Total Ionization Dose (TID) Test Results of the MSK5055RH (RH3845MKDICE) High Voltage Synchronous Step-Down Controller @ High Dose Rate (HDR)

HDR = 50 rad(Si)/s

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TID HDR Testing of the MSK5055RH (RH3845MKDICE) High Voltage Synchronous Step-Down Controller

Part Type Tested: The MSK5055RH is a radiation hardened wide input voltage range step-down synchronous switching regulator controller, utilizing the RH3845MKDICE High Voltage Synchronous Step-Down Controller.

Traceability Information: Fab Lot # WD005795.2; Wafer # 9. See photograph of unit under test in Appendix A.

Quantity of Units: 52 units received, 2 units for control, 25 units for biased irradiation, and 25 units for unbiased irradiation. Serial numbers 82-86, 92-96, 144-145, 149-150, 152, 174-178, and 165-169 had all pins tied to ground during irradiation. Serial numbers 74-78, 87-91, 136-140, 143, 153, 158,161-162, 164, and 170-173 were biased during irradiation. Serial numbers 134 and 135 were used as control. See Appendix B for the radiation bias connection tables.

Radiation and Electrical Test Increments: 50 samples were divided into five groups of 10 each. Serial numbers 74-78 and 82-86 of group 1 were irradiated to 10 Krads(Si). Serial numbers 87-96 of group 2 were irradiated to 30 Krads(Si). Serial numbers 137-140, 143-145, 149-150, and 152 of group 3 were irradiated to 50 Krads(Si). Serial numbers 136, 170-178 of group 4 were irradiated to 100 Krads(Si). Serial numbers 153, 158, 161-162, 164-169 of group 5 were irradiated to 200 Krads(Si).

Radiation dose: 50 rad(Si)/sec.

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

Test Hardware and Software: LTX pre- and post-irradiation test program EFRH5055RH.VS; Test Board LT3485.

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

Irradiation and Test Temperature: Room temperature controlled to 24°C±6°C per MIL-STD-883 and MIL-STD-750.

SUMMARY

ALL 52 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, unless using dry ice. If using dry ice electrical testing can be performed no longer than 72 hours after irradiation, when the parts are packed within 15 minutes of completion of irradiation. 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 without dry ice, and no more than 72 hours after electrical testing with dry ice.

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 rad(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 50 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 five separate groups were biased at +40V/+5V, 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); and group 5 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 52 units (50 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 at V_{IN} = 20V, V_{CC} = BOOST = BURST_EN = $SENSE^-$ = $SENSE^+$ = 10V, /SHDN = 2V, SGND = PGND = SW = SYNC = 0V, unless otherwise noted:

- V_{IN} Minimum Start Voltage (V)
- V_{IN} UVLO Threshold (Falling) (V)
- V_{IN} Current I_{VIN} (uA)
- V_{IN} Shutdown Current (uA)
- Boost Supply Current (mA)
- V_{CC} Supply Current (mA)
- V_{CC} Current Limit (mA)
- /SHDN Enable Threshold (Rising) (V)
- /SHDN Hysteresis (mV)
- Reference Voltage (V)
- V_{FB} Input Bias Current (nA)
- V_{FB} Error Amp Transconductance (us)
- Error Amp Sink Current (uA)
- Error Amp Source Current (uA)
- Current Limit Sense Voltage (mA)
- Soft-Start Charge Current (mA)
- Sense Pins Input Current ((uA)
- Reverse Protect Sense Voltage (mV)
- Reverse Protect Sense V_{OS} (mV)
- Switching Frequency (kHz)
- Maximum Programmable Frequency (kHz)
- Minimum Programmable Frequency (kHz)
- Non-Overlap Time TG to BG (ns)
- Non-Overlap Time BG to TG (ns)
- TG Minimum On-Time (ns)
- TG Minimum Off-Time (ns)
- TG Drive On Voltage (V)
- BG Drive On Voltage (V)
- TG Drive Off Voltage (V)
- BG Drive Off Voltage (V)
- TG-BG Drive Rise Time (ns)
- TG-BG Drive Fall Time (ns)

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

5.0 Test Results

All 50 samples passed the post-irradiation electrical tests. All measurements of the 31 listed parameters in section 4.0 are within the specification limits.

The V_{IN} UVLO Threshold (Falling) was not logged as specified in LTC datasheet. Future qualified lots will include the mentioned parameter.

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

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

$-K_{TL}$ = mean - (K_{TL}) (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 Ps90%/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 datasheets 20 Krads(Si) specification limits.

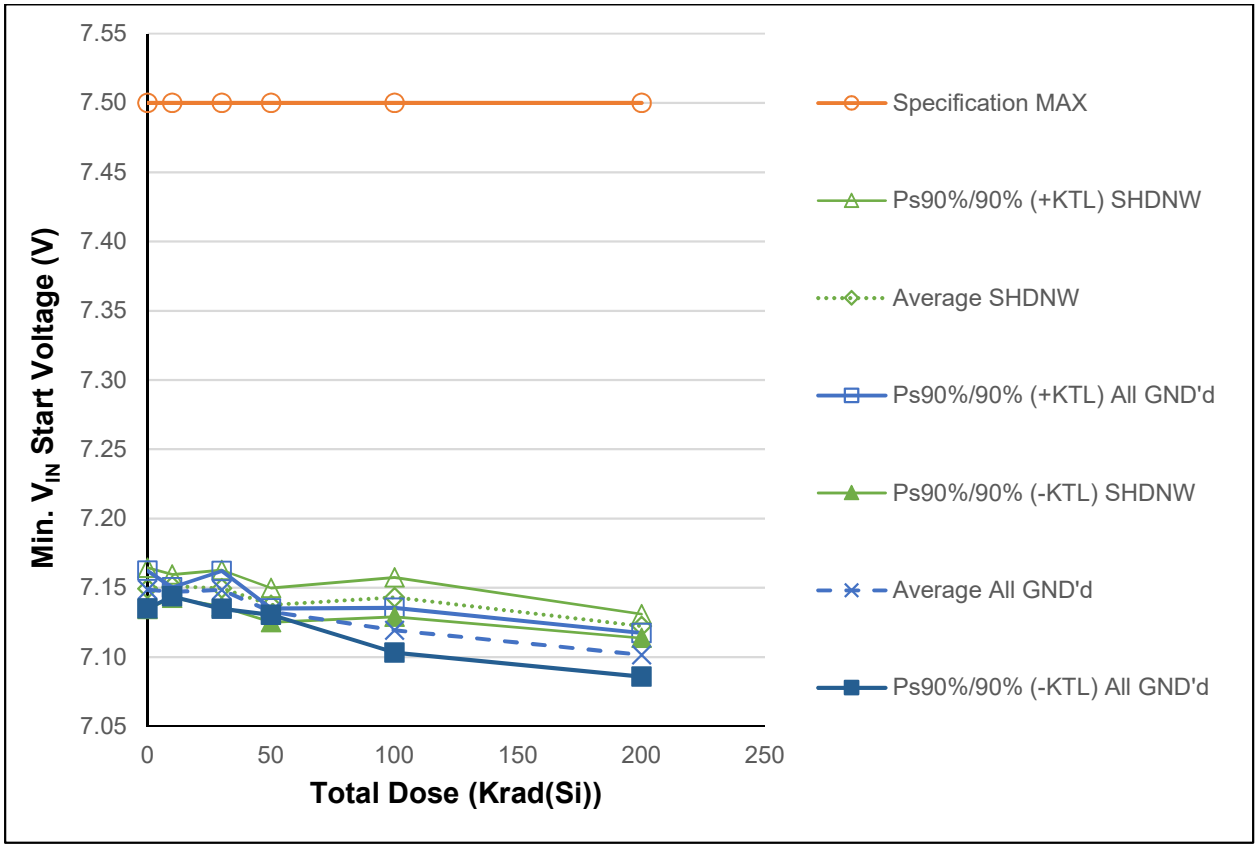

Figure 5.1 Plot of Minimum Start Voltage versus Total Dose

Table 5.1: Raw data for V_{IN} minimum start voltage versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL) under the orange headers)

Parameter	Min. V_{IN} Start Voltage	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(V)	0	10	30	50	100	200
82	All GND'd Irradiation	7.1464	7.1473				
83	All GND'd Irradiation	7.1478	7.1487				
84	All GND'd Irradiation	7.1446	7.1470				
85	All GND'd Irradiation	7.1473	7.1453				
86	All GND'd Irradiation	7.1573	7.1473				
74	SHDNW Irradiation	7.1570	7.1522				
75	SHDNW Irradiation	7.1464	7.1530				
76	SHDNW Irradiation	7.1441	7.1480				
77	SHDNW Irradiation	7.1535	7.1549				
78	SHDNW Irradiation	7.1465	7.1480				
92	All GND'd Irradiation	7.1372		7.1399			
93	All GND'd Irradiation	7.1478		7.1522			
94	All GND'd Irradiation	7.1544		7.1492			
95	All GND'd Irradiation	7.1454		7.1500			
96	All GND'd Irradiation	7.1464		7.1514			
87	SHDNW Irradiation	7.1471		7.1555			
88	SHDNW Irradiation	7.1444		7.1525			
89	SHDNW Irradiation	7.1465		7.1448			
90	SHDNW Irradiation	7.1459		7.1447			
91	SHDNW Irradiation	7.1447		7.1511			
144	All GND'd Irradiation	7.1346			7.1339		
145	All GND'd Irradiation	7.1310			7.1318		
149	All GND'd Irradiation	7.1438			7.1333		
150	All GND'd Irradiation	7.1420			7.1322		
152	All GND'd Irradiation	7.1341			7.1329		
137	SHDNW Irradiation	7.1432			7.1455		
138	SHDNW Irradiation	7.1329			7.1360		
139	SHDNW Irradiation	7.1440			7.1363		
140	SHDNW Irradiation	7.1341			7.1357		
143	SHDNW Irradiation	7.1320			7.1342		
174	All GND'd Irradiation	7.1429				7.1175	
175	All GND'd Irradiation	7.1311				7.1157	
176	All GND'd Irradiation	7.1297				7.1146	
177	All GND'd Irradiation	7.1429				7.1194	
178	All GND'd Irradiation	7.1437				7.1293	
136	SHDNW Irradiation	7.1459				7.1400	
170	SHDNW Irradiation	7.1527				7.1493	
171	SHDNW Irradiation	7.1447				7.1407	
172	SHDNW Irradiation	7.1425				7.1379	
173	SHDNW Irradiation	7.1435				7.1482	
165	All GND'd Irradiation	7.1553					7.1033
166	All GND'd Irradiation	7.1341					7.0930
167	All GND'd Irradiation	7.1435					7.1087
168	All GND'd Irradiation	7.1553					7.1030
169	All GND'd Irradiation	7.1435					7.1004
153	SHDNW Irradiation	7.1329					7.1172
158	SHDNW Irradiation	7.1420					7.1240
161	SHDNW Irradiation	7.1532					7.1217
162	SHDNW Irradiation	7.1459					7.1250
164	SHDNW Irradiation	7.1450					7.1239
134	Control Unit	7.1347					7.1332
135	Control Unit	7.1334					7.1426
	All GND'd Irradiation Statistics						
	Average All GND'd	7.1487	7.1471	7.1485	7.1328	7.1193	7.1017
	Std Dev All GND'd	0.0050	0.0012	0.0050	0.0008	0.0059	0.0057
	Ps90%/90% (+KTL) All GND'd	7.1623	7.1504	7.1621	7.1351	7.1355	7.1174
	Ps90%/90% (-KTL) All GND'd	7.1351	7.1438	7.1349	7.1305	7.1031	7.0859
	SHDNW Irradiation Statistics						
	Average SHDNW	7.1495	7.1512	7.1497	7.1375	7.1432	7.1224
	Std Dev SHDNW	0.0055	0.0031	0.0048	0.0045	0.0052	0.0031
	Ps90%/90% (+KTL) SHDNW	7.1645	7.1597	7.1628	7.1499	7.1574	7.1310
	Ps90%/90% (-KTL) SHDNW	7.1345	7.1428	7.1365	7.1252	7.1291	7.1138
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	7.5	7.5	7.5	7.5	7.5	7.5
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

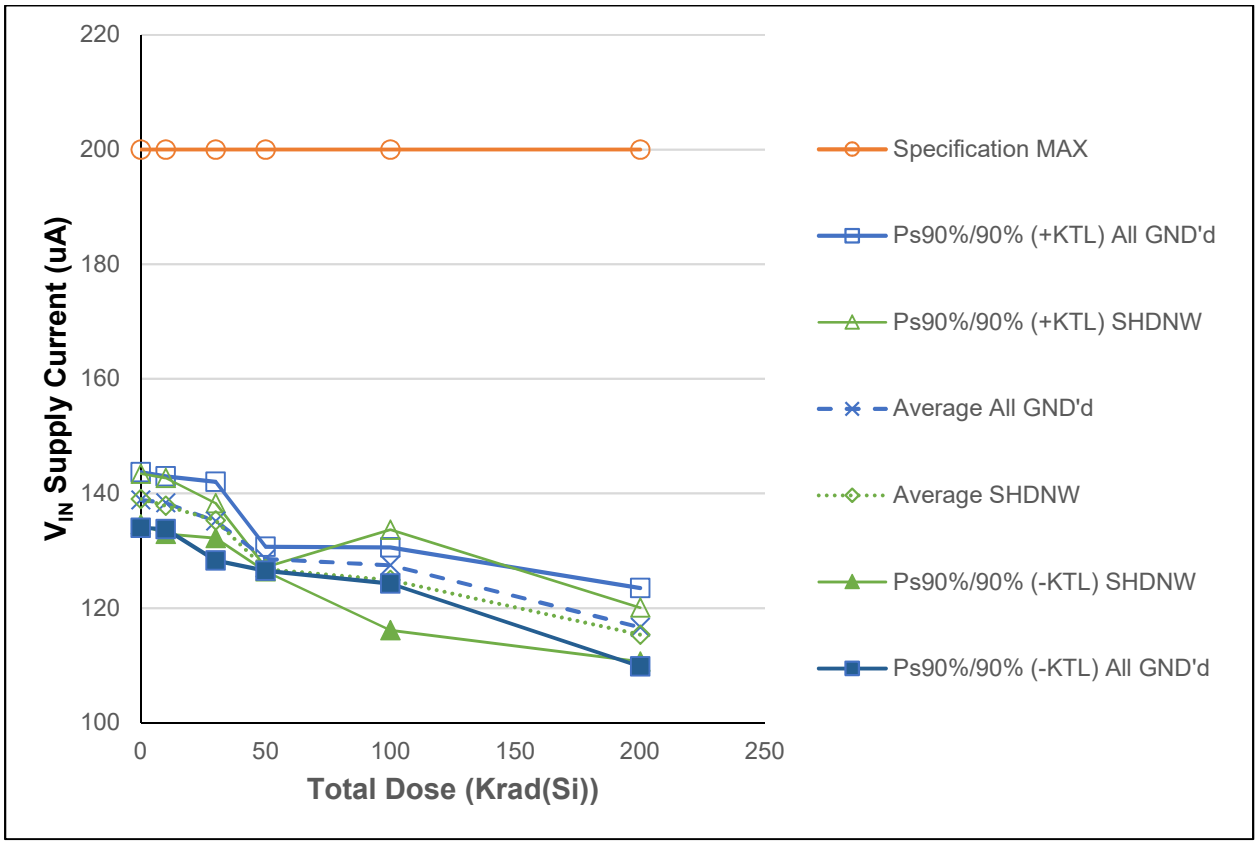

Figure 5.3: Plot of V_{IN} Supply Current versus Total Dose

Table 5.3: Raw data for V_{IN} supply current versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL).

Parameter	V_{IN} Supply Current	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(uA)	0	10	30	50	100	200
82	All GND'd Irradiation	140.611	140.059				
83	All GND'd Irradiation	139.630	138.963				
84	All GND'd Irradiation	135.926	135.598				
85	All GND'd Irradiation	139.413	139.032				
86	All GND'd Irradiation	138.764	138.191				
74	SHDNW Irradiation	139.642	138.460				
75	SHDNW Irradiation	137.926	136.535				
76	SHDNW Irradiation	139.854	138.648				
77	SHDNW Irradiation	140.861	139.947				
78	SHDNW Irradiation	136.859	135.493				
92	All GND'd Irradiation	139.168		137.357			
93	All GND'd Irradiation	137.335		134.769			
94	All GND'd Irradiation	138.459		135.808			
95	All GND'd Irradiation	133.531		131.024			
96	All GND'd Irradiation	139.135		136.778			
87	SHDNW Irradiation	138.559		133.809			
88	SHDNW Irradiation	141.598		136.592			
89	SHDNW Irradiation	139.423		134.726			
90	SHDNW Irradiation	140.277		135.029			
91	SHDNW Irradiation	140.480		136.094			
144	All GND'd Irradiation	133.298			128.224		
145	All GND'd Irradiation	134.691			129.292		
149	All GND'd Irradiation	134.596			129.394		
150	All GND'd Irradiation	133.872			128.489		
152	All GND'd Irradiation	132.103			127.564		
137	SHDNW Irradiation	133.872			126.718		
138	SHDNW Irradiation	134.212			126.747		
139	SHDNW Irradiation	133.627			126.637		
140	SHDNW Irradiation	133.384			126.797		
143	SHDNW Irradiation	134.065			126.988		
174	All GND'd Irradiation	138.823				126.535	
175	All GND'd Irradiation	141.353				129.122	
176	All GND'd Irradiation	140.544				128.093	
177	All GND'd Irradiation	139.928				127.023	
178	All GND'd Irradiation	137.966				126.421	
136	SHDNW Irradiation	134.212				121.417	
170	SHDNW Irradiation	136.119				122.260	
171	SHDNW Irradiation	138.426				125.577	
172	SHDNW Irradiation	142.475				129.404	
173	SHDNW Irradiation	138.216				125.861	
165	All GND'd Irradiation	139.145					117.309
166	All GND'd Irradiation	134.270					112.859
167	All GND'd Irradiation	141.870					119.816
168	All GND'd Irradiation	138.383					116.483
169	All GND'd Irradiation	138.280					116.802
153	SHDNW Irradiation	133.736					112.725
158	SHDNW Irradiation	137.509					115.136
161	SHDNW Irradiation	136.986					115.549
162	SHDNW Irradiation	138.052					115.970
164	SHDNW Irradiation	138.861					117.462
134	Control Unit	138.754	139.127	139.127	139.127	139.127	139.127
135	Control Unit	136.566	136.723	136.723	136.723	136.723	136.723
	All GND'd Irradiation Statistics						
	Average All GND'd	138.869	138.368	135.147	128.593	127.439	116.654
	Std Dev All GND'd	1.774	1.685	2.506	0.764	1.150	2.494
	Ps90%/90% (+KTL) All GND'd	143.732	142.988	142.019	130.688	130.592	123.492
	Ps90%/90% (-KTL) All GND'd	134.006	133.748	128.275	126.497	124.286	109.815
	SHDNW Irradiation Statistics						
	Average SHDNW	139.028	137.817	135.250	126.777	124.904	115.368
	Std Dev SHDNW	1.607	1.781	1.108	0.131	3.192	1.719
	Ps90%/90% (+KTL) SHDNW	143.436	142.699	138.289	127.137	133.657	120.082
	Ps90%/90% (-KTL) SHDNW	134.621	132.934	132.211	126.418	116.150	110.655
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	200	200	200	200	200	200
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

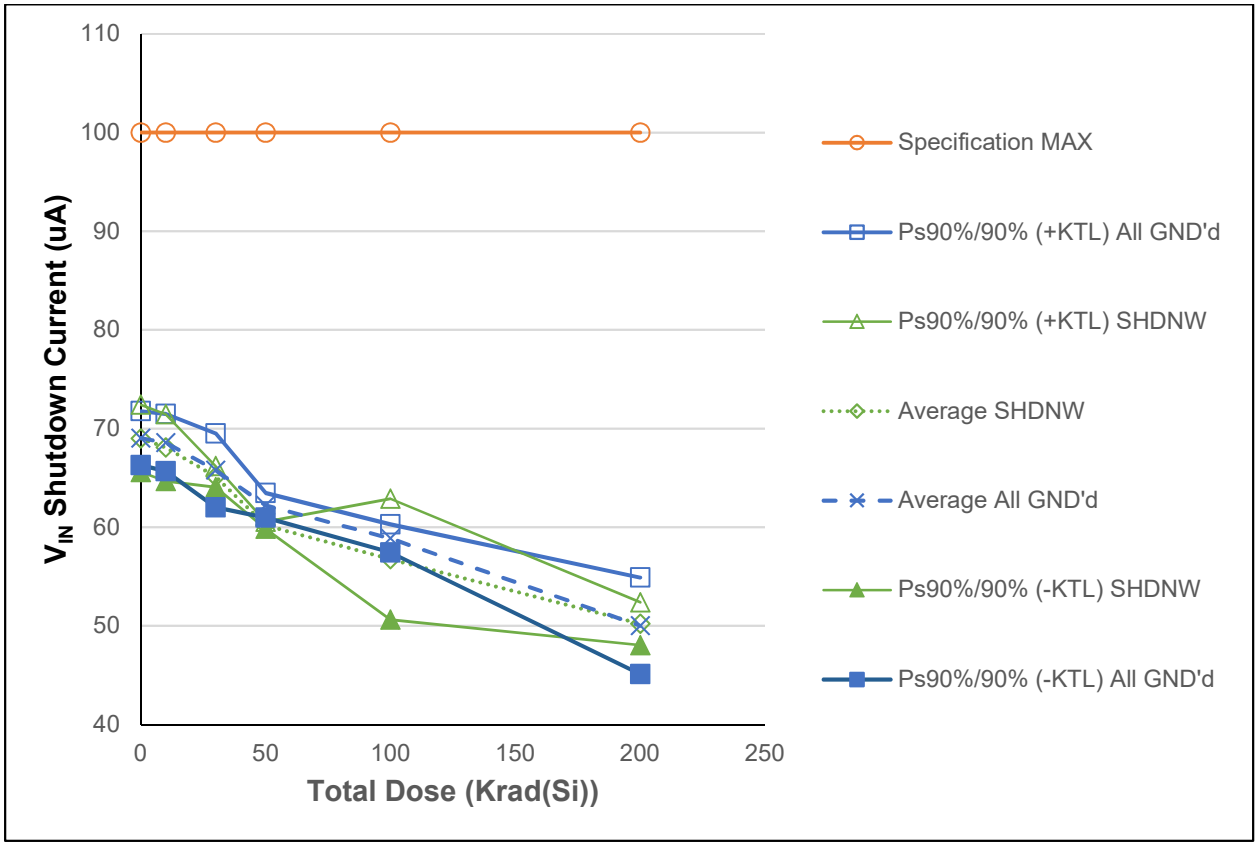

Figure 5.4: Plot of V_{IN} Shutdown Current versus Total Dose

All measured data points are within datasheet specification limits.

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

Parameter	V_{IN} Shutdown Current	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(uA)	0	10	30	50	100	200
82	All GND'd Irradiation	70.038	69.337				
83	All GND'd Irradiation	69.416	68.854				
84	All GND'd Irradiation	67.426	66.759				
85	All GND'd Irradiation	69.457	69.318				
86	All GND'd Irradiation	68.784	68.608				
74	SHDNW Irradiation	70.374	69.569				
75	SHDNW Irradiation	68.612	67.390				
76	SHDNW Irradiation	68.596	67.570				
77	SHDNW Irradiation	70.091	69.141				
78	SHDNW Irradiation	67.319	66.655				
92	All GND'd Irradiation	68.803		66.923			
93	All GND'd Irradiation	67.641		65.730			
94	All GND'd Irradiation	68.297		65.747			
95	All GND'd Irradiation	66.110		63.553			
96	All GND'd Irradiation	69.178		66.878			
87	SHDNW Irradiation	69.733		64.691			
88	SHDNW Irradiation	70.989		65.500			
89	SHDNW Irradiation	69.538		65.105			
90	SHDNW Irradiation	69.927		64.777			
91	SHDNW Irradiation	70.171		65.535			
144	All GND'd Irradiation	67.516			61.906		
145	All GND'd Irradiation	68.171			62.562		
149	All GND'd Irradiation	68.300			62.511		
150	All GND'd Irradiation	68.340			62.556		
152	All GND'd Irradiation	66.688			61.568		
137	SHDNW Irradiation	67.764			60.392		
138	SHDNW Irradiation	67.535			60.080		
139	SHDNW Irradiation	68.266			60.277		
140	SHDNW Irradiation	67.888			60.163		
143	SHDNW Irradiation	67.781			60.088		
174	All GND'd Irradiation	69.284				58.563	
175	All GND'd Irradiation	71.035				59.565	
176	All GND'd Irradiation	71.426				59.212	
177	All GND'd Irradiation	69.800				58.680	
178	All GND'd Irradiation	69.136				58.292	
136	SHDNW Irradiation	68.784				55.858	
170	SHDNW Irradiation	65.440				53.556	
171	SHDNW Irradiation	68.765				57.184	
172	SHDNW Irradiation	72.619				59.603	
173	SHDNW Irradiation	68.941				57.572	
165	All GND'd Irradiation	68.990					50.702
166	All GND'd Irradiation	63.380					46.974
167	All GND'd Irradiation	71.140					51.675
168	All GND'd Irradiation	68.502					50.183
169	All GND'd Irradiation	69.138					50.500
153	SHDNW Irradiation	68.493					48.987
158	SHDNW Irradiation	68.186					50.221
161	SHDNW Irradiation	67.935					50.219
162	SHDNW Irradiation	68.431					50.418
164	SHDNW Irradiation	68.980					51.198
134	Control Unit	71.531	71.910	71.910	71.910	71.910	71.910
135	Control Unit	70.380	70.376	70.376	70.376	70.376	70.376
	All GND'd Irradiation Statistics						
	Average All GND'd	69.024	68.575	65.766	62.221	58.862	50.007
	Std Dev All GND'd	0.998	1.061	1.367	0.458	0.515	1.785
	Ps90%/90% (+KTL) All GND'd	71.760	71.485	69.515	63.476	60.276	54.900
	Ps90%/90% (-KTL) All GND'd	66.289	65.665	62.017	60.965	57.449	45.114
	SHDNW Irradiation Statistics						
	Average SHDNW	68.998	68.065	65.122	60.200	56.755	50.208
	Std Dev SHDNW	1.247	1.236	0.393	0.134	2.236	0.793
	Ps90%/90% (+KTL) SHDNW	72.416	71.454	66.200	60.566	62.885	52.383
	Ps90%/90% (-KTL) SHDNW	65.580	64.676	64.044	59.834	50.624	48.034
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	100	100	100	100	100	100
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

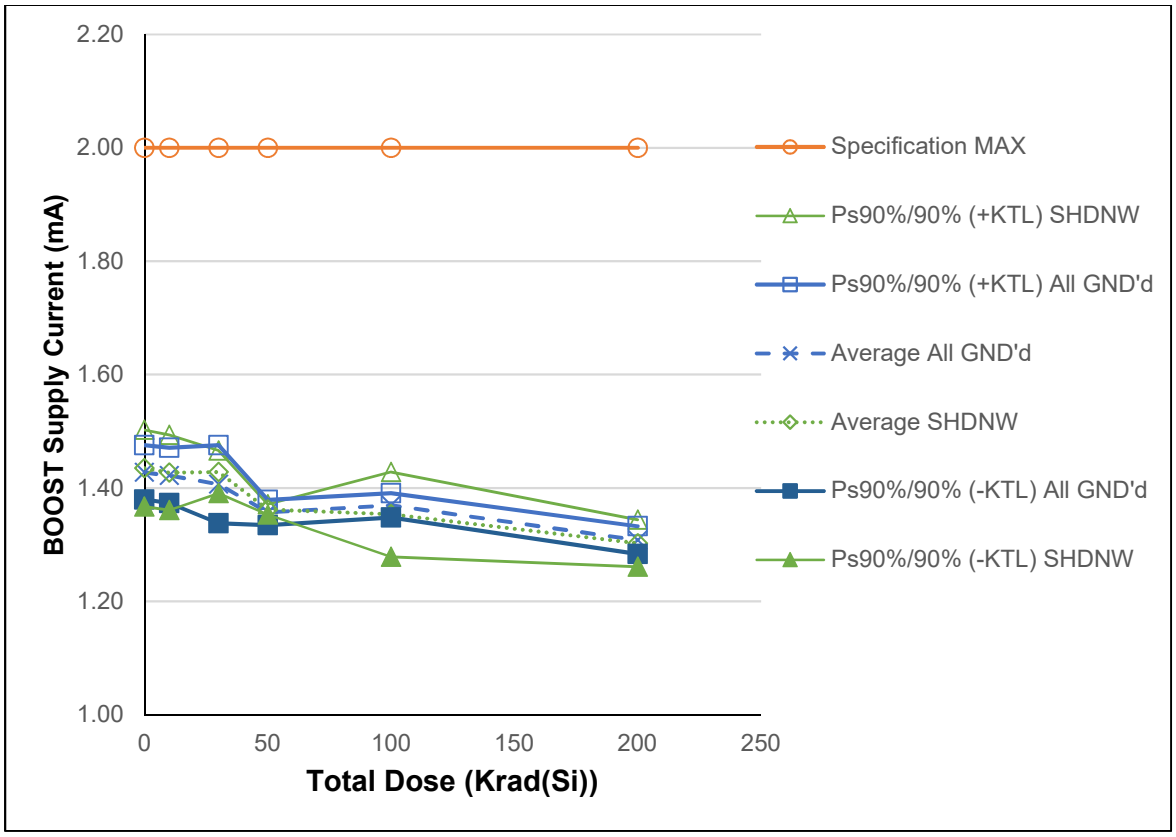

Figure 5.5: Plot of BOOST Supply Current versus Total Dose

Table 5.5: Raw data for BOOST supply current versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	BOOST Supply Current	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(mA)	0	10	30	50	100	200
82	All GND'd Irradiation	1.4449	1.4405				
83	All GND'd Irradiation	1.4194	1.4133				
84	All GND'd Irradiation	1.4063	1.4008				
85	All GND'd Irradiation	1.4461	1.4406				
86	All GND'd Irradiation	1.4202	1.4145				
74	SHDNW Irradiation	1.4450	1.4369				
75	SHDNW Irradiation	1.4151	1.4062				
76	SHDNW Irradiation	1.4605	1.4518				
77	SHDNW Irradiation	1.4502	1.4438				
78	SHDNW Irradiation	1.4026	1.3968				
92	All GND'd Irradiation	1.4385		1.4207			
93	All GND'd Irradiation	1.4150		1.3963			
94	All GND'd Irradiation	1.4561		1.4364			
95	All GND'd Irradiation	1.3889		1.3701			
96	All GND'd Irradiation	1.4274		1.4085			
87	SHDNW Irradiation	1.4294		1.4101			
88	SHDNW Irradiation	1.4617		1.4417			
89	SHDNW Irradiation	1.4404		1.4203			
90	SHDNW Irradiation	1.4468		1.4277			
91	SHDNW Irradiation	1.4601		1.4416			
144	All GND'd Irradiation	1.3863			1.3531		
145	All GND'd Irradiation	1.3973			1.3641		
149	All GND'd Irradiation	1.4001			1.3658		
150	All GND'd Irradiation	1.3882			1.3545		
152	All GND'd Irradiation	1.3782			1.3462		
137	SHDNW Irradiation	1.3891			1.3591		
138	SHDNW Irradiation	1.3969			1.3647		
139	SHDNW Irradiation	1.3948			1.3621		
140	SHDNW Irradiation	1.3898			1.3585		
143	SHDNW Irradiation	1.3976			1.3658		
174	All GND'd Irradiation	1.4211				1.3622	
175	All GND'd Irradiation	1.4430				1.3826	
176	All GND'd Irradiation	1.4304				1.3685	
177	All GND'd Irradiation	1.4305				1.3687	
178	All GND'd Irradiation	1.4232				1.3645	
136	SHDNW Irradiation	1.3654				1.3054	
170	SHDNW Irradiation	1.4206				1.3660	
171	SHDNW Irradiation	1.4180				1.3604	
172	SHDNW Irradiation	1.4291				1.3736	
173	SHDNW Irradiation	1.4159				1.3613	
165	All GND'd Irradiation	1.4061					1.2985
166	All GND'd Irradiation	1.4210					1.3099
167	All GND'd Irradiation	1.4338					1.3221
168	All GND'd Irradiation	1.4185					1.3060
169	All GND'd Irradiation	1.4111					1.3033
153	SHDNW Irradiation	1.3865					1.2786
158	SHDNW Irradiation	1.4178					1.3097
161	SHDNW Irradiation	1.4101					1.3032
162	SHDNW Irradiation	1.4093					1.3012
164	SHDNW Irradiation	1.4234					1.3194
134	Control Unit	1.4140	1.4150	1.4150	1.4150	1.4150	1.4150
135	Control Unit	1.4118	1.4139	1.4139	1.4139	1.4139	1.4139
	All GND'd Irradiation Statistics						
	Average All GND'd	1.4274	1.4219	1.4064	1.3567	1.3693	1.3080
	Std Dev All GND'd	0.0174	0.0178	0.0252	0.0081	0.0079	0.0089
	Ps90%/90% (+KTL) All GND'd	1.4752	1.4708	1.4754	1.3791	1.3910	1.3324
	Ps90%/90% (-KTL) All GND'd	1.3796	1.3731	1.3375	1.3344	1.3476	1.2835
	SHDNW Irradiation Statistics						
	Average SHDNW	1.4347	1.4271	1.4283	1.3621	1.3533	1.3024
	Std Dev SHDNW	0.0246	0.0242	0.0137	0.0033	0.0273	0.0151
	Ps90%/90% (+KTL) SHDNW	1.5022	1.4934	1.4659	1.3710	1.4282	1.3439
	Ps90%/90% (-KTL) SHDNW	1.3672	1.3608	1.3906	1.3531	1.2784	1.2610
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	2	2	2	2	2	2
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

