ESA-QCA9963T-C

EVAL- RAD- 239

MOTOROLA

Motorola Semiconductors S.A.
Discrete & Analog Products Division

TOTAL DOSE EFFECTS CHARACTERIZATION

RESULTS FOR LM139J

ORIGINAL
EN ROUGE

Ref : MOT/RAD.0041

DATE CODE : 9504	**DIFFUSION LOT : 012021** **WAFER N° : 48**

Total Quality Six Sigma for Total Customer Satisfaction

MOTOROLA

Motorola Semiconductors S.A.

Discrete & Analog Products Division

	TOTAL DOSE TEST PLAN No. **N° MOT/RAD.0041**	ISSUE No : 0 DATE : 07/03/95 PAGE : 1/2
SCC COMPONENT No **9103 004 05B**	COMPONENT DESIGNATION **LM139J**	IRRADIATION SPEC : ISSUE :

SPECIFICATIONS GENERIC : **9000** ISSUE REV. DETAIL ISSUE REV. **9103 004**	ACCEPTANCE DIFFUSION ☐ LOT ☐	SAMPLE SIZE **10 (Sn° 1 to 10)** CONTROL DEVICES **1 (Sn° 11)**	PROJECT

FAMILY **LINEAR**	GROUP **IC'S**	PACKAGE **CERDIP 14**
MANUFACTURER NAME **MOTOROLA** ADDRESS : AVENUE GENERAL EISENHOWER 31023 TOULOUSE CEDEX - FRANCE	TEST HOUSE NAME **MOTOROLA** ADDRESS : AVENUE GENERAL EISENHOWER 31023 TOULOUSE CEDEX - FRANCE	ORIGINATOR NAME **ALCATEL BELL** TELEPHONE :

FACILITY SOURCE **C060** **DERTS** AVENUE E. BELIN 31055 TOULOUSE CEDEX - FRANCE	IRRADIATION SINGLE ☐ MULTIPLE ☒	IRRADIATION MEASUREMENT INTERVAL BIASED ☐ CIRCUIT REF UNBIASED ☒ SUPPLY VOLTAGE TEMP °C DURATION	LEVEL OF INTEREST

SINGLE IRRADIATION	MULTIPLE IRRADIATION STEPS	1	2	3	4	5	6	7	8
DOSE (KRAD) (Si)	DOSE KRADS (Si)	10	20	30	50				
DOSE RATE (RAD) (Si)	DOSE RATE (KRADS) (Si)	5,7	5,7	5,7	5,7				
EXPOSURE TIME	EXPOSURE TIME (mn)	105'	105'	105'	210'				

IRRADIATION CONDITIONS			ANNEAL TEST ? YES	
BIASED (REMOTE TEST)	☒	BIAS CIRCUIT REF (**SEE P 5**)	BIASED	☒ BIAS CIRCUIT REF (**SEE P 5**)
UNBIASED (REMOTE TEST)	☐	SUPPLY VOLTAGE ±15V	UNBIASED	☐ SUPPLY VOLTAGES ±15 V
IN-SITU TEST	☐	TEMP °C : 25	TEMP °C : 25°	DURATION : **168 h**

ELECTRICAL PARAMETERS TO BE TESTED : **TABLE 2A OF ESA / SCC DETAIL SPECIFICATION N° 9103 004**

	TOTAL DOSE TEST PLAN No. **N° MOT/RAD.0041**	ISSUE No : 0 REV : DATE : **07/03/95** DATE : PAGE : 2/2

IRRADIATION TEST SEQUENCE **(SEE PAGE 6)**

TEST STEP	DESCRIPTION	REQUIREMENTS

REMARKS

1 - TOTAL DOSE EFFECTS CHARACTERIZATION SUMMARY

NUMBER OF IRRADIATED DEVICES	10
IRRADIATION STEPS (KRADS [Si])	10 - 20 - 30 - 50
1ST PARAMETERS OUT OF SPECIFICATION	After an irradiation of 20Krads, drifts on IIB and IIO parameters are found. However, these drifts are rather limited since worst case values are respectively 230nA and 29nA.
2ND PARAMETER OUT OF SPECIFICATION	After an irradiation of 30Krads, the tested parts show on VIO parameters several out of specification values. The worst case value found is 5,475mV.
LOST OF FUNCTIONALITY	After an irradation of 50Krads most devices show severe degradations particularly on IIB parameters.

2 - DEVICES IDENTIFICATION

DEVICE IDENTIFICATION NUMBER : **LM139J**

MANUFACTURER : **MOTOROLA**

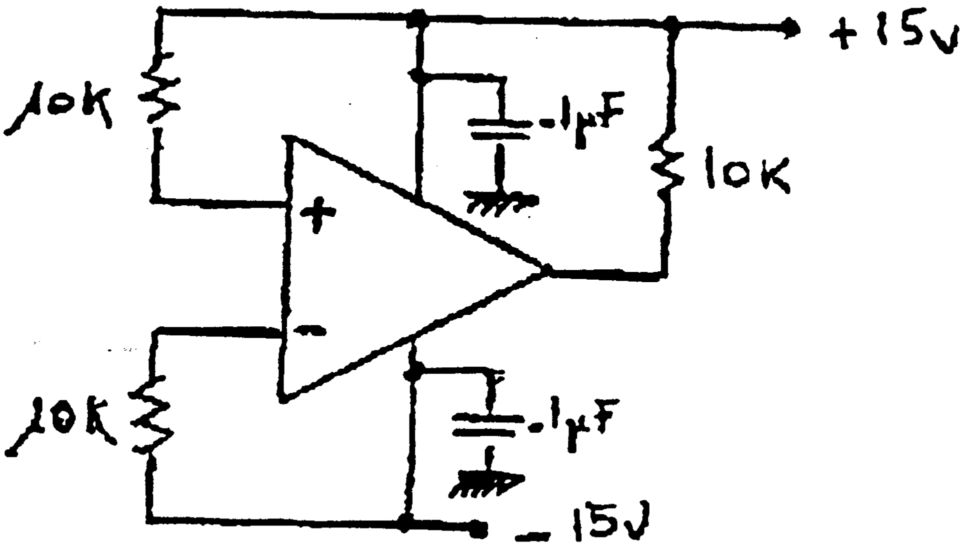
DATE CODE : **9504**

SERIAL NUMBERS : **1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10**

CORRELATION PART : **N° 11**

3 - IRRADIATION CONDITIONS

3.1) POLARIZATION CONDITIONS



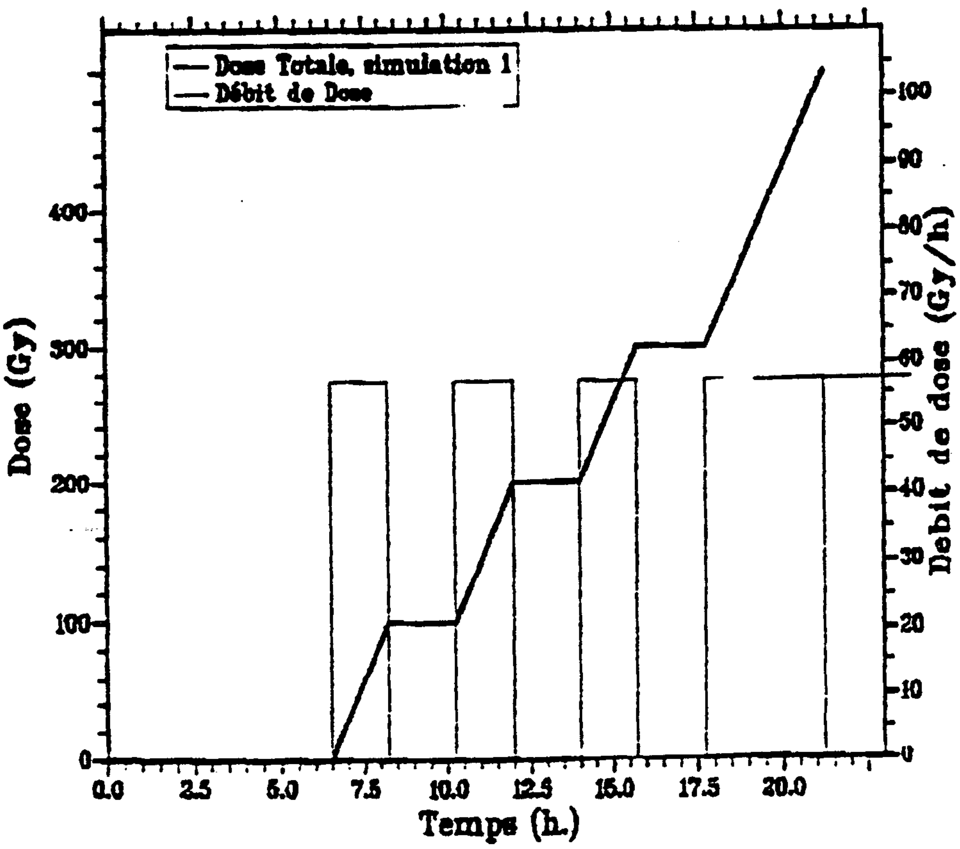
3.2) IRRADIATION PLAN

DATE	TIME	TOTAL DOSE (KRADS)	DOSE RATE (KRADS / H)
21.02.95	105'	10	5,7
21.02.95	105'	20	5,7
21.02.95	105'	30	5,7
21.02.95	210'	50	5,7

NOTE

Between two irradiation steps a read and record measurement was performed at MOTOROLA plant.
The time interval between exposure and re-exposure was 2H. The measurements were performed in a time interval of 1H after the exposure.

3.3) IRRADIATION PROFILE



3.4) IRRADIATION EQUIPMENT

Irradiations were performed with the CERT-DERT CO60 source (Gammacell 220) in TOULOUSE (31). The dose rate was 5,7 Krads / h. The exposure was done at ambient temperature

4 - MEASUREMENT CONDITIONS

Measurements were done according ESA / SCC 9103/004 detail specification table 2 on a LTX equipment.

5 - RESULTS

5.1) DATALOGS

ESA / SCC table 2A datalogs including measurement conditions are shown in appendix 1. Part number 11 is the correlation component.

5.2) DIAGRAMS

Diagrams corresponding to ESA / SCC 9103 / 004 detail specification table 4 are shown in appendix 2. Specification limits and statistical information are given.

5.3) TOTAL DOSE HARDNESS

The following table sums up the radiation hardness results of the 10 irradiated parts.

TOTAL DOSE (KRADS)	0	10	20	30	50	annealing
NUMBER OF IN SPECIFICATION DEVICE	10/10	10/10	0/10	0/10	0/10	0/10
NUMBER OF IN SPECIFICATION PARAMETERS FOR ALL DEVICES	98/98	98/98	54/98	49/98	33/98	50/98

NOTE

The 98 parameters of ESA/SCC table2A detail specification have been measured.

5.4) COMMENTS

After an irradiation of 20Krads, all tested parts are out of the specification limits for IIB and IIO parameters. The IIB worst case value found is 230nA and the IIO one is 29nA (Spec. limits respectively 100nA and 25nA).

At 30Krads level, IIB and IIO parameters degradations increase. The worst case values found are respectively 441nA and 82nA. At this irradiation level we can notice a weak drifts of some parts on VIO parameters. The worst case value found is 5,47mV (Spec.limit 5mV).

After an irradiation of 50Krads, the tested parts have shown more severe degradations since the IIB and IIO worst case values are respectively : 1171nA and 387nA. The worst case value found for VIO parameter is 7,14mV. Out of specification results on AVS parameters are also found. The corresponding worst case value is 44V/mV. (min. limit : 50V/mV). Futhermore, one part is also found out of the specification limits regarding the saturation voltage parameter (VOL2).

Finally, we have to notice that the 25°C annealing phase performed in a biased mode during 168 hours shows recovery effects on VOL and VIO parameters since all the tested parts are again inside the specified limits. In other hand, higher worst case values are found on IIB and IIO parameters. These values are respectively 1302nA and 623nA.

