RIR IN:- 74568

RIR OUT:- 74568

PARTS HISTORY LOG

Radiation Testing

PROGRAMME:- XMM

PART TYPE:- 2N4392

RADIATION REPORT:- RD 214

IGG TASK NUMBER:- 1500

Radiation Report Number:- RD 214

Project:- XMM

Part Type:- 2N4392 Date Code:- 9639

Manufacturer:- Semelab IGG Task No:- 1500

Project Approval of Lot Traveller:-

Signed.......................... Date............

Position........................

Serial Number Range:-

01 through 11 (inclusive)

I certify that the subject component has been tested in accordance with the following radiation specifications:-

Test Method - ESA/SCC22900 ISSUE- 4 DATE- Jan '95

Irradiation Test Plan- XM-PL-IGG-0052 ISSUE- 1 DATE- June '96

Closed/Approved NCR No:- N

Approved Waiver No:- WAR N/A

Signed....P.A. Russell.......... Date.21/1/97.

Upscreening Engineer

Signed............. Date.21/1/97.

Upscreening Manager

RADIATION REPORT NUMBER:- RD 214 DATE:- 7.1.97

PROJECT:- XMM RIR IN:- 74568

PART NUMBER:- 2N4392 MANUFACTURER:- Semelab

PROCUREMENT LEVEL:- ESA/SCC5205/003 DATE CODE:- 9639

TEST METHOD:- ESA/SCC22900 ISSUE- 4 DATE- Jan '95

TEST PLAN:- XM-PL-IGG-0052 ISSUE- 1 DATE- June '96

START QUANTITY:- 11

No.	Test (Sample Size)	XM-PL-IGG-0052 Test Method and Conditions	Date in	Qty in	Date out	Qty out	SIGNED Op/QA
1	Serialisation and Selection of Control Sample (100%)	Control Sample= SN 01	13/12/96	11	13/12/96	10 + CONTROL SAMPLE	P.A.R. IGG 16 CT
2	Initial Electrical Measurements (100% read and record)	Table A Testing at IGG	13/12/96	10	13/12/96	10	P.A.R. IGG 16 CT
3	Initial Electrical Measurements (100% read and record)	Table A Testing at ERA	16/12/96	10	16/12/96	9	P.A.R. IGG 16 CT
4	Set-up and apply Bias per Figure 1	Verify Bias Circuit and conditions (in-situ) for all 4 test samples	17/12/96	10	17/12/96	10	P.A.R. IGG 16 CT
5	Irradiation 1 (10 samples)	Dose= 10kRAD(Si) Rate= 10RAD(Si) per second Time= 1000secs	17/12/96	10	17/12/96	10	P.A.R. IGG 16 CT
6	Interim 1 Electrical Measurements (100% read and record)	Table A. Bias to be maintained until testing is performed. Tdwell=10mins maximum	17/12/96	10	17/12/96	10	P.A.R. IGG 16 CT

Report No: RD 214	Part Type: 2N4392	Date: 7.1.97

No.	Test (Sample Size)	XM-PL-IGG-0052 Test Method and Conditions	Date in	Qty in	Date out	Qty out	SIGNED Op/QA
7	Irradiation 2 (10 samples)	As Test 5	17/12/96	10	17/12/96	10	IGG 16 CT
8	Interim 2 Electrical Measurements (100% read and record)	As Test 6	17/12/96	10	17/12/96	10	IGG 16 CT
9	Irradiation 3 (10 samples)	As Test 5	17/12/96	10	17/12/96	10	IGG 16 CT
10	Interim 3 Electrical Measurements (100% read and record)	As Test 6	17/12/96	10	17/12/96	2	IGG 16 CT
11	Irradiation 4 (10 samples)	Dose= 20kRAD(Si) Rate= 10RAD(Si) per second Time=2000secs	17/12/96	10	17/12/96	10	IGG 16 CT
12	Interim 4 Electrical Measurements (100% read and record)	As Test 6	17/12/96	10	17/12/96	0	IGG 16 CT
13	Irradiation 5 (10 samples)	Dose= 25kRAD(Si) Rate= 10RAD(Si) per second Time=2500secs	17/12/96	10	17/12/96	10	IGG 16 CT
14	Interim 5 Electrical Measurements (100% read and record)	As Test 6	17/12/96	10	17/12/96	0	IGG 16 CT
15	Irradiation 6 (10 samples)	As Test 13	17/12/96	10	17/12/96	10	IGG 16 CT

