National Aeronautics and Space Administration

RH1014MW Quad Precision Operational Amplifier Total Ionizing Dose Radiation Lot Acceptance Test (RLAT) Report

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Test start date: *July 5, 2019*
Test completion date: *December 30, 2019*
Test report date: *August 1, 2020*

1. Purpose

The purpose of this testing was to characterize the Analog Devices (ADI) RH1014MW flight lot for use in the fabrication of Europa Clipper Propulsion subsystem flight hardware. This test shall serve as the radiation lot acceptance test (RLAT) for this flight lot with wafer lot number 883426.1 and lot date code (LDC) 1803A. The RH1014 is a precision quad operational amplifier with low offset voltage, low drift, low offset current, and high gain. Low dose rate (LDR) irradiations were performed in this test so that the device susceptibility to enhanced low dose rate sensitivity (ELDRS) can be determined.

2. Test Samples

Twenty-five (25) parts from the flight lot of RH1014s have been provided by the Europa Clipper Propulsion system to Code 561 for TID testing. Two of the twenty-five were used as controls. More information can be found in Table 1.

Table 1: Part Identification Information

Qty	Generic Part Number	Flight Part Number	LDC	Wafer Lot	Package
25	RH1014	RH1014MW	1803A	883426.1	14-Lead Flatpak Glass Sealed

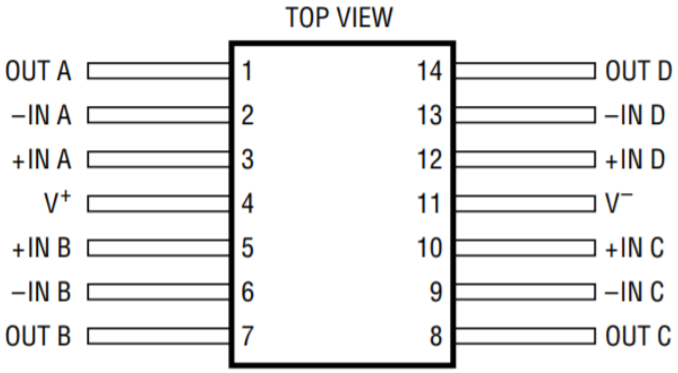

Figure 1: Pin out for RH1014MW operational amplifier.

3. General

Radiation testing was done by exposing the parts to gamma radiation at a dose rate of 0.01 rad(Si)/s. 25 parts were tested – 23 exposed to radiation and the remaining two were used as controls. Prior to the first radiation dose, all parts were electrically tested. After each exposure level, the parts (including controls) were tested again. Parts were subjected to multiple levels of total dose and step levels tested as shown in Table 2.

Table 2: Device Grouping and Step-Stress Instructions

Group	Qty	Bias	Sample #	Dose Rate	Test Levels (krad(Si))
1	6	Biased	1, 2, 3, 4, 5, 6	LDR 0.01 rad(Si)/s	0, 25, 50, 80, 100, 127.8
	6	Unbiased	7, 8, 9, 10, 11, 12	LDR 0.01 rad(Si)/s	0, 25, 50, 80, 100, 127.8
2	6	Biased	13, 14, 15, 16, 17, 18	LDR 0.01 rad(Si)/s	0, 25, 55, 75, 103, 125
	5	Unbiased	19, 20, 21, 22, 23	LDR 0.01 rad(Si)/s	0, 25, 55, 75, 103, 125
3	2	Controls	24, 25	N/A	N/A

4. Electrical Tests

These parts will be used in a specific application with a +15.2 V supply and ground. Therefore, all electrical parameters listed below were performed in accordance with the Analog Devices datasheet I.D. No. 66-10-0179 Rev. E 0508 (Table 3), as well as with the application-specific supply voltage (Table 4). All test conditions listed for the following parameters were tested:

Table 3: List of Parameters measured

Test	Symbol	Conditions T_A = +25°C V_S = ±15 V	Specifications		
			Min	Typ	Max
Input Offset Voltage	V_{OS}				900 µV
Input Offset Current	I_{OS}				25 nA
Input Bias Current	I_B				250 nA
Input Voltage Range			13.5 V		
			-15 V		
Common-Mode Rejection Ratio	CMRR	V_{CM} = 13 V, -15 V	86 dB		
Large-Signal Voltage Gain	A_{VOL}	$R_L \geq 10$ kΩ, V_O = 5-10 V	25 V/mV		
Maximum Output Voltage Swing	V_{OUT}	$R_L \geq 10$ kΩ	-12.5 V		+12.5 V
Supply Current	I_S	Per Amplifier			0.55 mA

Table 4: List of Parameters measured with application-specific supply voltages

Test	Symbol	Conditions T_A = +25°C V_S = 15.2 V, 0 V
Input Offset Voltage	V_{OS}	
Input Offset Current	I_{OS}	
Input Bias Current	I_B	
Input Voltage Range		
Common-Mode Rejection Ratio	CMRR	V_{CM} = 13.2 V, 0 V
Large-Signal Voltage Gain	A_{VOL}	$R_L \geq 10$ kΩ, V_O = 5-10 V
Maximum Output Voltage Swing	V_{OUT}	$R_L \geq 10$ kΩ
Output Voltage Shift (Application-Specific)	ΔV_{OUT}	See bias circuit for conditions
Supply Current	I_S	Per Amplifier

5. Failure Criteria

The parameter limits were defined as those listed in the Analog Devices datasheet I.D. No. 66-11-1014 Rev. G 1007. Accurate parameter measurements were maintained beyond the specified limits when parameter drift was observed. No functional failure was observed.

6. Source Requirements

The total dose sources are the GSFC 1-MeV gamma ray irradiator in the Radiation Effects Facility, which is compliant with MIL-STD-883, Method 1019. Dosimetry shall be NIST traceable.

7. Bias Conditions and Fixtures

During irradiation, the unbiased parts had all leads grounded and the biased part configuration was connected in the following way:

Table 5: Applied Voltages for Biased Irradiations

Pin Name	Symbol	Pin Number	Connection
Output A	OUT A	1	Negative Input A (Pin 2) through 20 kΩ resistor and 10 kΩ resistor to +4.73 V
Negative Input A	-IN A	2	Output A (Pin 1) through 20 kΩ resistor and 220 Ω resistor to Negative Input B (Pin 6)
Positive Input A	+IN A	3	+4.88 V through 2.5 kΩ resistor
Positive Supply Voltage	+V	4	27 Ω resistor to +15.2 V
Positive Input B	+IN B	5	+4.89 V through 2.5 kΩ resistor
Negative Input B	-IN B	6	Output B (Pin 7) through 20 kΩ resistor and 220 Ω resistor to Negative Input A (Pin 2)
Output B	OUT B	7	Negative Input B (Pin 6) through 20 kΩ resistor and 10 kΩ resistor to +4.73 V
Output C	OUT C	8	Negative Input C (Pin 9) through 20 kΩ resistor
Negative Input C	-IN C	9	Output C (Pin 8) through 20 kΩ resistor and 10 kΩ resistor to +4 V
Positive Input C	+IN C	10	+4.73 V through 6.67 kΩ resistor
Negative Supply Voltage	-V	11	27 Ω resistor to Ground (0 V)
Positive Input D	+IN D	12	+2.65 V through 600 Ω resistor
Negative Input D	-IN D	13	Output D (Pin 14) through 1 kΩ resistor
Output D	OUT D	14	Negative Input D (Pin 13) through 1 kΩ resistor and 100 Ω resistor to +2.65 V

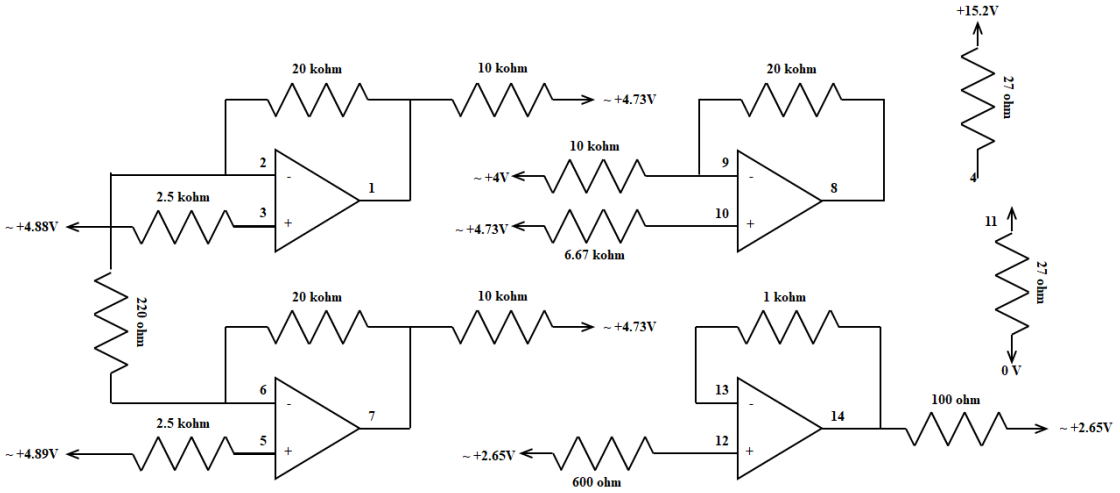

Figure 2: Pin out for RH1014MW operational amplifier.

8. Procedure

General test procedures were in accordance with MIL-STD-883, Method 1019, Condition D. Parts were serialized, with controls marked prominently to distinguish them from test samples. Exposures were performed at ambient laboratory temperature. Cumulative test levels are provided by the values in Table 2.

All data from the evaluation of the parameters in Table 3 and 4 were logged in ASCII format, suitable for import into Microsoft Excel. Data for all twenty-five op amps were measured and logged.

9. Results

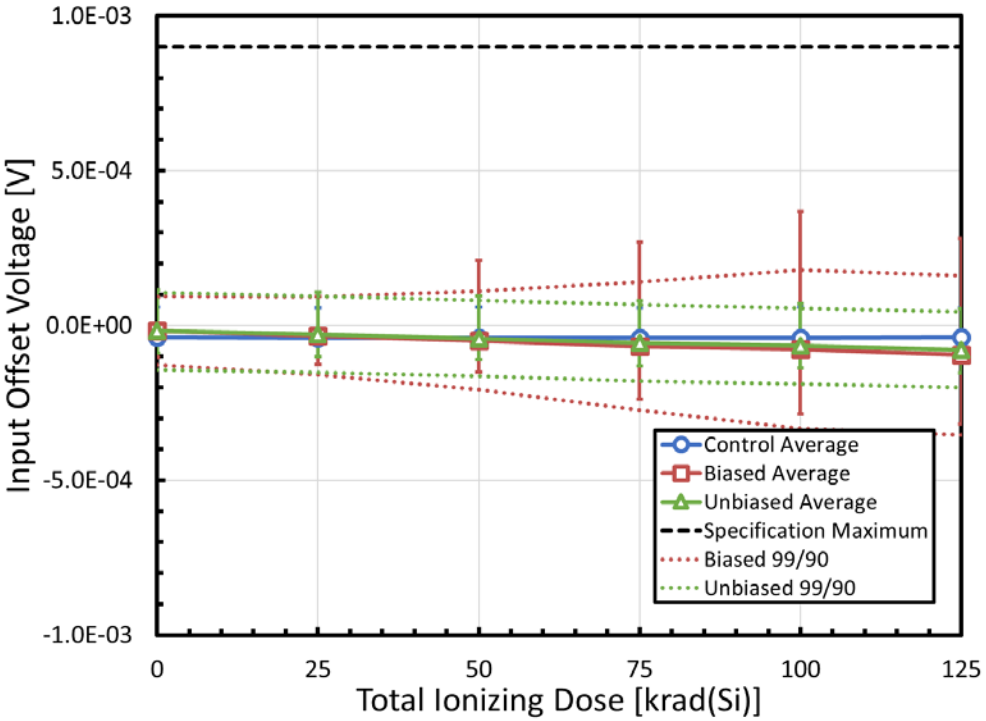

Figure 3. Input offset voltage as a function of total ionizing dose with datasheet-specified supply voltages.

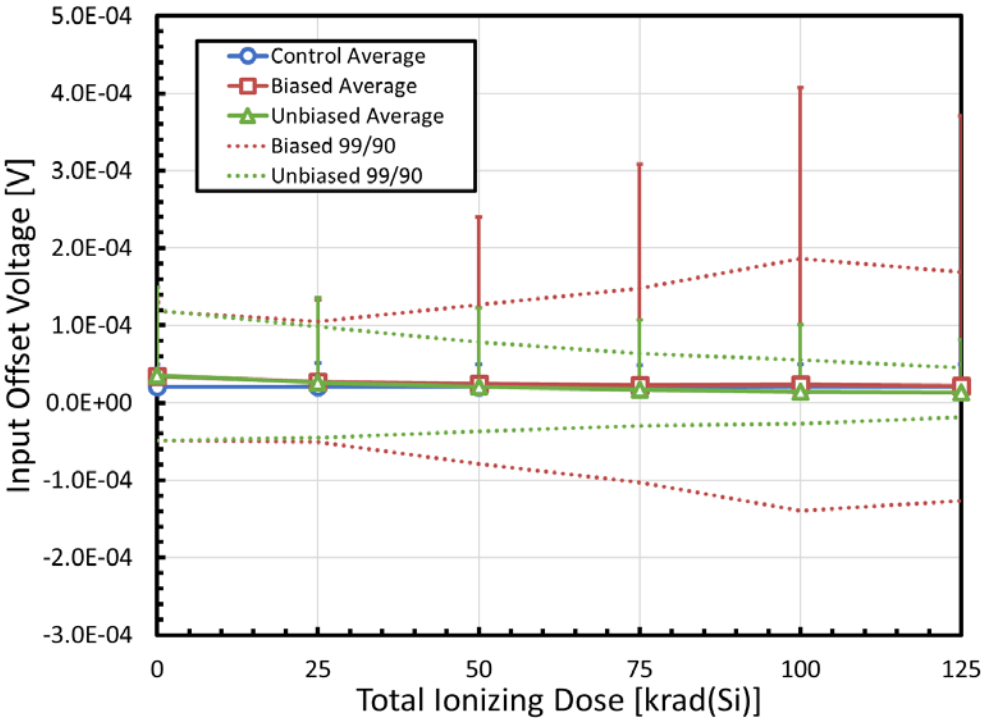

Figure 4. Input offset voltage as a function of total ionizing dose with application-specific supply voltages.

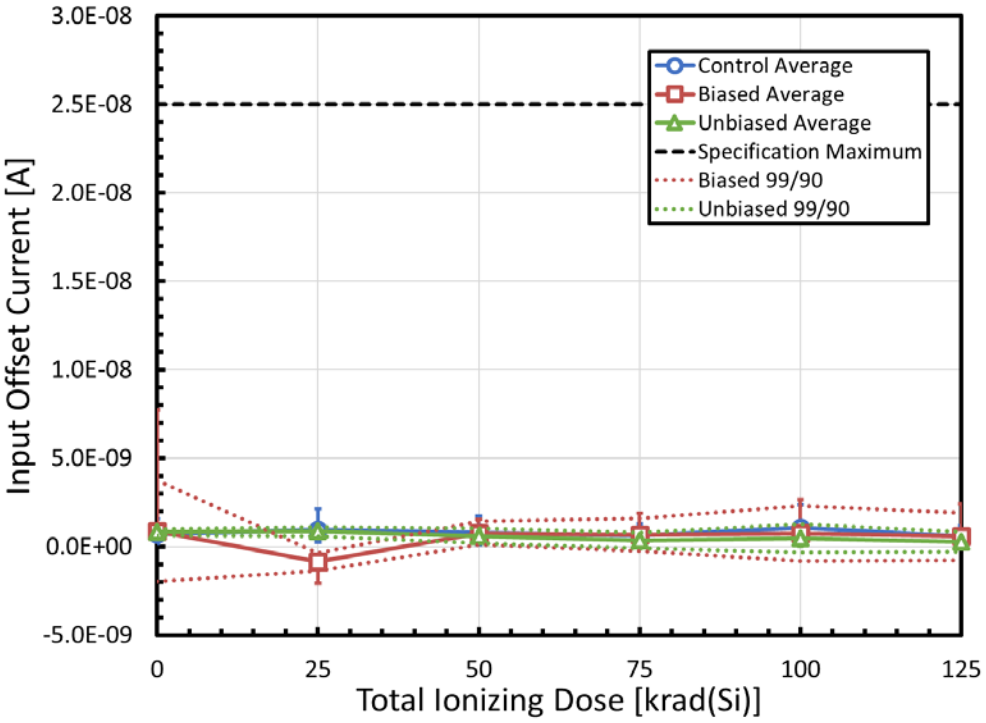

Figure 5. Input offset current as a function of total ionizing dose with datasheet-specified supply voltages.

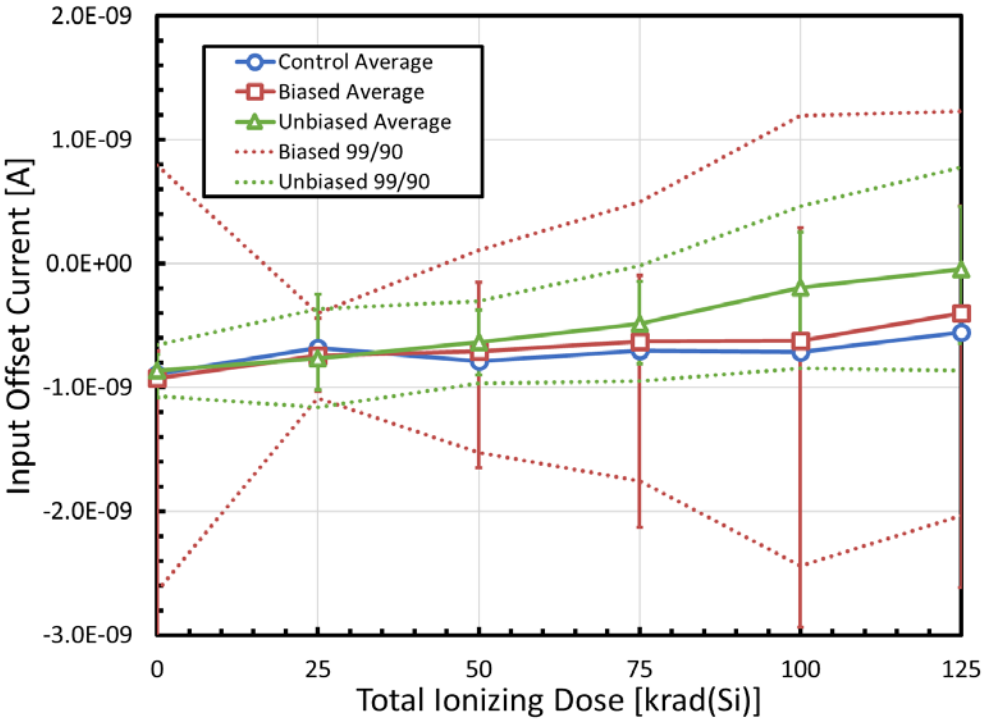

Figure 6. Input offset current as a function of total ionizing dose with application-specific supply voltages.

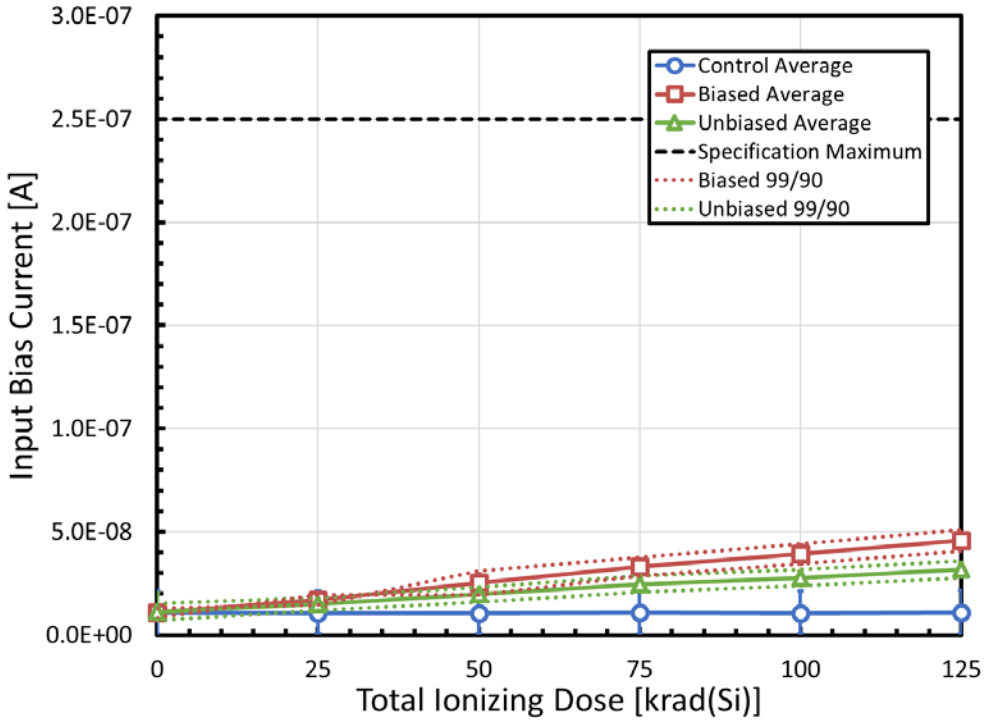

Figure 7. Input bias current as a function of total ionizing dose with datasheet-specified supply voltages.

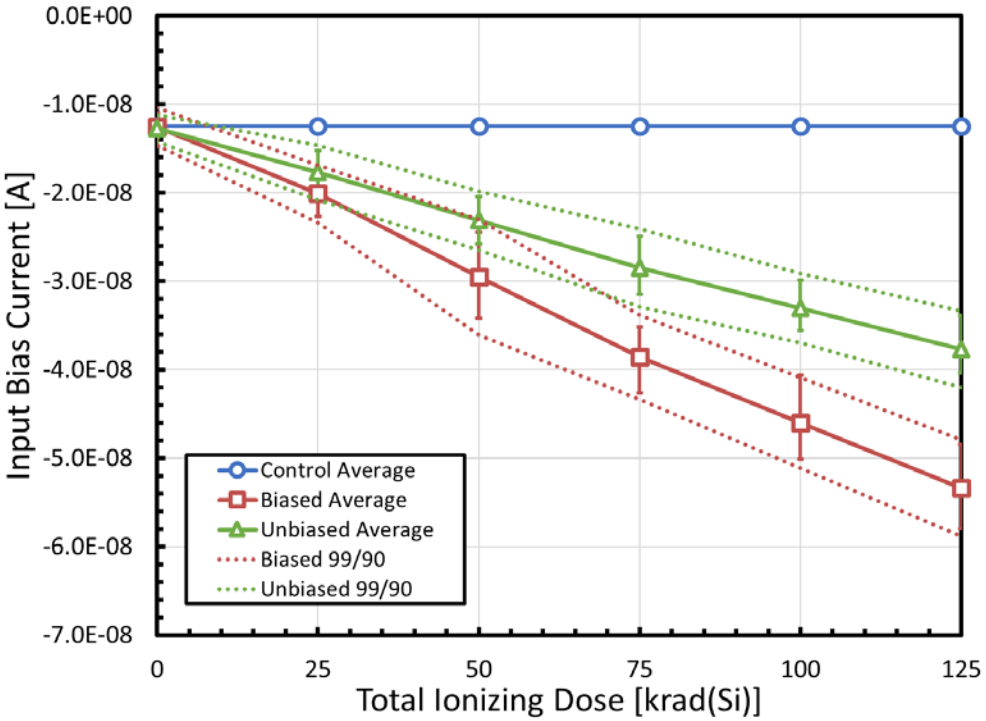

Figure 8. Input bias current as a function of total ionizing dose with application-specific supply voltages.

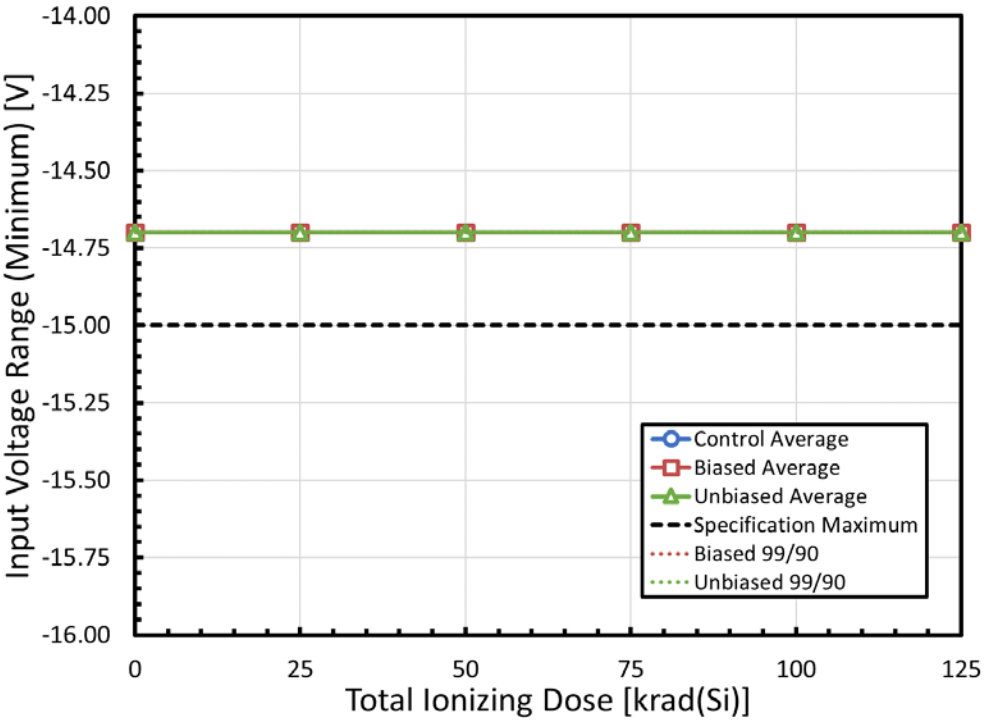

Figure 9. Minimum input voltage range as a function of total ionizing dose with datasheet-specified supply voltages.

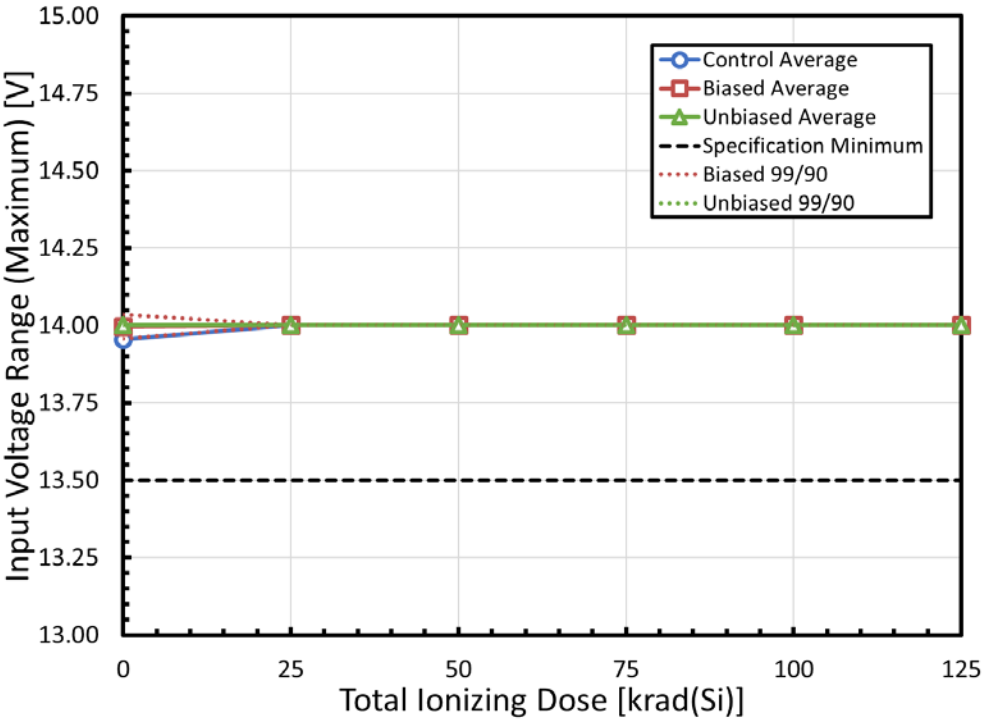

Figure 10. Maximum input voltage range as a function of total ionizing dose with datasheet-specified supply voltages.

