



# TOTAL DOSE RADIATION TEST REPORT

**Part Type : LTC1414**

**Package : 28-Pin SSOP**

**14-Bit, Sampling A/D Converter**

**Linear Technology**

**Report Reference : ESA\_QCA991202T\_C**

**Issue : 01**

**Date : December 21<sup>st</sup> 1999**

**ESA Contract No 13602/99/NL/GD dated 18/06/99**

European Space Agency Contract Report

The work described in this report was done under ESA contract.  
Responsibility for the contents resides in the author or organization that prepared it

**ESTEC Technical Officer: R. Harboe Sorensen**

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# TOTAL DOSE RADIATION TEST REPORT

## on

### Linear Technology LTC1414 14-Bit A/D Converter.

#### TABLE OF CONTENTS

<b>1</b>	<b>ABSTRACT .....</b>	<b>3</b>
<b>2</b>	<b>INTRODUCTION.....</b>	<b>4</b>
<b>3</b>	<b>APPLICABLE AND REFERENCE DOCUMENTS.....</b>	<b>4</b>
3.1	APPLICABLE DOCUMENTS .....	4
3.2	REFERENCE DOCUMENTS .....	4
<b>4</b>	<b>TEST SAMPLES .....</b>	<b>4</b>
<b>5</b>	<b>EXPERIMENTAL CONDITIONS.....</b>	<b>5</b>
5.1	RADIATION SOURCE DOSE RATE AND ANNEALING.....	5
5.2	BIAS DURING DOSE EXPOSURES AND MEASUREMENTS CONDITIONS .....	6
5.2.1	Bias conditions .....	6
5.2.2	Electrical Measurements.....	7
5.2.2.1	Test Setup .....	7
5.2.2.2	Conversion Characteristics Test Principle.....	9
5.2.2.3	Dynamic Characteristics.....	10
5.3	ELECTRICAL PARAMETERS TEST CONDITIONS AND LIMITS.....	11
<b>6</b>	<b>CONCLUSION .....</b>	<b>13</b>

**List of tables:**

Table 1 : Experimental Conditions: High Dose Rate .....	5
Table 2 : Experimental Conditions: Low Dose Rate .....	5
Table 3 : Measured electrical parameters .....	11

**List of Figures:**

Figure 1 : Bias Conditions during Irradiation Exposures and Annealing.....	6
Figure 2 : LTC1414 test program principle .....	7
Figure 3 : LTC1414 Test Fixture Board .....	8
Figure 4 : Conversion Characteristics Example.....	9
Figure 5 : Dynamic Characteristics Example.....	10

**Appendix:**

APPENDIX 1 : TEST RESULTS - HIGH DOSE RATE.....	14
APPENDIX 2 : TEST RESULTS - LOW DOSE RATE .....	53

<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

## 1 Abstract

Under ESA/ESTEC contract n° 13602/99/NL/GD dated 18/06/99 covering "Radiation Pre-screening of High-resolution High-speed ADC's", three different 14-bit Analog to Digital converters were radiation assessed. Results from these assessments, primarily focused on the radiation sensitivity of the ADC's to Total Ionizing Dose (TID) and Single Event Effects (SEE), are reported in individual TID and SEE reports. Below summary table lists manufacturer and evaluated types, and gives references to the various reports issued.

<b>Manufacturer</b>	<b>Type</b>	<b>TID Report</b>	<b>SEE Report</b>
Analog Devices	AD9243	ESA_QCA991201T_C	ESA_QCA991201S_C
Linear Technology	LTC1414	ESA_QCA991202T_C	ESA_QCA991202S_C
National Semiconductor	ADC14161	ESA_QCA991203T_C	ESA_QCA991203S_C

<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

## 2 Introduction

A total dose radiation evaluation test of the Linear Technology LTC1414 14-Bit A/D Converter has been performed with an accumulated dose of about 50 Krad(Si) at two different dose rates of 300 rad(Si)/hour and 1000 rad(Si)/hour respectively, in response to European Space Agency contract reference : 13602/99/NL/GD dated 18/06/99.

The purpose of this test was to evaluate total dose withstanding of this component, to investigate its suitability for being used in space applications. This test was conducted on commercial samples procured from Linear Technology.

Test has been performed in accordance with Hirex proposal HRX/99.4366 issue 01.

A complete set of electrical measurements together with graphical representation of measured parameters with respect to total dose received, are provided for all samples.

SEE results for this device type can be found in SEE radiation test report: ESA\_QCA991202S\_C.

## 3 Applicable and Reference Documents

### 3.1 Applicable Documents

- ESA/SCC Basic specification N° 22900 issue 4.
- Linear technology LTC1414 datasheet - August 1998.
- Hirex Engineering proposal: HRX/99.4366 issue 01.

### 3.2 Reference Documents

- SOW Radiation Pre-screening of High-resolution High-speed ADC's Ref: APP-JP/99-02-057/PS/ps.
- MIL-STD-883: test methods and procedures for microcircuits.

## 4 Test Samples

6 samples of the LTC1414 device were tested (2 groups of 3 + 1 control sample). Each group was submitted to exposures at two different dose rates (a high dose rate of 1000rad(Si)/hour and a low dose rate of 300 rad(Si)/hour respectively).

The samples were serialized before the radiation test as indicated in the following table.

Serial Number	Allocation
1	Control
2	High Dose Rate
3	High Dose Rate
4	High Dose Rate
5	Low Dose Rate
6	Low Dose Rate
7	Low Dose Rate

Identification of the LTC1414 is given below:

<b>Part Number:</b>	LTC1414CGN	<b>Mask Set:</b>	NA
<b>Top Marking:</b>	9817 LTC1414CGN	<b>Chip Marking:</b>	NA
<b>Diffusion Lot:</b>	NA	<b>Wafer #:</b>	NA
<b>Date Code:</b>	9817	<b>Project:</b>	Multi-Project

<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

## 5 Experimental Conditions

### 5.1 Radiation Source Dose Rate and Annealing

The dose exposures were performed at CERT-ONERA. In this irradiation facility, a Cobalt 60 source is used with the possibility to vary the dose rate by simply adjusting the distance to the source. The irradiation conditions used for this test are provided in the following tables:

<b>Irradiation Steps</b>	<b>Doserate</b>	<b>Annealing steps</b>	<b>Temperature</b>
<b>krads</b>	<b>krads/h</b>	<b>hours</b>	<b>°C</b>
0			25
8	1,0		25
22	1,0		25
28	1,0		25
43.2	1,0		25
50	1,0	0	25
		24	25
		192	100

**Table 1 : Experimental Conditions: High Dose Rate**

<b>Irradiation Steps</b>	<b>Doserate</b>	<b>Annealing steps</b>	<b>Temperature</b>
<b>krads</b>	<b>krads/h</b>	<b>hours</b>	<b>°C</b>
0			25
7.5	0,3		25
14	0,3		25
20.5	0,3		25
29.2	0,3		25
50	0,3	0	25
		24	25
		192	100

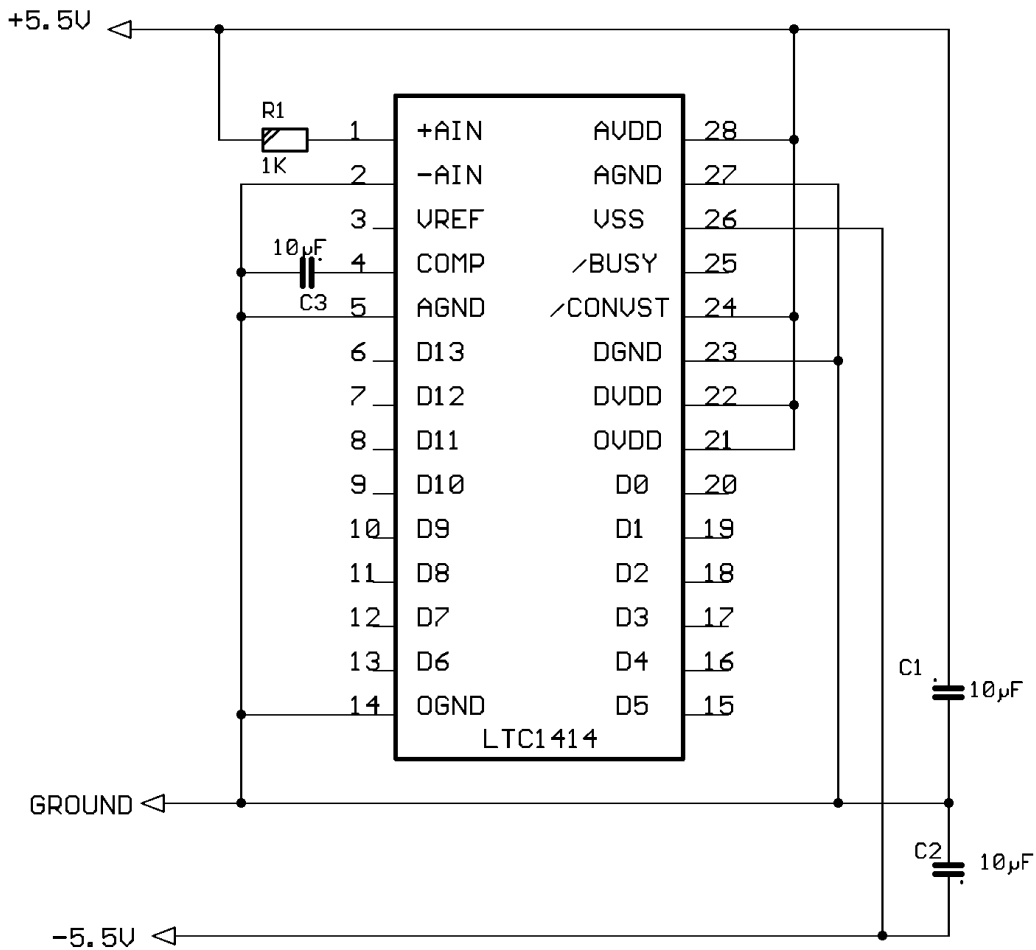
**Table 2 : Experimental Conditions: Low Dose Rate**

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Part Type :	LTC1414	Manufacturer :	Linear Technology

## 5.2 Bias during Dose Exposures and Measurements conditions

### 5.2.1 Bias conditions

During exposures a dedicated test board was used mounted on a special board-holder made for irradiation. The test board allowed to bias the devices in accordance with the electrical circuit provided in Figure 1.



**Figure 1 : Bias Conditions during Irradiation Exposures and Annealing**

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Part Type :	LTC1414	Manufacturer :	Linear Technology

## 5.2.2 Electrical Measurements

### 5.2.2.1 Test Setup

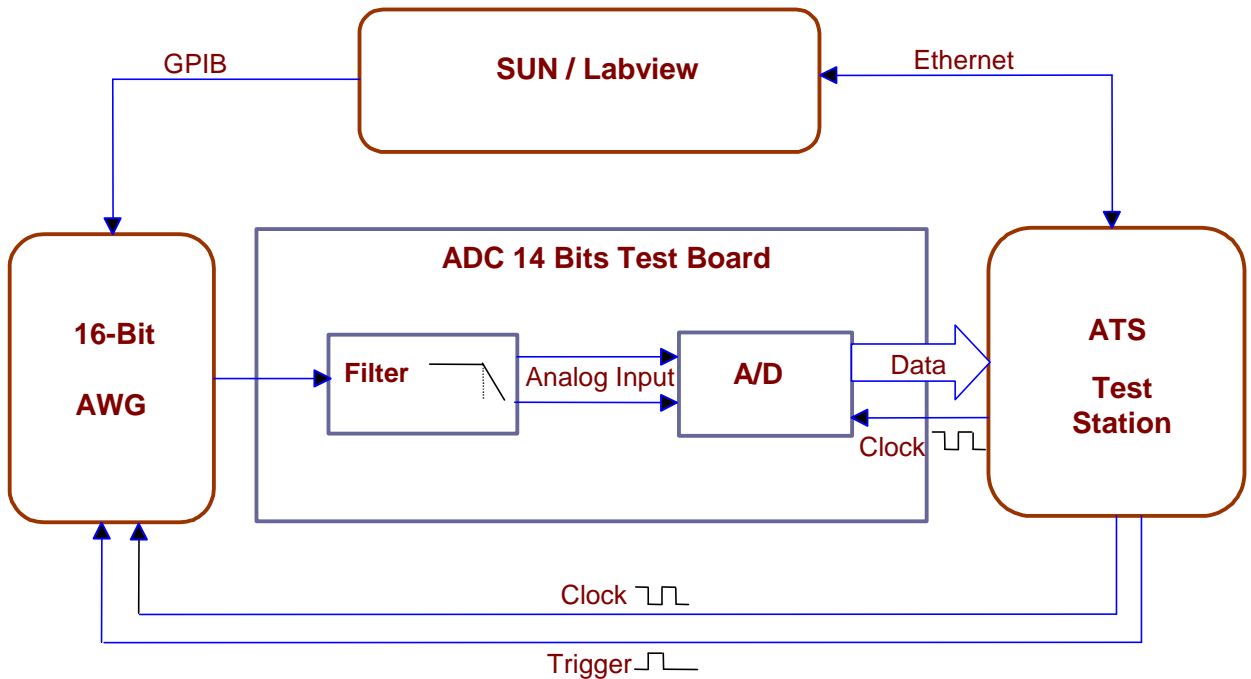
Electrical parameters test program principle for LTC1414 is provided in Figure 2.

The test Setup for this ADC includes an IMS ATS Test Station, an arbitrary waveform generator (AWG), and a filter. To ensure coherent clocking to the digital tester, ADC, and AWG, the clock from the ATS is used.

The AWG has 16 bits of resolution, and provides pure enough signal to the test board thanks to internal seventh-order butterworth and third-order Chebyshev filters. Additional filtering was also implemented on the test fixture board to clean the noise and distortion from the input signal.

After input signal is generated, the ATS acquires data output by the ADC. The dedicated Labview program analyses the data and displays the results on a SUN workstation.

The combination of high-speed digital signals and sensitive high-resolution analog signals on the same DUT requires effective techniques for isolating the digital switching transients from the analog signals. With proper grounding and fixture-board layering it is possible to effectively shield signals and maintain signal integrity. In addition minimizing grounding problems is required and was ensured by carefully selecting and connecting the socket and by using the correct decoupling methods. These constraints have led to the design of a specific multilayer test board (See photo of this board in figure 3).



**Figure 2 : LTC1414 test program principle**

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Part Type :	LTC1414	Manufacturer :	Linear Technology

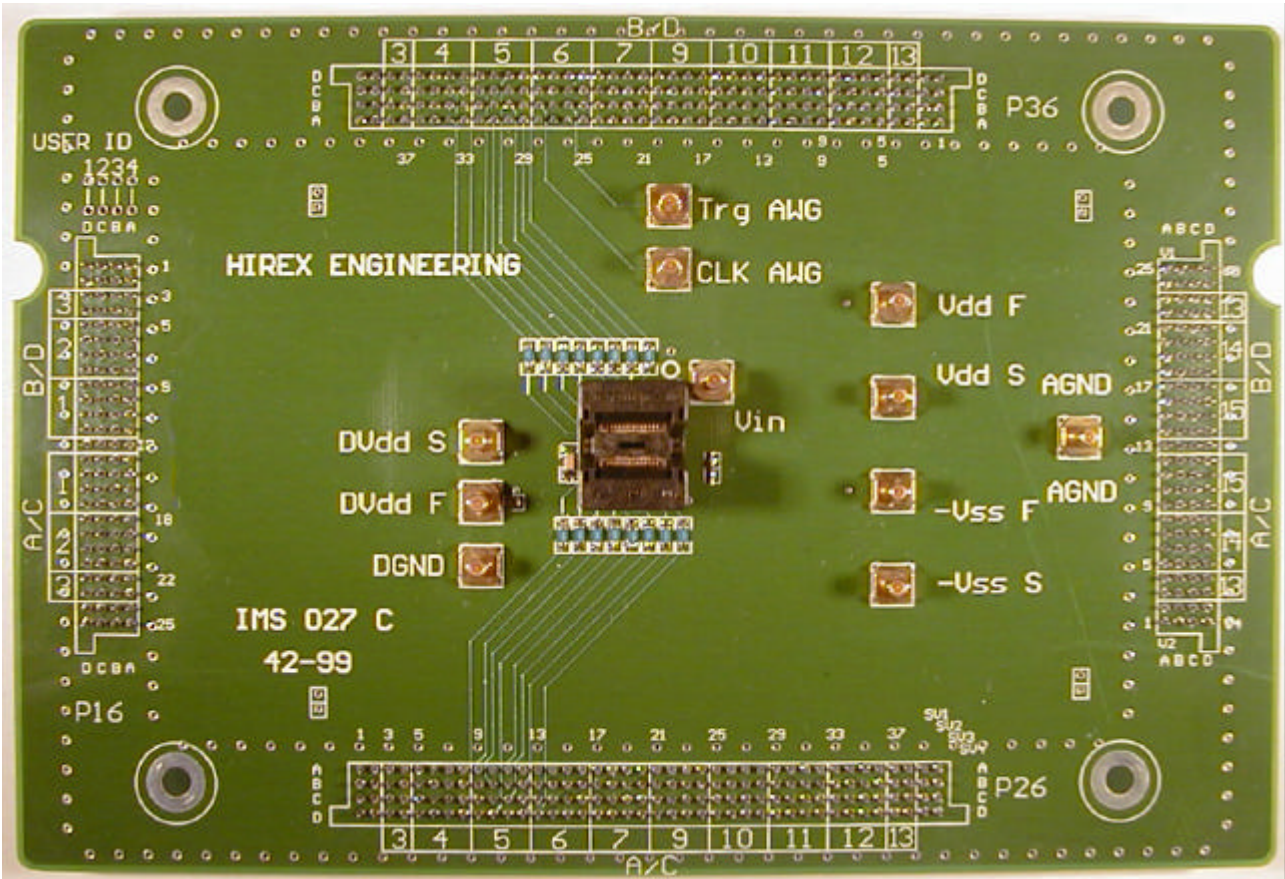


Figure 3 : LTC1414 Test Fixture Board



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Part Type :	LTC1414	Manufacturer :	Linear Technology

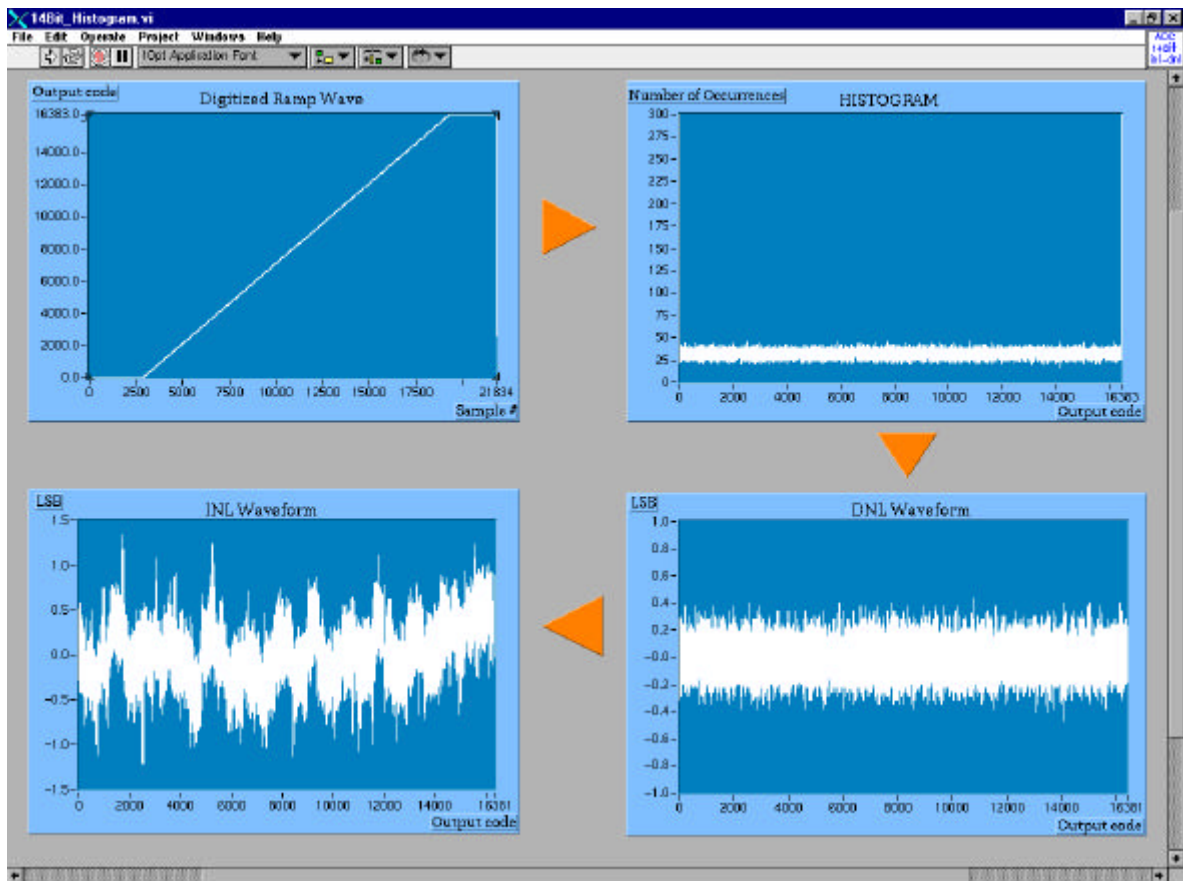
### 5.2.2.2 Conversion Characteristics Test Principle

For conversion characteristics including Differential Non Linearity, Integral Non Linearity, Offset Error, Gain Error, a histogram test technique was used.

A full scale pure ramp is input to the ADC. Thousands samples of the input signal are taken and processed by the histogram software. At the end of sampling, the histogram is plotted with possible output codes along the X axis and frequency of occurrence along Y axis. Above each possible output code, a point is plotted whose height is proportional to the total number of times that code occurred.

From histogram test data, dedicated math routines calculate the different parameter values.

An example of histogram obtained and typical waveforms for Integral and Differential Non linearities is shown on Figure 4.



**Figure 4 : Conversion Characteristics Example**

<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

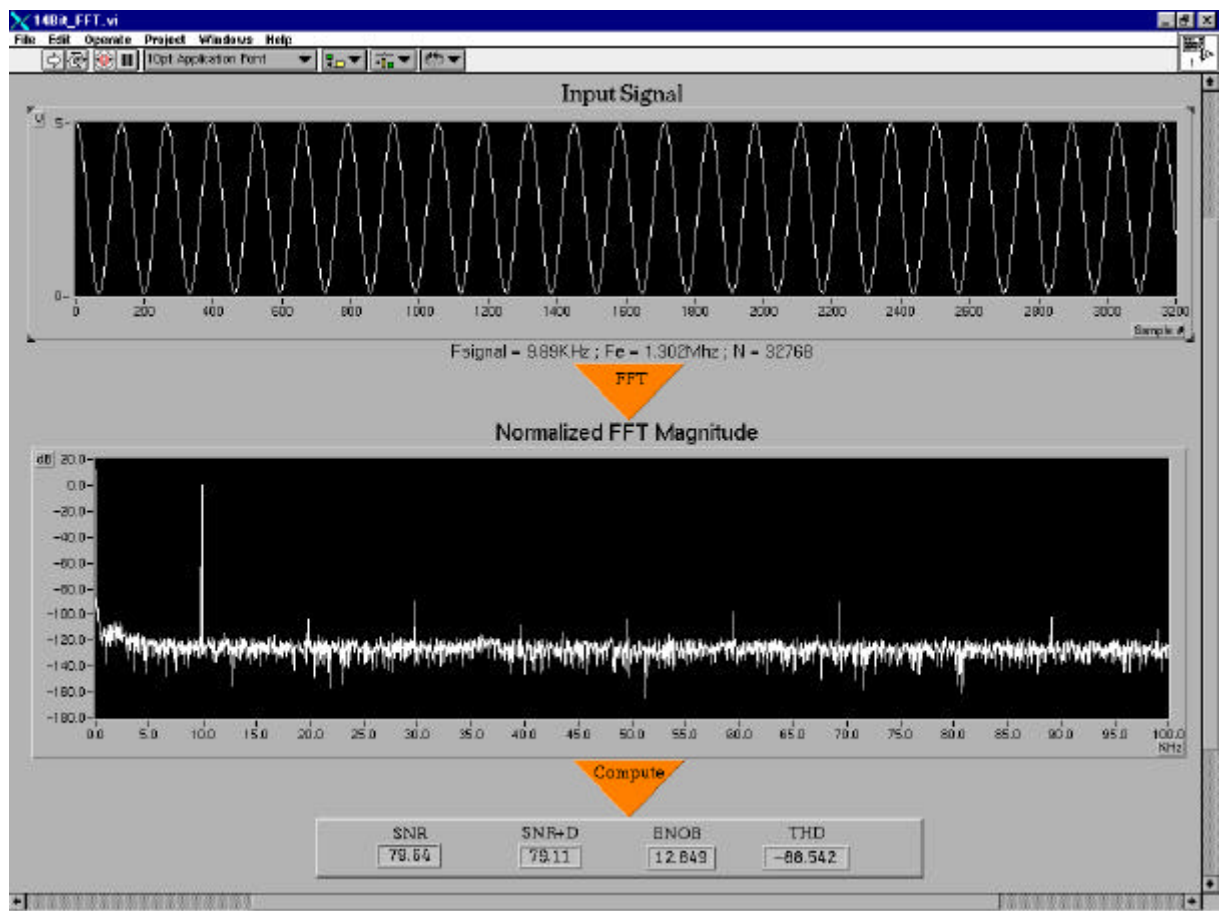
### 5.2.2.3 Dynamic Characteristics

For dynamic characteristics including Signal-to-Noise Ratio, Signal-to-Noise Plus Distortion Ratio, Effective Number of Bits, and Total Harmonic Distortion, a Fast Fourier Transform (FFT) algorithm was implemented.

A full scale sinewave of specified frequency is input to the device under test. Harmonics of the input sinewave, caused by the integral nonlinearity of the ADC, are aliased into the baseband spectrum and can be readily identified. The frequency of the input sinewave is not arbitrary and must be selected so that harmonics, aliased into baseband, do not coincide with the fundamental.

From FFT spectra test data, dedicated math routines calculate the different parameter values.

Figure 5 shows an example of results of FFT testing.



**Figure 5 : Dynamic Characteristics Example**

<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

### 5.3 Electrical parameters test conditions and limits

Electrical parameters test conditions and limits used for performing this test are given in the following table.

Symbol	Test Parameter	Test Conditions	Min limit	Typical	Max limit	Unit
S(N+D)	Signal-to-Noise Plus Distortion Ratio	VDD=+5V; VSS=-5V; Input signal: +/-2.5V, 10KHz; F <sub>sample</sub> =1.3MHz		80		dB
THD	Total Harmonic Distortion	VDD=+5V; VSS=-5V; Input signal: +/-2.5V, 10KHz; F <sub>sample</sub> =1.3MHz; first 5 Harmonics		-95		dB
INL	Integral Nonlinearity	VDD=+5V; VSS=-5V; Input signal: +/-2.5V			2	LSB
DNL	Differential Nonlinearity	VDD=+5V; VSS=-5V; Input signal: +/-2.5V			1.75	LSB
BOE	Bipolar Offset error	VDD=+5V; VSS=-5V; Input signal: 0V	-20		20	LSB
FSE	Full Scale error	VDD=+5V; VSS=-5V; Input signal:2.5V; Int Ref.	-60		60	LSB
I <sub>dd</sub>	Positive Supply Current	VDD=+5V; VSS=-5V; CS High			0.016	A
I <sub>ss</sub>	Negative Supply Current	VDD=+5V; VSS=-5V; CS High			0.03	A
V <sub>ih</sub>	High Level Input voltage	VDD=5.25V; VSS=-5V	2.4			V
V <sub>il</sub>	Low Level Input Voltage	VDD=4.75V; VSS=-5V			0.8	V
V <sub>ohD13</sub>	High Level Output Voltage Pin D13	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD12</sub>	High Level Output Voltage Pin D12	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD11</sub>	High Level Output Voltage Pin D11	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD10</sub>	High Level Output Voltage Pin D10	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD9</sub>	High Level Output Voltage Pin D9	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD8</sub>	High Level Output Voltage Pin D8	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD7</sub>	High Level Output Voltage Pin D7	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD6</sub>	High Level Output Voltage Pin D6	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD5</sub>	High Level Output Voltage Pin D5	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD4</sub>	High Level Output Voltage Pin D4	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD3</sub>	High Level Output Voltage Pin D3	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
V <sub>ohD2</sub>	High Level Output Voltage Pin D2	VDD=4.75V; VSS=-5V; IO=-200uA	4			V

**Table 3 : Measured electrical parameters**

<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

Symbol	Test Parameter	Test Conditions	Min limit	Typical	Max limit	Unit
VohD1	High Level Output Voltage Pin D1	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
VohD0	High Level Output Voltage Pin D0	VDD=4.75V; VSS=-5V; IO=-200uA	4			V
VolD13	Low Level Output Voltage Pin D13	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD12	Low Level Output Voltage Pin D12	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD11	Low Level Output Voltage Pin D11	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD10	Low Level Output Voltage Pin D10	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD9	Low Level Output Voltage Pin D9	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD8	Low Level Output Voltage Pin D8	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD7	Low Level Output Voltage Pin D7	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD6	Low Level Output Voltage Pin D6	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD5	Low Level Output Voltage Pin D5	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD4	Low Level Output Voltage Pin D4	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD3	Low Level Output Voltage Pin D3	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD2	Low Level Output Voltage Pin D2	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD1	Low Level Output Voltage Pin D1	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V
VolD0	Low Level Output Voltage Pin D0	VDD=4.75V; VSS=-5V; IO=1.6mA			0.4	V

**Table 3 : Measured electrical parameters (continued)**

<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

## 6 Conclusion

A Total Ionizing Dose assessment was carried out by Hirex Engineering under ESA contract on the Linear Technology LTC1414 14-Bit Analog to Digital Converter.

2 groups of 3 samples each plus one control sample were used during testing. The first group was exposed to radiation using a dose rate of 1000 rad(Si)/hour. The second group of 3 samples was exposed to radiation using a lower dose rate of 300 rad(Si)/hour. All devices were irradiated and tested at room temperature.

At high dose rate, Integral Non Linearity marginally exceeded specification limit at 22 krad(Si), but remained constant up to the last exposure step at 50 krad(Si) and recovered for most samples after annealing.

All other measured parameters remained within specification limits all along testing.

At low dose rate, Integral Non Linearity exhibited small changes just beyond specification limit at 50 krad(Si), but recovered for all samples after annealing.

All other measured parameters remained within specification limits all along testing.

No significant changes were recorded depending on the dose rate conditions, and all devices remained functional with good parametric performances at any stages during testing.

No Time Dependent Effects (TDE) were recorded during this evaluation, only a slight rebound effect was observed at both dose rates on static parameters I<sub>dd</sub>, I<sub>ss</sub>, V<sub>ih</sub>, V<sub>il</sub> and V<sub>ol</sub>. However these parameters did remain within specification limits in all cases.

Finally it should be mentioned that Signal-to-Noise Plus Distortion Ratio S(N+D) and Total Harmonic Distortion (THD) were compared to typical values since no limits are specified in data sheet.

These two parameters were measured for this lot, slightly under typical values from the initial readings, but did not exhibit significant drift during testing.

This device has shown a fairly good resistance to radiation total dose induced effects.

Details on test results can be found in Appendix 1 and Appendix 2 for high dose rate and low dose rate respectively.

