Total Ionization Dose (TID) Test Results of the RH3845MK High Voltage Synchronous Step-Down Controller @ Low Dose Rate (LDR)

LDR = 10 mrad(Si)/s

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Acknowledgements

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TID LDR 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 # WD005797.2; Wafer # 9. See photograph of unit under test in Appendix A.

Quantity of Units: 17 units received, 2 units for control, 5 units for SHDNW (shutdown) biased irradiation, 5 units for RUN biased irradiation and 5 units for All GND'd irradiation. Serial numbers 102, 103, and 146-148 had all pins tied to ground during irradiation. Serial numbers 129,130, 133, 159, and 160 were biased in RUN mode during irradiation. Serial numbers 97-101 were biased in SHDNW mode. Serial numbers 134 and 135 were used as control. See Appendix B for the radiation bias connection tables.

Radiation and Electrical Test Increments: Ionizing radiation with the following electrical test increments: 25 Krads(Si), 50 Krads(Si), 75 Krads(Si), 100 Krads(Si), 128 Krads(Si), 150 Krads(Si).

Radiation dose: 10 mrad(Si)/sec.

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

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

THE PARTS PASSED THE ELECTRICAL TEST LIMITS UP TO 150 KRAD(SI), WITH THE EXCEPTION OF THE MINIMUM FREQUENCY RANGE PARAMETER, WHICH EXCEEDED SPECIFICATION LIMITS BETWEEN 100 AND 128 KRAD(SI).

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 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 D (for low-dose rates ranging from less than or equal to 10 mrads(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 10 mrads(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 15 samples were placed in a lead/aluminum container and aligned with the radiation source, Cobalt-60, at DMEA facility in Sacramento, California. During irradiation, ten units were biased at +40V, +5V in two different modes: RUN and SHUTDOWN, other five had all pads grounded. The devices were irradiated up to 150 Krad(Si) with increments of 25, 50, 75, 100, 128 Krads(Si). After each 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 17 units (15 irradiated and 2 control).

The criteria to pass the low dose-rate test is that ten samples irradiated under electrical bias must pass the datasheet limits. If any of the test parameters of these ten 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 fifteen samples passed the post-irradiation electrical tests, with the exception of the minimum frequency range measurement. Two parts biased under the RUN mode exceeded specification limits for the minimum frequency range between 100 and 128 krad(Si), as shown in Figure 5.22 and Table 5.22. All five parts biased under the RUN mode exceeded specification limits for the minimum frequency range parameter after 150 krad(Si). Additionally, the KTL tolerance limits exceeded specification limits for several parameters, even though the measured values of the parameters remained within specification.

The V_{IN} UVLO Threshold (Falling) parameter was not logged and recorded. Future qualified lots will include data and charts.

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

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

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

However, in most cases, mean and standard deviation 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 green diamond markers are the average of the measured data points of five samples irradiated under RUN biased mode. The green 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 RUN biased setup. The combined dotted-dashed lines are used for SHUTDOWN (SHDNW) bias: the purple diamond markers represent averages while purple triangle markers are the averages after the application of the KTL statistics. 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 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 25 Krads(Si) test limits are using Linear Technology datasheets 20 Krads(Si) specification limits.

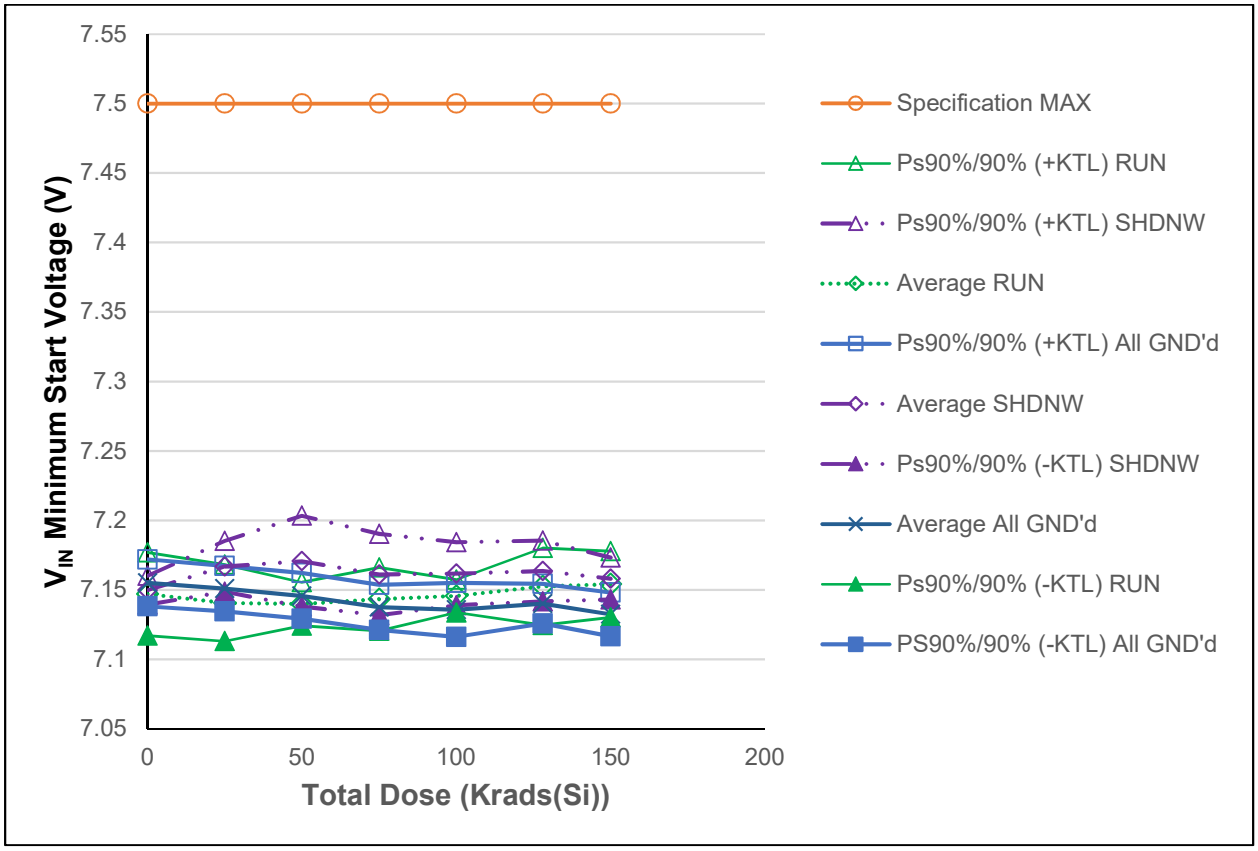

Figure 5.1 Plot of Minimum Start Voltage versus Total Dose

All fifteen samples passed the post-irradiation V_{IN} Start Voltage parameter.

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	V_{IN} Minimum Start Voltage	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(V)	0	25	50	75	100	128	150
102	All GND'd Irradiation	7.1567	7.1557	7.1506	7.1414	7.1439	7.1435	7.1344
103	All GND'd Irradiation	7.1471	7.1463	7.1490	7.1419	7.1379	7.1426	7.1373
146	All GND'd Irradiation	7.1526	7.1426	7.1353	7.1274	7.1244	7.1308	7.1225
147	All GND'd Irradiation	7.1640	7.1539	7.1457	7.1374	7.1351	7.1408	7.1327
148	All GND'd Irradiation	7.1547	7.1557	7.1472	7.1390	7.1364	7.1422	7.1347
97	SHDNW Irradiation	7.1467	7.1751	7.1834	7.1778	7.1730	7.1716	7.1549
98	SHDNW Irradiation	7.1562	7.1566	7.1512	7.1482	7.1541	7.1516	7.1529
99	SHDNW Irradiation	7.1489	7.1686	7.1745	7.1610	7.1645	7.1624	7.1649
100	SHDNW Irradiation	7.1478	7.1675	7.1742	7.1588	7.1530	7.1616	7.1544
101	SHDNW Irradiation	7.1489	7.1663	7.1697	7.1588	7.1633	7.1702	7.1630
129	RUN Irradiation	7.1417	7.1302	7.1408	7.1416	7.1463	7.1538	7.1581
130	RUN Irradiation	7.1439	7.1524	7.1428	7.1536	7.1502	7.1567	7.1614
133	RUN Irradiation	7.1336	7.1313	7.1311	7.1321	7.1384	7.1354	7.1391
159	RUN Irradiation	7.1538	7.1396	7.1381	7.1400	7.1460	7.1537	7.1564
160	RUN Irradiation	7.1616	7.1490	7.1463	7.1488	7.1467	7.1622	7.1552
134	Control Unit	7.1347	7.1341	7.1434	7.1346	7.1458	7.1474	7.1485
135	Control Unit	7.1334	7.1430	7.1456	7.1466	7.1443	7.1466	7.1464
	All GND'd Irradiation Statistics							
	Average All GND'd	7.1550	7.1508	7.1456	7.1374	7.1356	7.1400	7.1323
	Std Dev All GND'd	0.0062	0.0060	0.0060	0.0059	0.0071	0.0052	0.0057
	Ps90%/90% (+KTL) All GND'd	7.1719	7.1673	7.1620	7.1536	7.1550	7.1543	7.1480
	PS90%/90% (-KTL) All GND'd	7.1381	7.1344	7.1291	7.1212	7.1161	7.1256	7.1166
	SHDNW Irradiation Statistics							
	Average SHDNW	7.1497	7.1668	7.1706	7.1609	7.1616	7.1635	7.1580
	Std Dev SHDNW	0.0038	0.0067	0.0119	0.0107	0.0083	0.0080	0.0055
	Ps90%/90% (+KTL) SHDNW	7.1600	7.1851	7.2033	7.1902	7.1842	7.1854	7.1732
	Ps90%/90% (-KTL) SHDNW	7.1393	7.1486	7.1379	7.1317	7.1389	7.1415	7.1429
	RUN Irradiation Statistics							
	Average RUN	7.1469	7.1405	7.1398	7.1432	7.1455	7.1524	7.1540
	Std Dev RUN	0.0109	0.0100	0.0057	0.0083	0.0043	0.0101	0.0087
	Ps90%/90% (+KTL) RUN	7.1769	7.1680	7.1554	7.1660	7.1574	7.1801	7.1778
	Ps90%/90% (-KTL) RUN	7.1170	7.1130	7.1242	7.1205	7.1336	7.1247	7.1302
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	7.5	7.5	7.5		7.5		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

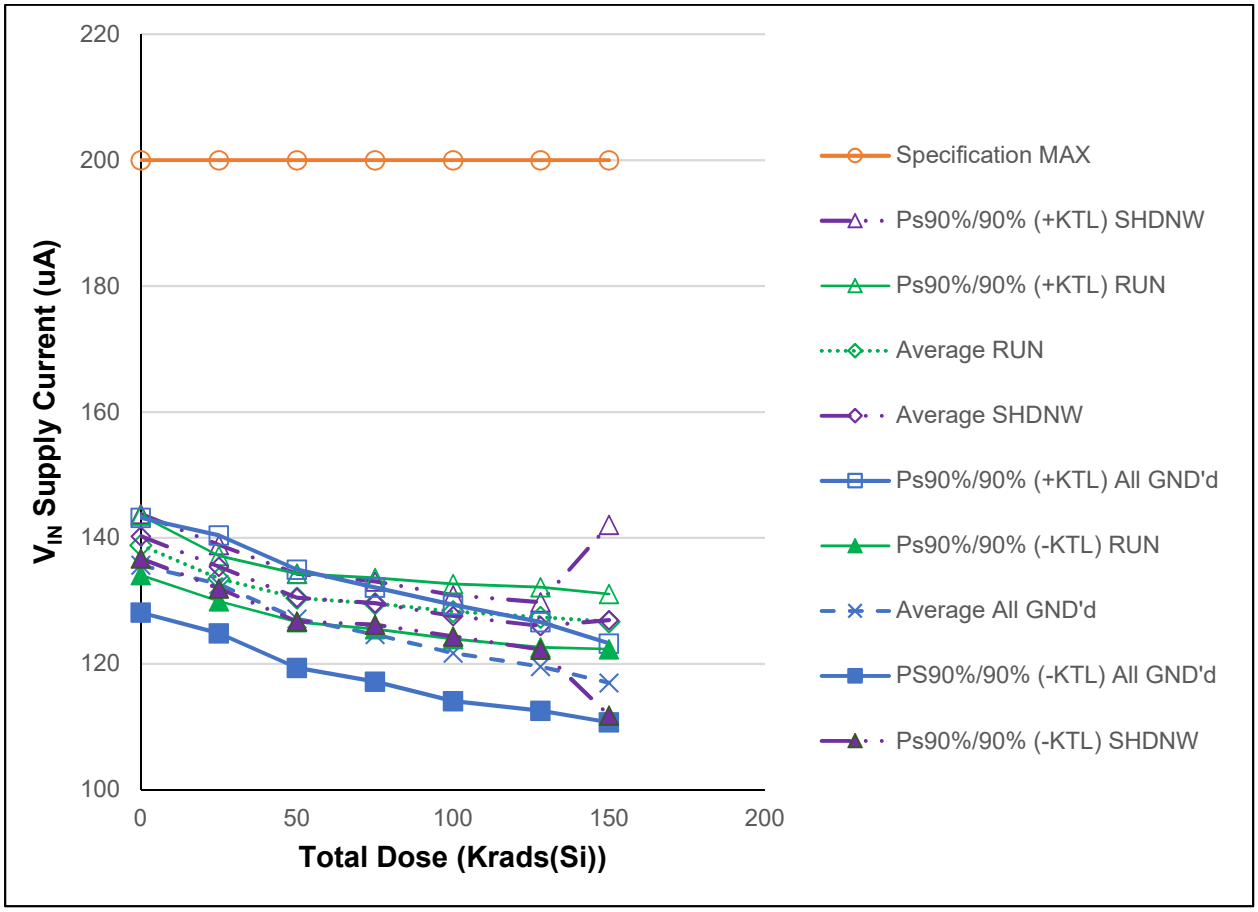

Figure 5.3: Plot of V_{IN} Supply Current versus Total Dose

All measured data points are within the datasheet specification limits.

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)) @ 10 mrads(Si)/second						
Units	(uA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	136.435	133.596	128.251	125.780	123.236	120.435	118.100
103	All GND'd Irradiation	139.906	136.911	131.540	128.802	125.812	123.585	120.348
146	All GND'd Irradiation	135.463	132.438	126.539	123.928	120.837	119.064	116.373
147	All GND'd Irradiation	133.655	130.825	125.280	123.053	119.960	117.922	115.704
148	All GND'd Irradiation	132.952	129.545	124.293	121.777	118.874	117.044	114.475
97	SHDNW Irradiation	140.304	135.732	130.515	129.915	127.999	126.426	136.616
98	SHDNW Irradiation	141.965	136.766	131.835	130.934	128.881	127.333	125.829
99	SHDNW Irradiation	140.276	135.199	130.230	129.516	127.642	126.172	124.461
100	SHDNW Irradiation	138.341	133.408	128.384	127.645	125.660	123.709	122.654
101	SHDNW Irradiation	140.543	136.015	131.635	130.360	127.973	126.526	125.300
129	RUN Irradiation	141.827	135.848	132.853	132.128	130.975	130.285	129.385
130	RUN Irradiation	138.417	132.952	129.735	128.742	127.394	126.326	125.840
133	RUN Irradiation	138.210	132.859	129.392	128.844	127.554	126.640	126.007
159	RUN Irradiation	138.436	133.570	130.601	129.725	128.688	127.797	127.005
160	RUN Irradiation	137.331	132.611	129.866	128.573	127.051	126.031	125.395
134	Control Unit	138.754	138.886	138.716	138.952	138.528	138.509	138.095
135	Control Unit	136.566	136.816	136.281	136.140	136.360	136.330	136.144
	All GND'd Irradiation Statistics							
	Average All GND'd	135.682	132.663	127.181	124.668	121.744	119.610	117.000
	Std Dev All GND'd	2.740	2.831	2.851	2.731	2.785	2.560	2.284
	Ps90%/90% (+KTL) All GND'd	143.194	140.427	134.998	132.156	129.379	126.629	123.263
	PS90%/90% (-KTL) All GND'd	128.170	124.899	119.363	117.180	114.108	112.591	110.737
	SHDNW Irradiation Statistics							
	Average SHDNW	140.286	135.424	130.520	129.674	127.631	126.033	126.972
	Std Dev SHDNW	1.291	1.261	1.380	1.251	1.194	1.370	5.524
	Ps90%/90% (+KTL) SHDNW	143.826	138.882	134.304	133.103	130.904	129.790	142.118
	Ps90%/90% (-KTL) SHDNW	136.745	131.966	126.735	126.245	124.357	122.276	111.825
	RUN Irradiation Statistics							
	Average RUN	138.844	133.568	130.489	129.603	128.332	127.416	126.726
	Std Dev RUN	1.727	1.323	1.393	1.480	1.600	1.738	1.598
	Ps90%/90% (+KTL) RUN	143.581	137.195	134.309	133.662	132.720	132.182	131.109
	Ps90%/90% (-KTL) RUN	134.108	129.941	126.670	125.543	123.945	122.649	122.344
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	200	200	200		200		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

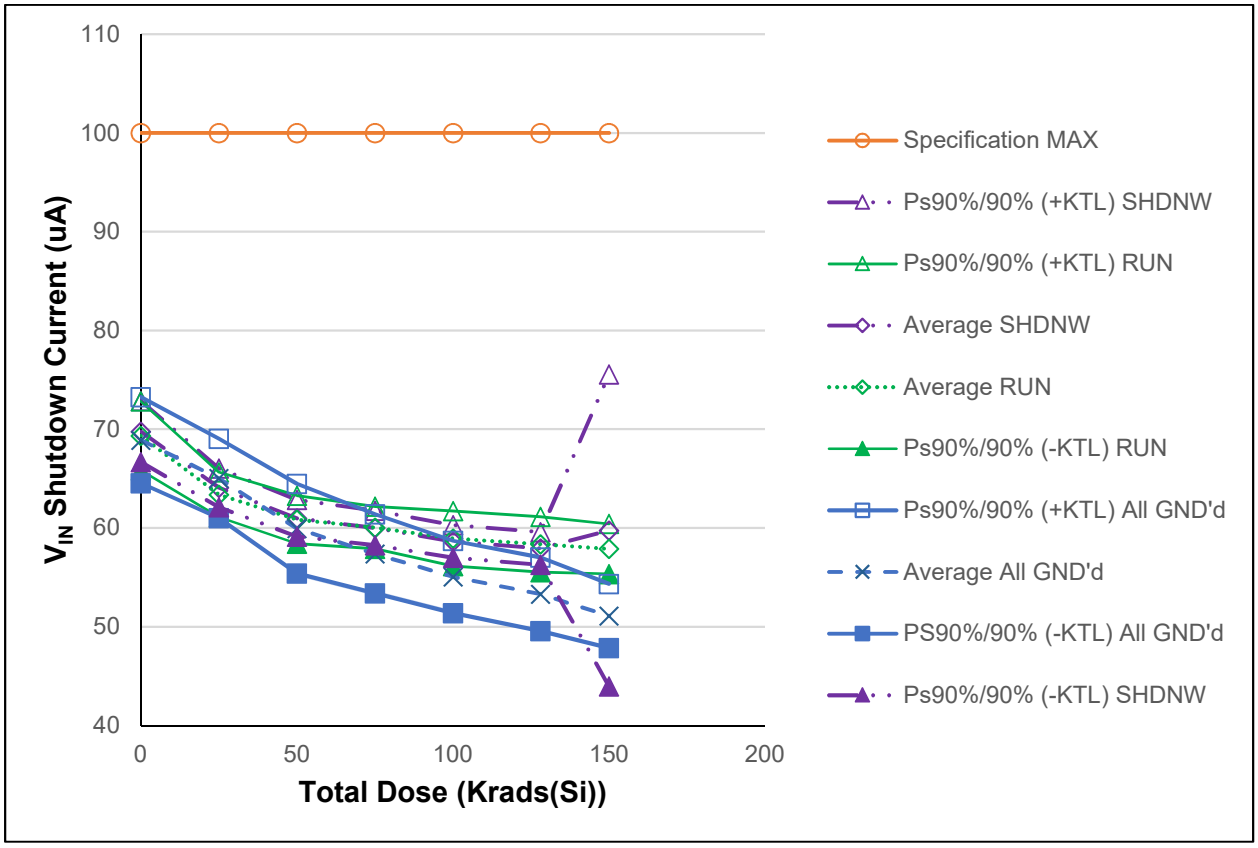

Figure 5.4: Plot of V_{IN} Shutdown Current versus Total Dose

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, maximum specification, and the status of the test (PASS/FAIL).

Parameter	V_{IN} Shutdown Current	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(uA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	68.835	65.288	61.001	58.182	55.931	53.961	51.683
103	All GND'd Irradiation	70.836	66.813	62.127	59.463	56.873	55.261	52.816
146	All GND'd Irradiation	70.092	65.948	59.750	57.152	54.749	53.065	50.854
147	All GND'd Irradiation	67.062	63.422	58.623	56.066	54.010	52.183	50.313
148	All GND'd Irradiation	67.643	63.665	58.135	56.050	53.672	51.964	49.815
97	SHDNW Irradiation	69.535	64.102	60.674	59.933	58.653	57.818	69.994
98	SHDNW Irradiation	71.170	64.693	61.664	60.705	59.223	58.573	57.876
99	SHDNW Irradiation	69.578	64.035	61.002	60.080	58.768	58.122	57.175
100	SHDNW Irradiation	68.144	62.923	60.013	58.976	57.630	56.955	56.116
101	SHDNW Irradiation	70.402	64.655	61.563	60.265	58.930	58.170	57.626
129	RUN Irradiation	71.245	64.826	62.282	61.318	60.645	60.033	59.393
130	RUN Irradiation	68.397	62.759	60.336	59.540	58.292	57.894	57.118
133	RUN Irradiation	70.036	63.095	59.946	59.387	58.259	57.561	57.586
159	RUN Irradiation	68.682	63.251	60.835	60.200	59.054	58.536	58.075
160	RUN Irradiation	68.320	62.989	60.774	59.727	58.378	57.665	57.229
134	Control Unit	71.531	71.831	71.596	71.736	71.602	71.410	71.286
135	Control Unit	70.380	70.186	69.925	69.839	70.075	69.823	69.852
	All GND'd Irradiation Statistics							
	Average All GND'd	68.893	65.027	59.927	57.383	55.047	53.287	51.096
	Std Dev All GND'd	1.591	1.461	1.654	1.461	1.339	1.357	1.185
	Ps90%/90% (+KTL) All GND'd	73.257	69.034	64.462	61.387	58.719	57.008	54.345
	PS90%/90% (-KTL) All GND'd	64.530	61.021	55.393	53.378	51.375	49.566	47.848
	SHDNW Irradiation Statistics							
	Average SHDNW	69.766	64.082	60.983	59.992	58.641	57.928	59.757
	Std Dev SHDNW	1.129	0.716	0.678	0.638	0.605	0.607	5.762
	Ps90%/90% (+KTL) SHDNW	72.860	66.044	62.841	61.740	60.299	59.591	75.557
	Ps90%/90% (-KTL) SHDNW	66.671	62.119	59.125	58.243	56.983	56.265	43.958
	RUN Irradiation Statistics							
	Average RUN	69.336	63.384	60.835	60.034	58.926	58.338	57.880
	Std Dev RUN	1.272	0.826	0.886	0.780	1.015	1.021	0.924
	Ps90%/90% (+KTL) RUN	72.825	65.648	63.263	62.172	61.708	61.137	60.415
	Ps90%/90% (-KTL) RUN	65.847	61.120	58.407	57.896	56.143	55.539	55.345
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	100	100	100		100		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

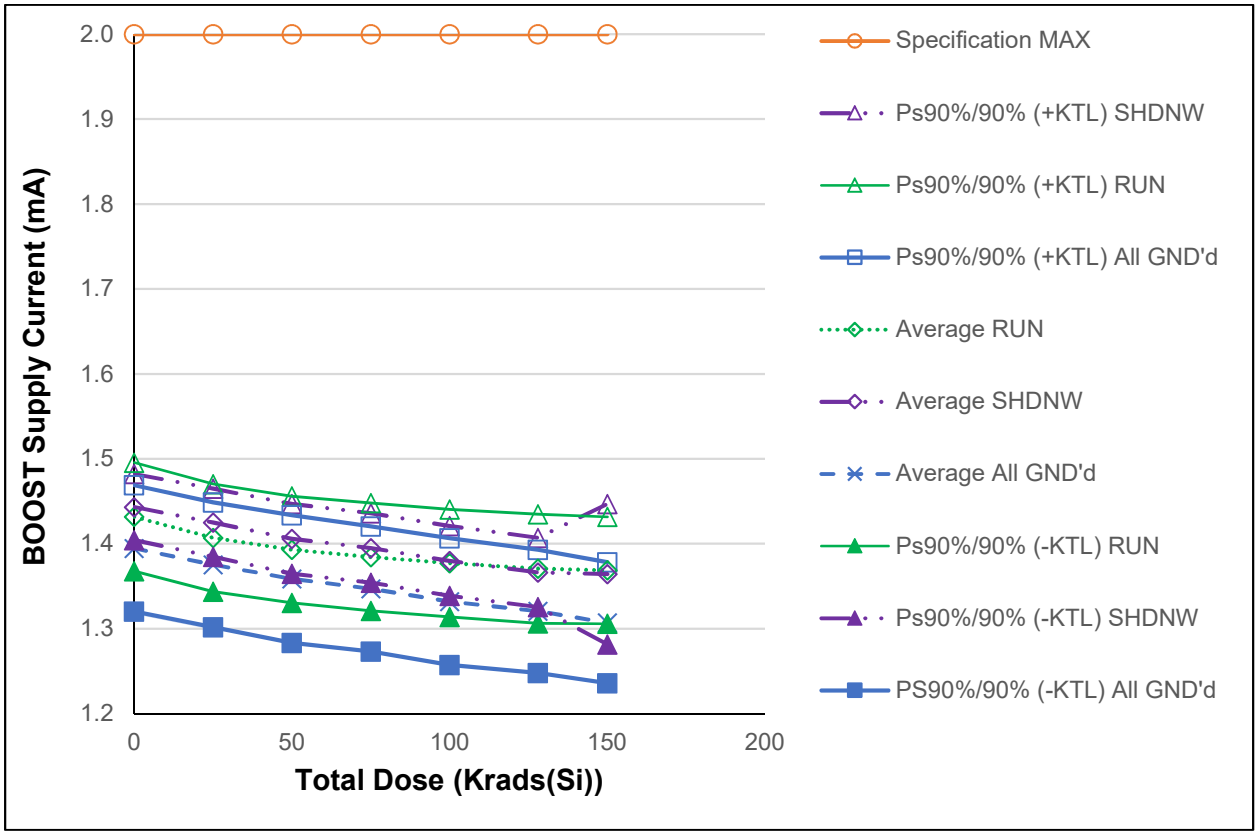

Figure 5.5: Plot of BOOST Supply Current versus Total Dose

The measured parameters are under maximum specification limits.

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)) @ 10 mrads(Si)/second						
Units	(mA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	1.396	1.377	1.361	1.349	1.335	1.323	1.308
103	All GND'd Irradiation	1.431	1.412	1.397	1.384	1.370	1.357	1.344
146	All GND'd Irradiation	1.403	1.383	1.365	1.353	1.338	1.327	1.313
147	All GND'd Irradiation	1.386	1.367	1.348	1.338	1.322	1.312	1.299
148	All GND'd Irradiation	1.357	1.338	1.322	1.310	1.295	1.284	1.272
97	SHDNW Irradiation	1.435	1.417	1.399	1.389	1.374	1.361	1.411
98	SHDNW Irradiation	1.461	1.443	1.423	1.412	1.397	1.384	1.369
99	SHDNW Irradiation	1.444	1.425	1.406	1.395	1.381	1.367	1.351
100	SHDNW Irradiation	1.424	1.405	1.385	1.373	1.358	1.344	1.329
101	SHDNW Irradiation	1.452	1.434	1.417	1.405	1.390	1.375	1.361
129	RUN Irradiation	1.462	1.437	1.423	1.415	1.408	1.402	1.399
130	RUN Irradiation	1.419	1.393	1.378	1.369	1.362	1.355	1.353
133	RUN Irradiation	1.443	1.417	1.403	1.394	1.387	1.380	1.378
159	RUN Irradiation	1.434	1.412	1.397	1.389	1.382	1.375	1.374
160	RUN Irradiation	1.400	1.377	1.364	1.355	1.348	1.341	1.340
134	Control Unit	1.414	1.413	1.413	1.412	1.412	1.412	1.412
135	Control Unit	1.412	1.411	1.410	1.408	1.410	1.410	1.410
	All GND'd Irradiation Statistics							
	Average All GND'd	1.395	1.375	1.359	1.347	1.332	1.321	1.307
	Std Dev All GND'd	0.027	0.027	0.027	0.027	0.027	0.026	0.026
	Ps90%/90% (+KTL) All GND'd	1.469	1.449	1.434	1.421	1.406	1.393	1.378
	PS90%/90% (-KTL) All GND'd	1.320	1.302	1.283	1.273	1.257	1.248	1.236
	SHDNW Irradiation Statistics							
	Average SHDNW	1.443	1.425	1.406	1.395	1.380	1.366	1.364
	Std Dev SHDNW	0.014	0.015	0.015	0.015	0.015	0.015	0.030
	Ps90%/90% (+KTL) SHDNW	1.482	1.465	1.447	1.436	1.421	1.407	1.447
	Ps90%/90% (-KTL) SHDNW	1.404	1.385	1.365	1.354	1.339	1.325	1.282
	RUN Irradiation Statistics							
	Average RUN	1.432	1.407	1.393	1.384	1.377	1.371	1.369
	Std Dev RUN	0.023	0.023	0.023	0.023	0.023	0.023	0.023
	Ps90%/90% (+KTL) RUN	1.496	1.470	1.456	1.448	1.441	1.435	1.432
	Ps90%/90% (-KTL) RUN	1.368	1.344	1.331	1.321	1.314	1.306	1.306
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	2	2	2		2		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

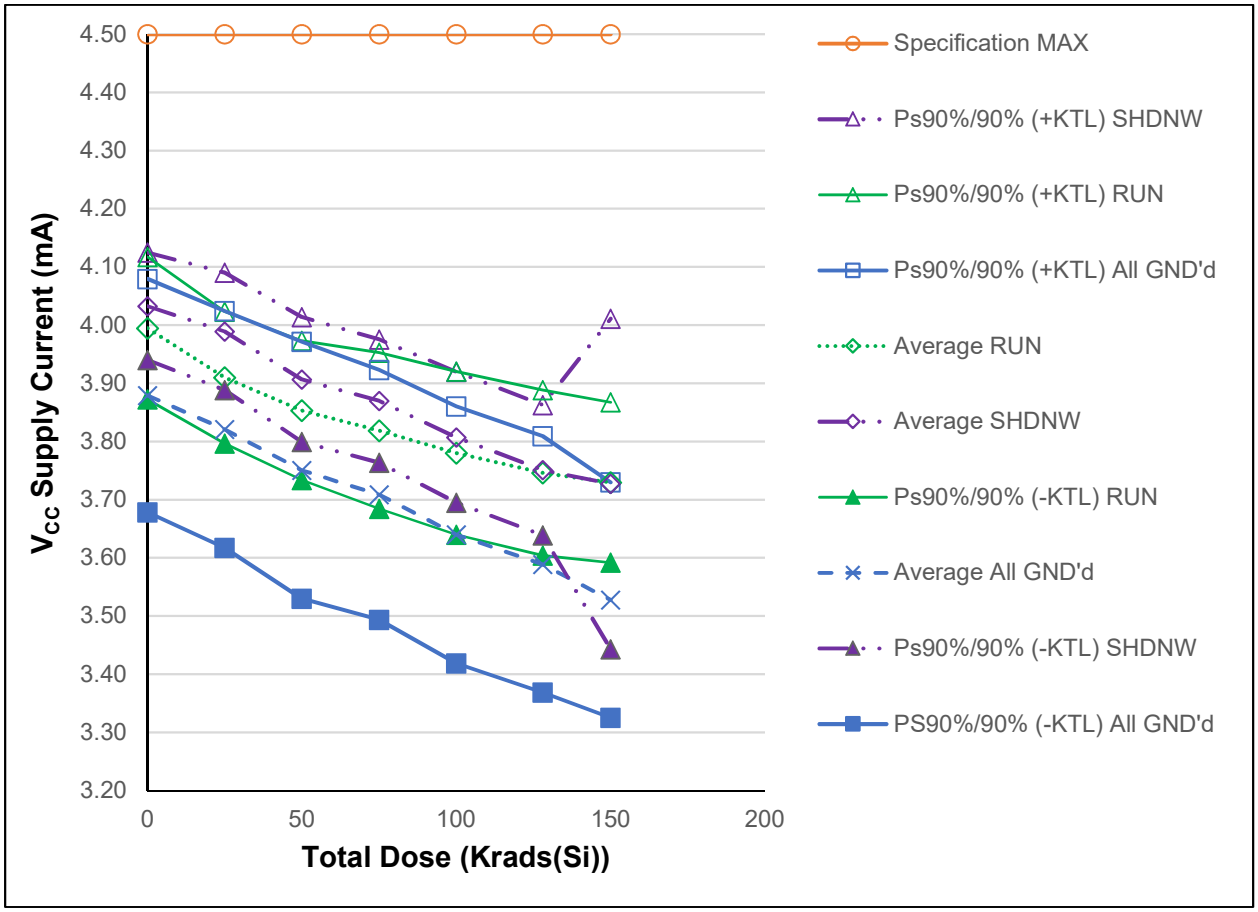

Figure 5.6: Plot of V_{CC} Supply Current versus Total Dose

All measured data are under specification maximum limits.