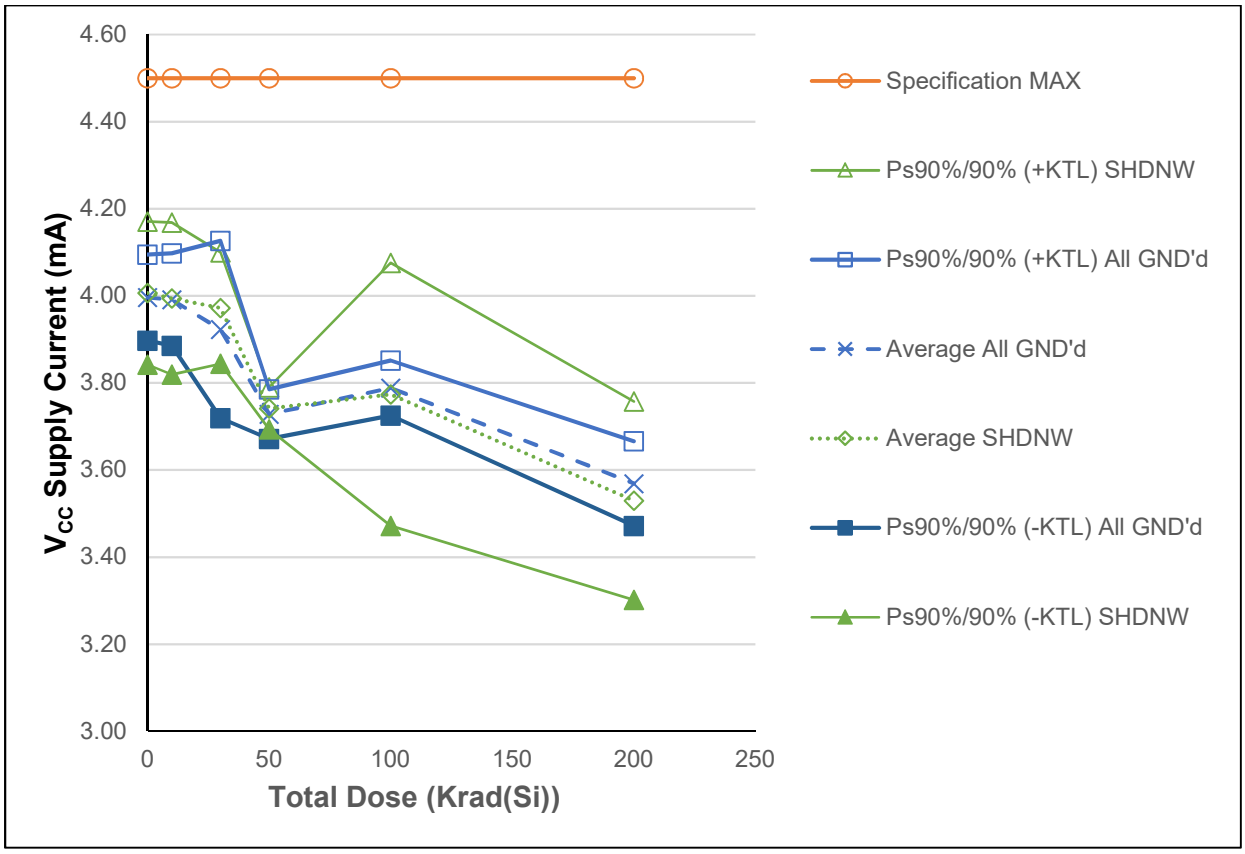

Figure 5.6: Plot of V_{CC} Supply Current versus Total Dose

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

Parameter	V_{CC} Supply Current	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(mA)	0	10	30	50	100	200
82	All GND'd Irradiation	4.0322	4.0241				
83	All GND'd Irradiation	3.9994	3.9934				
84	All GND'd Irradiation	3.9413	3.9311				
85	All GND'd Irradiation	4.0237	4.0261				
86	All GND'd Irradiation	3.9849	3.9836				
74	SHDNW Irradiation	4.0087	3.9949				
75	SHDNW Irradiation	3.9570	3.9342				
76	SHDNW Irradiation	4.0818	4.0743				
77	SHDNW Irradiation	4.0469	4.0386				
78	SHDNW Irradiation	3.9385	3.9293				
92	All GND'd Irradiation	4.0106		3.9723			
93	All GND'd Irradiation	3.9582		3.8954			
94	All GND'd Irradiation	4.0490		3.9913			
95	All GND'd Irradiation	3.8649		3.8067			
96	All GND'd Irradiation	4.0078		3.9491			
87	SHDNW Irradiation	3.9583		3.9111			
88	SHDNW Irradiation	4.0716		4.0163			
89	SHDNW Irradiation	3.9906		3.9338			
90	SHDNW Irradiation	4.0519		3.9943			
91	SHDNW Irradiation	4.0512		4.0047			
144	All GND'd Irradiation	3.8222			3.7189		
145	All GND'd Irradiation	3.8643			3.7545		
149	All GND'd Irradiation	3.8623			3.7473		
150	All GND'd Irradiation	3.8203			3.7118		
152	All GND'd Irradiation	3.8202			3.7101		
137	SHDNW Irradiation	3.8220			3.7287		
138	SHDNW Irradiation	3.8623			3.7657		
139	SHDNW Irradiation	3.8304			3.7227		
140	SHDNW Irradiation	3.8363			3.7388		
143	SHDNW Irradiation	3.8589			3.7531		
174	All GND'd Irradiation	3.9943				3.7850	
175	All GND'd Irradiation	4.0350				3.8276	
176	All GND'd Irradiation	3.9889				3.7794	
177	All GND'd Irradiation	4.0037				3.7827	
178	All GND'd Irradiation	3.9739				3.7672	
136	SHDNW Irradiation	3.8192				3.5869	
170	SHDNW Irradiation	4.0216				3.8335	
171	SHDNW Irradiation	3.9651				3.7777	
172	SHDNW Irradiation	4.0628				3.8697	
173	SHDNW Irradiation	3.9735				3.8027	
165	All GND'd Irradiation	4.0020					3.5658
166	All GND'd Irradiation	3.9895					3.5482
167	All GND'd Irradiation	4.0667					3.6288
168	All GND'd Irradiation	3.9760					3.5377
169	All GND'd Irradiation	3.9962					3.5645
153	SHDNW Irradiation	3.8205					3.3869
158	SHDNW Irradiation	3.9706					3.5585
161	SHDNW Irradiation	3.9663					3.5472
162	SHDNW Irradiation	3.9647					3.5505
164	SHDNW Irradiation	3.9921					3.6050
134	Control Unit	3.9244	3.9485	3.9485	3.9485	3.9485	3.9485
135	Control Unit	3.8978	3.9078	3.9078	3.9078	3.9078	3.9078
	All GND'd Irradiation Statistics						
	Average All GND'd	3.9963	3.9917	3.9230	3.7285	3.7884	3.5690
	Std Dev All GND'd	0.0361	0.0386	0.0742	0.0209	0.0230	0.0354
	Ps90%/90% (+KTL) All GND'd	4.0952	4.0976	4.1266	3.7857	3.8514	3.6661
	Ps90%/90% (-KTL) All GND'd	3.8974	3.8857	3.7194	3.6713	3.7254	3.4719
	SHDNW Irradiation Statistics						
	Average SHDNW	4.0066	3.9942	3.9720	3.7418	3.7741	3.5296
	Std Dev SHDNW	0.0600	0.0637	0.0466	0.0176	0.1102	0.0831
	Ps90%/90% (+KTL) SHDNW	4.1710	4.1688	4.0999	3.7902	4.0762	3.7575
	Ps90%/90% (-KTL) SHDNW	3.8422	3.8197	3.8442	3.6934	3.4720	3.3017
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	4.5	4.5	4.5	4.5	4.5	4.5
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

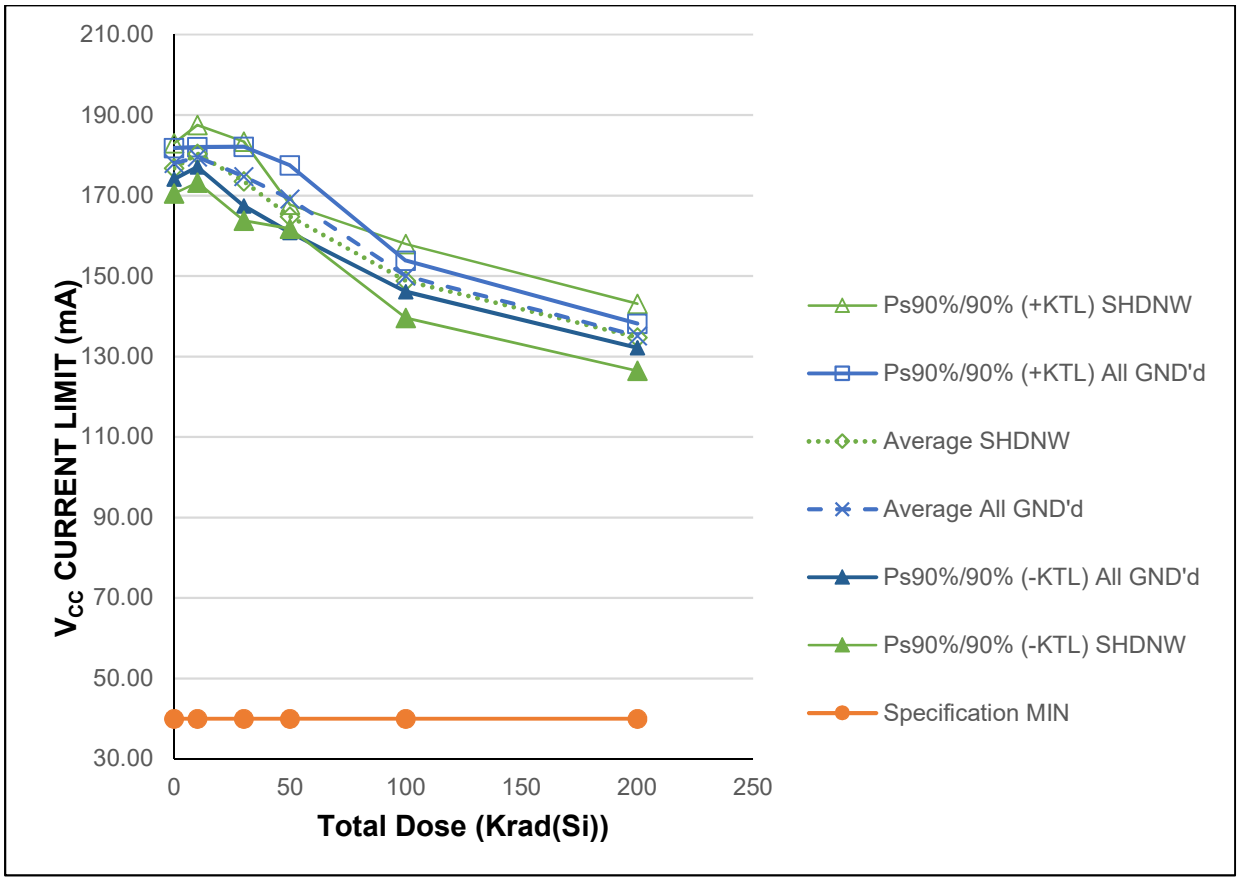

Figure 5.7: Plot of V_{CC} Current Limit versus Total Dose

Table 5.7: Raw data table for V_{CC} current limit versus total dose including the statistical calculations, minimum specification, and the status of the test (PASS/FAIL)

Parameter	V_{CC} Current Limit	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(mA)	0	10	30	50	100	200
82	All GND'd Irradiation	177.9997	179.9996				
83	All GND'd Irradiation	177.9997	179.9996				
84	All GND'd Irradiation	177.9997	179.9996				
85	All GND'd Irradiation	179.9996	179.9996				
86	All GND'd Irradiation	175.9997	177.9997				
74	SHDNW Irradiation	175.9997	181.9996				
75	SHDNW Irradiation	179.9996	183.9997				
76	SHDNW Irradiation	173.9997	177.9997				
77	SHDNW Irradiation	175.9997	177.9997				
78	SHDNW Irradiation	177.9997	179.9996				
92	All GND'd Irradiation	177.9997		175.9997			
93	All GND'd Irradiation	179.9996		175.9997			
94	All GND'd Irradiation	171.9996		169.9997			
95	All GND'd Irradiation	179.9996		175.9997			
96	All GND'd Irradiation	177.9997		175.9997			
87	SHDNW Irradiation	177.9997		173.9997			
88	SHDNW Irradiation	175.9997		173.9996			
89	SHDNW Irradiation	177.9997		173.9997			
90	SHDNW Irradiation	181.9996		177.9997			
91	SHDNW Irradiation	171.9996		167.9997			
144	All GND'd Irradiation	177.9997			169.9997		
145	All GND'd Irradiation	173.9997			167.9997		
149	All GND'd Irradiation	171.9996			165.9997		
150	All GND'd Irradiation	173.9997			167.9997		
152	All GND'd Irradiation	179.9996			173.9996		
137	SHDNW Irradiation	171.9998			163.9996		
138	SHDNW Irradiation	175.9997			165.9997		
139	SHDNW Irradiation	173.9997			163.9997		
140	SHDNW Irradiation	175.9997			165.9997		
143	SHDNW Irradiation	173.9997			163.9997		
174	All GND'd Irradiation	163.9997				149.9997	
175	All GND'd Irradiation	165.9997				151.9996	
176	All GND'd Irradiation	165.9997				149.9997	
177	All GND'd Irradiation	163.9997				147.9997	
178	All GND'd Irradiation	165.9997				149.9997	
136	SHDNW Irradiation	177.9997				153.9997	
170	SHDNW Irradiation	165.9997				147.9997	
171	SHDNW Irradiation	165.9997				145.9997	
172	SHDNW Irradiation	165.9997				149.9997	
173	SHDNW Irradiation	163.9997				145.9997	
165	All GND'd Irradiation	165.9997					133.9998
166	All GND'd Irradiation	165.9997					135.9997
167	All GND'd Irradiation	165.9997					135.9997
168	All GND'd Irradiation	163.9997					133.9997
169	All GND'd Irradiation	163.9997					135.9997
153	SHDNW Irradiation	175.9997					139.9997
158	SHDNW Irradiation	165.9997					133.9998
161	SHDNW Irradiation	167.9997					133.9998
162	SHDNW Irradiation	165.9997					131.9997
164	SHDNW Irradiation	165.9997					133.9998
134	Control Unit	177.9997	177.9997	177.9997	177.9997	177.9997	177.9997
135	Control Unit	177.9997	177.9997	177.9997	177.9997	177.9997	177.9997
	All GND'd Irradiation Statistics						
	Average All GND'd	177.9997	179.5996	174.7997	169.1997	149.9997	135.1997
	Std Dev All GND'd	1.4142	0.8944	2.6833	3.0331	1.4142	1.0954
	Ps90%/90% (+KTL) All GND'd	181.8774	182.0520	182.1573	177.5165	153.8774	138.2034
	Ps90%/90% (-KTL) All GND'd	174.1220	177.1472	167.4421	160.8829	146.1220	132.1961
	SHDNW Irradiation Statistics						
	Average SHDNW	176.7997	180.3997	173.5997	164.7997	148.7997	134.7998
	Std Dev SHDNW	2.2803	2.6077	3.5777	1.0955	3.3466	3.0331
	Ps90%/90% (+KTL) SHDNW	183.0523	187.5499	183.4097	167.8034	157.9762	143.1166
	Ps90%/90% (-KTL) SHDNW	170.5471	173.2494	163.7896	161.7959	139.6232	126.4829
	Specification MIN	40	40	40	40	40	40
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Status (-KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) All GND'd						
	Status (-KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW						

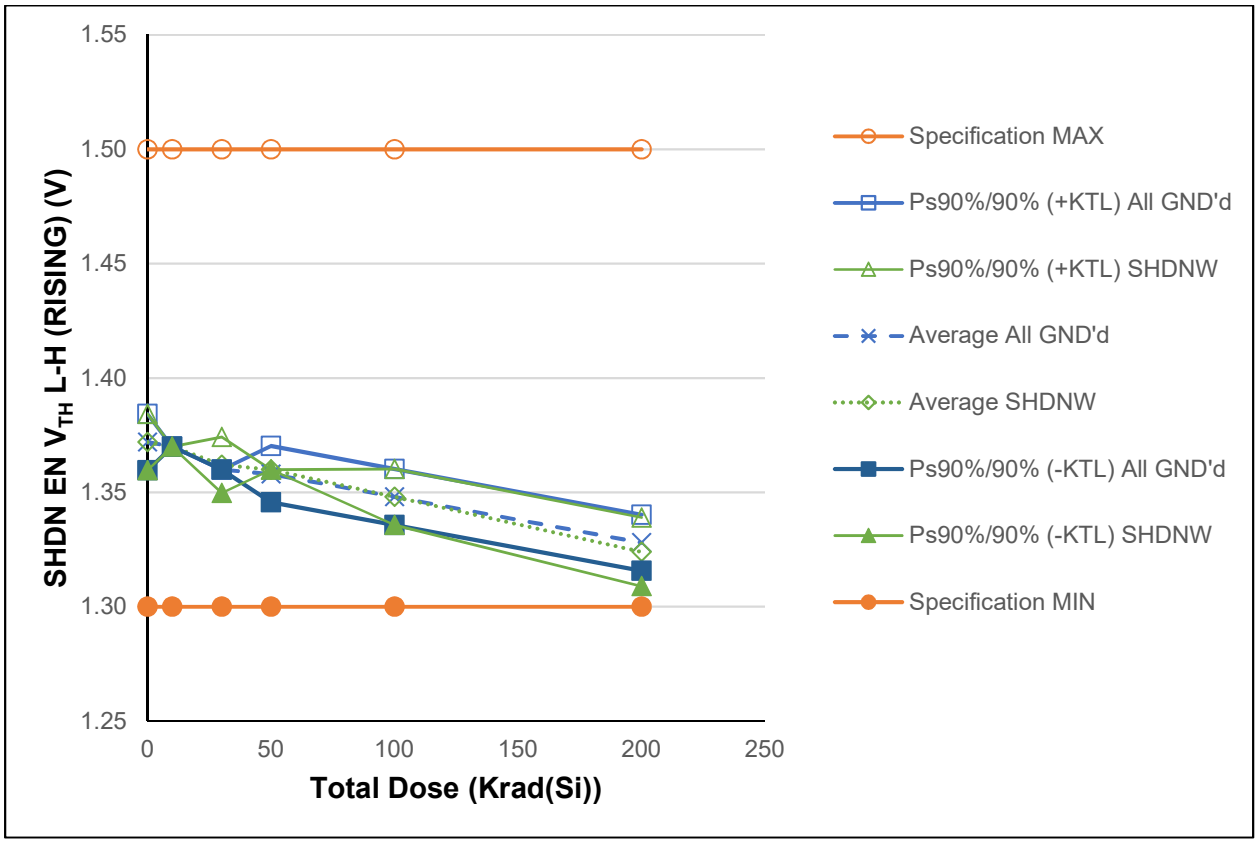

Figure 5.8: Plot of SHDN EN V_{TH} L-H (Rising) versus Total Dose

Table 5.8: Raw data table for SHDN EN V_{TH} L-H (rising) versus total dose including the statistical calculations, minimum-maximum specifications, and the status of the test (PASS/FAIL)

Parameter	SHDN EN V_{TH} L-H (RISING)	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(V)	0	10	30	50	100	200
82	All GND'd Irradiation	1.3700	1.3700				
83	All GND'd Irradiation	1.3700	1.3700				
84	All GND'd Irradiation	1.3700	1.3700				
85	All GND'd Irradiation	1.3700	1.3700				
86	All GND'd Irradiation	1.3800	1.3700				
74	SHDNW Irradiation	1.3700	1.3700				
75	SHDNW Irradiation	1.3700	1.3700				
76	SHDNW Irradiation	1.3700	1.3700				
77	SHDNW Irradiation	1.3800	1.3700				
78	SHDNW Irradiation	1.3700	1.3700				
92	All GND'd Irradiation	1.3700		1.3600			
93	All GND'd Irradiation	1.3700		1.3600			
94	All GND'd Irradiation	1.3700		1.3600			
95	All GND'd Irradiation	1.3700		1.3600			
96	All GND'd Irradiation	1.3700		1.3600			
87	SHDNW Irradiation	1.3700		1.3600			
88	SHDNW Irradiation	1.3700		1.3600			
89	SHDNW Irradiation	1.3700		1.3600			
90	SHDNW Irradiation	1.3700		1.3600			
91	SHDNW Irradiation	1.3700		1.3700			
144	All GND'd Irradiation	1.3700			1.3600		
145	All GND'd Irradiation	1.3700			1.3600		
149	All GND'd Irradiation	1.3700			1.3500		
150	All GND'd Irradiation	1.3700			1.3600		
152	All GND'd Irradiation	1.3700			1.3600		
137	SHDNW Irradiation	1.3700			1.3600		
138	SHDNW Irradiation	1.3700			1.3600		
139	SHDNW Irradiation	1.3700			1.3600		
140	SHDNW Irradiation	1.3700			1.3600		
143	SHDNW Irradiation	1.3700			1.3600		
174	All GND'd Irradiation	1.3700				1.3500	
175	All GND'd Irradiation	1.3800				1.3500	
176	All GND'd Irradiation	1.3700				1.3400	
177	All GND'd Irradiation	1.3700				1.3500	
178	All GND'd Irradiation	1.3700				1.3500	
136	SHDNW Irradiation	1.3700				1.3400	
170	SHDNW Irradiation	1.3800				1.3500	
171	SHDNW Irradiation	1.3700				1.3500	
172	SHDNW Irradiation	1.3700				1.3500	
173	SHDNW Irradiation	1.3700				1.3500	
165	All GND'd Irradiation	1.3700					1.3300
166	All GND'd Irradiation	1.3700					1.3200
167	All GND'd Irradiation	1.3700					1.3300
168	All GND'd Irradiation	1.3700					1.3300
169	All GND'd Irradiation	1.3700					1.3300
153	SHDNW Irradiation	1.3800					1.3200
158	SHDNW Irradiation	1.3700					1.3200
161	SHDNW Irradiation	1.3700					1.3300
162	SHDNW Irradiation	1.3700					1.3200
164	SHDNW Irradiation	1.3700					1.3300
134	Control Unit	1.3700	1.3700	1.3700	1.3700	1.3700	1.3700
135	Control Unit	1.3700	1.3700	1.3700	1.3700	1.3700	1.3700
	All GND'd Irradiation Statistics						
	Average All GND'd	1.3720	1.3700	1.3600	1.3580	1.3480	1.3280
	Std Dev All GND'd	0.0045	0.0000	0.0000	0.0045	0.0045	0.0045
	Ps90%/90% (+KTL) All GND'd	1.3842	1.3700	1.3600	1.3702	1.3602	1.3402
	Ps90%/90% (-KTL) All GND'd	1.3597	1.3700	1.3600	1.3457	1.3357	1.3157
	SHDNW Irradiation Statistics						
	Average SHDNW	1.3720	1.3700	1.3620	1.3600	1.3480	1.3240
	Std Dev SHDNW	0.0045	0.0000	0.0045	0.0000	0.0045	0.0055
	Ps90%/90% (+KTL) SHDNW	1.3842	1.3700	1.3742	1.3600	1.3602	1.3390
	Ps90%/90% (-KTL) SHDNW	1.3597	1.3700	1.3497	1.3600	1.3357	1.3090
	Specification MIN	1.3	1.3	1.3	1.3	1.3	1.3
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX	1.5	1.5	1.5	1.5	1.5	1.5
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	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) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

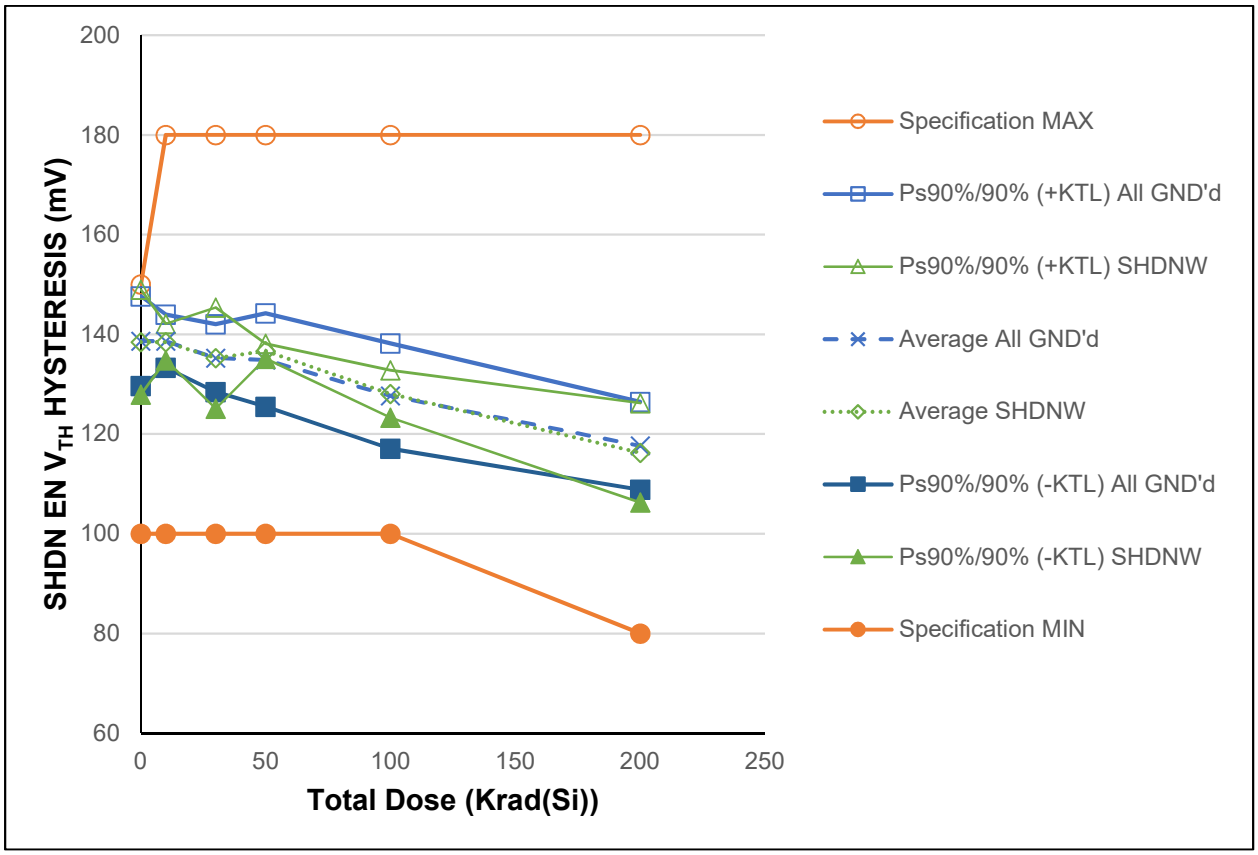

Figure 5.9: Plot of SHDN EN V_{TH} Hysteresis versus Total Dose

Table 5.9: Raw data table for SHDEN EN V_{TH} hysteresis versus total dose including the statistical calculations, minimum-maximum specifications, and the status of the test (PASS/FAIL)

Parameter	SHDN EN V_{TH} HYSTERESIS	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(mV)	0	10	30	50	100	200
82	All GND'd Irradiation	138.042	140.042				
83	All GND'd Irradiation	136.041	138.042				
84	All GND'd Irradiation	139.042	141.043				
85	All GND'd Irradiation	136.041	138.042				
86	All GND'd Irradiation	144.044	136.041				
74	SHDNW Irradiation	135.040	137.041				
75	SHDNW Irradiation	137.041	139.042				
76	SHDNW Irradiation	137.041	139.042				
77	SHDNW Irradiation	145.044	137.041				
78	SHDNW Irradiation	138.042	140.042				
92	All GND'd Irradiation	140.042		136.041			
93	All GND'd Irradiation	140.042		137.041			
94	All GND'd Irradiation	140.042		137.041			
95	All GND'd Irradiation	138.042		135.040			
96	All GND'd Irradiation	135.040		131.039			
87	SHDNW Irradiation	140.042		136.041			
88	SHDNW Irradiation	137.041		132.039			
89	SHDNW Irradiation	136.041		132.039			
90	SHDNW Irradiation	138.042		135.040			
91	SHDNW Irradiation	136.041		141.043			
144	All GND'd Irradiation	136.041			136.041		
145	All GND'd Irradiation	135.040			136.041		
149	All GND'd Irradiation	138.042			129.038		
150	All GND'd Irradiation	135.040			135.040		
152	All GND'd Irradiation	138.042			138.042		
137	SHDNW Irradiation	137.041			137.041		
138	SHDNW Irradiation	137.041			137.041		
139	SHDNW Irradiation	136.041			136.041		
140	SHDNW Irradiation	136.041			136.041		
143	SHDNW Irradiation	136.041			137.041		
174	All GND'd Irradiation	139.042				132.039	
175	All GND'd Irradiation	144.044				126.037	
176	All GND'd Irradiation	139.042				122.035	
177	All GND'd Irradiation	136.041				130.038	
178	All GND'd Irradiation	135.040				128.038	
136	SHDNW Irradiation	137.041				125.036	
170	SHDNW Irradiation	145.044				128.038	
171	SHDNW Irradiation	137.041				129.038	
172	SHDNW Irradiation	136.041				129.038	
173	SHDNW Irradiation	137.041				129.038	
165	All GND'd Irradiation	136.041					119.034
166	All GND'd Irradiation	139.042					112.031
167	All GND'd Irradiation	136.041					120.034
168	All GND'd Irradiation	135.040					118.033
169	All GND'd Irradiation	137.041					119.034
153	SHDNW Irradiation	146.045					115.032
158	SHDNW Irradiation	139.042					114.032
161	SHDNW Irradiation	134.040					120.034
162	SHDNW Irradiation	137.041					112.031
164	SHDNW Irradiation	136.041					120.034
134	Control Unit	138.042	138.042	138.042	138.042	138.042	138.042
135	Control Unit	137.041	137.041	137.041	137.041	137.041	137.041
	All GND'd Irradiation Statistics						
	Average All GND'd	138.642	138.642	135.240	134.840	127.637	117.633
	Std Dev All GND'd	3.288	1.950	2.491	3.422	3.849	3.211
	Ps90%/90% (+KTL) All GND'd	147.656	143.989	142.071	144.223	138.190	126.437
	Ps90%/90% (-KTL) All GND'd	129.627	133.294	128.410	125.457	117.084	108.830
	SHDNW Irradiation Statistics						
	Average SHDNW	138.442	138.442	135.240	136.641	128.037	116.233
	Std Dev SHDNW	3.849	1.342	3.703	0.548	1.733	3.635
	Ps90%/90% (+KTL) SHDNW	148.995	142.122	145.394	138.143	132.789	126.199
	Ps90%/90% (-KTL) SHDNW	127.889	134.761	125.087	135.138	123.286	106.267
	Specification MIN	100	100	100	100	100	80
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX	150	180	180	180	180	180
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	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) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

