ESA-QCA0043T-C

ANALOG DEVICES

1500 Space Park Dr. • P.O. Box 58020 • Santa Clara, Ca. • 95052-8020

CERTIFICATE OF CONFORMANCE
CO60 RADIATION TEST

The data supplied with this Test Report that corresponds to the sample test groups referenced below are certified to comply with all requirements of the detail specification and the quality conformance requirements of the general specification. Any exceptions or modifications are stated below.

ADI P/N: OP42-115I
Cust. P/N: _
Prod. Code: EG

General spec: ESA/SCC9000
Detail spec: XM-PL-IGG-0023
Die type: 1432Z-6A6

REV: 8E
REV: Iss 2

EXCEPTIONS/MODIFICATIONS:

Device 248 fails VOS limit at 50K, 75K, 100K, & 24Hr, recovers after 168Hr
All other devices exceed VOS limit after 24 hour and 168 hour.

RADIATION DOSIMETRY:

Total Dose Test Date: 30-Jan-97

Dose target:	10K	20K	30K	50K	75K	100K	24Hr	168Hr
Dose rate:	22.26 rad/sec						@25°C	@100°C
Dose Delivered	10K	10K	10K	20K	25K	25K	24Hr	168Hr
TOTAL DOSE:	10K	20K	30K	50K	75K	100K	24Hr	168Hr
PASS/FAIL:				Fail	Fail	Fail	Fail	Fail

SAMPLE DATA:

Wafer Lot #
Travel Log #: 1A11313.1
Release #: _____
Date Code: 9647

Sample S/N's: 244, 245, 246, 248, 249, 250, 251, 252, 253

Control S/N(s): 243

Pass/Fail FAIL

Wafer Lot Qualified (Yes/No) NO

AUTHORIZED SIGNATURES:

Analog Devices, PMI Division:

Bob Pardue 2/11/97
NAME DATE
Radiation Program Manager
TITLE

C Bonnet 3/5/97
NAME DATE
Q.A. DATA ANALYST
TITLE (Product Assurance Representative)

038

N **Total Dose Radiation Test**
Test Flow

Valid from 10/1/96 to 9/30/97

NSPN: _____ **est Date:** 1/30/97

A SAMPLE LIST

Serial Numbers Start	Serial Numbers End	Qty.	Wafer Run #	Lot #	Date Code	BS #
243	253	11		1A11313.1	9647	

Correlation unit serial number: 243

B DOSE RATE

Test Date: 1/30/97

Enclosure Type: 6

Enclosures:
1 - No Enclosure
2 - Field Flattener w/Al Liner
3 - Field Flattener w/JLS 25% Attenuator & Liner
4 - 53% Attenuator
5 - 66% Attenuator
6 - 90% Attenuator

Calculations (based upon last dosimetery data):

Days since last dosimetery: 126

Reference decay: 0.74857 min/kRad(Si)

Reference dose rate: 22.26 Rads(Si)/sec

Decay: 0.78340 min/kRad(Si)

Dose Rate: (Expected) 21.27 Rads(Si)/sec

(Range) 19.15 to 23.40 Rads(Si)/sec

039

N **Total Dose Radiation Test Flow**

Valid from 10/1/96 to 9/30/97

C EXPOSURE TIMES

Total-Dose kRads(Si)[1]	Total Acc. Dose kRads(Si)	Time mins	Exposure Time (HHMM) Start	Stop	Serial Number
10.0	10.0	7.81			
10.0	20.0	7.81			
10.0	30.0	7.81			
20.0	50.0	15.64			
25.0	75.0	19.56			
25.0	100.0	19.56			
0.0	100.0	0.01			
0.0	100.1	0.01			
0.0	100.1	0.01			
0.0	100.2	0.01			
0.0	100.2	0.01			

[1] Minumum dose is 450 Rads(Si) per cycle.

Bias Circuit: ROI5-3470-25

Start Voltage: ±15V End Voltage: ±15V

D ELECTRICAL TESTS

Tester Type: LTX Station No: 16

Location: ANALOG DEVICES Harness No:

Socket No.: Test Box No: #2

Program Name: 191240066.RO

Lot Names: 1- 5-

2- 6-

3- 7-

4- 8-

Test conducted by: Frank Lanik

ANALOG DEVICES

TOTAL DOSE TEST PLAN NO. **ADI-TID-96-0040** Issue No. 1 rev A

5/29/96 Date: 10/10/96 Date.

IGG — Customer

Page 1

SCC Component No: none

Component Designation: M38510/12208SGA

Irradiation Spec No.: XM-PL-IGG-0023

3 OP42-1155 4 Iss 3 rev 5

Specifications		Acceptance		Sample Size	Project/Program
ESA/SCC9000	Iss/rev -	Diffusion		10+1	
Generic				Control Devices	
XM-IS-IGG-0070	Iss/rev _	Lot	X	1	XMM
Detail 6		7		8	9
Family		Group		Package	
Operational Amplifier		Bipolar		8 lead TO	
10		11			12

Manufacturer Name/Address	Test House Name/Address	Originator Name
Analog Devices, Inc. PMI Division	Analog Devices, Inc. PMI Division	Bob Gardner, Analog Devices
P.O. Box 58020	P.O. Box 58020	Telephone
Santa Clara, Ca. 95052-8020 13	Santa Clara, Ca. 95052-8020 14	408-562-7156 15

Irradiation	Irradiation Measurement Interval	Level of Interest
LSI Logic	R015-34JO-25 Circuit Reference	
Facility Single _	Biased _	
Co60	±15V Supply Voltage	100K
Source Multiple _	Unbiased X	
16	17 Temp °C Duration	18 19

Single Irradiation	Multiple Irradiation Steps							
	1	2	3	4	5	6	7	8
Dose (krads(Si)) _K	Dose (krads(Si)) 10	20	30	50	75	100	_	_
Dose Rate(rad(Si) per S _	Dose Rate(rad(Si) per S 20							
Exposure Time (min) _	Exposure Time (min) 8	8	8	17	21	21	na	na
20								21

Irradiation Conditions			Anneal Test?		
Biased (Remote Test)	X	191RAD0G_.PM Test Program	Biased	X	191RAD0G_.PM Test Program
Unbiased (Remote Test)	_	R015-34JO-25 Bias Circuit Reference	Unbiased	_	R015-34JO-25 Bias Circuit Reference
In-Situ Test	_	±15V Supply Voltage / ROOM Temp °C	Room Temp °C		±15V Supply Voltages / 24 Duration
		22			23

Electrical Parameters to be Tested

Pre Radiation test per table II of XM-IS-IGG-0070

Post anneal accept criteria per table B of XM-PL-IGG-0023

041

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ANALOG DEVICES

TOTAL DOSE TEST PLAN FOR PART NO. ADI-TID-96-0040

Issue No. 1 rev A

5/29/96 Date: 10/10/96 Date.

IGG
Customer

Irradiation Test Sequence

Test Step	Description	Requirements
1	10 Krad total dose exposure, then R & R.	
2	20 Krad total dose exposure, then R & R.	
3	30 Krad total dose exposure, then R & R.	
4	50 Krad total dose exposure, then R & R.	
5	75 Krad total dose exposure, then R & R.	
6	100 Krad total dose exposure, then R & R.	
7	24 Hour biased anneal at room temperature, then R & R.	
8	168 Hour biased anneal at 100°C, then R & R.	
9	Prepare test report.	

Remarks

Iss 2, Rev. A -- Change dose rate from 10 to 20 rad/sec

At least one device per wafer in production lot.