5.5) SYNTHESIS SUMMARY :

No out of specification values are found at 10Krads level. After an irradiation of 20Krads, degradations are still rather low. After an irradiation of 50Krads, tested parts show severe degradations on IIB and IIO parameters. The annealing phase do not produce very large recovery on these parameters.

APPENDIX 1

TABLE 2 (A) RESULTS AFTER 0 Krad, 10 Krads, 20 Krads, 30 Krads and 50 Krads AND AFTER 168 h of annealing

ELECTRICAL MEASUREMENTS

BEFORE RADIATION

DC AT 25 °C

LM139J **Temperature : 25** **Lot: NTTA0139J** **Page: 1**

PARAMETERS TEST CONDITIONS

Test Nb	1.0	1.1	2.0	2.1	2.2	2.3	3.0	3.1	3.2	3.3
Test	ICC1	ICC2	IIL+CELL1	IIL+CELL2	IIL+CELL3	IIL+CELL4	IIL-CELL4	IIL-CELL3	IIL-CELL2	IIL-CELL1
VCC	5.000 V	30.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V
VEE	0.000 V	0.000 V								
VIN+			34.000 V	34.000 V	34.000 V	34.000 V				
VIN-							34.000 V	34.000 V	34.000 V	34.000 V

LIMITS

MIN	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A
MAX	2.000 mA	3.000 mA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA

DATA RECORDS

Test Nb	**1.0**	**1.1**	**2.0**	**2.1**	**2.2**	**2.3**	**3.0**	**3.1**	**3.2**	**3.3**
Test	**ICC1**	**ICC2**	**IIL+CELL1**	**IIL+CELL2**	**IIL+CELL3**	**IIL+CELL4**	**IIL-CELL4**	**IIL-CELL3**	**IIL-CELL2**	**IIL-CELL1**
Unit	**mA**	**mA**	**nA**	**nA**	**nA**	**nA**	**nA**	**nA**	**nA**	**nA**
1	0.957	1.198	77.000	14.000	6.000	13.000	99.000	22.000	7.000	18.000
2	0.962	1.229	66.000	18.000	19.000	15.000	90.000	16.000	10.000	13.000
3	0.954	1.195	61.000	17.000	6.000	22.000	101.000	24.000	8.000	20.000
4	0.953	1.203	76.000	27.000	18.000	29.000	122.000	33.000	3.000	18.000
5	0.951	1.220	72.000	17.000	13.000	8.000	97.000	28.000	5.000	23.000
6	0.948	1.192	70.000	22.000	3.000	22.000	104.000	29.000	2.000	21.000
7	0.951	1.202	86.000	16.000	14.000	16.000	105.000	31.000	2.000	16.000
8	0.948	1.188	70.000	18.000	10.000	16.000	104.000	32.000	2.000	13.000
9	0.950	1.188	60.000	19.000	4.000	21.000	80.000	22.000	7.000	23.000
10	0.966	1.229	78.000	8.000	21.000	10.000	107.000	33.000	4.000	38.000
11	0.949	1.192	69.000	19.000	0.000	27.000	108.000	25.000	5.000	21.000
MEAN	0.954mA	1.203mA	71.364nA	17.727nA	10.364nA	18.091nA	101.545nA	26.818nA	5.000nA	20.364nA
SIGMA	5.888uA	15.563uA	7.659nA	4.692nA	7.117nA	6.700nA	10.671nA	5.492nA	2.720nA	6.816nA
MIN	0.948mA	1.188mA	60.000nA	8.000nA	0.000 A	8.000nA	80.000nA	16.000nA	2.000nA	13.000nA
MAX	0.966mA	1.229mA	86.000nA	27.000nA	21.000nA	29.000nA	122.000nA	33.000nA	10.000nA	38.000nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1
Test	IOLCELL1	IOLCELL2	IOLCELL3	IOLCELL4	VOL1CELL4	VOL1CELL3	VOL1CELL2	VOL1CELL1	VOL2CELL1	VOL2CELL2
VCC	30.000 V	30.000 V	30.000 V	30.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V
VOUT	30.000 V	30.000 V	30.000 V	30.000 V						
VEE					0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
IOUT					4.000 mA	4.000 mA	4.000 mA	4.000 mA	8.000 mA	8.000 mA

LIMITS

	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1
MIN	0.000 A	0.000 A	0.000 A	0.000 A	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
MAX	1.000 uA	1.000 uA	1.000 uA	1.000 uA	400.000 mV	400.000 mV	400.000 mV	400.000 mV	1.500 V	1.500 V

DATA RECORDS

Test Nb	**4.0**	**4.1**	**4.2**	**4.3**	**5.0**	**5.1**	**5.2**	**5.3**	**6.0**	**6.1**
Test	**IOLCELL1**	**IOLCELL2**	**IOLCELL3**	**IOLCELL4**	**VOL1CELL4**	**VOL1CELL3**	**VOL1CELL2**	**VOL1CELL1**	**VOL2CELL1**	**VOL2CELL2**
Unit	**nA**	**nA**	**nA**	**nA**	**mV**	**mV**	**mV**	**mV**	**mV**	**mV**
1	62.000	31.000	24.000	19.000	82.929	85.721	85.835	87.851	123.809	121.688
2	60.000	32.000	23.000	15.000	79.948	81.293	82.342	85.096	120.173	116.582
3	59.000	33.000	20.000	20.000	83.232	84.945	85.077	88.059	125.021	122.673
4	61.000	29.000	23.000	20.000	82.107	83.876	84.774	86.619	122.673	119.567
5	63.000	31.000	25.000	18.000	80.971	83.194	83.024	85.153	120.173	117.643
6	59.000	33.000	22.000	20.000	83.725	84.964	85.683	88.097	125.324	121.461
7	64.000	33.000	20.000	24.000	83.876	85.021	86.365	88.059	126.309	123.809
8	62.000	29.000	26.000	18.000	83.933	85.835	86.544	88.495	125.021	122.673
9	60.000	33.000	23.000	20.000	83.232	84.490	85.835	87.396	124.946	121.385
10	58.000	33.000	21.000	20.000	80.213	81.577	82.285	84.160	120.173	117.112
11	60.000	34.000	22.000	21.000	84.009	85.683	85.986	88.059	126.006	123.279
MEAN	60.727nA	31.909nA	22.636nA	19.545nA	82.561mV	84.236mV	84.886mV	87.004mV	123.603mV	120.716mV
SIGMA	1.849nA	1.700nA	1.912nA	2.207nA	1.522mV	1.597mV	1.592mV	1.514mV	2.410mV	2.580mV
MIN	58.000nA	29.000nA	20.000nA	15.000nA	79.948mV	81.293mV	82.285mV	84.160mV	120.173mV	116.582mV
MAX	64.000nA	34.000nA	26.000nA	24.000nA	84.009mV	85.835mV	86.544mV	88.495mV	126.309mV	123.809mV
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	6.2	6.3	7.0	7.1	7.2	7.3	8.0	8.1	8.2	8.3
Test	VOL2CELL3	VOL2CELL4	VIO3CELL1	IIB3-CELL1	IIB3+CELL1	IIO3CELL1	VIO3CELL2	IIB3-CELL2	IIB3+CELL2	IIO3CELL2
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
IOUT	8.000 mA	8.000 mA								
VT			1.400 V				1.400 V			

LIMITS

MIN	0.000 V	0.000 V	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	1.500 V	1.500 V	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**6.2**	**6.3**	**7.0**	**7.1**	**7.2**	**7.3**	**8.0**	**8.1**	**8.2**	**8.3**
Test	**VOL2CELL3**	**VOL2CELL4**	**VIO3CELL1**	**IIB3-CELL1**	**IIB3+CELL1**	**IIO3CELL1**	**VIO3CELL2**	**IIB3-CELL2**	**IIB3+CELL2**	**IIO3CELL2**
Unit	**mV**	**mV**	**uV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1	121.158	117.825	-819.000	16.968	21.815	4.848	0.141	16.968	21.815	4.848
2	115.294	113.552	-794.000	24.239	29.087	4.848	0.027	24.239	26.663	2.424
3	121.385	119.037	-189.000	14.544	21.815	7.272	-0.014	14.544	24.239	9.696
4	119.567	117.037	-496.000	16.968	19.392	2.424	0.336	16.968	21.815	4.848
5	116.582	115.294	-421.000	16.968	21.815	4.848	0.048	16.968	24.239	7.272
6	121.916	119.264	-38.000	14.544	21.815	7.272	-0.227	19.392	16.968	2.424
7	124.415	121.991	-99.000	16.968	19.392	2.424	0.131	16.968	19.392	2.424
8	121.310	119.567	126.000	16.968	19.392	2.424	-0.606	14.544	24.239	9.696
9	120.855	119.037	-32.000	16.968	21.815	4.848	0.278	16.968	21.815	4.848
10	116.506	114.082	-214.000	19.392	19.392	0.000	1.294	16.968	21.815	4.848
11	122.370	119.536	-327.000	16.968	21.815	4.848	0.886	16.968	21.815	4.848
MEAN	120.123mV	117.838mV	-300.273uV	17.409nA	21.595nA	4.187nA	208.545uV	17.409nA	22.256nA	5.289nA
SIGMA	2.838mV	2.600mV	308.098uV	2.615nA	2.754nA	2.193nA	512.859uV	2.615nA	2.615nA	2.615nA
MIN	115.294mV	113.552mV	-819.000uV	14.544nA	19.392nA	0.000 A	-606.000uV	14.544nA	16.968nA	2.424nA
MAX	124.415mV	121.991mV	126.000uV	24.239nA	29.087nA	7.272nA	1.294mV	24.239nA	26.663nA	9.696nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1
Test	VIO3CELL3	IIB3-CELL3	IIB3+CELL3	IIO3CELL3	VIO3CELL4	IIB3-CELL4	IIB3+CELL4	IIO3CELL4	VIO4CELL1	IIB4-CELL1
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	2.000 V	2.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	-3.000 V	-3.000 V
VT	1.400 V				1.400 V				-1.600 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**9.0**	**9.1**	**9.2**	**9.3**	**10.0**	**10.1**	**10.2**	**10.3**	**11.0**	**11.1**
Test	**VIO3CELL3**	**IIB3-CELL3**	**IIB3+CELL3**	**IIO3CELL3**	**VIO3CELL4**	**IIB3-CELL4**	**IIB3+CELL4**	**IIO3CELL4**	**VIO4CELL1**	**IIB4-CELL1**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**uV**	**nA**
1	0.962	14.544	24.239	9.696	0.084	16.968	21.815	4.848	-796.000	14.544
2	0.223	24.239	29.087	4.848	-0.516	21.815	29.087	7.272	-769.000	21.815
3	-0.640	16.968	21.815	4.848	-1.664	16.968	24.239	7.272	-183.000	14.544
4	-0.267	16.968	21.815	4.848	0.150	16.968	21.815	4.848	-497.000	16.968
5	-0.911	16.968	24.239	7.272	0.334	16.968	21.815	4.848	-418.000	16.968
6	-0.153	19.392	21.815	2.424	-0.516	16.968	24.239	7.272	-37.000	14.544
7	-0.588	14.544	21.815	7.272	-0.587	14.544	24.239	9.696	-105.000	14.544
8	-0.494	19.392	21.815	2.424	-0.759	19.392	21.815	2.424	129.000	14.544
9	-0.915	16.968	21.815	4.848	0.123	19.392	21.815	2.424	-35.000	16.968
10	0.900	16.968	21.815	4.848	0.126	16.968	21.815	4.848	-211.000	16.968
11	-0.527	16.968	21.815	4.848	-0.290	19.392	19.392	0.000	-333.000	14.544
MEAN	-219.091uV	17.629nA	22.917nA	5.289nA	-319.545uV	17.849nA	22.917nA	5.068nA	-295.909uV	16.086nA
SIGMA	655.448uV	2.675nA	2.264nA	2.118nA	579.230uV	1.961nA	2.510nA	2.754nA	300.447uV	2.241nA
MIN	-0.915mV	14.544nA	21.815nA	2.424nA	-1.664mV	14.544nA	19.392nA	0.000 A	-796.000uV	14.544nA
MAX	0.962mV	24.239nA	29.087nA	9.696nA	334.000uV	21.815nA	29.087nA	9.696nA	129.000uV	21.815nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	11.2	11.3	12.0	12.1	12.2	12.3	13.0	13.1	13.2	13.3
Test	IIB4+CELL1	IIO4CELL1	VIO4CELL2	IIB4-CELL2	IIB4+CELL2	IIO4CELL2	VIO4CELL3	IIB4-CELL3	IIB4+CELL3	IIO4CELL3
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V
VT			-1.600 V				-1.600 V			

