-02	2.32E-02
Ps90%/90% (-KTL) Biased	1.73E-02	1.84E-02	1.92E-02	1.98E-02	2.08E-02	2.24E-02	2.07E-02	2.08E-02
Un-Biased Statistics								
Average Un-Biased	1.82E-02	1.93E-02	1.99E-02	2.04E-02	2.10E-02	2.24E-02	2.26E-02	2.34E-02
Std Dev Un-Biased	3.57E-04	2.86E-04	1.88E-04	2.54E-04	1.45E-04	1.78E-04	1.52E-04	3.49E-04
Ps90%/90% (+KTL) Un-Biased	1.91E-02	2.01E-02	2.05E-02	2.11E-02	2.14E-02	2.29E-02	2.30E-02	2.43E-02
Ps90%/90% (-KTL) Un-Biased	1.72E-02	1.85E-02	1.94E-02	1.97E-02	2.06E-02	2.19E-02	2.22E-02	2.24E-02
Specification MAX	3.00E-02	3.10E-02	3.20E-02	3.20E-02	3.40E-02	3.80E-02	3.80E-02	3.80E-02
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

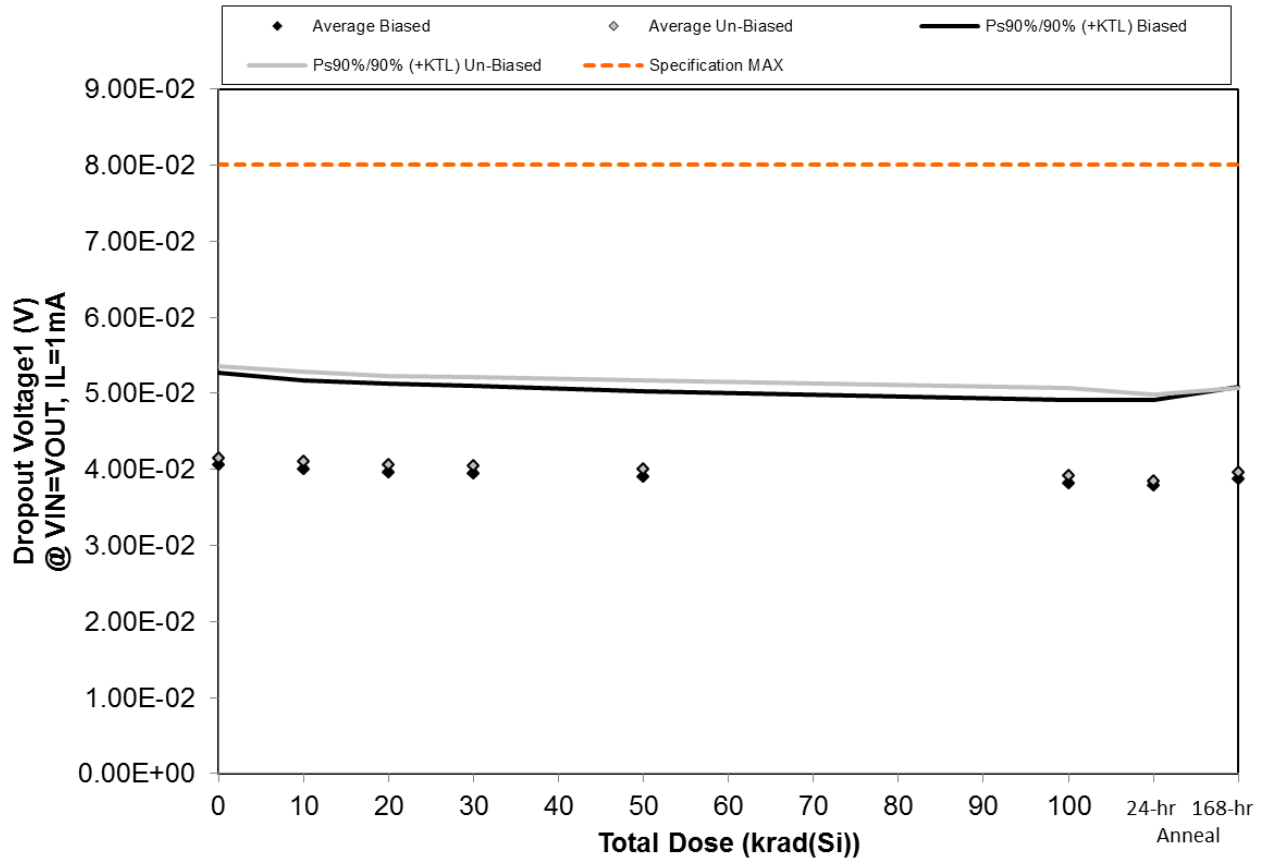


Figure 5.12. Plot of Dropout Voltage1 (V) @ VIN=VOUT, IL=1mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



**TID Report
16-0300 08/21/17 R1.0**

**Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800**

Table 5.12. Raw data for Dropout Voltage1 (V) @ VIN=VOUT, IL=1mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Dropout Voltage1 (V) @ VIN=VOUT, IL=1mA	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	3.99E-02	3.91E-02	3.87E-02	3.84E-02	3.80E-02	3.71E-02	3.69E-02	3.77E-02
120	3.35E-02	3.32E-02	3.30E-02	3.28E-02	3.26E-02	3.19E-02	3.15E-02	3.18E-02
151	4.18E-02	4.10E-02	4.07E-02	4.05E-02	4.00E-02	3.92E-02	3.89E-02	4.00E-02
152	4.54E-02	4.48E-02	4.44E-02	4.42E-02	4.37E-02	4.26E-02	4.24E-02	4.36E-02
153	4.22E-02	4.18E-02	4.14E-02	4.11E-02	4.09E-02	3.99E-02	3.99E-02	4.08E-02
154	4.21E-02	4.17E-02	4.13E-02	4.11E-02	4.07E-02	3.97E-02	3.91E-02	4.01E-02
155	4.43E-02	4.39E-02	4.34E-02	4.32E-02	4.28E-02	4.19E-02	4.10E-02	4.20E-02
172	4.47E-02	4.41E-02	4.39E-02	4.36E-02	4.33E-02	4.23E-02	4.17E-02	4.27E-02
173	4.23E-02	4.18E-02	4.13E-02	4.12E-02	4.09E-02	3.98E-02	3.91E-02	4.02E-02
174	3.38E-02	3.36E-02	3.34E-02	3.32E-02	3.28E-02	3.18E-02	3.13E-02	3.25E-02
175	3.87E-02	3.88E-02	3.89E-02	3.88E-02	3.88E-02	3.88E-02	3.87E-02	3.86E-02
Biased Statistics								
Average Biased	4.05E-02	4.00E-02	3.96E-02	3.94E-02	3.90E-02	3.82E-02	3.79E-02	3.88E-02
Std Dev Biased	4.43E-03	4.30E-03	4.25E-03	4.23E-03	4.11E-03	4.01E-03	4.12E-03	4.42E-03
Ps90%/90% (+KTL) Biased	5.27E-02	5.18E-02	5.13E-02	5.10E-02	5.03E-02	4.91E-02	4.92E-02	5.09E-02
Ps90%/90% (-KTL) Biased	2.84E-02	2.82E-02	2.80E-02	2.78E-02	2.78E-02	2.72E-02	2.66E-02	2.67E-02
Un-Biased Statistics								
Average Un-Biased	4.14E-02	4.10E-02	4.07E-02	4.05E-02	4.01E-02	3.91E-02	3.84E-02	3.95E-02
Std Dev Un-Biased	4.42E-03	4.31E-03	4.23E-03	4.23E-03	4.25E-03	4.25E-03	4.14E-03	4.07E-03
Ps90%/90% (+KTL) Un-Biased	5.36E-02	5.28E-02	5.23E-02	5.21E-02	5.17E-02	5.08E-02	4.98E-02	5.07E-02
Ps90%/90% (-KTL) Un-Biased	2.93E-02	2.92E-02	2.90E-02	2.88E-02	2.84E-02	2.74E-02	2.71E-02	2.84E-02
Specification MAX	8.00E-02	8.00E-02	8.00E-02	8.00E-02	8.00E-02	8.00E-02	8.00E-02	8.00E-02
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