Radiation Test Plan ADI-TID-96-0040

Serial Number of samples: 244, 245, 246, 247, 248, 249, 250, 251, 252, 253

Serial number of Control Units: 243

Pre-Radiation Screening:

Pre Radiation test per table II of XM-IS-IGG-0070

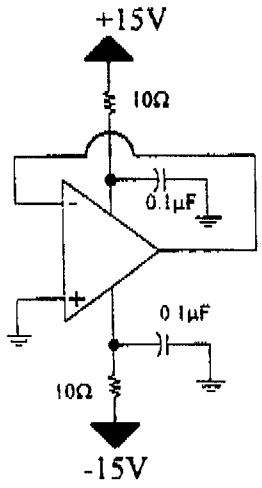
Sequence description	TIME IN	TIME OUT	NOTES
PRE-RAD R & R at +25°C (Table A parameters). 1/30/97 191RAD0G0.PM	9:35	9:41	
First Irradiation 1/30/97 10 Krad	9:30	9:37 9:40	
Test Devices at +25°C. (Table A parameters). 1/30/97 191RAD0G0.PM	9:55	9:59	
1/30/97 20 Krad	10:25	10:33	
Test Devices at +25°C. (Table A parameters). 1/30/97 191RAD0G0.PM	10:48	10:55	
1/30/97 30 Krad	11:20	11:28	
Test Devices at +25°C. (Table A parameters). 1/30/97 191RAD0G0.PM	11:45	11:49	
1/30/97 50 Krad	12:20	12:35	
Test Devices at +25°C. (Table A parameters). 1/30/97 191RAD0G0.PM	13:01	13:09	
1/30/97 75 Krad	13:48	14:04	
Test Devices at +25°C. (Table A parameters). 1/30/97 191RAD0G0.PM	14:22	14:29	
1/30/97 100 Krad	14:53	15:13	
Test Devices at +25°C. (Table A parameters). 1/30/97 191RAD0G0.PM	15:40	15:45	
24 Hour biased anneal at Room. 1/30/97	16:00	16:00	
Test Devices at +25°C. (Table A parameters). 1/31/97 191RAD0G0.PM	16:02	16:09	
168 Hour anneal at 100°C. 1/31/97	17:00	17:00	
Test Devices at +25°C. (Table A parameters). 2/7/97 191RAD0G0.PM	17:14	17:21	
Review data and prepare test report. Post anneal accept criteria per table B of XM-PL-IGG-0023			
Return samples to PC with report.			

Test Operator: Frank Hanis

ANALOG DEVICES 1500 Space Park Dr. • P.O. Box 58020 • Santa Clara. Ca. • 95052-8020

100 Krad (Si)

Symbol	Test Name	Conditions VS ± 15V TA = 25°C	LIMITS Pre Radiation		Post Radiation		
			min	max	min	max	units
ISY	Supply Current			6		6	mA
VOS	Input Offset Voltage		-1	1	-4	4	mV
IB	Input Bias Current		-0.2	0.2	-4	4	nA
IOS	Input Offset Current		-0.04	0.04	-0.15	0.15	nA
AOL	Open Loop Gain	Vo=±10V, RL=2KΩ	200		100		V/mV



R015-34JO-25 for TO; R015-34ZO-25 for CDIP

Post Radiation Acceptance Criteria and Bias circuit 044

Product	Customer	Test Plan #	Rev	Page
OP42-115J	IGG	ADI-TID-96-0040	0	4 of 4

XMM	IRRADIATION TEST PLAN NO. XM-PL-IGG-0023	Issue No. 3 Date: APRIL 1996 Page: 1/5	Rev. Date:

Component No. M38510/12208SGA (3)	Component Designation: I.C. Bipolar Operational Amplifier TYPE: OP42AJ (Screened) (4)	Irradiation Spec No. N/A Iss. Rev.

Specifications (5)	Acceptance (7)	Electrical Meas (8)	Project/Programme
Generic ESA/SCC 9000 Iss. Detail XM-IS-IGG-0070 Iss.	Evaluation ___ Element ___ Diffusion ___ Lot X	In-situ ___ Remote X	XMM

Manufacturer: Name: ANALOG DEVICES (10)	Test Facility: Name: LSI LOGIC GRP (11)	Originator:
Address: 1500 Space Park Drive PO Box 58020 Santa Clara CA 95052-8020	Address: 48660 Kato Road MS-304 Freemont CA 94538	IGG CT Name: J. T. ARNOLD Telephone: 01329 829311

Radiation Source (13)	Sample Size: 10 (14)	Exposure (15)	Annealing Test (16)	Radiation Level:
COBALT 60	Control Devices: 1	Single ___ Multiple X	YES X NO ___	10 KRad(Si), 50 KRad(Si) 20 KRad(Si), 75 KRad(Si) 30 KRad(Si), 100 KRad(Si)

Single Exposure (17)
Dose [Krad(Si)]
Dose Rate [rad(Si)/s]
NOT APPLICABLE
Exposure Time

Multiple Exposure:

Irradiation Steps	1	2	3	4	5	6
Dose [Krad(Si)]	10	10	10	20	25	25
Dose Rate [rad(Si)/s]	10	10	10	10	10	10
Exposure Time(s)	1000	1000	1000	2000	2500	2500

Bias Requirements: During Exposure (for in-situ elec. measure): N/A
During and after Exposure (for remote elec. measure): YES

Bias Conditions:
Test Circuits: The Electrical Bias circuit is given in Figure 1 herein.
Voltages: See Figure 1 Tolerance: See Figure 1

Shielding: Shielding is required to minimize dose enhancement effects caused by low energy, scattered radiation. The test specimens shall be enclosed in a Pb/Al container of Pb 1.5mm minimum, surrounding an inner shield of 0.7 to 1.0mm Al.

Irradiation Test Sequence

Test Step	Description	Requirements
1(A)	Serialisation Goods Receiving Inspection	If parts are not serialised, serialise them (permanently) sequentially from 1 to 11 inclusive.
2	Initial Electrical Measurements at Room Temperature only	Per Table 2 of XMM Detail Specifiction XM-IS-IGG-0070 - 11 parts.
3	Set-up of Test	Verify Figure 1 Bias Circuit and Voltages (In-situ) for all 10 test samples.
4	Irradiation Exposure	Verify Radiation dose rate and position in the chamber to achieve required dose. Verify and witness duration of exposure to achieve required dose.

Irradiation Test Sequence (Cont.)

Test Step	Description	Requirements
5	Intermediate Electrical Measurements	Bias to be maintained until measurements are performed. Test per Table A herein - Read and Record - 11 parts. Test to be performed immediately upon removal from chamber (less than 1 hour interval). Upon completion of test devices, to be replaced in bias circuit (10 parts) and returned to chamber. Maximum interval between two consecutive exposures to be (2 hours).
6 to 21	Repeat Set-up/Exposure/Test sequence up to Total Dose of 100Krad(Si) as per Plan above	Repeat Step 3, 4, 5 for a total of 6 cycles up to the total dose of 100KRad(Si) at accumulated dose of 10,20,30,50,75, and 100KRad(Si)
22	Annealing	To be 24 hours at 25°C under Figure 1 Bias.
23	Post Anneal Electrical Measurements	Per Table A herein - Read and Record - 11 - parts.
24	Accelerated ageing under Bias	Bake at +100°C under Figure 1 Bias conditions for 168 hours.
25	Final Electrical Measurements	Per Table A herein - Read and Record - 11 parts.
26	Lot Jeopardy	Post Anneal 100KRads parameters shall meet Table B limits. See Annex 1. Any failure shall be cause for Lot rejection.
27	Total Dose Irradiation Report	ESA/SCC 22900.

Remarks

1. Performed for the purposes of correlation.
2. The set-up/exposure/test sequence shall be stopped for any device that exhibits repeated functional failure.
3. Electrical testing shall be performed on the same test equipment from test step 1 to step 25.

XMM	IRRADIATION TEST PLAN NO. XM-PL-IGG-0023	Issue No. 3 Date: APRIL 1996 Page: 3/5	Rev. Date:

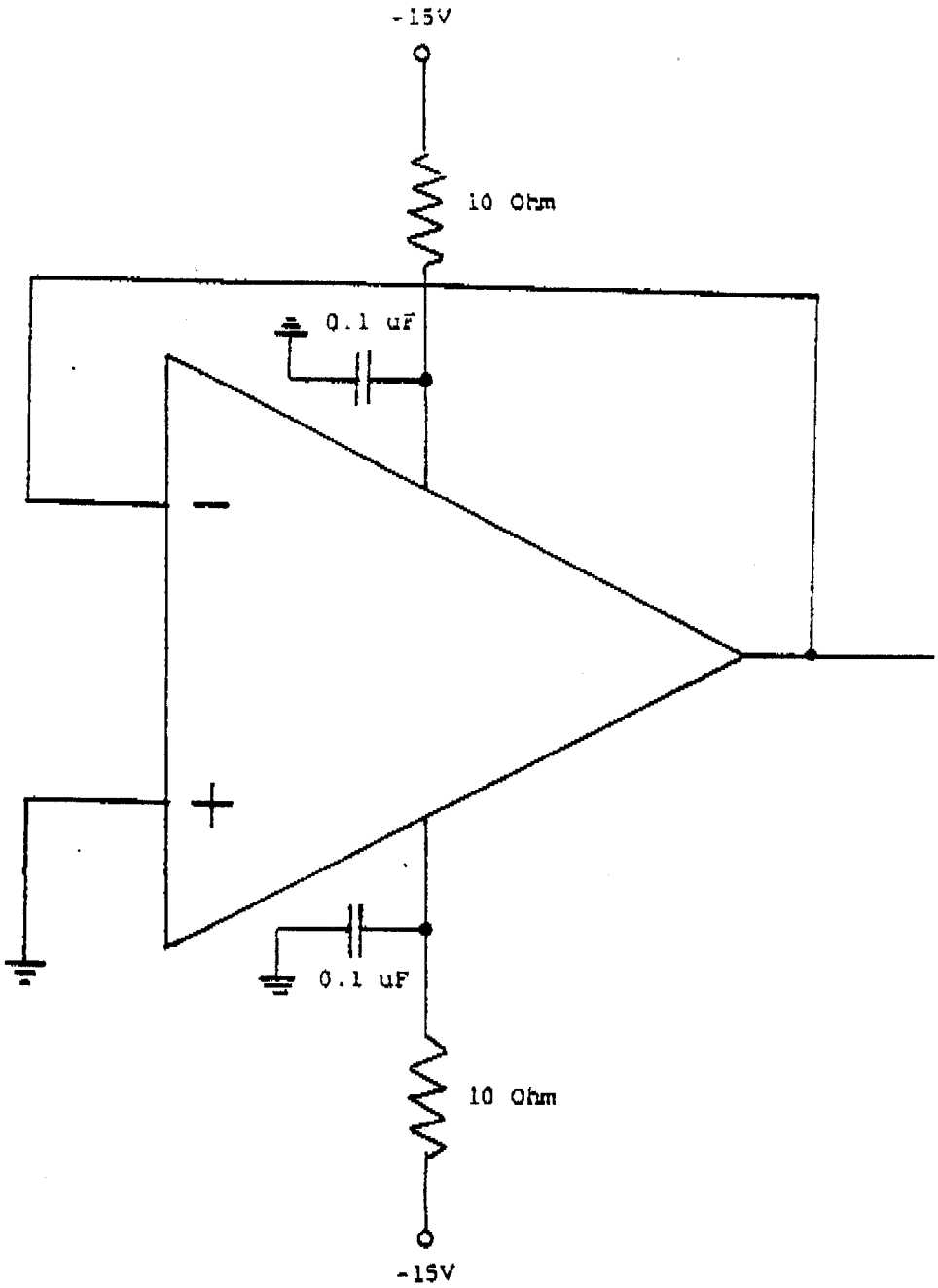
TABLE A - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE -T_{amb} = +25 ±5°C BEFORE AT INTERMEDIATE POINTS, AND ON COMPLETION OF IRRADIATION

No.	Characteristics	Symbol	Test Method MIL-STD-883	Test Fig Note 1	Measured Value Note 1	Test Conditions Note 2	Limits		Unit
							Min.	Max.	
1	Input Offset Voltage	V_{os}	4001	-	-	-	-	1.0	mV
2	Input Bias Current	I_B	4001	-	-	-	-	±200	pA
3	Input Offset Current	I_{os}	4001	-	-	-	-	40	pA
4	Common Mode Rejection	CMR	4003	-	-	V_{CM} = ±11V	86	-	dB
5	Power Supply Rejection Ratio	PSRR	4003	-	-	V_S = ±10V, ±20V	-	40	µV/V
6	Short Circuit Current limit	I_{SC}	-	-	-	Output shorted to ground	20	60	mA
7	Supply Current	I_{SY}	3005	-	-	V_O = 0V No Load	-	6	mA
8	Output Voltage Swing	V_O	4005	-	-	R_L = 1kΩ	±11.5	-	V
9	Large Signal Voltage Gain	A_{VO1}	-	-	-	V_O = ±10V R_L = 10kΩ	500	-	V/mV
10		A_{VO2}				V_O = ±10V R_L = 2kΩ	200	-	V/mV
11		A_{VO3}				V_O = ±10V R_L = 1kΩ	100	-	V/mV
12	Slew Rate	S_R	-	-	-	A_{VCL} = +1 R_L = 2kΩ	45	-	V/µs

NOTES:-

1. All test figures per Figure 4 of XMM Detail Specification XM-IS-IGG-0070 shall apply.
2. Unless otherwise specified V_S = ±15V, R_S = 50Ω, V_{CM} = 0V, T_A = T_J = 25°C

FIGURE 1 - ELECTRICAL BIAS CIRCUIT FOR IRRADIATION



ANNEX 1
TABLE B 100KRAD(Si)

Symbol	Test Name	Conditions VS ±15V TA = 25°C	Limits				Units
			Pre Radiation		Post Radiation		
			Min	Max	Min	Max	
ISY	Supply Current		-	6	-	6	mA
VOS	Input Offset Voltage		-1	1	-4	4	mV
IB	Input Bias Current		-0.2	0.2	-4	4	nA
IOS	Input Offset Current		-0.04	0.04	-0.15	0.15	nA
AOL	Open Loop Gain	VO = ±10V, RL = 2KΩ	200	-	100	-	V/mV

RADIATION TEST REPORT

PRODUCT: OP42-115J

MASK: 1432Z-6A6

FILE: 1A113131.XLS

DATE CODE: 9647

GAMMA: 0, 10K, 20K, 30K, 50K, 75K, 100K, 24Hr, 168Hr@100°C

GAMMA SOURCE: Co60

DOSE RATE: 20 rad/sec

FACILITIES: National Semiconductor
Sunnyvale, Ca.

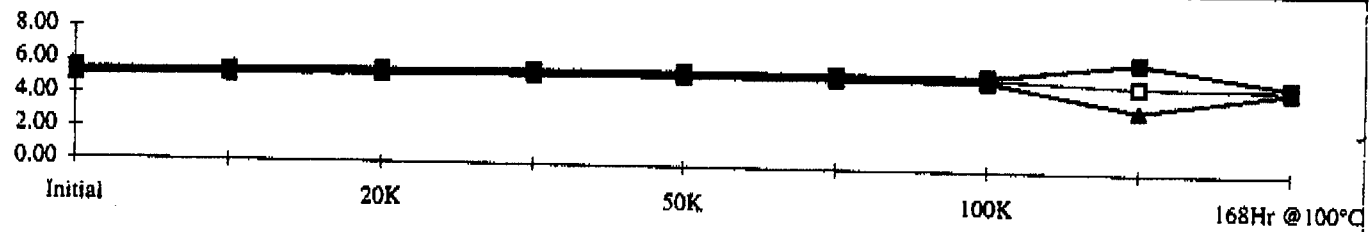
TESTED: Jan. 30, 1997

ANALOG DEVICES

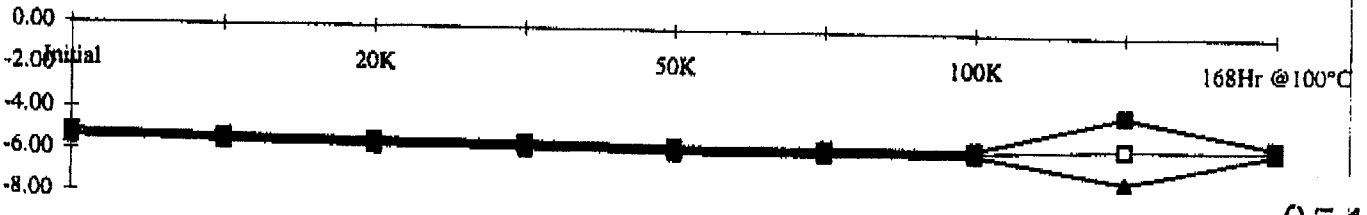
Tested Jan. 30, 1997

File: IA113131.XLS

T# 6	ISY+ @ VS=±15V								mA
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	5.24	5.24	5.24	5.23	5.24	5.23	5.24	5.24	5.24
244	5.24	5.34	5.43	5.50	5.56	5.58	5.58	5.43	5.26
245	5.25	5.36	5.46	5.53	5.58	5.6	5.59	5.43	5.27
246	5.21	5.33	5.43	5.49	5.54	5.54	5.54	5.38	5.23
247	5.22	5.33	5.43	5.50	5.55	5.56	5.56	5.40	5.24
248	5.27	5.40	5.50	5.57	5.60	5.61	5.60	3.93	5.29
249	5.29	5.38	5.47	5.54	5.61	5.63	5.62	5.47	5.31
250	5.31	5.42	5.51	5.58	5.64	5.65	5.65	5.50	5.33
251	5.31	5.42	5.51	5.58	5.64	5.65	5.66	5.50	5.34
252	5.27	5.39	5.49	5.57	5.62	5.62	5.61	5.45	5.28
253	5.16	5.29	5.39	5.46	5.52	5.52	5.52	5.36	5.19
min	5.16	5.29	5.39	5.46	5.52	5.52	5.52	3.93	5.19
max	5.31	5.42	5.51	5.58	5.64	5.65	5.66	5.50	5.34
stdev	0.05	0.04	0.04	0.04	0.04	0.05	0.04	0.48	0.05
average	5.25	5.37	5.46	5.53	5.59	5.60	5.59	5.29	5.27
+3S	5.40	5.50	5.59	5.66	5.71	5.73	5.73	6.72	5.41
-3S	5.11	5.24	5.34	5.40	5.46	5.46	5.46	3.85	5.13