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**11.2**	**11.3**	**12.0**	**12.1**	**12.2**	**12.3**	**13.0**	**13.1**	**13.2**	**13.3**
Test	**IIB4+CELL1**	**IIO4CELL1**	**VIO4CELL2**	**IIB4-CELL2**	**IIB4+CELL2**	**IIO4CELL2**	**VIO4CELL3**	**IIB4-CELL3**	**IIB4+CELL3**	**IIO4CELL3**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1	21.815	7.272	0.151	14.544	21.815	7.272	0.906	14.544	21.815	7.272
2	26.663	4.848	0.053	19.392	29.087	9.696	0.178	24.239	26.663	2.424
3	19.392	4.848	-0.003	14.544	19.392	4.848	-0.676	16.968	21.815	4.848
4	16.968	0.000	0.338	14.544	19.392	4.848	-0.305	16.968	19.392	2.424
5	21.815	4.848	0.090	12.120	24.239	12.120	-0.936	19.392	21.815	2.424
6	19.392	4.848	-0.202	14.544	19.392	4.848	-0.193	16.968	21.815	4.848
7	16.968	2.424	0.150	14.544	21.815	7.272	-0.603	16.968	19.392	2.424
8	19.392	4.848	-0.570	14.544	21.815	7.272	-0.509	19.392	19.392	0.000
9	19.392	2.424	0.286	14.544	19.392	4.848	-0.923	14.544	21.815	7.272
10	16.968	0.000	1.301	16.968	19.392	2.424	0.856	16.968	21.815	4.848
11	19.392	4.848	0.869	14.544	21.815	7.272	-0.551	16.968	19.392	2.424
MEAN	19.832nA	3.746nA	223.909uV	14.985nA	21.595nA	6.611nA	-250.545uV	17.629nA	21.375nA	3.746nA
SIGMA	2.830nA	2.264nA	501.422uV	1.820nA	2.959nA	2.675nA	643.142uV	2.675nA	2.118nA	2.264nA
MIN	16.968nA	0.000 A	-570.000uV	12.120nA	19.392nA	2.424nA	-0.936mV	14.544nA	19.392nA	0.000 A
MAX	26.663nA	7.272nA	1.301mV	19.392nA	29.087nA	12.120nA	0.906mV	24.239nA	26.663nA	7.272nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	14.0	14.1	14.2	14.3	15.0	15.1	15.2	15.3	16.0	16.1
Test	VIO4CELL4	IIB4-CELL4	IIB4+CELL4	IIO4CELL4	VIO2CELL1	IIB2-CELL1	IIB2+CELL1	IIO2CELL1	VIO2CELL2	IIB2-CELL2
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT	-1.600 V				-13.000 V				-13.000 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb **Test** **Unit**	**14.0** **VIO4CELL4** **mV**	**14.1** **IIB4-CELL4** **nA**	**14.2** **IIB4+CELL4** **nA**	**14.3** **IIO4CELL4** **nA**	**15.0** **VIO2CELL1** **uV**	**15.1** **IIB2-CELL1** **nA**	**15.2** **IIB2+CELL1** **nA**	**15.3** **IIO2CELL1** **nA**	**16.0** **VIO2CELL2** **mV**	**16.1** **IIB2-CELL2** **nA**
1	0.059	14.544	21.815	7.272	-780.000	9.696	14.544	4.848	0.044	9.696
2	-0.551	21.815	26.663	4.848	-727.000	14.544	19.392	4.848	0.023	14.544
3	-1.668	14.544	21.815	7.272	-181.000	9.696	16.968	7.272	-0.117	7.272
4	0.105	14.544	21.815	7.272	-497.000	7.272	14.544	7.272	0.239	9.696
5	0.290	14.544	21.815	7.272	-406.000	9.696	14.544	4.848	0.032	12.120
6	-0.524	14.544	19.392	4.848	-26.000	9.696	16.968	7.272	-0.290	12.120
7	-0.606	14.544	19.392	4.848	-105.000	9.696	14.544	4.848	0.078	7.272
8	-0.765	16.968	19.392	2.424	128.000	9.696	14.544	4.848	-0.648	9.696
9	0.099	14.544	21.815	7.272	-9.000	9.696	16.968	7.272	0.163	9.696
10	0.114	14.544	19.392	4.848	-190.000	9.696	16.968	7.272	1.245	9.696
11	-0.305	16.968	16.968	0.000	-350.000	9.696	14.544	4.848	0.707	9.696
MEAN	-341.091uV	15.646nA	20.934nA	5.289nA	-285.727uV	9.916nA	15.866nA	5.950nA	134.182uV	10.137nA
SIGMA	569.870uV	2.264nA	2.489nA	2.380nA	295.002uV	1.698nA	1.667nA	1.266nA	496.264uV	2.118nA
MIN	-1.668mV	14.544nA	16.968nA	0.000 A	-780.000uV	7.272nA	14.544nA	4.848nA	-648.000uV	7.272nA
MAX	290.000uV	21.815nA	26.663nA	7.272nA	128.000uV	14.544nA	19.392nA	7.272nA	1.245mV	14.544nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
Test	IIB2+CELL2	IIO2CELL2	VIO2CELL3	IIB2-CELL3	IIB2+CELL3	IIO2CELL3	VIO2CELL4	IIB2-CELL4	IIB2+CELL4	IIO2CELL4
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT			-13.000 V				-13.000 V			

LIMITS

	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**16.2**	**16.3**	**17.0**	**17.1**	**17.2**	**17.3**	**18.0**	**18.1**	**18.2**	**18.3**
Test	**IIB2+CELL2**	**IIO2CELL2**	**VIO2CELL3**	**IIB2-CELL3**	**IIB2+CELL3**	**IIO2CELL3**	**VIO2CELL4**	**IIB2-CELL4**	**IIB2+CELL4**	**IIO2CELL4**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1	16.968	7.272	0.898	12.120	16.968	4.848	-0.108	9.696	16.968	7.272
2	21.815	7.272	0.157	16.968	24.239	7.272	-0.770	16.968	21.815	4.848
3	16.968	9.696	-0.658	12.120	16.968	4.848	-1.818	12.120	16.968	4.848
4	16.968	7.272	-0.299	12.120	16.968	4.848	-0.102	9.696	16.968	7.272
5	16.968	4.848	-0.893	12.120	21.815	9.696	0.060	12.120	16.968	4.848
6	14.544	2.424	-0.195	12.120	16.968	4.848	-0.692	9.696	16.968	7.272
7	16.968	9.696	-0.546	12.120	16.968	4.848	-0.790	12.120	16.968	4.848
8	14.544	4.848	-0.460	14.544	14.544	0.000	-0.932	12.120	16.968	4.848
9	16.968	7.272	-0.898	12.120	19.392	7.272	-0.099	9.696	19.392	9.696
10	16.968	7.272	0.917	14.544	16.968	2.424	-0.035	12.120	16.968	4.848
11	16.968	7.272	-0.500	12.120	16.968	4.848	-0.442	12.120	14.544	2.424
MEAN	16.968nA	6.831nA	-225.182uV	13.001nA	18.070nA	5.068nA	-520.727uV	11.679nA	17.409nA	5.729nA
SIGMA	1.877nA	2.118nA	635.462uV	1.634nA	2.734nA	2.532nA	558.475uV	2.118nA	1.820nA	1.961nA
MIN	14.544nA	2.424nA	-898.000uV	12.120nA	14.544nA	0.000 A	-1.818mV	9.696nA	14.544nA	2.424nA
MAX	21.815nA	9.696nA	0.917mV	16.968nA	24.239nA	9.696nA	60.000uV	16.968nA	21.815nA	9.696nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	19.0	19.1	19.2	19.3	20.0	20.1	20.2	20.3	21.0	21.1
Test	VIO1CELL1	IIB1-CELL1	IIB1+CELL1	IIO1CELL1	VIO1CELL2	IIB1-CELL2	IIB1+CELL2	IIO1CELL2	VIO1CELL3	IIB1-CELL3
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT	15.000 V				15.000 V				15.000 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**19.0**	**19.1**	**19.2**	**19.3**	**20.0**	**20.1**	**20.2**	**20.3**	**21.0**	**21.1**
Test	**VIO1CELL1**	**IIB1-CELL1**	**IIB1+CELL1**	**IIO1CELL1**	**VIO1CELL2**	**IIB1-CELL2**	**IIB1+CELL2**	**IIO1CELL2**	**VIO1CELL3**	**IIB1-CELL3**
Unit	**uV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1	-768.000	19.392	21.815	2.424	0.012	21.815	21.815	0.000	1.209	16.968
2	-748.000	24.239	33.935	9.696	-0.100	24.239	31.511	7.272	0.412	26.663
3	-130.000	19.392	21.815	2.424	-0.126	16.968	21.815	4.848	-0.447	16.968
4	-429.000	16.968	21.815	4.848	0.248	16.968	24.239	7.272	-0.038	16.968
5	-356.000	21.815	21.815	0.000	-0.071	16.968	24.239	7.272	-0.699	16.968
6	26.000	19.392	21.815	2.424	-0.388	16.968	21.815	4.848	0.071	16.968
7	-51.000	19.392	21.815	2.424	-0.007	16.968	21.815	4.848	-0.403	16.968
8	224.000	19.392	21.815	2.424	-0.765	16.968	21.815	4.848	-0.314	19.392
9	34.000	21.815	19.392	2.424	0.162	16.968	24.239	7.272	-0.752	14.544
10	-132.000	24.239	21.815	2.424	1.220	16.968	24.239	7.272	1.165	16.968
11	-294.000	21.815	19.392	2.424	0.820	16.968	21.815	4.848	-0.348	16.968
MEAN	-238.545uV	20.714nA	22.476nA	3.085nA	91.364uV	18.070nA	23.578nA	5.509nA	-13.091uV	17.849nA
SIGMA	317.731uV	2.264nA	3.922nA	2.446nA	540.704uV	2.510nA	2.887nA	2.193nA	680.388uV	3.118nA
MIN	-768.000uV	16.968nA	19.392nA	0.000 A	-765.000uV	16.968nA	21.815nA	0.000 A	-752.000uV	14.544nA
MAX	224.000uV	24.239nA	33.935nA	9.696nA	1.220mV	24.239nA	31.511nA	7.272nA	1.209mV	26.663nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	21.2	21.3	22.0	22.1	22.2	22.3	23.0	23.1	23.2	23.3
Test	IIB1+CELL3	IIO1CELL3	VIO1CELL4	IIB1-CELL4	IIB1+CELL4	IIO1CELL4	AVSCELL1	AVSCELL2	AVSCELL3	AVSCELL4
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	15.000 V	15.000 V	15.000 V	15.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT			15.000 V				1.000 V	1.000 V	1.000 V	1.000 V
VT'							11.000 V	11.000 V	11.000 V	11.000 V

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	50.000	50.000	50.000	50.000
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 K	5.000 K	5.000 K	5.000 K

