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To
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Department
Code 311
From
K. Sahu KS
Department
7809
Subject
Radiation Report on MC708-149

PPM-91-483
Date
July 29, 1991
Location
Lanham
Telephone
731-8954
Location
Lanham
cc
J. Buckner
S. Esmacher
P. Thornton

A radiation evaluation was performed on MC708-149 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 I.

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 one part was used as control sample. The total dose radiation steps were 5, 10, 20, 30, 50, 75 and 100 krads. After 100 krads, parts were annealed at 25°C for 24 and 168 hours. The dose rate was between 0.3 - 1.3 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) test samples passed all DC and AC parametric tests up to 100 krads, without any significant changes in any of the electrical parameters. Table IV provides the mean and standard deviation values for each parameter after each radiation/annealing step.

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:	MC708-149
Manufacturer:	McCoy Electronics Co.
Lot Date Code:	9109
Quantity Tested:	10
Serial Numbers of Radiation Samples:	4, 10, 11, 13, 14, 15, 16, 20
Serial Numbers of Control Samples:	1, 3
Part Function:	Crystal Oscillator
Part Technology:	Crystal, Bipolar Output
Package Style:	8-Pin Can, T-08

TABLE II. Radiation Schedule

EVENTS	DATE
1) Initial Electrical Measurements	06/26/91
2) 5 krads irradiation @ 250 rads/hr Post 5 krads Electrical Measurements	07/08/91 07/09/91
3) 10 krads irradiation @ 260 rads/hr Post 10 krads Electrical Measurements	07/09/91 07/10/91
4) 20 krads irradiation @ 540 rads/hr Post 20 krads Electrical Measurements	07/10/91 07/11/91
5) 30 krads irradiation @ 540 rads/hr Post 30 krads Electrical Measurements	07/11/91 07/12/91
6) 50 krads irradiation @ 300 rads/hr Post 50 krads Electrical Measurements	07/12/91 07/15/91
7) 75 krads irradiation @ 1250 rads/hr Post 75 krads Electrical Measurements	07/15/91 07/16/91
8) 100 krads irradiation @ 1250 rads/hr Post 100 krads Electrical Measurements	07/16/91 07/17/91
9) 24 hrs annealing Post 24 hr Electrical Measurements	07/17/91 07/18/91
10) 168 hrs annealing Post 168 hr Electrical Measurements	07/17/91 07/24/91

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.
- Annealing was performed at 25°C under bias.

Table III. Electrical Characteristics of MC708-149

Parameter	Min	Max	Units
Supply Current, IDD	0	80	mA
Frequency	199.986	200.014	kHz
Rise Time, TR	0	15	ns
Fall Time, TF	0	15	ns
Duty Cycle, %T	45	55	%
Logic 1, VOH	2.4	-	VDC
Logic 0, VOL	-	0.5	VDC

TABLE IV: Summary of Electrical Measurements after
Total Dose Exposures and Annealing for MC708-149

1/

Parameters		Spec. Limits min max		Total Dose Exposure (krads)											
				Initials		5		10		20		30		50	
				mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
IDD	mA	0	80	14.6	0.1	15.2	0.1	15.3	0.1	15.3	0.1	15.1	0.1	15.2	0.1
Freq	kHz	199.986	200.014	200.000	.001	200.001	.001	200.001	.001	200.001	.001	200.001	.001	200.001	.001
TR	ns	0	15	13	0	9	0	8.9	0.3	9	0	11	1	9.1	0.1
TF	ns	0	15	3.1	0.2	2	0	2	0	2	0	2.7	0.3	2	0
RT	%	45	55	50	0	50	0	50	0	50	0	50	0	50	0
VCH	V	2.4	-	4.9	0	5.0	.03	5.1	0	5.1	0.1	5.1	0	5.1	0
VOL	mV	-	500	138	6	-20	0	10	7	12	15	12	3	5	6

Parameters		Spec. Limits min max		Total Dose (krads)				Annealing					
				75		100		24 hrs		168 hrs			
				mean	sd	mean	sd	mean	sd	mean	sd		
IDD	mA	0	80	15.2	0.4	15.1	0.5	15.1	0.5	15.1	0.5	15.1	0.5
Freq	kHz	199.986	200.014	200.001	.001	200.001	.001	200.001	.001	200.001	.001	200.001	.001
TR	ns	0	15	9.6	0.2	8.9	0.2	9.2	0.6	8.9	.03	8.9	.03
TF	ns	0	15	2	0	2	0	2	0	2	0	2	0
RT	%	45	55	50	0	50	0	50	0	50	0	50	0
VCH	V	2.4	-	5.0	0	5.0	0	5.0	0	4.9	0	4.9	0
VOL	mV	-	500	15	5	5	5	150	15	173	11	173	11

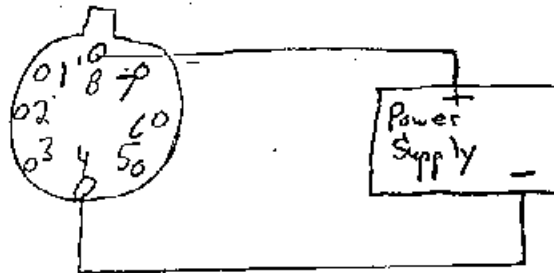
Note:

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 MC708-149

<u>Pin#</u>	<u>Function</u>
2,3,6,7	NC
4	B-
5	Output
8	B+

Top View



$$4.5V_{dc} \leq V_s \leq 5.5V_{dc}$$

$I = 80\text{mA}$ maximum
for each device

REQUEST NUMBER 0912793

OFA INFORMATION CENTER REQUEST FORM

DATE 9/30/93

NAME David Wilson CODE _____ BLDGRM _____
PHONE 303 939 6935 PROJECT HST
SEND TO: _____

FAX 303 939 5952

ITEMS REQUESTED:

Radiation
PDM-91-483

(TO BE COMPLETED BY OFA INFO CENTER PERSONNEL)

REQUEST METHOD: IN PERSON _____ PHONE FAX _____ EMAIL _____

STATUS OF REQUEST: PARTIAL _____
ON ORDER _____ (DATE)
NO ACTION TAKEN _____
COMPLETE _____

COMMENTS:

please fax

REQUEST COMPLETE BY: _____

rec 9.45