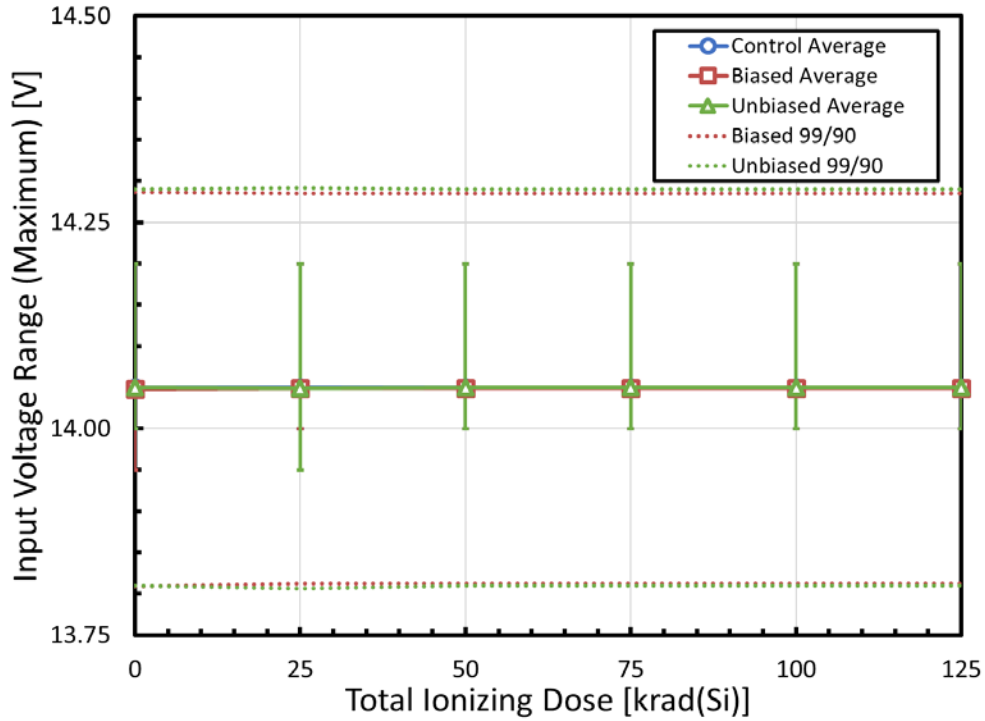

Figure 11. Maximum input voltage range as a function of total ionizing dose with application-specific supply voltages.

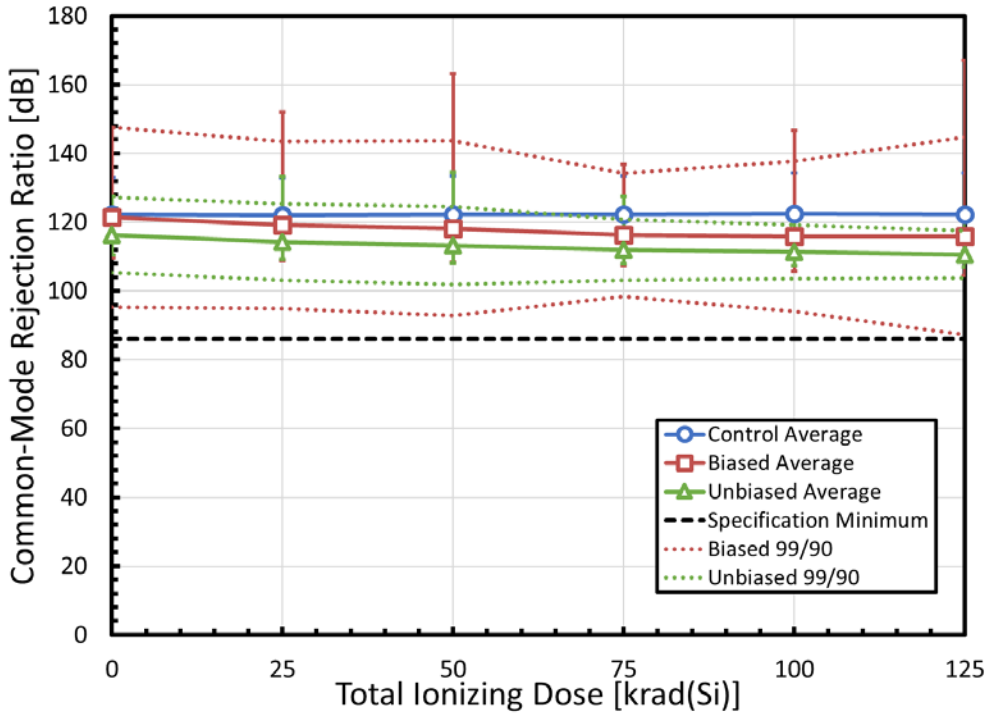

Figure 12. Common-mode rejection ratio as a function of total ionizing dose with datasheet-specified supply voltages.

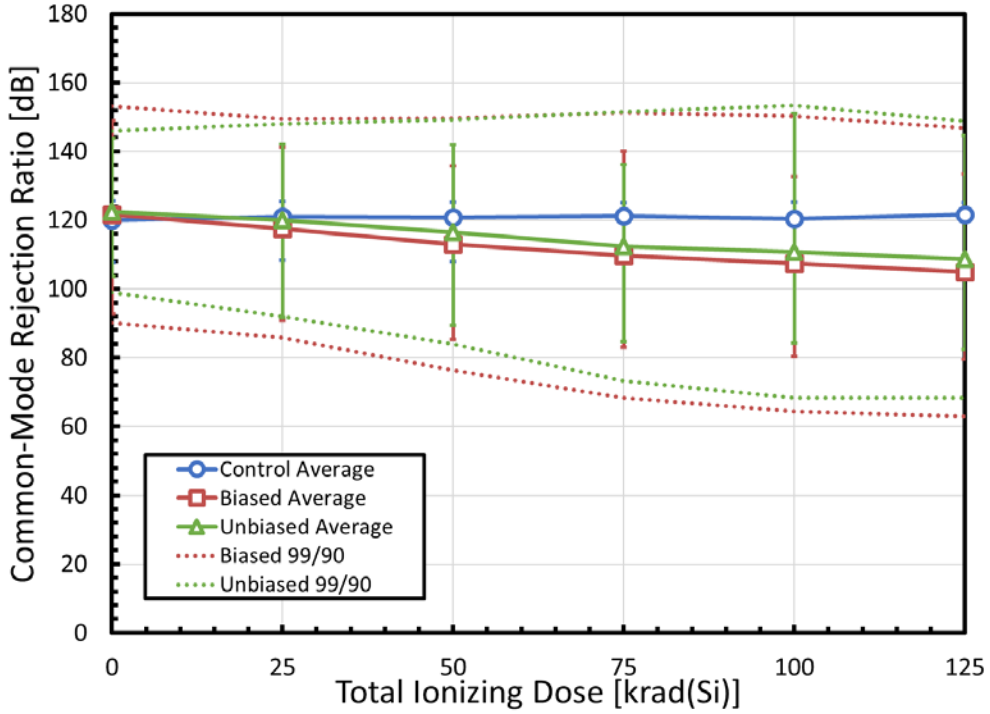

Figure 13. Common-mode rejection ratio as a function of total ionizing dose with application-specific supply voltages.

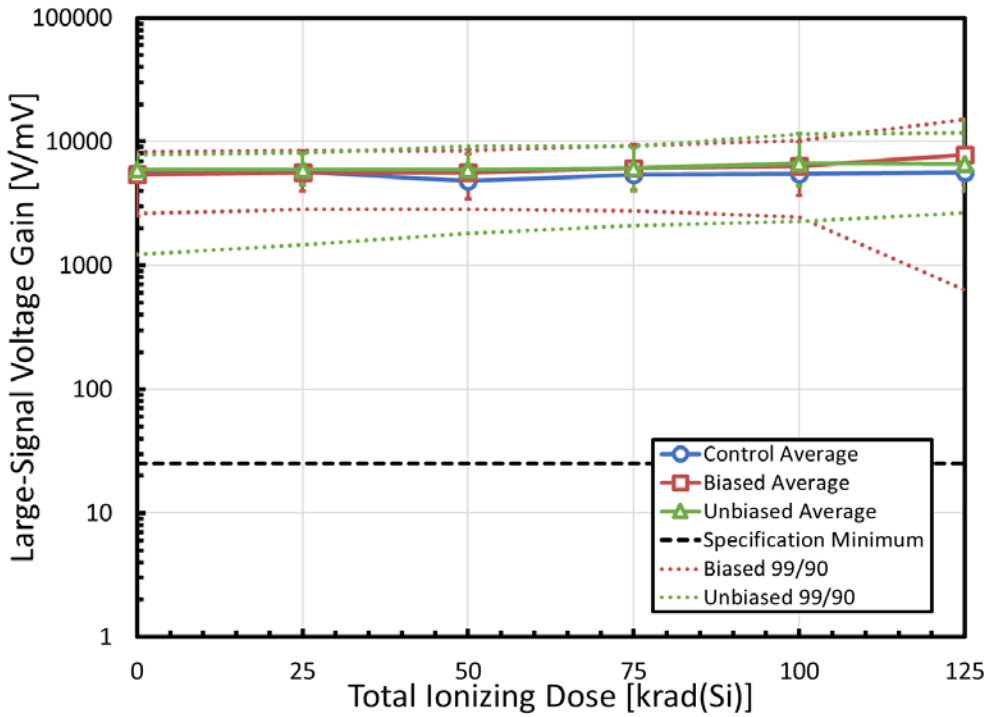

Figure 14. Large-signal voltage gain as a function of total ionizing dose with datasheet-specified supply voltages.

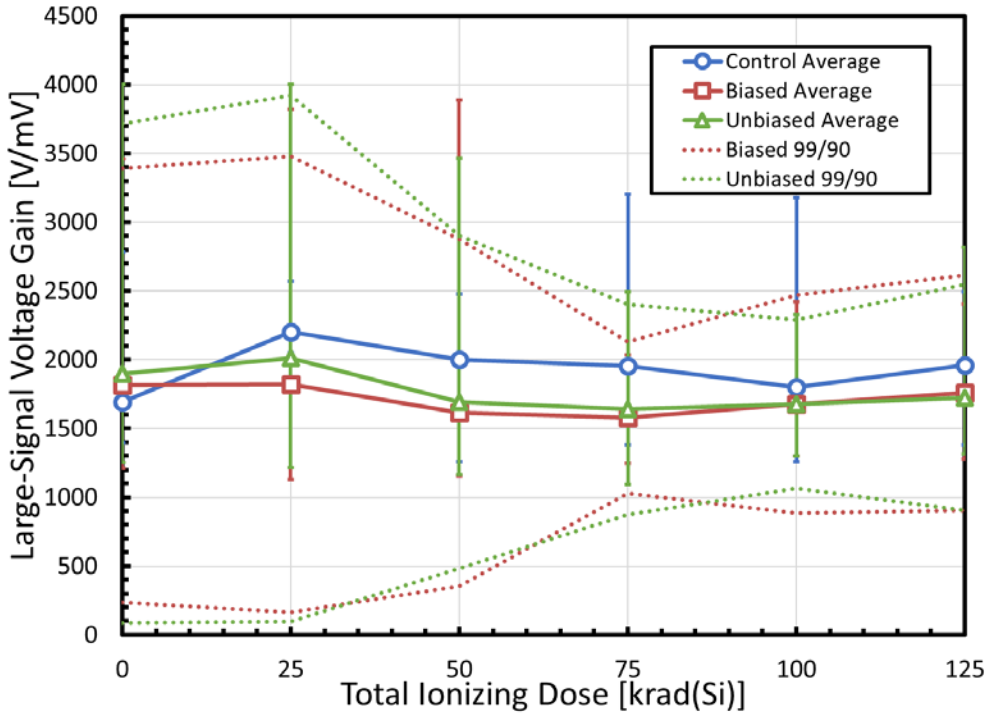

Figure 15. Large-signal voltage gain as a function of total ionizing dose with application-specific supply voltages.

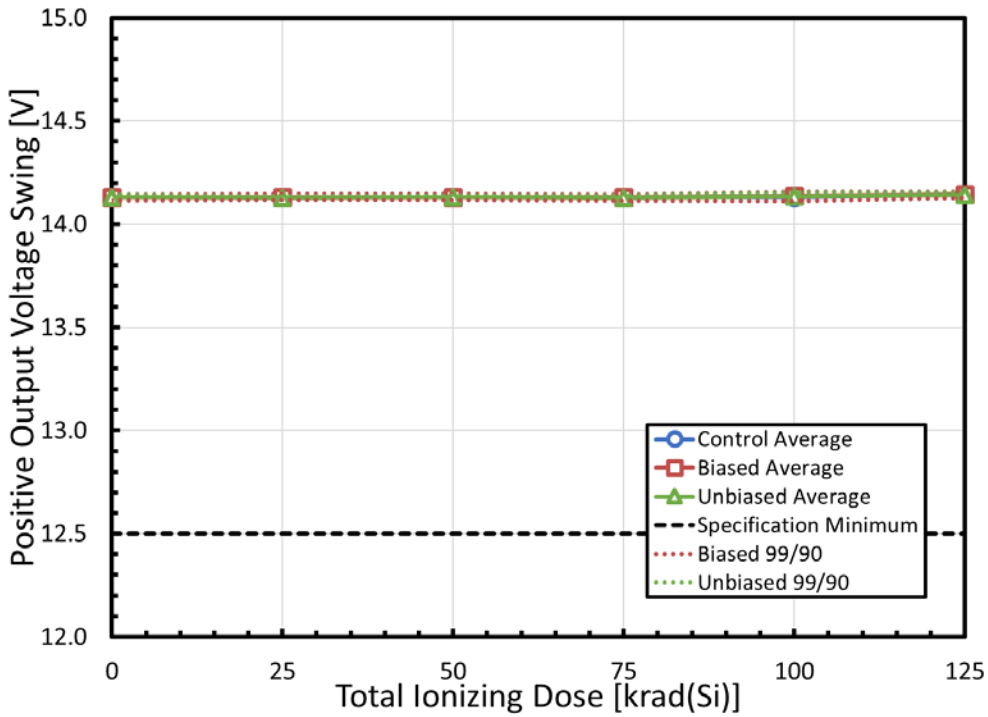

Figure 16. Positive maximum output voltage swing as a function of total ionizing dose with datasheet-specified supply voltages.

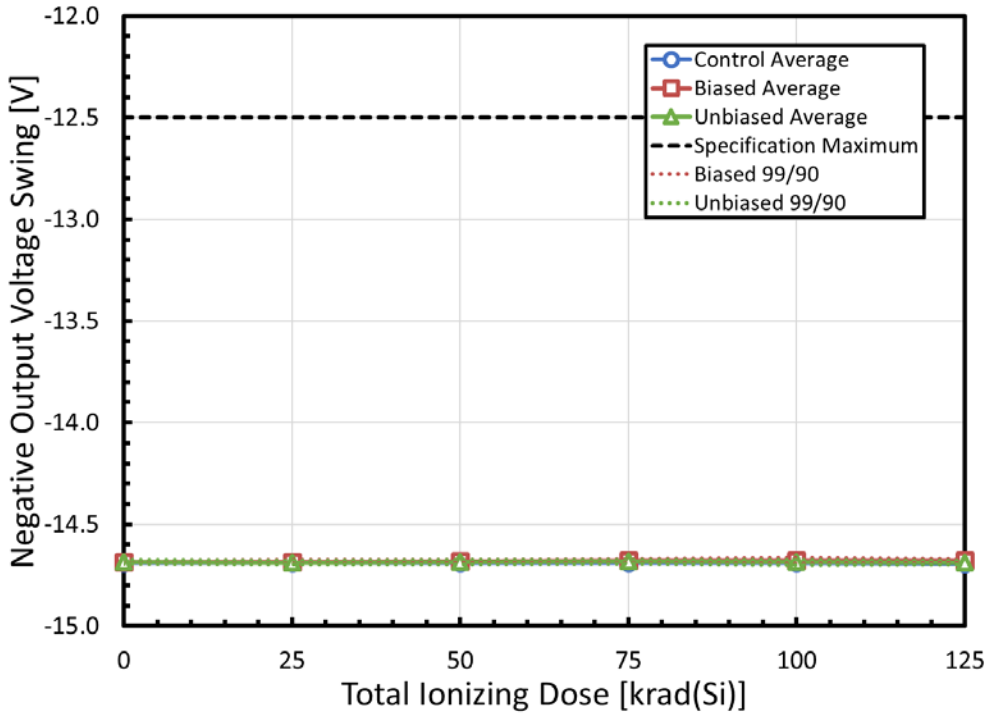

Figure 17. Negative maximum output voltage swing as a function of total ionizing dose with datasheet-specified supply voltages.

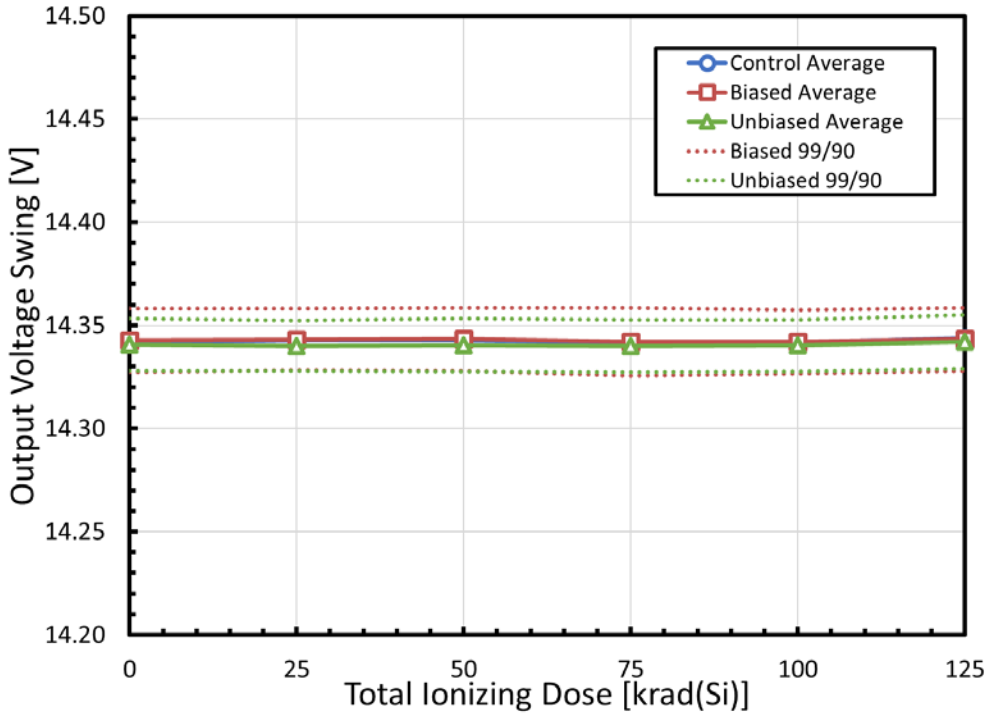

Figure 18. Maximum output voltage swing as a function of total ionizing dose with application-specific supply voltages.

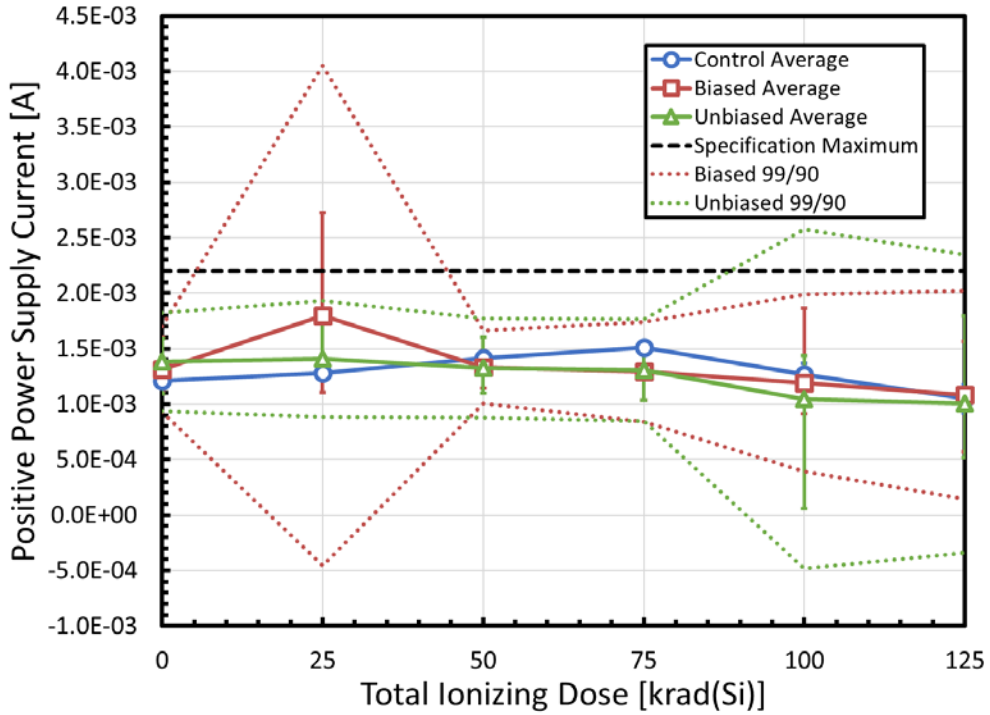

Figure 19. Positive power supply current as a function of total ionizing dose with datasheet-specified supply voltages.

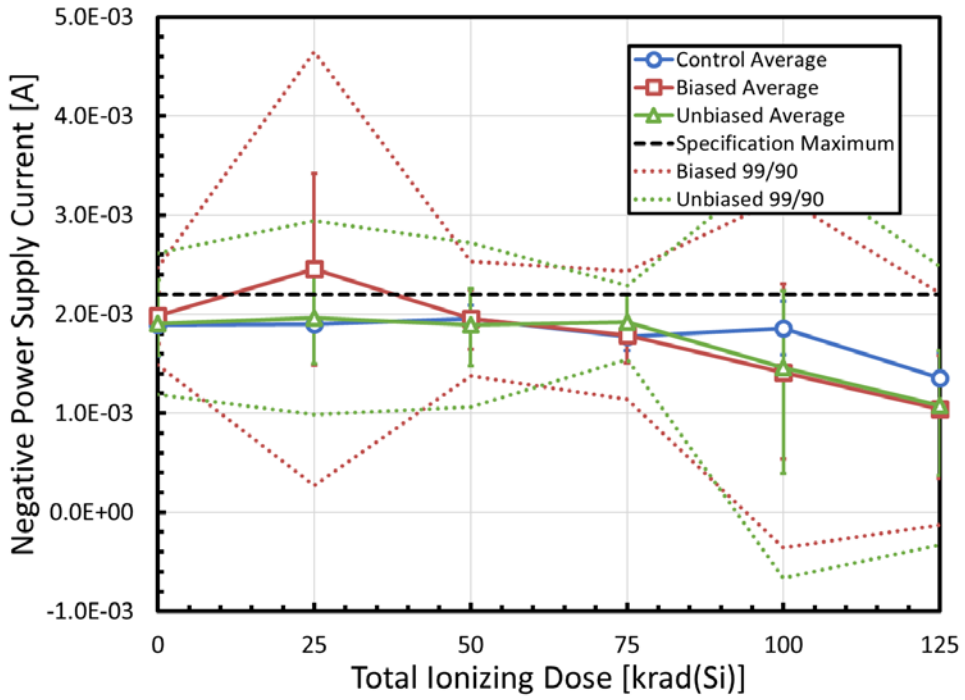

Figure 20. Negative power supply current as a function of total ionizing dose with datasheet-specified supply voltages.

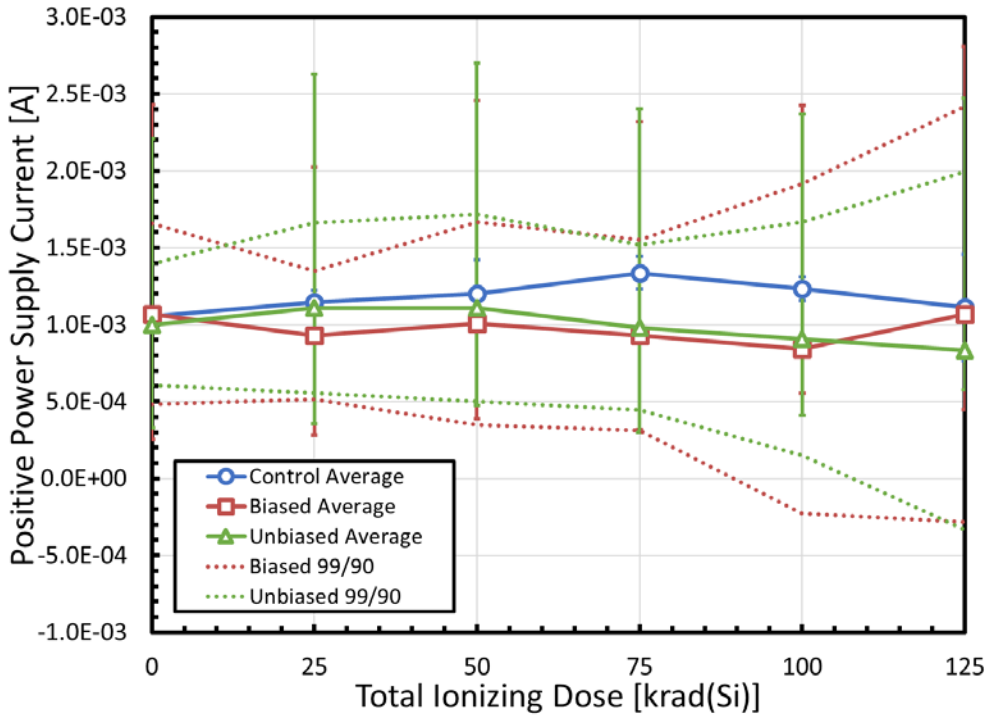

Figure 21. Power supply current as a function of total ionizing dose with application-specific supply voltages.

