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UNISYS

Interoffice Memorandum

To
W. Denoon

Department
Code 303

From
K. Sahu

Department
7809

Subject
Radiation Report on JM38510/11108 (DG-191)
EP/MMS/PA Control No. 5815

PPM-92-110

Date

March 16, 1992

Location

Lanham

Telephone

731-8954

Location

Lanham

cc

M. Robertson/311

A. Sharma/311

Library/300.1

A radiation evaluation was performed on the JM38510/11108 to determine the total dose tolerance of these parts. A brief summary of the test results is provided below. For detailed information, refer to Tables I through IV and Figure 1.

The total dose testing was performed using a cobalt-60 gamma ray source. During the radiation testing, four parts were irradiated under bias (see Figure 1 for bias configuration), and one part was used as a control sample. The total dose radiation steps were 2.5, 5, 10, 15 and 20 krads*. After 20 krads, the parts were annealed at 25°C for 168 hours and at 100°C for 168 hours. The dose rate was between 54 and 262 rads/hour, depending on the total dose level (see Table II for radiation schedule). After each radiation exposure and annealing treatment, the parts were electrically tested at 25°C according to the test conditions and the specification limits listed in Table III.

All four parts passed functional testing and all parametric tests upon irradiation to 20 krads and upon the subsequent annealing treatments at 25°C for 168 hours and at 100°C for 168 hours. No significant degradation was observed for any parameter that was tested.

Table IV provides the mean and standard deviation values for each parameter after each radiation exposure and annealing treatment. Any further details about this evaluation can be obtained upon request. If you have any questions, please call me at (301)731-8954.

* In this report, the term "rads" is used as an abbreviation for rads (Si).

TABLE I. Part Information

Generic Part Number:	DG-191A
EP/MMS/PA Part Number:	JM38510/11108
Control Number:	5815
Charge Number:	C23476
Manufacturer:	Intersil Corp.
Lot Date Code:	8531
Quantity Tested:	4
Serial Numbers of Radiation Samples:	51, 52, 53, 54
Serial Number of Control Sample:	50
Part Function:	Dual Channel, 75 Ohm, SPDT Switches
Part Technology:	JFET
Package Style:	14-pin Flat Pack
Test Engineer:	A. Phung

TABLE II. Radiation Schedule for JM38510/11108

EVENTS	DATE
1) Initial (Pre-Irradiation) Electrical Measurements	02/03/92
2) 2.5 KRAD IRRADIATION (128 rads/hour)	02/10/92
POST 2.5 KRAD ELECTRICAL MEASUREMENT	02/12/92
3) 5 KRAD IRRADIATION (262 rads/hour)	02/12/92
POST 5 KRAD ELECTRICAL MEASUREMENT	02/13/92
4) 10 KRAD IRRADIATION (54 rads/hour)	02/14/92
POST 10 KRAD ELECTRICAL MEASUREMENT	02/18/92
5) 15 KRAD IRRADIATION (250 rads/hour)	02/18/92
POST 15 KRAD ELECTRICAL MEASUREMENT	02/19/92
6) 20 KRAD IRRADIATION (213 rads/hour)	02/19/92
POST 20 KRAD ELECTRICAL MEASUREMENT	02/20/92
7) 168 HOURS ANNEALING AT 25°C	02/20/92
POST 168 HOURS ELECTRICAL MEASUREMENT	02/27/92
8) 168 HOURS ANNEALING AT 100°C	02/27/92
POST 168 HOURS ELECTRICAL MEASUREMENT	03/06/92

Notes:

- All parts were radiated under bias at the cobalt-60 gamma ray facility at GSFC.
- All electrical measurements were performed off-site at +25°C.
- All annealing steps were performed under bias.

