

Total Ionization Dose (TID) Test Results of the RH3083MK Adjustable 2.8A Single Resistor Low Dropout Regulator @ High Dose Rate (HDR)

HDR = 50 rads(Si)/s

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TID HDR Testing of the RH3083MK Adjustable 2.8A Single Resistor Low Dropout Regulator

Part Type Tested: RH3083MK Adjustable 2.8A Single Resistor Low Dropout Regulator

Traceability Information: Fab Lot # HP201494.1; Wafer # 2. See photograph of unit under test in Appendix A.

Quantity of Units: 62 units received, 2 units for control, 30 units for biased irradiation, and 30 units for unbiased irradiation. Serial numbers 56-60, 66-70, 76-80, 86-90, 96-100, and 106-110 had all pins tied to ground during irradiation. Serial numbers 51-55, 61-65, 71-75, 81-85, 91-95, and 101-105 were biased during irradiation. Serial numbers 111 and 112 were used as control. See Appendix B for the radiation bias connection tables.

Radiation and Electrical Test Increments: 60 samples were divided into six groups of 10 each. Serial numbers 51-60 of group 1 were irradiated to 10 Krads(Si). Serial numbers 61-70 of group 2 were irradiated to 30 Krads(Si). Serial numbers 71-80 of group 3 were irradiated to 50 Krads(Si). Serial numbers 81-90 of group 4 were irradiated to 100 Krads(Si). Serial numbers 91-100 of group 5 were irradiated to 150 Krads(Si). Serial numbers 101-110 were irradiated to 200 Krads(Si).

Radiation dose: 50 rads(Si)/sec.

Radiation Test Standard: MIL-STD-883 TM1019.9 Condition A.

Test Hardware and Software: LTX pre-irradiation test program EFR3083R.00; LTX post-irradiation test program EFR3083R.00.

Facility and Radiation Source: Defense Micro Electronic Activity (DMEA) and Cobalt-60.

Irradiation and Test Temperature: Room temperature controlled to $24^{\circ}\text{C}\pm 6^{\circ}\text{C}$ per MIL-STD-883 and MIL-STD-750.

SUMMARY

ALL 62 PARTS PASSED THE ELECTRICAL TEST LIMITS AS SPECIFIED IN THE DATASHEET AFTER EACH IRRADIATION INCREMENT. ADDITIONAL INFORMATION CAN BE PROVIDED PER REQUEST.

1.0 Overview and Background

Among other radiation effects, Total Ionizing Dose (TID) may affect circuits' electrical characteristics, causing parametric and/or functional failures in integrated circuits. During gamma-irradiations, TID-induced and transported electron-hole pairs may result in charge trapping in the transistors' dielectrics and interface regions, affecting hence the devices' basic features. Such effects warrant testing and monitoring of circuits to TID, after which annealing and/or Time Dependent Effects (TDE) may take place, depending on the circuit's design and process technology. Hence is the requirement per Condition A (for high-dose rates ranging from 50 and 300 rads(Si)/sec) in TM1019, MIL-STD-883 to not exceed the allowed time from the end of an incremented irradiation and an electrical test to more than one hour. Additionally, the total time from the end of one incremental irradiation to the start of the next incremental step should be less than two hours.

2.0 Radiation Facility and Test Equipment

The samples were irradiated at Defense Micro-Electronics Activity (DMEA) facility in Sacramento, California. DMEA utilizes J.L. Shepherd model 81-22/484 to provide the dose-rate of 50 rads(Si)/s. A special design screw-driven automatic cart inside the exposure tunnel positions the Device-Under-Test (DUT) precisely and repeatedly from the source to attain optimal rate verified by ion chamber detectors. See Appendix C for the certificate of dosimetry.

3.0 Test Conditions

The 60 test samples and two control units were electrically tested at 25°C prior to irradiation. The parts were then placed in a lead/aluminum container and aligned with the radiation source, Cobalt-60, at DMEA facility in Sacramento, California. During irradiation, five units of six separate groups were biased at +3V and other five of similar groups had all pads grounded. Ten units of group 1 were irradiated to 10 Krads(Si); group 2 to 30 Krads(Si); group 3 to 50 Krads(Si); group 4 to 100 Krads(Si); group 5 to 150 Krads(Si), and group 6 to 200 Krads(Si). After irradiation, the samples were transported in dry ice to Linear Technology testing facility. Testing was performed on the two control units to confirm the operation of the test system prior to the electrical testing of the 62 units (60 irradiated and 2 control).

The criteria to pass the high dose-rate test is that five samples in each corresponding dose group irradiated under electrical bias must pass the datasheet limits. If any of the tested parameters of these five units do not meet the required limits then a failure-analysis of the part should be conducted and if valid the lot will be scrapped.

4.0 Tested Parameters

The following parameters were measured pre- and post-irradiations:

- SET Pin Current (μA)
- Output Offset Voltage (mV)
- Load Regulation I_{SET} (nA)
- Load Regulation V_{OS} (mV)
- Line Regulation I_{SET} (nA/V)
- Line Regulation V_{OS} (mV/V)
- Minimum Load Current (mA) @ $V_{\text{IN}} = 1\text{V}$, $V_{\text{CONTROL}} = 2\text{V}$
- Minimum Load Current (mA) @ $V_{\text{IN}} = 23\text{V}$, $V_{\text{CONTROL}} = 25\text{V}$
- V_{CONTROL} Dropout Voltage (V) @ $V_{\text{IN}} = 1\text{V}$, $I_{\text{LOAD}} = 0.1\text{A}$
- V_{CONTROL} Dropout Voltage (V) @ $V_{\text{IN}} = 1\text{V}$, $I_{\text{LOAD}} = 1\text{A}$
- V_{CONTROL} Dropout Voltage (V) @ $V_{\text{IN}} = 1\text{V}$, $I_{\text{LOAD}} = 2.8\text{A}$
- V_{IN} Dropout Voltage (V) @ $V_{\text{CONTROL}} = 2\text{V}$, $I_{\text{LOAD}} = 0.1\text{A}$
- V_{IN} Dropout Voltage (V) @ $V_{\text{CONTROL}} = 2\text{V}$, $I_{\text{LOAD}} = 1\text{A}$
- V_{IN} Dropout Voltage (V) @ $V_{\text{CONTROL}} = 2\text{V}$, $I_{\text{LOAD}} = 2.8\text{A}$
- V_{CONTROL} Pin Current (mA) @ $V_{\text{IN}} = 1\text{V}$, $V_{\text{CONTROL}} = 2\text{V}$, $I_{\text{LOAD}} = 0.1\text{A}$
- V_{CONTROL} Pin Current (mA) @ $V_{\text{IN}} = 1\text{V}$, $V_{\text{CONTROL}} = 2\text{V}$, $I_{\text{LOAD}} = 1\text{A}$
- V_{CONTROL} Pin Current (mA) @ $V_{\text{IN}} = 1\text{V}$, $V_{\text{CONTROL}} = 2\text{V}$, $I_{\text{LOAD}} = 2.8\text{A}$
- Current Limit (A) @ $V_{\text{IN}} = 5\text{V}$, $V_{\text{CONTROL}} = 5\text{V}$, $V_{\text{OUT}} = -0.1\text{V}$

Appendix D details the test conditions, minimum and maximum values at different accumulated doses.

5.0 Test Results

All 60 samples passed the post-irradiation electrical tests. All measurements of the 18 listed parameters in section 4.0 are within the specification limits.

The used statistics in this report are based on the tolerance limits, which are bounds to gage the quality of the manufactured products. It assumes that if the quality of the items is normally distributed with known mean and known standard deviation, the two-sided tolerance limits can be calculated by adding to and subtracting from mean the product of standard deviation and the tolerance limit factor K_{TL} where K_{TL} is tabulated from a table of the inverse normal probability distribution. The upper tolerance limit $+K_{TL}$ and the lower tolerance limit $-K_{TL}$ are

$$+K_{TL} = \text{mean} + (K_{TL}) (\text{standard deviation})$$

$$-K_{TL} = \text{mean} - (K_{TL}) (\text{standard deviation})$$

However, in most cases, mean and standard deviations are unknown and therefore it is practical to estimate both of them from a sample. Hence the tolerance limit depends greatly on the sample size. The $P_{s90\%/90\%}$ K_{TL} factor for a lot quality P of 0.9, confidence C of 0.9 with a sample size of 5, can be found from the tabulated table (MIL-HDBK-814, page 94, table IX-B). The K_{TL} factor in this report is 2.742.

In the plots, the dotted lines with diamond markers are the average of the measured data points of five samples irradiated under electrical bias while the dashed lines with X-markers are the average of measured data points of five units irradiated with all pins tied to ground. The solid lines with triangle markers are the average of the data points after the calculation of the K_{TL} statistics on the sample irradiated in the biased setup. The solid lines with square symbols are the average of the measured points after the application of the K_{TL} statistics on the five samples irradiated with all pins grounded. The orange solid lines with circle markers are the specification limits.

The 30 Krads(Si) test limits are using Linear Technology datasheet 20 Krads(Si) specification limits.

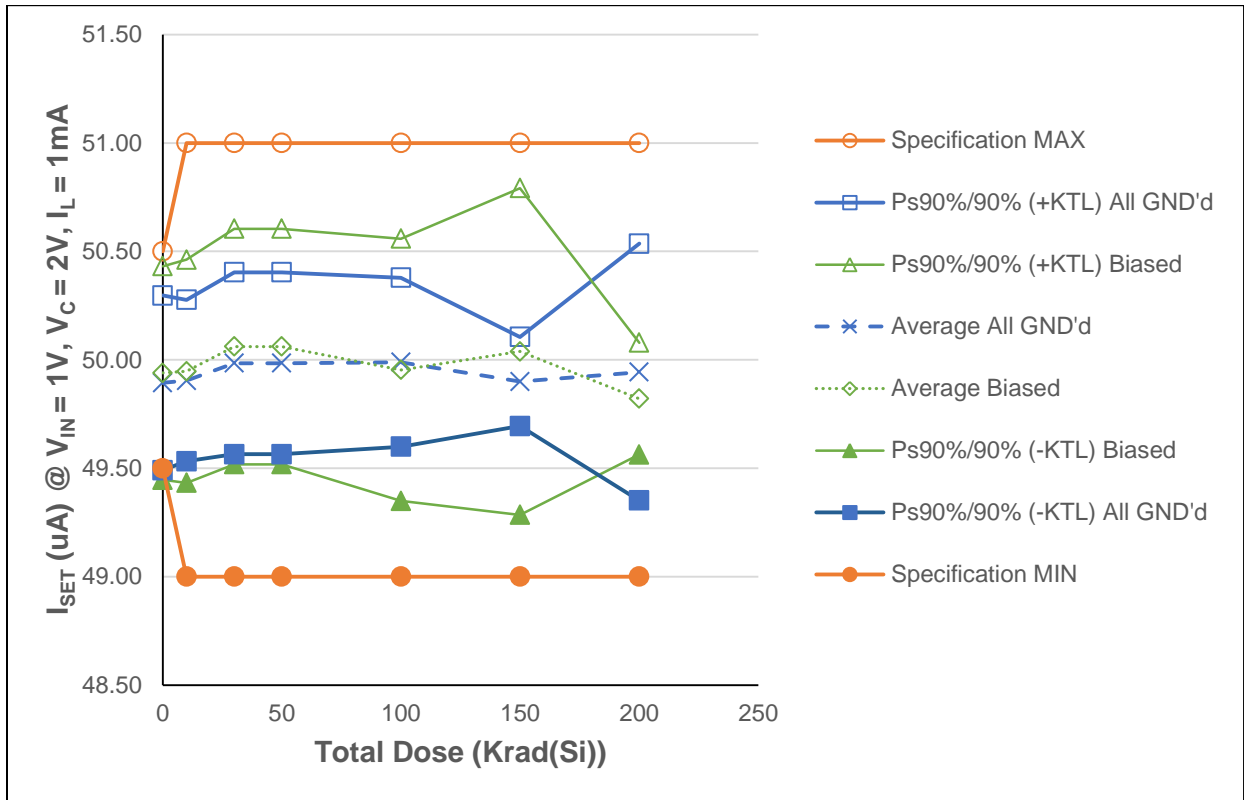


Figure 5.1 Plot of SET Pin Current versus Total Dose

The measured data of five samples of six groups are within datasheet specification limits. Note the pre-irradiation computed -KTL data points are slightly lower than the minimum limit due to the small 5-piece sample size.

Table 5.1: Raw data for SET Pin current versus total dose including the statistical calculations, minimum specification, maximum specification, and the status of the test (PASS/FAIL) under the orange headers)

Parameter Units	I _{SET} @ V _{IN} = 1V, V _C = 2V, I _L = 1mA (uA)	Total Dose (Krad(Si)) @ 50 rads(Si)/s							
		0	10	30	50	100	150	200	
56	All GND'd Irradiation	50.052	50.058						
57	All GND'd Irradiation	49.800	49.827						
58	All GND'd Irradiation	49.953	49.970						
59	All GND'd Irradiation	49.975	49.956						
60	All GND'd Irradiation	49.688	49.711						
51	Biased Irradiation	49.856	49.836						
52	Biased Irradiation	49.878	49.843						
53	Biased Irradiation	49.800	49.843						
54	Biased Irradiation	50.253	50.274						
55	Biased Irradiation	49.909	49.940						
66	All GND'd Irradiation	50.122		50.082					
67	All GND'd Irradiation	50.152		50.082					
68	All GND'd Irradiation	50.010		50.028					
69	All GND'd Irradiation	49.968		50.012					
70	All GND'd Irradiation	49.728		49.716					
61	Biased Irradiation	50.378		50.367					
62	Biased Irradiation	50.003		50.033					
63	Biased Irradiation	49.939		49.889					
64	Biased Irradiation	49.897		49.892					
65	Biased Irradiation	50.165		50.124					
76	All GND'd Irradiation	50.265			50.082				
77	All GND'd Irradiation	50.300			50.082				
78	All GND'd Irradiation	50.108			50.028				
79	All GND'd Irradiation	50.265			50.012				
80	All GND'd Irradiation	50.010			49.716				
71	Biased Irradiation	49.975			50.367				
72	Biased Irradiation	49.785			50.033				
73	Biased Irradiation	50.138			49.889				
74	Biased Irradiation	49.968			49.892				
75	Biased Irradiation	50.277			50.124				
86	All GND'd Irradiation	49.806				49.760			
87	All GND'd Irradiation	50.131				49.986			
88	All GND'd Irradiation	49.997				49.986			
89	All GND'd Irradiation	50.172				50.089			
90	All GND'd Irradiation	50.193				50.125			
81	Biased Irradiation	49.997				49.986			
82	Biased Irradiation	49.834				49.773			
83	Biased Irradiation	49.742				49.715			
84	Biased Irradiation	50.277				50.267			
85	Biased Irradiation	50.087				50.028			
96	All GND'd Irradiation	50.010					49.936		
97	All GND'd Irradiation	50.052					49.986		
98	All GND'd Irradiation	49.997					49.917		
99	All GND'd Irradiation	49.918					49.873		
100	All GND'd Irradiation	49.881					49.787		
91	Biased Irradiation	50.448					50.406		
92	Biased Irradiation	50.235					50.167		
93	Biased Irradiation	49.938					49.873		
94	Biased Irradiation	50.083					50.058		
95	Biased Irradiation	49.742					49.688		
106	All GND'd Irradiation	49.983						49.883	
107	All GND'd Irradiation	49.815						49.716	
108	All GND'd Irradiation	50.068						49.899	
109	All GND'd Irradiation	50.108						49.915	
110	All GND'd Irradiation	50.364						50.302	
101	Biased Irradiation	49.772						49.715	
102	Biased Irradiation	49.962						49.855	
103	Biased Irradiation	50.022						49.949	
104	Biased Irradiation	49.800						49.743	
105	Biased Irradiation	49.913						49.843	
111	Control Unit	50.179	50.179	50.179	50.179	50.179	50.179	50.179	50.179
112	Control Unit	50.404	50.404	50.404	50.404	50.404	50.404	50.404	50.404
All GND'd Irradiation Statistics									
Average All GND'd		49.894	49.904	49.984	49.984	49.989	49.900	49.943	
Std Dev All GND'd		0.147	0.136	0.153	0.153	0.142	0.075	0.216	
Ps90%/90% (+KTL) All GND'd		50.296	50.276	50.404	50.404	50.379	50.105	50.535	
Ps90%/90% (-KTL) All GND'd		49.491	49.532	49.565	49.565	49.600	49.694	49.351	
Biased Irradiation Statistics									
Average Biased		49.939	49.947	50.061	50.061	49.954	50.038	49.821	
Std Dev Biased		0.180	0.188	0.198	0.198	0.221	0.275	0.094	
Ps90%/90% (+KTL) Biased		50.432	50.462	50.604	50.604	50.558	50.792	50.079	
Ps90%/90% (-KTL) Biased		49.447	49.432	49.518	49.518	49.349	49.285	49.563	
Specification MIN		49.5	49.0	49.0	49.0	49.0		49.0	
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS	
Specification MAX		50.5	51.0	51.0	51.0	51.0		51.0	
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS	
Status (-KTL) All GND'd		FAIL	PASS	PASS	PASS	PASS		PASS	
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (-KTL) Biased		FAIL	PASS	PASS	PASS	PASS		PASS	
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS	

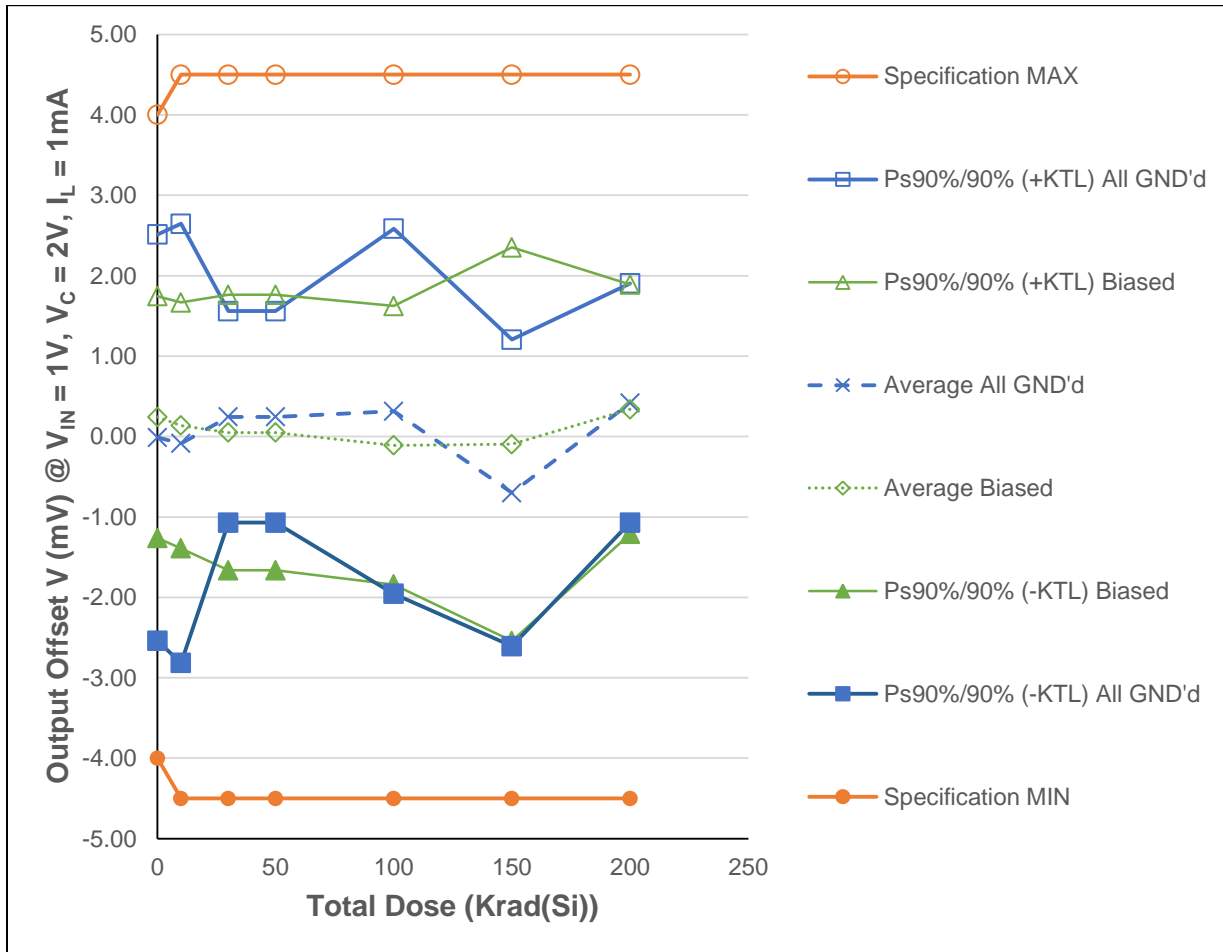


Figure 5.2: Plot of Output Offset Voltage versus Total Dose

All samples passed the Output Offset Voltage parameter test.