DATA RECORDS

Test Nb	**21.2**	**21.3**	**22.0**	**22.1**	**22.2**	**22.3**	**23.0**	**23.1**	**23.2**	**23.3**
Test	**IIB1+CELL3**	**IIO1CELL3**	**VIO1CELL4**	**IIB1-CELL4**	**IIB1+CELL4**	**IIO1CELL4**	**AVSCELL1**	**AVSCELL2**	**AVSCELL3**	**AVSCELL4**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**V/MV**	**V/MV**	**V/MV**	**V/MV**
1	21.815	4.848	0.078	16.968	24.239	7.272	280.837	235.703	280.837	244.433
2	29.087	2.424	-0.550	24.239	31.511	7.272	231.568	223.718	227.575	219.989
3	24.239	7.272	-1.718	19.392	24.239	4.848	263.987	249.045	249.045	249.045
4	24.239	7.272	0.157	16.968	24.239	7.272	286.943	253.834	244.433	235.703
5	26.663	9.696	0.314	19.392	24.239	4.848	227.575	219.989	223.718	212.893
6	24.239	7.272	-0.558	19.392	21.815	2.424	239.988	249.045	212.893	239.988
7	24.239	7.272	-0.614	16.968	24.239	7.272	227.575	227.575	239.988	219.989
8	21.815	2.424	-0.831	19.392	24.239	4.848	249.045	239.988	223.718	223.718
9	24.239	9.696	0.116	16.968	24.239	7.272	239.988	235.703	219.989	231.568
10	21.815	4.848	0.103	21.815	24.239	2.424	249.045	249.045	223.718	209.514
11	24.239	7.272	-0.320	21.815	19.392	2.424	239.988	244.433	231.568	231.568
MEAN	24.239nA	6.391nA	-347.545uV	19.392nA	24.239nA	5.289nA	248.776	238.916	234.317	228.946
SIGMA	2.168nA	2.489nA	596.663uV	2.424nA	2.868nA	2.118nA	20.354	11.404	18.894	12.838
MIN	21.815nA	2.424nA	-1.718mV	16.968nA	19.392nA	2.424nA	227.575	219.989	212.893	209.514
MAX	29.087nA	9.696nA	314.000uV	24.239nA	31.511nA	7.272nA	286.943	253.834	280.837	249.045
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	24.0	24.1	24.2	24.3	25.0	25.1	25.2	25.3
Test	CMR1C1	CMR1C2	CMR1C3	CMR1C4	CMR2C1	CMR2C2	CMR2C3	CMR2C4
VCC	5.000 V	5.000 V	5.000 V	5.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VCC'	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE'	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V

LIMITS

MIN	70.000 DB	70.000 DB	70.000 DB	70.000 DB	76.000 DB	76.000 DB	76.000 DB	76.000 DB
MAX	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB

DATA RECORDS

Test Nb **Test** **Unit**	**24.0** **CMR1C1** **DB**	**24.1** **CMR1C2** **DB**	**24.2** **CMR1C3** **DB**	**24.3** **CMR1C4** **DB**	**25.0** **CMR2C1** **DB**	**25.1** **CMR2C2** **DB**	**25.2** **CMR2C3** **DB**	**25.3** **CMR2C4** **DB**
1	102.558	109.675	94.511	101.851	127.161	118.847	99.100	103.578
2	101.795	101.073	96.332	98.755	122.568	107.169	100.809	102.097
3	112.869	108.604	98.292	118.891	114.807	129.771	102.448	108.949
4	131.953	121.073	98.062	96.434	112.230	129.771	100.608	100.674
5	121.073	97.114	101.400	96.580	114.937	108.677	103.196	100.827
6	137.975	101.716	97.600	110.740	114.589	109.136	100.423	106.390
7	114.453	103.753	105.719	103.823	114.427	110.393	105.843	104.014
8	120.576	98.474	105.934	113.892	109.251	107.581	105.643	108.884
9	121.073	111.954	111.777	101.851	116.327	157.375	105.661	102.263
10	121.073	112.213	96.805	107.872	113.658	120.985	101.076	106.148
11	114.453	105.106	101.931	105.933	113.958	107.913	105.286	107.239
MEAN	118.168 DB	106.432 DB	100.760 DB	105.147 DB	115.810 DB	118.874 DB	102.736 DB	104.642 DB
SIGMA	10.867 DB	7.096 DB	5.217 DB	7.200 DB	4.938 DB	15.426 DB	2.510 DB	3.043 DB
MIN	101.795 DB	97.114 DB	94.511 DB	96.434 DB	109.251 DB	107.169 DB	99.100 DB	100.674 DB
MAX	137.975 DB	121.073 DB	111.777 DB	118.891 DB	127.161 DB	157.375 DB	105.843 DB	108.949 DB
QTY	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

MOTOROLA Semiconductors

HIGH RELIABILITY DIVISION

TRACEABILITY INFORMATION

PROCESS LOT NUMBER	**NTTA0139J**
DEVICE	**TY38348H**
SOURCE TYPE	**LM139J**
DATE CODE	**9504**
CUSTOMER	**VARIOUS**
CUSTOMER PART NUMBER	**SCC 9103 004 05B**
LOT SIZE	**11**
SERIAL NUMBER RANGE	**1-11**
MEASUREMENT TYPE	**25 C RADIATION TESTING**
DATE	**03-MAR-95**
COMMENTS	

TABLE 2A DC PARAMETERS
ELECTRICAL RECORDS BEFORE RADIATION TESTING

REJECTED UNITS :

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0

ELECTRICAL MEASUREMENTS

AFTER 10 KRad

DC AT 25 °C

MOTOROLA

Motorola Semiconducteurs S.A.
Centre Electronique de Toulouse

MOTOROLA Semiconductors

HIGH RELIABILITY DIVISION

TRACEABILITY INFORMATION

PROCESS LOT NUMBER	**NTTA0139J**
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SERIAL NUMBER RANGE	**1-11**
MEASUREMENT TYPE	**25 C RADIATION TESTING**
DATE	**03-MAR-95**

COMMENTS

TABLE 2A DC PARAMETERS
ELECTRICAL RECORDS AFTER 10 Krad

PARAMETERS TEST CONDITIONS

Test Nb	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1
Test	IOLCELL1	IOLCELL2	IOLCELL3	IOLCELL4	VOL1CELL4	VOL1CELL3	VOL1CELL2	VOL1CELL1	VOL2CELL1	VOL2CELL2
VCC	30.000 V	30.000 V	30.000 V	30.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V
VOUT	30.000 V	30.000 V	30.000 V	30.000 V						
VEE					0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
IOUT					4.000 mA	4.000 mA	4.000 mA	4.000 mA	8.000 mA	8.000 mA

LIMITS

MIN	0.000 A	0.000 A	0.000 A	0.000 A	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
MAX	1.000 uA	1.000 uA	1.000 uA	1.000 uA	400.000 mV	400.000 mV	400.000 mV	400.000 mV	1.500 V	1.500 V

DATA RECORDS

Test Nb	**4.0**	**4.1**	**4.2**	**4.3**	**5.0**	**5.1**	**5.2**	**5.3**	**6.0**	**6.1**
Test	**IOLCELL1**	**IOLCELL2**	**IOLCELL3**	**IOLCELL4**	**VOL1CELL4**	**VOL1CELL3**	**VOL1CELL2**	**VOL1CELL1**	**VOL2CELL1**	**VOL2CELL2**
Unit	**nA**	**nA**	**nA**	**nA**	**mV**	**mV**	**mV**	**mV**	**mV**	**mV**
1	63.000	27.000	23.000	16.000	91.328	94.189	94.151	97.121	136.350	133.092
2	64.000	28.000	21.000	20.000	87.847	90.582	90.639	92.711	130.970	129.379
3	61.000	29.000	24.000	18.000	91.253	93.678	94.367	96.678	136.653	133.623
4	61.000	32.000	18.000	20.000	87.222	89.654	90.507	91.556	131.198	128.849
5	51.000	31.000	19.000	18.000	86.653	88.510	89.654	92.086	130.970	128.849
6	59.000	32.000	21.000	18.000	89.957	91.423	93.621	95.144	136.123	132.486
7	60.000	34.000	20.000	20.000	90.279	92.389	93.147	95.712	136.350	134.229
8	65.000	29.000	21.000	21.000	90.279	92.863	93.147	94.973	134.835	133.092
9	62.000	29.000	26.000	22.000	90.563	92.863	92.370	94.973	134.835	133.092
10	61.000	33.000	19.000	17.000	87.866	89.370	90.507	92.162	131.198	127.637
11	63.000	27.000	22.000	19.000	84.790	87.070	88.169	88.283	126.093	123.820
MEAN	60.909nA	30.091nA	21.273nA	19.000nA	88.912mV	91.145mV	91.844mV	93.764mV	133.234mV	130.741mV
SIGMA	3.727nA	2.427nA	2.370nA	1.789nA	2.146mV	2.290mV	2.046mV	2.642mV	3.378mV	3.266mV
MIN	51.000nA	27.000nA	18.000nA	16.000nA	84.790mV	87.070mV	88.169mV	88.283mV	126.093mV	123.820mV
MAX	65.000nA	34.000nA	26.000nA	22.000nA	91.328mV	94.189mV	94.367mV	97.121mV	136.653mV	134.229mV
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	6.2	6.3	7.0	7.1	7.2	7.3	8.0	8.1	8.2	8.3
Test	VOL2CELL3	VOL2CELL4	VIO3CELL1	IIB3-CELL1	IIB3+CELL1	IIO3CELL1	VIO3CELL2	IIB3-CELL2	IIB3+CELL2	IIO3CELL2
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
IOUT	8.000 mA	8.000 mA								
VT			1.400 V				1.400 V			

LIMITS

MIN	0.000 V	0.000 V	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	1.500 V	1.500 V	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**6.2**	**6.3**	**7.0**	**7.1**	**7.2**	**7.3**	**8.0**	**8.1**	**8.2**	**8.3**
Test	**VOL2CELL3**	**VOL2CELL4**	**VIO3CELL1**	**IIB3-CELL1**	**IIB3+CELL1**	**IIO3CELL1**	**VIO3CELL2**	**IIB3-CELL2**	**IIB3+CELL2**	**IIO3CELL2**
Unit	**mV**	**mV**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1	133.092	128.925	-1.311	75.164	80.014	4.849	-0.354	72.740	82.438	9.699
2	127.608	125.108	-1.451	82.438	92.137	9.699	-0.542	87.288	94.562	7.274
3	133.092	129.985	-0.785	80.014	87.288	7.274	-0.619	77.589	87.288	9.699
4	127.836	124.502	-0.931	72.740	82.438	9.699	-0.165	72.740	82.438	9.699
5	125.790	122.986	-0.989	80.014	89.712	9.699	-0.477	72.740	82.438	9.699
6	130.667	128.139	-0.609	82.438	89.712	7.274	-0.816	80.014	89.712	9.699
7	130.970	128.849	-0.643	80.014	89.712	9.699	-0.435	80.014	92.137	12.123
8	130.970	128.215	-0.401	80.014	87.288	7.274	-1.233	77.589	84.863	7.274
9	131.198	128.849	-0.506	77.589	84.863	7.274	-0.250	82.438	84.863	2.425
10	127.608	124.881	-0.764	80.014	92.137	12.123	0.753	72.740	82.438	9.699
11	124.047	120.940	-0.329	19.397	16.973	2.425	0.886	16.973	21.822	4.849
MEAN	129.353mV	126.489mV	-792.636uV	73.621nA	81.116nA	7.935nA	-295.636uV	72.079nA	80.454nA	8.376nA
SIGMA	2.959mV	2.941mV	355.997uV	18.218nA	21.615nA	2.676nA	623.335uV	18.878nA	19.900nA	2.735nA
MIN	124.047mV	120.940mV	-1.451mV	19.397nA	16.973nA	2.425nA	-1.233mV	16.973nA	21.822nA	2.425nA
MAX	133.092mV	129.985mV	-329.000uV	82.438nA	92.137nA	12.123nA	886.000uV	87.288nA	94.562nA	12.123nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1
Test	VIO3CELL3	IIB3-CELL3	IIB3+CELL3	IIO3CELL3	VIO3CELL4	IIB3-CELL4	IIB3+CELL4	IIO3CELL4	VIO4CELL1	IIB4-CELL1
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	2.000 V	2.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	-3.000 V	-3.000 V
VT	1.400 V				1.400 V				-1.600 V	