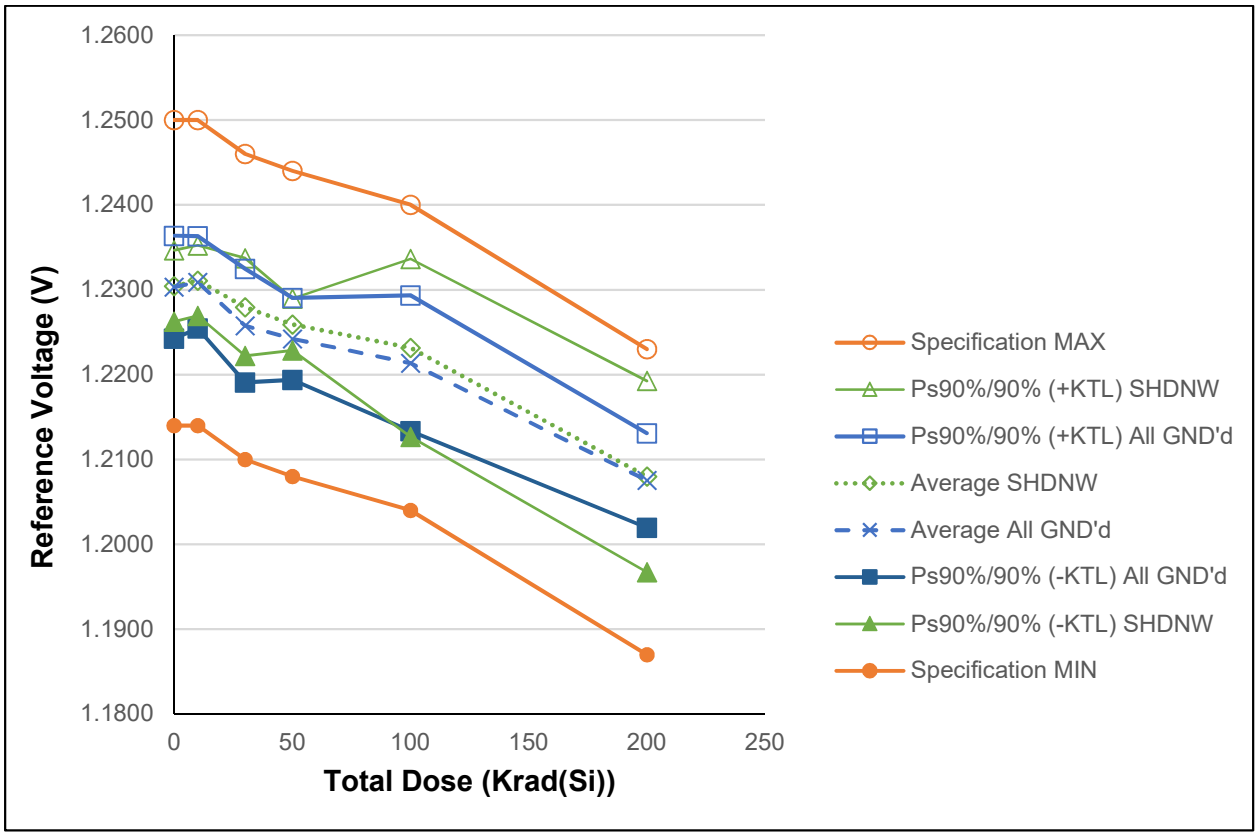

Figure 5.10: Plot of V_{REF} versus Total Dose

Table 5.10: Raw data table for V_{REF} versus total dose including the statistical calculations, minimum-maximum specifications, and the status of the test (PASS/FAIL)

Parameter	Reference Voltage	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(V)	0	10	30	50	100	200
82	All GND'd Irradiation	1.22846	1.22930				
83	All GND'd Irradiation	1.23122	1.23173				
84	All GND'd Irradiation	1.22756	1.22845				
85	All GND'd Irradiation	1.23155	1.23163				
86	All GND'd Irradiation	1.23279	1.23335				
74	SHDNW Irradiation	1.23158	1.23238				
75	SHDNW Irradiation	1.23144	1.23164				
76	SHDNW Irradiation	1.23009	1.23059				
77	SHDNW Irradiation	1.23120	1.23218				
78	SHDNW Irradiation	1.22791	1.22869				
92	All GND'd Irradiation	1.22639		1.22426			
93	All GND'd Irradiation	1.22769		1.22510			
94	All GND'd Irradiation	1.22695		1.22357			
95	All GND'd Irradiation	1.22828		1.22611			
96	All GND'd Irradiation	1.23164		1.22979			
87	SHDNW Irradiation	1.22661		1.22467			
88	SHDNW Irradiation	1.23047		1.22896			
89	SHDNW Irradiation	1.23134		1.22945			
90	SHDNW Irradiation	1.22878		1.22709			
91	SHDNW Irradiation	1.23004		1.22963			
144	All GND'd Irradiation	1.23080			1.22503		
145	All GND'd Irradiation	1.23144			1.22493		
149	All GND'd Irradiation	1.22858			1.22239		
150	All GND'd Irradiation	1.23188			1.22637		
152	All GND'd Irradiation	1.22825			1.22240		
137	SHDNW Irradiation	1.23036			1.22490		
138	SHDNW Irradiation	1.23050			1.22637		
139	SHDNW Irradiation	1.23159			1.22701		
140	SHDNW Irradiation	1.23078			1.22673		
143	SHDNW Irradiation	1.22988			1.22455		
174	All GND'd Irradiation	1.22644				1.21770	
175	All GND'd Irradiation	1.23213				1.22458	
176	All GND'd Irradiation	1.22718				1.21909	
177	All GND'd Irradiation	1.23119				1.22179	
178	All GND'd Irradiation	1.23162				1.22360	
136	SHDNW Irradiation	1.22989				1.21648	
170	SHDNW Irradiation	1.23156				1.22606	
171	SHDNW Irradiation	1.22945				1.22373	
172	SHDNW Irradiation	1.23026				1.22468	
173	SHDNW Irradiation	1.22968				1.22480	
165	All GND'd Irradiation	1.23074					1.20915
166	All GND'd Irradiation	1.22685					1.20406
167	All GND'd Irradiation	1.23133					1.20875
168	All GND'd Irradiation	1.23056					1.20811
169	All GND'd Irradiation	1.22985					1.20759
153	SHDNW Irradiation	1.23051					1.20193
158	SHDNW Irradiation	1.22689					1.20593
161	SHDNW Irradiation	1.23260					1.21134
162	SHDNW Irradiation	1.22963					1.20893
164	SHDNW Irradiation	1.23057					1.21181
134	Control Unit	1.22898	1.23141	1.23141	1.23141	1.23141	1.23141
135	Control Unit	1.22971	1.23123	1.23123	1.23123	1.23123	1.23123
	All GND'd Irradiation Statistics						
	Average All GND'd	1.23032	1.23089	1.22577	1.22422	1.22135	1.20753
	Std Dev All GND'd	0.00221	0.00199	0.00244	0.00176	0.00292	0.00203
	Ps90%/90% (+KTL) All GND'd	1.23637	1.23634	1.23246	1.22906	1.22935	1.21310
	Ps90%/90% (-KTL) All GND'd	1.22426	1.22544	1.21907	1.21939	1.21335	1.20196
	SHDNW Irradiation Statistics						
	Average SHDNW	1.23044	1.23110	1.22796	1.22591	1.22315	1.20799
	Std Dev SHDNW	0.00153	0.00151	0.00210	0.00112	0.00382	0.00411
	Ps90%/90% (+KTL) SHDNW	1.23464	1.23525	1.23371	1.22897	1.23363	1.21926
	Ps90%/90% (-KTL) SHDNW	1.22624	1.22695	1.22221	1.22285	1.21267	1.19671
	Specification MIN	1.214	1.214	1.210	1.208	1.204	1.187
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX	1.250	1.250	1.246	1.244	1.240	1.223
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	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) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

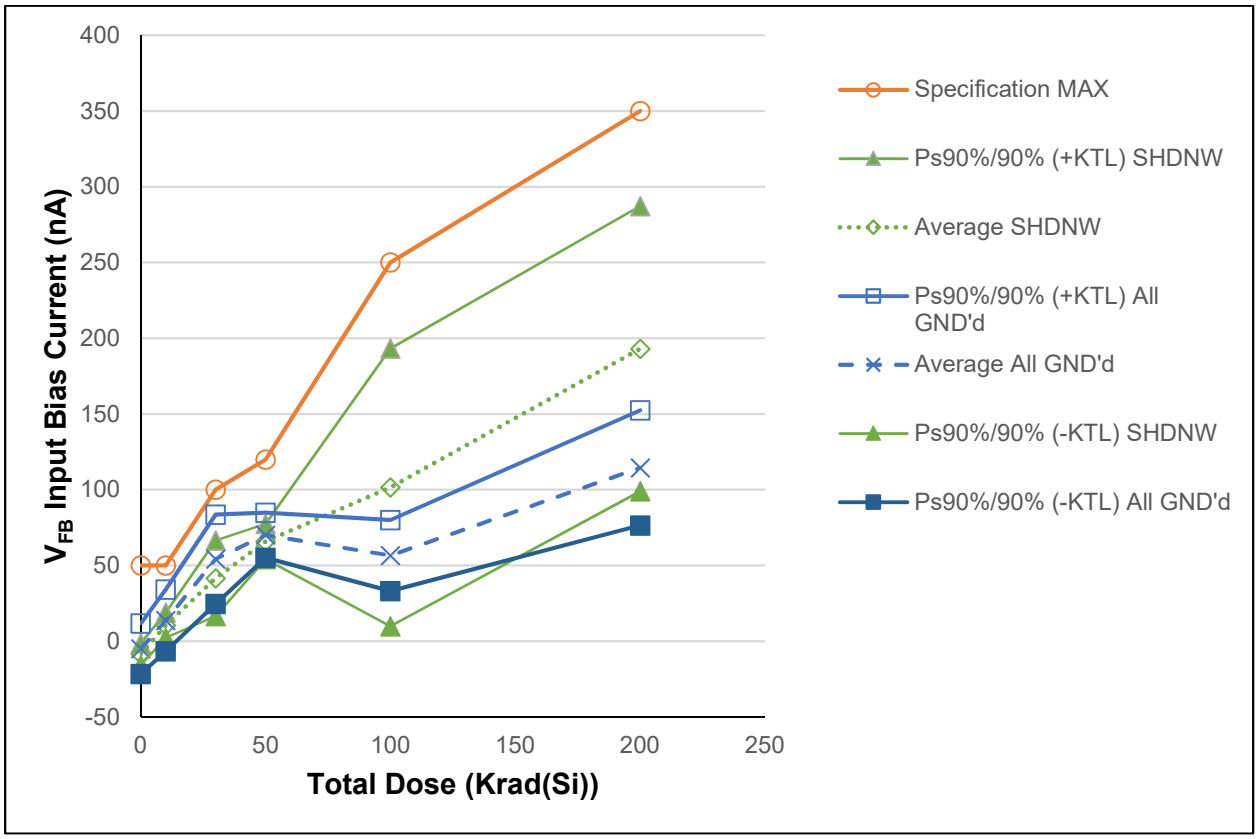

Figure 5.11: Plot of V_{FB} Input Bias Current versus Total Dose

Table 5.11: Raw data table for V_{FB} input bias current versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	V_{FB} Input Bias Current	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(nA)	0	10	30	50	100	200
82	All GND'd Irradiation	3.777	24.328				
83	All GND'd Irradiation	-12.178	6.170				
84	All GND'd Irradiation	-8.297	9.298				
85	All GND'd Irradiation	-2.003	18.539				
86	All GND'd Irradiation	-5.808	10.653				
74	SHDNW Irradiation	-7.505	12.894				
75	SHDNW Irradiation	-9.995	9.604				
76	SHDNW Irradiation	-8.392	8.268				
77	SHDNW Irradiation	-4.864	14.734				
78	SHDNW Irradiation	-11.778	7.648				
92	All GND'd Irradiation	3.872		66.710			
93	All GND'd Irradiation	0.658		58.041			
94	All GND'd Irradiation	-12.827		37.193			
95	All GND'd Irradiation	-3.328		53.434			
96	All GND'd Irradiation	-5.131		55.590			
87	SHDNW Irradiation	-1.736		53.110			
88	SHDNW Irradiation	-15.297		31.548			
89	SHDNW Irradiation	-13.838		33.836			
90	SHDNW Irradiation	-9.995		42.124			
91	SHDNW Irradiation	-0.763		47.617			
144	All GND'd Irradiation	-6.418			76.141		
145	All GND'd Irradiation	-10.643			68.531		
149	All GND'd Irradiation	-21.067			61.960		
150	All GND'd Irradiation	-12.798			73.729		
152	All GND'd Irradiation	-9.632			69.895		
137	SHDNW Irradiation	-18.167			60.997		
138	SHDNW Irradiation	-9.212			70.248		
139	SHDNW Irradiation	-12.541			69.771		
140	SHDNW Irradiation	-11.539			66.366		
143	SHDNW Irradiation	-19.827			62.046		
174	All GND'd Irradiation	-24.834				46.625	
175	All GND'd Irradiation	-17.300				68.655	
176	All GND'd Irradiation	-20.771				57.020	
177	All GND'd Irradiation	-34.723				50.640	
178	All GND'd Irradiation	-21.448				59.853	
136	SHDNW Irradiation	-11.206				160.475	
170	SHDNW Irradiation	-26.417				83.160	
171	SHDNW Irradiation	-17.691				86.250	
172	SHDNW Irradiation	-30.813				96.807	
173	SHDNW Irradiation	-24.796				81.263	
165	All GND'd Irradiation	-24.071					111.475
166	All GND'd Irradiation	-19.426					125.895
167	All GND'd Irradiation	-30.956					91.715
168	All GND'd Irradiation	-20.761					123.129
169	All GND'd Irradiation	-25.625					120.401
153	SHDNW Irradiation	-11.806					249.558
158	SHDNW Irradiation	-22.001					176.916
161	SHDNW Irradiation	-24.652					192.165
162	SHDNW Irradiation	-25.768					188.761
164	SHDNW Irradiation	-22.354					157.871
134	Control Unit	-10.529	-10.157	-10.157	-10.157	-10.157	-10.157
135	Control Unit	0.267	0.849	0.849	0.849	0.849	0.849
	All GND'd Irradiation Statistics						
	Average All GND'd	-4.902	13.798	54.193	70.051	56.559	114.523
	Std Dev All GND'd	6.104	7.445	10.759	5.441	8.531	13.851
	Ps90%/90% (+KTL) All GND'd	11.834	34.211	83.693	84.970	79.950	152.503
	Ps90%/90% (-KTL) All GND'd	-21.638	-6.615	24.694	55.132	33.168	76.543
	SHDNW Irradiation Statistics						
	Average SHDNW	-8.507	10.630	41.647	65.886	101.591	193.054
	Std Dev SHDNW	2.608	3.061	9.087	4.272	33.461	34.315
	Ps90%/90% (+KTL) SHDNW	-1.356	19.024	66.563	77.599	193.340	287.146
	Ps90%/90% (-KTL) SHDNW	-15.657	2.235	16.731	54.172	9.842	98.962
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	50	50	100	120	250	350
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

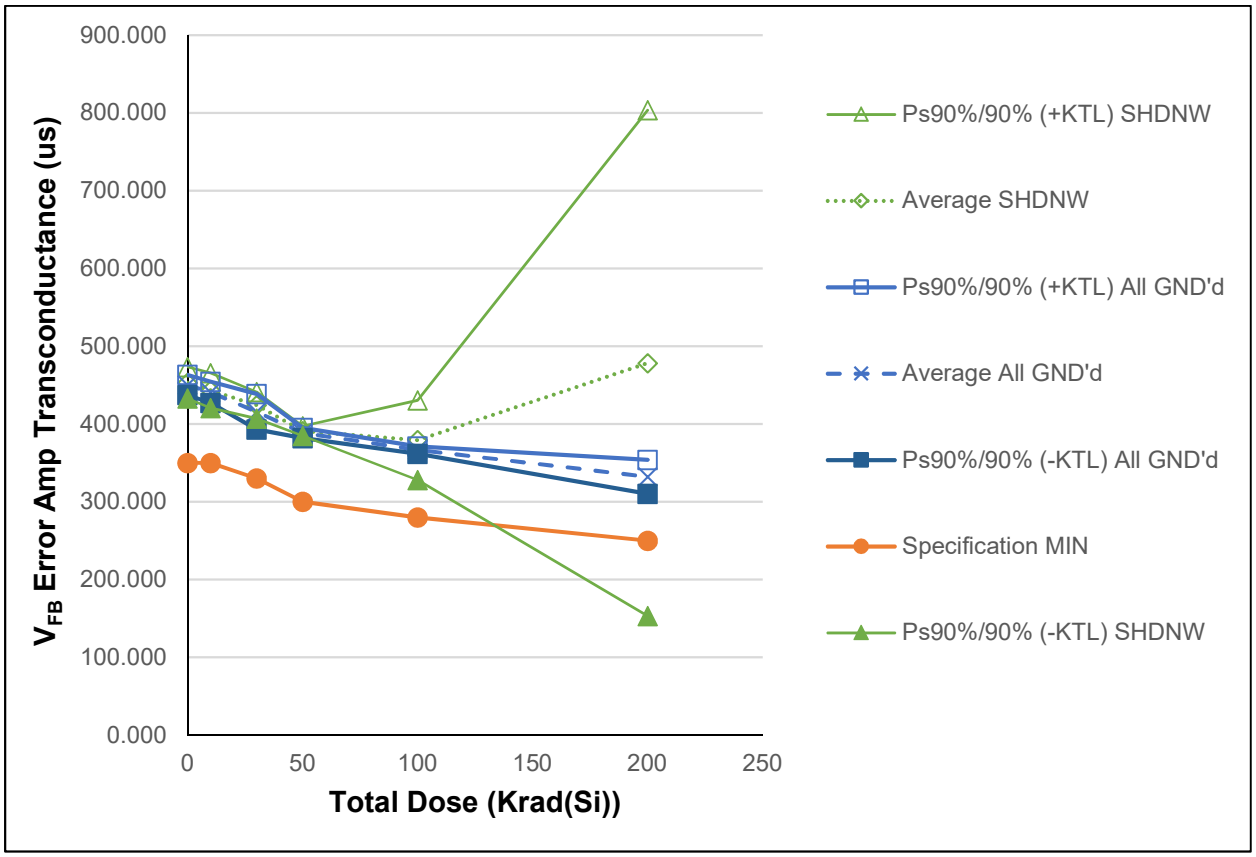

Figure 5.12: Plot of V_{FB} Error Amp Transconductance versus Total Dose

Note: The calculated – KTL point at 200 Krads(Si) is lower than the specification MIN due to the small 5-piece sample size. All five samples of SHDNW bias irradiation pass the parameter.

Table 5.12: Raw data table for V_{FB} error amp transconductance versus total dose including the statistical calculations, minimum specification, and the status of the test (PASS/FAIL)

Parameter	V_{FB} Error Amp Transconductance	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(us)	0	10	30	50	100	200
82	All GND'd Irradiation	456.129	445.335				
83	All GND'd Irradiation	450.761	439.961				
84	All GND'd Irradiation	443.079	432.668				
85	All GND'd Irradiation	451.896	443.841				
86	All GND'd Irradiation	449.852	441.860				
74	SHDNW Irradiation	453.868	444.004				
75	SHDNW Irradiation	446.110	435.132				
76	SHDNW Irradiation	461.911	453.494				
77	SHDNW Irradiation	458.248	448.324				
78	SHDNW Irradiation	445.169	434.797				
92	All GND'd Irradiation	450.127		418.665			
93	All GND'd Irradiation	442.673		410.343			
94	All GND'd Irradiation	458.967		425.652			
95	All GND'd Irradiation	437.322		404.596			
96	All GND'd Irradiation	452.397		419.715			
87	SHDNW Irradiation	448.558		416.748			
88	SHDNW Irradiation	461.904		431.248			
89	SHDNW Irradiation	449.586		419.538			
90	SHDNW Irradiation	455.542		424.578			
91	SHDNW Irradiation	458.337		429.375			
144	All GND'd Irradiation	438.501			387.005		
145	All GND'd Irradiation	444.195			391.951		
149	All GND'd Irradiation	441.730			387.812		
150	All GND'd Irradiation	437.896			385.909		
152	All GND'd Irradiation	440.448			389.698		
137	SHDNW Irradiation	437.308			387.814		
138	SHDNW Irradiation	439.078			391.915		
139	SHDNW Irradiation	439.345			390.390		
140	SHDNW Irradiation	440.595			391.297		
143	SHDNW Irradiation	444.614			394.035		
174	All GND'd Irradiation	455.875				368.205	
175	All GND'd Irradiation	458.000				368.580	
176	All GND'd Irradiation	455.953				366.609	
177	All GND'd Irradiation	456.603				364.875	
178	All GND'd Irradiation	451.843				365.071	
136	SHDNW Irradiation	435.400				412.388	
170	SHDNW Irradiation	455.526				370.913	
171	SHDNW Irradiation	451.015				367.258	
172	SHDNW Irradiation	461.553				375.425	
173	SHDNW Irradiation	452.651				370.645	
165	All GND'd Irradiation	453.026					325.694
166	All GND'd Irradiation	457.217					341.345
167	All GND'd Irradiation	461.856					322.260
168	All GND'd Irradiation	453.015					336.968
169	All GND'd Irradiation	453.361					334.542
153	SHDNW Irradiation	441.535					687.085
158	SHDNW Irradiation	453.294					421.848
161	SHDNW Irradiation	451.098					448.056
162	SHDNW Irradiation	451.022					441.351
164	SHDNW Irradiation	454.969					393.318
134	Control Unit	447.535	448.301	448.301	448.301	448.301	448.301
135	Control Unit	443.362	443.637	443.637	443.637	443.637	443.637
	All GND'd Irradiation Statistics						
	Average All GND'd	450.343	440.733	415.794	388.475	366.668	332.162
	Std Dev All GND'd	4.719	4.944	8.305	2.385	1.716	7.952
	Ps90%/90% (+KTL) All GND'd	463.283	454.288	438.567	395.015	371.374	353.967
	Ps90%/90% (-KTL) All GND'd	437.404	427.178	393.021	381.935	361.962	310.356
	SHDNW Irradiation Statistics						
	Average SHDNW	453.061	443.150	424.297	391.090	379.326	478.331
	Std Dev SHDNW	7.357	8.194	6.202	2.271	18.709	118.617
	Ps90%/90% (+KTL) SHDNW	473.233	465.618	441.302	397.316	430.626	803.579
	Ps90%/90% (-KTL) SHDNW	432.889	420.682	407.293	384.865	328.026	153.084
	Specification MIN	350	350	330	300	280	250
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Status (-KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) All GND'd						
	Status (-KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	FAIL
	Status (+KTL) SHDNW						

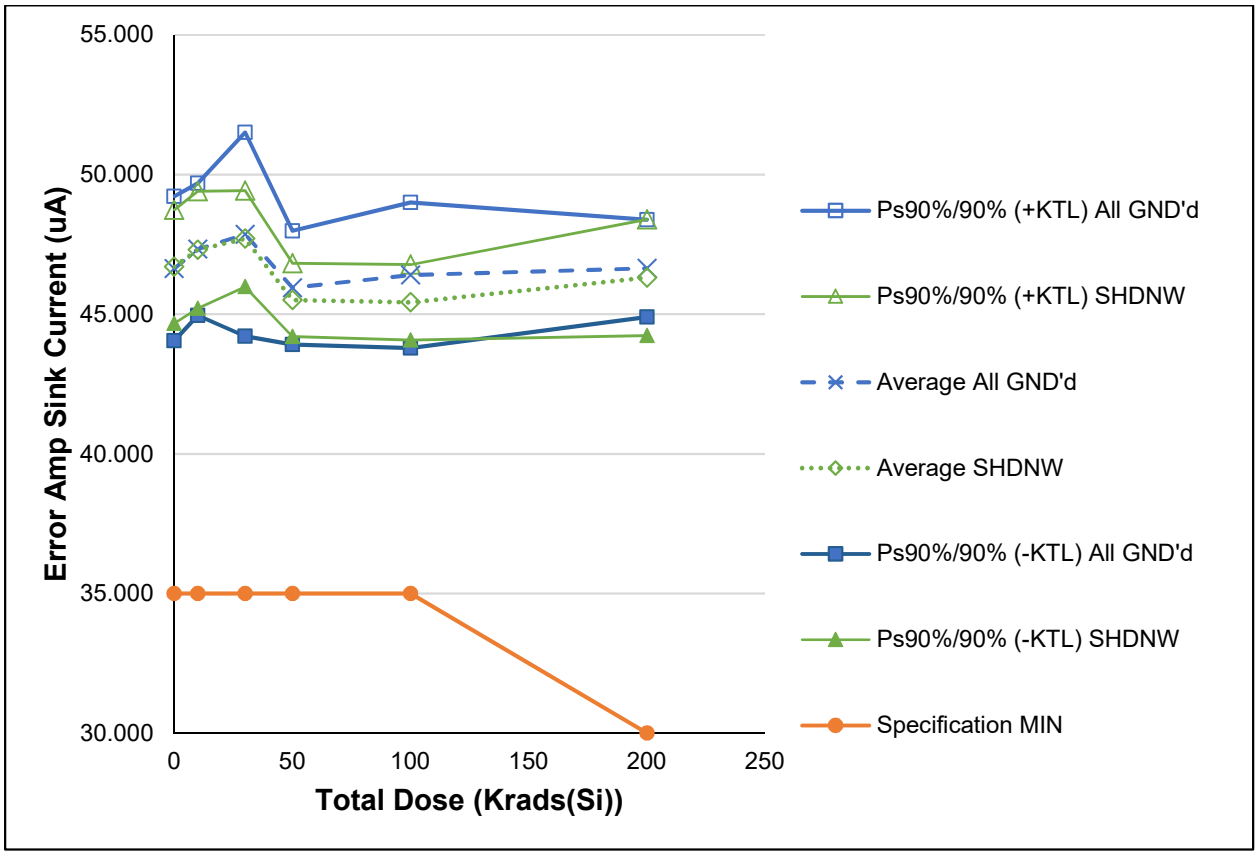

Figure 5.13: Plot of Error Amp Sink Current versus Total Dose

Table 5.13: Raw data table for error amp sink current versus total dose including the statistical calculations, minimum specification, and the status of the test (PASS/FAIL)

Parameter	Error Amp Sink Current	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(uA)	0	10	30	50	100	200
82	All GND'd Irradiation	48.011	48.622				
83	All GND'd Irradiation	46.251	46.922				
84	All GND'd Irradiation	47.042	47.523				
85	All GND'd Irradiation	46.351	47.286				
86	All GND'd Irradiation	45.508	46.277				
74	SHDNW Irradiation	46.333	46.875				
75	SHDNW Irradiation	45.635	46.277				
76	SHDNW Irradiation	47.585	48.296				
77	SHDNW Irradiation	46.985	47.478				
78	SHDNW Irradiation	46.980	47.610				
92	All GND'd Irradiation	48.471		49.058			
93	All GND'd Irradiation	47.013		47.685			
94	All GND'd Irradiation	48.446		49.389			
95	All GND'd Irradiation	46.077		46.489			
96	All GND'd Irradiation	46.204		46.676			
87	SHDNW Irradiation	47.775		48.238			
88	SHDNW Irradiation	47.546		47.963			
89	SHDNW Irradiation	46.084		46.656			
90	SHDNW Irradiation	47.685		48.043			
91	SHDNW Irradiation	47.499		47.619			
144	All GND'd Irradiation	44.959			45.661		
145	All GND'd Irradiation	45.076			45.999		
149	All GND'd Irradiation	45.982			46.576		
150	All GND'd Irradiation	44.361			44.842		
152	All GND'd Irradiation	45.980			46.661		
137	SHDNW Irradiation	45.108			45.613		
138	SHDNW Irradiation	45.122			45.413		
139	SHDNW Irradiation	44.543			44.946		
140	SHDNW Irradiation	45.042			45.322		
143	SHDNW Irradiation	45.642			46.247		
174	All GND'd Irradiation	48.287				47.535	
175	All GND'd Irradiation	46.318				45.718	
176	All GND'd Irradiation	48.039				47.224	
177	All GND'd Irradiation	46.395				46.171	
178	All GND'd Irradiation	45.875				45.332	
136	SHDNW Irradiation	45.025				45.301	
170	SHDNW Irradiation	46.190				44.895	
171	SHDNW Irradiation	46.768				45.452	
172	SHDNW Irradiation	47.456				46.227	
173	SHDNW Irradiation	46.704				45.251	
165	All GND'd Irradiation	46.458					46.057
166	All GND'd Irradiation	48.323					47.514
167	All GND'd Irradiation	46.999					47.086
168	All GND'd Irradiation	46.411					46.130
169	All GND'd Irradiation	46.765					46.429
153	SHDNW Irradiation	45.075					45.509
158	SHDNW Irradiation	47.944					47.409
161	SHDNW Irradiation	45.337					45.685
162	SHDNW Irradiation	46.651					46.547
164	SHDNW Irradiation	46.687					46.423
134	Control Unit	46.617	47.052	47.052	47.052	47.052	47.052
135	Control Unit	45.930	46.750	46.750	46.750	46.750	46.750
	All GND'd Irradiation Statistics						
	Average All GND'd	46.633	47.326	47.860	45.948	46.396	46.643
	Std Dev All GND'd	0.943	0.863	1.331	0.744	0.952	0.634
	Ps90%/90% (+KTL) All GND'd	49.218	49.694	51.508	47.987	49.006	48.381
	Ps90%/90% (-KTL) All GND'd	44.047	44.959	44.211	43.909	43.786	44.905
	SHDNW Irradiation Statistics						
	Average SHDNW	46.704	47.307	47.704	45.508	45.425	46.315
	Std Dev SHDNW	0.744	0.766	0.627	0.479	0.493	0.760
	Ps90%/90% (+KTL) SHDNW	48.742	49.407	49.424	46.821	46.777	48.398
	Ps90%/90% (-KTL) SHDNW	44.665	45.208	45.984	44.195	44.074	44.231
	Specification MIN	35	35	35	35	35	30
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Status (-KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) All GND'd						
	Status (-KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW						