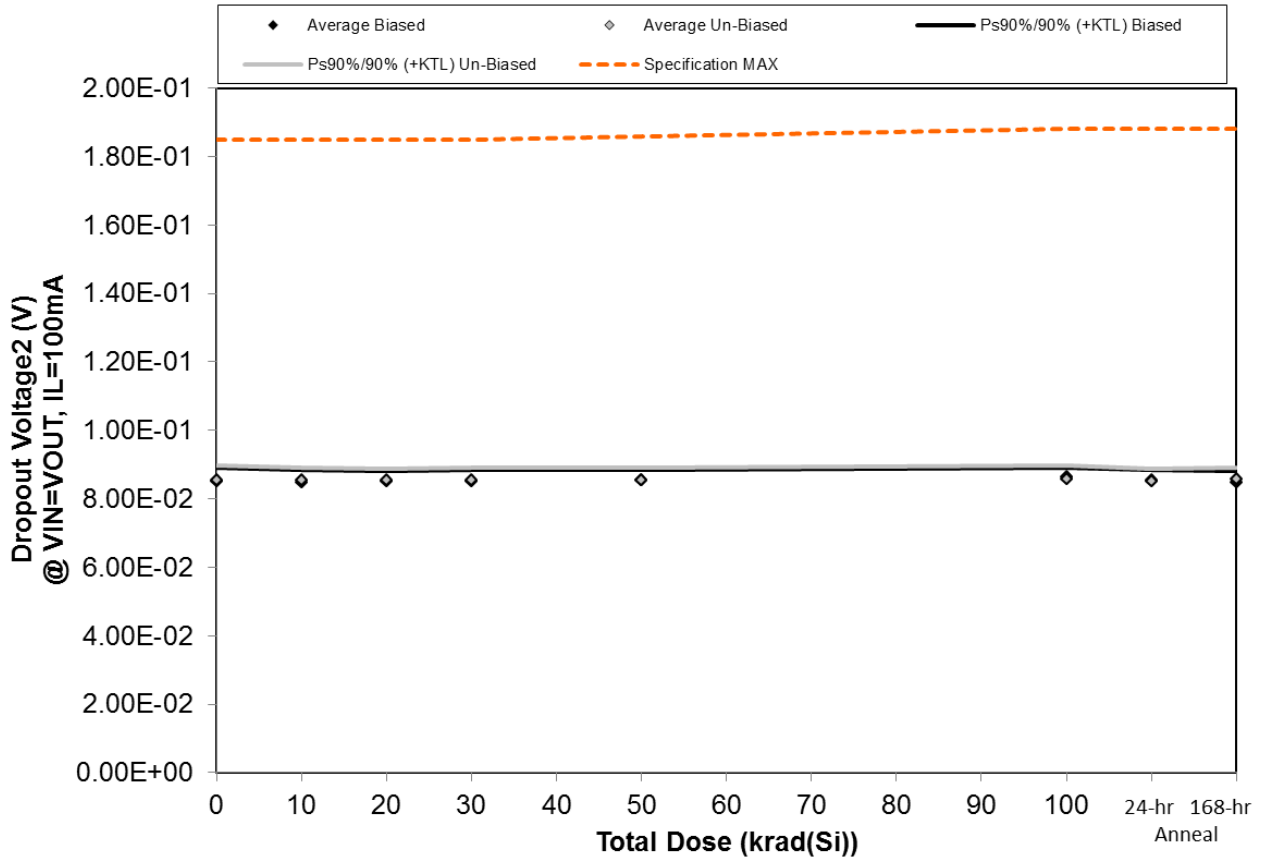


Figure 5.13. Plot of Dropout Voltage2 (V) @ VIN=VOUT, IL=100mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.13. Raw data for Dropout Voltage2 (V) @ VIN=VOUT, IL=100mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Dropout Voltage2 (V) @ VIN=VOUT, IL=100mA	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	8.52E-02	8.47E-02	8.49E-02	8.49E-02	8.53E-02	8.60E-02	8.52E-02	8.45E-02
120	8.30E-02	8.30E-02	8.34E-02	8.34E-02	8.41E-02	8.51E-02	8.37E-02	8.28E-02
151	8.63E-02	8.57E-02	8.59E-02	8.60E-02	8.62E-02	8.70E-02	8.61E-02	8.57E-02
152	8.65E-02	8.64E-02	8.63E-02	8.65E-02	8.68E-02	8.75E-02	8.67E-02	8.58E-02
153	8.51E-02	8.50E-02	8.51E-02	8.52E-02	8.55E-02	8.62E-02	8.56E-02	8.51E-02
154	8.58E-02	8.58E-02	8.58E-02	8.59E-02	8.60E-02	8.60E-02	8.56E-02	8.61E-02
155	8.66E-02	8.67E-02	8.66E-02	8.67E-02	8.68E-02	8.72E-02	8.66E-02	8.67E-02
172	8.65E-02	8.61E-02	8.62E-02	8.62E-02	8.64E-02	8.66E-02	8.61E-02	8.68E-02
173	8.52E-02	8.51E-02	8.49E-02	8.50E-02	8.51E-02	8.53E-02	8.49E-02	8.54E-02
174	8.28E-02	8.33E-02	8.33E-02	8.33E-02	8.35E-02	8.36E-02	8.32E-02	8.40E-02
175	8.35E-02	8.36E-02	8.37E-02	8.35E-02	8.35E-02	8.35E-02	8.34E-02	8.34E-02
Biased Statistics								
Average Biased	8.52E-02	8.49E-02	8.51E-02	8.52E-02	8.56E-02	8.64E-02	8.55E-02	8.48E-02
Std Dev Biased	1.40E-03	1.26E-03	1.14E-03	1.19E-03	1.01E-03	9.47E-04	1.15E-03	1.23E-03
Ps90%/90% (+KTL) Biased	8.90E-02	8.84E-02	8.82E-02	8.85E-02	8.84E-02	8.90E-02	8.86E-02	8.81E-02
Ps90%/90% (-KTL) Biased	8.13E-02	8.15E-02	8.20E-02	8.19E-02	8.28E-02	8.38E-02	8.23E-02	8.14E-02
Un-Biased Statistics								
Average Un-Biased	8.54E-02	8.54E-02	8.54E-02	8.54E-02	8.56E-02	8.57E-02	8.53E-02	8.58E-02
Std Dev Un-Biased	1.54E-03	1.32E-03	1.30E-03	1.33E-03	1.34E-03	1.42E-03	1.29E-03	1.15E-03
Ps90%/90% (+KTL) Un-Biased	8.96E-02	8.90E-02	8.89E-02	8.91E-02	8.92E-02	8.96E-02	8.88E-02	8.90E-02
Ps90%/90% (-KTL) Un-Biased	8.12E-02	8.18E-02	8.18E-02	8.18E-02	8.19E-02	8.18E-02	8.17E-02	8.26E-02
Specification MAX	1.85E-01	1.85E-01	1.85E-01	1.85E-01	1.86E-01	1.88E-01	1.88E-01	1.88E-01
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

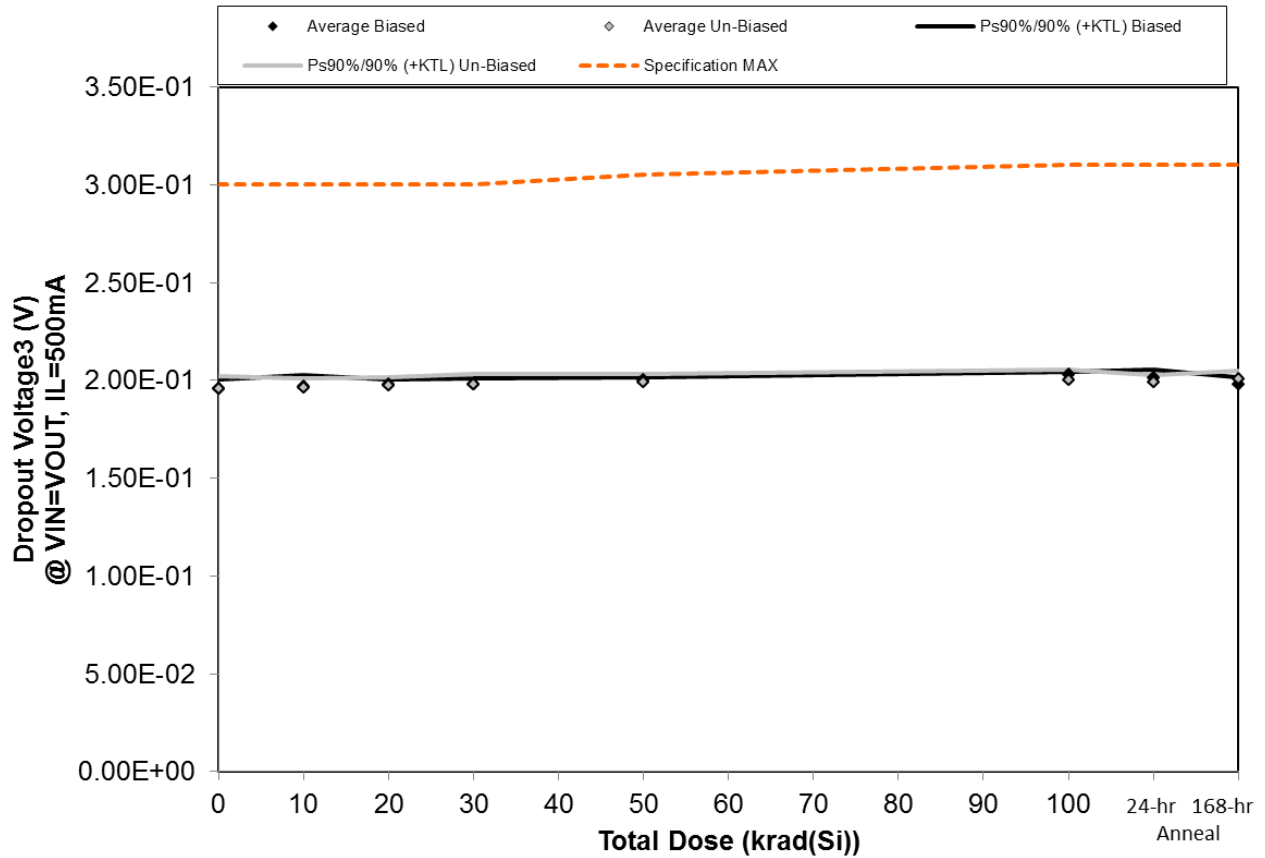


Figure 5.14. Plot of Dropout Voltage3 (V) @ VIN=VOUT, IL=500mA versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.14. Raw data for Dropout Voltage3 (V) @ VIN=VOUT, IL=500mA versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Dropout Voltage3 (V) @ VIN=VOUT, IL=500mA	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	1.96E-01	1.97E-01	1.98E-01	1.99E-01	2.01E-01	2.03E-01	2.01E-01	1.99E-01
120	1.94E-01	1.94E-01	1.97E-01	1.96E-01	2.00E-01	2.02E-01	2.00E-01	1.97E-01
151	1.94E-01	1.97E-01	1.98E-01	1.98E-01	2.00E-01	2.03E-01	2.01E-01	1.97E-01
152	1.98E-01	2.00E-01	1.97E-01	1.98E-01	2.01E-01	2.04E-01	2.04E-01	1.98E-01
153	1.96E-01	1.97E-01	2.00E-01	1.99E-01	2.00E-01	2.03E-01	2.00E-01	2.00E-01
154	1.96E-01	1.98E-01	1.97E-01	2.00E-01	2.00E-01	2.00E-01	1.99E-01	2.01E-01
155	1.97E-01	1.98E-01	2.00E-01	2.00E-01	2.01E-01	2.02E-01	2.00E-01	2.01E-01
172	1.97E-01	1.97E-01	1.99E-01	1.98E-01	2.00E-01	2.02E-01	2.01E-01	2.02E-01
173	1.97E-01	1.95E-01	1.97E-01	1.97E-01	1.99E-01	2.00E-01	1.98E-01	2.00E-01
174	1.92E-01	1.94E-01	1.96E-01	1.95E-01	1.97E-01	1.98E-01	1.98E-01	1.98E-01
175	1.95E-01	1.96E-01	1.94E-01	1.96E-01	1.94E-01	1.94E-01	1.95E-01	1.94E-01
Biased Statistics								
Average Biased	1.96E-01	1.97E-01	1.98E-01	1.98E-01	2.00E-01	2.03E-01	2.01E-01	1.98E-01
Std Dev Biased	1.72E-03	2.09E-03	1.05E-03	1.21E-03	5.93E-04	5.81E-04	1.70E-03	1.19E-03
Ps90%/90% (+KTL) Biased	2.00E-01	2.03E-01	2.01E-01	2.01E-01	2.02E-01	2.05E-01	2.06E-01	2.01E-01
Ps90%/90% (-KTL) Biased	1.91E-01	1.91E-01	1.95E-01	1.95E-01	1.98E-01	2.01E-01	1.96E-01	1.95E-01
Un-Biased Statistics								
Average Un-Biased	1.96E-01	1.96E-01	1.98E-01	1.98E-01	1.99E-01	2.00E-01	1.99E-01	2.01E-01
Std Dev Un-Biased	2.27E-03	1.69E-03	1.53E-03	1.86E-03	1.63E-03	1.80E-03	1.22E-03	1.69E-03
Ps90%/90% (+KTL) Un-Biased	2.02E-01	2.01E-01	2.02E-01	2.03E-01	2.04E-01	2.05E-01	2.03E-01	2.05E-01
Ps90%/90% (-KTL) Un-Biased	1.90E-01	1.92E-01	1.93E-01	1.93E-01	1.95E-01	1.95E-01	1.96E-01	1.96E-01
Specification MAX	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.05E-01	3.10E-01	3.10E-01	3.10E-01
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