Table 5.2: Raw data for output offset voltage versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL under the second orange header)

Parameter Units	V _{OS} @ V _{IN} = 1V, V _C = 2V, I _L = 1mA (mV)	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	-1.241	-1.460					
57	All GND'd Irradiation	0.036	0.015					
58	All GND'd Irradiation	0.332	0.232					
59	All GND'd Irradiation	-0.438	-0.474					
60	All GND'd Irradiation	1.246	1.262					
51	Biased Irradiation	0.743	0.417					
52	Biased Irradiation	-0.135	-0.421					
53	Biased Irradiation	-0.468	-0.424					
54	Biased Irradiation	0.278	0.255					
55	Biased Irradiation	0.793	0.863					
66	All GND'd Irradiation	-0.034		-0.171				
67	All GND'd Irradiation	1.207		1.071				
68	All GND'd Irradiation	0.288		0.098				
69	All GND'd Irradiation	0.157		0.169				
70	All GND'd Irradiation	0.338		0.053				
61	Biased Irradiation	-0.635		-0.477				
62	Biased Irradiation	-0.277		0.046				
63	Biased Irradiation	-0.648		-0.631				
64	Biased Irradiation	0.820		0.864				
65	Biased Irradiation	0.330		0.447				
76	All GND'd Irradiation	-0.614			-0.171			
77	All GND'd Irradiation	-0.962			1.071			
78	All GND'd Irradiation	-0.375			0.098			
79	All GND'd Irradiation	-0.629			0.169			
80	All GND'd Irradiation	-0.523			0.053			
71	Biased Irradiation	-0.085			-0.477			
72	Biased Irradiation	1.143			0.046			
73	Biased Irradiation	-0.261			-0.631			
74	Biased Irradiation	0.626			0.864			
75	Biased Irradiation	-0.180			0.447			
86	All GND'd Irradiation	1.203				1.293		
87	All GND'd Irradiation	-0.285				-0.132		
88	All GND'd Irradiation	-0.886				-0.262		
89	All GND'd Irradiation	-0.561				-0.456		
90	All GND'd Irradiation	1.064				1.126		
81	Biased Irradiation	-0.795				-0.766		
82	Biased Irradiation	0.405				0.527		
83	Biased Irradiation	0.206				0.115		
84	Biased Irradiation	-0.849				-0.798		
85	Biased Irradiation	-0.317				0.376		
96	All GND'd Irradiation	-1.305					-1.225	
97	All GND'd Irradiation	-1.559					-1.303	
98	All GND'd Irradiation	-0.739					-0.878	
99	All GND'd Irradiation	-0.524					-0.498	
100	All GND'd Irradiation	0.505					0.405	
91	Biased Irradiation	-0.243					-0.026	
92	Biased Irradiation	0.975					1.347	
93	Biased Irradiation	-0.243					-0.339	
94	Biased Irradiation	-0.518					-0.387	
95	Biased Irradiation	-1.772					-1.073	
106	All GND'd Irradiation	0.218						0.138
107	All GND'd Irradiation	-0.284						-0.223
108	All GND'd Irradiation	0.255						0.250
109	All GND'd Irradiation	0.752						1.150
110	All GND'd Irradiation	0.793						0.767
101	Biased Irradiation	-0.582						-0.295
102	Biased Irradiation	-0.258						0.166
103	Biased Irradiation	-0.547						-0.033
104	Biased Irradiation	0.547						1.017
105	Biased Irradiation	0.730						0.838
111	Control Unit	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007
112	Control Unit	-0.160	-0.160	-0.160	-0.160	-0.160	-0.160	-0.160
All GND'd Irradiation Statistics								
Average All GND'd		-0.013	-0.085	0.244	0.244	0.314	-0.700	0.416
Std Dev All GND'd		0.921	0.996	0.480	0.480	0.828	0.695	0.542
Ps90%/90% (+KTL) All GND'd		2.513	2.645	1.559	1.559	2.584	1.206	1.903
Ps90%/90% (-KTL) All GND'd		-2.539	-2.815	-1.071	-1.071	-1.956	-2.606	-1.071
Biased Irradiation Statistics								
Average Biased		0.242	0.138	0.050	0.050	-0.109	-0.095	0.338
Std Dev Biased		0.548	0.558	0.625	0.625	0.632	0.892	0.566
Ps90%/90% (+KTL) Biased		1.745	1.668	1.763	1.763	1.623	2.352	1.890
Ps90%/90% (-KTL) Biased		-1.261	-1.392	-1.663	-1.663	-1.841	-2.543	-1.213
Specification MIN		-4.0	-4.5	-4.5	-4.5	-4.5	-4.5	-4.5
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS	PASS	PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS	PASS	PASS
Specification MAX		4.0	4.5	4.5	4.5	4.5	4.5	4.5
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS	PASS	PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS	PASS	PASS
Status (-KTL) All GND'd		PASS	PASS	PASS	PASS	PASS	PASS	PASS
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS	PASS	PASS
Status (-KTL) Biased		PASS	PASS	PASS	PASS	PASS	PASS	PASS
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS	PASS	PASS

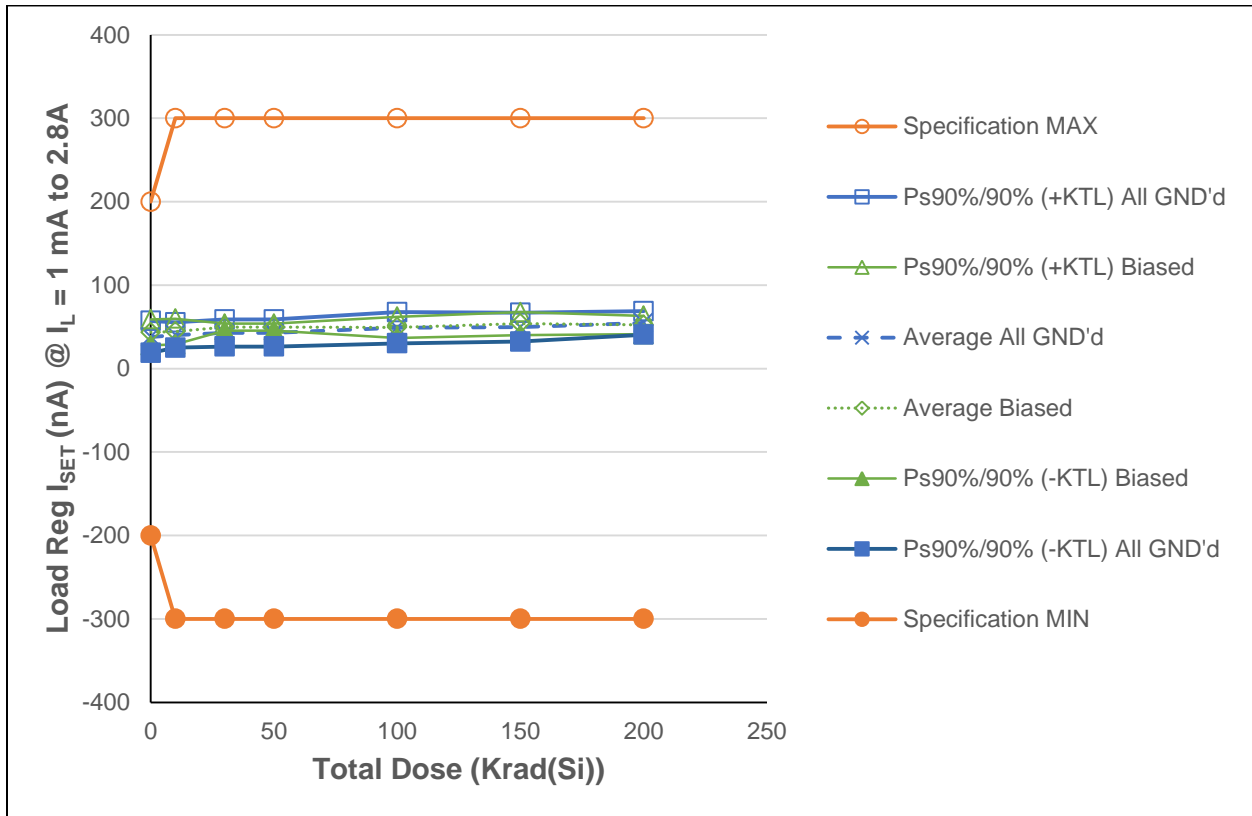


Figure 5.3: Plot of Load Regulation I_{SET} versus Total Dose

All measured post-irradiation data points are within the datasheet specification limits.

Table 5.3: Raw data for Load Regulation I_{SET} versus total dose including the statistical calculations, minimum specification, maximum specification, and the status of the test (PASS/FAIL).

Parameter Units	Load Reg. I _{SET} @I _L =1mA to 2.8A (nA)	Total Dose (Krad(Si)) @ 50 rads(Si)/s							
		0	10	30	50	100	150	200	
56	All GND'd Irradiation	48.109	43.903						
57	All GND'd Irradiation	31.971	37.558						
58	All GND'd Irradiation	35.740	35.638						
59	All GND'd Irradiation	32.029	36.060						
60	All GND'd Irradiation	41.837	48.138						
51	Biased Irradiation	44.907	44.995						
52	Biased Irradiation	48.371	42.812						
53	Biased Irradiation	46.493	49.477						
54	Biased Irradiation	33.746	48.982						
55	Biased Irradiation	43.656	35.652						
66	All GND'd Irradiation	48.836		42.215					
67	All GND'd Irradiation	46.275		46.173					
68	All GND'd Irradiation	34.110		33.440					
69	All GND'd Irradiation	64.203		49.171					
70	All GND'd Irradiation	47.017		42.390					
61	Biased Irradiation	43.277		50.146					
62	Biased Irradiation	38.533		47.963					
63	Biased Irradiation	36.162		49.389					
64	Biased Irradiation	51.601		52.038					
65	Biased Irradiation	41.662		49.244					
76	All GND'd Irradiation	52.081			42.215				
77	All GND'd Irradiation	49.520			46.173				
78	All GND'd Irradiation	38.897			33.440				
79	All GND'd Irradiation	49.156			49.171				
80	All GND'd Irradiation	39.421			42.390				
71	Biased Irradiation	41.706			50.146				
72	Biased Irradiation	48.705			47.963				
73	Biased Irradiation	30.312			49.389				
74	Biased Irradiation	40.483			52.038				
75	Biased Irradiation	49.869			49.244				
86	All GND'd Irradiation	43.481				37.195			
87	All GND'd Irradiation	40.891				49.680			
88	All GND'd Irradiation	61.031				51.004			
89	All GND'd Irradiation	43.015				51.892			
90	All GND'd Irradiation	39.581				54.773			
81	Biased Irradiation	50.088				51.878			
82	Biased Irradiation	30.108				47.643			
83	Biased Irradiation	40.091				50.364			
84	Biased Irradiation	51.630				54.773			
85	Biased Irradiation	51.645				42.564			
96	All GND'd Irradiation	27.503					54.948		
97	All GND'd Irradiation	41.546					43.976		
98	All GND'd Irradiation	50.801					57.145		
99	All GND'd Irradiation	41.473					43.292		
100	All GND'd Irradiation	41.808					48.531		
91	Biased Irradiation	40.221					59.386		
92	Biased Irradiation	32.829					54.759		
93	Biased Irradiation	45.839					46.799		
94	Biased Irradiation	42.855					51.441		
95	Biased Irradiation	48.443					57.553		
106	All GND'd Irradiation	40.818							51.587
107	All GND'd Irradiation	40.847							57.771
108	All GND'd Irradiation	40.614							60.667
109	All GND'd Irradiation	42.681							55.836
110	All GND'd Irradiation	43.685							47.745
101	Biased Irradiation	39.072							49.913
102	Biased Irradiation	43.117							49.899
103	Biased Irradiation	33.251							59.343
104	Biased Irradiation	35.448							50.801
105	Biased Irradiation	44.529							51.208
111	Control Unit	43.015	43.015	43.015	43.015	43.015	43.015	43.015	43.015
112	Control Unit	39.639	39.639	39.639	39.639	39.639	39.639	39.639	39.639
All GND'd Irradiation Statistics									
Average All GND'd		37.937	40.259	42.678	42.678	48.909	49.578	54.721	
Std Dev All GND'd		6.964	5.514	5.916	5.916	6.810	6.287	5.109	
Ps90%/90% (+KTL) All GND'd		57.033	55.380	58.900	58.900	67.582	66.817	68.729	
Ps90%/90% (-KTL) All GND'd		18.841	25.139	26.456	26.456	30.236	32.340	40.713	
Biased Irradiation Statistics									
Average Biased		43.435	44.383	49.756	49.756	49.444	53.988	52.233	
Std Dev Biased		5.697	5.616	1.497	1.497	4.630	5.015	4.015	
Ps90%/90% (+KTL) Biased		59.055	59.783	53.862	53.862	62.140	67.740	63.242	
Ps90%/90% (-KTL) Biased		27.814	28.984	45.650	45.650	36.749	40.236	41.223	
Specification MIN		-200	-300	-300	-300	-300		-300	
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS	
Specification MAX		200	300	300	300	300		300	
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS	
Status (-KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (-KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS	
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS	

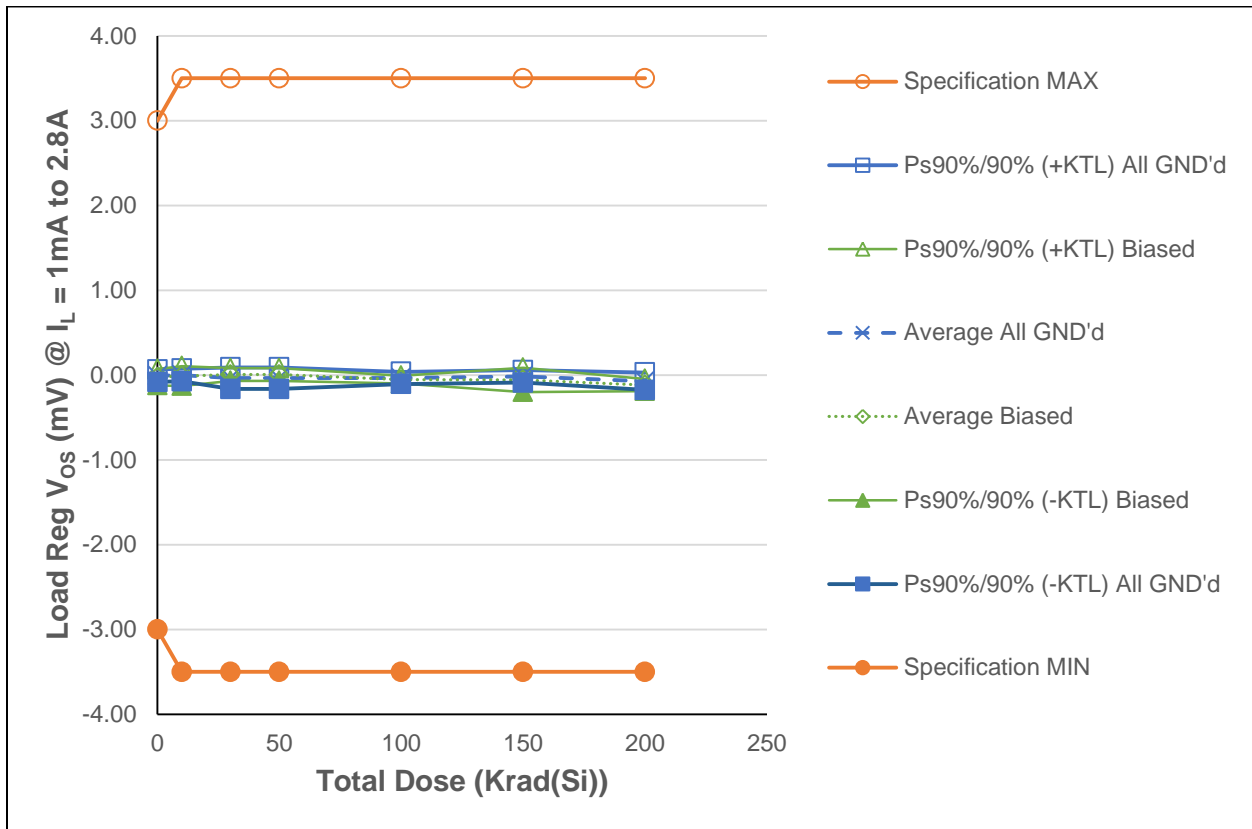


Figure 5.4: Plot of Load Regulation V_{Os} versus Total Dose

All measured data points are within datasheet specification limits.

Table 5.4: Raw data for load regulation V_{OS} versus total dose including the statistical calculations, minimum specification, maximum specification, and the status of the test (PASS/FAIL).

Parameter Units	Load Reg. V_{OS} @ $I_L = 1mA$ to 2.8A (mV)	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	0.0313	0.0347					
57	All GND'd Irradiation	-0.0352	-0.0355					
58	All GND'd Irradiation	-0.0295	-0.0111					
59	All GND'd Irradiation	0.0048	0.0180					
60	All GND'd Irradiation	-0.0075	-0.0016					
51	Biased Irradiation	-0.0645	-0.0706					
52	Biased Irradiation	-0.0351	-0.0036					
53	Biased Irradiation	0.0249	0.0446					
54	Biased Irradiation	-0.0050	0.0026					
55	Biased Irradiation	-0.0442	-0.0309					
66	All GND'd Irradiation	-0.0222		-0.0124				
67	All GND'd Irradiation	-0.1132		-0.1123				
68	All GND'd Irradiation	-0.0300		-0.0329				
69	All GND'd Irradiation	0.0001		0.0112				
70	All GND'd Irradiation	-0.0386		-0.0358				
61	Biased Irradiation	0.0214		0.0290				
62	Biased Irradiation	0.0087		0.0274				
63	Biased Irradiation	0.0014		0.0190				
64	Biased Irradiation	-0.0351		-0.0085				
65	Biased Irradiation	-0.0368		-0.0342				
76	All GND'd Irradiation	-0.0316			-0.0124			
77	All GND'd Irradiation	-0.0271			-0.1123			
78	All GND'd Irradiation	-0.0128			-0.0329			
79	All GND'd Irradiation	-0.0132			0.0112			
80	All GND'd Irradiation	-0.0600			-0.0358			
71	Biased Irradiation	-0.0190			0.0290			
72	Biased Irradiation	-0.0759			0.0274			
73	Biased Irradiation	-0.0382			0.0190			
74	Biased Irradiation	-0.0593			-0.0085			
75	Biased Irradiation	-0.0077			-0.0342			
86	All GND'd Irradiation	-0.0662				-0.0688		
87	All GND'd Irradiation	-0.0113				-0.0228		
88	All GND'd Irradiation	-0.0399				-0.0471		
89	All GND'd Irradiation	0.0146				0.0005		
90	All GND'd Irradiation	-0.0289				-0.0309		
81	Biased Irradiation	-0.0337				-0.0639		
82	Biased Irradiation	-0.0117				-0.0445		
83	Biased Irradiation	-0.0715				-0.0790		
84	Biased Irradiation	-0.0151				-0.0432		
85	Biased Irradiation	-0.0080				-0.0399		
96	All GND'd Irradiation	0.0080					-0.0143	
97	All GND'd Irradiation	0.0161					0.0096	
98	All GND'd Irradiation	0.0001					-0.0044	
99	All GND'd Irradiation	0.0096					-0.0055	
100	All GND'd Irradiation	-0.0458					-0.0608	
91	Biased Irradiation	-0.0289					-0.1193	
92	Biased Irradiation	0.0050					-0.0242	
93	Biased Irradiation	-0.0549					-0.0978	
94	Biased Irradiation	0.0076					-0.0501	
95	Biased Irradiation	0.0525					0.0092	
106	All GND'd Irradiation	0.0057						-0.0134
107	All GND'd Irradiation	-0.0079						-0.0586
108	All GND'd Irradiation	-0.0669						-0.0891
109	All GND'd Irradiation	-0.0592						-0.1099
110	All GND'd Irradiation	-0.0627						-0.0902
101	Biased Irradiation	-0.0186						-0.0748
102	Biased Irradiation	-0.0522						-0.1140
103	Biased Irradiation	-0.0180						-0.1261
104	Biased Irradiation	-0.0629						-0.1309
105	Biased Irradiation	-0.0623						-0.1428
111	Control Unit	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009	0.0009
112	Control Unit	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041	0.0041
All GND'd Irradiation Statistics								
Average All GND'd		-0.0072	0.0009	-0.0364	-0.0364	-0.0338	-0.0151	-0.0722
Std Dev All GND'd		0.0269	0.0270	0.0464	0.0464	0.0260	0.0269	0.0376
Ps90%/90% (+KTL) All GND'd		0.0666	0.0750	0.0908	0.0908	0.0375	0.0588	0.0310
Ps90%/90% (-KTL) All GND'd		-0.0810	-0.0731	-0.1637	-0.1637	-0.1052	-0.0890	-0.1755
Biased Irradiation Statistics								
Average Biased		-0.0248	-0.0116	0.0065	0.0065	-0.0541	-0.0564	-0.1177
Std Dev Biased		0.0351	0.0426	0.0273	0.0273	0.0168	0.0526	0.0261
Ps90%/90% (+KTL) Biased		0.0714	0.1053	0.0814	0.0814	-0.0080	0.0877	-0.0461
Ps90%/90% (-KTL) Biased		-0.1209	-0.1285	-0.0683	-0.0683	-0.1001	-0.2006	-0.1894
Specification MIN		-3.0	-3.5	-3.5	-3.5	-3.5	-2.006	-3.5
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Specification MAX		3.0	3.5	3.5	3.5	3.5		3.5
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

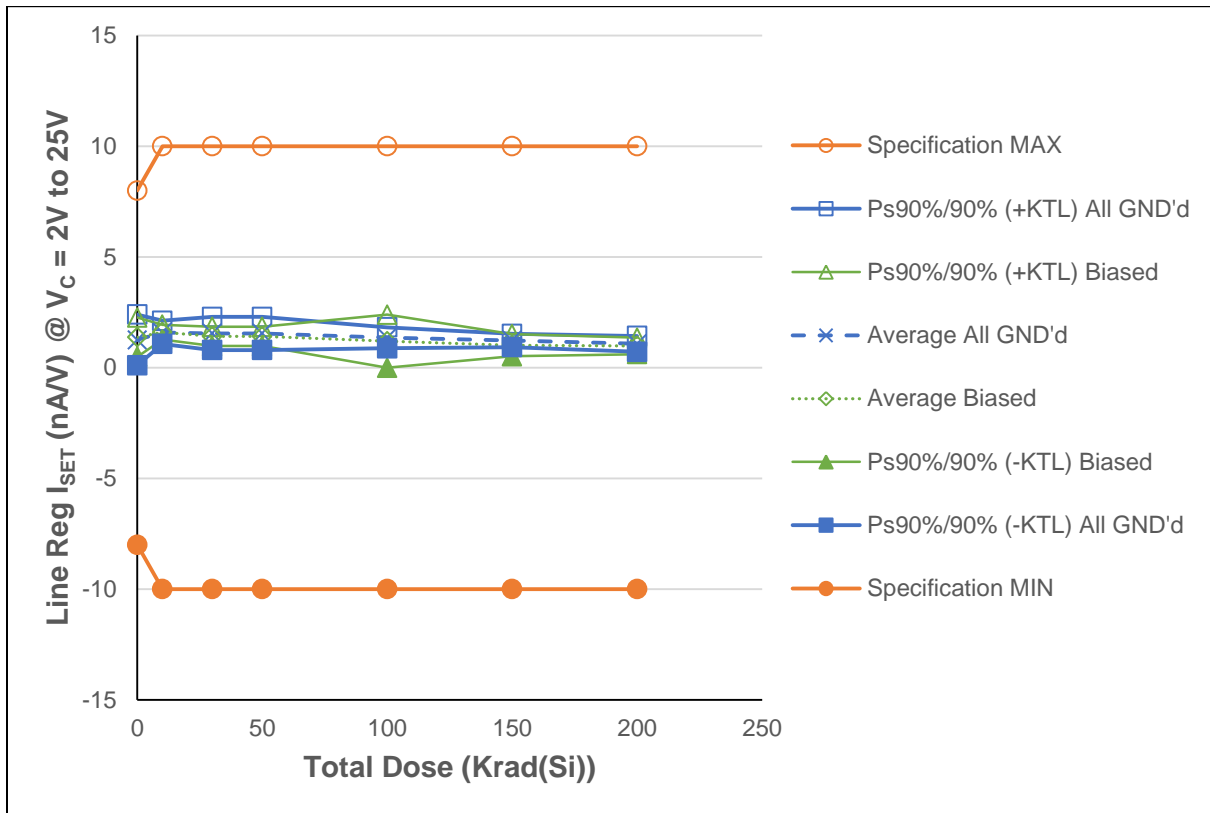


Figure 5.5: Plot of Line Regulation I_{SET} versus Total Dose

The measured post-irradiation average data points are within datasheet specification limits.