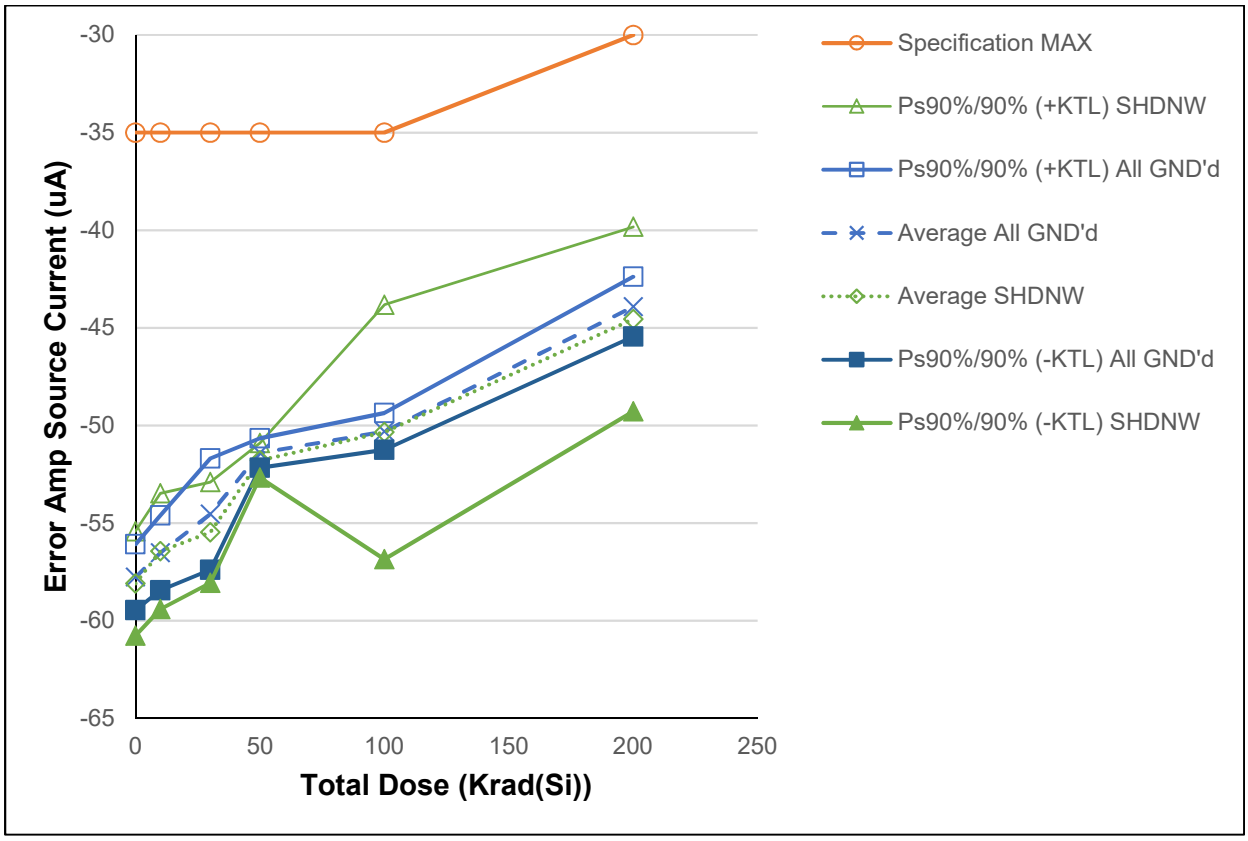

Figure 5.14: Plot of Error Amp Source Current versus Total Dose

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

Table 5.14: Raw data table for error amp source current versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Error Amp Source Current	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(uA)	0	10	30	50	100	200
82	All GND'd Irradiation	-58.524	-57.180				
83	All GND'd Irradiation	-57.855	-56.532				
84	All GND'd Irradiation	-56.817	-55.374				
85	All GND'd Irradiation	-57.927	-56.965				
86	All GND'd Irradiation	-57.755	-56.597				
74	SHDNW Irradiation	-58.183	-56.410				
75	SHDNW Irradiation	-57.394	-55.277				
76	SHDNW Irradiation	-59.007	-57.344				
77	SHDNW Irradiation	-59.070	-57.725				
78	SHDNW Irradiation	-56.858	-55.515				
92	All GND'd Irradiation	-57.800		-55.305			
93	All GND'd Irradiation	-56.868		-54.028			
94	All GND'd Irradiation	-58.221		-55.314			
95	All GND'd Irradiation	-55.769		-52.942			
96	All GND'd Irradiation	-58.105		-55.122			
87	SHDNW Irradiation	-57.036		-54.138			
88	SHDNW Irradiation	-59.220		-56.377			
89	SHDNW Irradiation	-57.983		-55.098			
90	SHDNW Irradiation	-58.360		-55.437			
91	SHDNW Irradiation	-58.834		-56.368			
144	All GND'd Irradiation	-55.498			-51.245		
145	All GND'd Irradiation	-56.381			-51.827		
149	All GND'd Irradiation	-56.012			-51.590		
150	All GND'd Irradiation	-55.660			-51.237		
152	All GND'd Irradiation	-55.378			-51.208		
137	SHDNW Irradiation	-55.612			-51.351		
138	SHDNW Irradiation	-55.850			-51.836		
139	SHDNW Irradiation	-55.744			-51.674		
140	SHDNW Irradiation	-55.750			-51.865		
143	SHDNW Irradiation	-56.255			-52.244		
174	All GND'd Irradiation	-57.888				-50.082	
175	All GND'd Irradiation	-58.669				-50.912	
176	All GND'd Irradiation	-58.083				-50.262	
177	All GND'd Irradiation	-58.402				-50.216	
178	All GND'd Irradiation	-57.924				-50.093	
136	SHDNW Irradiation	-55.340				-46.219	
170	SHDNW Irradiation	-58.251				-51.331	
171	SHDNW Irradiation	-57.610				-50.691	
172	SHDNW Irradiation	-58.961				-52.263	
173	SHDNW Irradiation	-57.812				-51.235	
165	All GND'd Irradiation	-58.183					-43.894
166	All GND'd Irradiation	-57.960					-43.432
167	All GND'd Irradiation	-59.058					-44.852
168	All GND'd Irradiation	-57.922					-43.546
169	All GND'd Irradiation	-58.003					-43.887
153	SHDNW Irradiation	-55.766					-41.579
158	SHDNW Irradiation	-57.633					-44.833
161	SHDNW Irradiation	-57.671					-45.140
162	SHDNW Irradiation	-57.631					-45.186
164	SHDNW Irradiation	-58.246					-46.044
134	Control Unit	-56.845	-56.457	-56.457	-56.457	-56.457	-56.457
135	Control Unit	-56.436	-55.809	-55.809	-55.809	-55.809	-55.809
	All GND'd Irradiation Statistics						
	Average All GND'd	-57.775	-56.530	-54.542	-51.421	-50.313	-43.922
	Std Dev All GND'd	0.614	0.699	1.041	0.276	0.344	0.559
	Ps90%/90% (+KTL) All GND'd	-56.091	-54.614	-51.687	-50.666	-49.371	-42.390
	Ps90%/90% (-KTL) All GND'd	-59.460	-58.446	-57.398	-52.177	-51.255	-45.454
	SHDNW Irradiation Statistics						
	Average SHDNW	-58.102	-56.454	-55.483	-51.794	-50.348	-44.556
	Std Dev SHDNW	0.976	1.082	0.941	0.324	2.376	1.724
	Ps90%/90% (+KTL) SHDNW	-55.425	-53.489	-52.904	-50.905	-43.832	-39.828
	Ps90%/90% (-KTL) SHDNW	-60.779	-59.420	-58.063	-52.683	-56.864	-49.284
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	-35	-35	-35	-35	-35	-30
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

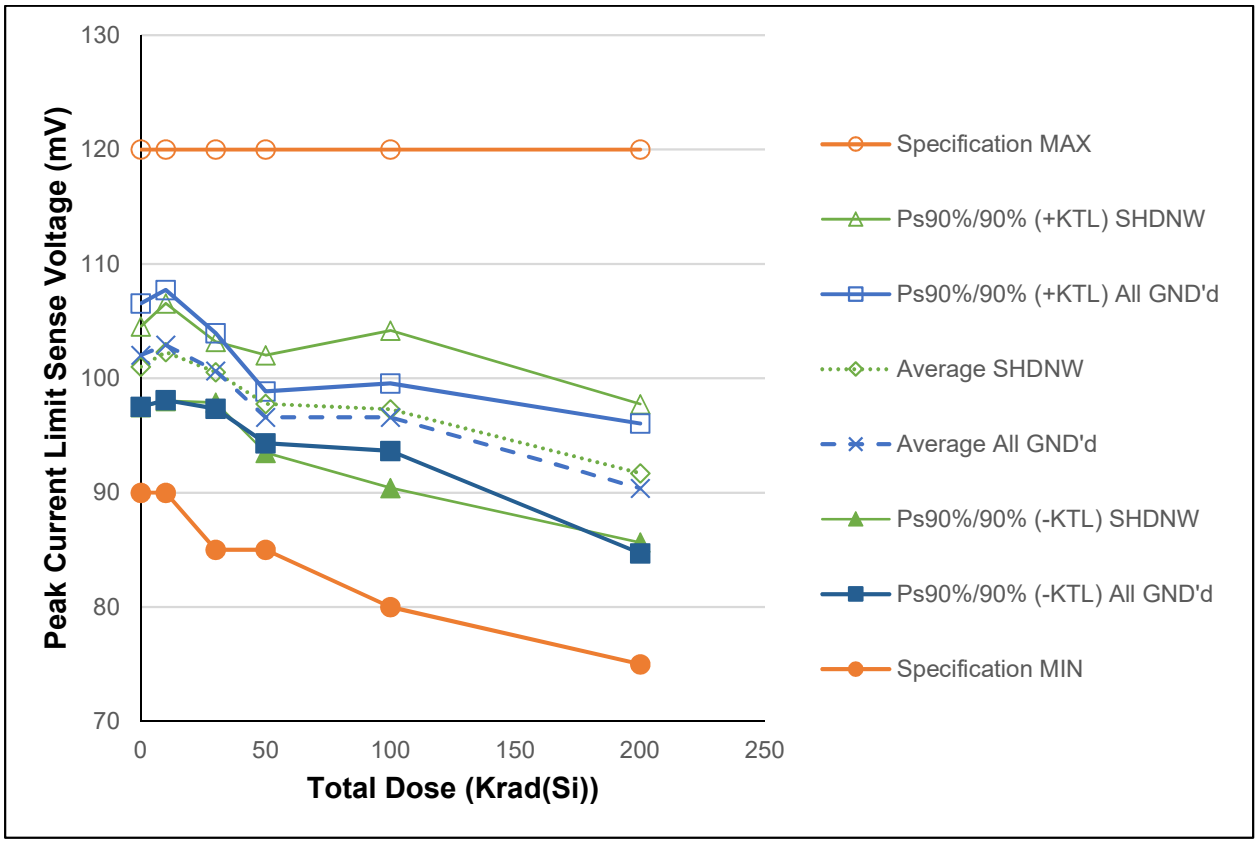

Figure 5.15: Plot of Peak Current Limit Sense Voltage versus Total Dose

Table 5.15: Raw data table for peak current limit sense voltage versus total dose including the statistical calculations, minimum-maximum specifications, and the status of the test (PASS/FAIL)

Parameter	Peak Current Limit Sense Voltage	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(mV)	0	10	30	50	100	200
82	All GND'd Irradiation	102.851	104.427				
83	All GND'd Irradiation	103.825	104.475				
84	All GND'd Irradiation	99.855	100.618				
85	All GND'd Irradiation	102.858	103.549				
86	All GND'd Irradiation	100.788	101.515				
74	SHDNW Irradiation	100.867	101.458				
75	SHDNW Irradiation	99.826	101.567				
76	SHDNW Irradiation	102.782	104.341				
77	SHDNW Irradiation	101.764	103.479				
78	SHDNW Irradiation	99.805	100.608				
92	All GND'd Irradiation	100.807		99.622			
93	All GND'd Irradiation	100.883		99.660			
94	All GND'd Irradiation	101.799		100.634			
95	All GND'd Irradiation	101.926		100.730			
96	All GND'd Irradiation	103.758		102.585			
87	SHDNW Irradiation	101.850		101.541			
88	SHDNW Irradiation	100.730		99.539			
89	SHDNW Irradiation	100.828		99.586			
90	SHDNW Irradiation	101.773		100.575			
91	SHDNW Irradiation	101.780		101.448			
144	All GND'd Irradiation	100.867			96.865		
145	All GND'd Irradiation	101.935			97.755		
149	All GND'd Irradiation	100.924			96.796		
150	All GND'd Irradiation	99.881			95.822		
152	All GND'd Irradiation	99.843			95.767		
137	SHDNW Irradiation	99.855			97.722		
138	SHDNW Irradiation	99.826			96.758		
139	SHDNW Irradiation	101.875			98.743		
140	SHDNW Irradiation	98.915			95.812		
143	SHDNW Irradiation	101.897			99.747		
174	All GND'd Irradiation	104.777				96.796	
175	All GND'd Irradiation	103.748				97.732	
176	All GND'd Irradiation	103.775				96.856	
177	All GND'd Irradiation	102.842				94.812	
178	All GND'd Irradiation	103.808				96.815	
136	SHDNW Irradiation	98.955				92.883	
170	SHDNW Irradiation	102.842				97.619	
171	SHDNW Irradiation	102.887				98.705	
172	SHDNW Irradiation	103.784				98.629	
173	SHDNW Irradiation	102.868				98.669	
165	All GND'd Irradiation	105.874					92.979
166	All GND'd Irradiation	103.748					90.016
167	All GND'd Irradiation	101.764					88.870
168	All GND'd Irradiation	104.844					91.967
169	All GND'd Irradiation	101.819					88.049
153	SHDNW Irradiation	99.843					88.030
158	SHDNW Irradiation	102.868					92.905
161	SHDNW Irradiation	102.868					91.862
162	SHDNW Irradiation	102.909					91.874
164	SHDNW Irradiation	104.817					93.826
134	Control Unit	101.811	102.601	102.601	102.601	102.601	102.601
135	Control Unit	99.797	101.591	101.591	101.591	101.591	101.591
	All GND'd Irradiation Statistics						
	Average All GND'd	102.035	102.917	100.646	96.601	96.602	90.376
	Std Dev All GND'd	1.647	1.758	1.203	0.828	1.076	2.068
	Ps90%/90% (+KTL) All GND'd	106.553	107.736	103.944	98.872	99.551	96.048
	Ps90%/90% (-KTL) All GND'd	97.518	98.097	97.349	94.330	93.653	84.704
	SHDNW Irradiation Statistics						
	Average SHDNW	101.009	102.291	100.538	97.756	97.301	91.699
	Std Dev SHDNW	1.283	1.554	0.967	1.558	2.511	2.208
	Ps90%/90% (+KTL) SHDNW	104.526	106.553	103.190	102.029	104.187	97.753
	Ps90%/90% (-KTL) SHDNW	97.491	98.028	97.886	93.483	90.415	85.646
	Specification MIN	90	90	85	85	80	75
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX	120	120	120	120	120	120
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	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) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

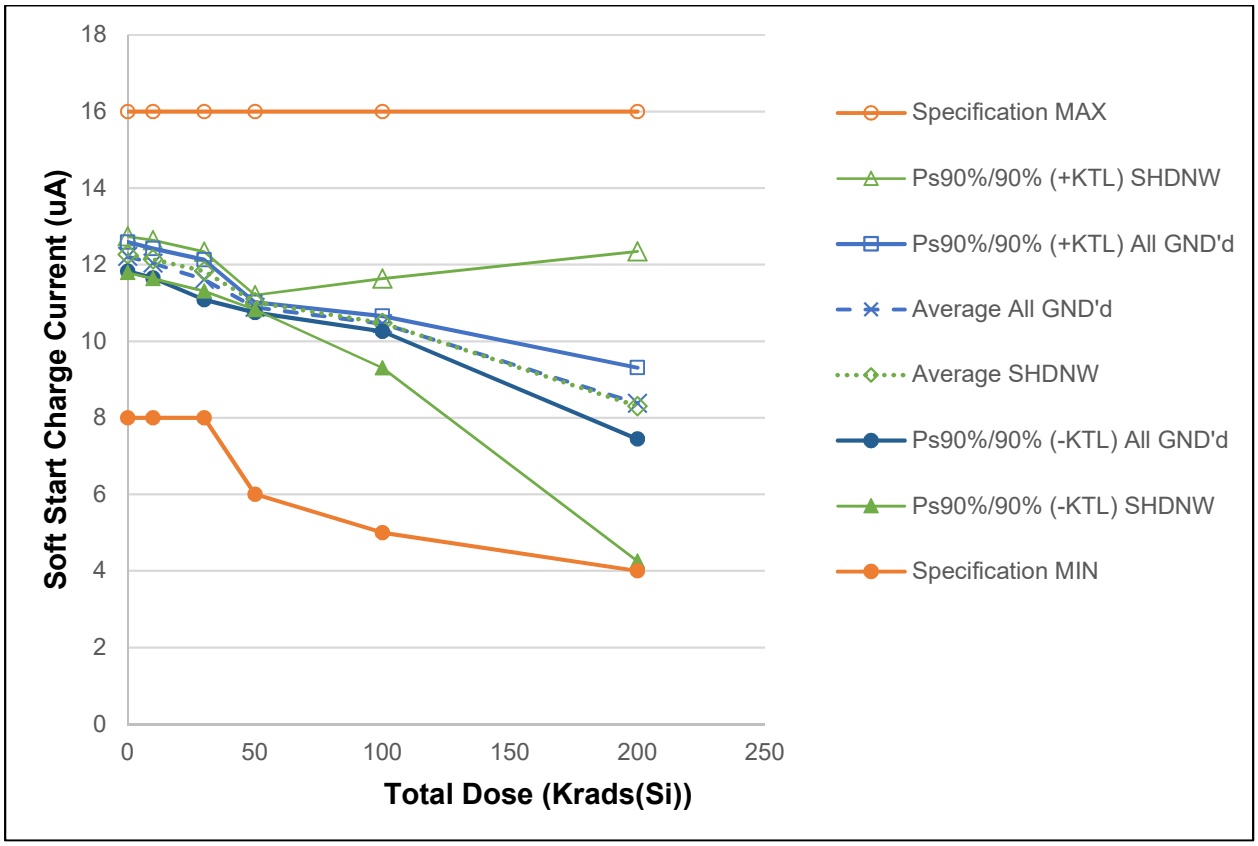

Figure 5.16: Plot of Soft Start Charge Current versus Total Dose

Table 5.16: Raw data table for soft start charge current versus total dose including the statistical calculations, minimum-maximum specifications, and the status of the test (PASS/FAIL)

Parameter	Soft Start Charge Current	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(uA)	0	10	30	50	100	200
82	All GND'd Irradiation	12.355	12.174				
83	All GND'd Irradiation	12.242	12.063				
84	All GND'd Irradiation	12.012	11.838				
85	All GND'd Irradiation	12.308	12.153				
86	All GND'd Irradiation	12.133	11.961				
74	SHDNW Irradiation	12.321	12.208				
75	SHDNW Irradiation	12.136	11.978				
76	SHDNW Irradiation	12.375	12.269				
77	SHDNW Irradiation	12.452	12.318				
78	SHDNW Irradiation	12.036	11.909				
92	All GND'd Irradiation	12.154		11.677			
93	All GND'd Irradiation	12.037		11.512			
94	All GND'd Irradiation	12.339		11.818			
95	All GND'd Irradiation	11.875		11.330			
96	All GND'd Irradiation	12.217		11.701			
87	SHDNW Irradiation	12.048		11.601			
88	SHDNW Irradiation	12.462		12.032			
89	SHDNW Irradiation	12.124		11.668			
90	SHDNW Irradiation	12.271		11.848			
91	SHDNW Irradiation	12.382		11.975			
144	All GND'd Irradiation	11.781			10.837		
145	All GND'd Irradiation	11.849			10.917		
149	All GND'd Irradiation	11.857			10.937		
150	All GND'd Irradiation	11.841			10.897		
152	All GND'd Irradiation	11.753			10.829		
137	SHDNW Irradiation	11.770			10.943		
138	SHDNW Irradiation	11.839			11.040		
139	SHDNW Irradiation	11.787			10.965		
140	SHDNW Irradiation	11.808			11.006		
143	SHDNW Irradiation	11.921			11.117		
174	All GND'd Irradiation	12.118				10.428	
175	All GND'd Irradiation	12.305				10.575	
176	All GND'd Irradiation	12.209				10.474	
177	All GND'd Irradiation	12.146				10.388	
178	All GND'd Irradiation	12.096				10.423	
136	SHDNW Irradiation	11.791				9.723	
170	SHDNW Irradiation	12.210				10.641	
171	SHDNW Irradiation	12.185				10.613	
172	SHDNW Irradiation	12.330				10.783	
173	SHDNW Irradiation	12.087				10.598	
165	All GND'd Irradiation	12.119					8.285
166	All GND'd Irradiation	12.212					8.022
167	All GND'd Irradiation	12.563					8.944
168	All GND'd Irradiation	12.125					8.313
169	All GND'd Irradiation	12.175					8.321
153	SHDNW Irradiation	11.852					5.689
158	SHDNW Irradiation	12.143					8.962
161	SHDNW Irradiation	12.099					8.784
162	SHDNW Irradiation	12.054					8.785
164	SHDNW Irradiation	12.154					9.293
134	Control Unit	12.016	11.962	11.962	11.962	11.962	11.962
135	Control Unit	12.063	11.994	11.994	11.994	11.994	11.994
	All GND'd Irradiation Statistics						
	Average All GND'd	12.210	12.038	11.607	10.883	10.458	8.377
	Std Dev All GND'd	0.139	0.140	0.190	0.048	0.072	0.340
	Ps90%/90% (+KTL) All GND'd	12.589	12.421	12.128	11.015	10.657	9.309
	Ps90%/90% (-KTL) All GND'd	11.830	11.654	11.087	10.751	10.259	7.444
	SHDNW Irradiation Statistics						
	Average SHDNW	12.264	12.137	11.825	11.014	10.471	8.303
	Std Dev SHDNW	0.173	0.182	0.188	0.068	0.425	1.476
	Ps90%/90% (+KTL) SHDNW	12.737	12.636	12.340	11.202	11.636	12.349
	Ps90%/90% (-KTL) SHDNW	11.791	11.638	11.310	10.827	9.307	4.256
	Specification MIN	8	8	8	6	5	4
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX	16	16	16	16	16	16
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	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) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

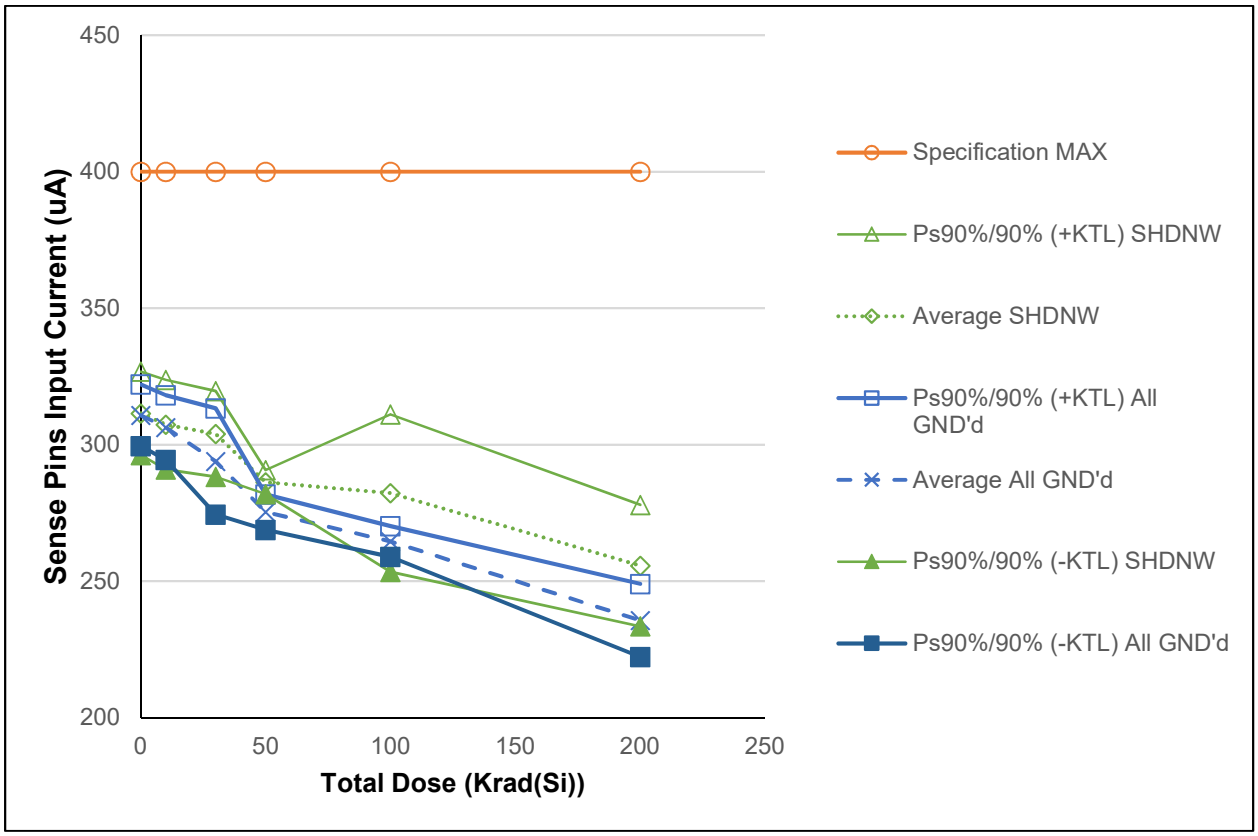

Figure 5.17: Plot of Sense Pins Input Current versus Total Dose

Table 5.17: Raw data table for sense pins input current versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Sense Pins Input Current	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(uA)	0	10	30	50	100	200
82	All GND'd Irradiation	312.954	308.574				
83	All GND'd Irradiation	311.001	306.326				
84	All GND'd Irradiation	303.971	299.359				
85	All GND'd Irradiation	314.875	310.852				
86	All GND'd Irradiation	311.020	306.449				
74	SHDNW Irradiation	309.741	305.630				
75	SHDNW Irradiation	308.654	303.161				
76	SHDNW Irradiation	320.302	316.838				
77	SHDNW Irradiation	313.013	309.177				
78	SHDNW Irradiation	305.766	301.903				
92	All GND'd Irradiation	311.305		296.719			
93	All GND'd Irradiation	305.276		289.384			
94	All GND'd Irradiation	318.931		303.428			
95	All GND'd Irradiation	301.572		284.914			
96	All GND'd Irradiation	311.598		294.956			
87	SHDNW Irradiation	306.744		297.453			
88	SHDNW Irradiation	319.419		309.844			
89	SHDNW Irradiation	308.806		298.201			
90	SHDNW Irradiation	315.153		306.397			
91	SHDNW Irradiation	316.667		307.915			
144	All GND'd Irradiation	300.705			273.030		
145	All GND'd Irradiation	304.714			276.639		
149	All GND'd Irradiation	306.999			278.510		
150	All GND'd Irradiation	301.403			273.037		
152	All GND'd Irradiation	302.648			275.360		
137	SHDNW Irradiation	301.984			285.436		
138	SHDNW Irradiation	301.363			285.581		
139	SHDNW Irradiation	303.677			284.478		
140	SHDNW Irradiation	305.799			287.637		
143	SHDNW Irradiation	306.009			288.278		
174	All GND'd Irradiation	310.427				264.786	
175	All GND'd Irradiation	313.394				267.872	
176	All GND'd Irradiation	308.523				263.338	
177	All GND'd Irradiation	310.066				262.478	
178	All GND'd Irradiation	309.427				264.441	
136	SHDNW Irradiation	300.184				265.754	
170	SHDNW Irradiation	310.296				286.305	
171	SHDNW Irradiation	305.309				278.912	
172	SHDNW Irradiation	316.743				293.126	
173	SHDNW Irradiation	310.103				287.108	
165	All GND'd Irradiation	309.839					233.672
166	All GND'd Irradiation	311.669					233.624
167	All GND'd Irradiation	320.949					243.877
168	All GND'd Irradiation	307.066					231.223
169	All GND'd Irradiation	311.950					235.749
153	SHDNW Irradiation	304.943					241.781
158	SHDNW Irradiation	309.858					259.083
161	SHDNW Irradiation	311.077					258.049
162	SHDNW Irradiation	309.265					256.684
164	SHDNW Irradiation	312.608					262.880
134	Control Unit	307.561	307.995	307.995	307.995	307.995	307.995
135	Control Unit	304.781	304.848	304.848	304.848	304.848	304.848
	All GND'd Irradiation Statistics						
	Average All GND'd	310.764	306.312	293.880	275.315	264.583	235.629
	Std Dev All GND'd	4.122	4.304	7.089	2.365	2.053	4.881
	Ps90%/90% (+KTL) All GND'd	322.066	318.113	313.317	281.800	270.212	249.014
	Ps90%/90% (-KTL) All GND'd	299.462	294.510	274.443	268.830	258.954	222.244
	SHDNW Irradiation Statistics						
	Average SHDNW	311.495	307.342	303.962	286.282	282.241	255.695
	Std Dev SHDNW	5.564	5.990	5.738	1.603	10.507	8.112
	Ps90%/90% (+KTL) SHDNW	326.751	323.767	319.696	290.678	311.052	277.939
	Ps90%/90% (-KTL) SHDNW	296.239	290.917	288.228	281.886	253.430	233.452
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	400	400	400	400	400	400
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

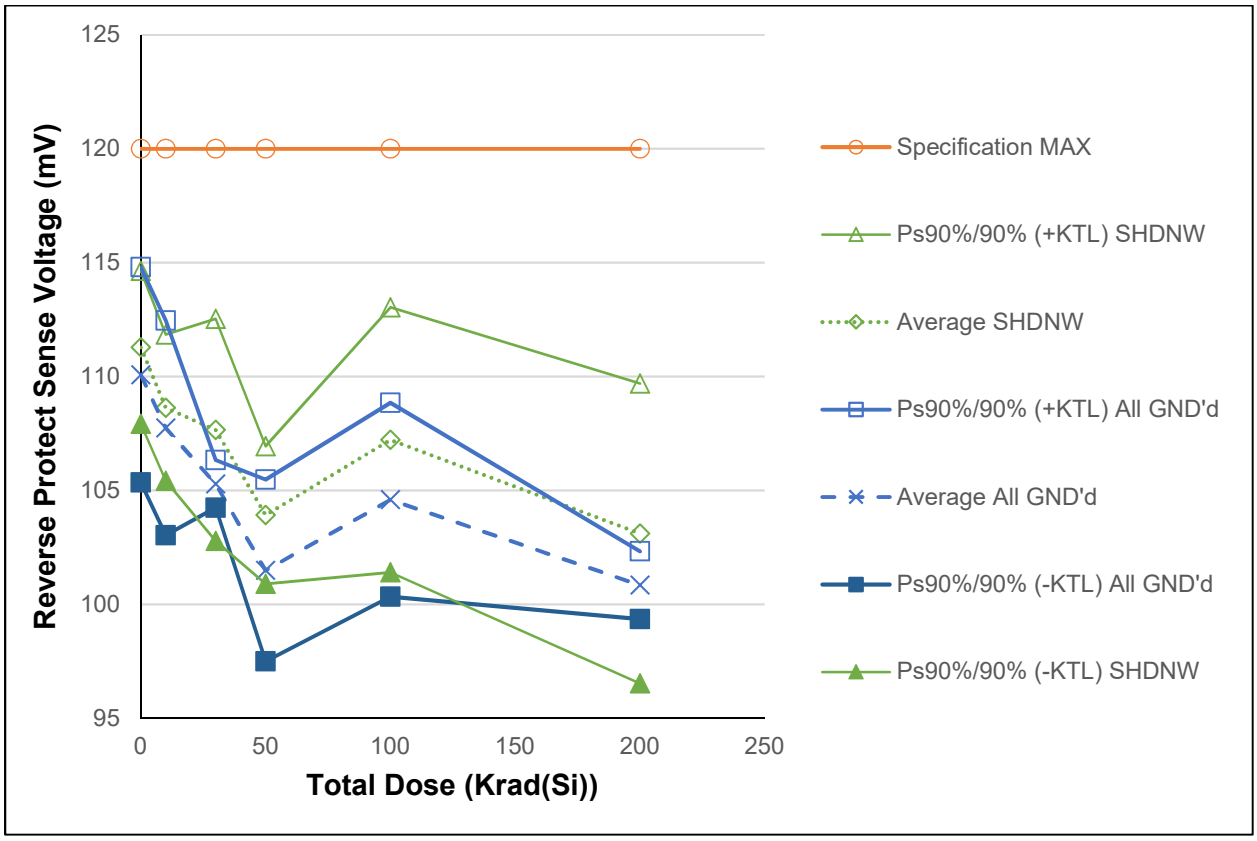

Figure 5.18: Plot of Reverse Protect Sense Voltage versus Total Dose

Table 5.18: Raw data table for reverse protect sense voltage versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Reverse Protect Sense Voltage	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(mV)	0	10	30	50	100	200
82	All GND'd Irradiation	107.588	105.315				
83	All GND'd Irradiation	109.668	107.215				
84	All GND'd Irradiation	111.698	109.431				
85	All GND'd Irradiation	109.685	107.387				
86	All GND'd Irradiation	111.737	109.373				
74	SHDNW Irradiation	111.737	109.414				
75	SHDNW Irradiation	110.947	108.113				
76	SHDNW Irradiation	109.714	107.301				
77	SHDNW Irradiation	113.044	110.230				
78	SHDNW Irradiation	110.947	108.091				
92	All GND'd Irradiation	109.632		105.964			
93	All GND'd Irradiation	110.964		105.093			
94	All GND'd Irradiation	109.714		105.131			
95	All GND'd Irradiation	109.587		105.047			
96	All GND'd Irradiation	109.735		105.188			
87	SHDNW Irradiation	110.930		107.199			
88	SHDNW Irradiation	109.735		107.275			
89	SHDNW Irradiation	113.101		109.390			
90	SHDNW Irradiation	108.857		105.102			
91	SHDNW Irradiation	111.787		109.314			
144	All GND'd Irradiation	108.857			102.047		
145	All GND'd Irradiation	106.688			101.216		
149	All GND'd Irradiation	107.531			102.076		
150	All GND'd Irradiation	109.649			102.954		
152	All GND'd Irradiation	104.713			99.128		
137	SHDNW Irradiation	108.793			104.159		
138	SHDNW Irradiation	108.857			104.186		
139	SHDNW Irradiation	107.605			102.040		
140	SHDNW Irradiation	109.628			104.981		
143	SHDNW Irradiation	108.826			104.214		
174	All GND'd Irradiation	111.033				104.062	
175	All GND'd Irradiation	113.008				104.959	
176	All GND'd Irradiation	111.844				102.804	
177	All GND'd Irradiation	114.698				107.005	
178	All GND'd Irradiation	111.796				104.119	
136	SHDNW Irradiation	110.890				104.083	
170	SHDNW Irradiation	114.724				109.986	
171	SHDNW Irradiation	113.027				107.022	
172	SHDNW Irradiation	111.823				107.110	
173	SHDNW Irradiation	113.848				107.912	
165	All GND'd Irradiation	113.056					101.045
166	All GND'd Irradiation	111.796					101.121
167	All GND'd Irradiation	113.903					101.121
168	All GND'd Irradiation	113.018					101.037
169	All GND'd Irradiation	112.987					99.870
153	SHDNW Irradiation	107.576					99.077
158	SHDNW Irradiation	111.787					102.804
161	SHDNW Irradiation	111.787					104.021
162	SHDNW Irradiation	112.987					104.818
164	SHDNW Irradiation	113.008					104.826
134	Control Unit	106.061	104.367	104.367	104.367	104.367	104.367
135	Control Unit	108.886	105.964	105.964	105.964	105.964	105.964
	All GND'd Irradiation Statistics						
	Average All GND'd	110.075	107.744	105.285	101.484	104.590	100.839
	Std Dev All GND'd	1.725	1.718	0.383	1.454	1.554	0.543
	Ps90%/90% (+KTL) All GND'd	114.804	112.455	106.336	105.470	108.851	102.328
	Ps90%/90% (-KTL) All GND'd	105.346	103.034	104.234	97.498	100.329	99.350
	SHDNW Irradiation Statistics						
	Average SHDNW	111.278	108.630	107.656	103.916	107.223	103.109
	Std Dev SHDNW	1.224	1.172	1.777	1.104	2.123	2.400
	Ps90%/90% (+KTL) SHDNW	114.635	111.845	112.528	106.942	113.043	109.691
	Ps90%/90% (-KTL) SHDNW	107.921	105.415	102.784	100.890	101.403	96.528
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	120	120	120	120	120	120
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