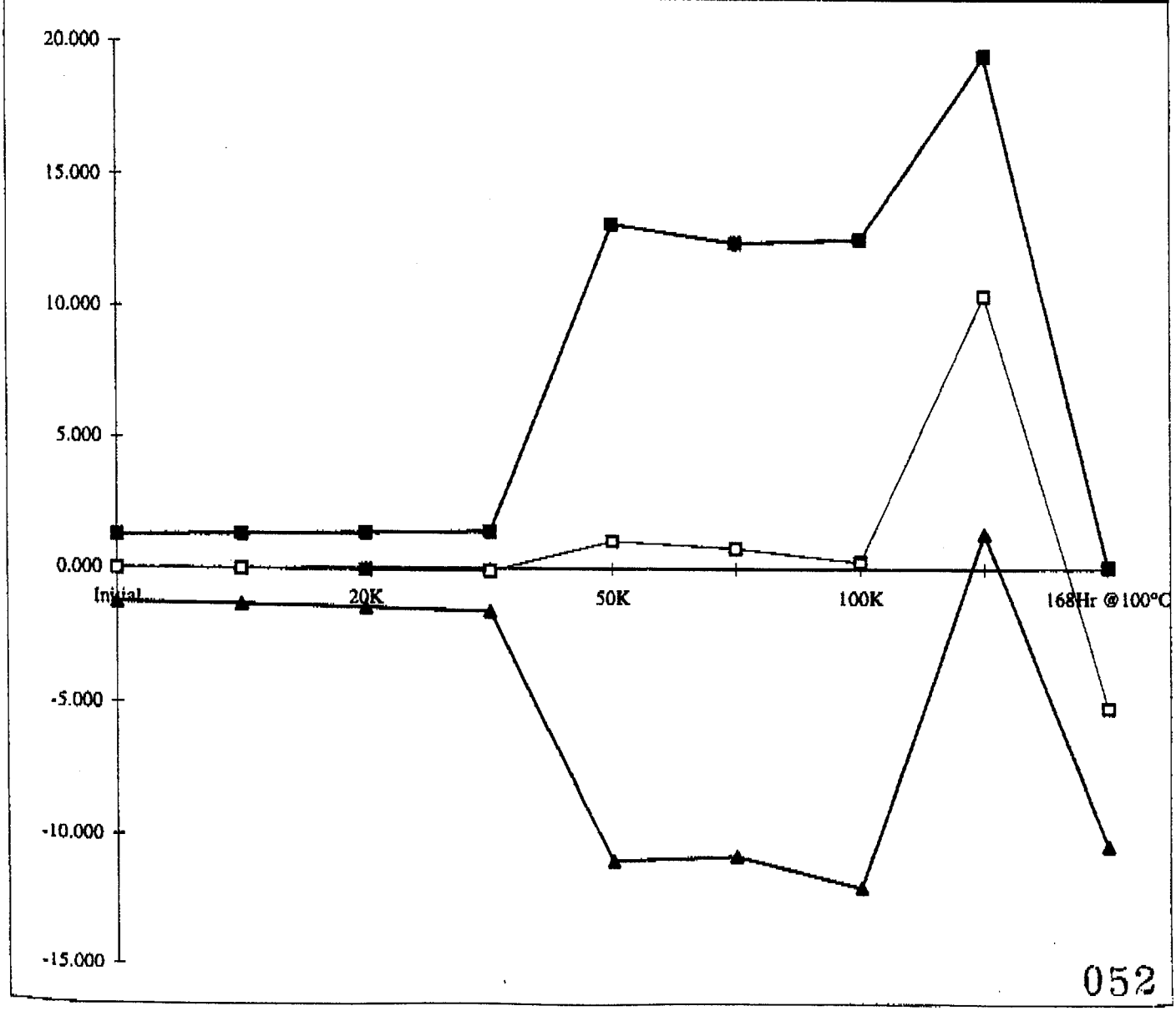


T# 7	ISY- @ VS=±15V								mA
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	-5.24	-5.24	-5.24	-5.23	-5.24	-5.24	-5.24	-5.24	-5.24
244	-5.23	-5.34	-5.43	-5.50	-5.56	-5.58	-5.58	-5.43	-5.26
245	-5.25	-5.36	-5.47	-5.53	-5.58	-5.6	-5.59	-5.43	-5.27
246	-5.20	-5.33	-5.43	-5.49	-5.54	-5.55	-5.54	-5.39	-5.22
247	-5.21	-5.33	-5.43	-5.50	-5.56	-5.57	-5.56	-5.41	-5.24
248	-5.27	-5.40	-5.50	-5.57	-5.61	-5.62	-5.60	-3.81	-5.29
249	-5.27	-5.38	-5.47	-5.55	-5.61	-5.63	-5.62	-5.48	-5.31
250	-5.30	-5.42	-5.52	-5.59	-5.64	-5.65	-5.64	-5.50	-5.34
251	-5.31	-5.42	-5.51	-5.58	-5.64	-5.65	-5.65	-5.50	-5.34
252	-5.26	-5.39	-5.49	-5.57	-5.62	-5.62	-5.61	-5.45	-5.28
253	-5.16	-5.29	-5.39	-5.46	-5.52	-5.53	-5.52	-5.36	-5.19
min	-5.31	-5.42	-5.52	-5.59	-5.64	-5.65	-5.65	-5.50	-5.34
max	-5.16	-5.29	-5.39	-5.46	-5.52	-5.53	-5.52	-3.81	-5.19
stdev	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.52	0.05
average	-5.25	-5.37	-5.46	-5.53	-5.59	-5.60	-5.59	-5.28	-5.27
+3S	-5.11	-5.24	-5.34	-5.40	-5.46	-5.48	-5.46	-3.72	-5.13
-3S	-5.39	-5.50	-5.59	-5.67	-5.71	-5.72	-5.72	-6.83	-5.42



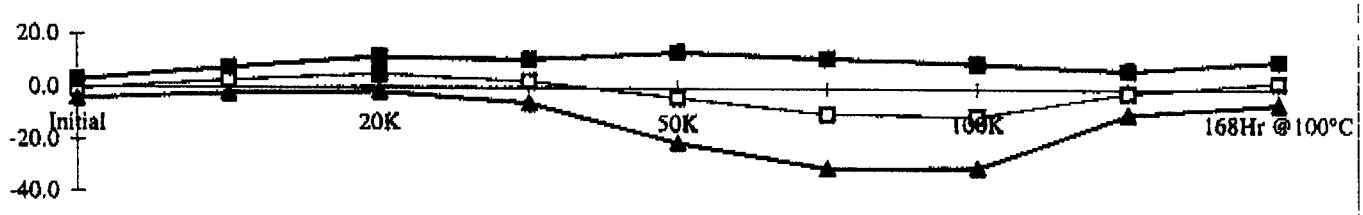
Tested Jan. 30, 1997 File: 1A113131.XLS

T# 8	VOS								mV
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	0.186	0.184	0.185	0.177	0.182	0.179	0.180	0.184	0.174
244	0.135	0.075	0.032	-0.012	-0.042	-0.056	-0.159	6.700	-5.240
245	0.578	0.544	0.507	0.461	0.410	0.325	0.165	9.117	-5.602
246	-0.064	-0.111	-0.134	-0.160	-0.145	0.039	0.209	11.018	-6.507
247	0.529	0.598	0.667	0.746	0.842	0.841	0.488	12.440	-6.289
248	0.304	0.341	0.354	0.363	12.374	11.541	11.389	17.682	-0.591
249	-0.385	-0.402	-0.445	-0.505	-0.873	-2.025	-2.890	7.486	-4.533
250	-0.554	-0.559	-0.569	-0.567	-0.591	-0.795	-1.631	10.170	-5.989
251	-0.606	-0.625	-0.669	-0.738	-0.850	-1.257	-2.861	10.192	-5.703
252	-0.231	-0.343	-0.457	-0.579	-0.684	-0.768	-0.871	10.000	-6.538
253	0.111	0.060	-0.002	-0.026	-0.048	-0.144	-1.292	9.449	-4.880
min	-0.606	-0.625	-0.669	-0.738	-0.873	-2.025	-2.890	6.700	-6.538
max	0.578	0.598	0.667	0.746	12.374	11.541	11.389	17.682	-0.591
stdev	0.423	0.442	0.468	0.503	4.021	3.873	4.096	3.029	1.748
average	-0.018	-0.042	-0.072	-0.102	1.039	0.770	0.255	10.425	-5.187
+3S	1.252	1.283	1.332	1.408	13.103	12.389	12.543	19.511	0.058
-3S	-1.288	-1.367	-1.475	-1.611	-11.024	-10.849	-12.034	1.340	-10.432

