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Interoffice Memorandum

To
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Department
Code 300.1
From
K. Sahu KS
Department
7809
Subject
Radiation Report on TSTP
Non-Common Buy Part No. JAN2N2608

PPM-91-424
Date
June 19, 1991
Location
Lanham
Telephone
731-8954
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A radiation evaluation was performed on JAN2N2608 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, eight parts were irradiated under bias (see Figure 1 for bias configuration), and two parts were used as control samples. The total dose radiation steps were 5, 10, 20, and 50 krads. After 50 krads, parts were annealed at 25°C for 24 and 168 hours (cumulative). The dose rate was between 0.2 - 1.7 Krads/hour, depending on the total dose level (see Table II for radiation schedule). After each radiation exposure and annealing treatment, parts were electrically tested according to the test conditions and the specification limits listed in Table III.

All (8) parts passed the initial electrical measurements. Parts continued to stay within the specification limits without any significant degradation for all radiation steps up to 50 krads and subsequent annealing up to 168 hours. Table IV provides the mean and standard deviation values for each parameter after different radiation exposures and annealing treatments.

Any further details about this evaluation can be obtained upon request. If you have any questions, please call me at (301) 731-8954.

TABLE I. Part Information

Generic Part Number:	JAN2N2608
ISTP Non-Common Buy Part Number:	JAN2N2608
ISTP Non-Common Buy Control Number:	2083
Charge Number:	C14147
Manufacturer:	Motorola
Quantity Procured:	47
Lot Date Codes:	9046
Quantity Tested:	10
Serial Numbers of Radiation Samples:	230, 231, 232, 233, 234, 235, 236, 237
Serial Numbers of Control Samples:	228, 229
Part Function:	Transistor
Part Technology:	JFET
Package Style:	Tin Can

TABLE II. Radiation Schedule

EVENTS	DATE
1) Initial Electrical Measurements	04/02/91
2) 5 krads irradiation @ 278 rads/hr Post 5 krads Electrical Measurements	05/29/91 05/30/91
3) 10 krads irradiation @ 278 rads/hr Post 10 krads Electrical Measurements	05/30/91 05/31/91
4) 20 krads irradiation @ 151 rads/hr Post 20 krads Electrical Measurements	05/31/91 06/04/91
5) 50 krads irradiation @ 1667 rads/hr Post 50 krads Electrical Measurements	06/04/91 06/05/91
6) 24 hour annealing Post 24 hr Electrical Measurements	06/05/91 06/06/91
7) 168 hour annealing Post 168 hr Electrical Measurements	06/05/91 06/12/91

Notes:

- 1) All parts were radiated under bias at the cobalt-60 gamma ray facility at GSFC.
- 2) All electrical measurements were performed off-site at 25°C.
- 3) Annealing performed at 25°C under bias.

Table III. Electrical Characteristics of JAN2N2608

<u>Test</u>	<u>Other Conditions</u>	<u>MIN</u>	<u>MAX</u>
I_{GSS1}	$V_{GS} = 30 \text{ V}, V_{DS} = 0$	0.0 nA	10.0 nA
I_{GSS2}	$V_{GS} = 15 \text{ V}, V_{DS} = 0$	0.0 nA	7.5 nA
$V_{BR_{CSS}}$	$I_G = 1 \mu\text{A}, V_{DS} = 0$	30.0 V	---
I_{DSS}	$V_{GS} = 0, V_{DS} = -5 \text{ V}$	-1.0 mA	-5.0 mA
$V_{GS(OFF)}$	$V_{DS} = -5 \text{ V}, I_D = -1 \mu\text{A}$	0.75 V	6.0 V

TABLE IV: Summary of Electrical Measurements after
Total Dose Exposures and Annealing for JAN2N2608

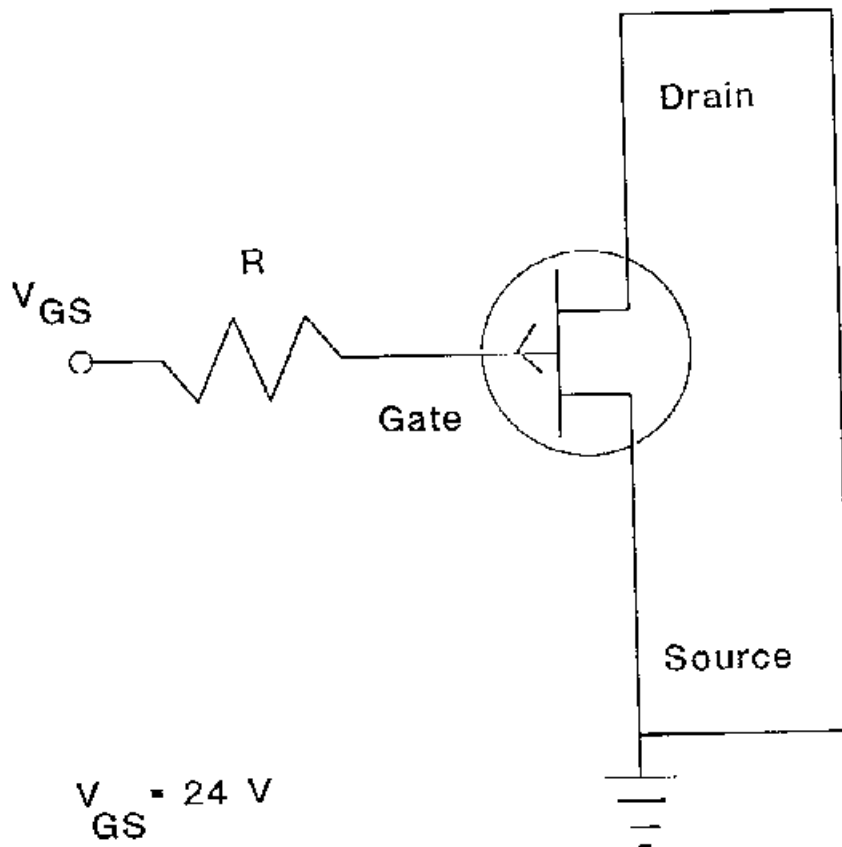
1/

Parameters		Spec. Limits		Initials	Total Dose Exposure (krads)								Annealing				
					5		10		20		50		24 hrs		168 hrs		
					min	max	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean
IGSS1	nA	0	10	.20	.01	.22	.02	.22	.02	.21	.01	.22	.02	.22	.1	.22	.01
IGSS1	nA	0	7.5	.01	.005	.02	.01	.02	.01	.02	.01	.03	.01	.02	.01	.02	.01
VBRGSS	V	30	---	P		P		P		P		P		P		P	
IDSS	mA	1.0	5.0	2.2	0.8	2.3	.7	2.3	.7	2.4	.7	2.3	.7	2.3	.7	2.2	.7
VGSoff	V	.75	6.0	1.9	.3	2.0	.3	2.0	.3	2.7	2.1	2.0	.3	2.0	.3	1.9	.3

Notes:

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

Figure 1: Radiation Bias Circuit for JAN2N2608



$$V_{GS} = 24 \text{ V}$$

$$V_{DS} = 0 \text{ V}$$

$$R = 100 \text{ kohms } \pm 5\% @ 1/4 \text{ W}$$

$$T_A = 25^\circ$$