ESA-QCA0096T-C

MetOp	TOTAL DOSE RADIATION TEST REPORT No. MO-RR-TLG-PM-0010	Issue: 1 Rev.: Date: 26/11/99 Page: 1/5

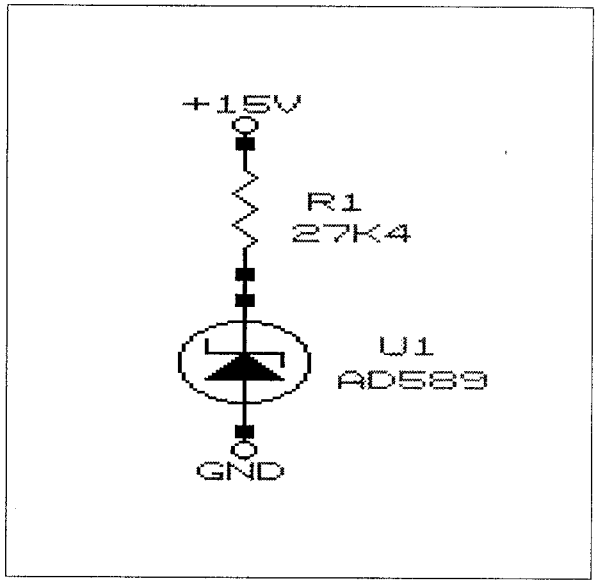
SCC Component No: POTL812802B	Component Designation: AD589TH	Irradiation Spec. No.: SCC 22900 Iss.4
Gen. Spec.: SCC 9000 9C Det. Spec.: PO-PS-TLG-PL-8128 1 B Amend.: TL-AM-0801 1	Evaluation: - Acceptance Diffusion: - Acceptance Lot: X	Project/Programme: METOP
Family: 08 / Group: 21	Functional Assignment: PRECISION VOLT. REFERENCE	Package: CAN-2
MFR. Name: ANALOG DEVICES Address: USA	Test House: TECNOLOGICA Address: MADRID (SPAIN)	Orig. house: TECNOLOGICA Address: SEVILLA (SPAIN)
Radiation Test Plan No.: MO-RP-TLG-PM-0010	Sample Size: 6 Irradiation Devices: 5 Control Devices: 1	Date Code: 9737A Diffusion LOT: -- Wafer No.: --
Radiation Source: Cobalt-60 Facility Name: CIEMAT Address: MADRID (SPAIN)	Energy: 1.33/1.17 MeV Dose Rate: 290 rad(Si)/h	Date of Test: 16-11-99
Irradiation Conditions: Biased: X Unbiased: -- Test Circuit: Figure 1	Irradiation Measurements Interval: Remote test: -- In situ Test: X	Annealing Tests: 72h/25°C Biased: X Unbiased: - Test Circuit: Figure 1

Electrical Measurements. Parameters Tested:

V_{OUT1}, V_{OUT2}, V_{OUT3}, $\delta V_O/\delta I_{IN}$

Prepared by.: Jose Maria Valverde Date: 26/11/99 Signature:	Approved by : Date: 02/12/99 Signature:

FIGURE 1.-BIAS CIRCUIT DURING IRRADIATION



SUMMARY

Total dose steady-state irradiation test has been carried out on a PRECISION VOLTAGE REFERENCE AD589TH from ANALOG DEVICES with date code 9737A. The irradiated parts were labelled as follows: irradiated devices R2,..,R6= S/N 205 to 209 and R1= S/N 204 as control device.

DEVIATION TO PLAN

There are not desviation to the plan

RESULTS

The next table shows a results resume of the irradiation test:

	0KRAD	2KRAD	8KRAD	13.5KRAD	20KRAD	ANN72h
V_{OUT1}	PASS	PASS	PASS	PASS	PASS	PASS
V_{OUT2}	PASS	PASS	PASS	PASS	PASS	PASS
V_{OUT3}	PASS	PASS	PASS	PASS	PASS	PASS
$\delta VO/\delta IIN$	PASS	PASS	PASS	PASS	PASS	PASS

