



AHEAD OF WHAT'S POSSIBLE™

DISPLACEMENT DAMAGE TEST REPORT OP471S

January 2023



Radiation Test Report	
Product:	OP471S
Die:	1470W
Fluence:	2e12 n/cm ²
Test Method:	MIL-STD-883 TM1017
Facilities:	UMass Lowell
Tested:	January 5, 2023

The RADTEST® DATA SERVICE is a compilation of radiation test results on Analog Devices' Space grade products. It is designed to assist customers in selecting the right product for applications where radiation is a consideration. Many products manufactured by Analog Devices, Inc. have been shown to be radiation tolerant to most tactical radiation environments. Analog Devices, Inc. does not make any claim to maintain or guarantee these levels of radiation tolerance without lot qualification test.

It is the responsibility of the Procuring Activity to screen products from Analog Devices, Inc. for compliance to Nuclear Hardness Critical Items (HCI) specifications.

Warning:

Analog Devices, Inc. does not recommend use of this data to qualify other product grades or process levels. Analog Devices, Inc. is not responsible and has no liability for any consequences, and all applicable Warranties are null and void if any Analog Devices product is modified in any way or used outside of normal environmental and operating conditions, including the parameters specified in the corresponding data sheet. Analog Devices, Inc. does not guarantee that wafer manufacturing is the same for all process levels.

Wafer #	SN	+ICC @ VCC=+-15V			-ICC @ VCC=+-15V			VIO A		
		A			A			V		
		Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12
86	7.91E-03	7.66E-03	7.65E-03	-7.91E-03	-7.66E-03	-7.65E-03	-1.95E-04	-1.99E-04	-1.92E-04	
76	7.82E-03	7.79E-03	7.82E-03	-7.82E-03	-7.79E-03	-7.82E-03	-3.05E-04	-3.33E-04	-3.52E-04	
77	7.98E-03	7.88E-03	7.91E-03	-7.98E-03	-7.88E-03	-7.91E-03	-2.48E-04	-2.69E-04	-3.10E-04	
78	7.80E-03	7.78E-03	7.81E-03	-7.80E-03	-7.78E-03	-7.81E-03	-1.59E-04	-1.84E-04	-2.16E-04	
79	7.73E-03	7.69E-03	7.72E-03	-7.73E-03	-7.69E-03	-7.72E-03	-1.62E-04	-1.79E-04	-1.97E-04	
80	7.76E-03	7.74E-03	7.79E-03	-7.76E-03	-7.74E-03	-7.79E-03	-2.59E-04	-2.99E-04	-3.32E-04	
81	7.86E-03	7.81E-03	7.85E-03	-7.86E-03	-7.82E-03	-7.85E-03	-1.27E-04	-1.57E-04	-1.71E-04	
82	7.70E-03	7.71E-03	7.76E-03	-7.70E-03	-7.71E-03	-7.76E-03	-7.70E-05	-7.15E-05	-8.39E-05	
83	7.63E-03	7.65E-03	7.70E-03	-7.63E-03	-7.65E-03	-7.70E-03	-1.76E-04	-1.97E-04	-2.10E-04	
84	7.81E-03	7.82E-03	7.85E-03	-7.81E-03	-7.82E-03	-7.86E-03	-1.21E-04	-1.42E-04	-1.70E-04	
85	7.86E-03	7.87E-03	7.91E-03	-7.86E-03	-7.87E-03	-7.91E-03	-3.59E-04	-3.81E-04	-3.88E-04	
min	7.63E-03	7.65E-03	7.70E-03	-7.98E-03	-7.88E-03	-7.91E-03	-3.59E-04	-3.81E-04	-3.88E-04	
max	7.98E-03	7.88E-03	7.91E-03	-7.63E-03	-7.65E-03	-7.70E-03	-7.70E-05	-7.15E-05	-8.39E-05	
mean	7.79E-03	7.77E-03	7.81E-03	-7.79E-03	-7.77E-03	-7.81E-03	-1.99E-04	-2.21E-04	-2.43E-04	
std. dev	9.84E-05	7.55E-05	7.19E-05	9.77E-05	7.56E-05	7.18E-05	8.96E-05	9.59E-05	9.73E-05	
mean - 3 sigma	7.50E-03	7.55E-03	7.60E-03	-8.09E-03	-8.00E-03	-8.03E-03	-4.68E-04	-5.09E-04	-5.35E-04	
mean +3 sigma	8.09E-03	8.00E-03	8.03E-03	-7.50E-03	-7.55E-03	-7.60E-03	6.96E-05	6.64E-05	4.88E-05	