10. Raw Data

Table 5. Input offset voltage values with datasheet-specified supply voltages

Input Offset Voltage	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	1.65E-05	1.60E-05	1.64E-05	1.70E-05	1.50E-05	1.70E-05
Control (DUT24B)	5.13E-05	4.90E-05	5.12E-05	5.10E-05	5.00E-05	5.00E-05
Control (DUT24C)	1.83E-05	1.90E-05	1.84E-05	1.90E-05	1.90E-05	1.90E-05
Control (DUT24D)	9.79E-05	9.70E-05	9.83E-05	9.70E-05	9.80E-05	9.60E-05
Control (DUT25A)	1.03E-06	4.00E-06	2.90E-06	3.00E-06	2.00E-06	2.00E-06
Control (DUT25B)	6.27E-05	6.40E-05	6.25E-05	6.40E-05	6.30E-05	6.10E-05
Control (DUT25C)	5.80E-05	5.80E-05	5.81E-05	6.00E-05	5.80E-05	5.90E-05
Control (DUT25D)	3.85E-05	4.00E-05	3.85E-05	3.90E-05	3.90E-05	3.70E-05
DUT1A	-4.96E-05	-1.04E-04	-1.14E-04	-1.26E-04	-1.36E-04	-1.48E-04
DUT1B	-1.94E-05	-3.60E-05	-4.93E-05	-7.20E-05	-8.30E-05	-1.06E-04
DUT1C	9.14E-05	7.50E-05	6.51E-05	4.70E-05	3.80E-05	1.50E-05
DUT1D	-5.11E-05	-7.00E-05	-7.79E-05	-9.10E-05	-1.02E-04	-1.18E-04
DUT2A	6.92E-06	-2.00E-05	-5.94E-05	-1.74E-04	-2.19E-04	-3.06E-04
DUT2B	-1.32E-05	-2.00E-05	-4.71E-05	-4.10E-05	-5.30E-05	-5.50E-05
DUT2C	-2.73E-05	-4.60E-05	-5.74E-05	-7.40E-05	-8.40E-05	-1.08E-04
DUT2D	7.65E-06	-1.30E-05	-2.71E-05	-4.90E-05	-6.00E-05	-8.20E-05
DUT3A	-2.68E-05	-3.20E-05	-5.44E-05	-5.80E-05	-6.30E-05	-5.70E-05
DUT3B	-6.49E-05	-8.80E-05	-1.25E-04	-2.25E-04	-2.44E-04	-3.18E-04
DUT3C	9.30E-06	-5.00E-06	-1.42E-05	-2.70E-05	-3.60E-05	-4.80E-05
DUT3D	-2.53E-05	-4.30E-05	-5.53E-05	-7.00E-05	-7.10E-05	-9.00E-05
DUT4A	-4.63E-05	-7.60E-05	-1.17E-04	-2.35E-04	-2.85E-04	-2.70E-04
DUT4B	3.07E-05	2.50E-05	1.60E-06	6.00E-06	2.00E-06	-1.70E-05
DUT4C	-6.05E-05	-7.80E-05	-8.89E-05	-1.08E-04	-1.16E-04	-1.37E-04
DUT4D	-7.02E-05	-9.20E-05	-1.03E-04	-1.15E-04	-1.26E-04	-1.45E-04
DUT5A	3.88E-05	2.00E-05	-7.54E-06	-9.60E-05	-1.47E-04	-2.17E-04
DUT5B	5.42E-05	4.30E-05	1.51E-05	2.20E-05	1.70E-05	1.00E-05
DUT5C	2.68E-05	8.00E-06	-5.58E-06	-2.90E-05	-3.70E-05	-5.70E-05
DUT5D	3.67E-05	1.30E-05	9.29E-07	-2.40E-05	-3.30E-05	-5.90E-05
DUT6A	6.20E-06	-7.00E-06	-2.75E-05	-4.20E-05	-4.50E-05	-7.00E-05
DUT6B	-9.12E-05	-1.09E-04	-1.23E-04	-1.25E-04	-1.35E-04	-1.55E-04
DUT6C	-8.97E-05	-1.06E-04	-1.15E-04	-1.25E-04	-1.36E-04	-1.55E-04
DUT6D	-2.03E-05	-3.90E-05	-4.91E-05	-6.70E-05	-6.80E-05	-9.30E-05
DUT13A	-8.29E-07	-1.70E-05	-4.00E-05	-4.87E-05	-6.10E-05	-7.40E-05
DUT13B	-1.67E-05	-4.10E-05	-5.40E-05	-7.61E-05	-9.60E-05	-1.14E-04
DUT13C	-1.03E-04	-1.25E-04	-1.52E-04	-1.66E-04	-1.92E-04	-1.97E-04
DUT13D	-3.18E-05	-5.40E-05	-8.60E-05	-9.82E-05	-1.15E-04	-1.27E-04
DUT14A	2.10E-07	-1.20E-05	-2.50E-05	-3.45E-05	-5.80E-05	-6.30E-05
DUT14B	2.95E-06	4.00E-06	6.00E-06	-4.66E-06	6.30E-05	9.30E-05
DUT14C	-3.02E-05	-3.80E-05	-5.90E-05	-6.61E-05	-7.90E-05	-8.90E-05
DUT14D	-2.65E-05	-4.40E-05	-5.90E-05	-6.69E-05	-8.10E-05	-9.20E-05
DUT15A	2.07E-06	-1.90E-05	-4.10E-05	-5.67E-05	-7.30E-05	-8.60E-05
DUT15B	6.30E-06	-7.00E-06	-2.50E-05	-3.31E-05	-4.80E-05	-6.30E-05
DUT15C	-4.73E-05	-6.00E-05	-8.50E-05	-9.28E-05	-1.08E-04	-1.22E-04
DUT15D	-1.64E-05	-3.60E-05	-5.30E-05	-7.86E-05	-9.90E-05	-1.10E-04
DUT16A	-4.75E-05	-6.40E-05	-7.20E-05	-8.03E-05	-8.80E-05	-1.01E-04
DUT16B	5.51E-05	9.30E-05	2.11E-04	2.70E-04	3.69E-04	2.81E-04
DUT16C	-5.87E-05	-7.10E-05	-9.10E-05	-1.01E-04	-1.17E-04	-1.34E-04
DUT16D	-6.92E-06	-2.00E-05	-4.20E-05	-5.21E-05	-7.10E-05	-8.10E-05
DUT17A	2.11E-05	3.00E-06	-1.50E-05	-2.57E-05	-3.70E-05	-5.10E-05
DUT17B	-4.34E-05	-5.90E-05	-8.40E-05	-9.56E-05	-1.12E-04	-1.25E-04
DUT17C	-1.59E-05	-3.60E-05	-5.60E-05	-6.42E-05	-7.90E-05	-9.00E-05
DUT17D	2.57E-05	7.00E-06	-1.50E-05	-3.02E-05	-4.60E-05	-5.60E-05
DUT18A	-5.13E-05	-6.90E-05	-9.40E-05	-1.05E-04	-1.21E-04	-1.31E-04
DUT18B	-5.77E-05	-7.80E-05	-9.50E-05	-1.07E-04	-1.22E-04	-1.38E-04
DUT18C	-3.16E-06	-1.90E-05	-4.50E-05	-5.50E-05	-7.70E-05	-8.50E-05
DUT18D	-5.85E-05	-7.60E-05	-1.08E-04	-1.20E-04	-1.47E-04	-1.61E-04
DUT7A	7.92E-05	2.40E-05	1.06E-05	-6.00E-06	-8.00E-06	-2.10E-05
DUT7B	7.19E-07	-4.00E-06	-1.41E-05	-2.90E-05	-3.50E-05	-4.60E-05
DUT7C	-3.33E-05	-4.30E-05	-4.96E-05	-7.00E-05	-7.90E-05	-9.40E-05
DUT7D	1.05E-05	-3.00E-06	-1.15E-05	-3.10E-05	-3.60E-05	-4.90E-05
DUT8A	-7.87E-05	-8.60E-05	-9.73E-05	-1.14E-04	-1.20E-04	-1.37E-04
DUT8B	1.16E-05	-1.00E-06	-1.40E-05	-3.10E-05	-3.80E-05	-5.50E-05
DUT8C	1.14E-04	1.07E-04	9.51E-05	8.00E-05	7.00E-05	5.50E-05
DUT8D	-5.48E-05	-7.10E-05	-8.60E-05	-1.08E-04	-1.18E-04	-1.35E-04
DUT9A	-1.61E-05	-3.20E-05	-4.16E-05	-6.20E-05	-6.70E-05	-8.40E-05
DUT9B	-5.35E-05	-6.60E-05	-7.42E-05	-8.70E-05	-9.50E-05	-1.05E-04
DUT9C	3.34E-05	1.50E-05	7.44E-06	-1.00E-05	-1.80E-05	-3.20E-05
DUT9D	-8.27E-06	-2.40E-05	-3.67E-05	-6.20E-05	-6.80E-05	-8.70E-05
DUT10A	-5.27E-06	-1.70E-05	-2.24E-05	-4.20E-05	-5.00E-05	-6.30E-05
DUT10B	-7.52E-05	-9.00E-05	-9.65E-05	-1.16E-04	-1.29E-04	-1.43E-04
DUT10C	4.37E-05	3.00E-05	1.85E-05	-3.00E-06	-1.30E-05	-2.90E-05
DUT10D	-6.05E-05	-7.40E-05	-8.45E-05	-1.06E-04	-1.13E-04	-1.30E-04
DUT11A	-2.69E-05	-3.90E-05	-4.48E-05	-6.00E-05	-6.60E-05	-7.70E-05
DUT11B	-8.83E-05	-1.00E-04	-1.10E-04	-1.31E-04	-1.38E-04	-1.53E-04
DUT11C	-2.52E-05	-3.80E-05	-5.01E-05	-7.20E-05	-8.20E-05	-1.00E-04
DUT11D	1.27E-05	2.00E-06	-5.21E-06	-2.10E-05	-3.00E-05	-4.30E-05
DUT12A	-1.57E-05	-2.60E-05	-3.96E-05	-5.90E-05	-6.40E-05	-7.30E-05
DUT12B	-7.04E-05	-8.20E-05	-9.35E-05	-1.04E-04	-1.09E-04	-1.18E-04
DUT12C	2.74E-06	-8.00E-06	-1.80E-05	-3.40E-05	-3.90E-05	-5.00E-05
DUT12D	-7.93E-05	-8.90E-05	-9.74E-05	-1.11E-04	-1.19E-04	-1.33E-04
DUT19A	-1.96E-05	-2.60E-05	-4.70E-05	-5.80E-05	-6.40E-05	-7.50E-05
DUT19B	6.48E-05	5.60E-05	4.40E-05	3.46E-05	2.30E-05	1.20E-05
DUT19C	-7.06E-05	-7.70E-05	-9.40E-05	-1.01E-04	-1.15E-04	-1.27E-04
DUT19D	1.38E-05	3.00E-06	-2.30E-05	-3.56E-05	-5.20E-05	-6.50E-05
DUT20A	-2.69E-06	-7.00E-06	-1.80E-05	-2.31E-05	-2.70E-05	-3.10E-05
DUT20B	-5.70E-05	-6.40E-05	-8.70E-05	-9.88E-05	-1.14E-04	-1.26E-04
DUT20C	-4.41E-05	-5.40E-05	-7.10E-05	-8.41E-05	-1.00E-04	-1.11E-04
DUT20D	-7.60E-05	-8.20E-05	-9.00E-05	-9.67E-05	-1.03E-04	-1.08E-04
DUT21A	3.80E-05	3.00E-05	1.40E-05	4.66E-06	-5.00E-06	-1.40E-05
DUT21B	-3.86E-05	-4.60E-05	-6.80E-05	-8.10E-05	-8.80E-05	-1.00E-04
DUT21C	-2.61E-05	-3.80E-05	-5.60E-05	-6.74E-05	-8.20E-05	-9.20E-05
DUT21D	1.30E-05	1.00E-06	-1.70E-05	-2.77E-05	-4.10E-05	-5.40E-05
DUT22A	-8.40E-05	-8.60E-05	-9.90E-05	-1.01E-04	-1.12E-04	-1.21E-04
DUT22B	-7.38E-05	-8.00E-05	-9.60E-05	-1.02E-04	-1.17E-04	-1.21E-04
DUT22C	4.14E-06	-5.00E-06	-2.50E-05	-3.33E-05	-5.20E-05	-6.30E-05
DUT22D	-2.56E-05	-3.10E-05	-4.60E-05	-5.57E-05	-6.80E-05	-7.40E-05
DUT23A	4.20E-05	3.40E-05	1.00E-05	7.15E-07	-2.00E-05	-3.10E-05
DUT23B	-4.16E-05	-4.90E-05	-6.90E-05	-8.07E-05	-9.80E-05	-1.10E-04
DUT23C	-2.56E-05	-3.30E-05	-5.10E-05	-6.44E-05	-7.60E-05	-8.80E-05
DUT23D	3.11E-05	2.10E-05	-5.00E-06	-1.43E-05	-3.30E-05	-4.00E-05
Specification Maximum	9.00E-04	9.00E-04	9.00E-04	9.00E-04	9.00E-04	9.00E-04
Control Average	-3.89E-05	-3.94E-05	-3.92E-05	-3.95E-05	-3.93E-05	-3.84E-05
Control Std Dev	3.45E-05	3.37E-05	3.43E-05	3.43E-05	3.40E-05	3.38E-05
Control +99/90	1.04E-04	1.01E-04	1.03E-04	1.03E-04	1.02E-04	1.02E-04
Control -99/90	-1.82E-04	-1.79E-04	-1.81E-04	-1.82E-04	-1.80E-04	-1.79E-04
+Control Error Bar	1.65E-05	1.60E-05	1.64E-05	1.70E-05	1.50E-05	1.70E-05
-Control Error Bar	-9.79E-05	-9.70E-05	-9.83E-05	-9.70E-05	-9.80E-05	-9.60E-05
Biased Average	-1.62E-05	-3.26E-05	-4.85E-05	-6.70E-05	-7.71E-05	-9.60E-05
Biased Std Dev	4.06E-05	4.57E-05	5.81E-05	7.51E-05	9.32E-05	9.34E-05
Biased +99/90	9.55E-05	9.30E-05	1.11E-04	1.40E-04	1.79E-04	1.61E-04
Biased -99/90	-1.28E-04	-1.58E-04	-2.08E-04	-2.74E-04	-3.33E-04	-3.53E-04
+Biased Error Bar	1.08E-04	1.26E-04	2.60E-04	3.37E-04	4.46E-04	3.77E-04
-Biased Error Bar	8.65E-05	9.24E-05	1.03E-04	1.72E-04	2.08E-04	2.22E-04
Unbiased Average	-1.84E-05	-2.84E-05	-4.20E-05	-5.62E-05	-6.61E-05	-7.82E-05
Unbiased Std Dev	4.49E-05	4.47E-05	4.42E-05	4.42E-05	4.42E-05	4.44E-05
Unbiased +99/90	1.06E-04	9.57E-05	8.05E-05	6.63E-05	5.65E-05	4.50E-05
Unbiased -99/90	-1.43E-04	-1.52E-04	-1.65E-04	-1.79E-04	-1.89E-04	-2.01E-04
+Unbiased Error Bar	1.32E-04	1.35E-04	1.37E-04	1.36E-04	1.36E-04	1.33E-04
-Unbiased Error Bar	6.98E-05	7.16E-05	5.79E-05	7.48E-05	7.19E-05	7.48E-05

Table 6. Input offset voltage values with application-specific supply voltages

Input Offset Voltage	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	5.00E-05	5.10E-05	5.00E-05	4.90E-05	5.00E-05	5.00E-05
Control (DUT24B)	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
Control (DUT24C)	2.40E-05	2.30E-05	2.30E-05	2.50E-05	2.40E-05	2.30E-05
Control (DUT24D)	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
Control (DUT25A)	3.90E-05	3.90E-05	3.70E-05	3.90E-05	3.80E-05	3.80E-05
Control (DUT25B)	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
Control (DUT25C)	1.00E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
Control (DUT25D)	1.00E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05
DUT1A	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.10E-05	1.00E-05
DUT1B	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.10E-05	1.00E-05
DUT1C	1.30E-04	1.13E-04	1.01E-04	8.20E-05	7.40E-05	4.80E-05
DUT1D	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.10E-05	1.00E-05
DUT2A	4.00E-05	1.00E-05	1.00E-05	1.10E-05	1.00E-05	1.00E-05
DUT2B	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.10E-05	1.00E-05
DUT2C	2.30E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT2D	3.30E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT3A	2.80E-05	1.80E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT3B	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.00E-05
DUT3C	8.80E-05	7.10E-05	6.70E-05	5.00E-05	4.30E-05	2.80E-05
DUT3D	2.00E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT4A	1.00E-05	1.00E-05	1.00E-05	1.10E-05	1.00E-05	1.00E-05
DUT4B	6.80E-05	5.50E-05	3.90E-05	4.50E-05	4.00E-05	2.60E-05
DUT4C	1.00E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT4D	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05
DUT5A	8.80E-05	6.80E-05	3.80E-05	1.00E-05	1.00E-05	1.00E-05
DUT5B	9.60E-05	8.10E-05	5.70E-05	6.30E-05	5.70E-05	4.40E-05
DUT5C	7.20E-05	5.10E-05	3.70E-05	1.80E-05	1.00E-05	9.00E-06
DUT5D	9.00E-05	6.30E-05	5.00E-05	2.80E-05	1.60E-05	1.00E-05
DUT6A	5.10E-05	3.50E-05	1.50E-05	1.00E-05	1.00E-05	1.00E-05
DUT6B	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.00E-05
DUT6C	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05
DUT6D	1.70E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05
DUT13A	4.00E-05	2.20E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT13B	1.80E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT13C	1.00E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT13D	1.00E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05
DUT14A	5.20E-05	3.70E-05	2.20E-05	1.30E-05	1.00E-05	1.00E-05
DUT14B	3.60E-05	3.40E-05	3.60E-05	2.40E-05	4.00E-05	6.00E-05
DUT14C	2.80E-05	1.40E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05
DUT14D	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05
DUT15A	4.30E-05	2.20E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT15B	4.00E-05	2.40E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT15C	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT15D	1.90E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT16A	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05
DUT16B	8.80E-05	1.33E-04	2.40E-04	3.09E-04	4.07E-04	3.71E-04
DUT16C	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05
DUT16D	3.10E-05	1.40E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05
DUT17A	7.30E-05	5.50E-05	3.70E-05	2.30E-05	1.50E-05	1.00E-05
DUT17B	1.00E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT17C	1.50E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT17D	5.30E-05	3.10E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05
DUT18A	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT18B	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.00E-05	1.00E-05
DUT18C	5.30E-05	3.30E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT18D	1.00E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT7A	6.40E-05	5.20E-05	3.80E-05	2.30E-05	1.60E-05	1.00E-05
DUT7B	4.80E-05	3.80E-05	2.80E-05	1.50E-05	1.10E-05	1.10E-05
DUT7C	1.70E-05	1.10E-05	1.10E-05	1.00E-05	1.10E-05	1.00E-05
DUT7D	4.50E-05	2.60E-05	1.70E-05	1.10E-05	1.10E-05	1.10E-05
DUT8A	1.10E-05	1.00E-05	1.10E-05	1.10E-05	1.10E-05	1.00E-05
DUT8B	4.00E-05	2.20E-05	1.10E-05	1.10E-05	1.10E-05	1.00E-05
DUT8C	1.49E-04	1.36E-04	1.23E-04	1.07E-04	1.01E-04	8.20E-05
DUT8D	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT9A	2.60E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT9B	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT9C	7.40E-05	5.20E-05	4.10E-05	2.50E-05	1.40E-05	1.00E-05
DUT9D	3.50E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT10A	3.20E-05	1.60E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT10B	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT10C	9.70E-05	7.80E-05	6.60E-05	4.50E-05	2.90E-05	1.30E-05
DUT10D	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT11A	2.30E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.00E-05
DUT11B	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT11C	2.60E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT11D	4.80E-05	3.10E-05	2.70E-05	1.10E-05	1.10E-05	1.10E-05
DUT12A	2.70E-05	1.30E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT12B	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT12C	5.10E-05	3.50E-05	2.30E-05	1.00E-05	1.00E-05	1.00E-05
DUT12D	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT19A	3.20E-05	1.80E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT19B	9.30E-05	7.90E-05	6.10E-05	5.40E-05	4.30E-05	3.30E-05
DUT19C	1.00E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT19D	6.00E-05	4.50E-05	2.10E-05	1.10E-05	1.00E-05	1.00E-05
DUT20A	6.30E-05	5.60E-05	4.60E-05	4.10E-05	4.00E-05	3.50E-05
DUT20B	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT20C	1.10E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT20D	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT21A	6.40E-05	5.00E-05	3.40E-05	2.40E-05	1.60E-05	1.00E-05
DUT21B	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT21C	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT21D	4.10E-05	2.40E-05	1.10E-05	1.10E-05	1.00E-05	1.10E-05
DUT22A	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT22B	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT22C	4.40E-05	3.00E-05	1.10E-05	1.00E-05	1.00E-05	1.00E-05
DUT22D	1.70E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT23A	8.10E-05	6.50E-05	3.90E-05	2.90E-05	1.00E-05	1.00E-05
DUT23B	1.00E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05	1.10E-05
DUT23C	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
DUT23D	6.80E-05	5.30E-05	2.60E-05	1.50E-05	1.00E-05	1.00E-05
Control Average	2.08E-05	2.10E-05	2.06E-05	2.09E-05	2.08E-05	2.06E-05
Control Std Dev	1.46E-05	1.47E-05	1.41E-05	1.43E-05	1.44E-05	1.44E-05
Control +99/90	8.15E-05	8.20E-05	7.93E-05	8.04E-05	8.05E-05	8.03E-05
Control -99/90	-4.00E-05	-4.00E-05	-3.80E-05	-3.86E-05	-3.90E-05	-3.90E-05
+Control Error Bar	2.93E-05	3.00E-05	2.94E-05	2.81E-05	2.93E-05	2.94E-05
-Control Error Bar	9.75E-06	1.00E-05	9.63E-06	9.88E-06	9.75E-06	9.63E-06
Biased Average	3.49E-05	2.71E-05	2.40E-05	2.25E-05	2.37E-05	2.15E-05
Biased Std Dev	3.04E-05	2.84E-05	3.74E-05	4.57E-05	5.93E-05	5.38E-05
Biased +99/90	1.18E-04	1.05E-04	1.27E-04	1.48E-04	1.87E-04	1.69E-04
Biased -99/90	-4.86E-05	-5.09E-05	-7.87E-05	-1.03E-04	-1.39E-04	-1.26E-04
+Biased Error Bar	9.51E-05	1.06E-04	2.16E-04	2.86E-04	3.83E-04	3.50E-04
-Biased Error Bar	2.49E-05	1.71E-05	1.40E-05	1.25E-05	1.37E-05	1.25E-05
Unbiased Average	3.54E-05	2.67E-05	2.07E-05	1.68E-05	1.48E-05	1.32E-05
Unbiased Std Dev	3.03E-05	2.58E-05	2.09E-05	1.69E-05	1.49E-05	1.16E-05
Unbiased +99/90	1.20E-04	9.82E-05	7.85E-05	6.36E-05	5.60E-05	4.53E-05
Unbiased -99/90	-4.87E-05	-4.48E-05	-3.72E-05	-3.00E-05	-2.65E-05	-1.89E-05
+Unbiased Error Bar	1.14E-04	1.09E-04	1.02E-04	9.02E-05	8.62E-05	6.88E-05
-Unbiased Error Bar	2.54E-05	1.67E-05	1.07E-05	6.80E-06	4.77E-06	3.20E-06

Table 7. Input offset current values with datasheet-specified supply voltages

Input Offset Current	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	6.25E-10	9.19E-10	7.58E-10	5.79E-10	9.76E-10	5.61E-10
Control (DUT24B)	6.35E-10	7.05E-10	7.81E-10	6.09E-10	9.26E-10	5.68E-10
Control (DUT24C)	8.44E-10	1.16E-09	9.30E-10	5.79E-10	1.29E-09	6.06E-10
Control (DUT24D)	8.09E-10	1.10E-09	8.85E-10	6.44E-10	1.26E-09	5.81E-10
Control (DUT25A)	5.53E-10	9.73E-10	7.23E-10	5.88E-10	1.06E-09	5.57E-10
Control (DUT25B)	6.82E-10	8.05E-10	8.29E-10	6.79E-10	9.77E-10	6.58E-10
Control (DUT25C)	7.82E-10	1.04E-09	7.91E-10	6.34E-10	1.02E-09	5.76E-10
Control (DUT25D)	7.39E-10	1.01E-09	7.26E-10	5.34E-10	1.01E-09	5.17E-10
DUT1A	7.09E-10	8.52E-10	5.97E-10	4.52E-10	4.57E-10	2.53E-10
DUT1B	3.55E-10	7.40E-10	4.34E-10	1.83E-10	2.38E-10	1.70E-10
DUT1C	7.72E-09	8.31E-10	6.29E-10	3.03E-10	5.15E-10	1.08E-10
DUT1D	8.29E-10	9.22E-10	6.79E-10	4.98E-10	5.78E-10	2.13E-10
DUT2A	7.42E-10	1.17E-09	1.55E-09	1.90E-09	2.65E-09	2.41E-09
DUT2B	4.71E-10	9.54E-10	9.17E-10	7.99E-10	1.18E-09	9.94E-10
DUT2C	7.47E-10	8.76E-10	5.57E-10	4.45E-10	6.40E-10	1.67E-10
DUT2D	7.79E-10	9.41E-10	6.38E-10	5.44E-10	8.78E-10	7.69E-10
DUT3A	7.55E-10	8.69E-10	9.82E-10	6.11E-10	1.07E-09	8.34E-10
DUT3B	5.31E-10	-----	1.22E-09	1.40E-09	1.93E-09	1.56E-09
DUT3C	8.50E-10	1.04E-09	8.80E-10	7.53E-10	8.47E-10	4.58E-10
DUT3D	8.55E-10	9.32E-10	7.02E-10	6.04E-10	8.61E-10	4.44E-10
DUT4A	7.87E-10	1.11E-09	1.47E-09	1.72E-09	2.50E-09	1.80E-09
DUT4B	5.19E-10	9.23E-10	9.58E-10	7.24E-10	1.28E-09	9.88E-10
DUT4C	8.60E-10	1.08E-09	7.55E-10	5.77E-10	9.23E-10	7.48E-10
DUT4D	7.46E-10	8.64E-10	7.24E-10	7.91E-10	9.76E-10	9.07E-10
DUT5A	8.45E-10	1.03E-09	9.44E-10	1.13E-09	1.62E-09	1.43E-09
DUT5B	4.71E-10	9.79E-10	8.49E-10	6.12E-10	1.04E-09	5.86E-10
DUT5C	8.35E-10	1.04E-09	6.60E-10	4.91E-10	7.19E-10	4.98E-10
DUT5D	7.32E-10	8.43E-10	4.39E-10	4.68E-10	7.37E-10	3.68E-10
DUT6A	7.68E-10	9.47E-10	8.57E-10	7.61E-10	1.15E-09	7.26E-10
DUT6B	5.87E-10	1.01E-09	8.69E-10	9.52E-10	1.36E-09	1.10E-09
DUT6C	8.24E-10	9.26E-10	6.87E-10	5.15E-10	6.20E-10	3.41E-10
DUT6D	7.50E-10	8.00E-10	5.60E-10	4.98E-10	6.59E-10	3.04E-10
DUT13A	5.88E-10	7.20E-10	7.57E-10	7.81E-10	7.64E-10	7.10E-10
DUT13B	6.74E-10	8.10E-10	9.94E-10	8.15E-10	5.71E-10	5.49E-10
DUT13C	7.44E-10	7.12E-10	6.74E-10	4.91E-10	3.66E-10	3.51E-10
DUT13D	7.97E-10	2.06E-09	7.11E-10	5.69E-10	3.26E-10	4.66E-10
DUT14A	7.42E-10	6.77E-10	5.53E-10	3.94E-10	3.73E-10	4.10E-10
DUT14B	7.25E-10	7.05E-10	5.67E-10	4.10E-10	3.30E-11	6.50E-11
DUT14C	8.02E-10	7.63E-10	5.12E-10	5.19E-10	2.91E-10	2.62E-10
DUT14D	9.07E-10	8.57E-10	7.73E-10	5.79E-10	2.37E-10	2.92E-10
DUT15A	5.96E-10	4.82E-10	4.22E-10	1.51E-10	1.06E-10	6.90E-11
DUT15B	6.32E-10	6.54E-10	6.21E-10	5.98E-10	4.93E-10	4.63E-10
DUT15C	8.32E-10	6.86E-10	6.29E-10	5.15E-10	3.16E-10	2.03E-10
DUT15D	7.33E-10	7.11E-10	5.84E-10	4.25E-10	4.00E-11	1.10E-11
DUT16A	6.97E-10	7.93E-10	8.69E-10	8.19E-10	4.95E-10	5.35E-10
DUT16B	6.51E-10	8.11E-10	8.02E-10	5.23E-10	2.69E-10	1.15E-10
DUT16C	8.00E-10	6.74E-10	5.40E-10	4.25E-10	2.50E-10	8.70E-11
DUT16D	8.27E-10	6.94E-10	7.06E-10	4.34E-10	1.74E-10	3.10E-10
DUT17A	8.08E-10	8.87E-10	1.19E-09	1.09E-09	1.06E-09	1.14E-09
DUT17B	7.03E-10	7.69E-10	9.18E-10	8.35E-10	6.56E-10	5.02E-10
DUT17C	8.14E-10	7.00E-10	5.30E-10	4.91E-10	3.05E-10	2.49E-10
DUT17D	7.50E-10	6.85E-10	7.04E-10	5.36E-10	3.17E-10	3.55E-10
DUT18A	7.17E-10	8.05E-10	6.89E-10	5.47E-10	5.97E-10	3.98E-10
DUT18B	7.54E-10	7.41E-10	9.49E-10	7.63E-10	6.74E-10	7.20E-10
DUT18C	8.48E-10	7.33E-10	8.08E-10	5.72E-10	6.71E-10	5.85E-10
DUT18D	8.41E-10	7.06E-10	7.82E-10	5.25E-10	3.12E-10	3.08E-10
DUT7A	8.92E-10	7.73E-10	8.22E-10	4.34E-10	9.93E-10	4.97E-10
DUT7B	8.25E-10	7.46E-10	7.33E-10	4.73E-10	9.99E-10	6.52E-10
DUT7C	7.56E-10	8.82E-10	7.04E-10	4.54E-10	9.70E-10	5.75E-10
DUT7D	9.12E-10	9.13E-10	6.87E-10	1.97E-10	6.89E-10	3.23E-10
DUT8A	7.98E-10	8.41E-10	7.91E-10	2.20E-10	4.95E-10	2.50E-11
DUT8B	8.22E-10	7.24E-10	6.46E-10	2.77E-10	6.89E-10	3.87E-10
DUT8C	8.61E-10	8.28E-10	5.72E-10	3.31E-10	7.89E-10	2.45E-10
DUT8D	8.61E-10	9.10E-10	8.14E-10	4.42E-10	9.38E-10	4.10E-11
DUT9A	8.28E-10	8.51E-10	8.05E-10	4.30E-10	7.46E-10	3.30E-10
DUT9B	7.44E-10	6.09E-10	5.75E-10	3.50E-11	3.07E-10	3.31E-10
DUT9C	8.86E-10	8.48E-10	6.43E-10	2.16E-10	5.43E-10	1.59E-10
DUT9D	8.70E-10	7.83E-10	6.59E-10	1.23E-10	7.11E-10	1.20E-10
DUT10A	9.14E-10	7.41E-10	6.34E-10	1.10E-10	4.30E-10	1.18E-10
DUT10B	7.37E-10	7.17E-10	6.17E-10	6.30E-11	4.91E-10	3.10E-11
DUT10C	8.71E-10	9.01E-10	7.59E-10	3.35E-10	6.83E-10	2.70E-10
DUT10D	8.40E-10	8.14E-10	5.93E-10	3.05E-10	6.85E-10	1.41E-10
DUT11A	9.06E-10	7.38E-10	6.07E-10	2.12E-10	4.78E-10	5.00E-12
DUT11B	7.77E-10	9.16E-10	7.40E-10	1.79E-10	4.71E-10	2.90E-11
DUT11C	8.39E-10	8.97E-10	7.20E-10	1.83E-10	4.06E-10	2.59E-10
DUT11D	8.12E-10	8.78E-10	6.79E-10	1.00E-10	3.36E-10	2.52E-10
DUT12A	8.20E-10	8.52E-10	7.00E-10	4.62E-10	7.25E-10	2.80E-10
DUT12B	8.06E-10	9.35E-10	7.00E-10	4.52E-10	8.15E-10	5.58E-10
DUT12C	8.97E-10	9.33E-10	6.24E-10	1.86E-10	5.90E-10	2.00E-10
DUT12D	8.91E-10	9.65E-10	8.97E-10	5.07E-10	7.84E-10	3.26E-10
DUT19A	6.42E-10	8.58E-10	4.82E-10	3.07E-10	2.71E-10	9.30E-11
DUT19B	6.63E-10	6.90E-10	2.93E-10	2.32E-10	4.60E-11	2.60E-10
DUT19C	8.30E-10	9.70E-10	4.92E-10	4.36E-10	8.90E-11	1.97E-10
DUT19D	7.77E-10	9.61E-10	4.32E-10	2.58E-10	1.76E-10	2.60E-11
DUT20A	7.91E-10	1.07E-09	6.51E-10	7.10E-10	5.41E-10	7.46E-10
DUT20B	8.44E-10	9.11E-10	5.72E-10	5.16E-10	3.19E-10	1.74E-10
DUT20C	8.60E-10	9.10E-10	4.40E-10	4.71E-10	6.60E-11	8.20E-11
DUT20D	8.70E-10	1.11E-09	6.91E-10	7.19E-10	7.39E-10	7.48E-10
DUT21A	8.17E-10	9.23E-10	6.04E-10	4.44E-10	3.09E-10	3.66E-10
DUT21B	7.34E-10	7.18E-10	2.17E-10	1.59E-10	6.30E-11	1.13E-10
DUT21C	8.70E-10	9.08E-10	5.53E-10	5.41E-10	3.58E-10	3.52E-10
DUT21D	8.19E-10	8.27E-10	4.50E-10	5.05E-10	4.77E-10	5.11E-10
DUT22A	7.29E-10	7.93E-10	3.91E-10	3.79E-10	2.40E-11	4.90E-11
DUT22B	8.50E-10	7.77E-10	5.26E-10	4.40E-10	1.09E-10	5.00E-12
DUT22C	8.90E-10	8.77E-10	4.82E-10	3.67E-10	7.40E-11	7.40E-11
DUT22D	8.22E-10	7.84E-10	3.33E-10	3.27E-10	6.70E-11	1.05E-10
DUT23A	7.32E-10	7.25E-10	4.68E-10	3.72E-10	1.07E-10	6.00E-11
DUT23B	7.49E-10	8.29E-10	6.10E-10	5.93E-10	4.70E-10	4.73E-10
DUT23C	8.97E-10	8.58E-10	5.21E-10	4.63E-10	2.21E-10	3.55E-10
DUT23D	8.36E-10	8.02E-10	3.70E-10	2.64E-10	5.50E-11	4.30E-11
Specification Maximum	2.50E-08	2.50E-08	2.50E-08	2.50E-08	2.50E-08	2.50E-08
Control Average	7.09E-10	9.62E-10	8.03E-10	6.18E-10	1.07E-09	5.78E-10
Control Std Dev	9.49E-11	1.40E-10	6.94E-11	4.73E-11	1.77E-10	3.83E-11
Control +99/90	1.10E-09	1.54E-09	1.09E-09	8.15E-10	1.59E-09	7.37E-10
Control -99/90	3.15E-10	3.83E-10	5.15E-10	4.22E-10	5.40E-10	4.19E-10
+Control Error Bar	8.44E-10	1.16E-09	9.30E-10	5.79E-10	1.29E-09	6.06E-10
-Control Error Bar	5.53E-10	7.05E-10	7.23E-10	5.79E-10	9.26E-10	5.57E-10
Biased Average	8.80E-10	-8.71E-10	7.62E-10	6.64E-10	7.43E-10	5.71E-10
Biased Std Dev	1.04E-09	2.29E-10	2.41E-10	3.39E-10	5.70E-10	4.88E-10
Biased +99/90	3.73E-09	-3.75E-10	1.43E-09	1.60E-09	2.31E-09	1.91E-09
Biased -99/90	-1.97E-09	-1.37E-09	9.85E-11	-2.68E-10	-8.24E-10	-7.71E-10
+Biased Error Bar	6.84E-09	3.89E-10	7.83E-10	1.24E-09	1.90E-09	1.83E-09
-Biased Error Bar	5.25E-10	1.19E-09	3.40E-10	5.13E-10	7.10E-10	5.60E-10
Unbiased Average	8.22E-10	8.48E-10	5.98E-10	3.46E-10	4.62E-10	2.50E-10
Unbiased Std Dev	6.40E-11	9.76E-11	1.48E-10	1.62E-10	2.91E-10	2.01E-10
Unbiased +99/90	1.00E-09	1.12E-09	1.01E-09	7.95E-10	1.27E-09	8.08E-10
Unbiased -99/90	6.45E-10	5.77E-10	1.88E-10	-1.02E-10	-3.45E-10	-3.09E-10
+Unbiased Error Bar	9.16E-11	2.65E-10	2.99E-10	3.73E-10	5.37E-10	4.98E-10
-Unbiased Error Bar	1.80E-10	2.39E-10	3.81E-10	3.11E-10	4.38E-10	2.45E-10