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)) @ 10 mrads(Si)/second						
Units	(mA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	3.895	3.842	3.770	3.724	3.660	3.602	3.544
103	All GND'd Irradiation	3.992	3.937	3.879	3.834	3.766	3.717	3.645
146	All GND'd Irradiation	3.861	3.792	3.717	3.673	3.608	3.557	3.499
147	All GND'd Irradiation	3.852	3.793	3.718	3.684	3.612	3.567	3.501
148	All GND'd Irradiation	3.794	3.740	3.669	3.627	3.552	3.500	3.449
97	SHDNW Irradiation	4.039	3.982	3.901	3.872	3.811	3.754	3.892
98	SHDNW Irradiation	4.074	4.037	3.949	3.904	3.848	3.794	3.736
99	SHDNW Irradiation	4.017	3.977	3.889	3.859	3.796	3.748	3.679
100	SHDNW Irradiation	3.985	3.939	3.853	3.810	3.744	3.685	3.613
101	SHDNW Irradiation	4.049	4.010	3.941	3.903	3.837	3.773	3.715
129	RUN Irradiation	4.069	3.976	3.920	3.892	3.860	3.827	3.807
130	RUN Irradiation	3.966	3.881	3.818	3.777	3.744	3.702	3.684
133	RUN Irradiation	3.969	3.883	3.820	3.786	3.747	3.718	3.702
159	RUN Irradiation	4.005	3.927	3.875	3.846	3.803	3.768	3.752
160	RUN Irradiation	3.964	3.884	3.833	3.791	3.746	3.715	3.702
134	Control Unit	3.924	3.928	3.932	3.924	3.919	3.923	3.915
135	Control Unit	3.898	3.897	3.888	3.885	3.890	3.884	3.888
	All GND'd Irradiation Statistics							
	Average All GND'd	3.879	3.821	3.751	3.708	3.640	3.589	3.527
	Std Dev All GND'd	0.073	0.074	0.080	0.078	0.081	0.080	0.074
	Ps90%/90% (+KTL) All GND'd	4.079	4.024	3.971	3.923	3.861	3.809	3.730
	PS90%/90% (-KTL) All GND'd	3.678	3.617	3.530	3.494	3.419	3.368	3.325
	SHDNW Irradiation Statistics							
	Average SHDNW	4.032	3.989	3.907	3.870	3.807	3.751	3.727
	Std Dev SHDNW	0.034	0.037	0.039	0.039	0.041	0.041	0.104
	Ps90%/90% (+KTL) SHDNW	4.125	4.090	4.014	3.975	3.920	3.863	4.011
	Ps90%/90% (-KTL) SHDNW	3.940	3.888	3.799	3.764	3.695	3.639	3.443
	RUN Irradiation Statistics							
	Average RUN	3.995	3.910	3.853	3.819	3.780	3.746	3.730
	Std Dev RUN	0.045	0.041	0.044	0.049	0.051	0.052	0.050
	Ps90%/90% (+KTL) RUN	4.117	4.023	3.973	3.953	3.920	3.888	3.867
	Ps90%/90% (-KTL) RUN	3.872	3.797	3.734	3.684	3.640	3.604	3.592
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	4.50	4.50	4.50		4.50		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

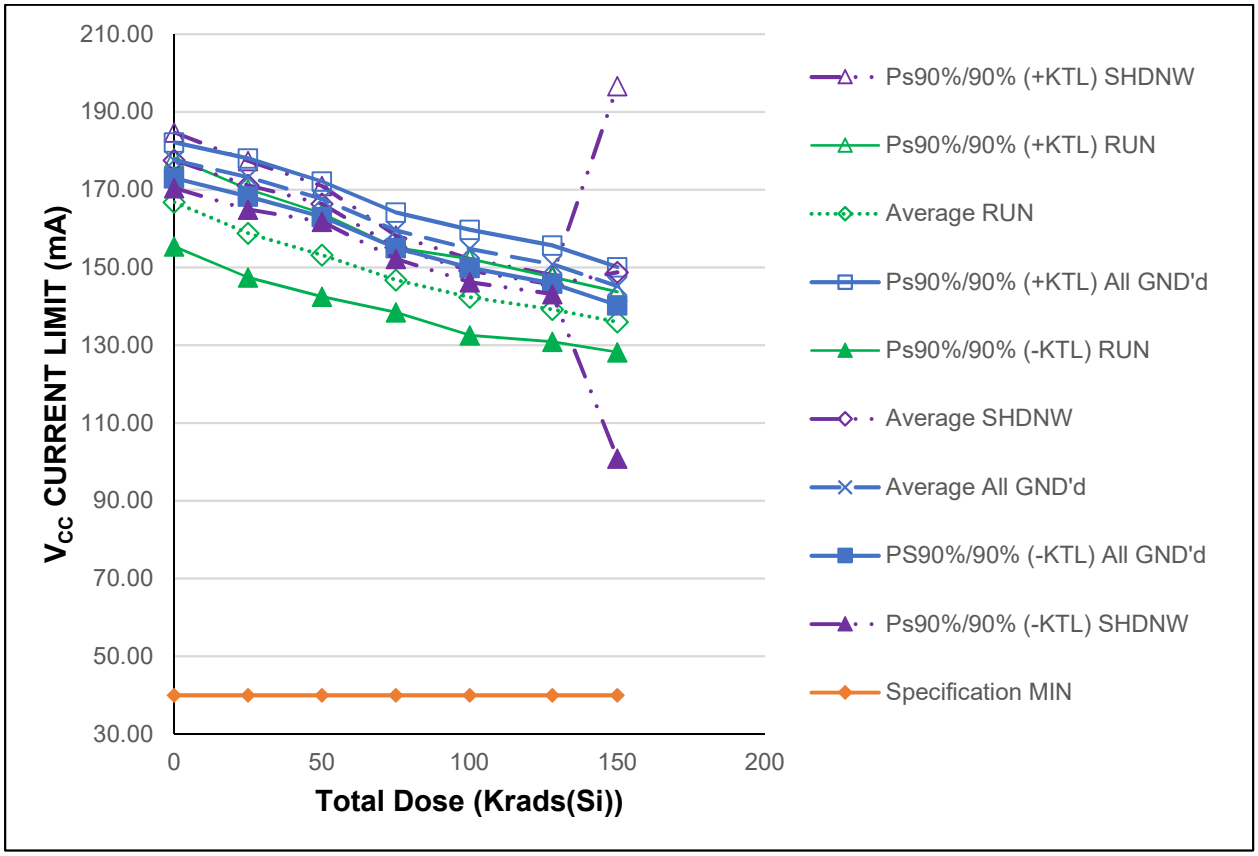

Figure 5.7: Plot of V_{CC} Current Limit versus Total Dose

The average measured values of 15 samples pass the datasheet specification maximum limits.

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

Parameter	V_{CC} Current Limit	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(mA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	178.00	174.00	168.00	160.00	154.00	150.00	144.00
103	All GND'd Irradiation	178.00	172.00	168.00	160.00	154.00	150.00	146.00
146	All GND'd Irradiation	180.00	176.00	170.00	162.00	158.00	154.00	148.00
147	All GND'd Irradiation	176.00	172.00	166.00	158.00	154.00	150.00	144.00
148	All GND'd Irradiation	176.00	172.00	166.00	158.00	154.00	150.00	144.00
97	SHDNW Irradiation	176.00	170.00	166.00	154.00	148.00	146.00	180.00
98	SHDNW Irradiation	174.00	168.00	164.00	154.00	148.00	144.00	140.00
99	SHDNW Irradiation	180.00	174.00	168.00	156.00	150.00	146.00	142.00
100	SHDNW Irradiation	180.00	172.00	168.00	156.00	150.00	146.00	140.00
101	SHDNW Irradiation	178.00	172.00	166.00	156.00	150.00	146.00	142.00
129	RUN Irradiation	164.00	156.00	152.00	146.00	142.00	138.00	136.00
130	RUN Irradiation	164.00	156.00	150.00	144.00	138.00	136.00	132.00
133	RUN Irradiation	174.00	166.00	160.00	152.00	148.00	144.00	140.00
159	RUN Irradiation	166.00	158.00	152.00	146.00	142.00	140.00	136.00
160	RUN Irradiation	166.00	158.00	152.00	146.00	142.00	138.00	136.00
134	Control Unit	178.00	178.00	178.00	178.00	178.00	180.00	180.00
135	Control Unit	178.00	178.00	180.00	180.00	178.00	180.00	180.00
	All GND'd Irradiation Statistics							
	Average All GND'd	177.60	173.20	167.60	159.60	154.80	150.80	145.20
	Std Dev All GND'd	1.67	1.79	1.67	1.67	1.79	1.79	1.79
	Ps90%/90% (+KTL) All GND'd	182.19	178.10	172.19	164.19	159.70	155.70	150.10
	PS90%/90% (-KTL) All GND'd	173.01	168.29	163.01	155.01	149.89	145.89	140.29
	SHDNW Irradiation Statistics							
	Average SHDNW	177.60	171.20	166.40	155.20	149.20	145.60	148.80
	Std Dev SHDNW	2.61	2.28	1.67	1.10	1.10	0.89	17.47
	Ps90%/90% (+KTL) SHDNW	184.75	177.45	170.99	158.20	152.20	148.05	196.70
	Ps90%/90% (-KTL) SHDNW	170.45	164.95	161.81	152.20	146.20	143.15	100.90
	RUN Irradiation Statistics							
	Average RUN	166.80	158.80	153.20	146.80	142.40	139.20	136.00
	Std Dev RUN	4.15	4.15	3.90	3.03	3.58	3.03	2.83
	Ps90%/90% (+KTL) RUN	178.17	170.17	163.89	155.12	152.21	147.52	143.76
	Ps90%/90% (-KTL) RUN	155.43	147.43	142.51	138.48	132.59	130.88	128.24
	Specification MIN	40	40	40		40		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Specification MAX							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd							
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW							
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN							

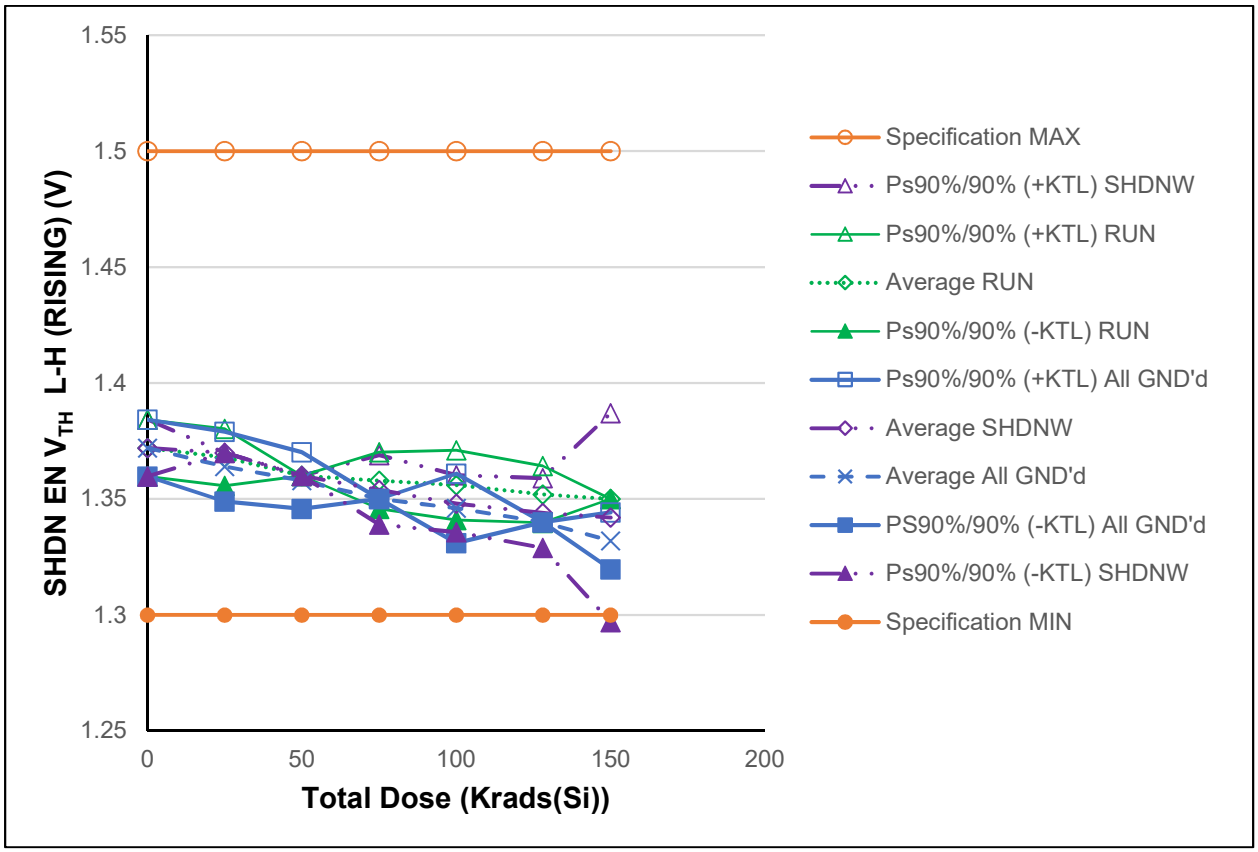

Figure 5.8: Plot of Shutdown EN Threshold Voltage versus Total Dose

The average measured values of 15 samples pass the datasheet specification limits.

Table 5.8: Raw data table for shutdown EN threshold voltage (rising) versus total dose including the statistical calculations, minimum specification, maximum specification, and the status of the test (PASS/FAIL)

Paramter	SHDN EN V_{TH} (Rising)	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(V)	0	25	50	75	100	128	150
102	All GND'd Irradiation	1.370	1.360	1.360	1.350	1.340	1.340	1.330
103	All GND'd Irradiation	1.370	1.360	1.360	1.350	1.350	1.340	1.330
146	All GND'd Irradiation	1.370	1.370	1.360	1.350	1.350	1.340	1.330
147	All GND'd Irradiation	1.380	1.370	1.360	1.350	1.350	1.340	1.340
148	All GND'd Irradiation	1.370	1.360	1.350	1.350	1.340	1.340	1.330
97	SHDNW Irradiation	1.380	1.370	1.360	1.360	1.350	1.350	1.370
98	SHDNW Irradiation	1.370	1.370	1.360	1.350	1.350	1.340	1.340
99	SHDNW Irradiation	1.370	1.370	1.360	1.360	1.350	1.350	1.340
100	SHDNW Irradiation	1.370	1.370	1.360	1.350	1.340	1.340	1.330
101	SHDNW Irradiation	1.370	1.370	1.360	1.350	1.350	1.340	1.330
129	RUN Irradiation	1.370	1.370	1.360	1.360	1.360	1.350	1.350
130	RUN Irradiation	1.370	1.360	1.360	1.350	1.350	1.350	1.350
133	RUN Irradiation	1.380	1.370	1.360	1.360	1.360	1.350	1.350
159	RUN Irradiation	1.370	1.370	1.360	1.360	1.360	1.360	1.350
160	RUN Irradiation	1.370	1.370	1.360	1.360	1.350	1.350	1.350
134	Control Unit	1.370	1.370	1.370	1.370	1.370	1.370	1.370
135	Control Unit	1.370	1.370	1.370	1.370	1.370	1.370	1.370
	All GND'd Irradiation Statistics							
	Average All GND'd	1.372	1.364	1.358	1.350	1.346	1.340	1.332
	Std Dev All GND'd	0.004	0.005	0.004	0.000	0.005	0.000	0.004
	Ps90%/90% (+KTL) All GND'd	1.384	1.379	1.370	1.350	1.361	1.340	1.344
	PS90%/90% (-KTL) All GND'd	1.360	1.349	1.346	1.350	1.331	1.340	1.320
	SHDNW Irradiation Statistics							
	Average SHDNW	1.372	1.370	1.360	1.354	1.348	1.344	1.342
	Std Dev SHDNW	0.004	0.000	0.000	0.005	0.004	0.005	0.016
	Ps90%/90% (+KTL) SHDNW	1.384	1.370	1.360	1.369	1.360	1.359	1.387
	Ps90%/90% (-KTL) SHDNW	1.360	1.370	1.360	1.339	1.336	1.329	1.297
	RUN Irradiation Statistics							
	Average RUN	1.372	1.368	1.360	1.358	1.356	1.352	1.350
	Std Dev RUN	0.004	0.004	0.000	0.004	0.005	0.004	0.000
	Ps90%/90% (+KTL) RUN	1.384	1.380	1.360	1.370	1.371	1.364	1.350
	Ps90%/90% (-KTL) RUN	1.360	1.356	1.360	1.346	1.341	1.340	1.350
	Specification MIN	1.3	1.3	1.3		1.3		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements)RUN	PASS	PASS	PASS		PASS		
	Specification MAX	1.5	1.5	1.5		1.5		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

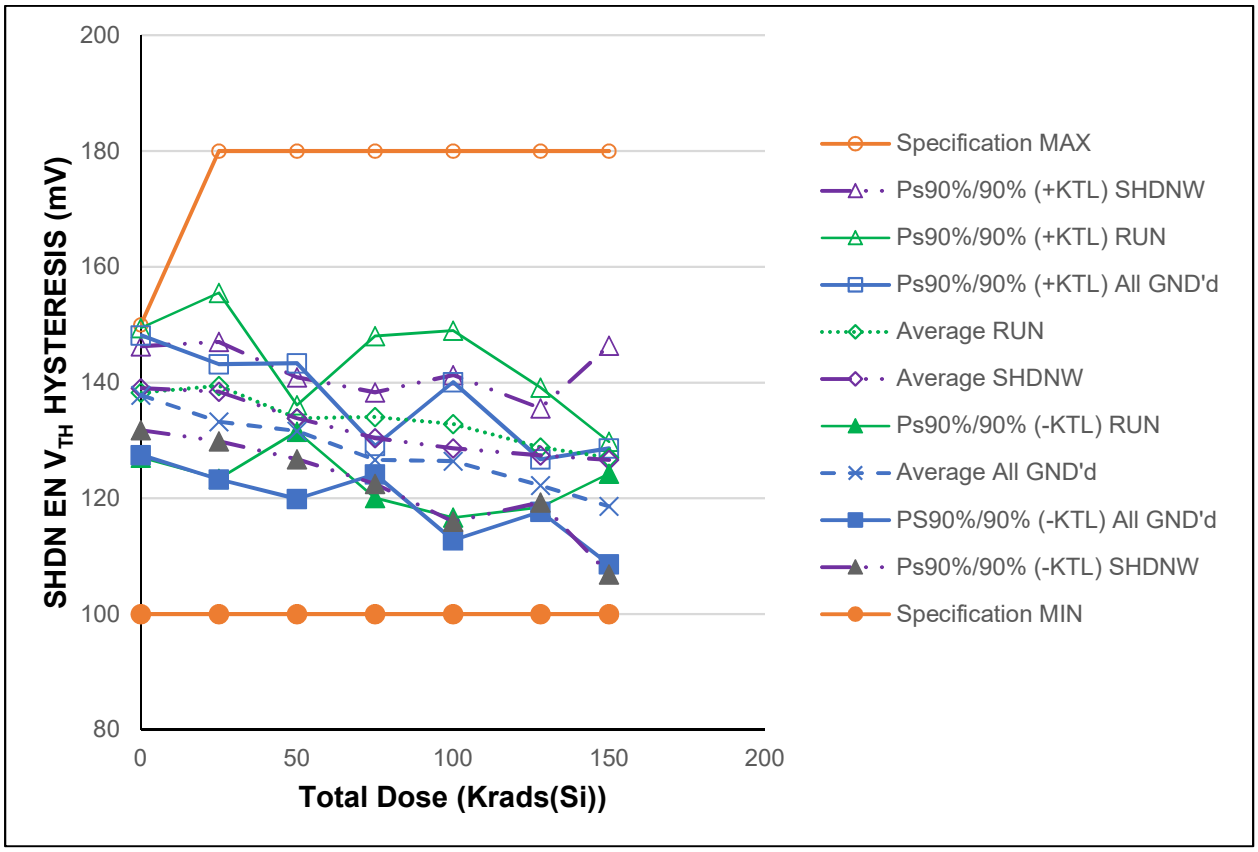

Figure 5.9: Plot of Shutdown V_{TH} Hysteresis Voltage versus Total Dose

The average measured values of 15 samples pass the datasheet specification minimum limits.

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

Parameter	SHDN EN V_{TH} Hystereis	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(mV)	0	25	50	75	100	128	150
102	All GND'd Irradiation	137.041	131.039	133.040	127.037	121.035	123.035	117.033
103	All GND'd Irradiation	138.042	132.039	134.040	127.037	131.039	124.036	118.033
146	All GND'd Irradiation	134.040	137.041	134.040	127.037	130.038	121.035	116.033
147	All GND'd Irradiation	144.044	137.041	133.040	125.036	129.038	120.034	125.036
148	All GND'd Irradiation	136.041	129.038	124.036	127.037	121.035	123.035	117.033
97	SHDNW Irradiation	143.044	135.040	130.038	131.039	125.036	128.038	138.042
98	SHDNW Irradiation	138.042	139.042	135.040	128.038	132.039	124.036	128.038
99	SHDNW Irradiation	136.041	136.041	133.040	135.040	129.038	132.039	126.037
100	SHDNW Irradiation	138.042	139.042	134.040	128.038	123.035	126.037	120.034
101	SHDNW Irradiation	140.042	143.044	137.041	130.038	134.040	127.037	121.035
129	RUN Irradiation	137.041	142.043	135.040	137.041	138.042	128.038	128.038
130	RUN Irradiation	134.040	129.038	133.040	125.036	125.036	125.036	126.037
133	RUN Irradiation	145.044	142.043	134.040	136.041	137.041	127.037	127.037
159	RUN Irradiation	137.041	141.043	133.040	135.040	136.041	135.040	126.037
160	RUN Irradiation	138.042	143.044	134.040	137.041	128.038	129.038	128.038
134	Control Unit	138.042	137.041	138.042	138.042	138.042	138.042	138.042
135	Control Unit	137.041	137.041	138.042	137.041	138.042	138.042	138.042
	All GND'd Irradiation Statistics							
	Average All GND'd	137.841	133.240	131.639	126.637	126.437	122.235	118.634
	Std Dev All GND'd	3.770	3.635	4.280	0.895	4.982	1.644	3.648
	Ps90%/90% (+KTL) All GND'd	148.178	143.206	143.374	129.090	140.097	126.742	128.637
	PS90%/90% (-KTL) All GND'd	127.505	123.273	119.904	124.183	112.776	117.728	108.630
	SHDNW Irradiation Statistics							
	Average SHDNW	139.042	138.442	133.840	130.438	128.638	127.437	126.637
	Std Dev SHDNW	2.647	3.132	2.589	2.882	4.617	2.968	7.200
	Ps90%/90% (+KTL) SHDNW	146.299	147.029	140.940	138.341	141.298	135.575	146.380
	Ps90%/90% (-KTL) SHDNW	131.784	129.854	126.739	122.536	115.978	119.300	106.894
	RUN Irradiation Statistics							
	Average RUN	138.242	139.442	133.840	134.040	132.839	128.838	127.037
	Std Dev RUN	4.088	5.859	0.837	5.101	5.893	3.770	1.000
	Ps90%/90% (+KTL) RUN	149.451	155.507	136.135	148.027	148.998	139.175	129.780
	Ps90%/90% (-KTL) RUN	127.032	123.377	131.545	120.053	116.681	118.501	124.294
	Specification MIN	100	100	100		100		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Specification MAX	150	180	180		180		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

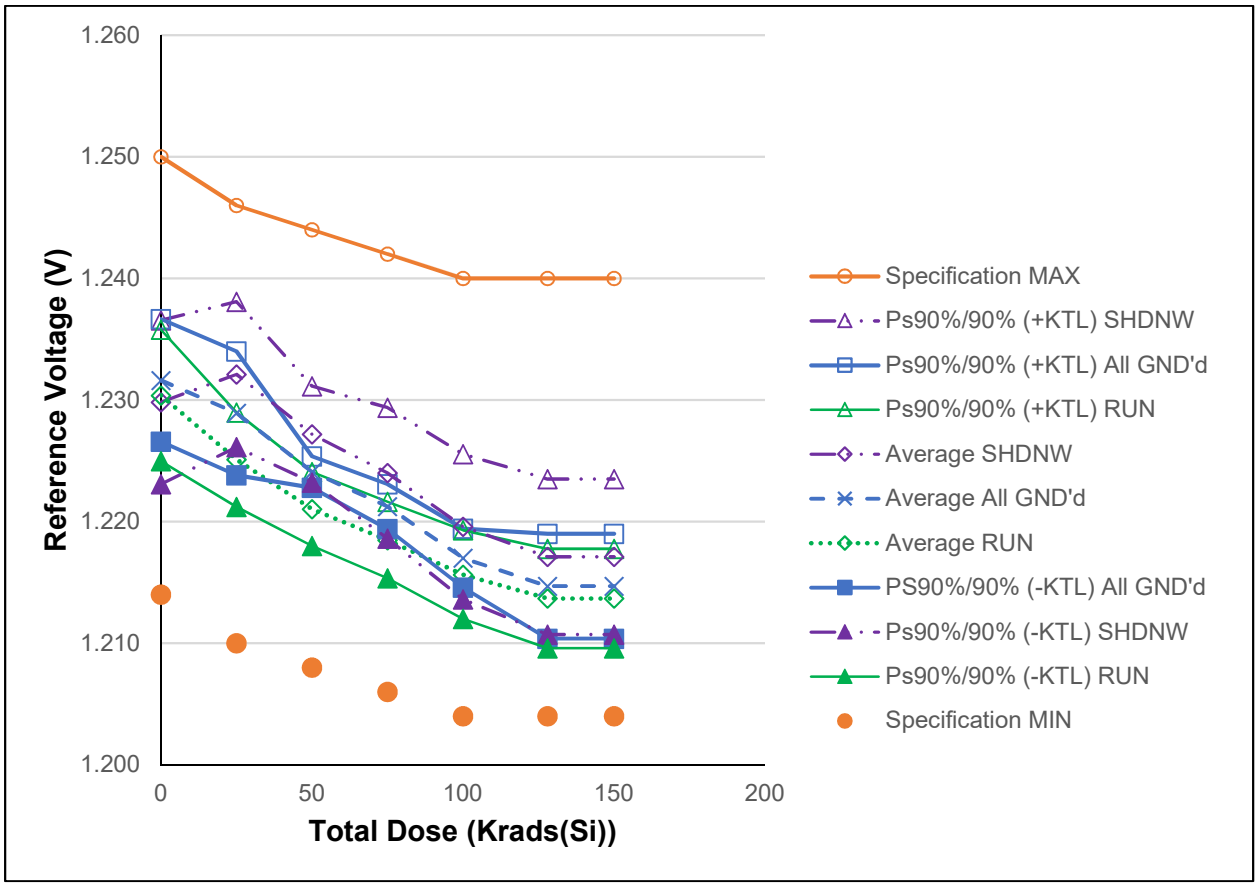

Figure 5.10: Plot of Reference Voltage versus Total Dose

The measured values of 15 samples pass the datasheet specification limits.