Wafer #	SN	VIO B			VIO C			VIO D		
		V			V			V		
		Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12
86	5.51E-05	4.90E-05	5.78E-05	9.91E-05	9.26E-05	1.01E-04	-3.14E-04	-3.18E-04	-3.10E-04	
76	-1.55E-04	-1.69E-04	-1.81E-04	2.38E-05	-4.10E-07	-2.49E-05	-7.78E-05	-9.04E-05	-1.06E-04	
77	-3.94E-05	-8.55E-05	-1.04E-04	2.78E-04	2.46E-04	2.24E-04	7.59E-05	7.77E-05	4.26E-05	
78	4.41E-05	1.52E-05	1.09E-06	2.12E-04	1.83E-04	1.82E-04	9.18E-06	-5.07E-05	-6.91E-05	
79	4.12E-05	1.69E-05	-9.32E-06	4.60E-05	1.82E-05	6.32E-06	-3.55E-05	-5.15E-05	-7.35E-05	
80	-6.93E-06	-4.59E-05	-7.37E-05	9.27E-05	4.12E-05	3.53E-05	6.64E-05	3.25E-05	1.60E-05	
81	5.54E-05	4.36E-05	2.50E-05	2.11E-04	1.80E-04	1.86E-04	-4.11E-05	-6.95E-05	-7.45E-05	
82	6.61E-05	3.40E-05	3.24E-05	1.96E-04	1.63E-04	1.68E-04	-3.57E-05	-7.13E-05	-7.78E-05	
83	-5.22E-05	-9.17E-05	-1.14E-04	2.10E-04	1.64E-04	1.62E-04	-2.46E-05	-4.00E-05	-7.05E-05	
84	-6.20E-05	-1.00E-04	-1.09E-04	1.41E-04	1.27E-04	1.14E-04	-7.08E-05	-8.33E-05	-9.08E-05	
85	1.11E-04	8.37E-05	7.14E-05	8.00E-05	4.22E-05	6.23E-05	-1.58E-04	5.98E-09	-2.00E-04	
min	-1.55E-04	-1.69E-04	-1.81E-04	2.38E-05	-4.10E-07	-2.49E-05	-1.58E-04	-9.04E-05	-2.00E-04	
max	1.11E-04	8.37E-05	7.14E-05	2.78E-04	2.46E-04	2.24E-04	7.59E-05	7.77E-05	4.26E-05	
mean	2.63E-07	-2.98E-05	-4.61E-05	1.49E-04	1.16E-04	1.12E-04	-2.92E-05	-3.46E-05	-7.03E-05	
std. dev	7.85E-05	8.02E-05	8.13E-05	8.48E-05	8.45E-05	8.62E-05	6.88E-05	5.47E-05	6.57E-05	
mean - 3 sigma	-2.35E-04	-2.71E-04	-2.90E-04	-1.05E-04	-1.37E-04	-1.47E-04	-2.36E-04	-1.99E-04	-2.67E-04	
mean +3 sigma	2.36E-04	2.11E-04	1.98E-04	4.04E-04	3.70E-04	3.70E-04	1.77E-04	1.30E-04	1.27E-04	