Table 5.5: Raw data for line regulation I_{SET} versus total dose including the statistical calculations, minimum specification, maximum specification, and the status of the test (PASS/FAIL)

Parameter Units	Line Reg. I_{SET} @ $V_C = 2V$ to $25V$ (nAV)	Total Dose (Krad(Si)) @ 50 rads(Si)/s							
		0	10	30	50	100	150	200	
56	All GND'd Irradiation	1.136	1.300						
57	All GND'd Irradiation	1.533	1.757						
58	All GND'd Irradiation	1.150	1.758						
59	All GND'd Irradiation	1.763	1.528						
60	All GND'd Irradiation	0.674	1.612						
51	Biased Irradiation	1.518	1.452						
52	Biased Irradiation	1.058	1.682						
53	Biased Irradiation	0.997	1.529						
54	Biased Irradiation	1.610	1.605						
55	Biased Irradiation	1.685	1.758						
66	All GND'd Irradiation	1.150		1.758					
67	All GND'd Irradiation	1.379		1.452					
68	All GND'd Irradiation	1.840		1.528					
69	All GND'd Irradiation	1.149		1.146					
70	All GND'd Irradiation	1.686		1.834					
61	Biased Irradiation	1.303		1.383					
62	Biased Irradiation	1.533		1.527					
63	Biased Irradiation	1.150		1.452					
64	Biased Irradiation	0.843		1.529					
65	Biased Irradiation	1.149		1.147					
76	All GND'd Irradiation	1.303			1.758				
77	All GND'd Irradiation	1.073			1.452				
78	All GND'd Irradiation	1.824			1.528				
79	All GND'd Irradiation	1.763			1.146				
80	All GND'd Irradiation	1.840			1.834				
71	Biased Irradiation	1.532			1.383				
72	Biased Irradiation	0.536			1.527				
73	Biased Irradiation	1.840			1.452				
74	Biased Irradiation	1.763			1.529				
75	Biased Irradiation	1.150			1.147				
86	All GND'd Irradiation	1.455				1.375			
87	All GND'd Irradiation	1.226				1.376			
88	All GND'd Irradiation	0.996				1.605			
89	All GND'd Irradiation	1.455				1.223			
90	All GND'd Irradiation	1.303				1.155			
81	Biased Irradiation	1.303				1.605			
82	Biased Irradiation	1.455				0.535			
83	Biased Irradiation	1.456				0.993			
84	Biased Irradiation	1.303				1.299			
85	Biased Irradiation	1.518				1.528			
96	All GND'd Irradiation	1.840					1.069		
97	All GND'd Irradiation	1.838					1.300		
98	All GND'd Irradiation	1.532					1.307		
99	All GND'd Irradiation	1.610					1.300		
100	All GND'd Irradiation	1.364					1.147		
91	Biased Irradiation	1.303					0.841		
92	Biased Irradiation	1.838					0.925		
93	Biased Irradiation	1.073					1.300		
94	Biased Irradiation	1.365					1.071		
95	Biased Irradiation	0.919					0.916		
106	All GND'd Irradiation	1.303						1.146	
107	All GND'd Irradiation	1.610						1.146	
108	All GND'd Irradiation	1.212						0.848	
109	All GND'd Irradiation	1.226						1.155	
110	All GND'd Irradiation	1.533						1.070	
101	Biased Irradiation	1.303						0.993	
102	Biased Irradiation	1.226						1.070	
103	Biased Irradiation	1.685						0.841	
104	Biased Irradiation	1.226						1.146	
105	Biased Irradiation	1.839						0.841	
111	Control Unit	1.761	1.761	1.761	1.761	1.761	1.761	1.761	
112	Control Unit	1.747	1.747	1.747	1.747	1.747	1.747	1.747	
All GND'd Irradiation Statistics									
Average All GND'd		1.251	1.591	1.544	1.544	1.347	1.225	1.073	
Std Dev All GND'd		0.418	0.190	0.272	0.272	0.174	0.110	0.130	
Ps90%/90% (+KTL) All GND'd		2.396	2.113	2.290	2.290	1.823	1.525	1.430	
Ps90%/90% (-KTL) All GND'd		0.106	1.069	0.797	0.797	0.871	0.924	0.716	
Biased Irradiation Statistics									
Average Biased		1.374	1.605	1.408	1.408	1.192	1.010	0.978	
Std Dev Biased		0.322	0.121	0.158	0.158	0.438	0.182	0.137	
Ps90%/90% (+KTL) Biased		2.257	1.936	1.840	1.840	2.392	1.509	1.353	
Ps90%/90% (-KTL) Biased		0.490	1.274	0.975	0.975	-0.008	0.512	0.604	
Specification MIN		-8	-10	-10	-10	-10	-10	-10	
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS	PASS	PASS	
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS	PASS	PASS	
Specification MAX		8	10	10	10	10	10	10	
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS	PASS	PASS	
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS	PASS	PASS	
Status (-KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (-KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS	
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS	

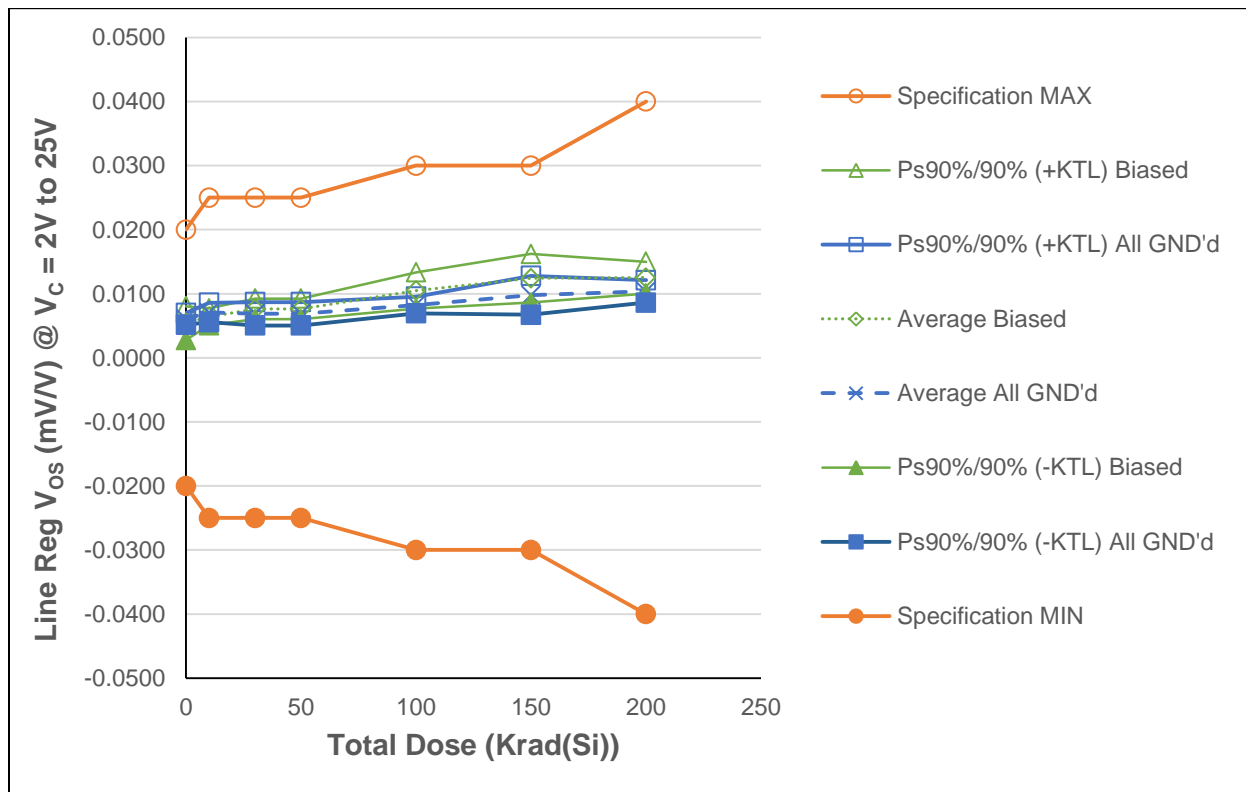


Figure 5.6: Plot of Line Regulation V_{OS} versus Total Dose

All measured average data points are within datasheet specification limits.

Table 5.6: Raw data for line regulation V_{OS} versus total dose including the statistical calculations, minimum specification, maximum specification, and the status of the test (PASS/FAIL)

Parameter Units	Line Reg. V_{OS} @ $V_C = 2V$ to $25V$ (mV/V)	Total Dose (Krad(Si)) @ 50 rads(Si)/s							
		0	10	30	50	100	150	200	
56	All GND'd Irradiation	0.0061	0.0076						
57	All GND'd Irradiation	0.0057	0.0065						
58	All GND'd Irradiation	0.0062	0.0065						
59	All GND'd Irradiation	0.0065	0.0072						
60	All GND'd Irradiation	0.0058	0.0075						
51	Biased Irradiation	0.0041	0.0057						
52	Biased Irradiation	0.0061	0.0065						
53	Biased Irradiation	0.0062	0.0070						
54	Biased Irradiation	0.0060	0.0065						
55	Biased Irradiation	0.0046	0.0063						
66	All GND'd Irradiation	0.0063		0.0070					
67	All GND'd Irradiation	0.0048		0.0062					
68	All GND'd Irradiation	0.0045		0.0069					
69	All GND'd Irradiation	0.0065		0.0079					
70	All GND'd Irradiation	0.0052		0.0063					
61	Biased Irradiation	0.0066		0.0084					
62	Biased Irradiation	0.0060		0.0076					
63	Biased Irradiation	0.0059		0.0080					
64	Biased Irradiation	0.0057		0.0071					
65	Biased Irradiation	0.0058		0.0070					
76	All GND'd Irradiation	0.0046			0.0070				
77	All GND'd Irradiation	0.0056			0.0062				
78	All GND'd Irradiation	0.0059			0.0069				
79	All GND'd Irradiation	0.0067			0.0079				
80	All GND'd Irradiation	0.0053			0.0063				
71	Biased Irradiation	0.0060			0.0084				
72	Biased Irradiation	0.0056			0.0076				
73	Biased Irradiation	0.0063			0.0080				
74	Biased Irradiation	0.0045			0.0071				
75	Biased Irradiation	0.0057			0.0070				
86	All GND'd Irradiation	0.0055				0.0074			
87	All GND'd Irradiation	0.0056				0.0083			
88	All GND'd Irradiation	0.0060				0.0083			
89	All GND'd Irradiation	0.0057				0.0086			
90	All GND'd Irradiation	0.0060				0.0086			
81	Biased Irradiation	0.0066				0.0110			
82	Biased Irradiation	0.0059				0.0105			
83	Biased Irradiation	0.0055				0.0092			
84	Biased Irradiation	0.0049				0.0100			
85	Biased Irradiation	0.0065				0.0119			
96	All GND'd Irradiation	0.0057					0.0101		
97	All GND'd Irradiation	0.0067					0.0107		
98	All GND'd Irradiation	0.0062					0.0089		
99	All GND'd Irradiation	0.0063					0.0108		
100	All GND'd Irradiation	0.0048					0.0083		
91	Biased Irradiation	0.0047					0.0121		
92	Biased Irradiation	0.0057					0.0114		
93	Biased Irradiation	0.0053					0.0112		
94	Biased Irradiation	0.0052					0.0127		
95	Biased Irradiation	0.0076					0.0146		
106	All GND'd Irradiation	0.0053						0.0106	
107	All GND'd Irradiation	0.0055						0.0111	
108	All GND'd Irradiation	0.0051						0.0095	
109	All GND'd Irradiation	0.0050						0.0107	
110	All GND'd Irradiation	0.0058						0.0099	
101	Biased Irradiation	0.0058						0.0128	
102	Biased Irradiation	0.0059						0.0128	
103	Biased Irradiation	0.0059						0.0137	
104	Biased Irradiation	0.0049						0.0115	
105	Biased Irradiation	0.0052						0.0118	
111	Control Unit	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	
112	Control Unit	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	
All GND'd Irradiation Statistics									
Average All GND'd		0.0061	0.0071	0.0069	0.0069	0.0082	0.0098	0.0104	
Std Dev All GND'd		0.0003	0.0006	0.0007	0.0007	0.0005	0.0011	0.0006	
Ps90%/90% (+KTL) All GND'd		0.0070	0.0086	0.0087	0.0087	0.0095	0.0128	0.0121	
Ps90%/90% (-KTL) All GND'd		0.0051	0.0056	0.0050	0.0050	0.0070	0.0067	0.0086	
Biased Irradiation Statistics									
Average Biased		0.0054	0.0064	0.0076	0.0076	0.0105	0.0124	0.0125	
Std Dev Biased		0.0010	0.0005	0.0006	0.0006	0.0010	0.0014	0.0009	
Ps90%/90% (+KTL) Biased		0.0081	0.0077	0.0092	0.0092	0.0133	0.0162	0.0150	
Ps90%/90% (-KTL) Biased		0.0028	0.0051	0.0060	0.0060	0.0077	0.0086	0.0100	
Specification MIN		-0.020	-0.025	-0.025	-0.025	-0.030		-0.040	
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS	
Specification MAX		0.020	0.025	0.025	0.025	0.030		0.040	
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS	
Status (-KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS	
Status (-KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS	
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS	

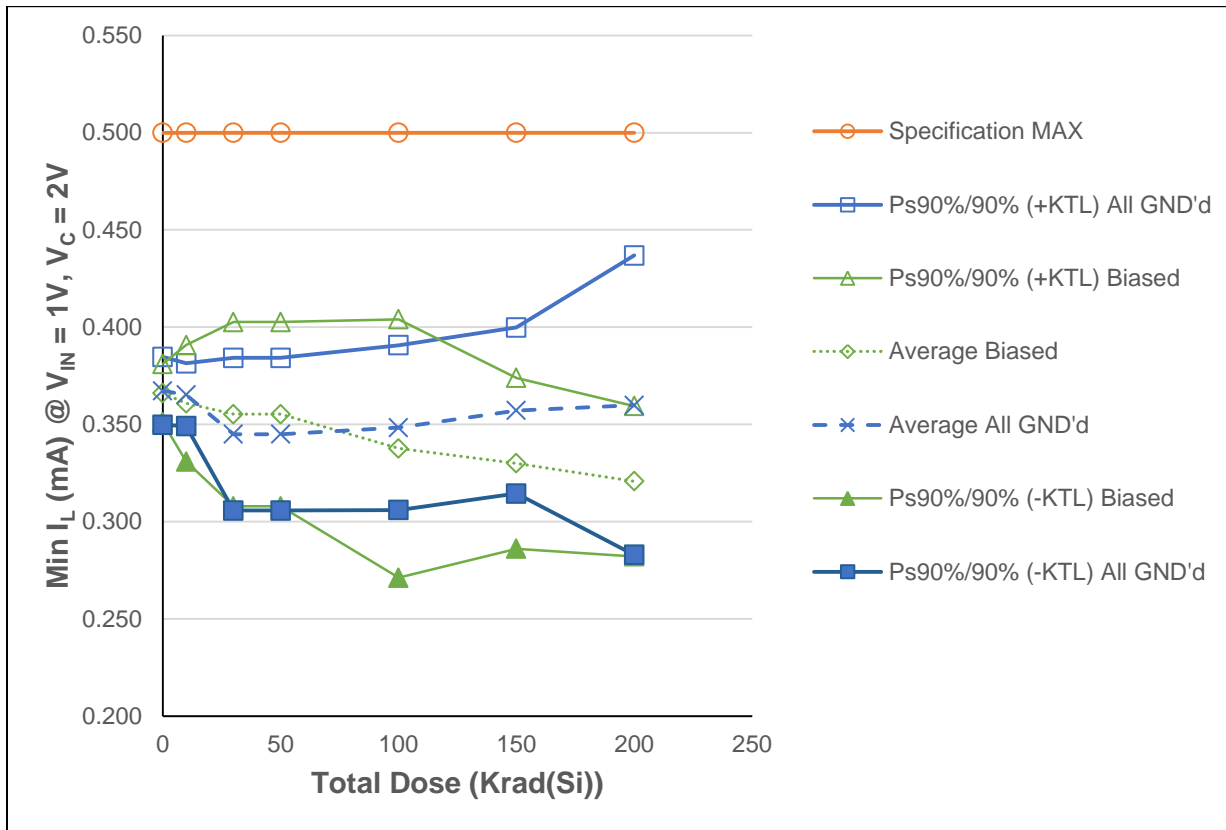


Figure 5.7: Plot of Minimum Load Current (@ $V_{IN} = 1V$) versus Total Dose

The average measured values of all samples pass the datasheet specification maximum limit.