Table 5.10: Raw data table for reference voltage versus total dose including the statistical calculations, minimum specification, maximum specification, and the status of the test (PASS/FAIL)

Parameter	Reference Voltage	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(V)	0	25	50	75	100	128	150
102	All GND'd Irradiation	1.2305	1.2277	1.2245	1.2215	1.2166	1.2144	1.2144
103	All GND'd Irradiation	1.2290	1.2263	1.2234	1.2202	1.2158	1.2122	1.2122
146	All GND'd Irradiation	1.2336	1.2304	1.2239	1.2211	1.2174	1.2156	1.2156
147	All GND'd Irradiation	1.2328	1.2305	1.2246	1.2220	1.2182	1.2163	1.2163
148	All GND'd Irradiation	1.2321	1.2297	1.2241	1.2214	1.2171	1.2150	1.2150
97	SHDNW Irradiation	1.2334	1.2326	1.2286	1.2259	1.2220	1.2194	1.2194
98	SHDNW Irradiation	1.2289	1.2322	1.2262	1.2222	1.2184	1.2162	1.2162
99	SHDNW Irradiation	1.2303	1.2345	1.2286	1.2264	1.2220	1.2197	1.2197
100	SHDNW Irradiation	1.2298	1.2327	1.2272	1.2230	1.2180	1.2159	1.2159
101	SHDNW Irradiation	1.2267	1.2286	1.2253	1.2226	1.2177	1.2144	1.2144
129	RUN Irradiation	1.2294	1.2243	1.2203	1.2177	1.2146	1.2132	1.2132
130	RUN Irradiation	1.2327	1.2265	1.2221	1.2191	1.2161	1.2132	1.2132
133	RUN Irradiation	1.2322	1.2264	1.2220	1.2197	1.2172	1.2153	1.2153
159	RUN Irradiation	1.2295	1.2251	1.2213	1.2191	1.2164	1.2150	1.2150
160	RUN Irradiation	1.2281	1.2232	1.2196	1.2169	1.2139	1.2117	1.2117
134	Control Unit	1.2290	1.2296	1.2296	1.2296	1.2298	1.2297	1.2297
135	Control Unit	1.2297	1.2293	1.2293	1.2292	1.2294	1.2293	1.2293
	All GND'd Irradiation Statistics							
	Average All GND'd	1.2316	1.2289	1.2241	1.2212	1.2170	1.2147	1.2147
	Std Dev All GND'd	0.0018	0.0019	0.0005	0.0007	0.0009	0.0016	0.0016
	Ps90%/90% (+KTL) All GND'd	1.2367	1.2340	1.2254	1.2231	1.2194	1.2190	1.2190
	PS90%/90% (-KTL) All GND'd	1.2266	1.2238	1.2228	1.2194	1.2146	1.2104	1.2104
	SHDNW Irradiation Statistics							
	Average SHDNW	1.2298	1.2321	1.2272	1.2240	1.2196	1.2171	1.2171
	Std Dev SHDNW	0.0025	0.0022	0.0014	0.0020	0.0022	0.0023	0.0023
	Ps90%/90% (+KTL) SHDNW	1.2366	1.2381	1.2311	1.2294	1.2256	1.2235	1.2235
	Ps90%/90% (-KTL) SHDNW	1.2231	1.2261	1.2232	1.2186	1.2136	1.2107	1.2107
	RUN Irradiation Statistics							
	Average RUN	1.2304	1.2251	1.2210	1.2185	1.2156	1.2137	1.2137
	Std Dev RUN	0.0020	0.0014	0.0011	0.0011	0.0013	0.0015	0.0015
	Ps90%/90% (+KTL) RUN	1.2358	1.2290	1.2241	1.2216	1.2193	1.2178	1.2178
	Ps90%/90% (-KTL) RUN	1.2250	1.2212	1.2180	1.2153	1.2120	1.2096	1.2096
	Specification MIN	1.214	1.210	1.208		1.204		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Specification MAX	1.250	1.246	1.244		1.240		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

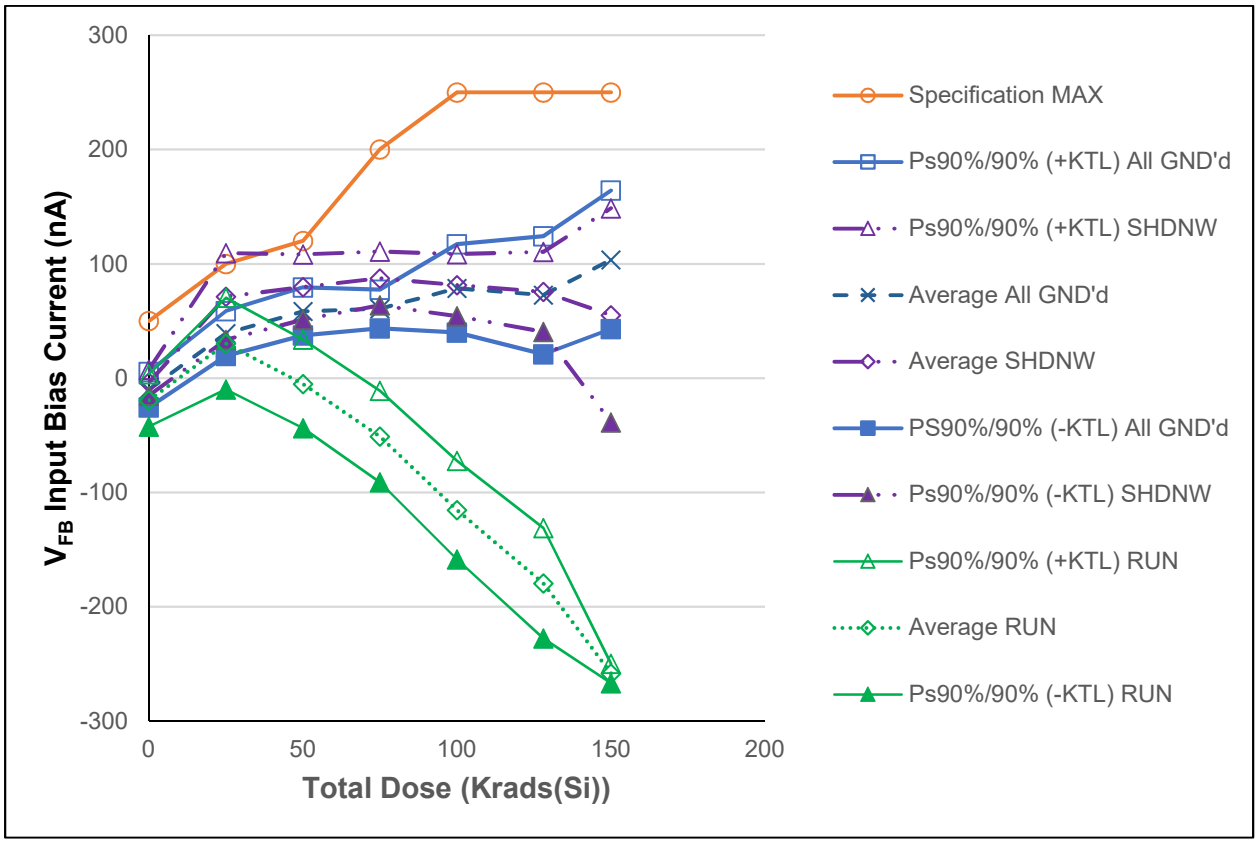

Figure 5.11: Plot of V_{FB} Input Bias Current versus Total Dose

The measured values of 15 samples pass the datasheet specification maximum limit.

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)) @ 10 mrads(Si)/second						
Units	(nA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	-2.861	46.921	59.900	66.185	97.256	96.111	128.746
103	All GND'd Irradiation	-10.681	35.429	44.909	49.982	59.977	50.478	72.374
146	All GND'd Irradiation	-17.643	29.831	61.054	63.000	82.149	75.254	113.258
147	All GND'd Irradiation	-12.293	37.851	63.705	62.075	70.448	57.287	90.666
148	All GND'd Irradiation	-6.237	45.490	62.237	61.693	83.094	84.305	112.772
97	SHDNW Irradiation	-3.672	52.032	67.244	88.654	88.510	84.534	1.059
98	SHDNW Irradiation	-2.527	79.365	83.923	85.306	76.342	63.496	51.470
99	SHDNW Irradiation	-10.185	71.163	77.019	81.129	74.053	68.798	65.842
100	SHDNW Irradiation	1.373	88.606	95.167	101.500	95.215	93.212	94.852
101	SHDNW Irradiation	-3.881	66.004	75.941	80.242	72.927	67.234	61.684
129	RUN Irradiation	-25.787	27.008	-7.448	-54.779	-119.772	-182.333	-260.229
130	RUN Irradiation	-25.206	20.094	-16.785	-64.325	-133.305	-200.176	-258.522
133	RUN Irradiation	-7.668	55.656	17.891	-28.410	-95.129	-158.625	-258.560
159	RUN Irradiation	-24.920	20.790	-16.155	-62.017	-125.427	-191.288	-261.040
160	RUN Irradiation	-13.256	27.914	-2.575	-45.710	-103.645	-164.375	-253.143
134	Control Unit	-10.529	-10.138	-10.681	-10.319	-10.767	-10.319	-10.719
135	Control Unit	0.267	0.057	0.000	0.563	0.401	0.772	0.124
	All GND'd Irradiation Statistics							
	Average All GND'd	-9.943	39.104	58.361	60.587	78.585	72.687	103.563
	Std Dev All GND'd	5.684	7.123	7.651	6.186	14.090	18.846	22.091
	Ps90%/90% (+KTL) All GND'd	5.643	58.636	79.341	77.549	117.219	124.362	164.137
	PS90%/90% (-KTL) All GND'd	-25.529	19.573	37.381	43.625	39.950	21.012	42.990
	SHDNW Irradiation Statistics							
	Average SHDNW	-3.778	71.434	79.859	87.366	81.409	75.455	54.981
	Std Dev SHDNW	4.159	13.818	10.409	8.592	9.909	12.774	34.178
	Ps90%/90% (+KTL) SHDNW	7.624	109.323	108.401	110.926	108.580	110.480	148.698
	Ps90%/90% (-KTL) SHDNW	-15.181	33.545	51.316	63.806	54.239	40.429	-38.735
	RUN Irradiation Statistics							
	Average RUN	-19.367	30.293	-5.014	-51.048	-115.456	-179.359	-258.299
	Std Dev RUN	8.372	14.612	14.135	14.590	15.727	17.599	3.080
	Ps90%/90% (+KTL) RUN	3.589	70.360	33.744	-11.041	-72.333	-131.102	-249.855
	Ps90%/90% (-KTL) RUN	-42.323	-9.774	-43.772	-91.055	-158.578	-227.617	-266.743
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	50	100	120		250		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	FAIL	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

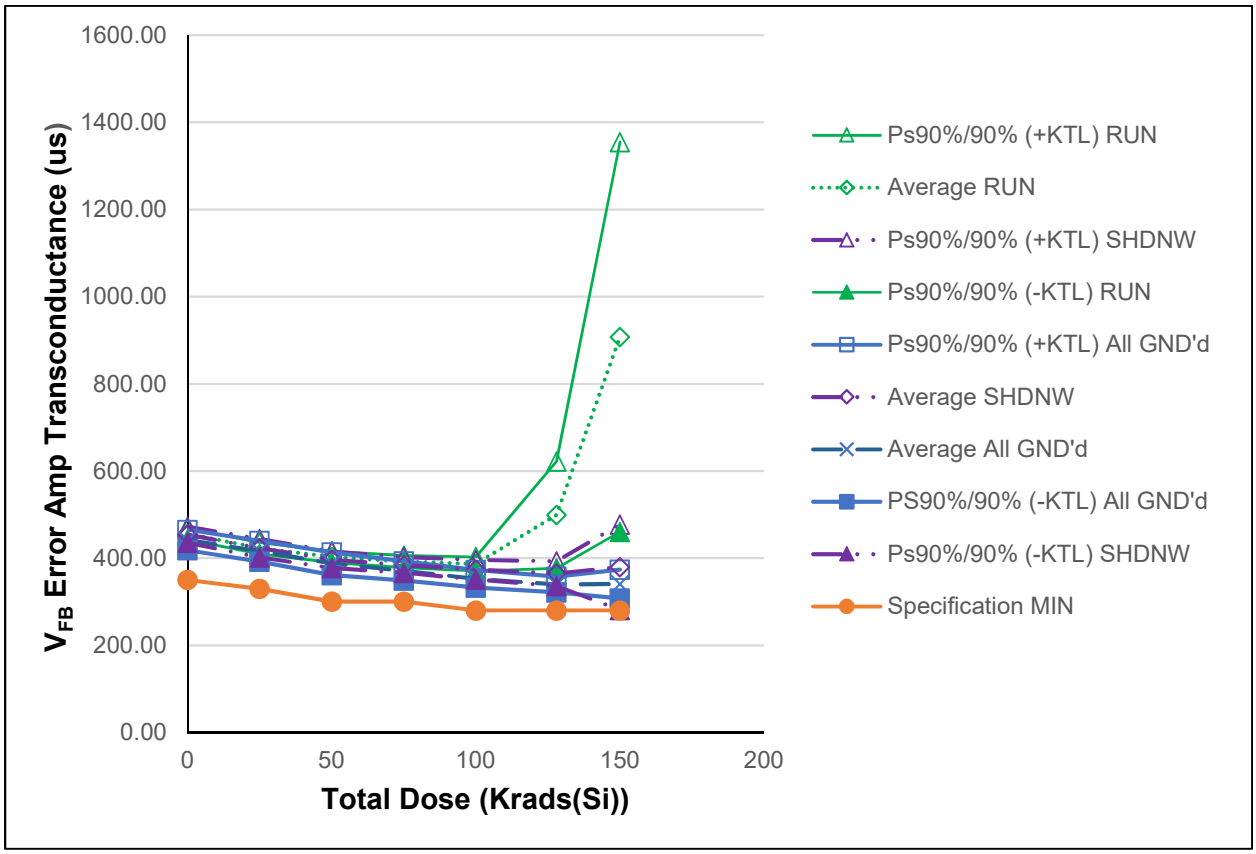

Figure 5.12: Plot of V_{FB} Error Amp Transconductance versus Total Dose

The measured values of 15 samples pass the datasheet specification minimum limits.

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)) @ 10 mrads(Si)/second						
Units	(us)	0	25	50	75	100	128	150
102	All GND'd Irradiation	440.32	415.40	389.00	370.86	351.54	337.49	359.75
103	All GND'd Irradiation	454.13	428.40	401.73	383.54	364.22	349.31	336.25
146	All GND'd Irradiation	442.52	418.15	386.50	369.51	353.09	340.36	342.87
147	All GND'd Irradiation	441.08	414.37	384.58	368.30	351.56	339.79	327.08
148	All GND'd Irradiation	430.14	404.05	375.54	361.21	343.55	331.00	337.39
97	SHDNW Irradiation	456.12	429.96	399.85	382.06	364.78	349.99	442.35
98	SHDNW Irradiation	462.25	428.94	403.15	392.67	383.18	376.43	371.02
99	SHDNW Irradiation	448.72	417.20	391.88	382.33	373.62	366.28	361.68
100	SHDNW Irradiation	445.50	412.42	386.84	375.65	366.08	359.79	353.91
101	SHDNW Irradiation	456.83	425.68	401.16	389.02	379.87	371.44	367.93
129	RUN Irradiation	463.10	429.87	408.84	399.24	391.08	509.83	973.77
130	RUN Irradiation	451.58	419.08	399.95	388.43	391.54	548.26	1123.53
133	RUN Irradiation	454.50	417.73	396.63	386.80	378.15	444.19	752.21
159	RUN Irradiation	457.24	425.22	405.91	395.54	389.61	531.28	952.40
160	RUN Irradiation	451.88	422.16	402.70	392.10	382.98	461.44	736.24
134	Control Unit	447.54	451.54	448.15	448.72	448.52	448.59	446.59
135	Control Unit	443.36	446.26	443.07	442.92	443.04	442.43	443.99
	All GND'd Irradiation Statistics							
	Average All GND'd	441.64	416.07	387.47	370.68	352.79	339.59	340.67
	Std Dev All GND'd	8.53	8.72	9.45	8.10	7.40	6.58	12.08
	Ps90%/90% (+KTL) All GND'd	465.03	439.99	413.38	392.88	373.09	357.64	373.80
	PS90%/90% (-KTL) All GND'd	418.25	392.16	361.56	348.48	332.50	321.53	307.53
	SHDNW Irradiation Statistics							
	Average SHDNW	453.89	422.84	396.58	384.35	373.51	364.79	379.38
	Std Dev SHDNW	6.72	7.69	6.92	6.63	8.15	10.32	35.81
	Ps90%/90% (+KTL) SHDNW	472.31	443.92	415.57	402.53	395.84	393.08	477.56
	Ps90%/90% (-KTL) SHDNW	435.46	401.76	377.59	366.16	351.17	336.49	281.19
	RUN Irradiation Statistics							
	Average RUN	455.66	422.81	402.81	392.42	386.67	499.00	907.63
	Std Dev RUN	4.75	4.89	4.80	5.10	5.87	44.72	163.19
	Ps90%/90% (+KTL) RUN	468.68	436.23	415.98	406.40	402.78	621.64	1355.09
	Ps90%/90% (-KTL) RUN	442.64	409.39	389.63	378.45	370.57	376.37	460.16
	Specification MIN	350	330	300		280		
	All GND'd Status (Measurements)	PASS	PASS	PASS		PASS		
	SHDNW Status (Measurements)	PASS	PASS	PASS		PASS		
	RUN Status (Measurements)	PASS	PASS	PASS		PASS		
	Specification MAX							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDWN							
	Status (Measurements) RUN							
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd							
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW							
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN							

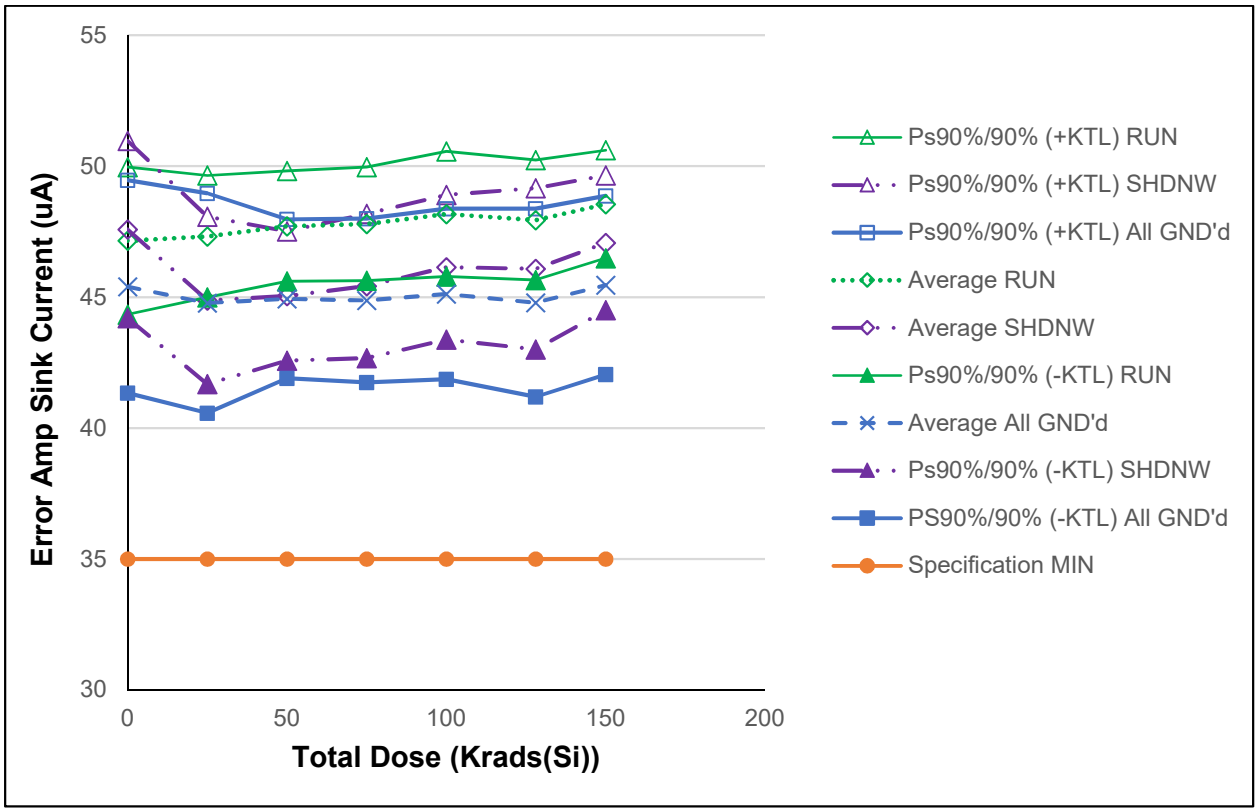

Figure 5.13: Plot of Error Amp Sink Current versus Total Dose

The measured values of 15 samples pass the datasheet specification minimum limits.

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 (Krads(Si)) @ 10 mrads(Si)/second						
Units	(uA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	45.985	45.432	45.029	45.016	45.460	45.012	45.696
103	All GND'd Irradiation	47.730	47.112	46.706	46.685	46.969	46.940	47.484
146	All GND'd Irradiation	44.547	44.160	44.762	44.684	44.829	44.289	45.023
147	All GND'd Irradiation	44.689	43.934	44.497	44.388	44.495	44.158	44.852
148	All GND'd Irradiation	44.069	43.230	43.697	43.602	43.844	43.548	44.244
97	SHDNW Irradiation	46.199	44.962	44.786	44.813	45.210	44.946	46.276
98	SHDNW Irradiation	48.680	45.398	46.020	46.784	47.289	47.223	48.069
99	SHDNW Irradiation	47.042	43.622	44.239	44.376	45.207	45.240	46.241
100	SHDNW Irradiation	46.934	43.903	44.211	45.003	45.902	45.656	46.696
101	SHDNW Irradiation	49.082	46.498	45.979	46.170	47.115	47.330	48.106
129	RUN Irradiation	48.349	48.402	48.722	48.859	49.359	48.804	49.415
130	RUN Irradiation	45.928	46.509	47.086	47.318	47.706	47.916	48.399
133	RUN Irradiation	46.242	46.431	46.823	46.815	47.062	46.689	47.484
159	RUN Irradiation	47.548	47.455	47.809	47.781	48.173	47.724	48.345
160	RUN Irradiation	47.701	47.811	48.102	48.225	48.589	48.595	49.108
134	Control Unit	46.617	46.588	46.647	46.590	46.593	46.537	46.477
135	Control Unit	45.930	46.333	46.300	46.297	46.286	46.261	46.200
	All GND'd Irradiation Statistics							
	Average All GND'd	45.404	44.774	44.938	44.875	45.119	44.789	45.460
	Std Dev All GND'd	1.481	1.530	1.107	1.139	1.187	1.310	1.244
	Ps90%/90% (+KTL) All GND'd	49.465	48.969	47.972	47.999	48.375	48.382	48.872
	PS90%/90% (-KTL) All GND'd	41.343	40.578	41.904	41.751	41.864	41.197	42.048
	SHDNW Irradiation Statistics							
	Average SHDNW	47.587	44.877	45.047	45.429	46.145	46.079	47.078
	Std Dev SHDNW	1.233	1.165	0.899	1.007	1.008	1.123	0.939
	Ps90%/90% (+KTL) SHDNW	50.968	48.071	47.513	48.190	48.909	49.157	49.653
	Ps90%/90% (-KTL) SHDNW	44.207	41.682	42.581	42.669	43.381	43.001	44.502
	RUN Irradiation Statistics							
	Average RUN	47.153	47.321	47.709	47.799	48.178	47.946	48.550
	Std Dev RUN	1.027	0.848	0.769	0.791	0.870	0.835	0.751
	Ps90%/90% (+KTL) RUN	49.969	49.647	49.816	49.970	50.565	50.235	50.611
	Ps90%/90% (-KTL) RUN	44.338	44.996	45.601	45.629	45.791	45.657	46.490
	Specification MIN	35	35	35		35		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Specification MAX							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd							
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW							
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN							

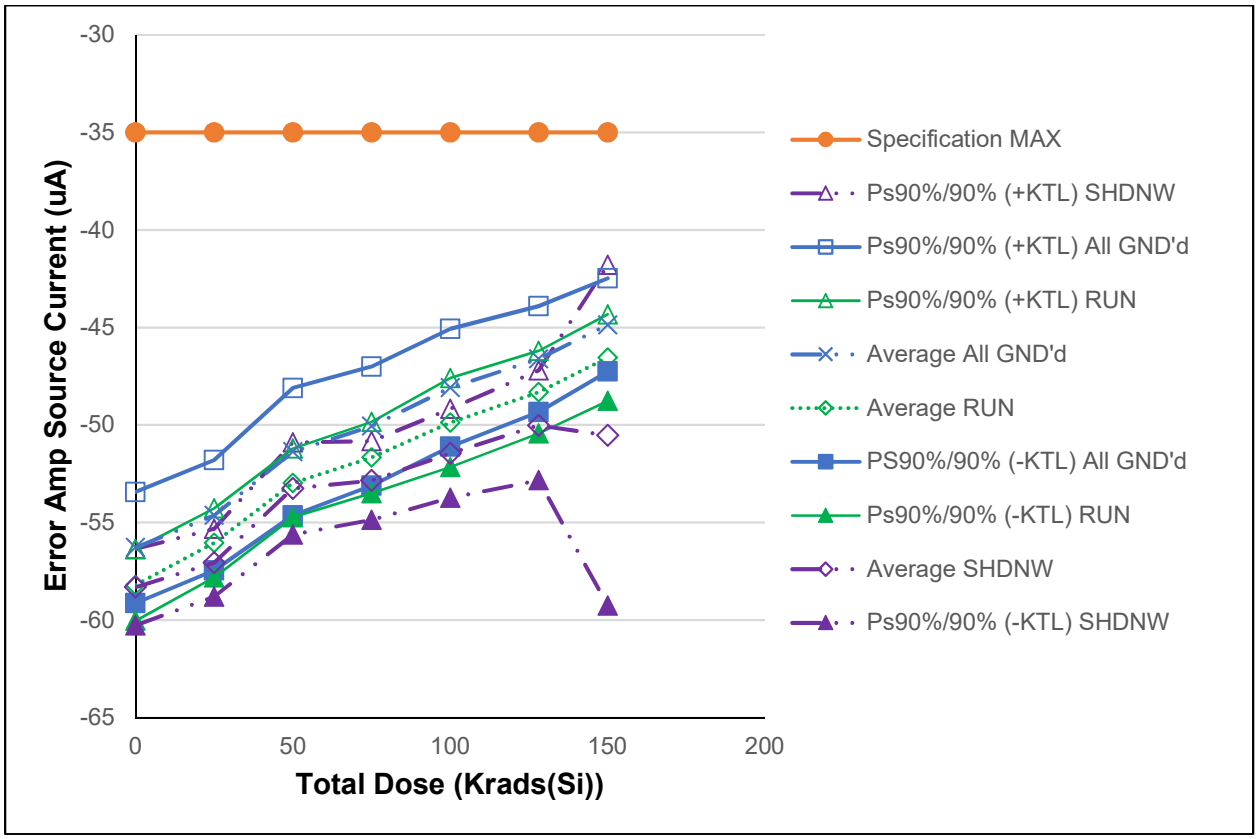

Figure 5.14: Plot of Error Amp Source Current versus Total Dose

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

Parameter	Error Amp Source Current	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(uA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	-56.375	-54.670	-51.490	-50.267	-48.527	-46.670	-45.078
103	All GND'd Irradiation	-57.809	-56.105	-53.233	-51.750	-49.646	-48.102	-46.108
146	All GND'd Irradiation	-56.252	-54.628	-51.056	-49.706	-47.789	-46.457	-44.629
147	All GND'd Irradiation	-56.100	-54.558	-51.139	-49.912	-47.822	-46.554	-44.849
148	All GND'd Irradiation	-54.885	-53.183	-49.939	-48.676	-46.646	-45.313	-43.683
97	SHDNW Irradiation	-58.667	-57.053	-52.798	-52.267	-50.502	-48.663	-56.046
98	SHDNW Irradiation	-59.308	-58.017	-54.250	-53.768	-52.348	-51.143	-50.088
99	SHDNW Irradiation	-58.000	-56.962	-53.038	-52.858	-51.753	-50.383	-49.089
100	SHDNW Irradiation	-57.412	-56.230	-52.192	-51.994	-50.648	-49.246	-47.934
101	SHDNW Irradiation	-58.186	-57.072	-54.030	-53.363	-52.009	-50.654	-49.476
129	RUN Irradiation	-59.372	-57.084	-53.850	-52.642	-51.066	-49.444	-47.520
130	RUN Irradiation	-58.007	-55.580	-52.370	-51.022	-49.048	-47.489	-45.488
133	RUN Irradiation	-57.848	-55.680	-52.351	-51.148	-49.330	-47.857	-46.109
159	RUN Irradiation	-58.105	-56.277	-53.343	-52.023	-50.385	-48.717	-47.148
160	RUN Irradiation	-57.700	-55.620	-52.955	-51.517	-49.561	-48.079	-46.469
134	Control Unit	-56.845	-57.172	-57.211	-56.806	-56.715	-56.511	-56.232
135	Control Unit	-56.436	-56.610	-56.161	-55.852	-56.188	-55.821	-55.803
	All GND'd Irradiation Statistics							
	Average All GND'd	-56.284	-54.629	-51.371	-50.062	-48.086	-46.619	-44.869
	Std Dev All GND'd	1.040	1.034	1.192	1.114	1.102	0.992	0.872
	Ps90%/90% (+KTL) All GND'd	-53.432	-51.794	-48.102	-47.008	-45.063	-43.898	-42.478
	PS90%/90% (-KTL) All GND'd	-59.136	-57.464	-54.640	-53.116	-51.109	-49.340	-47.260
	SHDNW Irradiation Statistics							
	Average SHDNW	-58.315	-57.067	-53.262	-52.850	-51.452	-50.018	-50.527
	Std Dev SHDNW	0.714	0.635	0.862	0.738	0.829	1.029	3.184
	Ps90%/90% (+KTL) SHDNW	-56.356	-55.325	-50.897	-50.826	-49.178	-47.196	-41.797
	Ps90%/90% (-KTL) SHDNW	-60.274	-58.809	-55.626	-54.874	-53.726	-52.840	-59.256
	RUN Irradiation Statistics							
	Average RUN	-58.206	-56.048	-52.974	-51.671	-49.878	-48.317	-46.547
	Std Dev RUN	0.670	0.645	0.644	0.668	0.830	0.772	0.810
	Ps90%/90% (+KTL) RUN	-56.370	-54.279	-51.209	-49.839	-47.602	-46.200	-44.325
	Ps90%/90% (-KTL) RUN	-60.043	-57.817	-54.739	-53.503	-52.155	-50.435	-48.769
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	-35	-35	-35		-35		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