CONCLUSION

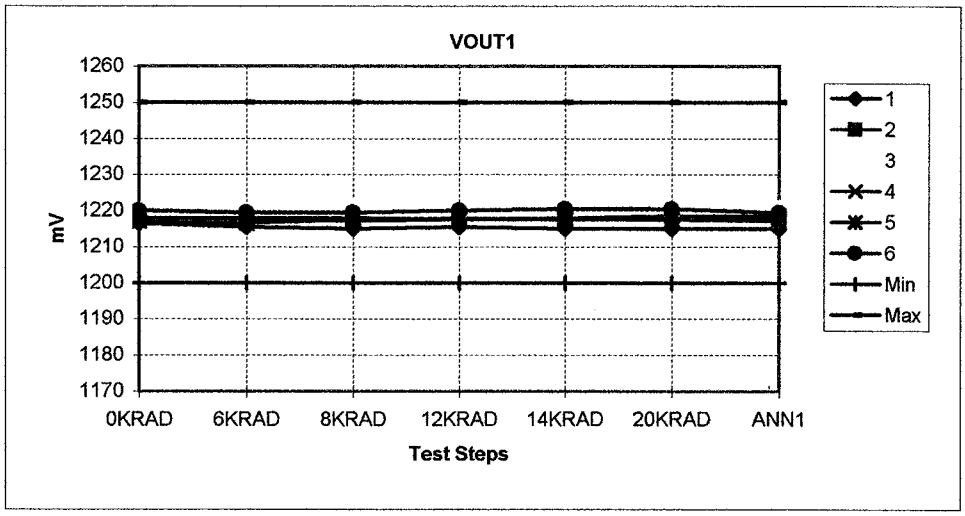
The results indicate that: all tested devices pass according to irradiation plan.

SCHEDULE

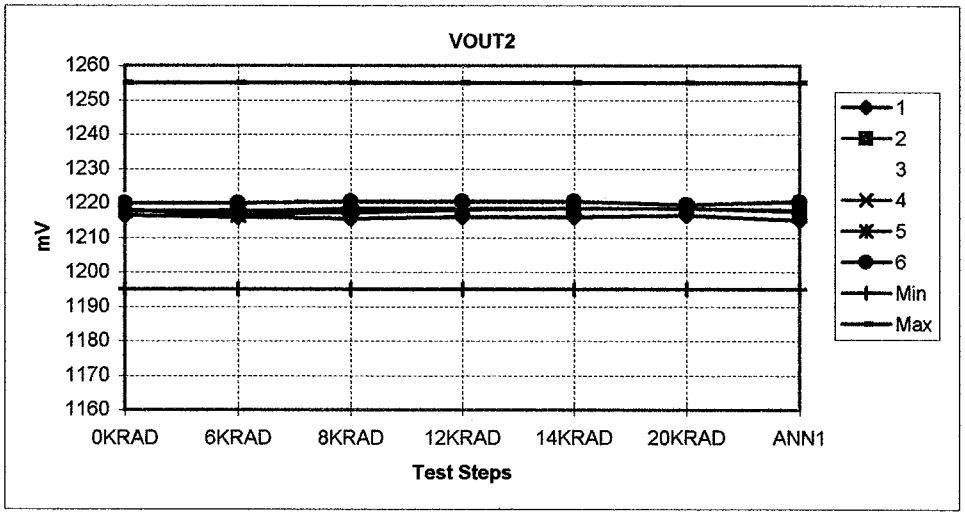
Test Step	Description	Result or Actual Test Condition	Time In	Time Out	Exposure
1	Sample serialization	CONTROL R1 IRR. DEVICES R2 to R9			
2	Initial Electrical Measurements	See 0 krad(Si) values in respective Parameter Data Tables	10:00 16/11	10:45 16/11	45min.
3	Set-up of Test	Bias circuit verified according to Fig. 1			
4	Irradiation Exposure	Total Dose: 6 Krad(Si) Cumulative Dose: 6 Krad(Si) Dose Rate: 290 Rad(Si)/h	10:50 16/11	07:35 17/11	20h 45min
5	Intermediate Electrical Measurements	See 6 krad(Si) values in respective Parameter Data Tables	07:45 17/11	08:15 17/11	30min.
6	Set-up of Test	Bias circuit verified according to Fig. 1			
7	Irradiation Exposure	Total Dose: 2 Krad(Si) Cumulative Dose: 8 Krad(Si) Dose Rate: 290 Rad(Si)/h	08:30 17/11	15:25 17/11	06h 55min
8	Intermediate Electrical Measurements	See 8 krad(Si) values in respective Parameter Data Tables	16:00 17/11	17:00 17/11	1h
9	Set-up of Test	Bias circuit verified according to Fig. 1			
10	Irradiation Exposure	Total Dose: 4 Krad(Si) Cumulative Dose: 12 Krad(Si) Dose Rate: 290 Rad(Si)/h	17:30 17/11	07:30 18/11	14h
11	Intermediate Electrical Measurements	See 12 krad(Si) values in respective Parameter Data Tables	07:45 18/11	08:15 18/11	30min.
12	Set-up of Test	Bias circuit verified according to Fig. 1			
13	Irradiation Exposure	Total Dose: 2 Krad(Si) Cumulative Dose: 14 Krad(Si) Dose Rate: 290 Rad(Si)/h	08:30 18/11	15:20 18/11	6h 50min
14	Intermediate Electrical Measurements	See 14 krad(Si) values in respective Parameter Data Tables	15:25 18/11	15:40 18/11	15min.
15	Irradiation Exposure	Total Dose: 6 Krad(Si) Cumulative Dose: 20 Krad(Si) Dose Rate: 290 Rad(Si)/h	15:45 18/11	12:25 19/11	20h 40min