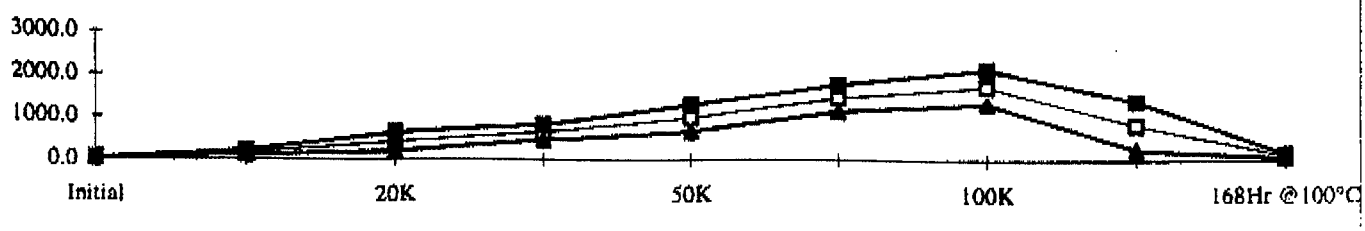


Tested Jan. 30, 1997 File: 1A113131.XLS

T# 9	IOS 10M								pA
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	-1.4	-0.8	-1.0	-1.4	-0.9	-1.1	-0.9	-0.8	-0.8
244	1.1	2.3	4.2	0.9	-6.0	-14.4	-12.6	-3.0	2.1
245	0.9	4.2	6.3	3.3	-4.8	-11.5	-10.4	-2.6	2.3
246	-2.0	1.3	2.6	-0.8	-9.0	-18.7	-15.7	-4.9	1.1
247	-1.9	0.7	1.9	3.0	0.9	0.1	3.1	3.1	1.9
248	-0.8	4.5	5.1	-0.6	-12.2	-15.1	-16.9	0.5	10.2
249	-0.6	1.5	4.5	3.8	3.8	-4.0	-9.4	-1.2	1.0
250	-1.4	1.0	2.3	1.0	-3.8	-7.7	-7.1	-1.1	1.6
251	-1.8	3.1	7.2	8.7	6.1	1.8	-4.5	3.6	1.6
252	0.3	5.4	8.4	1.6	-7.4	-13.3	-10.8	-3.4	2.3
253	0.0	3.4	5.9	2.0	-4.2	-15.0	-20.3	-2.8	1.2
min	-2.0	0.7	1.9	-0.8	-12.2	-18.7	-20.3	-4.9	1.0
max	1.1	5.4	8.4	8.7	6.1	1.8	3.1	3.6	10.2
stdev	1.2	1.6	2.2	2.7	5.7	7.0	6.7	2.8	2.7
average	-0.6	2.7	4.8	2.3	-3.7	-9.8	-10.5	-1.2	2.5
+3S	2.8	7.6	11.3	10.5	13.5	11.2	9.5	7.2	10.7
-3S	-4.1	-2.2	-1.6	-5.9	-20.8	-30.8	-30.5	-9.6	-5.6

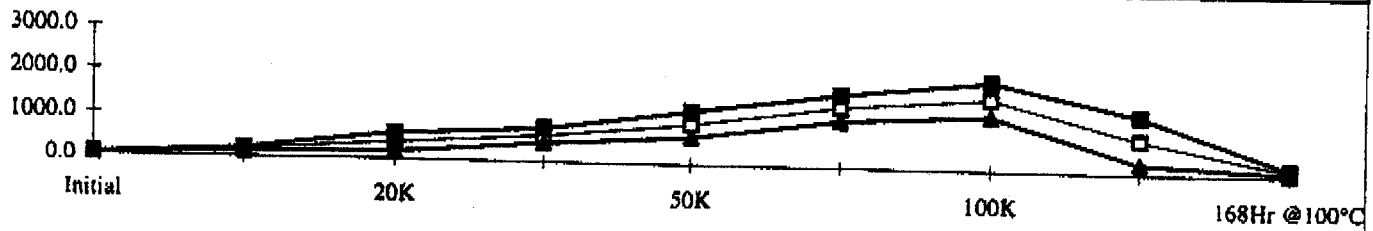


T# 10	IB+ RES 10M								pA
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	49.5	45.6	45.5	47.9	45.5	47.3	45.8	45.0	45.0
244	32.1	148.3	322.5	554.1	774.1	1348.2	1644.4	675.8	89.8
245	38.8	172.3	392.9	633.8	893.6	1448.0	1719.8	818.4	107.1
246	39.7	186.5	434.8	686.2	949.6	1492.9	1801.9	891.8	115.1
247	36.7	172.7	401.6	626.9	900.2	1356.3	1713.7	826.0	104.3
248	38.1	192.5	423.1	645.0	1149.7	1409.4	1970.0	315.4	80.0
249	41.7	148.4	337.7	530.0	935.5	1221.9	1511.7	887.0	141.7
250	38.0	158.7	351.6	592.7	933.7	1350.0	1637.7	850.8	105.3
251	39.6	160.9	349.3	604.6	1016.3	1469.6	1514.8	849.9	110.3
252	35.1	175.3	564.2	730.3	1068.7	1578.5	1713.8	938.6	106.5
253	38.9	182.7	455.6	656.5	989.0	1517.8	1671.7	946.2	114.8
min	32.1	148.3	322.5	530.0	774.1	1221.9	1511.7	315.4	80.0
max	41.7	192.5	564.2	730.3	1149.7	1578.5	1970.0	946.2	141.7
stdev	2.7	15.4	71.9	59.4	103.1	103.7	133.6	186.5	16.2
average	37.9	169.8	403.3	626.0	961.0	1419.3	1689.9	800.0	107.5
+3S	46.0	215.9	619.1	804.3	1270.5	1730.2	2090.6	1359.4	156.2
-3S	29.8	123.7	187.6	447.7	651.6	1108.3	1289.2	240.5	58.7

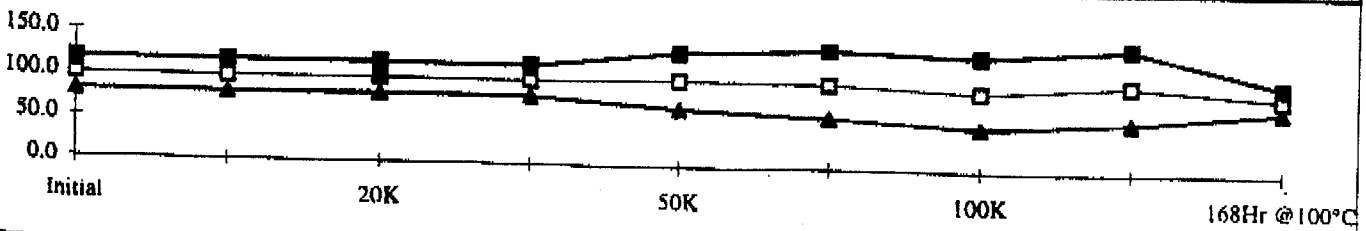


Tested Jan. 30, 1997 File: 1A113131.XLS

T# 11	IB- RES CALC								pA
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	48.0	44.8	44.5	46.5	44.6	46.3	45.0	44.1	44.2
244	33.1	150.5	326.7	555.0	768.1	1333.9	1631.8	672.8	91.9
245	39.7	176.5	399.2	637.1	888.8	1436.5	1709.4	815.8	109.4
246	37.7	187.8	437.5	685.4	940.6	1474.2	1786.3	886.9	116.1
247	34.9	173.3	403.5	629.9	901.2	1356.4	1716.7	829.1	106.2
248	37.3	196.9	428.1	644.4	1137.5	1394.3	1953.1	315.9	90.1
249	41.1	149.9	342.2	533.8	939.2	1217.9	1502.3	885.8	142.7
250	36.6	159.8	353.9	593.7	929.9	1342.3	1630.6	849.7	106.9
251	37.8	164.0	356.6	613.3	1022.5	1471.4	1510.2	853.5	111.9
252	35.4	180.7	572.6	731.9	1061.3	1565.2	1702.9	935.3	108.9
253	38.9	186.1	461.4	658.4	984.8	1502.8	1651.4	943.4	116.0
min	33.1	149.9	326.7	533.8	768.1	1217.9	1502.3	315.9	90.1
max	41.1	196.9	572.6	731.9	1137.5	1565.2	1953.1	943.4	142.7
stdev	2.4	16.1	72.9	58.6	101.8	100.9	131.1	185.8	14.5
average	37.3	172.6	408.2	628.3	957.4	1409.5	1679.5	798.8	110.0
+3S	44.4	220.8	626.9	804.2	1262.8	1712.3	2072.6	1356.2	153.6
-3S	30.1	124.3	189.5	452.4	651.9	1106.7	1286.3	241.4	66.5