Wafer #	SN	+IIB A @ VCM=0V			+IIB B @ VCM=0V			+IIB C @ VCM=0V		
		A			A			A		
		Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12
86	3.31E-09	3.20E-09	3.23E-09	2.73E-09	2.71E-09	2.68E-09	2.19E-09	2.24E-09	2.05E-09	
76	5.31E-09	1.14E-08	1.79E-08	3.99E-09	9.50E-09	2.07E-08	3.57E-09	3.93E-09	1.36E-08	
77	5.21E-09	1.77E-08	1.96E-08	4.53E-09	1.94E-08	2.90E-08	4.36E-09	1.52E-08	2.49E-08	
78	5.52E-09	1.69E-08	2.40E-08	5.40E-09	2.27E-08	2.48E-08	4.47E-09	1.97E-08	2.20E-08	
79	5.73E-09	1.61E-08	2.79E-08	4.38E-09	2.46E-08	2.70E-08	3.36E-09	1.51E-08	2.47E-08	
80	5.26E-09	1.28E-08	2.71E-08	5.26E-09	3.01E-08	3.85E-08	4.37E-09	1.76E-08	2.13E-08	
81	3.91E-09	8.18E-09	1.12E-08	3.53E-09	1.54E-08	2.16E-08	2.66E-09	1.80E-08	2.05E-08	
82	3.87E-09	1.74E-08	2.24E-08	4.01E-09	1.42E-08	1.80E-08	2.91E-09	1.27E-08	2.18E-08	
83	5.19E-09	1.31E-08	2.19E-08	4.81E-09	2.26E-08	2.64E-08	3.98E-09	1.70E-08	2.49E-08	
84	3.52E-09	8.70E-09	1.35E-08	3.01E-09	8.93E-09	1.64E-08	2.62E-09	1.10E-08	2.01E-08	
85	3.38E-09	8.26E-09	1.36E-08	3.01E-09	1.28E-08	1.72E-08	1.78E-09	1.25E-08	1.84E-08	
min	3.38E-09	8.18E-09	1.12E-08	3.01E-09	8.93E-09	1.64E-08	1.78E-09	3.93E-09	1.36E-08	
max	5.73E-09	1.77E-08	2.79E-08	5.40E-09	3.01E-08	3.85E-08	4.47E-09	1.97E-08	2.49E-08	
mean	4.69E-09	1.31E-08	1.99E-08	4.19E-09	1.80E-08	2.40E-08	3.41E-09	1.43E-08	2.12E-08	
std. dev	9.07E-10	3.85E-09	5.81E-09	8.46E-10	6.98E-09	6.72E-09	9.07E-10	4.55E-09	3.46E-09	
mean - 3 sigma	1.97E-09	1.50E-09	2.49E-09	1.65E-09	-2.90E-09	3.82E-09	6.87E-10	6.10E-10	1.08E-08	
mean +3 sigma	7.41E-09	2.46E-08	3.73E-08	6.73E-09	3.90E-08	4.41E-08	6.13E-09	2.79E-08	3.16E-08	

Wafer #	SN	+IIB D @ VCM=0V			-IIB A @ VCM=0V			-IIB B @ VCM=0V		
		A			A			A		
		3□	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12
86	2.26E-09	2.23E-09	2.17E-09	2.43E-09	2.54E-09	2.42E-09	1.68E-09	1.73E-09	1.73E-09	
76	4.72E-09	1.32E-08	1.93E-08	4.79E-09	1.88E-08	2.67E-08	2.85E-09	1.12E-08	1.34E-08	
77	4.51E-09	1.78E-08	2.32E-08	4.48E-09	1.61E-08	2.33E-08	3.94E-09	1.58E-08	2.55E-08	
78	4.03E-09	1.29E-08	2.01E-08	3.09E-09	1.11E-08	1.65E-08	4.33E-09	1.51E-08	2.19E-08	
79	3.88E-09	1.28E-08	1.37E-08	4.33E-09	2.03E-08	2.81E-08	2.90E-09	1.94E-08	2.45E-08	
80	4.86E-09	1.47E-08	2.34E-08	4.63E-09	1.71E-08	3.38E-08	3.66E-09	2.03E-08	2.63E-08	
81	3.56E-09	1.24E-08	1.62E-08	3.17E-09	7.77E-09	1.04E-08	2.55E-09	1.23E-08	1.91E-08	
82	3.49E-09	1.40E-08	2.06E-08	3.09E-09	1.69E-08	2.05E-08	2.78E-09	1.10E-08	1.53E-08	
83	4.43E-09	2.08E-08	2.81E-08	3.81E-09	1.65E-08	2.39E-08	3.88E-09	1.59E-08	3.08E-08	
84	3.40E-09	1.23E-08	1.86E-08	2.03E-09	8.20E-09	1.55E-08	2.11E-09	1.49E-08	2.38E-08	
85	2.73E-09	1.38E-08	1.68E-08	2.62E-09	1.43E-08	1.41E-08	1.82E-09	1.16E-08	1.68E-08	
min	2.73E-09	1.23E-08	1.37E-08	2.03E-09	7.77E-09	1.04E-08	1.82E-09	1.10E-08	1.34E-08	
max	4.86E-09	2.08E-08	2.81E-08	4.79E-09	2.03E-08	3.38E-08	4.33E-09	2.03E-08	3.08E-08	
mean	3.96E-09	1.45E-08	2.00E-08	3.60E-09	1.47E-08	2.13E-08	3.08E-09	1.48E-08	2.17E-08	
std. dev	6.76E-10	2.75E-09	4.14E-09	9.40E-10	4.30E-09	7.25E-09	8.34E-10	3.30E-09	5.48E-09	
mean - 3 sigma	1.93E-09	6.21E-09	7.57E-09	7.84E-10	1.78E-09	-4.69E-10	5.79E-10	4.87E-09	5.29E-09	
mean +3 sigma	5.99E-09	2.27E-08	3.24E-08	6.42E-09	2.76E-08	4.30E-08	5.58E-09	2.46E-08	3.82E-08	