Table 5.7: Raw data table for minimum load current (@ $V_{IN} = 1V$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter Units	Min I_L @ $V_{IN}=1V, V_C=2V$ (mA)	Total Dose (Krad(Si)) @ 50 rads(Si/s)						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	0.361	0.356					
57	All GND'd Irradiation	0.366	0.366					
58	All GND'd Irradiation	0.373	0.364					
59	All GND'd Irradiation	0.375	0.370					
60	All GND'd Irradiation	0.361	0.370					
51	Biased Irradiation	0.361	0.342					
52	Biased Irradiation	0.365	0.370					
53	Biased Irradiation	0.375	0.364					
54	Biased Irradiation	0.361	0.361					
55	Biased Irradiation	0.368	0.367					
66	All GND'd Irradiation	0.366		0.345				
67	All GND'd Irradiation	0.368		0.356				
68	All GND'd Irradiation	0.373		0.326				
69	All GND'd Irradiation	0.370		0.337				
70	All GND'd Irradiation	0.365		0.361				
61	Biased Irradiation	0.376		0.370				
62	Biased Irradiation	0.389		0.368				
63	Biased Irradiation	0.381		0.355				
64	Biased Irradiation	0.381		0.327				
65	Biased Irradiation	0.376		0.356				
76	All GND'd Irradiation	0.364			0.345			
77	All GND'd Irradiation	0.381			0.356			
78	All GND'd Irradiation	0.389			0.326			
79	All GND'd Irradiation	0.373			0.337			
80	All GND'd Irradiation	0.381			0.361			
71	Biased Irradiation	0.385			0.370			
72	Biased Irradiation	0.387			0.368			
73	Biased Irradiation	0.348			0.355			
74	Biased Irradiation	0.361			0.327			
75	Biased Irradiation	0.387			0.356			
86	All GND'd Irradiation	0.370				0.368		
87	All GND'd Irradiation	0.361				0.338		
88	All GND'd Irradiation	0.357				0.342		
89	All GND'd Irradiation	0.358				0.332		
90	All GND'd Irradiation	0.386				0.361		
81	Biased Irradiation	0.381				0.323		
82	Biased Irradiation	0.357				0.367		
83	Biased Irradiation	0.373				0.318		
84	Biased Irradiation	0.381				0.319		
85	Biased Irradiation	0.383				0.361		
96	All GND'd Irradiation	0.376					0.351	
97	All GND'd Irradiation	0.375					0.376	
98	All GND'd Irradiation	0.366					0.337	
99	All GND'd Irradiation	0.375					0.351	
100	All GND'd Irradiation	0.368					0.370	
91	Biased Irradiation	0.378					0.342	
92	Biased Irradiation	0.370					0.323	
93	Biased Irradiation	0.364					0.351	
94	Biased Irradiation	0.370					0.320	
95	Biased Irradiation	0.375					0.313	
106	All GND'd Irradiation	0.351						0.337
107	All GND'd Irradiation	0.366						0.366
108	All GND'd Irradiation	0.381						0.326
109	All GND'd Irradiation	0.367						0.376
110	All GND'd Irradiation	0.375						0.394
101	Biased Irradiation	0.351						0.308
102	Biased Irradiation	0.385						0.327
103	Biased Irradiation	0.367						0.327
104	Biased Irradiation	0.383						0.337
105	Biased Irradiation	0.389						0.304
111	Control Unit	0.365	0.365	0.365	0.365	0.365	0.365	0.365
112	Control Unit	0.383	0.383	0.383	0.383	0.383	0.383	0.383
All GND'd Irradiation Statistics								
Average All GND'd		0.367	0.365	0.345	0.345	0.348	0.357	0.360
Std Dev All GND'd		0.006	0.006	0.014	0.014	0.015	0.016	0.028
Ps90%/90% (+KTL) All GND'd		0.385	0.381	0.384	0.384	0.391	0.400	0.437
Ps90%/90% (-KTL) All GND'd		0.350	0.349	0.306	0.306	0.306	0.314	0.283
Biased Irradiation Statistics								
Average Biased		0.366	0.361	0.355	0.355	0.338	0.330	0.321
Std Dev Biased		0.005	0.011	0.017	0.017	0.024	0.016	0.014
Ps90%/90% (+KTL) Biased		0.381	0.391	0.403	0.403	0.404	0.374	0.359
Ps90%/90% (-KTL) Biased		0.351	0.331	0.308	0.308	0.271	0.286	0.282
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		0.5	0.5	0.5	0.5	0.5		0.5
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

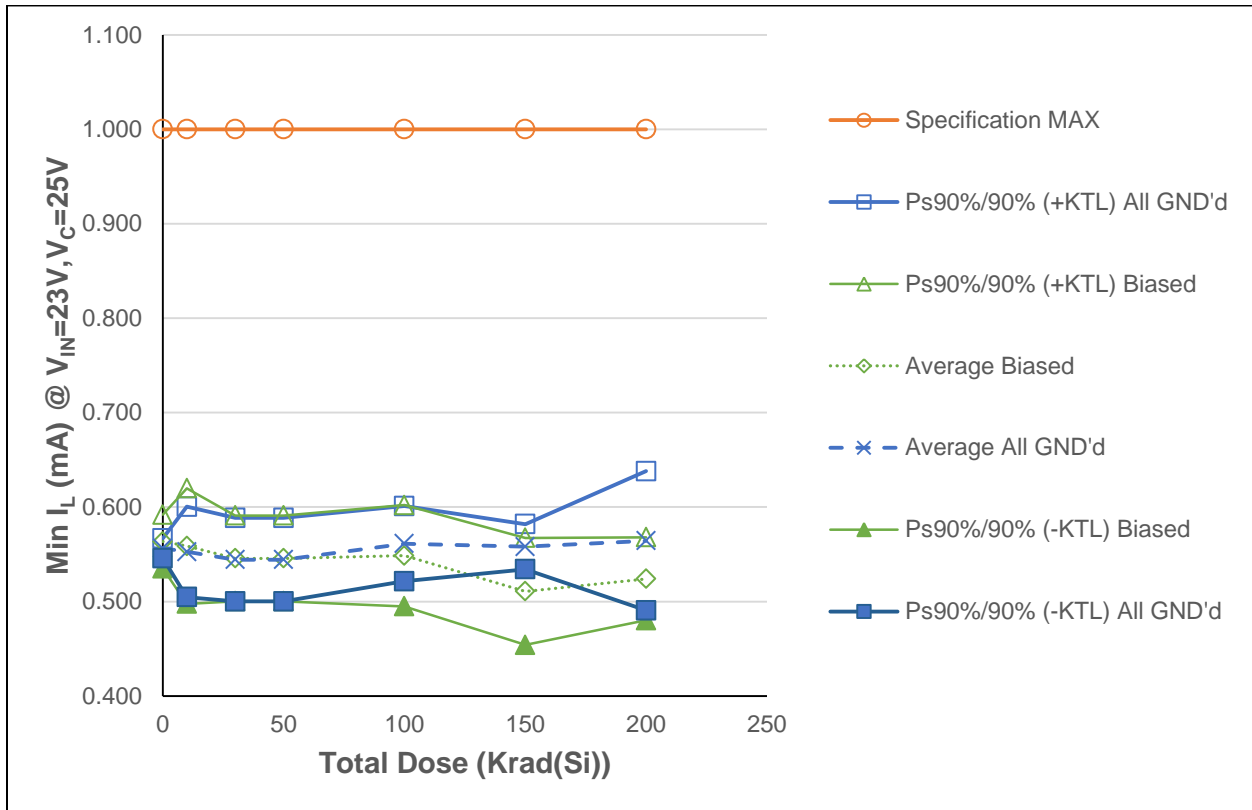


Figure 5.8: Plot of Minimum Load Current (@ $V_{IN} = 23V$) versus Total Dose

The average measured values of samples are within the datasheet maximum limit.

Table 5.8: Raw data table for minimum I_L (@ $V_{IN} = 23V$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Min I_L @ $V_{IN}=23V, V_C=25V$	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
Units	(mA)	0	10	30	50	100	150	200
56	All GND'd Irradiation	0.553	0.568					
57	All GND'd Irradiation	0.561	0.523					
58	All GND'd Irradiation	0.552	0.556					
59	All GND'd Irradiation	0.559	0.561					
60	All GND'd Irradiation	0.556	0.554					
51	Biased Irradiation	0.574	0.583					
52	Biased Irradiation	0.552	0.556					
53	Biased Irradiation	0.575	0.523					
54	Biased Irradiation	0.556	0.566					
55	Biased Irradiation	0.561	0.565					
66	All GND'd Irradiation	0.559		0.549				
67	All GND'd Irradiation	0.555		0.527				
68	All GND'd Irradiation	0.561		0.530				
69	All GND'd Irradiation	0.566		0.549				
70	All GND'd Irradiation	0.561		0.566				
61	Biased Irradiation	0.566		0.546				
62	Biased Irradiation	0.565		0.556				
63	Biased Irradiation	0.566		0.529				
64	Biased Irradiation	0.552		0.530				
65	Biased Irradiation	0.566		0.567				
76	All GND'd Irradiation	0.552			0.549			
77	All GND'd Irradiation	0.566			0.527			
78	All GND'd Irradiation	0.557			0.530			
79	All GND'd Irradiation	0.555			0.549			
80	All GND'd Irradiation	0.571			0.566			
71	Biased Irradiation	0.561			0.546			
72	Biased Irradiation	0.559			0.556			
73	Biased Irradiation	0.557			0.529			
74	Biased Irradiation	0.571			0.530			
75	Biased Irradiation	0.576			0.567			
86	All GND'd Irradiation	0.566				0.564		
87	All GND'd Irradiation	0.556				0.547		
88	All GND'd Irradiation	0.555				0.556		
89	All GND'd Irradiation	0.571				0.554		
90	All GND'd Irradiation	0.561				0.585		
81	Biased Irradiation	0.571				0.552		
82	Biased Irradiation	0.586				0.547		
83	Biased Irradiation	0.564				0.516		
84	Biased Irradiation	0.556				0.566		
85	Biased Irradiation	0.566				0.561		
96	All GND'd Irradiation	0.549					0.566	
97	All GND'd Irradiation	0.564					0.547	
98	All GND'd Irradiation	0.565					0.566	
99	All GND'd Irradiation	0.566					0.559	
100	All GND'd Irradiation	0.556					0.552	
91	Biased Irradiation	0.561					0.492	
92	Biased Irradiation	0.556					0.504	
93	Biased Irradiation	0.571					0.546	
94	Biased Irradiation	0.555					0.508	
95	Biased Irradiation	0.564					0.504	
106	All GND'd Irradiation	0.561						0.533
107	All GND'd Irradiation	0.555						0.585
108	All GND'd Irradiation	0.555						0.542
109	All GND'd Irradiation	0.574						0.566
110	All GND'd Irradiation	0.571						0.596
101	Biased Irradiation	0.556						0.509
102	Biased Irradiation	0.576						0.509
103	Biased Irradiation	0.566						0.528
104	Biased Irradiation	0.559						0.547
105	Biased Irradiation	0.564						0.528
111	Control Unit	0.566	0.566	0.566	0.566	0.566	0.566	0.566
112	Control Unit	0.571	0.571	0.571	0.571	0.571	0.571	0.571
All GND'd Irradiation Statistics								
Average All GND'd		0.556	0.553	0.544	0.544	0.561	0.558	0.564
Std Dev All GND'd		0.004	0.017	0.016	0.016	0.015	0.009	0.027
Ps90%/90% (+KTL) All GND'd		0.567	0.600	0.588	0.588	0.601	0.582	0.638
Ps90%/90% (-KTL) All GND'd		0.546	0.505	0.500	0.500	0.521	0.534	0.491
Biased Irradiation Statistics								
Average Biased		0.563	0.559	0.546	0.546	0.548	0.511	0.524
Std Dev Biased		0.010	0.022	0.017	0.017	0.020	0.021	0.016
Ps90%/90% (+KTL) Biased		0.592	0.620	0.591	0.591	0.602	0.567	0.568
Ps90%/90% (-KTL) Biased		0.535	0.498	0.500	0.500	0.495	0.454	0.480
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		1	1	1	1	1		1
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

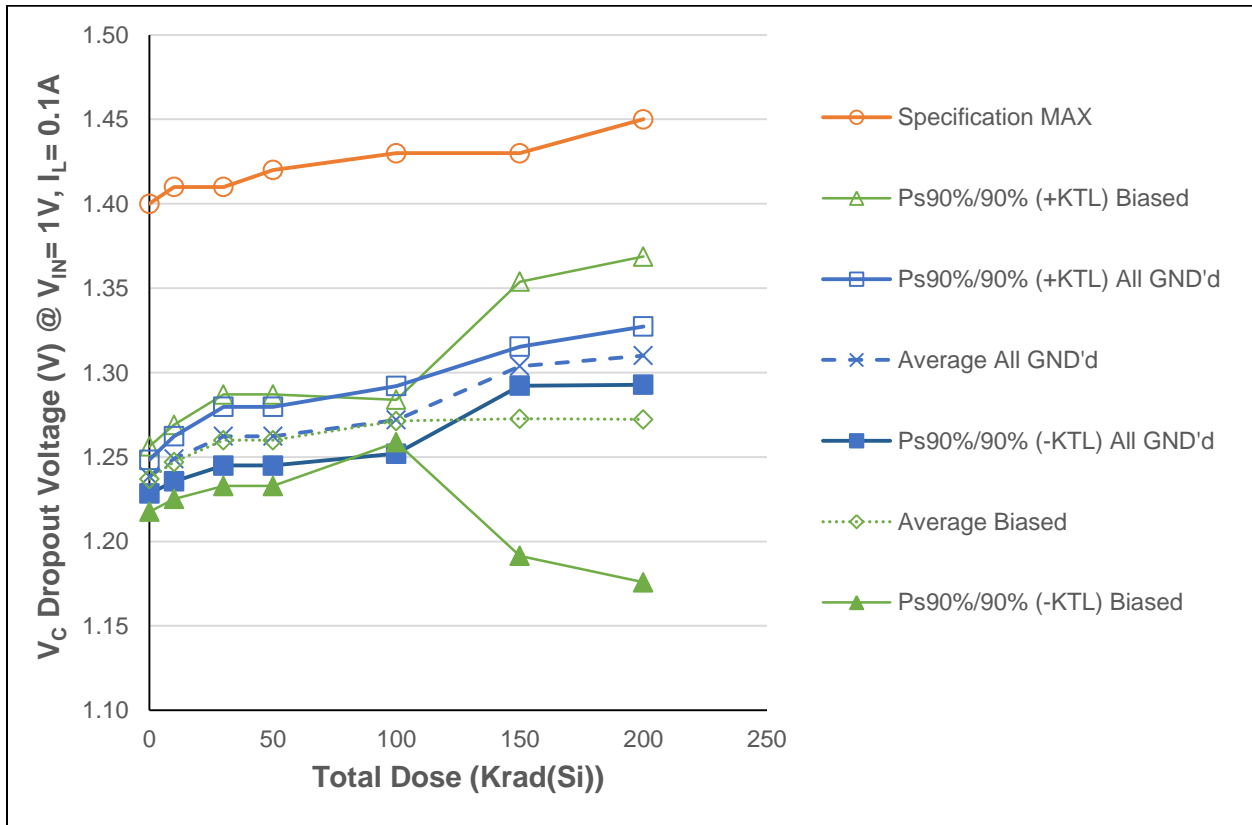


Figure 5.9: Plot of $V_{CONTROL}$ Dropout Voltage (@ $I_L = 0.1A$) versus Total Dose

The average measured values are within datasheet specification maximum limit.

Table 5.9: Raw data table for $V_{CONTROL}$ dropout voltage ($I_L = 0.1A$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	V_C Dropout @ $V_{IN}=1V, I_L=0.1A$	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
Units	(V)	0	10	30	50	100	150	200
56	All GND'd Irradiation	1.242	1.253					
57	All GND'd Irradiation	1.236	1.246					
58	All GND'd Irradiation	1.235	1.250					
59	All GND'd Irradiation	1.243	1.254					
60	All GND'd Irradiation	1.237	1.243					
51	Biased Irradiation	1.225	1.234					
52	Biased Irradiation	1.242	1.254					
53	Biased Irradiation	1.239	1.251					
54	Biased Irradiation	1.240	1.245					
55	Biased Irradiation	1.240	1.251					
66	All GND'd Irradiation	1.233		1.253				
67	All GND'd Irradiation	1.249		1.269				
68	All GND'd Irradiation	1.245		1.267				
69	All GND'd Irradiation	1.243		1.264				
70	All GND'd Irradiation	1.241		1.260				
61	Biased Irradiation	1.241		1.261				
62	Biased Irradiation	1.249		1.269				
63	Biased Irradiation	1.245		1.265				
64	Biased Irradiation	1.241		1.261				
65	Biased Irradiation	1.233		1.243				
76	All GND'd Irradiation	1.243			1.253			
77	All GND'd Irradiation	1.242			1.269			
78	All GND'd Irradiation	1.249			1.267			
79	All GND'd Irradiation	1.249			1.264			
80	All GND'd Irradiation	1.246			1.260			
71	Biased Irradiation	1.249			1.261			
72	Biased Irradiation	1.244			1.269			
73	Biased Irradiation	1.243			1.265			
74	Biased Irradiation	1.246			1.261			
75	Biased Irradiation	1.244			1.243			
86	All GND'd Irradiation	1.228				1.271		
87	All GND'd Irradiation	1.232				1.269		
88	All GND'd Irradiation	1.245				1.285		
89	All GND'd Irradiation	1.230				1.266		
90	All GND'd Irradiation	1.238				1.269		
81	Biased Irradiation	1.245				1.273		
82	Biased Irradiation	1.237				1.264		
83	Biased Irradiation	1.241				1.269		
84	Biased Irradiation	1.246				1.276		
85	Biased Irradiation	1.246				1.274		
96	All GND'd Irradiation	1.242					1.304	
97	All GND'd Irradiation	1.249					1.306	
98	All GND'd Irradiation	1.246					1.310	
99	All GND'd Irradiation	1.243					1.302	
100	All GND'd Irradiation	1.242					1.298	
91	Biased Irradiation	1.249					1.220	
92	Biased Irradiation	1.237					1.284	
93	Biased Irradiation	1.240					1.284	
94	Biased Irradiation	1.239					1.285	
95	Biased Irradiation	1.247					1.291	
106	All GND'd Irradiation	1.234						1.299
107	All GND'd Irradiation	1.246						1.310
108	All GND'd Irradiation	1.243						1.314
109	All GND'd Irradiation	1.246						1.313
110	All GND'd Irradiation	1.242						1.314
101	Biased Irradiation	1.238						1.282
102	Biased Irradiation	1.245						1.292
103	Biased Irradiation	1.229						1.210
104	Biased Irradiation	1.239						1.287
105	Biased Irradiation	1.245						1.291
111	Control Unit	1.237	1.237	1.237	1.237	1.237	1.237	1.237
112	Control Unit	1.251	1.251	1.251	1.251	1.251	1.251	1.251
All GND'd Irradiation Statistics								
Average All GND'd		1.238	1.249	1.262	1.262	1.272	1.304	1.310
Std Dev All GND'd		0.004	0.005	0.006	0.006	0.007	0.004	0.006
Ps90%/90% (+KTL) All GND'd		1.248	1.262	1.280	1.280	1.292	1.315	1.327
Ps90%/90% (-KTL) All GND'd		1.228	1.236	1.245	1.245	1.252	1.292	1.293
Biased Irradiation Statistics								
Average Biased		1.237	1.247	1.260	1.260	1.271	1.273	1.272
Std Dev Biased		0.007	0.008	0.010	0.010	0.005	0.030	0.035
Ps90%/90% (+KTL) Biased		1.256	1.269	1.287	1.287	1.284	1.354	1.369
Ps90%/90% (-KTL) Biased		1.218	1.225	1.233	1.233	1.259	1.191	1.176
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		1.40	1.41	1.41	1.42	1.43		1.45
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

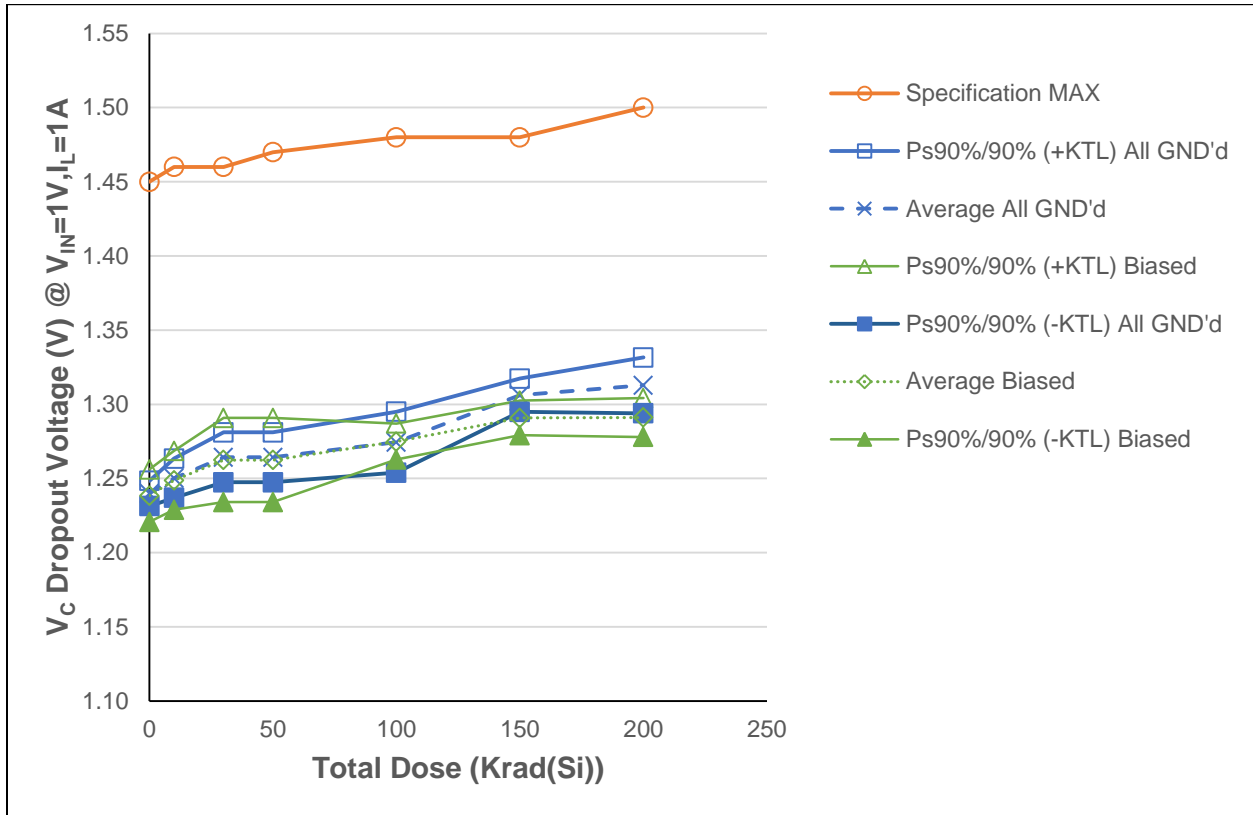


Figure 5.10: Plot of $V_{CONTROL}$ Dropout Voltage (@ $I_L = 1A$) versus Total Dose

The average measured values of samples are within datasheet limits.