LIMITS

	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1
MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**9.0**	**9.1**	**9.2**	**9.3**	**10.0**	**10.1**	**10.2**	**10.3**	**11.0**	**11.1**
Test	**VIO3CELL3**	**IIB3-CELL3**	**IIB3+CELL3**	**IIO3CELL3**	**VIO3CELL4**	**IIB3-CELL4**	**IIB3+CELL4**	**IIO3CELL4**	**VIO4CELL1**	**IIB4-CELL1**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1	0.392	70.315	75.164	4.849	-0.419	63.041	72.740	9.699	-1.214	67.890
2	-0.484	82.438	92.137	9.699	-1.220	80.014	82.438	2.425	-1.342	75.164
3	-1.325	75.164	80.014	4.849	-2.336	75.164	75.164	0.000	-0.700	70.315
4	-0.831	67.890	75.164	7.274	-0.329	65.466	67.890	2.425	-0.868	65.466
5	-1.530	67.890	70.315	2.425	-0.142	72.740	72.740	0.000	-0.916	75.164
6	-0.819	75.164	80.014	4.849	-1.120	70.315	75.164	4.849	-0.527	75.164
7	-1.272	77.589	82.438	4.849	-1.211	72.740	77.589	4.849	-0.561	72.740
8	-1.149	72.740	80.014	7.274	-1.349	67.890	75.164	7.274	-0.325	75.164
9	-1.532	72.740	82.438	9.699	-0.430	67.890	75.164	7.274	-0.436	70.315
10	0.300	65.466	72.740	7.274	-0.358	72.740	80.014	7.274	-0.685	75.164
11	-0.527	16.973	21.822	4.849	-0.285	21.822	19.397	2.425	-0.323	14.548
MEAN	-797.909uV	67.670nA	73.842nA	6.172nA	-836.273uV	66.347nA	70.315nA	4.409nA	-717.909uV	67.009nA
SIGMA	670.482uV	17.500nA	18.221nA	2.265nA	670.179uV	15.498nA	17.316nA	3.220nA	339.063uV	17.727nA
MIN	-1.532mV	16.973nA	21.822nA	2.425nA	-2.336mV	21.822nA	19.397nA	0.000 A	-1.342mV	14.548nA
MAX	392.000uV	82.438nA	92.137nA	9.699nA	-142.000uV	80.014nA	82.438nA	9.699nA	-323.000uV	75.164nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	11.2	11.3	12.0	12.1	12.2	12.3	13.0	13.1	13.2	13.3
Test	IIB4+CELL1	IIO4CELL1	VIO4CELL2	IIB4-CELL2	IIB4+CELL2	IIO4CELL2	VIO4CELL3	IIB4-CELL3	IIB4+CELL3	IIO4CELL3
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V
VT			-1.600 V				-1.600 V			

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**11.2**	**11.3**	**12.0**	**12.1**	**12.2**	**12.3**	**13.0**	**13.1**	**13.2**	**13.3**
Test	**IIB4+CELL1**	**IIO4CELL1**	**VIO4CELL2**	**IIB4-CELL2**	**IIB4+CELL2**	**IIO4CELL2**	**VIO4CELL3**	**IIB4-CELL3**	**IIB4+CELL3**	**IIO4CELL3**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1	75.164	7.274	-0.272	70.315	75.164	4.849	0.441	67.890	72.740	4.849
2	84.863	9.699	-0.421	80.014	89.712	9.699	-0.429	82.438	82.438	0.000
3	82.438	12.123	-0.515	72.740	80.014	7.274	-1.247	72.740	72.740	0.000
4	75.164	9.699	-0.074	67.890	75.164	7.274	-0.776	70.315	67.890	2.425
5	80.014	4.849	-0.356	65.466	72.740	7.274	-1.458	65.466	65.466	0.000
6	84.863	9.699	-0.700	72.740	84.863	12.123	-0.751	72.740	75.164	2.425
7	82.438	9.699	-0.332	77.589	82.438	4.849	-1.178	75.164	77.589	2.425
8	80.014	4.849	-1.098	70.315	80.014	9.699	-1.065	72.740	75.164	2.425
9	80.014	9.699	-0.154	72.740	82.438	9.699	-1.444	72.740	75.164	2.425
10	84.863	9.699	0.845	67.890	75.164	7.274	0.346	65.466	67.890	2.425
11	21.822	7.274	0.878	14.548	21.822	7.274	-0.552	16.973	21.822	4.849
MEAN	75.605nA	8.597nA	-199.909uV	66.568nA	74.503nA	7.935nA	-737.545uV	66.788nA	68.552nA	2.204nA
SIGMA	18.171nA	2.265nA	593.592uV	17.763nA	18.180nA	2.193nA	653.700uV	17.191nA	16.232nA	1.699nA
MIN	21.822nA	4.849nA	-1.098mV	14.548nA	21.822nA	4.849nA	-1.458mV	16.973nA	21.822nA	0.000 A
MAX	84.863nA	12.123nA	878.000uV	80.014nA	89.712nA	12.123nA	441.000uV	82.438nA	82.438nA	4.849nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	14.0	14.1	14.2	14.3	15.0	15.1	15.2	15.3	16.0	16.1
Test	VIO4CELL4	IIB4-CELL4	IIB4+CELL4	IIO4CELL4	VIO2CELL1	IIB2-CELL1	IIB2+CELL1	IIO2CELL1	VIO2CELL2	IIB2-CELL2
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT	-1.600 V				-13.000 V				-13.000 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**14.0**	**14.1**	**14.2**	**14.3**	**15.0**	**15.1**	**15.2**	**15.3**	**16.0**	**16.1**
Test	**VIO4CELL4**	**IIB4-CELL4**	**IIB4+CELL4**	**IIO4CELL4**	**VIO2CELL1**	**IIB2-CELL1**	**IIB2+CELL1**	**IIO2CELL1**	**VIO2CELL2**	**IIB2-CELL2**
Unit	**mV**	**nA**	**nA**	**nA**	**uV**	**nA**	**nA**	**nA**	**mV**	**nA**
1	-0.372	60.616	65.466	4.849	-795.000	50.918	63.041	12.123	0.081	50.918
2	-1.148	72.740	80.014	7.274	-899.000	60.616	72.740	12.123	-0.050	63.041
3	-2.227	65.466	70.315	4.849	-298.000	58.192	65.466	7.274	-0.175	58.192
4	-0.289	63.041	60.616	2.425	-500.000	53.342	60.616	7.274	0.239	53.342
5	-0.109	63.041	72.740	9.699	-546.000	60.616	70.315	9.699	-0.022	53.342
6	-1.035	65.466	70.315	4.849	-130.000	58.192	72.740	14.548	-0.342	60.616
7	-1.135	65.466	72.740	7.274	-187.000	58.192	67.890	9.699	0.026	60.616
8	-1.281	63.041	70.315	7.274	42.000	58.192	67.890	9.699	-0.717	58.192
9	-0.372	60.616	72.740	12.123	-41.000	55.767	67.890	12.123	0.154	58.192
10	-0.309	65.466	72.740	7.274	-303.000	60.616	67.890	7.274	1.178	53.342
11	-0.296	16.973	19.397	2.425	-338.000	9.699	14.548	4.849	0.710	7.274
MEAN	-779.364uV	60.176nA	66.127nA	6.392nA	-363.182uV	53.122nA	62.821nA	9.699nA	98.364uV	52.461nA
SIGMA	644.331uV	14.701nA	16.232nA	2.924nA	297.926uV	14.727nA	16.425nA	2.869nA	503.795uV	15.460n.
MIN	-2.227mV	16.973nA	19.397nA	2.425nA	-899.000uV	9.699nA	14.548nA	4.849nA	-717.000uV	7.274nA
MAX	-109.000uV	72.740nA	80.014nA	12.123nA	42.000uV	60.616nA	72.740nA	14.548nA	1.178mV	63.041nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
Test	IIB2+CELL2	IIO2CELL2	VIO2CELL3	IIB2-CELL3	IIB2+CELL3	IIO2CELL3	VIO2CELL4	IIB2-CELL4	IIB2+CELL4	IIO2CELL4
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT			-13.000 V				-13.000 V			

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**16.2**	**16.3**	**17.0**	**17.1**	**17.2**	**17.3**	**18.0**	**18.1**	**18.2**	**18.3**
Test	**IIB2+CELL2**	**IIO2CELL2**	**VIO2CELL3**	**IIB2-CELL3**	**IIB2+CELL3**	**IIO2CELL3**	**VIO2CELL4**	**IIB2-CELL4**	**IIB2+CELL4**	**IIO2CELL4**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1	65.466	14.548	0.871	53.342	58.192	4.849	-0.098	46.068	55.767	9.699
2	75.164	12.123	-0.021	63.041	70.315	7.274	-0.927	58.192	65.466	7.274
3	65.466	7.274	-0.747	58.192	60.616	2.425	-1.924	53.342	58.192	4.849
4	63.041	9.699	-0.332	53.342	55.767	2.425	-0.092	43.644	55.767	12.123
5	65.466	12.123	-1.013	53.342	55.767	2.425	0.049	50.918	60.616	9.699
6	67.890	7.274	-0.305	58.192	63.041	4.849	-0.755	50.918	58.192	7.274
7	67.890	7.274	-0.666	60.616	65.466	4.849	-0.875	55.767	60.616	4.849
8	65.466	7.274	-0.570	55.767	63.041	7.274	-1.026	50.918	58.192	7.274
9	67.890	9.699	-0.968	58.192	60.616	2.425	-0.165	50.918	58.192	7.274
10	65.466	12.123	0.810	53.342	55.767	2.425	-0.068	55.767	60.616	4.849
11	16.973	9.699	-0.497	12.123	16.973	4.849	-0.441	12.123	16.973	4.849
MEAN	62.380nA	9.919nA	-312.545uV	52.681nA	56.869nA	4.188nA	-574.727uV	48.052nA	55.326nA	7.274nA
SIGMA	15.376nA	2.532nA	638.793uV	13.848nA	13.986nA	1.906nA	596.892uV	12.637nA	13.004nA	2.425nA
MIN	16.973nA	7.274nA	-1.013mV	12.123nA	16.973nA	2.425nA	-1.924mV	12.123nA	16.973nA	4.849nA
MAX	75.164nA	14.548nA	871.000uV	63.041nA	70.315nA	7.274nA	49.000uV	58.192nA	65.466nA	12.123nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	19.0	19.1	19.2	19.3	20.0	20.1	20.2	20.3	21.0	21.1
Test	VIO1CELL1	IIB1-CELL1	IIB1+CELL1	IIO1CELL1	VIO1CELL2	IIB1-CELL2	IIB1+CELL2	IIO1CELL2	VIO1CELL3	IIB1-CELL3
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT	15.000 V				15.000 V				15.000 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**19.0**	**19.1**	**19.2**	**19.3**	**20.0**	**20.1**	**20.2**	**20.3**	**21.0**	**21.1**
Test	**VIO1CELL1**	**IIB1-CELL1**	**IIB1+CELL1**	**IIO1CELL1**	**VIO1CELL2**	**IIB1-CELL2**	**IIB1+CELL2**	**IIO1CELL2**	**VIO1CELL3**	**IIB1-CELL3**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1	-1.141	80.014	87.288	7.274	-0.330	80.014	89.712	9.699	0.783	72.740
2	-1.299	92.137	96.986	4.849	-0.539	92.137	99.411	7.274	-0.191	89.712
3	-0.594	84.863	92.137	7.274	-0.597	80.014	96.986	16.973	-1.008	80.014
4	-0.716	80.014	84.863	4.849	-0.111	80.014	87.288	7.274	-0.464	70.315
5	-0.795	87.288	94.562	7.274	-0.454	77.589	84.863	7.274	-1.199	70.315
6	-0.410	87.288	96.986	9.699	-0.849	87.288	94.562	7.274	-0.476	80.014
7	-0.448	87.288	92.137	4.849	-0.424	84.863	99.411	14.548	-0.959	82.438
8	-0.190	87.288	94.562	7.274	-1.262	82.438	92.137	9.699	-0.839	80.014
9	-0.311	87.288	89.712	2.425	-0.201	84.863	94.562	9.699	-1.238	80.014
10	-0.554	89.712	96.986	7.274	0.835	77.589	84.863	7.274	0.697	75.164
11	-0.281	21.822	19.397	2.425	0.819	21.822	21.822	0.000	-0.350	16.973
MEAN	-612.636uV	80.455nA	85.965nA	5.951nA	-283.000uV	77.148nA	85.965nA	8.817nA	-476.727uV	72.519nA
SIGMA	352.951uV	19.782nA	22.443nA	2.265nA	632.052uV	18.869nA	21.912nA	4.374nA	693.520uV	19.289nA
MIN	-1.299mV	21.822nA	19.397nA	2.425nA	-1.262mV	21.822nA	21.822nA	0.000 A	-1.238mV	16.973nA
MAX	-190.000uV	92.137nA	96.986nA	9.699nA	835.000uV	92.137nA	99.411nA	16.973nA	783.000uV	89.712nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	21.2	21.3	22.0	22.1	22.2	22.3	23.0	23.1	23.2	23.3
Test	IIB1+CELL3	IIO1CELL3	VIO1CELL4	IIB1-CELL4	IIB1+CELL4	IIO1CELL4	AVSCELL1	AVSCELL2	AVSCELL3	AVSCELL4
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	15.000 V	15.000 V	15.000 V	15.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT			15.000 V				1.000 V	1.000 V	1.000 V	1.000 V
VT'							11.000 V	11.000 V	11.000 V	11.000 V

