ANALOG DEVICES

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SINGLE EVENT EFFECTS TEST REPORT ADL8120-CSL

November 2025

Radiation Test Report	
Product:	ADL8120-CSL
Effective LET:	83.2 MeV-cm^2/mg
Fluence:	1E7 Ions/cm^2
Facilities:	TAMU
Tested:	Nov. 3, 2025

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SEE Test Report for the ADL8120 –
30kHz to 20GHz LNA

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Test Date:
November 3, 2025

I. Introduction

The purpose of this test is to determine the heavy ion-induced Single-Event Effects (SEE) susceptibility of the ADL8120, a 30kHz – 20GHz Ultra-Wideband LNA.

Single Event Latch-up was evaluated with high supply voltage and high temperature with no latch-up or other destructive SEE events observed to the highest LET tested (83.2 MeV-cm^2/mg). The device was evaluated at 125°C using the TAMU heating system (forced air).

II. Device Under Test

The ADL8120 is a ultra-wideband low noise amplifier (LNA) that operates from 30 kHz to 20 GHz. Typical gain and noise figure are 14 dB and 1.9 dB, respectively, from 30 kHz to 14 GHz. The ADL8120 is fabricated on a pseudo-morphic high electron mobility transistor (pHEMT) process. Figure 1 shows a functional block diagram of the device. Table 1 shows the basic part and test details. Detailed device parameters and functional descriptions can be found in the datasheet.

Figure 1. Functional block diagram.

Table 1
Part and test information.

Generic Part Number:	ADL8120
Date of Test:	Nov 3, 2025
Manufacturer:	Analog Devices
Die Revision:	ADL8120
Part Function:	30kHz to 20GHz LNA
Part Technology:	GaAs
Package Style:	8-Ld LFCSP
Interconnect:	Wire-Bonded

III. Test Facilities

The heavy-ion beam testing was carried out at the Texas A&M University Cyclotron Facility. The facility utilizes the K500 cyclotron with a superconducting magnet which generates the magnetic field used to accelerate the ions. The test setup was in an air environment.

Facility: Texas A&M University Cyclotron Facility
Beam: 24.7 A MeV
Flux: up to 1×10^5 $cm^{-2} \cdot s^{-1}$
Fluence: up to 1×10^7 cm^{-2} (perrun)
Ions: Ag

IV. Test Method

A. Test Setup

The device under test (DUT) was chemically de-processed to expose the wire-bonded die. The RF input was set to 10 GHz @ 15dBm using a Hittite HMC-T2240 RF Generator. The power supply to the DUT was set to 3.6 V with ~62 mA supply current for SEL and 2.967V with ~48mA supply current for SET. The output was monitored using a Keysight Field Fox Spectrum Analyzer. The power supply current was monitored using Python scripts. The TAMU temp forcing system was used to get the device to 125°C. The test configuration is shown in Figure 2.

Figure 2: ADL8120 Test Setup

B. Irradiation procedure

1) Turn on power to DUT
2) SEL: Set the temperature of the DUT to 125°C

   SET: Set the temperature of the DUT to room temperature
3) Start power supply current and spectrum analyzer monitoring script
4) Start Beam
5) Stop beam at 1E7 total ions

Test Conditions

Temperature:	**SEL:** 125°C **SET:** 25°C
RF Input Frequency:	10 GHz
Power Supply(s):	**SEL:** 3.63V **SET:** 2.97V
Parameters:	Supply Current RF Output
Samples:	4

V. Results

SEL – The ADL8120 did not exhibit SEL at ≤ 83.2 MeV-cm^2/mg out to 1.0E7 ions/cm^2 while heated to 125°C. The test runs are shown below in Table 2. Plots are shown below in Figures 3-6.

Table 2: SEL Test Runs

Run	Dut	ion	LET (MeVcm^2/mg)	Range(um)	Angle(°)	TID(Rads)	Flux (ions/cm^{2}s)	Fluence (Ions/cm^2)	SEL
Run 1	4	Xe	83.2	70.5	40	13.3k	7.6e4	9.99e6	0
Run 4	3	Xe	83.2	70.5	40	13.3k	8.9e4	9.97e6	0
Run 5	2	Xe	83.2	70.5	40	13.35k	8.6e4	1.001e7	0
Run 7	1	Xe	83.2	70.5	40	13.38k	8.49e4	1.003e7	0

SET – The ADL8120 did not exhibit SET at ≤ 83.2 MeV-cm^2/mg out to 1.0E7 ions/cm^2 while at 25°C. The test runs are shown below in Table 3. Plots are shown below in Figures 7-10.

Table 3: SET Test Runs

Run	Dut	ion	LET (MeVcm^2/mg)	Range(um)	Angle(°)	TID(Rads)	Flux (ions/cm^{2}s)	Fluence (Ions/cm^2)	SET
Run 2	4	Xe	83.2	70.5	40	13.3k	7.6e4	9.99e6	0
Run 3	3	Xe	83.2	70.5	40	13.4k	9.5e4	1.002e7	0
Run 6	2	Xe	83.2	70.5	40	13.38k	9.51e4	1.003e7	0
Run 8	1	Xe	83.2	70.5	40	13.41k	9.06e4	1.005e7	0

Figure 3: ADL8120 Run 1 Power Supply Current Bd 4

Figure 4: ADL8120 Run 4 Power Supply Current Bd 3

Figure 5: ADL8120 Run 5 Power Supply Current Bd 2

Figure 6: ADL8120 Run 7 Power Supply Current Bd 1

Figure 7: SET Run 2, Bd 4

Figure 8: SET Run 3, Bd 3

Figure 9: SET Run 6, Bd 2

Figure 10: SET Run 8, Bd 1

VI. Conclusion:

The ADL8120 does not exhibit SEL ≤83.2 MeV-cm^2/mg. SET were not detected at the same level.

Table 4: Equipment used and Calibration:

Equipment	Calibration
Keithley 2300G-30-6	SN# 802901012766910023 Calibration due 2/28/26
HMC-T2240	SN#002023 No Cal required – verified using Field Fox
Keysight Field Fox N9552B	SN#MY62151444 Calibration due 9/24/26