Table 8. Input offset current values with application-specific supply voltages

Input Offset Current	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	-8.58E-10	-6.49E-10	-7.54E-10	-6.92E-10	-6.92E-10	-5.48E-10
Control (DUT24B)	-8.97E-10	-7.08E-10	-7.84E-10	-7.00E-10	-7.32E-10	-5.59E-10
Control (DUT24C)	-9.47E-10	-7.34E-10	-8.48E-10	-7.55E-10	-7.48E-10	-6.24E-10
Control (DUT24D)	-9.08E-10	-6.60E-10	-7.92E-10	-7.17E-10	-7.08E-10	-5.79E-10
Control (DUT25A)	-8.16E-10	-6.42E-10	-7.63E-10	-6.70E-10	-6.92E-10	-5.10E-10
Control (DUT25B)	-9.70E-10	-7.64E-10	-8.65E-10	-7.61E-10	-7.97E-10	-6.28E-10
Control (DUT25C)	-8.89E-10	-6.65E-10	-7.83E-10	-6.85E-10	-7.04E-10	-5.25E-10
Control (DUT25D)	-8.58E-10	-6.30E-10	-7.36E-10	-6.43E-10	-6.43E-10	-4.84E-10
DUT1A	-7.25E-10	-6.98E-10	-5.54E-10	-3.74E-10	-2.97E-10	4.30E-11
DUT1B	-7.37E-10	-5.41E-10	-3.99E-10	-9.30E-11	-5.60E-11	3.72E-10
DUT1C	-5.05E-09	-7.04E-10	-5.84E-10	-3.04E-10	-4.41E-10	1.90E-11
DUT1D	-8.13E-10	-7.32E-10	-6.37E-10	-3.99E-10	-3.18E-10	6.90E-11
DUT2A	-7.64E-10	-1.01E-09	-1.65E-09	-2.13E-09	-2.94E-09	-2.62E-09
DUT2B	-7.91E-10	-8.17E-10	-8.75E-10	-8.28E-10	-1.05E-09	-8.09E-10
DUT2C	-7.39E-10	-7.10E-10	-4.91E-10	-3.73E-10	-4.15E-10	1.05E-10
DUT2D	-7.26E-10	-7.93E-10	-5.93E-10	-6.54E-10	-7.55E-10	-6.16E-10
DUT3A	-7.41E-10	-7.00E-10	-9.48E-10	-5.81E-10	-9.61E-10	-6.66E-10
DUT3B	-9.00E-10	-8.83E-10	-1.20E-09	-1.46E-09	-1.95E-09	-1.42E-09
DUT3C	-7.99E-10	-8.65E-10	-8.03E-10	-6.91E-10	-6.38E-10	-1.68E-10
DUT3D	-8.33E-10	-7.58E-10	-6.61E-10	-5.92E-10	-6.72E-10	-2.53E-10
DUT4A	-8.02E-10	-1.03E-09	-1.62E-09	-1.91E-09	-2.75E-09	-2.05E-09
DUT4B	-8.19E-10	-7.53E-10	-9.88E-10	-7.48E-10	-1.15E-09	-8.28E-10
DUT4C	-8.72E-10	-9.50E-10	-7.56E-10	-6.93E-10	-7.53E-10	-5.78E-10
DUT4D	-7.52E-10	-7.76E-10	-7.29E-10	-8.96E-10	-9.17E-10	-9.24E-10
DUT5A	-8.13E-10	-9.00E-10	-9.56E-10	-1.16E-09	-1.62E-09	-1.33E-09
DUT5B	-9.08E-10	-8.69E-10	-8.64E-10	-6.42E-10	-9.12E-10	-5.74E-10
DUT5C	-8.04E-10	-9.04E-10	-6.36E-10	-4.91E-10	-5.38E-10	-4.19E-10
DUT5D	-7.09E-10	-7.06E-10	-3.43E-10	-3.83E-10	-4.56E-10	-2.36E-10
DUT6A	-7.84E-10	-8.85E-10	-8.45E-10	-8.36E-10	-1.07E-09	-6.49E-10
DUT6B	-8.66E-10	-9.48E-10	-8.38E-10	-1.03E-09	-1.32E-09	-8.95E-10
DUT6C	-8.08E-10	-8.09E-10	-6.10E-10	-4.82E-10	-3.96E-10	-1.51E-10
DUT6D	-7.21E-10	-7.18E-10	-4.99E-10	-4.94E-10	-5.29E-10	-2.11E-10
DUT13A	-7.33E-10	-6.27E-10	-7.10E-10	-7.55E-10	-7.37E-10	-6.44E-10
DUT13B	-8.95E-10	-8.22E-10	-9.95E-10	-7.86E-10	-5.25E-10	-4.00E-10
DUT13C	-8.11E-10	-6.25E-10	-6.20E-10	-4.63E-10	-2.89E-10	-1.49E-10
DUT13D	-8.80E-10	-6.72E-10	-6.62E-10	-5.00E-10	-2.84E-10	-3.80E-10
DUT14A	-8.85E-10	-6.03E-10	-2.50E-10	-3.12E-10	-1.93E-10	-1.30E-10
DUT14B	-9.60E-10	-6.90E-10	-1.54E-10	-1.11E-10	2.86E-10	4.69E-10
DUT14C	-8.56E-10	-6.73E-10	-3.71E-10	-3.39E-10	-4.20E-11	1.50E-11
DUT14D	-1.01E-09	-8.08E-10	-6.66E-10	-4.26E-10	-2.10E-11	-5.70E-11
DUT15A	-7.80E-10	-4.41E-10	-3.26E-10	-9.20E-11	-5.30E-11	2.60E-11
DUT15B	-8.80E-10	-6.00E-10	-5.85E-10	-5.12E-10	-4.16E-10	-4.25E-10
DUT15C	-9.34E-10	-6.24E-10	-6.18E-10	-4.03E-10	-2.25E-10	-1.02E-10
DUT15D	-7.70E-10	-6.15E-10	-5.80E-10	-3.31E-10	5.70E-11	1.04E-10
DUT16A	-8.91E-10	-7.10E-10	-7.82E-10	-7.01E-10	-2.68E-10	-2.21E-10
DUT16B	-1.00E-09	-7.71E-10	-6.57E-10	-3.60E-10	2.80E-11	2.88E-10
DUT16C	-9.20E-10	-6.52E-10	-3.91E-10	-2.72E-10	1.40E-11	2.70E-10
DUT16D	-9.27E-10	-6.33E-10	-5.70E-10	-2.86E-10	1.05E-10	1.17E-10
DUT17A	-9.02E-10	-6.48E-10	-1.18E-09	-1.08E-09	-9.52E-10	-1.02E-09
DUT17B	-9.19E-10	-6.96E-10	-8.82E-10	-8.63E-10	-6.16E-10	-4.88E-10
DUT17C	-8.91E-10	-6.26E-10	-5.38E-10	-4.43E-10	-2.08E-10	-1.38E-10
DUT17D	-8.07E-10	-6.38E-10	-6.37E-10	-4.55E-10	-1.82E-10	-1.11E-10
DUT18A	-8.64E-10	-7.97E-10	-7.03E-10	-5.66E-10	-5.44E-10	-3.79E-10
DUT18B	-9.35E-10	-7.26E-10	-8.82E-10	-6.92E-10	-5.21E-10	-4.60E-10
DUT18C	-9.36E-10	-6.64E-10	-7.52E-10	-5.89E-10	-4.98E-10	-4.01E-10
DUT18D	-9.06E-10	-6.55E-10	-7.67E-10	-5.14E-10	-3.44E-10	-2.92E-10
DUT7A	-7.45E-10	-8.75E-10	-7.58E-10	-7.81E-10	-5.70E-10	-4.61E-10
DUT7B	-9.07E-10	-9.18E-10	-7.31E-10	-7.45E-10	-6.14E-10	-4.93E-10
DUT7C	-7.58E-10	-8.76E-10	-7.69E-10	-7.83E-10	-5.04E-10	-4.46E-10
DUT7D	-7.33E-10	-8.64E-10	-7.03E-10	-5.18E-10	-2.97E-10	-1.92E-10
DUT8A	-8.00E-10	-9.18E-10	-7.93E-10	-4.04E-10	7.70E-11	1.25E-10
DUT8B	-7.76E-10	-8.81E-10	-6.99E-10	-4.32E-10	-1.57E-10	-2.29E-10
DUT8C	-7.66E-10	-7.79E-10	-5.02E-10	-5.31E-10	-1.96E-10	-7.10E-11
DUT8D	-7.90E-10	-8.59E-10	-7.23E-10	-6.50E-10	-8.90E-11	9.50E-11
DUT9A	-7.58E-10	-8.93E-10	-7.75E-10	-4.46E-10	-3.47E-10	-2.59E-10
DUT9B	-7.82E-10	-7.42E-10	-4.87E-10	-1.71E-10	2.14E-10	4.50E-10
DUT9C	-8.90E-10	-8.50E-10	-5.06E-10	-5.52E-10	-1.03E-10	2.85E-10
DUT9D	-8.57E-10	-7.68E-10	-5.75E-10	-4.85E-10	-1.78E-10	-8.80E-11
DUT10A	-8.78E-10	-7.54E-10	-5.44E-10	-2.98E-10	1.86E-10	3.60E-10
DUT10B	-8.16E-10	-7.43E-10	-5.10E-10	-1.43E-10	1.08E-10	2.85E-10
DUT10C	-8.51E-10	-8.50E-10	-7.13E-10	-5.43E-10	-8.70E-11	-3.80E-11
DUT10D	-8.02E-10	-7.56E-10	-5.29E-10	-4.77E-10	-1.54E-10	6.60E-11
DUT11A	-8.76E-10	-7.02E-10	-4.48E-10	-4.25E-10	-2.10E-11	2.20E-10
DUT11B	-8.79E-10	-9.91E-10	-7.66E-10	-4.68E-10	-2.05E-10	1.12E-10
DUT11C	-8.15E-10	-8.83E-10	-6.37E-10	-4.62E-10	3.90E-11	3.76E-10
DUT11D	-7.87E-10	-8.42E-10	-7.03E-10	-2.69E-10	2.54E-10	4.59E-10
DUT12A	-7.95E-10	-8.88E-10	-7.09E-10	-6.36E-10	-3.86E-10	-1.00E-10
DUT12B	-9.26E-10	-1.02E-09	-7.24E-10	-6.35E-10	-2.92E-10	-3.10E-10
DUT12C	-8.78E-10	-8.55E-10	-5.11E-10	-2.64E-10	5.80E-11	1.73E-10
DUT12D	-8.73E-10	-9.39E-10	-9.00E-10	-6.68E-10	-2.73E-10	-1.14E-10
DUT19A	-8.85E-10	-6.25E-10	-6.43E-10	-2.84E-10	-1.64E-10	-1.00E-11
DUT19B	-8.95E-10	-6.11E-10	-5.49E-10	-3.21E-10	-4.40E-11	2.83E-10
DUT19C	-8.88E-10	-6.84E-10	-6.50E-10	-5.33E-10	-1.70E-11	1.17E-10
DUT19D	-8.34E-10	-6.63E-10	-6.09E-10	-3.15E-10	-1.33E-10	8.20E-11
DUT20A	-9.20E-10	-8.33E-10	-7.70E-10	-8.07E-10	-5.69E-10	-5.82E-10
DUT20B	-1.08E-09	-7.56E-10	-6.80E-10	-4.63E-10	-3.32E-10	2.04E-10
DUT20C	-9.18E-10	-4.77E-10	-6.04E-10	-4.66E-10	-1.20E-10	2.70E-11
DUT20D	-9.13E-10	-2.46E-10	-6.86E-10	-7.07E-10	-7.04E-10	-6.44E-10
DUT21A	-9.02E-10	-6.89E-10	-7.54E-10	-6.05E-10	-4.32E-10	-2.74E-10
DUT21B	-9.07E-10	-6.71E-10	-3.73E-10	-2.60E-10	-7.60E-11	-1.61E-10
DUT21C	-9.20E-10	-7.07E-10	-6.91E-10	-6.72E-10	-5.03E-10	-4.40E-10
DUT21D	-8.56E-10	-6.60E-10	-5.39E-10	-5.01E-10	-4.74E-10	-4.41E-10
DUT22A	-8.22E-10	-6.09E-10	-4.45E-10	-3.53E-10	7.90E-11	3.27E-10
DUT22B	-1.04E-09	-7.93E-10	-6.46E-10	-5.16E-10	-1.80E-10	1.49E-10
DUT22C	-9.41E-10	-6.90E-10	-6.38E-10	-4.05E-10	-1.43E-10	1.38E-10
DUT22D	-8.47E-10	-5.59E-10	-4.16E-10	-2.97E-10	1.08E-10	3.26E-10
DUT23A	-8.00E-10	-5.67E-10	-5.69E-10	-4.31E-10	-1.63E-10	-1.80E-11
DUT23B	-9.86E-10	-8.56E-10	-8.10E-10	-7.33E-10	-6.05E-10	-5.17E-10
DUT23C	-9.43E-10	-7.84E-10	-5.90E-10	-5.97E-10	-3.72E-10	-3.57E-10
DUT23D	-8.54E-10	-7.12E-10	-4.92E-10	-3.13E-10	-1.18E-10	-6.00E-12
Control Average	-8.93E-10	-6.82E-10	-7.91E-10	-7.03E-10	-7.15E-10	-5.57E-10
Control Std Dev	4.67E-11	4.51E-11	4.19E-11	3.78E-11	4.20E-11	4.83E-11
Control +99/90	-6.99E-10	-4.94E-10	-6.17E-10	-5.46E-10	-5.38E-10	-3.57E-10
Control -99/90	-1.09E-09	-8.69E-10	-9.64E-10	-8.60E-10	-8.91E-10	-7.57E-10
+Control Error Bar	7.69E-11	3.95E-11	3.66E-11	3.29E-11	2.25E-11	4.71E-11
-Control Error Bar	5.41E-11	5.25E-11	5.74E-11	5.21E-11	3.35E-11	6.69E-11
Biased Average	-9.29E-10	-7.43E-10	-7.10E-10	-6.29E-10	-6.21E-10	-4.03E-10
Biased Std Dev	6.26E-10	1.24E-10	2.97E-10	4.10E-10	6.62E-10	5.93E-10
Biased +99/90	7.93E-10	-4.01E-10	1.07E-10	4.99E-10	1.20E-09	1.23E-09
Biased -99/90	-2.65E-09	-1.08E-09	-1.53E-09	-1.76E-09	-2.44E-09	-2.03E-09
+Biased Error Bar	2.20E-10	3.02E-10	5.56E-10	5.37E-10	9.07E-10	8.72E-10
-Biased Error Bar	4.12E-09	2.88E-10	9.38E-10	1.50E-09	2.31E-09	2.22E-09
Unbiased Average	-8.61E-10	-7.65E-10	-6.33E-10	-4.86E-10	-1.93E-10	-4.55E-11
Unbiased Std Dev	7.44E-11	1.43E-10	1.20E-10	1.68E-10	2.37E-10	2.96E-10
Unbiased +99/90	-6.55E-10	-3.68E-10	-3.02E-10	-1.99E-11	4.63E-10	7.75E-10
Unbiased -99/90	-1.07E-09	-1.16E-09	-9.65E-10	-9.51E-10	-8.49E-10	-8.66E-10
+Unbiased Error Bar	1.28E-10	5.19E-10	2.60E-10	3.43E-10	4.47E-10	5.04E-10
-Unbiased Error Bar	2.20E-10	2.56E-10	2.67E-10	3.21E-10	5.11E-10	5.99E-10

Table 9. Input bias current values with datasheet-specified supply voltages

Input Bias Current	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	1.06E-08	1.05E-08	1.06E-08	1.06E-08	1.05E-08	1.06E-08
Control (DUT24B)	1.05E-08	1.02E-08	1.04E-08	1.05E-08	1.02E-08	1.05E-08
Control (DUT24C)	1.01E-08	9.86E-09	9.98E-09	1.00E-08	9.80E-09	1.00E-08
Control (DUT24D)	1.05E-08	1.03E-08	1.04E-08	1.05E-08	1.03E-08	1.05E-08
Control (DUT25A)	1.10E-08	1.08E-08	1.09E-08	1.10E-08	1.08E-08	1.09E-08
Control (DUT25B)	1.08E-08	1.06E-08	1.09E-08	1.09E-08	1.06E-08	1.09E-08
Control (DUT25C)	1.06E-08	1.04E-08	1.05E-08	1.06E-08	1.04E-08	1.05E-08
Control (DUT25D)	1.13E-08	1.11E-08	1.13E-08	1.13E-08	1.11E-08	1.13E-08
DUT1A	9.31E-09	1.54E-08	2.06E-08	2.97E-08	3.42E-08	4.10E-08
DUT1B	1.07E-08	1.76E-08	2.34E-08	3.35E-08	3.83E-08	4.57E-08
DUT1C	1.42E-08	1.73E-08	2.30E-08	3.30E-08	3.77E-08	4.51E-08
DUT1D	1.02E-08	1.67E-08	2.24E-08	3.22E-08	3.68E-08	4.42E-08
DUT2A	1.04E-08	1.70E-08	2.22E-08	3.18E-08	3.62E-08	4.34E-08
DUT2B	1.05E-08	1.76E-08	2.34E-08	3.36E-08	3.83E-08	4.61E-08
DUT2C	1.05E-08	1.73E-08	2.30E-08	3.31E-08	3.77E-08	4.53E-08
DUT2D	1.13E-08	1.83E-08	2.42E-08	3.47E-08	3.95E-08	4.72E-08
DUT3A	1.11E-08	1.84E-08	2.42E-08	3.46E-08	3.94E-08	4.70E-08
DUT3B	1.07E-08	-----	2.37E-08	3.41E-08	3.87E-08	4.65E-08
DUT3C	1.05E-08	1.77E-08	2.35E-08	3.36E-08	3.83E-08	4.59E-08
DUT3D	1.09E-08	1.82E-08	2.41E-08	3.44E-08	3.92E-08	4.70E-08
DUT4A	1.08E-08	1.77E-08	2.31E-08	3.30E-08	3.74E-08	4.47E-08
DUT4B	1.11E-08	1.83E-08	2.41E-08	3.44E-08	3.92E-08	4.68E-08
DUT4C	1.04E-08	1.71E-08	2.28E-08	3.27E-08	3.72E-08	4.44E-08
DUT4D	1.11E-08	1.81E-08	2.39E-08	3.41E-08	3.89E-08	4.65E-08
DUT5A	1.11E-08	1.86E-08	2.45E-08	3.50E-08	3.97E-08	4.77E-08
DUT5B	1.15E-08	1.94E-08	2.55E-08	3.64E-08	4.14E-08	4.95E-08
DUT5C	1.08E-08	1.81E-08	2.39E-08	3.42E-08	3.89E-08	4.65E-08
DUT5D	1.14E-08	1.91E-08	2.52E-08	3.60E-08	4.09E-08	4.89E-08
DUT6A	1.04E-08	1.77E-08	2.33E-08	3.34E-08	3.81E-08	4.56E-08
DUT6B	9.65E-09	1.72E-08	2.29E-08	3.32E-08	3.81E-08	4.58E-08
DUT6C	1.01E-08	1.77E-08	2.36E-08	3.41E-08	3.90E-08	4.69E-08
DUT6D	1.15E-08	1.94E-08	2.55E-08	3.65E-08	4.15E-08	4.98E-08
DUT13A	1.09E-08	1.64E-08	2.70E-08	3.19E-08	3.98E-08	4.47E-08
DUT13B	1.19E-08	1.80E-08	2.95E-08	3.47E-08	4.33E-08	4.85E-08
DUT13C	1.16E-08	1.75E-08	2.87E-08	3.39E-08	4.21E-08	4.72E-08
DUT13D	1.18E-08	1.70E-08	2.90E-08	3.42E-08	4.26E-08	4.78E-08
DUT14A	1.03E-08	1.60E-08	2.67E-08	3.15E-08	3.95E-08	4.45E-08
DUT14B	9.83E-09	1.58E-08	2.68E-08	3.17E-08	3.99E-08	4.51E-08
DUT14C	9.49E-09	1.52E-08	2.59E-08	3.09E-08	3.87E-08	4.36E-08
DUT14D	1.01E-08	1.56E-08	2.61E-08	3.09E-08	3.86E-08	4.34E-08
DUT15A	1.13E-08	1.73E-08	2.86E-08	3.37E-08	4.20E-08	4.70E-08
DUT15B	1.06E-08	1.62E-08	2.65E-08	3.12E-08	3.89E-08	4.37E-08
DUT15C	1.03E-08	1.56E-08	2.57E-08	3.03E-08	3.77E-08	4.23E-08
DUT15D	1.18E-08	1.79E-08	2.97E-08	3.50E-08	4.35E-08	4.87E-08
DUT16A	9.38E-09	1.50E-08	2.56E-08	3.05E-08	3.83E-08	4.32E-08
DUT16B	1.02E-08	1.62E-08	2.74E-08	3.25E-08	4.07E-08	4.58E-08
DUT16C	9.89E-09	1.57E-08	2.65E-08	3.15E-08	3.94E-08	4.43E-08
DUT16D	9.77E-09	1.56E-08	2.67E-08	3.18E-08	3.99E-08	4.50E-08
DUT17A	1.06E-08	1.63E-08	2.69E-08	3.18E-08	3.96E-08	4.45E-08
DUT17B	1.10E-08	1.67E-08	2.75E-08	3.24E-08	4.04E-08	4.53E-08
DUT17C	1.08E-08	1.63E-08	2.69E-08	3.17E-08	3.95E-08	4.43E-08
DUT17D	1.08E-08	1.67E-08	2.76E-08	3.25E-08	4.08E-08	4.58E-08
DUT18A	1.07E-08	1.63E-08	2.67E-08	3.14E-08	3.92E-08	4.40E-08
DUT18B	1.07E-08	1.65E-08	2.73E-08	3.22E-08	4.05E-08	4.53E-08
DUT18C	1.05E-08	1.62E-08	2.67E-08	3.15E-08	3.96E-08	4.44E-08
DUT18D	1.17E-08	1.77E-08	2.90E-08	3.40E-08	4.24E-08	4.75E-08
DUT7A	1.11E-08	1.56E-08	1.85E-08	2.53E-08	2.70E-08	3.18E-08
DUT7B	1.13E-08	1.60E-08	1.94E-08	2.64E-08	2.84E-08	3.36E-08
DUT7C	1.08E-08	1.55E-08	1.89E-08	2.55E-08	2.76E-08	3.25E-08
DUT7D	1.14E-08	1.62E-08	1.97E-08	2.65E-08	2.86E-08	3.36E-08
DUT8A	1.09E-08	1.53E-08	1.86E-08	2.49E-08	2.66E-08	3.14E-08
DUT8B	1.13E-08	1.61E-08	1.95E-08	2.60E-08	2.80E-08	3.27E-08
DUT8C	1.06E-08	1.51E-08	1.82E-08	2.42E-08	2.62E-08	3.07E-08
DUT8D	1.18E-08	1.67E-08	2.03E-08	2.70E-08	2.93E-08	3.43E-08
DUT9A	1.09E-08	1.57E-08	1.87E-08	2.54E-08	2.72E-08	3.21E-08
DUT9B	2.02E-08	1.47E-08	1.77E-08	2.37E-08	2.55E-08	3.00E-08
DUT9C	1.06E-08	1.52E-08	1.83E-08	2.45E-08	2.64E-08	3.08E-08
DUT9D	1.18E-08	1.69E-08	2.05E-08	2.73E-08	2.96E-08	3.46E-08
DUT10A	1.01E-08	1.41E-08	1.68E-08	2.28E-08	2.43E-08	2.86E-08
DUT10B	1.19E-08	1.68E-08	2.02E-08	2.74E-08	2.92E-08	3.45E-08
DUT10C	1.16E-08	1.64E-08	1.98E-08	2.68E-08	2.90E-08	3.39E-08
DUT10D	1.10E-08	1.55E-08	1.86E-08	2.51E-08	2.70E-08	3.15E-08
DUT11A	1.04E-08	1.51E-08	1.79E-08	2.43E-08	2.60E-08	3.09E-08
DUT11B	1.08E-08	1.55E-08	1.85E-08	2.50E-08	2.70E-08	3.19E-08
DUT11C	1.11E-08	1.58E-08	1.90E-08	2.54E-08	2.75E-08	3.24E-08
DUT11D	1.08E-08	1.56E-08	1.87E-08	2.52E-08	2.73E-08	3.21E-08
DUT12A	1.08E-08	1.57E-08	1.86E-08	2.52E-08	2.69E-08	3.19E-08
DUT12B	1.05E-08	1.55E-08	1.84E-08	2.49E-08	2.68E-08	3.17E-08
DUT12C	1.09E-08	1.61E-08	1.93E-08	2.57E-08	2.78E-08	3.26E-08
DUT12D	1.12E-08	1.62E-08	1.95E-08	2.60E-08	2.82E-08	3.30E-08
DUT19A	1.09E-08	1.41E-08	2.08E-08	2.38E-08	2.86E-08	3.16E-08
DUT19B	1.05E-08	1.35E-08	1.99E-08	2.28E-08	2.72E-08	3.01E-08
DUT19C	1.00E-08	1.31E-08	1.93E-08	2.22E-08	2.65E-08	2.94E-08
DUT19D	1.19E-08	1.55E-08	2.26E-08	2.50E-08	3.09E-08	3.43E-08
DUT20A	1.08E-08	1.41E-08	2.08E-08	2.39E-08	2.85E-08	3.20E-08
DUT20B	1.12E-08	1.45E-08	2.14E-08	2.46E-08	2.94E-08	3.27E-08
DUT20C	1.10E-08	1.44E-08	2.11E-08	2.43E-08	2.90E-08	3.22E-08
DUT20D	1.15E-08	1.50E-08	2.22E-08	2.55E-08	3.05E-08	3.40E-08
DUT21A	1.09E-08	1.41E-08	2.06E-08	2.36E-08	2.81E-08	3.11E-08
DUT21B	1.11E-08	1.43E-08	2.11E-08	2.41E-08	2.87E-08	3.18E-08
DUT21C	1.09E-08	1.40E-08	2.06E-08	2.35E-08	2.81E-08	3.11E-08
DUT21D	1.13E-08	1.47E-08	2.15E-08	2.45E-08	2.92E-08	3.22E-08
DUT22A	9.54E-09	1.24E-08	1.86E-08	2.13E-08	2.56E-08	2.86E-08
DUT22B	1.05E-08	1.36E-08	1.99E-08	2.27E-08	2.71E-08	3.01E-08
DUT22C	1.01E-08	1.31E-08	1.92E-08	2.20E-08	2.63E-08	2.92E-08
DUT22D	9.95E-09	1.31E-08	1.93E-08	2.21E-08	2.66E-08	2.97E-08
DUT23A	1.13E-08	1.44E-08	2.13E-08	2.42E-08	2.88E-08	3.19E-08
DUT23B	1.09E-08	1.40E-08	2.07E-08	2.36E-08	2.82E-08	3.12E-08
DUT23C	1.12E-08	1.44E-08	2.12E-08	2.42E-08	2.87E-08	3.20E-08
DUT23D	1.18E-08	1.52E-08	2.21E-08	2.51E-08	2.98E-08	3.31E-08
Specification Maximum	2.50E-07	2.50E-07	2.50E-07	2.50E-07	2.50E-07	2.50E-07
Control Average	1.07E-08	1.05E-08	1.06E-08	1.07E-08	1.05E-08	1.07E-08
Control Std Dev	3.57E-10	3.68E-10	3.72E-10	3.58E-10	3.75E-10	3.54E-10
Control +99/90	1.22E-08	1.20E-08	1.22E-08	1.22E-08	1.20E-08	1.21E-08
Control -99/90	9.19E-09	8.95E-09	9.09E-09	9.19E-09	8.90E-09	9.19E-09
+Control Error Bar	1.10E-08	1.08E-08	1.09E-08	1.10E-08	1.08E-08	1.09E-08
-Control Error Bar	1.01E-08	9.86E-09	9.98E-09	1.00E-08	9.80E-09	1.00E-08
Biased Average	1.07E-08	1.71E-08	2.53E-08	3.30E-08	3.93E-08	4.57E-08
Biased Std Dev	8.27E-10	1.12E-09	2.14E-09	1.60E-09	1.79E-09	1.88E-09
Biased +99/90	1.30E-08	1.47E-08	3.12E-08	3.75E-08	4.42E-08	5.08E-08
Biased -99/90	8.47E-09	1.95E-08	1.94E-08	2.86E-08	3.44E-08	4.05E-08
+Biased Error Bar	3.45E-09	2.10E-09	4.37E-09	3.43E-09	4.16E-09	4.11E-09
-Biased Error Bar	1.44E-09	2.32E-09	4.67E-09	3.33E-09	5.14E-09	4.73E-09
Unbiased Average	1.12E-08	1.50E-08	1.97E-08	2.46E-08	2.78E-08	3.18E-08
Unbiased Std Dev	1.47E-09	1.08E-09	1.30E-09	1.43E-09	1.38E-09	1.51E-09
Unbiased +99/90	1.52E-08	1.80E-08	2.33E-08	2.86E-08	3.16E-08	3.60E-08
Unbiased -99/90	7.09E-09	1.20E-08	1.61E-08	2.07E-08	2.40E-08	2.77E-08
+Unbiased Error Bar	8.99E-09	1.98E-09	2.83E-09	2.70E-09	3.12E-09	2.74E-09
-Unbiased Error Bar	1.62E-09	2.56E-09	2.94E-09	3.32E-09	3.48E-09	3.21E-09