T# 12	CMRR ±11 V								DB
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2	90.2
244	91.3	91.1	91.0	90.9	90.9	89.6	83.9	92.4	90.3
245	95.5	95.9	96.3	96.3	96.1	111.5	87.9	97.0	84.7
246	94.9	94.8	94.8	95.0	94.8	88.6	81.8	92.4	88.2
247	88.5	88.6	88.8	88.9	89.0	88.3	82.2	85.4	88.7
248	97.8	97.4	97.4	97.2	126.8	126.8	126.8	126.8	102.2
249	105.3	105.2	105.1	105.4	104.0	100.7	97.1	101.5	88.8
250	106.2	107.3	107.1	106.6	105.0	107.7	89.1	110.5	86.6
251	94.1	94.2	94.2	94.2	94.3	103.8	100.9	125.5	86.7
252	104.0	103.2	102.3	101.9	101.1	87.4	84.5	94.6	87.8
253	102.7	102.8	102.7	102.4	102.6	90.1	86.1	96.0	89.5
min	88.5	88.6	88.8	88.9	89.0	87.4	81.8	85.4	84.7
max	106.2	107.3	107.1	106.6	126.8	126.8	126.8	126.8	102.2
stdev	6.2	6.3	6.1	6.0	10.8	13.1	13.7	14.2	4.8
average	98.0	98.1	98.0	97.9	100.5	99.5	92.0	102.2	89.4
+3S	116.6	116.9	116.3	115.9	132.8	138.9	133.2	144.8	103.7
-3S	79.5	79.2	79.7	79.9	68.2	60.0	50.8	59.6	75.0



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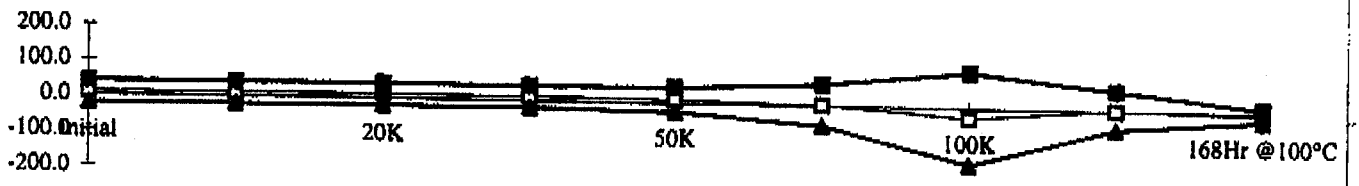
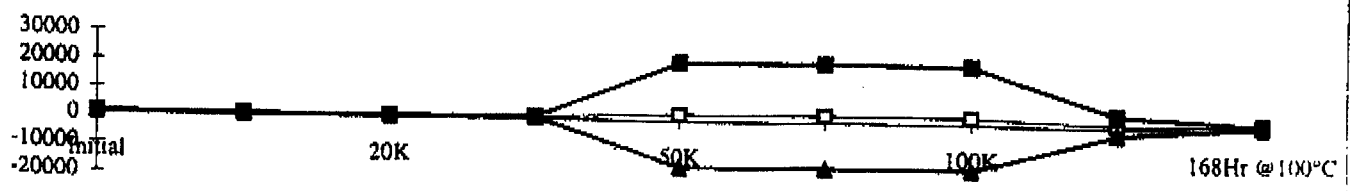
T# 13	PSRR[UV/V] ±10V TO ±20V								µV
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	9.9	10.0	9.9	9.9	9.9	9.9	9.9	9.9	9.9
244	13.0	14.2	15.2	16.5	17.8	18.7	14.7	14.2	-3.5
245	-8.5	-7.2	-5.6	-4.4	-3.2	-4.5	-21.7	-6.2	-17.2
246	9.8	10.6	11.5	12.3	13.7	19.9	3.7	10.2	-9.3
247	21.2	21.4	21.3	21.3	21.4	12.1	-16.9	21.8	-6.7
248	8.6	9.1	10.0	10.6	0.0	0.0	0.0	-0.1	-15.8
249	8.2	8.9	9.5	9.9	4.0	-3.8	-41.1	4.0	-3.1
250	-5.9	-5.2	-4.9	-4.3	-4.4	-18.6	-66.7	-12.3	-13.7
251	2.2	2.7	3.1	3.9	1.2	-36.8	-111.6	-36.2	-7.7
252	23.6	24.5	25.8	27.0	28.8	29.0	23.7	26.5	-0.3
253	14.3	15.1	16.6	17.9	17.8	-2.3	-69.3	-5.7	-4.2
min	-8.5	-7.2	-5.6	-4.4	-4.4	-36.8	-111.6	-36.2	-17.2
max	23.6	24.5	25.8	27.0	28.8	29.0	23.7	26.5	-0.3
stdev	10.4	10.3	10.3	10.4	11.6	19.6	43.2	18.3	5.8
average	8.7	9.4	10.2	11.1	9.7	1.4	-28.5	1.6	-8.2
+3S	40.0	40.4	41.3	42.1	44.6	60.2	101.1	56.4	9.1
-3S	-22.6	-21.6	-20.8	-20.0	-25.1	-57.5	-158.1	-53.2	-25.4

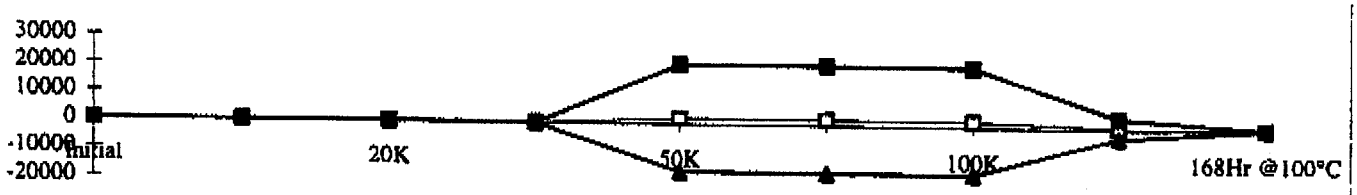


T# 14	AVO VO=±10V, RL=10K								V/mV
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	891	926	939	889	918	861	895	896	890
244	820	733	684	614	580	507	501	624	1074
245	915	838	769	643	617	544	549	658	1226
246	857	754	696	603	584	520	521	640	1094
247	878	767	699	666	575	541	515	648	1132
248	945	804	736	696	20000	20000	20000	4175	905
249	979	885	765	736	622	585	571	697	1171
250	886	820	714	668	596	549	519	647	1132
251	884	786	705	650	572	533	524	633	1118
252	908	815	672	645	581	565	522	661	1152
253	853	782	698	612	562	530	498	634	1143
min	820	733	672	603	562	507	498	624	905
max	979	885	769	736	20000	20000	20000	4175	1226
stdev	46	44	33	41	6139	6153	6159	1115	85
average	893	798	714	653	2529	2487	2472	1002	1115
+3S	1032	931	812	776	20945	20947	20948	4347	1369
-3S	753	666	616	531	-15887	-15973	-16004	-2344	861

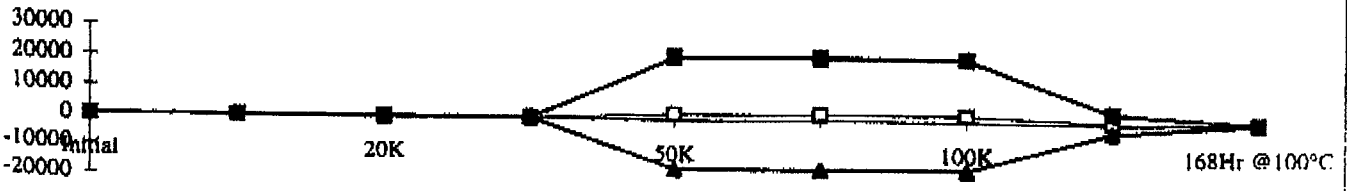


Tested Jan. 30, 1997 File: 1A113131.XLS

T# 15	AVO VO ±10V, RL=2K								V/mV
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	266	265	266	257	265	260	262	267	265
244	245	226	213	196	186	169	164	200	326
245	265	245	225	209	193	177	176	208	361
246	254	233	213	199	183	172	168	197	347
247	250	232	215	198	184	173	169	196	347
248	270	251	230	213	20000	20000	20000	3910	268
249	272	253	236	216	196	182	169	205	346
250	257	241	221	205	187	175	167	202	349
251	255	237	220	201	183	172	168	195	347
252	263	246	217	202	188	177	170	203	372
253	248	232	212	197	179	172	159	191	341
min	245	226	212	196	179	169	159	191	268
max	272	253	236	216	20000	20000	20000	3910	372
stdev	9	9	8	7	6266	6269	6272	1173	28
average	258	240	220	204	2168	2157	2151	571	340
+3S	286	267	244	224	20965	20965	20966	4091	425
-3S	230	213	196	183	-16629	-16651	-16664	-2949	256