Table III. Electrical Characteristics of JM38510/11108

UNLESS OTHERWISE LISTED +VCC = +15 V, -VCC = -15V, VL = 5 V, VK = GND

TEST #	TEST NAME	TEST CONDITIONS	-55°C		+25°C		+125°C		UNITS
			MIN	MAX	MIN	MAX	MIN	MAX	
1	RDS 1/	VIN=0.0, 2.0 V VDRAIN = -10V ISOURCE = -10mA	0	75	0	75	0	150	OHMS
2	ISOFF1 2/	VIN=0.8, 2.0 V VSOURCE = +10 V VDRAIN = -10 V +VCC = +10 V -VCC = -20 V	-100	+100	-10	+10	-100	+100	nA
3	ISOFF2 2/	VIN=0.8, 2.0 V VSOURCE = +10 V VDRAIN = -10 V	-100	+100	-10	+10	-100	+100	nA
4	IDOFF1 2/	VIN=0.8, 2.0 V VSOURCE = -10 V VDRAIN = +10 V +VCC = +10 V -VCC = -20 V	-100	+100	-10	+10	-100	+100	nA
5	IDOFF2 2/	VIN=0.8, 2.0 V VSOURCE = -10 V VDRAIN = +10 V	-100	+100	-10	+10	-100	+100	nA
6	IDON 3/	VIN=0.0, 2.0 V VDRAIN = -10 V VSOURCE = -10 V	-200	+200	-10	+10	-200	+200	nA
7	ISON 3/	VIN=0.8, 2.0 V VDRAIN = -10 V VSOURCE = -10 V	-200	+200	-10	+10	-200	+200	nA
8	ILL	VTEST = 0 V	-250	-0.1	-250	-0.1	-250	-0.1	nA
9	IIH	VTEST = 5.0 V	-1	+10	-1	+10	-2	+20	nA
10	ICCP	VIN=0, 5 V	0	2.5	0	1.5	0	1.5	nA
11	ICCN	VIN=0, 5 V	-8.0	0	-5.0	0	-5.0	0	nA
12	IL	VIN=0, 5 V VTEST = 5.0 V	0	7.0	0	4.5	0	4.5	nA
13	IR	VIN=0, 5 V VTEST = 0 V	-2.0	0	-2.2	0	-2.2	0	nA
14	TON 4/	VIN=0, 3 V VSOURCE = -10, +10V	2.0	250	2.0	250	2.0	350	ns
15	TOFF 4/	VIN=0, 3 V VSOURCE = -10, +10V	2.0	130	2.0	130	2.0	200	ns

NOTES AND EXCEPTIONS

- 1/ The limits for RDS tests are given in OHM's, not volts as listed in the spec. The limits were derived from the voltage drop across the switch divided by the current passing through the switch.
- 2/ The limits used for these tests at 25C are +/-10nA, not the +/-1nA given in the spec. This is due to ATE limitations.
- 3/ The limits used for these tests at 25C are +/-10nA, not the +/-2nA given in the spec. This is due to ATE limitations.
- 4/ A 1000 OHM and (100pF + system capacitance) is placed on the outputs during AC tests.
- 5/ A functional tests is performed at 20KHz with +/-VCC at +/-15V, VIN=0.8, 2.0V and VDRAIN=0,15V. The SOURCE is taken as the output and is loaded with a 200KOHM load. VOH and VOL are 14.7 and 0.3 V respectively.

The following tests are not performed:
VCTE, VCT, VISO, TD

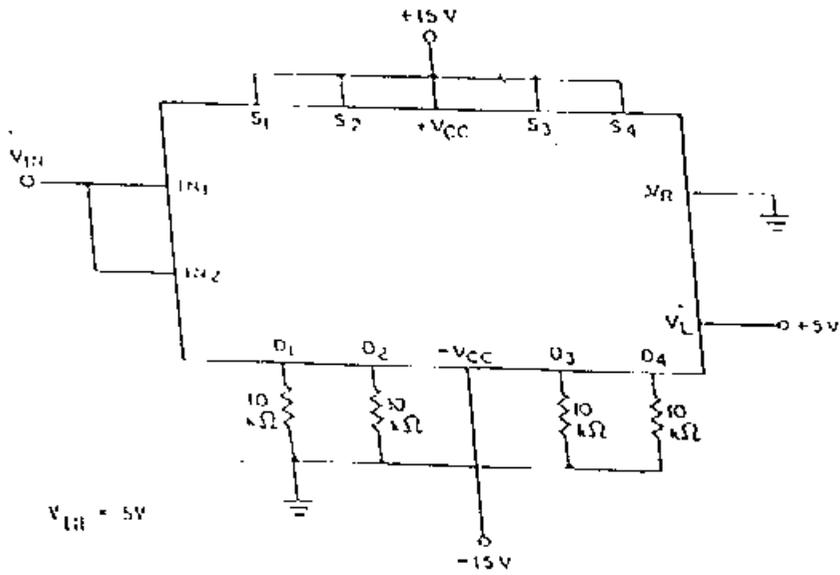
TABLE IV: Summary of Electrical Measurements After
Total Dose Exposures and Annealing for JM38510/11108 1/