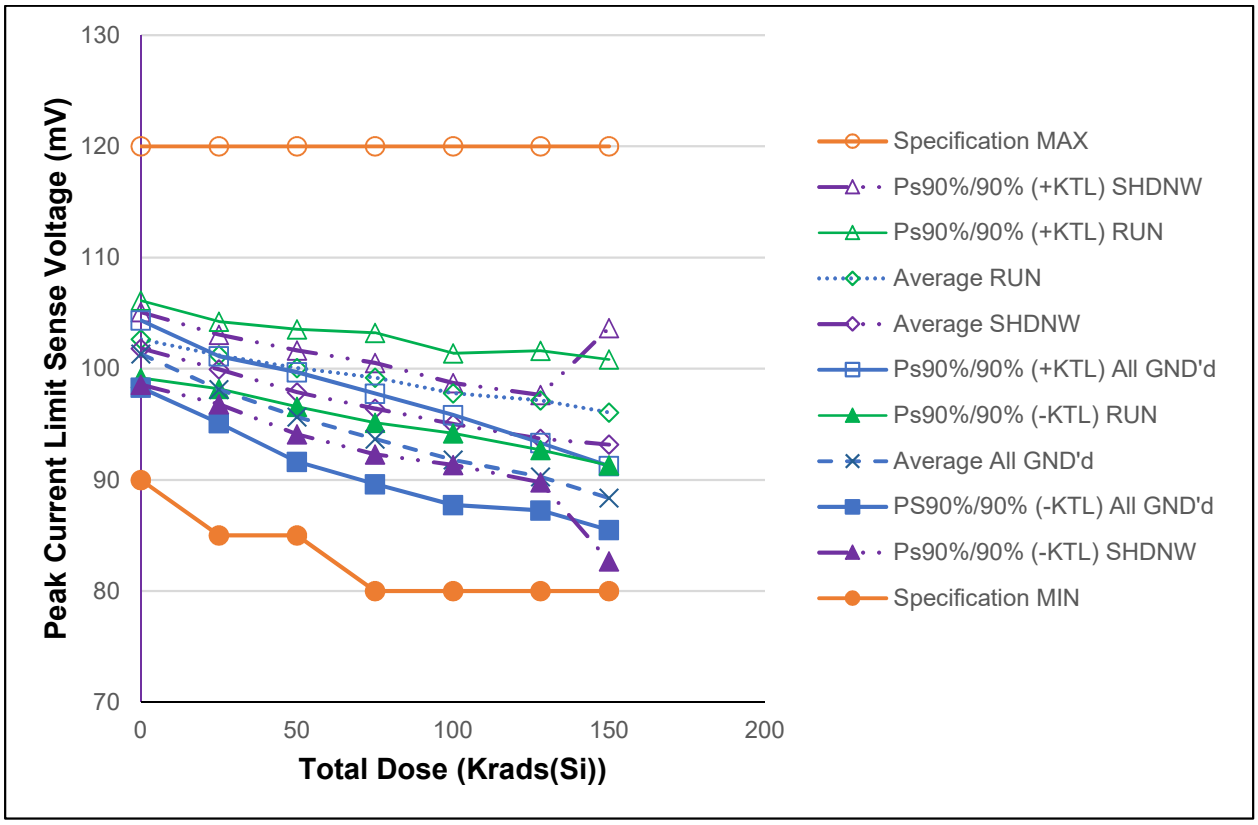

Figure 5.15: Plot of Peak Current Limit Sense Voltage versus Total Dose

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

Parameter	Peak Current Limit Sense Voltage	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(mV)	0	25	50	75	100	128	150
102	All GND'd Irradiation	101.993	98.697	96.081	93.899	92.187	90.869	88.204
103	All GND'd Irradiation	102.831	99.694	97.970	95.908	94.115	91.861	90.073
146	All GND'd Irradiation	100.915	97.710	95.011	92.833	91.194	89.884	88.188
147	All GND'd Irradiation	100.924	97.710	95.070	93.853	91.229	89.830	88.204
148	All GND'd Irradiation	99.967	96.830	94.133	91.927	90.227	88.979	87.183
97	SHDNW Irradiation	103.769	101.563	99.858	98.769	96.975	95.823	99.858
98	SHDNW Irradiation	101.793	99.503	97.834	95.777	94.991	93.673	91.948
99	SHDNW Irradiation	101.877	100.533	97.877	96.900	95.048	93.661	92.041
100	SHDNW Irradiation	100.886	98.590	95.964	94.855	93.180	91.780	90.054
101	SHDNW Irradiation	100.826	99.510	97.834	95.789	94.991	93.611	91.979
129	RUN Irradiation	103.788	102.558	100.793	100.652	98.963	98.722	97.796
130	RUN Irradiation	103.862	101.640	100.883	99.851	98.027	96.762	95.950
133	RUN Irradiation	100.883	99.696	97.908	96.824	95.946	94.831	93.929
159	RUN Irradiation	102.812	101.599	100.819	99.799	99.004	98.698	97.804
160	RUN Irradiation	101.914	100.562	99.932	98.831	97.015	96.738	94.850
134	Control Unit	101.811	101.599	101.811	101.668	100.903	100.679	100.824
135	Control Unit	99.797	99.697	99.953	99.727	99.879	99.680	99.846
	All GND'd Irradiation Statistics							
	Average All GND'd	101.326	98.129	95.653	93.684	91.790	90.285	88.370
	Std Dev All GND'd	1.105	1.097	1.467	1.486	1.473	1.107	1.048
	Ps90%/90% (+KTL) All GND'd	104.357	101.135	99.677	97.759	95.829	93.319	91.245
	PS90%/90% (-KTL) All GND'd	98.295	95.122	91.629	89.610	87.751	87.250	85.496
	SHDNW Irradiation Statistics							
	Average SHDNW	101.830	99.940	97.873	96.418	95.037	93.709	93.176
	Std Dev SHDNW	1.190	1.138	1.377	1.501	1.342	1.432	3.828
	Ps90%/90% (+KTL) SHDNW	105.093	103.062	101.649	100.533	98.718	97.636	103.673
	Ps90%/90% (-KTL) SHDNW	98.567	96.818	94.097	92.303	91.356	89.783	82.678
	RUN Irradiation Statistics							
	Average RUN	102.652	101.211	100.067	99.191	97.791	97.150	96.066
	Std Dev RUN	1.270	1.103	1.269	1.473	1.314	1.625	1.737
	Ps90%/90% (+KTL) RUN	106.135	104.234	103.546	103.229	101.394	101.606	100.830
	Ps90%/90% (-KTL) RUN	99.169	98.187	96.588	95.154	94.188	92.694	91.301
	Specification MIN	90	85	85		80		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Specification MAX	120	120	120		120		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

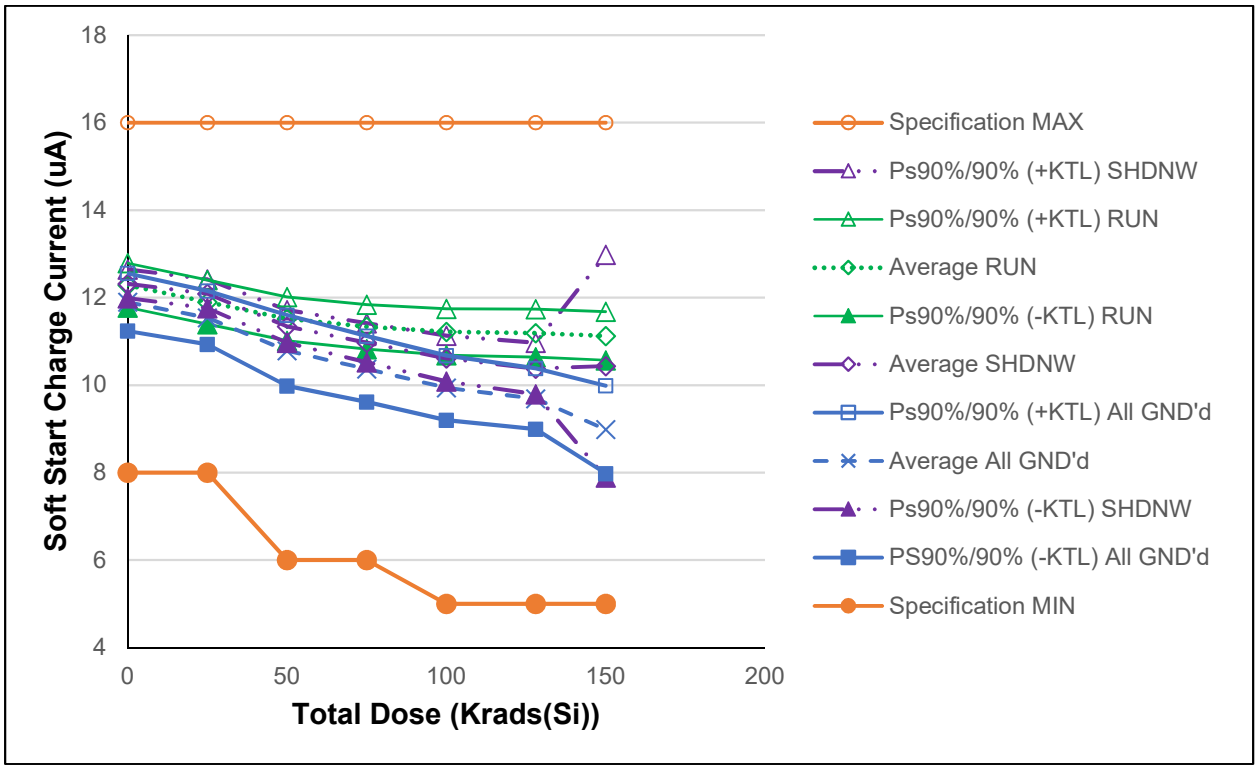

Figure 5.16: Plot of Soft Start Charge Current versus Total Dose

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

Parameter	Soft Start Charge Current	Total Dose (Krads(Si)) @ 10 mrads(Si)/second						
Units	(uA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	11.919	11.537	10.916	10.490	10.039	9.696	9.034
103	All GND'd Irradiation	12.227	11.825	11.208	10.770	10.330	10.027	9.503
146	All GND'd Irradiation	11.893	11.577	10.676	10.246	9.838	9.675	8.828
147	All GND'd Irradiation	11.897	11.575	10.719	10.312	9.899	9.737	9.053
148	All GND'd Irradiation	11.549	11.203	10.418	10.038	9.599	9.316	8.500
97	SHDNW Irradiation	12.357	12.074	11.298	10.870	10.466	10.213	12.042
98	SHDNW Irradiation	12.441	12.225	11.476	11.125	10.791	10.614	10.254
99	SHDNW Irradiation	12.303	12.113	11.318	10.994	10.680	10.490	10.096
100	SHDNW Irradiation	12.122	11.896	11.153	10.744	10.354	10.098	9.649
101	SHDNW Irradiation	12.359	12.126	11.472	11.110	10.755	10.481	10.123
129	RUN Irradiation	12.601	12.209	11.823	11.635	11.531	11.515	11.454
130	RUN Irradiation	12.207	11.794	11.400	11.217	11.099	11.059	10.996
133	RUN Irradiation	12.214	11.783	11.379	11.191	11.069	11.073	10.992
159	RUN Irradiation	12.272	11.931	11.547	11.379	11.273	11.252	11.189
160	RUN Irradiation	12.125	11.778	11.429	11.236	11.104	11.050	10.992
134	Control Unit	12.016	12.050	12.043	12.003	12.014	12.030	11.996
135	Control Unit	12.063	12.078	12.078	12.029	12.042	12.064	12.040
	All GND'd Irradiation Statistics							
	Average All GND'd	11.897	11.543	10.787	10.371	9.941	9.690	8.983
	Std Dev All GND'd	0.240	0.222	0.295	0.275	0.269	0.253	0.366
	Ps90%/90% (+KTL) All GND'd	12.555	12.153	11.595	11.127	10.680	10.384	9.987
	PS90%/90% (-KTL) All GND'd	11.239	10.934	9.980	9.616	9.202	8.996	7.980
	SHDNW Irradiation Statistics							
	Average SHDNW	12.316	12.087	11.343	10.968	10.609	10.379	10.433
	Std Dev SHDNW	0.119	0.120	0.135	0.162	0.190	0.215	0.928
	Ps90%/90% (+KTL) SHDNW	12.643	12.416	11.714	11.413	11.131	10.969	12.978
	Ps90%/90% (-KTL) SHDNW	11.990	11.757	10.972	10.523	10.088	9.790	7.888
	RUN Irradiation Statistics							
	Average RUN	12.284	11.899	11.515	11.332	11.215	11.190	11.125
	Std Dev RUN	0.185	0.185	0.184	0.185	0.194	0.200	0.202
	Ps90%/90% (+KTL) RUN	12.790	12.405	12.019	11.838	11.747	11.738	11.680
	Ps90%/90% (-KTL) RUN	11.778	11.392	11.012	10.825	10.683	10.641	10.570
	Specification MIN	8	8	6		5		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Specification MAX	16	16	16		16		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

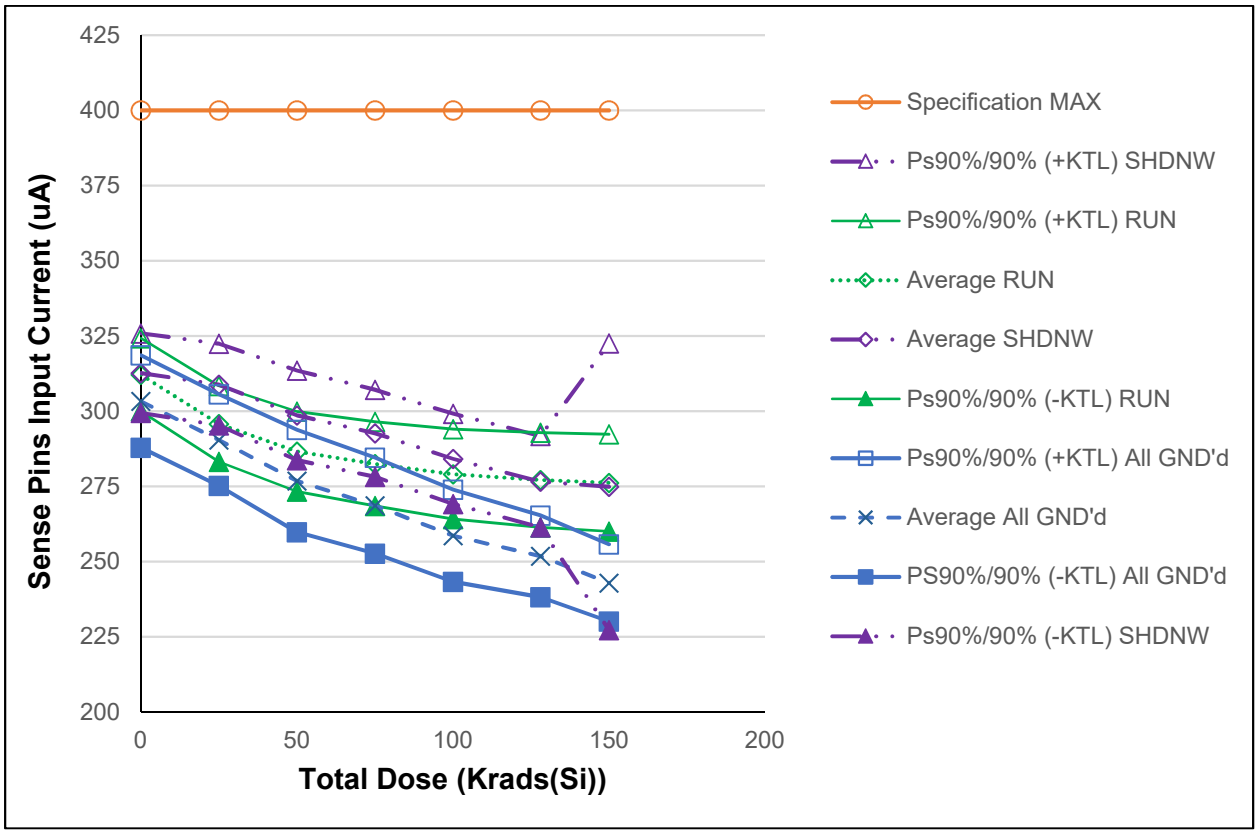

Figure 5.17: Plot of Sense Pins Input Current versus Total Dose

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)) @ 10 mrads(Si)/second						
Units	(uA)	0	25	50	75	100	128	150
102	All GND'd Irradiation	300.953	288.290	275.619	267.178	256.643	249.715	240.609
103	All GND'd Irradiation	311.541	298.848	286.827	277.920	267.440	259.353	250.123
146	All GND'd Irradiation	304.119	291.254	276.438	268.229	258.730	252.352	243.401
147	All GND'd Irradiation	303.488	290.057	275.565	267.787	257.951	251.644	243.003
148	All GND'd Irradiation	296.150	283.641	269.708	261.834	252.083	245.789	237.428
97	SHDNW Irradiation	315.675	310.476	300.494	295.017	286.958	279.405	304.309
98	SHDNW Irradiation	318.801	315.732	305.081	298.423	290.026	282.696	274.703
99	SHDNW Irradiation	307.214	303.549	292.555	287.673	279.467	271.834	263.550
100	SHDNW Irradiation	308.596	304.557	293.338	286.494	277.256	269.627	260.836
101	SHDNW Irradiation	312.971	309.937	301.482	295.731	287.053	279.191	270.955
129	RUN Irradiation	317.600	301.191	292.042	288.273	285.381	283.909	282.941
130	RUN Irradiation	306.461	288.632	278.947	274.622	270.966	268.690	267.569
133	RUN Irradiation	315.066	296.697	286.943	283.145	280.077	278.178	277.827
159	RUN Irradiation	311.980	297.496	288.882	285.086	281.926	279.953	279.104
160	RUN Irradiation	309.358	294.853	286.049	281.319	277.087	274.801	273.441
134	Control Unit	307.561	308.100	308.076	307.765	307.524	307.258	306.861
135	Control Unit	304.781	304.862	304.339	303.995	304.407	303.897	303.961
	All GND'd Irradiation Statistics							
	Average All GND'd	303.250	290.418	276.831	268.590	258.569	251.770	242.913
	Std Dev All GND'd	5.596	5.531	6.203	5.820	5.588	4.946	4.680
	Ps90%/90% (+KTL) All GND'd	318.594	305.583	293.839	284.547	273.891	265.333	255.747
	PS90%/90% (-KTL) All GND'd	287.907	275.253	259.824	252.633	243.248	238.208	230.079
	SHDNW Irradiation Statistics							
	Average SHDNW	312.651	308.850	298.590	292.668	284.152	276.551	274.871
	Std Dev SHDNW	4.824	4.943	5.434	5.270	5.484	5.547	17.372
	Ps90%/90% (+KTL) SHDNW	325.878	322.403	313.491	307.118	299.189	291.761	322.504
	Ps90%/90% (-KTL) SHDNW	299.424	295.297	283.690	278.217	269.115	261.340	227.237
	RUN Irradiation Statistics							
	Average RUN	312.093	295.774	286.573	282.489	279.088	277.106	276.176
	Std Dev RUN	4.426	4.610	4.843	5.096	5.445	5.738	5.887
	Ps90%/90% (+KTL) RUN	324.230	308.415	299.851	296.463	294.018	292.839	292.318
	Ps90%/90% (-KTL) RUN	299.956	283.132	273.294	268.514	264.157	261.374	260.035
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	400	400	400		400		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

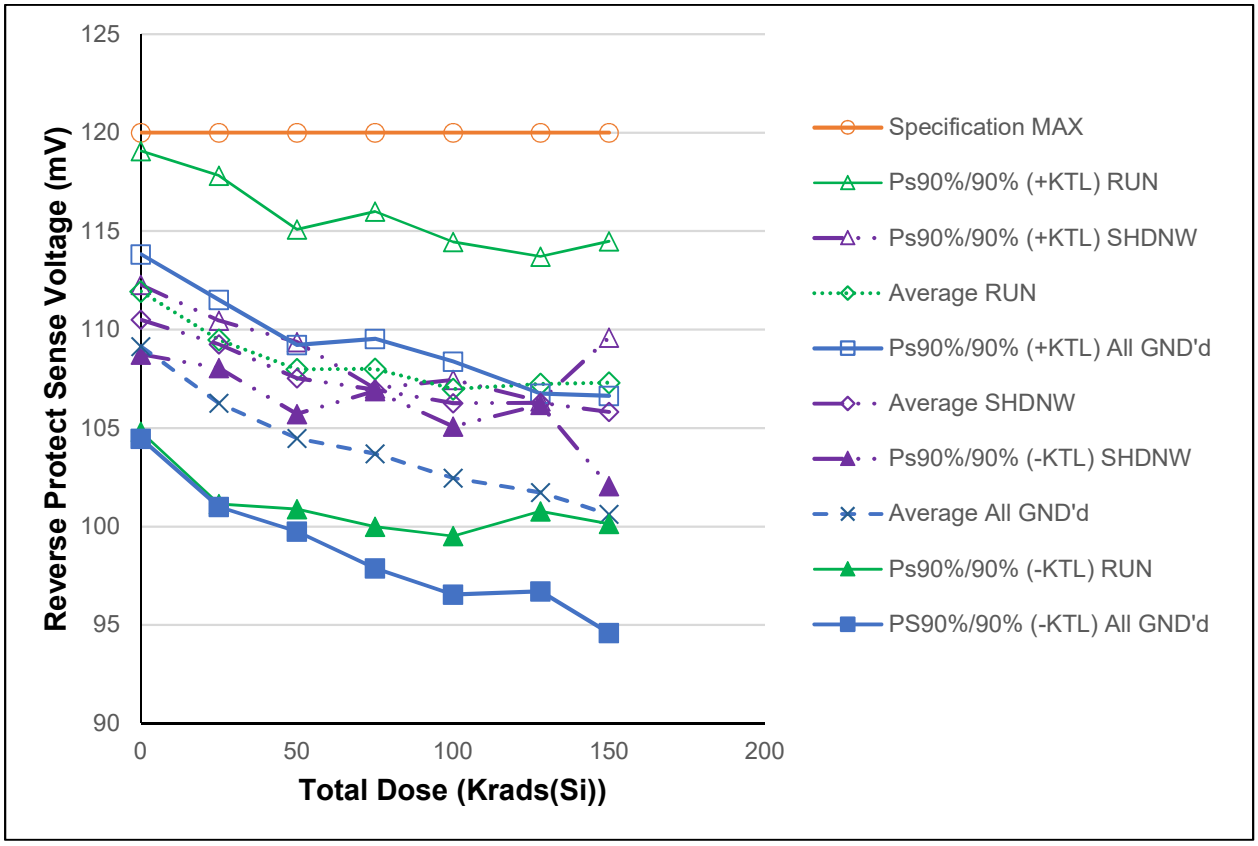

Figure 5.18: Plot of Reverse Protect Sense Voltage versus Total Dose

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

Parameter	Reverse Protect Sense Voltage	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Unit #	(mV)	0	25	50	75	100	128	150
102	All GND'd Irradiation	111.769	108.668	106.666	106.828	105.696	104.736	103.678
103	All GND'd Irradiation	109.742	107.846	105.950	104.821	103.598	102.042	102.063
146	All GND'd Irradiation	107.718	104.520	102.961	101.908	100.729	100.238	98.703
147	All GND'd Irradiation	108.894	105.781	103.881	103.114	101.555	101.256	99.984
148	All GND'd Irradiation	107.625	104.489	102.958	101.845	100.724	100.388	98.679
97	SHDNW Irradiation	109.821	108.792	106.790	106.976	105.811	106.290	108.193
98	SHDNW Irradiation	109.780	108.754	106.830	106.957	105.772	106.314	105.067
99	SHDNW Irradiation	111.000	109.574	108.032	106.919	106.574	106.238	105.048
100	SHDNW Irradiation	110.942	109.555	107.975	106.931	106.567	106.238	104.948
101	SHDNW Irradiation	110.985	109.584	108.065	106.957	106.612	106.290	105.857
129	RUN Irradiation	112.761	110.850	108.948	109.116	108.713	109.375	108.966
130	RUN Irradiation	112.666	109.551	108.061	108.235	107.472	106.962	107.980
133	RUN Irradiation	107.715	104.625	103.881	103.219	102.529	103.479	103.039
159	RUN Irradiation	114.765	112.872	110.986	111.126	109.534	109.113	109.708
160	RUN Irradiation	111.807	109.553	108.077	108.292	106.682	107.268	106.849
134	Control Unit	106.061	105.895	106.122	106.308	105.964	106.490	106.217
135	Control Unit	108.886	107.932	108.163	108.380	107.606	108.445	108.228
	All GND'd Irradiation Statistics							
	Average All GND'd	109.149	106.261	104.483	103.703	102.460	101.732	100.621
	Std Dev All GND'd	1.707	1.918	1.727	2.123	2.156	1.829	2.195
	Ps90%/90% (+KTL) All GND'd	113.829	111.519	109.217	109.526	108.373	106.748	106.641
	PS90%/90% (-KTL) All GND'd	104.470	101.002	99.749	97.881	96.548	96.715	94.602
	SHDNW Irradiation Statistics							
	Average SHDNW	110.506	109.252	107.538	106.948	106.267	106.274	105.822
	Std Dev SHDNW	0.644	0.437	0.666	0.023	0.435	0.035	1.374
	Ps90%/90% (+KTL) SHDNW	112.272	110.451	109.364	107.011	107.460	106.369	109.591
	Ps90%/90% (-KTL) SHDNW	108.739	108.053	105.712	106.885	105.075	106.179	102.054
	RUN Irradiation Statistics							
	Average RUN	111.943	109.490	107.990	107.997	106.986	107.239	107.308
	Std Dev RUN	2.600	3.040	2.588	2.916	2.724	2.360	2.617
	Ps90%/90% (+KTL) RUN	119.073	117.826	115.087	115.994	114.454	113.711	114.484
	Ps90%/90% (-KTL) RUN	104.813	101.154	100.894	100.001	99.518	100.767	100.132
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDWN							
	Status (Measurements) RUN							
	Specification MAX	120	120	120		120		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDWN	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

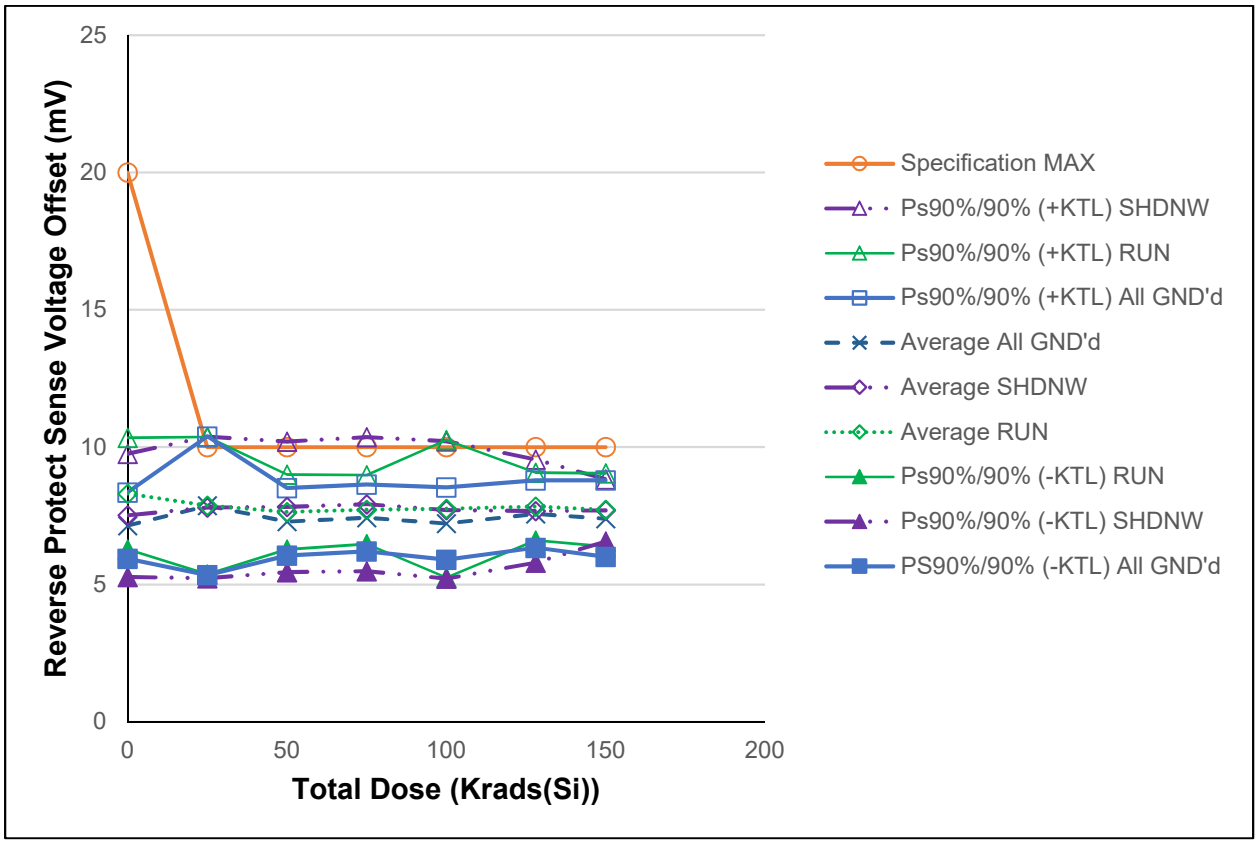

Figure 5.19: Plot of Reverse Protect Sense Offset Voltage versus Total Dose

Note: The + KTL lines are slightly over the specification MAX limit due to the small 5-piece sample size. All samples passed the reverse protect sense voltage offset parameter.