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	50.000	50.000	50.000	50.000
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 K	5.000 K	5.000 K	5.000 K

DATA RECORDS

Test Nb	**21.2**	**21.3**	**22.0**	**22.1**	**22.2**	**22.3**	**23.0**	**23.1**	**23.2**	**23.3**
Test	**IIB1+CELL3**	**IIO1CELL3**	**VIO1CELL4**	**IIB1-CELL4**	**IIB1+CELL4**	**IIO1CELL4**	**AVSCELL1**	**AVSCELL2**	**AVSCELL3**	**AVSCELL4**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**V/MV**	**V/MV**	**V/MV**	**V/MV**
1	80.014	7.274	-0.293	75.164	72.740	2.425	206.230	206.230	183.316	183.316
2	94.562	4.849	-1.138	84.863	92.137	7.274	157.128	175.983	162.947	162.947
3	84.863	4.849	-2.263	75.164	82.438	7.274	159.021	175.983	155.279	169.214
4	80.014	9.699	-0.171	65.466	75.164	9.699	191.286	191.286	185.897	196.996
5	75.164	4.849	-0.034	75.164	82.438	7.274	175.983	157.128	157.128	175.983
6	87.288	7.274	-1.027	77.589	80.014	2.425	167.072	171.412	157.128	164.984
7	89.712	7.274	-1.114	77.589	84.863	7.274	162.947	157.128	160.960	157.128
8	82.438	2.425	-1.287	75.164	80.014	4.849	173.667	191.286	175.983	169.214
9	84.863	4.849	-0.316	72.740	80.014	7.274	178.361	159.021	153.473	151.709
10	77.589	2.425	-0.245	80.014	80.014	0.000	183.316	173.667	167.072	167.072
11	24.247	7.274	-0.326	21.822	21.822	0.000	239.977	249.032	235.691	249.032
MEAN	78.250nA	5.731nA	-746.727uV	70.976nA	75.605nA	5.070nA	181.363	182.560	172.261	177.054
SIGMA	18.753nA	2.241nA	679.492uV	16.976nA	18.523nA	3.334nA	24.256	26.960	23.846	26.880
MIN	24.247nA	2.425nA	-2.263mV	21.822nA	21.822nA	0.000 A	157.128	157.128	153.473	151.709
MAX	94.562nA	9.699nA	-34.000uV	84.863nA	92.137nA	9.699nA	239.977	249.032	235.691	249.032
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	24.0	24.1	24.2	24.3	25.0	25.1	25.2	25.3
Test	CMR1C1	CMR1C2	CMR1C3	CMR1C4	CMR2C1	CMR2C2	CMR2C3	CMR2C4
VCC	5.000 V	5.000 V	5.000 V	5.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VCC'	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE'	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V

LIMITS

MIN	70.000 DB	70.000 DB	70.000 DB	70.000 DB	76.000 DB	76.000 DB	76.000 DB	76.000 DB
MAX	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB

DATA RECORDS

Test Nb	**24.0**	**24.1**	**24.2**	**24.3**	**25.0**	**25.1**	**25.2**	**25.3**
Test	**CMR1C1**	**CMR1C2**	**CMR1C3**	**CMR1C4**	**CMR2C1**	**CMR2C2**	**CMR2C3**	**CMR2C4**
Unit	**DB**	**DB**	**DB**	**DB**	**DB**	**DB**	**DB**	**DB**
1	89.829	91.209	95.602	96.078	98.158	96.677	110.035	103.124
2	88.792	87.839	94.582	92.318	96.883	95.160	104.326	102.464
3	90.953	89.245	91.748	88.751	99.523	96.422	100.635	98.340
4	93.550	90.413	94.760	97.631	102.248	98.069	106.588	111.022
5	92.227	87.849	92.363	99.182	101.010	96.222	103.560	110.534
6	91.173	88.265	92.897	90.991	99.993	94.839	104.278	100.260
7	91.253	89.262	90.092	91.963	100.588	95.871	99.618	101.388
8	91.963	86.965	91.094	92.849	101.640	94.221	100.345	100.598
9	92.641	89.829	90.672	94.314	100.322	97.932	100.296	105.331
10	91.512	90.198	96.218	95.906	100.951	98.224	107.827	103.954
11	114.730	110.737	101.532	109.029	113.709	108.212	105.571	107.727
MEAN	93.511 DB	91.074 DB	93.778 DB	95.365 DB	101.366 DB	97.441 DB	103.916 DB	104.067 DB
SIGMA	7.155 DB	6.646 DB	3.292 DB	5.462 DB	4.369 DB	3.810 DB	3.437 DB	4.185 DB
MIN	88.792 DB	86.965 DB	90.092 DB	88.751 DB	96.883 DB	94.221 DB	99.618 DB	98.340 DB
MAX	114.730 DB	110.737 DB	101.532 DB	109.029 DB	113.709 DB	108.212 DB	110.035 DB	111.022 DB
QTY	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

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REJECTED UNITS :


TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
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ELECTRICAL MEASUREMENTS

AFTER 20 KRad

DC AT 25 °C

MOTOROLA Semiconductors

HIGH RELIABILITY DIVISION

TRACEABILITY INFORMATION

PROCESS LOT NUMBER	**NTTA0139J**
DEVICE	**TY38348H**
SOURCE TYPE	**LM139J**
DATE CODE	**9504**
CUSTOMER	**VARIOUS**
CUSTOMER PART NUMBER	**SCC 9103 004 05B**
LOT SIZE	**11**
SERIAL NUMBER RANGE	**1-11**
MEASUREMENT TYPE	**25 C RADIATION TESTING**
DATE	**03-MAR-95**

COMMENTS

TABLE 2A DC PARAMETERS
ELECTRICAL RECORDS AFTER 20 Krad

LM139J **Temperature : 25** **Lot: NTTA0139J** **Page: 1**

PARAMETERS TEST CONDITIONS

Test Nb	1.0	1.1	2.0	2.1	2.2	2.3	3.0	3.1	3.2	3.3
Test	ICC1	ICC2	IIL+CELL1	IIL+CELL2	IIL+CELL3	IIL+CELL4	IIL-CELL4	IIL-CELL3	IIL-CELL2	IIL-CELL1
VCC	5.000 V	30.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V
VEE	0.000 V	0.000 V								
VIN+			34.000 V	34.000 V	34.000 V	34.000 V				
VIN-							34.000 V	34.000 V	34.000 V	34.000 V

LIMITS

MIN	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A
MAX	2.000 mA	3.000 mA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA

DATA RECORDS

Test Nb **Test** Unit	**1.0** **ICC1** **mA**	**1.1** **ICC2** **mA**	**2.0** **IIL+CELL1** **nA**	**2.1** **IIL+CELL2** **nA**	**2.2** **IIL+CELL3** **nA**	**2.3** **IIL+CELL4** **nA**	**3.0** **IIL-CELL4** **nA**	**3.1** **IIL-CELL3** **nA**	**3.2** **IIL-CELL2** **nA**	**3.3** **IIL-CELL1** **nA**
1	0.836	1.098	7.000	63.000	70.000	69.000	50.000	49.000	78.000	95.000
2	0.835	1.097	19.000	56.000	76.000	77.000	42.000	50.000	89.000	98.000
3	0.831	1.116	16.000	64.000	86.000	121.000	46.000	52.000	92.000	99.000
4	0.842	1.108	10.000	51.000	66.000	69.000	47.000	48.000	81.000	95.000
5	0.831	1.122	8.000	61.000	64.000	86.000	38.000	40.000	88.000	104.000
6	0.817	1.075	27.000	75.000	76.000	74.000	31.000	55.000	88.000	109.000
7	0.815	1.085	23.000	67.000	88.000	90.000	26.000	60.000	90.000	104.000
8	0.820	1.062	14.000	56.000	86.000	81.000	42.000	56.000	85.000	121.000
9	0.823	1.076	7.000	62.000	90.000	77.000	37.000	58.000	82.000	97.000
10	0.837	1.041	20.000	58.000	71.000	78.000	14.000	41.000	90.000	114.000
11	0.945	1.193	77.000	28.000	3.000	6.000	102.000	29.000	2.000	21.000
MEAN	839.273uA	1.098mA	20.727nA	58.273nA	70.545nA	75.273nA	43.182nA	48.909nA	78.636nA	96.091nA
SIGMA	36.164uA	39.687uA	19.840nA	11.884nA	24.180nA	27.108nA	22.117nA	9.181nA	25.789nA	26.243nA
MIN	815.000uA	1.041mA	7.000nA	28.000nA	3.000nA	6.000nA	14.000nA	29.000nA	2.000nA	21.000nA
MAX	0.945mA	1.193mA	77.000nA	75.000nA	90.000nA	121.000nA	102.000nA	60.000nA	92.000nA	121.000nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1
Test	IOLCELL1	IOLCELL2	IOLCELL3	IOLCELL4	VOL1CELL4	VOL1CELL3	VOL1CELL2	VOL1CELL1	VOL2CELL1	VOL2CELL2
VCC	30.000 V	30.000 V	30.000 V	30.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V
VOUT	30.000 V	30.000 V	30.000 V	30.000 V						
VEE					0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
IOUT					4.000 mA	4.000 mA	4.000 mA	4.000 mA	8.000 mA	8.000 mA

LIMITS

MIN	0.000 A	0.000 A	0.000 A	0.000 A	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
MAX	1.000 uA	1.000 uA	1.000 uA	1.000 uA	400.000 mV	400.000 mV	400.000 mV	400.000 mV	1.500 V	1.500 V