Test Step	Description	Result or Actual Test Condition	Time In	Time Out	Exposure
16	Intermediate Electrical Measurements	See 20 krad(Si) values in respective Parameter Data Tables	12:30 19/11	13:00 19/11	30min.
17	Annealing 24h	Bias circuit verified according to Fig. 1. Temperature: 25 °C	13:00 19/11	13:00 22/11	72h
18	Electrical Measurements	See ANN24h values in respective parameter Data Tables	13:05 22/11	13:25 22/11	20min
19	Annealing 168h	Bias circuit verified according to Fig. 1. Temperature: 125 °C	13:30 22/11	13:30 29/11	168h
20	Final Electrical Measurements	See ANN168h values in respective parameter Data Tables	13:30 29/11	13:45 29/11	15min

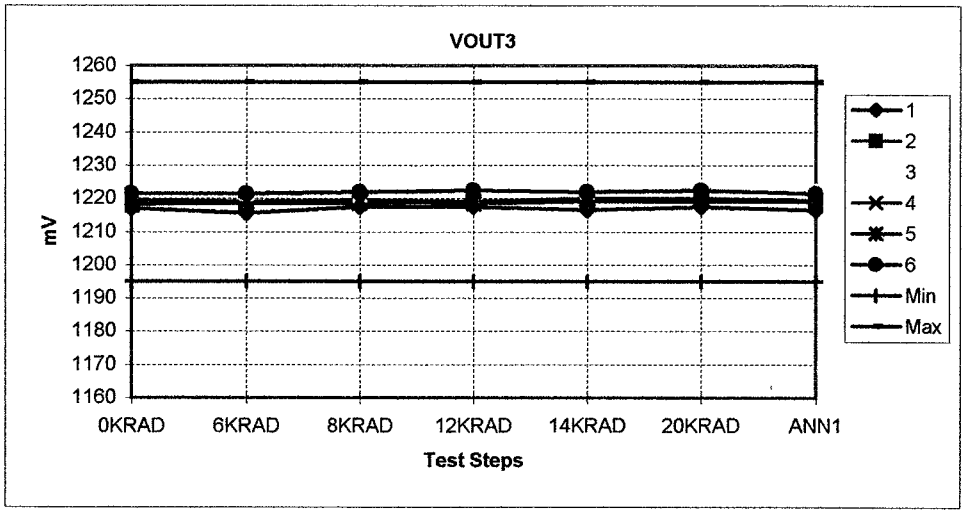
ELECTRICAL MEASUREMENT RESULTS



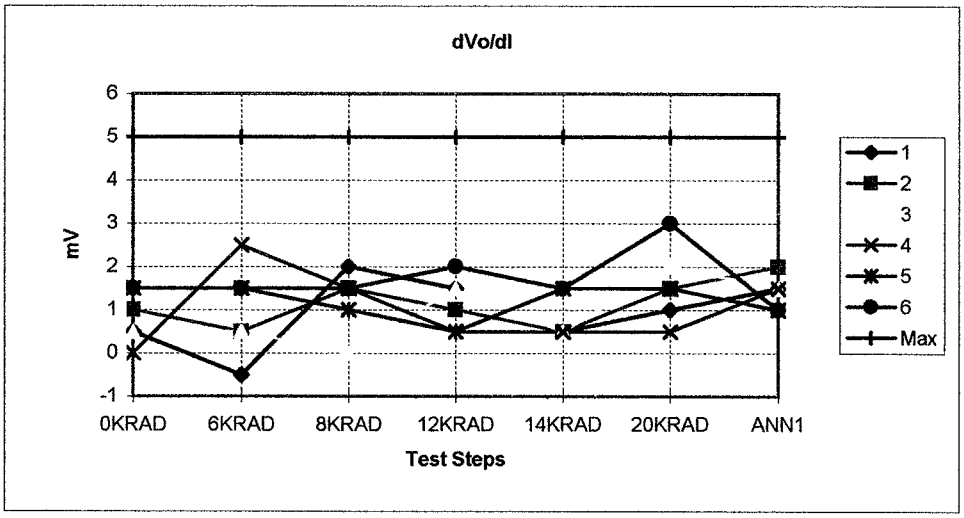
VOUT1	0KRAD	6KRAD	8KRAD	12KRAD	14KRAD	20KRAD	ANN1
1	1216.5	1215.5	1215.0	1215.5	1215.0	1215.0	1215.0
2	1218.0	1217.5	1217.0	1217.5	1217.5	1218.5	1217.5
3	1220.5	1220.5	1221.0	1220.5	1221.5	1220.5	1221.0
4	1217.0	1216.5	1217.5	1218.0	1217.5	1217.5	1217.0
5	1218.0	1218.0	1218.0	1217.5	1218.0	1218.5	1218.5
6	1220.0	1219.5	1219.5	1220.0	1220.5	1220.5	1219.5
Min	1200	1200	1200	1200	1200	1200	1200
Max	1250	1250	1250	1250	1250	1250	1250
Unit	mV	mV	mV	mV	mV	mV	mV



