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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 ISTEP
Non-Common Buy Part No. CA3080A

PPM-91-484
Date
July 31, 1991
Location
Lanham
Telephone
731-8954
Location
Lanham
cc
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A radiation evaluation was performed on CA3080A 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 5, 10, 20, 30, 50, and 100 krads. After 100 krads, parts were annealed at 25°C for 24 and 168 hours (cumulative). The dose rate was between 0.1 - 2.6 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 (4) parts passed all tests on irradiation 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 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 1. Part Information

Generic Part Number:	CA3080A
ISTP Non-Common Buy Part Number:	CA3080A
ISTP Non-Common Buy Control Number:	1995
Charge Number:	C13906
Manufacturer:	Harris Corp.
Quantity Procured:	42
Lot Date Code:	Unknown (possibly 8823)
Quantity Tested:	5
Serial Numbers of Radiation Samples:	31, 32, 33, 34
Serial Number of Control Sample:	30
Part Function:	Transconductance Amplifier
Part Technology:	Bipolar
Package Style:	8-Lead Can

TABLE II. Radiation Schedule

EVENTS	DATE
1) Initial Electrical Measurements	06/28/91
2) 5 krad irradiation @ 260 rads/hr Post 5 krad Electrical Measurements	07/01/91 07/02/91
3) 10 krad irradiation @ 250 rads/hr* @2000 rads/hr Post 10 krad Electrical Measurements	07/02/91 07/03/91 07/03/91
4) 20 krad irradiation @ 230 rads/hr Post 20 krad Electrical Measurements	07/03/91 07/05/91
5) 30 krad irradiation @ 150 rads/hr Post 30 krad Electrical Measurements	07/05/91 07/08/91
6) 50 krad irradiation @ 1000 rads/hr Post 50 krad Electrical Measurements	07/08/91 07/09/91
7) 100 krad irradiation @ 2630 rads/hr Post 100 krad Electrical Measurements	07/09/91 07/10/91
8) 24 hour annealing Post 24 hr Electrical Measurements	07/10/91 07/11/91
9) 168 hour annealing Post 168 hr Electrical Measurements	07/10/91 07/17/91

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.

* On 07/02/91, the parts received a net dose of 1.5 krad before a thunderstorm caused the radiation facility to shut down. The dose rate was increased the next day so that the parts could receive the rest (3.5 krad) of the scheduled net dose in 1 hour and 45 minutes.

Table III. Electrical Characteristics of CA3080A

Test	Conditions	Min	Max	Units
Vio1	Iset = 5uA	-	2000	uV
Vio2	Iset = 500uA	-	2000	uV
dVio	Iset = 5uA to 500uA	-	5000	uV
Iio	Iset = 500uA	-	600	nA
Ib+	Iset = 500uA	-	5	uA
Ib-	Iset = 500uA	-	5	uA
gm	Iset = 500uA	6.7	13	mMhos
PSRR+	Iset = 500uA	-	150	uV/V
PSRR-	Iset = 500uA	-	150	uV/V
CMRR	Iset = 500uA	80	-	dB
V+OM1	Iset = 500uA	12	-	V
V-OM1	Iset = 500uA	-	-12	V
V+OM2	Iset = 5uA	12	-	V
V-OM2	Iset = 5uA	-	-12	V
I+OM1	Iset = 500uA	350	650	uA
I-OM1	Iset = 500uA	350	650	uA
I+OM2	Iset = 5uA	3	7	uA
I-OM2	Iset = 5uA	3	7	uA

TABLE IV: Summary of Electrical Measurements after
Total Dose Exposures and Annealing for CA3080A 1/