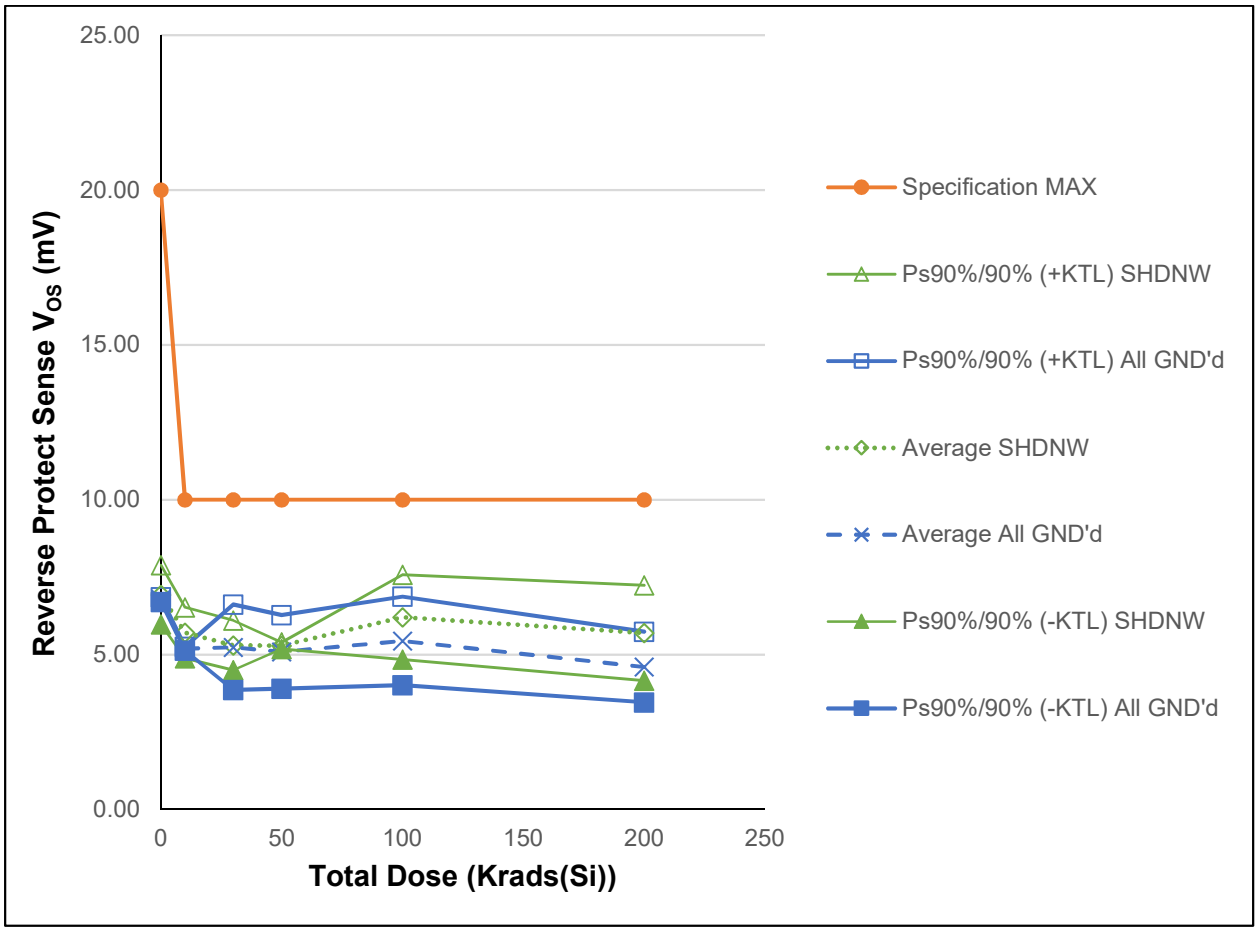

Figure 5.19: Plot of Reverse Protect Sense V_{OS} versus Total Dose

Table 5.19: Raw data table for reverse protect sense offset voltage versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Reverse Protect Sense V_{OS}	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(mV)	0	10	30	50	100	200
82	All GND'd Irradiation	6.81	5.22				
83	All GND'd Irradiation	6.74	5.18				
84	All GND'd Irradiation	6.79	5.21				
85	All GND'd Irradiation	6.76	5.17				
86	All GND'd Irradiation	6.79	5.18				
74	SHDNW Irradiation	6.87	5.89				
75	SHDNW Irradiation	6.81	5.85				
76	SHDNW Irradiation	6.63	5.70				
77	SHDNW Irradiation	6.82	5.18				
78	SHDNW Irradiation	7.53	5.89				
92	All GND'd Irradiation	7.53		5.98			
93	All GND'd Irradiation	6.78		5.24			
94	All GND'd Irradiation	6.68		5.14			
95	All GND'd Irradiation	6.08		4.57			
96	All GND'd Irradiation	6.77		5.25			
87	SHDNW Irradiation	6.81		5.22			
88	SHDNW Irradiation	7.40		5.80			
89	SHDNW Irradiation	6.84		5.27			
90	SHDNW Irradiation	6.66		5.10			
91	SHDNW Irradiation	6.70		5.10			
144	All GND'd Irradiation	6.83			4.56		
145	All GND'd Irradiation	7.50			5.35		
149	All GND'd Irradiation	6.89			4.68		
150	All GND'd Irradiation	6.94			5.48		
152	All GND'd Irradiation	6.82			5.39		
137	SHDNW Irradiation	6.91			5.32		
138	SHDNW Irradiation	6.82			5.23		
139	SHDNW Irradiation	6.88			5.33		
140	SHDNW Irradiation	6.79			5.27		
143	SHDNW Irradiation	6.81			5.29		
174	All GND'd Irradiation	7.42				6.14	
175	All GND'd Irradiation	7.36				5.39	
176	All GND'd Irradiation	6.76				4.68	
177	All GND'd Irradiation	7.52				5.46	
178	All GND'd Irradiation	7.52				5.55	
136	SHDNW Irradiation	6.92				5.56	
170	SHDNW Irradiation	7.42				6.74	
171	SHDNW Irradiation	6.85				6.03	
172	SHDNW Irradiation	7.42				6.68	
173	SHDNW Irradiation	6.78				6.02	
165	All GND'd Irradiation	6.85					4.14
166	All GND'd Irradiation	7.46					4.95
167	All GND'd Irradiation	7.43					4.86
168	All GND'd Irradiation	6.87					4.15
169	All GND'd Irradiation	7.45					4.89
153	SHDNW Irradiation	6.83					4.91
158	SHDNW Irradiation	7.40					6.24
161	SHDNW Irradiation	7.40					5.54
162	SHDNW Irradiation	6.78					5.56
164	SHDNW Irradiation	7.48					6.26
134	Control Unit	6.84	5.89	5.89	5.89	5.89	5.89
135	Control Unit	6.84	5.25	5.25	5.25	5.25	5.25
	All GND'd Irradiation Statistics						
	Average All GND'd	6.778	5.192	5.236	5.092	5.443	4.598
	Std Dev All GND'd	0.029	0.024	0.502	0.434	0.521	0.415
	Ps90%/90% (+KTL) All GND'd	6.857	5.258	6.613	6.282	6.871	5.737
	Ps90%/90% (-KTL) All GND'd	6.700	5.127	3.860	3.901	4.015	3.460
	SHDNW Irradiation Statistics						
	Average SHDNW	6.931	5.704	5.299	5.289	6.206	5.700
	Std Dev SHDNW	0.349	0.300	0.292	0.038	0.499	0.562
	Ps90%/90% (+KTL) SHDNW	7.888	6.527	6.099	5.394	7.575	7.243
	Ps90%/90% (-KTL) SHDNW	5.975	4.880	4.498	5.184	4.837	4.158
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	20	10	10	10	10	10
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

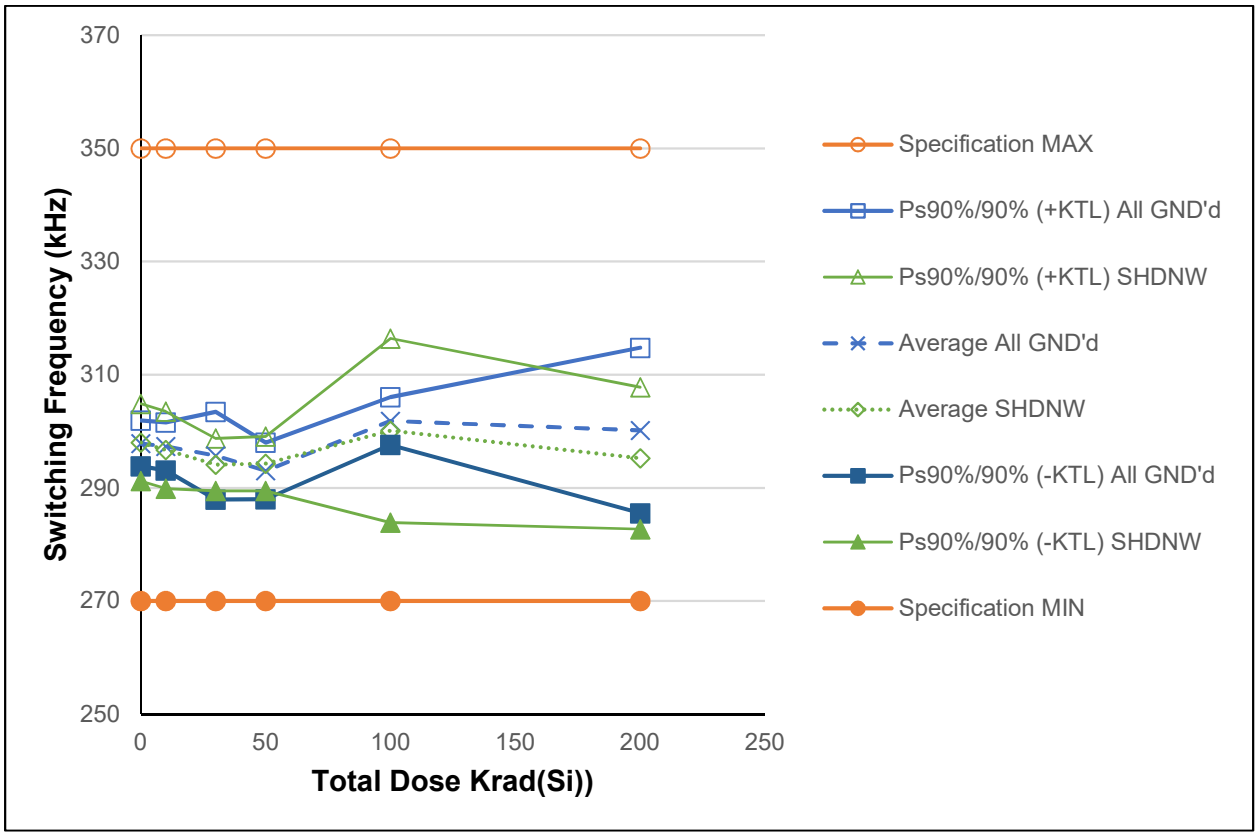

Figure 5.20: Plot of Switching Frequency versus Total Dose

Table 5.20: Raw data table for switching frequency versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Switching Frequency	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(KHz)	0	10	30	50	100	200
82	All GND'd Irradiation	295.544	294.945				
83	All GND'd Irradiation	297.522	296.653				
84	All GND'd Irradiation	298.786	298.076				
85	All GND'd Irradiation	299.359	298.856				
86	All GND'd Irradiation	298.132	298.049				
74	SHDNW Irradiation	298.271	296.791				
75	SHDNW Irradiation	295.407	293.780				
76	SHDNW Irradiation	302.029	300.625				
77	SHDNW Irradiation	297.744	296.447				
78	SHDNW Irradiation	296.709	295.790				
92	All GND'd Irradiation	298.717		296.200			
93	All GND'd Irradiation	294.727		292.331			
94	All GND'd Irradiation	302.529		299.738			
95	All GND'd Irradiation	296.736		293.807			
96	All GND'd Irradiation	298.730		296.365			
87	SHDNW Irradiation	297.287		294.754			
88	SHDNW Irradiation	295.858		293.430			
89	SHDNW Irradiation	296.489		294.266			
90	SHDNW Irradiation	294.321		291.758			
91	SHDNW Irradiation	298.758		296.338			
144	All GND'd Irradiation	296.791			291.585		
145	All GND'd Irradiation	297.039			291.691		
149	All GND'd Irradiation	300.075			294.104		
150	All GND'd Irradiation	301.418			295.694		
152	All GND'd Irradiation	297.204			291.971		
137	SHDNW Irradiation	297.536			293.322		
138	SHDNW Irradiation	297.647			292.598		
139	SHDNW Irradiation	302.315			297.163		
140	SHDNW Irradiation	299.107			293.861		
143	SHDNW Irradiation	299.555			294.564		
174	All GND'd Irradiation	309.598				303.318	
175	All GND'd Irradiation	309.448				303.102	
176	All GND'd Irradiation	308.434				301.418	
177	All GND'd Irradiation	307.043				299.499	
178	All GND'd Irradiation	308.821				301.745	
136	SHDNW Irradiation	299.710				290.408	
170	SHDNW Irradiation	308.568				302.300	
171	SHDNW Irradiation	304.733				298.870	
172	SHDNW Irradiation	311.254				305.416	
173	SHDNW Irradiation	309.134				303.620	
165	All GND'd Irradiation	303.533					294.415
166	All GND'd Irradiation	309.463					300.286
167	All GND'd Irradiation	315.535					308.345
168	All GND'd Irradiation	304.835					296.585
169	All GND'd Irradiation	310.108					301.134
153	SHDNW Irradiation	299.892					288.613
158	SHDNW Irradiation	307.028					298.368
161	SHDNW Irradiation	302.115					293.672
162	SHDNW Irradiation	304.009					295.121
164	SHDNW Irradiation	308.597					300.484
134	Control Unit	299.079	300.005	300.005	300.005	300.005	300.005
135	Control Unit	298.007	298.202	298.202	298.202	298.202	298.202
	All GND'd Irradiation Statistics						
	Average All GND'd	297.869	297.316	295.688	293.009	301.816	300.153
	Std Dev All GND'd	1.471	1.545	2.825	1.820	1.536	5.332
	Ps90%/90% (+KTL) All GND'd	301.903	301.553	303.435	298.000	306.029	314.774
	Ps90%/90% (-KTL) All GND'd	293.835	293.079	287.941	288.019	297.604	285.532
	SHDNW Irradiation Statistics						
	Average SHDNW	298.032	296.687	294.109	294.302	300.123	295.252
	Std Dev SHDNW	2.488	2.491	1.688	1.754	5.936	4.573
	Ps90%/90% (+KTL) SHDNW	304.854	303.518	298.737	299.112	316.400	307.792
	Ps90%/90% (-KTL) SHDNW	291.210	289.855	289.481	289.491	283.846	282.711
	Specification MIN	270	270	270	270	270	270
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX	350	350	350	350	350	350
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	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) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

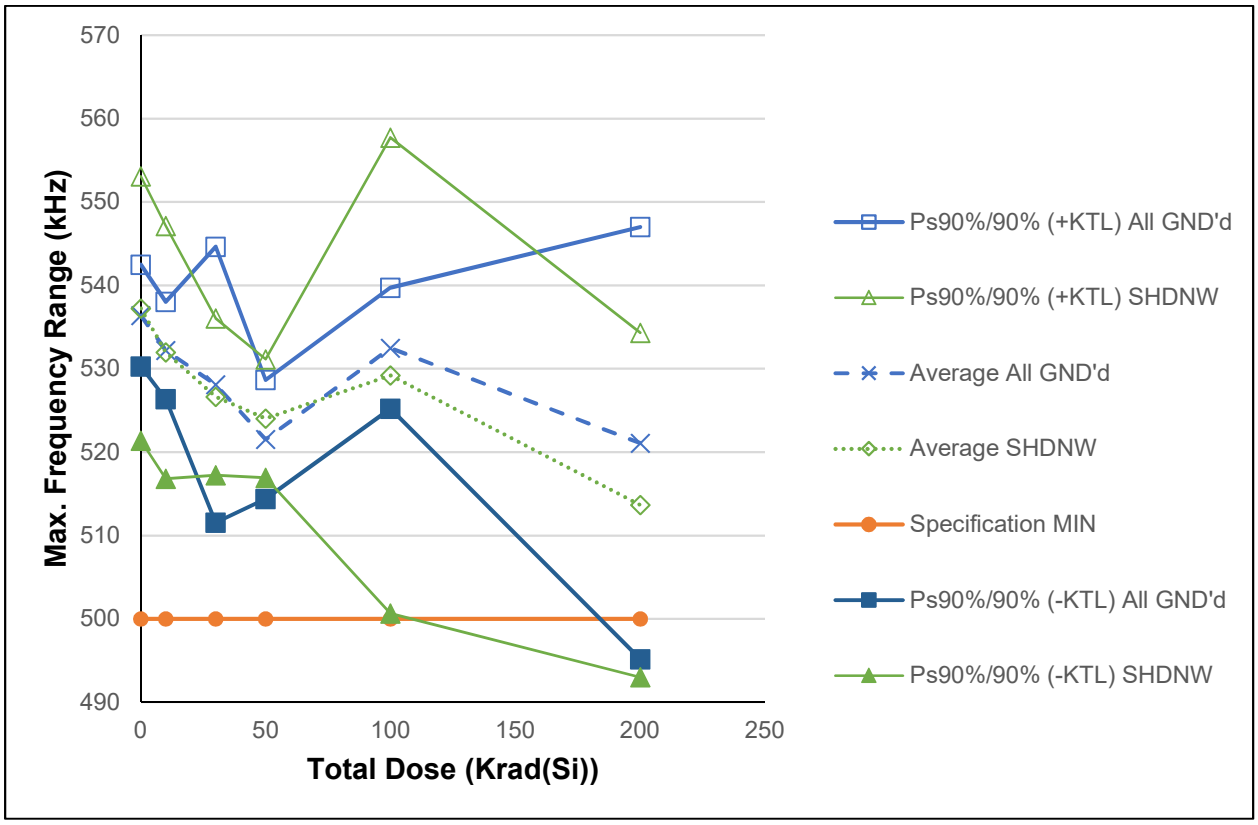

Figure 5.21: Plot of Maximum Frequency Range versus Total Dose

Note: The calculated – KTL points at 200 Krads(Si) are lower than the specification MIN due to the small 5-piece sample size. All ten samples pass the parameter.

Table 5.21: Raw data table for maximum frequency range versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Max. Frequency Range	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(KHz)	0	10	30	50	100	200
82	All GND'd Irradiation	534.023	529.999				
83	All GND'd Irradiation	535.072	530.504				
84	All GND'd Irradiation	537.161	532.867				
85	All GND'd Irradiation	539.788	535.341				
86	All GND'd Irradiation	535.812	532.335				
74	SHDNW Irradiation	538.177	533.001				
75	SHDNW Irradiation	530.746	525.516				
76	SHDNW Irradiation	545.866	540.176				
77	SHDNW Irradiation	538.041	532.623				
78	SHDNW Irradiation	533.333	528.576				
92	All GND'd Irradiation	537.928		529.407			
93	All GND'd Irradiation	529.845		521.385			
94	All GND'd Irradiation	546.542		537.025			
95	All GND'd Irradiation	532.912		523.796			
96	All GND'd Irradiation	537.680		528.926			
87	SHDNW Irradiation	534.737		526.186			
88	SHDNW Irradiation	535.117		526.273			
89	SHDNW Irradiation	533.956		525.538			
90	SHDNW Irradiation	531.517		522.897			
91	SHDNW Irradiation	540.723		532.247			
144	All GND'd Irradiation	533.801			519.080		
145	All GND'd Irradiation	534.849			519.839		
149	All GND'd Irradiation	539.857			523.796		
150	All GND'd Irradiation	540.221			524.848		
152	All GND'd Irradiation	534.469			520.114		
137	SHDNW Irradiation	535.789			522.833		
138	SHDNW Irradiation	536.373			521.555		
139	SHDNW Irradiation	542.879			528.358		
140	SHDNW Irradiation	537.906			523.303		
143	SHDNW Irradiation	538.902			524.182		
174	All GND'd Irradiation	555.002				533.667	
175	All GND'd Irradiation	556.885				535.408	
176	All GND'd Irradiation	555.435				532.823	
177	All GND'd Irradiation	551.296				528.271	
178	All GND'd Irradiation	554.449				532.180	
136	SHDNW Irradiation	538.132				512.739	
170	SHDNW Irradiation	554.209				532.779	
171	SHDNW Irradiation	546.775				526.078	
172	SHDNW Irradiation	560.224				539.584	
173	SHDNW Irradiation	554.737				534.826	
165	All GND'd Irradiation	544.913					511.060
166	All GND'd Irradiation	556.788					521.555
167	All GND'd Irradiation	567.930					535.610
168	All GND'd Irradiation	548.250					514.511
169	All GND'd Irradiation	557.346					522.705
153	SHDNW Irradiation	539.743					503.046
158	SHDNW Irradiation	552.415					519.523
161	SHDNW Irradiation	544.310					510.611
162	SHDNW Irradiation	547.266					513.108
164	SHDNW Irradiation	554.185					522.044
134	Control Unit	539.766	538.562	538.562	538.562	538.562	538.562
135	Control Unit	537.680	535.341	535.341	535.341	535.341	535.341
	All GND'd Irradiation Statistics						
	Average All GND'd	536.371	532.209	528.108	521.536	532.470	521.088
	Std Dev All GND'd	2.226	2.124	6.035	2.599	2.641	9.454
	Ps90%/90% (+KTL) All GND'd	542.474	538.034	544.655	528.661	539.713	547.012
	Ps90%/90% (-KTL) All GND'd	530.269	526.385	511.561	514.410	525.227	495.164
	SHDNW Irradiation Statistics						
	Average SHDNW	537.233	531.978	526.628	524.046	529.201	513.666
	Std Dev SHDNW	5.774	5.522	3.428	2.590	10.404	7.532
	Ps90%/90% (+KTL) SHDNW	553.065	547.121	536.027	531.149	557.730	534.319
	Ps90%/90% (-KTL) SHDNW	521.400	516.836	517.229	516.944	500.672	493.014
	Specification MIN	500	500	500	500	500	500
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Status (-KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	FAIL
	Status (+KTL) All GND'd						
	Status (-KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	FAIL
	Status (+KTL) SHDNW						

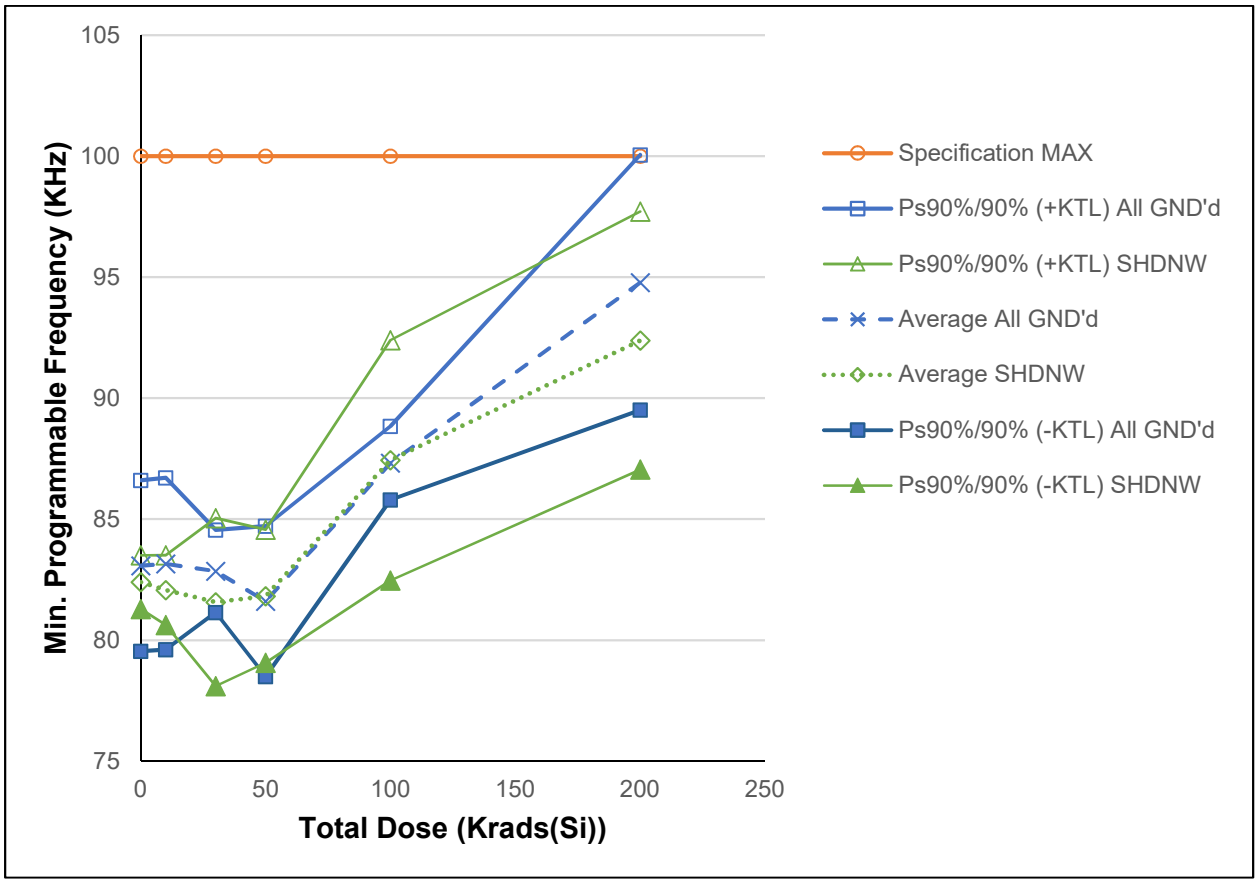

Figure 5.22: Plot of Minimum Frequency Range versus Total Dose

Table 5.22: Raw data table for minimum frequency range versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Min Programmable Frequency	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(KHz)	0	10	30	50	100	200
82	All GND'd Irradiation	80.836	80.874				
83	All GND'd Irradiation	83.220	83.388				
84	All GND'd Irradiation	84.079	83.943				
85	All GND'd Irradiation	83.722	83.851				
86	All GND'd Irradiation	83.499	83.733				
74	SHDNW Irradiation	82.286	81.765				
75	SHDNW Irradiation	82.699	82.273				
76	SHDNW Irradiation	82.212	81.655				
77	SHDNW Irradiation	81.877	81.752				
78	SHDNW Irradiation	82.896	82.901				
92	All GND'd Irradiation	83.168		82.921			
93	All GND'd Irradiation	82.130		82.441			
94	All GND'd Irradiation	82.405		82.053			
95	All GND'd Irradiation	83.314		83.158			
96	All GND'd Irradiation	83.732		83.655			
87	SHDNW Irradiation	83.298		83.147			
88	SHDNW Irradiation	80.625		80.418			
89	SHDNW Irradiation	82.676		82.727			
90	SHDNW Irradiation	80.892		80.741			
91	SHDNW Irradiation	80.807		80.825			
144	All GND'd Irradiation	82.153			81.760		
145	All GND'd Irradiation	81.155			80.515		
149	All GND'd Irradiation	81.752			80.940		
150	All GND'd Irradiation	84.282			83.451		
152	All GND'd Irradiation	82.086			81.354		
137	SHDNW Irradiation	81.240			80.793		
138	SHDNW Irradiation	81.312			80.952		
139	SHDNW Irradiation	83.648			83.223		
140	SHDNW Irradiation	82.519			82.312		
143	SHDNW Irradiation	82.153			81.793		
174	All GND'd Irradiation	84.959				87.684	
175	All GND'd Irradiation	84.970				88.012	
176	All GND'd Irradiation	84.121				86.707	
177	All GND'd Irradiation	84.820				86.826	
178	All GND'd Irradiation	84.991				87.382	
136	SHDNW Irradiation	83.642				84.395	
170	SHDNW Irradiation	85.186				88.267	
171	SHDNW Irradiation	84.173				87.163	
172	SHDNW Irradiation	85.555				88.793	
173	SHDNW Irradiation	85.134				88.564	
165	All GND'd Irradiation	83.407					92.607
166	All GND'd Irradiation	84.770					94.612
167	All GND'd Irradiation	86.728					97.860
168	All GND'd Irradiation	83.730					94.033
169	All GND'd Irradiation	85.193					94.811
153	SHDNW Irradiation	82.917					89.164
158	SHDNW Irradiation	84.096					93.240
161	SHDNW Irradiation	82.850					92.353
162	SHDNW Irradiation	83.223					92.816
164	SHDNW Irradiation	84.916					94.342
134	Control Unit	81.086	81.157	81.157	81.157	81.157	81.157
135	Control Unit	81.088	80.937	80.937	80.937	80.937	80.937
	All GND'd Irradiation Statistics						
	Average All GND'd	83.071	83.158	82.846	81.604	87.322	94.785
	Std Dev All GND'd	1.288	1.294	0.622	1.132	0.556	1.923
	Ps90%/90% (+KTL) All GND'd	86.604	86.706	84.552	84.708	88.846	100.058
	Ps90%/90% (-KTL) All GND'd	79.538	79.610	81.139	78.500	85.799	89.511
	SHDNW Irradiation Statistics						
	Average SHDNW	82.394	82.069	81.572	81.815	87.436	92.383
	Std Dev SHDNW	0.405	0.524	1.265	1.003	1.811	1.944
	Ps90%/90% (+KTL) SHDNW	83.505	83.506	85.039	84.564	92.403	97.714
	Ps90%/90% (-KTL) SHDNW	81.283	80.632	78.104	79.066	82.470	87.051
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	100	100	100	100	100	100
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	FAIL
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