<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

**APPENDIX 1 : TEST RESULTS - HIGH DOSE RATE**

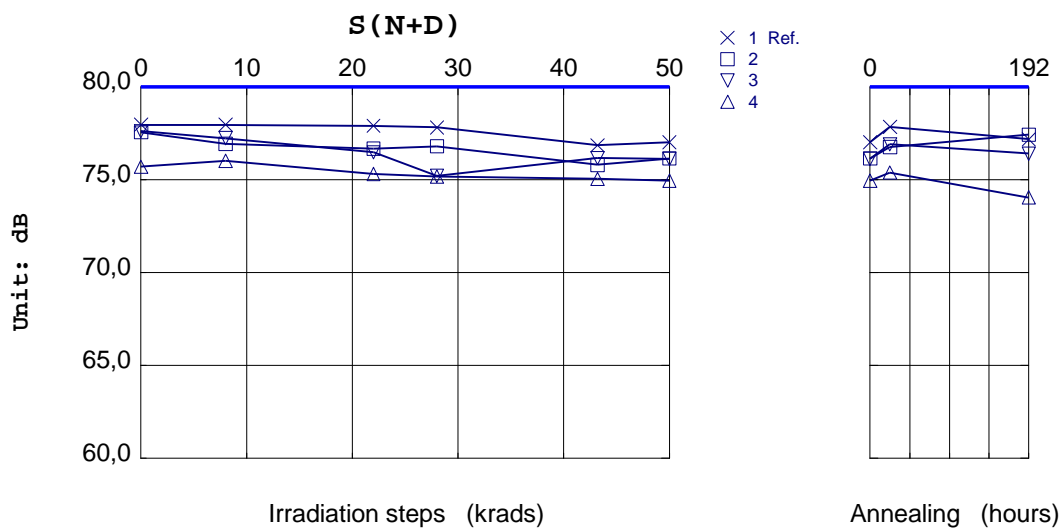
<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Test results including tables and graphics are provided in this section for each measured parameter corresponding to a high dose rate exposure.

**Parameter: Signal-to-Noise Plus Distortion Ratio: S(N+D)**  
**VDD=+5V; VSS=-5V; Input signal: +/-2.5V, 10KHz; Fsample=1.3MHz**  
 Unit= dB  
 Spec limit typical: 80  
 Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	7,795E +01	7,795E +01	7,790E +01	7,781E +01	7,685E +01	7,701E +01	7,784E +01
2	7,755E +01	7,692E +01	7,667E +01	7,679E +01	7,579E +01	7,613E +01	7,675E +01
3	7,761E +01	7,723E +01	7,647E +01	7,520E +01	7,616E +01	7,611E +01	7,690E +01
4	7,570E +01	7,601E +01	7,531E +01	7,516E +01	7,504E +01	7,494E +01	7,538E +01
Statistics							
Min	7,570E +01	7,601E +01	7,531E +01	7,516E +01	7,504E +01	7,494E +01	7,538E +01
Max	7,761E +01	7,723E +01	7,667E +01	7,679E +01	7,616E +01	7,613E +01	7,690E +01
Mean	7,695E +01	7,672E +01	7,615E +01	7,572E +01	7,566E +01	7,573E +01	7,634E +01
Sigma	1,086E +00	6,334E -01	7,372E -01	9,317E -01	5,718E -01	6,825E -01	8,408E -01

Test Step	192 hours
Serial #	
1 Ref.	7,717E +01
2	7,741E +01
3	7,640E +01
4	7,404E +01
Statistics	
Min	7,404E +01
Max	7,741E +01
Mean	7,595E +01
Sigma	1,734E +00



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Total Harmonic Distortion: THD**  
**VDD=+5V; VSS=-5V; Input signal: +/-2.5V, 10KHz; Fsample=1.3MHz; first 5 Harmonics**

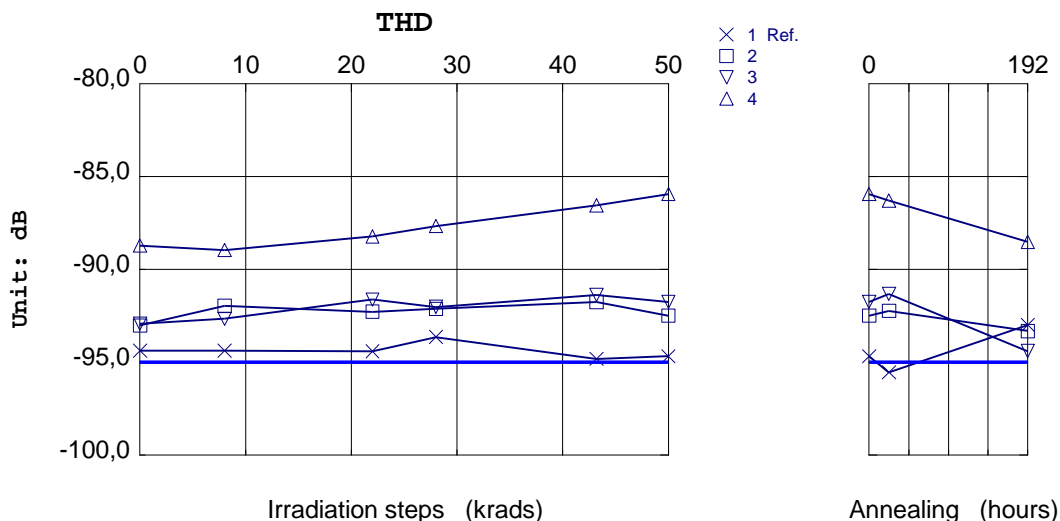
Unit= dB

Spec limit typical: -95

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	-9,438E +01	-9,438E +01	-9,441E +01	-9,365E +01	-9,482E +01	-9,468E +01	-9,554E +01
2	-9,303E +01	-9,196E +01	-9,228E +01	-9,213E +01	-9,177E +01	-9,250E +01	-9,224E +01
3	-9,293E +01	-9,266E +01	-9,163E +01	-9,202E +01	-9,137E +01	-9,176E +01	-9,132E +01
4	-8,872E +01	-8,897E +01	-8,822E +01	-8,767E +01	-8,656E +01	-8,595E +01	-8,630E +01
Statistics							
Min	-9,303E +01	-9,266E +01	-9,228E +01	-9,213E +01	-9,176E +01	-9,250E +01	-9,224E +01
Max	-8,872E +01	-8,897E +01	-8,822E +01	-8,767E +01	-8,656E +01	-8,595E +01	-8,630E +01
Mean	-9,156E +01	-9,120E +01	-9,071E +01	-9,061E +01	-8,990E +01	-9,007E +01	-8,995E +01
Sigma	2,461E +00	1,962E +00	2,178E +00	2,546E +00	2,901E +00	3,585E +00	3,197E +00

Test Step	192 hours
Serial #	
1 Ref.	-9,299E +01
2	-9,332E +01
3	-9,440E +01
4	-8,852E +01
Statistics	
Min	-9,440E +01
Max	-8,852E +01
Mean	-9,208E +01
Sigma	3,128E +00





<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070
			Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

**Parameter: Integral Nonlinearity: INL**  
**VDD=+5V; VSS=-5V; Input signal: +/-2.5V**

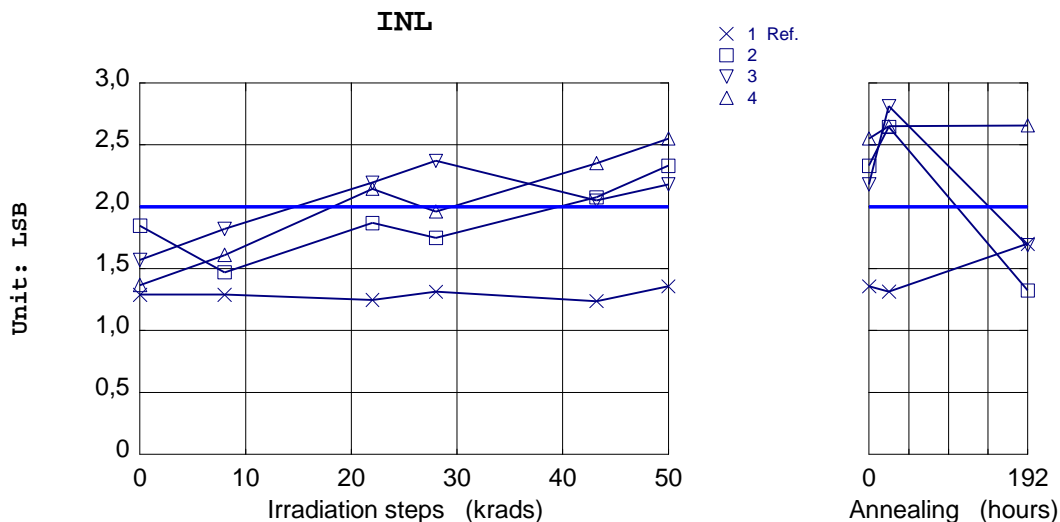
Unit= LSB

Spec limit max: 2

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,288E +00	1,288E +00	1,247E +00	1,313E +00	1,236E +00	1,356E +00	1,314E +00
2	1,846E +00	1,470E +00	1,868E +00	1,748E +00	2,076E +00	2,330E +00	2,644E +00
3	1,570E +00	1,820E +00	2,193E +00	2,370E +00	2,050E +00	2,180E +00	2,812E +00
4	1,367E +00	1,610E +00	2,144E +00	1,960E +00	2,350E +00	2,550E +00	2,649E +00
Statistics							
Min	1,367E +00	1,470E +00	1,868E +00	1,748E +00	2,050E +00	2,180E +00	2,644E +00
Max	1,846E +00	1,820E +00	2,193E +00	2,370E +00	2,350E +00	2,550E +00	2,812E +00
Mean	1,594E +00	1,633E +00	2,068E +00	2,026E +00	2,159E +00	2,353E +00	2,702E +00
Sigma	2,404E -01	1,762E -01	1,752E -01	3,162E -01	1,662E -01	1,861E -01	9,558E -02

Test Step	192 hours
Serial #	
1 Ref.	1,700E +00
2	1,323E +00
3	1,687E +00
4	2,656E +00
Statistics	
Min	1,323E +00
Max	2,656E +00
Mean	1,889E +00
Sigma	6,890E -01



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070
			Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

**Parameter: Differential Nonlinearity: DNL**  
**VDD=+5V; VSS=-5V; Input signal: +/-2.5V**

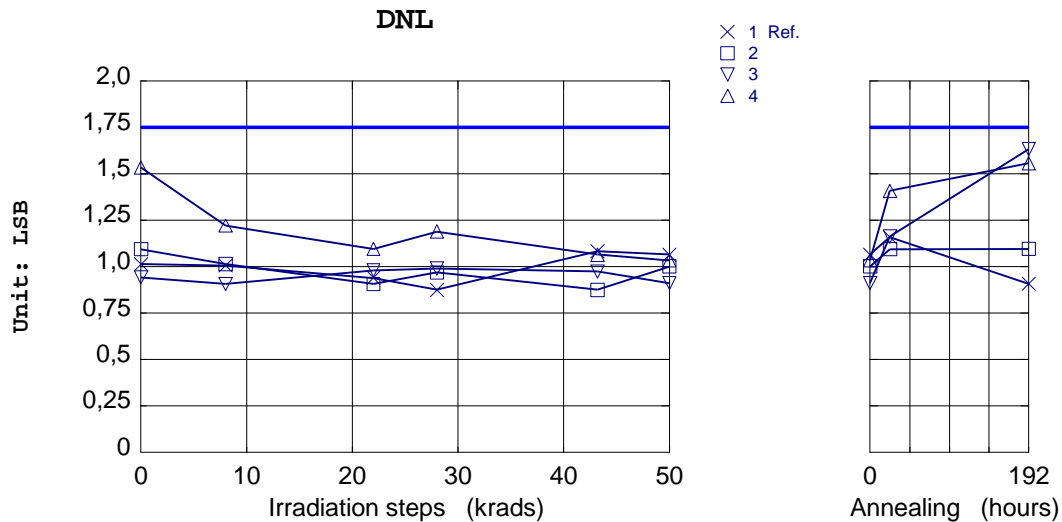
Unit= LSB

Spec limit max: 1.75

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,013E +00	1,005E +00	9,386E -01	8,749E -01	1,083E +00	1,064E +00	1,158E +00
2	1,094E +00	1,014E +00	9,062E -01	9,687E -01	8,749E -01	1,001E +00	1,094E +00
3	9,420E -01	9,060E -01	9,800E -01	9,900E -01	9,735E -01	9,109E -01	1,162E +00
4	1,533E +00	1,220E +00	1,095E +00	1,189E +00	1,064E +00	1,033E +00	1,408E +00
Statistics							
Min	9,420E -01	9,060E -01	9,062E -01	9,687E -01	8,749E -01	9,109E -01	1,094E +00
Max	1,533E +00	1,220E +00	1,095E +00	1,189E +00	1,064E +00	1,033E +00	1,408E +00
Mean	1,190E +00	1,047E +00	9,937E -01	1,049E +00	9,708E -01	9,816E -01	1,221E +00
Sigma	3,069E -01	1,595E -01	9,515E -02	1,215E -01	9,455E -02	6,329E -02	1,652E -01

Test Step	192 hours
Serial #	
1 Ref.	9,078E -01
2	1,095E +00
3	1,632E +00
4	1,556E +00
Statistics	
Min	1,095E +00
Max	1,632E +00
Mean	1,428E +00
Sigma	2,906E -01



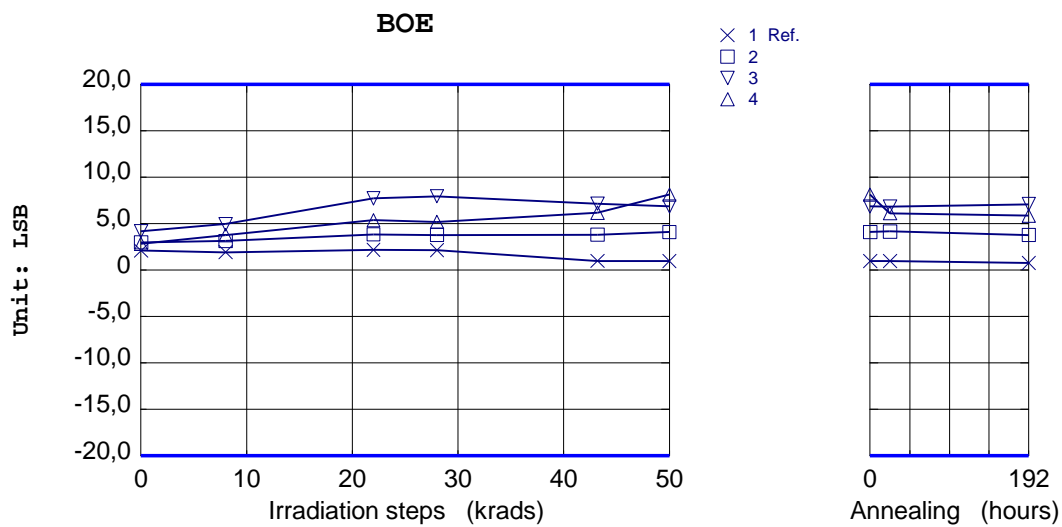
<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Bipolar Offset error: BOE**  
**VDD=+5V; VSS=-5V; Input signal: 0V**

Unit= LSB  
Spec limit max: 20  
Spec limit min: -20  
Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	2,092E +00	1,912E +00	2,169E +00	2,145E +00	9,815E -01	9,647E -01	9,596E -01
2	2,963E +00	3,123E +00	3,830E +00	3,778E +00	3,791E +00	4,089E +00	4,136E +00
3	4,186E +00	4,942E +00	7,724E +00	7,943E +00	7,133E +00	6,846E +00	6,826E +00
4	2,821E +00	3,757E +00	5,357E +00	5,177E +00	6,159E +00	8,126E +00	6,115E +00
Statistics							
Min	2,821E +00	3,123E +00	3,830E +00	3,778E +00	3,791E +00	4,089E +00	4,136E +00
Max	4,186E +00	4,942E +00	7,724E +00	7,943E +00	7,133E +00	8,126E +00	6,826E +00
Mean	3,323E +00	3,941E +00	5,637E +00	5,633E +00	5,694E +00	6,354E +00	5,693E +00
Sigma	7,504E -01	9,234E -01	1,962E +00	2,120E +00	1,719E +00	2,063E +00	1,394E +00

Test Step	192 hours
Serial #	
1 Ref.	7,658E -01
2	3,769E +00
3	7,081E +00
4	5,857E +00
Statistics	
Min	3,769E +00
Max	7,081E +00
Mean	5,569E +00
Sigma	1,675E +00



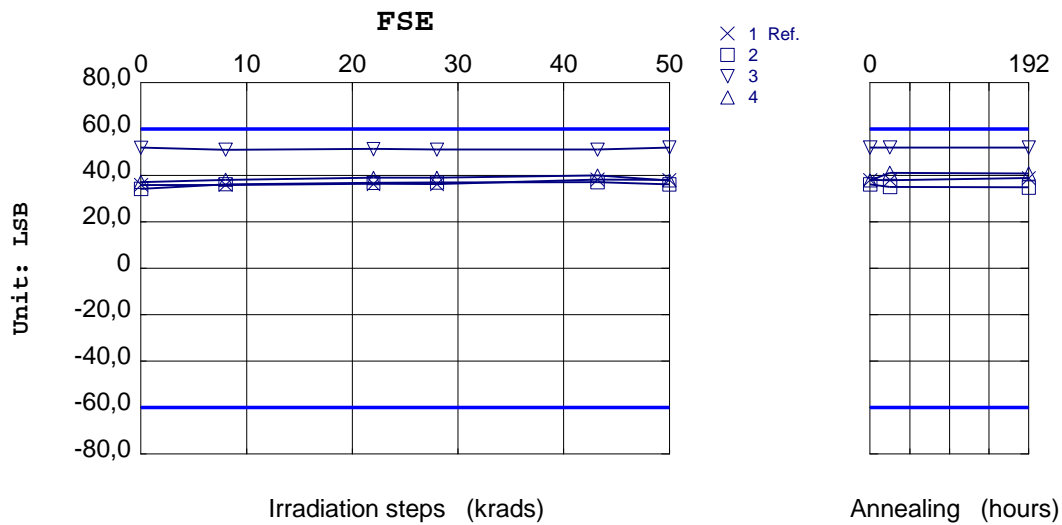
<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Full Scale error: FSE**  
**VDD=+5V; VSS=-5V; Input signal: 2.5V**

Unit= LSB  
Spec limit max: 60  
Spec limit min: -60  
Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	3,588E +01	3,587E +01	3,632E +01	3,625E +01	3,820E +01	3,806E +01	3,793E +01
2	3,415E +01	3,612E +01	3,673E +01	3,691E +01	3,710E +01	3,606E +01	3,494E +01
3	5,189E +01	5,097E +01	5,134E +01	5,114E +01	5,112E +01	5,197E +01	5,203E +01
4	3,710E +01	3,809E +01	3,887E +01	3,896E +01	3,994E +01	3,780E +01	4,113E +01
Statistics							
Min	3,415E +01	3,612E +01	3,673E +01	3,691E +01	3,710E +01	3,606E +01	3,494E +01
Max	5,189E +01	5,097E +01	5,134E +01	5,114E +01	5,112E +01	5,197E +01	5,203E +01
Mean	4,105E +01	4,173E +01	4,231E +01	4,233E +01	4,272E +01	4,195E +01	4,270E +01
Sigma	9,505E +00	8,066E +00	7,891E +00	7,696E +00	7,413E +00	8,724E +00	8,654E +00

Test Step	192 hours
Serial #	
1 Ref.	3,877E +01
2	3,478E +01
3	5,194E +01
4	4,076E +01
Statistics	
Min	3,478E +01
Max	5,194E +01
Mean	4,249E +01
Sigma	8,714E +00



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Positive Supply Current: Idd**  
**VDD=+5V; VSS=-5V; CS High**

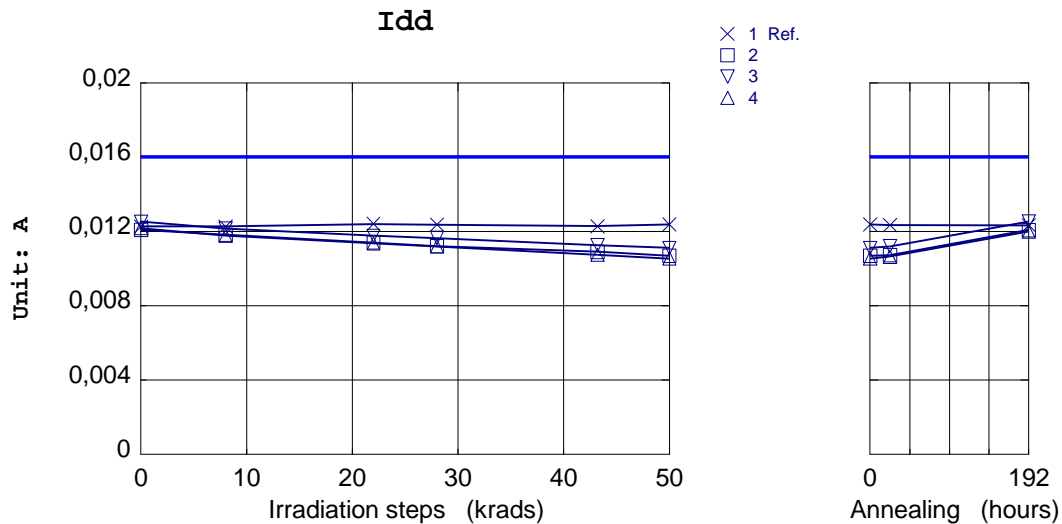
Unit= A

Spec limit max: 0.016

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,227E -02	1,227E -02	1,240E -02	1,237E -02	1,228E -02	1,237E -02	1,234E -02
2	1,208E -02	1,182E -02	1,140E -02	1,120E -02	1,090E -02	1,069E -02	1,072E -02
3	1,252E -02	1,215E -02	1,177E -02	1,165E -02	1,126E -02	1,111E -02	1,120E -02
4	1,218E -02	1,178E -02	1,136E -02	1,120E -02	1,075E -02	1,054E -02	1,064E -02
Statistics							
Min	1,208E -02	1,178E -02	1,136E -02	1,120E -02	1,075E -02	1,054E -02	1,064E -02
Max	1,252E -02	1,215E -02	1,177E -02	1,165E -02	1,126E -02	1,111E -02	1,120E -02
Mean	1,226E -02	1,192E -02	1,151E -02	1,135E -02	1,097E -02	1,078E -02	1,085E -02
Sigma	2,300E -04	2,064E -04	2,275E -04	2,590E -04	2,638E -04	2,968E -04	3,017E -04

Test Step	192 hours
Serial #	
1 Ref.	1,233E -02
2	1,207E -02
3	1,253E -02
4	1,200E -02
Statistics	
Min	1,200E -02
Max	1,253E -02
Mean	1,220E -02
Sigma	2,899E -04



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Negative Supply Current: Iss**  
**VDD=+5V; VSS=-5V; CS High**

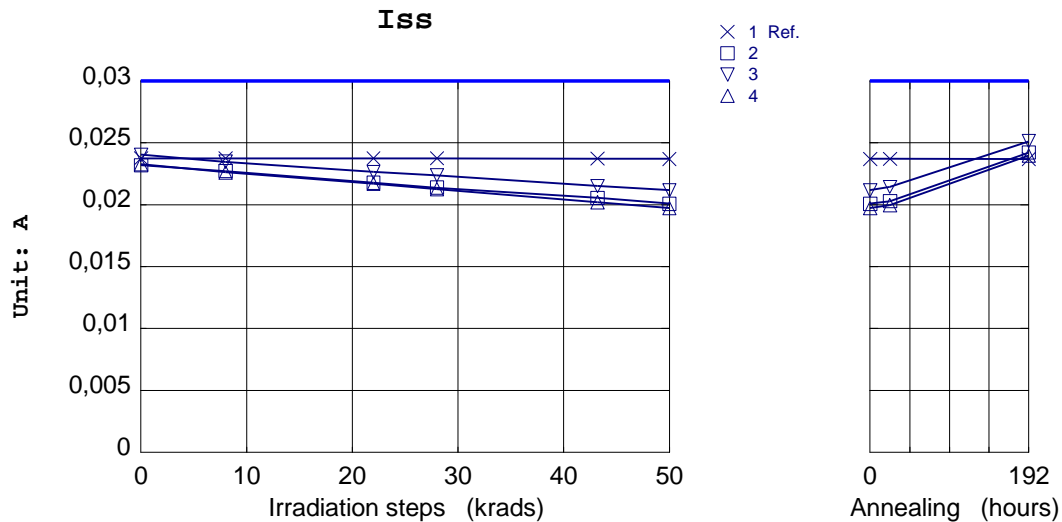
Unit= A

Spec limit max: 0.03

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	2,374E -02	2,374E -02	2,375E -02	2,375E -02	2,371E -02	2,369E -02	2,369E -02
2	2,319E -02	2,270E -02	2,176E -02	2,137E -02	2,055E -02	2,007E -02	2,028E -02
3	2,402E -02	2,346E -02	2,263E -02	2,237E -02	2,151E -02	2,116E -02	2,143E -02
4	2,327E -02	2,260E -02	2,169E -02	2,125E -02	2,019E -02	1,973E -02	1,996E -02
Statistics							
Min	2,319E -02	2,260E -02	2,169E -02	2,125E -02	2,019E -02	1,973E -02	1,996E -02
Max	2,402E -02	2,346E -02	2,263E -02	2,237E -02	2,151E -02	2,116E -02	2,143E -02
Mean	2,350E -02	2,292E -02	2,203E -02	2,166E -02	2,075E -02	2,032E -02	2,055E -02
Sigma	4,583E -04	4,710E -04	5,209E -04	6,141E -04	6,826E -04	7,461E -04	7,753E -04

Test Step	192 hours
Serial #	
1 Ref.	2,368E -02
2	2,421E -02
3	2,512E -02
4	2,397E -02
Statistics	
Min	2,397E -02
Max	2,512E -02
Mean	2,443E -02
Sigma	6,078E -04



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Input voltage: Vih**  
**VDD=5.25V; VSS=-5V**

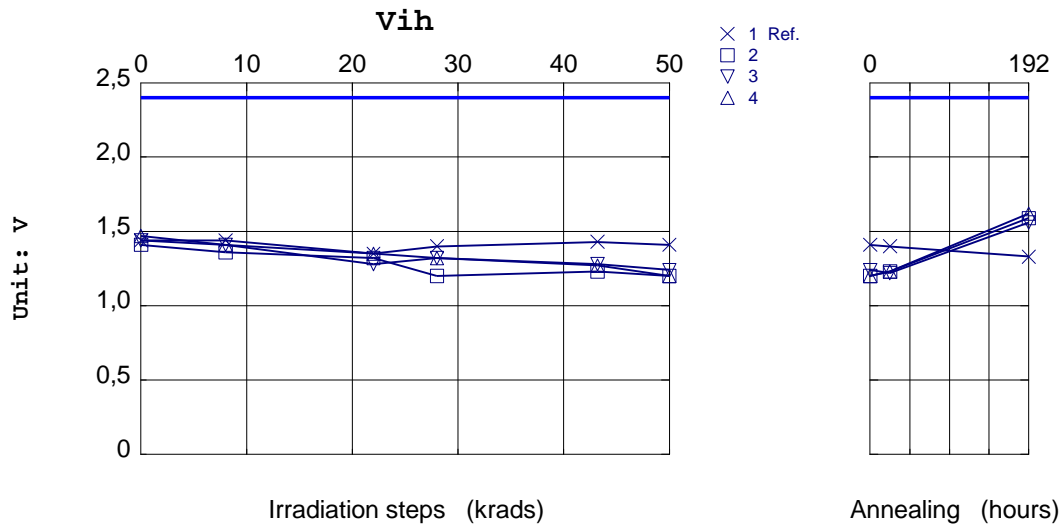
Unit= V

Spec limit min: 2.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,440E +00	1,440E +00	1,350E +00	1,400E +00	1,430E +00	1,410E +00	1,400E +00
2	1,410E +00	1,360E +00	1,320E +00	1,200E +00	1,230E +00	1,200E +00	1,230E +00
3	1,440E +00	1,410E +00	1,280E +00	1,320E +00	1,280E +00	1,240E +00	1,220E +00
4	1,470E +00	1,410E +00	1,350E +00	1,320E +00	1,270E +00	1,200E +00	1,230E +00
Statistics							
Min	1,410E +00	1,360E +00	1,280E +00	1,200E +00	1,230E +00	1,200E +00	1,220E +00
Max	1,470E +00	1,410E +00	1,350E +00	1,320E +00	1,280E +00	1,240E +00	1,230E +00
Mean	1,440E +00	1,393E +00	1,317E +00	1,280E +00	1,260E +00	1,213E +00	1,227E +00
Sigma	3,000E -02	2,887E -02	3,512E -02	6,928E -02	2,646E -02	2,309E -02	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	1,330E +00
2	1,590E +00
3	1,560E +00
4	1,620E +00
Statistics	
Min	1,560E +00
Max	1,620E +00
Mean	1,590E +00
Sigma	3,000E -02



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Input Voltage: Vil**  
**VDD=4.75V; VSS=-5V**

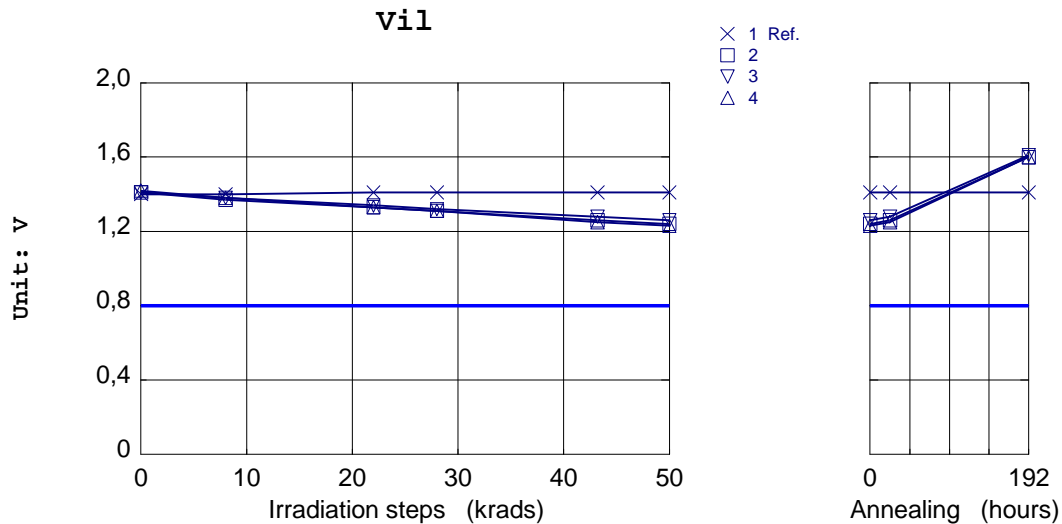
Unit= V

Spec limit max: 0.8

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,400E +00	1,400E +00	1,410E +00	1,410E +00	1,410E +00	1,410E +00	1,410E +00
2	1,410E +00	1,370E +00	1,330E +00	1,310E +00	1,260E +00	1,240E +00	1,260E +00
3	1,410E +00	1,380E +00	1,340E +00	1,320E +00	1,280E +00	1,260E +00	1,280E +00
4	1,420E +00	1,380E +00	1,330E +00	1,310E +00	1,250E +00	1,230E +00	1,250E +00
Statistics							
Min	1,410E +00	1,370E +00	1,330E +00	1,310E +00	1,250E +00	1,230E +00	1,250E +00
Max	1,420E +00	1,380E +00	1,340E +00	1,320E +00	1,280E +00	1,260E +00	1,280E +00
Mean	1,413E +00	1,377E +00	1,333E +00	1,313E +00	1,263E +00	1,243E +00	1,263E +00
Sigma	5,773E -03	5,773E -03	5,773E -03	5,774E -03	1,528E -02	1,528E -02	1,528E -02

Test Step	192 hours
Serial #	
1 Ref.	1,410E +00
2	1,600E +00
3	1,610E +00
4	1,600E +00
Statistics	
Min	1,600E +00
Max	1,610E +00
Mean	1,603E +00
Sigma	5,773E -03





HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D13: VohD13**

**VDD=4.75V; VSS=-5V; IO=-200uA**

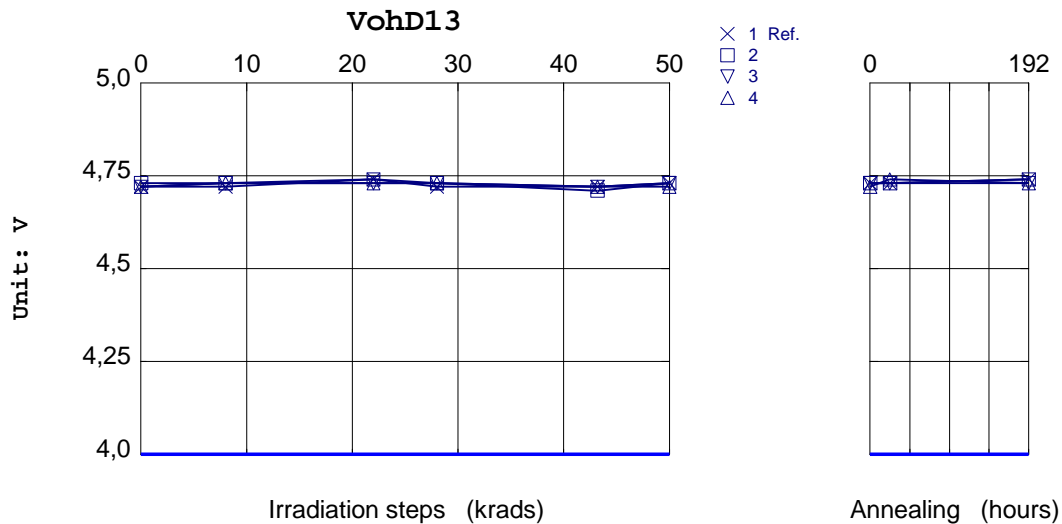
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00	4,730E +00
2	4,730E +00	4,730E +00	4,740E +00	4,730E +00	4,710E +00	4,730E +00	4,730E +00
3	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,730E +00	4,730E +00
4	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
Statistics							
Min	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,710E +00	4,720E +00	4,730E +00
Max	4,730E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
Mean	4,723E +00	4,730E +00	4,733E +00	4,730E +00	4,717E +00	4,727E +00	4,733E +00
Sigma	5,774E -03	2,634E -09	5,773E -03	2,634E -09	5,773E -03	5,774E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,740E +00
2	4,740E +00
3	4,730E +00
4	4,730E +00
Statistics	
Min	4,730E +00
Max	4,740E +00
Mean	4,733E +00
Sigma	5,773E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D12: VohD12**

**VDD=4.75V; VSS=-5V; IO=-200uA**

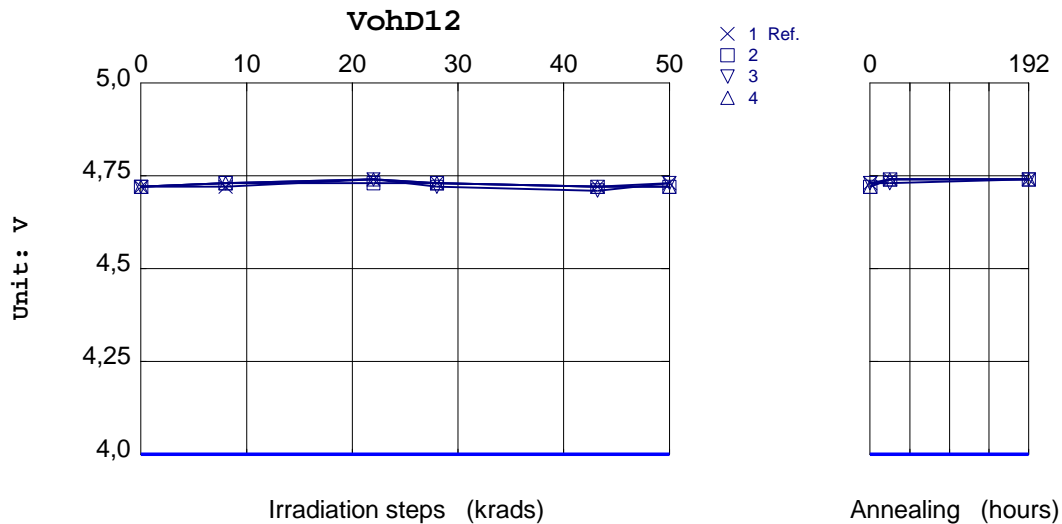
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
2	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
3	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,710E +00	4,730E +00	4,730E +00
4	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
Statistics							
Min	4,720E +00	4,730E +00	4,730E +00	4,720E +00	4,710E +00	4,720E +00	4,730E +00
Max	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
Mean	4,720E +00	4,730E +00	4,737E +00	4,727E +00	4,717E +00	4,723E +00	4,737E +00
Sigma	2,634E -09	2,634E -09	5,773E -03	5,774E -03	5,773E -03	5,774E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,740E +00
2	4,740E +00
3	4,740E +00
4	4,740E +00
Statistics	
Min	4,740E +00
Max	4,740E +00
Mean	4,740E +00
Sigma	2,634E -09



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D11: VohD11**  
**VDD=4.75V; VSS=-5V; IO=-200uA**

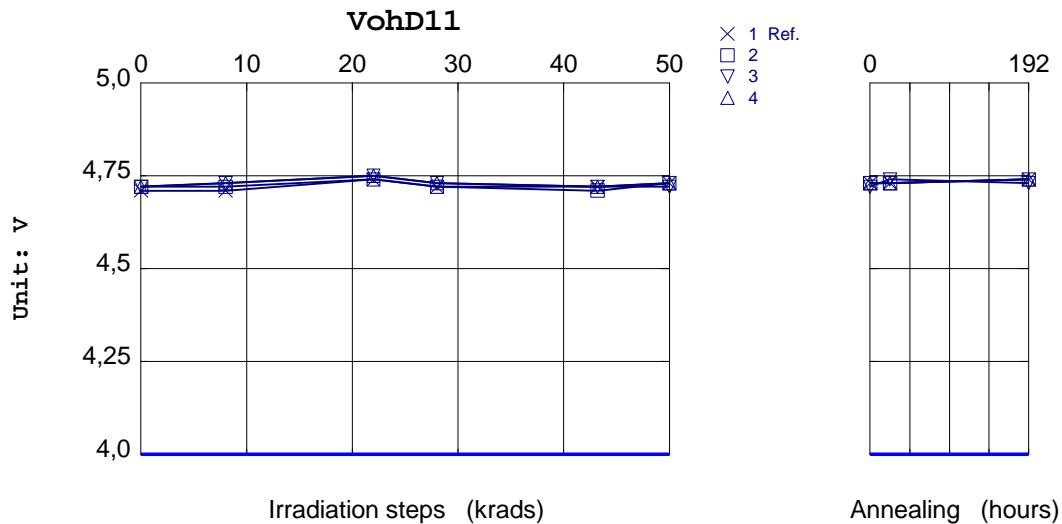
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,710E +00	4,710E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00	4,730E +00
2	4,720E +00	4,720E +00	4,740E +00	4,720E +00	4,710E +00	4,730E +00	4,730E +00
3	4,720E +00	4,730E +00	4,750E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
4	4,720E +00	4,730E +00	4,750E +00	4,730E +00	4,720E +00	4,730E +00	4,730E +00
Statistics							
Min	4,720E +00	4,720E +00	4,740E +00	4,720E +00	4,710E +00	4,720E +00	4,730E +00
Max	4,720E +00	4,730E +00	4,750E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
Mean	4,720E +00	4,727E +00	4,747E +00	4,727E +00	4,717E +00	4,727E +00	4,733E +00
Sigma	2,634E -09	5,774E -03	5,774E -03	5,774E -03	5,773E -03	5,774E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,740E +00
2	4,740E +00
3	4,730E +00
4	4,740E +00
Statistics	
Min	4,730E +00
Max	4,740E +00
Mean	4,737E +00
Sigma	5,773E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D10: VohD10**

VDD=4.75V; VSS=-5V; IO=-200uA

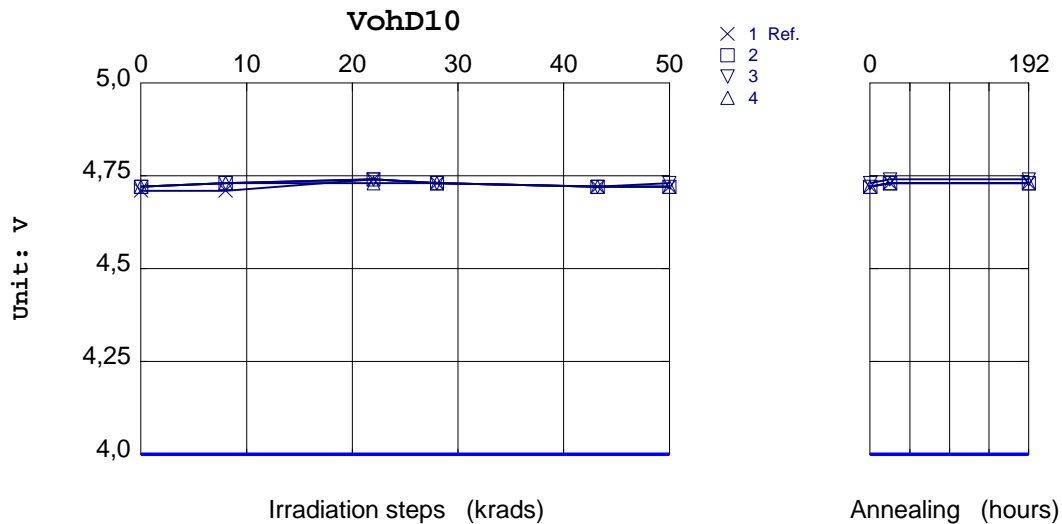
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,710E +00	4,710E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
2	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
3	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
4	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
Statistics							
Min	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
Max	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
Mean	4,720E +00	4,730E +00	4,737E +00	4,730E +00	4,720E +00	4,723E +00	4,733E +00
Sigma	2,634E -09	2,634E -09	5,773E -03	2,634E -09	2,634E -09	5,774E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
2	4,730E +00
3	4,740E +00
4	4,730E +00
Statistics	
Min	4,730E +00
Max	4,740E +00
Mean	4,733E +00
Sigma	5,773E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D9: VohD9**

**VDD=4.75V; VSS=-5V; IO=-200uA**

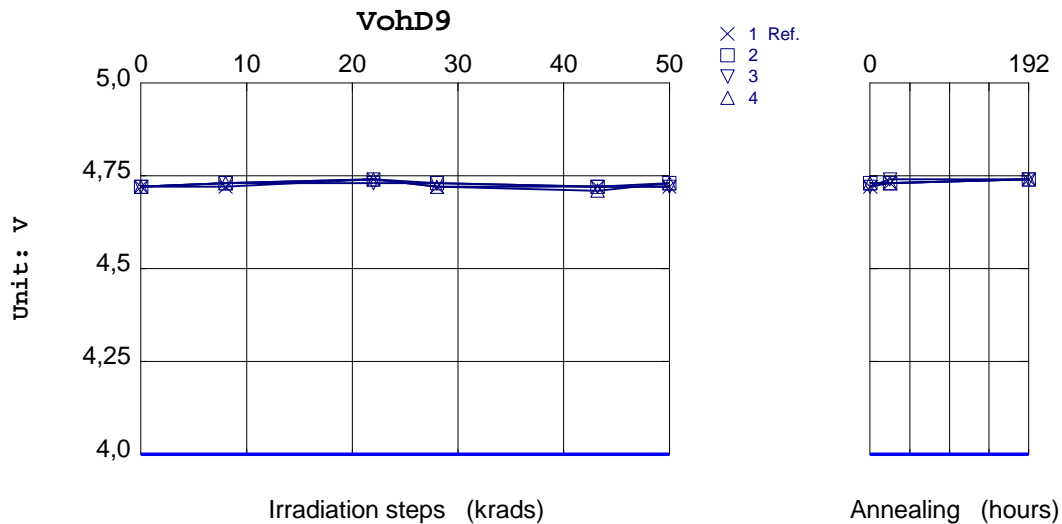
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,740E +00	4,720E +00	4,720E +00	4,720E +00	4,730E +00
2	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,730E +00
3	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
4	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,710E +00	4,730E +00	4,730E +00
Statistics							
Min	4,720E +00	4,730E +00	4,730E +00	4,720E +00	4,710E +00	4,720E +00	4,730E +00
Max	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
Mean	4,720E +00	4,730E +00	4,737E +00	4,727E +00	4,717E +00	4,727E +00	4,733E +00
Sigma	2,634E -09	2,634E -09	5,773E -03	5,774E -03	5,773E -03	5,774E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,740E +00
2	4,740E +00
3	4,740E +00
4	4,740E +00
Statistics	
Min	4,740E +00
Max	4,740E +00
Mean	4,740E +00
Sigma	2,634E -09



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: High Level Output Voltage Pin D8: VohD8  
VDD=4.75V; VSS=-5V; IO=-200uA

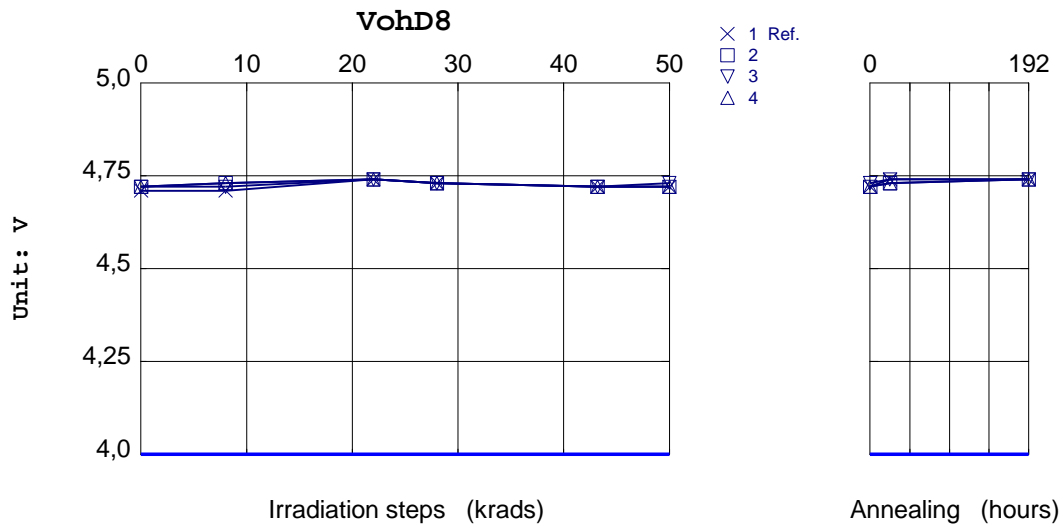
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,710E +00	4,710E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
2	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
3	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
4	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
Statistics							
Min	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
Max	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
Mean	4,720E +00	4,727E +00	4,740E +00	4,730E +00	4,720E +00	4,723E +00	4,733E +00
Sigma	2,634E -09	5,774E -03	2,634E -09	2,634E -09	2,634E -09	5,774E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,740E +00
2	4,740E +00
3	4,740E +00
4	4,740E +00
Statistics	
Min	4,740E +00
Max	4,740E +00
Mean	4,740E +00
Sigma	2,634E -09



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: High Level Output Voltage Pin D7: VohD7  
VDD=4.75V; VSS=-5V; IO=-200uA

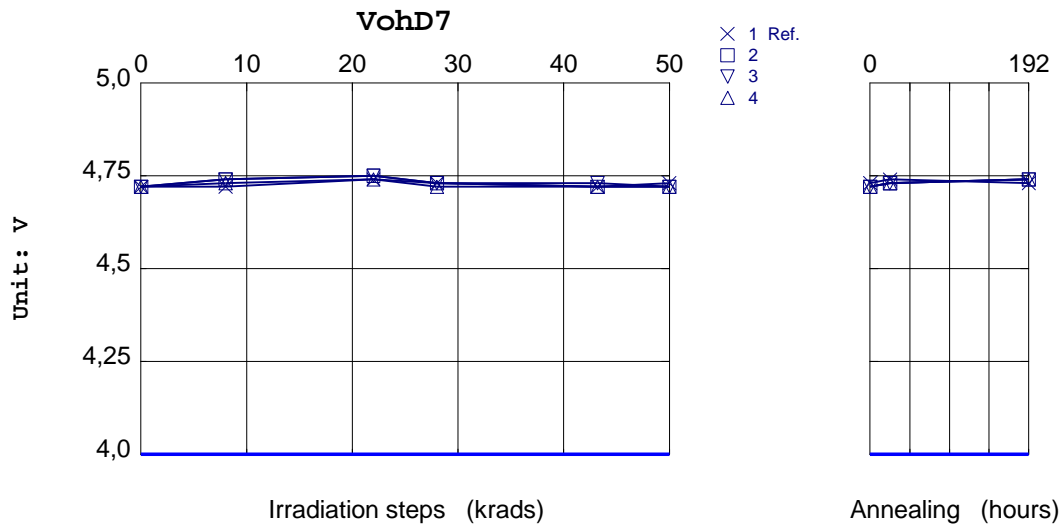
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
2	4,720E +00	4,740E +00	4,750E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
3	4,720E +00	4,740E +00	4,750E +00	4,730E +00	4,730E +00	4,720E +00	4,730E +00
4	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,720E +00	4,720E +00	4,730E +00
Statistics							
Min	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,720E +00	4,720E +00	4,730E +00
Max	4,720E +00	4,740E +00	4,750E +00	4,730E +00	4,730E +00	4,720E +00	4,730E +00
Mean	4,720E +00	4,737E +00	4,747E +00	4,727E +00	4,723E +00	4,720E +00	4,730E +00
Sigma	2,634E -09	5,773E -03	5,774E -03	5,774E -03	5,774E -03	2,634E -09	2,634E -09

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
2	4,740E +00
3	4,740E +00
4	4,740E +00
Statistics	
Min	4,740E +00
Max	4,740E +00
Mean	4,740E +00
Sigma	2,634E -09



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D6: VohD6**

**VDD=4.75V; VSS=-5V; IO=-200uA**

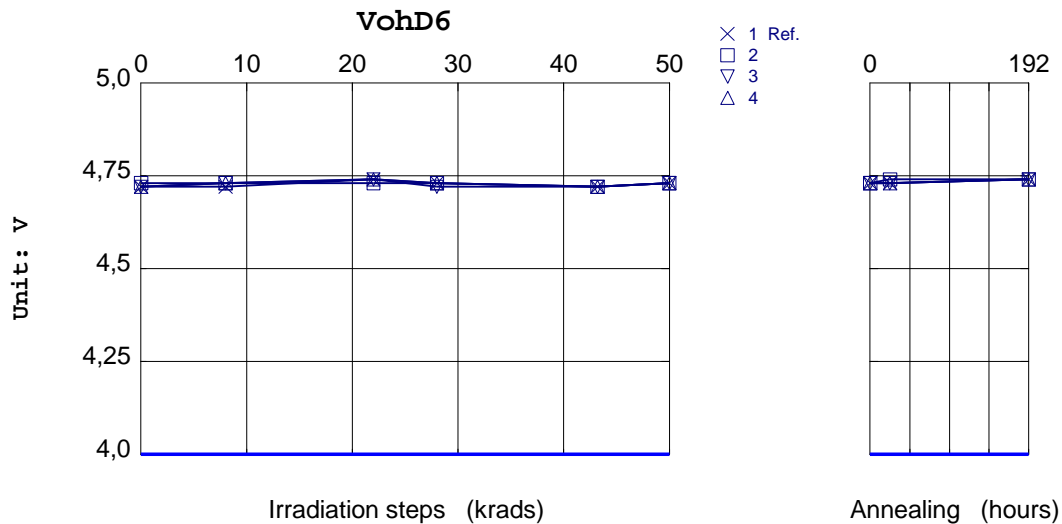
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,730E +00
2	4,730E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
3	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00	4,730E +00
4	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,730E +00
Statistics							
Min	4,720E +00	4,730E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00	4,730E +00
Max	4,730E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
Mean	4,723E +00	4,730E +00	4,737E +00	4,727E +00	4,720E +00	4,730E +00	4,733E +00
Sigma	5,774E -03	2,634E -09	5,773E -03	5,774E -03	2,634E -09	2,634E -09	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,740E +00
2	4,740E +00
3	4,740E +00
4	4,740E +00
Statistics	
Min	4,740E +00
Max	4,740E +00
Mean	4,740E +00
Sigma	2,634E -09





<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D5: VohD5**

**VDD=4.75V; VSS=-5V; IO=-200uA**

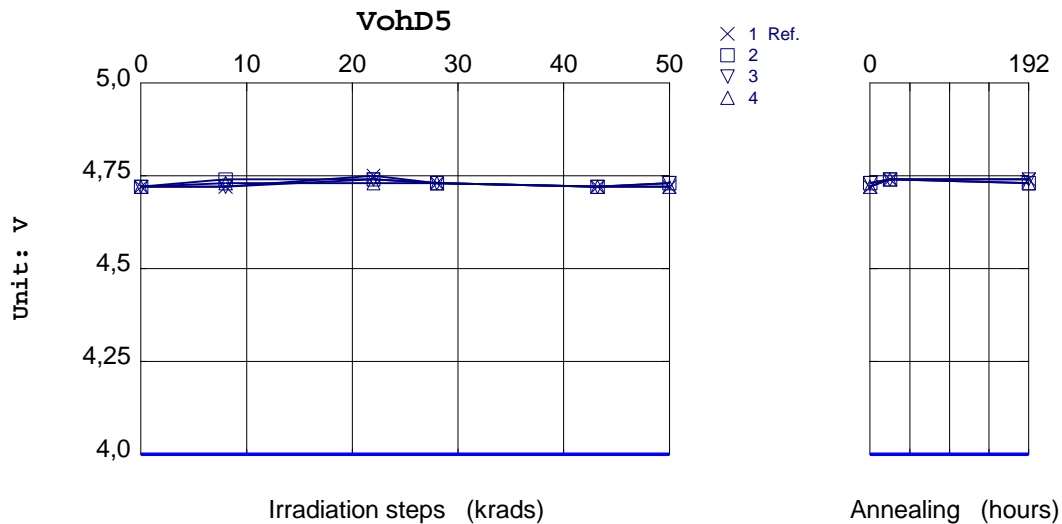
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,750E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
2	4,720E +00	4,740E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
3	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
4	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
Statistics							
Min	4,720E +00	4,720E +00	4,730E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
Max	4,720E +00	4,740E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
Mean	4,720E +00	4,730E +00	4,737E +00	4,730E +00	4,720E +00	4,727E +00	4,740E +00
Sigma	2,634E -09	1,000E -02	5,773E -03	2,634E -09	2,634E -09	5,774E -03	2,634E -09

Test Step	192 hours
Serial #	
1 Ref.	4,740E +00
2	4,730E +00
3	4,740E +00
4	4,730E +00
Statistics	
Min	4,730E +00
Max	4,740E +00
Mean	4,733E +00
Sigma	5,773E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: High Level Output Voltage Pin D4: VohD4  
VDD=4.75V; VSS=-5V; IO=-200uA

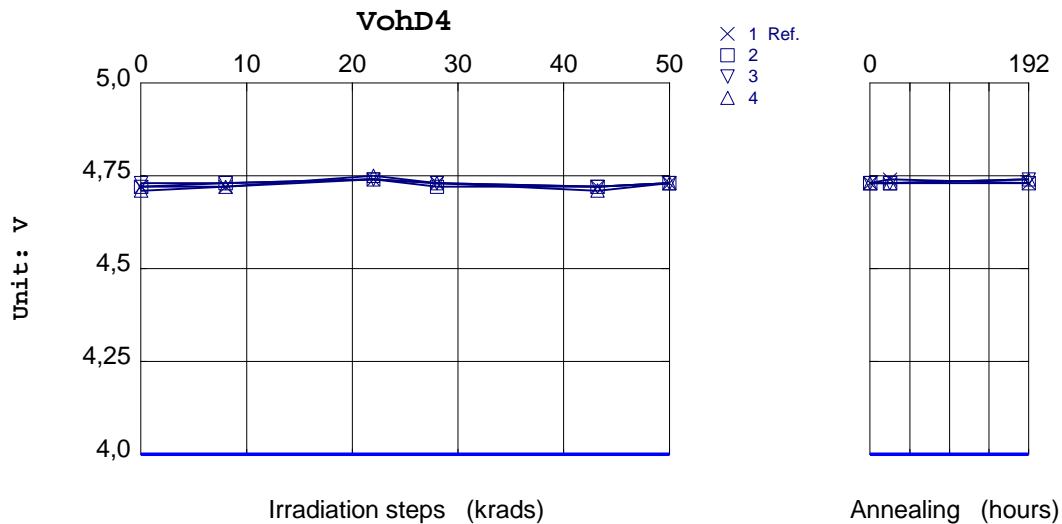
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
2	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00	4,730E +00
3	4,730E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,730E +00
4	4,710E +00	4,720E +00	4,750E +00	4,730E +00	4,710E +00	4,730E +00	4,730E +00
Statistics							
Min	4,710E +00	4,720E +00	4,740E +00	4,720E +00	4,710E +00	4,730E +00	4,730E +00
Max	4,730E +00	4,730E +00	4,750E +00	4,730E +00	4,720E +00	4,730E +00	4,730E +00
Mean	4,720E +00	4,727E +00	4,743E +00	4,727E +00	4,717E +00	4,730E +00	4,730E +00
Sigma	1,000E -02	5,774E -03	5,774E -03	5,774E -03	5,773E -03	2,634E -09	2,634E -09

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
2	4,730E +00
3	4,740E +00
4	4,740E +00
Statistics	
Min	4,730E +00
Max	4,740E +00
Mean	4,737E +00
Sigma	5,773E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D3: VohD3**

**VDD=4.75V; VSS=-5V; IO=-200uA**

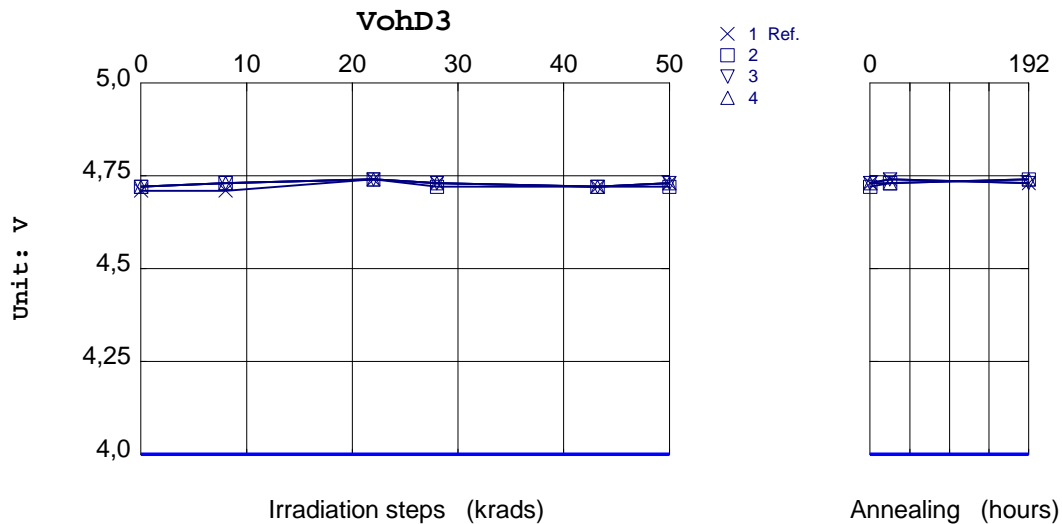
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,710E +00	4,710E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
2	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,720E +00	4,720E +00	4,730E +00
3	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
4	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,730E +00
Statistics							
Min	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,720E +00	4,720E +00	4,730E +00
Max	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
Mean	4,720E +00	4,730E +00	4,740E +00	4,727E +00	4,720E +00	4,727E +00	4,733E +00
Sigma	2,634E -09	2,634E -09	2,634E -09	5,774E -03	2,634E -09	5,774E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
2	4,740E +00
3	4,730E +00
4	4,740E +00
Statistics	
Min	4,730E +00
Max	4,740E +00
Mean	4,737E +00
Sigma	5,773E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D2: VohD2**

VDD=4.75V; VSS=-5V; IO=-200uA

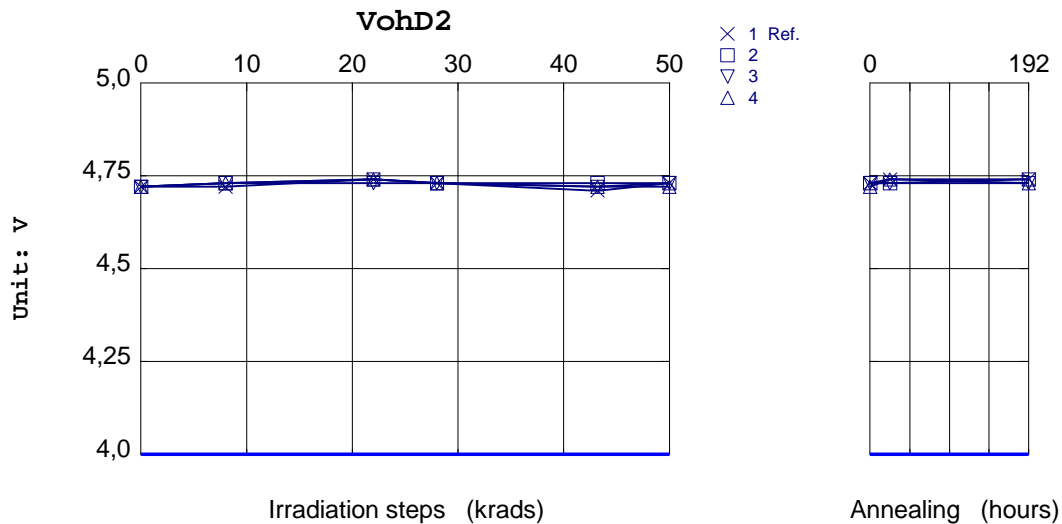
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,710E +00	4,730E +00	4,740E +00
2	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,730E +00	4,730E +00	4,730E +00
3	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,730E +00	4,730E +00
4	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
Statistics							
Min	4,720E +00	4,730E +00	4,730E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
Max	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,730E +00	4,730E +00	4,740E +00
Mean	4,720E +00	4,730E +00	4,737E +00	4,730E +00	4,723E +00	4,727E +00	4,733E +00
Sigma	2,634E -09	2,634E -09	5,773E -03	2,634E -09	5,774E -03	5,774E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,740E +00
2	4,740E +00
3	4,730E +00
4	4,730E +00
Statistics	
Min	4,730E +00
Max	4,740E +00
Mean	4,733E +00
Sigma	5,773E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: High Level Output Voltage Pin D1: VohD1  
VDD=4.75V; VSS=-5V; IO=-200uA