Report No: RD 214	Part Type: 2N4392	Date: 7.1.97

No.	Test (Sample Size)	XM-PL-IGG-0052 Test Method and Conditions	Date in	Qty in	Date out	Qty out	SIGNED Op/QA
16	Final Electrical Measurements (100% read and record)	As Test 6 At ERA	17/12/96	10	17/12/96	0	IGG 16 CT
17	Annealing Test (10 samples)	Bias for 24hrs min at +25°C (record exact time)	17/12/96	10	18/12/96	10	IGG 16 CT
18	Post Annealing Electrical Measurements (100% read and record)	Table A	18/12/96	10	18/12/96	0	IGG 16 CT
19	Accelerated Aging under bias (10 samples)	168 hours bias at +100±5°C	18/12/96	10	24/12/96	10	IGG 16 CT
20	Post Aging Electrical Measurements (100% read and record)	Table A	24/12/96	10	24/12/96	10	IGG 16 CT
21	Test Report Collation				21/1/97		IGG 2 CT
22	Test Report Approval				21/1/97		IGG 2 CT
23	NOTES:- 1. The results of IGSS were corrected by -0.1nA to allow for the losses in the ATE DAB and test fixture. This value was the difference in the ATE and curve tracer results.						

Report No: RD 214 Part Type: 2N4392 Date: 7.1.97

FAILURE LIST AND APPLICABLE NCR

Test No.	Serial Number(s)	Failed Parameter and Failure Mode	Applicable NCR
3	7	FAILS I_{GSS} (SPURIOUS RESULT DUE TO LACK OF RESOLUTION OF ATE)	–
10	5, 6 4, 7, 8, 9, 10, 11	FAIL I_{DSX}. FAIL I_{DSX} AND I_{GSS}.	–
12	5, 6 2, 3	FAIL I_{GSS} FAIL I_{DSX} AND I_{GSS}.	–

Report No: RD 214 Part Type: 2N4392 Date: 7.1.97

TEST EQUIPMENT LIST

Item, Type Number and Serial Number	CT Inventory Number	Function	Calibration Due
Item: Radiation Source Type No: Cobalt 60 Serial No: N/A	ERA's Facility	Irradiation	1 / 1 /1997
Item: SZ Type No: M3000 Serial No: 884769	CT339	ATE	28 / 3 /1997
Item: THURLBY Type No: PL320 Serial No: 2GP0623	CT288	BIAS PSU	22 / 4 /1997
Item: TEKTRONIX Type No: 370 Serial No: 300553	CT217	CURVE TRACER	30 / 1 /1997
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199
Item: Type No: Serial No:			/ /199