Table 5.19: Raw data table for reverse protect sense voltage offset 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)) @ 10 mrads(Si)/second						
Unit #	(mV)	0	25	50	75	100	128	150
102	All GND'd Irradiation	7.317	7.481	7.427	7.580	7.403	7.676	7.587
103	All GND'd Irradiation	6.357	6.413	6.490	6.636	6.367	6.772	6.491
146	All GND'd Irradiation	7.296	8.456	7.482	7.604	7.436	7.819	7.613
147	All GND'd Irradiation	7.358	8.499	7.508	7.656	7.436	7.814	7.661
148	All GND'd Irradiation	7.391	8.490	7.530	7.656	7.480	7.752	7.637
97	SHDNW Irradiation	6.373	6.315	6.490	6.562	6.272	6.732	8.438
98	SHDNW Irradiation	7.317	8.416	8.381	8.495	8.274	8.668	7.484
99	SHDNW Irradiation	7.279	7.427	7.406	7.475	7.341	7.685	7.537
100	SHDNW Irradiation	8.329	8.452	8.433	8.572	8.375	7.623	7.534
101	SHDNW Irradiation	8.301	8.418	8.424	8.519	8.315	7.657	7.508
129	RUN Irradiation	8.329	7.424	7.406	7.477	7.322	7.619	7.470
130	RUN Irradiation	8.279	7.431	7.415	7.527	7.341	7.623	7.572
133	RUN Irradiation	7.281	7.501	7.432	7.580	7.417	7.633	7.527
159	RUN Irradiation	8.267	7.496	7.427	7.503	7.305	7.676	7.448
160	RUN Irradiation	9.377	9.501	8.531	8.543	9.387	8.639	8.586
134	Control Unit	7.384	7.481	7.420	7.523	7.341	7.561	7.470
135	Control Unit	8.412	8.452	8.452	8.498	8.334	8.629	8.501
	All GND'd Irradiation Statistics							
	Average All GND'd	7.144	7.868	7.287	7.426	7.225	7.567	7.398
	Std Dev All GND'd	0.442	0.922	0.447	0.443	0.480	0.448	0.507
	Ps90%/90% (+KTL) All GND'd	8.354	10.395	8.514	8.642	8.541	8.795	8.789
	PS90%/90% (-KTL) All GND'd	5.933	5.341	6.061	6.211	5.909	6.339	6.007
	SHDNW Irradiation Statistics							
	Average SHDNW	7.520	7.806	7.827	7.925	7.715	7.673	7.700
	Std Dev SHDNW	0.818	0.939	0.865	0.888	0.912	0.685	0.413
	Ps90%/90% (+KTL) SHDNW	9.764	10.381	10.199	10.361	10.217	9.552	8.833
	Ps90%/90% (-KTL) SHDNW	5.276	5.230	5.454	5.488	5.213	5.794	6.567
	RUN Irradiation Statistics							
	Average RUN	8.307	7.870	7.642	7.726	7.754	7.838	7.721
	Std Dev RUN	0.742	0.912	0.497	0.458	0.914	0.448	0.486
	Ps90%/90% (+KTL) RUN	10.340	10.371	9.004	8.982	10.259	9.067	9.054
	Ps90%/90% (-KTL) RUN	6.273	5.370	6.280	6.470	5.249	6.608	6.387
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDWN							
	Status (Measurements) RUN							
	Specification MAX	20	10	10		10		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDWN	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	FAIL	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	FAIL	FAIL		FAIL		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	FAIL	PASS		FAIL		

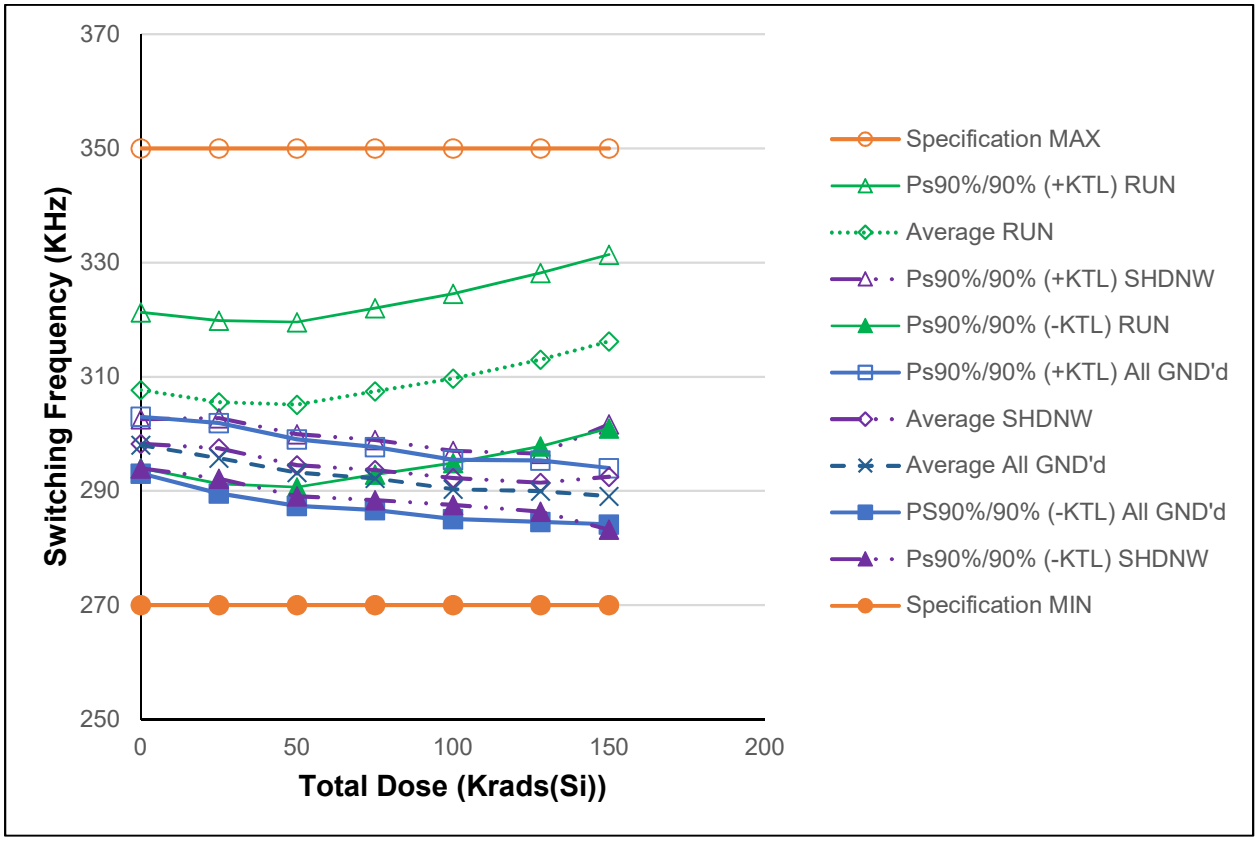

Figure 5.20: Plot of Switching Frequency versus Total Dose

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

Parameter	Switching Frequency	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(KHz)	0	25	50	75	100	128	150
102	All GND'd Irradiation	295.49	292.95	291.21	290.38	288.74	288.22	287.43
103	All GND'd Irradiation	299.57	297.51	295.54	294.41	292.33	291.90	290.93
146	All GND'd Irradiation	299.85	298.34	295.31	294.12	292.14	292.05	290.88
147	All GND'd Irradiation	298.22	295.65	292.77	291.92	289.93	289.76	289.03
148	All GND'd Irradiation	297.03	294.16	291.24	290.14	288.22	287.91	287.20
97	SHDNW Irradiation	296.12	294.60	291.80	291.24	290.04	289.13	297.96
98	SHDNW Irradiation	300.16	299.68	296.23	295.01	293.77	293.21	292.40
99	SHDNW Irradiation	299.35	298.27	295.37	295.08	293.65	292.92	291.97
100	SHDNW Irradiation	298.05	296.60	293.01	291.93	290.83	289.82	288.83
101	SHDNW Irradiation	297.65	298.14	296.10	295.11	293.13	292.13	291.15
129	RUN Irradiation	315.16	312.87	312.33	314.63	317.22	320.75	324.02
130	RUN Irradiation	303.74	300.82	300.00	302.04	304.40	307.37	310.69
133	RUN Irradiation	302.74	300.76	300.36	303.10	305.47	309.28	312.31
159	RUN Irradiation	309.42	308.61	308.30	310.97	313.23	316.58	319.76
160	RUN Irradiation	307.28	304.67	304.63	306.59	308.27	310.95	314.19
134	Control Unit	299.08	300.24	300.34	300.07	299.88	299.51	299.31
135	Control Unit	298.01	298.55	298.10	297.95	298.09	297.85	297.80
	All GND'd Irradiation Statistics							
	Average All GND'd	298.03	295.72	293.21	292.19	290.28	289.97	289.09
	Std Dev All GND'd	1.82	2.25	2.12	2.01	1.90	1.96	1.80
	Ps90%/90% (+KTL) All GND'd	303.01	301.88	299.02	297.71	295.48	295.35	294.02
	PS90%/90% (-KTL) All GND'd	293.05	289.56	287.41	286.68	285.07	284.59	284.16
	SHDNW Irradiation Statistics							
	Average SHDNW	298.26	297.46	294.50	293.67	292.28	291.44	292.46
	Std Dev SHDNW	1.56	1.93	1.99	1.92	1.73	1.86	3.37
	Ps90%/90% (+KTL) SHDNW	302.55	302.76	299.95	298.95	297.02	296.53	301.70
	Ps90%/90% (-KTL) SHDNW	293.97	292.16	289.05	288.40	287.55	286.36	283.22
	RUN Irradiation Statistics							
	Average RUN	307.67	305.55	305.12	307.47	309.72	312.99	316.19
	Std Dev RUN	4.98	5.22	5.27	5.31	5.41	5.54	5.55
	Ps90%/90% (+KTL) RUN	321.32	319.86	319.58	322.03	324.56	328.17	331.41
	Ps90%/90% (-KTL) RUN	294.02	291.24	290.66	292.90	294.88	297.80	300.97
	Specification MIN	270	270	270		270		
	RUN Status (Measurements)	PASS	PASS	PASS		PASS		
	SHDNW Status (Measurements)	PASS	PASS	PASS		PASS		
	All GND'd Status (Measurements)	PASS	PASS	PASS		PASS		
	Specification MAX	350	350	350		350		
	RUN Status (Measurements)	PASS	PASS	PASS		PASS		
	SHDNW Status (Measurements)	PASS	PASS	PASS		PASS		
	All GND'd Status (Measurements)	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

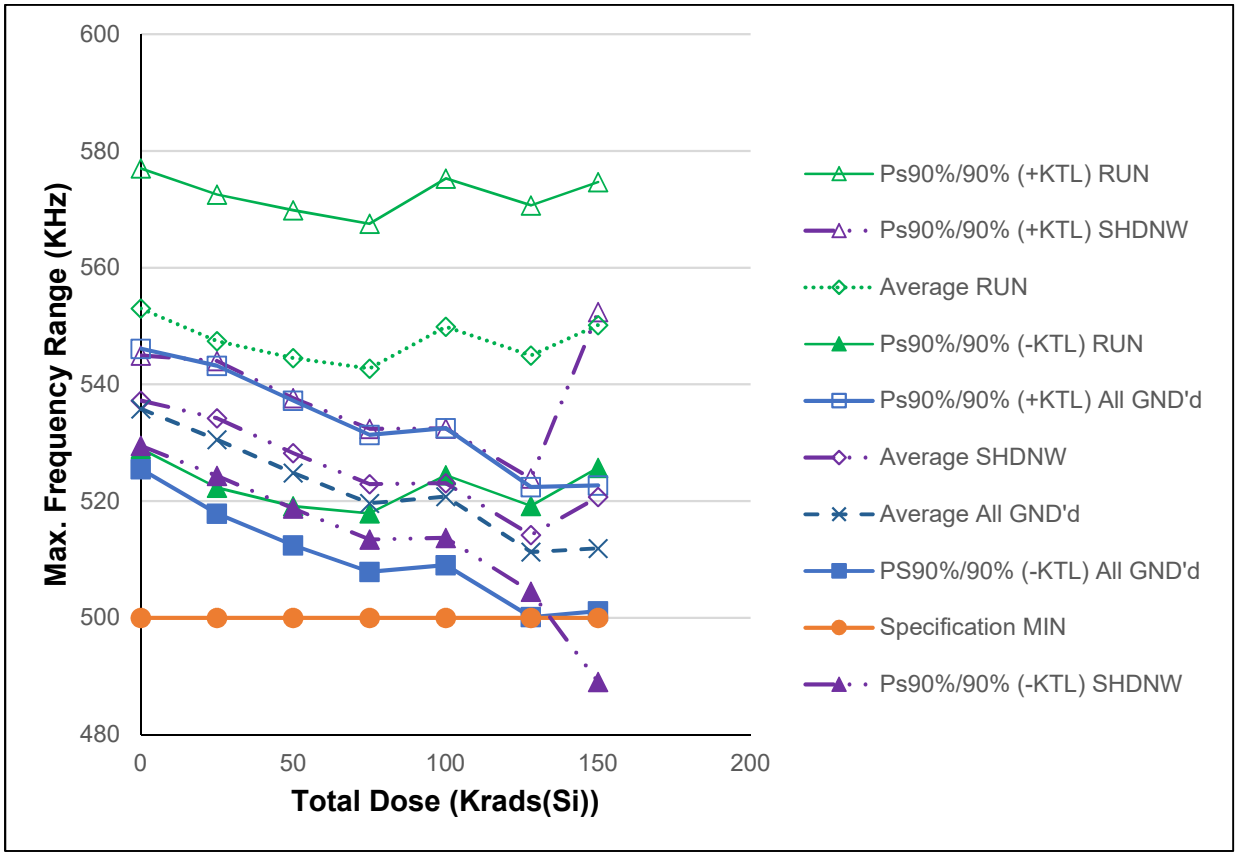

Figure 5.21: Plot of Maximum Frequency Range versus Total Dose

All fifteen samples pass the post-irradiation test.

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

Parameter	Max. Frequency Range	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(KHz)	0	25	50	75	100	128	150
102	All GND'd Irradiation	531.540	525.795	521.362	516.295	517.151	507.996	508.417
103	All GND'd Irradiation	539.311	534.690	529.755	524.332	524.934	515.028	515.730
146	All GND'd Irradiation	539.993	535.966	529.492	523.902	525.603	516.045	516.271
147	All GND'd Irradiation	535.274	529.514	523.323	518.449	519.713	510.224	511.137
148	All GND'd Irradiation	532.912	526.660	520.196	515.111	516.462	507.111	507.993
97	SHDNW Irradiation	533.912	530.041	524.609	519.627	519.396	511.018	540.582
98	SHDNW Irradiation	541.570	538.990	532.089	526.315	526.035	517.861	518.971
99	SHDNW Irradiation	537.567	534.043	528.443	523.838	523.582	515.422	516.104
100	SHDNW Irradiation	535.857	531.581	524.846	518.932	519.713	509.878	510.526
101	SHDNW Irradiation	537.206	536.281	531.096	525.883	526.684	516.753	517.314
129	RUN Irradiation	566.899	561.204	558.170	555.892	563.306	558.780	563.351
130	RUN Irradiation	545.075	538.605	535.025	533.199	539.971	534.915	540.856
133	RUN Irradiation	546.332	540.310	537.542	536.170	543.478	539.151	544.468
159	RUN Irradiation	555.122	551.270	548.436	547.008	554.497	549.473	554.589
160	RUN Irradiation	551.558	545.793	543.291	541.317	548.133	542.418	547.613
134	Control Unit	539.766	542.578	542.416	540.471	547.922	538.606	541.634
135	Control Unit	537.680	539.217	538.718	536.912	544.797	535.385	540.559
	All GND'd Irradiation Statistics							
	Average All GND'd	535.806	530.525	524.825	519.618	520.773	511.281	511.910
	Std Dev All GND'd	3.764	4.618	4.521	4.281	4.286	4.063	3.929
	Ps90%/90% (+KTL) All GND'd	546.128	543.187	537.223	531.355	532.524	522.421	522.683
	PS90%/90% (-KTL) All GND'd	525.484	517.863	512.428	507.880	509.021	500.140	501.136
	SHDNW Irradiation Statistics							
	Average SHDNW	537.222	534.187	528.217	522.919	523.082	514.186	520.700
	Std Dev SHDNW	2.822	3.587	3.454	3.460	3.423	3.543	11.558
	Ps90%/90% (+KTL) SHDNW	544.959	544.022	537.687	532.407	532.469	523.902	552.393
	Ps90%/90% (-KTL) SHDNW	529.485	524.352	518.747	513.431	513.695	504.471	489.006
	RUN Irradiation Statistics							
	Average RUN	552.997	547.437	544.493	542.717	549.877	544.948	550.175
	Std Dev RUN	8.761	9.161	9.247	9.047	9.271	9.387	8.931
	Ps90%/90% (+KTL) RUN	577.020	572.557	569.847	567.525	575.298	570.687	574.665
	Ps90%/90% (-KTL) RUN	528.974	522.316	519.139	517.910	524.456	519.208	525.686
	Specification MIN	500	500	500		500		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Specification MAX							
	Status (Measurements) RUN							
	Status (Measurements) SHDNW							
	Status (Measurements) All GND'd							
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd							
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW							
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN							

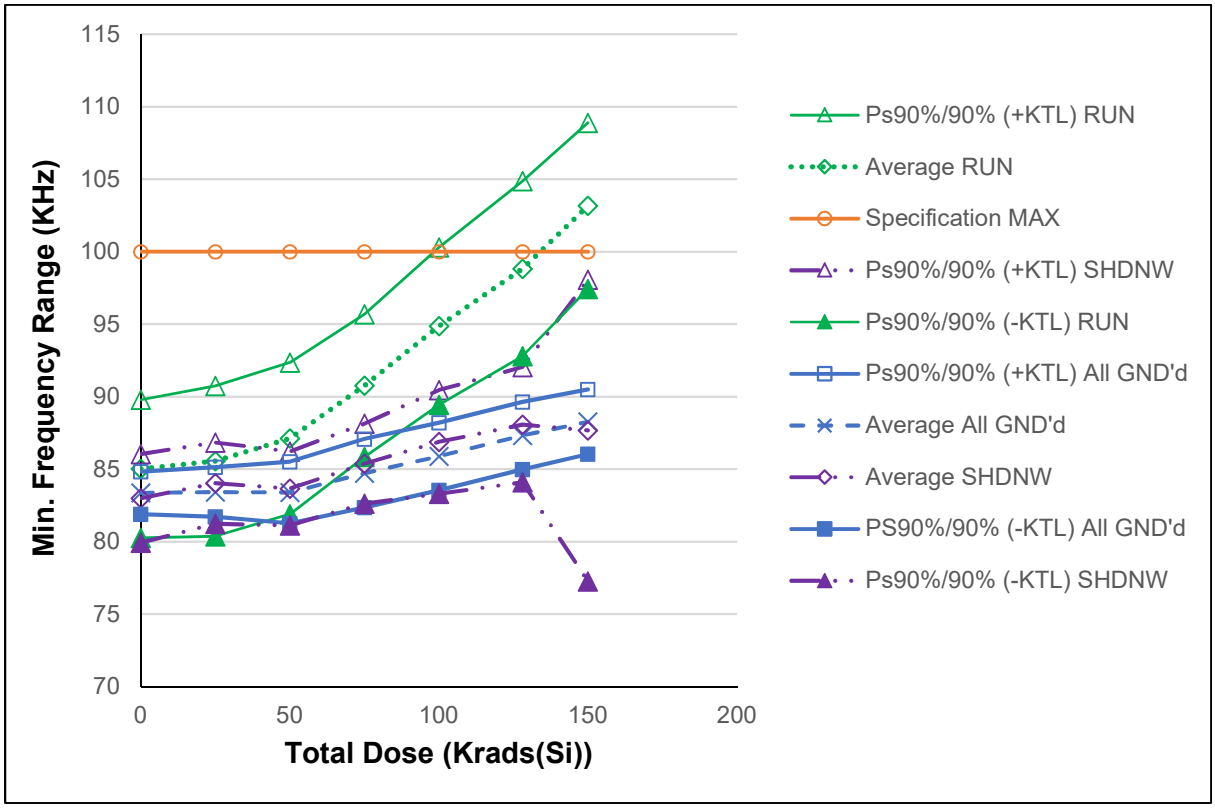

Figure 5.22: Plot of Minimum Frequency Range versus Total Dose

Note: The measured data of 5 pieces in RUN mode bias irradiation are slightly over the limits at 128 and 150 Krads(Si).

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 Frequency Range	Total Dose (Krads(Si)) @ 10 mrads(Si)/second						
Units	(KHz)	0	25	50	75	100	128	150
102	All GND'd Irradiation	82.867	82.834	83.349	84.793	86.178	87.426	88.554
103	All GND'd Irradiation	84.114	84.206	84.657	86.057	87.058	88.614	89.396
146	All GND'd Irradiation	83.182	83.552	83.137	84.346	85.552	87.190	87.870
147	All GND'd Irradiation	83.694	83.767	83.257	84.645	85.854	87.056	88.292
148	All GND'd Irradiation	82.931	82.756	82.540	83.707	84.743	86.266	87.201
97	SHDNW Irradiation	82.297	82.742	82.565	84.429	85.812	86.709	81.163
98	SHDNW Irradiation	82.069	83.700	83.073	84.551	85.938	87.463	88.490
99	SHDNW Irradiation	84.539	85.425	84.987	86.920	88.856	90.153	90.840
100	SHDNW Irradiation	83.801	84.596	84.077	85.674	87.570	88.971	89.786
101	SHDNW Irradiation	82.232	83.684	83.616	85.328	86.248	87.040	88.045
129	RUN Irradiation	87.425	87.865	89.387	92.794	97.280	101.665	105.838
130	RUN Irradiation	84.162	84.375	85.692	89.231	93.705	97.633	102.060
133	RUN Irradiation	82.868	83.397	84.939	89.128	93.054	97.114	101.532
159	RUN Irradiation	85.930	87.159	88.712	92.571	96.745	100.731	104.991
160	RUN Irradiation	84.703	84.959	86.875	90.086	93.565	96.992	101.400
134	Control Unit	81.086	81.954	82.208	82.000	82.283	81.649	81.153
135	Control Unit	81.088	81.620	81.440	81.293	81.939	81.568	80.966
	All GND'd Irradiation Statistics							
	Average All GND'd	83.357	83.423	83.388	84.710	85.877	87.310	88.262
	Std Dev All GND'd	0.534	0.621	0.776	0.861	0.848	0.849	0.814
	Ps90%/90% (+KTL) All GND'd	84.820	85.125	85.517	87.070	88.202	89.638	90.495
	PS90%/90% (-KTL) All GND'd	81.894	81.721	81.259	82.350	83.552	84.983	86.030
	SHDNW Irradiation Statistics							
	Average SHDNW	82.987	84.029	83.663	85.380	86.885	88.067	87.665
	Std Dev SHDNW	1.114	1.019	0.933	1.007	1.305	1.452	3.797
	Ps90%/90% (+KTL) SHDNW	86.042	86.824	86.221	88.140	90.462	92.048	98.077
	Ps90%/90% (-KTL) SHDNW	79.933	81.235	81.106	82.620	83.308	84.086	77.252
	RUN Irradiation Statistics							
	Average RUN	85.018	85.551	87.121	90.762	94.870	98.827	103.164
	Std Dev RUN	1.738	1.891	1.906	1.794	1.980	2.203	2.091
	Ps90%/90% (+KTL) RUN	89.783	90.737	92.347	95.681	100.299	104.867	108.897
	Ps90%/90% (-KTL) RUN	80.252	80.364	81.895	85.843	89.441	92.787	97.432
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	100	100	100		100		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		FAIL		

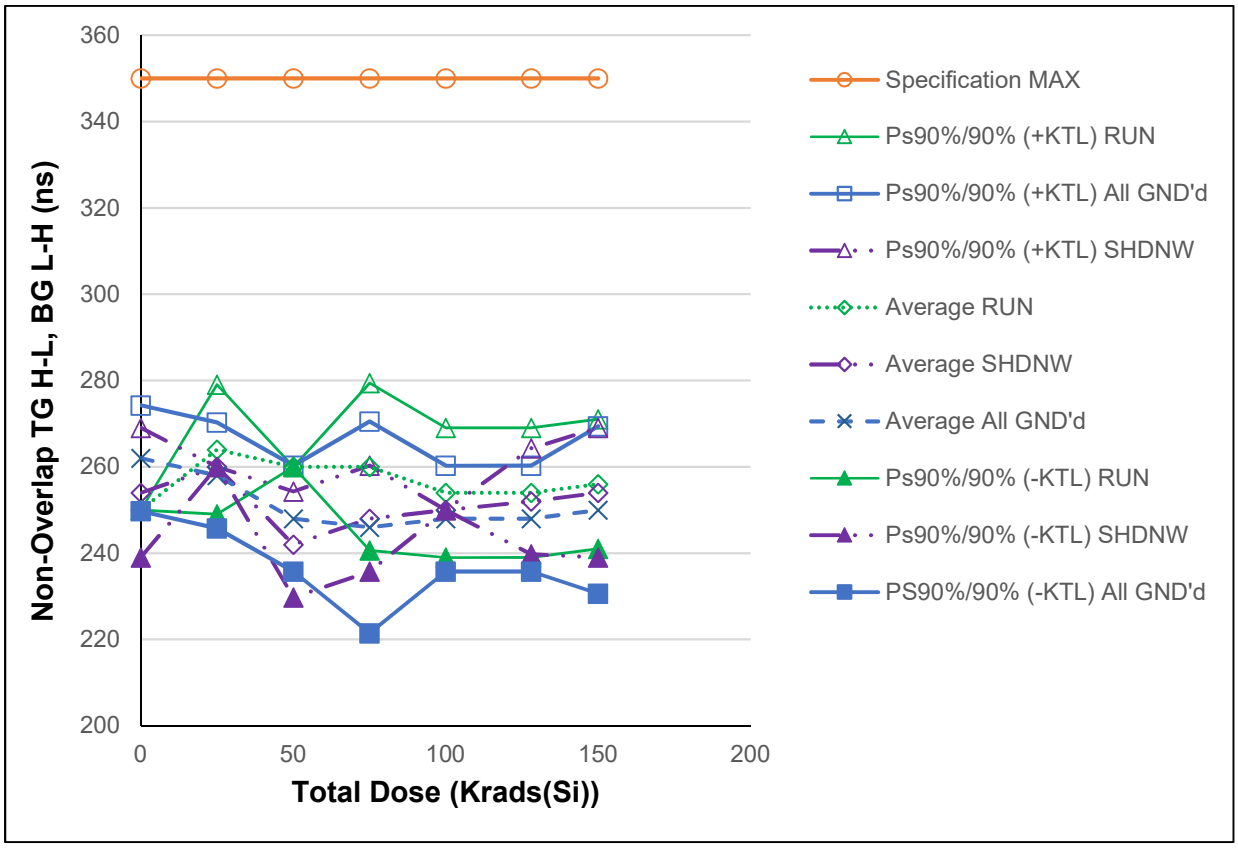

Figure 5.23: Plot of Non-Overlap TG (H-L) to BG (L-H) versus Total Dose

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 TG (H-L) to BG (L-H)	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(ns)	0	25	50	75	100	128	150
102	All GND'd Irradiation	260.00	260.00	250.00	260.00	250.00	240.00	250.00
103	All GND'd Irradiation	260.00	250.00	250.00	240.00	240.00	250.00	240.00
146	All GND'd Irradiation	260.00	260.00	250.00	240.00	250.00	250.00	250.00
147	All GND'd Irradiation	260.00	260.00	240.00	240.00	250.00	250.00	250.00
148	All GND'd Irradiation	270.00	260.00	250.00	250.00	250.00	250.00	260.00
97	SHDNW Irradiation	250.00	260.00	240.00	250.00	250.00	250.00	250.00
98	SHDNW Irradiation	250.00	260.00	240.00	240.00	250.00	250.00	250.00
99	SHDNW Irradiation	260.00	260.00	250.00	250.00	250.00	250.00	260.00
100	SHDNW Irradiation	260.00	260.00	240.00	250.00	250.00	260.00	260.00
101	SHDNW Irradiation	250.00	260.00	240.00	250.00	250.00	250.00	250.00
129	RUN Irradiation	250.00	260.00	260.00	260.00	260.00	250.00	250.00
130	RUN Irradiation	250.00	270.00	260.00	260.00	250.00	260.00	260.00
133	RUN Irradiation	250.00	260.00	260.00	250.00	250.00	250.00	250.00
159	RUN Irradiation	250.00	260.00	260.00	270.00	250.00	250.00	260.00
160	RUN Irradiation	250.00	270.00	260.00	260.00	260.00	260.00	260.00
134	Control Unit	240.00	260.00	260.00	260.00	250.00	250.00	260.00
135	Control Unit	230.00	260.00	260.00	250.00	250.00	250.00	260.00
	All GND'd Irradiation Statistics							
	Average All GND'd	262.00	258.00	248.00	246.00	248.00	248.00	250.00
	Std Dev All GND'd	4.47	4.47	4.47	8.94	4.47	4.47	7.07
	Ps90%/90% (+KTL) All GND'd	274.26	270.26	260.26	270.53	260.26	260.26	269.39
	PS90%/90% (-KTL) All GND'd	249.74	245.74	235.74	221.48	235.74	235.74	230.61
	SHDNW Irradiation Statistics							
	Average SHDNW	254.00	260.00	242.00	248.00	250.00	252.00	254.00
	Std Dev SHDNW	5.48	0.00	4.47	4.47	0.00	4.47	5.48
	Ps90%/90% (+KTL) SHDNW	269.02	260.00	254.26	260.26	250.00	264.26	269.02
	Ps90%/90% (-KTL) SHDNW	238.98	260.00	229.74	235.74	250.00	239.74	238.98
	RUN Irradiation Statistics							
	Average RUN	250.00	264.00	260.00	260.00	254.00	254.00	256.00
	Std Dev RUN	0.00	5.48	0.00	7.07	5.48	5.48	5.48
	Ps90%/90% (+KTL) RUN	250.00	279.02	260.00	279.39	269.02	269.02	271.02
	Ps90%/90% (-KTL) RUN	250.00	248.98	260.00	240.61	238.98	238.98	240.98
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX		350	350		350		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

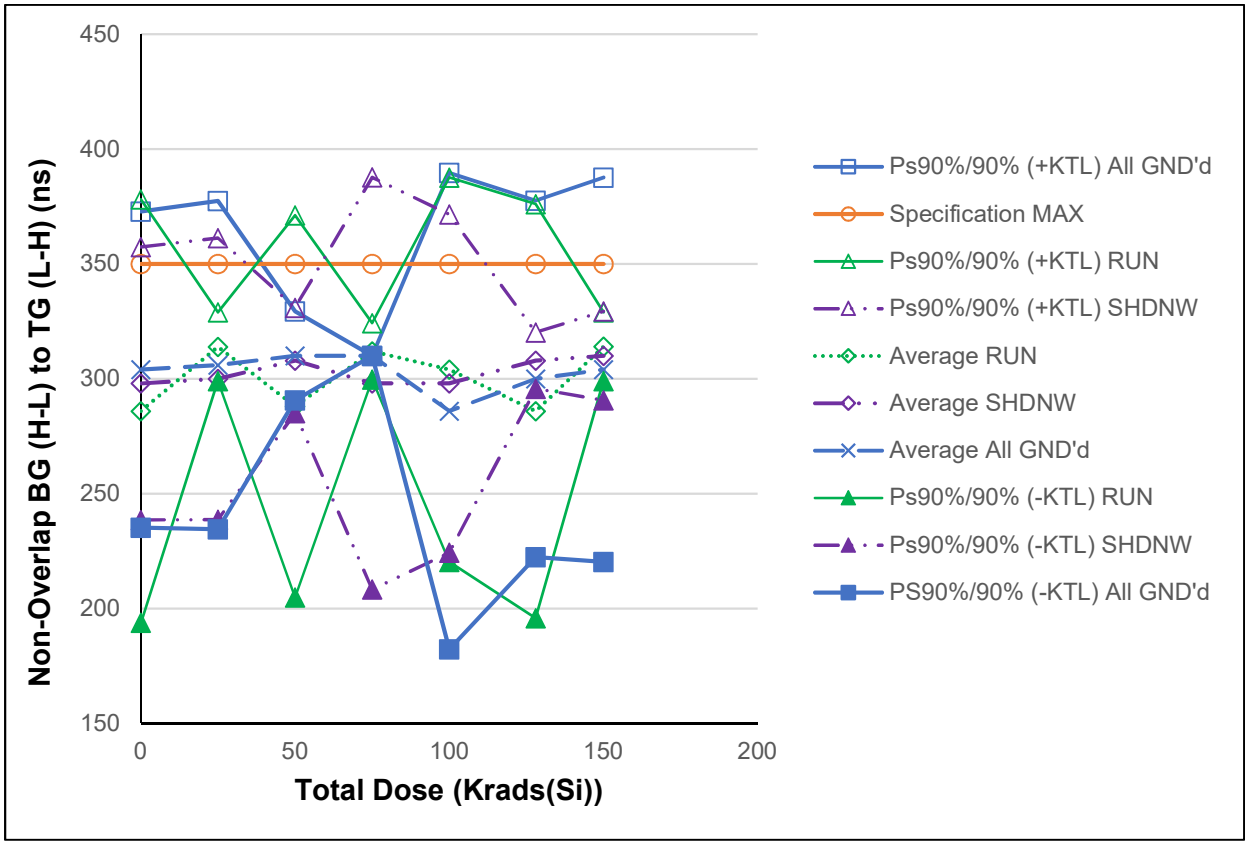

Figure 5.24: Plot of Non-Overlap BG (H-L) to TG (L-H) versus Total Dose

Note: Measured data of all fifteen parts are within specification MAX limit.