VOUT2	0KRAD	6KRAD	8KRAD	12KRAD	14KRAD	20KRAD	ANN1
1	1216.5	1216.0	1215.5	1216.0	1216.0	1216.5	1215.0
2	1217.5	1218.0	1217.0	1218.0	1218.5	1218.5	1217.5
3	1221.0	1221.0	1221.0	1221.0	1221.5	1221.5	1221.0
4	1218.0	1216.5	1217.5	1218.0	1218.5	1218.5	1217.5
5	1218.0	1217.5	1218.5	1218.5	1218.5	1218.5	1218.0
6	1220.0	1220.0	1220.5	1220.5	1220.5	1219.5	1220.5
Min	1195	1195	1195	1195	1195	1195	1195
Max	1255	1255	1255	1255	1255	1255	1255
Unit	mV	mV	mV	mV	mV	mV	mV



VOUT3	0KRAD	6KRAD	8KRAD	12KRAD	14KRAD	20KRAD	ANN1
1	1217.0	1215.5	1217.5	1217.5	1216.5	1217.5	1216.5
2	1218.5	1218.5	1218.5	1219.0	1219.0	1220.0	1219.5
3	1221.5	1221.5	1221.0	1222.5	1222.0	1223.5	1222.5
4	1218.0	1219.0	1219.0	1218.5	1219.0	1219.0	1219.0
5	1219.5	1219.0	1219.5	1219.0	1220.0	1220.0	1219.0
6	1221.5	1221.5	1222.0	1222.5	1222.0	1222.5	1221.5
Min	1195	1195	1195	1195	1195	1195	1195
Max	1255	1255	1255	1255	1255	1255	1255
Unit	mV	mV	mV	mV	mV	mV	mV



dVo/dl	0KRAD	6KRAD	8KRAD	12KRAD	14KRAD	20KRAD	ANN1
1	0.5	-0.5	2.0	1.5	0.5	1.0	1.5
2	1.0	0.5	1.5	1.0	0.5	1.5	2.0
3	0.5	0.5	0.0	1.5	0.5	2.0	1.5
4	0.0	2.5	1.5	0.5	0.5	0.5	1.5
5	1.5	1.5	1.0	0.5	1.5	1.5	1.0
6	1.5	1.5	1.5	2.0	1.5	3.0	1.0
Max	5	5	5	5	5	5	5
Unit	mV	mV	mV	mV	mV	mV	mV

DOSIMETRY

MetOp	TOTAL DOSE RADIATION TEST REPORT No. MO-RR-TLG-PM-0010	Issue: 1 Rev.: Date: 26/11/99 ANNEX II

User:Tecnológica S.A.
Ref.: Tecnológica
Date: 17/11/99

REQUIREMENTS

Krad(Si)/h	Rad(Si)/min	R/min
0.280	4.67	5.39

CORRECTIONS

Presion (mm)	706
Temperature (°C)	22.4
Probe Position	0.95
Final Equip. reading (R/min)	4.08

FRICKE DOSIMETRY

Irradiation time (h)	69
Spectrometer temp.(°C)	18.8
Coeficiente de ex. Molar	2181
Factor de conversión	28794.18

Dosimeter	Fricke Reading	Rad (Fricke)	Rad (Fricke)/min	R/min	Rad(Si)/ min	Krad(Si)/h
D-1	0.762	21941.17	5.30	5.46	4.72	0.28
D-2	0.779	22430.67	5.42	5.59	4.84	0.29
D-3	0.793	22833.78	5.52	5.69	4.92	0.30
PROBE				5.36	4.64	0.28
D-4	0.796	22920.17	5.54	5.71	4.94	0.30
D-5	0.793	22833.78	5.52	5.69	4.92	0.30
D-6	0.789	22718.61	5.49	5.66	4.90	0.29

DOSE RATE (AVERAGE): D2-D5

Rad(Si)/min	4.85
Rad(Si)/h	0.29
Non Uniformity (%)	6.19