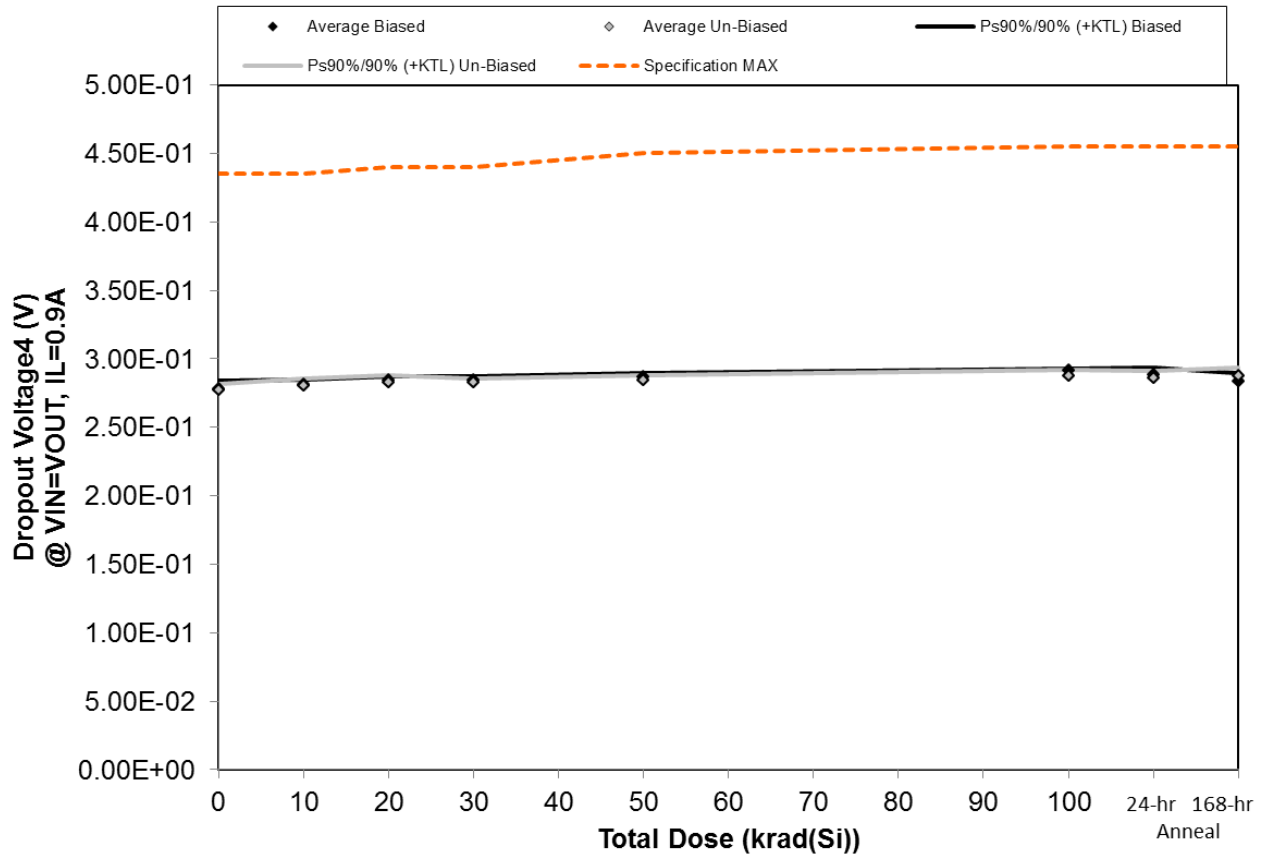


Figure 5.15. Plot of Dropout Voltage4 (V) @ VIN=VOUT, IL=0.9A versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.15. Raw data for Dropout Voltage4 (V) @ VIN=VOUT, IL=0.9A versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Dropout Voltage4 (V) @ VIN=VOUT, IL=0.9A	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	2.79E-01	2.81E-01	2.85E-01	2.86E-01	2.87E-01	2.92E-01	2.89E-01	2.85E-01
120	2.75E-01	2.79E-01	2.83E-01	2.83E-01	2.88E-01	2.92E-01	2.86E-01	2.83E-01
151	2.79E-01	2.82E-01	2.84E-01	2.84E-01	2.87E-01	2.92E-01	2.87E-01	2.84E-01
152	2.80E-01	2.83E-01	2.86E-01	2.85E-01	2.88E-01	2.91E-01	2.90E-01	2.80E-01
153	2.80E-01	2.83E-01	2.85E-01	2.85E-01	2.86E-01	2.91E-01	2.90E-01	2.85E-01
154	2.78E-01	2.82E-01	2.85E-01	2.83E-01	2.85E-01	2.89E-01	2.87E-01	2.88E-01
155	2.79E-01	2.82E-01	2.83E-01	2.84E-01	2.85E-01	2.90E-01	2.88E-01	2.88E-01
172	2.77E-01	2.83E-01	2.83E-01	2.84E-01	2.86E-01	2.88E-01	2.87E-01	2.90E-01
173	2.77E-01	2.81E-01	2.81E-01	2.82E-01	2.84E-01	2.86E-01	2.84E-01	2.90E-01
174	2.75E-01	2.78E-01	2.81E-01	2.82E-01	2.83E-01	2.86E-01	2.83E-01	2.84E-01
175	2.79E-01	2.79E-01	2.79E-01	2.82E-01	2.82E-01	2.79E-01	2.76E-01	2.79E-01
Biased Statistics								
Average Biased	2.78E-01	2.81E-01	2.85E-01	2.84E-01	2.87E-01	2.92E-01	2.88E-01	2.83E-01
Std Dev Biased	2.09E-03	1.39E-03	1.03E-03	9.99E-04	9.39E-04	4.04E-04	1.84E-03	2.27E-03
Ps90%/90% (+KTL) Biased	2.84E-01	2.85E-01	2.87E-01	2.87E-01	2.90E-01	2.93E-01	2.93E-01	2.90E-01
Ps90%/90% (-KTL) Biased	2.73E-01	2.78E-01	2.82E-01	2.82E-01	2.85E-01	2.91E-01	2.83E-01	2.77E-01
Un-Biased Statistics								
Average Un-Biased	2.77E-01	2.81E-01	2.82E-01	2.83E-01	2.85E-01	2.88E-01	2.86E-01	2.88E-01
Std Dev Un-Biased	1.55E-03	1.81E-03	1.90E-03	1.00E-03	1.12E-03	1.65E-03	2.01E-03	2.25E-03
Ps90%/90% (+KTL) Un-Biased	2.82E-01	2.86E-01	2.88E-01	2.86E-01	2.88E-01	2.92E-01	2.91E-01	2.94E-01
Ps90%/90% (-KTL) Un-Biased	2.73E-01	2.76E-01	2.77E-01	2.80E-01	2.82E-01	2.83E-01	2.80E-01	2.82E-01
Specification MAX	4.35E-01	4.35E-01	4.40E-01	4.40E-01	4.50E-01	4.55E-01	4.55E-01	4.55E-01
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

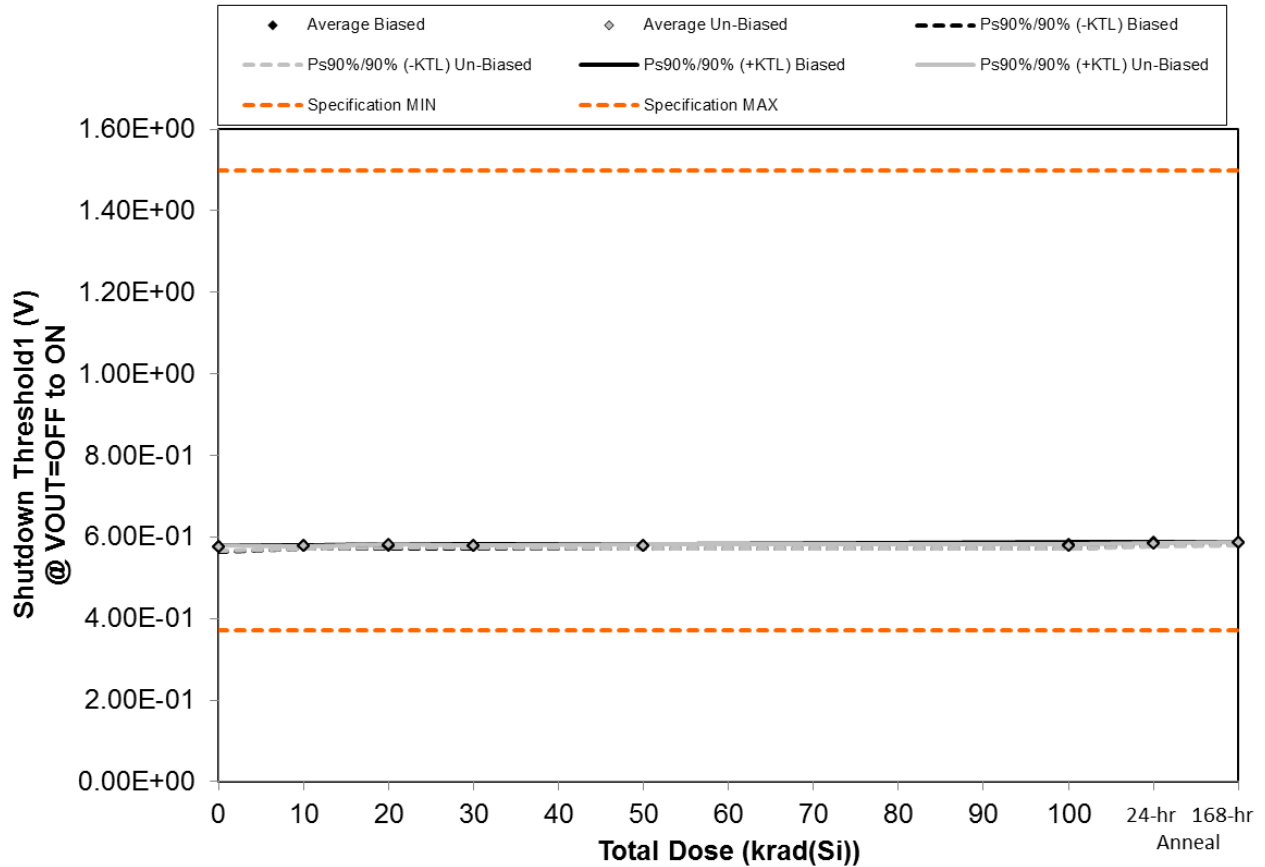


Figure 5.16. Plot of Shutdown Threshold1 (V) @ VOUT=OFF to ON versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.16. Raw data for Shutdown Threshold1 (V) @ VOUT=OFF to ON versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Shutdown Threshold1 (V) @ VOUT=OFF to ON	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	5.72E-01	5.76E-01	5.76E-01	5.76E-01	5.76E-01	5.79E-01	5.85E-01	5.86E-01
120	5.72E-01	5.74E-01	5.74E-01	5.74E-01	5.74E-01	5.74E-01	5.82E-01	5.84E-01
151	5.69E-01	5.77E-01	5.76E-01	5.76E-01	5.76E-01	5.79E-01	5.85E-01	5.84E-01
152	5.74E-01	5.76E-01	5.79E-01	5.76E-01	5.76E-01	5.81E-01	5.85E-01	5.84E-01
153	5.77E-01	5.76E-01	5.79E-01	5.79E-01	5.79E-01	5.81E-01	5.82E-01	5.84E-01
154	5.71E-01	5.74E-01	5.76E-01	5.77E-01	5.74E-01	5.76E-01	5.80E-01	5.81E-01
155	5.75E-01	5.74E-01	5.76E-01	5.76E-01	5.76E-01	5.74E-01	5.80E-01	5.84E-01
172	5.71E-01	5.76E-01	5.79E-01	5.76E-01	5.76E-01	5.76E-01	5.82E-01	5.81E-01
173	5.74E-01	5.76E-01	5.79E-01	5.79E-01	5.79E-01	5.79E-01	5.82E-01	5.84E-01
174	5.77E-01	5.76E-01	5.79E-01	5.76E-01	5.76E-01	5.79E-01	5.82E-01	5.84E-01
175	5.77E-01	5.77E-01	5.76E-01	5.76E-01	5.76E-01	5.76E-01	5.77E-01	5.78E-01
Biased Statistics								
Average Biased	5.73E-01	5.76E-01	5.77E-01	5.76E-01	5.76E-01	5.79E-01	5.84E-01	5.84E-01
Std Dev Biased	2.95E-03	1.10E-03	2.17E-03	1.79E-03	1.79E-03	2.86E-03	1.64E-03	8.94E-04
Ps90%/90% (+KTL) Biased	5.81E-01	5.79E-01	5.83E-01	5.81E-01	5.81E-01	5.87E-01	5.88E-01	5.87E-01
Ps90%/90% (-KTL) Biased	5.65E-01	5.73E-01	5.71E-01	5.71E-01	5.71E-01	5.71E-01	5.79E-01	5.82E-01
Un-Biased Statistics								
Average Un-Biased	5.74E-01	5.75E-01	5.78E-01	5.77E-01	5.76E-01	5.77E-01	5.81E-01	5.83E-01
Std Dev Un-Biased	2.61E-03	1.10E-03	1.64E-03	1.30E-03	1.79E-03	2.17E-03	1.10E-03	1.64E-03
Ps90%/90% (+KTL) Un-Biased	5.81E-01	5.78E-01	5.82E-01	5.80E-01	5.81E-01	5.83E-01	5.84E-01	5.87E-01
Ps90%/90% (-KTL) Un-Biased	5.66E-01	5.72E-01	5.73E-01	5.73E-01	5.71E-01	5.71E-01	5.78E-01	5.78E-01
Specification MIN	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Specification MAX	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