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) to TG(L-H)	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(ns)	0	25	50	75	100	128	150
102	All GND'd Irradiation	310.00	260.00	310.00	310.00	250.00	310.00	320.00
103	All GND'd Irradiation	310.00	310.00	300.00	310.00	310.00	310.00	310.00
146	All GND'd Irradiation	320.00	320.00	310.00	310.00	310.00	250.00	250.00
147	All GND'd Irradiation	260.00	320.00	320.00	310.00	240.00	310.00	320.00
148	All GND'd Irradiation	320.00	320.00	310.00	310.00	320.00	320.00	320.00
97	SHDNW Irradiation	300.00	260.00	300.00	310.00	310.00	310.00	310.00
98	SHDNW Irradiation	310.00	310.00	300.00	240.00	310.00	300.00	300.00
99	SHDNW Irradiation	310.00	310.00	310.00	310.00	250.00	310.00	310.00
100	SHDNW Irradiation	260.00	310.00	320.00	320.00	310.00	310.00	320.00
101	SHDNW Irradiation	310.00	310.00	310.00	310.00	310.00	310.00	310.00
129	RUN Irradiation	250.00	310.00	310.00	310.00	310.00	310.00	310.00
130	RUN Irradiation	320.00	320.00	310.00	310.00	320.00	310.00	310.00
133	RUN Irradiation	300.00	310.00	250.00	310.00	250.00	250.00	310.00
159	RUN Irradiation	310.00	310.00	310.00	310.00	320.00	310.00	320.00
160	RUN Irradiation	250.00	320.00	260.00	320.00	320.00	250.00	320.00
134	Control Unit	260.00	310.00	250.00	300.00	310.00	310.00	310.00
135	Control Unit	260.00	310.00	260.00	260.00	310.00	310.00	320.00
	All GND'd Irradiation Statistics							
	Average All GND'd	304.00	306.00	310.00	310.00	286.00	300.00	304.00
	Std Dev All GND'd	25.10	26.08	7.07	0.00	37.82	28.28	30.50
	Ps90%/90% (+KTL) All GND'd	372.82	377.50	329.39	310.00	389.69	377.56	387.62
	PS90%/90% (-KTL) All GND'd	235.18	234.50	290.61	310.00	182.31	222.44	220.38
	SHDNW Irradiation Statistics							
	Average SHDNW	298.00	300.00	308.00	298.00	298.00	308.00	310.00
	Std Dev SHDNW	21.68	22.36	8.37	32.71	26.83	4.47	7.07
	Ps90%/90% (+KTL) SHDNW	357.45	361.31	330.94	387.69	371.58	320.26	329.39
	Ps90%/90% (-KTL) SHDNW	238.55	238.69	285.06	208.31	224.42	295.74	290.61
	RUN Irradiation Statistics							
	Average RUN	286.00	314.00	288.00	312.00	304.00	286.00	314.00
	Std Dev RUN	33.62	5.48	30.33	4.47	30.50	32.86	5.48
	Ps90%/90% (+KTL) RUN	378.17	329.02	371.17	324.26	387.62	376.11	329.02
	Ps90%/90% (-KTL) RUN	193.83	298.98	204.83	299.74	220.38	195.89	298.98
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX		350	350		350		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	FAIL	FAIL	PASS		FAIL		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	FAIL	FAIL	PASS		FAIL		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	FAIL	PASS	FAIL		FAIL		

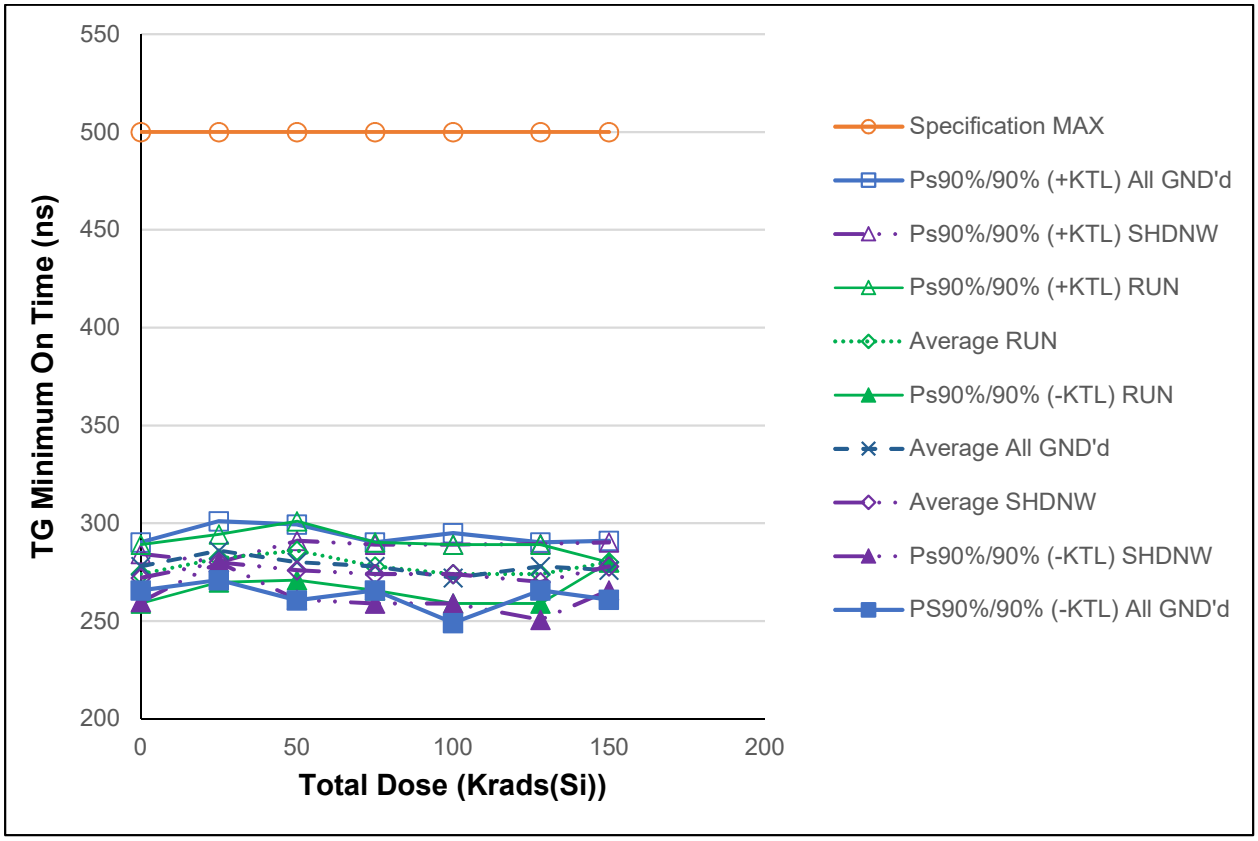

Figure 5.25: Plot of TG Minimum ON Time versus Total Dose

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)) @ 10 mrads(Si)/second						
Units	(ns)	0	25	50	75	100	128	150
102	All GND'd Irradiation	280.00	280.00	280.00	280.00	270.00	280.00	280.00
103	All GND'd Irradiation	270.00	280.00	270.00	270.00	260.00	270.00	270.00
146	All GND'd Irradiation	280.00	290.00	280.00	280.00	270.00	280.00	280.00
147	All GND'd Irradiation	280.00	290.00	280.00	280.00	280.00	280.00	270.00
148	All GND'd Irradiation	280.00	290.00	290.00	280.00	280.00	280.00	280.00
97	SHDNW Irradiation	270.00	280.00	270.00	280.00	280.00	270.00	280.00
98	SHDNW Irradiation	270.00	280.00	270.00	270.00	270.00	260.00	270.00
99	SHDNW Irradiation	280.00	280.00	280.00	270.00	270.00	270.00	280.00
100	SHDNW Irradiation	270.00	280.00	280.00	270.00	280.00	280.00	280.00
101	SHDNW Irradiation	270.00	280.00	280.00	280.00	270.00	270.00	280.00
129	RUN Irradiation	280.00	280.00	280.00	280.00	280.00	270.00	280.00
130	RUN Irradiation	280.00	280.00	290.00	270.00	270.00	270.00	280.00
133	RUN Irradiation	270.00	290.00	280.00	280.00	270.00	280.00	280.00
159	RUN Irradiation	270.00	280.00	290.00	280.00	280.00	280.00	280.00
160	RUN Irradiation	270.00	280.00	290.00	280.00	270.00	270.00	280.00
134	Control Unit	220.00	280.00	290.00	270.00	280.00	280.00	280.00
135	Control Unit	230.00	280.00	280.00	270.00	280.00	280.00	280.00
	All GND'd Irradiation Statistics							
	Average All GND'd	278.00	286.00	280.00	278.00	272.00	278.00	276.00
	Std Dev All GND'd	4.47	5.48	7.07	4.47	8.37	4.47	5.48
	Ps90%/90% (+KTL) All GND'd	290.26	301.02	299.39	290.26	294.94	290.26	291.02
	PS90%/90% (-KTL) All GND'd	265.74	270.98	260.61	265.74	249.06	265.74	260.98
	SHDNW Irradiation Statistics							
	Average SHDNW	272.00	280.00	276.00	274.00	274.00	270.00	278.00
	Std Dev SHDNW	4.47	0.00	5.48	5.48	5.48	7.07	4.47
	Ps90%/90% (+KTL) SHDNW	284.26	280.00	291.02	289.02	289.02	289.39	290.26
	Ps90%/90% (-KTL) SHDNW	259.74	280.00	260.98	258.98	258.98	250.61	265.74
	RUN Irradiation Statistics							
	Average RUN	274.00	282.00	286.00	278.00	274.00	274.00	280.00
	Std Dev RUN	5.48	4.47	5.48	4.47	5.48	5.48	0.00
	Ps90%/90% (+KTL) RUN	289.02	294.26	301.02	290.26	289.02	289.02	280.00
	Ps90%/90% (-KTL) RUN	258.98	269.74	270.98	265.74	258.98	258.98	280.00
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX		500	500		500		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

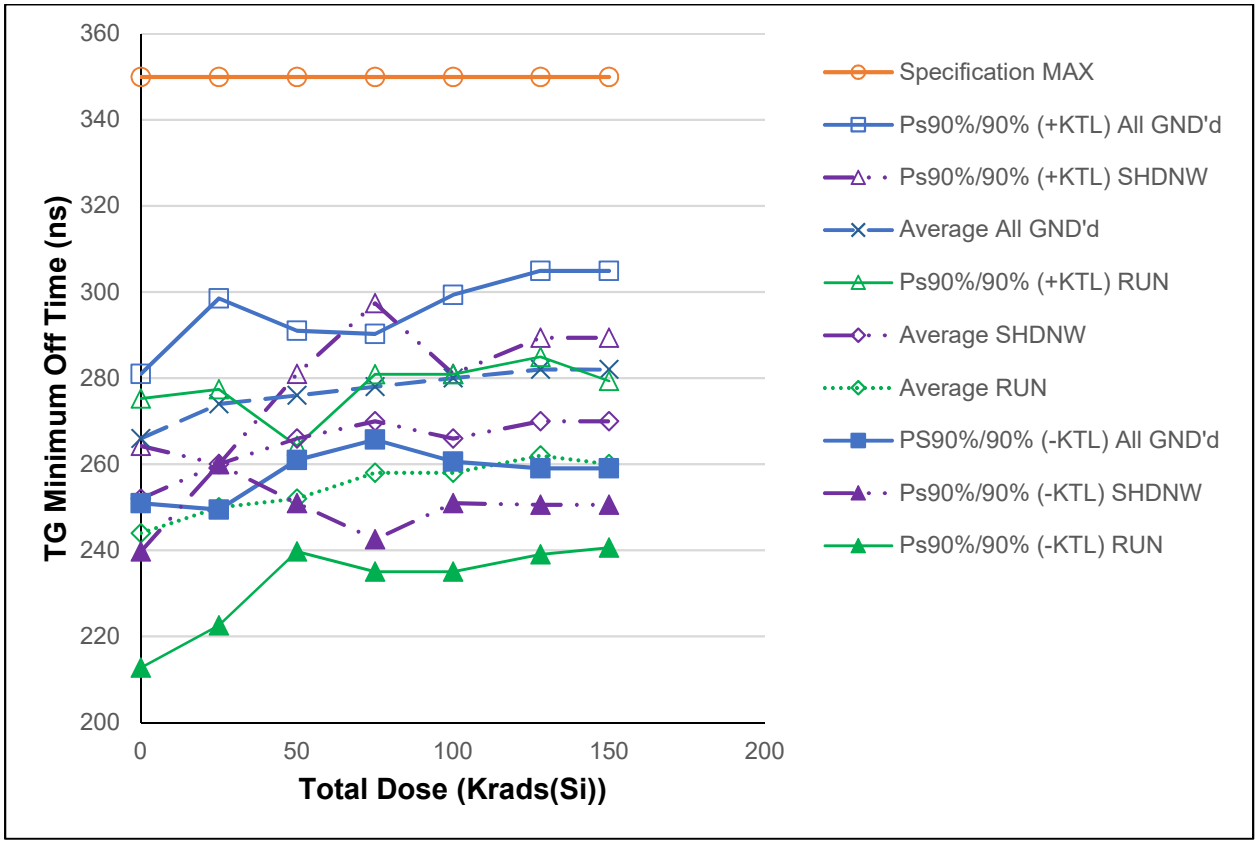

Figure 5.26: Plot of TG Minimum OFF Time versus Total Dose

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)) @ 10 mrads(Si)/second						
Units	(ns)	0	25	50	75	100	128	150
102	All GND'd Irradiation	260.00	270.00	280.00	280.00	280.00	290.00	280.00
103	All GND'd Irradiation	260.00	260.00	270.00	270.00	270.00	270.00	270.00
146	All GND'd Irradiation	270.00	280.00	280.00	280.00	280.00	280.00	280.00
147	All GND'd Irradiation	270.00	280.00	270.00	280.00	280.00	280.00	290.00
148	All GND'd Irradiation	270.00	280.00	280.00	280.00	290.00	290.00	290.00
97	SHDNW Irradiation	250.00	260.00	260.00	270.00	270.00	270.00	260.00
98	SHDNW Irradiation	250.00	260.00	260.00	260.00	260.00	260.00	270.00
99	SHDNW Irradiation	250.00	260.00	270.00	280.00	270.00	270.00	270.00
100	SHDNW Irradiation	260.00	260.00	270.00	280.00	270.00	280.00	280.00
101	SHDNW Irradiation	250.00	260.00	270.00	260.00	260.00	270.00	270.00
129	RUN Irradiation	230.00	240.00	250.00	250.00	250.00	260.00	250.00
130	RUN Irradiation	250.00	260.00	250.00	260.00	260.00	270.00	260.00
133	RUN Irradiation	260.00	260.00	260.00	270.00	270.00	270.00	270.00
159	RUN Irradiation	240.00	240.00	250.00	250.00	250.00	250.00	260.00
160	RUN Irradiation	240.00	250.00	250.00	260.00	260.00	260.00	260.00
134	Control Unit	250.00	260.00	260.00	250.00	250.00	250.00	250.00
135	Control Unit	260.00	260.00	260.00	260.00	260.00	260.00	260.00
	All GND'd Irradiation Statistics							
	Average All GND'd	266.00	274.00	276.00	278.00	280.00	282.00	282.00
	Std Dev All GND'd	5.48	8.94	5.48	4.47	7.07	8.37	8.37
	Ps90%/90% (+KTL) All GND'd	281.02	298.53	291.02	290.26	299.39	304.94	304.94
	PS90%/90% (-KTL) All GND'd	250.98	249.48	260.98	265.74	260.61	259.06	259.06
	SHDNW Irradiation Statistics							
	Average SHDNW	252.00	260.00	266.00	270.00	266.00	270.00	270.00
	Std Dev SHDNW	4.47	0.00	5.48	10.00	5.48	7.07	7.07
	Ps90%/90% (+KTL) SHDNW	264.26	260.00	281.02	297.42	281.02	289.39	289.39
	Ps90%/90% (-KTL) SHDNW	239.74	260.00	250.98	242.58	250.98	250.61	250.61
	RUN Irradiation Statistics							
	Average RUN	244.00	250.00	252.00	258.00	258.00	262.00	260.00
	Std Dev RUN	11.40	10.00	4.47	8.37	8.37	8.37	7.07
	Ps90%/90% (+KTL) RUN	275.26	277.42	264.26	280.94	280.94	284.94	279.39
	Ps90%/90% (-KTL) RUN	212.74	222.58	239.74	235.06	235.06	239.06	240.61
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX		350	350		350		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

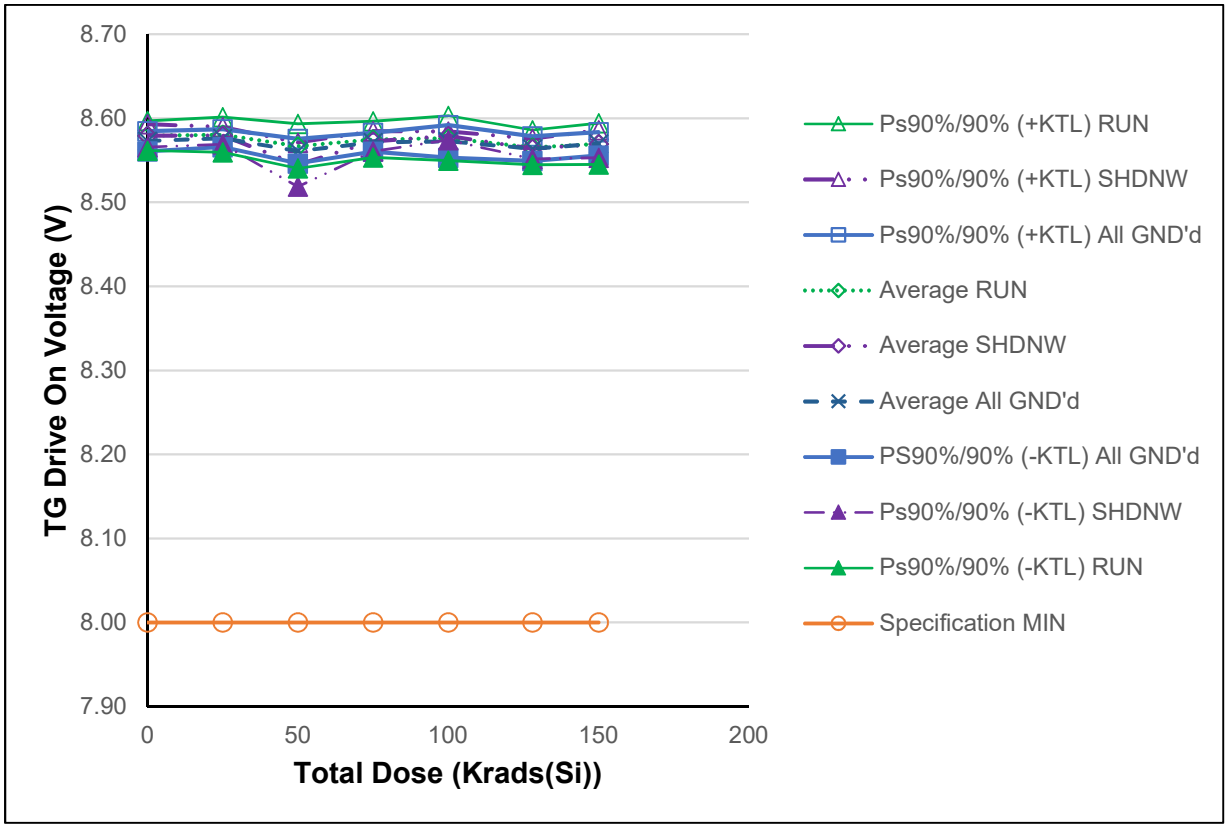

Figure 5.27: Plot of TG Drive ON voltage versus Total Dose

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

Parameter	TG Drive On Voltage	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(V)	0	25	50	75	100	128	150
102	All GND'd Irradiation	8.574	8.577	8.554	8.570	8.581	8.565	8.575
103	All GND'd Irradiation	8.573	8.576	8.561	8.570	8.573	8.569	8.567
146	All GND'd Irradiation	8.579	8.582	8.569	8.579	8.577	8.569	8.575
147	All GND'd Irradiation	8.568	8.573	8.559	8.570	8.565	8.558	8.566
148	All GND'd Irradiation	8.569	8.573	8.562	8.570	8.566	8.558	8.565
97	SHDNW Irradiation	8.579	8.579	8.536	8.570	8.578	8.560	8.575
98	SHDNW Irradiation	8.587	8.584	8.554	8.579	8.582	8.569	8.576
99	SHDNW Irradiation	8.577	8.575	8.539	8.568	8.577	8.561	8.564
100	SHDNW Irradiation	8.574	8.576	8.538	8.571	8.578	8.561	8.563
101	SHDNW Irradiation	8.579	8.582	8.556	8.574	8.580	8.568	8.570
129	RUN Irradiation	8.584	8.582	8.565	8.576	8.583	8.570	8.571
130	RUN Irradiation	8.568	8.567	8.551	8.562	8.562	8.553	8.555
133	RUN Irradiation	8.580	8.584	8.569	8.580	8.581	8.570	8.575
159	RUN Irradiation	8.582	8.587	8.577	8.581	8.585	8.570	8.578
160	RUN Irradiation	8.582	8.580	8.572	8.575	8.571	8.564	8.569
134	Control Unit	8.573	8.587	8.588	8.579	8.580	8.569	8.565
135	Control Unit	8.575	8.587	8.578	8.569	8.580	8.566	8.569
	All GND'd Irradiation Statistics							
	Average All GND'd	8.573	8.576	8.561	8.571	8.572	8.564	8.570
	Std Dev All GND'd	0.004	0.004	0.005	0.004	0.007	0.005	0.005
	Ps90%/90% (+KTL) All GND'd	8.585	8.587	8.576	8.583	8.592	8.578	8.584
	PS90%/90% (-KTL) All GND'd	8.561	8.566	8.546	8.560	8.553	8.549	8.556
	SHDNW Irradiation Statistics							
	Average SHDNW	8.579	8.579	8.545	8.573	8.579	8.564	8.570
	Std Dev SHDNW	0.005	0.004	0.010	0.004	0.002	0.004	0.006
	Ps90%/90% (+KTL) SHDNW	8.593	8.590	8.571	8.585	8.584	8.576	8.586
	Ps90%/90% (-KTL) SHDNW	8.566	8.569	8.519	8.561	8.574	8.551	8.553
	RUN Irradiation Statistics							
	Average RUN	8.579	8.580	8.567	8.575	8.576	8.565	8.570
	Std Dev RUN	0.006	0.008	0.010	0.008	0.010	0.008	0.009
	Ps90%/90% (+KTL) RUN	8.597	8.601	8.593	8.596	8.603	8.586	8.594
	Ps90%/90% (-KTL) RUN	8.561	8.559	8.540	8.553	8.550	8.545	8.545
	Specification MIN	8	8	8		8		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDWN	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Specification MAX							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDWN							
	Status (Measurements) RUN							
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd							
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW							
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN							

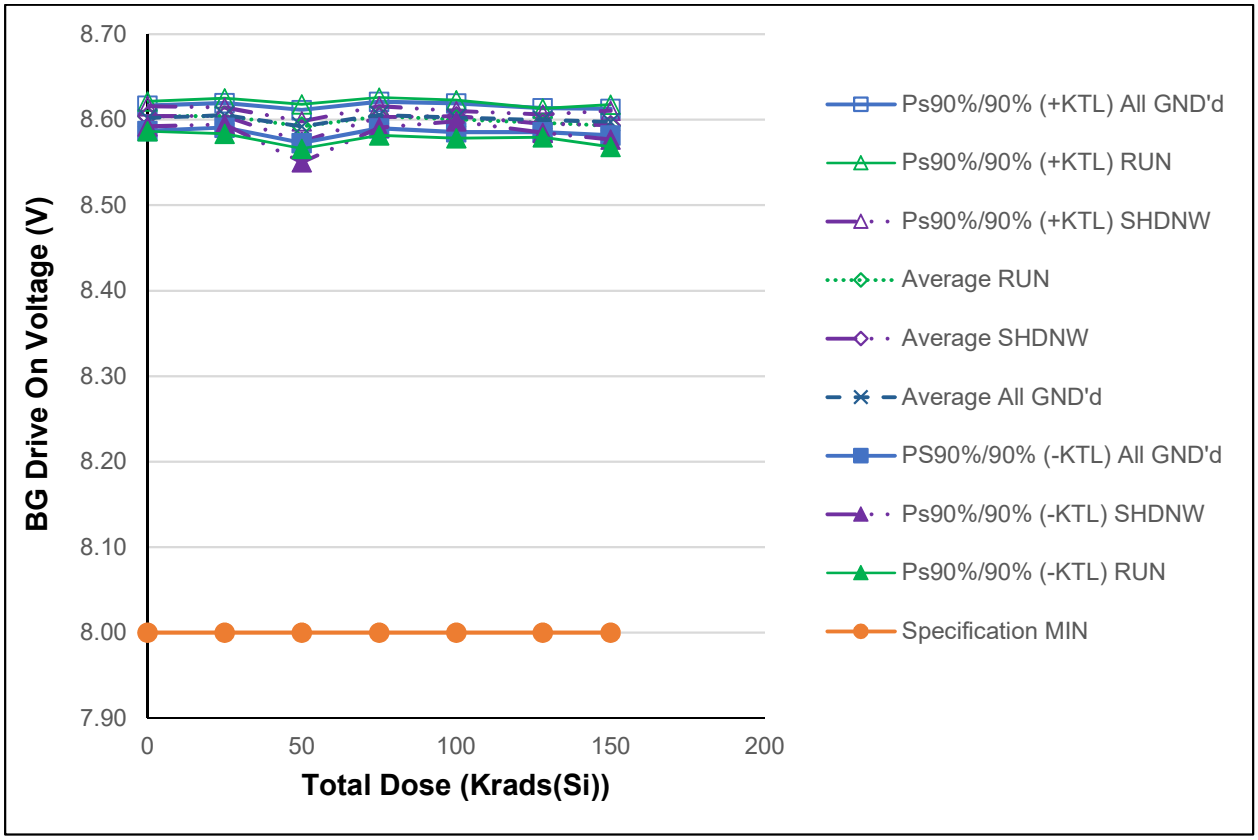

Figure 5.28: Plot of BG Drive ON voltage versus Total Dose

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

Parameter	BG Drive On Voltage	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(V)	0	25	50	75	100	128	150
102	All GND'd Irradiation	8.601	8.604	8.584	8.601	8.607	8.598	8.600
103	All GND'd Irradiation	8.600	8.603	8.590	8.601	8.600	8.601	8.592
146	All GND'd Irradiation	8.611	8.614	8.603	8.615	8.609	8.607	8.606
147	All GND'd Irradiation	8.596	8.600	8.589	8.603	8.594	8.593	8.592
148	All GND'd Irradiation	8.601	8.604	8.595	8.607	8.600	8.598	8.596
97	SHDNW Irradiation	8.603	8.604	8.566	8.600	8.602	8.592	8.601
98	SHDNW Irradiation	8.612	8.609	8.583	8.609	8.607	8.600	8.599
99	SHDNW Irradiation	8.601	8.600	8.568	8.598	8.602	8.592	8.587
100	SHDNW Irradiation	8.601	8.603	8.570	8.604	8.605	8.595	8.589
101	SHDNW Irradiation	8.603	8.606	8.584	8.605	8.605	8.599	8.593
129	RUN Irradiation	8.605	8.603	8.587	8.601	8.603	8.597	8.591
130	RUN Irradiation	8.593	8.592	8.578	8.591	8.588	8.585	8.578
133	RUN Irradiation	8.606	8.609	8.595	8.610	8.605	8.601	8.599
159	RUN Irradiation	8.606	8.610	8.600	8.610	8.608	8.600	8.600
160	RUN Irradiation	8.609	8.607	8.600	8.608	8.599	8.598	8.596
134	Control Unit	8.604	8.612	8.613	8.609	8.605	8.601	8.592
135	Control Unit	8.607	8.613	8.605	8.601	8.606	8.601	8.597
	All GND'd Irradiation Statistics							
	Average All GND'd	8.602	8.605	8.592	8.606	8.602	8.600	8.597
	Std Dev All GND'd	0.005	0.005	0.007	0.006	0.006	0.005	0.006
	Ps90%/90% (+KTL) All GND'd	8.617	8.619	8.611	8.621	8.619	8.614	8.613
	PS90%/90% (-KTL) All GND'd	8.587	8.591	8.573	8.590	8.585	8.586	8.582
	SHDNW Irradiation Statistics							
	Average SHDNW	8.604	8.604	8.574	8.603	8.604	8.595	8.594
	Std Dev SHDNW	0.004	0.004	0.009	0.005	0.002	0.004	0.006
	Ps90%/90% (+KTL) SHDNW	8.616	8.614	8.598	8.616	8.610	8.606	8.611
	Ps90%/90% (-KTL) SHDNW	8.592	8.594	8.550	8.591	8.598	8.585	8.577
	RUN Irradiation Statistics							
	Average RUN	8.604	8.604	8.592	8.604	8.601	8.596	8.593
	Std Dev RUN	0.006	0.008	0.009	0.008	0.008	0.006	0.009
	Ps90%/90% (+KTL) RUN	8.621	8.625	8.618	8.626	8.623	8.613	8.618
	Ps90%/90% (-KTL) RUN	8.586	8.584	8.566	8.582	8.578	8.579	8.568
	Specification MIN	8	8	8		8		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDWN	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Specification MAX							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDWN							
	Status (Measurements) RUN							
	Status (-KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (+KTL) All GND'd							
	Status (-KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (+KTL) SHDNW							
	Status (-KTL) RUN	PASS	PASS	PASS		PASS		
	Statsu (+KTL) RUN							