Table 5.10: Raw data table for $V_{CONTROL}$ dropout voltage ($I_L = 1A$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	V_C Dropout @ $V_{IN}=1V, I_L=1A$	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
		0	10	30	50	100	150	200
Units	(V)							
56	All GND'd Irradiation	1.244	1.255					
57	All GND'd Irradiation	1.238	1.247					
58	All GND'd Irradiation	1.236	1.250					
59	All GND'd Irradiation	1.242	1.255					
60	All GND'd Irradiation	1.239	1.244					
51	Biased Irradiation	1.227	1.237					
52	Biased Irradiation	1.243	1.254					
53	Biased Irradiation	1.241	1.252					
54	Biased Irradiation	1.241	1.248					
55	Biased Irradiation	1.240	1.254					
66	All GND'd Irradiation	1.234		1.255				
67	All GND'd Irradiation	1.249		1.271				
68	All GND'd Irradiation	1.246		1.268				
69	All GND'd Irradiation	1.244		1.266				
70	All GND'd Irradiation	1.243		1.262				
61	Biased Irradiation	1.242		1.264				
62	Biased Irradiation	1.248		1.271				
63	Biased Irradiation	1.247		1.268				
64	Biased Irradiation	1.241		1.264				
65	Biased Irradiation	1.234		1.245				
76	All GND'd Irradiation	1.243			1.255			
77	All GND'd Irradiation	1.242			1.271			
78	All GND'd Irradiation	1.250			1.268			
79	All GND'd Irradiation	1.249			1.266			
80	All GND'd Irradiation	1.247			1.262			
71	Biased Irradiation	1.249			1.264			
72	Biased Irradiation	1.244			1.271			
73	Biased Irradiation	1.244			1.268			
74	Biased Irradiation	1.247			1.264			
75	Biased Irradiation	1.246			1.245			
86	All GND'd Irradiation	1.231				1.273		
87	All GND'd Irradiation	1.233				1.272		
88	All GND'd Irradiation	1.246				1.287		
89	All GND'd Irradiation	1.232				1.268		
90	All GND'd Irradiation	1.240				1.272		
81	Biased Irradiation	1.247				1.276		
82	Biased Irradiation	1.239				1.268		
83	Biased Irradiation	1.243				1.273		
84	Biased Irradiation	1.248				1.279		
85	Biased Irradiation	1.246				1.278		
96	All GND'd Irradiation	1.241					1.307	
97	All GND'd Irradiation	1.249					1.308	
98	All GND'd Irradiation	1.247					1.311	
99	All GND'd Irradiation	1.246					1.304	
100	All GND'd Irradiation	1.243					1.301	
91	Biased Irradiation	1.249					1.296	
92	Biased Irradiation	1.239					1.288	
93	Biased Irradiation	1.239					1.287	
94	Biased Irradiation	1.240					1.288	
95	Biased Irradiation	1.246					1.295	
106	All GND'd Irradiation	1.236						1.301
107	All GND'd Irradiation	1.245						1.312
108	All GND'd Irradiation	1.246						1.317
109	All GND'd Irradiation	1.246						1.316
110	All GND'd Irradiation	1.244						1.317
101	Biased Irradiation	1.239						1.286
102	Biased Irradiation	1.247						1.296
103	Biased Irradiation	1.229						1.286
104	Biased Irradiation	1.240						1.292
105	Biased Irradiation	1.246						1.295
111	Control Unit	1.239	1.239	1.239	1.239	1.239	1.239	1.239
112	Control Unit	1.250	1.250	1.250	1.250	1.250	1.250	1.250
All GND'd Irradiation Statistics								
Average All GND'd		1.240	1.250	1.264	1.264	1.274	1.306	1.313
Std Dev All GND'd		0.003	0.005	0.006	0.006	0.007	0.004	0.007
Ps90%/90% (+KTL) All GND'd		1.248	1.263	1.281	1.281	1.295	1.317	1.332
Ps90%/90% (-KTL) All GND'd		1.231	1.237	1.247	1.247	1.254	1.295	1.294
Biased Irradiation Statistics								
Average Biased		1.238	1.249	1.262	1.262	1.275	1.291	1.291
Std Dev Biased		0.006	0.007	0.010	0.010	0.004	0.004	0.005
Ps90%/90% (+KTL) Biased		1.256	1.269	1.291	1.291	1.287	1.302	1.304
Ps90%/90% (-KTL) Biased		1.221	1.229	1.234	1.234	1.263	1.279	1.278
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		1.45	1.46	1.46	1.47	1.48		1.50
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

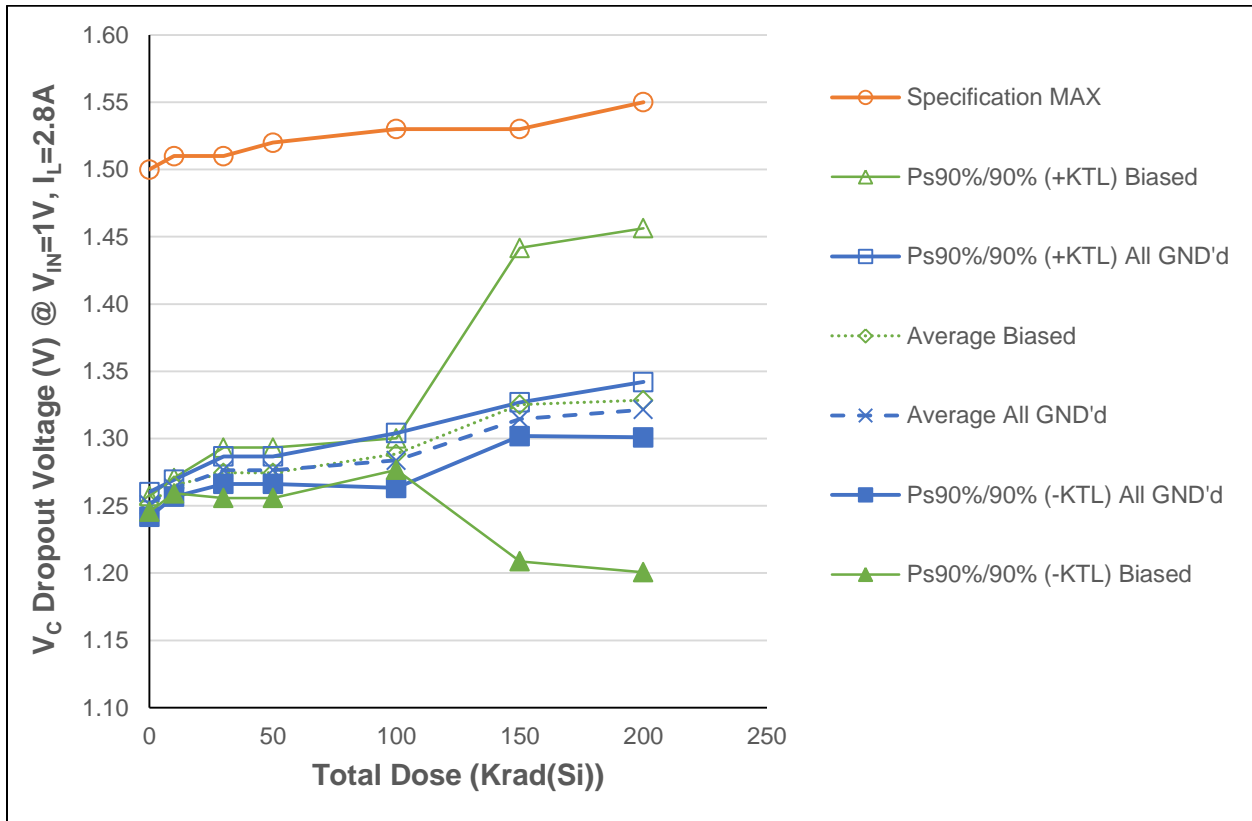


Figure 5.11: Plot of $V_{CONTROL}$ Dropout Voltage (@ $I_L = 2.8A$) versus Total Dose

The average measured values of samples are within datasheet limits.

Table 5.11: Raw data table for $V_{CONTROL}$ dropout voltage ($I_L = 2.8A$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	V_C Dropout @ $V_{IN}=1V, I_L=2.8A$	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
Units	(V)	0	10	30	50	100	150	200
56	All GND'd Irradiation	1.254	1.265					
57	All GND'd Irradiation	1.247	1.259					
58	All GND'd Irradiation	1.248	1.263					
59	All GND'd Irradiation	1.254	1.264					
60	All GND'd Irradiation	1.252	1.264					
51	Biased Irradiation	1.251	1.264					
52	Biased Irradiation	1.251	1.265					
53	Biased Irradiation	1.251	1.263					
54	Biased Irradiation	1.255	1.269					
55	Biased Irradiation	1.250	1.264					
66	All GND'd Irradiation	1.249		1.270				
67	All GND'd Irradiation	1.259		1.280				
68	All GND'd Irradiation	1.257		1.279				
69	All GND'd Irradiation	1.255		1.276				
70	All GND'd Irradiation	1.258		1.278				
61	Biased Irradiation	1.253		1.275				
62	Biased Irradiation	1.260		1.281				
63	Biased Irradiation	1.256		1.277				
64	Biased Irradiation	1.254		1.276				
65	Biased Irradiation	1.252		1.263				
76	All GND'd Irradiation	1.254			1.270			
77	All GND'd Irradiation	1.253			1.280			
78	All GND'd Irradiation	1.258			1.279			
79	All GND'd Irradiation	1.259			1.276			
80	All GND'd Irradiation	1.257			1.278			
71	Biased Irradiation	1.259			1.275			
72	Biased Irradiation	1.257			1.281			
73	Biased Irradiation	1.255			1.277			
74	Biased Irradiation	1.258			1.276			
75	Biased Irradiation	1.253			1.263			
86	All GND'd Irradiation	1.245				1.283		
87	All GND'd Irradiation	1.244				1.281		
88	All GND'd Irradiation	1.257				1.297		
89	All GND'd Irradiation	1.244				1.278		
90	All GND'd Irradiation	1.249				1.280		
81	Biased Irradiation	1.257				1.289		
82	Biased Irradiation	1.251				1.284		
83	Biased Irradiation	1.250				1.285		
84	Biased Irradiation	1.256				1.293		
85	Biased Irradiation	1.257				1.292		
96	All GND'd Irradiation	1.254					1.315	
97	All GND'd Irradiation	1.259					1.317	
98	All GND'd Irradiation	1.258					1.320	
99	All GND'd Irradiation	1.255					1.311	
100	All GND'd Irradiation	1.251					1.309	
91	Biased Irradiation	1.259					1.401	
92	Biased Irradiation	1.253					1.302	
93	Biased Irradiation	1.249					1.302	
94	Biased Irradiation	1.267					1.314	
95	Biased Irradiation	1.255					1.308	
106	All GND'd Irradiation	1.247						1.309
107	All GND'd Irradiation	1.257						1.321
108	All GND'd Irradiation	1.275						1.328
109	All GND'd Irradiation	1.257						1.324
110	All GND'd Irradiation	1.253						1.326
101	Biased Irradiation	1.249						1.303
102	Biased Irradiation	1.257						1.310
103	Biased Irradiation	1.243						1.412
104	Biased Irradiation	1.249						1.307
105	Biased Irradiation	1.257						1.310
111	Control Unit	1.250	1.250	1.250	1.250	1.250	1.250	1.250
112	Control Unit	1.259	1.259	1.259	1.259	1.259	1.259	1.259
All GND'd Irradiation Statistics								
Average All GND'd		1.251	1.263	1.277	1.277	1.284	1.314	1.321
Std Dev All GND'd		0.003	0.002	0.004	0.004	0.007	0.005	0.008
Ps90%/90% (+KTL) All GND'd		1.260	1.269	1.287	1.287	1.304	1.327	1.342
Ps90%/90% (-KTL) All GND'd		1.242	1.257	1.266	1.266	1.263	1.302	1.301
Biased Irradiation Statistics								
Average Biased		1.251	1.265	1.275	1.275	1.288	1.325	1.328
Std Dev Biased		0.002	0.002	0.007	0.007	0.004	0.042	0.047
Ps90%/90% (+KTL) Biased		1.257	1.271	1.293	1.293	1.300	1.442	1.456
Ps90%/90% (-KTL) Biased		1.246	1.259	1.256	1.256	1.277	1.209	1.201
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		1.50	1.51	1.51	1.52	1.53		1.55
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

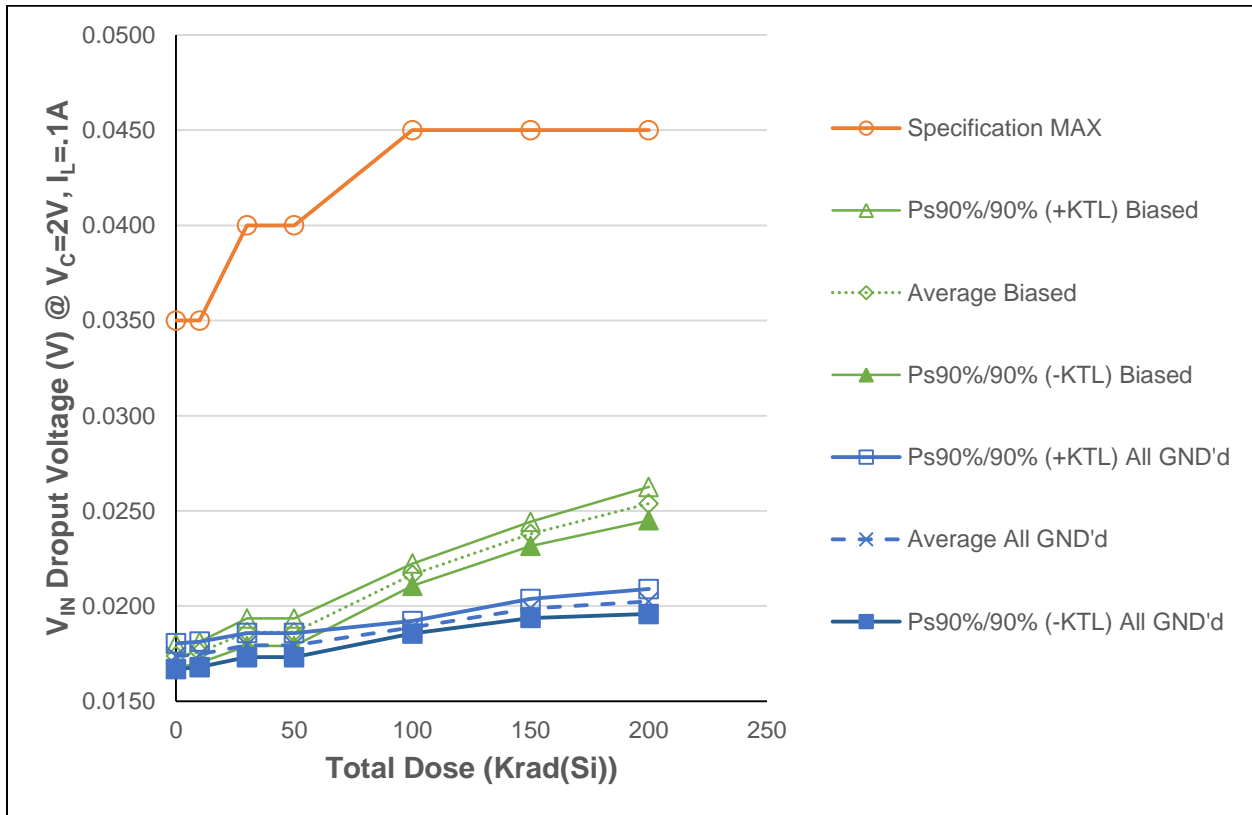


Figure 5.12: Plot of V_{IN} Dropout Voltage (@ $I_L = 0.1A$) versus Total Dose

The measured data points are within datasheet specification maximum limits.

Table 5.12: Raw data table for V_{IN} dropout voltage ($I_L = 0.1A$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter Units	V_{IN} Dropout @ $V_C=2V, I_L=.1A$ (V)	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	0.0174	0.0175					
57	All GND'd Irradiation	0.0173	0.0174					
58	All GND'd Irradiation	0.0175	0.0177					
59	All GND'd Irradiation	0.0170	0.0171					
60	All GND'd Irradiation	0.0177	0.0177					
51	Biased Irradiation	0.0170	0.0173					
52	Biased Irradiation	0.0175	0.0177					
53	Biased Irradiation	0.0173	0.0174					
54	Biased Irradiation	0.0177	0.0178					
55	Biased Irradiation	0.0175	0.0177					
66	All GND'd Irradiation	0.0172		0.0180				
67	All GND'd Irradiation	0.0170		0.0177				
68	All GND'd Irradiation	0.0173		0.0179				
69	All GND'd Irradiation	0.0176		0.0183				
70	All GND'd Irradiation	0.0172		0.0178				
61	Biased Irradiation	0.0176		0.0189				
62	Biased Irradiation	0.0173		0.0186				
63	Biased Irradiation	0.0173		0.0188				
64	Biased Irradiation	0.0171		0.0186				
65	Biased Irradiation	0.0171		0.0182				
76	All GND'd Irradiation	0.0174			0.0180			
77	All GND'd Irradiation	0.0169			0.0177			
78	All GND'd Irradiation	0.0171			0.0179			
79	All GND'd Irradiation	0.0172			0.0183			
80	All GND'd Irradiation	0.0175			0.0178			
71	Biased Irradiation	0.0171			0.0189			
72	Biased Irradiation	0.0170			0.0186			
73	Biased Irradiation	0.0172			0.0188			
74	Biased Irradiation	0.0175			0.0186			
75	Biased Irradiation	0.0170			0.0182			
86	All GND'd Irradiation	0.0171				0.0189		
87	All GND'd Irradiation	0.0170				0.0187		
88	All GND'd Irradiation	0.0172				0.0190		
89	All GND'd Irradiation	0.0173				0.0189		
90	All GND'd Irradiation	0.0173				0.0189		
81	Biased Irradiation	0.0172				0.0217		
82	Biased Irradiation	0.0171				0.0217		
83	Biased Irradiation	0.0174				0.0220		
84	Biased Irradiation	0.0169				0.0214		
85	Biased Irradiation	0.0171				0.0215		
96	All GND'd Irradiation	0.0170					0.0197	
97	All GND'd Irradiation	0.0175					0.0200	
98	All GND'd Irradiation	0.0177					0.0201	
99	All GND'd Irradiation	0.0173					0.0198	
100	All GND'd Irradiation	0.0173					0.0198	
91	Biased Irradiation	0.0171					0.0236	
92	Biased Irradiation	0.0176					0.0239	
93	Biased Irradiation	0.0171					0.0235	
94	Biased Irradiation	0.0173					0.0241	
95	Biased Irradiation	0.0172					0.0238	
106	All GND'd Irradiation	0.0173						0.0201
107	All GND'd Irradiation	0.0170						0.0200
108	All GND'd Irradiation	0.0174						0.0205
109	All GND'd Irradiation	0.0174						0.0205
110	All GND'd Irradiation	0.0171						0.0202
101	Biased Irradiation	0.0171						0.0250
102	Biased Irradiation	0.0172						0.0251
103	Biased Irradiation	0.0169						0.0256
104	Biased Irradiation	0.0172						0.0256
105	Biased Irradiation	0.0176						0.0256
111	Control Unit	0.0175	0.0175	0.0175	0.0175	0.0175	0.0175	0.0175
112	Control Unit	0.0172	0.0172	0.0172	0.0172	0.0172	0.0172	0.0172
All GND'd Irradiation Statistics								
Average All GND'd		0.0174	0.0175	0.0179	0.0179	0.0189	0.0199	0.0202
Std Dev All GND'd		0.0002	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002
Ps90%/90% (+KTL) All GND'd		0.0180	0.0181	0.0186	0.0186	0.0192	0.0204	0.0209
Ps90%/90% (-KTL) All GND'd		0.0167	0.0168	0.0173	0.0173	0.0186	0.0194	0.0196
Biased Irradiation Statistics								
Average Biased		0.0174	0.0176	0.0186	0.0186	0.0216	0.0238	0.0254
Std Dev Biased		0.0002	0.0002	0.0003	0.0003	0.0002	0.0002	0.0003
Ps90%/90% (+KTL) Biased		0.0180	0.0181	0.0194	0.0194	0.0222	0.0244	0.0263
Ps90%/90% (-KTL) Biased		0.0167	0.0170	0.0179	0.0179	0.0211	0.0232	0.0245
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		0.035	0.035	0.040	0.040	0.045		0.045
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

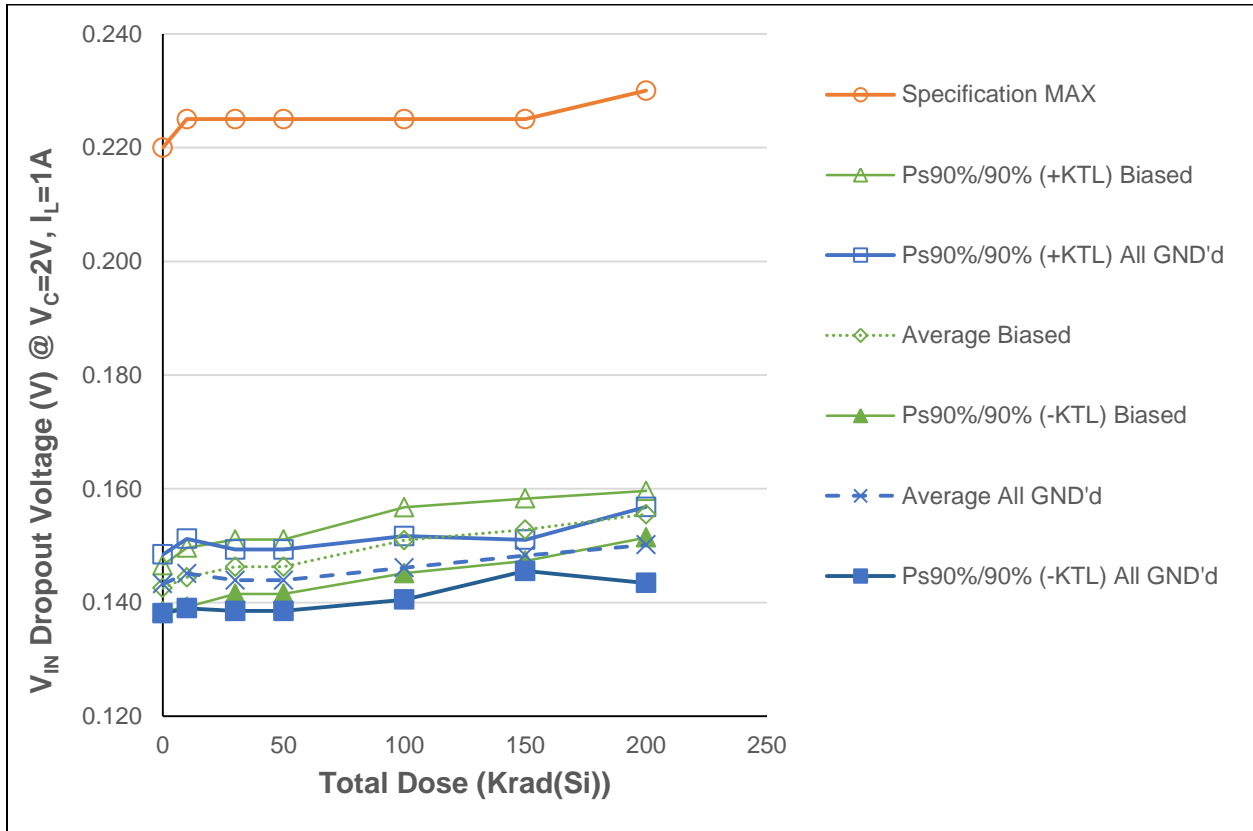


Figure 5.13: Plot of V_{IN} Dropout Voltage (@ $I_L = 1A$) versus Total Dose

The average measured values of samples are within datasheet specification maximum limits.