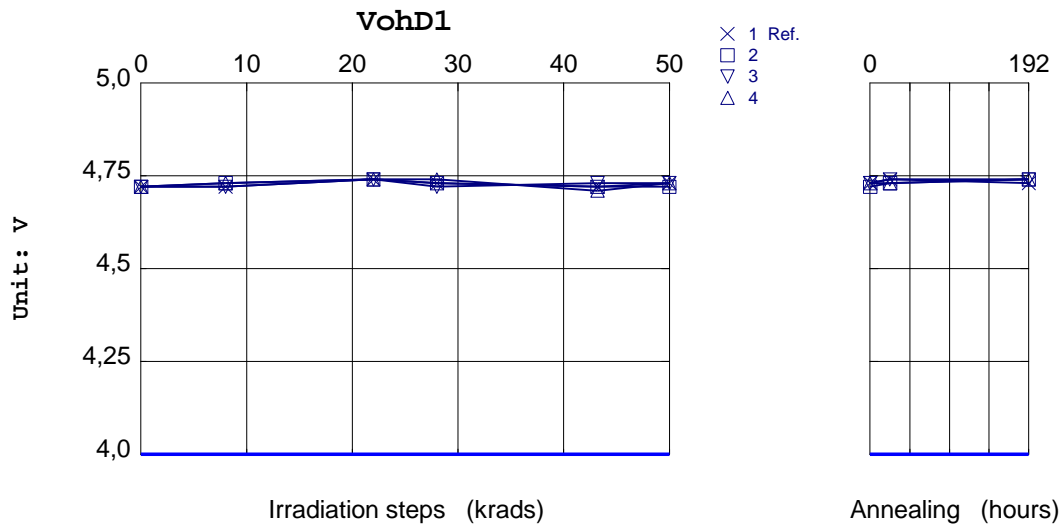
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,720E +00	4,730E +00	4,740E +00
2	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,730E +00
3	4,720E +00	4,720E +00	4,740E +00	4,720E +00	4,730E +00	4,730E +00	4,740E +00
4	4,720E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,730E +00	4,730E +00
Statistics							
Min	4,720E +00	4,720E +00	4,740E +00	4,720E +00	4,710E +00	4,720E +00	4,730E +00
Max	4,720E +00	4,730E +00	4,740E +00	4,740E +00	4,730E +00	4,730E +00	4,740E +00
Mean	4,720E +00	4,727E +00	4,740E +00	4,730E +00	4,720E +00	4,727E +00	4,733E +00
Sigma	2,634E -09	5,774E -03	2,634E -09	1,000E -02	1,000E -02	5,774E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
2	4,740E +00
3	4,740E +00
4	4,740E +00
Statistics	
Min	4,740E +00
Max	4,740E +00
Mean	4,740E +00
Sigma	2,634E -09



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: High Level Output Voltage Pin D0: VohD0  
VDD=4.75V; VSS=-5V; IO=-200uA

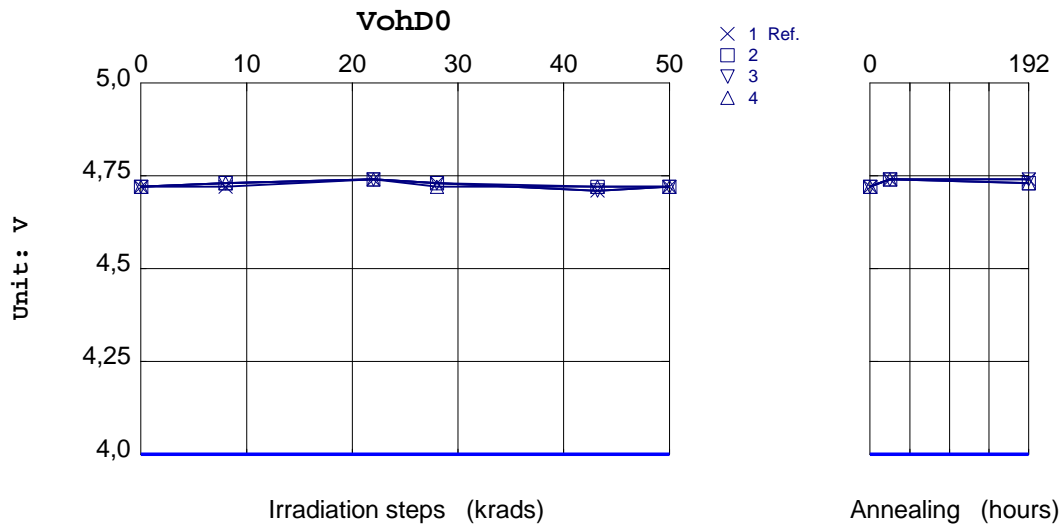
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krads	22 krads	28 krads	43,2 krads	50 krads	24 hours
Serial #							
1 Ref.	4,720E +00	4,720E +00	4,740E +00	4,730E +00	4,710E +00	4,720E +00	4,740E +00
2	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
3	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,710E +00	4,720E +00	4,740E +00
4	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,720E +00	4,720E +00	4,740E +00
Statistics							
Min	4,720E +00	4,730E +00	4,740E +00	4,720E +00	4,710E +00	4,720E +00	4,740E +00
Max	4,720E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,720E +00	4,740E +00
Mean	4,720E +00	4,730E +00	4,740E +00	4,727E +00	4,717E +00	4,720E +00	4,740E +00
Sigma	2,634E -09	2,634E -09	2,634E -09	5,774E -03	5,773E -03	2,634E -09	2,634E -09

Test Step	192 hours
Serial #	
1 Ref.	4,740E +00
2	4,730E +00
3	4,740E +00
4	4,730E +00
Statistics	
Min	4,730E +00
Max	4,740E +00
Mean	4,733E +00
Sigma	5,773E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D13: VoID13

VDD=4.75V; VSS=-5V; IO=1.6mA

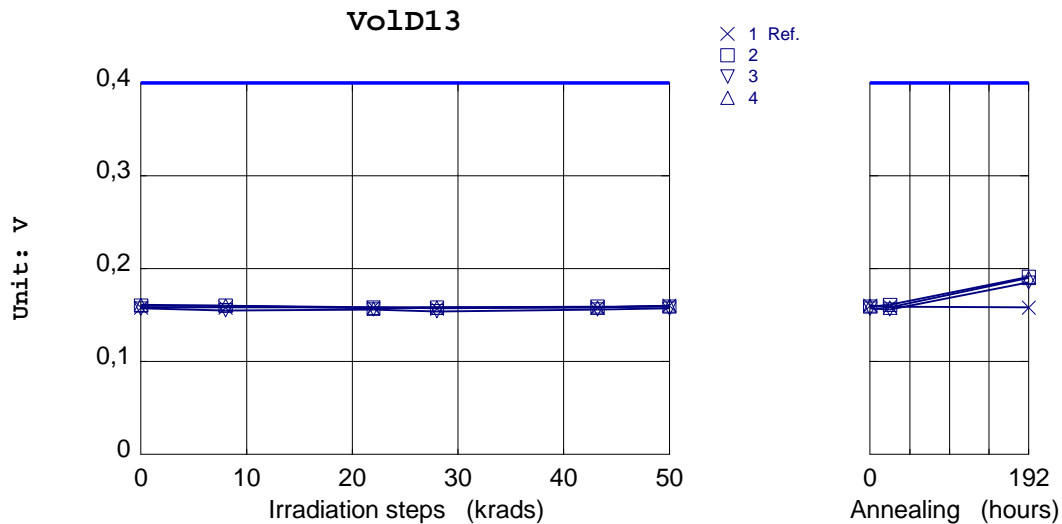
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,580E -01	1,580E -01	1,580E -01	1,570E -01	1,580E -01	1,600E -01	1,590E -01
2	1,600E -01	1,600E -01	1,580E -01	1,580E -01	1,590E -01	1,590E -01	1,610E -01
3	1,570E -01	1,550E -01	1,560E -01	1,540E -01	1,560E -01	1,570E -01	1,560E -01
4	1,610E -01	1,600E -01	1,570E -01	1,580E -01	1,580E -01	1,600E -01	1,580E -01
Statistics							
Min	1,570E -01	1,550E -01	1,560E -01	1,540E -01	1,560E -01	1,570E -01	1,560E -01
Max	1,610E -01	1,600E -01	1,580E -01	1,580E -01	1,590E -01	1,600E -01	1,610E -01
Mean	1,593E -01	1,583E -01	1,570E -01	1,567E -01	1,577E -01	1,587E -01	1,583E -01
Sigma	2,082E -03	2,887E -03	1,000E -03	2,309E -03	1,528E -03	1,528E -03	2,517E -03

Test Step	192 hours
Serial #	
1 Ref.	1,580E -01
2	1,910E -01
3	1,850E -01
4	1,900E -01
Statistics	
Min	1,850E -01
Max	1,910E -01
Mean	1,887E -01
Sigma	3,215E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D12: VoID12**

**VDD=4.75V; VSS=-5V; IO=1.6mA**

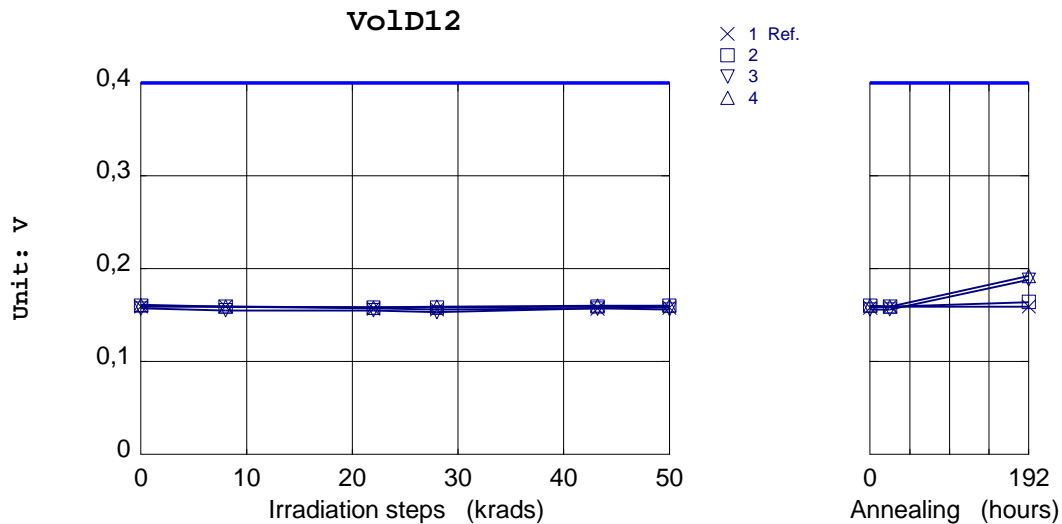
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,590E -01	1,590E -01	1,570E -01	1,560E -01	1,570E -01	1,580E -01	1,590E -01
2	1,600E -01	1,590E -01	1,580E -01	1,580E -01	1,590E -01	1,600E -01	1,590E -01
3	1,570E -01	1,550E -01	1,550E -01	1,530E -01	1,570E -01	1,560E -01	1,560E -01
4	1,610E -01	1,590E -01	1,580E -01	1,590E -01	1,600E -01	1,600E -01	1,590E -01
Statistics							
Min	1,570E -01	1,550E -01	1,550E -01	1,530E -01	1,570E -01	1,560E -01	1,560E -01
Max	1,610E -01	1,590E -01	1,580E -01	1,590E -01	1,600E -01	1,600E -01	1,590E -01
Mean	1,593E -01	1,577E -01	1,570E -01	1,567E -01	1,587E -01	1,587E -01	1,580E -01
Sigma	2,082E -03	2,309E -03	1,732E -03	3,215E -03	1,528E -03	2,309E -03	1,732E -03

Test Step	192 hours
Serial #	
1 Ref.	1,590E -01
2	1,640E -01
3	1,880E -01
4	1,920E -01
Statistics	
Min	1,640E -01
Max	1,920E -01
Mean	1,813E -01
Sigma	1,514E -02





HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D11: VoID11  
VDD=4.75V; VSS=-5V; IO=1.6mA

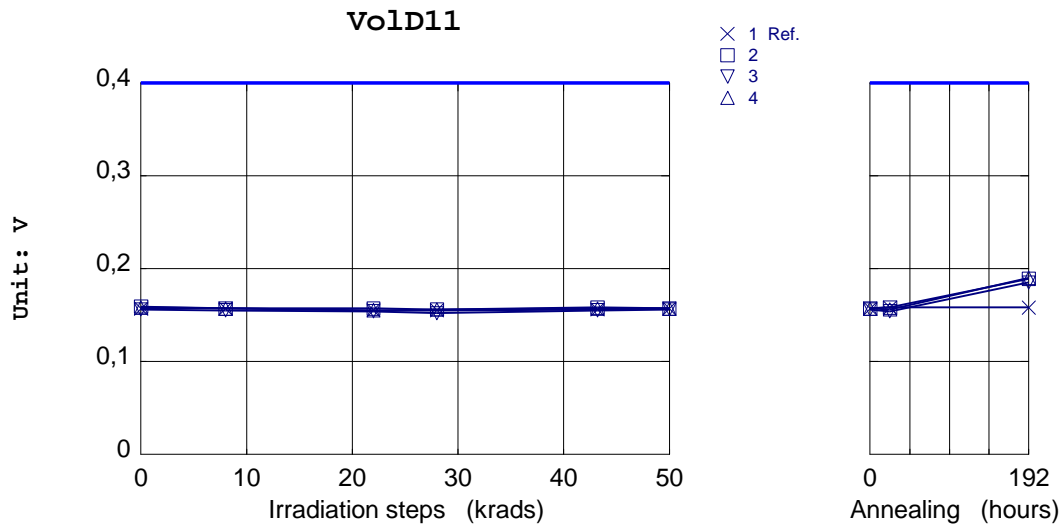
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,570E -01	1,570E -01	1,550E -01	1,550E -01	1,560E -01	1,570E -01	1,580E -01
2	1,590E -01	1,570E -01	1,570E -01	1,560E -01	1,580E -01	1,570E -01	1,580E -01
3	1,560E -01	1,550E -01	1,540E -01	1,520E -01	1,550E -01	1,560E -01	1,540E -01
4	1,580E -01	1,570E -01	1,550E -01	1,560E -01	1,570E -01	1,570E -01	1,560E -01
Statistics							
Min	1,560E -01	1,550E -01	1,540E -01	1,520E -01	1,550E -01	1,560E -01	1,540E -01
Max	1,590E -01	1,570E -01	1,570E -01	1,560E -01	1,580E -01	1,570E -01	1,580E -01
Mean	1,577E -01	1,563E -01	1,553E -01	1,547E -01	1,567E -01	1,567E -01	1,560E -01
Sigma	1,528E -03	1,155E -03	1,528E -03	2,309E -03	1,528E -03	5,774E -04	2,000E -03

Test Step	192 hours
Serial #	
1 Ref.	1,580E -01
2	1,890E -01
3	1,850E -01
4	1,900E -01
Statistics	
Min	1,850E -01
Max	1,900E -01
Mean	1,880E -01
Sigma	2,646E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D10: Void10

VDD=4.75V; VSS=-5V; IO=1.6mA

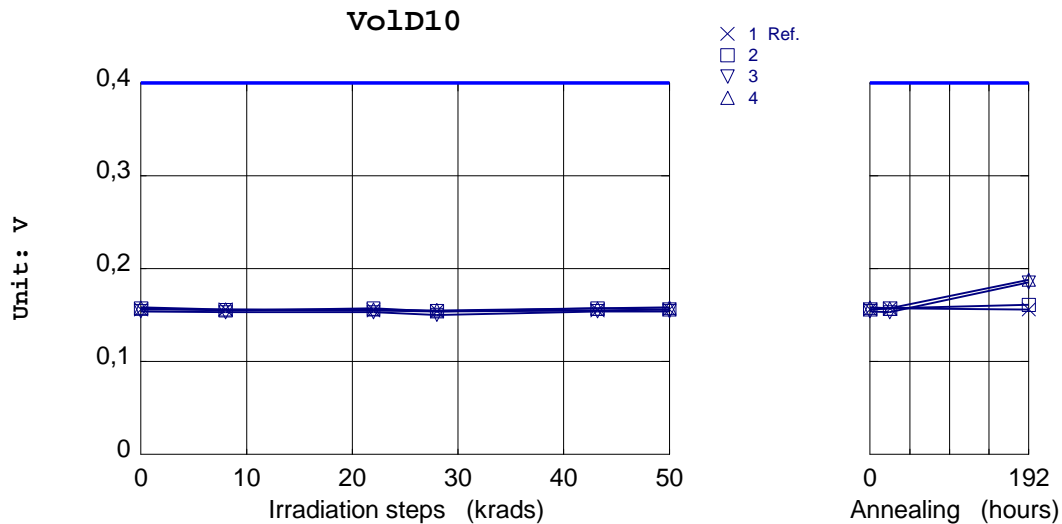
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,560E -01	1,560E -01	1,550E -01	1,540E -01	1,550E -01	1,560E -01	1,570E -01
2	1,570E -01	1,550E -01	1,570E -01	1,540E -01	1,570E -01	1,560E -01	1,570E -01
3	1,540E -01	1,530E -01	1,530E -01	1,500E -01	1,540E -01	1,540E -01	1,530E -01
4	1,580E -01	1,560E -01	1,560E -01	1,550E -01	1,570E -01	1,580E -01	1,570E -01
Statistics							
Min	1,540E -01	1,530E -01	1,530E -01	1,500E -01	1,540E -01	1,540E -01	1,530E -01
Max	1,580E -01	1,560E -01	1,570E -01	1,550E -01	1,570E -01	1,580E -01	1,570E -01
Mean	1,563E -01	1,547E -01	1,553E -01	1,530E -01	1,560E -01	1,560E -01	1,557E -01
Sigma	2,082E -03	1,528E -03	2,082E -03	2,646E -03	1,732E -03	2,000E -03	2,309E -03

Test Step	192 hours
Serial #	
1 Ref.	1,560E -01
2	1,610E -01
3	1,850E -01
4	1,880E -01
Statistics	
Min	1,610E -01
Max	1,880E -01
Mean	1,780E -01
Sigma	1,480E -02



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D9: Vo1D9  
VDD=4.75V; VSS=-5V; IO=1.6mA

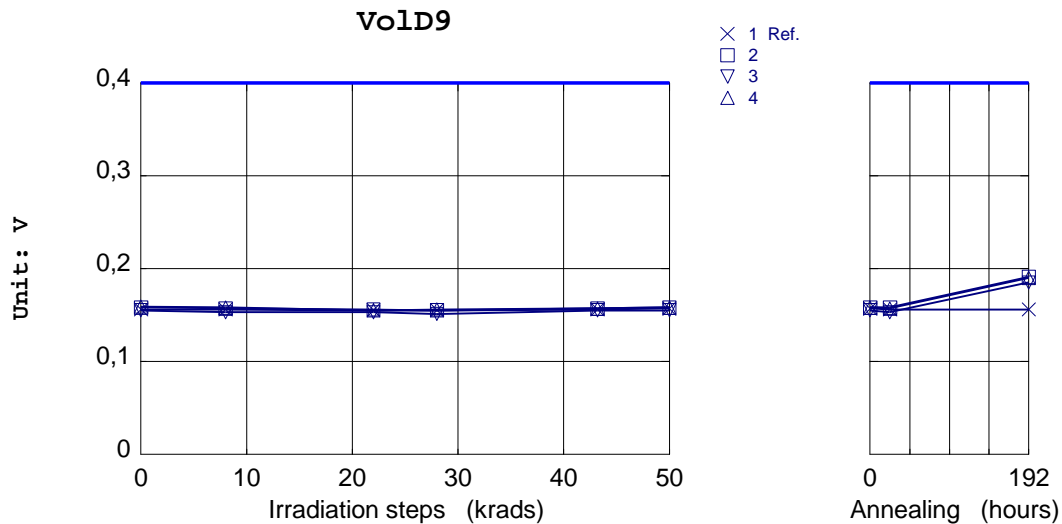
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,560E -01	1,560E -01	1,550E -01	1,550E -01	1,560E -01	1,570E -01	1,560E -01
2	1,580E -01	1,570E -01	1,560E -01	1,550E -01	1,570E -01	1,580E -01	1,580E -01
3	1,550E -01	1,530E -01	1,530E -01	1,510E -01	1,550E -01	1,550E -01	1,530E -01
4	1,590E -01	1,580E -01	1,550E -01	1,560E -01	1,570E -01	1,580E -01	1,570E -01
Statistics							
Min	1,550E -01	1,530E -01	1,530E -01	1,510E -01	1,550E -01	1,550E -01	1,530E -01
Max	1,590E -01	1,580E -01	1,560E -01	1,560E -01	1,570E -01	1,580E -01	1,580E -01
Mean	1,573E -01	1,560E -01	1,547E -01	1,540E -01	1,563E -01	1,570E -01	1,560E -01
Sigma	2,082E -03	2,646E -03	1,528E -03	2,646E -03	1,155E -03	1,732E -03	2,646E -03

Test Step	192 hours
Serial #	
1 Ref.	1,560E -01
2	1,910E -01
3	1,850E -01
4	1,900E -01
Statistics	
Min	1,850E -01
Max	1,910E -01
Mean	1,887E -01
Sigma	3,215E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D8: Void8  
VDD=4.75V; VSS=-5V; IO=1.6mA

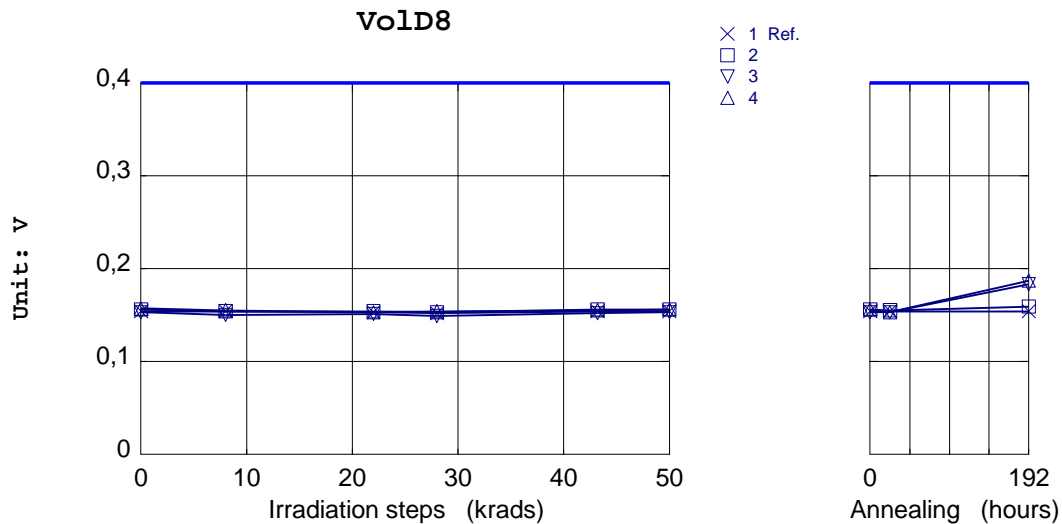
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,530E -01	1,520E -01	1,540E -01	1,540E -01	1,540E -01
2	1,560E -01	1,540E -01	1,540E -01	1,530E -01	1,560E -01	1,560E -01	1,550E -01
3	1,530E -01	1,500E -01	1,510E -01	1,490E -01	1,520E -01	1,530E -01	1,530E -01
4	1,570E -01	1,550E -01	1,530E -01	1,540E -01	1,550E -01	1,560E -01	1,530E -01
Statistics							
Min	1,530E -01	1,500E -01	1,510E -01	1,490E -01	1,520E -01	1,530E -01	1,530E -01
Max	1,570E -01	1,550E -01	1,540E -01	1,540E -01	1,560E -01	1,560E -01	1,550E -01
Mean	1,553E -01	1,530E -01	1,527E -01	1,520E -01	1,543E -01	1,550E -01	1,537E -01
Sigma	2,082E -03	2,646E -03	1,528E -03	2,646E -03	2,082E -03	1,732E -03	1,155E -03

Test Step	192 hours
Serial #	
1 Ref.	1,540E -01
2	1,590E -01
3	1,830E -01
4	1,870E -01
Statistics	
Min	1,590E -01
Max	1,870E -01
Mean	1,763E -01
Sigma	1,514E -02



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D7: Vold7  
VDD=4.75V; VSS=-5V; IO=1.6mA

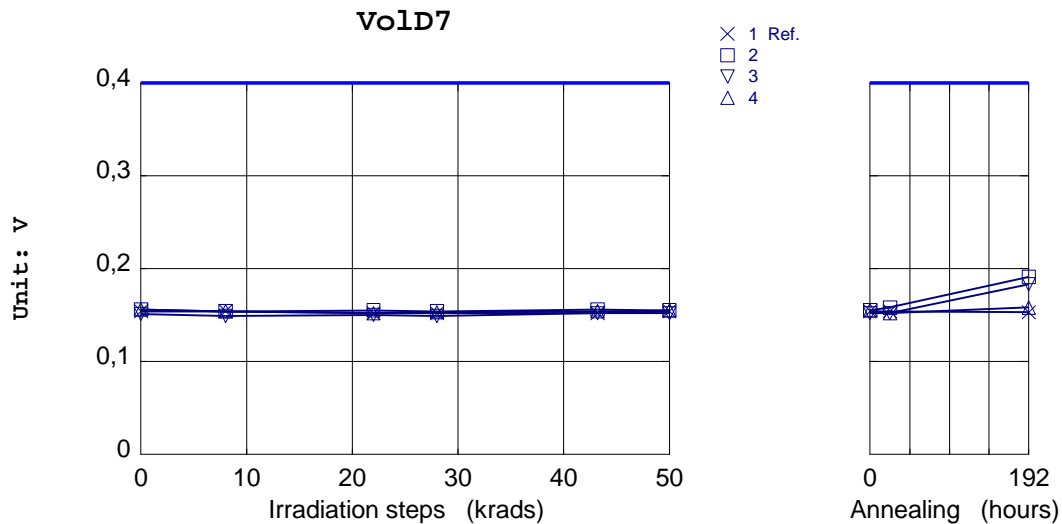
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,520E -01	1,520E -01	1,520E -01	1,540E -01	1,540E -01
2	1,560E -01	1,540E -01	1,550E -01	1,540E -01	1,560E -01	1,550E -01	1,580E -01
3	1,510E -01	1,490E -01	1,500E -01	1,490E -01	1,520E -01	1,520E -01	1,520E -01
4	1,560E -01	1,540E -01	1,520E -01	1,530E -01	1,540E -01	1,550E -01	1,520E -01
Statistics							
Min	1,510E -01	1,490E -01	1,500E -01	1,490E -01	1,520E -01	1,520E -01	1,520E -01
Max	1,560E -01	1,540E -01	1,550E -01	1,540E -01	1,560E -01	1,550E -01	1,580E -01
Mean	1,543E -01	1,523E -01	1,523E -01	1,520E -01	1,540E -01	1,540E -01	1,540E -01
Sigma	2,887E -03	2,887E -03	2,517E -03	2,646E -03	2,000E -03	1,732E -03	3,464E -03

Test Step	192 hours
Serial #	
1 Ref.	1,530E -01
2	1,910E -01
3	1,830E -01
4	1,580E -01
Statistics	
Min	1,580E -01
Max	1,910E -01
Mean	1,773E -01
Sigma	1,721E -02



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D6: Vo1D6  
VDD=4.75V; VSS=-5V; IO=1.6mA

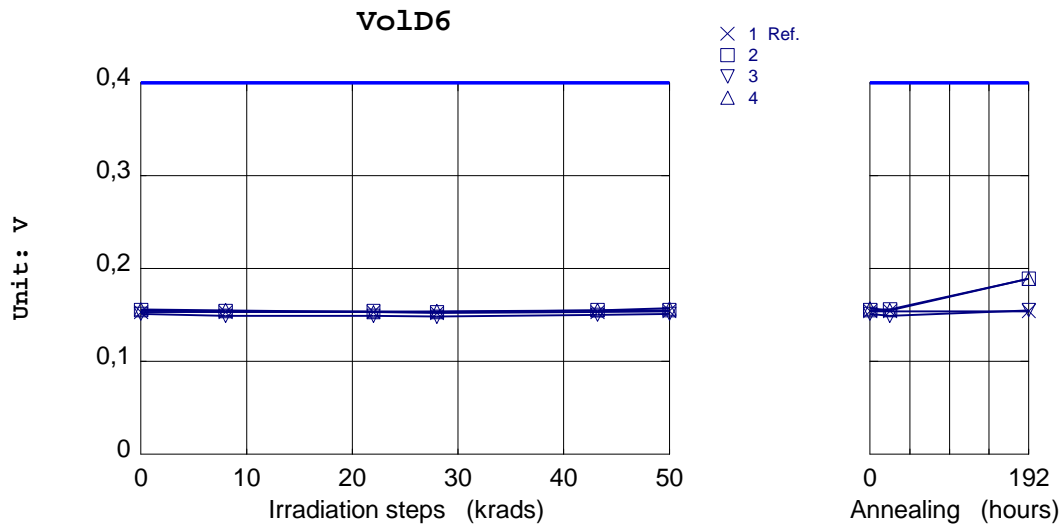
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,530E -01	1,530E -01	1,530E -01	1,520E -01	1,530E -01	1,540E -01	1,540E -01
2	1,550E -01	1,540E -01	1,540E -01	1,530E -01	1,550E -01	1,550E -01	1,560E -01
3	1,510E -01	1,490E -01	1,490E -01	1,480E -01	1,500E -01	1,510E -01	1,490E -01
4	1,560E -01	1,550E -01	1,530E -01	1,540E -01	1,550E -01	1,570E -01	1,550E -01
Statistics							
Min	1,510E -01	1,490E -01	1,490E -01	1,480E -01	1,500E -01	1,510E -01	1,490E -01
Max	1,560E -01	1,550E -01	1,540E -01	1,540E -01	1,550E -01	1,570E -01	1,560E -01
Mean	1,540E -01	1,527E -01	1,520E -01	1,517E -01	1,533E -01	1,543E -01	1,533E -01
Sigma	2,646E -03	3,215E -03	2,646E -03	3,215E -03	2,887E -03	3,055E -03	3,786E -03

Test Step	192 hours
Serial #	
1 Ref.	1,540E -01
2	1,890E -01
3	1,550E -01
4	1,890E -01
Statistics	
Min	1,550E -01
Max	1,890E -01
Mean	1,777E -01
Sigma	1,963E -02



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D5: V01D5**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

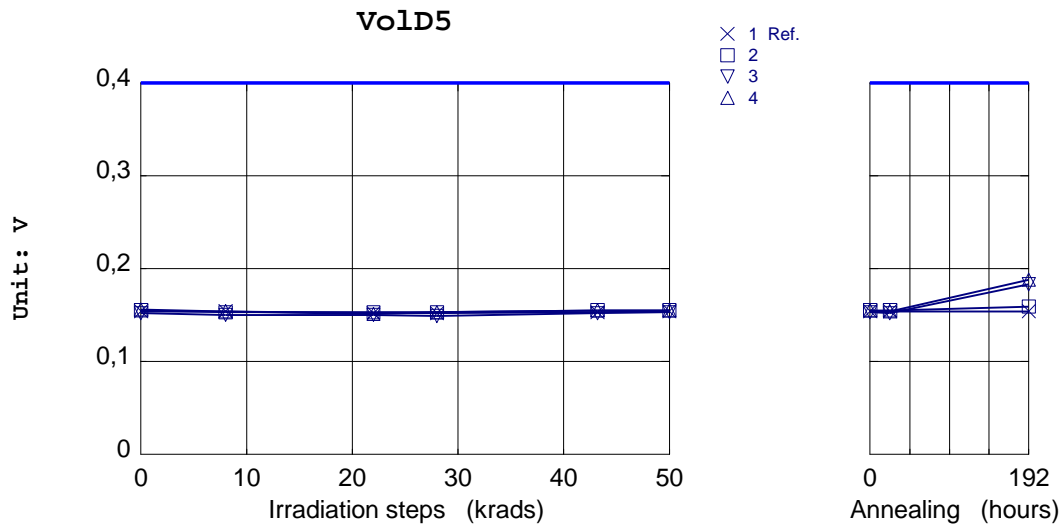
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,520E -01	1,520E -01	1,530E -01	1,540E -01	1,540E -01
2	1,550E -01	1,530E -01	1,530E -01	1,530E -01	1,550E -01	1,550E -01	1,550E -01
3	1,520E -01	1,500E -01	1,500E -01	1,490E -01	1,520E -01	1,530E -01	1,520E -01
4	1,560E -01	1,540E -01	1,510E -01	1,530E -01	1,550E -01	1,550E -01	1,540E -01
Statistics							
Min	1,520E -01	1,500E -01	1,500E -01	1,490E -01	1,520E -01	1,530E -01	1,520E -01
Max	1,560E -01	1,540E -01	1,530E -01	1,530E -01	1,550E -01	1,550E -01	1,550E -01
Mean	1,543E -01	1,523E -01	1,513E -01	1,517E -01	1,540E -01	1,543E -01	1,537E -01
Sigma	2,082E -03	2,082E -03	1,528E -03	2,309E -03	1,732E -03	1,155E -03	1,528E -03