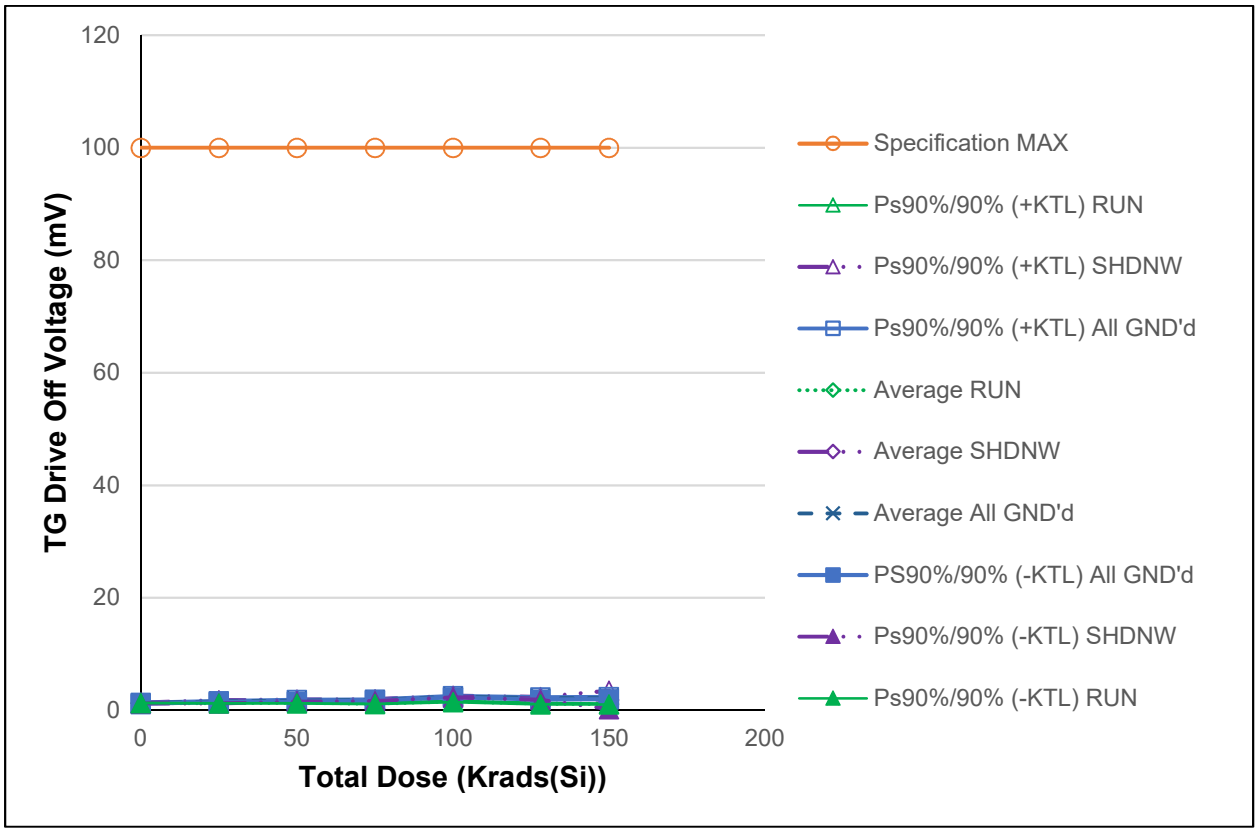

Figure 5.29: Plot of TG Drive OFF voltage versus Total Dose

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)) @ 10 mrads(Si)/second						
Units	(mV)	0	25	50	75	100	128	150
102	All GND'd Irradiation	1.249	1.566	1.639	1.860	2.477	2.240	2.223
103	All GND'd Irradiation	1.249	1.528	1.713	1.822	2.362	2.169	2.137
146	All GND'd Irradiation	1.218	1.528	1.665	1.822	2.410	2.062	2.054
147	All GND'd Irradiation	1.285	1.609	1.729	1.827	2.384	2.093	2.178
148	All GND'd Irradiation	1.323	1.564	1.806	1.872	2.441	2.188	2.223
97	SHDNW Irradiation	1.323	1.490	1.636	1.796	2.460	2.043	0.804
98	SHDNW Irradiation	1.269	1.456	1.672	1.827	2.393	2.040	2.092
99	SHDNW Irradiation	1.324	1.625	1.720	1.856	2.481	2.226	2.154
100	SHDNW Irradiation	1.333	1.661	1.806	1.922	2.555	2.188	2.185
101	SHDNW Irradiation	1.316	1.432	1.751	1.751	2.470	2.102	2.092
129	RUN Irradiation	1.323	1.261	1.424	1.212	1.599	1.158	1.104
130	RUN Irradiation	1.328	1.346	1.293	1.243	1.620	1.261	1.131
133	RUN Irradiation	1.316	1.296	1.367	1.160	1.544	1.158	1.162
159	RUN Irradiation	1.304	1.301	1.348	1.212	1.553	1.196	1.116
160	RUN Irradiation	1.304	1.301	1.338	1.186	1.656	1.234	1.100
134	Control Unit	0.952	1.177	1.043	0.881	1.446	0.844	0.825
135	Control Unit	0.873	1.110	1.007	0.854	1.257	0.891	0.849
	All GND'd Irradiation Statistics							
	Average All GND'd	1.265	1.559	1.710	1.841	2.415	2.150	2.163
	Std Dev All GND'd	0.040	0.033	0.065	0.024	0.046	0.072	0.071
	Ps90%/90% (+KTL) All GND'd	1.375	1.650	1.887	1.906	2.540	2.349	2.357
	PS90%/90% (-KTL) All GND'd	1.155	1.467	1.533	1.776	2.290	1.952	1.969
	SHDNW Irradiation Statistics							
	Average SHDNW	1.313	1.533	1.717	1.830	2.472	2.120	1.865
	Std Dev SHDNW	0.025	0.104	0.066	0.064	0.058	0.084	0.595
	Ps90%/90% (+KTL) SHDNW	1.383	1.817	1.899	2.007	2.630	2.351	3.497
	Ps90%/90% (-KTL) SHDNW	1.243	1.249	1.535	1.654	2.313	1.888	0.234
	RUN Irradiation Statistics							
	Average RUN	1.315	1.301	1.354	1.202	1.594	1.202	1.122
	Std Dev RUN	0.011	0.030	0.048	0.031	0.047	0.046	0.025
	Ps90%/90% (+KTL) RUN	1.345	1.385	1.485	1.289	1.723	1.327	1.191
	Ps90%/90% (-KTL) RUN	1.286	1.218	1.223	1.116	1.466	1.077	1.054
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	100	100	100		100		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

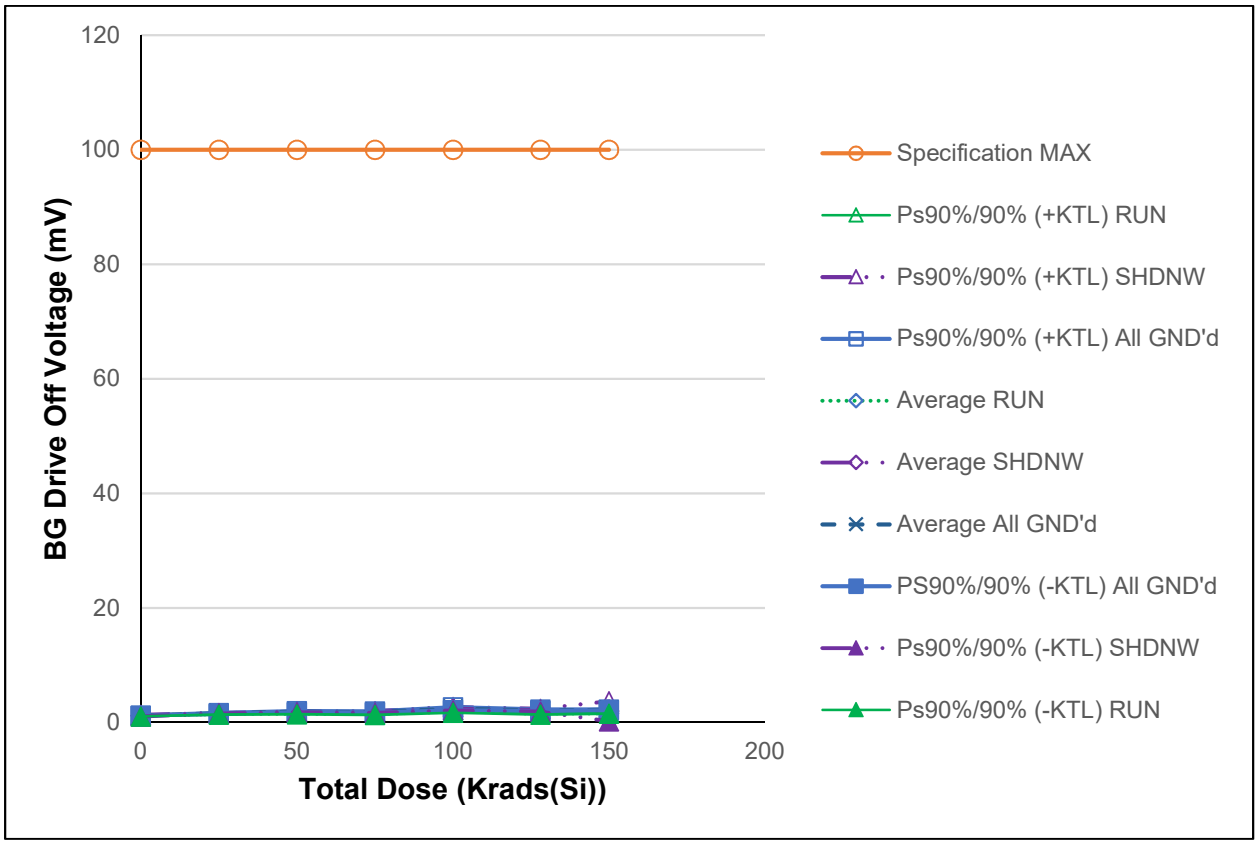

Figure 5.30: Plot of BG Drive OFF voltage versus Total Dose

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)) @ 10 mrads(Si)/second						
Units	(mV)	0	25	50	75	100	128	150
102	All GND'd Irradiation	1.211	1.566	1.903	1.880	2.290	2.188	2.252
103	All GND'd Irradiation	1.214	1.559	1.825	1.789	2.384	2.126	2.245
146	All GND'd Irradiation	1.218	1.644	1.882	1.815	2.343	2.074	2.180
147	All GND'd Irradiation	1.194	1.604	1.903	1.827	2.536	2.074	2.185
148	All GND'd Irradiation	1.202	1.585	1.922	1.870	2.441	2.157	2.199
97	SHDNW Irradiation	1.288	1.606	1.882	1.770	2.400	2.100	0.825
98	SHDNW Irradiation	1.137	1.635	1.873	1.822	2.400	2.088	2.216
99	SHDNW Irradiation	1.202	1.566	1.825	1.860	2.405	2.100	2.252
100	SHDNW Irradiation	1.180	1.626	1.894	1.936	2.572	2.291	2.338
101	SHDNW Irradiation	1.211	1.606	1.903	1.808	2.250	2.110	2.178
129	RUN Irradiation	1.135	1.528	1.558	1.465	1.935	1.578	1.641
130	RUN Irradiation	1.211	1.454	1.653	1.465	1.983	1.654	1.651
133	RUN Irradiation	1.249	1.454	1.558	1.415	1.983	1.542	1.612
159	RUN Irradiation	1.171	1.473	1.558	1.417	1.925	1.483	1.574
160	RUN Irradiation	1.192	1.487	1.500	1.388	1.789	1.578	1.605
134	Control Unit	0.771	1.091	1.159	0.852	1.257	0.791	0.811
135	Control Unit	0.797	1.151	1.062	0.854	1.209	0.887	0.935
	All GND'd Irradiation Statistics							
	Average All GND'd	1.208	1.592	1.887	1.836	2.399	2.124	2.212
	Std Dev All GND'd	0.010	0.034	0.038	0.038	0.095	0.051	0.034
	Ps90%/90% (+KTL) All GND'd	1.234	1.686	1.990	1.940	2.658	2.262	2.305
	PS90%/90% (-KTL) All GND'd	1.181	1.497	1.784	1.732	2.140	1.985	2.120
	SHDNW Irradiation Statistics							
	Average SHDNW	1.204	1.608	1.875	1.839	2.406	2.138	1.962
	Std Dev SHDNW	0.055	0.026	0.030	0.063	0.114	0.086	0.638
	Ps90%/90% (+KTL) SHDNW	1.354	1.680	1.959	2.013	2.718	2.373	3.712
	Ps90%/90% (-KTL) SHDNW	1.053	1.535	1.792	1.666	2.093	1.902	0.212
	RUN Irradiation Statistics							
	Average RUN	1.192	1.479	1.565	1.430	1.923	1.567	1.617
	Std Dev RUN	0.043	0.031	0.055	0.034	0.079	0.062	0.030
	Ps90%/90% (+KTL) RUN	1.310	1.563	1.716	1.522	2.140	1.738	1.700
	Ps90%/90% (-KTL) RUN	1.074	1.395	1.415	1.337	1.706	1.396	1.533
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX	100	100	100		100		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

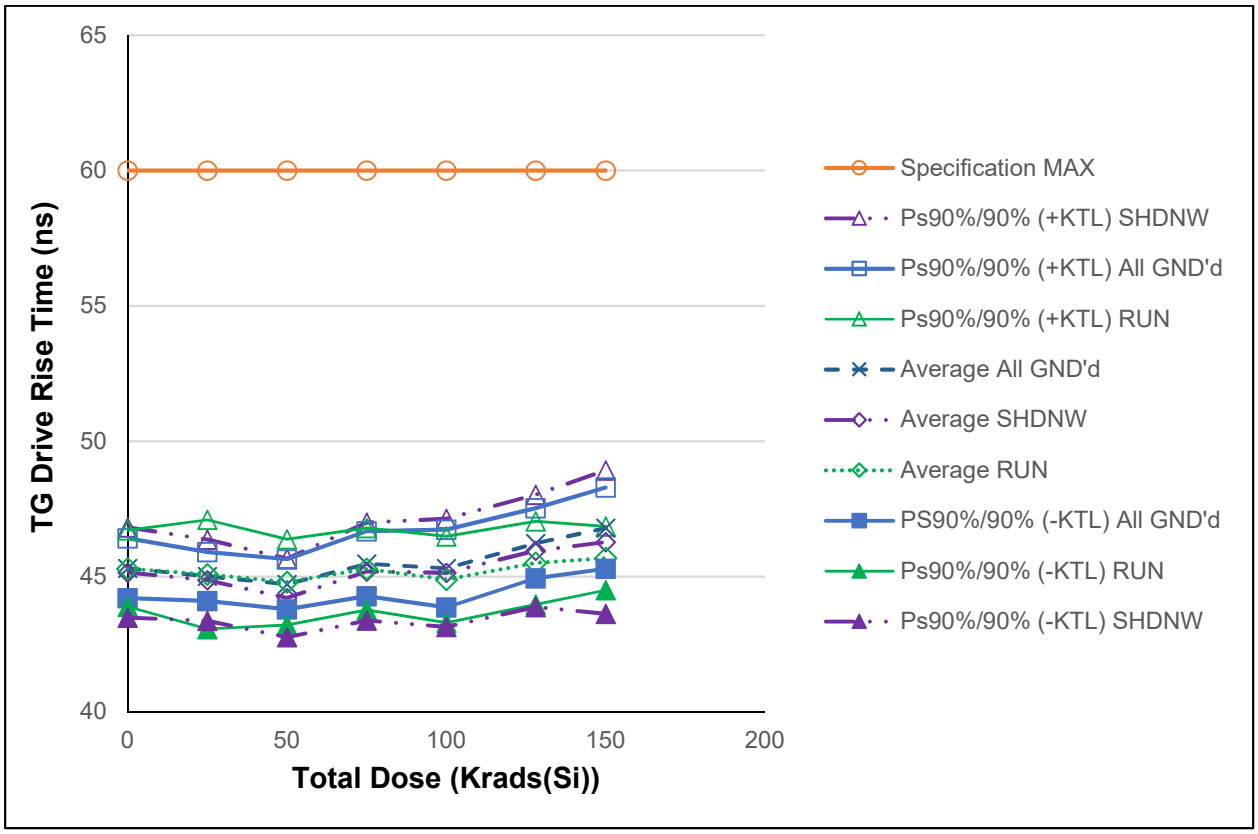

Figure 5.31: Plot of TG Drive Rise Time versus Total Dose

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)) @ 10 mrads(Si)/second						
Units	(ns)	0	25	50	75	100	128	150
102	All GND'd Irradiation	45.865	45.521	44.994	45.918	45.917	46.836	47.492
103	All GND'd Irradiation	44.847	44.660	44.223	44.851	44.621	45.729	46.133
146	All GND'd Irradiation	44.989	44.846	44.516	45.216	44.958	45.805	46.375
147	All GND'd Irradiation	45.386	45.108	44.819	45.587	45.317	46.233	46.830
148	All GND'd Irradiation	45.447	44.868	45.006	45.786	45.673	46.547	47.112
97	SHDNW Irradiation	44.902	44.572	43.680	44.764	44.799	45.553	45.116
98	SHDNW Irradiation	44.390	44.219	43.682	44.471	44.313	45.058	45.605
99	SHDNW Irradiation	45.950	45.666	44.906	45.929	45.951	46.696	47.194
100	SHDNW Irradiation	45.541	45.078	44.480	45.839	45.865	46.783	47.317
101	SHDNW Irradiation	44.933	44.772	44.286	44.927	44.767	45.652	46.124
129	RUN Irradiation	45.786	45.850	45.351	45.922	45.583	46.238	46.185
130	RUN Irradiation	45.400	44.836	44.680	45.334	45.104	45.717	45.861
133	RUN Irradiation	44.417	43.934	43.870	44.413	44.013	44.690	45.010
159	RUN Irradiation	45.411	45.486	45.170	45.506	45.052	45.482	45.692
160	RUN Irradiation	45.448	45.274	44.908	45.222	44.691	45.380	45.628
134	Control Unit	44.693	44.862	45.160	45.303	44.535	45.094	44.775
135	Control Unit	44.920	45.133	45.235	45.291	44.695	45.191	45.002
	All GND'd Irradiation Statistics							
	Average All GND'd	45.307	45.001	44.712	45.472	45.297	46.230	46.788
	Std Dev All GND'd	0.403	0.332	0.337	0.436	0.524	0.474	0.548
	Ps90%/90% (+KTL) All GND'd	46.412	45.910	45.637	46.669	46.734	47.530	48.291
	PS90%/90% (-KTL) All GND'd	44.202	44.091	43.787	44.275	43.860	44.930	45.285
	SHDNW Irradiation Statistics							
	Average SHDNW	45.143	44.862	44.207	45.186	45.139	45.948	46.271
	Std Dev SHDNW	0.608	0.547	0.530	0.659	0.728	0.757	0.968
	Ps90%/90% (+KTL) SHDNW	46.810	46.362	45.659	46.992	47.136	48.024	48.924
	Ps90%/90% (-KTL) SHDNW	43.477	43.361	42.755	43.381	43.142	43.872	43.618
	RUN Irradiation Statistics							
	Average RUN	45.292	45.076	44.796	45.280	44.889	45.502	45.675
	Std Dev RUN	0.515	0.736	0.577	0.552	0.583	0.562	0.430
	Ps90%/90% (+KTL) RUN	46.703	47.094	46.377	46.794	46.488	47.042	46.854
	Ps90%/90% (-KTL) RUN	43.881	43.058	43.214	43.765	43.289	43.961	44.496
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX		60	60		60		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

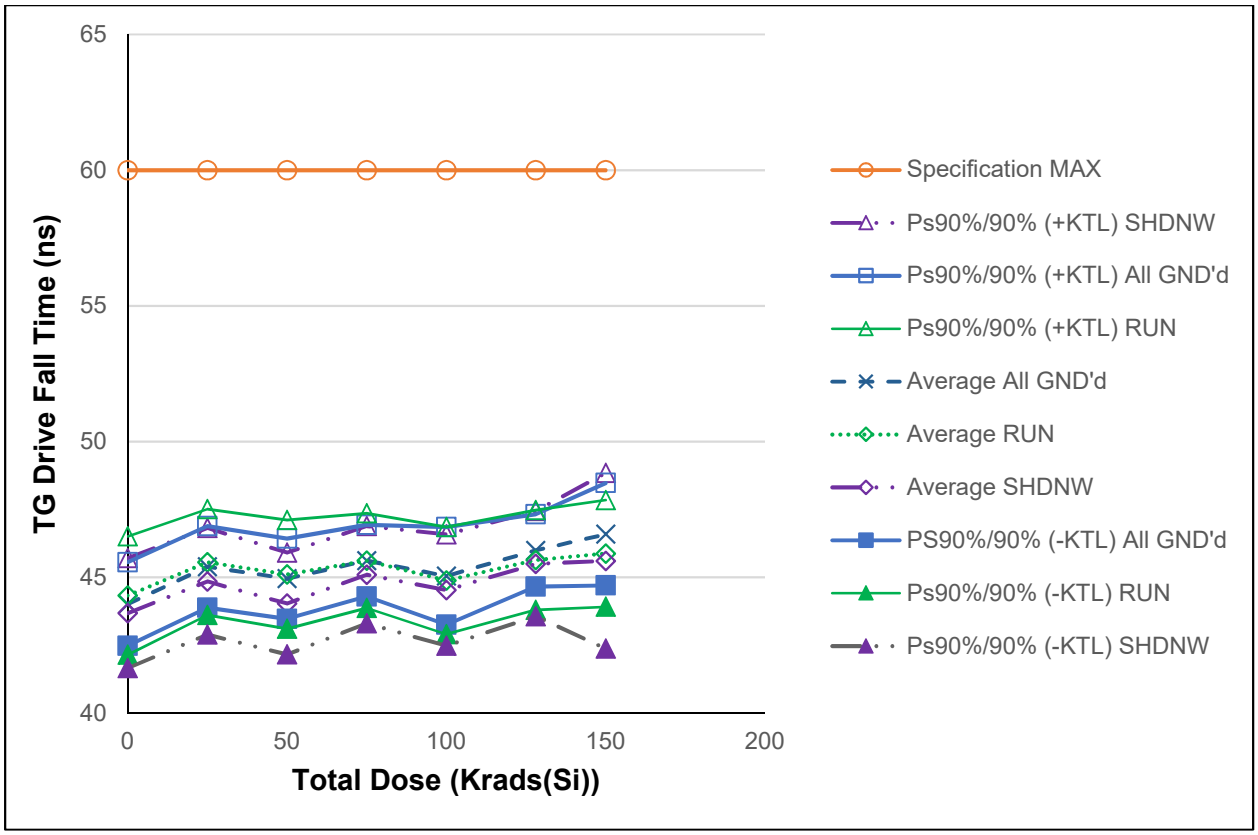

Figure 5.32: Plot of TG Drive Fall Time versus Total Dose

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 Fall Time	Total Dose (Krad(Si)) @ 10 mrads(Si)/second						
Units	(ns)	0	25	50	75	100	128	150
102	All GND'd Irradiation	44.764	46.059	45.464	46.157	46.069	46.650	47.509
103	All GND'd Irradiation	43.348	44.677	44.215	44.970	44.436	45.462	45.752
146	All GND'd Irradiation	43.592	45.011	44.575	45.291	44.531	45.573	46.092
147	All GND'd Irradiation	44.138	45.530	45.139	45.776	45.007	46.082	46.750
148	All GND'd Irradiation	44.254	45.677	45.380	45.898	45.235	46.203	46.860
97	SHDNW Irradiation	43.424	44.606	43.631	44.786	44.227	45.166	44.010
98	SHDNW Irradiation	42.728	43.888	43.170	44.285	43.560	44.619	44.912
99	SHDNW Irradiation	44.644	45.722	44.914	45.813	45.432	46.317	46.845
100	SHDNW Irradiation	44.162	45.381	44.462	45.723	45.129	46.132	46.606
101	SHDNW Irradiation	43.455	44.686	44.021	44.882	44.343	45.298	45.671
129	RUN Irradiation	45.156	46.278	45.769	46.247	45.777	46.376	46.611
130	RUN Irradiation	44.403	45.633	45.155	45.710	44.900	45.794	45.964
133	RUN Irradiation	43.006	44.372	43.866	44.547	43.781	44.545	44.685
159	RUN Irradiation	44.522	45.838	45.446	45.874	45.137	45.789	46.155
160	RUN Irradiation	44.567	45.700	45.324	45.698	44.819	45.704	45.999
134	Control Unit	43.969	44.294	43.875	44.027	43.215	43.991	43.685
135	Control Unit	44.182	44.455	43.875	43.935	43.305	43.995	43.877
	All GND'd Irradiation Statistics							
	Average All GND'd	44.019	45.391	44.955	45.618	45.055	45.994	46.593
	Std Dev All GND'd	0.561	0.548	0.540	0.480	0.656	0.485	0.688
	Ps90%/90% (+KTL) All GND'd	45.557	46.894	46.435	46.934	46.854	47.324	48.478
	PS90%/90% (-KTL) All GND'd	42.482	43.888	43.474	44.302	43.257	44.664	44.707
	SHDNW Irradiation Statistics							
	Average SHDNW	43.682	44.856	44.040	45.098	44.538	45.506	45.609
	Std Dev SHDNW	0.739	0.717	0.683	0.653	0.748	0.706	1.180
	Ps90%/90% (+KTL) SHDNW	45.709	46.822	45.912	46.889	46.589	47.443	48.844
	Ps90%/90% (-KTL) SHDNW	41.656	42.891	42.167	43.307	42.487	43.570	42.373
	RUN Irradiation Statistics							
	Average RUN	44.331	45.564	45.112	45.616	44.883	45.642	45.883
	Std Dev RUN	0.796	0.712	0.732	0.637	0.721	0.669	0.717
	Ps90%/90% (+KTL) RUN	46.513	47.517	47.119	47.362	46.861	47.476	47.850
	Ps90%/90% (-KTL) RUN	42.148	43.612	43.105	43.869	42.905	43.807	43.916
	Specification MIN							
	Status (Measurements) All GND'd							
	Status (Measurements) SHDNW							
	Status (Measurements) RUN							
	Specification MAX		60	60		60		
	Status (Measurements) All GND'd	PASS	PASS	PASS		PASS		
	Status (Measurements) SHDNW	PASS	PASS	PASS		PASS		
	Status (Measurements) RUN	PASS	PASS	PASS		PASS		
	Status (-KTL) All GND'd							
	Status (+KTL) All GND'd	PASS	PASS	PASS		PASS		
	Status (-KTL) SHDNW							
	Status (+KTL) SHDNW	PASS	PASS	PASS		PASS		
	Status (-KTL) RUN							
	Statsu (+KTL) RUN	PASS	PASS	PASS		PASS		

Appendix A

Picture of one among fifteen samples used in the test. The date code and related identification numbers should be correlated with the provided information in the second page of this report.

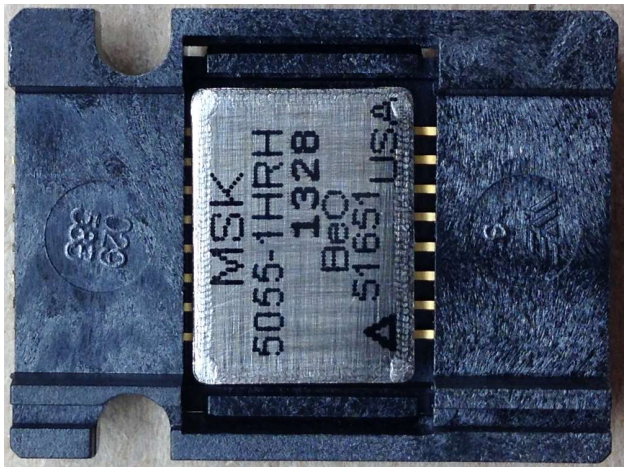

Figure A1: Top View showing date code

Figure A2: Bottom View showing serial number

Appendix B

Radiation Bias Connection

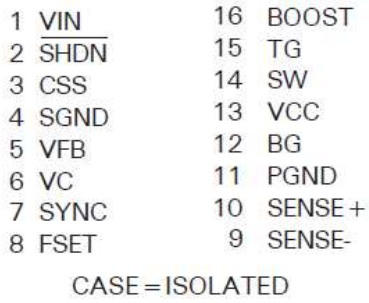

Figure B1: Pin-Out

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

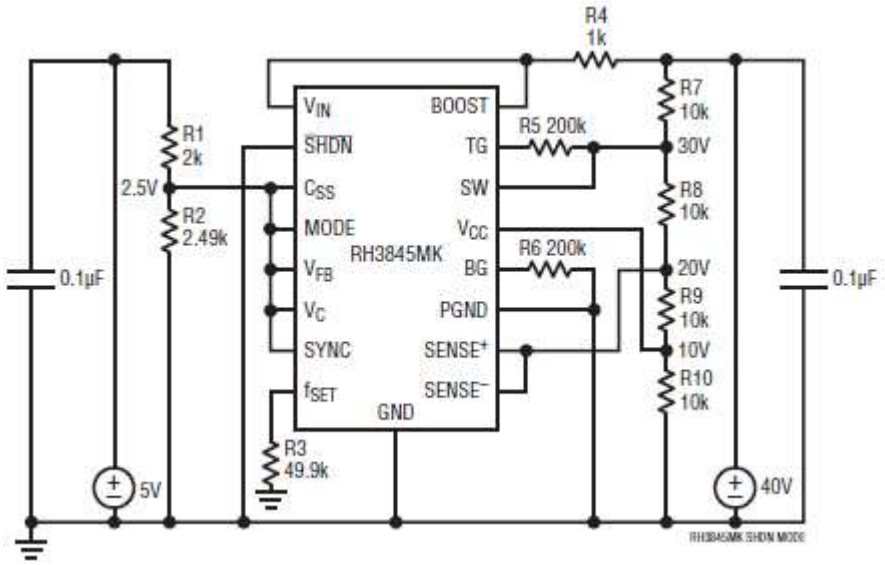

Figure B2: Total Dose Bias SHUTDOWN mode

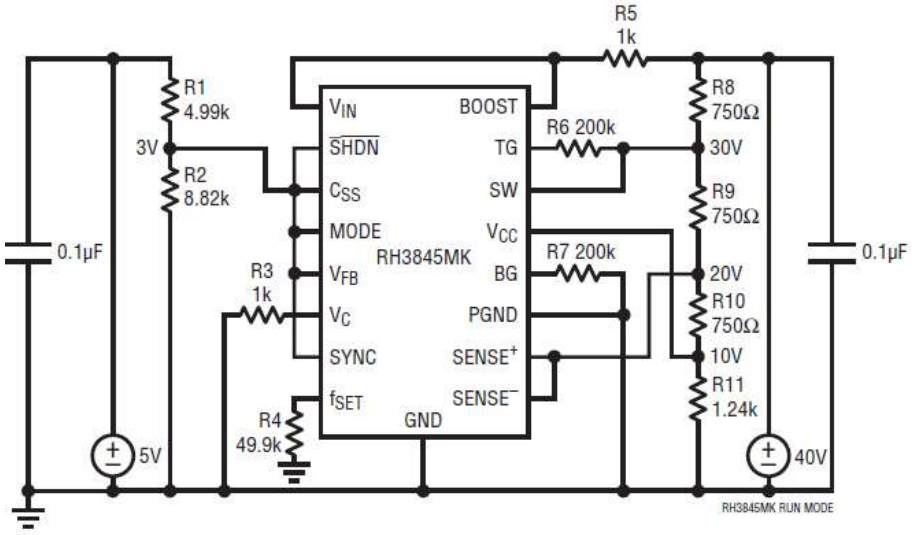

Figure B3: Total Dose Bias RUN mode

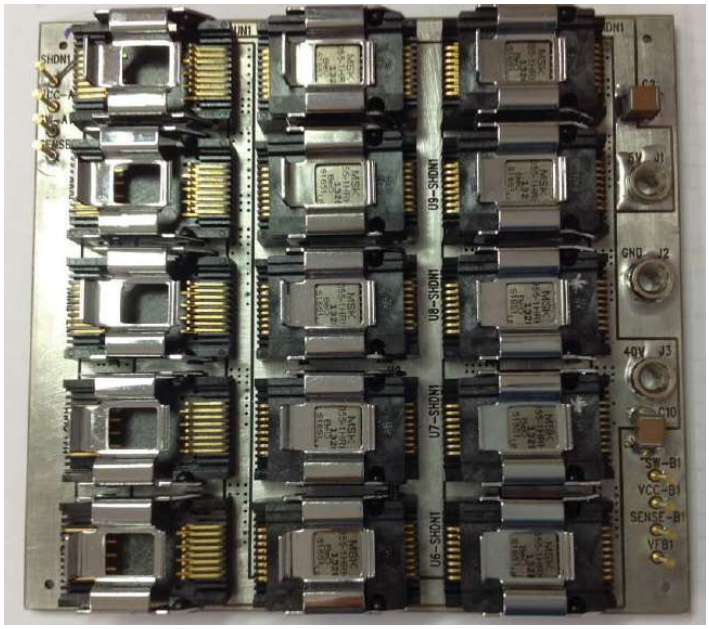

Figure B3: Bias Board (top view)

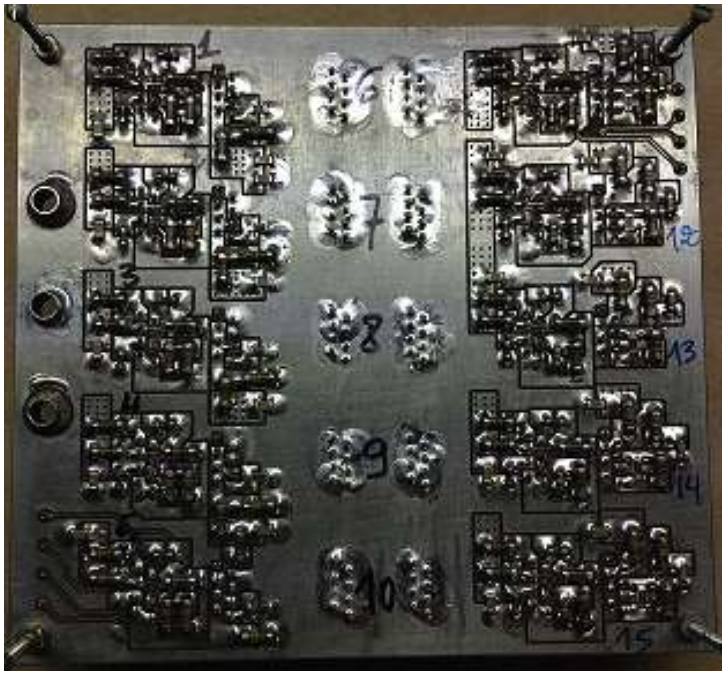

Figure B4: Bias Board (bottom view)

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 (exceptions as noted).
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: 2014-12-10 **Test Certificate #: 2014-NRC-009** **Total Pages (except cover): 36**

REQUEST FOR AND RESULTS OF TESTS

PAGE NO. 1 | NO. OF PAGES 36

SECTION A - REQUEST FOR TEST

1. TO: *(Include ZIP Code)*
Defense Microelectronics Activity
Science and Engineering Gamma Irradiation Test Facility
4234 54th Street
McClellan, CA 95652-2100

2. FROM: *(Include ZIP Code)*
Dr. Sana Rezgui
Linear Technology Corp.
1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408) 432-1900
Email: srezgui@linear.com

3. PRIME CONTRACTOR AND ADDRESS *(Include ZIP Code)*
Same as block 2

CONTRACT NUMBER CRADA CR-08-17

4. MANUFACTURING PLANT NAME AND ADDRESS *(Include ZIP Code)*
Linear Technology Corp.
1630 McCarthy Blvd.
Milpitas, CA 95035

P.O. NUMBER TBD

5. END ITEM AND/OR PROJECT	6. SAMPLE NUMBER	7. LOT NO.	8. REASON FOR SUBMITTAL	9. DATE SUBMITTED
N/A	N/A	See below	Total Ionizing Dose (TID) Testing	2013-08-26

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	2013-10-23 by Tom Shepherd

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

Dose Rate: 10 ±10% mrad(SiO2)/sec Irradiation Steps: 4 Type of Test: Customer-Performed
Total Dose: see below ±10% krad(SiO2) Requested Test Start Date: 2013-10-21 Dimensions: Various
Security Requirements, Safety or Handling Precautions: Customer to perform pre- and post-irradiation electrical testing. Parts may be packed by customer in dry ice for transport. Irradiation portion of testing to be conducted per MIL-STD-883H, Test Method 1019.8, Condition D. Customer reserves right to modify parameters, devices, etc. to suit test requirements. Some or all of these devices may be irradiated up to 200 krad(SiO2).