Table 5.13: Raw data table for V_{IN} dropout voltage ($I_L = 1A$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter Units	V_{IN} Dropout @ $V_C=2V, I_L=1A$ (V)	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	0.1437	0.1453					
57	All GND'd Irradiation	0.1422	0.1438					
58	All GND'd Irradiation	0.1452	0.1466					
59	All GND'd Irradiation	0.1406	0.1421					
60	All GND'd Irradiation	0.1448	0.1477					
51	Biased Irradiation	0.1431	0.1450					
52	Biased Irradiation	0.1409	0.1425					
53	Biased Irradiation	0.1410	0.1426					
54	Biased Irradiation	0.1439	0.1470					
55	Biased Irradiation	0.1437	0.1451					
66	All GND'd Irradiation	0.1427		0.1460				
67	All GND'd Irradiation	0.1388		0.1411				
68	All GND'd Irradiation	0.1431		0.1455				
69	All GND'd Irradiation	0.1416		0.1436				
70	All GND'd Irradiation	0.1410		0.1434				
61	Biased Irradiation	0.1456		0.1486				
62	Biased Irradiation	0.1408		0.1441				
63	Biased Irradiation	0.1416		0.1453				
64	Biased Irradiation	0.1432		0.1463				
65	Biased Irradiation	0.1425		0.1471				
76	All GND'd Irradiation	0.1417			0.1460			
77	All GND'd Irradiation	0.1419			0.1411			
78	All GND'd Irradiation	0.1394			0.1455			
79	All GND'd Irradiation	0.1407			0.1436			
80	All GND'd Irradiation	0.1416			0.1434			
71	Biased Irradiation	0.1391			0.1486			
72	Biased Irradiation	0.1406			0.1441			
73	Biased Irradiation	0.1423			0.1453			
74	Biased Irradiation	0.1415			0.1463			
75	Biased Irradiation	0.1411			0.1471			
86	All GND'd Irradiation	0.1425				0.1474		
87	All GND'd Irradiation	0.1391				0.1443		
88	All GND'd Irradiation	0.1407				0.1459		
89	All GND'd Irradiation	0.1391				0.1441		
90	All GND'd Irradiation	0.1430				0.1488		
81	Biased Irradiation	0.1439				0.1536		
82	Biased Irradiation	0.1431				0.1524		
83	Biased Irradiation	0.1416				0.1507		
84	Biased Irradiation	0.1392				0.1482		
85	Biased Irradiation	0.1413				0.1499		
96	All GND'd Irradiation	0.1425					0.1482	
97	All GND'd Irradiation	0.1422					0.1483	
98	All GND'd Irradiation	0.1415					0.1470	
99	All GND'd Irradiation	0.1422					0.1482	
100	All GND'd Irradiation	0.1435					0.1498	
91	Biased Irradiation	0.1443					0.1556	
92	Biased Irradiation	0.1409					0.1517	
93	Biased Irradiation	0.1402					0.1505	
94	Biased Irradiation	0.1432					0.1541	
95	Biased Irradiation	0.1414					0.1522	
106	All GND'd Irradiation	0.1403						0.1479
107	All GND'd Irradiation	0.1391						0.1473
108	All GND'd Irradiation	0.1448						0.1531
109	All GND'd Irradiation	0.1431						0.1514
110	All GND'd Irradiation	0.1430						0.1508
101	Biased Irradiation	0.1416						0.1560
102	Biased Irradiation	0.1404						0.1540
103	Biased Irradiation	0.1392						0.1539
104	Biased Irradiation	0.1426						0.1568
105	Biased Irradiation	0.1434						0.1569
111	Control Unit	0.1452	0.1452	0.1452	0.1452	0.1452	0.1452	0.1452
112	Control Unit	0.1396	0.1396	0.1396	0.1396	0.1396	0.1396	0.1396
All GND'd Irradiation Statistics								
Average All GND'd		0.1433	0.1451	0.1439	0.1439	0.1461	0.1483	0.1501
Std Dev All GND'd		0.0019	0.0022	0.0020	0.0020	0.0020	0.0010	0.0024
Ps90%/90% (+KTL) All GND'd		0.1485	0.1512	0.1493	0.1493	0.1517	0.1510	0.1568
Ps90%/90% (-KTL) All GND'd		0.1381	0.1390	0.1385	0.1385	0.1405	0.1455	0.1434
Biased Irradiation Statistics								
Average Biased		0.1425	0.1444	0.1463	0.1463	0.1509	0.1528	0.1555
Std Dev Biased		0.0015	0.0019	0.0017	0.0017	0.0021	0.0020	0.0015
Ps90%/90% (+KTL) Biased		0.1466	0.1496	0.1511	0.1511	0.1567	0.1583	0.1596
Ps90%/90% (-KTL) Biased		0.1385	0.1392	0.1415	0.1415	0.1452	0.1473	0.1514
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		0.220	0.225	0.225	0.225	0.225		0.230
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

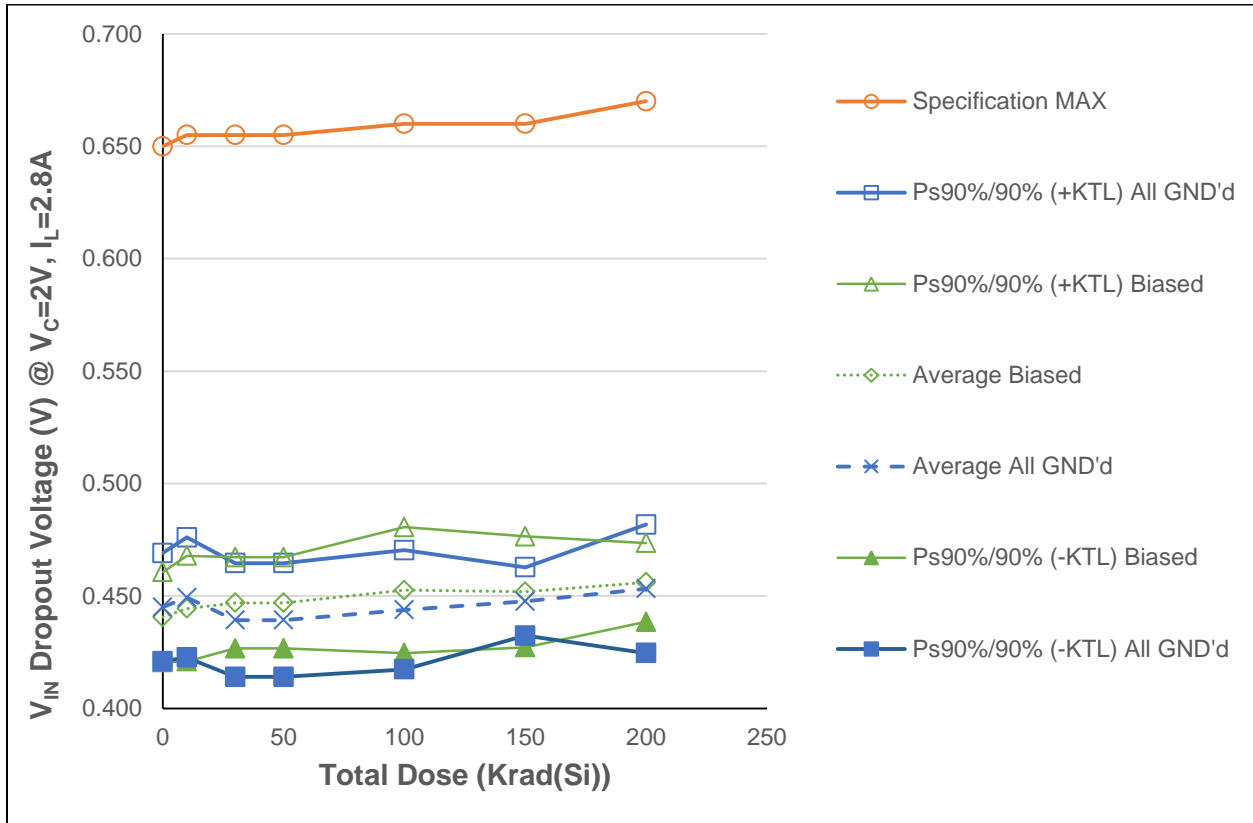


Figure 5.14: Plot of V_{IN} Dropout Voltage (@ $I_L = 2.8A$) versus Total Dose

The average measured values of samples are within datasheet specification maximum limits.

Table 5.14: Raw data table for V_{IN} dropout voltage ($I_L = 2.8A$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter Units	V_{IN} Dropout @ $V_C=2V, I_L=2.8A$ (V)	Total Dose (Krad(Si)) @ 50 rads(Si/s)						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	0.4470	0.4507					
57	All GND'd Irradiation	0.4401	0.4439					
58	All GND'd Irradiation	0.4536	0.4561					
59	All GND'd Irradiation	0.4325	0.4357					
60	All GND'd Irradiation	0.4520	0.4601					
51	Biased Irradiation	0.4470	0.4504					
52	Biased Irradiation	0.4325	0.4348					
53	Biased Irradiation	0.4327	0.4360					
54	Biased Irradiation	0.4455	0.4537					
55	Biased Irradiation	0.4453	0.4471					
66	All GND'd Irradiation	0.4435		0.4500				
67	All GND'd Irradiation	0.4235		0.4268				
68	All GND'd Irradiation	0.4434		0.4466				
69	All GND'd Irradiation	0.4326		0.4358				
70	All GND'd Irradiation	0.4329		0.4372				
61	Biased Irradiation	0.4507		0.4539				
62	Biased Irradiation	0.4335		0.4377				
63	Biased Irradiation	0.4356		0.4411				
64	Biased Irradiation	0.4447		0.4479				
65	Biased Irradiation	0.4432		0.4541				
76	All GND'd Irradiation	0.4377			0.4500			
77	All GND'd Irradiation	0.4392			0.4268			
78	All GND'd Irradiation	0.4247			0.4466			
79	All GND'd Irradiation	0.4322			0.4358			
80	All GND'd Irradiation	0.4354			0.4372			
71	Biased Irradiation	0.4233			0.4539			
72	Biased Irradiation	0.4331			0.4377			
73	Biased Irradiation	0.4400			0.4411			
74	Biased Irradiation	0.4337			0.4479			
75	Biased Irradiation	0.4342			0.4541			
86	All GND'd Irradiation	0.4440				0.4523		
87	All GND'd Irradiation	0.4271				0.4365		
88	All GND'd Irradiation	0.4321				0.4414		
89	All GND'd Irradiation	0.4239				0.4335		
90	All GND'd Irradiation	0.4430				0.4555		
81	Biased Irradiation	0.4474				0.4640		
82	Biased Irradiation	0.4478				0.4618		
83	Biased Irradiation	0.4348				0.4493		
84	Biased Irradiation	0.4263				0.4393		
85	Biased Irradiation	0.4369				0.4486		
96	All GND'd Irradiation	0.4418					0.4488	
97	All GND'd Irradiation	0.4377					0.4474	
98	All GND'd Irradiation	0.4326					0.4402	
99	All GND'd Irradiation	0.4368					0.4459	
100	All GND'd Irradiation	0.4461					0.4555	
91	Biased Irradiation	0.4499					0.4665	
92	Biased Irradiation	0.4330					0.4459	
93	Biased Irradiation	0.4319					0.4437	
94	Biased Irradiation	0.4410					0.4535	
95	Biased Irradiation	0.4366					0.4496	
106	All GND'd Irradiation	0.4310						0.4447
107	All GND'd Irradiation	0.4252						0.4403
108	All GND'd Irradiation	0.4504						0.4656
109	All GND'd Irradiation	0.4434						0.4588
110	All GND'd Irradiation	0.4434						0.4565
101	Biased Irradiation	0.4384						0.4593
102	Biased Irradiation	0.4303						0.4486
103	Biased Irradiation	0.4261						0.4496
104	Biased Irradiation	0.4417						0.4609
105	Biased Irradiation	0.4430						0.4618
111	Control Unit	0.4525	0.4525	0.4525	0.4525	0.4525	0.4525	0.4525
112	Control Unit	0.4259	0.4259	0.4259	0.4259	0.4259	0.4259	0.4259
All GND'd Irradiation Statistics								
Average All GND'd		0.4451	0.4493	0.4393	0.4393	0.4438	0.4476	0.4532
Std Dev All GND'd		0.0088	0.0097	0.0092	0.0092	0.0097	0.0055	0.0104
Ps90%/90% (+KTL) All GND'd		0.4691	0.4761	0.4646	0.4646	0.4704	0.4627	0.4817
Ps90%/90% (-KTL) All GND'd		0.4210	0.4226	0.4140	0.4140	0.4173	0.4324	0.4246
Biased Irradiation Statistics								
Average Biased		0.4406	0.4444	0.4469	0.4469	0.4526	0.4519	0.4560
Std Dev Biased		0.0073	0.0086	0.0074	0.0074	0.0102	0.0090	0.0064
Ps90%/90% (+KTL) Biased		0.4606	0.4679	0.4672	0.4672	0.4806	0.4765	0.4736
Ps90%/90% (-KTL) Biased		0.4205	0.4209	0.4267	0.4267	0.4246	0.4272	0.4385
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		0.650	0.655	0.655	0.655	0.660		0.670
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

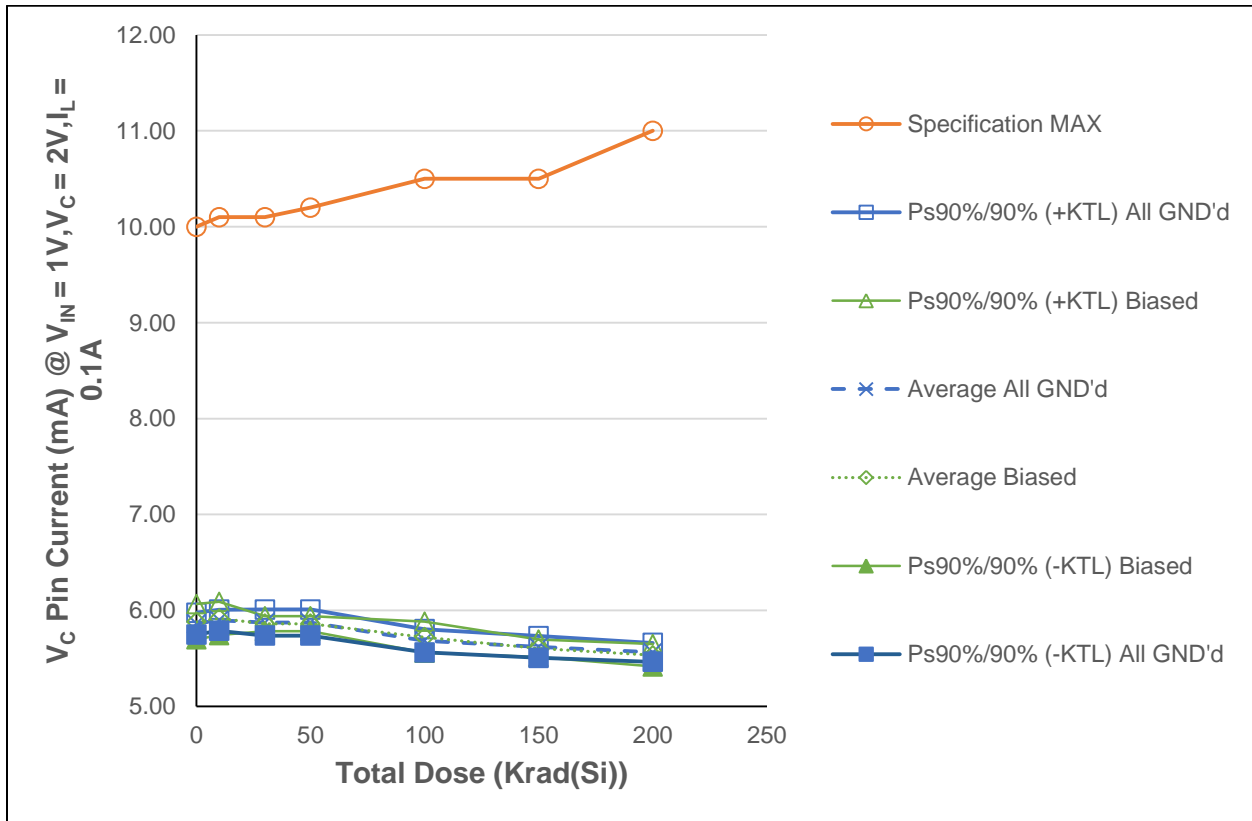


Figure 5.15: Plot of $V_{CONTROL}$ Pin Current (@ $I_L = 0.1A$) versus Total Dose

The average measured values of samples are within datasheet specification maximum limits.

Table 5.15: Raw data table for $V_{CONTROL}$ pin current ($I_L = 0.1A$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter Units	V_C Current@ $V_{IN}=1V, V_C=2V, I_L=-1A$ (mA)	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	5.893	5.930					
57	All GND'd Irradiation	5.886	5.922					
58	All GND'd Irradiation	5.833	5.875					
59	All GND'd Irradiation	5.893	5.924					
60	All GND'd Irradiation	5.803	5.837					
51	Biased Irradiation	5.879	5.905					
52	Biased Irradiation	5.829	5.864					
53	Biased Irradiation	5.965	5.998					
54	Biased Irradiation	5.804	5.850					
55	Biased Irradiation	5.929	5.962					
66	All GND'd Irradiation	5.875		5.853				
67	All GND'd Irradiation	5.916		5.881				
68	All GND'd Irradiation	5.960		5.920				
69	All GND'd Irradiation	5.828		5.798				
70	All GND'd Irradiation	5.941		5.912				
61	Biased Irradiation	5.934		5.906				
62	Biased Irradiation	5.863		5.837				
63	Biased Irradiation	5.903		5.871				
64	Biased Irradiation	5.891		5.851				
65	Biased Irradiation	5.892		5.843				
76	All GND'd Irradiation	5.838			5.853			
77	All GND'd Irradiation	5.914			5.881			
78	All GND'd Irradiation	5.922			5.920			
79	All GND'd Irradiation	5.938			5.798			
80	All GND'd Irradiation	5.826			5.912			
71	Biased Irradiation	5.925			5.906			
72	Biased Irradiation	5.966			5.837			
73	Biased Irradiation	5.894			5.871			
74	Biased Irradiation	5.856			5.851			
75	Biased Irradiation	5.959			5.843			
86	All GND'd Irradiation	5.880				5.684		
87	All GND'd Irradiation	5.902				5.706		
88	All GND'd Irradiation	5.864				5.673		
89	All GND'd Irradiation	5.775				5.617		
90	All GND'd Irradiation	5.901				5.737		
81	Biased Irradiation	5.988				5.803		
82	Biased Irradiation	5.926				5.715		
83	Biased Irradiation	5.854				5.661		
84	Biased Irradiation	5.960				5.754		
85	Biased Irradiation	5.872				5.672		
96	All GND'd Irradiation	5.932					5.633	
97	All GND'd Irradiation	5.831					5.584	
98	All GND'd Irradiation	5.841					5.572	
99	All GND'd Irradiation	5.941					5.673	
100	All GND'd Irradiation	5.935					5.634	
91	Biased Irradiation	5.951					5.614	
92	Biased Irradiation	5.792					5.550	
93	Biased Irradiation	5.888					5.631	
94	Biased Irradiation	5.909					5.628	
95	Biased Irradiation	5.868					5.599	
106	All GND'd Irradiation	5.824						5.502
107	All GND'd Irradiation	5.916						5.585
108	All GND'd Irradiation	5.968						5.584
109	All GND'd Irradiation	5.932						5.557
110	All GND'd Irradiation	5.942						5.584
101	Biased Irradiation	5.898						5.569
102	Biased Irradiation	5.846						5.522
103	Biased Irradiation	5.903						5.476
104	Biased Irradiation	5.942						5.580
105	Biased Irradiation	5.855						5.514
111	Control Unit	5.888	5.888	5.888	5.888	5.888	5.888	5.888
112	Control Unit	5.849	5.849	5.849	5.849	5.849	5.849	5.849
All GND'd Irradiation Statistics								
Average All GND'd		5.862	5.898	5.873	5.873	5.683	5.619	5.562
Std Dev All GND'd		0.041	0.040	0.050	0.050	0.044	0.041	0.036
Ps90%/90% (+KTL) All GND'd		5.975	6.008	6.009	6.009	5.805	5.733	5.661
Ps90%/90% (-KTL) All GND'd		5.748	5.787	5.737	5.737	5.562	5.506	5.464
Biased Irradiation Statistics								
Average Biased		5.881	5.916	5.861	5.861	5.721	5.604	5.532
Std Dev Biased		0.067	0.063	0.028	0.028	0.059	0.033	0.043
Ps90%/90% (+KTL) Biased		6.066	6.090	5.939	5.939	5.883	5.695	5.649
Ps90%/90% (-KTL) Biased		5.697	5.742	5.784	5.784	5.559	5.514	5.415
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		10.0	10.1	10.1	10.2	10.5		11.0
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