Wafer #	SN	-IIB C @ VCM=0V			-IIB D @ VCM=0V			IIO A @ VCM=0V		
		A			A			A		
		Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12
86	1.48E-09	1.40E-09	1.50E-09	2.56E-09	2.58E-09	2.62E-09	8.78E-10	6.61E-10	8.02E-10	
76	3.59E-09	8.06E-09	1.58E-08	4.17E-09	1.10E-08	1.95E-08	5.13E-10	-7.36E-09	-8.83E-09	
77	3.83E-09	1.71E-08	2.58E-08	4.26E-09	1.42E-08	2.46E-08	7.36E-10	1.62E-09	-3.70E-09	
78	3.97E-09	1.81E-08	1.86E-08	4.40E-09	2.10E-08	2.79E-08	2.44E-09	5.82E-09	7.56E-09	
79	2.93E-09	1.11E-08	1.96E-08	3.56E-09	1.37E-08	1.62E-08	1.40E-09	-4.24E-09	-2.67E-10	
80	3.90E-09	1.66E-08	2.24E-08	4.23E-09	1.59E-08	2.46E-08	6.34E-10	-4.34E-09	-6.71E-09	
81	2.20E-09	1.20E-08	1.93E-08	3.32E-09	1.51E-08	2.01E-08	7.41E-10	4.17E-10	8.10E-10	
82	2.58E-09	1.74E-08	2.80E-08	2.82E-09	1.38E-08	2.15E-08	7.78E-10	5.50E-10	1.93E-09	
83	3.57E-09	2.38E-08	3.06E-08	4.19E-09	1.21E-08	2.52E-08	1.38E-09	-3.36E-09	-2.00E-09	
84	2.16E-09	7.87E-09	1.55E-08	3.14E-09	9.28E-09	1.58E-08	1.48E-09	4.93E-10	-2.03E-09	
85	1.67E-09	9.40E-09	1.37E-08	2.22E-09	1.32E-08	1.80E-08	7.62E-10	-6.03E-09	-4.37E-10	
min	1.67E-09	7.87E-09	1.37E-08	2.22E-09	9.28E-09	1.58E-08	5.13E-10	-7.36E-09	-8.83E-09	
max	3.97E-09	2.38E-08	3.06E-08	4.40E-09	2.10E-08	2.79E-08	2.44E-09	5.82E-09	7.56E-09	
mean	3.04E-09	1.41E-08	2.09E-08	3.63E-09	1.39E-08	2.13E-08	1.09E-09	-1.64E-09	-1.37E-09	
std. dev	8.44E-10	5.24E-09	5.66E-09	7.40E-10	3.16E-09	4.11E-09	5.90E-10	4.07E-09	4.57E-09	
mean - 3 sigma	5.08E-10	-1.57E-09	3.96E-09	1.41E-09	4.44E-09	9.00E-09	-6.85E-10	-1.38E-08	-1.51E-08	
mean +3 sigma	5.57E-09	2.99E-08	3.79E-08	5.85E-09	2.34E-08	3.37E-08	2.86E-09	1.06E-08	1.23E-08	