Test Step	192 hours
Serial #	
1 Ref.	1,540E -01
2	1,590E -01
3	1,830E -01
4	1,880E -01
Statistics	
Min	1,590E -01
Max	1,880E -01
Mean	1,767E -01
Sigma	1,550E -02



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D4: Void4  
VDD=4.75V; VSS=-5V; IO=1.6mA

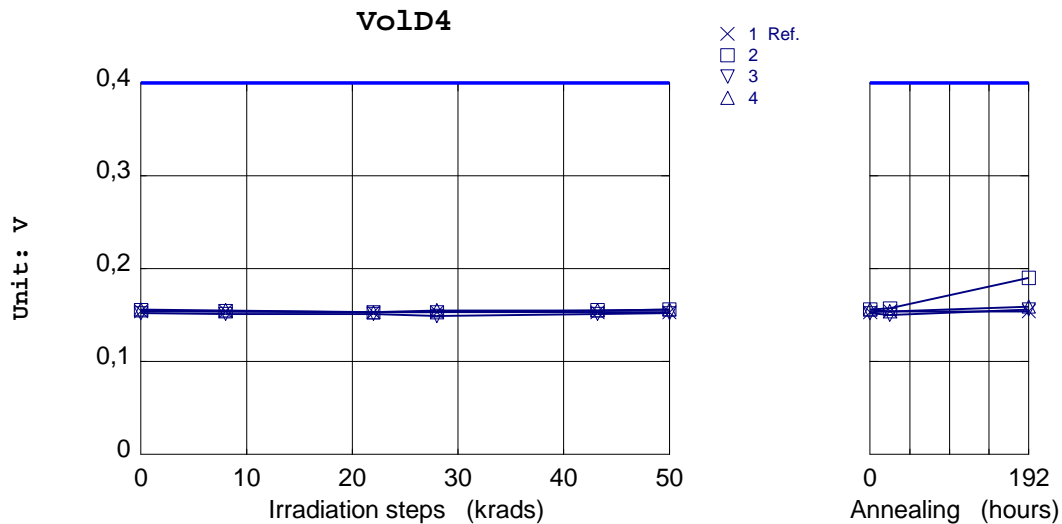
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,530E -01	1,530E -01	1,530E -01	1,530E -01	1,540E -01
2	1,550E -01	1,540E -01	1,530E -01	1,530E -01	1,550E -01	1,560E -01	1,570E -01
3	1,520E -01	1,510E -01	1,510E -01	1,490E -01	1,510E -01	1,520E -01	1,500E -01
4	1,560E -01	1,550E -01	1,530E -01	1,550E -01	1,550E -01	1,560E -01	1,540E -01
Statistics							
Min	1,520E -01	1,510E -01	1,510E -01	1,490E -01	1,510E -01	1,520E -01	1,500E -01
Max	1,560E -01	1,550E -01	1,530E -01	1,550E -01	1,550E -01	1,560E -01	1,570E -01
Mean	1,543E -01	1,533E -01	1,523E -01	1,523E -01	1,537E -01	1,547E -01	1,537E -01
Sigma	2,082E -03	2,082E -03	1,155E -03	3,055E -03	2,309E -03	2,309E -03	3,512E -03

Test Step	192 hours
Serial #	
1 Ref.	1,540E -01
2	1,900E -01
3	1,560E -01
4	1,590E -01
Statistics	
Min	1,560E -01
Max	1,900E -01
Mean	1,683E -01
Sigma	1,882E -02





HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D3: Vo1D3**

VDD=4.75V; VSS=-5V; IO=1.6mA

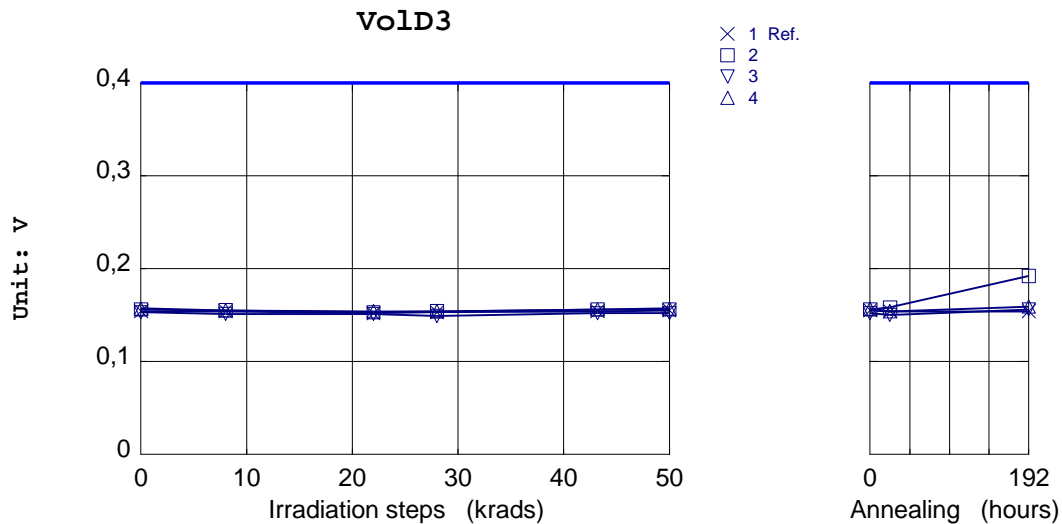
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,520E -01	1,530E -01	1,540E -01	1,550E -01	1,540E -01
2	1,560E -01	1,550E -01	1,530E -01	1,540E -01	1,560E -01	1,560E -01	1,580E -01
3	1,530E -01	1,510E -01	1,510E -01	1,490E -01	1,520E -01	1,520E -01	1,500E -01
4	1,570E -01	1,550E -01	1,540E -01	1,540E -01	1,560E -01	1,570E -01	1,540E -01
Statistics							
Min	1,530E -01	1,510E -01	1,510E -01	1,490E -01	1,520E -01	1,520E -01	1,500E -01
Max	1,570E -01	1,550E -01	1,540E -01	1,540E -01	1,560E -01	1,570E -01	1,580E -01
Mean	1,553E -01	1,537E -01	1,527E -01	1,523E -01	1,547E -01	1,550E -01	1,540E -01
Sigma	2,082E -03	2,309E -03	1,528E -03	2,887E -03	2,309E -03	2,646E -03	4,000E -03

Test Step	192 hours
Serial #	
1 Ref.	1,540E -01
2	1,920E -01
3	1,560E -01
4	1,590E -01
Statistics	
Min	1,560E -01
Max	1,920E -01
Mean	1,690E -01
Sigma	1,997E -02



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D2: Vo1D2**

**VDD=4.75V; VSS=-5V; IO=1.6mA**

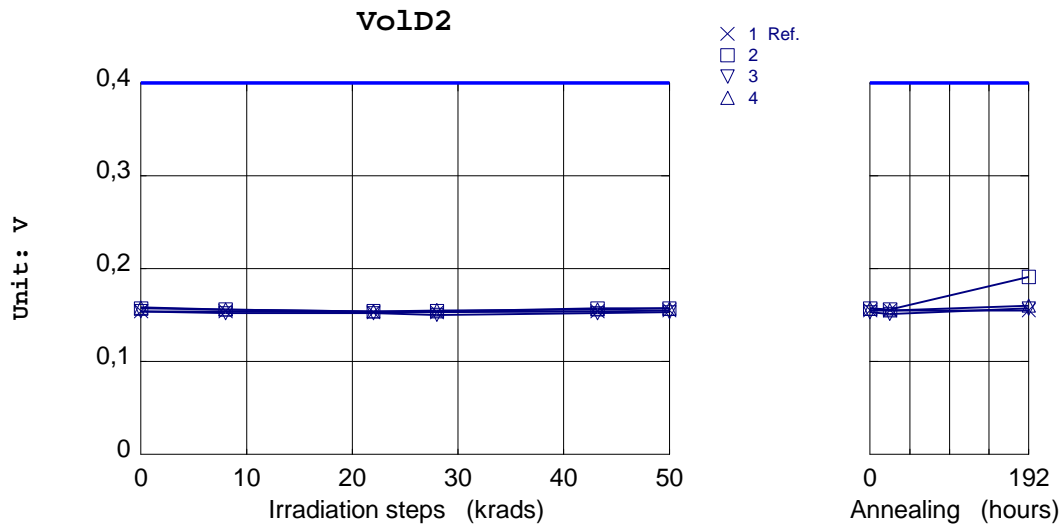
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,530E -01	1,530E -01	1,540E -01	1,550E -01	1,550E -01
2	1,570E -01	1,560E -01	1,540E -01	1,540E -01	1,570E -01	1,570E -01	1,560E -01
3	1,540E -01	1,520E -01	1,520E -01	1,500E -01	1,520E -01	1,530E -01	1,510E -01
4	1,580E -01	1,560E -01	1,540E -01	1,550E -01	1,560E -01	1,570E -01	1,550E -01
Statistics							
Min	1,540E -01	1,520E -01	1,520E -01	1,500E -01	1,520E -01	1,530E -01	1,510E -01
Max	1,580E -01	1,560E -01	1,540E -01	1,550E -01	1,570E -01	1,570E -01	1,560E -01
Mean	1,563E -01	1,547E -01	1,533E -01	1,530E -01	1,550E -01	1,557E -01	1,540E -01
Sigma	2,082E -03	2,309E -03	1,155E -03	2,646E -03	2,646E -03	2,309E -03	2,646E -03

Test Step	192 hours
Serial #	
1 Ref.	1,550E -01
2	1,910E -01
3	1,570E -01
4	1,600E -01
Statistics	
Min	1,570E -01
Max	1,910E -01
Mean	1,693E -01
Sigma	1,882E -02



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D1: Void1  
VDD=4.75V; VSS=-5V; IO=1.6mA

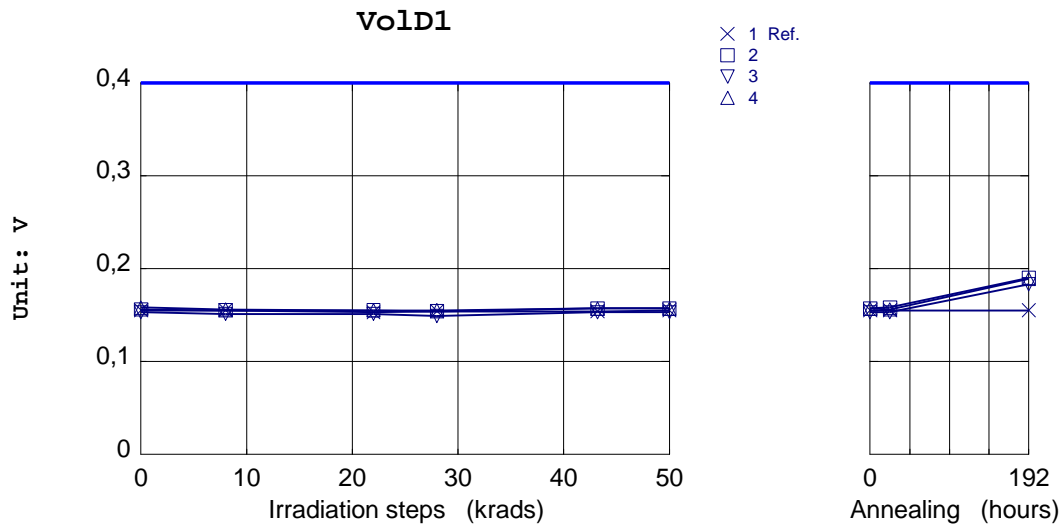
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,550E -01	1,550E -01	1,530E -01	1,540E -01	1,540E -01	1,550E -01	1,550E -01
2	1,560E -01	1,550E -01	1,550E -01	1,540E -01	1,570E -01	1,570E -01	1,580E -01
3	1,530E -01	1,510E -01	1,510E -01	1,490E -01	1,530E -01	1,530E -01	1,530E -01
4	1,580E -01	1,560E -01	1,550E -01	1,550E -01	1,570E -01	1,570E -01	1,560E -01
Statistics							
Min	1,530E -01	1,510E -01	1,510E -01	1,490E -01	1,530E -01	1,530E -01	1,530E -01
Max	1,580E -01	1,560E -01	1,550E -01	1,550E -01	1,570E -01	1,570E -01	1,580E -01
Mean	1,557E -01	1,540E -01	1,537E -01	1,527E -01	1,557E -01	1,557E -01	1,557E -01
Sigma	2,517E -03	2,646E -03	2,309E -03	3,215E -03	2,309E -03	2,309E -03	2,517E -03

Test Step	192 hours
Serial #	
1 Ref.	1,550E -01
2	1,900E -01
3	1,830E -01
4	1,890E -01
Statistics	
Min	1,830E -01
Max	1,900E -01
Mean	1,873E -01
Sigma	3,786E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D0: Void0**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

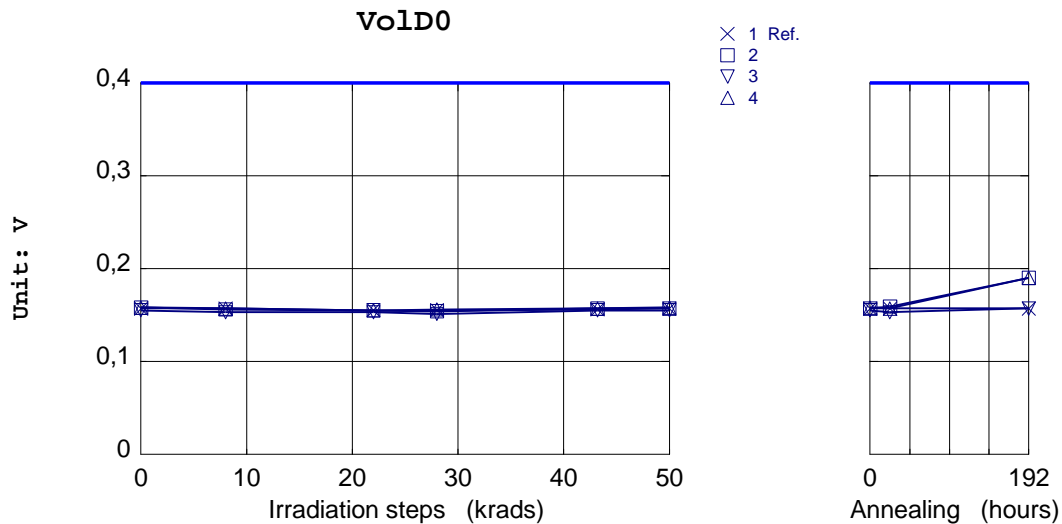
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	8 krad	22 krad	28 krad	43,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,570E -01	1,570E -01	1,550E -01	1,550E -01	1,560E -01	1,570E -01	1,570E -01
2	1,580E -01	1,560E -01	1,550E -01	1,540E -01	1,570E -01	1,570E -01	1,590E -01
3	1,550E -01	1,530E -01	1,530E -01	1,510E -01	1,550E -01	1,550E -01	1,530E -01
4	1,580E -01	1,570E -01	1,550E -01	1,560E -01	1,570E -01	1,580E -01	1,570E -01
Statistics							
Min	1,550E -01	1,530E -01	1,530E -01	1,510E -01	1,550E -01	1,550E -01	1,530E -01
Max	1,580E -01	1,570E -01	1,550E -01	1,560E -01	1,570E -01	1,580E -01	1,590E -01
Mean	1,570E -01	1,553E -01	1,543E -01	1,537E -01	1,563E -01	1,567E -01	1,563E -01
Sigma	1,732E -03	2,082E -03	1,155E -03	2,517E -03	1,155E -03	1,528E -03	3,055E -03

Test Step	192 hours
Serial #	
1 Ref.	1,570E -01
2	1,900E -01
3	1,570E -01
4	1,900E -01
Statistics	
Min	1,570E -01
Max	1,900E -01
Mean	1,790E -01
Sigma	1,905E -02



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>		Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology

**APPENDIX 2 : TEST RESULTS - LOW DOSE RATE**

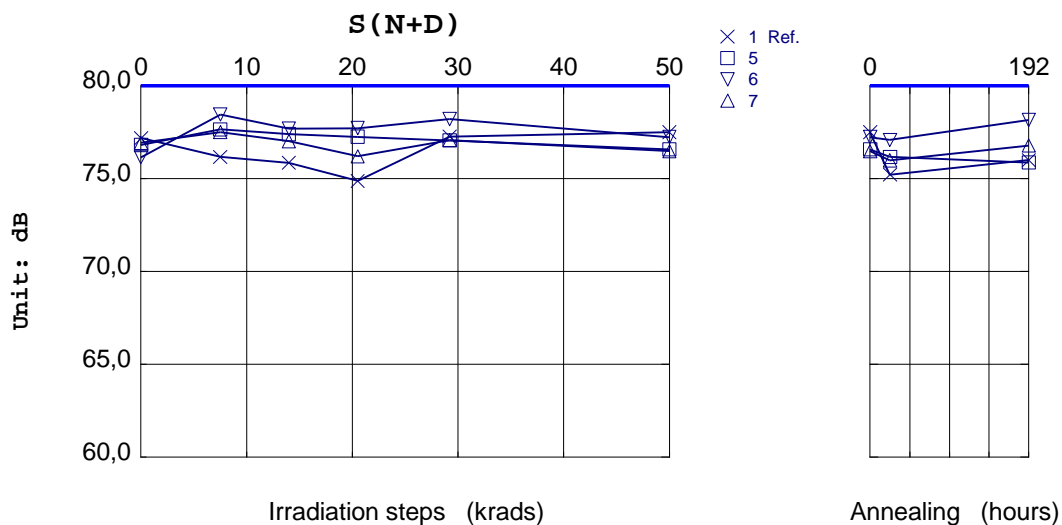
<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Test results including tables and graphics are provided in this section for each measured parameter corresponding to a low dose rate exposure.

**Parameter: Signal-to-Noise Plus Distortion Ratio: S(N+D)**  
**DD=+5V; VSS=-5V; Input signal: +/-2.5V, 10KHz; Fsample=1.3MHz**  
Unit= dB  
Spec limit typical: 80  
Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	7,717E +01	7,617E +01	7,585E +01	7,487E +01	7,726E +01	7,749E +01	7,520E +01
5	7,680E +01	7,764E +01	7,739E +01	7,724E +01	7,705E +01	7,657E +01	7,617E +01
6	7,613E +01	7,844E +01	7,769E +01	7,771E +01	7,820E +01	7,723E +01	7,707E +01
7	7,692E +01	7,749E +01	7,701E +01	7,620E +01	7,707E +01	7,647E +01	7,598E +01
Statistics							
Min	7,613E +01	7,749E +01	7,701E +01	7,620E +01	7,704E +01	7,647E +01	7,598E +01
Max	7,692E +01	7,844E +01	7,768E +01	7,771E +01	7,820E +01	7,723E +01	7,707E +01
Mean	7,662E +01	7,786E +01	7,736E +01	7,705E +01	7,744E +01	7,676E +01	7,641E +01
Sigma	4,234E -01	5,110E -01	3,389E -01	7,735E -01	6,577E -01	4,122E -01	5,843E -01

Test Step	192 hours
Serial #	
1 Ref.	7,599E +01
5	7,586E +01
6	7,815E +01
7	7,678E +01
Statistics	
Min	7,586E +01
Max	7,815E +01
Mean	7,693E +01
Sigma	1,151E +00



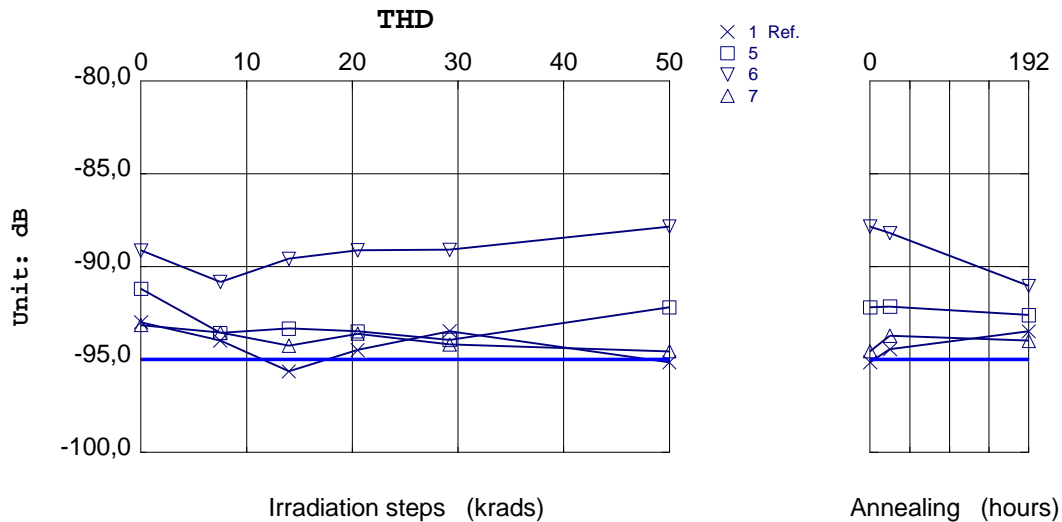
<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Total Harmonic Distortion: THD**  
**VDD=+5V; VSS=-5V; Input signal: +/-2.5V, 10KHz; Fsample=1.3MHz; first 5 Harmonics**

Unit= dB  
 Spec limit typical: -95  
 Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	-9,299E +01	-9,399E +01	-9,564E +01	-9,449E +01	-9,347E +01	-9,516E +01	-9,445E +01
5	-9,120E +01	-9,357E +01	-9,333E +01	-9,349E +01	-9,395E +01	-9,219E +01	-9,215E +01
6	-8,913E +01	-9,083E +01	-8,958E +01	-8,912E +01	-8,910E +01	-8,785E +01	-8,819E +01
7	-9,315E +01	-9,356E +01	-9,425E +01	-9,362E +01	-9,419E +01	-9,456E +01	-9,372E +01
Statistics							
Min	-9,315E +01	-9,357E +01	-9,425E +01	-9,362E +01	-9,419E +01	-9,456E +01	-9,372E +01
Max	-8,913E +01	-9,083E +01	-8,958E +01	-8,912E +01	-8,910E +01	-8,785E +01	-8,819E +01
Mean	-9,116E +01	-9,265E +01	-9,239E +01	-9,208E +01	-9,241E +01	-9,154E +01	-9,136E +01
Sigma	2,010E +00	1,577E +00	2,474E +00	2,561E +00	2,871E +00	3,404E +00	2,849E +00

Test Step	192 hours
Serial #	
1 Ref.	-9,349E +01
5	-9,261E +01
6	-9,103E +01
7	-9,399E +01
Statistics	
Min	-9,399E +01
Max	-9,103E +01
Mean	-9,255E +01
Sigma	1,482E +00



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Integral Nonlinearity: INL**  
**VDD=+5V; VSS=-5V; Input signal: +/-2.5V**

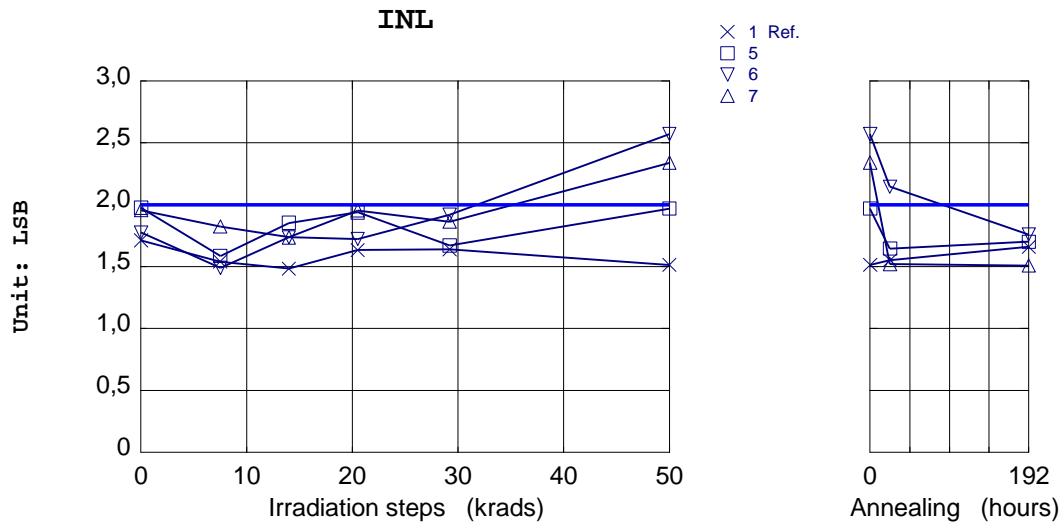
Unit= LSB

Spec limit max: 2

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,712E +00	1,540E +00	1,484E +00	1,633E +00	1,639E +00	1,513E +00	1,551E +00
5	1,976E +00	1,585E +00	1,853E +00	1,938E +00	1,670E +00	1,968E +00	1,645E +00
6	1,774E +00	1,490E +00	1,737E +00	1,722E +00	1,918E +00	2,570E +00	2,146E +00
7	1,956E +00	1,823E +00	1,736E +00	1,953E +00	1,862E +00	2,339E +00	1,521E +00
Statistics							
Min	1,774E +00	1,490E +00	1,736E +00	1,722E +00	1,670E +00	1,968E +00	1,521E +00
Max	1,976E +00	1,823E +00	1,853E +00	1,953E +00	1,918E +00	2,570E +00	2,146E +00
Mean	1,902E +00	1,633E +00	1,775E +00	1,871E +00	1,817E +00	2,292E +00	1,771E +00
Sigma	1,113E -01	1,715E -01	6,726E -02	1,293E -01	1,301E -01	3,037E -01	3,309E -01

Test Step	192 hours
Serial #	
1 Ref.	1,660E +00
5	1,701E +00
6	1,759E +00
7	1,508E +00
Statistics	
Min	1,508E +00
Max	1,759E +00
Mean	1,656E +00
Sigma	1,314E -01





<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Differential Nonlinearity: DNL**  
**VDD=+5V; VSS=-5V; Input signal: +/-2.5V**

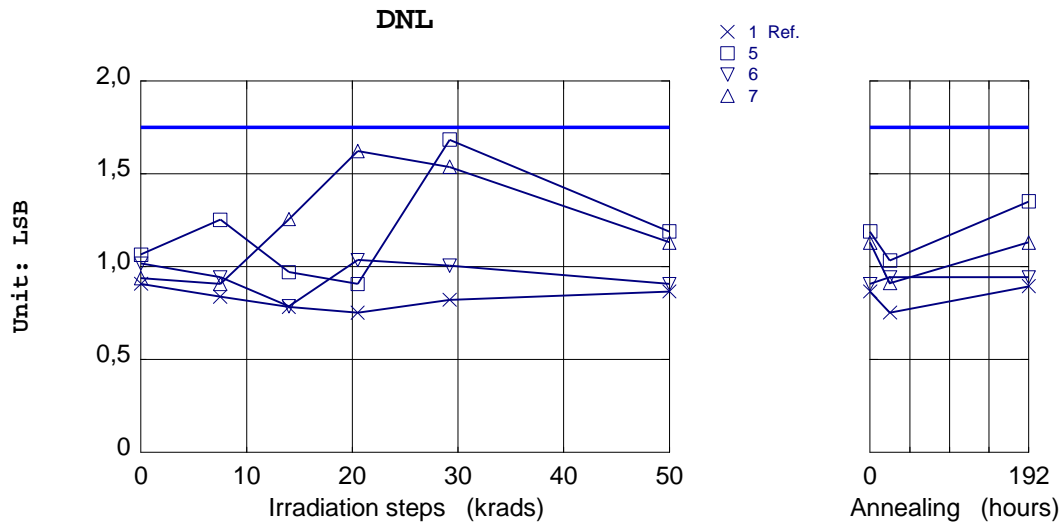
Unit= LSB

Spec limit max: 1.75

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	9,078E -01	8,378E -01	7,826E -01	7,514E -01	8,210E -01	8,659E -01	7,517E -01
5	1,064E +00	1,252E +00	9,700E -01	9,062E -01	1,683E +00	1,189E +00	1,032E +00
6	1,017E +00	9,424E -01	7,861E -01	1,036E +00	1,005E +00	9,060E -01	9,423E -01
7	9,374E -01	9,060E -01	1,256E +00	1,622E +00	1,537E +00	1,130E +00	9,108E -01
Statistics							
Min	9,374E -01	9,060E -01	7,861E -01	9,062E -01	1,005E +00	9,060E -01	9,108E -01
Max	1,064E +00	1,252E +00	1,256E +00	1,622E +00	1,683E +00	1,189E +00	1,032E +00
Mean	1,006E +00	1,033E +00	1,004E +00	1,188E +00	1,408E +00	1,075E +00	9,617E -01
Sigma	6,400E -02	1,901E -01	2,368E -01	3,814E -01	3,568E -01	1,493E -01	6,289E -02

Test Step	192 hours
Serial #	
1 Ref.	8,939E -01
5	1,351E +00
6	9,426E -01
7	1,130E +00
Statistics	
Min	9,426E -01
Max	1,351E +00
Mean	1,141E +00
Sigma	2,044E -01



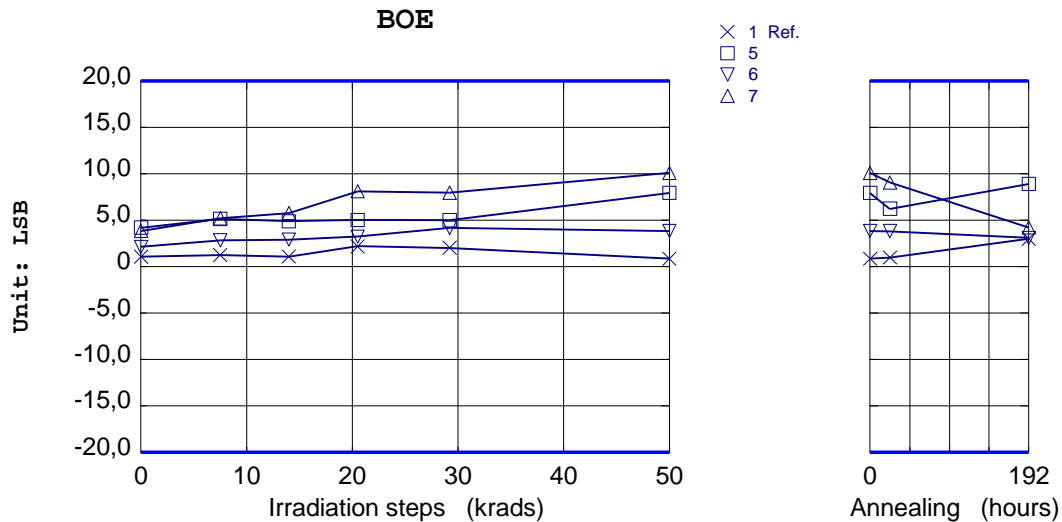
<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Bipolar Offset error: BOE**  
**VDD=+5V; VSS=-5V; Input signal: 0V**