Parameters	Spec Limits min max	Total Dose Exposure (TDE) (krads)												Anneal					
		(Pre-Rad)		0		2.5		5		10		15		20		168 hrs @ 25°C		168 hrs @ 100°C	
		mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
PUNC @ 20kHz		Pass		Pass		Pass		Pass		Pass		Pass		Pass		Pass		Pass	
RDS Ohms	0 75	27.22	2.11	28.98	2.78	28.68	22.81	28.74	2.86	28.43	2.91	28.33	2.89	28.33	2.79	28.49	3.74		
ISOFF1 nA	-10 10	1.63	2.06	1.60	2.02	2.04	2.01	4.66	0.92	4.66	10.90	3.83	1.28	2.88	1.62	2.51	1.73		
IDOFF1 nA	-10 10	0.58	1.22	0.19	0.76	0.20	0.79	3.69	0.33	3.11	1.06	1.38	1.59	0.10	0.54	0.19	0.76		
IDON nA	-10 10	-5.03	0.18	-4.90	0.19	-4.83	0.05	-6.74	0.28	-6.93	0.37	-5.79	0.21	-3.91	0.19	-3.79	0.39		
ISON nA	-10 10	-2.61	1.22	-1.86	1.65	-1.91	1.71	-4.49	0.32	-4.25	0.36	-2.88	1.39	-4.00	0.27	-4.07	0.33		
IIL uA	-250 -0.1	-45.73	5.03	-53.13	4.18	-69.23	4.50	-86.39	5.05	-102.40	5.55	-110.40	5.87	-108.50	6.17	-87.35	3.33		
IIR uA	-1 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
ICCP mA	0 1.5	0.03	0.05	0.03	0.05	0.02	0.04	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.04		
ICCN mA	-5 0	-3.09	0.06	-2.97	0.06	-2.85	0.06	-2.72	0.05	-2.61	0.05	-2.52	0.05	-2.58	0.04	-2.83	0.03		
IL mA	0 4.5	3.51	0.05	3.44	0.04	3.39	0.05	3.31	0.06	3.27	0.06	3.21	0.06	3.26	0.07	3.40	0.05		
IR mA	-2.2 0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
ION nS	2 250	127.40	12.94	128.40	13.14	129.70	13.78	130.20	13.64	133.00	14.40	134.10	14.76	136.60	12.68	133.30	10.80		
IOFF nS	2 130	65.41	11.30	71.25	11.11	71.88	10.31	72.63	10.53	75.00	10.30	75.06	10.33	66.56	13.23	64.81	13.97		

Notes:

1/ The mean and standard deviation values were calculated over the four parts irradiated in this testing. The control sample remained constant throughout the testing and is not included in this table.

Figure 1. Radiation Bias Circuit for JM38510/11108



$R = 10 \text{ Kohms } \pm 5\% , @ 1/4 \text{ W}$

$+V_{CC} = +15.0 \text{ V } \pm 0.5 \text{ V}$

$-V_{CC} = -15.0 \text{ V } \pm 0.5 \text{ V}$

$V_{in} = V_L = 5.0 \text{ V } \pm 0.5 \text{ V}$

$T_a = 25^\circ \text{ C}$