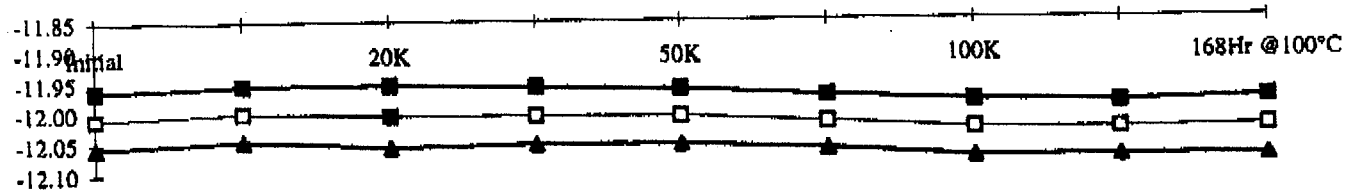


T# 16	AVO VO ±10V, RL=1K								V/mV
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	175	174	175	170	174	171	173	176	174
244	163	152	142	132	122	112	107	131	218
245	175	162	148	137	128	118	113	136	241
246	167	155	141	131	122	114	110	128	230
247	166	155	141	132	123	114	111	129	232
248	179	165	151	141	20000	20000	20000	3692	181
249	177	167	153	144	127	120	110	135	225
250	167	157	146	135	122	115	107	130	227
251	170	157	145	133	120	114	110	130	228
252	174	162	143	136	125	117	112	134	246
253	164	154	137	129	119	111	104	126	224
min	163	152	137	129	119	111	104	126	181
max	179	167	153	144	20000	20000	20000	3692	246
stdev	6	5	5	5	6286	6288	6290	1126	18
average	170	159	145	135	2111	2104	2098	487	225
+3S	187	174	159	149	20968	20968	20968	3865	278
-3S	153	143	130	121	-16746	-16761	-16772	-2891	173

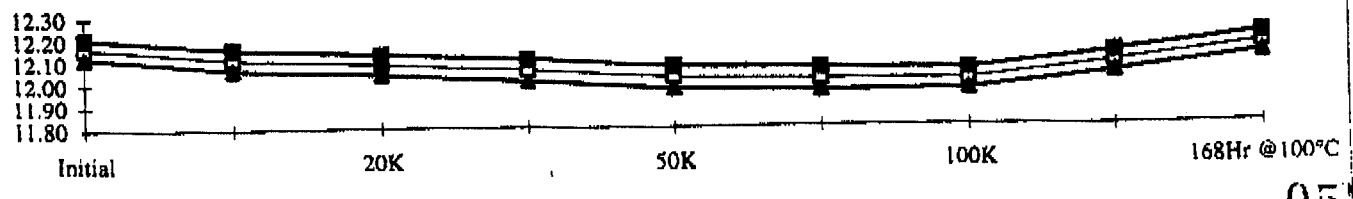


Tested Jan. 30, 1997 File: 1A113131.XLS

T# 19	VOM -VO, RL=1K								V
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	-12.00	-12.00	-11.99	-12.00	-11.99	-12	-11.99	-11.99	-11.99
244	-12.02	-12.01	-12.01	-12.02	-12.02	-12.029	-12.04	-12.04	-12.04
245	-11.99	-11.98	-11.98	-11.98	-11.98	-11.999	-12.00	-12.01	-12.01
246	-12.00	-11.99	-11.99	-11.99	-11.99	-12.005	-12.01	-12.02	-12.02
247	-12.04	-12.03	-12.03	-12.03	-12.03	-12.042	-12.05	-12.06	-12.06
248	-12.00	-12.00	-12.00	-12.00	-12.01	-12.014	-12.03	-12.03	-12.02
249	-12.02	-12.01	-12.01	-12.01	-12.02	-12.021	-12.05	-12.04	-12.05
250	-12.00	-11.98	-11.99	-11.99	-11.99	-12.002	-12.02	-12.02	-12.02
251	-12.01	-12.00	-12.00	-12.01	-12.01	-12.021	-12.03	-12.03	-12.03
252	-12.03	-12.02	-12.03	-12.03	-12.03	-12.038	-12.05	-12.05	-12.05
253	-12.02	-12.00	-12.01	-12.01	-12.01	-12.021	-12.04	-12.04	-12.03
min	-12.04	-12.03	-12.03	-12.03	-12.03	-12.04	-12.05	-12.06	-12.06
max	-11.99	-11.98	-11.98	-11.98	-11.98	-12.00	-12.00	-12.01	-12.01
stdev	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.02
average	-12.01	-12.00	-12.01	-12.01	-12.01	-12.02	-12.03	-12.03	-12.03
+3S	-11.96	-11.95	-11.95	-11.96	-11.96	-11.98	-11.98	-11.99	-11.98
-3S	-12.06	-12.05	-12.06	-12.05	-12.05	-12.06	-12.08	-12.08	-12.08

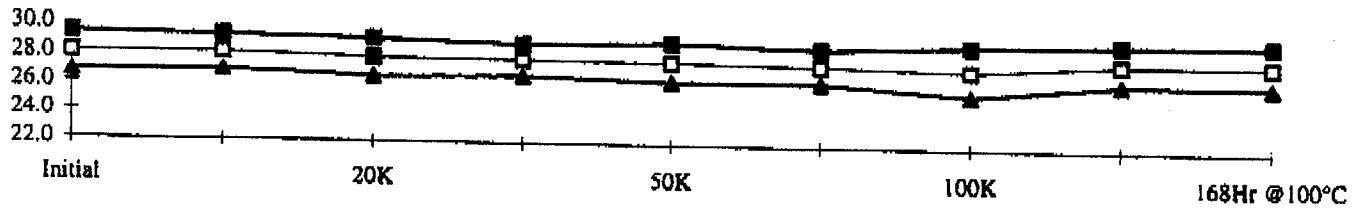


T# 20	VOM +VO, RL=1K								V
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	12.17	12.17	12.17	12.18	12.17	12.182	12.18	12.17	12.17
244	12.18	12.13	12.10	12.08	12.05	12.036	12.03	12.09	12.17
245	12.16	12.11	12.08	12.05	12.02	12.009	12.00	12.08	12.16
246	12.18	12.13	12.10	12.07	12.04	12.027	12.02	12.10	12.18
247	12.19	12.14	12.11	12.08	12.05	12.032	12.03	12.11	12.18
248	12.17	12.11	12.08	12.05	12.03	12.01	12.01	12.09	12.16
249	12.16	12.11	12.09	12.06	12.03	12.004	12.02	12.08	12.16
250	12.17	12.12	12.09	12.06	12.03	12.012	12.01	12.09	12.16
251	12.14	12.09	12.06	12.03	12.00	11.983	11.98	12.06	12.13
252	12.16	12.10	12.09	12.05	12.01	12.003	12.00	12.08	12.16
253	12.16	12.10	12.07	12.03	12.00	11.988	12.00	12.06	12.15
min	12.14	12.09	12.06	12.03	12.00	11.98	11.98	12.06	12.13
max	12.19	12.14	12.11	12.08	12.05	12.04	12.03	12.11	12.18
stdev	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
average	12.17	12.11	12.09	12.06	12.02	12.01	12.01	12.08	12.16
+3S	12.21	12.16	12.13	12.11	12.07	12.06	12.06	12.13	12.20
-3S	12.12	12.07	12.04	12.01	11.97	11.96	11.96	12.04	12.12