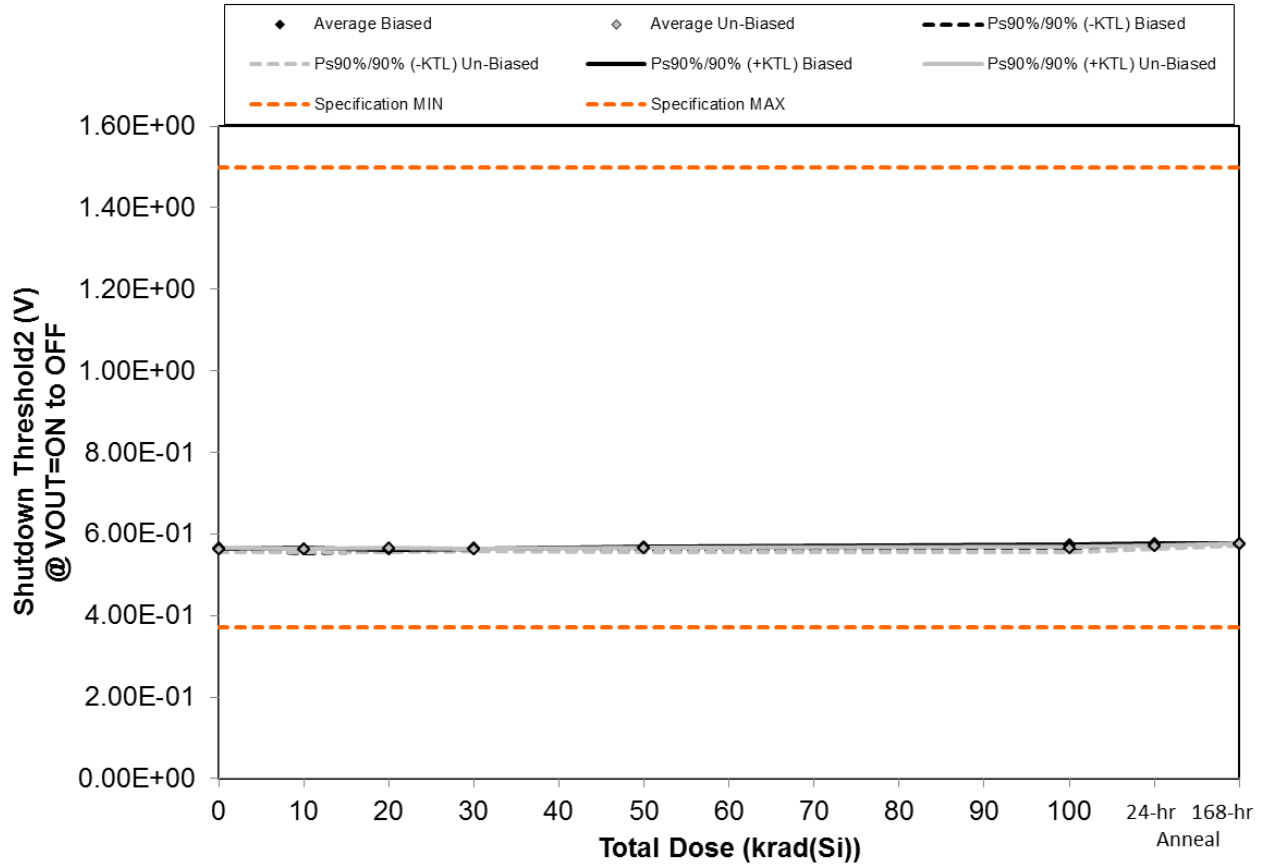


Figure 5.17. Plot of Shutdown Threshold2 (V) @ VOUT=ON to OFF versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.17. Raw data for Shutdown Threshold2 (V) @ VOUT=ON to OFF versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Shutdown Threshold2 (V) @ VOUT=ON to OFF	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	5.63E-01	5.61E-01	5.61E-01	5.63E-01	5.66E-01	5.71E-01	5.74E-01	5.75E-01
120	5.63E-01	5.55E-01	5.60E-01	5.63E-01	5.63E-01	5.68E-01	5.74E-01	5.75E-01
151	5.63E-01	5.61E-01	5.60E-01	5.63E-01	5.66E-01	5.68E-01	5.74E-01	5.73E-01
152	5.63E-01	5.61E-01	5.60E-01	5.63E-01	5.66E-01	5.71E-01	5.74E-01	5.73E-01
153	5.63E-01	5.61E-01	5.60E-01	5.63E-01	5.66E-01	5.71E-01	5.72E-01	5.73E-01
154	5.60E-01	5.58E-01	5.60E-01	5.60E-01	5.60E-01	5.63E-01	5.67E-01	5.73E-01
155	5.58E-01	5.58E-01	5.60E-01	5.60E-01	5.60E-01	5.60E-01	5.66E-01	5.73E-01
172	5.60E-01	5.58E-01	5.60E-01	5.60E-01	5.60E-01	5.60E-01	5.67E-01	5.73E-01
173	5.60E-01	5.58E-01	5.63E-01	5.60E-01	5.63E-01	5.63E-01	5.69E-01	5.73E-01
174	5.63E-01	5.61E-01	5.63E-01	5.63E-01	5.63E-01	5.66E-01	5.69E-01	5.75E-01
175	5.60E-01	5.58E-01	5.58E-01	5.58E-01	5.58E-01	5.58E-01	5.59E-01	5.60E-01
Biased Statistics								
Average Biased	5.63E-01	5.60E-01	5.60E-01	5.63E-01	5.65E-01	5.70E-01	5.74E-01	5.74E-01
Std Dev Biased	0.00E+00	2.68E-03	4.47E-04	0.00E+00	1.34E-03	1.64E-03	8.94E-04	1.10E-03
Ps90%/90% (+KTL) Biased	5.63E-01	5.67E-01	5.61E-01	5.63E-01	5.69E-01	5.74E-01	5.76E-01	5.77E-01
Ps90%/90% (-KTL) Biased	5.63E-01	5.52E-01	5.59E-01	5.63E-01	5.62E-01	5.65E-01	5.71E-01	5.71E-01
Un-Biased Statistics								
Average Un-Biased	5.60E-01	5.59E-01	5.61E-01	5.61E-01	5.61E-01	5.62E-01	5.68E-01	5.73E-01
Std Dev Un-Biased	1.79E-03	1.34E-03	1.64E-03	1.34E-03	1.64E-03	2.51E-03	1.34E-03	8.94E-04
Ps90%/90% (+KTL) Un-Biased	5.65E-01	5.62E-01	5.66E-01	5.64E-01	5.66E-01	5.69E-01	5.71E-01	5.76E-01
Ps90%/90% (-KTL) Un-Biased	5.55E-01	5.55E-01	5.57E-01	5.57E-01	5.57E-01	5.56E-01	5.64E-01	5.71E-01
Specification MIN	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
Specification MAX	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

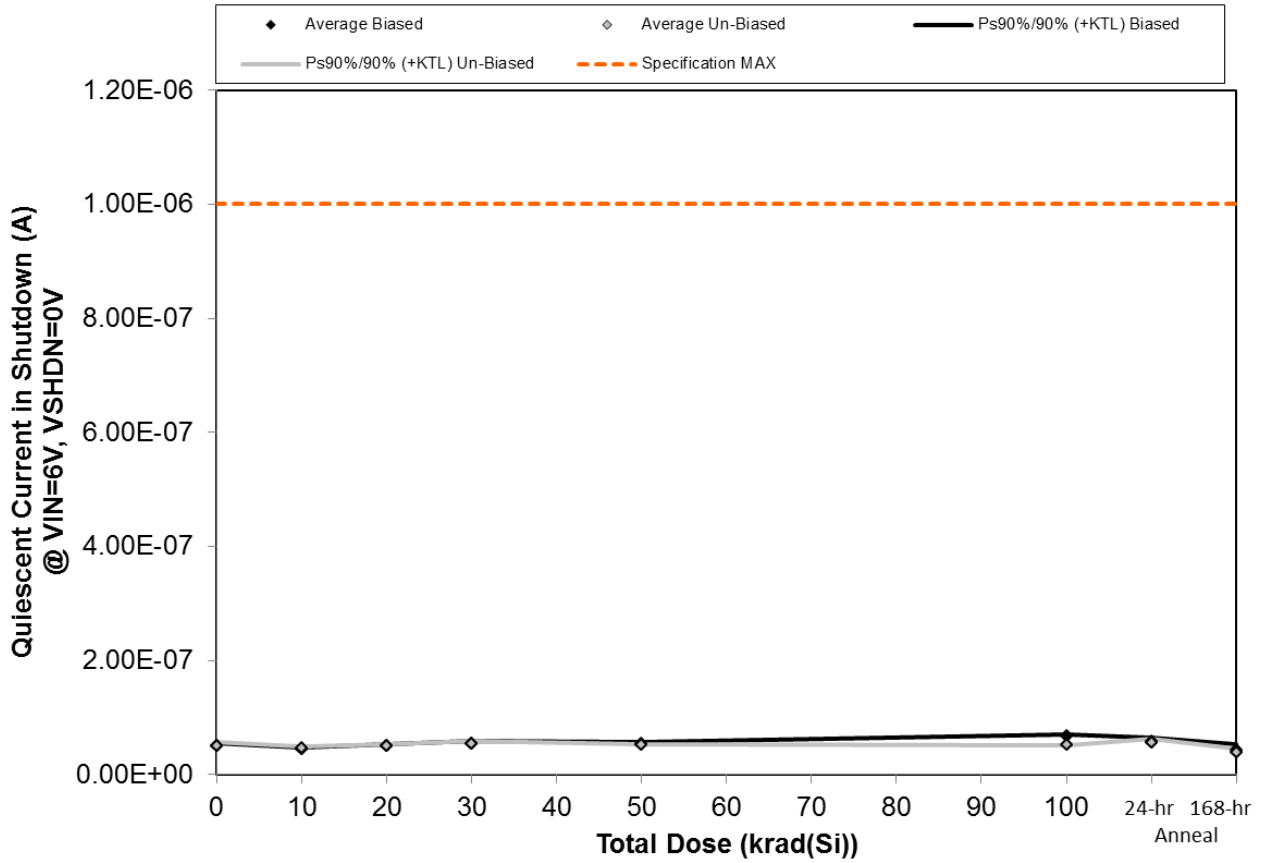


Figure 5.18. Plot of Quiescent Current in Shutdown (A) @ VIN=6V, VSHDN=0V versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.18. Raw data for Quiescent Current in Shutdown (A) @ VIN=6V, VSHDN=0V versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Quiescent Current in Shutdown (A) @ VIN=6V, VSHDN=0V	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	4.50E-08	4.60E-08	5.00E-08	5.40E-08	5.30E-08	6.70E-08	5.10E-08	4.60E-08
120	4.80E-08	4.20E-08	4.90E-08	5.60E-08	5.20E-08	6.80E-08	5.50E-08	3.80E-08
151	5.00E-08	4.20E-08	5.10E-08	5.30E-08	5.20E-08	6.50E-08	5.70E-08	4.40E-08
152	5.10E-08	4.20E-08	4.70E-08	5.10E-08	5.50E-08	6.70E-08	5.70E-08	4.40E-08
153	4.70E-08	4.30E-08	4.80E-08	5.10E-08	5.40E-08	6.50E-08	5.90E-08	3.60E-08
154	5.10E-08	4.70E-08	4.70E-08	5.20E-08	5.10E-08	5.00E-08	5.50E-08	3.60E-08
155	5.10E-08	4.60E-08	5.00E-08	5.60E-08	5.20E-08	5.10E-08	5.70E-08	4.20E-08
172	4.40E-08	4.30E-08	5.00E-08	5.00E-08	5.20E-08	5.00E-08	5.40E-08	3.60E-08
173	4.60E-08	4.40E-08	4.80E-08	5.00E-08	5.10E-08	5.10E-08	5.60E-08	3.60E-08
174	5.10E-08	4.30E-08	5.00E-08	5.00E-08	5.10E-08	5.10E-08	4.90E-08	3.90E-08
175	4.50E-08	4.30E-08	5.00E-08	5.00E-08	5.20E-08	5.20E-08	4.40E-08	4.20E-08
Biased Statistics								
Average Biased	4.82E-08	4.30E-08	4.90E-08	5.30E-08	5.32E-08	6.64E-08	5.58E-08	4.16E-08
Std Dev Biased	2.39E-09	1.73E-09	1.58E-09	2.12E-09	1.30E-09	1.34E-09	3.03E-09	4.34E-09
Ps90%/90% (+KTL) Biased	5.47E-08	4.77E-08	5.33E-08	5.88E-08	5.68E-08	7.01E-08	6.41E-08	5.35E-08
Ps90%/90% (-KTL) Biased	4.17E-08	3.83E-08	4.47E-08	4.72E-08	4.96E-08	6.27E-08	4.75E-08	2.97E-08
Un-Biased Statistics								
Average Un-Biased	4.86E-08	4.46E-08	4.90E-08	5.16E-08	5.14E-08	5.06E-08	5.42E-08	3.78E-08
Std Dev Un-Biased	3.36E-09	1.82E-09	1.41E-09	2.61E-09	5.48E-10	5.48E-10	3.11E-09	2.68E-09
Ps90%/90% (+KTL) Un-Biased	5.78E-08	4.96E-08	5.29E-08	5.88E-08	5.29E-08	5.21E-08	6.27E-08	4.52E-08
Ps90%/90% (-KTL) Un-Biased	3.94E-08	3.96E-08	4.51E-08	4.44E-08	4.99E-08	4.91E-08	4.57E-08	3.04E-08
Specification MAX	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