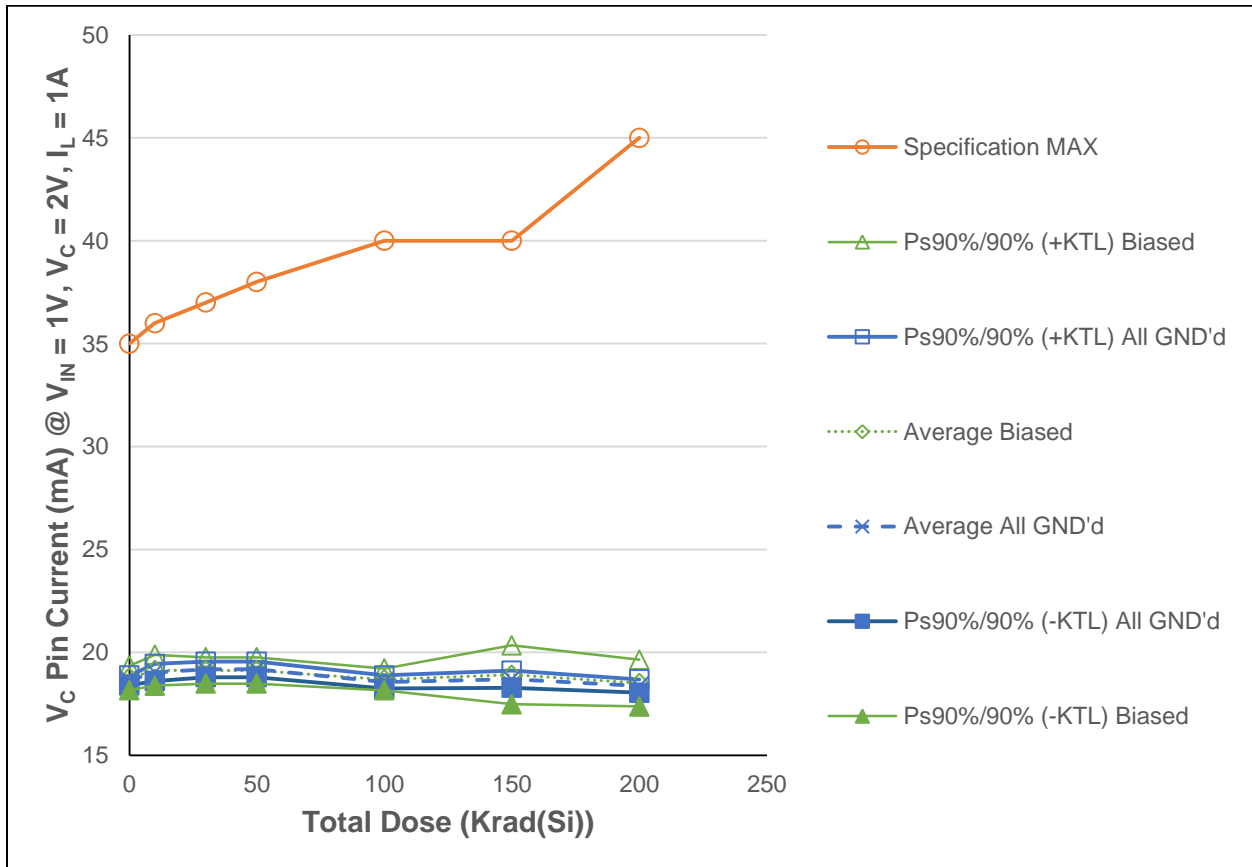


Figure 5.16: Plot of $V_{CONTROL}$ Pin Current (@ $I_L = 1A$) versus Total Dose

The average measured values of samples are within datasheet specification maximum limits.

Table 5.16: Raw data table for $V_{CONTROL}$ pin current ($I_L = 1A$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter Units	V_C Current@ $V_{IN}=1V, V_C=2V, I_L=1A$ (mA)	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	18.680	19.115					
57	All GND'd Irradiation	18.736	19.121					
58	All GND'd Irradiation	18.543	19.049					
59	All GND'd Irradiation	18.668	19.076					
60	All GND'd Irradiation	18.541	18.756					
51	Biased Irradiation	18.767	19.088					
52	Biased Irradiation	18.585	19.034					
53	Biased Irradiation	19.052	19.454					
54	Biased Irradiation	18.520	18.753					
55	Biased Irradiation	18.878	19.328					
66	All GND'd Irradiation	18.743		19.085				
67	All GND'd Irradiation	18.819		19.167				
68	All GND'd Irradiation	19.026		19.352				
69	All GND'd Irradiation	18.666		18.997				
70	All GND'd Irradiation	18.973		19.249				
61	Biased Irradiation	18.975		19.410				
62	Biased Irradiation	18.670		19.028				
63	Biased Irradiation	18.829		19.208				
64	Biased Irradiation	18.830		19.179				
65	Biased Irradiation	18.803		18.785				
76	All GND'd Irradiation	18.676			19.085			
77	All GND'd Irradiation	18.927			19.167			
78	All GND'd Irradiation	18.891			19.352			
79	All GND'd Irradiation	18.907			18.997			
80	All GND'd Irradiation	18.610			19.249			
71	Biased Irradiation	18.885			19.410			
72	Biased Irradiation	19.029			19.028			
73	Biased Irradiation	18.830			19.208			
74	Biased Irradiation	18.756			19.179			
75	Biased Irradiation	19.014			18.785			
86	All GND'd Irradiation	18.774				18.640		
87	All GND'd Irradiation	18.836				18.666		
88	All GND'd Irradiation	18.701				18.573		
89	All GND'd Irradiation	18.482				18.368		
90	All GND'd Irradiation	18.831				18.559		
81	Biased Irradiation	19.118				18.955		
82	Biased Irradiation	18.891				18.590		
83	Biased Irradiation	18.717				18.536		
84	Biased Irradiation	18.999				18.824		
85	Biased Irradiation	18.720				18.528		
96	All GND'd Irradiation	18.946					18.817	
97	All GND'd Irradiation	18.610					18.508	
98	All GND'd Irradiation	18.692					18.592	
99	All GND'd Irradiation	19.022					18.873	
100	All GND'd Irradiation	18.966					18.683	
91	Biased Irradiation	18.985					19.820	
92	Biased Irradiation	18.551					18.546	
93	Biased Irradiation	18.769					18.710	
94	Biased Irradiation	18.975					18.849	
95	Biased Irradiation	18.709					18.626	
106	All GND'd Irradiation	18.626						18.178
107	All GND'd Irradiation	18.834						18.336
108	All GND'd Irradiation	19.070						18.473
109	All GND'd Irradiation	18.893						18.382
110	All GND'd Irradiation	18.944						18.451
101	Biased Irradiation	18.810						18.344
102	Biased Irradiation	18.688						18.278
103	Biased Irradiation	18.844						19.231
104	Biased Irradiation	18.971						18.460
105	Biased Irradiation	18.728						18.221
111	Control Unit	18.849	18.849	18.849	18.849	18.849	18.849	18.849
112	Control Unit	18.657	18.657	18.657	18.657	18.657	18.657	18.657
All GND'd Irradiation Statistics								
Average All GND'd		18.634	19.024	19.170	19.170	18.561	18.695	18.364
Std Dev All GND'd		0.087	0.152	0.138	0.138	0.117	0.152	0.117
Ps90%/90% (+KTL) All GND'd		18.873	19.442	19.549	19.549	18.882	19.111	18.686
Ps90%/90% (-KTL) All GND'd		18.394	18.605	18.791	18.791	18.241	18.278	18.042
Biased Irradiation Statistics								
Average Biased		18.760	19.131	19.122	19.122	18.686	18.910	18.507
Std Dev Biased		0.217	0.273	0.232	0.232	0.192	0.521	0.414
Ps90%/90% (+KTL) Biased		19.354	19.879	19.759	19.759	19.214	20.339	19.643
Ps90%/90% (-KTL) Biased		18.166	18.384	18.485	18.485	18.159	17.481	17.370
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		35	36	37	38	40		45
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

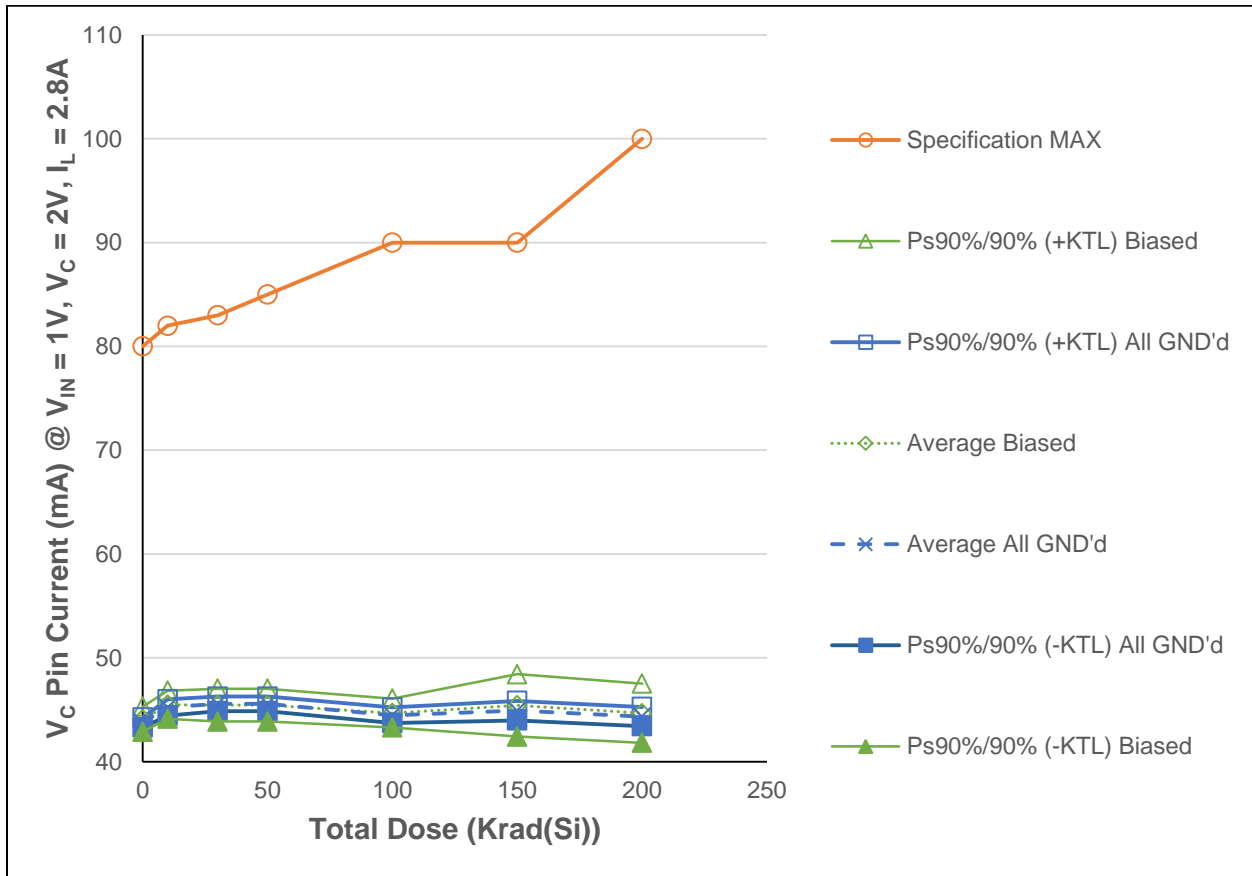


Figure 5.17: Plot of $V_{CONTROL}$ Pin Current (@ $I_L = 2.8A$) versus Total Dose

The average measured values of samples are within datasheet specification maximum limits.

Table 5.17: Raw data table for $V_{CONTROL}$ pin current ($I_L = 2.8A$) versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter Units	V_C Current@ $V_{IN}=1V, V_C=2V, I_L=2.8A$ (mA)	Total Dose (Krad(Si)) @ 50 rads(Si)/s						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	43.826	45.390					
57	All GND'd Irradiation	44.059	45.511					
58	All GND'd Irradiation	43.620	45.314					
59	All GND'd Irradiation	43.701	45.138					
60	All GND'd Irradiation	43.683	44.773					
51	Biased Irradiation	44.193	45.481					
52	Biased Irradiation	43.577	45.107					
53	Biased Irradiation	44.613	46.058					
54	Biased Irradiation	43.694	44.900					
55	Biased Irradiation	44.353	45.892					
66	All GND'd Irradiation	44.046		45.472				
67	All GND'd Irradiation	44.065		45.452				
68	All GND'd Irradiation	44.632		45.975				
69	All GND'd Irradiation	43.943		45.299				
70	All GND'd Irradiation	44.372		45.624				
61	Biased Irradiation	44.685		46.246				
62	Biased Irradiation	43.702		45.073				
63	Biased Irradiation	44.172		45.641				
64	Biased Irradiation	44.174		45.521				
65	Biased Irradiation	44.127		44.735				
76	All GND'd Irradiation	43.903			45.472			
77	All GND'd Irradiation	44.441			45.452			
78	All GND'd Irradiation	44.193			45.975			
79	All GND'd Irradiation	44.267			45.299			
80	All GND'd Irradiation	43.607			45.624			
71	Biased Irradiation	44.114			46.246			
72	Biased Irradiation	44.427			45.073			
73	Biased Irradiation	44.110			45.641			
74	Biased Irradiation	43.974			45.521			
75	Biased Irradiation	44.523			44.735			
86	All GND'd Irradiation	43.988				44.601		
87	All GND'd Irradiation	44.241				44.785		
88	All GND'd Irradiation	43.700				44.346		
89	All GND'd Irradiation	43.455				44.069		
90	All GND'd Irradiation	44.208				44.551		
81	Biased Irradiation	44.855				45.435		
82	Biased Irradiation	44.311				44.544		
83	Biased Irradiation	43.903				44.357		
84	Biased Irradiation	44.358				44.918		
85	Biased Irradiation	43.759				44.150		
96	All GND'd Irradiation	44.323					45.166	
97	All GND'd Irradiation	43.685					44.453	
98	All GND'd Irradiation	43.874					44.720	
99	All GND'd Irradiation	44.566					45.310	
100	All GND'd Irradiation	44.534					44.942	
91	Biased Irradiation	44.484					47.331	
92	Biased Irradiation	43.758					44.803	
93	Biased Irradiation	44.002					44.907	
94	Biased Irradiation	44.610					45.371	
95	Biased Irradiation	43.826					44.698	
106	All GND'd Irradiation	43.735						43.926
107	All GND'd Irradiation	43.950						44.046
108	All GND'd Irradiation	44.771						44.672
109	All GND'd Irradiation	44.320						44.451
110	All GND'd Irradiation	44.465						44.613
101	Biased Irradiation	44.045						44.193
102	Biased Irradiation	43.716						44.010
103	Biased Irradiation	44.340						46.481
104	Biased Irradiation	44.518						44.594
105	Biased Irradiation	44.021						44.062
111	Control Unit	44.360	44.360	44.360	44.360	44.360	44.360	44.360
112	Control Unit	43.642	43.642	43.642	43.642	43.642	43.642	43.642
All GND'd Irradiation Statistics								
Average All GND'd		43.778	45.225	45.564	45.564	44.470	44.918	44.341
Std Dev All GND'd		0.174	0.287	0.257	0.257	0.273	0.343	0.337
Ps90%/90% (+KTL) All GND'd		44.256	46.011	46.268	46.268	45.220	45.860	45.267
Ps90%/90% (-KTL) All GND'd		43.300	44.439	44.861	44.861	43.721	43.977	43.416
Biased Irradiation Statistics								
Average Biased		44.086	45.488	45.443	45.443	44.681	45.422	44.668
Std Dev Biased		0.440	0.495	0.576	0.576	0.508	1.098	1.039
Ps90%/90% (+KTL) Biased		45.292	46.844	47.024	47.024	46.073	48.432	47.516
Ps90%/90% (-KTL) Biased		42.880	44.131	43.863	43.863	43.289	42.412	41.819
Specification MIN								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Specification MAX		80	82	83	85	90		100
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) All GND'd								
Status (+KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (-KTL) Biased								
Status (+KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS

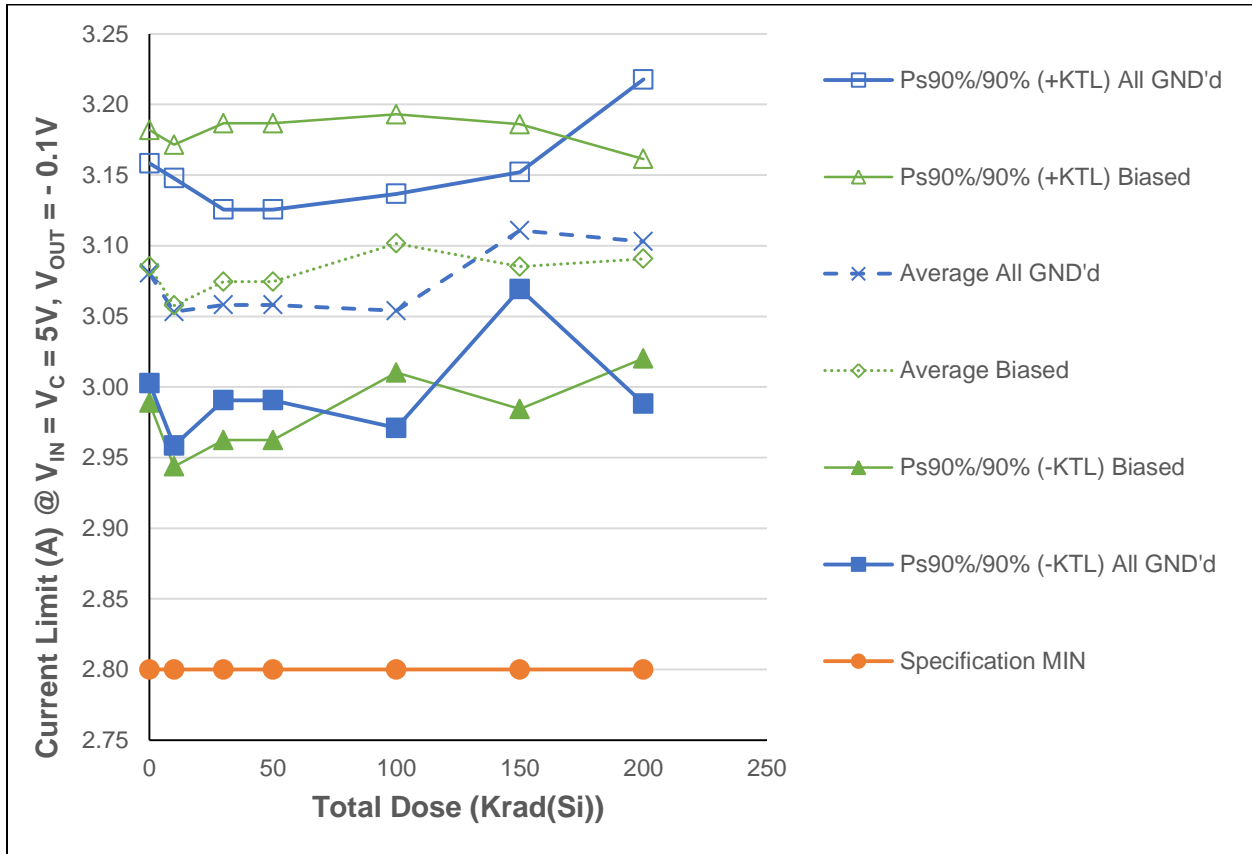


Figure 5.18: Plot of Current Limit versus Total Dose

The average measured values of samples passed datasheet specification minimum limits.