Unit= LSB  
Spec limit max: 20  
Spec limit min: -20  
Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,058E +00	1,243E +00	1,068E +00	2,178E +00	2,015E +00	8,448E -01	9,674E -01
5	4,198E +00	5,136E +00	4,878E +00	5,016E +00	4,997E +00	7,936E +00	6,217E +00
6	2,129E +00	2,824E +00	2,893E +00	3,221E +00	4,168E +00	3,825E +00	3,806E +00
7	3,841E +00	5,193E +00	5,754E +00	8,105E +00	7,957E +00	1,008E +01	9,044E +00
Statistics							
Min	2,129E +00	2,824E +00	2,893E +00	3,221E +00	4,168E +00	3,825E +00	3,806E +00
Max	4,198E +00	5,193E +00	5,754E +00	8,105E +00	7,957E +00	1,008E +01	9,044E +00
Mean	3,389E +00	4,384E +00	4,508E +00	5,447E +00	5,707E +00	7,282E +00	6,356E +00
Sigma	1,106E +00	1,352E +00	1,466E +00	2,470E +00	1,992E +00	3,181E +00	2,622E +00

Test Step	192 hours
Serial #	
1 Ref.	2,984E +00
5	8,900E +00
6	3,093E +00
7	4,214E +00
Statistics	
Min	3,093E +00
Max	8,900E +00
Mean	5,402E +00
Sigma	3,081E +00



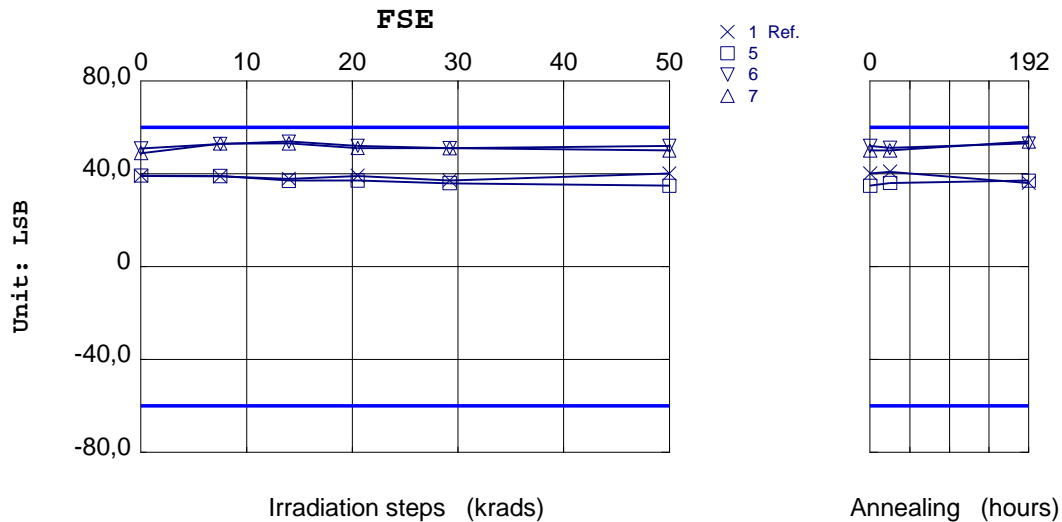
<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Full Scale error: FSE**  
**VDD=+5V; VSS=-5V; Input signal: 2.5V**

Unit= LSB  
Spec limit max: 60  
Spec limit min: -60  
Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	3,908E +01	3,884E +01	3,776E +01	3,909E +01	3,714E +01	4,012E +01	4,089E +01
5	3,920E +01	3,897E +01	3,696E +01	3,706E +01	3,589E +01	3,479E +01	3,597E +01
6	5,080E +01	5,279E +01	5,383E +01	5,202E +01	5,097E +01	5,194E +01	5,116E +01
7	4,885E +01	5,293E +01	5,310E +01	5,103E +01	5,094E +01	4,996E +01	5,001E +01
Statistics							
Min	3,920E +01	3,897E +01	3,696E +01	3,706E +01	3,589E +01	3,479E +01	3,597E +01
Max	5,080E +01	5,293E +01	5,383E +01	5,202E +01	5,097E +01	5,194E +01	5,116E +01
Mean	4,628E +01	4,823E +01	4,797E +01	4,670E +01	4,594E +01	4,557E +01	4,572E +01
Sigma	6,212E +00	8,015E +00	9,541E +00	8,367E +00	8,701E +00	9,380E +00	8,457E +00

Test Step	192 hours
Serial #	
1 Ref.	3,595E +01
5	3,698E +01
6	5,299E +01
7	5,385E +01
Statistics	
Min	3,698E +01
Max	5,385E +01
Mean	4,794E +01
Sigma	9,504E +00



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Positive Supply Current: Idd**  
**VDD=+5V; VSS=-5V; CS High**

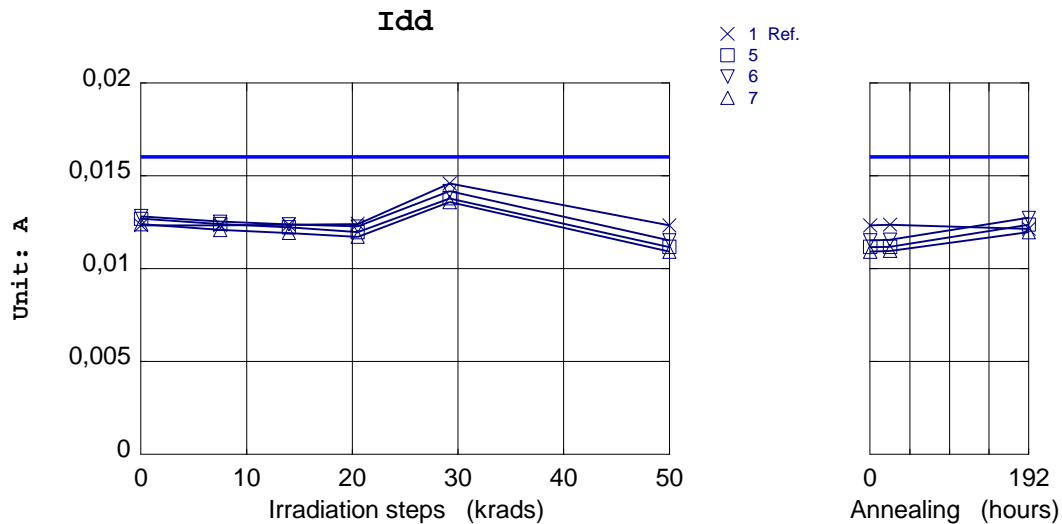
Unit= A

Spec limit max: 0.016

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,233E -02	1,234E -02	1,236E -02	1,240E -02	1,458E -02	1,233E -02	1,237E -02
5	1,269E -02	1,240E -02	1,222E -02	1,196E -02	1,378E -02	1,117E -02	1,117E -02
6	1,282E -02	1,252E -02	1,238E -02	1,227E -02	1,417E -02	1,152E -02	1,155E -02
7	1,239E -02	1,208E -02	1,192E -02	1,171E -02	1,358E -02	1,090E -02	1,095E -02
Statistics							
Min	1,239E -02	1,208E -02	1,192E -02	1,171E -02	1,358E -02	1,090E -02	1,095E -02
Max	1,282E -02	1,252E -02	1,238E -02	1,227E -02	1,417E -02	1,152E -02	1,155E -02
Mean	1,263E -02	1,233E -02	1,217E -02	1,198E -02	1,385E -02	1,120E -02	1,122E -02
Sigma	2,202E -04	2,282E -04	2,331E -04	2,795E -04	3,024E -04	3,081E -04	3,038E -04

Test Step	192 hours
Serial #	
1 Ref.	1,214E -02
5	1,236E -02
6	1,273E -02
7	1,196E -02
Statistics	
Min	1,196E -02
Max	1,273E -02
Mean	1,235E -02
Sigma	3,856E -04



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Negative Supply Current: Iss**  
**VDD=+5V; VSS=-5V; CS High**

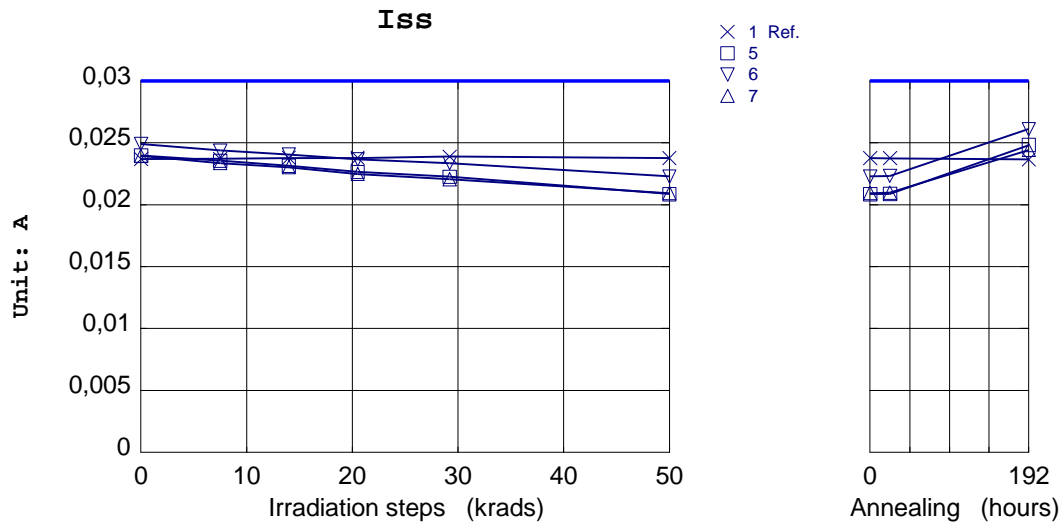
Unit= A

Spec limit max: 0.03

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	2,368E -02	2,370E -02	2,378E -02	2,378E -02	2,388E -02	2,376E -02	2,375E -02
5	2,397E -02	2,355E -02	2,313E -02	2,264E -02	2,225E -02	2,084E -02	2,087E -02
6	2,489E -02	2,436E -02	2,405E -02	2,365E -02	2,335E -02	2,227E -02	2,232E -02
7	2,395E -02	2,336E -02	2,303E -02	2,247E -02	2,205E -02	2,094E -02	2,096E -02
Statistics							
Min	2,395E -02	2,336E -02	2,303E -02	2,247E -02	2,205E -02	2,084E -02	2,087E -02
Max	2,489E -02	2,436E -02	2,405E -02	2,365E -02	2,335E -02	2,227E -02	2,232E -02
Mean	2,427E -02	2,376E -02	2,340E -02	2,292E -02	2,255E -02	2,135E -02	2,138E -02
Sigma	5,411E -04	5,337E -04	5,611E -04	6,404E -04	7,020E -04	7,969E -04	8,138E -04

Test Step	192 hours
Serial #	
1 Ref.	2,364E -02
5	2,481E -02
6	2,609E -02
7	2,441E -02
Statistics	
Min	2,441E -02
Max	2,609E -02
Mean	2,510E -02
Sigma	8,768E -04



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Input voltage: Vih**  
**VDD=5.25V; VSS=-5V**

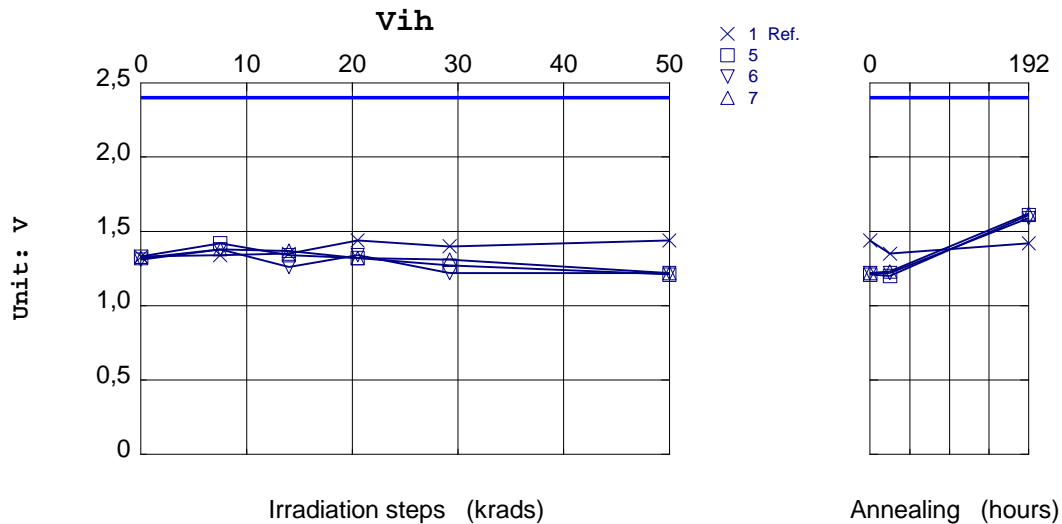
Unit= V

Spec limit min: 2.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,330E +00	1,340E +00	1,350E +00	1,440E +00	1,400E +00	1,440E +00	1,350E +00
5	1,330E +00	1,420E +00	1,340E +00	1,320E +00	1,270E +00	1,210E +00	1,200E +00
6	1,310E +00	1,380E +00	1,260E +00	1,340E +00	1,220E +00	1,220E +00	1,220E +00
7	1,320E +00	1,380E +00	1,370E +00	1,320E +00	1,310E +00	1,220E +00	1,230E +00
Statistics							
Min	1,310E +00	1,380E +00	1,260E +00	1,320E +00	1,220E +00	1,210E +00	1,200E +00
Max	1,330E +00	1,420E +00	1,370E +00	1,340E +00	1,310E +00	1,220E +00	1,230E +00
Mean	1,320E +00	1,393E +00	1,323E +00	1,327E +00	1,267E +00	1,217E +00	1,217E +00
Sigma	1,000E -02	2,309E -02	5,686E -02	1,155E -02	4,509E -02	5,773E -03	1,528E -02

Test Step	192 hours
Serial #	
1 Ref.	1,420E +00
5	1,610E +00
6	1,590E +00
7	1,620E +00
Statistics	
Min	1,590E +00
Max	1,620E +00
Mean	1,607E +00
Sigma	1,528E -02



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Input Voltage: Vil**  
**VDD=4.75V; VSS=-5V**

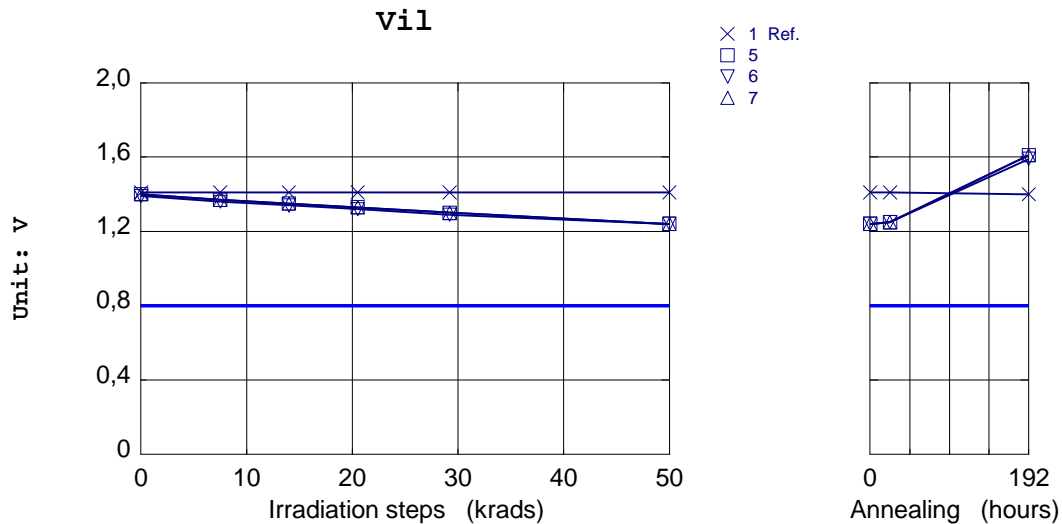
Unit= V

Spec limit max: 0.8

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,410E +00	1,410E +00	1,410E +00	1,410E +00	1,410E +00	1,410E +00	1,410E +00
5	1,400E +00	1,370E +00	1,350E +00	1,330E +00	1,300E +00	1,240E +00	1,250E +00
6	1,390E +00	1,360E +00	1,340E +00	1,320E +00	1,290E +00	1,240E +00	1,250E +00
7	1,400E +00	1,370E +00	1,350E +00	1,330E +00	1,300E +00	1,240E +00	1,250E +00
Statistics							
Min	1,390E +00	1,360E +00	1,340E +00	1,320E +00	1,290E +00	1,240E +00	1,250E +00
Max	1,400E +00	1,370E +00	1,350E +00	1,330E +00	1,300E +00	1,240E +00	1,250E +00
Mean	1,397E +00	1,367E +00	1,347E +00	1,327E +00	1,297E +00	1,240E +00	1,250E +00
Sigma	5,773E -03	5,773E -03	5,773E -03	5,773E -03	5,773E -03	0,000E +00	0,000E +00

Test Step	192 hours
Serial #	
1 Ref.	1,400E +00
5	1,610E +00
6	1,590E +00
7	1,610E +00
Statistics	
Min	1,590E +00
Max	1,610E +00
Mean	1,603E +00
Sigma	1,155E -02



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D13: VohD13**  
**VDD=4.75V; VSS=-5V; IO=-200uA**

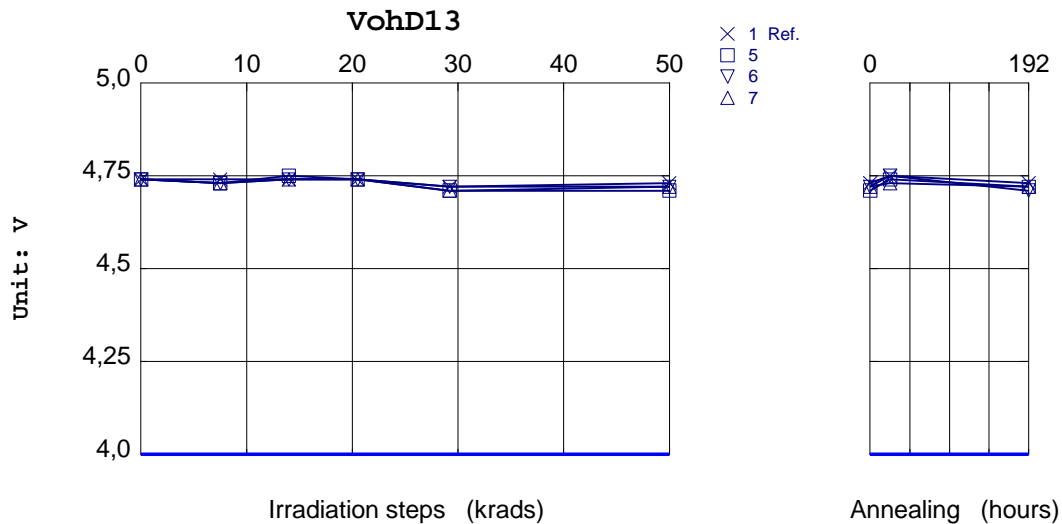
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,730E +00	4,750E +00
5	4,740E +00	4,730E +00	4,750E +00	4,740E +00	4,710E +00	4,710E +00	4,740E +00
6	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,750E +00
7	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,720E +00	4,730E +00
Statistics							
Min	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,710E +00	4,730E +00
Max	4,740E +00	4,730E +00	4,750E +00	4,740E +00	4,720E +00	4,720E +00	4,750E +00
Mean	4,740E +00	4,730E +00	4,743E +00	4,740E +00	4,713E +00	4,717E +00	4,740E +00
Sigma	2,634E -09	2,634E -09	5,774E -03	2,634E -09	5,773E -03	5,773E -03	1,000E -02

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
5	4,720E +00
6	4,710E +00
7	4,720E +00
Statistics	
Min	4,710E +00
Max	4,720E +00
Mean	4,717E +00
Sigma	5,773E -03





<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D12: VohD12**  
**VDD=4.75V; VSS=-5V; IO=-200uA**

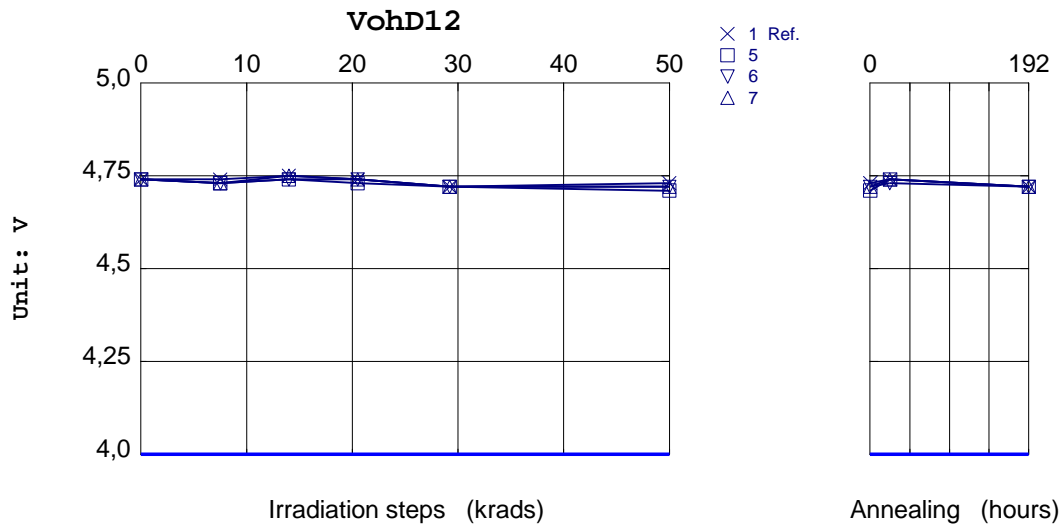
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,740E +00	4,740E +00	4,750E +00	4,740E +00	4,720E +00	4,730E +00	4,740E +00
5	4,740E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,710E +00	4,740E +00
6	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00
7	4,740E +00	4,730E +00	4,750E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
Statistics							
Min	4,740E +00	4,730E +00	4,740E +00	4,730E +00	4,720E +00	4,710E +00	4,730E +00
Max	4,740E +00	4,730E +00	4,750E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
Mean	4,740E +00	4,730E +00	4,743E +00	4,737E +00	4,720E +00	4,717E +00	4,737E +00
Sigma	2,634E -09	2,634E -09	5,774E -03	5,773E -03	2,634E -09	5,773E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,720E +00
5	4,720E +00
6	4,720E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,720E +00
Mean	4,720E +00
Sigma	2,634E -09



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D11: VohD11**

**VDD=4.75V; VSS=-5V; IO=-200uA**

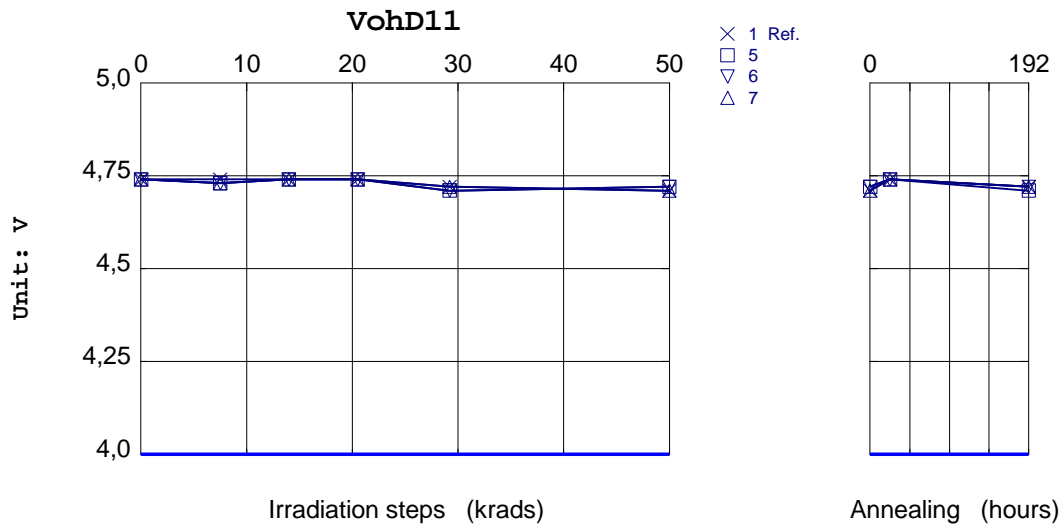
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,710E +00	4,740E +00
5	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,720E +00	4,740E +00
6	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,720E +00	4,740E +00
7	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,710E +00	4,740E +00
Statistics							
Min	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,710E +00	4,740E +00
Max	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
Mean	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,713E +00	4,717E +00	4,740E +00
Sigma	2,634E -09	2,634E -09	2,634E -09	2,634E -09	5,773E -03	5,773E -03	2,634E -09

Test Step	192 hours
Serial #	
1 Ref.	4,720E +00
5	4,710E +00
6	4,720E +00
7	4,720E +00
Statistics	
Min	4,710E +00
Max	4,720E +00
Mean	4,717E +00
Sigma	5,773E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D10: VohD10**

VDD=4.75V; VSS=-5V; IO=-200uA

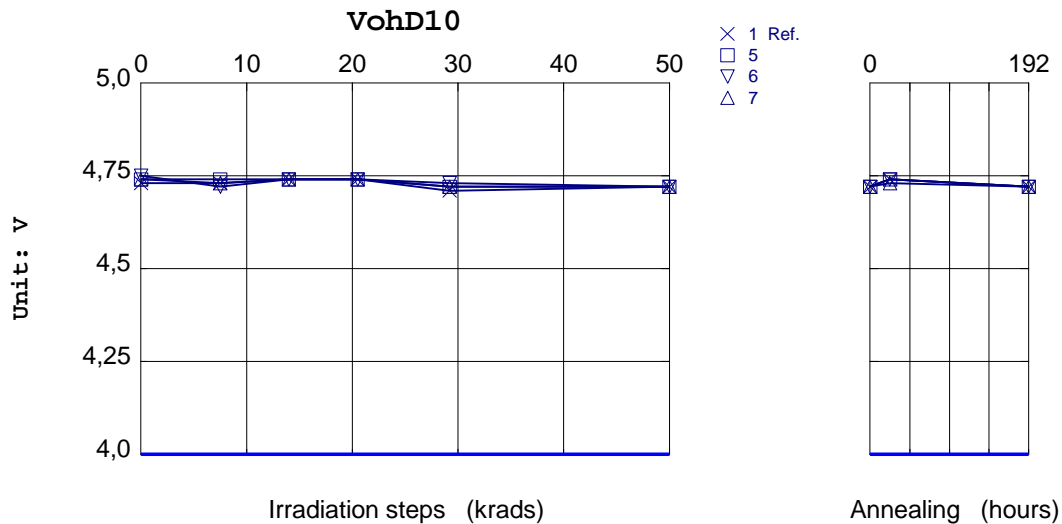
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,730E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,720E +00	4,740E +00
5	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
6	4,750E +00	4,720E +00	4,740E +00	4,740E +00	4,730E +00	4,720E +00	4,740E +00
7	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00
Statistics							
Min	4,740E +00	4,720E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00
Max	4,750E +00	4,740E +00	4,740E +00	4,740E +00	4,730E +00	4,720E +00	4,740E +00
Mean	4,743E +00	4,730E +00	4,740E +00	4,740E +00	4,723E +00	4,720E +00	4,737E +00
Sigma	5,774E -03	1,000E -02	2,634E -09	2,634E -09	5,774E -03	2,634E -09	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,720E +00
5	4,720E +00
6	4,720E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,720E +00
Mean	4,720E +00
Sigma	2,634E -09



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D9: VohD9**

VDD=4.75V; VSS=-5V; IO=-200uA

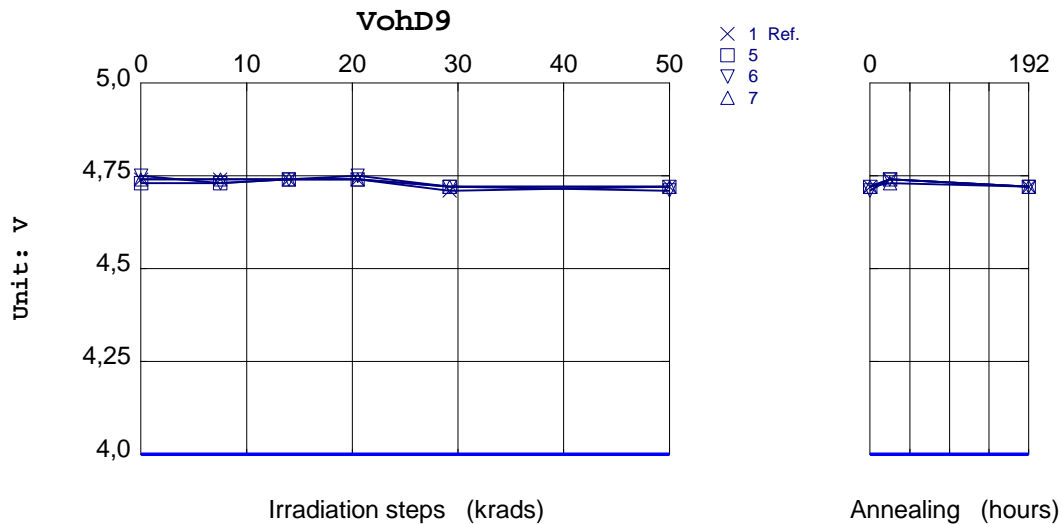
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,710E +00	4,720E +00	4,740E +00
5	4,730E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
6	4,750E +00	4,730E +00	4,740E +00	4,750E +00	4,720E +00	4,710E +00	4,740E +00
7	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00
Statistics							
Min	4,730E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,710E +00	4,730E +00
Max	4,750E +00	4,740E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,740E +00
Mean	4,740E +00	4,733E +00	4,740E +00	4,743E +00	4,720E +00	4,717E +00	4,737E +00
Sigma	1,000E -02	5,773E -03	2,634E -09	5,774E -03	2,634E -09	5,773E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,720E +00
5	4,720E +00
6	4,720E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,720E +00
Mean	4,720E +00
Sigma	2,634E -09



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D8: VohD8**  
**VDD=4.75V; VSS=-5V; IO=-200uA**

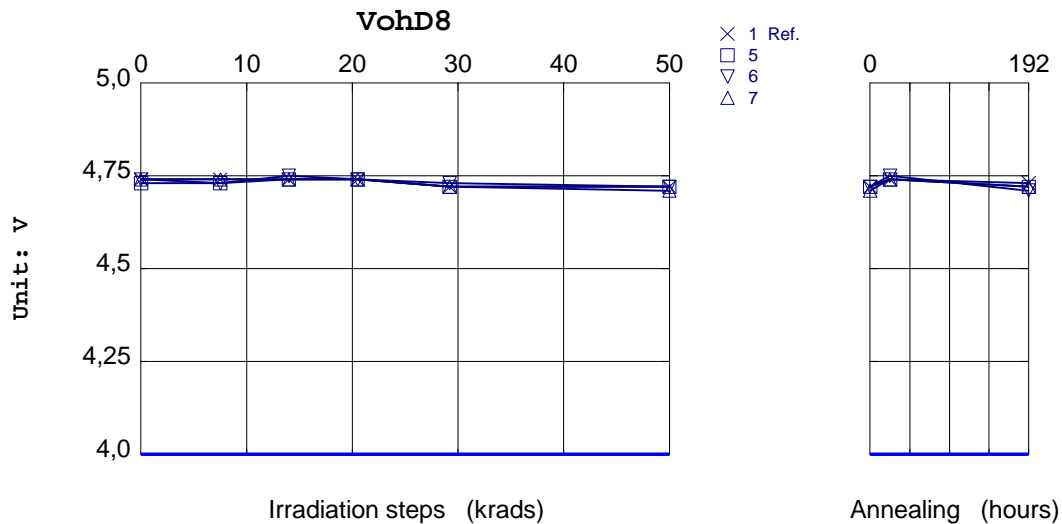
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
5	4,730E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
6	4,740E +00	4,730E +00	4,750E +00	4,740E +00	4,730E +00	4,720E +00	4,750E +00
7	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,710E +00	4,740E +00
Statistics							
Min	4,730E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,710E +00	4,740E +00
Max	4,740E +00	4,740E +00	4,750E +00	4,740E +00	4,730E +00	4,720E +00	4,750E +00
Mean	4,737E +00	4,733E +00	4,743E +00	4,740E +00	4,723E +00	4,717E +00	4,743E +00
Sigma	5,773E -03	5,773E -03	5,774E -03	2,634E -09	5,774E -03	5,773E -03	5,774E -03