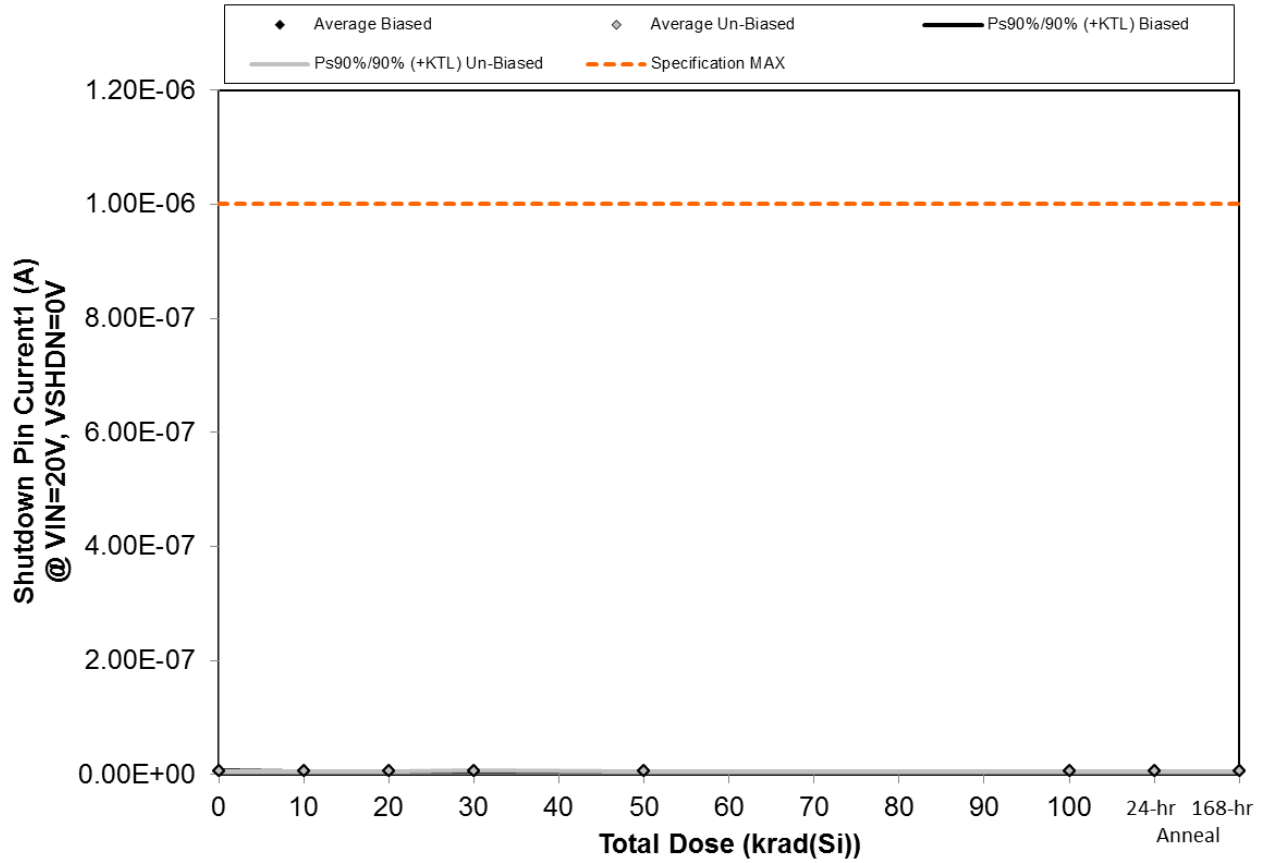


Figure 5.19. Plot of Shutdown Pin Current1 (A) @ VIN=20V, VSHDN=0V versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.19. Raw data for Shutdown Pin Current1 (A) @ VIN=20V, VSHDN=0V versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Shutdown Pin Current1 (A) @ VIN=20V, VSHDN=0V	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	3.00E-09	4.00E-09	4.00E-09	4.00E-09	5.00E-09	4.00E-09	4.00E-09	4.00E-09
120	5.00E-09	4.00E-09	5.00E-09	5.00E-09	5.00E-09	4.00E-09	5.00E-09	5.00E-09
151	5.00E-09	4.00E-09	4.00E-09	5.00E-09	4.00E-09	5.00E-09	4.00E-09	5.00E-09
152	4.00E-09	4.00E-09	5.00E-09	5.00E-09	5.00E-09	4.00E-09	5.00E-09	5.00E-09
153	5.00E-09	5.00E-09	4.00E-09	4.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09
154	4.00E-09	4.00E-09	4.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09	4.00E-09
155	3.00E-09	4.00E-09	5.00E-09	4.00E-09	4.00E-09	5.00E-09	4.00E-09	5.00E-09
172	4.00E-09	4.00E-09	5.00E-09	4.00E-09	5.00E-09	4.00E-09	4.00E-09	5.00E-09
173	4.00E-09	4.00E-09	5.00E-09	5.00E-09	5.00E-09	4.00E-09	5.00E-09	4.00E-09
174	5.00E-09	3.00E-09	5.00E-09	6.00E-09	4.00E-09	5.00E-09	5.00E-09	5.00E-09
175	5.00E-09	4.00E-09	4.00E-09	4.00E-09	4.00E-09	5.00E-09	5.00E-09	4.00E-09
Biased Statistics								
Average Biased	4.40E-09	4.20E-09	4.40E-09	4.60E-09	4.80E-09	4.40E-09	4.60E-09	4.80E-09
Std Dev Biased	8.94E-10	4.47E-10	5.48E-10	5.48E-10	4.47E-10	5.48E-10	5.48E-10	4.47E-10
Ps90%/90% (+KTL) Biased	6.85E-09	5.43E-09	5.90E-09	6.10E-09	6.03E-09	5.90E-09	6.10E-09	6.03E-09
Ps90%/90% (-KTL) Biased	1.95E-09	2.97E-09	2.90E-09	3.10E-09	3.57E-09	2.90E-09	3.10E-09	3.57E-09
Un-Biased Statistics								
Average Un-Biased	4.00E-09	3.80E-09	4.80E-09	4.80E-09	4.60E-09	4.60E-09	4.60E-09	4.60E-09
Std Dev Un-Biased	7.07E-10	4.47E-10	4.47E-10	8.37E-10	5.48E-10	5.48E-10	5.48E-10	5.48E-10
Ps90%/90% (+KTL) Un-Biased	5.94E-09	5.03E-09	6.03E-09	7.09E-09	6.10E-09	6.10E-09	6.10E-09	6.10E-09
Ps90%/90% (-KTL) Un-Biased	2.06E-09	2.57E-09	3.57E-09	2.51E-09	3.10E-09	3.10E-09	3.10E-09	3.10E-09
Specification MAX	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06	1.00E-06
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