Table 10. Input bias current values with application-specific supply voltages

Input Bias Current	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	-1.24E-08	-1.25E-08	-1.25E-08	-1.25E-08	-1.25E-08	-1.24E-08
Control (DUT24B)	-1.23E-08	-1.23E-08	-1.23E-08	-1.23E-08	-1.23E-08	-1.23E-08
Control (DUT24C)	-1.18E-08	-1.18E-08	-1.18E-08	-1.18E-08	-1.18E-08	-1.18E-08
Control (DUT24D)	-1.23E-08	-1.23E-08	-1.23E-08	-1.23E-08	-1.23E-08	-1.23E-08
Control (DUT25A)	-1.27E-08	-1.28E-08	-1.28E-08	-1.28E-08	-1.28E-08	-1.28E-08
Control (DUT25B)	-1.27E-08	-1.27E-08	-1.27E-08	-1.27E-08	-1.27E-08	-1.27E-08
Control (DUT25C)	-1.23E-08	-1.23E-08	-1.23E-08	-1.23E-08	-1.23E-08	-1.23E-08
Control (DUT25D)	-1.31E-08	-1.32E-08	-1.32E-08	-1.32E-08	-1.32E-08	-1.31E-08
DUT1A	-1.10E-08	-1.82E-08	-2.44E-08	-3.51E-08	-4.06E-08	-4.85E-08
DUT1B	-1.28E-08	-2.06E-08	-2.75E-08	-3.94E-08	-4.52E-08	-5.37E-08
DUT1C	-1.47E-08	-2.03E-08	-2.71E-08	-3.86E-08	-4.44E-08	-5.28E-08
DUT1D	-1.20E-08	-1.97E-08	-2.64E-08	-3.79E-08	-4.36E-08	-5.21E-08
DUT2A	-1.22E-08	-2.00E-08	-2.61E-08	-3.72E-08	-4.25E-08	-5.06E-08
DUT2B	-1.25E-08	-2.07E-08	-2.75E-08	-3.94E-08	-4.52E-08	-5.40E-08
DUT2C	-1.23E-08	-2.03E-08	-2.70E-08	-3.87E-08	-4.44E-08	-5.30E-08
DUT2D	-1.32E-08	-2.14E-08	-2.84E-08	-4.05E-08	-4.64E-08	-5.51E-08
DUT3A	-1.29E-08	-2.15E-08	-2.82E-08	-4.03E-08	-4.61E-08	-5.48E-08
DUT3B	-1.26E-08	-2.11E-08	-2.77E-08	-3.98E-08	-4.54E-08	-5.43E-08
DUT3C	-1.22E-08	-2.06E-08	-2.74E-08	-3.91E-08	-4.49E-08	-5.35E-08
DUT3D	-1.27E-08	-2.11E-08	-2.81E-08	-3.99E-08	-4.58E-08	-5.45E-08
DUT4A	-1.27E-08	-2.06E-08	-2.70E-08	-3.85E-08	-4.38E-08	-5.22E-08
DUT4B	-1.31E-08	-2.13E-08	-2.81E-08	-4.01E-08	-4.59E-08	-5.46E-08
DUT4C	-1.22E-08	-1.99E-08	-2.66E-08	-3.80E-08	-4.35E-08	-5.18E-08
DUT4D	-1.30E-08	-2.11E-08	-2.79E-08	-3.97E-08	-4.55E-08	-5.42E-08
DUT5A	-1.29E-08	-2.16E-08	-2.84E-08	-4.08E-08	-4.66E-08	-5.54E-08
DUT5B	-1.37E-08	-2.26E-08	-2.97E-08	-4.24E-08	-4.85E-08	-5.75E-08
DUT5C	-1.26E-08	-2.09E-08	-2.78E-08	-3.95E-08	-4.53E-08	-5.38E-08
DUT5D	-1.32E-08	-2.21E-08	-2.94E-08	-4.17E-08	-4.78E-08	-5.68E-08
DUT6A	-1.22E-08	-2.07E-08	-2.73E-08	-3.89E-08	-4.48E-08	-5.33E-08
DUT6B	-1.14E-08	-2.02E-08	-2.70E-08	-3.90E-08	-4.51E-08	-5.38E-08
DUT6C	-1.18E-08	-2.07E-08	-2.77E-08	-3.99E-08	-4.60E-08	-5.50E-08
DUT6D	-1.34E-08	-2.26E-08	-2.99E-08	-4.26E-08	-4.88E-08	-5.80E-08
DUT13A	-1.26E-08	-1.91E-08	-3.12E-08	-3.68E-08	-4.60E-08	-5.19E-08
DUT13B	-1.38E-08	-2.09E-08	-3.40E-08	-4.00E-08	-4.98E-08	-5.60E-08
DUT13C	-1.34E-08	-2.03E-08	-3.30E-08	-3.90E-08	-4.85E-08	-5.45E-08
DUT13D	-1.37E-08	-2.06E-08	-3.36E-08	-3.95E-08	-4.92E-08	-5.54E-08
DUT14A	-1.21E-08	-1.89E-08	-3.12E-08	-3.70E-08	-4.63E-08	-5.23E-08
DUT14B	-1.17E-08	-1.88E-08	-3.14E-08	-3.74E-08	-4.71E-08	-5.31E-08
DUT14C	-1.12E-08	-1.81E-08	-3.06E-08	-3.66E-08	-4.58E-08	-5.17E-08
DUT14D	-1.18E-08	-1.85E-08	-3.06E-08	-3.64E-08	-4.53E-08	-5.10E-08
DUT15A	-1.31E-08	-2.02E-08	-3.31E-08	-3.91E-08	-4.85E-08	-5.46E-08
DUT15B	-1.24E-08	-1.90E-08	-3.08E-08	-3.64E-08	-4.53E-08	-5.09E-08
DUT15C	-1.19E-08	-1.84E-08	-3.00E-08	-3.53E-08	-4.39E-08	-4.93E-08
DUT15D	-1.35E-08	-2.09E-08	-3.42E-08	-4.04E-08	-5.01E-08	-5.64E-08
DUT16A	-1.11E-08	-1.80E-08	-3.03E-08	-3.62E-08	-4.54E-08	-5.14E-08
DUT16B	-1.20E-08	-1.92E-08	-3.20E-08	-3.81E-08	-4.77E-08	-5.37E-08
DUT16C	-1.16E-08	-1.86E-08	-3.10E-08	-3.70E-08	-4.63E-08	-5.22E-08
DUT16D	-1.15E-08	-1.86E-08	-3.15E-08	-3.75E-08	-4.71E-08	-5.33E-08
DUT17A	-1.24E-08	-1.96E-08	-3.16E-08	-3.73E-08	-4.64E-08	-5.24E-08
DUT17B	-1.29E-08	-1.95E-08	-3.20E-08	-3.77E-08	-4.69E-08	-5.27E-08
DUT17C	-1.26E-08	-1.92E-08	-3.12E-08	-3.68E-08	-4.59E-08	-5.15E-08
DUT17D	-1.27E-08	-1.98E-08	-3.24E-08	-3.83E-08	-4.78E-08	-5.39E-08
DUT18A	-1.24E-08	-1.90E-08	-3.09E-08	-3.66E-08	-4.55E-08	-5.12E-08
DUT18B	-1.25E-08	-1.95E-08	-3.20E-08	-3.79E-08	-4.71E-08	-5.31E-08
DUT18C	-1.22E-08	-1.90E-08	-3.12E-08	-3.70E-08	-4.61E-08	-5.19E-08
DUT18D	-1.35E-08	-2.06E-08	-3.35E-08	-3.95E-08	-4.90E-08	-5.51E-08
DUT7A	-1.29E-08	-1.84E-08	-2.26E-08	-2.93E-08	-3.33E-08	-3.75E-08
DUT7B	-1.31E-08	-1.88E-08	-2.31E-08	-3.03E-08	-3.44E-08	-3.91E-08
DUT7C	-1.26E-08	-1.82E-08	-2.24E-08	-2.95E-08	-3.34E-08	-3.80E-08
DUT7D	-1.34E-08	-1.91E-08	-2.35E-08	-3.08E-08	-3.49E-08	-3.95E-08
DUT8A	-1.26E-08	-1.79E-08	-2.20E-08	-2.85E-08	-3.27E-08	-3.67E-08
DUT8B	-1.23E-08	-1.90E-08	-2.32E-08	-3.01E-08	-3.43E-08	-3.84E-08
DUT8C	-1.23E-08	-1.77E-08	-2.16E-08	-2.81E-08	-3.20E-08	-3.60E-08
DUT8D	-1.36E-08	-1.95E-08	-2.39E-08	-3.10E-08	-3.54E-08	-3.99E-08
DUT9A	-1.26E-08	-1.84E-08	-2.25E-08	-2.85E-08	-3.31E-08	-3.74E-08
DUT9B	-1.21E-08	-1.75E-08	-2.13E-08	-3.13E-08	-3.14E-08	-3.55E-08
DUT9C	-1.24E-08	-1.79E-08	-2.19E-08	-3.07E-08	-3.22E-08	-3.63E-08
DUT9D	-1.36E-08	-1.98E-08	-2.41E-08	-2.90E-08	-3.56E-08	-4.04E-08
DUT10A	-1.19E-08	-1.67E-08	-2.04E-08	-2.67E-08	-3.02E-08	-3.39E-08
DUT10B	-1.37E-08	-1.95E-08	-2.39E-08	-3.15E-08	-3.55E-08	-4.01E-08
DUT10C	-1.34E-08	-1.91E-08	-2.34E-08	-3.08E-08	-3.48E-08	-3.92E-08
DUT10D	-1.29E-08	-1.83E-08	-2.23E-08	-2.91E-08	-3.29E-08	-3.71E-08
DUT11A	-1.23E-08	-1.78E-08	-2.18E-08	-2.82E-08	-3.22E-08	-3.65E-08
DUT11B	-1.27E-08	-1.83E-08	-2.22E-08	-2.88E-08	-3.29E-08	-3.74E-08
DUT11C	-1.29E-08	-1.86E-08	-2.27E-08	-2.93E-08	-3.34E-08	-3.79E-08
DUT11D	-1.27E-08	-1.84E-08	-2.25E-08	-2.92E-08	-3.32E-08	-3.78E-08
DUT12A	-1.25E-08	-1.83E-08	-2.23E-08	-2.87E-08	-3.28E-08	-3.72E-08
DUT12B	-1.23E-08	-1.81E-08	-2.20E-08	-2.85E-08	-3.27E-08	-3.70E-08
DUT12C	-1.26E-08	-1.87E-08	-2.27E-08	-2.94E-08	-3.35E-08	-3.80E-08
DUT12D	-1.29E-08	-1.89E-08	-2.30E-08	-2.98E-08	-3.39E-08	-3.85E-08
DUT19A	-1.27E-08	-1.68E-08	-2.37E-08	-2.72E-08	-3.28E-08	-3.95E-08
DUT19B	-1.24E-08	-1.63E-08	-2.30E-08	-2.65E-08	-3.18E-08	-3.67E-08
DUT19C	-1.17E-08	-1.56E-08	-2.24E-08	-2.58E-08	-3.10E-08	-3.84E-08
DUT19D	-1.37E-08	-1.81E-08	-2.58E-08	-2.96E-08	-3.55E-08	-3.60E-08
DUT20A	-1.25E-08	-1.67E-08	-2.38E-08	-2.74E-08	-3.27E-08	-3.99E-08
DUT20B	-1.30E-08	-1.73E-08	-2.44E-08	-2.80E-08	-3.35E-08	-3.74E-08
DUT20C	-1.26E-08	-1.69E-08	-2.40E-08	-2.77E-08	-3.30E-08	-3.55E-08
DUT20D	-1.32E-08	-1.80E-08	-2.54E-08	-2.93E-08	-3.50E-08	-3.63E-08
DUT21A	-1.27E-08	-1.68E-08	-2.37E-08	-2.72E-08	-3.25E-08	-4.04E-08
DUT21B	-1.29E-08	-1.70E-08	-2.41E-08	-2.76E-08	-3.30E-08	-3.39E-08
DUT21C	-1.25E-08	-1.66E-08	-2.35E-08	-2.70E-08	-3.24E-08	-4.01E-08
DUT21D	-1.31E-08	-1.74E-08	-2.48E-08	-2.84E-08	-3.40E-08	-3.92E-08
DUT22A	-1.13E-08	-1.52E-08	-2.15E-08	-2.49E-08	-2.99E-08	-3.71E-08
DUT22B	-1.23E-08	-1.63E-08	-2.28E-08	-2.61E-08	-3.13E-08	-3.65E-08
DUT22C	-1.18E-08	-1.57E-08	-2.22E-08	-2.54E-08	-3.04E-08	-3.74E-08
DUT22D	-1.18E-08	-1.58E-08	-2.26E-08	-2.59E-08	-3.12E-08	-3.79E-08
DUT23A	-1.32E-08	-1.72E-08	-2.48E-08	-2.78E-08	-3.30E-08	-3.78E-08
DUT23B	-1.27E-08	-1.68E-08	-2.42E-08	-2.72E-08	-3.25E-08	-3.72E-08
DUT23C	-1.30E-08	-1.72E-08	-2.48E-08	-2.79E-08	-3.33E-08	-3.70E-08
DUT23D	-1.36E-08	-1.79E-08	-2.56E-08	-2.89E-08	-3.44E-08	-3.80E-08
Control Average	-1.25E-08	-1.25E-08	-1.25E-08	-1.25E-08	-1.25E-08	-1.24E-08
Control Std Dev	3.74E-10	3.75E-10	3.77E-10	3.76E-10	3.77E-10	3.73E-10
Control +99/90	-1.09E-08	-1.09E-08	-1.09E-08	-1.09E-08	-1.09E-08	-1.09E-08
Control -99/90	-1.40E-08	-1.41E-08	-1.41E-08	-1.41E-08	-1.41E-08	-1.40E-08
+Control Error Bar	6.65E-10	6.70E-10	6.64E-10	6.65E-10	6.72E-10	6.67E-10
-Control Error Bar	2.87E-10	2.95E-10	3.02E-10	3.01E-10	2.98E-10	3.07E-10
Biased Average	-1.25E-08	-2.01E-08	-2.95E-08	-3.86E-08	-4.60E-08	-5.34E-08
Biased Std Dev	7.67E-10	1.17E-09	2.37E-09	1.73E-09	1.87E-09	1.98E-09
Biased +99/90	-1.04E-08	-1.69E-08	-2.30E-08	-3.38E-08	-4.09E-08	-4.79E-08
Biased -99/90	-1.46E-08	-2.33E-08	-3.61E-08	-4.34E-08	-5.12E-08	-5.88E-08
+Biased Error Bar	1.51E-09	2.06E-09	5.10E-09	3.44E-09	5.45E-09	4.92E-09
-Biased Error Bar	2.21E-09	2.53E-09	4.66E-09	4.04E-09	4.13E-09	4.58E-09
Unbiased Average	-1.27E-08	-1.77E-08	-2.31E-08	-2.85E-08	-3.30E-08	-3.77E-08
Unbiased Std Dev	5.52E-10	1.11E-09	1.19E-09	1.59E-09	1.40E-09	1.57E-09
Unbiased +99/90	-1.12E-08	-1.46E-08	-1.99E-08	-2.41E-08	-2.92E-08	-3.33E-08
Unbiased -99/90	-1.42E-08	-2.08E-08	-2.64E-08	-3.29E-08	-3.69E-08	-4.20E-08
+Unbiased Error Bar	1.37E-09	2.49E-09	2.70E-09	3.58E-09	3.13E-09	3.82E-09
-Unbiased Error Bar	9.85E-10	2.09E-09	2.68E-09	2.97E-09	2.51E-09	2.69E-09

Table 11. Minimum input voltage range values with datasheet-specified supply voltages

Input Voltage Range Minimum	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Control (DUT24B)	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Control (DUT24C)	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Control (DUT24D)	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Control (DUT25A)	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Control (DUT25B)	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Control (DUT25C)	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Control (DUT25D)	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT1A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT1B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT1C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT1D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT2A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT2B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT2C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT2D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT3A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT3B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT3C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT3D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT4A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT4B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT4C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT4D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT5A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT5B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT5C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT5D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT6A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT6B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT6C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT6D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT13A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT13B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT13C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT13D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT14A	-14.70	-14.70	-----	-14.70	-14.70	-14.70
DUT14B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT14C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT14D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT15A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT15B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT15C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT15D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT16A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT16B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT16C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT16D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT17A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT17B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT17C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT17D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT18A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT18B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT18C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT18D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT7A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT7B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT7C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT7D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT8A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT8B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT8C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT8D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT9A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT9B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT9C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT9D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT10A	14.70	14.70	14.70	14.70	14.70	14.70
DUT10B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT10C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT10D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT11A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT11B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT11C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT11D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT12A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT12B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT12C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT12D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT19A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT19B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT19C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT19D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT20A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT20B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT20C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT20D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT21A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT21B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT21C	14.70	14.70	14.70	14.70	14.70	14.70
DUT21D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT22A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT22B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT22C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT22D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT23A	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT23B	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT23C	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
DUT23D	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Specification Maximum	-15.00	-15.00	-15.00	-15.00	-15.00	-15.00
Control Average	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Control Std Dev	0.00	0.00	0.00	0.00	0.00	0.00
Control +99/90	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Control -99/90	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
+Control Error Bar	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
-Control Error Bar	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Biased Average	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Biased Std Dev	0.00	0.00	0.00	0.00	0.00	0.00
Biased +99/90	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Biased -99/90	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
+Biased Error Bar	0.00	0.00	0.00	0.00	0.00	0.00
-Biased Error Bar	0.00	0.00	0.00	0.00	0.00	0.00
Unbiased Average	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Unbiased Std Dev	0.00	0.00	0.00	0.00	0.00	0.00
Unbiased +99/90	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
Unbiased -99/90	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
+Unbiased Error Bar	0.00	0.00	0.00	0.00	0.00	0.00
-Unbiased Error Bar	0.00	0.00	0.00	0.00	0.00	0.00

Table 12. Maximum input voltage range values with datasheet-specified supply voltages

Input Voltage Range	Total Ionizing Dose					
Maximum	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	13.95	14.00	14.00	14.00	14.00	14.00
Control (DUT24B)	13.95	14.00	14.00	14.00	14.00	14.00
Control (DUT24C)	13.95	14.00	14.00	14.00	14.00	14.00
Control (DUT24D)	13.95	14.00	14.00	14.00	14.00	14.00
Control (DUT25A)	13.95	14.00	14.00	14.00	14.00	14.00
Control (DUT25B)	14.00	14.00	14.00	14.00	14.00	14.00
Control (DUT25C)	13.95	14.00	14.00	14.00	14.00	14.00
Control (DUT25D)	13.95	14.00	14.00	14.00	14.00	14.00
DUT1A	14.00	14.00	14.00	14.00	14.00	14.00
DUT1B	14.00	14.00	14.00	14.00	14.00	14.00
DUT1C	14.00	14.00	14.00	14.00	14.00	14.00
DUT1D	14.00	14.00	14.00	14.00	14.00	14.00
DUT2A	14.00	14.00	14.00	14.00	14.00	14.00
DUT2B	14.00	14.00	14.00	14.00	14.00	14.00
DUT2C	14.00	14.00	14.00	14.00	14.00	14.00
DUT2D	14.00	14.00	14.00	14.00	14.00	14.00
DUT3A	14.00	14.00	14.00	14.00	14.00	14.00
DUT3B	14.00	14.00	14.00	14.00	14.00	14.00
DUT3C	14.00	14.00	14.00	14.00	14.00	14.00
DUT3D	14.00	14.00	14.00	14.00	14.00	14.00
DUT4A	14.00	14.00	14.00	14.00	14.00	14.00
DUT4B	14.00	14.00	14.00	14.00	14.00	14.00
DUT4C	14.00	14.00	14.00	14.00	14.00	14.00
DUT4D	14.00	14.00	14.00	14.00	14.00	14.00
DUT5A	14.00	14.00	14.00	14.00	14.00	14.00
DUT5B	14.00	14.00	14.00	14.00	14.00	14.00
DUT5C	14.00	14.00	14.00	14.00	14.00	14.00
DUT5D	14.00	14.00	14.00	14.00	14.00	14.00
DUT6A	14.00	14.00	14.00	14.00	14.00	14.00
DUT6B	14.00	14.00	14.00	14.00	14.00	14.00
DUT6C	14.00	14.00	14.00	14.00	14.00	14.00
DUT6D	14.00	14.00	14.00	14.00	14.00	14.00
DUT13A	13.95	14.00	14.00	14.00	14.00	14.00
DUT13B	13.95	14.00	14.00	14.00	14.00	14.00
DUT13C	13.95	14.00	14.00	14.00	14.00	14.00
DUT13D	13.95	14.00	14.00	14.00	14.00	14.00
DUT14A	14.00	14.00	-----	14.00	14.00	14.00
DUT14B	14.00	14.00	14.00	14.00	14.00	14.00
DUT14C	14.00	14.00	14.00	14.00	14.00	14.00
DUT14D	14.00	14.00	14.00	14.00	14.00	14.00
DUT15A	14.00	14.00	14.00	14.00	14.00	14.00
DUT15B	14.00	14.00	14.00	14.00	14.00	14.00
DUT15C	14.00	14.00	14.00	14.00	14.00	14.00
DUT15D	14.00	14.00	14.00	14.00	14.00	14.00
DUT16A	14.00	14.00	14.00	14.00	14.00	14.00
DUT16B	14.00	14.00	14.00	14.00	14.00	14.00
DUT16C	14.00	14.00	14.00	14.00	14.00	14.00
DUT16D	14.00	14.00	14.00	14.00	14.00	14.00
DUT17A	14.00	14.00	14.00	14.00	14.00	14.00
DUT17B	14.00	14.00	14.00	14.00	14.00	14.00
DUT17C	14.00	14.00	14.00	14.00	14.00	14.00
DUT17D	14.00	14.00	14.00	14.00	14.00	14.00
DUT18A	14.00	14.00	14.00	14.00	14.00	14.00
DUT18B	14.00	14.00	14.00	14.00	14.00	14.00
DUT18C	14.00	14.00	14.00	14.00	14.00	14.00
DUT18D	14.00	14.00	14.00	14.00	14.00	14.00
DUT7A	14.00	14.00	14.00	14.00	14.00	14.00
DUT7B	14.00	14.00	14.00	14.00	14.00	14.00
DUT7C	14.00	14.00	14.00	14.00	14.00	14.00
DUT7D	14.00	14.00	14.00	14.00	14.00	14.00
DUT8A	14.00	14.00	14.00	14.00	14.00	14.00
DUT8B	14.00	14.00	14.00	14.00	14.00	14.00
DUT8C	14.00	14.00	14.00	14.00	14.00	14.00
DUT8D	14.00	14.00	14.00	14.00	14.00	14.00
DUT9A	14.00	14.00	14.00	14.00	14.00	14.00
DUT9B	14.00	14.00	14.00	14.00	14.00	14.00
DUT9C	14.00	14.00	14.00	14.00	14.00	14.00
DUT9D	14.00	14.00	14.00	14.00	14.00	14.00
DUT10A	14.00	14.00	14.00	14.00	14.00	14.00
DUT10B	14.00	14.00	14.00	14.00	14.00	14.00
DUT10C	14.00	14.00	14.00	14.00	14.00	14.00
DUT10D	14.00	14.00	14.00	14.00	14.00	14.00
DUT11A	14.00	14.00	14.00	14.00	14.00	14.00
DUT11B	14.00	14.00	14.00	14.00	14.00	14.00
DUT11C	14.00	14.00	14.00	14.00	14.00	14.00
DUT11D	14.00	14.00	14.00	14.00	14.00	14.00
DUT12A	14.00	14.00	14.00	14.00	14.00	14.00
DUT12B	14.00	14.00	14.00	14.00	14.00	14.00
DUT12C	14.00	14.00	14.00	14.00	14.00	14.00
DUT12D	14.00	14.00	14.00	14.00	14.00	14.00
DUT19A	14.00	14.00	14.00	14.00	14.00	14.00
DUT19B	14.00	14.00	14.00	14.00	14.00	14.00
DUT19C	14.00	14.00	14.00	14.00	14.00	14.00
DUT19D	14.00	14.00	14.00	14.00	14.00	14.00
DUT20A	14.00	14.00	14.00	14.00	14.00	14.00
DUT20B	14.00	14.00	14.00	14.00	14.00	14.00
DUT20C	14.00	14.00	14.00	14.00	14.00	14.00
DUT20D	14.00	14.00	14.00	14.00	14.00	14.00
DUT21A	14.00	14.00	14.00	14.00	14.00	14.00
DUT21B	14.00	14.00	14.00	14.00	14.00	14.00
DUT21C	14.00	14.00	14.00	14.00	14.00	14.00
DUT21D	14.00	14.00	14.00	14.00	14.00	14.00
DUT22A	14.00	14.00	14.00	14.00	14.00	14.00
DUT22B	14.00	14.00	14.00	14.00	14.00	14.00
DUT22C	14.00	14.00	14.00	14.00	14.00	14.00
DUT22D	14.00	14.00	14.00	14.00	14.00	14.00
DUT23A	14.00	14.00	14.00	14.00	14.00	14.00
DUT23B	14.00	14.00	14.00	14.00	14.00	14.00
DUT23C	14.00	14.00	14.00	14.00	14.00	14.00
DUT23D	14.00	14.00	14.00	14.00	14.00	14.00
Specification Minimum	13.50	13.50	13.50	13.50	13.50	13.50
Control Average	13.96	14.00	14.00	14.00	14.00	14.00
Control Std Dev	0.02	0.00	0.00	0.00	0.00	0.00
Control +99/90	14.02	14.00	14.00	14.00	14.00	14.00
Control -99/90	13.89	14.00	14.00	14.00	14.00	14.00
+Control Error Bar	0.01	0.00	0.00	0.00	0.00	0.00
-Control Error Bar	0.01	0.00	0.00	0.00	0.00	0.00
Biased Average	14.00	14.00	14.00	14.00	14.00	14.00
Biased Std Dev	0.01	0.00	0.00	0.00	0.00	0.00
Biased +99/90	14.03	14.00	14.00	14.00	14.00	14.00
Biased -99/90	13.96	14.00	14.00	14.00	14.00	14.00
+Biased Error Bar	0.00	0.00	0.00	0.00	0.00	0.00
-Biased Error Bar	0.05	0.00	0.00	0.00	0.00	0.00
Unbiased Average	14.00	14.00	14.00	14.00	14.00	14.00
Unbiased Std Dev	0.00	0.00	0.00	0.00	0.00	0.00
Unbiased +99/90	14.00	14.00	14.00	14.00	14.00	14.00
Unbiased -99/90	14.00	14.00	14.00	14.00	14.00	14.00
+Unbiased Error Bar	0.00	0.00	0.00	0.00	0.00	0.00
-Unbiased Error Bar	0.00	0.00	0.00	0.00	0.00	0.00