DATA RECORDS

Test Nb	**4.0**	**4.1**	**4.2**	**4.3**	**5.0**	**5.1**	**5.2**	**5.3**	**6.0**	**6.1**
Test	**IOLCELL1**	**IOLCELL2**	**IOLCELL3**	**IOLCELL4**	**VOL1CELL4**	**VOL1CELL3**	**VOL1CELL2**	**VOL1CELL1**	**VOL2CELL1**	**VOL2CELL2**
Unit	**nA**	**nA**	**nA**	**nA**	**mV**	**mV**	**mV**	**mV**	**mV**	**mV**
1	58.000	31.000	18.000	20.000	97.405	100.766	102.061	103.482	148.303	145.850
2	57.000	31.000	21.000	11.000	98.492	101.645	103.274	104.626	148.530	144.562
3	61.000	28.000	19.000	19.000	97.121	99.686	100.444	101.986	145.244	143.653
4	62.000	27.000	22.000	17.000	96.678	100.008	101.550	102.592	144.562	143.122
5	58.000	31.000	17.000	18.000	96.110	98.625	101.145	101.228	144.865	143.653
6	60.000	27.000	22.000	16.000	101.588	104.702	105.782	107.456	152.849	150.121
7	57.000	31.000	20.000	16.000	100.766	103.274	105.498	107.570	153.683	150.121
8	57.000	25.000	21.000	17.000	100.766	103.812	107.456	106.983	152.167	150.652
9	58.000	27.000	23.000	15.000	100.330	103.369	104.835	106.085	150.121	149.212
10	58.000	31.000	17.000	18.000	98.201	100.595	100.918	102.270	145.244	143.956
11	57.000	28.000	20.000	15.000	85.851	86.324	88.681	89.060	127.305	126.093
MEAN	58.455nA	28.818nA	20.000nA	16.545nA	97.573mV	100.255mV	101.968mV	103.031mV	146.625mV	144.636mV
SIGMA	1.753nA	2.228nA	2.049nA	2.423nA	4.312mV	5.007mV	4.979mV	5.179mV	7.227mV	6.836mV
MIN	57.000nA	25.000nA	17.000nA	11.000nA	85.851mV	86.324mV	88.681mV	89.060mV	127.305mV	126.093mV
MAX	62.000nA	31.000nA	23.000nA	20.000nA	101.588mV	104.702mV	107.456mV	107.570mV	153.683mV	150.652mV
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

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                                        PARAMETERS TEST CONDITIONS

Test Nb          6.2          6.3          7.0          7.1          7.2          7.3          8.0          8.1          8.2          8.3
Test       VOL2CELL3    VOL2CELL4    VIO3CELL1   IIB3-CELL1   IIB3+CELL1    IIO3CELL1    VIO3CELL2   IIB3-CELL2   IIB3+CELL2    IIO3CELL2
VCC        5.000  V     5.000  V     5.000  V     5.000  V     5.000  V     5.000  V     5.000  V     5.000  V     5.000  V     5.000  V
VEE        0.000  V     0.000  V     0.000  V     0.000  V     0.000  V     0.000  V     0.000  V     0.000  V     0.000  V     0.000  V
IOUT       8.000 mA     8.000 mA
VT                                   1.400  V                                            1.400  V

                                                  LIMITS

MIN        0.000  V     0.000  V    -5.000 mV     0.000  A     0.000  A     0.000  A    -5.000 mV     0.000  A     0.000  A     0.000  A
MAX        1.500  V     1.500  V     5.000 mV   100.000 nA   100.000 nA    25.000 nA     5.000 mV   100.000 nA   100.000 nA    25.000 nA

                                               DATA RECORDS

Test Nb          6.2          6.3          7.0          7.1          7.2          7.3          8.0          8.1          8.2          8.3
Test       VOL2CELL3    VOL2CELL4    VIO3CELL1   IIB3-CELL1   IIB3+CELL1    IIO3CELL1    VIO3CELL2   IIB3-CELL2   IIB3+CELL2    IIO3CELL2
Unit              mV           mV           mV           nA           nA           nA           mV           nA           nA           nA

   1 F       143.122      138.245       -2.609    162.452 *    179.425 *     16.973       -1.695    164.877 *    186.699 *     21.822
   2 F       144.486      140.016       -2.617    162.452 *    179.425 *     16.973       -1.699    164.877 *    186.699 *     21.822
   3 F       141.531      137.942       -2.840    172.151 *    189.123 *     16.973       -1.853    179.425 *    198.822 *     19.397
   4 F       141.531      137.335       -2.162    160.027 *    177.000 *     16.973       -1.488    160.027 *    184.274 *     24.247
   5 F       140.925      136.653       -2.357    172.151 *    198.822 *     26.671 *     -1.865    155.178 *    164.877 *      9.699
   6 F       149.212      145.244       -2.083    184.274 *    206.096 *     21.822       -2.350    186.699 *    208.521 *     21.822
   7 F       148.303      143.653       -2.127    177.000 *    196.397 *     19.397       -1.947    186.699 *    210.945 *     24.247
   8 F       148.303      143.425       -1.877    177.000 *    201.247 *     24.247       -2.728    174.576 *    191.548 *     16.973
   9 F       145.926      143.274       -1.911    172.151 *    191.548 *     19.397       -1.704    177.000 *    196.397 *     19.397
  10 F       142.213      139.712       -2.215    179.425 *    206.096 *     26.671 *     -0.594    157.603 *    169.726 *     12.123

  11         123.365      121.471       -0.326     19.397       16.973        2.425        0.883     14.548       21.822        7.274

MEAN       142.629mV    138.815mV     -2.102mV   158.044nA    176.559nA     18.957nA     -1.549mV   156.501nA    174.575nA     18.075nA
SIGMA        7.063mV      6.457mV    662.615uV    46.612nA     53.954nA      6.668nA      0.963mV    48.376nA     52.599nA      5.876nA
MIN        123.365mV    121.471mV     -2.840mV    19.397nA     16.973nA      2.425nA     -2.728mV    14.548nA     21.822nA      7.274nA
MAX        149.212mV    145.244mV   -326.000uV   184.274nA    206.096nA     26.671nA    883.000uV   186.699nA    210.945nA     24.247nA
QTY               11           11           11           11           11           11           11           11           11           11

  TOTAL PASSED DEVICES : 1
  TOTAL FAILED DEVICES : 10
  REJECTED UNITS:

          1,2,3,4,5,6,7,8,9,10
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PARAMETERS TEST CONDITIONS

Test Nb	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1
Test	VIO3CELL3	IIB3-CELL3	IIB3+CELL3	IIO3CELL3	VIO3CELL4	IIB3-CELL4	IIB3+CELL4	IIO3CELL4	VIO4CELL1	IIB4-CELL1
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	2.000 V	2.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	-3.000 V	-3.000 V
VT	1.400 V				1.400 V				-1.600 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1
Test	VIO3CELL3	IIB3-CELL3	IIB3+CELL3	IIO3CELL3	VIO3CELL4	IIB3-CELL4	IIB3+CELL4	IIO3CELL4	VIO4CELL1	IIB4-CELL1
Unit	mV	nA	nA	nA	mV	nA	nA	nA	mV	nA
1 F	-0.965	152.753 *	157.603 *	4.849	-1.728	135.781 *	140.630 *	4.849	-2.354	150.329 *
2 F	-0.970	150.329 *	157.603 *	7.274	-1.728	135.781 *	140.630 *	4.849	-2.357	145.479 *
3 F	-1.980	177.000 *	181.849 *	4.849	-2.649	162.452 *	167.301 *	4.849	-2.582	160.027 *
4 F	-2.207	147.904 *	157.603 *	9.699	-1.584	130.932 *	138.206 *	7.274	-1.944	147.904 *
5 F	-2.950	138.206 *	135.781 *	2.425	-1.420	147.904 *	152.753 *	4.849	-2.138	157.603 *
6 F	-2.421	167.301 *	174.576 *	7.274	-2.597	152.753 *	155.178 *	2.425	-1.843	169.726 *
7 F	-2.903	172.151 *	184.274 *	12.123	-2.775	155.178 *	164.877 *	9.699	-1.880	162.452 *
8 F	-2.684	162.452 *	169.726 *	7.274	-2.798	147.904 *	152.753 *	4.849	-1.635	162.452 *
9 F	-3.051	164.877 *	172.151 *	7.274	-1.878	145.479 *	150.329 *	4.849	-1.685	157.603 *
10 F	-1.111	143.055 *	138.206 *	4.849	-1.659	150.329 *	164.877 *	14.548	-1.983	164.877 *
11	-0.527	16.973	21.822	4.849	-0.293	21.822	16.973	4.849	-0.329	16.973
MEAN	-1.979mV	144.818nA	150.109nA	6.613nA	-1.919mV	135.120nA	140.410nA	6.172nA	-1.885mV	145.039nA
SIGMA	0.927mV	44.154nA	45.406nA	2.676nA	751.353uV	38.705nA	42.170nA	3.318nA	594.228uV	43.113nA
MIN	-3.051mV	16.973nA	21.822nA	2.425nA	-2.798mV	21.822nA	16.973nA	2.425nA	-2.582mV	16.973nA
MAX	-527.000uV	177.000nA	184.274nA	12.123nA	-293.000uV	162.452nA	167.301nA	14.548nA	-329.000uV	169.726nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	11.2	11.3	12.0	12.1	12.2	12.3	13.0	13.1	13.2	13.3
Test	IIB4+CELL1	IIO4CELL1	VIO4CELL2	IIB4-CELL2	IIB4+CELL2	IIO4CELL2	VIO4CELL3	IIB4-CELL3	IIB4+CELL3	IIO4CELL3
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V
VT			-1.600 V				-1.600 V			