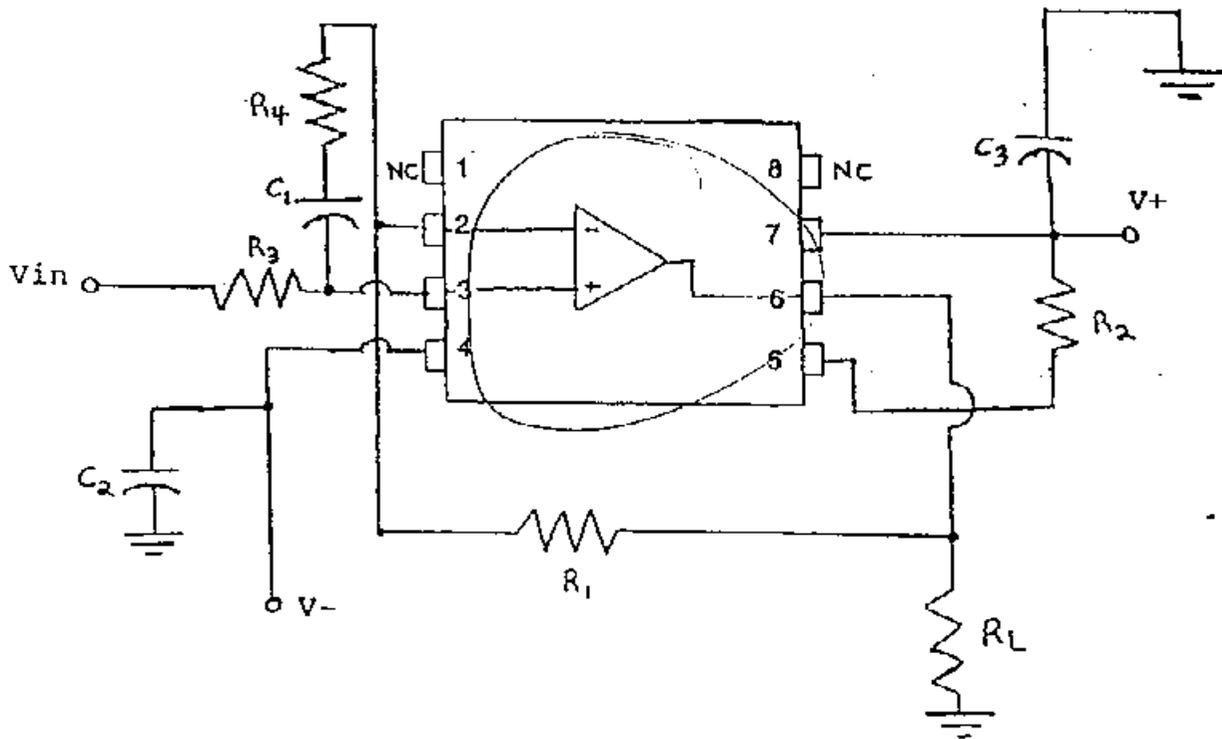
Parameters	Units	Spec. Limits		Initials	Total Dose Exposure (krads)												Annealing				
					5		10		20		30		50		100		24 hrs		168 hrs		
					mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	
Vic1	uV	-	2000	-170	550	-151	554	-135	639	302	16	157	255	78	215	276	249	284	244	290	256
Vic2	uV	-	2000	-175	599	-179	603	-225	686	260	20	140	191	48	158	169	165	188	162	218	160
dVio	uV	-	5000	70	48	83	49	91	49	42	35	67	18	84	45	115	73	110	62	115	35
Iio	nA	-	500	40	53	-17	80	-12	58	-53	87	-148	33	-58	219	-371	22	-356	21	-357	21
Ib+	uA	-	5	2.0	0.1	2.0	0.1	2.0	0.1	2.3	0.0	2.2	0.0	2.2	0.0	2.4	0.0	2.4	0.0	2.1	0.0
Ib-	uA	-	5	1.9	0.1	2.0	0.2	2.0	0.2	2.4	0.0	2.3	0.1	2.4	0.1	2.8	0.0	2.7	0.0	2.5	0.0
gm	mMhos	6.7	13	9.2	0.4	9.3	0.4	9.8	0.5	9.7	0.2	9.5	0.2	9.5	0.3	9.6	0.3	9.6	0.3	9.5	0.3
PSRR-	uV	-	150	1.4	1.3	-0.3	1.8	0.4	1.5	-1.0	0.3	0.4	1.6	-1.1	0.8	-1.4	0.9	-1.3	0.8	-0.5	0.8
PSRR-	uV	-	150	5.1	0.4	4.0	1.0	4.2	1.0	4.8	0.8	4.6	0.3	5.0	0.2	5.6	0.3	4.0	0.9	3.1	0.3
CMRR	dB	80	-	155	6	159	7	153	5	159	0	163	2	168	15	162	7	168	3	165	8
V+OM 1	V	12	-	13.5	0.0	13.5	0.0	13.5	0.0	13.5	0.0	13.5	0.0	13.6	0.0	13.5	0.0	13.5	0.0	13.5	0.0
V-OM 1	-V	12	-	14.3	0.0	14.3	0.0	14.3	0.0	14.3	0.0	14.3	0.0	14.3	0.0	14.3	0.0	14.3	0.0	14.3	0.0
V+OM 2	V	12	-	13.9	0.0	13.9	0.0	13.9	0.0	13.9	0.0	13.9	0.0	13.9	0.0	13.9	0.0	13.9	0.0	13.9	0.0
V-OM 2	-V	12	-	14.4	0.0	14.4	0.0	14.4	0.0	14.4	0.0	14.4	0.0	14.4	0.0	14.4	0.0	14.4	0.0	14.4	0.0
I-OM 1	uA	350	650	501	16	502	16	508	16	520	10	513	15	516	15	520	15	519	16	515	16
I-OM 1	uA	350	650	491	28	492	28	494	33	519	9	512	13	516	13	521	14	521	14	520	14
I+OM 2	uA	3	7	4.5	0.1	4.6	0.1	4.6	0.2	4.6	0.0	4.5	0.1	4.5	0.1	4.5	0.0	4.6	0.1	4.5	0.1
I-OM 2	uA	3	7	4.5	0.2	4.5	0.2	4.5	0.3	4.6	0.0	4.5	0.0	4.6	0.1	4.6	0.1	4.6	0.1	4.6	0.1

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.

* Due to bad contacts with the testing socket, testing recorded invalid data for SN32 at 10 and 20 krads, and for SN33 at 20 krads and above. The values in Table IV do not include these invalid measurements.

Figure 1. Radiation Bias Circuit for CA3080A



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

$V^+ = -15\text{V} \pm 0.5 / -0.0 \text{ V}$

$V^- = +15\text{V} \pm 0.0 / -0.5 \text{ V}$

$V_{IN} = +2.5\text{V} \pm 0.5 \text{ V}$

$R_1 = R_2 = R_3 = 10\text{K}\Omega \pm 10\%, 1/4\text{W}$

$R_L = 1.5\text{K}\Omega \pm 10\%, 1/4\text{W}$

$R_3 = 300\Omega \pm 10\%, 1/4\text{W}$

$C_1 = 370\text{pF}$

$C_2 = C_3 = .01\mu\text{F}$