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Interoffice Memorandum

PPM-91-0391

Date June 7, 1991

Location Lanham

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Location Lanham

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Subject Radiation Report on ISTP  
Non-Common Buy Part No. MC1350

A radiation evaluation was performed on MC1350 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, 50, 100, 200, 300 krad. After 300 krad, parts were annealed at 25°C for 24 and 192 hours (cumulative). The dose rate was between 0.25 - 5.0 krad/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 300 krad and subsequent annealing up to 192 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:	MC1350
ISTP Non-Common Buy Part Number:	ISTP-5962-35
ISTP Non-Common Buy Control Number:	2567
Manufacturer:	Austin Semiconductor, Inc.
Quantity Procured:	40
Lot Date Codes:	9101
Quantity Tested:	10
Serial Numbers of Radiation Samples:	0031, 0043, 0059, 0066, 0077, 0087, 0106, 0116
Serial Numbers of Control Samples:	0004, 0012
Part Function:	Video Operational Amplifier
Part Technology:	Bipolar
Package Style:	8 pin can

TABLE II. Radiation Schedule

EVENTS	DATE
1) Initial Electrical Measurements	05/01/91
2) 5 krads irradiation @ 277.8 rads/hr	05/08/91
Post 5 krads Electrical Measurements	05/09/91
3) 10 krads irradiation @ 263.2 rads/hr	05/09/91
Post 10 krads Electrical Measurements	05/10/91
4) 20 krads irradiation @ 500 rads/hr	05/10/91
Post 20 krads Electrical Measurements	05/11/91
5) 50 krads irradiation @ 1500 rads/hr	05/12/91
Post 51 krads Electrical Measurements*	05/13/91
6) 100 krads irradiation @ 1578.9 rads/hr	05/13/91
Post 100 krads Electrical Measurements	05/14/91
7) 200 krads irradiation @ 5000 rads/hr	05/14/91
Post 200 krads Electrical Measurements	05/15/91
8) 300 krads irradiation @ 5000 rads/hr	05/15/91
Post 300 krads Electrical Measurements	05/16/91
9) 24 hour annealing	05/16/91
Post 24 hr Electrical Measurements	05/17/91
10) 192 hour annealing	05/17/91
Post 192 hr Electrical Measurements	05/24/91

Notes:

\* The test facility was closed on 5/12/91 and the parts could not be tested as scheduled. Instead, they were placed under irradiation at the minimum dose rate of 43.5 rad/hour for 23 hours until 5/13/91 up to the time when electrical measurements could be taken. The total extra dose was 1 krad.

Table III. Electrical Characteristics of MC1350

Conditions

$V_{CC} = 12.0 \text{ V} \pm 10\%$   
 $V_{IN} = 80 \text{ mVpk-pk, sinewave, @455kHz, 50 \% Duty Cycle}$   
 $V_1 = 5\text{V} \pm 10\%$   
 $T_A = 25^\circ\text{C}$

<u>Test</u>	<u>MIN</u>	<u>MAX</u>
$I_S$		17 mA
$P_o$	46 dB	

TABLE IV: Summary of Electrical Measurements after  
Total Dose Exposures and Annealing for MC1350 1/

Parameters		Spec. Limits		Initials		Total Dose Exposure (krads)									
						5		10		20		50		100	
						mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
Is	mA		17	15.8	.1	15.7	.1	15.9	.1	15.7	.1	15.8	.1	15.7	.1
Po	dB	46		54.2	.2	54.2	.1	54.2	.1	54.1	.1	54.3	.2	54.1	.1

Parameters		Spec. Limits		Initials		Total Dose Exposure (krads)				Annealing					
						200		300		24 hrs		168 hrs			
						mean	sd	mean	sd	mean	sd	mean	sd		
Is	mA		17	15.8	.1	15.8	.1	15.7	.1	15.7	.1	15.7	.1	15.7	.1
Po	dB	46		54.2	.2	54.1	.1	53.9	.1	54.1	.1	54.0	.1	54.0	.1

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 MC1350