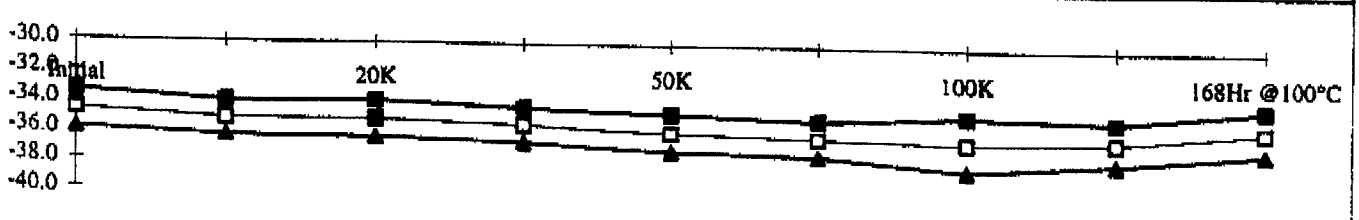


Tested Jan. 30, 1997 File: 1A113131.XLS

T# 21	ISC VOUT SOURCE								mA
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	28.2	28.1	28.2	27.8	28.2	27.8	28.1	28.3	28.2
244	28.6	28.6	28.5	28.3	28.4	28.0	28.0	28.8	28.7
245	27.8	27.8	27.6	27.5	27.5	27.3	27.3	27.8	27.8
246	28.3	28.3	28.0	27.9	28.0	27.8	27.8	28.2	28.2
247	28.8	28.8	28.5	28.4	28.5	28.3	28.3	28.7	28.7
248	28.2	28.2	28.0	27.9	27.7	27.8	27.6	28.2	28.2
249	27.8	27.8	27.5	27.5	27.3	27.4	26.6	27.5	27.2
250	28.1	28.2	28.0	27.9	27.8	27.7	27.5	28.0	28.1
251	27.7	27.7	27.6	27.4	27.2	27.1	27.1	27.6	27.7
252	28.2	28.3	27.5	27.8	27.8	27.7	27.6	28.1	28.1
253	27.3	27.6	27.2	27.3	27.3	27.1	26.5	27.5	27.5
min	27.3	27.6	27.2	27.3	27.2	27.1	26.5	27.5	27.2
max	28.8	28.8	28.5	28.4	28.5	28.3	28.3	28.8	28.7
stdev	0.4	0.4	0.4	0.4	0.5	0.4	0.6	0.5	0.5
average	28.1	28.1	27.8	27.8	27.8	27.6	27.4	28.0	28.0
+3S	29.4	29.3	29.1	28.9	29.1	28.8	29.2	29.4	29.5
-3S	26.7	26.9	26.5	26.7	26.4	26.4	25.7	26.7	26.6

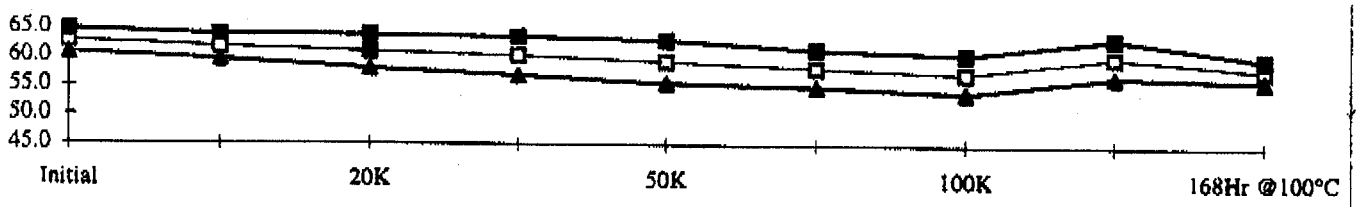


T# 22	ISC VOUT SINK								mA
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	-34.6	-34.5	-34.6	-34.1	-34.6	-34.2	-34.5	-34.7	-34.6
244	-35.1	-35.5	-35.6	-35.7	-36.3	-36.3	-36.7	-36.8	-36.0
245	-34.4	-34.8	-34.9	-35.1	-35.7	-35.8	-36.2	-36.0	-35.2
246	-34.8	-35.2	-35.3	-35.5	-36.1	-36.3	-36.6	-36.3	-35.5
247	-35.3	-35.7	-35.8	-36.1	-36.6	-36.9	-37.2	-36.9	-36.1
248	-34.8	-35.3	-35.5	-35.8	-35.9	-36.6	-36.7	-36.5	-35.4
249	-34.2	-34.6	-34.6	-34.9	-35.2	-35.7	-35.2	-35.4	-34.4
250	-34.5	-35.0	-35.1	-35.3	-35.7	-36.0	-36.1	-35.9	-35.3
251	-34.5	-34.9	-35.1	-35.2	-35.6	-35.9	-36.3	-36.0	-35.3
252	-34.9	-35.4	-34.9	-35.6	-36.2	-36.4	-36.7	-36.4	-35.7
253	-33.9	-34.6	-34.6	-35.0	-35.6	-35.8	-35.5	-35.8	-35.0
min	-35.3	-35.7	-35.8	-36.1	-36.6	-36.9	-37.2	-36.9	-36.1
max	-33.9	-34.6	-34.6	-34.9	-35.2	-35.7	-35.2	-35.4	-34.4
stdev	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.5	0.5
average	-34.6	-35.1	-35.1	-35.4	-35.9	-36.2	-36.3	-36.2	-35.4
+3S	-33.4	-34.0	-33.9	-34.3	-34.7	-35.0	-34.5	-34.8	-33.9
-3S	-35.9	-36.2	-36.4	-36.6	-37.1	-37.4	-38.1	-37.6	-36.9



Tested Jan. 30, 1997 File: IA113131.XLS

T# 23	+ SLEW RATE, RL=2K								V/µS
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	61.8	61.9	61.9	61.7	61.8	61.7	61.9	62.0	58.1
244	63.3	62.7	62.1	61.6	60.7	59.4	58.5	61.6	58.8
245	62.5	60.8	59.5	59.0	58.5	57.6	57.0	59.1	57.7
246	62.5	60.9	60.0	59.5	58.6	57.7	57.0	59.6	57.6
247	62.4	61.1	60.3	59.8	59.2	58.3	57.7	60.0	57.8
248	63.9	62.6	62.0	61.3	60.2	59.2	58.3	61.5	59.2
249	62.9	62.0	61.5	60.9	59.8	58.8	57.6	60.7	58.2
250	61.9	61.1	59.6	58.2	57.5	57.0	56.4	58.4	57.6
251	62.5	61.9	61.3	60.6	59.5	58.5	57.7	60.7	58.2
252	63.2	62.6	61.8	61.1	61.0	58.8	58.1	61.5	59.0
253	61.7	61.4	60.6	59.5	57.5	56.0	54.7	59.9	57.6
min	61.7	60.8	59.5	58.2	57.5	56.0	54.7	58.4	57.6
max	63.9	62.7	62.1	61.6	61.0	59.4	58.5	61.6	59.2
stdev	0.7	0.7	1.0	1.1	1.2	1.1	1.1	1.1	0.6
average	62.7	61.7	60.9	60.1	59.2	58.1	57.3	60.3	58.2
+3S	64.7	63.9	63.8	63.5	63.0	61.3	60.6	63.6	60.0
-3S	60.7	59.5	57.9	56.8	55.5	54.9	54.0	57.0	56.3



T# 24	- SLEW RATE, RL=2K								V/µS
SN	Initial	10K	20K	30K	50K	75K	100K	24Hr	168Hr @100°C
243	65.6	65.9	65.9	65.7	65.9	65.9	65.8	66.1	62.1
244	68.7	69.3	69.5	69.5	69.6	69.3	69.0	69.6	65.4
245	66.3	66.8	67.0	66.8	66.9	66.6	66.3	66.9	63.0
246	66.9	67.3	67.5	67.4	67.5	67.2	66.8	67.5	63.3
247	67.1	67.5	67.7	67.7	67.7	67.5	67.2	67.8	63.6
248	68.7	69.3	69.4	69.3	69.1	69.0	68.7	69.2	65.5
249	68.3	68.7	68.9	68.9	68.9	68.8	68.2	68.9	64.6
250	65.6	66.2	66.3	66.2	66.1	65.9	65.5	66.2	62.4
251	68.2	68.5	68.8	68.5	68.4	68.1	68.0	68.7	64.8
252	69.1	69.7	69.7	69.8	72.3	69.4	69.2	69.8	65.7
253	67.3	67.8	67.9	68.0	67.8	67.7	67.3	68.0	63.9
min	65.6	66.2	66.3	66.2	66.1	65.9	65.5	66.2	62.4
max	69.1	69.7	69.7	69.8	72.3	69.4	69.2	69.8	65.7
stdev	1.2	1.2	1.2	1.2	1.7	1.2	1.2	1.2	1.1
average	67.6	68.1	68.3	68.2	68.4	67.9	67.6	68.2	64.2
+3S	71.1	71.6	71.7	71.8	73.5	71.5	71.3	71.8	67.6
-3S	64.1	64.6	64.8	64.6	63.3	64.4	63.9	64.7	60.8