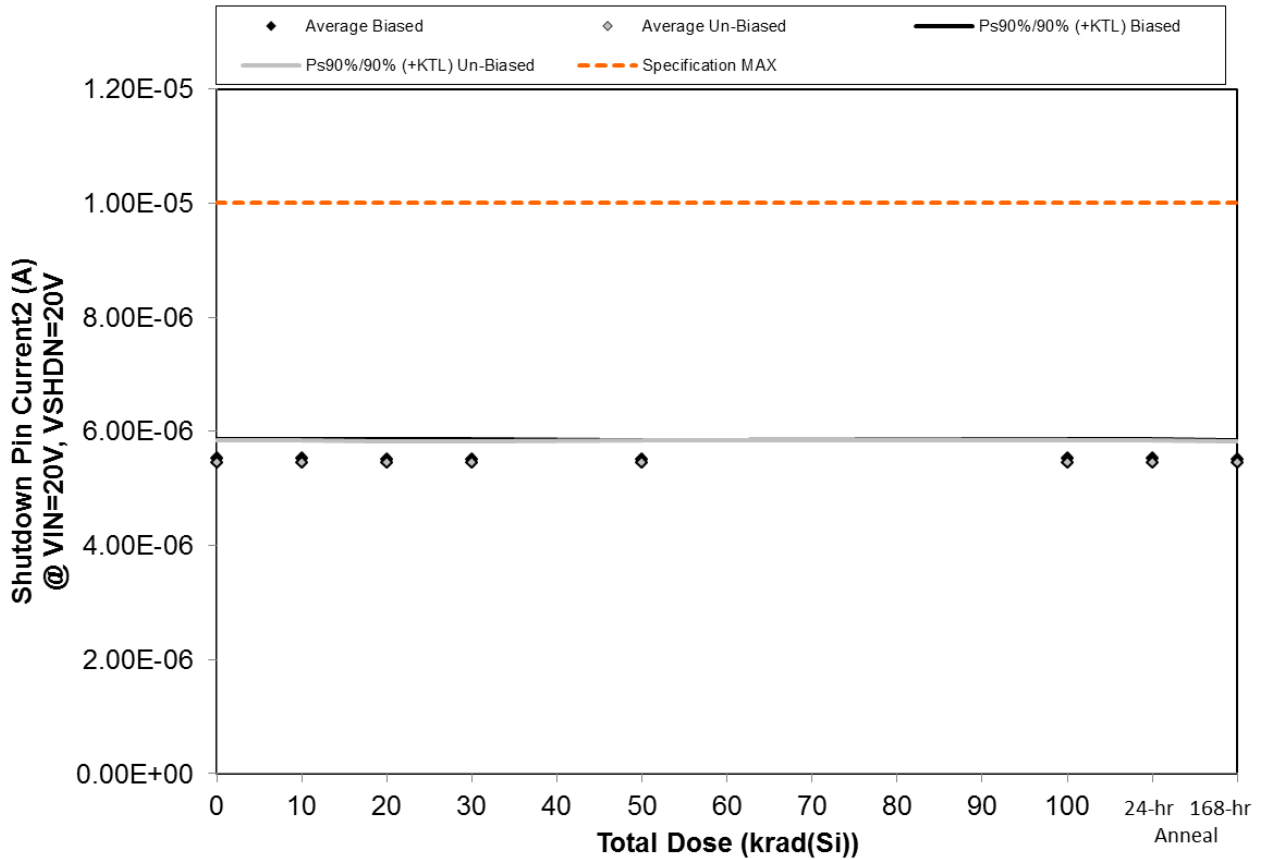


Figure 5.20. Plot of Shutdown Pin Current2 (A) @ VIN=20V, VSHDN=20V versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.20. Raw data for Shutdown Pin Current2 (A) @ VIN=20V, VSHDN=20V versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Shutdown Pin Current2 (A) @ VIN=20V, VSHDN=20V	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	5.54E-06	5.54E-06	5.53E-06	5.53E-06	5.53E-06	5.53E-06	5.54E-06	5.52E-06
120	5.50E-06	5.50E-06	5.49E-06	5.49E-06	5.49E-06	5.49E-06	5.50E-06	5.48E-06
151	5.33E-06	5.33E-06	5.32E-06	5.32E-06	5.32E-06	5.32E-06	5.33E-06	5.32E-06
152	5.61E-06	5.62E-06	5.61E-06	5.61E-06	5.61E-06	5.61E-06	5.62E-06	5.61E-06
153	5.64E-06	5.64E-06	5.63E-06	5.63E-06	5.63E-06	5.64E-06	5.64E-06	5.63E-06
154	5.37E-06	5.37E-06	5.37E-06	5.36E-06	5.36E-06	5.37E-06	5.37E-06	5.36E-06
155	5.39E-06	5.39E-06	5.38E-06	5.38E-06	5.38E-06	5.38E-06	5.39E-06	5.38E-06
172	5.56E-06	5.56E-06	5.55E-06	5.55E-06	5.55E-06	5.56E-06	5.56E-06	5.55E-06
173	5.65E-06	5.65E-06	5.64E-06	5.64E-06	5.64E-06	5.64E-06	5.65E-06	5.64E-06
174	5.32E-06	5.32E-06	5.32E-06	5.32E-06	5.32E-06	5.32E-06	5.33E-06	5.31E-06
175	5.60E-06	5.60E-06	5.60E-06	5.59E-06	5.60E-06	5.60E-06	5.61E-06	5.59E-06
Biased Statistics								
Average Biased	5.52E-06	5.53E-06	5.52E-06	5.52E-06	5.52E-06	5.52E-06	5.52E-06	5.51E-06
Std Dev Biased	1.22E-07	1.24E-07	1.23E-07	1.24E-07	1.22E-07	1.24E-07	1.24E-07	1.24E-07
Ps90%/90% (+KTL) Biased	5.86E-06	5.87E-06	5.85E-06	5.86E-06	5.85E-06	5.86E-06	5.86E-06	5.85E-06
Ps90%/90% (-KTL) Biased	5.19E-06	5.18E-06	5.18E-06	5.18E-06	5.18E-06	5.18E-06	5.18E-06	5.17E-06
Un-Biased Statistics								
Average Un-Biased	5.46E-06	5.46E-06	5.45E-06	5.45E-06	5.45E-06	5.45E-06	5.46E-06	5.45E-06
Std Dev Un-Biased	1.40E-07	1.39E-07	1.37E-07	1.39E-07	1.40E-07	1.40E-07	1.38E-07	1.40E-07
Ps90%/90% (+KTL) Un-Biased	5.84E-06	5.84E-06	5.83E-06	5.83E-06	5.84E-06	5.84E-06	5.84E-06	5.83E-06
Ps90%/90% (-KTL) Un-Biased	5.07E-06	5.08E-06	5.07E-06	5.07E-06	5.07E-06	5.07E-06	5.08E-06	5.06E-06
Specification MAX	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

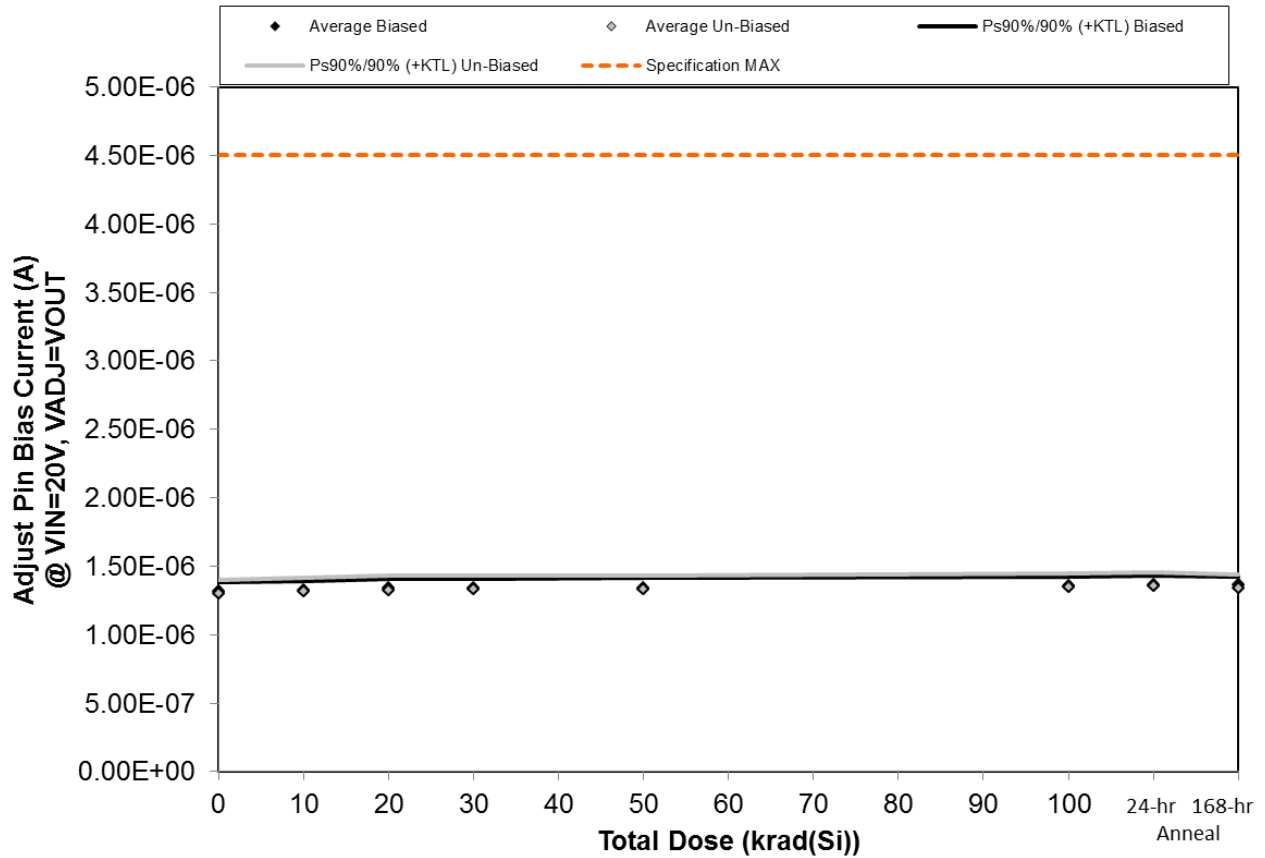


Figure 5.21. Plot of Adjust Pin Bias Current (A) @ VIN=20V, VADJ=VOUT versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.21. Raw data for Adjust Pin Bias Current (A) @ VIN=20V, VADJ=VOUT versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Adjust Pin Bias Current (A) @ VIN=20V, VADJ=VOUT	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	1.32E-06	1.33E-06	1.34E-06	1.35E-06	1.35E-06	1.36E-06	1.37E-06	1.37E-06
120	1.30E-06	1.31E-06	1.32E-06	1.32E-06	1.32E-06	1.33E-06	1.34E-06	1.34E-06
151	1.28E-06	1.30E-06	1.31E-06	1.31E-06	1.32E-06	1.33E-06	1.33E-06	1.33E-06
152	1.33E-06	1.34E-06	1.35E-06	1.36E-06	1.36E-06	1.37E-06	1.38E-06	1.38E-06
153	1.35E-06	1.36E-06	1.37E-06	1.37E-06	1.38E-06	1.39E-06	1.39E-06	1.39E-06
154	1.28E-06	1.29E-06	1.31E-06	1.31E-06	1.32E-06	1.33E-06	1.34E-06	1.32E-06
155	1.28E-06	1.28E-06	1.30E-06	1.30E-06	1.31E-06	1.32E-06	1.33E-06	1.32E-06
172	1.30E-06	1.31E-06	1.32E-06	1.33E-06	1.33E-06	1.34E-06	1.35E-06	1.34E-06
173	1.37E-06	1.38E-06	1.39E-06	1.39E-06	1.40E-06	1.41E-06	1.42E-06	1.40E-06
174	1.29E-06	1.30E-06	1.31E-06	1.31E-06	1.32E-06	1.33E-06	1.34E-06	1.33E-06
175	1.33E-06	1.32E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06
Biased Statistics								
Average Biased	1.32E-06	1.33E-06	1.34E-06	1.34E-06	1.34E-06	1.35E-06	1.36E-06	1.36E-06
Std Dev Biased	2.59E-08	2.38E-08	2.49E-08	2.45E-08	2.54E-08	2.61E-08	2.47E-08	2.32E-08
Ps90%/90% (+KTL) Biased	1.39E-06	1.39E-06	1.41E-06	1.41E-06	1.41E-06	1.43E-06	1.43E-06	1.42E-06
Ps90%/90% (-KTL) Biased	1.24E-06	1.26E-06	1.27E-06	1.27E-06	1.27E-06	1.28E-06	1.29E-06	1.30E-06
Un-Biased Statistics								
Average Un-Biased	1.30E-06	1.31E-06	1.33E-06	1.33E-06	1.33E-06	1.35E-06	1.36E-06	1.34E-06
Std Dev Un-Biased	3.62E-08	3.68E-08	3.73E-08	3.70E-08	3.60E-08	3.76E-08	3.68E-08	3.59E-08
Ps90%/90% (+KTL) Un-Biased	1.40E-06	1.41E-06	1.43E-06	1.43E-06	1.43E-06	1.45E-06	1.46E-06	1.44E-06
Ps90%/90% (-KTL) Un-Biased	1.20E-06	1.21E-06	1.22E-06	1.23E-06	1.24E-06	1.24E-06	1.25E-06	1.24E-06
Specification MAX	4.50E-06	4.50E-06	4.50E-06	4.50E-06	4.50E-06	4.50E-06	4.50E-06	4.50E-06
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

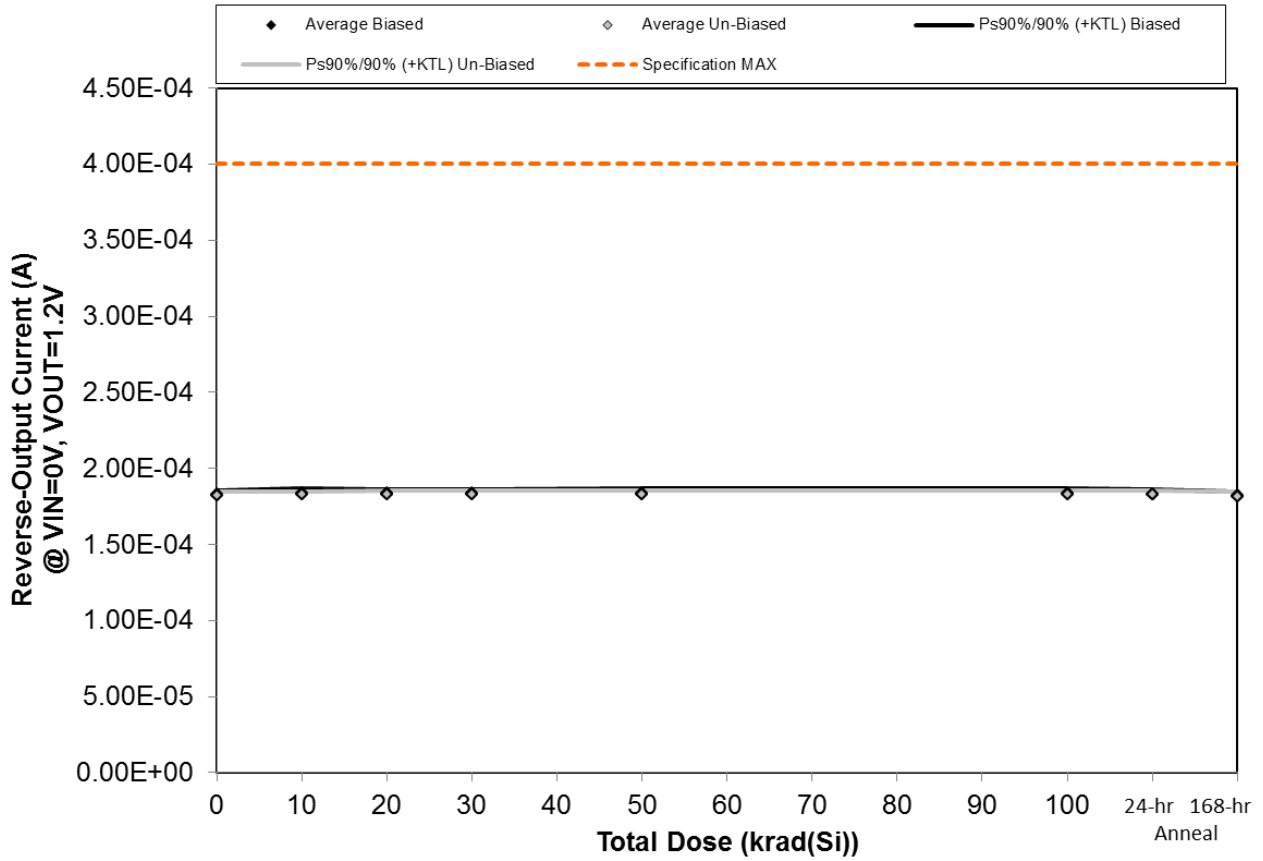


Figure 5.22. Plot of Reverse-Output Current (A) @ VIN=0V, VOUT=1.2V versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