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
5	4,720E +00
6	4,710E +00
7	4,720E +00
Statistics	
Min	4,710E +00
Max	4,720E +00
Mean	4,717E +00
Sigma	5,773E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D7: VohD7**

VDD=4.75V; VSS=-5V; IO=-200uA

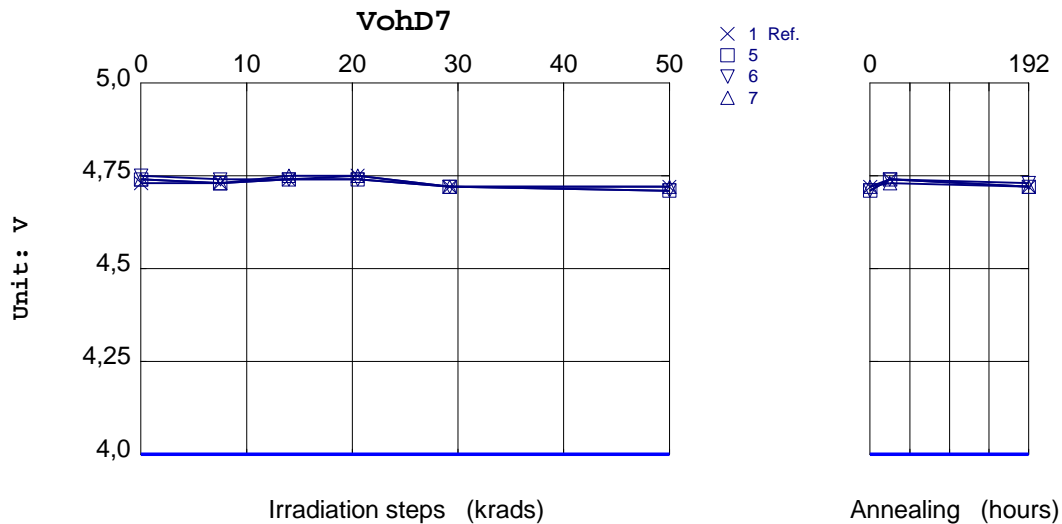
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,730E +00	4,730E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,740E +00
5	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,710E +00	4,740E +00
6	4,750E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,710E +00	4,740E +00
7	4,740E +00	4,730E +00	4,750E +00	4,750E +00	4,720E +00	4,720E +00	4,730E +00
Statistics							
Min	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,710E +00	4,730E +00
Max	4,750E +00	4,740E +00	4,750E +00	4,750E +00	4,720E +00	4,720E +00	4,740E +00
Mean	4,743E +00	4,733E +00	4,743E +00	4,743E +00	4,720E +00	4,713E +00	4,737E +00
Sigma	5,774E -03	5,773E -03	5,774E -03	5,774E -03	2,634E -09	5,773E -03	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,720E +00
5	4,720E +00
6	4,730E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,730E +00
Mean	4,723E +00
Sigma	5,774E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D6: VohD6**

**VDD=4.75V; VSS=-5V; IO=-200uA**

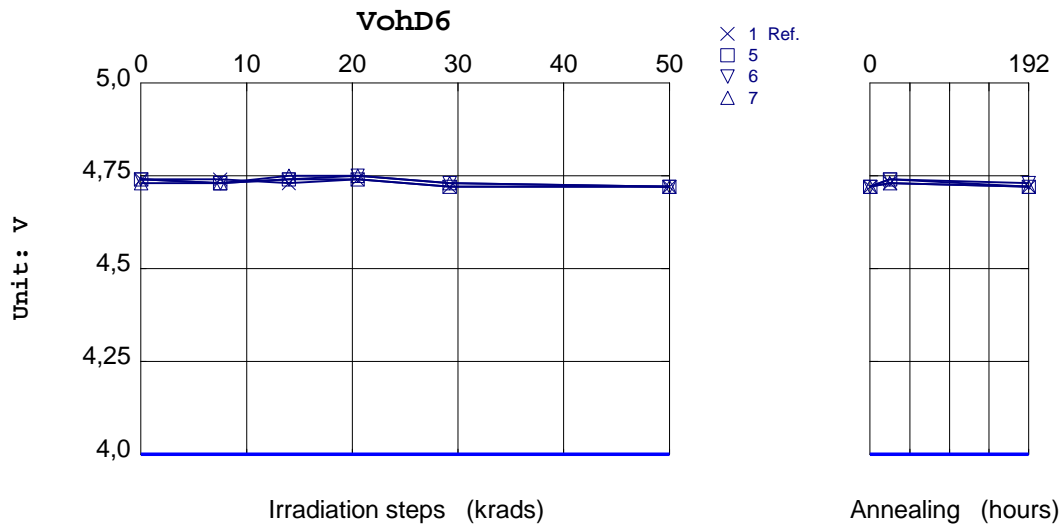
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,740E +00	4,740E +00	4,730E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00
5	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
6	4,740E +00	4,730E +00	4,740E +00	4,750E +00	4,730E +00	4,720E +00	4,740E +00
7	4,730E +00	4,730E +00	4,750E +00	4,750E +00	4,730E +00	4,720E +00	4,730E +00
Statistics							
Min	4,730E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00
Max	4,740E +00	4,730E +00	4,750E +00	4,750E +00	4,730E +00	4,720E +00	4,740E +00
Mean	4,737E +00	4,730E +00	4,743E +00	4,747E +00	4,727E +00	4,720E +00	4,737E +00
Sigma	5,773E -03	2,634E -09	5,774E -03	5,774E -03	5,774E -03	2,634E -09	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,720E +00
5	4,720E +00
6	4,730E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,730E +00
Mean	4,723E +00
Sigma	5,774E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D5: VohD5**

VDD=4.75V; VSS=-5V; IO=-200uA

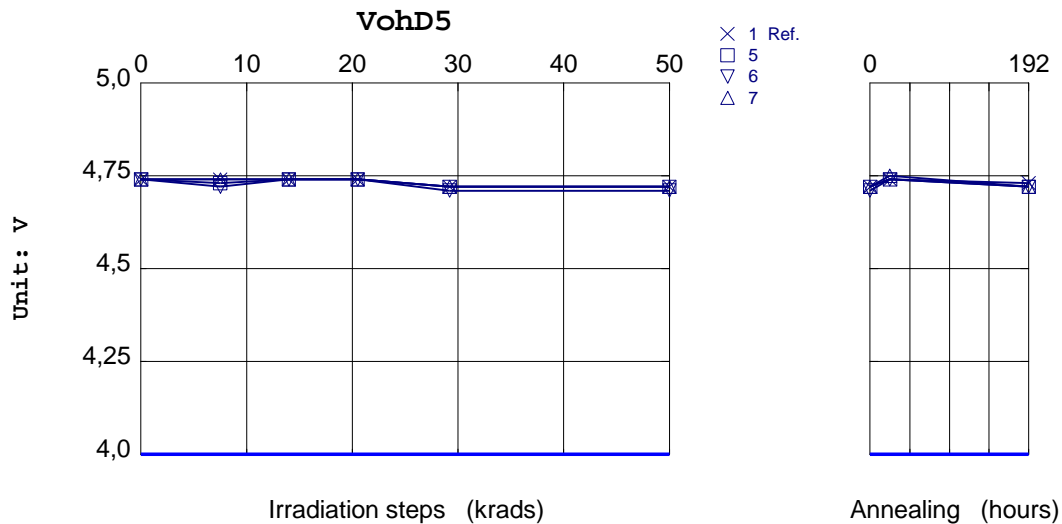
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
5	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
6	4,740E +00	4,720E +00	4,740E +00	4,740E +00	4,710E +00	4,710E +00	4,740E +00
7	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,750E +00
Statistics							
Min	4,740E +00	4,720E +00	4,740E +00	4,740E +00	4,710E +00	4,710E +00	4,740E +00
Max	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,750E +00
Mean	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,717E +00	4,717E +00	4,743E +00
Sigma	2,634E -09	1,000E -02	2,634E -09	2,634E -09	5,773E -03	5,773E -03	5,774E -03

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
5	4,720E +00
6	4,720E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,720E +00
Mean	4,720E +00
Sigma	2,634E -09





<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070 Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D4: VohD4**  
**VDD=4.75V; VSS=-5V; IO=-200uA**

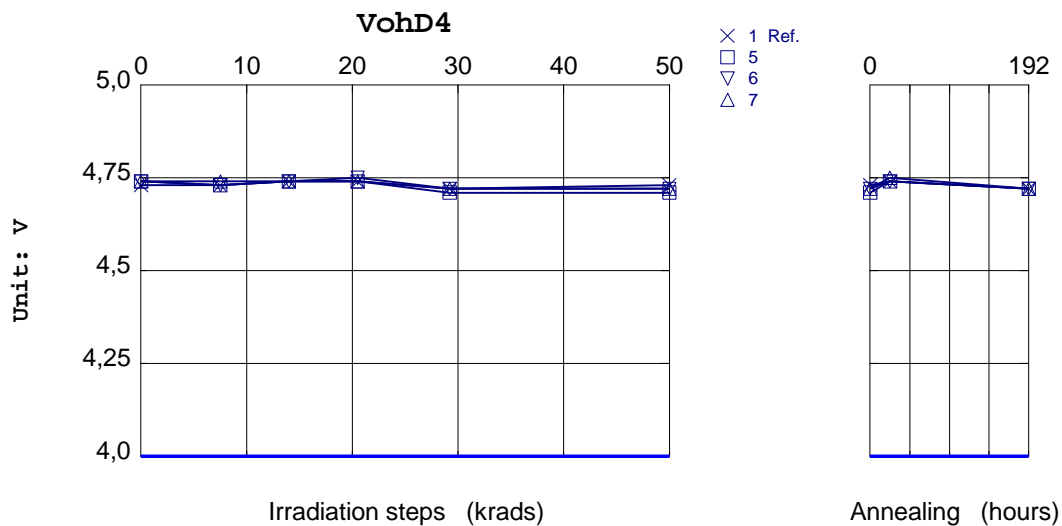
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,730E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,730E +00	4,740E +00
5	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,710E +00	4,740E +00
6	4,740E +00	4,730E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,740E +00
7	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,750E +00
Statistics							
Min	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,710E +00	4,740E +00
Max	4,740E +00	4,740E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,750E +00
Mean	4,740E +00	4,733E +00	4,740E +00	4,743E +00	4,717E +00	4,717E +00	4,743E +00
Sigma	2,634E -09	5,773E -03	2,634E -09	5,774E -03	5,773E -03	5,773E -03	5,774E -03

Test Step	192 hours
Serial #	
1 Ref.	4,720E +00
5	4,720E +00
6	4,720E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,720E +00
Mean	4,720E +00
Sigma	2,634E -09



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D3: VohD3**

VDD=4.75V; VSS=-5V; IO=-200uA

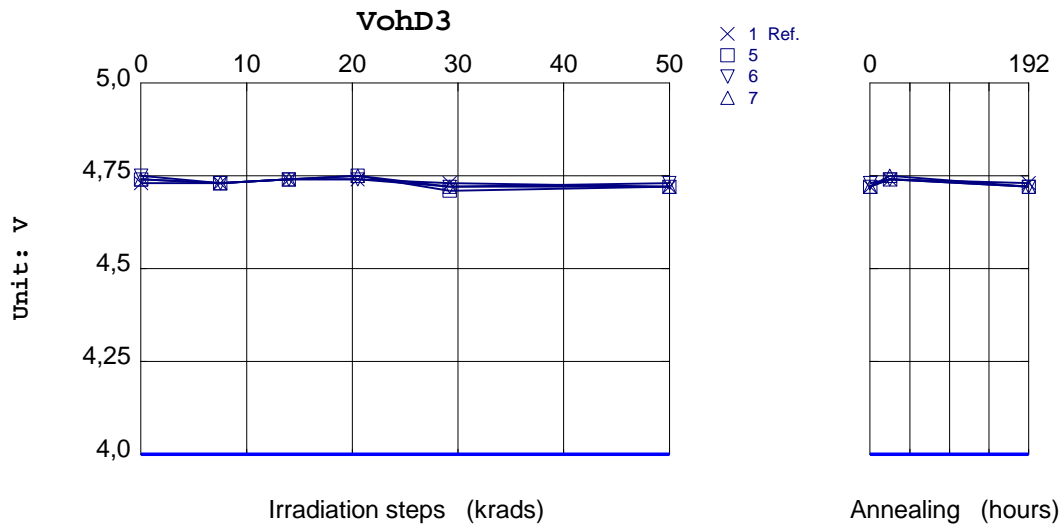
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,730E +00	4,730E +00	4,740E +00	4,740E +00	4,730E +00	4,720E +00	4,740E +00
5	4,740E +00	4,730E +00	4,740E +00	4,750E +00	4,710E +00	4,720E +00	4,740E +00
6	4,750E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,730E +00	4,740E +00
7	4,740E +00	4,730E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,750E +00
Statistics							
Min	4,740E +00	4,730E +00	4,740E +00	4,740E +00	4,710E +00	4,720E +00	4,740E +00
Max	4,750E +00	4,730E +00	4,740E +00	4,750E +00	4,720E +00	4,730E +00	4,750E +00
Mean	4,743E +00	4,730E +00	4,740E +00	4,747E +00	4,717E +00	4,723E +00	4,743E +00
Sigma	5,774E -03	2,634E -09	2,634E -09	5,774E -03	5,773E -03	5,774E -03	5,774E -03

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
5	4,720E +00
6	4,720E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,720E +00
Mean	4,720E +00
Sigma	2,634E -09



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: High Level Output Voltage Pin D2: VohD2  
VDD=4.75V; VSS=-5V; IO=-200uA

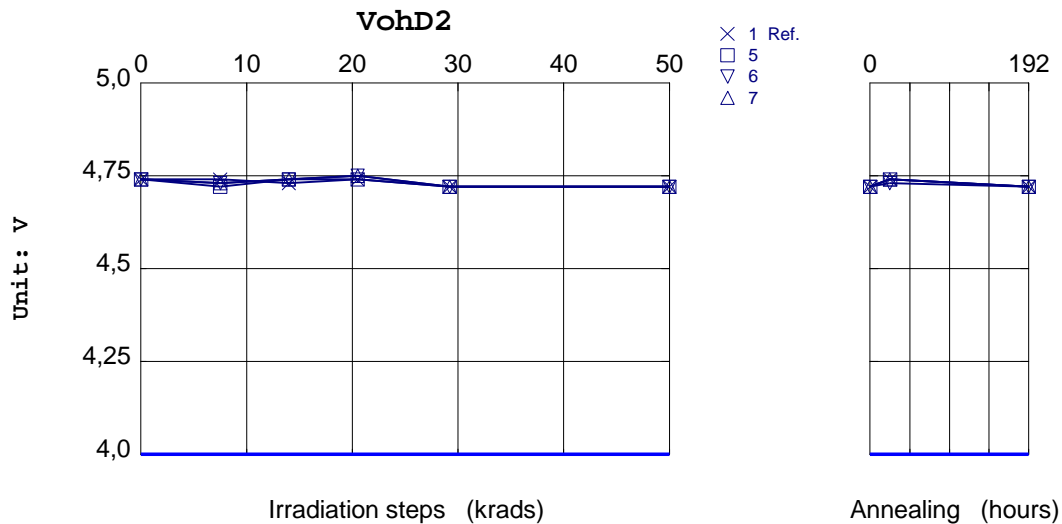
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,740E +00	4,740E +00	4,730E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
5	4,740E +00	4,720E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
6	4,740E +00	4,730E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,730E +00
7	4,740E +00	4,730E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,740E +00
Statistics							
Min	4,740E +00	4,720E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00
Max	4,740E +00	4,730E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,740E +00
Mean	4,740E +00	4,727E +00	4,740E +00	4,747E +00	4,720E +00	4,720E +00	4,737E +00
Sigma	2,634E -09	5,774E -03	2,634E -09	5,774E -03	2,634E -09	2,634E -09	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,720E +00
5	4,720E +00
6	4,720E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,720E +00
Mean	4,720E +00
Sigma	2,634E -09



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: High Level Output Voltage Pin D1: VohD1  
VDD=4.75V; VSS=-5V; IO=-200uA

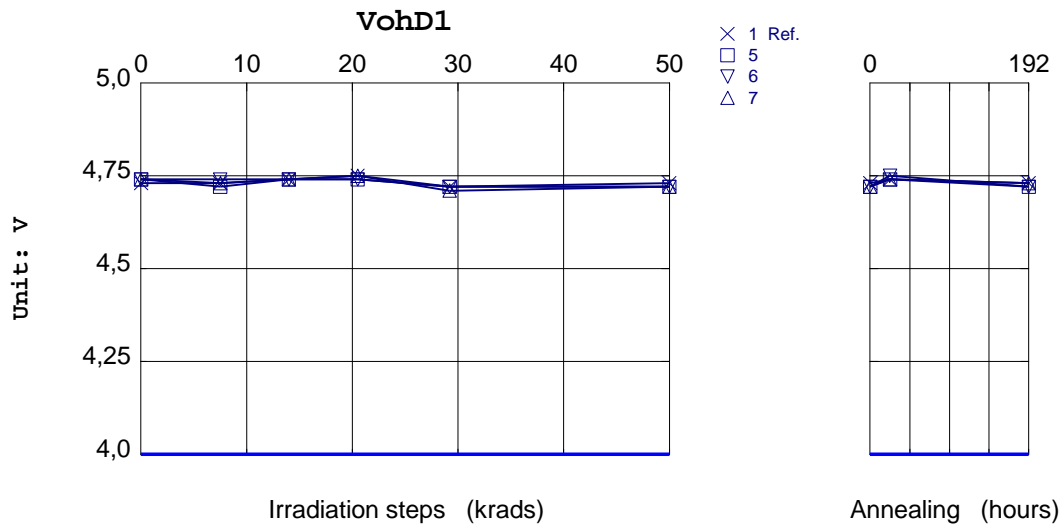
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,730E +00	4,730E +00	4,740E +00	4,750E +00	4,720E +00	4,730E +00	4,740E +00
5	4,740E +00	4,720E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
6	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,750E +00
7	4,740E +00	4,730E +00	4,740E +00	4,750E +00	4,710E +00	4,720E +00	4,740E +00
Statistics							
Min	4,740E +00	4,720E +00	4,740E +00	4,740E +00	4,710E +00	4,720E +00	4,740E +00
Max	4,740E +00	4,740E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,750E +00
Mean	4,740E +00	4,730E +00	4,740E +00	4,743E +00	4,717E +00	4,720E +00	4,743E +00
Sigma	2,634E -09	1,000E -02	2,634E -09	5,774E -03	5,773E -03	2,634E -09	5,774E -03

Test Step	192 hours
Serial #	
1 Ref.	4,730E +00
5	4,720E +00
6	4,720E +00
7	4,730E +00
Statistics	
Min	4,720E +00
Max	4,730E +00
Mean	4,723E +00
Sigma	5,774E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: High Level Output Voltage Pin D0: VohD0**  
**VDD=4.75V; VSS=-5V; IO=-200uA**

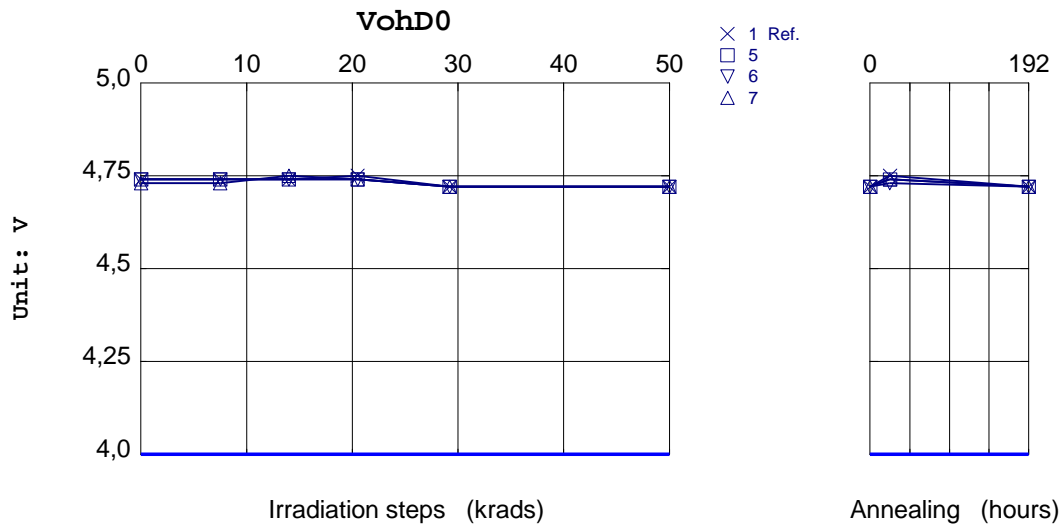
Unit= V

Spec limit min: 4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	4,740E +00	4,740E +00	4,740E +00	4,750E +00	4,720E +00	4,720E +00	4,750E +00
5	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
6	4,740E +00	4,740E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00
7	4,730E +00	4,730E +00	4,750E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
Statistics							
Min	4,730E +00	4,730E +00	4,740E +00	4,740E +00	4,720E +00	4,720E +00	4,730E +00
Max	4,740E +00	4,740E +00	4,750E +00	4,740E +00	4,720E +00	4,720E +00	4,740E +00
Mean	4,737E +00	4,737E +00	4,743E +00	4,740E +00	4,720E +00	4,720E +00	4,737E +00
Sigma	5,773E -03	5,773E -03	5,774E -03	2,634E -09	2,634E -09	2,634E -09	5,773E -03

Test Step	192 hours
Serial #	
1 Ref.	4,720E +00
5	4,720E +00
6	4,720E +00
7	4,720E +00
Statistics	
Min	4,720E +00
Max	4,720E +00
Mean	4,720E +00
Sigma	2,634E -09



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D13: VoID13**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

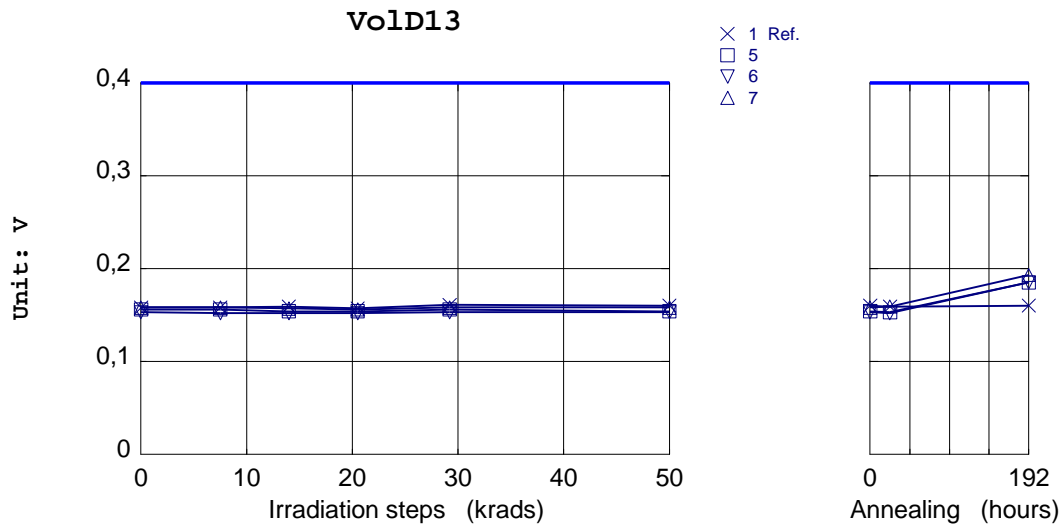
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,580E -01	1,580E -01	1,590E -01	1,570E -01	1,610E -01	1,600E -01	1,590E -01
5	1,560E -01	1,560E -01	1,540E -01	1,540E -01	1,560E -01	1,540E -01	1,530E -01
6	1,530E -01	1,520E -01	1,520E -01	1,520E -01	1,530E -01	1,530E -01	1,520E -01
7	1,580E -01	1,580E -01	1,570E -01	1,560E -01	1,580E -01	1,580E -01	1,590E -01
Statistics							
Min	1,530E -01	1,520E -01	1,520E -01	1,520E -01	1,530E -01	1,530E -01	1,520E -01
Max	1,580E -01	1,580E -01	1,570E -01	1,560E -01	1,580E -01	1,580E -01	1,590E -01
Mean	1,557E -01	1,553E -01	1,543E -01	1,540E -01	1,557E -01	1,550E -01	1,547E -01
Sigma	2,517E -03	3,055E -03	2,517E -03	2,000E -03	2,517E -03	2,646E -03	3,786E -03

Test Step	192 hours
Serial #	
1 Ref.	1,600E -01
5	1,850E -01
6	1,850E -01
7	1,930E -01
Statistics	
Min	1,850E -01
Max	1,930E -01
Mean	1,877E -01
Sigma	4,619E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D12: VoID12**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

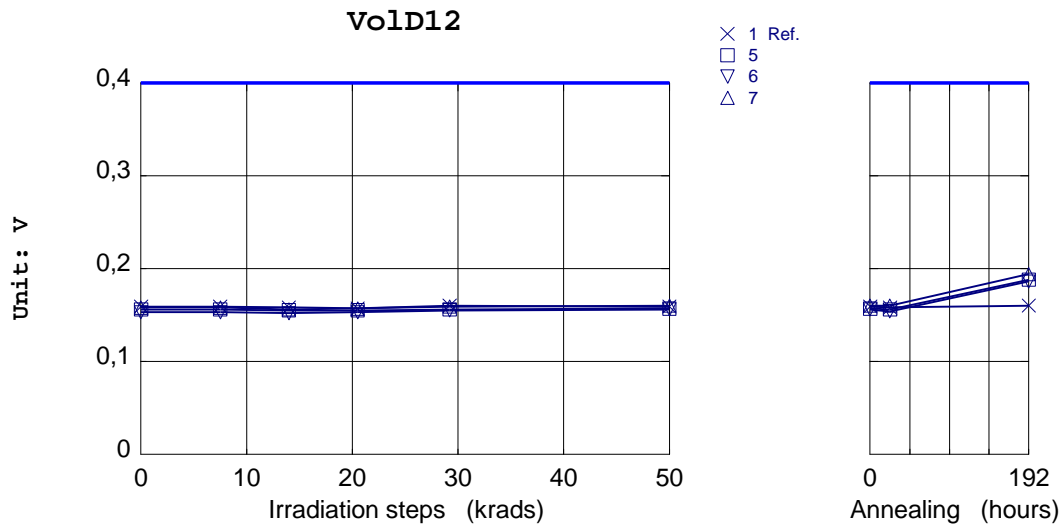
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,590E -01	1,590E -01	1,580E -01	1,570E -01	1,600E -01	1,590E -01	1,580E -01
5	1,560E -01	1,560E -01	1,550E -01	1,550E -01	1,560E -01	1,570E -01	1,560E -01
6	1,530E -01	1,530E -01	1,520E -01	1,530E -01	1,550E -01	1,560E -01	1,540E -01
7	1,580E -01	1,580E -01	1,560E -01	1,570E -01	1,590E -01	1,600E -01	1,600E -01
Statistics							
Min	1,530E -01	1,530E -01	1,520E -01	1,530E -01	1,550E -01	1,560E -01	1,540E -01
Max	1,580E -01	1,580E -01	1,560E -01	1,570E -01	1,590E -01	1,600E -01	1,600E -01
Mean	1,557E -01	1,557E -01	1,543E -01	1,550E -01	1,567E -01	1,577E -01	1,567E -01
Sigma	2,517E -03	2,517E -03	2,082E -03	2,000E -03	2,082E -03	2,082E -03	3,055E -03

Test Step	192 hours
Serial #	
1 Ref.	1,600E -01
5	1,880E -01
6	1,860E -01
7	1,940E -01
Statistics	
Min	1,860E -01
Max	1,940E -01
Mean	1,893E -01
Sigma	4,163E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D11: Void11**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

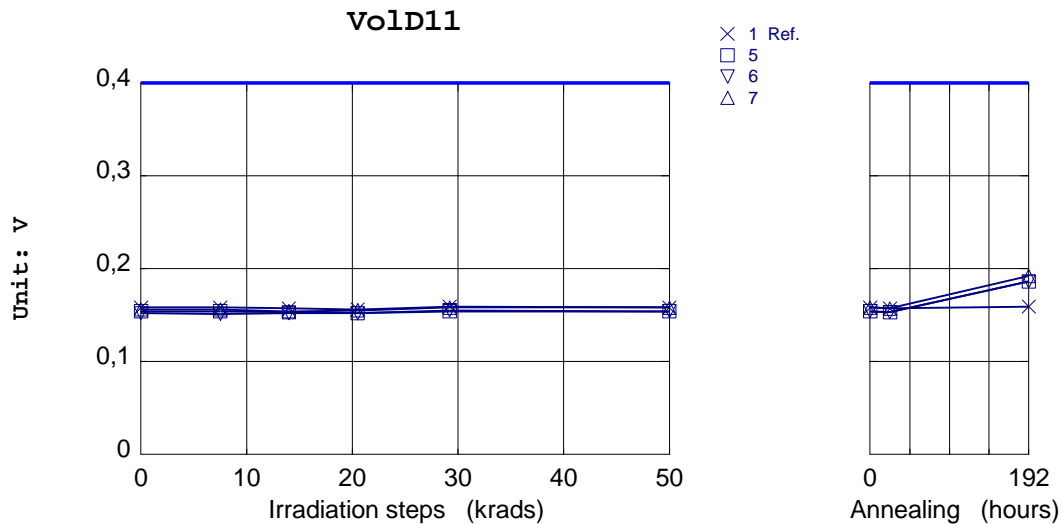
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,580E -01	1,580E -01	1,570E -01	1,560E -01	1,590E -01	1,580E -01	1,570E -01
5	1,540E -01	1,540E -01	1,530E -01	1,520E -01	1,540E -01	1,540E -01	1,530E -01
6	1,520E -01	1,510E -01	1,520E -01	1,520E -01	1,550E -01	1,540E -01	1,530E -01
7	1,560E -01	1,560E -01	1,540E -01	1,550E -01	1,580E -01	1,580E -01	1,570E -01
Statistics							
Min	1,520E -01	1,510E -01	1,520E -01	1,520E -01	1,540E -01	1,540E -01	1,530E -01
Max	1,560E -01	1,560E -01	1,540E -01	1,550E -01	1,580E -01	1,580E -01	1,570E -01
Mean	1,540E -01	1,537E -01	1,530E -01	1,530E -01	1,557E -01	1,553E -01	1,543E -01
Sigma	2,000E -03	2,517E -03	1,000E -03	1,732E -03	2,082E -03	2,309E -03	2,309E -03

Test Step	192 hours
Serial #	
1 Ref.	1,590E -01
5	1,860E -01
6	1,860E -01
7	1,920E -01
Statistics	
Min	1,860E -01
Max	1,920E -01
Mean	1,880E -01
Sigma	3,464E -03





<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D10: Void10**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