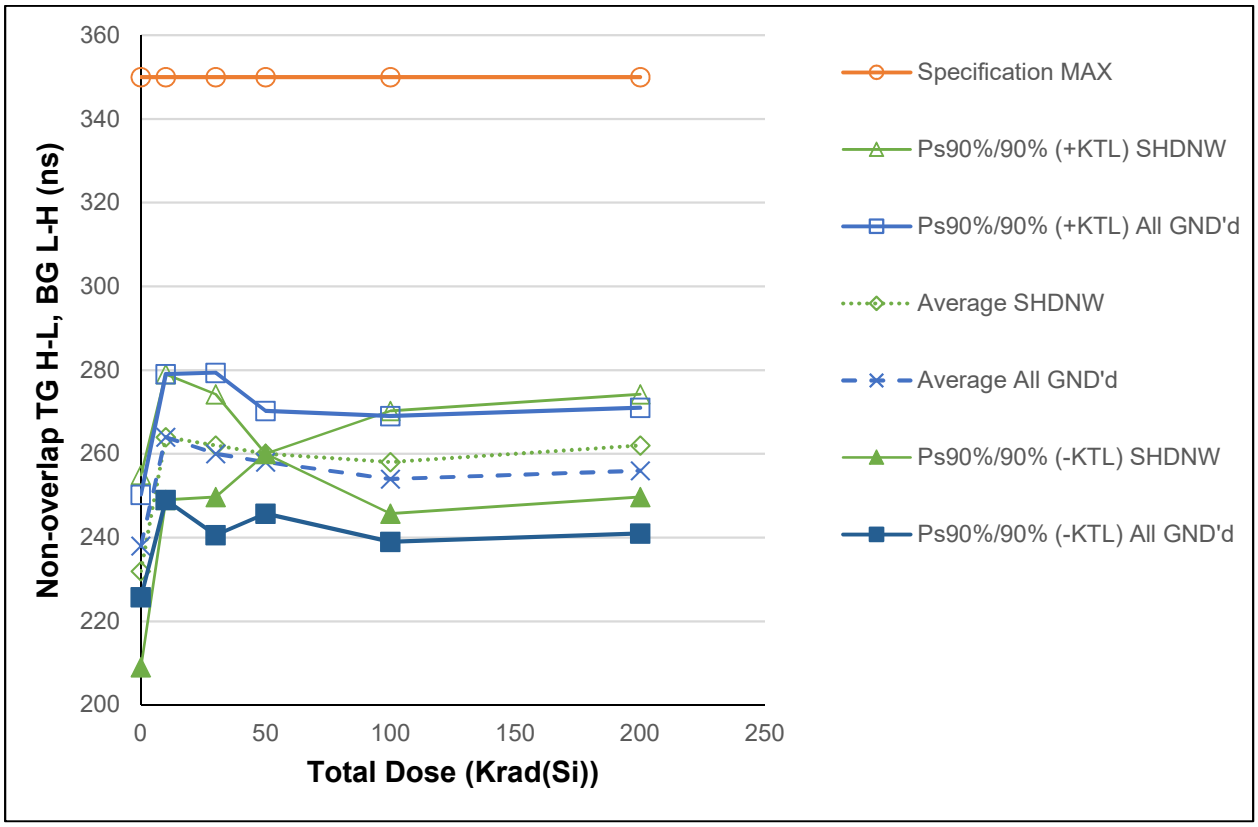

Figure 5.23: Plot of Non-Overlap TG H-L to BG L-H versus Total Dose

Table 5.23: Raw data table for non-overlap TG H-L to BG L-H versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Non-overlap TH H-L, BG L-H	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(ns)	0	10	30	50	100	200
82	All GND'd Irradiation	230.000	260.000				
83	All GND'd Irradiation	240.000	260.000				
84	All GND'd Irradiation	240.000	270.000				
85	All GND'd Irradiation	240.000	260.000				
86	All GND'd Irradiation	240.000	270.000				
74	SHDNW Irradiation	230.000	260.000				
75	SHDNW Irradiation	240.000	270.000				
76	SHDNW Irradiation	220.000	260.000				
77	SHDNW Irradiation	230.000	260.000				
78	SHDNW Irradiation	240.000	270.000				
92	All GND'd Irradiation	240.000		260.000			
93	All GND'd Irradiation	240.000		260.000			
94	All GND'd Irradiation	230.000		250.000			
95	All GND'd Irradiation	240.000		270.000			
96	All GND'd Irradiation	240.000		260.000			
87	SHDNW Irradiation	240.000		260.000			
88	SHDNW Irradiation	240.000		260.000			
89	SHDNW Irradiation	240.000		270.000			
90	SHDNW Irradiation	240.000		260.000			
91	SHDNW Irradiation	230.000		260.000			
144	All GND'd Irradiation	240.000			260.000		
145	All GND'd Irradiation	230.000			250.000		
149	All GND'd Irradiation	240.000			260.000		
150	All GND'd Irradiation	240.000			260.000		
152	All GND'd Irradiation	240.000			260.000		
137	SHDNW Irradiation	240.000			260.000		
138	SHDNW Irradiation	240.000			260.000		
139	SHDNW Irradiation	240.000			260.000		
140	SHDNW Irradiation	230.000			260.000		
143	SHDNW Irradiation	240.000			260.000		
174	All GND'd Irradiation	240.000				260.000	
175	All GND'd Irradiation	230.000				250.000	
176	All GND'd Irradiation	240.000				260.000	
177	All GND'd Irradiation	230.000				250.000	
178	All GND'd Irradiation	240.000				250.000	
136	SHDNW Irradiation	240.000				260.000	
170	SHDNW Irradiation	240.000				250.000	
171	SHDNW Irradiation	240.000				260.000	
172	SHDNW Irradiation	240.000				260.000	
173	SHDNW Irradiation	230.000				260.000	
165	All GND'd Irradiation	240.000					260.000
166	All GND'd Irradiation	240.000					260.000
167	All GND'd Irradiation	240.000					250.000
168	All GND'd Irradiation	240.000					250.000
169	All GND'd Irradiation	240.000					260.000
153	SHDNW Irradiation	240.000					270.000
158	SHDNW Irradiation	240.000					260.000
161	SHDNW Irradiation	240.000					260.000
162	SHDNW Irradiation	240.000					260.000
164	SHDNW Irradiation	240.000					260.000
134	Control Unit	240.000	260.000	260.000	260.000	260.000	260.000
135	Control Unit	230.000	260.000	260.000	260.000	260.000	260.000
	All GND'd Irradiation Statistics						
	Average All GND'd	238.000	264.000	260.000	258.000	254.000	256.000
	Std Dev All GND'd	4.472	5.477	7.071	4.472	5.477	5.477
	Ps90%/90% (+KTL) All GND'd	250.262	279.018	279.389	270.262	269.018	271.018
	Ps90%/90% (-KTL) All GND'd	225.737	248.981	240.611	245.737	238.981	240.981
	SHDNW Irradiation Statistics						
	Average SHDNW	232.000	264.000	262.000	260.000	258.000	262.000
	Std Dev SHDNW	8.367	5.477	4.472	0.000	4.472	4.472
	Ps90%/90% (+KTL) SHDNW	254.941	279.018	274.262	260.000	270.262	274.262
	Ps90%/90% (-KTL) SHDNW	209.059	248.981	249.737	260.000	245.737	249.737
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX		350	350	350	350	350
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

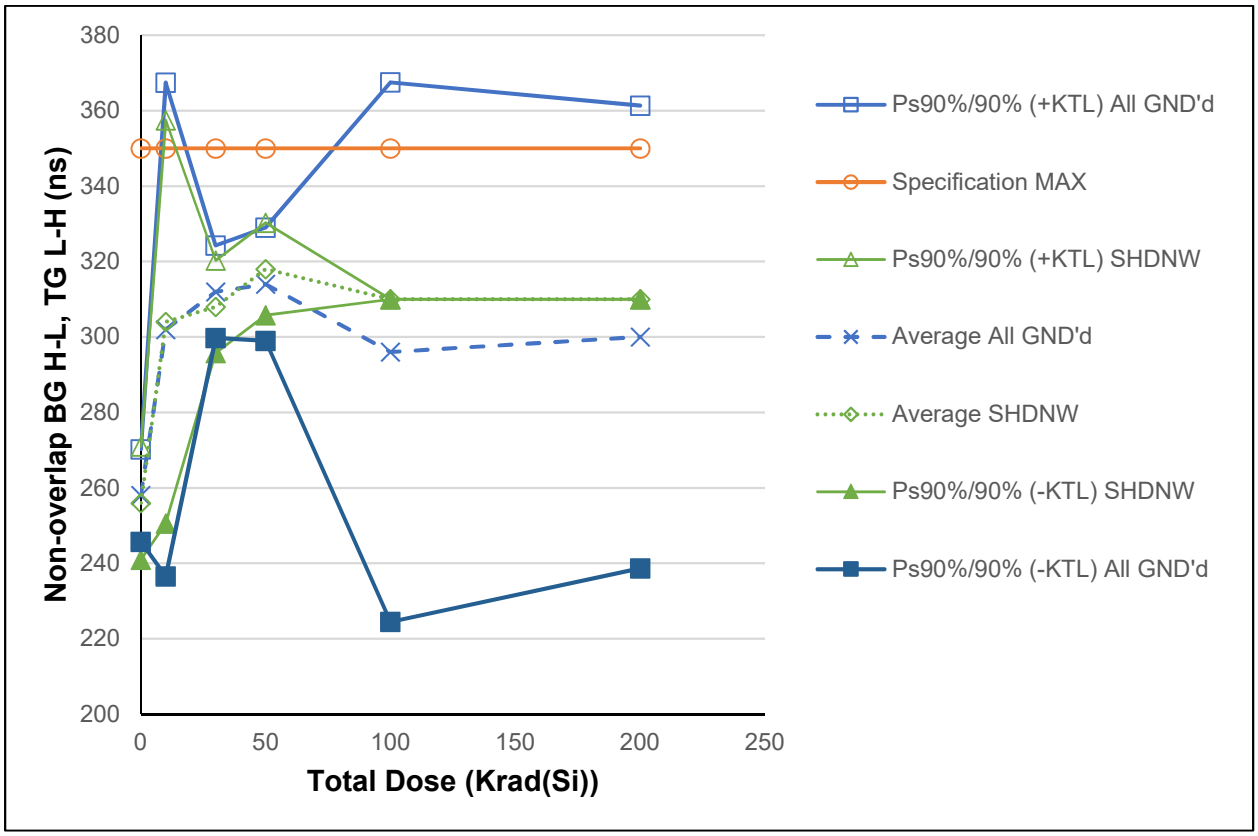

Figure 5.24: Plot of Non-Overlap BG H-L to TG L-H versus Total Dose

Note: The calculated + KTL points at 10,100, 200 Krads(Si) are slightly higher than the specification MAX due to the small 5-piece sample size. All ten samples pass the parameter.

Table 5.24: Raw data table for non-overlap BG H-L to TG L-H versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Non-overlap BG H-L, TG L-H	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(ns)	0	10	30	50	100	200
82	All GND'd Irradiation	250.000	260.000				
83	All GND'd Irradiation	260.000	310.000				
84	All GND'd Irradiation	260.000	320.000				
85	All GND'd Irradiation	260.000	310.000				
86	All GND'd Irradiation	260.000	310.000				
74	SHDNW Irradiation	250.000	310.000				
75	SHDNW Irradiation	260.000	270.000				
76	SHDNW Irradiation	250.000	310.000				
77	SHDNW Irradiation	260.000	320.000				
78	SHDNW Irradiation	260.000	310.000				
92	All GND'd Irradiation	250.000		310.000			
93	All GND'd Irradiation	250.000		310.000			
94	All GND'd Irradiation	250.000		310.000			
95	All GND'd Irradiation	260.000		320.000			
96	All GND'd Irradiation	250.000		310.000			
87	SHDNW Irradiation	250.000		310.000			
88	SHDNW Irradiation	250.000		300.000			
89	SHDNW Irradiation	260.000		310.000			
90	SHDNW Irradiation	250.000		310.000			
91	SHDNW Irradiation	250.000		310.000			
144	All GND'd Irradiation	260.000			310.000		
145	All GND'd Irradiation	260.000			310.000		
149	All GND'd Irradiation	260.000			310.000		
150	All GND'd Irradiation	240.000			320.000		
152	All GND'd Irradiation	270.000			320.000		
137	SHDNW Irradiation	260.000			320.000		
138	SHDNW Irradiation	260.000			320.000		
139	SHDNW Irradiation	240.000			320.000		
140	SHDNW Irradiation	260.000			310.000		
143	SHDNW Irradiation	260.000			320.000		
174	All GND'd Irradiation	260.000				250.000	
175	All GND'd Irradiation	260.000				300.000	
176	All GND'd Irradiation	260.000				310.000	
177	All GND'd Irradiation	260.000				310.000	
178	All GND'd Irradiation	260.000				310.000	
136	SHDNW Irradiation	260.000				310.000	
170	SHDNW Irradiation	250.000				310.000	
171	SHDNW Irradiation	250.000				310.000	
172	SHDNW Irradiation	260.000				310.000	
173	SHDNW Irradiation	250.000				310.000	
165	All GND'd Irradiation	260.000					310.000
166	All GND'd Irradiation	260.000					310.000
167	All GND'd Irradiation	250.000					310.000
168	All GND'd Irradiation	260.000					260.000
169	All GND'd Irradiation	250.000					310.000
153	SHDNW Irradiation	240.000					310.000
158	SHDNW Irradiation	260.000					310.000
161	SHDNW Irradiation	260.000					310.000
162	SHDNW Irradiation	260.000					310.000
164	SHDNW Irradiation	260.000					310.000
134	Control Unit	260.000	260.000	260.000	260.000	260.000	260.000
135	Control Unit	260.000	310.000	310.000	310.000	310.000	310.000
	All GND'd Irradiation Statistics						
	Average All GND'd	258.000	302.000	312.000	314.000	296.000	300.000
	Std Dev All GND'd	4.472	23.875	4.472	5.477	26.077	22.361
	Ps90%/90% (+KTL) All GND'd	270.262	367.464	324.263	329.019	367.503	361.313
	Ps90%/90% (-KTL) All GND'd	245.737	236.536	299.737	298.981	224.497	238.687
	SHDNW Irradiation Statistics						
	Average SHDNW	256.000	304.000	308.000	318.000	310.000	310.000
	Std Dev SHDNW	5.477	19.494	4.472	4.472	0.000	0.000
	Ps90%/90% (+KTL) SHDNW	271.018	357.452	320.263	330.263	310.000	310.000
	Ps90%/90% (-KTL) SHDNW	240.981	250.548	295.737	305.737	310.000	310.000
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX		350	350	350	350	350
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	FAIL	PASS	PASS	FAIL	FAIL
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	FAIL	PASS	PASS	PASS	PASS

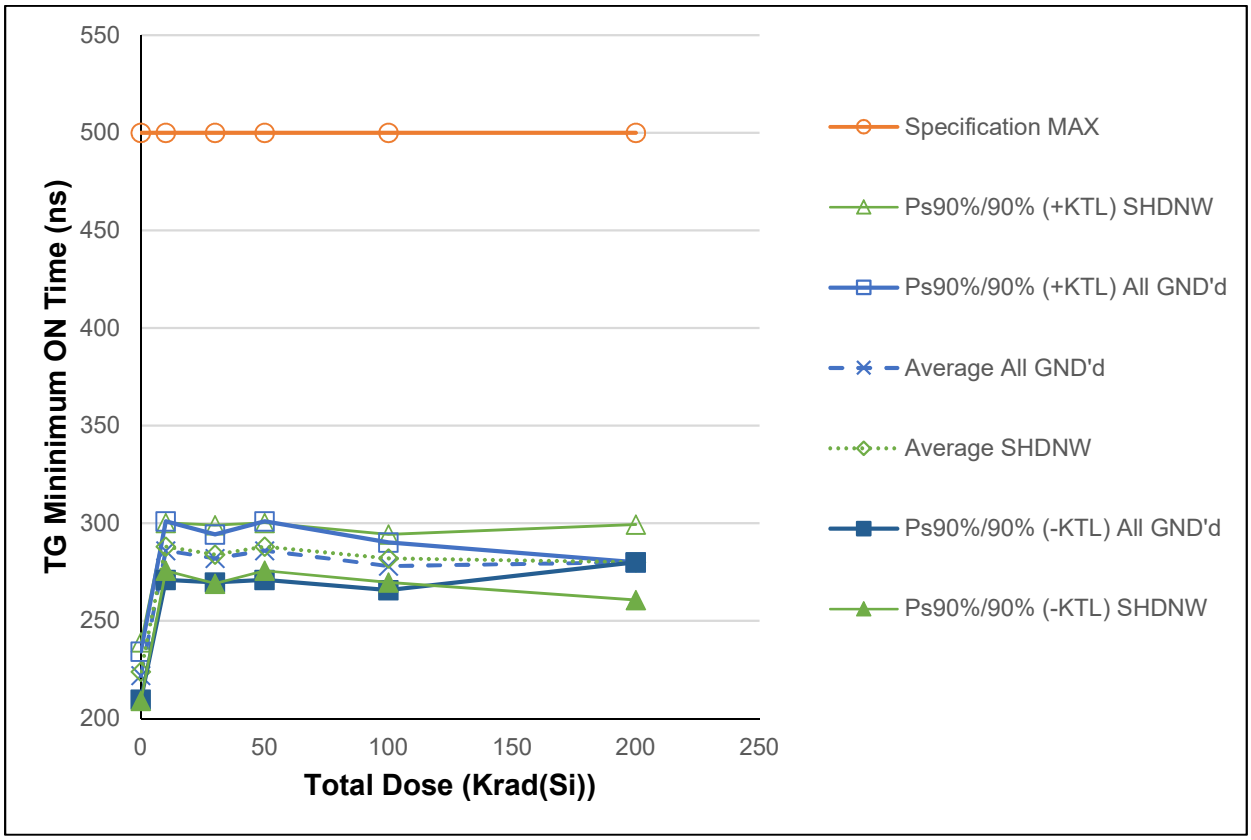

Figure 5.25: Plot of TG Minimum ON Time versus Total Dose

Table 5.25: Raw data table for TG minimum ON time versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	TG Minimum ON Time	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(ns)	0	10	30	50	100	200
82	All GND'd Irradiation	220.000	280.000				
83	All GND'd Irradiation	220.000	290.000				
84	All GND'd Irradiation	220.000	290.000				
85	All GND'd Irradiation	220.000	280.000				
86	All GND'd Irradiation	230.000	290.000				
74	SHDNW Irradiation	220.000	290.000				
75	SHDNW Irradiation	230.000	290.000				
76	SHDNW Irradiation	220.000	290.000				
77	SHDNW Irradiation	220.000	280.000				
78	SHDNW Irradiation	230.000	290.000				
92	All GND'd Irradiation	220.000		280.000			
93	All GND'd Irradiation	220.000		290.000			
94	All GND'd Irradiation	220.000		280.000			
95	All GND'd Irradiation	230.000		280.000			
96	All GND'd Irradiation	220.000		280.000			
87	SHDNW Irradiation	220.000		290.000			
88	SHDNW Irradiation	220.000		280.000			
89	SHDNW Irradiation	220.000		280.000			
90	SHDNW Irradiation	220.000		290.000			
91	SHDNW Irradiation	220.000		280.000			
144	All GND'd Irradiation	230.000			290.000		
145	All GND'd Irradiation	220.000			290.000		
149	All GND'd Irradiation	230.000			280.000		
150	All GND'd Irradiation	220.000			280.000		
152	All GND'd Irradiation	230.000			290.000		
137	SHDNW Irradiation	230.000			290.000		
138	SHDNW Irradiation	220.000			290.000		
139	SHDNW Irradiation	230.000			290.000		
140	SHDNW Irradiation	230.000			290.000		
143	SHDNW Irradiation	230.000			280.000		
174	All GND'd Irradiation	230.000				270.000	
175	All GND'd Irradiation	220.000				280.000	
176	All GND'd Irradiation	230.000				280.000	
177	All GND'd Irradiation	220.000				280.000	
178	All GND'd Irradiation	230.000				280.000	
136	SHDNW Irradiation	230.000				290.000	
170	SHDNW Irradiation	220.000				280.000	
171	SHDNW Irradiation	230.000				280.000	
172	SHDNW Irradiation	220.000				280.000	
173	SHDNW Irradiation	220.000				280.000	
165	All GND'd Irradiation	220.000					280.000
166	All GND'd Irradiation	220.000					280.000
167	All GND'd Irradiation	220.000					280.000
168	All GND'd Irradiation	230.000					280.000
169	All GND'd Irradiation	220.000					280.000
153	SHDNW Irradiation	230.000					290.000
158	SHDNW Irradiation	220.000					280.000
161	SHDNW Irradiation	230.000					270.000
162	SHDNW Irradiation	230.000					280.000
164	SHDNW Irradiation	220.000					280.000
134	Control Unit	220.000	280.000	280.000	280.000	280.000	280.000
135	Control Unit	230.000	290.000	290.000	290.000	290.000	290.000
	All GND'd Irradiation Statistics						
	Average All GND'd	222.000	286.000	282.000	286.000	278.000	280.000
	Std Dev All GND'd	4.472	5.477	4.472	5.477	4.472	0.000
	Ps90%/90% (+KTL) All GND'd	234.262	301.018	294.262	301.018	290.262	280.000
	Ps90%/90% (-KTL) All GND'd	209.738	270.981	269.737	270.981	265.737	280.000
	SHDNW Irradiation Statistics						
	Average SHDNW	224.000	288.000	284.000	288.000	282.000	280.000
	Std Dev SHDNW	5.477	4.472	5.477	4.472	4.472	7.071
	Ps90%/90% (+KTL) SHDNW	239.018	300.262	299.018	300.262	294.262	299.389
	Ps90%/90% (-KTL) SHDNW	208.982	275.737	268.981	275.737	269.737	260.611
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX		500	500	500	500	500
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

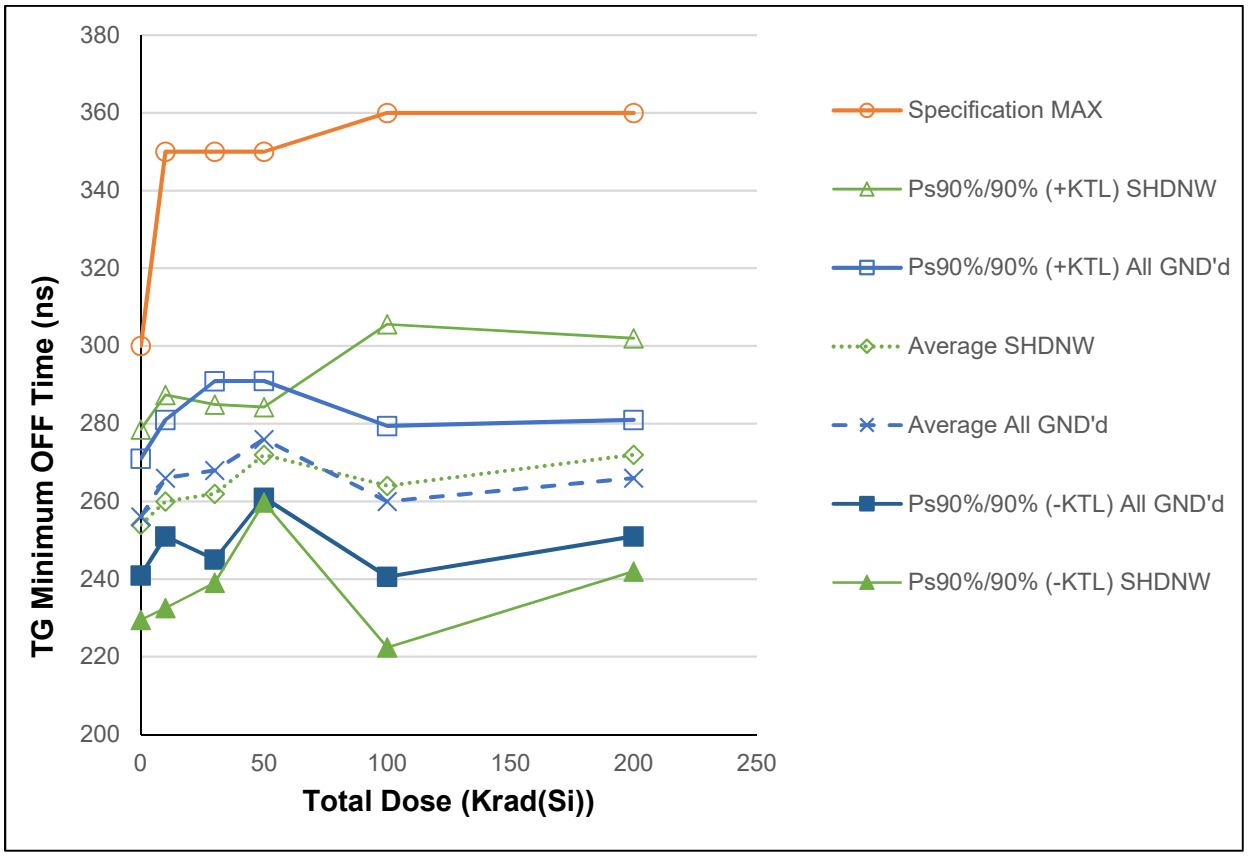

Figure 5.26: Plot of TG Minimum OFF Time versus Total Dose

Table 5.26: Raw data table for TG minimum OFF time versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	TG Minimum OFF Time	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(ns)	0	10	30	50	100	200
82	All GND'd Irradiation	250.000	260.000				
83	All GND'd Irradiation	260.000	270.000				
84	All GND'd Irradiation	260.000	270.000				
85	All GND'd Irradiation	250.000	270.000				
86	All GND'd Irradiation	260.000	260.000				
74	SHDNW Irradiation	260.000	260.000				
75	SHDNW Irradiation	260.000	270.000				
76	SHDNW Irradiation	240.000	250.000				
77	SHDNW Irradiation	250.000	250.000				
78	SHDNW Irradiation	260.000	270.000				
92	All GND'd Irradiation	260.000		260.000			
93	All GND'd Irradiation	260.000		270.000			
94	All GND'd Irradiation	250.000		260.000			
95	All GND'd Irradiation	270.000		280.000			
96	All GND'd Irradiation	260.000		270.000			
87	SHDNW Irradiation	260.000		260.000			
88	SHDNW Irradiation	250.000		260.000			
89	SHDNW Irradiation	260.000		270.000			
90	SHDNW Irradiation	260.000		270.000			
91	SHDNW Irradiation	250.000		250.000			
144	All GND'd Irradiation	260.000			270.000		
145	All GND'd Irradiation	260.000			280.000		
149	All GND'd Irradiation	260.000			270.000		
150	All GND'd Irradiation	270.000			280.000		
152	All GND'd Irradiation	270.000			280.000		
137	SHDNW Irradiation	260.000			280.000		
138	SHDNW Irradiation	260.000			270.000		
139	SHDNW Irradiation	260.000			270.000		
140	SHDNW Irradiation	260.000			270.000		
143	SHDNW Irradiation	260.000			270.000		
174	All GND'd Irradiation	240.000				260.000	
175	All GND'd Irradiation	240.000				250.000	
176	All GND'd Irradiation	240.000				260.000	
177	All GND'd Irradiation	240.000				260.000	
178	All GND'd Irradiation	240.000				270.000	
136	SHDNW Irradiation	260.000				290.000	
170	SHDNW Irradiation	250.000				260.000	
171	SHDNW Irradiation	250.000				260.000	
172	SHDNW Irradiation	240.000				250.000	
173	SHDNW Irradiation	240.000				260.000	
165	All GND'd Irradiation	240.000					270.000
166	All GND'd Irradiation	240.000					270.000
167	All GND'd Irradiation	240.000					260.000
168	All GND'd Irradiation	240.000					260.000
169	All GND'd Irradiation	250.000					270.000
153	SHDNW Irradiation	260.000					290.000
158	SHDNW Irradiation	250.000					270.000
161	SHDNW Irradiation	250.000					270.000
162	SHDNW Irradiation	250.000					270.000
164	SHDNW Irradiation	250.000					260.000
134	Control Unit	250.000	260.000	260.000	260.000	260.000	260.000
135	Control Unit	260.000	260.000	260.000	260.000	260.000	260.000
	All GND'd Irradiation Statistics						
	Average All GND'd	256.000	266.000	268.000	276.000	260.000	266.000
	Std Dev All GND'd	5.477	5.477	8.367	5.477	7.071	5.477
	Ps90%/90% (+KTL) All GND'd	271.018	281.018	290.941	291.018	279.389	281.018
	Ps90%/90% (-KTL) All GND'd	240.981	250.981	245.059	260.981	240.611	250.981
	SHDNW Irradiation Statistics						
	Average SHDNW	254.000	260.000	262.000	272.000	264.000	272.000
	Std Dev SHDNW	8.944	10.000	8.367	4.472	15.166	10.954
	Ps90%/90% (+KTL) SHDNW	278.525	287.420	284.941	284.262	305.584	302.037
	Ps90%/90% (-KTL) SHDNW	229.475	232.580	239.059	259.737	222.415	241.963
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX		350	350	350	360	360
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