Table 13. Maximum input voltage range values with application-specific supply voltages

Input Voltage Range	Total Ionizing Dose					
Maximum	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	14.00	14.00	14.00	14.00	14.00	14.00
Control (DUT24B)	14.00	14.00	14.00	14.00	14.00	14.00
Control (DUT24C)	14.00	14.00	14.00	14.00	14.00	14.00
Control (DUT24D)	14.20	14.20	14.20	14.20	14.20	14.20
Control (DUT25A)	14.00	14.00	14.00	14.00	14.00	14.00
Control (DUT25B)	14.00	14.00	14.00	14.00	14.00	14.00
Control (DUT25C)	14.00	14.00	14.00	14.00	14.00	14.00
Control (DUT25D)	14.20	14.20	14.20	14.20	14.20	14.20
DUT1A	14.00	14.00	14.00	14.00	14.00	14.00
DUT1B	14.00	14.00	14.00	14.00	14.00	14.00
DUT1C	14.00	14.00	14.00	14.00	14.00	14.00
DUT1D	14.20	14.20	14.20	14.20	14.20	14.20
DUT2A	14.00	14.00	14.00	14.00	14.00	14.00
DUT2B	14.00	14.00	14.00	14.00	14.00	14.00
DUT2C	14.00	14.00	14.00	14.00	14.00	14.00
DUT2D	14.20	14.20	14.20	14.20	14.20	14.20
DUT3A	14.00	14.00	14.00	14.00	14.00	14.00
DUT3B	14.00	14.00	14.00	14.00	14.00	14.00
DUT3C	14.00	14.00	14.00	14.00	14.00	14.00
DUT3D	14.20	14.20	14.20	14.20	14.20	14.20
DUT4A	14.00	14.00	14.00	14.00	14.00	14.00
DUT4B	14.00	14.00	14.00	14.00	14.00	14.00
DUT4C	14.00	14.00	14.00	14.00	14.00	14.00
DUT4D	14.20	14.20	14.20	14.20	14.20	14.20
DUT5A	14.00	14.00	14.00	14.00	14.00	14.00
DUT5B	14.00	14.00	14.00	14.00	14.00	14.00
DUT5C	14.00	14.00	14.00	14.00	14.00	14.00
DUT5D	14.20	14.20	14.20	14.20	14.20	14.20
DUT6A	14.00	14.00	14.00	14.00	14.00	14.00
DUT6B	14.00	14.00	14.00	14.00	14.00	14.00
DUT6C	14.00	14.00	14.00	14.00	14.00	14.00
DUT6D	14.20	14.20	14.20	14.20	14.20	14.20
DUT13A	14.00	14.00	14.00	14.00	14.00	14.00
DUT13B	14.00	14.00	14.00	14.00	14.00	14.00
DUT13C	14.00	14.00	14.00	14.00	14.00	14.00
DUT13D	14.20	14.20	14.20	14.20	14.20	14.20
DUT14A	14.00	14.00	14.00	14.00	14.00	14.00
DUT14B	14.00	14.00	14.00	14.00	14.00	14.00
DUT14C	14.00	14.00	14.00	14.00	14.00	14.00
DUT14D	14.20	14.20	14.20	14.20	14.20	14.20
DUT15A	14.00	14.00	14.00	14.00	14.00	14.00
DUT15B	14.00	14.00	14.00	14.00	14.00	14.00
DUT15C	14.00	14.00	14.00	14.00	14.00	14.00
DUT15D	14.20	14.20	14.20	14.20	14.20	14.20
DUT16A	14.00	14.00	14.00	14.00	14.00	14.00
DUT16B	14.00	14.00	14.00	14.00	14.00	14.00
DUT16C	14.00	14.00	14.00	14.00	14.00	14.00
DUT16D	14.20	14.20	14.20	14.20	14.20	14.20
DUT17A	14.00	14.00	14.00	14.00	14.00	14.00
DUT17B	13.95	14.00	14.00	14.00	14.00	14.00
DUT17C	14.00	14.00	14.00	14.00	14.00	14.00
DUT17D	14.20	14.20	14.20	14.20	14.20	14.20
DUT18A	14.00	14.00	14.00	14.00	14.00	14.00
DUT18B	14.00	14.00	14.00	14.00	14.00	14.00
DUT18C	14.00	14.00	14.00	14.00	14.00	14.00
DUT18D	14.20	14.20	14.20	14.20	14.20	14.20
DUT7A	14.00	14.00	14.00	14.00	14.00	14.00
DUT7B	14.00	14.00	14.00	14.00	14.00	14.00
DUT7C	14.00	14.00	14.00	14.00	14.00	14.00
DUT7D	14.20	14.20	14.20	14.20	14.20	14.20
DUT8A	14.00	14.00	14.00	14.00	14.00	14.00
DUT8B	14.00	13.95	14.00	14.00	14.00	14.00
DUT8C	14.00	14.00	14.00	14.00	14.00	14.00
DUT8D	14.20	14.20	14.20	14.20	14.20	14.20
DUT9A	14.00	14.00	14.00	14.00	14.00	14.00
DUT9B	14.00	14.00	14.00	14.00	14.00	14.00
DUT9C	14.00	14.00	14.00	14.00	14.00	14.00
DUT9D	14.20	14.20	14.20	14.20	14.20	14.20
DUT10A	14.00	14.00	14.00	14.00	14.00	14.00
DUT10B	14.00	14.00	14.00	14.00	14.00	14.00
DUT10C	14.00	14.00	14.00	14.00	14.00	14.00
DUT10D	14.20	14.20	14.20	14.20	14.20	14.20
DUT11A	14.00	14.00	14.00	14.00	14.00	14.00
DUT11B	14.00	14.00	14.00	14.00	14.00	14.00
DUT11C	14.00	14.00	14.00	14.00	14.00	14.00
DUT11D	14.20	14.20	14.20	14.20	14.20	14.20
DUT12A	14.00	14.00	14.00	14.00	14.00	14.00
DUT12B	14.00	14.00	14.00	14.00	14.00	14.00
DUT12C	14.00	14.00	14.00	14.00	14.00	14.00
DUT12D	14.20	14.20	14.20	14.20	14.20	14.20
DUT19A	14.00	14.00	14.00	14.00	14.00	14.00
DUT19B	14.00	14.00	14.00	14.00	14.00	14.00
DUT19C	14.00	14.00	14.00	14.00	14.00	14.00
DUT19D	14.20	14.20	14.20	14.20	14.20	14.20
DUT20A	14.00	14.00	14.00	14.00	14.00	14.00
DUT20B	14.00	14.00	14.00	14.00	14.00	14.00
DUT20C	14.00	14.00	14.00	14.00	14.00	14.00
DUT20D	14.20	14.20	14.20	14.20	14.20	14.20
DUT21A	14.00	14.00	14.00	14.00	14.00	14.00
DUT21B	14.00	14.00	14.00	14.00	14.00	14.00
DUT21C	14.00	14.00	14.00	14.00	14.00	14.00
DUT21D	14.20	14.20	14.20	14.20	14.20	14.20
DUT22A	14.00	14.00	14.00	14.00	14.00	14.00
DUT22B	14.00	14.00	14.00	14.00	14.00	14.00
DUT22C	14.00	14.00	14.00	14.00	14.00	14.00
DUT22D	14.20	14.20	14.20	14.20	14.20	14.20
DUT23A	14.00	14.00	14.00	14.00	14.00	14.00
DUT23B	14.00	14.00	14.00	14.00	14.00	14.00
DUT23C	14.00	14.00	14.00	14.00	14.00	14.00
DUT23D	14.20	14.20	14.20	14.20	14.20	14.20
Control Average	14.05	14.05	14.05	14.05	14.05	14.05
Control Std Dev	0.09	0.09	0.09	0.09	0.09	0.09
Control +99/90	14.41	14.41	14.41	14.41	14.41	14.41
Control -99/90	13.69	13.69	13.69	13.69	13.69	13.69
+Control Error Bar	0.15	0.15	0.15	0.15	0.15	0.15
-Control Error Bar	0.05	0.05	0.05	0.05	0.05	0.05
Biased Average	14.05	14.05	14.05	14.05	14.05	14.05
Biased Std Dev	0.09	0.09	0.09	0.09	0.09	0.09
Biased +99/90	14.29	14.29	14.29	14.29	14.29	14.29
Biased -99/90	13.81	13.81	13.81	13.81	13.81	13.81
+Biased Error Bar	0.15	0.15	0.15	0.15	0.15	0.15
-Biased Error Bar	0.10	0.05	0.05	0.05	0.05	0.05
Unbiased Average	14.05	14.05	14.05	14.05	14.05	14.05
Unbiased Std Dev	0.09	0.09	0.09	0.09	0.09	0.09
Unbiased +99/90	14.29	14.29	14.29	14.29	14.29	14.29
Unbiased -99/90	13.81	13.81	13.81	13.81	13.81	13.81
+Unbiased Error Bar	0.15	0.15	0.15	0.15	0.15	0.15
-Unbiased Error Bar	0.05	0.10	0.05	0.05	0.05	0.05

Table 14. Common-mode rejection ratio values with datasheet-specified supply voltages

Common-Mode Rejection	Total Ionizing Dose					
Ratio	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	132.77	132.38	132.22	133.43	133.17	134.31
Control (DUT24B)	114.06	114.10	114.12	114.05	114.04	113.98
Control (DUT24C)	115.17	115.08	115.13	115.13	115.14	115.10
Control (DUT24D)	128.07	128.04	127.94	127.51	127.86	127.25
Control (DUT25A)	132.90	132.88	133.57	133.39	134.41	133.21
Control (DUT25B)	120.49	120.60	120.79	120.77	120.84	120.59
Control (DUT25C)	117.48	117.57	117.57	117.60	117.57	117.49
Control (DUT25D)	116.70	116.69	116.70	116.62	116.68	116.54
DUT1A	115.24	113.62	112.94	112.11	111.46	111.01
DUT1B	114.95	113.61	113.04	112.07	111.81	111.36
DUT1C	135.51	127.88	124.89	122.74	122.25	121.44
DUT1D	113.93	112.84	112.51	111.83	111.38	111.03
DUT2A	122.91	118.02	119.26	116.52	116.02	114.88
DUT2B	112.86	112.06	110.39	107.40	105.70	104.53
DUT2C	119.56	117.22	116.34	115.48	115.23	114.67
DUT2D	128.08	124.02	122.07	120.29	119.23	119.09
DUT3A	131.26	130.38	163.18	120.03	116.87	113.94
DUT3B	124.86	119.00	118.89	116.02	115.66	112.90
DUT3C	115.16	113.92	113.29	112.83	112.42	112.13
DUT3D	121.23	124.61	127.76	132.30	141.99	167.07
DUT4A	118.68	115.06	115.67	113.93	113.63	113.59
DUT4B	112.61	112.20	111.08	107.97	106.62	105.28
DUT4C	110.38	109.53	109.12	108.69	108.37	108.18
DUT4D	115.36	113.94	113.15	112.73	112.08	112.06
DUT5A	116.86	114.57	113.28	112.84	112.50	110.58
DUT5B	118.89	117.29	115.83	113.81	111.88	110.68
DUT5C	135.88	141.22	132.16	128.30	127.22	124.61
DUT5D	115.84	114.22	113.40	112.87	112.33	112.05
DUT6A	118.22	116.58	115.51	113.66	113.51	112.28
DUT6B	113.71	112.61	112.01	110.95	110.89	110.15
DUT6C	115.89	114.48	113.75	113.21	112.88	112.54
DUT6D	122.52	125.61	129.54	136.88	146.74	143.91
DUT13A	117.49	115.65	114.58	113.98	113.25	112.58
DUT13B	113.23	112.04	111.39	110.75	110.52	110.38
DUT13C	120.37	118.23	116.66	116.30	115.67	115.15
DUT13D	117.36	115.96	114.57	114.31	113.59	113.41
DUT14A	120.45	117.12	115.34	114.85	107.87	106.87
DUT14B	123.77	120.31	117.73	117.19	115.75	115.47
DUT14C	118.84	116.82	115.59	115.04	114.51	114.11
DUT14D	138.04	132.94	127.84	124.93	123.12	121.25
DUT15A	113.33	112.21	111.20	110.86	110.40	109.94
DUT15B	114.96	113.45	112.48	111.97	111.70	111.25
DUT15C	115.78	114.22	113.08	112.63	112.18	112.02
DUT15D	112.18	111.15	110.52	110.29	110.34	109.82
DUT16A	118.85	115.74	116.33	115.84	119.12	134.34
DUT16B	138.68	127.05	123.09	121.72	120.27	118.89
DUT16C	147.59	129.61	125.42	123.62	122.38	121.26
DUT16D	130.86	152.12	133.00	128.73	126.72	123.79
DUT17A	115.52	114.09	113.23	113.01	112.28	111.85
DUT17B	138.76	127.69	124.37	122.20	121.36	120.37
DUT17C	121.76	119.02	117.91	117.12	116.28	116.04
DUT17D	109.64	108.89	108.37	108.21	107.84	107.59
DUT18A	147.33	136.78	128.08	125.27	123.13	121.78
DUT18B	112.05	111.19	110.55	110.04	109.93	109.66
DUT18C	118.49	116.55	115.52	115.00	114.21	113.80
DUT18D	134.76	142.70	129.54	127.06	124.90	122.36
DUT7A	115.98	114.04	113.40	112.29	112.07	111.29
DUT7B	111.36	109.68	109.15	108.33	108.07	107.42
DUT7C	114.24	112.26	111.68	110.29	110.00	109.22
DUT7D	118.02	115.48	114.50	113.12	112.96	111.52
DUT8A	114.13	112.43	111.85	110.90	110.61	109.80
DUT8B	111.89	110.24	109.84	108.99	108.76	108.06
DUT8C	117.39	114.57	113.99	112.53	112.18	111.01
DUT8D	111.77	110.25	109.85	108.84	108.63	107.93
DUT9A	113.05	111.52	114.61	110.09	109.70	108.93
DUT9B	114.07	111.99	111.31	110.37	110.30	109.43
DUT9C	116.55	113.87	113.10	112.01	111.74	110.81
DUT9D	118.17	115.47	114.59	113.18	112.70	111.35
DUT10A	118.49	115.80	114.86	113.48	113.14	111.92
DUT10B	113.65	111.90	111.15	110.01	109.90	109.09
DUT10C	116.74	114.31	113.46	112.17	111.90	111.03
DUT10D	118.64	115.78	114.85	113.03	112.83	111.61
DUT11A	112.74	111.06	110.50	109.47	109.22	108.39
DUT11B	122.73	118.31	116.82	114.91	114.29	112.64
DUT11C	118.02	115.10	114.35	112.68	112.38	111.06
DUT11D	121.13	116.71	115.70	113.52	113.05	111.93
DUT12A	120.90	117.60	116.81	114.76	114.67	113.40
DUT12B	115.11	113.02	112.63	111.30	110.99	110.26
DUT12C	114.75	112.81	112.32	111.13	110.96	109.87
DUT12D	123.59	118.86	117.60	115.32	114.96	113.51
DUT19A	110.34	109.19	108.24	107.88	107.27	106.95
DUT19B	115.06	113.27	111.65	111.24	110.47	110.01
DUT19C	127.59	122.08	118.50	116.98	115.47	114.36
DUT19D	113.44	111.80	110.43	109.81	109.05	108.65
DUT20A	114.11	112.53	111.23	110.70	109.91	109.45
DUT20B	121.31	118.14	115.88	115.14	114.17	113.73
DUT20C	118.93	116.46	114.74	114.16	113.38	112.80
DUT20D	117.69	115.22	113.44	112.54	111.63	111.14
DUT21A	114.44	112.92	111.48	111.05	110.20	109.82
DUT21B	113.12	111.69	110.25	109.89	109.23	109.00
DUT21C	116.14	114.34	112.72	112.15	111.26	110.85
DUT21D	112.03	111.07	109.58	109.07	108.30	107.98
DUT22A	112.57	111.39	110.16	109.71	108.99	108.65
DUT22B	121.04	118.47	115.67	114.94	113.84	113.12
DUT22C	125.28	133.21	134.55	127.49	123.88	121.72
DUT22D	115.73	113.47	112.04	111.38	110.47	109.88
DUT23A	112.50	111.13	110.12	109.57	109.04	108.59
DUT23B	114.06	112.46	111.03	110.32	109.62	109.33
DUT23C	115.94	114.17	112.43	111.62	110.86	110.32
DUT23D	111.85	110.43	109.14	108.68	107.99	107.64
Specification Minimum	86	86	86	86	86	86
Control Average	122.20	122.17	122.25	122.31	122.46	122.31
Control Std Dev	7.35	7.27	7.35	7.50	7.67	7.65
Control +99/90	152.68	152.31	152.72	153.43	154.29	154.04
Control -99/90	91.73	92.03	91.79	91.20	90.63	90.58
+Control Error Bar	10.69	10.72	11.31	11.12	11.95	12.00
-Control Error Bar	8.14	8.06	8.14	8.27	8.42	8.33
Biased Average	121.45	119.23	118.22	116.32	115.93	115.96
Biased Std Dev	9.49	8.82	9.27	6.51	7.93	10.45
Biased +99/90	147.55	143.49	143.69	134.23	137.73	144.70
Biased -99/90	95.35	94.98	92.75	98.41	94.13	87.22
+Biased Error Bar	26.14	32.89	44.96	20.56	30.81	51.12
-Biased Error Bar	11.81	10.35	9.85	8.91	10.24	11.43
Unbiased Average	116.28	114.24	113.23	111.98	111.39	110.58
Unbiased Std Dev	3.91	4.00	4.07	3.17	2.80	2.49
Unbiased +99/90	127.12	125.34	124.51	120.77	119.14	117.48
Unbiased -99/90	105.44	103.14	101.95	103.19	103.63	103.68
+Unbiased Error Bar	11.31	18.97	21.31	15.51	12.49	11.14
-Unbiased Error Bar	5.94	5.04	4.99	4.10	4.12	3.62

Table 15. Common-mode rejection ratio values with application-specific supply voltages

Common-Mode Rejection Ratio	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	107.77	119.14	120.17	122.92	114.42	124.89
Control (DUT24B)	119.42	119.81	119.01	119.41	118.60	120.01
Control (DUT24C)	117.12	116.56	116.44	116.25	116.67	116.03
Control (DUT24D)	125.64	125.42	125.25	125.04	125.32	125.00
Control (DUT25A)	109.53	108.40	108.05	108.64	108.63	109.35
Control (DUT25B)	122.98	122.91	122.31	122.99	122.82	122.93
Control (DUT25C)	123.24	122.58	122.11	121.76	122.68	121.70
Control (DUT25D)	135.18	133.53	132.60	132.42	134.04	132.85
DUT1A	148.17	136.72	135.84	131.43	128.36	133.41
DUT1B	119.89	117.11	115.07	112.67	110.78	108.25
DUT1C	106.82	105.22	104.29	103.46	102.96	102.30
DUT1D	121.56	96.30	92.06	85.09	83.81	80.72
DUT2A	121.04	121.11	113.48	116.81	119.34	89.52
DUT2B	116.02	102.84	94.39	85.35	85.12	79.50
DUT2C	115.73	115.21	114.26	105.33	87.38	83.76
DUT2D	123.42	125.84	103.47	93.17	92.90	85.36
DUT3A	128.78	130.36	126.18	120.43	120.29	116.19
DUT3B	143.09	141.30	135.20	127.70	131.74	118.13
DUT3C	118.91	118.61	118.14	116.05	117.30	114.72
DUT3D	141.19	117.04	108.94	99.17	99.22	87.73
DUT4A	131.45	120.61	118.91	115.54	113.51	111.20
DUT4B	112.31	109.47	107.28	106.38	104.70	101.84
DUT4C	116.14	112.12	103.62	84.53	86.15	83.99
DUT4D	122.90	120.62	120.29	117.82	117.64	115.51
DUT5A	122.69	121.11	122.13	118.70	118.09	113.46
DUT5B	128.38	129.13	131.49	140.11	112.06	106.41
DUT5C	117.99	117.66	117.41	92.21	91.12	86.04
DUT5D	127.24	124.85	123.78	120.26	119.25	116.56
DUT6A	105.35	101.77	101.38	99.43	99.17	97.90
DUT6B	117.12	115.70	114.29	108.85	108.31	104.02
DUT6C	127.54	125.45	125.88	122.80	123.45	122.72
DUT6D	120.39	118.12	116.48	115.75	115.88	112.48
DUT13A	95.40	92.35	86.97	85.33	82.44	83.49
DUT13B	103.93	98.37	89.05	86.47	81.65	83.63
DUT13C	123.04	122.74	121.14	121.75	123.46	121.75
DUT13D	92.71	90.96	85.35	83.08	80.31	80.75
DUT14A	120.09	120.69	120.23	119.91	111.04	107.98
DUT14B	126.56	127.97	120.17	116.76	112.98	112.22
DUT14C	122.19	123.85	122.59	122.21	122.76	121.56
DUT14D	121.02	121.54	120.84	120.53	120.80	121.55
DUT15A	118.02	115.82	108.77	107.20	105.56	104.80
DUT15B	148.95	93.58	85.27	83.26	80.50	81.54
DUT15C	122.26	121.27	119.92	123.43	132.77	123.40
DUT15D	118.64	119.34	117.26	117.55	117.17	114.82
DUT16A	106.38	105.53	105.73	107.61	103.14	101.05
DUT16B	119.48	119.82	118.76	110.07	102.79	102.55
DUT16C	129.63	130.77	129.75	129.55	127.20	124.63
DUT16D	135.01	133.77	133.27	133.21	128.68	127.87
DUT17A	121.08	121.99	119.28	120.62	118.07	115.73
DUT17B	135.74	132.35	91.49	89.12	83.41	86.56
DUT17C	123.12	122.79	120.83	119.77	118.23	117.98
DUT17D	113.80	113.76	107.04	105.13	103.23	101.98
DUT18A	119.56	119.43	100.67	99.67	89.39	112.55
DUT18B	91.16	90.40	83.79	82.04	79.32	80.01
DUT18C	115.48	92.75	86.97	85.19	83.08	83.39
DUT18D	107.96	109.21	97.51	93.84	86.44	92.71
DUT7A	132.32	126.03	122.20	111.69	107.93	105.51
DUT7B	123.93	121.77	123.09	119.87	122.40	120.61
DUT7C	121.49	119.38	119.32	117.38	117.77	115.48
DUT7D	131.88	142.04	142.01	134.81	151.00	128.82
DUT8A	129.34	127.23	126.96	128.39	130.29	127.31
DUT8B	105.98	95.39	92.80	85.62	85.12	82.57
DUT8C	130.81	133.51	126.77	120.61	121.17	115.35
DUT8D	116.49	114.93	114.73	111.55	108.38	103.37
DUT9A	117.32	116.38	116.70	115.85	115.91	115.26
DUT9B	123.86	121.80	113.24	85.33	85.05	83.11
DUT9C	126.13	127.13	125.57	131.71	132.97	144.59
DUT9D	128.24	122.54	120.15	119.13	119.03	116.18
DUT10A	127.24	127.48	127.25	125.09	126.61	126.08
DUT10B	109.10	103.36	93.03	87.19	85.87	82.35
DUT10C	126.50	125.53	126.07	125.13	127.48	124.45
DUT10D	103.70	95.86	92.87	87.49	86.95	83.60
DUT11A	129.22	124.87	122.04	86.67	86.37	84.08
DUT11B	125.30	123.94	123.57	123.69	124.53	117.59
DUT11C	127.10	124.77	125.24	120.91	116.46	110.84
DUT11D	109.97	91.65	89.39	84.62	84.39	82.65
DUT12A	129.26	125.03	124.80	119.42	119.19	107.22
DUT12B	119.63	116.15	114.86	112.31	111.03	109.77
DUT12C	120.47	118.30	117.64	110.93	108.04	104.78
DUT12D	136.12	127.39	128.77	122.84	121.45	118.47
DUT19A	112.86	110.26	106.23	105.34	103.73	102.87
DUT19B	118.18	119.08	91.95	89.27	84.53	84.91
DUT19C	113.94	114.01	112.65	112.15	111.14	110.80
DUT19D	116.06	116.66	115.01	114.40	113.43	114.94
DUT20A	121.38	123.22	113.38	108.87	105.99	105.11
DUT20B	116.68	112.60	111.80	110.84	109.55	108.54
DUT20C	120.20	121.02	117.33	117.34	113.74	116.60
DUT20D	129.17	120.50	114.59	112.25	108.88	107.26
DUT21A	120.35	122.22	109.38	107.47	105.33	103.48
DUT21B	127.49	129.32	126.71	118.44	112.54	110.11
DUT21C	138.38	131.74	132.69	135.38	133.07	132.23
DUT21D	125.98	127.86	118.80	117.53	114.03	112.25
DUT22A	111.81	112.71	110.94	111.11	109.11	105.93
DUT22B	109.30	105.74	101.52	100.95	87.58	95.97
DUT22C	122.72	117.71	115.16	114.38	113.90	114.61
DUT22D	119.65	118.90	115.70	115.17	113.51	112.92
DUT23A	118.42	119.70	105.25	89.81	85.05	86.32
DUT23B	124.54	124.18	122.40	120.97	121.32	119.03
DUT23C	143.69	137.85	137.37	136.22	117.74	113.77
DUT23D	127.86	125.28	121.81	118.28	116.38	112.86
Control Average	120.11	121.04	120.74	121.18	120.40	121.59
Control Std Dev	8.29	6.76	6.60	6.45	7.18	6.47
Control +99/90	154.49	149.10	148.11	147.93	150.19	148.41
Control -99/90	85.73	92.98	93.37	94.43	90.60	94.78
+Control Error Bar	5.53E+00	4.38E+00	4.51E+00	3.86E+00	4.92E+00	3.41E+00
-Control Error Bar	1.23E+01	1.26E+01	1.27E+01	1.25E+01	1.18E+01	1.22E+01
Biased Average	121.57	117.62	113.08	109.81	107.42	104.89
Biased Std Dev	11.46	11.56	13.33	15.07	15.62	15.22
Biased +99/90	153.08	149.39	149.72	151.24	150.36	146.73
Biased -99/90	90.07	85.85	76.44	68.37	64.49	63.06
+Biased Error Bar	27.38	23.68	22.76	30.31	25.35	28.52
-Biased Error Bar	28.86	26.66	27.81	26.73	27.11	25.39
Unbiased Average	122.50	120.07	116.59	112.37	110.82	108.65
Unbiased Std Dev	8.44	10.12	11.79	14.09	15.35	14.53
Unbiased +99/90	145.89	148.11	149.27	151.42	153.37	148.93
Unbiased -99/90	99.11	92.03	83.90	73.32	68.26	68.37
+Unbiased Error Bar	21.19	21.97	25.42	23.84	40.19	35.94
-Unbiased Error Bar	18.81	28.42	27.19	27.75	26.43	26.30