Description of parts to be irradiated is as follows:
MSK5055RH (RH3845MK): fab lot #WD005797.2, assy lot #N/A, WFR #9: 10, 30, 50, and 100 krad; 15 pieces; biased
MSK196RH (6R196105RKG0*01): fab lot #WD005524.3, assy lot #N/A, WFR #7: 10, 30, 50, and 100 krad; 15 pieces; biased
RH3080MK-CS: fab lot #UP201494.1, assy lot #N/A, WFR #2: 10, 30, 50 and 100 krad; 10 pieces; biased
RH1086K#7AB-1-CS: fab lot #W1075048.2, assy lot #562977.1, WFR #6: 10, 30, 50 and 100 krad; 10 pieces; biased
RH1084MK-CS: fab lot #W728121.1, assy lot #12198.1, WFR #6: 10, 30, 50 and 100 krad; 10 pieces; biased
RH1185MK-CS: fab lot #WP005088.1, assy lot #673016.2, WFR #3: 10, 30, 50 and 100 krad; 10 pieces; biased
RH1028MW: fab lot #W1117814.1, assy lot #675617.1, WFR #5: quantity and dose levels TBD
Device board: device type, quantity, and dose levels TBD

Experiment #: 2014-NRC-009 DMEA Approval: SHEPHERD.THOM... SHEPHERD.THOM... SHEPHERD.THOM... MELINE.CARY.W.1231954033

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
2013-10-21	2014-12-10	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
2014-12-10	Thomas J. Shepherd, SEGIT Technical Manager	SHEPHERD.THOMAS.J.1255235946
2014-12-10	Mohammad Arshad, Alt. SEGIT Facility Supervisor	ARSHAD.MOHAMMAD.1231956693

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

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4. Test Performed			Results of Test			Sample Result	Requirements	Step No.
20131021 16:02:00	to 20131120 14:55:51	2.579E+04	rad(SiO2) at	5.978E-01	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 25.79 krad SD, 25.79 krad TD		1
20131021 16:02:00	to 20131120 14:55:51	2.579E+04	rad(SiO2) at	5.978E-01	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 950-954, 956-965: 25.79 krad SD, 25.79 krad TD		1
20131021 16:02:00	to 20131120 14:55:51	2.579E+04	rad(SiO2) at	5.978E-01	rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 25.79 krad SD, 25.79 krad TD		1
20131021 16:02:00	to 20131120 14:55:51	2.579E+04	rad(SiO2) at	5.978E-01	rad(SiO2)/min	RH1086K#7AB-1-CS, WFR #6, S/Ns 81-90: 25.79 krad SD, 25.79 krad TD		1
20131021 16:02:00	to 20131120 14:55:51	2.579E+04	rad(SiO2) at	5.978E-01	rad(SiO2)/min	RH1084MK-CS, WFR #6, S/Ns 359-368: 25.79 krad SD, 25.79 krad TD		1
20131021 16:02:00	to 20131120 14:55:51	2.579E+04	rad(SiO2) at	5.978E-01	rad(SiO2)/min	RH1185MK-CS, WFR #3, S/Ns 17-19, 26, 28-33: 25.79 krad SD, 25.79 krad TD		1
20131121 16:31:00	to 20131204 09:00:30	1.092E+04	rad(SiO2) at	5.977E-01	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 10.92 krad SD, 36.71 krad TD		2
20131121 16:31:00	to 20131204 09:00:30	1.092E+04	rad(SiO2) at	5.977E-01	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 950-954, 956-965: 10.92 krad SD, 36.71 krad TD		2
20131121 16:31:00	to 20131204 09:00:30	1.092E+04	rad(SiO2) at	5.977E-01	rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 10.92 krad SD, 36.71 krad TD		2
20131121 16:31:00	to 20131204 09:00:30	1.092E+04	rad(SiO2) at	5.977E-01	rad(SiO2)/min	RH1086K#7AB-1-CS, WFR #6, S/Ns 81-90: 10.92 krad SD, 36.71 krad TD		2
20131121 16:31:00	to 20131204 09:00:30	1.092E+04	rad(SiO2) at	5.977E-01	rad(SiO2)/min	RH1084MK-CS, WFR #6, S/Ns 359-368: 10.92 krad SD, 36.71 krad TD		2
20131121 16:31:00	to 20131204 09:00:30	1.092E+04	rad(SiO2) at	5.977E-01	rad(SiO2)/min	RH1185MK-CS, WFR #3, S/Ns 17-19, 26, 28-33: 10.92 krad SD, 36.71 krad TD		2
20131121 16:31:00	to 20131204 09:00:30	1.092E+04	rad(SiO2) at	5.977E-01	rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 10.92 krad SD, 10.92 krad TD		2
20131204 19:10:00	to 20131220 07:50:00	1.330E+04	rad(SiO2) at	5.946E-01	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 13.3 krad SD, 50.01 krad TD		3
20131204 19:10:00	to 20131220 07:50:00	1.330E+04	rad(SiO2) at	5.946E-01	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 950-954, 956-965: 13.3 krad SD, 50.01 krad TD		3
20131204 19:10:00	to 20131220 07:50:00	1.330E+04	rad(SiO2) at	5.946E-01	rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 13.3 krad SD, 50.01 krad TD		3
20131204 19:10:00	to 20131220 07:50:00	1.330E+04	rad(SiO2) at	5.946E-01	rad(SiO2)/min	RH1086K#7AB-1-CS, WFR #6, S/Ns 81-90: 13.3 krad SD, 50.01 krad TD		3
20131204 19:10:00	to 20131220 07:50:00	1.330E+04	rad(SiO2) at	5.946E-01	rad(SiO2)/min	RH1084MK-CS, WFR #6, S/Ns 359-368: 13.3 krad SD, 50.01 krad TD		3
20131204 19:10:00	to 20131220 07:50:00	1.330E+04	rad(SiO2) at	5.946E-01	rad(SiO2)/min	RH1185MK-CS, WFR #3, S/Ns 17-19, 26, 28-33: 13.3 krad SD, 50.01 krad TD		3
20131204 19:10:00	to 20131220 07:50:00	1.330E+04	rad(SiO2) at	5.946E-01	rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 13.3 krad SD, 24.22 krad TD		3
20131204 19:10:00	to 20131220 07:50:00	1.330E+04	rad(SiO2) at	5.946E-01	rad(SiO2)/min	LTC Devices G, E, N, WFR #2 - S/Ns G4, E4, N4: 13.3 krad SD, 13.3 krad TD		3

Total Doses reported are = 13.51% at 95% confidence (Step No. 1)
13.23% at 95% confidence (Step No. 2)
13.28% at 95% confidence (Step No. 3)

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

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NOTES:

1. ASTM = American Society for Testing and Materials.
2. DUT = Device Under Test.
3. S/N = Serial Number.
4. SD = Step Dose.
5. TD = Total Dose.
6. WFR = Wafer.
7. Dose rate uniformity across target area: = 7.22% (Step No. 1)
   = 7.25% (Step Nos. 2-3)
8. All irradiation steps met the requirements of MIL-STD-883H, Test Method 1019.8, Condition D.
9. After the original Test Request (DD Form 1222) was approved, the following changes were made:
   a. LTC Devices D, F, H, I, G, E, and N (WFR #2) were added to the test lineup.
   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.
10. The time standard changed from Pacific Daylight Time (PDT) to Pacific Standard Time (PST) during Step No. 1. This step's times are shown in PDT to avoid confusion with overall test duration.
11. Source information:
    a. Irradiator = J.L. Shepherd & Associates Model 81-22/484 self-contained irradiation facility, S/Ns 7133/50017.
    b. Source selection = Co-60.
12. Dosimeter system:
    a. Radcal Model No. 9010 Radiation Monitor Controller, S/N 90-1286.
    b. Radcal Model No. 90X6-60 Electrometer/Ion Chamber, S/N 96-0360.
    c. This dosimeter system was calibrated per ISO/IEC 17025:2005 by University of Wisconsin Medical Radiation Research Center on 11 Oct 2012 (Report No. ION13911). This calibration is effective for two years.
13. 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.
14. 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.

Continuation of DD Form 1222 Experiment #: 2014-NRC-009

4. Test Performed	Results of Test				Sample Result	Requirements	Step No.
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 25.36 krad SD, 75.37 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 950-954, 956-965: 25.36 krad SD, 75.37 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 25.36 krad SD, 75.37 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	RH1086K#7AB-1-CS, WFR #6, S/Ns 81-90: 25.36 krad SD, 75.37 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	RH1084MK-CS, WFR #6, S/Ns 359-368: 25.36 krad SD, 75.37 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	RH1185MK-CS, WFR #3, S/Ns 17-19, 26, 28-33: 25.36 krad SD, 75.37 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 25.36 krad SD, 49.58 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	LTC Devices G, E, N, WFR #2 - S/Ns G4, E4, N4: 25.36 krad SD, 38.66 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	LTC Devices C, K, L, M, R, S, WFR #2 - S/Ns C4, K4, L4, M4, R4, S4: 25.36 krad SD, 25.36 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	LT6654-2.5V-TO5, WFR #N/A, S/Ns 21-38 (floating): 25.36 krad SD, 25.36 krad TD		4
20131223 15:34:00 to 20140122 13:06:06	2.536E+04	rad(SiO2) at	5.891E-01	rad(SiO2)/min	RH1028MW, WFR #5, S/Ns 0432-0433, 0435-0437, 0451-0455: 25.36 krad SD, 25.36 krad TD		4
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 27.22 krad SD, 102.59 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #7, S/Ns 950-954, 956-965: 27.22 krad SD, 102.59 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 27.22 krad SD, 102.59 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	RH1086K#7AB-1-CS, WFR #6, S/Ns 81-90: 27.22 krad SD, 102.59 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	RH1084MK-CS, WFR #6, S/Ns 359-368: 27.22 krad SD, 102.59 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	RH1185MK-CS, WFR #3, S/Ns 17-19, 26, 28-33: 27.22 krad SD, 102.59 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 27.22 krad SD, 76.80 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	LTC Devices G, E, N, WFR #2 - S/Ns G4, E4, N4: 27.22 krad SD, 65.88 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	LTC Devices C, K, L, M, R, S, WFR #2 - S/Ns C4, K4, L4, M4, R4, S4: 27.22 krad SD, 52.58 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	LT6654-2.5V-TO5, WFR #N/A, S/Ns 21-38 (floating): 27.22 krad SD, 52.58 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	RH1028MW, WFR #5, S/Ns 0432-0433, 0435-0437, 0451-0455: 27.22 krad SD, 52.58 krad TD		5
20140124 15:36:00 to 20140225 10:57:24	2.722E+04	rad(SiO2) at	5.943E-01	rad(SiO2)/min	LT6654-LS8-2.5, WFR #N/A, S/Ns 1-18: 27.22 krad SD, 27.22 krad TD		5

Total Doses reported are ± 13.54% at 95% confidence (Step No. 4)
13.67% at 95% confidence (Step No. 5)

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

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NOTES:
1. ASTM = American Society for Testing and Materials.
2. DUT = Device Under Test.
3. S/N = Serial Number.
4. SD = Step Dose.
5. TD = Total Dose.
6. WFR = Wafer.
7. Dose rate uniformity across target area: ± 7.25% (Step No. 4)
   ± 7.33% (Step No. 5)
8. Both irradiation steps met the requirements of MIL-STD-883H, Test Method 1019.8, Condition D.
9. After the original Test Request (DD Form 1222) was approved, the following changes were made:
   a. The following devices were added to the test lineup:
      LTC Devices C, K, L, M, R, and S, WFR #2
      LT6654-2.5V-TO5, WFR #N/A
      RH1028MW, WFR #5
      LT6654-LS8-2.5, WFR #N/A
   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.
10. Source information:
   a. Irradiator = J.L. Shepherd & Associates Model 81-22/484 self-contained irradiation facility, S/Ns 7133/50017.
   b. Source selection = Co-60.
11. Dosimeter system:
   a. Radcal Model No. 9010 Radiation Monitor Controller, S/N 90-1286.
   b. Radcal Model No. 90X6-60 Electrometer/Ion Chamber, S/N 96-0360.
   c. This dosimeter system was calibrated per ISO/IEC 17025:2005 by University of Wisconsin Medical Radiation Research Center on 11 Oct 2012 (Report No. ION13911). This calibration is effective for two years.
12. 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.
13. 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.

Continuation of DD Form 1222 — Experiment #: 2014-NRC-009 — Page 4 of 36

4. Test Performed			Results of Test			Sample Result	Requirements	Step No.
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 10.1 krad SD, 112.69 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #2, S/Ns 1085, 1087-1088, 1092-1097, 1099-1102, 1105-1106: 10.1 krad SD, 10.1 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 10.1 krad SD, 112.69 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	RH1021BMH-10, WFR #1, S/Ns 145-154: 10.1 krad SD, 10.1 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	RH1084MK-CS, WFR #5, S/Ns 1-10: 10.1 krad SD, 10.1 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	RH1021CMH-5#50289, WFR #10, S/Ns 334, 336-343, 345: 10.1 krad SD, 10.1 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 10.1 krad SD, 86.9 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	LTC Devices G, E, N, WFR #2 - S/Ns G4, E4, N4: 10.1 krad SD, 75.98 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	LTC Devices C, K, L, M, R, S, WFR #2 - S/Ns C4, K4, L4, M4, R4, S4: 10.1 krad SD, 62.68 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	LT6654-2.5V-TO5, WFR #N/A, S/Ns 21-38 (floating): 10.1 krad SD, 62.68 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	RH1028MW, WFR #5, S/Ns 0432-0433, 0435-0437, 0451-0455: 10.1 krad SD, 62.68 krad TD	6
20140228 17:00:00	to	20140312 12:33:20	1.010E+04	rad(SiO2) at	5.937E-01	rad(SiO2)/min	LT6654-LS8-2.5, WFR #N/A, S/Ns 1-18: 10.1 krad SD, 37.32 krad TD	6
20140312 18:00:00	to	20140317 09:40:28	4.000E+03	rad(SiO2) at	5.970E-01	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 4 krad SD, 116.69 krad TD	7
20140312 18:00:00	to	20140317 09:40:28	4.000E+03	rad(SiO2) at	5.970E-01	rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 4 krad SD, 116.69 krad TD	7
20140312 18:00:00	to	20140317 09:40:28	4.000E+03	rad(SiO2) at	5.970E-01	rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 4 krad SD, 90.9 krad TD	7
20140312 18:00:00	to	20140317 09:40:28	4.000E+03	rad(SiO2) at	5.970E-01	rad(SiO2)/min	LTC Devices G, E, N, WFR #2 - S/Ns G4, E4, N4: 4 krad SD, 79.98 krad TD	7
20140312 18:00:00	to	20140317 09:40:28	4.000E+03	rad(SiO2) at	5.970E-01	rad(SiO2)/min	LTC Devices C, K, L, M, R, S, WFR #2 - S/Ns C4, K4, L4, M4, R4, S4: 4 krad SD, 66.68 krad TD	7
20140312 18:00:00	to	20140317 09:40:28	4.000E+03	rad(SiO2) at	5.970E-01	rad(SiO2)/min	LT6654-2.5V-TO5, WFR #N/A, S/Ns 21-38 (floating): 4 krad SD, 66.68 krad TD	7
20140312 18:00:00	to	20140317 09:40:28	4.000E+03	rad(SiO2) at	5.970E-01	rad(SiO2)/min	RH1028MW, WFR #5, S/Ns 0432-0433, 0435-0437, 0451-0455: 4 krad SD, 66.68 krad TD	7
20140312 18:00:00	to	20140317 09:40:28	4.000E+03	rad(SiO2) at	5.970E-01	rad(SiO2)/min	LT6654-LS8-2.5, WFR #N/A, S/Ns 1-18: 4 krad SD, 41.32 krad TD	7

Total Doses reported are = 13.18% at 95% confidence (Step No. 6)
13.10% at 95% confidence (Step No. 7)

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. SD = Step Dose.
5. TD = Total Dose.
6. WFR = Wafer.
7. Dose rate uniformity across target area: ± 7.19% (Step No. 6)
   = 7.25% (Step No. 7)
8. Both irradiation steps met the requirements of MIL-STD-883H, Test Method 1019.8, Condition D.
9. After the original Test Request (DD Form 1222) was approved, the following changes were made:
   a. The following devices were added to the test lineup:
      MSK196RH (6RH6105BK#IB*01), WFR #2
      RH1021BMH-10, WFR #1
      RH1084MK-CS, WFR #5
      RH1021CMH-5#50289, WFR #10
   Latitude to change test parameters to suit customer requirements was included in the original Test Request; no Customer Order Change Request (SEGHT Form QP03-4, Rev. 5) was required/issued.
10. The time standard changed from Pacific Standard Time (PST) to Pacific Daylight Time (PDT) during Step No. 6. Times shown are in PST to avoid confusion with overall test duration.
11. Source information:
    a. Irradiator = J.L. Shepherd & Associates Model 81-22/484 self-contained irradiation facility, S/Ns 7133/50017.
    b. Source selection = Co-60.
12. Dosimeter system:
    a. Radcal Model No. 9010 Radiation Monitor Controller, S/N 90-1286.
    b. Radcal Model No. 90X6-60 Electrometer/Ion Chamber, S/N 96-0360.
    c. This dosimeter system was calibrated per ISO/IEC 17025:2005 by University of Wisconsin Medical Radiation Research Center on 11 Oct 2012 (Report No. ION13911). This calibration is effective for two years.
13. 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.
14. 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.

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4. Test Performed			Results of Test			Sample Result	Requirements	Step No.
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 11.9 krad SD, 128.59 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 11.9 krad SD, 128.59 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 11.9 krad SD, 102.8 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	LTC Devices G, E, N, WFR #2 - S/Ns G4, E4, N4: 11.9 krad SD, 91.88 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	LTC Devices C, K, L, M, R, S, WFR #2 - S/Ns C4, K4, L4, M4, R4, S4: 11.9 krad SD, 78.58 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	LT6654-2.5V-TO5, WFR #N/A, S/Ns 21-38 (floating): 11.9 krad SD, 78.58 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	RH1028MW, WFR #5, S/Ns 0432-0433, 0435-0437, 0451-0455: 11.9 krad SD, 78.58 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	LT6654-LS8-2.5, WFR #N/A, S/Ns 1-18: 11.9 krad SD, 53.22 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	RH1021BMH-10, WFR #1, S/Ns 145-154: 11.9 krad SD, 22 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	RH1084MK-CS, WFR #5, S/Ns 1-10: 11.9 krad SD, 22 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	RH1021CMH-5#50289, WFR #10, S/Ns 334, 336-343, 345: 11.9 krad SD, 22 krad TD		8
20140317 14:02:50	to 20140331 11:24:41	1.190E+04	rad(SiO2) at	5.949E-01	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #2, S/Ns 1085, 1087-1088, 1092-1097, 1099-1102, 1105-1106: 11.9 krad SD, 22 krad TD		8
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 10.4 krad SD, 138.99 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 10.4 krad SD, 138.99 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 10.4 krad SD, 113.2 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	LTC Devices G, E, N, WFR #2 - S/Ns G4, E4, N4: 10.4 krad SD, 102.28 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	LTC Devices C, K, L, M, R, S, WFR #2 - S/Ns C4, K4, L4, M4, R4, S4: 10.4 krad SD, 88.98 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	RH1028MW, WFR #5, S/Ns 0432-0433, 0435-0437, 0451-0455: 10.4 krad SD, 88.98 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	RH1021BMH-10, WFR #1, S/Ns 145-154: 10.4 krad SD, 32.4 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	RH1084MK-CS, WFR #5, S/Ns 1-10: 10.4 krad SD, 32.4 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	RH1021CMH-5#50289, WFR #10, S/Ns 334, 336-343, 345: 10.4 krad SD, 32.4 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #2, S/Ns 1085, 1087-1088, 1092-1097, 1099-1102, 1105-1106: 10.4 krad SD, 32.4 krad TD		9
20140404 13:00:00	to 20140416 13:44:00	1.040E+04	rad(SiO2) at	6.003E-01	rad(SiO2)/min	BIPC150-RH6016, WFR #10, S/Ns E1, H1, I1: 10.4 krad SD, 10.4 krad TD		9

Total Doses reported are = 13.27% at 95% confidence (Step No. 8)
13.32% at 95% confidence (Step No. 9)

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

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NOTES:
1. ASTM = American Society for Testing and Materials.
2. DUT = Device Under Test.
3. S/N = Serial Number.
4. SD = Step Dose.
5. TD = Total Dose.
6. WFR = Wafer.
7. Dose rate uniformity across target area: ± 7.25% (Step No. 8)
   ± 7.34% (Step No. 9)
8. Both irradiation steps met the requirements of MIL-STD-883H, Test Method 1019.8, Condition D. **(The median dose rate during Step No. 9 was 10.005 mrad(SiO2)/sec. Rounded to one decimal place, this is 10.0 mrad(SiO2)/sec, and meets the requirements of this MIL-STD.)**
9. After the original Test Request (DD Form 1222) was approved, the following changes were made:
   a. The following devices were added to the test lineup:
      BIPC150-RH6016, WFR #10
   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.
10. Source information:
   a. Irradiator = J.L. Shepherd & Associates Model 81-22/484 self-contained irradiation facility, S/Ns 7133/50017.
   b. Source selection = Co-60.
11. Dosimeter system (Step No. 8):
   a. Radcal Model No. 9010 Radiation Monitor Controller, S/N 90-1286.
   b. Radcal Model No. 90X6-60 Electrometer/Ion Chamber, S/N 96-0360.
   c. This dosimeter system was calibrated per ISO/IEC 17025:2005 by University of Wisconsin Medical Radiation Research Center on 11 Oct 2012 (Report No. ION13911). This calibration is effective for two years.
12. Dosimeter system (Step No. 9):
   a. Radcal Model No. 9010 Radiation Monitor Controller, S/N 90-1313.
   b. Radcal Model No. 90X6-60 Electrometer/Ion Chamber, S/N 96-0362.
   c. This dosimeter system was calibrated per ISO/IEC 17025:2005 by University of Wisconsin Medical Radiation Research Center on 3 Feb 2014 (Report No. ION14427). This calibration is effective for two years.
13. 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.
14. 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.

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4. Test Performed	Results of Test	Sample Result	Requirements	Step No.
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	MSK5055RH (RH3845MK), WFR #9, S/Ns 97-103, 129-130, 133, 146-148, 159-160: 18.13 krad SD, 157.12 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	RH3083MK-CS, WFR #2, S/Ns 1-10: 18.13 krad SD, 157.12 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 18.13 krad SD, 131.33 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	LTC Devices G, E, N, WFR #2 - S/Ns G4, E4, N4: 18.13 krad SD, 120.41 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	LTC Devices C, K, L, M, R, S, WFR #2 - S/Ns C4, K4, L4, M4, R4, S4: 18.13 krad SD, 107.11 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	RH1028MW, WFR #5, S/Ns 0432-0433, 0435-0437, 0451-0455: 18.13 krad SD, 107.11 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	RH1021BMH-10, WFR #1, S/Ns 145-154: 18.13 krad SD, 50.53 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	RH1084MK-CS, WFR #5, S/Ns 1-10: 18.13 krad SD, 50.53 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	RH1021CMH-5#50289, WFR #10, S/Ns 334, 336-343, 345: 18.13 krad SD, 50.53 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #2, S/Ns 1085, 1087-1088, 1092-1097, 1099-1102, 1105-1106: 18.13 krad SD, 50.53 krad TD		10
20140418 13:46:00 to 20140509 16:20:33	1.813E+04 rad(SiO2) at 5.963E-01 rad(SiO2)/min	BIPC150-RH6016, WFR #10, S/Ns E1, H1, I1: 18.13 krad SD, 28.53 krad TD		10
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	LTC Devices D, F, H, I, WFR #2 - S/Ns D4, F4, H4, I4: 11 krad SD, 142.33 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	LTC Devices G, E, N, WFR #2 - S/Ns G4, E4, N4: 11 krad SD, 131.41 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	LTC Devices C, K, L, M, R, S, WFR #2 - S/Ns C4, K4, L4, M4, R4, S4: 11 krad SD, 118.11 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	RH1021BMH-10, WFR #1, S/Ns 145-154: 11 krad SD, 61.53 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	RH1084MK-CS, WFR #5, S/Ns 1-10: 11 krad SD, 61.53 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	RH1021CMH-5#50289, WFR #10, S/Ns 334, 336-343, 345: 11 krad SD, 61.53 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	MSK196RH (6RH6105BK#IB*01), WFR #2, S/Ns 1085, 1087-1088, 1092-1097, 1099-1102, 1105-1106: 11 krad SD, 61.53 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	BIPC150-RH6016, WFR #10, S/Ns E1, H1, I1: 11 krad SD, 39.53 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	RH1498MW, WFR #7, S/Ns 821-830: 11 krad SD, 11 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	RH1965MK, WFR #2, S/Ns 1, 3-9, 11-12: 11 krad SD, 11 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	RH1963MK, WFR #11, S/Ns 3-7, 9-11, 13-14: 11 krad SD, 11 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	LT1965, WFR #N/A, S/Ns 21-30: 11 krad SD, 11 krad TD		11
20140514 14:37:00 to 20140527 12:37:03	1.100E+04 rad(SiO2) at 5.916E-01 rad(SiO2)/min	WFR #4, S/Ns 662-671: 11 krad SD, 11 krad TD		11

Total Doses reported are ± 13.49% at 95% confidence (Step No. 10)
13.34% at 95% confidence (Step No. 11)

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

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NOTES:
1. ASTM = American Society for Testing and Materials.
2. DUT = Device Under Test.
3. S/N = Serial Number.
4. SD = Step Dose.
5. TD = Total Dose.
6. WFR = Wafer.
7. Dose rate uniformity across target area: ± 7.34%
8. Both irradiation steps met the requirements of MIL-STD-883H, Test Method 1019.8, Condition D.
9. After the original Test Request (DD Form 1222) was approved, the following changes were made.
   a. The following devices were added to the test lineup:
      RH1498MW, WFR #7
      RH1965MK, WFR #2
      RH1963MK, WFR #11
      LT1965, WFR #N/A
      RH1086MH (6RH1086BHK), WFR #4
   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.
10. Source information:
   a. Irradiator = J.L. Shepherd & Associates Model 81-22/484 self-contained irradiation facility, S/Ns 7133/50017.
   b. Source selection = Co-60.
11. Dosimeter system:
   a. Radcal Model No. 9010 Radiation Monitor Controller, S/N 90-1313.
   b. Radcal Model No. 90X6-60 Electrometer/Ion Chamber, S/N 96-0362.
   c. This dosimeter system was calibrated per ISO/IEC 17025:2005 by University of Wisconsin Medical Radiation Research Center on 3 Feb 2014 (Report No. ION14427). This calibration is effective for two years.
12. 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.
13. 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 ≤ T_A ≥ 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_{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.