RADIATION TEST SUMMARY

PART TYPE : 2N4392

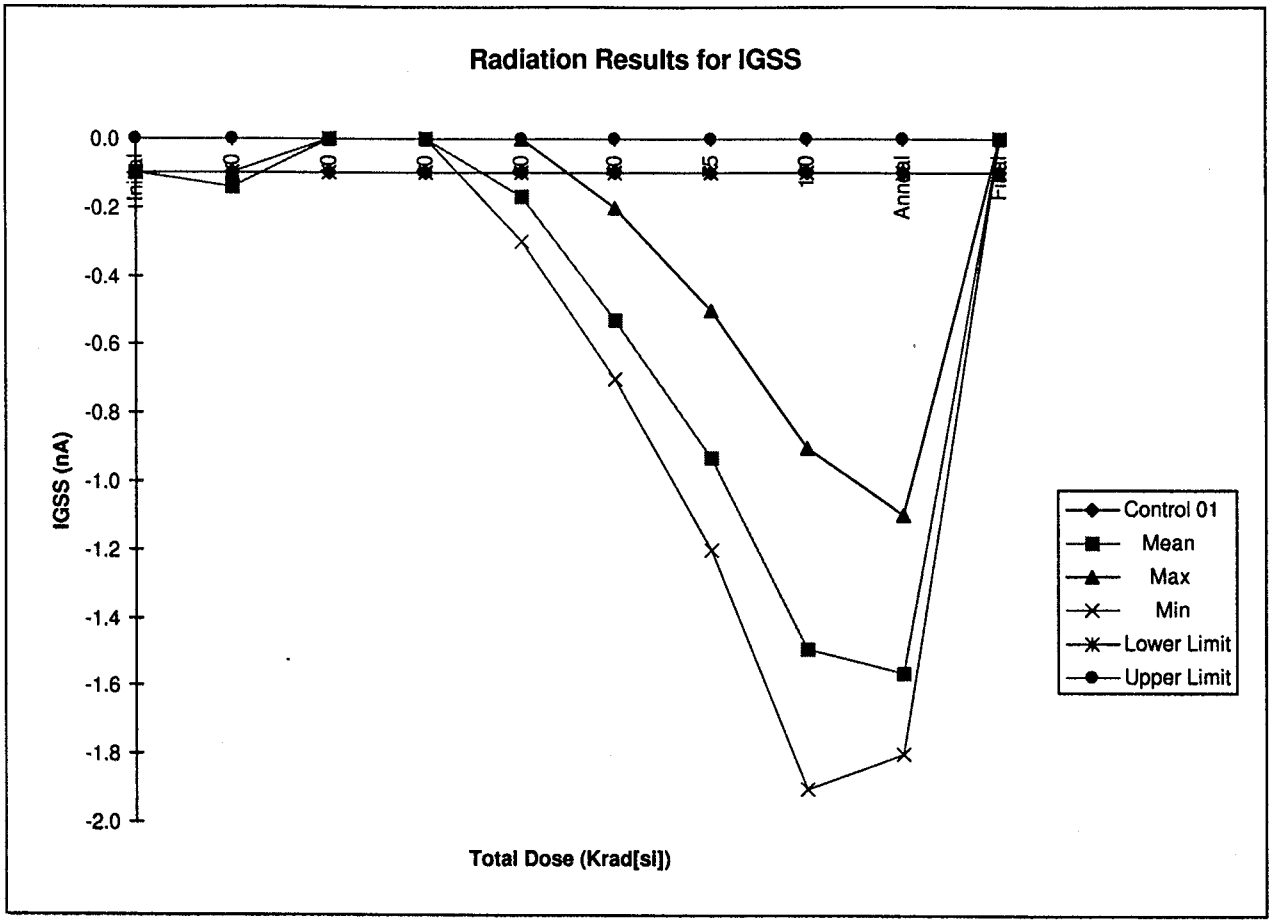
DESCRIPTION : N-CHANNEL FET

REPORT NO. : RD 214

PARAMETERS PLOTTED :

IGSS
IDSX

NOTE : The results for the remaining parameters showed no significant change and hence plots were not considered necessary.