Table 16. Large-signal voltage gain values with datasheet-specified supply voltages

Large-Signal Voltage Gain	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	4651	5017	4478	4704	4923	4848
Control (DUT24B)	6269	6135	6185	5934	5893	6564
Control (DUT24C)	6011	8243	5938	5744	5552	5459
Control (DUT24D)	4801	4707	4920	4903	4855	4786
Control (DUT25A)	4885	5314	5142	5241	5670	5650
Control (DUT25B)	6707	5692	6122	5544	6238	6955
Control (DUT25C)	5432	5376	5381	5758	5667	5696
Control (DUT25D)	5501	5090	361	5298	5353	4999
DUT1A	6404	5985	6559	6836	5915	9272
DUT1B	5084	5245	5862	5163	5821	7076
DUT1C	4750	4884	4769	5221	5272	5572
DUT1D	4638	5151	5865	6293	5557	6853
DUT2A	5166	5135	5345	5349	5938	5981
DUT2B	5615	5657	5199	7935	6735	7869
DUT2C	5585	5036	5926	6812	6189	8750
DUT2D	5078	5142	4766	5625	5248	6795
DUT3A	5070	5126	4735	5876	5497	5700
DUT3B	6006	5615	5744	7458	7710	8127
DUT3C	5870	5950	5248	5962	5538	12830
DUT3D	4872	4567	4940	4830	4944	6170
DUT4A	5774	6483	3430	5961	5735	10222
DUT4B	6794	6936	6180	8370	8383	10756
DUT4C	3653	6996	7265	8433	8505	13482
DUT4D	6055	6784	5757	6578	6897	7609
DUT5A	6773	6816	7816	7052	9577	9716
DUT5B	5346	5936	6106	6091	5037	6419
DUT5C	4979	5177	4890	5228	5659	6337
DUT5D	6237	6938	5491	8301	7656	15220
DUT6A	4658	4016	4673	4447	4777	5915
DUT6B	6752	5748	5860	6245	7798	7911
DUT6C	5721	6528	5454	6904	6368	6390
DUT6D	4389	4132	4022	4556	3665	4589
DUT13A	5572	5733	6111	7095	7741	9794
DUT13B	6640	6757	6083	6922	7050	6084
DUT13C	3763	5626	6386	5023	6532	9853
DUT13D	7815	6981	6811	7171	7801	8525
DUT14A	2510	4060	4894	4315	4240	4454
DUT14B	5139	5271	5595	5481	6015	5868
DUT14C	5432	5653	5313	5932	6975	6131
DUT14D	4154	4533	4309	4362	5162	5114
DUT15A	6461	6985	6569	------	6858	9271
DUT15B	5033	6665	7088	8502	9970	12149
DUT15C	7015	6044	5436	6772	6510	8487
DUT15D	5926	5605	6691	6306	6760	11743
DUT16A	4896	3979	4208	4106	4548	4966
DUT16B	4470	4042	4147	4615	4867	5197
DUT16C	4448	4561	4856	4640	4341	4788
DUT16D	4455	4210	4397	4267	4875	5107
DUT17A	7042	7506	7313	8046	8772	10845
DUT17B	6030	5657	6301	7437	6745	6270
DUT17C	4570	5127	5138	5684	5528	7007
DUT17D	6597	8391	7970	9471	7586	11457
DUT18A	5463	5421	5354	5215	5492	4905
DUT18B	6934	8245	7026	7515	10342	10618
DUT18C	6480	6492	6984	6282	10834	10528
DUT18D	4863	5016	5476	5116	5117	4573
DUT7A	4977	6504	5594	7519	5736	7318
DUT7B	5703	6825	7982	5548	6733	8363
DUT7C	5733	6056	5572	5552	6044	4691
DUT7D	6976	7054	6368	5934	6816	9520
DUT8A	6192	5887	6741	6452	4897	6425
DUT8B	6812	7944	5255	8694	6043	9704
DUT8C	5910	5790	6257	8482	6901	6134
DUT8D	5489	5954	5780	6416	7022	6608
DUT9A	6166	5572	4948	5337	6960	5841
DUT9B	6440	5857	7867	8865	11526	7074
DUT9C	5001	7080	5684	5889	9517	6889
DUT9D	5201	5243	7094	5068	5933	4711
DUT10A	5365	5516	4776	5045	5027	6336
DUT10B	6213	6059	6346	6127	5525	7498
DUT10C	4683	4899	4598	4458	5440	4710
DUT10D	5782	5894	5278	6034	5522	5610
DUT11A	5693	5910	7188	6326	10624	14914
DUT11B	4959	5530	5329	4845	5430	6518
DUT11C	5245	4997	4647	5196	4672	4867
DUT11D	6774	5188	8651	5778	6543	6277
DUT12A	5185	4471	4801	5050	4794	6143
DUT12B	5981	7690	5823	7406	7004	6537
DUT12C	5701	4942	4856	6187	4430	4999
DUT12D	5394	4667	4560	4502	4699	5726
DUT19A	6475	6341	6922	6843	8208	7090
DUT19B	6751	6717	5430	5671	6836	8101
DUT19C	5936	5943	6258	5575	6225	5446
DUT19D	6586	5768	6797	5161	5689	4743
DUT20A	4861	7369	8286	5518	9593	8097
DUT20B	6457	6621	5349	6388	7846	6876
DUT20C	5271	5342	4845	5205	5378	4618
DUT20D	6350	6253	6151	6437	6946	6001
DUT21A	7827	5788	8252	7585	8163	8021
DUT21B	5878	5917	5193	6110	8572	5122
DUT21C	5642	5197	5565	5045	5097	6706
DUT21D	6763	6674	7752	6098	8338	9615
DUT22A	5786	5178	5846	7162	5536	6493
DUT22B	5072	4509	4448	3961	4582	3973
DUT22C	4738	5009	4152	4459	5086	4444
DUT22D	6269	6027	5011	7454	9077	8037
DUT23A	6551	5939	5899	6028	9404	5957
DUT23B	6164	6464	5898	6638	7505	7083
DUT23C	6522	6398	4538	7568	7649	5801
DUT23D	6578	6144	6581	5422	5430	5914
Specification Minimum	25	25	25	25	25	25
Control Average	5532	5697	4816	5391	5519	5620
Control Std Dev	698	1045	1776	406	437	740
Control +99/90	8426	10031	12183	7075	7330	8690
Control -99/90	2639	1363	-2551	3707	3708	2549
+Control Error Bar	737	2546	1369	543	374	944
-Control Error Bar	881	990	338	687	664	834
Biased Average	5438	5662	5664	6068	6329	7857
Biased Std Dev	1027	1032	1021	1523	1412	2627
Biased +99/90	8260	8498	8470	9361	10209	15078
Biased -99/90	2616	2826	2857	2775	2448	636
+Biased Error Bar	2377	2729	2306	3403	3642	7363
-Biased Error Bar	2928	1683	2233	1962	2664	3404
Unbiased Average	5910	5935	5958	6069	6704	6626
Unbiased Std Dev	694	797	1141	1128	1711	1870
Unbiased +99/90	7834	8144	9122	9196	11446	11810
Unbiased -99/90	3987	3725	2794	2942	1963	1442
+Unbiased Error Bar	1916	2009	2693	2796	4822	8287
-Unbiased Error Bar	1227	1463	1807	2108	2275	2653

Table 17. Large-signal voltage gain values with application-specific supply voltages

Large-Signal Voltage Gain	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	1511	2345	1260	1683	1291	2493
Control (DUT24B)	2406	2170	1766	1436	1910	1445
Control (DUT24C)	2780	2332	2479	1581	1388	1380
Control (DUT24D)	1397	2569	2350	1381	1256	1999
Control (DUT25A)	1456	2051	1667	3203	3178	2017
Control (DUT25B)	1286	1277	1391	3547	1257	1380
Control (DUT25C)	1379	3510	3876	1357	1982	3338
Control (DUT25D)	1344	1382	1240	1437	2132	1632
DUT1A	2527	2367	1155	1588	1394	1732
DUT1B	1430	1346	1542	1527	1379	1777
DUT1C	1385	1420	1282	1470	1496	1541
DUT1D	1261	2283	1544	1725	1543	2236
DUT2A	2313	2186	1484	1551	1306	1476
DUT2B	1581	1650	1639	1640	1818	1780
DUT2C	1343	2480	3890	1513	1508	1798
DUT2D	2067	2036	1400	1496	1719	1740
DUT3A	1366	1469	1332	1333	1341	1524
DUT3B	1857	1623	1735	1560	1656	2159
DUT3C	2440	1740	1537	1496	1711	1774
DUT3D	1382	1397	1361	1325	1517	1440
DUT4A	1378	3423	1398	1607	1772	1922
DUT4B	3158	1894	1581	1774	2422	2248
DUT4C	1669	2606	1845	1717	2313	2162
DUT4D	1427	1609	1739	1775	1575	1937
DUT5A	1240	1854	1522	1508	1595	1795
DUT5B	1309	1532	1660	1662	1673	2087
DUT5C	1510	2107	1634	1683	1355	1662
DUT5D	1658	1864	1644	1749	1662	2324
DUT6A	1420	1302	1384	1458	1485	1419
DUT6B	1539	1641	1537	1505	1740	2160
DUT6C	2235	1813	1461	1601	1461	1548
DUT6D	1361	1214	1311	1303	1360	1444
DUT13A	2489	1494	1195	2038	2247	2003
DUT13B	1630	1478	2332	1933	2210	2230
DUT13C	1831	1372	1483	1636	2314	1731
DUT13D	2180	1561	1753	1753	1958	1737
DUT14A	1370	1316	1346	1361	1301	1558
DUT14B	1333	2879	1594	1247	1534	1419
DUT14C	1815	1229	1470	1422	1621	1551
DUT14D	1441	1267	1333	1278	1506	1297
DUT15A	2731	1265	1439	2011	1625	1912
DUT15B	2457	1798	1895	1668	1711	2170
DUT15C	3264	3824	2720	1795	1911	2404
DUT15D	1462	1320	1509	1733	1942	1792
DUT16A	2043	3026	1443	1312	1438	1369
DUT16B	1274	1254	1309	1290	1447	1392
DUT16C	1355	1873	1241	1391	1327	1280
DUT16D	1213	1131	1311	1324	1620	1310
DUT17A	1842	1389	1599	1782	2061	2013
DUT17B	2264	1479	1542	1537	1562	1425
DUT17C	2037	2668	2336	1558	1679	1474
DUT17D	3459	1764	1092	1983	2000	1923
DUT18A	1277	1715	1191	1485	1632	1562
DUT18B	1605	1639	1908	1911	2398	1961
DUT18C	1320	3501	1611	1642	1873	2170
DUT18D	2030	1299	1449	1556	1470	1326
DUT7A	2201	2793	1612	1421	1664	1375
DUT7B	1420	2422	1446	1766	1631	1688
DUT7C	1316	2219	1936	1719	1662	1553
DUT7D	2514	1654	1693	1487	1691	1673
DUT8A	1958	3109	2463	1430	1601	1781
DUT8B	1582	1690	1755	1519	1697	2521
DUT8C	1473	3999	1263	1506	1753	2127
DUT8D	1710	1526	1563	1580	1930	1572
DUT9A	1584	1700	1541	2113	1521	1649
DUT9B	1806	1786	1751	1797	1791	1763
DUT9C	1328	2504	1495	1454	1663	1962
DUT9D	1450	2209	1520	1520	1590	2143
DUT10A	2532	1215	2441	1094	1475	1938
DUT10B	1623	1647	1638	1509	1606	1537
DUT10C	1376	1264	1711	1564	1298	1404
DUT10D	1588	1616	1707	1538	1644	1337
DUT11A	1792	1248	1449	1457	1542	1762
DUT11B	1711	2855	1401	1538	1452	1423
DUT11C	2417	1796	3109	1437	1415	1455
DUT11D	2049	2281	1463	1606	1586	1689
DUT12A	1890	1930	1657	1549	1489	1406
DUT12B	1660	1856	1793	1429	1845	1827
DUT12C	1739	1937	1656	1826	1857	1886
DUT12D	1434	1653	1340	1587	1507	1650
DUT19A	1252	1528	1581	1925	1964	1705
DUT19B	1432	1447	1564	1393	1790	2817
DUT19C	2952	3144	2233	1427	1714	1662
DUT19D	2252	1649	1257	1657	1888	2087
DUT20A	1331	1276	1389	1510	2026	1952
DUT20B	1474	1467	1385	1731	1582	1542
DUT20C	1420	1901	1556	1561	1604	1505
DUT20D	2019	1402	1382	2496	2222	1743
DUT21A	4003	1379	1396	1513	1444	1915
DUT21B	1544	1393	1677	1915	1630	1348
DUT21C	1918	2487	3464	1520	1455	1907
DUT21D	3128	3719	1610	2099	1966	1807
DUT22A	1680	1760	1527	1693	2070	1656
DUT22B	1374	2235	1501	1329	1396	1313
DUT22C	1664	2372	1166	1153	1408	1525
DUT22D	1716	3652	1582	1817	1578	1907
DUT23A	3232	1331	1728	1628	2330	1512
DUT23B	1723	1844	1809	2090	1445	1551
DUT23C	1435	2144	1703	2298	1689	1643
DUT23D	3955	1349	1503	1951	1764	1711
Control Average	1695	2205	2004	1953	1799	1961
Control Std Dev	531	655	832	832	620	636
Control +99/90	3896	4922	5453	5402	4370	4597
Control -99/90	506	513	1446	1496	772	676
+Control Error Bar	1085	364	475	1250	1378	532
-Control Error Bar	298	153	743	572	543	580
Biased Average	1814	1821	1614	1580	1677	1761
Biased Std Dev	574	603	459	200	288	311
Biased +99/90	3392	3478	2877	2131	2470	2615
Biased -99/90	236	165	352	1029	884	907
+Biased Error Bar	1645	2002	2276	458	745	643
-Biased Error Bar	601	690	459	333	375	481
Unbiased Average	1901	2010	1691	1640	1679	1726
Unbiased Std Dev	654	689	436	276	221	297
Unbiased +99/90	3714	3919	2901	2404	2292	2548
Unbiased -99/90	88	100	482	875	1066	904
+Unbiased Error Bar	2102	1989	1773	856	651	1091
-Unbiased Error Bar	649	795	525	545	381	413

Table 18. Positive maximum output voltage swing values with datasheet-specified supply voltages

Positive Maximum Output	Total Ionizing Dose					
Voltage Swing	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	14.12	14.12	14.12	14.12	14.12	14.14
Control (DUT24B)	14.14	14.14	14.14	14.14	14.14	14.15
Control (DUT24C)	14.13	14.13	14.13	14.13	14.13	14.14
Control (DUT24D)	14.13	14.13	14.13	14.13	14.13	14.14
Control (DUT25A)	14.12	14.12	14.12	14.12	14.12	14.14
Control (DUT25B)	14.13	14.13	14.13	14.13	14.13	14.15
Control (DUT25C)	14.13	14.13	14.13	14.13	14.13	14.14
Control (DUT25D)	14.13	14.13	14.13	14.13	14.13	14.14
DUT1A	14.13	14.13	14.13	14.13	14.13	14.14
DUT1B	14.13	14.13	14.13	14.13	14.13	14.14
DUT1C	14.13	14.13	14.13	14.13	14.13	14.14
DUT1D	14.14	14.14	14.14	14.14	14.14	14.15
DUT2A	14.12	14.13	14.13	14.12	14.12	14.14
DUT2B	14.14	14.14	14.14	14.14	14.14	14.15
DUT2C	14.13	14.13	14.13	14.13	14.13	14.14
DUT2D	14.13	14.13	14.13	14.13	14.13	14.15
DUT3A	14.12	14.12	14.13	14.12	14.12	14.14
DUT3B	14.14	14.14	14.14	14.14	14.14	14.15
DUT3C	14.13	14.13	14.14	14.13	14.13	14.15
DUT3D	14.13	14.13	14.13	14.13	14.13	14.14
DUT4A	14.12	14.12	14.12	14.12	14.12	14.13
DUT4B	14.13	14.13	14.13	14.13	14.13	14.14
DUT4C	14.13	14.13	14.13	14.13	14.13	14.14
DUT4D	14.13	14.13	14.13	14.13	14.13	14.14
DUT5A	14.12	14.13	14.13	14.13	14.13	14.14
DUT5B	14.13	14.13	14.13	14.13	14.13	14.14
DUT5C	14.13	14.13	14.13	14.13	14.12	14.14
DUT5D	14.13	14.14	14.14	14.14	14.14	14.15
DUT6A	14.13	14.13	14.13	14.13	14.13	14.14
DUT6B	14.14	14.14	14.14	14.14	14.14	14.15
DUT6C	14.14	14.14	14.14	14.14	14.14	14.15
DUT6D	14.14	14.14	14.14	14.14	14.14	14.15
DUT13A	14.12	14.13	14.13	14.12	14.14	14.14
DUT13B	14.13	14.13	14.13	14.13	14.14	14.14
DUT13C	14.13	14.13	14.13	14.12	14.14	14.14
DUT13D	14.13	14.14	14.13	14.13	14.14	14.14
DUT14A	14.13	14.13	14.13	14.13	14.14	14.14
DUT14B	14.14	14.14	14.14	14.14	14.15	14.15
DUT14C	14.13	14.13	14.13	14.13	14.14	14.14
DUT14D	14.14	14.14	14.14	14.14	14.15	14.15
DUT15A	14.12	14.13	14.12	14.12	14.13	14.13
DUT15B	14.13	14.13	14.13	14.13	14.14	14.14
DUT15C	14.12	14.12	14.12	14.12	14.14	14.14
DUT15D	14.13	14.13	14.13	14.13	14.14	14.14
DUT16A	14.13	14.13	14.13	14.13	14.14	14.14
DUT16B	14.14	14.14	14.14	14.14	14.15	14.15
DUT16C	14.13	14.14	14.13	14.13	14.15	14.15
DUT16D	14.14	14.14	14.14	14.14	14.15	14.15
DUT17A	14.13	14.13	14.13	14.13	14.14	14.14
DUT17B	14.12	14.13	14.13	14.12	14.14	14.14
DUT17C	14.12	14.12	14.12	14.12	14.13	14.13
DUT17D	14.14	14.14	14.14	14.14	14.15	14.15
DUT18A	14.12	14.12	14.12	14.12	14.14	14.13
DUT18B	14.13	14.14	14.14	14.13	14.15	14.15
DUT18C	14.13	14.13	14.13	14.13	14.14	14.14
DUT18D	14.13	14.13	14.13	14.13	14.14	14.14
DUT7A	14.13	14.12	14.12	14.12	14.12	14.13
DUT7B	14.14	14.13	14.13	14.13	14.13	14.15
DUT7C	14.14	14.13	14.13	14.13	14.13	14.14
DUT7D	14.13	14.13	14.13	14.13	14.13	14.14
DUT8A	14.12	14.12	14.12	14.12	14.12	14.14
DUT8B	14.13	14.13	14.13	14.13	14.13	14.14
DUT8C	14.13	14.12	14.13	14.13	14.12	14.14
DUT8D	14.13	14.13	14.13	14.13	14.13	14.14
DUT9A	14.12	14.12	14.12	14.12	14.12	14.13
DUT9B	14.13	14.13	14.13	14.13	14.13	14.14
DUT9C	14.13	14.12	14.13	14.13	14.12	14.14
DUT9D	14.13	14.13	14.13	14.13	14.13	14.14
DUT10A	14.12	14.12	14.12	14.12	14.12	14.13
DUT10B	14.13	14.13	14.13	14.13	14.13	14.14
DUT10C	14.13	14.13	14.13	14.13	14.13	14.14
DUT10D	14.13	14.13	14.13	14.13	14.13	14.14
DUT11A	14.13	14.12	14.13	14.13	14.12	14.14
DUT11B	14.13	14.13	14.13	14.13	14.13	14.14
DUT11C	14.12	14.12	14.12	14.12	14.12	14.13
DUT11D	14.14	14.13	14.13	14.14	14.13	14.15
DUT12A	14.13	14.13	14.13	14.13	14.12	14.14
DUT12B	14.14	14.13	14.14	14.14	14.13	14.15
DUT12C	14.13	14.13	14.13	14.13	14.13	14.14
DUT12D	14.14	14.13	14.13	14.13	14.13	14.15
DUT19A	14.12	14.13	14.13	14.12	14.14	14.14
DUT19B	14.13	14.13	14.13	14.13	14.14	14.14
DUT19C	14.12	14.12	14.12	14.12	14.13	14.14
DUT19D	14.13	14.13	14.13	14.13	14.14	14.15
DUT20A	14.13	-----	14.13	14.13	14.14	14.15
DUT20B	14.13	-----	14.13	14.13	14.14	14.14
DUT20C	14.13	-----	14.13	14.12	14.14	14.14
DUT20D	14.14	-----	14.14	14.14	14.15	14.16
DUT21A	14.13	14.13	14.13	14.12	14.14	14.14
DUT21B	14.13	14.13	14.13	14.13	14.14	14.14
DUT21C	14.12	14.12	14.12	14.12	14.13	14.14
DUT21D	14.13	14.13	14.14	14.13	14.15	14.15
DUT22A	14.13	14.13	14.13	14.13	14.14	14.14
DUT22B	14.13	14.13	14.13	14.13	14.14	14.14
DUT22C	14.13	14.12	14.13	14.12	14.14	14.14
DUT22D	14.14	14.14	14.14	14.14	14.15	14.15
DUT23A	14.12	14.12	14.12	14.12	14.13	14.13
DUT23B	14.13	14.13	14.13	14.13	14.14	14.14
DUT23C	14.12	14.12	14.12	14.12	14.13	14.14
DUT23D	14.13	14.13	14.13	14.13	14.14	14.14
Specification Maximum	12.5	12.5	12.5	12.5	12.5	12.5
Control Average	14.13	14.13	14.13	14.13	14.13	14.14
Control Std Dev	0.00	0.00	0.00	0.00	0.00	0.00
Control +99/90	14.15	14.15	14.15	14.15	14.15	14.16
Control -99/90	14.11	14.11	14.11	14.11	14.11	14.12
+Control Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
-Control Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
Biased Average	14.13	14.13	14.13	14.13	14.14	14.14
Biased Std Dev	0.01	0.01	0.01	0.01	0.01	0.01
Biased +99/90	14.15	14.15	14.15	14.15	14.16	14.16
Biased -99/90	14.11	14.12	14.12	14.11	14.11	14.13
+Biased Error Bar	0.01	0.01	0.01	0.01	0.02	0.01
-Biased Error Bar	0.01	0.01	0.01	0.01	0.02	0.01
Unbiased Average	14.13	14.13	14.13	14.13	14.13	14.14
Unbiased Std Dev	0.00	0.00	0.00	0.00	0.01	0.00
Unbiased +99/90	14.14	14.14	14.14	14.14	14.16	14.16
Unbiased -99/90	14.12	14.12	14.12	14.11	14.11	14.13
+Unbiased Error Bar	0.01	0.01	0.01	0.01	0.02	0.01
-Unbiased Error Bar	0.01	0.01	0.01	0.01	0.01	0.01

Table 19. Negative maximum output voltage swing values with datasheet-specified supply voltages