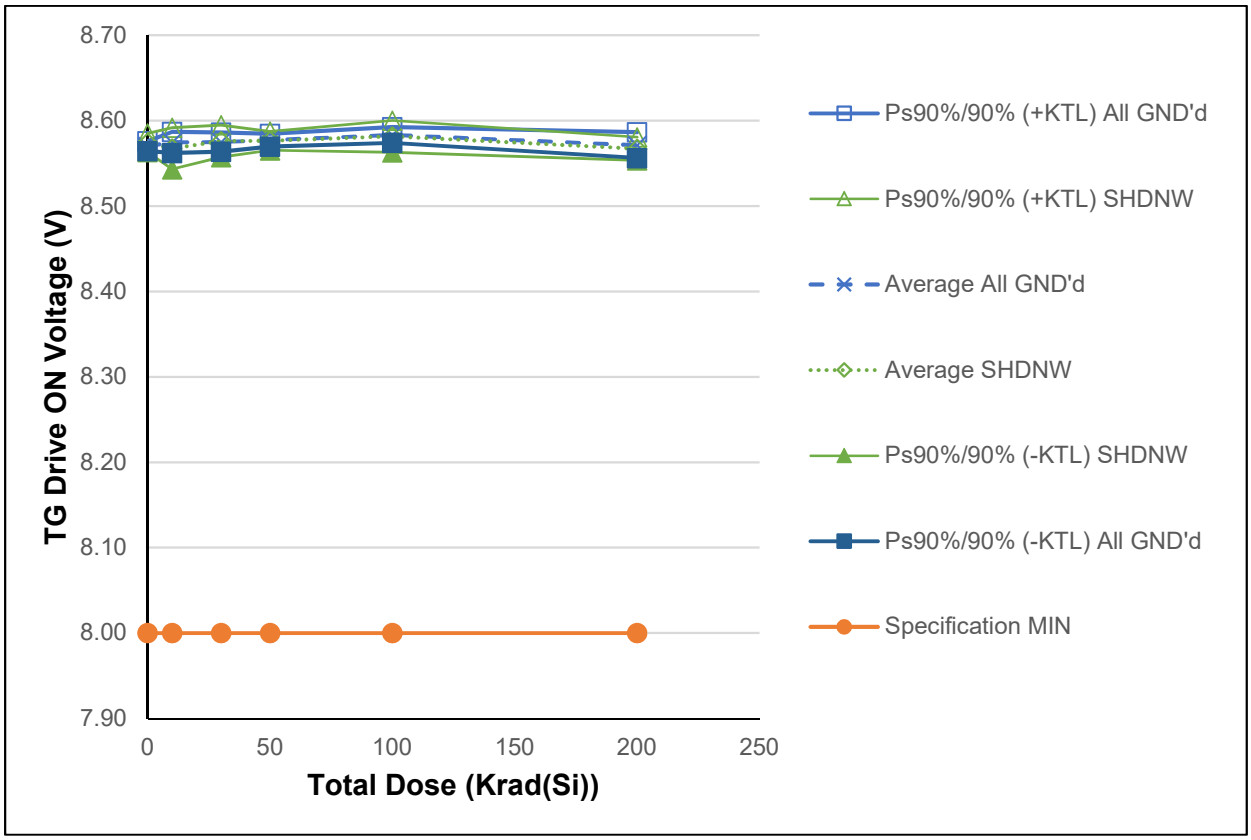

Figure 5.27: Plot of TG Drive ON Voltage versus Total Dose

Table 5.27: Raw data table for TG drive ON voltage versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	TG Drive ON Voltage	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(V)	0	10	30	50	100	200
82	All GND'd Irradiation	8.5724	8.5747				
83	All GND'd Irradiation	8.5680	8.5704				
84	All GND'd Irradiation	8.5721	8.5704				
85	All GND'd Irradiation	8.5680	8.5811				
86	All GND'd Irradiation	8.5702	8.5762				
74	SHDNW Irradiation	8.5738	8.5621				
75	SHDNW Irradiation	8.5726	8.5557				
76	SHDNW Irradiation	8.5781	8.5710				
77	SHDNW Irradiation	8.5775	8.5789				
78	SHDNW Irradiation	8.5683	8.5691				
92	All GND'd Irradiation	8.5656		8.5750			
93	All GND'd Irradiation	8.5659		8.5698			
94	All GND'd Irradiation	8.5763		8.5811			
95	All GND'd Irradiation	8.5690		8.5734			
96	All GND'd Irradiation	8.5729		8.5756			
87	SHDNW Irradiation	8.5672		8.5654			
88	SHDNW Irradiation	8.5819		8.5796			
89	SHDNW Irradiation	8.5772		8.5759			
90	SHDNW Irradiation	8.5788		8.5750			
91	SHDNW Irradiation	8.5798		8.5838			
144	All GND'd Irradiation	8.5664			8.5747		
145	All GND'd Irradiation	8.5786			8.5814		
149	All GND'd Irradiation	8.5675			8.5764		
150	All GND'd Irradiation	8.5699			8.5752		
152	All GND'd Irradiation	8.5677			8.5778		
137	SHDNW Irradiation	8.5677			8.5717		
138	SHDNW Irradiation	8.5732			8.5790		
139	SHDNW Irradiation	8.5672			8.5730		
140	SHDNW Irradiation	8.5683			8.5768		
143	SHDNW Irradiation	8.5732			8.5813		
174	All GND'd Irradiation	8.5775				8.5826	
175	All GND'd Irradiation	8.5830				8.5863	
176	All GND'd Irradiation	8.5837				8.5869	
177	All GND'd Irradiation	8.5775				8.5789	
178	All GND'd Irradiation	8.5799				8.5814	
136	SHDNW Irradiation	8.5630				8.5719	
170	SHDNW Irradiation	8.5769				8.5815	
171	SHDNW Irradiation	8.5727				8.5796	
172	SHDNW Irradiation	8.5811				8.5902	
173	SHDNW Irradiation	8.5753				8.5848	
165	All GND'd Irradiation	8.5702					8.5655
166	All GND'd Irradiation	8.5737					8.5685
167	All GND'd Irradiation	8.5802					8.5796
168	All GND'd Irradiation	8.5705					8.5691
169	All GND'd Irradiation	8.5756					8.5738
153	SHDNW Irradiation	8.5727					8.5753
158	SHDNW Irradiation	8.5778					8.5621
161	SHDNW Irradiation	8.5721					8.5668
162	SHDNW Irradiation	8.5692					8.5658
164	SHDNW Irradiation	8.5711					8.5655
134	Control Unit	8.5732	8.5832	8.5832	8.5832	8.5832	8.5832
135	Control Unit	8.5752	8.5815	8.5815	8.5815	8.5815	8.5815
	All GND'd Irradiation Statistics						
	Average All GND'd	8.5701	8.5746	8.5750	8.5771	8.5832	8.5713
	Std Dev All GND'd	0.0021	0.0045	0.0041	0.0027	0.0034	0.0055
	Ps90%/90% (+KTL) All GND'd	8.5759	8.5868	8.5862	8.5845	8.5925	8.5864
	Ps90%/90% (-KTL) All GND'd	8.5644	8.5623	8.5638	8.5698	8.5740	8.5562
	SHDNW Irradiation Statistics						
	Average SHDNW	8.5741	8.5674	8.5759	8.5763	8.5816	8.5671
	Std Dev SHDNW	0.0040	0.0088	0.0068	0.0040	0.0068	0.0049
	Ps90%/90% (+KTL) SHDNW	8.5849	8.5916	8.5947	8.5874	8.6001	8.5806
	Ps90%/90% (-KTL) SHDNW	8.5632	8.5431	8.5572	8.5653	8.5631	8.5536
	Specification MIN	8	8	8	8	8	8
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Status (-KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) All GND'd						
	Status (-KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW						

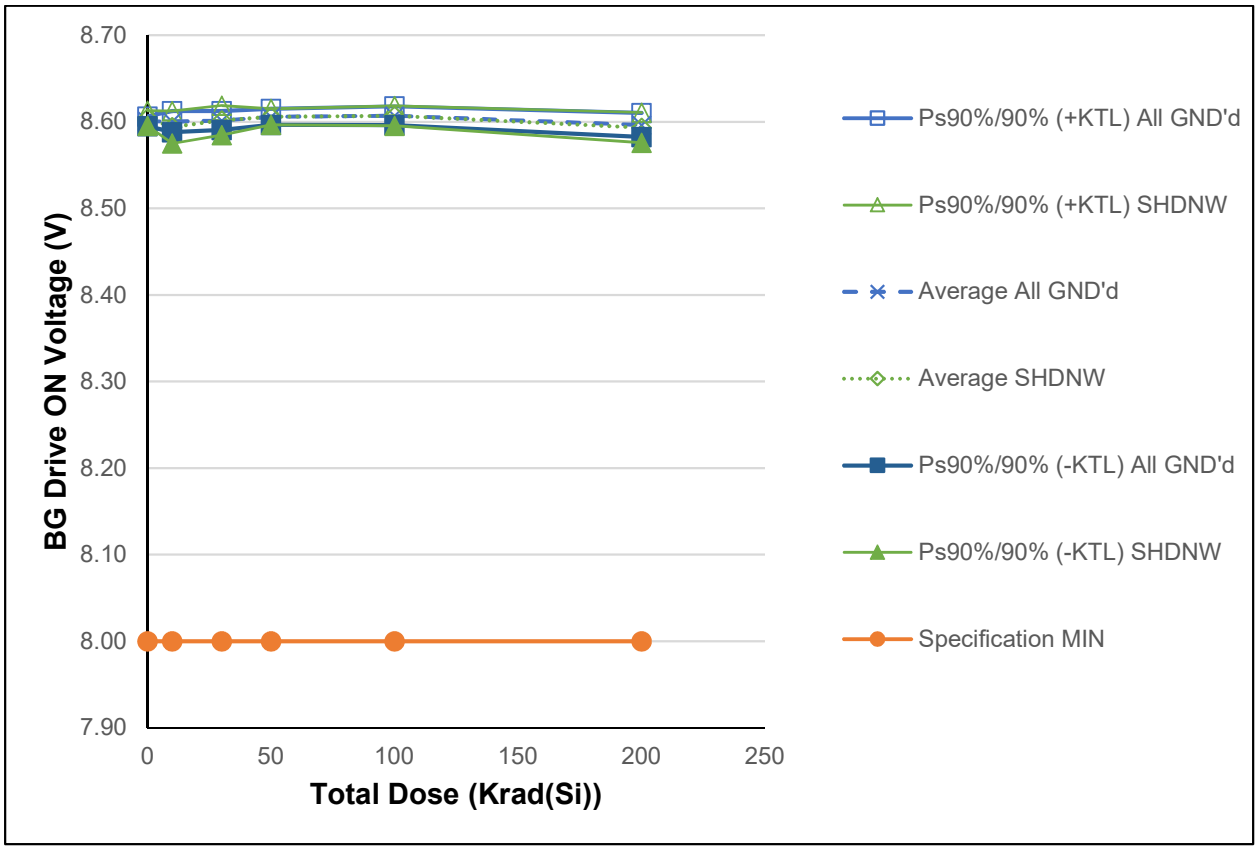

Figure 5.28: Plot of BG Drive ON Voltage versus Total Dose

Table 5.28: Raw data table for BG drive ON voltage versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	BG Drive ON Voltage	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(V)	0	10	30	50	100	200
82	All GND'd Irradiation	8.602	8.600				
83	All GND'd Irradiation	8.598	8.596				
84	All GND'd Irradiation	8.603	8.597				
85	All GND'd Irradiation	8.601	8.607				
86	All GND'd Irradiation	8.600	8.601				
74	SHDNW Irradiation	8.605	8.590				
75	SHDNW Irradiation	8.604	8.584				
76	SHDNW Irradiation	8.608	8.598				
77	SHDNW Irradiation	8.604	8.601				
78	SHDNW Irradiation	8.599	8.595				
92	All GND'd Irradiation	8.596		8.600			
93	All GND'd Irradiation	8.597		8.597			
94	All GND'd Irradiation	8.607		8.608			
95	All GND'd Irradiation	8.602		8.602			
96	All GND'd Irradiation	8.603		8.602			
87	SHDNW Irradiation	8.598		8.592			
88	SHDNW Irradiation	8.610		8.604			
89	SHDNW Irradiation	8.607		8.601			
90	SHDNW Irradiation	8.610		8.602			
91	SHDNW Irradiation	8.610		8.609			
144	All GND'd Irradiation	8.603			8.606		
145	All GND'd Irradiation	8.609			8.608		
149	All GND'd Irradiation	8.598			8.602		
150	All GND'd Irradiation	8.602			8.603		
152	All GND'd Irradiation	8.605			8.610		
137	SHDNW Irradiation	8.602			8.601		
138	SHDNW Irradiation	8.607			8.608		
139	SHDNW Irradiation	8.602			8.604		
140	SHDNW Irradiation	8.602			8.606		
143	SHDNW Irradiation	8.607			8.609		
174	All GND'd Irradiation	8.606				8.607	
175	All GND'd Irradiation	8.611				8.610	
176	All GND'd Irradiation	8.613				8.612	
177	All GND'd Irradiation	8.605				8.602	
178	All GND'd Irradiation	8.607				8.604	
136	SHDNW Irradiation	8.599				8.602	
170	SHDNW Irradiation	8.606				8.607	
171	SHDNW Irradiation	8.603				8.605	
172	SHDNW Irradiation	8.609				8.613	
173	SHDNW Irradiation	8.603				8.607	
165	All GND'd Irradiation	8.600					8.591
166	All GND'd Irradiation	8.603					8.594
167	All GND'd Irradiation	8.608					8.604
168	All GND'd Irradiation	8.599					8.594
169	All GND'd Irradiation	8.606					8.598
153	SHDNW Irradiation	8.605					8.604
158	SHDNW Irradiation	8.606					8.588
161	SHDNW Irradiation	8.603					8.595
162	SHDNW Irradiation	8.598					8.590
164	SHDNW Irradiation	8.600					8.590
134	Control Unit	8.604	8.609	8.609	8.609	8.609	8.609
135	Control Unit	8.607	8.608	8.608	8.608	8.608	8.608
	All GND'd Irradiation Statistics						
	Average All GND'd	8.601	8.600	8.601	8.606	8.607	8.596
	Std Dev All GND'd	0.002	0.004	0.004	0.003	0.004	0.005
	Ps90%/90% (+KTL) All GND'd	8.606	8.612	8.612	8.615	8.618	8.610
	Ps90%/90% (-KTL) All GND'd	8.595	8.588	8.591	8.596	8.596	8.582
	SHDNW Irradiation Statistics						
	Average SHDNW	8.604	8.594	8.602	8.606	8.607	8.593
	Std Dev SHDNW	0.003	0.007	0.006	0.003	0.004	0.006
	Ps90%/90% (+KTL) SHDNW	8.613	8.613	8.619	8.615	8.618	8.611
	Ps90%/90% (-KTL) SHDNW	8.596	8.575	8.585	8.597	8.596	8.576
	Specification MIN	8	8	8	8	8	8
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Specification MAX						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Status (-KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) All GND'd						
	Status (-KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (+KTL) SHDNW						

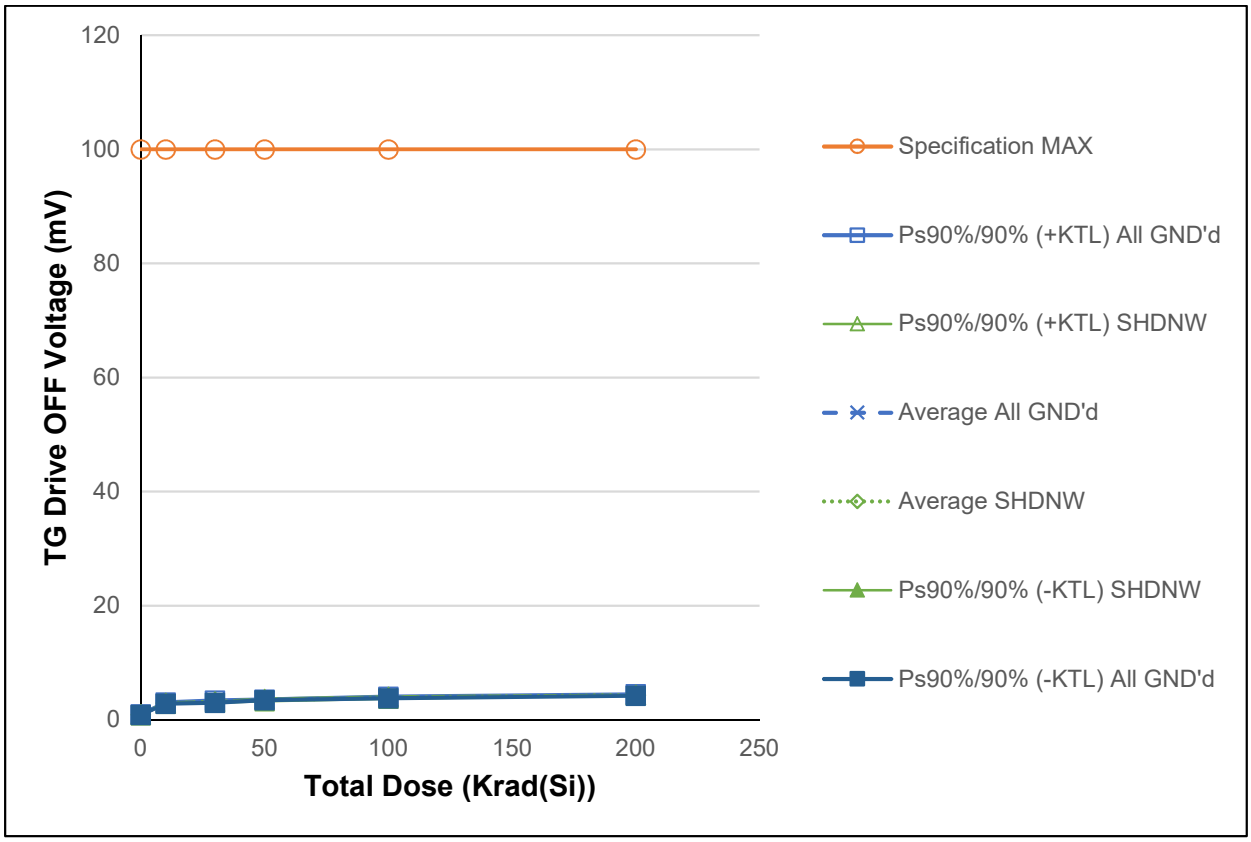

Figure 5.29: Plot of TG Drive OFF Voltage versus Total Dose

Table 5.29: Raw data table for TG drive OFF voltage versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	TG Drive OFF Voltage	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(mV)	0	10	30	50	100	200
82	All GND'd Irradiation	0.918	2.870				
83	All GND'd Irradiation	0.885	2.949				
84	All GND'd Irradiation	0.933	2.987				
85	All GND'd Irradiation	0.907	2.930				
86	All GND'd Irradiation	0.897	2.951				
74	SHDNW Irradiation	0.897	2.949				
75	SHDNW Irradiation	0.897	2.911				
76	SHDNW Irradiation	0.840	2.911				
77	SHDNW Irradiation	0.916	2.947				
78	SHDNW Irradiation	0.924	2.870				
92	All GND'd Irradiation	0.952		3.200			
93	All GND'd Irradiation	0.933		3.255			
94	All GND'd Irradiation	0.881		3.226			
95	All GND'd Irradiation	0.995		3.219			
96	All GND'd Irradiation	0.952		3.083			
87	SHDNW Irradiation	0.954		3.112			
88	SHDNW Irradiation	0.933		3.107			
89	SHDNW Irradiation	0.923		3.178			
90	SHDNW Irradiation	0.933		3.188			
91	SHDNW Irradiation	0.916		3.149			
144	All GND'd Irradiation	0.885			3.505		
145	All GND'd Irradiation	0.885			3.505		
149	All GND'd Irradiation	0.919			3.541		
150	All GND'd Irradiation	0.916			3.489		
152	All GND'd Irradiation	0.923			3.486		
137	SHDNW Irradiation	0.990			3.465		
138	SHDNW Irradiation	0.878			3.505		
139	SHDNW Irradiation	0.918			3.522		
140	SHDNW Irradiation	0.881			3.493		
143	SHDNW Irradiation	0.916			3.336		
174	All GND'd Irradiation	0.885				3.904	
175	All GND'd Irradiation	0.923				3.902	
176	All GND'd Irradiation	0.924				3.904	
177	All GND'd Irradiation	0.933				3.964	
178	All GND'd Irradiation	0.933				4.018	
136	SHDNW Irradiation	0.933				3.789	
170	SHDNW Irradiation	0.885				3.866	
171	SHDNW Irradiation	0.990				3.973	
172	SHDNW Irradiation	0.916				3.897	
173	SHDNW Irradiation	0.916				3.887	
165	All GND'd Irradiation	0.923					4.355
166	All GND'd Irradiation	0.933					4.400
167	All GND'd Irradiation	0.878					4.305
168	All GND'd Irradiation	0.933					4.290
169	All GND'd Irradiation	0.885					4.403
153	SHDNW Irradiation	0.885					4.355
158	SHDNW Irradiation	0.857					4.345
161	SHDNW Irradiation	0.857					4.365
162	SHDNW Irradiation	0.897					4.365
164	SHDNW Irradiation	0.919					4.345
134	Control Unit	0.952	2.987	2.987	2.987	2.987	2.987
135	Control Unit	0.873	2.987	2.987	2.987	2.987	2.987
	All GND'd Irradiation Statistics						
	Average All GND'd	0.908	2.938	3.196	3.505	3.938	4.351
	Std Dev All GND'd	0.018	0.043	0.066	0.022	0.052	0.052
	Ps90%/90% (+KTL) All GND'd	0.959	3.056	3.379	3.565	4.080	4.494
	Ps90%/90% (-KTL) All GND'd	0.858	2.820	3.014	3.445	3.796	4.208
	SHDNW Irradiation Statistics						
	Average SHDNW	0.895	2.918	3.147	3.464	3.882	4.355
	Std Dev SHDNW	0.033	0.032	0.037	0.075	0.066	0.010
	Ps90%/90% (+KTL) SHDNW	0.985	3.006	3.248	3.669	4.064	4.382
	Ps90%/90% (-KTL) SHDNW	0.805	2.829	3.045	3.259	3.701	4.328
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	100	100	100	100	100	100
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

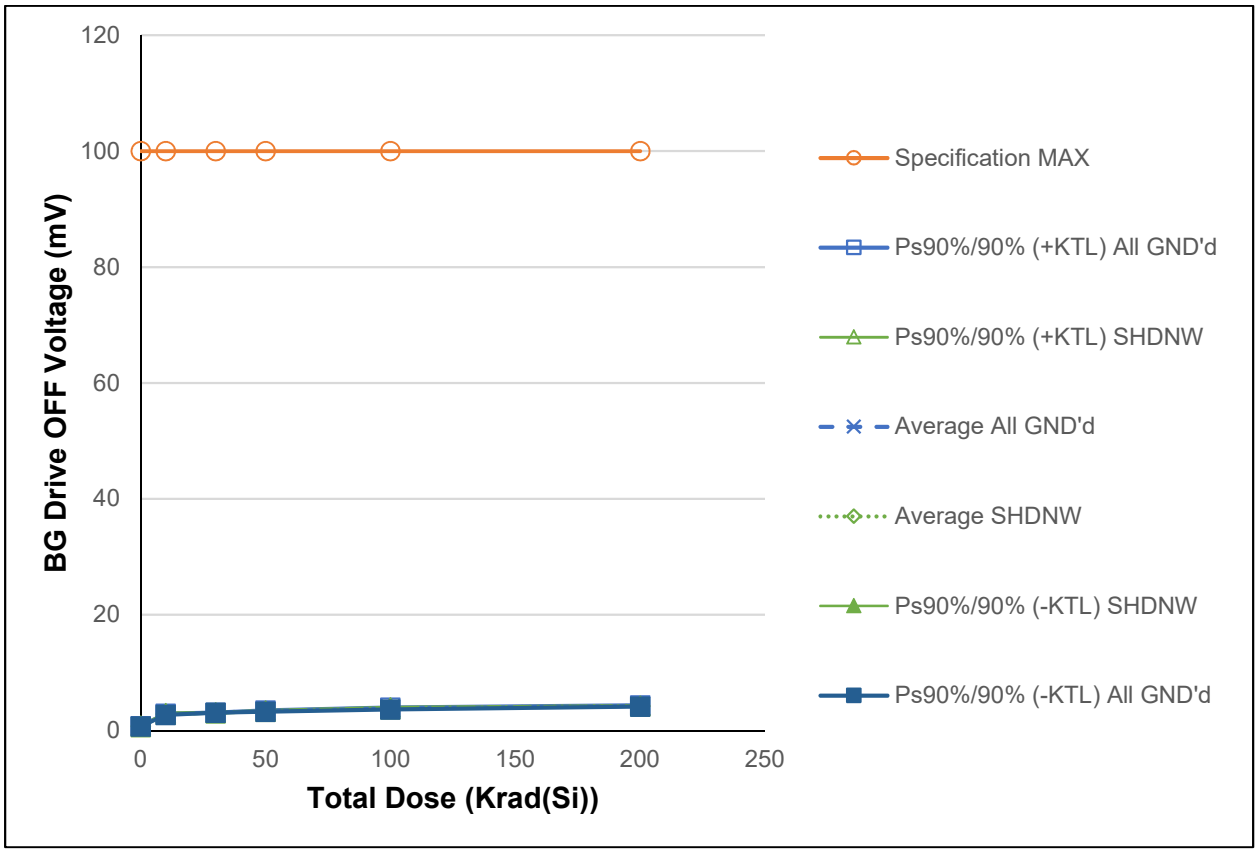

Figure 5.30: Plot of BG Drive OFF Voltage versus Total Dose

Table 5.30: Raw data table for BG drive OFF voltage versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	BG Drive OFF Voltage	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(mV)	0	10	30	50	100	200
82	All GND'd Irradiation	0.780	2.767				
83	All GND'd Irradiation	0.797	2.865				
84	All GND'd Irradiation	0.799	2.839				
85	All GND'd Irradiation	0.780	2.839				
86	All GND'd Irradiation	0.761	2.870				
74	SHDNW Irradiation	0.821	2.980				
75	SHDNW Irradiation	0.799	2.894				
76	SHDNW Irradiation	0.842	2.949				
77	SHDNW Irradiation	0.761	2.865				
78	SHDNW Irradiation	0.728	2.873				
92	All GND'd Irradiation	0.821		3.143			
93	All GND'd Irradiation	0.771		3.143			
94	All GND'd Irradiation	0.821		3.143			
95	All GND'd Irradiation	0.761		3.145			
96	All GND'd Irradiation	0.771		3.143			
87	SHDNW Irradiation	0.728		3.112			
88	SHDNW Irradiation	0.847		3.102			
89	SHDNW Irradiation	0.761		3.102			
90	SHDNW Irradiation	0.857		3.159			
91	SHDNW Irradiation	0.799		3.083			
144	All GND'd Irradiation	0.744			3.429		
145	All GND'd Irradiation	0.857			3.389		
149	All GND'd Irradiation	0.821			3.429		
150	All GND'd Irradiation	0.830			3.429		
152	All GND'd Irradiation	0.754			3.331		
137	SHDNW Irradiation	0.771			3.429		
138	SHDNW Irradiation	0.780			3.400		
139	SHDNW Irradiation	0.728			3.353		
140	SHDNW Irradiation	0.761			3.379		
143	SHDNW Irradiation	0.744			3.448		
174	All GND'd Irradiation	0.869				3.828	
175	All GND'd Irradiation	0.840				3.914	
176	All GND'd Irradiation	0.821				3.782	
177	All GND'd Irradiation	0.780				3.887	
178	All GND'd Irradiation	0.847				3.792	
136	SHDNW Irradiation	0.761				3.923	
170	SHDNW Irradiation	0.761				3.837	
171	SHDNW Irradiation	0.780				3.875	
172	SHDNW Irradiation	0.840				3.792	
173	SHDNW Irradiation	0.771				3.940	
165	All GND'd Irradiation	0.799					4.269
166	All GND'd Irradiation	0.840					4.305
167	All GND'd Irradiation	0.792					4.207
168	All GND'd Irradiation	0.744					4.305
169	All GND'd Irradiation	0.792					4.269
153	SHDNW Irradiation	0.780					4.291
158	SHDNW Irradiation	0.780					4.269
161	SHDNW Irradiation	0.761					4.296
162	SHDNW Irradiation	0.840					4.324
164	SHDNW Irradiation	0.766					4.305
134	Control Unit	0.771	2.875	2.875	2.875	2.875	2.875
135	Control Unit	0.797	2.894	2.894	2.894	2.894	2.894
	All GND'd Irradiation Statistics						
	Average All GND'd	0.784	2.836	3.143	3.401	3.840	4.271
	Std Dev All GND'd	0.015	0.041	0.001	0.043	0.058	0.040
	Ps90%/90% (+KTL) All GND'd	0.826	2.949	3.146	3.519	4.000	4.381
	Ps90%/90% (-KTL) All GND'd	0.741	2.724	3.140	3.283	3.681	4.161
	SHDNW Irradiation Statistics						
	Average SHDNW	0.790	2.912	3.112	3.402	3.873	4.297
	Std Dev SHDNW	0.046	0.050	0.029	0.038	0.061	0.020
	Ps90%/90% (+KTL) SHDNW	0.917	3.050	3.190	3.507	4.041	4.352
	Ps90%/90% (-KTL) SHDNW	0.664	2.775	3.033	3.297	3.706	4.242
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX	100	100	100	100	100	100
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

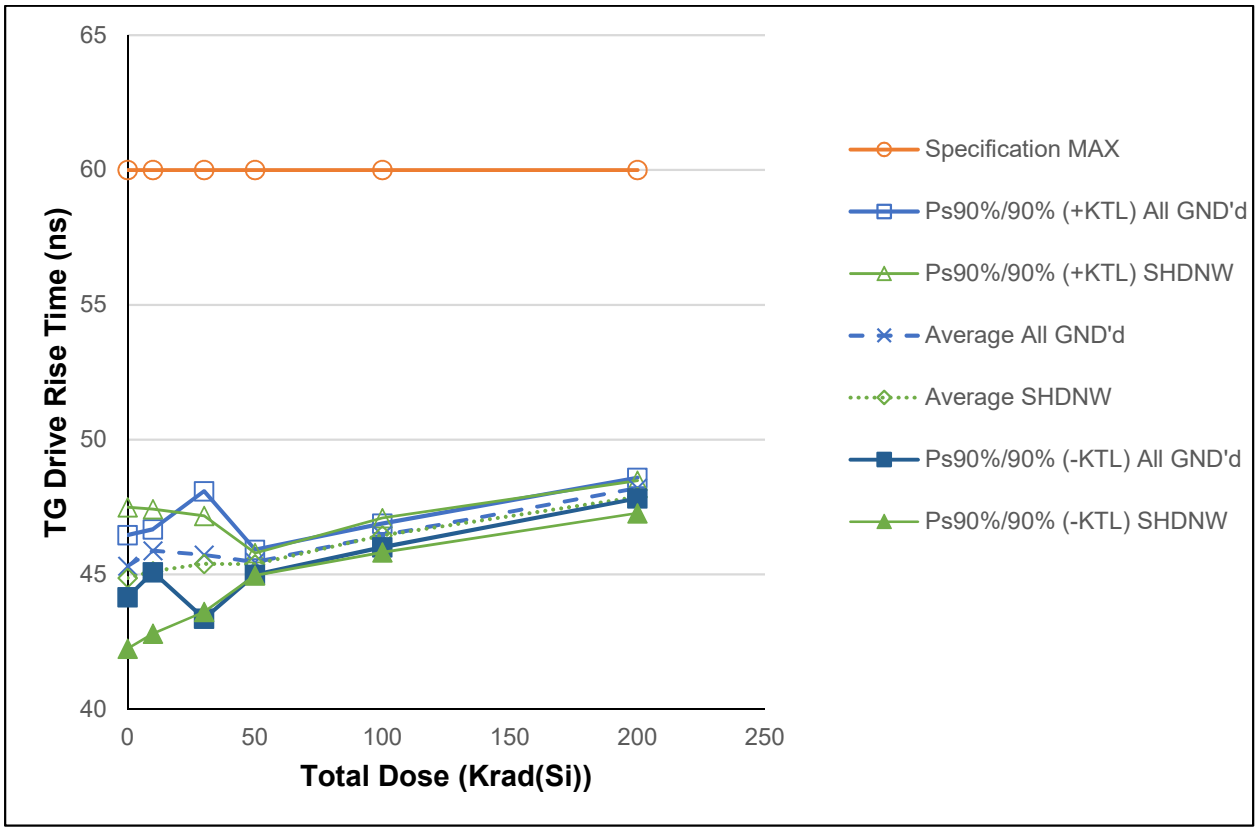

Figure 5.31: Plot of TG Drive Rise Time versus Total Dose

Table 5.31: Raw data table for TG drive rise time versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	TG Drive Rise Time	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(ns)	0	10	30	50	100	200
82	All GND'd Irradiation	44.928	45.494				
83	All GND'd Irradiation	45.695	46.213				
84	All GND'd Irradiation	45.828	46.122				
85	All GND'd Irradiation	44.973	45.789				
86	All GND'd Irradiation	45.138	45.798				
74	SHDNW Irradiation	44.526	44.763				
75	SHDNW Irradiation	45.956	45.856				
76	SHDNW Irradiation	43.549	43.865				
77	SHDNW Irradiation	44.678	45.231				
78	SHDNW Irradiation	45.634	45.879				
92	All GND'd Irradiation	45.424		45.903			
93	All GND'd Irradiation	45.730		46.187			
94	All GND'd Irradiation	43.433		44.212			
95	All GND'd Irradiation	45.772		46.324			
96	All GND'd Irradiation	45.581		45.990			
87	SHDNW Irradiation	45.103		45.307			
88	SHDNW Irradiation	44.407		45.142			
89	SHDNW Irradiation	45.933		46.323			
90	SHDNW Irradiation	45.292		45.631			
91	SHDNW Irradiation	43.808		44.564			
144	All GND'd Irradiation	45.072			45.561		
145	All GND'd Irradiation	44.985			45.446		
149	All GND'd Irradiation	44.981			45.242		
150	All GND'd Irradiation	45.321			45.674		
152	All GND'd Irradiation	44.987			45.361		
137	SHDNW Irradiation	45.196			45.416		
138	SHDNW Irradiation	44.949			45.316		
139	SHDNW Irradiation	45.121			45.498		
140	SHDNW Irradiation	44.796			45.148		
143	SHDNW Irradiation	44.906			45.520		
174	All GND'd Irradiation	45.370				46.446	
175	All GND'd Irradiation	45.364				46.467	
176	All GND'd Irradiation	45.569				46.705	
177	All GND'd Irradiation	45.227				46.340	
178	All GND'd Irradiation	45.375				46.292	
136	SHDNW Irradiation	45.358				46.704	
170	SHDNW Irradiation	45.348				46.296	
171	SHDNW Irradiation	45.318				46.436	
172	SHDNW Irradiation	45.450				46.658	
173	SHDNW Irradiation	45.146				46.162	
165	All GND'd Irradiation	45.290					48.045
166	All GND'd Irradiation	45.252					48.117
167	All GND'd Irradiation	45.444					48.409
168	All GND'd Irradiation	45.250					48.264
169	All GND'd Irradiation	45.327					48.201
153	SHDNW Irradiation	44.913					47.984
158	SHDNW Irradiation	45.175					47.605
161	SHDNW Irradiation	45.231					47.910
162	SHDNW Irradiation	45.224					48.162
164	SHDNW Irradiation	45.150					47.718
134	Control Unit	44.693	45.130	45.130	45.130	45.130	45.130
135	Control Unit	44.920	45.314	45.314	45.314	45.314	45.314
	All GND'd Irradiation Statistics						
	Average All GND'd	45.312	45.883	45.723	45.457	46.450	48.207
	Std Dev All GND'd	0.420	0.289	0.861	0.169	0.160	0.140
	Ps90%/90% (+KTL) All GND'd	46.464	46.675	48.083	45.919	46.889	48.592
	Ps90%/90% (-KTL) All GND'd	44.161	45.092	43.363	44.994	46.012	47.823
	SHDNW Irradiation Statistics						
	Average SHDNW	44.869	45.119	45.393	45.380	46.451	47.876
	Std Dev SHDNW	0.957	0.842	0.648	0.152	0.232	0.220
	Ps90%/90% (+KTL) SHDNW	47.493	47.427	47.169	45.797	47.086	48.479
	Ps90%/90% (-KTL) SHDNW	42.244	42.811	43.617	44.962	45.816	47.273
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX		60	60	60	60	60
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