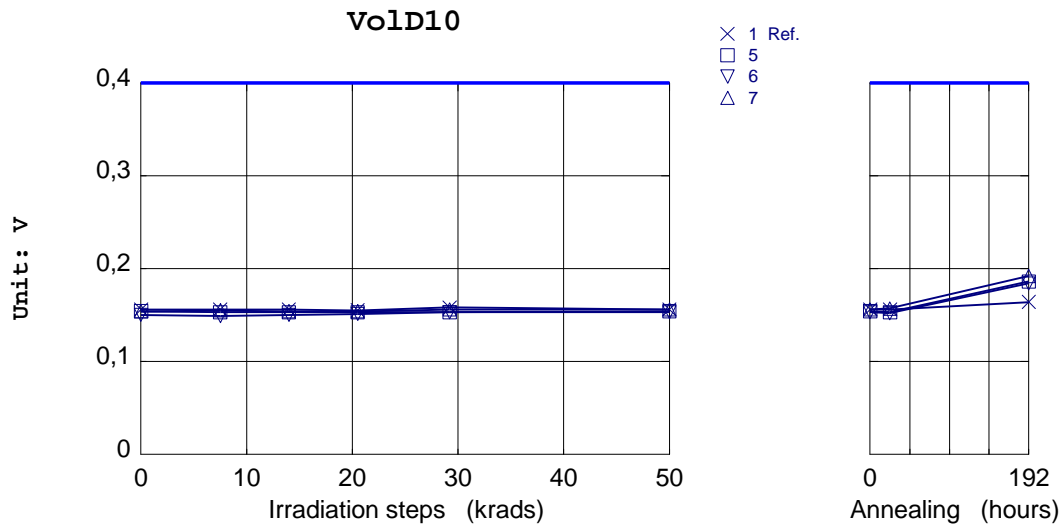
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,560E -01	1,560E -01	1,560E -01	1,550E -01	1,580E -01	1,560E -01	1,560E -01
5	1,540E -01	1,530E -01	1,530E -01	1,530E -01	1,530E -01	1,540E -01	1,530E -01
6	1,500E -01	1,490E -01	1,500E -01	1,510E -01	1,530E -01	1,530E -01	1,520E -01
7	1,540E -01	1,550E -01	1,540E -01	1,540E -01	1,560E -01	1,560E -01	1,570E -01
Statistics							
Min	1,500E -01	1,490E -01	1,500E -01	1,510E -01	1,530E -01	1,530E -01	1,520E -01
Max	1,540E -01	1,550E -01	1,540E -01	1,540E -01	1,560E -01	1,560E -01	1,570E -01
Mean	1,527E -01	1,523E -01	1,523E -01	1,527E -01	1,540E -01	1,543E -01	1,540E -01
Sigma	2,309E -03	3,055E -03	2,082E -03	1,528E -03	1,732E -03	1,528E -03	2,646E -03

Test Step	192 hours
Serial #	
1 Ref.	1,640E -01
5	1,860E -01
6	1,840E -01
7	1,920E -01
Statistics	
Min	1,840E -01
Max	1,920E -01
Mean	1,873E -01
Sigma	4,163E -03



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D9: Void9  
VDD=4.75V; VSS=-5V; IO=1.6mA

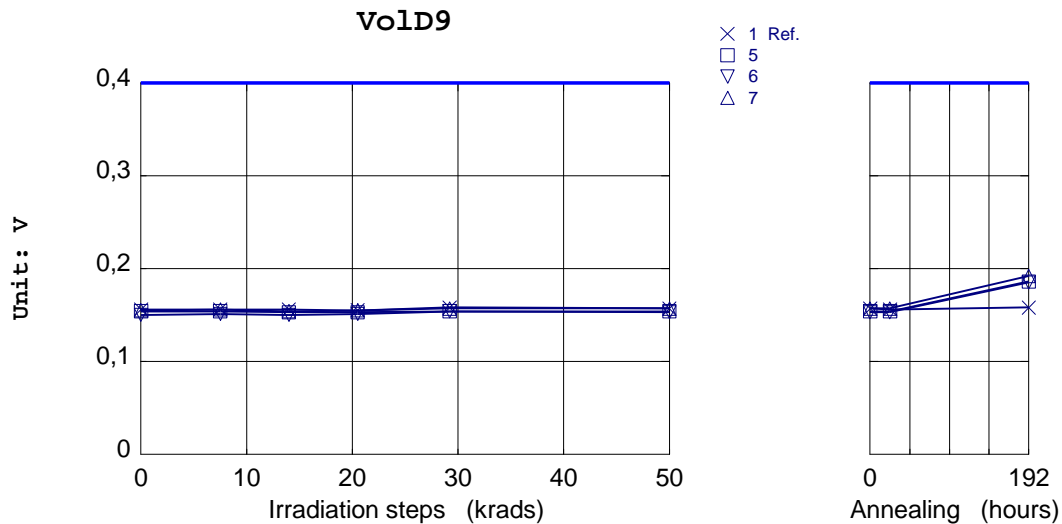
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,560E -01	1,560E -01	1,560E -01	1,550E -01	1,580E -01	1,570E -01	1,560E -01
5	1,540E -01	1,540E -01	1,530E -01	1,530E -01	1,540E -01	1,540E -01	1,540E -01
6	1,500E -01	1,510E -01	1,500E -01	1,510E -01	1,540E -01	1,530E -01	1,530E -01
7	1,550E -01	1,560E -01	1,540E -01	1,550E -01	1,570E -01	1,570E -01	1,570E -01
Statistics							
Min	1,500E -01	1,510E -01	1,500E -01	1,510E -01	1,540E -01	1,530E -01	1,530E -01
Max	1,550E -01	1,560E -01	1,540E -01	1,550E -01	1,570E -01	1,570E -01	1,570E -01
Mean	1,530E -01	1,537E -01	1,523E -01	1,530E -01	1,550E -01	1,547E -01	1,547E -01
Sigma	2,646E -03	2,517E -03	2,082E -03	2,000E -03	1,732E -03	2,082E -03	2,082E -03

Test Step	192 hours
Serial #	
1 Ref.	1,580E -01
5	1,860E -01
6	1,850E -01
7	1,920E -01
Statistics	
Min	1,850E -01
Max	1,920E -01
Mean	1,877E -01
Sigma	3,786E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D8: Void8**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

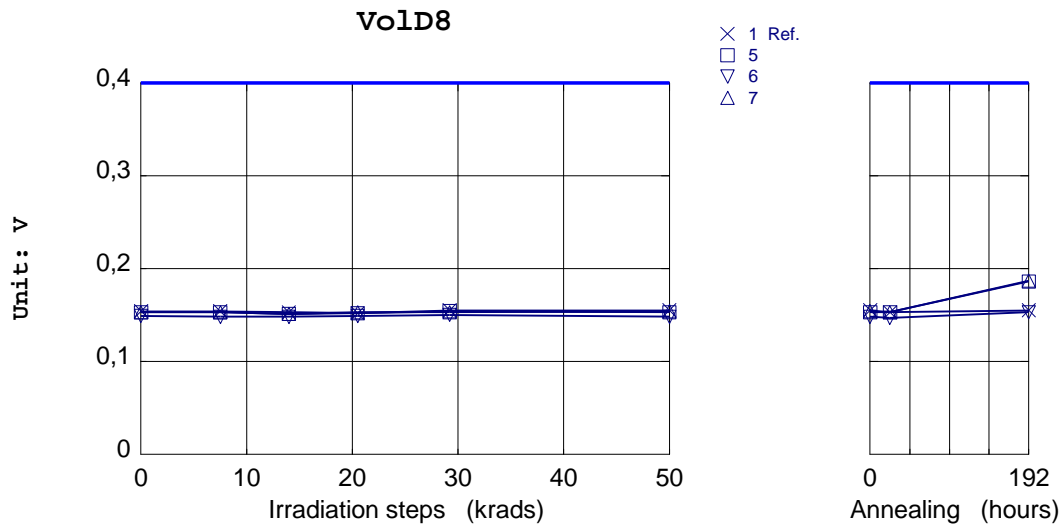
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,530E -01	1,520E -01	1,550E -01	1,550E -01	1,530E -01
5	1,530E -01	1,530E -01	1,510E -01	1,520E -01	1,540E -01	1,530E -01	1,530E -01
6	1,490E -01	1,480E -01	1,480E -01	1,490E -01	1,500E -01	1,480E -01	1,470E -01
7	1,530E -01	1,530E -01	1,510E -01	1,530E -01	1,530E -01	1,540E -01	1,530E -01
Statistics							
Min	1,490E -01	1,480E -01	1,480E -01	1,490E -01	1,500E -01	1,480E -01	1,470E -01
Max	1,530E -01	1,530E -01	1,510E -01	1,530E -01	1,540E -01	1,540E -01	1,530E -01
Mean	1,517E -01	1,513E -01	1,500E -01	1,513E -01	1,523E -01	1,517E -01	1,510E -01
Sigma	2,309E -03	2,887E -03	1,732E -03	2,082E -03	2,082E -03	3,215E -03	3,464E -03

Test Step	192 hours
Serial #	
1 Ref.	1,550E -01
5	1,860E -01
6	1,530E -01
7	1,870E -01
Statistics	
Min	1,530E -01
Max	1,870E -01
Mean	1,753E -01
Sigma	1,935E -02



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D7: Void7  
VDD=4.75V; VSS=-5V; IO=1.6mA

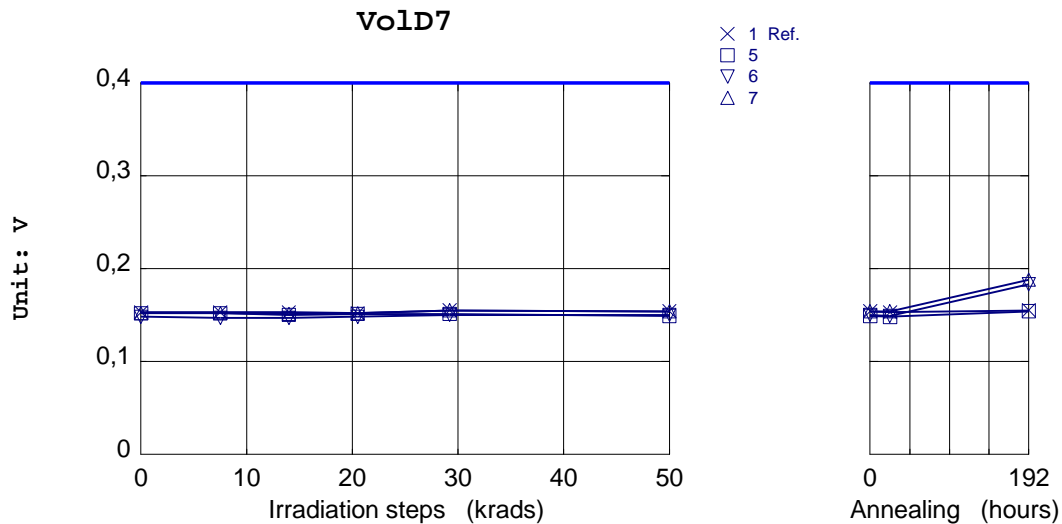
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,530E -01	1,530E -01	1,530E -01	1,520E -01	1,550E -01	1,540E -01	1,530E -01
5	1,520E -01	1,520E -01	1,500E -01	1,510E -01	1,510E -01	1,490E -01	1,480E -01
6	1,480E -01	1,470E -01	1,470E -01	1,480E -01	1,500E -01	1,500E -01	1,490E -01
7	1,520E -01	1,520E -01	1,510E -01	1,520E -01	1,550E -01	1,540E -01	1,540E -01
Statistics							
Min	1,480E -01	1,470E -01	1,470E -01	1,480E -01	1,500E -01	1,490E -01	1,480E -01
Max	1,520E -01	1,520E -01	1,510E -01	1,520E -01	1,550E -01	1,540E -01	1,540E -01
Mean	1,507E -01	1,503E -01	1,493E -01	1,503E -01	1,520E -01	1,510E -01	1,503E -01
Sigma	2,309E -03	2,887E -03	2,082E -03	2,082E -03	2,646E -03	2,646E -03	3,215E -03

Test Step	192 hours
Serial #	
1 Ref.	1,550E -01
5	1,540E -01
6	1,830E -01
7	1,880E -01
Statistics	
Min	1,540E -01
Max	1,880E -01
Mean	1,750E -01
Sigma	1,836E -02



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D6: Void6  
VDD=4.75V; VSS=-5V; IO=1.6mA

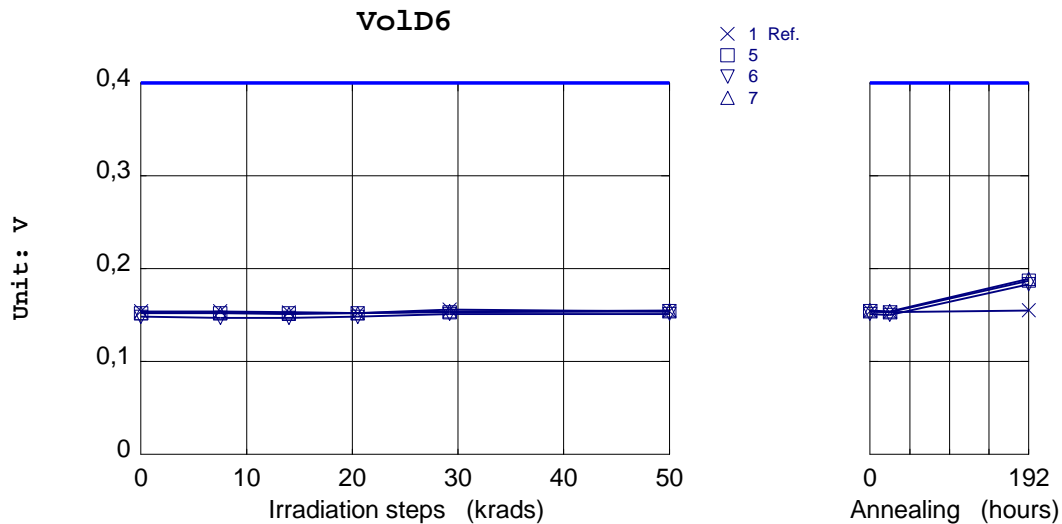
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,530E -01	1,520E -01	1,560E -01	1,540E -01	1,530E -01
5	1,520E -01	1,520E -01	1,520E -01	1,520E -01	1,530E -01	1,540E -01	1,530E -01
6	1,480E -01	1,470E -01	1,470E -01	1,480E -01	1,510E -01	1,510E -01	1,500E -01
7	1,520E -01	1,520E -01	1,510E -01	1,520E -01	1,540E -01	1,550E -01	1,540E -01
Statistics							
Min	1,480E -01	1,470E -01	1,470E -01	1,480E -01	1,510E -01	1,510E -01	1,500E -01
Max	1,520E -01	1,520E -01	1,520E -01	1,520E -01	1,540E -01	1,550E -01	1,540E -01
Mean	1,507E -01	1,503E -01	1,500E -01	1,507E -01	1,527E -01	1,533E -01	1,523E -01
Sigma	2,309E -03	2,887E -03	2,646E -03	2,309E -03	1,528E -03	2,082E -03	2,082E -03

Test Step	192 hours
Serial #	
1 Ref.	1,550E -01
5	1,870E -01
6	1,830E -01
7	1,890E -01
Statistics	
Min	1,830E -01
Max	1,890E -01
Mean	1,863E -01
Sigma	3,055E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D5: Vo1D5**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

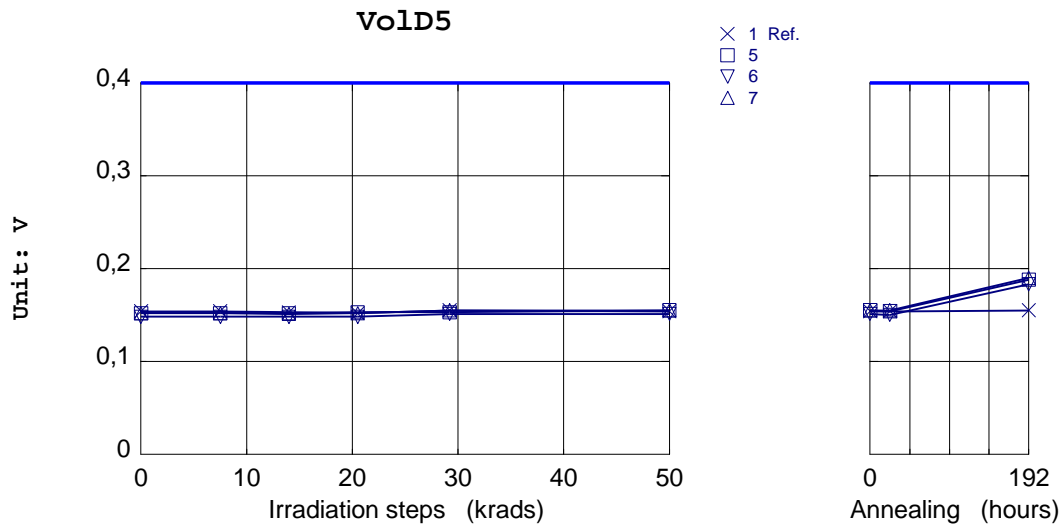
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,530E -01	1,520E -01	1,550E -01	1,540E -01	1,540E -01
5	1,520E -01	1,520E -01	1,520E -01	1,530E -01	1,530E -01	1,550E -01	1,540E -01
6	1,480E -01	1,480E -01	1,480E -01	1,480E -01	1,510E -01	1,510E -01	1,500E -01
7	1,520E -01	1,520E -01	1,510E -01	1,520E -01	1,550E -01	1,550E -01	1,550E -01
Statistics							
Min	1,480E -01	1,480E -01	1,480E -01	1,480E -01	1,510E -01	1,510E -01	1,500E -01
Max	1,520E -01	1,520E -01	1,520E -01	1,530E -01	1,550E -01	1,550E -01	1,550E -01
Mean	1,507E -01	1,507E -01	1,503E -01	1,510E -01	1,530E -01	1,537E -01	1,530E -01
Sigma	2,309E -03	2,309E -03	2,082E -03	2,646E -03	2,000E -03	2,309E -03	2,646E -03

Test Step	192 hours
Serial #	
1 Ref.	1,550E -01
5	1,880E -01
6	1,830E -01
7	1,900E -01
Statistics	
Min	1,830E -01
Max	1,900E -01
Mean	1,870E -01
Sigma	3,606E -03



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D4: Void4**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

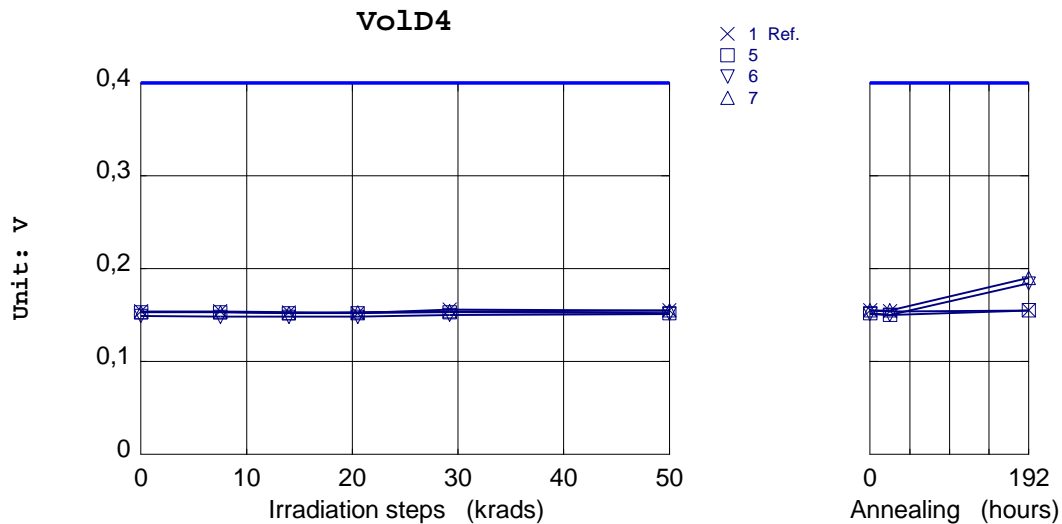
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,530E -01	1,520E -01	1,560E -01	1,550E -01	1,540E -01
5	1,530E -01	1,530E -01	1,520E -01	1,520E -01	1,530E -01	1,520E -01	1,500E -01
6	1,490E -01	1,480E -01	1,480E -01	1,480E -01	1,500E -01	1,510E -01	1,500E -01
7	1,530E -01	1,530E -01	1,520E -01	1,530E -01	1,540E -01	1,550E -01	1,550E -01
Statistics							
Min	1,490E -01	1,480E -01	1,480E -01	1,480E -01	1,500E -01	1,510E -01	1,500E -01
Max	1,530E -01	1,530E -01	1,520E -01	1,530E -01	1,540E -01	1,550E -01	1,550E -01
Mean	1,517E -01	1,513E -01	1,507E -01	1,510E -01	1,523E -01	1,527E -01	1,517E -01
Sigma	2,309E -03	2,887E -03	2,309E -03	2,646E -03	2,082E -03	2,082E -03	2,887E -03

Test Step	192 hours
Serial #	
1 Ref.	1,550E -01
5	1,550E -01
6	1,840E -01
7	1,900E -01
Statistics	
Min	1,550E -01
Max	1,900E -01
Mean	1,763E -01
Sigma	1,872E -02



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D3: V01D3**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

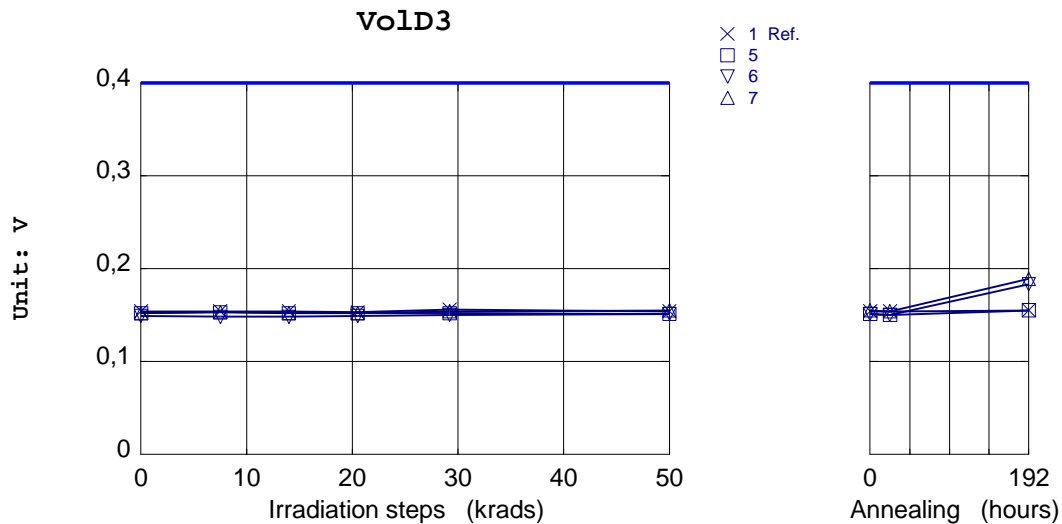
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,540E -01	1,540E -01	1,540E -01	1,530E -01	1,560E -01	1,540E -01	1,540E -01
5	1,520E -01	1,530E -01	1,520E -01	1,520E -01	1,520E -01	1,510E -01	1,500E -01
6	1,490E -01	1,480E -01	1,480E -01	1,490E -01	1,500E -01	1,510E -01	1,500E -01
7	1,520E -01	1,530E -01	1,520E -01	1,520E -01	1,540E -01	1,550E -01	1,540E -01
Statistics							
Min	1,490E -01	1,480E -01	1,480E -01	1,490E -01	1,500E -01	1,510E -01	1,500E -01
Max	1,520E -01	1,530E -01	1,520E -01	1,520E -01	1,540E -01	1,550E -01	1,540E -01
Mean	1,510E -01	1,513E -01	1,507E -01	1,510E -01	1,520E -01	1,523E -01	1,513E -01
Sigma	1,732E -03	2,887E -03	2,309E -03	1,732E -03	2,000E -03	2,309E -03	2,309E -03

Test Step	192 hours
Serial #	
1 Ref.	1,550E -01
5	1,550E -01
6	1,830E -01
7	1,890E -01
Statistics	
Min	1,550E -01
Max	1,890E -01
Mean	1,757E -01
Sigma	1,815E -02





<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D2: Vo1D2**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

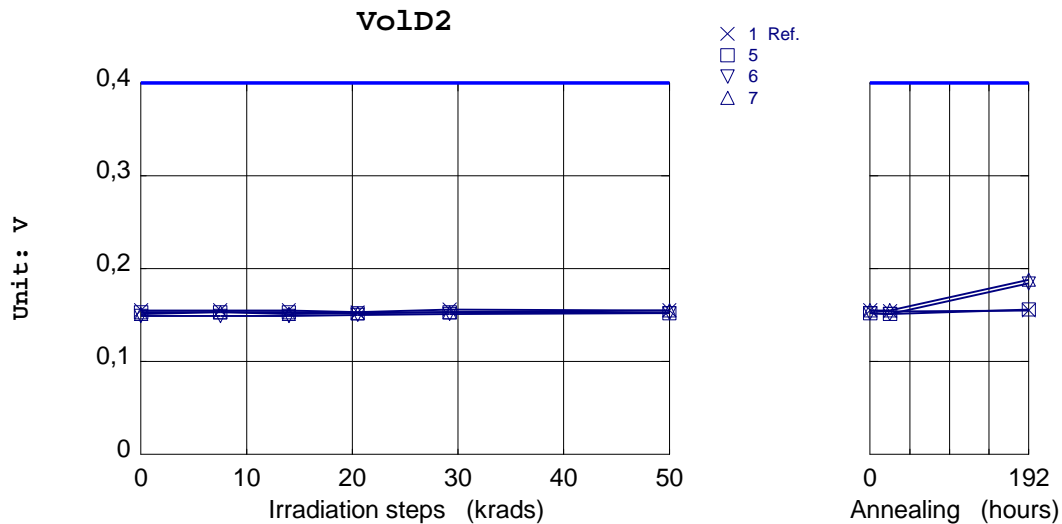
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,550E -01	1,550E -01	1,550E -01	1,530E -01	1,560E -01	1,550E -01	1,540E -01
5	1,530E -01	1,530E -01	1,530E -01	1,520E -01	1,530E -01	1,520E -01	1,510E -01
6	1,490E -01	1,490E -01	1,490E -01	1,500E -01	1,510E -01	1,520E -01	1,510E -01
7	1,510E -01	1,530E -01	1,510E -01	1,520E -01	1,530E -01	1,550E -01	1,550E -01
Statistics							
Min	1,490E -01	1,490E -01	1,490E -01	1,500E -01	1,510E -01	1,520E -01	1,510E -01
Max	1,530E -01	1,530E -01	1,530E -01	1,520E -01	1,530E -01	1,550E -01	1,550E -01
Mean	1,510E -01	1,517E -01	1,510E -01	1,513E -01	1,523E -01	1,530E -01	1,523E -01
Sigma	2,000E -03	2,309E -03	2,000E -03	1,155E -03	1,155E -03	1,732E -03	2,309E -03

Test Step	192 hours
Serial #	
1 Ref.	1,550E -01
5	1,560E -01
6	1,840E -01
7	1,880E -01
Statistics	
Min	1,560E -01
Max	1,880E -01
Mean	1,760E -01
Sigma	1,744E -02



<b>HIREX Engineering</b>	<b>Total Dose Test Report</b>			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

**Parameter: Low Level Output Voltage Pin D1: Void1**  
**VDD=4.75V; VSS=-5V; IO=1.6mA**

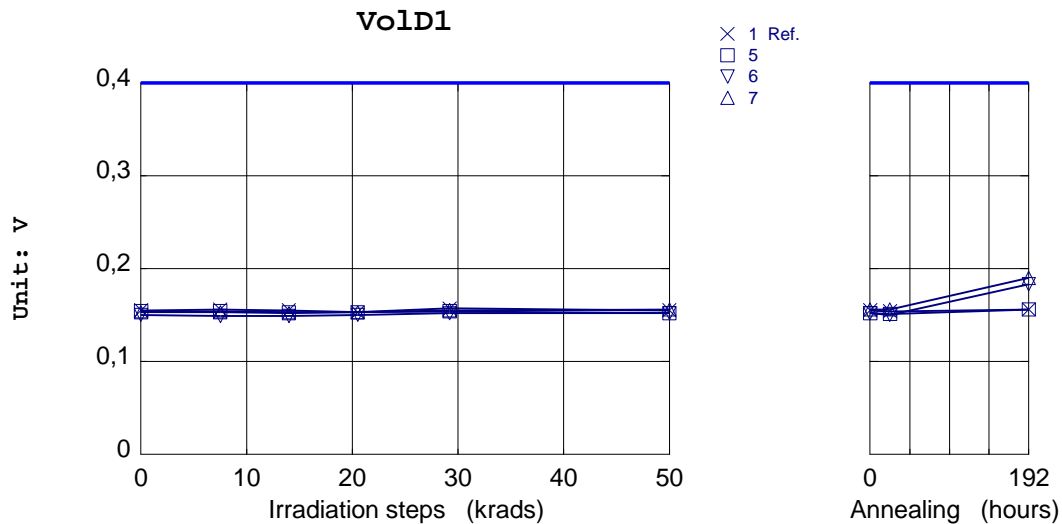
Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,550E -01	1,560E -01	1,550E -01	1,530E -01	1,570E -01	1,550E -01	1,540E -01
5	1,540E -01	1,540E -01	1,530E -01	1,530E -01	1,540E -01	1,520E -01	1,510E -01
6	1,500E -01	1,490E -01	1,490E -01	1,500E -01	1,520E -01	1,520E -01	1,500E -01
7	1,530E -01	1,530E -01	1,520E -01	1,530E -01	1,550E -01	1,560E -01	1,560E -01
Statistics							
Min	1,500E -01	1,490E -01	1,490E -01	1,500E -01	1,520E -01	1,520E -01	1,500E -01
Max	1,540E -01	1,540E -01	1,530E -01	1,530E -01	1,550E -01	1,560E -01	1,560E -01
Mean	1,523E -01	1,520E -01	1,513E -01	1,520E -01	1,537E -01	1,533E -01	1,523E -01
Sigma	2,082E -03	2,646E -03	2,082E -03	1,732E -03	1,528E -03	2,309E -03	3,215E -03

Test Step	192 hours
Serial #	
1 Ref.	1,560E -01
5	1,560E -01
6	1,830E -01
7	1,900E -01
Statistics	
Min	1,560E -01
Max	1,900E -01
Mean	1,763E -01
Sigma	1,795E -02



HIREX Engineering	Total Dose Test Report			Réf. : HRX/99.5070
				Issue : 01
Part Type :	LTC1414	Manufacturer :	Linear Technology	

Parameter: Low Level Output Voltage Pin D0: Vo1D0  
VDD=4.75V; VSS=-5V; IO=1.6mA

Unit= V

Spec limit max: 0.4

Spec limits are represented in bold lines on the graphic.

Test Step	Initial	7,5 krad	14 krad	20,5 krad	29,2 krad	50 krad	24 hours
Serial #							
1 Ref.	1,570E -01	1,570E -01	1,570E -01	1,550E -01	1,590E -01	1,570E -01	1,560E -01
5	1,540E -01	1,540E -01	1,530E -01	1,530E -01	1,530E -01	1,530E -01	1,520E -01
6	1,520E -01	1,510E -01	1,510E -01	1,520E -01	1,520E -01	1,530E -01	1,520E -01
7	1,540E -01	1,550E -01	1,540E -01	1,550E -01	1,560E -01	1,560E -01	1,570E -01
Statistics							
Min	1,520E -01	1,510E -01	1,510E -01	1,520E -01	1,520E -01	1,530E -01	1,520E -01
Max	1,540E -01	1,550E -01	1,540E -01	1,550E -01	1,560E -01	1,560E -01	1,570E -01
Mean	1,533E -01	1,533E -01	1,527E -01	1,533E -01	1,537E -01	1,540E -01	1,537E -01
Sigma	1,155E -03	2,082E -03	1,528E -03	1,528E -03	2,082E -03	1,732E -03	2,887E -03

Test Step	192 hours
Serial #	
1 Ref.	1,580E -01
5	1,560E -01
6	1,840E -01
7	1,900E -01
Statistics	
Min	1,560E -01
Max	1,900E -01
Mean	1,767E -01
Sigma	1,815E -02