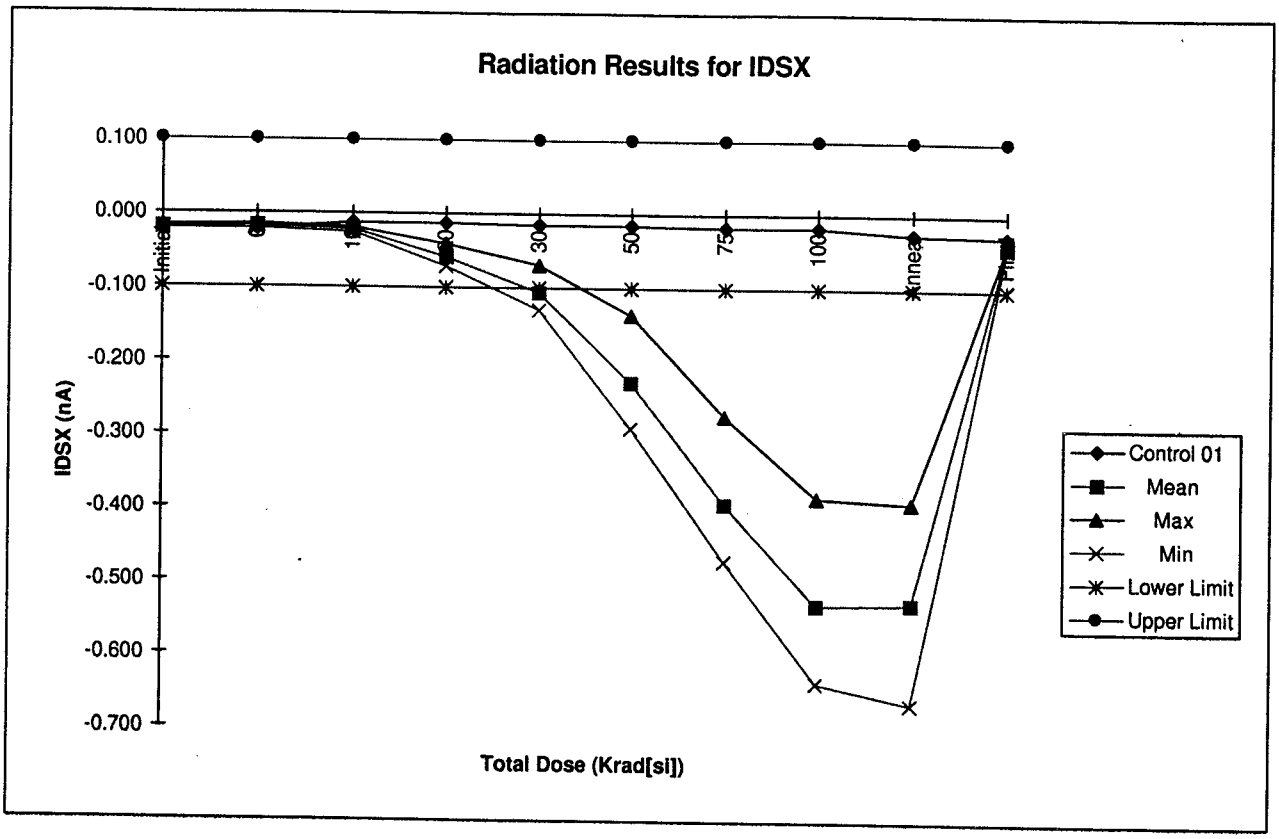
Dose (kRad)	Control 01	Mean	Max	Min	Lower Limit	Upper Limit	Std.Dev.
	(nA)	(nA)	(nA)	(nA)	(nA)	(nA)	
Initial	-0.1	-0.1	-0.1	-0.1	-0.1	0	0.00
0	-0.1	-0.1	-0.1	-0.1	-0.1	0	0.13
10	-0.1	0.0	0.0	0.0	-0.1	0	0.00
20	-0.1	0.0	0.0	0.0	-0.1	0	0.00
30	-0.1	-0.2	0.0	-0.3	-0.1	0	0.09
50	-0.1	-0.5	-0.2	-0.7	-0.1	0	0.17
75	-0.1	-0.9	-0.5	-1.2	-0.1	0	0.23
100	-0.1	-1.5	-0.9	-1.9	-0.1	0	0.32
Anneal	-0.1	-1.6	-1.1	-1.8	-0.1	0	0.22
Final	-0.1	0.0	0.0	0.0	-0.1	0	0.00

Notes :

1. Due to the lack of resolution of the ATE the results for IGSS have been corrected by -0.1nA (this being the disparity between the ATE results and measurements made on the curve tracer).

Lot size for statistics : 10 devices

RD 214 Date code 9639



Dose (kRad)	Control 01	Mean	Max	Min	Lower Limit	Upper Limit	Std.Dev.
	(nA)	(nA)	(nA)	(nA)	(nA)	(nA)	
Initial	-0.021	-0.019	-0.018	-0.022	-0.1	0.1	0.00
0	-0.021	-0.018	-0.016	-0.021	-0.1	0.1	0.00
10	-0.014	-0.023	-0.020	-0.026	-0.1	0.1	0.00
20	-0.014	-0.059	-0.041	-0.072	-0.1	0.1	0.01
30	-0.016	-0.107	-0.069	-0.131	-0.1	0.1	0.02
50	-0.016	-0.228	-0.136	-0.292	-0.1	0.1	0.05
75	-0.018	-0.394	-0.274	-0.471	-0.1	0.1	0.06
100	-0.018	-0.530	-0.384	-0.638	-0.1	0.1	0.08
Anneal	-0.026	-0.527	-0.392	-0.666	-0.1	0.1	0.09
Final	-0.028	-0.042	-0.040	-0.044	-0.1	0.1	0.00

Lot size for statistics : 10 devices

RD 214 Date code 9639