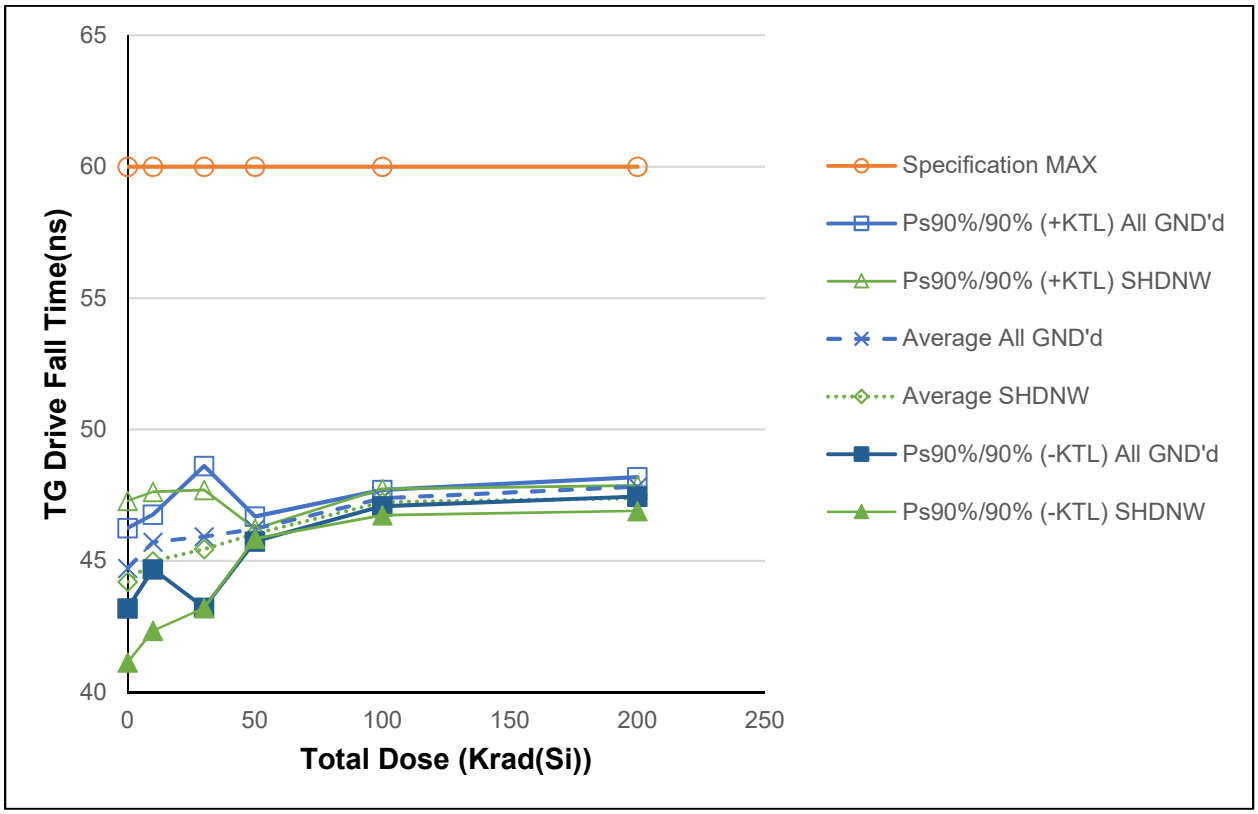

Figure 5.32: Plot of TG Drive Fall Time versus Total Dose

Table 5.32: Raw data table for TG drive fall time versus total dose including the statistical calculations, maximum specification, and the status of the test (PASS/FAIL)

Parameter	TG Drive Fall Time	Total Dose (Krad(Si)) @ 50 rads(si)/s					
Units	(ns)	0	10	30	50	100	200
82	All GND'd Irradiation	44.143	45.227				
83	All GND'd Irradiation	45.278	46.110				
84	All GND'd Irradiation	45.347	46.096				
85	All GND'd Irradiation	44.304	45.544				
86	All GND'd Irradiation	44.560	45.631				
74	SHDNW Irradiation	43.824	44.594				
75	SHDNW Irradiation	45.543	45.898				
76	SHDNW Irradiation	42.783	43.649				
77	SHDNW Irradiation	43.771	44.845				
78	SHDNW Irradiation	45.142	45.945				
92	All GND'd Irradiation	44.805		46.184			
93	All GND'd Irradiation	45.186		46.423			
94	All GND'd Irradiation	42.567		44.187			
95	All GND'd Irradiation	45.372		46.569			
96	All GND'd Irradiation	45.037		46.247			
87	SHDNW Irradiation	44.479		45.612			
88	SHDNW Irradiation	43.710		45.005			
89	SHDNW Irradiation	45.543		46.550			
90	SHDNW Irradiation	44.587		45.740			
91	SHDNW Irradiation	42.964		44.369			
144	All GND'd Irradiation	44.507			46.281		
145	All GND'd Irradiation	44.348			45.988		
149	All GND'd Irradiation	44.442			46.222		
150	All GND'd Irradiation	44.824			46.456		
152	All GND'd Irradiation	44.433			46.144		
137	SHDNW Irradiation	44.659			46.106		
138	SHDNW Irradiation	44.330			45.965		
139	SHDNW Irradiation	44.550			46.108		
140	SHDNW Irradiation	44.241			45.978		
143	SHDNW Irradiation	44.405			46.051		
174	All GND'd Irradiation	45.278				47.299	
175	All GND'd Irradiation	45.427				47.406	
176	All GND'd Irradiation	45.610				47.585	
177	All GND'd Irradiation	45.300				47.371	
178	All GND'd Irradiation	45.437				47.310	
136	SHDNW Irradiation	44.855				47.074	
170	SHDNW Irradiation	45.301				47.217	
171	SHDNW Irradiation	45.147				47.193	
172	SHDNW Irradiation	45.586				47.550	
173	SHDNW Irradiation	45.195				47.157	
165	All GND'd Irradiation	45.228					47.697
166	All GND'd Irradiation	45.183					47.733
167	All GND'd Irradiation	45.552					48.038
168	All GND'd Irradiation	45.233					47.794
169	All GND'd Irradiation	45.307					47.863
153	SHDNW Irradiation	44.292					47.118
158	SHDNW Irradiation	45.085					47.316
161	SHDNW Irradiation	45.053					47.465
162	SHDNW Irradiation	45.057					47.562
164	SHDNW Irradiation	45.189					47.492
134	Control Unit	43.969	44.914	44.914	44.914	44.914	44.914
135	Control Unit	44.182	44.982	44.982	44.982	44.982	44.982
	All GND'd Irradiation Statistics						
	Average All GND'd	44.727	45.722	45.922	46.218	47.394	47.825
	Std Dev All GND'd	0.556	0.379	0.981	0.172	0.115	0.135
	Ps90%/90% (+KTL) All GND'd	46.251	46.762	48.613	46.691	47.711	48.195
	Ps90%/90% (-KTL) All GND'd	43.203	44.682	43.231	45.746	47.078	47.455
	SHDNW Irradiation Statistics						
	Average SHDNW	44.213	44.986	45.455	46.042	47.238	47.391
	Std Dev SHDNW	1.121	0.963	0.820	0.068	0.183	0.177
	Ps90%/90% (+KTL) SHDNW	47.286	47.628	47.703	46.228	47.739	47.875
	Ps90%/90% (-KTL) SHDNW	41.140	42.345	43.208	45.855	46.737	46.906
	Specification MIN						
	Status (Measurements) All GND'd						
	Status (Measurements) SHDNW						
	Specification MAX		60	60	60	60	60
	Status (Measurements) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (Measurements) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) All GND'd						
	Status (+KTL) All GND'd	PASS	PASS	PASS	PASS	PASS	PASS
	Status (-KTL) SHDNW						
	Status (+KTL) SHDNW	PASS	PASS	PASS	PASS	PASS	PASS

Appendix A

Picture of one among fifty samples used in the test.

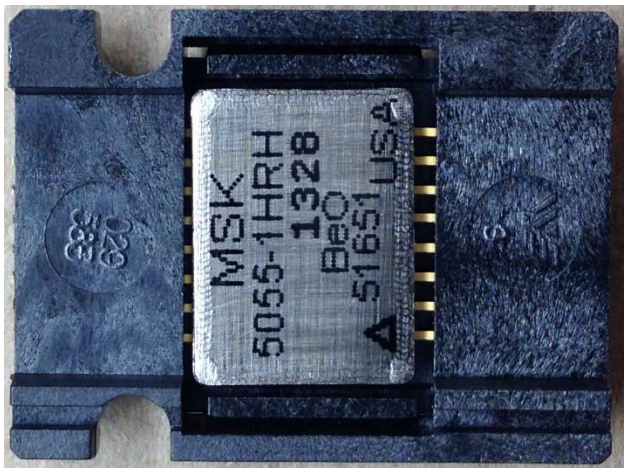

Figure A1: Top View showing date code

Figure A2: Bottom View showing serial number

Appendix B

Radiation Bias Connection

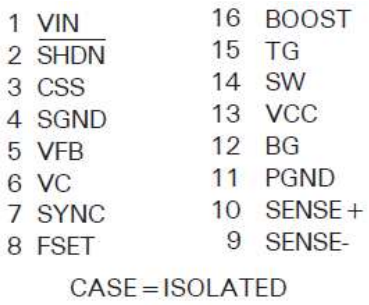

Figure B1: Pin-Out

Table B2: All GND'd

Pin	Function	Connection
1	VIN	GROUND
2	/SHDN	GROUND
3	CSS	GROUND
4	SGND	GROUND
5	VFB	GROUND
6	VC	GROUND
7	SYNC	GROUND
8	FSET	GROUND
9	SENSE -	GROUND
10	SENSE +	GROUND
11	PGND	GROUND
12	BG	GROUND
13	VCC	GROUND
14	SW	GROUND
15	TG	GROUND
16	BOOST	GROUND

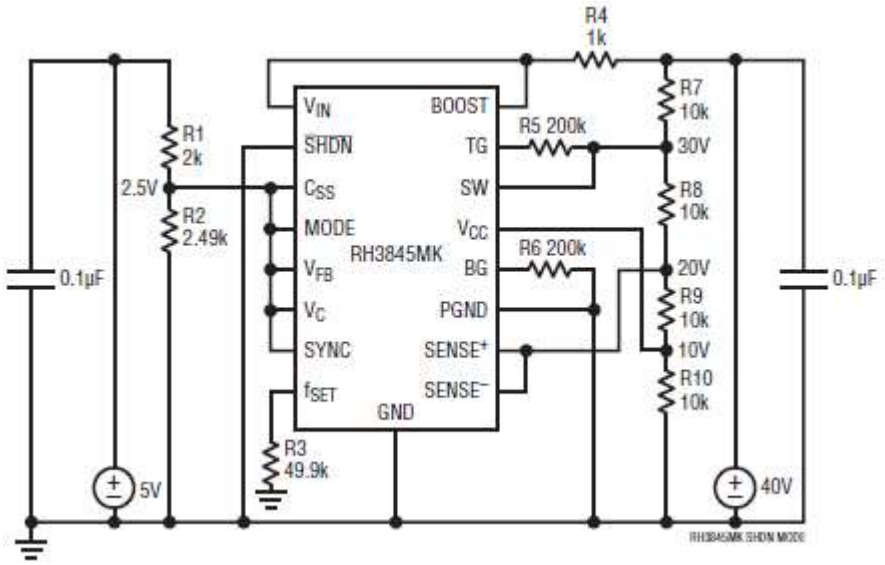

Figure B2: Total Dose Bias SHUTDOWN mode

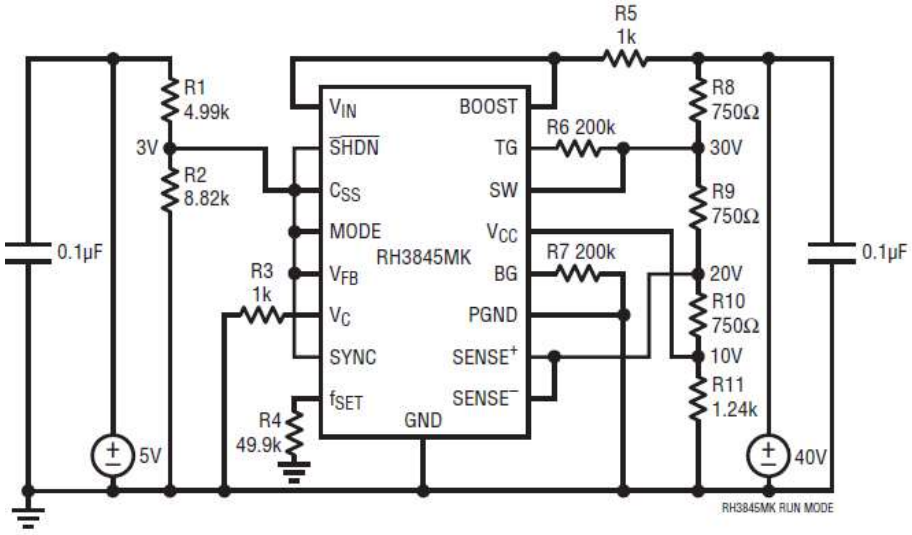

Figure B3: Total Dose Bias RUN mode

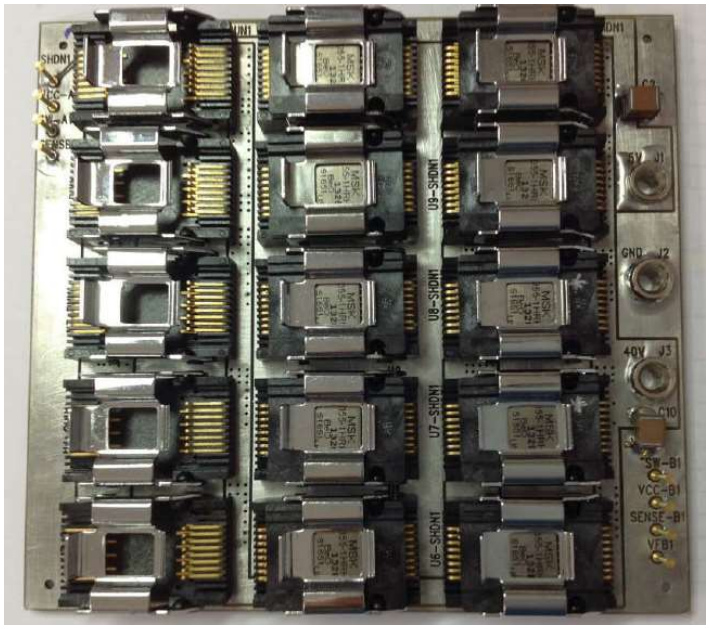

Figure B3: Bias Board (top view)

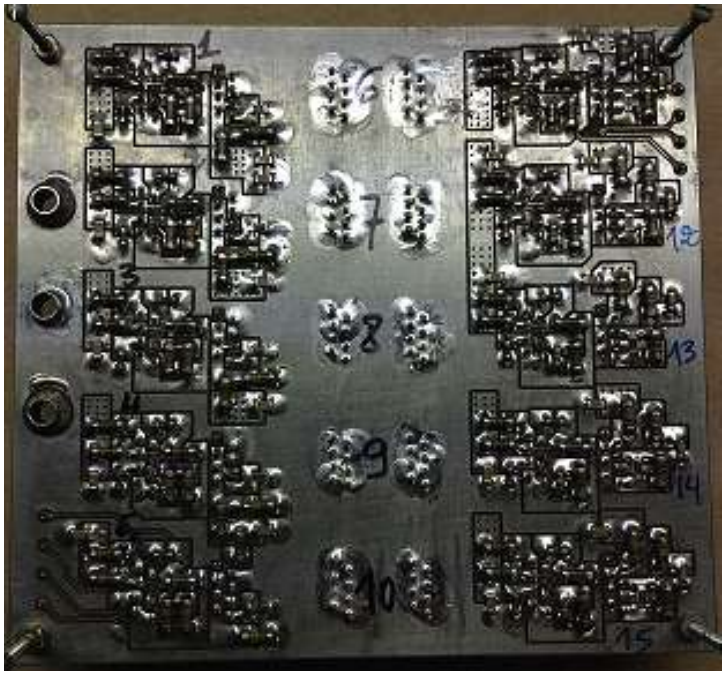

Figure B4: Bias Board (bottom view)

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: 2013-10-11 **Test Certificate #: 2014-NRC-001** **Total Pages (except cover): 5**

REQUEST FOR AND RESULTS OF TESTS

PAGE NO. 1 | NO. OF PAGES 5

SECTION A - REQUEST FOR TEST

1. TO: *(Include ZIP Code)*	2. FROM: *(Include ZIP Code)*
Defense Microelectronics Activity Science and Engineering Gamma Irradiation Test Facility 4234 54th Street McClellan, CA 95652-2100	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	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMITTED
N/A	N/A	See below	Total Ionizing Dose (TID) Testing	2013-10-08

10. MATERIAL TO BE TESTED	10a. QUANTITY SUBMITTED	11. QUANTITY REPRESENTED	12. SPEC. & AMEND AND/OR DRAWING NO. & REV. FOR SAMPLE & DATE
Various biased/unbiased devices - see below	See below	N/A	N/A

13. PURCHASED FROM OR SOURCE	14. SHIPMENT METHOD	15. DATE SAMPLED AND SUBMITTED BY
Linear Technology Corp.	Hand carry	2013-10-08 by Tom Shepherd

16. REMARKS AND/OR SPECIAL INSTRUCTIONS AND/OR WAIVERS.

Dose Rate: 3000 ±10% rad(SiO2)/min Irradiation Steps: 14 Type of Test: Customer-Performed

Total Dose: see below ±10% krad(SiO2) Requested Test Start Date: 2013-10-09 Dimensions: Various (photos of 2 boards are attached)

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-883H, Test Method 1019.8, Condition A. Customer reserves right to modify parameters, devices, etc. to suit test requirements.

Description of parts to be irradiated is as follows:

MSK5055RH (RH3845MK): fab lot #WD005797.2, ass'y lot #N/A, WFR #9: 10, 30, 50, 100, 150 and 200 krad, 10 pieces per dose level, biased

MSK196RH (6RH6105BK#IB*01): fab lot #WD005624.3, ass'y lot #N/A, WFR #7: 10, 30, 50, 100, 150 and 200 krad, 10 pieces per dose level, biased

WQRH3080MK-CS: fab lot #H0923840.4, ass'y lot #589492.4, WFR #5: 50 and 200 krad, 10 pieces per dose level, biased

Experiment #: 2014-NRC-001 DMEA Approval: SHEPHERD.THOM AS.J.1256235946 | SHEPHERD.THOM AS.J.1256235946 | SHEPHERD.THOM AS.J.1256235946 | MELINE.CARY W.1231854033

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	2. DATE RESULTS REPORTED	3. LAB REPORT NUMBER
2013-10-09	2013-10-11	N/A

4. TEST PERFORMED	RESULTS OF TEST	SAMPLE RESULT	REQUIREMENTS
Please see following pages.			

DATE	TYPED NAME AND TITLE OF PERSON CONDUCTING TEST	SIGNATURE
2013-10-11	Thomas J. Shepherd, SEGIT Technical Manager	SHEPHERD.THOMAS.J.1255235946
2013-10-15	Jon Lloyd, Alternate SEGIT Technical Manager	LLOYD.JON.E.1022655520

DD FORM 1222, FEB 62 (EF) REPLACES DD FORM 1222, 1 JUL 58, WHICH IS OBSOLETE.

Continuation of DD Form 1222 Experiment #: 2014-NRC-001 Page 2 of 5

4. Test Performed		Results of Test		Sample Result	Requirements
20131009 10:16:30 to 20131009 10:19:37	1.000E+04 rad(SiO2) at	3.216E+03	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 74-78, 82-86:	10 krad TD
20131009 10:30:20 to 20131009 10:39:40	3.000E+04 rad(SiO2) at	3.216E+03	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 87-96:	30 krad TD
20131009 10:46:45 to 20131009 11:02:18	5.000E+04 rad(SiO2) at	3.216E+03	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 137-140, 143-145, 149-150, 152:	50 krad TD
20131009 11:09:35 to 20131009 11:40:41	1.000E+05 rad(SiO2) at	3.216E+03	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 136, 170-178:	100 krad TD
20131009 11:48:00 to 20131009 12:50:11	2.000E+05 rad(SiO2) at	3.216E+03	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 153, 158, 161-162, 164-169:	200 krad TD
20131009 13:09:45 to 20131009 13:12:54	1.000E+04 rad(SiO2) at	3.176E+03	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 862-871:	10 krad TD
20131009 13:26:00 to 20131009 13:35:27	3.000E+04 rad(SiO2) at	3.176E+03	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 872-881:	30 krad TD
20131009 13:43:00 to 20131009 13:58:45	5.000E+04 rad(SiO2) at	3.176E+03	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 882-891:	50 krad TD
20131009 14:06:35 to 20131009 14:38:04	1.000E+05 rad(SiO2) at	3.176E+03	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 892-901:	100 krad TD
20131009 14:44:40 to 20131009 15:31:54	1.500E+05 rad(SiO2) at	3.176E+03	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 902-911:	150 krad TD
20131009 15:39:00 to 20131009 16:41:58	2.000E+05 rad(SiO2) at	3.176E+03	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 937-944, 946-947:	200 krad TD
20131009 17:04:10 to 20131009 17:19:55	5.000E+04 rad(SiO2) at	3.176E+03	rad(SiO2)/min	WQRH3080MK-CS, WFR #5, S/Ns 1-2, 4-9, 11-12:	50 krad TD
20131009 17:26:15 to 20131009 18:29:13	2.000E+05 rad(SiO2) at	3.176E+03	rad(SiO2)/min	WQRH3080MK-CS, WFR #5, S/Ns 13-15, 17-23:	200 krad TD

Uncertainty: Total Doses reported are ± 8.70% [MSK5055RH (RH3845MK)]
9.99% [All except MSK5055RH (RH3845MK)]

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

NOTES:
1. ASTM = American Society for Testing and Materials.
2. DUT = Device Under Test.
3. S/N = Serial Number.
4. TD = Total Dose.
5. WFR = Wafer.
6. Dose rate uniformity across target area: ± 2.46% [MSK5055RH (RH3845MK)]
   ± 3.74% [All except MSK5055RH (RH3845MK)]
7. All irradiation steps met the requirements of MIL-STD-883H, Test Method 1019.8, Condition A.
8. After the original Test Request (DD Form 1222) was approved, the following changes were made:
   a. There was no 150 krad(SiO2) dose step for the MSK5055RH (RH3845MK) devices.
   b. Total number of irradiation steps was 13 instead of 14.
   Latitude to change test parameters to suit customer requirements was included in the original Test Request; no Customer Order Change Request (SEGIT Form QP03-4, Rev. 5) was required/issued.
9. Source information:
   a. Irradiator = J.L. Shepherd & Associates Model 81-22/484 self-contained irradiation facility, S/Ns 7125/50016.
   b. Source selection = two large Co-60 sources.
10. Dosimeter system:
   a. Radcal Model No. 9010 Radiation Monitor Controller, S/N 90-1313.
   b. Radcal Model No. 90X5-0.18 Electrometer/Ion Chamber, S/Ns 95-0478/9771.
   c. This dosimeter system was calibrated per ISO/IEC 17025:2005 by University of Wisconsin Medical Radiation Research Center on 30 Aug 2011 (Report No. ION13407).
   This calibration is effective for two years.
11. Irradiation geometry: in accordance with section 7.3.2 of ASTM E1249-00 (2005), the DUT's semiconductor chip plane was perpendicular to the incident radiation beam.
12. Filter box: a DMEA Dose Enhancement Chamber (DEC) was used for all testing/dosimetry involved with this experiment.
   The DEC's Pb and Al layers are compliant with section 7.2.2 of ASTM E1249-00 (2005) with respect to thickness and geometry.

Appendix D

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

PARAMETER	CONDITIONS	SUB-GROUP	$T_A = 25°C$ MIN	TYP	MAX	SUB-GROUP	$-55°C \le T_A \ge 125°C$ MIN	TYP	MAX	UNITS
V_{IN} Minimum Start Voltage (Note 2)		1			7.5	2, 3			7.5	V
V_{IN} UVLO Threshold (Falling)		1	3.6	3.8	4.0	2, 3	3.6	3.8	4.0	V
V_{IN} Supply Current	V_{CC} > 9V	1		130	200	2, 3			800	µA
V_{IN} Shutdown Current	$V_{\overline{SHDN}}$ = 0.3V	1		65	100	2, 3			200	µA
BOOST Supply Current (Note 3)		1		1.4	2	2, 3			3.5	mA
V_{CC} Supply Current		1		3.8	4.5	2, 3			4.5	mA
V_{CC} Current Limit		1	–40	–150		2, 3	–40			mA
$\overline{SHDN}$ Enable Threshold (Rising)		1	1.30	1.38	1.5	2, 3	1.30		1.5	V
$\overline{SHDN}$ Hysteresis		1	100	140	150	2, 3	100		180	mV
Reference Voltage		1	1.214	1.232	1.250	2, 3	1.214		1.250	V
V_{FB} Input Bias Current		1		20	50	2, 3		20		nA
V_{FB} Error Amp Transconductance		1	350	450		2, 3	340		540	µS
Error Amp Sink/Source Current		1	35	50		2, 3	20			µA
Peak Current Limit Sense Voltage		1	90	105	120	2, 3	85		125	mV
Soft-Start Charge Current		1	8	12	16	2, 3	8		16	µA
Sense Pins Common-Mode Range		1	0		36	2, 3	0		36	V
Sense Pins Input Current	$V_{SENSE(CM)}$ > 4V	1		320	400	2, 3			500	µA
Reverse Protect Sense Voltage	V_{MODE} = 7.5V	1		108	120	2, 3			140	mV
Reverse Current Sense Voltage Offset	$V_{MODE} = V_{FB}$	1		7	20	2, 3			25	mV
Switching Frequency	R_T = 49.9k	1	270	310	350	2, 3	270		350	kHz
Programmable Frequency Range		1	100		500	2, 3	100		500	kHz
External Sync Frequency Range		1	100		600	2, 3	100		600	kHz
SYNC Voltage Threshold		1			2	2, 3			2	V
Non-Overlap Time TG to BG		1		250		2, 3				ns
Non-Overlap Time BG to TG		1		250		2, 3				ns
TG Minimum On-Time		1		400		2, 3				ns
TG Minimum Off-Time		1		300		2, 3				ns
TG, BG Drive On Voltage	V_{CC} = 10V	1	8	8.75		2, 3	8			V
TG, BG Drive Off Voltage		1			0.1	2, 3			0.1	V
TG, BG Drive Rise Time	$C_{TG} = C_{BG}$ = 3300pF	1		45		2, 3				ns
TG, BG Drive Fall Time	$C_{TG} = C_{BG}$ = 3300pF	1		45		2, 3				ns

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

PARAMETER	CONDITIONS	10KRADS (Si) MIN	10KRADS (Si) MAX	20KRADS (Si) MIN	20KRADS (Si) MAX	50KRADS (Si) MIN	50KRADS (Si) MAX	100KRADS (Si) MIN	100KRADS (Si) MAX	200KRADS (Si) MIN	200KRADS (Si) MAX	UNITS
V_{IN} Minimum Start Voltage (Note 2)			7.5		7.5		7.5		7.5		7.5	V
V_{IN} UVLO Threshold (Falling)			4		4		4		4		4	V
V_{IN} Supply Current	V_{CC} > 9V		200		200		200		200		200	µA
V_{IN} Shutdown Current	$V_{\overline{SHDN}}$ = 0.3V		100		100		100		100		100	µA
BOOST Supply Current (Note 3)			2		2		2		2		2	mA
V_{CC} Supply Current			4.5		4.5		4.5		4.5		4.5	mA
V_{CC} Current Limit		–40		–40		–40		–40		–40		mA
$\overline{SHDN}$ Enable Threshold (Rising)		1.30	1.5	1.30	1.5	1.30	1.5	1.30	1.5	1.30	1.5	V
$\overline{SHDN}$ Hysteresis		100	180	100	180	100	180	100	180	80	180	mV
Reference Voltage		1.214	1.250	1.210	1.246	1.208	1.244	1.204	1.240	1.187	1.223	V
V_{FB} Input Bias Current			50		100		120		250		350	nA
V_{FB} Error Amp Transconductance		350		330		300		280		250		µS
Error Amp Sink/Source Current		35		35		35		35		30		µA
Peak Current Limit Sense Voltage		90	120	85	120	85	120	80	120	75	120	mV
Soft-Start Charge Current		8	16	8	16	6	16	5	16	4	16	µA
Sense Pins Common-Mode Range			36		36		36		36		36	V
Sense Pins Input Current	$V_{SENSE(CM)}$ > 4V		400		400		400		400		400	µA
Reverse Protect Sense Voltage	V_{MODE} = 7.5V		120		120		120		120		120	mV
Reverse Current Sense Voltage Offset	V_{MODE} = V_{FB}		10		10		10		10		10	mV
Switching Frequency	R_T = 49.9k	270	350	270	350	270	350	270	350	270	350	kHz
Programmable Frequency Range		100	500	100	500	100	500	100	500	100	500	kHz
Non-Overlap Time TG to BG			350		350		350		350		350	ns
Non-Overlap Time BG to TG			350		350		350		350		350	ns
TG Minimum On-Time			500		500		500		500		500	ns
TG Minimum Off-Time			350		350		350		360		360	ns
TG, BG Drive On Voltage	V_{CC} = 10V	8		8		8		8		8		V
TG, BG Drive Off Voltage			0.1		0.1		0.1		0.1		0.1	V
TG, BG Drive Rise Time	C_{TG} = C_{BG} = 3300pF		60		60		60		60		60	ns
TG, BG Drive Fall Time	C_{TG} = C_{BG} = 3300pF		60		60		60		60		60	ns

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.

Note 2: V_{IN} voltages below the start-up threshold (7.5V) are only supported when the V_{CC} is externally driven above 6.5V.

Note 3: Supply current specification does not include switch drive currents. Actual supply currents will be higher.

Note 4: Connect the MODE pin to V_{FB} for pulse-skipping mode or V_{CC} for forced continuous mode.