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5030 Centennial Blvd.
Colorado Springs, CO 80919
(719) 531-0800

Table 5.22. Raw data for Reverse-Output Current (A) @ VIN=0V, VOUT=1.2V versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Reverse-Output Current (A) @ VIN=0V, VOUT=1.2V	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.82E-04	1.82E-04
120	1.84E-04	1.85E-04	1.85E-04	1.85E-04	1.85E-04	1.85E-04	1.84E-04	1.83E-04
151	1.82E-04	1.81E-04	1.81E-04	1.82E-04	1.82E-04	1.82E-04	1.81E-04	1.80E-04
152	1.82E-04	1.83E-04	1.82E-04	1.82E-04	1.82E-04	1.82E-04	1.82E-04	1.81E-04
153	1.83E-04	1.84E-04	1.84E-04	1.83E-04	1.84E-04	1.84E-04	1.83E-04	1.82E-04
154	1.81E-04	1.82E-04	1.81E-04	1.81E-04	1.81E-04	1.82E-04	1.81E-04	1.80E-04
155	1.80E-04	1.81E-04	1.81E-04	1.81E-04	1.81E-04	1.82E-04	1.81E-04	1.80E-04
172	1.82E-04	1.82E-04	1.82E-04	1.82E-04	1.82E-04	1.83E-04	1.82E-04	1.81E-04
173	1.83E-04	1.83E-04	1.84E-04	1.84E-04	1.84E-04	1.84E-04	1.84E-04	1.83E-04
174	1.82E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.82E-04
175	1.84E-04	1.85E-04	1.85E-04	1.85E-04	1.84E-04	1.84E-04	1.84E-04	1.83E-04
Biased Statistics								
Average Biased	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.83E-04	1.82E-04	1.82E-04
Std Dev Biased	1.04E-06	1.51E-06	1.20E-06	1.18E-06	1.37E-06	1.28E-06	1.27E-06	1.23E-06
Ps90%/90% (+KTL) Biased	1.85E-04	1.87E-04	1.86E-04	1.86E-04	1.87E-04	1.87E-04	1.86E-04	1.85E-04
Ps90%/90% (-KTL) Biased	1.80E-04	1.79E-04	1.80E-04	1.80E-04	1.79E-04	1.80E-04	1.79E-04	1.78E-04
Un-Biased Statistics								
Average Un-Biased	1.82E-04	1.82E-04	1.82E-04	1.82E-04	1.82E-04	1.83E-04	1.82E-04	1.81E-04
Std Dev Un-Biased	1.15E-06	1.07E-06	1.15E-06	1.28E-06	1.18E-06	1.05E-06	1.16E-06	1.30E-06
Ps90%/90% (+KTL) Un-Biased	1.85E-04	1.85E-04	1.85E-04	1.86E-04	1.85E-04	1.85E-04	1.85E-04	1.84E-04
Ps90%/90% (-KTL) Un-Biased	1.78E-04	1.79E-04	1.79E-04	1.79E-04	1.79E-04	1.80E-04	1.79E-04	1.77E-04
Specification MAX	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

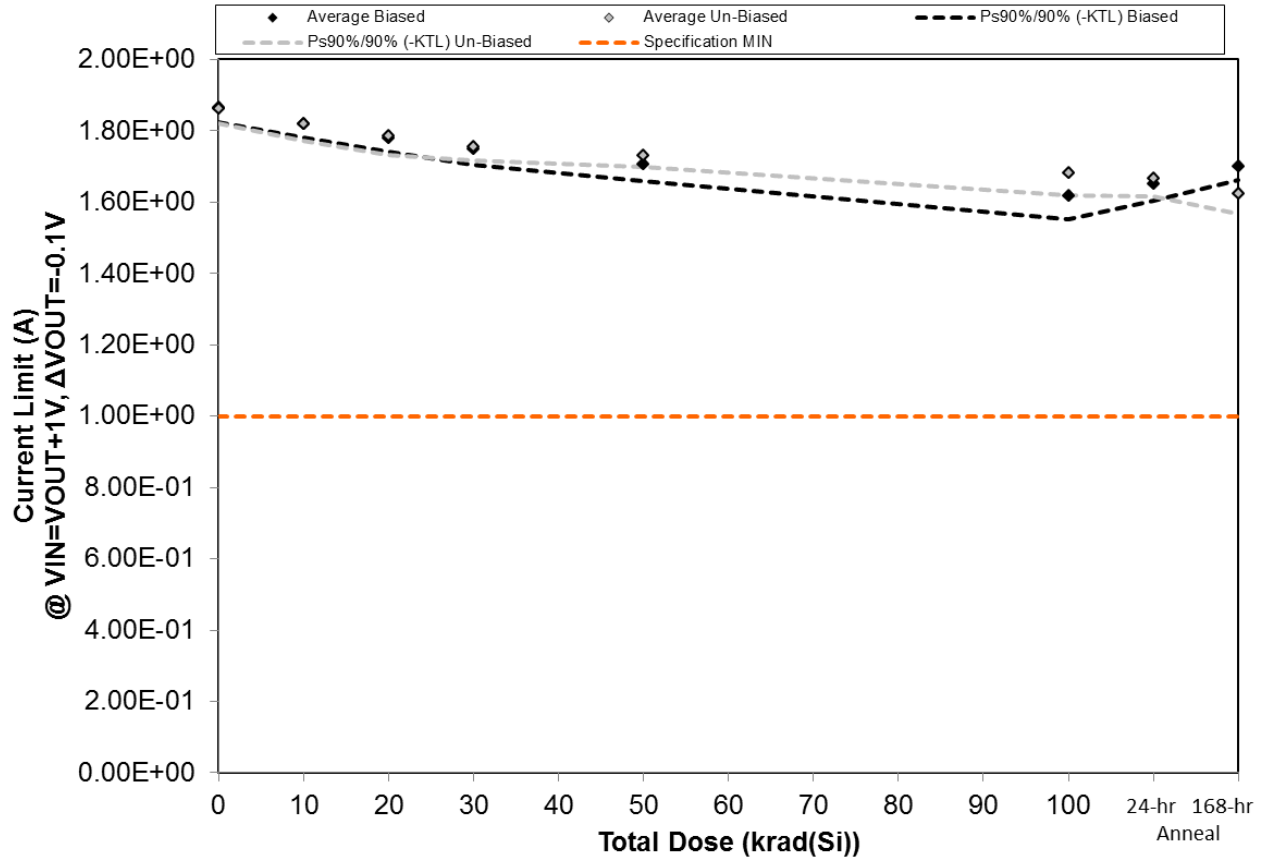


Figure 5.23. Plot of Current Limit (A) @ VIN=VOUT+1V, ΔVOUT=-0.1V versus total dose. The solid diamonds are the average of the measured data points for the samples irradiated under electrical bias while the shaded diamonds are the average of the measured data points for the samples irradiated with all pins tied to ground. The black lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated under electrical bias while the gray lines (solid and/or dashed) are the upper and/or lower confidence limits, as determined by KTL statistics, on the samples irradiated in the unbiased condition. The red dotted line(s) are the pre- and/or post-irradiation minimum and/or maximum specification value as defined in the datasheet and/or test plan.



TID Report
16-0300 08/21/17 R1.0

Aeroflex RAD
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(719) 531-0800

Table 5.23. Raw data for Current Limit (A) @ VIN=VOUT+1V, ΔVOUT=-0.1V versus total dose, including the statistical analysis, specification and the status of the testing (pass/fail).

Current Limit (A) @ VIN=VOUT+1V, ΔVOUT=-0.1V	Total Dose (krad(Si))						24-hr Anneal	168-hr Anneal
	0	10	20	30	50	100		
Device								
119	1.85E+00	1.81E+00	1.77E+00	1.75E+00	1.69E+00	1.61E+00	1.65E+00	1.70E+00
120	1.87E+00	1.81E+00	1.78E+00	1.74E+00	1.70E+00	1.61E+00	1.66E+00	1.70E+00
151	1.84E+00	1.80E+00	1.76E+00	1.73E+00	1.69E+00	1.58E+00	1.63E+00	1.69E+00
152	1.86E+00	1.81E+00	1.79E+00	1.75E+00	1.71E+00	1.62E+00	1.65E+00	1.69E+00
153	1.88E+00	1.84E+00	1.79E+00	1.76E+00	1.73E+00	1.64E+00	1.67E+00	1.72E+00
154	1.85E+00	1.84E+00	1.78E+00	1.75E+00	1.73E+00	1.69E+00	1.66E+00	1.62E+00
155	1.84E+00	1.80E+00	1.75E+00	1.73E+00	1.71E+00	1.65E+00	1.64E+00	1.61E+00
172	1.87E+00	1.82E+00	1.80E+00	1.76E+00	1.74E+00	1.70E+00	1.68E+00	1.64E+00
173	1.88E+00	1.82E+00	1.80E+00	1.76E+00	1.74E+00	1.69E+00	1.68E+00	1.64E+00
174	1.86E+00	1.80E+00	1.78E+00	1.76E+00	1.73E+00	1.66E+00	1.66E+00	1.59E+00
175	1.87E+00	1.87E+00	1.86E+00	1.89E+00	1.86E+00	1.87E+00	1.86E+00	1.88E+00
Biased Statistics								
Average Biased	1.86E+00	1.82E+00	1.78E+00	1.75E+00	1.70E+00	1.61E+00	1.65E+00	1.70E+00
Std Dev Biased	1.33E-02	1.25E-02	1.30E-02	1.51E-02	1.55E-02	2.20E-02	1.68E-02	1.29E-02
Ps90%/90% (+KTL) Biased	1.90E+00	1.85E+00	1.81E+00	1.79E+00	1.74E+00	1.67E+00	1.70E+00	1.73E+00
Ps90%/90% (-KTL) Biased	1.82E+00	1.78E+00	1.74E+00	1.70E+00	1.66E+00	1.55E+00	1.60E+00	1.66E+00
Un-Biased Statistics								
Average Un-Biased	1.86E+00	1.82E+00	1.78E+00	1.75E+00	1.73E+00	1.68E+00	1.66E+00	1.62E+00
Std Dev Un-Biased	1.44E-02	1.55E-02	1.84E-02	1.30E-02	1.12E-02	2.11E-02	1.74E-02	1.97E-02
Ps90%/90% (+KTL) Un-Biased	1.90E+00	1.86E+00	1.83E+00	1.79E+00	1.76E+00	1.74E+00	1.71E+00	1.67E+00
Ps90%/90% (-KTL) Un-Biased	1.82E+00	1.77E+00	1.73E+00	1.72E+00	1.70E+00	1.62E+00	1.62E+00	1.57E+00
Specification MIN	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00
Status	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS



6.0. Summary / Conclusions

The total ionizing dose testing described in this final report was performed using the facilities at Aeroflex RAD's Longmire Laboratories in Colorado Springs, CO. The high dose rate total ionizing dose (TID) source is a JLSA 81-24 irradiator modified to provide a panoramic exposure. The Co-60 rods are held in the base of the irradiator heavily shielded by lead, during the radiation exposures the rod is raised by an electronic timer/controller and the exposure is performed in air. The dose rate for this irradiator in this configuration ranges from 1rad(Si)/s to a maximum of approximately 300rad(Si)/s , determined by the distance from the source.

