

Total Dose Test  
1-of-8 Decoder/Demux 74 ACT 138  
Manufactured by National Semiconductor

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## 1 Tested Device

- 1-of-8 Decoder/Demux 74 ACT 138 from Harris Semiconductor
- Temperature range:  $-40^{\circ}\text{C} \dots +85^{\circ}\text{C}$
- Package: 16-lead plastic SOIC
- Package marks: 74 ACT 138 , P75SG
- National Semiconductor data sheet: Rev. March 1993
- vH&S order 004437/COSIMA-We00, 13 January 2000

### 1.1 Device Marking

One device irradiated, second device for reference.

Mark	Total Dose
22krad	22 kRad H <sub>2</sub> O
ref	non irradiated

## 2 Radiation Facility

Radiation Facility at ESTEC, Noordwijk, The Netherlands.

Date	2 March 2000	3 March 2000	2 March 2000
Total Dose	5 krad (H <sub>2</sub> O)	10 krad (H <sub>2</sub> O)	22 kRad (H <sub>2</sub> O)
Log File	d:\data\vh-s5k.txt	d:\data\vh-s10k.txt	d:\data\vh-s15k.txt
Device	unbiased		
Project	vH&S		
Dosemeter	Farmer 2670		
Chamber	NE 0.6cc air ionisation type 2571 serial no. 2915		
Dose Rate	24 rad/min (H <sub>2</sub> O)		
Test Eng.	Bob Nickson, QCA, ESTEC, Noordwijk		

All pins of all tested devices shorted during irradiation. No annealing was performed after irradiation.

### 3 Measured Device Parameters

- Current  $I_{CC}$  see section 4.
- Threshold voltages  $V_{IL}$ ,  $V_{IH}$  at A0 input see section 5.

### 4 $I_{CC}$ Test

Measurements done on 12th of April 2000, vH&S.

#### 4.1 Test Setup

Pins 1, 2, 3, 4, 5, 8 connected to GND  
 Pins 7, 9, 10, 11, 12, 13, 14, 15 not connected  
 Pin 6, 16 connected to  $V_{CC} = 5 V$

DC-Current into Pin 16 measured with digital multimeter.

#### 4.2 Test Results

Device	Total Dose	$I_{CC}$
22krad	22 kRad H <sub>2</sub> O	$\approx 1 \text{ nA}$
ref	0 kRad H <sub>2</sub> O	$\approx 1 \text{ nA}$

(currents of both devices below sensitivity range)

### 5 Threshold Voltages Test

Measurements done on 12th of April 2000, vH&S.

### 5.1 Test Setup

Pins 2, 3, 4, 5, 8 connected to GND

Pins 7, 9, 10, 11, 12, 13, 14 not connected

Pin 6, 16 connected to  $V_{CC} = 5\text{ V}$

Pin 1 (A0) connected to variable voltage source 0...5 V

Pin 15 (/Q0) connected to 1 k $\Omega$  load

Threshold voltage on pin 1 (A0) measured as voltage level on pin 15 (/Q0) reaches final High- or Low-condition.

### 5.2 Test Results

Device	Total Dose	Load Resistance	$V_{IL_{max}}$	$V_{IH_{min}}$
22krad	22 kRad H <sub>2</sub> O	1 k $\Omega$	0.705 V	2.395 V
ref	0 kRad H <sub>2</sub> O	1 k $\Omega$	0.809 V	2.385 V