Negative Maximum	Total Ionizing Dose					
Output Voltage Swing	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	-14.69	-14.69	-14.69	-14.69	-14.69	-14.70
Control (DUT24B)	-14.69	-14.69	-14.69	-14.69	-14.69	-14.70
Control (DUT24C)	-14.68	-14.69	-14.68	-14.69	-14.68	-14.69
Control (DUT24D)	-14.69	-14.70	-14.69	-14.69	-14.69	-14.70
Control (DUT25A)	-14.68	-14.69	-14.69	-14.69	-14.69	-14.69
Control (DUT25B)	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
Control (DUT25C)	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
Control (DUT25D)	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
DUT1A	-14.69	-14.69	-14.68	-14.68	-14.68	-14.68
DUT1B	-14.69	-14.69	-14.69	-14.69	-14.68	-14.69
DUT1C	-14.69	-14.69	-14.68	-14.68	-14.68	-14.68
DUT1D	-14.69	-14.69	-14.69	-14.68	-14.68	-14.69
DUT2A	-14.69	-14.69	-14.68	-14.68	-14.68	-14.68
DUT2B	-14.69	-14.68	-14.68	-14.68	-14.68	-14.68
DUT2C	-14.68	-14.68	-14.68	-14.68	-14.67	-14.68
DUT2D	-14.69	-14.69	-14.69	-14.68	-14.68	-14.69
DUT3A	-14.68	-14.68	-14.68	-14.68	-14.67	-14.68
DUT3B	-14.68	-14.68	-14.68	-14.68	-14.67	-14.68
DUT3C	-14.68	-14.68	-14.67	-14.67	-14.67	-14.67
DUT3D	-14.68	-14.68	-14.68	-14.68	-14.67	-14.68
DUT4A	-14.69	-14.68	-14.68	-14.68	-14.68	-14.68
DUT4B	-14.69	-14.69	-14.68	-14.68	-14.68	-14.68
DUT4C	-14.68	-14.68	-14.68	-14.68	-14.67	-14.68
DUT4D	-14.69	-14.69	-14.68	-14.68	-14.68	-14.68
DUT5A	-14.69	-14.68	-14.68	-14.67	-14.67	-14.67
DUT5B	-14.69	-14.68	-14.68	-14.68	-14.68	-14.68
DUT5C	-14.69	-14.68	-14.68	-14.67	-14.67	-14.67
DUT5D	-14.69	-14.68	-14.68	-14.68	-14.67	-14.68
DUT6A	-14.68	-14.68	-14.68	-14.68	-14.67	-14.68
DUT6B	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
DUT6C	-14.68	-14.68	-14.68	-14.68	-14.67	-14.67
DUT6D	-14.69	-14.68	-14.68	-14.68	-14.68	-14.68
DUT13A	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
DUT13B	-14.69	-14.68	-14.68	-14.68	-14.68	-14.68
DUT13C	-14.68	-14.68	-14.67	-14.67	-14.68	-14.67
DUT13D	-14.69	-14.68	-14.68	-14.68	-14.68	-14.68
DUT14A	-14.69	-14.69	-14.69	-14.68	-14.69	-14.68
DUT14B	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
DUT14C	-14.69	-14.69	-14.68	-14.68	-14.68	-14.68
DUT14D	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
DUT15A	-14.68	-14.68	-14.68	-14.67	-14.68	-14.67
DUT15B	-14.69	-14.69	-14.68	-14.68	-14.69	-14.68
DUT15C	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
DUT15D	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
DUT16A	-14.69	-14.69	-14.69	-14.68	-14.69	-14.68
DUT16B	-14.69	-14.68	-14.68	-14.68	-14.68	-14.68
DUT16C	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
DUT16D	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
DUT17A	-14.69	-14.69	-14.68	-14.68	-14.68	-14.68
DUT17B	-14.69	-14.69	-14.69	-14.68	-14.69	-14.68
DUT17C	-14.69	-14.68	-14.68	-14.68	-14.68	-14.68
DUT17D	-14.69	-14.69	-14.69	-14.68	-14.69	-14.69
DUT18A	-14.68	-14.68	-14.68	-14.68	-14.68	-14.67
DUT18B	-14.69	-14.69	-14.68	-14.68	-14.69	-14.68
DUT18C	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
DUT18D	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
DUT7A	-14.68	-14.69	-14.69	0.00	0.00	-14.69
DUT7B	-14.68	-14.69	-14.68	0.00	0.00	-14.69
DUT7C	-14.68	-14.68	-14.68	0.00	0.00	-14.68
DUT7D	-14.68	-14.69	-14.69	0.00	0.00	-14.69
DUT8A	-14.68	-14.68	-14.68	0.00	0.00	-14.68
DUT8B	-14.69	-14.69	-14.69	0.00	0.00	-14.69
DUT8C	-14.68	-14.69	-14.69	0.00	0.00	-14.69
DUT8D	-14.68	-14.68	-14.68	0.00	0.00	-14.69
DUT9A	-14.68	-14.68	-14.68	0.00	0.00	-14.68
DUT9B	-14.69	-14.69	-14.69	0.00	0.00	-14.70
DUT9C	-14.69	-14.69	-14.69	0.00	0.00	-14.69
DUT9D	-14.68	-14.68	-14.68	0.00	0.00	-14.69
DUT10A	-14.69	-14.69	-14.69	0.00	0.00	-14.69
DUT10B	-14.68	-14.68	-14.68	0.00	0.00	-14.69
DUT10C	-14.68	-14.68	-14.68	0.00	0.00	-14.68
DUT10D	-14.69	-14.69	-14.69	0.00	0.00	-14.69
DUT11A	-14.69	-14.69	-14.69	0.00	0.00	-14.69
DUT11B	14.69	14.69	14.69	0.00	0.00	14.69
DUT11C	-14.68	-14.68	-14.68	0.00	0.00	-14.69
DUT11D	-14.69	-14.69	-14.69	0.00	0.00	-14.70
DUT12A	-14.68	-14.68	-14.68	0.00	0.00	-14.68
DUT12B	-14.68	-14.69	-14.69	0.00	0.00	-14.69
DUT12C	-14.68	-14.68	-14.68	0.00	0.00	-14.68
DUT12D	-14.68	-14.68	-14.68	0.00	0.00	-14.69
DUT19A	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
DUT19B	-14.69	-14.69	-14.69	-14.69	-14.70	-14.69
DUT19C	-14.69	-14.69	-14.69	-14.68	-14.69	-14.69
DUT19D	-14.68	-14.69	-14.68	-14.68	-14.69	-14.69
DUT20A	-14.68	0.00	-14.68	-14.68	-14.68	-14.68
DUT20B	-14.68	-0.16	-14.68	-14.68	-14.69	-14.68
DUT20C	-14.68	-0.16	-14.68	-14.68	-14.68	-14.68
DUT20D	-14.68	0.00	-14.68	-14.68	-14.69	-14.68
DUT21A	-14.69	-14.69	-14.68	-14.68	-14.69	-14.69
DUT21B	-14.68	-14.69	-14.68	-14.68	-14.69	-14.69
DUT21C	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
DUT21D	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
DUT22A	-14.69	-14.69	-14.69	-14.69	-14.70	-14.69
DUT22B	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
DUT22C	-14.69	-14.69	-14.68	-14.68	-14.69	-14.69
DUT22D	-14.69	-14.70	-14.69	-14.69	-14.70	-14.70
DUT23A	14.68	14.69	14.68	14.68	14.69	14.68
DUT23B	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
DUT23C	-14.68	-14.69	-14.68	-14.68	-14.69	-14.69
DUT23D	-14.69	-14.69	-14.68	-14.68	-14.69	-14.69
Specification Minimum	-12.5	-12.5	-12.5	-12.5	-12.5	-12.5
Control Average	-14.69	-14.69	-14.69	-14.69	-14.69	-14.69
Control Std Dev	0.00	0.00	0.00	0.00	0.00	0.00
Control +99/90	-14.68	-14.68	-14.68	-14.68	-14.68	-14.68
Control -99/90	-14.70	-14.70	-14.70	-14.70	-14.70	-14.70
+Control Error Bar	0.00	0.00	0.00	0.00	0.00	0.00
-Control Error Bar	0.01	0.01	0.00	0.01	0.01	0.01
Biased Average	-14.69	-14.68	-14.68	-14.68	-14.68	-14.68
Biased Std Dev	0.00	0.00	0.00	0.00	0.01	0.00
Biased +99/90	-14.68	-14.68	-14.67	-14.67	-14.67	-14.67
Biased -99/90	14.69	14.69	14.69	14.69	14.69	14.69
+Biased Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
-Biased Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
Unbiased Average	-14.68	-14.69	-14.69	-14.68	-14.69	-14.69
Unbiased Std Dev	0.00	0.00	0.00	0.00	0.01	0.00
Unbiased +99/90	-14.67	-14.68	-14.68	-14.67	-14.67	-14.68
Unbiased -99/90	-14.69	-14.70	-14.69	-14.69	-14.70	-14.70
+Unbiased Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
-Unbiased Error Bar	0.01	0.01	0.01	0.01	0.01	0.01

Table 20. Maximum output voltage swing values with application-specific supply voltages

Maximum Output Voltage	Total Ionizing Dose					
Swing	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24A)	14.34	14.34	14.34	14.34	14.34	14.34
Control (DUT24B)	14.35	14.35	14.35	14.35	14.35	14.35
Control (DUT24C)	14.34	14.34	14.34	14.34	14.34	14.35
Control (DUT24D)	14.34	14.34	14.34	14.34	14.34	14.35
Control (DUT25A)	14.33	14.34	14.34	14.33	14.34	14.34
Control (DUT25B)	14.34	14.35	14.35	14.34	14.35	14.35
Control (DUT25C)	14.34	14.34	14.34	14.34	14.34	14.34
Control (DUT25D)	14.34	14.34	14.34	14.34	14.34	14.34
DUT1A	14.34	14.34	14.34	14.34	14.34	14.34
DUT1B	14.35	14.34	14.35	14.35	14.34	14.35
DUT1C	14.34	14.34	14.34	14.34	14.34	14.34
DUT1D	14.35	14.35	14.35	14.35	14.35	14.35
DUT2A	14.34	14.34	14.34	14.34	14.34	14.34
DUT2B	14.35	14.35	14.35	14.35	14.35	14.35
DUT2C	14.34	14.34	14.34	14.34	14.34	14.34
DUT2D	14.35	14.34	14.35	14.35	14.34	14.35
DUT3A	14.34	14.34	14.34	14.34	14.34	14.34
DUT3B	14.35	14.35	14.35	14.35	14.35	14.35
DUT3C	14.35	14.35	14.35	14.35	14.34	14.35
DUT3D	14.34	14.34	14.34	14.34	14.34	14.34
DUT4A	14.33	14.33	14.33	14.33	14.33	14.33
DUT4B	14.34	14.34	14.34	14.34	14.34	14.34
DUT4C	14.34	14.34	14.34	14.34	14.34	14.34
DUT4D	14.34	14.34	14.34	14.34	14.34	14.34
DUT5A	14.34	14.34	14.34	14.34	14.34	14.34
DUT5B	14.34	14.34	14.34	14.34	14.34	14.34
DUT5C	14.34	14.34	14.34	14.34	14.34	14.34
DUT5D	14.35	14.35	14.35	14.35	14.35	14.35
DUT6A	14.34	14.34	14.34	14.34	14.34	14.34
DUT6B	14.35	14.35	14.35	14.35	14.35	14.35
DUT6C	14.35	14.35	14.35	14.35	14.35	14.35
DUT6D	14.35	14.35	14.35	14.35	14.35	14.35
DUT13A	14.34	14.34	14.34	14.33	14.34	14.34
DUT13B	14.34	14.34	14.34	14.34	14.34	14.34
DUT13C	14.34	14.34	14.34	14.34	14.34	14.34
DUT13D	14.34	14.35	14.34	14.34	14.34	14.34
DUT14A	14.34	14.34	14.34	14.34	14.34	14.34
DUT14B	14.35	14.35	14.35	14.35	14.35	14.35
DUT14C	14.34	14.34	14.34	14.34	14.34	14.35
DUT14D	14.35	14.35	14.35	14.35	14.35	14.35
DUT15A	14.33	14.33	14.33	14.33	14.33	14.33
DUT15B	14.34	14.34	14.34	14.34	14.34	14.34
DUT15C	14.33	14.34	14.34	14.33	14.33	14.34
DUT15D	14.34	14.34	14.34	14.34	14.34	14.34
DUT16A	14.34	14.34	14.34	14.34	14.34	14.34
DUT16B	14.35	14.35	14.35	14.35	14.35	14.35
DUT16C	14.34	14.35	14.35	14.34	14.35	14.35
DUT16D	14.35	14.35	14.35	14.35	14.35	14.35
DUT17A	14.34	14.34	14.34	14.34	14.34	14.34
DUT17B	14.34	14.34	14.34	14.34	14.34	14.34
DUT17C	14.33	14.33	14.33	14.33	14.33	14.33
DUT17D	14.35	14.35	14.35	14.35	14.35	14.35
DUT18A	14.33	14.33	14.33	14.33	14.33	14.33
DUT18B	14.35	14.35	14.35	14.35	14.35	14.35
DUT18C	14.34	14.34	14.34	14.34	14.34	14.34
DUT18D	14.34	14.34	14.34	14.34	14.34	14.34
DUT7A	14.34	14.33	14.33	14.33	14.33	14.33
DUT7B	14.35	14.35	14.35	14.35	14.35	14.35
DUT7C	14.34	14.34	14.34	14.34	14.34	14.34
DUT7D	14.34	14.34	14.34	14.34	14.34	14.34
DUT8A	14.34	14.33	14.34	14.34	14.33	14.34
DUT8B	14.35	14.34	14.34	14.34	14.34	14.34
DUT8C	14.34	14.34	14.34	14.34	14.34	14.34
DUT8D	14.34	14.34	14.34	14.34	14.34	14.34
DUT9A	14.34	14.33	14.33	14.34	14.33	14.33
DUT9B	14.34	14.34	14.34	14.34	14.34	14.34
DUT9C	14.34	14.34	14.34	14.34	14.34	14.34
DUT9D	14.34	14.34	14.34	14.34	14.34	14.34
DUT10A	14.34	14.33	14.33	14.34	14.34	14.34
DUT10B	14.35	14.34	14.34	14.34	14.34	14.34
DUT10C	14.34	14.34	14.34	14.34	14.34	14.34
DUT10D	14.34	14.34	14.34	14.34	14.34	14.34
DUT11A	14.34	14.34	14.34	14.34	14.34	14.34
DUT11B	14.34	14.34	14.34	14.34	14.34	14.34
DUT11C	14.34	14.33	14.33	14.33	14.33	14.33
DUT11D	14.35	14.35	14.35	14.35	14.35	14.35
DUT12A	14.34	14.34	14.34	14.34	14.34	14.34
DUT12B	14.35	14.35	14.35	14.35	14.35	14.35
DUT12C	14.34	14.34	14.34	14.34	14.34	14.34
DUT12D	14.35	14.34	14.34	14.34	14.34	14.34
DUT19A	14.34	14.34	14.34	14.34	14.34	14.34
DUT19B	14.34	14.34	14.34	14.34	14.34	14.34
DUT19C	14.33	14.33	14.33	14.33	14.33	14.34
DUT19D	14.34	14.34	14.34	14.34	14.34	14.35
DUT20A	14.34	14.34	14.35	14.34	14.34	14.35
DUT20B	14.34	14.34	14.34	14.34	14.34	14.34
DUT20C	14.34	14.34	14.34	14.34	14.34	14.34
DUT20D	14.35	14.35	14.35	14.35	14.35	14.35
DUT21A	14.34	14.34	14.34	14.34	14.34	14.34
DUT21B	14.34	14.34	14.34	14.34	14.34	14.34
DUT21C	14.33	14.33	14.34	14.33	14.33	14.34
DUT21D	14.34	14.35	14.35	14.34	14.35	14.35
DUT22A	14.34	14.34	14.34	14.34	14.34	14.34
DUT22B	14.34	14.34	14.34	14.34	14.34	14.35
DUT22C	14.34	14.34	14.34	14.33	14.34	14.34
DUT22D	14.35	14.35	14.35	14.35	14.35	14.35
DUT23A	14.33	14.33	14.33	14.33	14.33	14.34
DUT23B	14.34	14.34	14.34	14.34	14.34	14.34
DUT23C	14.33	14.34	14.33	14.33	14.34	14.34
DUT23D	14.34	14.34	14.34	14.34	14.34	14.34
Control Average	14.34	14.34	14.34	14.34	14.34	14.34
Control Std Dev	0.00	0.00	0.00	0.00	0.00	0.00
Control +99/90	14.36	14.36	14.36	14.36	14.36	14.36
Control -99/90	14.32	14.32	14.32	14.32	14.32	14.33
+Control Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
-Control Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
Biased Average	14.34	14.34	14.34	14.34	14.34	14.34
Biased Std Dev	0.01	0.01	0.01	0.01	0.01	0.01
Biased +99/90	14.36	14.36	14.36	14.36	14.36	14.36
Biased -99/90	14.33	14.33	14.33	14.33	14.33	14.33
+Biased Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
-Biased Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
Unbiased Average	14.34	14.34	14.34	14.34	14.34	14.34
Unbiased Std Dev	0.00	0.00	0.00	0.00	0.00	0.00
Unbiased +99/90	14.35	14.35	14.35	14.35	14.35	14.35
Unbiased -99/90	14.33	14.33	14.33	14.33	14.33	14.33
+Unbiased Error Bar	0.01	0.01	0.01	0.01	0.01	0.01
-Unbiased Error Bar	0.01	0.01	0.01	0.01	0.01	0.01

Table 21. Positive power supply current values with datasheet-specific supply voltages

Positive Supply Current	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24)	1.12E-03	1.26E-03	1.39E-03	1.49E-03	1.17E-03	1.18E-03
Control (DUT25)	1.31E-03	1.30E-03	1.45E-03	1.54E-03	1.37E-03	9.20E-04
DUT1	1.11E-03	1.19E-03	1.29E-03	1.44E-03	1.13E-03	9.48E-04
DUT2	1.21E-03	1.25E-03	1.27E-03	1.51E-03	1.10E-03	1.56E-03
DUT3	1.32E-03	1.10E-03	1.14E-03	1.39E-03	1.17E-03	1.37E-03
DUT4	1.32E-03	1.29E-03	1.38E-03	1.20E-03	1.12E-03	9.89E-04
DUT5	1.60E-03	1.32E-03	1.48E-03	1.44E-03	1.12E-03	1.13E-03
DUT6	1.29E-03	1.22E-03	1.27E-03	1.26E-03	1.04E-03	6.47E-04
DUT13	1.26E-03	2.56E-03	1.44E-03	1.18E-03	1.37E-03	1.03E-03
DUT14	1.38E-03	2.73E-03	1.40E-03	1.23E-03	1.36E-03	1.10E-03
DUT15	1.28E-03	2.49E-03	1.28E-03	1.27E-03	1.07E-03	1.09E-03
DUT16	1.42E-03	2.54E-03	1.48E-03	1.18E-03	9.14E-04	1.10E-03
DUT17	1.31E-03	2.60E-03	1.27E-03	1.40E-03	1.86E-03	1.45E-03
DUT18	1.28E-03	1.27E-03	1.32E-03	1.04E-03	1.05E-03	5.69E-04
DUT7	1.57E-03	1.52E-03	1.42E-03	1.36E-03	1.41E-03	5.19E-04
DUT8	1.45E-03	1.45E-03	1.34E-03	1.39E-03	1.34E-03	1.80E-03
DUT9	1.31E-03	1.35E-03	1.34E-03	1.47E-03	1.29E-03	7.21E-04
DUT10	1.38E-03	1.25E-03	1.24E-03	1.50E-03	1.44E-03	1.51E-03
DUT11	1.43E-03	1.46E-03	1.42E-03	1.40E-03	1.30E-03	5.97E-04
DUT12	1.59E-03	1.30E-03	1.26E-03	1.21E-03	1.32E-03	1.08E-03
DUT19	1.37E-03	1.74E-03	1.36E-03	1.20E-03	9.48E-04	6.76E-04
DUT20	1.09E-03	1.39E-03	1.37E-03	1.03E-03	6.00E-05	1.03E-03
DUT21	1.31E-03	1.24E-03	1.10E-03	1.28E-03	3.17E-04	7.14E-04
DUT22	1.33E-03	1.25E-03	1.18E-03	1.19E-03	1.25E-03	1.08E-03
DUT23	1.37E-03	1.57E-03	1.60E-03	1.36E-03	8.36E-04	1.31E-03
Specification Maximum	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03
Control Average	1.21E-03	1.28E-03	1.42E-03	1.51E-03	1.27E-03	1.05E-03
Control Std Dev	9.25E-05	2.30E-05	2.95E-05	2.55E-05	9.80E-05	1.29E-04
+Control Error Bar	9.25E-05	2.30E-05	2.95E-05	2.55E-05	9.80E-05	1.29E-04
-Control Error Bar	9.25E-05	2.30E-05	2.95E-05	2.55E-05	9.80E-05	1.29E-04
Biased Average	1.31E-03	1.80E-03	1.33E-03	1.29E-03	1.19E-03	1.08E-03
Biased Std Dev	1.15E-04	6.68E-04	9.77E-05	1.34E-04	2.36E-04	2.79E-04
Biased +99/90	1.70E-03	4.05E-03	1.66E-03	1.74E-03	1.99E-03	2.02E-03
Biased -99/90	9.29E-04	-4.58E-04	1.00E-03	8.42E-04	3.94E-04	1.42E-04
+Biased Error Bar	2.88E-04	9.30E-04	1.45E-04	2.15E-04	6.72E-04	4.82E-04
-Biased Error Bar	2.04E-04	6.92E-04	1.91E-04	2.57E-04	2.77E-04	5.14E-04
Unbiased Average	1.38E-03	1.41E-03	1.33E-03	1.31E-03	1.05E-03	1.00E-03
Unbiased Std Dev	1.29E-04	1.52E-04	1.30E-04	1.33E-04	4.44E-04	3.89E-04
Unbiased +99/90	1.82E-03	1.93E-03	1.77E-03	1.77E-03	2.57E-03	2.34E-03
Unbiased -99/90	9.39E-04	8.87E-04	8.82E-04	8.40E-04	4.83E-04	3.38E-04
+Unbiased Error Bar	2.06E-04	3.31E-04	2.75E-04	1.95E-04	3.90E-04	7.93E-04
-Unbiased Error Bar	2.91E-04	1.75E-04	2.32E-04	2.74E-04	9.86E-04	4.85E-04

Table 22. Negative power supply current values with datasheet-specific supply voltages

Negative Supply Current	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24)	2.20E-03	1.97E-03	1.82E-03	1.92E-03	2.13E-03	1.61E-03
Control (DUT25)	1.58E-03	1.83E-03	2.09E-03	1.63E-03	1.59E-03	1.10E-03
DUT1	2.22E-03	1.99E-03	2.01E-03	1.80E-03	1.47E-03	9.03E-04
DUT2	1.95E-03	1.49E-03	2.00E-03	1.78E-03	1.91E-03	6.38E-04
DUT3	1.78E-03	1.79E-03	2.02E-03	1.59E-03	1.77E-03	3.43E-04
DUT4	1.91E-03	2.00E-03	2.03E-03	1.61E-03	2.30E-03	1.03E-03
DUT5	2.06E-03	2.09E-03	1.97E-03	1.79E-03	1.69E-03	1.57E-03
DUT6	2.17E-03	2.26E-03	2.00E-03	1.68E-03	1.94E-03	1.01E-03
DUT13	1.93E-03	3.12E-03	1.65E-03	1.88E-03	9.55E-04	1.58E-03
DUT14	2.08E-03	3.42E-03	1.74E-03	1.50E-03	5.40E-04	8.68E-04
DUT15	1.70E-03	3.11E-03	2.03E-03	2.03E-03	8.92E-04	1.01E-03
DUT16	1.87E-03	3.05E-03	2.05E-03	1.64E-03	1.00E-03	1.38E-03
DUT17	2.06E-03	3.27E-03	1.66E-03	2.19E-03	8.44E-04	9.43E-04
DUT18	2.03E-03	1.93E-03	2.25E-03	1.94E-03	1.62E-03	1.26E-03
DUT7	1.96E-03	2.20E-03	1.48E-03	1.87E-03	2.24E-03	1.42E-03
DUT8	1.79E-03	2.09E-03	1.66E-03	1.86E-03	1.81E-03	1.03E-03
DUT9	2.03E-03	1.59E-03	1.96E-03	1.87E-03	1.85E-03	5.22E-04
DUT10	1.99E-03	1.92E-01	1.94E-01	1.99E-01	1.75E-01	1.63E-03
DUT11	1.99E-03	2.46E-03	1.94E-03	1.78E-03	1.96E-03	1.34E-03
DUT12	1.63E-03	1.50E-03	1.55E-03	2.19E-03	2.18E-03	3.70E-04
DUT19	2.35E-03	2.17E-03	2.23E-03	1.94E-03	1.25E-03	1.01E-03
DUT20	1.93E-03	1.66E-03	1.96E-03	1.95E-03	1.11E-03	1.63E-03
DUT21	1.70E-03	2.19E-03	1.80E-03	1.83E-03	5.01E-04	1.27E-03
DUT22	2.00E-03	1.80E-03	2.26E-03	1.82E-03	3.89E-04	6.54E-04
DUT23	1.58E-03	2.03E-03	2.03E-03	1.98E-03	1.00E-03	9.95E-04
Specification Maximum	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03	2.20E-03
Control Average	1.89E-03	1.90E-03	1.96E-03	1.78E-03	1.86E-03	1.35E-03
Control Std Dev	3.14E-04	7.15E-05	1.33E-04	1.43E-04	2.73E-04	2.58E-04
+Control Error Bar	3.14E-04	7.15E-05	1.33E-04	1.43E-04	2.73E-04	2.58E-04
-Control Error Bar	3.14E-04	7.15E-05	1.33E-04	1.43E-04	2.73E-04	2.58E-04
Biased Average	1.98E-03	2.46E-03	1.95E-03	1.79E-03	1.41E-03	1.05E-03
Biased Std Dev	1.46E-04	6.50E-04	1.71E-04	1.92E-04	5.25E-04	3.47E-04
Biased +99/90	2.47E-03	4.65E-03	2.53E-03	2.43E-03	3.18E-03	2.22E-03
Biased -99/90	1.49E-03	2.70E-04	1.38E-03	1.14E-03	-3.58E-04	-1.26E-04
+Biased Error Bar	2.44E-04	9.61E-04	2.92E-04	4.08E-04	8.91E-04	5.37E-04
-Biased Error Bar	2.78E-04	9.74E-04	3.06E-04	2.82E-04	8.72E-04	7.02E-04
Unbiased Average	1.90E-03	1.96E-03	1.89E-03	1.92E-03	1.46E-03	1.08E-03
Unbiased Std Dev	2.08E-04	2.84E-04	2.40E-04	1.09E-04	6.16E-04	4.08E-04
Unbiased +99/90	2.62E-03	2.94E-03	2.72E-03	2.29E-03	3.58E-03	2.48E-03
Unbiased -99/90	1.19E-03	9.86E-04	1.07E-03	1.54E-03	-6.64E-04	-3.26E-04
+Unbiased Error Bar	4.47E-04	4.96E-04	3.69E-04	2.75E-04	7.82E-04	5.49E-04
-Unbiased Error Bar	3.19E-04	4.64E-04	4.11E-04	1.37E-04	1.07E-03	7.09E-04

Table 23. Power supply current values with application-specific supply voltages

Supply Current	Total Ionizing Dose					
	Pre-Rad	25 krad(Si)	50 krad(Si)	75 krad(Si)	100 krad(Si)	125 krad(Si)
Control (DUT24)	1.11E-03	1.22E-03	9.77E-04	1.44E-03	1.16E-03	1.46E-03
Control (DUT25)	1.00E-03	1.07E-03	1.42E-03	1.23E-03	1.31E-03	7.65E-04
DUT1	1.14E-03	9.18E-04	1.02E-03	9.46E-04	9.52E-04	9.14E-04
DUT2	1.36E-03	1.04E-03	8.45E-04	1.39E-03	8.97E-04	7.36E-04
DUT3	9.78E-04	1.01E-03	9.60E-04	1.01E-03	9.03E-04	1.74E-03
DUT4	8.82E-04	1.02E-03	6.71E-04	9.42E-04	9.63E-04	6.59E-04
DUT5	8.17E-04	1.06E-03	1.03E-03	9.59E-04	9.58E-04	1.71E-03
DUT6	1.03E-03	9.37E-04	1.22E-03	1.01E-03	6.42E-04	6.19E-04
DUT13	1.31E-03	6.50E-04	8.65E-04	8.15E-04	1.58E-03	7.81E-04
DUT14	1.07E-03	8.50E-04	9.96E-04	8.70E-04	8.02E-04	1.18E-03
DUT15	9.97E-04	8.81E-04	1.45E-03	6.82E-04	1.08E-03	6.28E-04
DUT16	9.75E-04	1.09E-03	9.25E-04	1.02E-03	4.51E-04	1.33E-03
DUT17	1.34E-03	9.46E-04	1.11E-03	9.28E-04	5.93E-04	1.01E-03
DUT18	9.33E-04	7.68E-04	1.05E-03	6.15E-04	2.90E-04	1.52E-03
DUT7	1.17E-03	1.33E-03	1.02E-03	6.82E-04	9.58E-04	2.56E-04
DUT8	9.22E-04	1.26E-03	1.03E-03	1.42E-03	4.98E-04	1.19E-03
DUT9	8.67E-04	1.06E-03	1.07E-03	9.05E-04	9.51E-04	5.77E-04
DUT10	6.71E-04	1.01E-03	1.31E-03	1.08E-03	1.14E-03	7.18E-04
DUT11	1.03E-03	1.00E-03	1.17E-03	1.12E-03	9.02E-04	2.77E-04
DUT12	1.01E-03	9.23E-04	1.12E-03	1.11E-03	1.18E-03	1.09E-03
DUT19	1.07E-03	1.19E-03	1.15E-03	8.18E-04	8.94E-04	1.64E-03
DUT20	1.07E-03	7.51E-04	1.09E-03	9.17E-04	5.05E-04	7.45E-04
DUT21	9.34E-04	1.05E-03	1.01E-03	9.03E-04	8.08E-04	4.11E-04
DUT22	1.07E-03	1.52E-03	6.34E-04	7.83E-04	1.46E-03	1.00E-03
DUT23	1.21E-03	1.10E-03	1.59E-03	1.04E-03	6.94E-04	1.24E-03
Control Average	1.05E-03	1.14E-03	1.20E-03	1.34E-03	1.23E-03	1.11E-03
Control Std Dev	5.30E-05	7.95E-05	2.22E-04	1.06E-04	7.50E-05	3.47E-04
+Control Error Bar	5.30E-05	7.95E-05	2.22E-04	1.06E-04	7.50E-05	3.47E-04
-Control Error Bar	5.30E-05	7.95E-05	2.22E-04	1.06E-04	7.50E-05	3.47E-04
Biased Average	1.07E-03	9.31E-04	1.01E-03	9.31E-04	8.43E-04	1.07E-03
Biased Std Dev	1.74E-04	1.24E-04	1.96E-04	1.84E-04	3.18E-04	4.00E-04
Biased +99/90	1.66E-03	1.35E-03	1.67E-03	1.55E-03	1.91E-03	2.42E-03
Biased -99/90	4.83E-04	5.14E-04	3.47E-04	3.11E-04	-2.28E-04	-2.81E-04
+Biased Error Bar	1.36E-03	1.09E-03	1.45E-03	1.39E-03	1.58E-03	1.74E-03
-Biased Error Bar	8.17E-04	6.50E-04	6.21E-04	6.15E-04	2.90E-04	6.19E-04
Unbiased Average	1.00E-03	1.11E-03	1.11E-03	9.80E-04	9.08E-04	8.31E-04
Unbiased Std Dev	1.42E-04	2.00E-04	2.19E-04	1.94E-04	2.74E-04	4.20E-04
Unbiased +99/90	1.39E-03	1.66E-03	1.72E-03	1.52E-03	1.67E-03	2.00E-03
Unbiased -99/90	6.06E-04	5.55E-04	5.02E-04	4.43E-04	1.50E-04	-3.33E-04
+Unbiased Error Bar	1.21E-03	1.52E-03	1.59E-03	1.42E-03	1.46E-03	1.64E-03
-Unbiased Error Bar	6.71E-04	7.51E-04	6.34E-04	5.82E-04	4.98E-04	2.56E-04

11. Summary

The datasheet-specific supply voltage results were all in specification with the exception of the power supply currents. Five of the six biased parts from Group 2 exceeded the positive supply current values at the 25 krad(Si) data point. This appears to be a measurement error as the parameters returned to within specification at the 50 krad(Si) point and stayed within after. The same datapoints were out of specification for the negative supply current, as well as a few other random points (including one of the control parts at the pre-irradiation datapoint.) All other datapoints remained within specification for all dose levels.

12. REFERENCES

1) Department of Defense “Test Method Standard Microcircuits,” MIL-STD-883 Test Method 1019.9 Ionizing radiation (total dose) test procedure, June 7, 2013, https://landandmaritimeapps.dla.mil/Downloads/MilSpec/Docs/MIL-STD-883/std883.pdf.
2) Analog Devices datasheet I.D. No. 66-10-0179 Rev. E 0508 rh102110fe