Wafer #	SN	IIO B @ VCM=0V			IIO C @ VCM=0V			IIO D @ VCM=0V		
		A			A			A		
		3□	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12
86	1.06E-09	9.78E-10	9.55E-10	7.10E-10	8.39E-10	5.57E-10	-3.01E-10	-3.49E-10	-4.47E-10	
76	1.14E-09	-1.74E-09	7.31E-09	-1.51E-11	-4.13E-09	-2.18E-09	5.51E-10	2.19E-09	-1.62E-10	
77	5.97E-10	3.68E-09	3.54E-09	5.37E-10	-1.95E-09	-9.16E-10	2.46E-10	3.59E-09	-1.42E-09	
78	1.08E-09	7.61E-09	2.83E-09	4.94E-10	1.60E-09	3.36E-09	-3.73E-10	-8.12E-09	-7.81E-09	
79	1.48E-09	5.19E-09	2.53E-09	4.24E-10	4.02E-09	5.03E-09	3.21E-10	-9.36E-10	-2.43E-09	
80	1.60E-09	9.87E-09	1.22E-08	4.67E-10	9.77E-10	-1.12E-09	6.36E-10	-1.21E-09	-1.18E-09	
81	9.76E-10	3.13E-09	2.54E-09	4.59E-10	5.98E-09	1.21E-09	2.38E-10	-2.67E-09	-3.90E-09	
82	1.23E-09	3.23E-09	2.70E-09	3.29E-10	-4.71E-09	-6.25E-09	6.76E-10	2.29E-10	-9.02E-10	
83	9.24E-10	6.66E-09	-4.31E-09	4.06E-10	-6.80E-09	-5.70E-09	2.40E-10	8.72E-09	2.92E-09	
84	9.03E-10	-6.00E-09	-7.35E-09	4.62E-10	3.14E-09	4.52E-09	2.63E-10	3.07E-09	2.75E-09	
85	1.19E-09	1.28E-09	4.50E-10	1.13E-10	3.14E-09	0.00E+00	5.12E-10	5.74E-10	-1.24E-09	
min	5.97E-10	-6.00E-09	-7.35E-09	-1.51E-11	-6.80E-09	-6.25E-09	-3.73E-10	-8.12E-09	-7.81E-09	
max	1.60E-09	9.87E-09	1.22E-08	5.37E-10	5.98E-09	5.03E-09	6.76E-10	8.72E-09	2.92E-09	
mean	1.11E-09	3.29E-09	2.24E-09	3.67E-10	1.26E-10	-2.07E-10	3.31E-10	5.43E-10	-1.34E-09	
std. dev	2.91E-10	4.63E-09	5.43E-09	1.79E-10	4.27E-09	3.89E-09	3.01E-10	4.42E-09	3.09E-09	
mean - 3 sigma	2.40E-10	-1.06E-08	-1.40E-08	-1.70E-10	-1.27E-08	-1.19E-08	-5.73E-10	-1.27E-08	-1.06E-08	
mean +3 sigma	1.98E-09	1.72E-08	1.85E-08	9.05E-10	1.29E-08	1.15E-08	1.23E-09	1.38E-08	7.95E-09	

Wafer #	SN	AVO A @ VO=+-10V, RL=10K			AVO B @ VO=+-10V, RL=10K			AVO C @ VO=+-10V, RL=10K		
		V/mV			V/mV			V/mV		
		Pre	1.00E+12	2.00E+12	Pre	1.00E+12	2.00E+12	3□	1.00E+12	2.00E+12
86		867.10	846.04	848.83	843.99	855.53	851.27	883.11	893.40	884.59
76		792.62	319.17	227.18	784.74	313.67	225.51	806.46	319.49	226.99
77		763.16	303.98	219.17	752.46	297.34	212.94	761.37	301.66	214.88
78		769.14	301.45	217.78	752.47	294.89	214.14	792.26	304.47	221.49
79		804.22	309.61	228.19	796.17	312.89	227.51	827.24	320.23	232.67
80		783.79	310.05	223.26	775.51	305.50	223.13	818.72	317.81	228.85
81		826.10	343.69	248.85	845.28	348.14	254.75	873.60	355.13	257.23
82		828.57	342.69	250.19	845.20	343.68	250.35	898.42	353.75	256.64
83		790.34	320.54	234.47	795.84	322.48	233.60	812.70	325.24	234.44
84		838.68	342.66	250.59	853.16	350.25	254.90	901.53	362.97	260.73
85		838.63	341.28	250.46	846.50	338.26	250.84	883.95	351.88	258.67
	min	763.16	301.45	217.78	752.46	294.89	212.94	761.37	301.66	214.88
	max	838.68	343.69	250.59	853.16	350.25	254.90	901.53	362.97	260.73
	mean	803.53	323.51	235.01	804.73	322.71	234.77	837.62	331.26	239.26
	std. dev	28.09	17.41	13.73	39.78	21.03	16.61	48.48	22.55	17.32
	mean - 3 sigma	719.27	271.28	193.81	685.40	259.63	184.94	692.19	263.61	187.31
	mean +3 sigma	887.78	375.74	276.21	924.06	385.79	284.60	983.06	398.91	291.20

Wafer #	SN	AVO D @ VO=+-10V, RL=10K		
		V/mV		
		3□	1.00E+12	2.00E+12
86		913.93	912.21	912.87
76		835.85	326.13	234.38
77		792.06	304.00	219.47
78		809.72	308.92	222.37
79		842.60	323.77	234.95
80		837.78	323.49	232.84
81		894.77	359.70	260.94
82		895.13	356.32	260.43
83		838.53	327.71	239.88
84		906.06	360.64	263.87
85		923.82	361.06	264.15
	min	792.06	304.00	219.47
	max	923.82	361.06	264.15
	mean	857.63	335.17	243.33
	std. dev	44.18	22.19	17.45
	mean - 3 sigma	725.09	268.59	190.99
	mean +3 sigma	990.17	401.75	295.66





