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UNISYS

(80)

Interoffice Memorandum

To
T. Miccolis
Department
Code 300.1
From
K. Sahu KS
Department
7809
Subject
Radiation Report on SMEX
Common Buy Part No.
SMEX-5955-03/8

PPM-91-613
Date
October 16, 1991
Location
Lanham
Telephone
731-8954
Location
Lanham
cc
B. Fafaul/311
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A radiation evaluation was performed on SMEX-5955-03/8 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 10, 20, 30, 50, 75 and 100 krads. After 100 krads, parts were annealed at 25°C for 24 and 192 hours (cumulative). After annealing, irradiation was continued to 200 and 300 krads. The dose rate was between 0.3 - 5.6 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 all tests on irradiation UP to 300 krads. 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:	MCM1471-8
SMEX/Common Buy Part Number:	SMEX-5955-03/8
SMEX/Common Buy Control Number:	1941
Charge Number:	C90292
Quantity Procured:	22
Manufacturer:	Q-TECH CORP.
Lot Date Code:	9106
Quantity Tested:	10
Serial Numbers of Radiation Samples:	5824, 5825, 5826, 5827, 5828, 5829, 5830, 5832
Serial Numbers of Control Samples:	5820, 5823
Part Function:	Crystal Oscillator
Part Technology:	Hybrid
Package Style:	20-Pin Flat Pack
Test Engineer:	Ted Scharer

TABLE II. Radiation Schedule

EVENTS	DATE
1) Initial Electrical Measurements	04/26/91
2) 10 krads irradiation @ 500 rads/hr	08/06/91
Post 10 krads Electrical Measurements	08/07/91
3) 20 krads irradiation @ 500 rads/hr	08/07/91
Post 20 krads Electrical Measurements	08/08/91
4) 30 krads irradiation @ 500 rads/hr	08/08/91
Post 30 krads Electrical Measurements	08/09/91
5) 50 krads irradiation @ 295 rads/hr	08/09/91
Post 50 krads Electrical Measurements	08/12/91
6) 75 krads irradiation @ 1320 rads/hr	08/12/91
Post 75 krads Electrical Measurements	08/13/91
7) 100 krads irradiation @ 1320 rads/hr	08/13/91
Post 100 krads Electrical Measurements	08/14/91
8) 24 hour annealing	08/14/91
Post 24 hr Electrical Measurements	08/15/91
9) 192 hour annealing	08/14/91
Post 192 hr Electrical Measurements	08/22/91
10) 200 krads irradiation @ 5260 rads/hr	08/22/91
Post 200 krads Electrical Measurements	08/23/91
11) 300 krads irradiation @ 1470 rads/hr	08/23/91
Post 300 krads Electrical Measurements	08/26/91

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 performed at 25°C under bias.

Table III. Electrical Characteristics of SMEX-5955-03/8

PARAMETER	MIN	MAX	UNITS
ICC	-	50	mA
VOH1	4.5	-	V
VOL1		0.5	V
F1	19999.5	20000.5	Hz
DC1	40	60	%
TR1	0	15	nS
TF1	0	15	nS
VOH2	4.5	-	V
VOL2	-	0.5	V
F2	9999.75	10000.25	Hz
DC2	40	60	%
TR2	0	15	nS
TF2	0	15	nS

TABLE IV: Summary of Elec al Measurements after Total Dose Exposures and Annealing for SMEX-5955-03/8 1/, 2/

Parameters		Spec. Limits min	Spec. Limits max	Initials mean	Initials sd	Total Dose Exposure (krads) 20 mean	20 sd	50 mean	50 sd	75 mean	75 sd	100 mean	100 sd	Annealing 192 hrs mean	Annealing 192 hrs sd	Total Dose (krads) 200 mean	200 sd	300 mean	300 sd
ICC	mA	0	50	33	.3	33.4	.3	33.9	.3	34.6	.4	34.7	.4	34	.4	35.9	.4	36	.4
VOH1	V	4.5	-	5.2	.04	5.3	.01	5.3	.01	5.3	0	5.3	.01	5.2	.01	5.3	0	5.3	.01
VOL1	mV	0	500	160	0	161	2	160	0	161	2	161	2	158	2	157	3	159	2
F1	kHz	*	*	20	0	20	0	20	0	20	0	20	0	20	0	20	0	20	0
DC1	%	40	60	50	0	50	0	49	.4	48.4	.7	48.4	.5	49.5	.5	49.4	.5	49.3	.7
TR1	nS	0	15	4.8	.4	2.5	.07	2.6	.05	2.2	.03	2.3	.03	2.3	.04	2.3	.09	2.2	.06
TF1	nS	0	15	4.5	.4	2.4	.07	2.4	.06	1.9	.05	2.0	.02	1.9	.04	2.0	.05	1.9	.07
VOH2	V	4.5	-	5.2	.04	5.3	.01	5.3	.01	5.3	.01	5.3	.01	5.2	.01	5.3	.01	5.3	0
VOL2	mV	0	500	160	0	141	3	140	0	139	3	141	2	138	2	136	2	139	2
F2	kHz	*	*	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0
DC2	%	40	60	50	0	50	0	49	0	49.1	.3	49	0	49.6	.5	49.1	.3	49	0
TR2	nS	0	15	5.7	0.5	2.7	.07	2.7	.1	2.16	.03	2.3	.03	2.3	.04	2.3	.06	2.2	.08
TF2	nS	0	15	5.2	1.3	2.3	.06	2.4	.01	2.0	0	1.9	.03	1.9	.04	1.9	.03	1.9	.02

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.

2/ Table IV provides radiation characteristics of parts at selected total dose exposures and annealing treatments. The data at other radiation exposures and annealing treatments is available and can be obtained upon request.

* The specification limits for F1 and F2 are 20kHz ± .0025% and 10kHz ± .0025%, respectively.

Figure 1. Radiation Bias Circuit for SMEX-5955-03/8