Table 5.18: Raw data table for current limit versus total dose including the statistical calculations, minimum specification, and the status of the test (PASS/FAIL)

Parameter Units	I _{LIMIT} @ V _{IN} =V _C =5V, V _{OUT} =-0.1V (A)	Total Dose (Krad(Si)) @ 50 rads(Si/s)						
		0	10	30	50	100	150	200
56	All GND'd Irradiation	3.082	3.055					
57	All GND'd Irradiation	3.067	3.040					
58	All GND'd Irradiation	3.119	3.097					
59	All GND'd Irradiation	3.092	3.070					
60	All GND'd Irradiation	3.043	3.004					
51	Biased Irradiation	3.065	3.042					
52	Biased Irradiation	3.107	3.082					
53	Biased Irradiation	3.118	3.095					
54	Biased Irradiation	3.033	2.992					
55	Biased Irradiation	3.103	3.077					
66	All GND'd Irradiation	3.040		3.018				
67	All GND'd Irradiation	3.102		3.081				
68	All GND'd Irradiation	3.092		3.074				
69	All GND'd Irradiation	3.080		3.059				
70	All GND'd Irradiation	3.083		3.058				
61	Biased Irradiation	3.100		3.088				
62	Biased Irradiation	3.123		3.104				
63	Biased Irradiation	3.113		3.096				
64	Biased Irradiation	3.098		3.082				
65	Biased Irradiation	3.028		3.003				
76	All GND'd Irradiation	3.070			3.018			
77	All GND'd Irradiation	3.079			3.081			
78	All GND'd Irradiation	3.108			3.074			
79	All GND'd Irradiation	3.124			3.059			
80	All GND'd Irradiation	3.123			3.058			
71	Biased Irradiation	3.145			3.088			
72	Biased Irradiation	3.117			3.104			
73	Biased Irradiation	3.056			3.096			
74	Biased Irradiation	3.114			3.082			
75	Biased Irradiation	3.117			3.003			
86	All GND'd Irradiation	3.050				3.043		
87	All GND'd Irradiation	3.061				3.049		
88	All GND'd Irradiation	3.120				3.106		
89	All GND'd Irradiation	3.045				3.026		
90	All GND'd Irradiation	3.063				3.046		
81	Biased Irradiation	3.149				3.140		
82	Biased Irradiation	3.065				3.051		
83	Biased Irradiation	3.109				3.098		
84	Biased Irradiation	3.108				3.100		
85	Biased Irradiation	3.133				3.120		
96	All GND'd Irradiation	3.085					3.088	
97	All GND'd Irradiation	3.135					3.126	
98	All GND'd Irradiation	3.126					3.124	
99	All GND'd Irradiation	3.110					3.106	
100	All GND'd Irradiation	3.117					3.110	
91	Biased Irradiation	3.107					3.106	
92	Biased Irradiation	3.039					3.036	
93	Biased Irradiation	3.095					3.104	
94	Biased Irradiation	3.053					3.057	
95	Biased Irradiation	3.126					3.122	
106	All GND'd Irradiation	3.051						3.038
107	All GND'd Irradiation	3.149						3.143
108	All GND'd Irradiation	3.133						3.130
109	All GND'd Irradiation	3.095						3.089
110	All GND'd Irradiation	3.114						3.115
101	Biased Irradiation	3.069						3.063
102	Biased Irradiation	3.123						3.116
103	Biased Irradiation	3.050						3.064
104	Biased Irradiation	3.097						3.099
105	Biased Irradiation	3.120						3.112
111	Control Unit	3.105	3.105	3.105	3.105	3.105	3.105	3.105
112	Control Unit	3.145	3.145	3.145	3.145	3.145	3.145	3.145
All GND'd Irradiation Statistics								
Average All GND'd		3.081	3.053	3.058	3.058	3.054	3.111	3.103
Std Dev All GND'd		0.028	0.035	0.025	0.025	0.030	0.015	0.042
Ps90%/90% (+KTL) All GND'd		3.158	3.148	3.126	3.126	3.137	3.152	3.218
Ps90%/90% (-KTL) All GND'd		3.003	2.959	2.991	2.991	2.971	3.069	2.988
Biased Irradiation Statistics								
Average Biased		3.085	3.058	3.075	3.075	3.102	3.085	3.091
Std Dev Biased		0.035	0.042	0.041	0.041	0.033	0.037	0.026
Ps90%/90% (+KTL) Biased		3.182	3.172	3.187	3.187	3.193	3.186	3.161
Ps90%/90% (-KTL) Biased		2.989	2.944	2.962	2.962	3.010	2.984	3.020
Specification MIN		2.8	2.8	2.8	2.8	2.8		2.8
Status (Measurements) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (Measurements) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Specification MAX								
Status (Measurements) All GND'd								
Status (Measurements) Biased								
Status (-KTL) All GND'd		PASS	PASS	PASS	PASS	PASS		PASS
Status (+KTL) All GND'd								
Status (-KTL) Biased		PASS	PASS	PASS	PASS	PASS		PASS
Status (+KTL) Biased								

Appendix A

Picture of one among ten samples used in the test. The part is in development and identification numbers will be marked on top of the future product.



Figure A1: Top View showing serial number



Figure A2: Bottom View

Appendix B

Radiation Bias Connection Tables

Table B1: Biased Conditions

PIN	FUNCTION	CONNECTION / BIAS
1	NC	NC
2	SET	To ground via 10KΩ resistor
3	V _{CONTROL}	To pin 4
4	IN	To +3V To ground via 1uF To pin 3
CASE	OUT	To ground via 100Ω resistor To ground via 10uF capacitor

Table B2: All GND'd

PIN	FUNCTION	CONNECTION / BIAS
1	NC	Ground
2	SET	Ground
3	V _{CONTROL}	Ground
4	IN	Ground
CASE	OUT	Ground

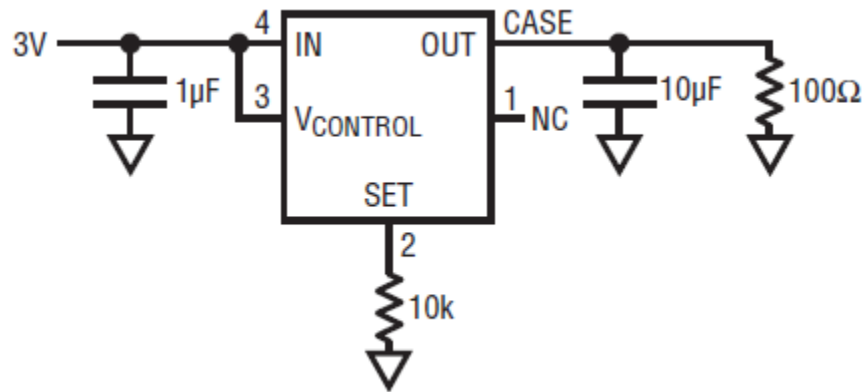


Figure B1: Total Dose Bias Circuit

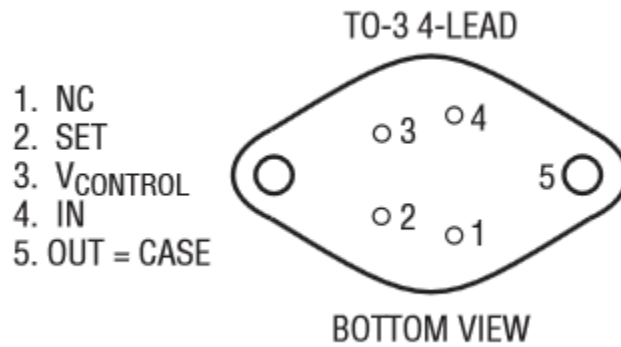


Figure B2: Pin-Out



Figure B3: Bias Board (top view)

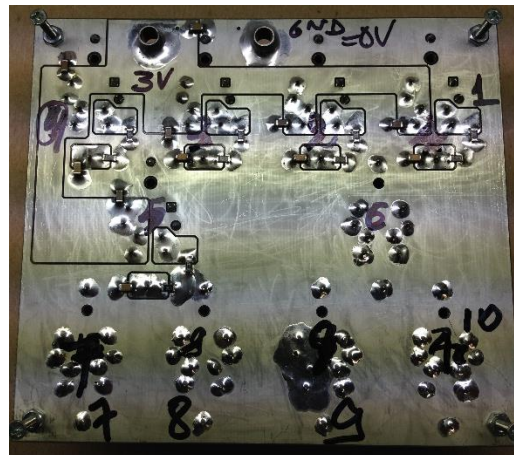


Figure B4: Bias Board (bottom view)

Appendix C

TEST CERTIFICATE

**Defense Microelectronics Activity
Science and Engineering Gamma Irradiation Test Facility
DMEA/MEBC
4234 54th Street
McClellan, CA 95652**



Testing Certificate Number: 1691.01

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the dosimetry reported in this test certificate has been determined in accordance with the laboratory's terms of accreditation. The results contained herein relate only to the items tested. This certificate may not be reproduced, except in full, without the approval of this laboratory.

Date: 2013-09-11

Test Certificate #: 2013-NRC-048

Total Pages (except cover): 2

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REQUEST FOR AND RESULTS OF TESTS					PAGE NO. 1	NO. OF PAGES 2				
SECTION A - REQUEST FOR TEST										
1. TO: (Include ZIP Code) Defense Microelectronics Activity Science and Engineering Gamma Irradiation Test Facility 4234 54th Street McClellan, CA 95652-2100			2. FROM: (Include ZIP Code) Dr. Sana Rezgui Linear Technology Corp. 1630 McCarthy Blvd. Milpitas, CA 95035 Phone: (408) 432-1900 Email: srezgui@linear.com							
3. PRIME CONTRACTOR AND ADDRESS (Include ZIP Code) Same as block 2 CONTRACT NUMBER CRADA CR-08-17			4. MANUFACTURING PLANT NAME AND ADDRESS (Include ZIP Code) Linear Technology Corp. 1630 McCarthy Blvd. Milpitas, CA 95035 P.O. NUMBER TBD							
5. END ITEM AND/OR PROJECT N/A	6. SAMPLE NUMBER N/A	7. LOT NO. See below	8. REASON FOR SUBMITTAL Total Ionizing Dose (TID) Testing	9. DATE SUBMITTED 2013-09-09						
10. MATERIAL TO BE TESTED Various biased/unbiased devices - see below	10a. QUANTITY SUBMITTED See below	11. QUANTITY REPRESENTED N/A	12. SPEC. & AMEND AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE N/A							
13. PURCHASED FROM OR SOURCE Linear Technology Corp.		14. SHIPMENT METHOD Hand carry	15. DATE SAMPLED AND SUBMITTED BY 2013-09-10 by Tom Shepherd							
16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS. Dose Rate: 3000 ±10% rad(SiO2)/min Irradiation Steps: 10 Type of Test: Customer-Performed Total Dose: see below ±10% krad(SiO2) Requested Test Start Date: 2013-09-11 Dimensions: Various Security Requirements, Safety or Handling Precautions: Customer to perform pre- and post-irradiation electrical testing. Parts may be packed by customer in dry ice for transport. Irradiation portion of testing to be conducted per MIL-STD-883G, Test Method 1019.7, Condition A. Customer reserves right to modify parameters, devices, etc. to suit test requirements. Description of parts to be irradiated is as follows: RH3083MK-CS: fab lot #HP201494.1, ass'y lot #N/A, WFR #2: 10, 30, 50, 100, 150 and 200 krad, 10 pieces per dose level, biased RH1086MH: fab lot #W1231270.1, ass'y lot #719601.1, WFR #4: 50 and 200 krad, 5 pieces per dose level, biased LT196517#PBP: fab lot #N/A, ass'y lot #480445.1, WFR #N/A: 10, 30, 50, 100, 150 and 200 krad, 3 pieces per dose level, bias TBD RH1499MW: fab lot #W1046927.1, ass'y lot #713901.1, WFR #11: 50 and 200 krad, 5 pieces per dose level, biased										
Experiment #: 2013-NRC-048		DMEA Approval:		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="font-size: 8px;">SHEPHERD, THOMAS J. AS J. 1255235946 20130911 16:43:40 -0700</td> <td style="font-size: 8px;">SHEPHERD, THOMAS J. AS J. 1255235946 20130911 16:43:40 -0700</td> <td style="font-size: 8px;">ARSHAD, MOHAMMAD MAD. 1231956693 20130911 16:43:40 -0700</td> <td style="font-size: 8px;">MELINE, CARY W. 1231854033 20130911 16:43:40 -0700</td> </tr> </table>			SHEPHERD, THOMAS J. AS J. 1255235946 20130911 16:43:40 -0700	SHEPHERD, THOMAS J. AS J. 1255235946 20130911 16:43:40 -0700	ARSHAD, MOHAMMAD MAD. 1231956693 20130911 16:43:40 -0700	MELINE, CARY W. 1231854033 20130911 16:43:40 -0700
SHEPHERD, THOMAS J. AS J. 1255235946 20130911 16:43:40 -0700	SHEPHERD, THOMAS J. AS J. 1255235946 20130911 16:43:40 -0700	ARSHAD, MOHAMMAD MAD. 1231956693 20130911 16:43:40 -0700	MELINE, CARY W. 1231854033 20130911 16:43:40 -0700							
17. SEND REPORT OF TEST TO Individual identified in Block 2										
SECTION B - RESULTS OF TEST (Continue on plain white paper if more space is required)										
1. DATE SAMPLE RECEIVED 2013-09-11	2. DATE RESULTS REPORTED 2013-09-11	3. LAB REPORT NUMBER N/A								
4. TEST PERFORMED	RESULTS OF TEST	SAMPLE RESULT	REQUIREMENTS							
Please see next page.										
DATE	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE								
2013-09-11	Thomas J. Shepherd, SEGIT Technical Manager	SHEPHERD, THOMAS J. 1255235946								
2013-09-12	Mohammad Arshad, Alt. SEGIT Facility Supervisor	ARSHAD, MOHAMMAD. 1231956693								

DD FORM 1222, FEB 62 (EF)

REPLACES DD FORM 1222, 1 JUL 58, WHICH IS OBSOLETE.

Appendix D

Table D1: Pre-Irradiation Electrical Characteristics of Device-Under-Test

PARAMETER	CONDITIONS	$T_A = 25^\circ\text{C}$		SUB-GROUP	$-55^\circ\text{C} < T_A < 125^\circ\text{C}$		SUB-GROUP	UNITS
		MIN	MAX		MIN	MAX		
SET Pin Current (Note 6)	$V_{IN} = 1\text{V}, V_{CONTROL} = 2\text{V}, I_{LOAD} = 1\text{mA}$	49.5	50.5	1	49	51.5	2, 3	μA
Output Offset Voltage ($V_{OUT} - V_{SET}$)	$V_{IN} = 1\text{V}, V_{CONTROL} = 2\text{V}, I_{LOAD} = 1\text{mA}$	-4	4	1	-6	6	2, 3	mV
Load Regulation, I_{SET}	$I_{LOAD} = 1\text{mA to } 2.8\text{A}$	-200	200	1	-300	300	2, 3	nA
Load Regulation, V_{OS}	$I_{LOAD} = 5\text{mA to } 2.8\text{A}$	-3	3	1	-4	4	2, 3	mV
Line Regulation, I_{SET}	$V_{IN} = 1\text{V to } 23\text{V}, V_{CONTROL} = 2\text{V to } 25\text{V}, I_{LOAD} = 1\text{mA}$ $V_{IN} = 1\text{V to } 23\text{V}, V_{CONTROL} = 2\text{V to } 25\text{V}, I_{LOAD} = 5\text{mA}$	-8	8	1	-10	10	2, 3	nA/V nA/V
Line Regulation, V_{OS}	$V_{IN} = 1\text{V to } 23\text{V}, V_{CONTROL} = 2\text{V to } 25\text{V}, I_{LOAD} = 1\text{mA}$ $V_{IN} = 1\text{V to } 23\text{V}, V_{CONTROL} = 2\text{V to } 25\text{V}, I_{LOAD} = 5\text{mA}$	-0.02	0.02	1	-0.05	0.05	2, 3	mV/V mV/V
Minimum Load Current (Note 3)	$V_{IN} = 1\text{V}, V_{CONTROL} = 2\text{V}$		0.5	1		5	2, 3	mA
	$V_{IN} = 23\text{V}, V_{CONTROL} = 25\text{V}$		1	1		5	2, 3	mA
$V_{CONTROL}$ Dropout Voltage (Note 4)	$V_{IN} = 1\text{V}, I_{LOAD} = 0.1\text{A}$		1.4	1		1.55	2, 3	V
	$V_{IN} = 1\text{V}, I_{LOAD} = 1\text{A}$		1.45	1		1.6	2, 3	V
	$V_{IN} = 1\text{V}, I_{LOAD} = 2.8\text{A}$		1.5	1		1.65	2, 3	V
V_{IN} Dropout Voltage (Note 4)	$V_{CONTROL} = 2\text{V}, I_{LOAD} = 0.1\text{A}$		35	1		35	2, 3	mV
	$V_{CONTROL} = 2\text{V}, I_{LOAD} = 1\text{A}$		220	1		280	2, 3	mV
	$V_{CONTROL} = 2\text{V}, I_{LOAD} = 2.8\text{A}$		650	1		750	2, 3	mV
$V_{CONTROL}$ Pin Current (Note 5)	$V_{IN} = 1\text{V}, V_{CONTROL} = 2\text{V}, I_{LOAD} = 0.1\text{A}$		10	1		10	2, 3	mA
	$V_{IN} = 1\text{V}, V_{CONTROL} = 2\text{V}, I_{LOAD} = 1\text{A}$		35	1		40	2, 3	mA
	$V_{IN} = 1\text{V}, V_{CONTROL} = 2\text{V}, I_{LOAD} = 2.8\text{A}$		80	1		90	2, 3	mA
Current Limit	$V_{IN} = 5\text{V}, V_{CONTROL} = 5\text{V}, V_{SET} = 0\text{V},$ $V_{OUT} = -0.1\text{V}$		2.8	1		2.8	2, 3	A
Error Amplifier RMS Output Noise (Note 7)	$I_{LOAD} = 500\text{mA}, 10\text{Hz} \leq f \leq 100\text{kHz},$ $C_{OUT} = 10\mu\text{F}, C_{SET} = 0.1\mu\text{F}$		TYP = 40	1				μV_{RMS}
Reference Current RMS Output Noise (Note 7)	$10\text{Hz} \leq f \leq 100\text{kHz}$		TYP = 1	1				nA_{RMS}

Table D2: Post-Irradiation Electrical Characteristics of Device-Under-Test

PARAMETER	CONDITIONS	10KRads(Si)		20KRads(Si)		50KRads(Si)		100KRads(Si)		200KRads(Si)		UNITS
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
SET Pin Current (Note 6)	$V_{IN} = 1V, V_{CONTROL} = 2V, I_{LOAD} = 1mA$	49	51	49	51	49	51	49	51	49	51	μA
Output Offset Voltage ($V_{OUT} - V_{SET}$)	$V_{IN} = 1V, V_{CONTROL} = 2V, I_{LOAD} = 1mA$	-4.5	4.5	-4.5	4.5	-4.5	4.5	-4.5	4.5	-4.5	4.5	mV
Load Regulation, I_{SET}	$I_{LOAD} = 1mA$ to 2.8A	-300	300	-300	300	-300	300	-300	300	-300	300	nA
Load Regulation, V_{OS}	$I_{LOAD} = 5mA$ to 2.8A	-3.5	3.5	-3.5	3.5	-3.5	3.5	-3.5	3.5	-3.5	3.5	mV
Line Regulation, I_{SET}	$V_{IN} = 1V$ to 23V, $V_{CONTROL} = 2V$ to 25V, $I_{LOAD} = 1mA$	-10	10	-10	10	-10	10	-10	10	-10	10	nA/V
Line Regulation, V_{OS}	$V_{IN} = 1V$ to 23V, $V_{CONTROL} = 2V$ to 25V, $I_{LOAD} = 1mA$	-0.025	0.025	-0.025	0.025	-0.025	0.025	-0.03	0.03	-0.04	0.04	mV/V
Minimum Load Current (Note 3)	$V_{IN} = 1V, V_{CONTROL} = 2V$	0.5		0.5		0.5		0.5		0.5		mA
	$V_{IN} = 23V, V_{CONTROL} = 25V$	1		1		1		1		1		mA
$V_{CONTROL}$ Dropout Voltage (Note 4)	$V_{IN} = 1V, I_{LOAD} = 0.1A$	1.41		1.41		1.42		1.43		1.45		V
	$V_{IN} = 1V, I_{LOAD} = 1A$	1.46		1.46		1.47		1.48		1.5		V
	$V_{IN} = 1V, I_{LOAD} = 2.8V$	1.51		1.51		1.52		1.53		1.55		V
V_{IN} Dropout Voltage (Note 4)	$V_{CONTROL} = 2V, I_{LOAD} = 0.1A$	35		40		40		45		45		mV
	$V_{CONTROL} = 2V, I_{LOAD} = 1A$	225		225		225		225		230		mV
	$V_{CONTROL} = 2V, I_{LOAD} = 2.8A$	655		655		655		660		670		mV
$V_{CONTROL}$ Pin Current (Note 5)	$V_{IN} = 1V, V_{CONTROL} = 2V, I_{LOAD} = 0.1A$	10.1		10.1		10.2		10.5		11		mA
	$V_{IN} = 1V, V_{CONTROL} = 2V, I_{LOAD} = 1A$	36		37		38		40		45		mA
	$V_{IN} = 1V, V_{CONTROL} = 2V, I_{LOAD} = 2.8A$	82		83		85		90		100		mA
Current Limit	$V_{IN} = 5V, V_{CONTROL} = 5V, V_{SET} = 0V,$ $V_{OUT} = -0.1V$	2.8		2.8		2.8		2.8		2.8		A
Error Amplifier RMS Output Noise (Note 7)	$I_{LOAD} = 500mA, 10Hz \leq f \leq 100kHz,$ $C_{OUT} = 10\mu F, C_{SET} = 0.1\mu F$	TYP = 40		TYP = 40		TYP = 40		TYP = 40		TYP = 40		μV_{RMS}
Reference Current RMS Output Noise (Note 7)	$10Hz \leq f \leq 100kHz$	TYP = 1		TYP = 1		TYP = 1		TYP = 1		TYP = 1		nA _{RMS}

Note 1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

Note 2: Unless otherwise specified, all voltages are with respect to V_{OUT} . The RH3083MK DICE is tested and specified under pulse load conditions such that $T_J \cong T_A$.

Note 3: Minimum load current is equivalent to the quiescent current of the part. Since all quiescent and drive current is delivered to the output of the part, the minimum load current is the minimum current required to maintain regulation.

Note 4: Dropout results from either of minimum control voltage, $V_{CONTROL}$, or minimum input voltage, V_{IN} , both specified with respect to V_{OUT} . These specifications represent the minimum input-to-output differential voltage required to maintain regulation.

Note 5: The $V_{CONTROL}$ pin current is the drive current required for the output transistor. This current tracks output current with roughly a 1:60 ratio. The minimum value is equal to the quiescent current of the device.

Note 6: The SET pin is clamped to the output with diodes through 1k resistors. These resistors and diodes only carry current under transient overloads.

Note 7: Adding a small capacitor across the reference current resistor lowers output noise. Adding this capacitor bypasses the resistor shot noise and reference current noise; output noise is then equal to error amplifier noise (see LT[®]3083 Data Sheet and Application Note 83).

Note 8: Dice are probe tested at 25°C to the limits shown in Table 1. Except for high current tests, dice are tested under low current conditions which assure full load current specifications when assembled.

Note 9: Dice that are not qualified by Linear Technology with a can sample are guaranteed to meet specifications of Table 1 only. Dice qualified by Linear Technology with a can sample meet specifications in all tables.

Note 10: This IC includes overtemperature protection that is intended to protect the device during momentary overload conditions. Junction temperature exceeds the maximum operating junction temperature when overtemperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

Note 11: Please refer to LT3083 standard product data sheet for Typical Performance Characteristics, Pin Functions, Applications Information, and Typical Applications.