The parametric data was obtained as "read and record" and all the raw data plus an attributes summary are contained in this report as well as in a separate Excel file. The attributes data contains the average, standard deviation and the average with the KTL values applied. The KTL value used in this work is 2.742 per MIL-HDBK-814 using one sided tolerance limits of 90/90 and a 5-piece sample size. The 90/90 KTL values were selected to match the statistical levels specified in the MIL-PRF-38535 sampling plan for the qualification of a radiation hardness assured (RHA) component. Note that the following criteria must be met for a device to pass the total ionizing dose test: following the radiation exposure each of the 5 pieces irradiated under electrical bias shall pass the specification value. The units irradiated without electrical bias and the KTL statistics are included in this report for reference only. If any of the 5 pieces irradiated under electrical bias exceed the device post radiation data sheet specification limits, then the lot could be logged as a failure.

Based on this criterion the RH1965MK 0.9A, Low Noise, Low Dropout Linear Regulator (from the lot date code identified on the first page of this test report) PASSED the total ionizing dose test to the maximum tested dose level of 100krad(Si) with all parameters remaining within their datasheet specifications. Further, the data in this report can be analyzed along with the low dose rate report titled "Enhanced Low Dose Rate Sensitivity (ELDRS) Radiation Testing of the RH1965MK 0.9A, Low Noise, Low Dropout Linear Regulator for Linear Technology" to demonstrate that these parts do not exhibit ELDRS as defined in the current test method.



Appendix A: Photograph of Packing Label and a Sample Unit-Under-Test to Show Part Traceability



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Appendix B: Radiation Bias Connections and Absolute Maximum Ratings

TID Radiation Biased Conditions: Extracted from Linear Technology RH1965MK DICE/DWF Datasheet ID No. 16-33-1965, Revision F.

Pin	Function	Connection / Bias
1	OUT	To GND via 1kΩ Resistor, To GND via 10μF Capacitor To Pin 2
2	ADJ	To Pin 1
3	SHDN	To Pin 4
4	IN	To 15V Decoupled to GND W/ 4.7μF Capacitor, To Pin 3
5 (Case)	GND	To GND

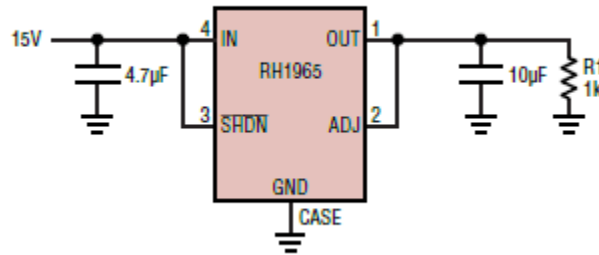


Figure B.1. Irradiation bias circuit. This figure was extracted from Linear Technology RH1965MK DICE/DWF Datasheet ID No. 16-33-1965, Revision F.



TID Radiation Unbiased Conditions: All pins grounded.

Pin	Function	Connection / Bias
1	OUT	GND
2	ADJ	GND
3	SHDN	GND
4	IN	GND
5 (Case)	GND	GND

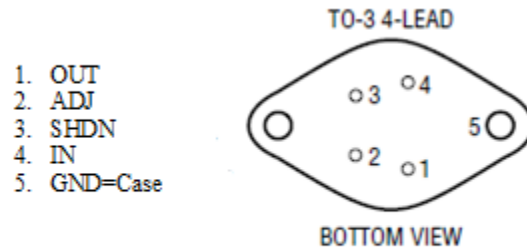


Figure B.2. Package drawing (for reference only). Bottom view for bias purposes

Absolute Maximum Ratings:

Parameter	Max Rating
IN Pin Voltage	±22V
OUT Pin Voltage	±22V
Input to Output Differential Voltage	±22V
ADJ Pin Voltage	±9V
SHDN Pin Voltage	±22V
Output Short-Circuit Duration	Indefinite

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Appendix C: Electrical Test Parameters and Conditions

The expected ranges of values as well as the measurement conditions are taken from Linear Technology RH1965MK DICE/DWF Datasheet ID No. 16-33-1965, Revision F. All electrical tests for this device are performed on one of Aeroflex RAD's LTS2020 Test Systems. The LTS2020 Test System is a programmable parametric tester that provides parameter measurements for a variety of digital, analog and mixed signal products including voltage regulators, voltage comparators, D to A and A to D converters. The LTS2020 Test System achieves accuracy and sensitivity through the use of software self-calibration and an internal relay matrix with separate family boards and custom personality adapter boards. The tester uses this relay matrix to connect the required test circuits, select the appropriate voltage / current sources and establish the needed measurement loops for all the tests performed. The measured parameters and test conditions are shown in Table C.1.

A listing of the measurement precision/resolution for each parameter is shown in Table C.2. The precision/resolution values were obtained from test data or from the DAC resolution of the LTS-2020 for the particular test shown, whichever is greater. To generate the precision/resolution shown in Table C.2, one of the units-under-test was tested repetitively (a total of 10-times with re-insertion between tests) to obtain the average test value and standard deviation. Using this test data MIL-HDBK-814 90/90 KTL statistics were applied to the measured standard deviation to generate the final measurement range. This value encompasses the precision/resolution of all aspects of the test system, including the LTS2020 mainframe, family board, socket assembly and DUT board as well as insertion error. In some cases, the measurement resolution is limited by the internal DACs, which results in a measured standard deviation of zero. In these instances the precision/resolution will be reported back as the LSB of the DAC.

Note that the testing and statistics used in this document are based on an “analysis of variables” technique, which relies on small sample sizes to qualify much larger lot sizes (see MIL-HDBK-814, p. 91 for a discussion of statistical treatments). Not all measured parameters are well suited to this approach due to inherent large variations. If necessary, larger samples sizes could be used to qualify these parameters using an “attributes” approach.



Table C.1. Measured parameters and test conditions for the RH1965MK 0.9A, Low Noise, Low Dropout Linear Regulator.

Parameter	Symbol	Test Conditions
Adjust Pin Voltage1 (V)	ADJ_VPIN1	VIN=2.1V, IL=1mA
Adjust Pin Voltage2 (V)	ADJ_VPIN2	VIN=20V, IL=1mA
Line Regulation (V)	LN_REG	Δ VIN=2.1 to 20V, IL=1mA
Adjust Pin Voltage3 (V)	ADJ_VPIN3	VIN=2.3V, IL=1mA
Adjust Pin Voltage4 (V)	ADJ_VPIN4	VIN=2.3V, IL=0.9A
Load Regulation (V)	LD_REG	VIN=2.3, Δ IL=1mA to 0.9A
GND Pin Current1 (A)	GND_IPIN1	VIN=VOUT+1V, IL=0mA
GND Pin Current2 (A)	GND_IPIN2	VIN=VOUT+1V, IL=1mA
GND Pin Current3 (A)	GND_IPIN3	VIN=VOUT+1V, IL=100mA
GND Pin Current4 (A)	GND_IPIN4	VIN=VOUT+1V, IL=500mA
GND Pin Current5 (A)	GND_IPIN5	VIN=VOUT+1V, IL=0.9A
Dropout Voltage1 (V)	DROPOUT_VOL1	VIN=VOUT, IL=1mA
Dropout Voltage2 (V)	DROPOUT_VOL2	VIN=VOUT, IL=100mA
Dropout Voltage3 (V)	DROPOUT_VOL3	VIN=VOUT, IL=500mA
Dropout Voltage4 (V)	DROPOUT_VOL4	VIN=VOUT, IL=0.9A
Shutdown Threshold1 (V)	SHDN_TH1	VOUT=OFF to ON
Shutdown Threshold2 (V)	SHDN_TH2	VOUT=ON to OFF
Quiescent Current in Shutdown (A)	SHDN_IQ	VIN=6V, VSHDN=0V
Shutdown Pin Current1 (A)	SHDN_IPIN1	VIN=20V, VSHDN=0V
Shutdown Pin Current2 (A)	SHDN_IPIN2	VIN=20V, VSHDN=20V
Adjust Pin Bias Current (A)	ADJ_IBIAS	VIN=20V, VADJ=VOUT
Reverse-Output Current (A)	REV_IOUT	VIN=0V, VOUT=1.2V
Current Limit (A)	ILIMIT	VIN=VOUT+1V, Δ VOUT=-0.1V



Table C.2. Measured parameters, pre-irradiation specifications and measurement precision for the RH1965MK 0.9A, Low Noise, Low Dropout Linear Regulator.

Parameter	Pre-Irradiation Specification		Measurement Precision/Resolution
	MIN	MAX	
Adjust Pin Voltage1 (V)	1.18E+00	1.22E+00	±8.71E-04
Adjust Pin Voltage2 (V)	1.18E+00	1.22E+00	±8.71E-04
Line Regulation (V)	-6.00E-03	6.00E-03	±5.17E-05
Adjust Pin Voltage3 (V)	1.16E+00	1.24E+00	±8.71E-04
Adjust Pin Voltage4 (V)	1.16E+00	1.24E+00	±8.71E-04
Load Regulation (V)	-8.00E-03	8.00E-03	±5.23E-04
GND Pin Current1 (A)		8.50E-04	±2.13E-06
GND Pin Current2 (A)		1.10E-03	±2.13E-06
GND Pin Current3 (A)		4.60E-03	±1.37E-05
GND Pin Current4 (A)		1.65E-02	±6.88E-05
GND Pin Current5 (A)		3.00E-02	±5.25E-05
Dropout Voltage 1 (V)		8.00E-02	±2.27E-04
Dropout Voltage2 (V)		1.85E-01	±2.76E-04
Dropout Voltage3 (V)		3.00E-01	±2.17E-03
Dropout Voltage4 (V)		4.35E-01	±1.17E-03
Shutdown Threshold1 (V)	3.70E-01	1.50E+00	±2.47E-03
Shutdown Threshold2 (V)	3.70E-01	1.50E+00	±3.52E-03
Quiescent Current in Shutdown (A)		1.00E-06	±5.26E-09
Shutdown Pin Current 1 (A)		1.00E-06	±1.07E-09
Shutdown Pin Current 2 (A)		1.00E-05	±3.54E-09
Adjust Pin Bias Current (A)		4.50E-06	±4.29E-09
Reverse-Output Current (A)		4.00E-04	±8.19E-07
Current Limit (A)	1.00E+00		±9.70E-03



Appendix D: List of Figures Used in the Results Section (Section 5)

- 5.1. Adjust Pin Voltage1 (V) @ VIN=2.1V, IL=1mA
- 5.2. Adjust Pin Voltage2 (V) @ VIN=20V, IL=1mA
- 5.3. Adjust Pin Voltage3 (V) @ VIN=2.3V, IL=1mA
- 5.4. Adjust Pin Voltage4 (V) @ VIN=2.3V, IL=0.9A
- 5.5. Line Regulation (V) @ Δ VIN=2.1 to 20V, IL=1mA
- 5.6. Load Regulation (V) @ VIN=2.3, Δ IL=1mA to 0.9A
- 5.7. GND Pin Current1 (A) @ VIN=VOUT+1V, IL=0mA
- 5.8. GND Pin Current2 (A) @ VIN=VOUT+1V, IL=1mA
- 5.9. GND Pin Current3 (A) @ VIN=VOUT+1V, IL=100mA
- 5.10. GND Pin Current4 (A) @ VIN=VOUT+1V, IL=500mA
- 5.11. GND Pin Current5 (A) @ VIN=VOUT+1V, IL=0.9A
- 5.12. Dropout Voltage1 (V) @ VIN=VOUT, IL=1mA
- 5.13. Dropout Voltage2 (V) @ VIN=VOUT, IL=100mA
- 5.14. Dropout Voltage3 (V) @ VIN=VOUT, IL=500mA
- 5.15. Dropout Voltage4 (V) @ VIN=VOUT, IL=0.9A
- 5.16. Shutdown Threshold1 (V) @ VOUT=OFF to ON
- 5.17. Shutdown Threshold2 (V) @ VOUT=ON to OFF
- 5.18. Quiescent Current in Shutdown (A) @ VIN=6V, VSHDN=0V
- 5.19. Shutdown Pin Current1 (A) @ VIN=20V, VSHDN=0V
- 5.20. Shutdown Pin Current2 (A) @ VIN=20V, VSHDN=20V
- 5.21. Adjust Pin Bias Current (A) @ VIN=20V, VADJ=VOUT
- 5.22. Reverse-Output Current (A) @ VIN=0V, VOUT=1.2V
- 5.23. Current Limit (A) @ VIN=VOUT+1V, Δ VOUT=-0.1V