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**11.2**	**11.3**	**12.0**	**12.1**	**12.2**	**12.3**	**13.0**	**13.1**	**13.2**	**13.3**
Test	**IIB4+CELL1**	**IIO4CELL1**	**VIO4CELL2**	**IIB4-CELL2**	**IIB4+CELL2**	**IIO4CELL2**	**VIO4CELL3**	**IIB4-CELL3**	**IIB4+CELL3**	**IIO4CELL3**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1 F	162.452 *	12.123	-1.461	147.904 *	169.726 *	21.822	-0.752	140.630 *	145.479 *	4.849
2 F	162.452 *	16.973	-1.470	147.904 *	169.726 *	21.822	-0.752	143.055 *	143.055 *	0.000
3 F	172.151 *	12.123	-1.597	162.452 *	184.274 *	21.822	-1.755	169.726 *	167.301 *	2.425
4 F	160.027 *	12.123	-1.270	145.479 *	169.726 *	24.247	-1.969	140.630 *	143.055 *	2.425
5 F	181.849 *	24.247	-1.619	140.630 *	150.329 *	9.699	-2.710	133.356 *	123.658 *	9.699
6 F	189.123 *	19.397	-2.081	169.726 *	191.548 *	21.822	-2.154	160.027 *	160.027 *	0.000
7 F	179.425 *	16.973	-1.685	167.301 *	191.548 *	24.247	-2.609	164.877 *	167.301 *	2.425
8 F	181.849 *	19.397	-2.449	157.603 *	174.576 *	16.973	-2.409	155.178 *	152.753 *	2.425
9 F	174.576 *	16.973	-1.470	160.027 *	181.849 *	21.822	-2.777	155.178 *	157.603 *	2.425
10 F	186.699 *	21.822	-0.375	140.630 *	155.178 *	14.548	-0.893	135.781 *	126.082 *	9.699
11	19.397	2.425	0.871	14.548	19.397	4.849	-0.549	16.973	19.397	2.425
MEAN	160.909nA	15.871nA	-1.328mV	141.291nA	159.807nA	18.516nA	-1.757mV	137.765nA	136.883nA	3.527nA
SIGMA	47.985nA	5.975nA	889.569uV	43.266nA	48.414nA	6.348nA	867.640uV	41.853nA	41.608nA	3.318nA
MIN	19.397nA	2.425nA	-2.449mV	14.548nA	19.397nA	4.849nA	-2.777mV	16.973nA	19.397nA	0.000 A
MAX	189.123nA	24.247nA	871.000uV	169.726nA	191.548nA	24.247nA	-549.000uV	169.726nA	167.301nA	9.699nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	14.0	14.1	14.2	14.3	15.0	15.1	15.2	15.3	16.0	16.1
Test	VIO4CELL4	IIB4-CELL4	IIB4+CELL4	IIO4CELL4	VIO2CELL1	IIB2-CELL1	IIB2+CELL1	IIO2CELL1	VIO2CELL2	IIB2-CELL2
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT	-1.600 V				-13.000 V				-13.000 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**14.0**	**14.1**	**14.2**	**14.3**	**15.0**	**15.1**	**15.2**	**15.3**	**16.0**	**16.1**
Test	**VIO4CELL4**	**IIB4-CELL4**	**IIB4+CELL4**	**IIO4CELL4**	**VIO2CELL1**	**IIB2-CELL1**	**IIB2+CELL1**	**IIO2CELL1**	**VIO2CELL2**	**IIB2-CELL2**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1 F	-1.518	121.233 *	130.932 *	9.699	-1.605	121.233 *	133.356 *	12.123	-0.837	116.384 *
2 F	-1.511	121.233 *	130.932 *	9.699	-1.611	116.384 *	133.356 *	16.973	-0.844	116.384 *
3 F	-2.433	150.329 *	152.753 *	2.425	-1.828	128.507 *	143.055 *	14.548	-0.953	130.932 *
4 F	-1.397	118.808 *	128.507 *	9.699	-1.264	111.534 *	130.932 *	19.397	-0.670	116.384 *
5 F	-1.256	133.356 *	143.055 *	9.699	-1.461	128.507 *	150.329 *	21.822	-0.983	116.384 *
6 F	-2.330	140.630 *	147.904 *	7.274	-1.099	130.932 *	152.753 *	21.822	-1.415	138.206 *
7 F	-2.510	143.055 *	152.753 *	9.699	-1.150	128.507 *	147.904 *	19.397	-1.002	133.356 *
8 F	-2.561	135.781 *	140.630 *	4.849	-0.915	128.507 *	145.479 *	16.973	-1.749	126.082 *
9 F	-1.665	130.932 *	140.630 *	9.699	-0.943	123.658 *	140.630 *	16.973	-0.853	128.507 *
10 F	-1.466	138.206 *	150.329 *	12.123	-1.257	130.932 *	155.178 *	24.247	0.242	113.959 *
11	-0.302	16.973	16.973	0.000	-0.336	9.699	14.548	4.849	0.707	7.274
MEAN	-1.723mV	122.776nA	130.491nA	7.715nA	-1.224mV	114.400nA	131.593nA	17.193nA	-759.727uV	113.077nA
SIGMA	685.139uV	36.455nA	38.655nA	3.728nA	412.636uV	35.284nA	39.665nA	5.362nA	688.369uV	36.066nA
MIN	-2.561mV	16.973nA	16.973nA	0.000 A	-1.828mV	9.699nA	14.548nA	4.849nA	-1.749mV	7.274nA
MAX	-302.000uV	150.329nA	152.753nA	12.123nA	-336.000uV	130.932nA	155.178nA	24.247nA	707.000uV	138.206nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
Test	IIB2+CELL2	IIO2CELL2	VIO2CELL3	IIB2-CELL3	IIB2+CELL3	IIO2CELL3	VIO2CELL4	IIB2-CELL4	IIB2+CELL4	IIO2CELL4
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT			-13.000 V				-13.000 V			

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb **Test** **Unit**	**16.2** **IIB2+CELL2** **nA**	**16.3** **IIO2CELL2** **nA**	**17.0** **VIO2CELL3** **mV**	**17.1** **IIB2-CELL3** **nA**	**17.2** **IIB2+CELL3** **nA**	**17.3** **IIO2CELL3** **nA**	**18.0** **VIO2CELL4** **mV**	**18.1** **IIB2-CELL4** **nA**	**18.2** **IIB2+CELL4** **nA**	**18.3** **IIO2CELL4** **nA**
1 F	135.781 *	19.397	0.036	109.110 *	116.384 *	7.274	-0.928	104.260 *	104.260 *	0.000
2 F	135.781 *	19.397	0.030	109.110 *	116.384 *	7.274	-0.934	96.986	106.685 *	9.699
3 F	152.753 *	21.822	-0.972	130.932 *	135.781 *	4.849	-1.877	121.233 *	126.082 *	4.849
4 F	133.356 *	16.973	-1.165	106.685 *	113.959 *	7.274	-0.885	96.986	101.836 *	4.849
5 F	126.082 *	9.699	-1.903	101.836 *	104.260 *	2.425	-0.782	109.110 *	118.808 *	9.699
6 F	152.753 *	14.548	-1.299	118.808 *	130.932 *	12.123	-1.724	111.534 *	121.233 *	9.699
7 F	152.753 *	19.397	-1.685	123.658 *	135.781 *	12.123	-1.909	113.959 *	123.658 *	9.699
8 F	140.630 *	14.548	-1.530	118.808 *	126.082 *	7.274	-1.968	106.685 *	116.384 *	9.699
9 F	145.479 *	16.973	-1.914	116.384 *	126.082 *	9.699	-1.096	106.685 *	113.959 *	7.274
10 F	128.507 *	14.548	-0.077	104.260 *	106.685 *	2.425	-0.921	113.959 *	123.658 *	9.699
11	16.973	9.699	-0.494	12.123	16.973	4.849	-0.448	16.973	16.973	0.000
MEAN	129.168nA	16.091nA	-0.998mV	104.701nA	111.755nA	7.054nA	-1.225mV	99.852nA	106.685nA	6.833nA
SIGMA	38.430nA	3.950nA	758.975uV	31.943nA	33.236nA	3.334nA	537.730uV	28.417nA	30.880nA	3.882nA
MIN	16.973nA	9.699nA	-1.914mV	12.123nA	16.973nA	2.425nA	-1.968mV	16.973nA	16.973nA	0.000 A
MAX	152.753nA	21.822nA	36.000uV	130.932nA	135.781nA	12.123nA	-448.000uV	121.233nA	126.082nA	9.699nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	19.0	19.1	19.2	19.3	20.0	20.1	20.2	20.3	21.0	21.1
Test	VIO1CELL1	IIB1-CELL1	IIB1+CELL1	IIO1CELL1	VIO1CELL2	IIB1-CELL2	IIB1+CELL2	IIO1CELL2	VIO1CELL3	IIB1-CELL3
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT	15.000 V				15.000 V				15.000 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**19.0**	**19.1**	**19.2**	**19.3**	**20.0**	**20.1**	**20.2**	**20.3**	**21.0**	**21.1**
Test	**VIO1CELL1**	**IIB1-CELL1**	**IIB1+CELL1**	**IIO1CELL1**	**VIO1CELL2**	**IIB1-CELL2**	**IIB1+CELL2**	**IIO1CELL2**	**VIO1CELL3**	**IIB1-CELL3**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1 F	-2.621	181.849 *	193.973 *	12.123	-1.856	177.000 *	203.671 *	26.671 *	-0.778	164.877 *
2 F	-2.631	179.425 *	193.973 *	14.548	-1.856	179.425 *	201.247 *	21.822	-0.780	169.726 *
3 F	-2.877	193.973 *	206.096 *	12.123	-2.010	196.397 *	218.219 *	21.822	-1.878	196.397 *
4 F	-2.114	174.576 *	193.973 *	19.397	-1.605	174.576 *	201.247 *	26.671 *	-2.022	160.027 *
5 F	-2.316	193.973 *	215.795 *	21.822	-2.001	167.301 *	181.849 *	14.548	-2.810	150.329 *
6 F	-2.083	206.096 *	230.343 *	24.247	-2.564	206.096 *	230.343 *	24.247	-2.289	181.849 *
7 F	-2.131	196.397 *	215.795 *	19.397	-2.114	201.247 *	230.343 *	29.096 *	-2.810	191.548 *
8 F	-1.835	196.397 *	218.219 *	21.822	-2.932	189.123 *	208.521 *	19.397	-2.590	177.000 *
9 F	-1.880	191.548 *	210.945 *	19.397	-1.835	191.548 *	215.795 *	24.247	-2.976	177.000 *
10 F	-2.181	201.247 *	223.068 *	21.822	-0.670	169.726 *	184.274 *	14.548	-0.905	155.178 *
11	-0.280	19.397	19.397	0.000	0.820	16.973	21.822	4.849	-0.350	16.973
MEAN	-2.086mV	175.898nA	192.871nA	16.973nA	-1.693mV	169.947nA	190.666nA	20.720nA	-1.835mV	158.264nA
SIGMA	681.230uV	52.759nA	58.829nA	6.943nA	1.005mV	52.335nA	58.205nA	7.058nA	0.965mV	49.025nA
MIN	-2.877mV	19.397nA	19.397nA	0.000 A	-2.932mV	16.973nA	21.822nA	4.849nA	-2.976mV	16.973nA
MAX	-280.000uV	206.096nA	230.343nA	24.247nA	820.000uV	206.096nA	230.343nA	29.096nA	-350.000uV	196.397nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	21.2	21.3	22.0	22.1	22.2	22.3	23.0	23.1	23.2	23.3
Test	IIB1+CELL3	IIO1CELL3	VIO1CELL4	IIB1-CELL4	IIB1+CELL4	IIO1CELL4	AVSCELL1	AVSCELL2	AVSCELL3	AVSCELL4
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	15.000 V	15.000 V	15.000 V	15.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT			15.000 V				1.000 V	1.000 V	1.000 V	1.000 V
VT'							11.000 V	11.000 V	11.000 V	11.000 V

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	50.000	50.000	50.000	50.000
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 K	5.000 K	5.000 K	5.000 K

DATA RECORDS

Test Nb	**21.2**	**21.3**	**22.0**	**22.1**	**22.2**	**22.3**	**23.0**	**23.1**	**23.2**	**23.3**
Test	**IIB1+CELL3**	**IIO1CELL3**	**VIO1CELL4**	**IIB1-CELL4**	**IIB1+CELL4**	**IIO1CELL4**	**AVSCELL1**	**AVSCELL2**	**AVSCELL3**	**AVSCELL4**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**V/MV**	**V/MV**	**V/MV**	**V/MV**
1 F	172.151 *	7.274	-1.767	145.479 *	155.178 *	9.699	143.464	138.934	136.069	145.041
2 F	169.726 *	0.000	-1.755	145.479 *	152.753 *	7.274	151.709	140.412	137.487	145.041
3 F	196.397 *	0.000	-2.736	179.425 *	181.849 *	2.425	122.210	115.778	116.803	113.782
4 F	172.151 *	12.123	-1.592	140.630 *	152.753 *	12.123	149.985	140.412	137.487	131.987
5 F	145.479 *	4.849	-1.446	160.027 *	167.301 *	7.274	122.210	122.210	121.089	123.352
6 F	191.548 *	9.699	-2.692	167.301 *	172.151 *	4.849	114.771	115.778	113.782	117.846
7 F	201.247 *	9.699	-2.880	172.151 *	179.425 *	7.274	118.907	113.782	114.771	113.782
8 F	186.699 *	9.699	-2.910	160.027 *	167.301 *	7.274	122.210	113.782	122.210	123.352
9 F	186.699 *	9.699	-1.927	157.603 *	167.301 *	9.699	125.702	123.352	118.907	117.846
10 F	152.753 *	2.425	-1.690	164.877 *	179.425 *	14.548	128.143	122.210	124.516	124.516
11	24.247	7.274	-0.323	21.822	19.397	2.425	253.821	244.421	231.556	223.707
MEAN	163.554nA	6.613nA	-1.974mV	146.802nA	154.076nA	7.715nA	141.194	135.552	134.062	134.568
SIGMA	49.386nA	4.212nA	782.131uV	43.107nA	45.881nA	3.728nA	39.452	37.611	33.531	31.540
MIN	24.247nA	0.000 A	-2.910mV	21.822nA	19.397nA	2.425nA	114.771	113.782	113.782	113.782
MAX	201.247nA	12.123nA	-323.000uV	179.425nA	181.849nA	14.548nA	253.821	244.421	231.556	223.707
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	24.0	24.1	24.2	24.3	25.0	25.1	25.2	25.3
Test	CMR1C1	CMR1C2	CMR1C3	CMR1C4	CMR2C1	CMR2C2	CMR2C3	CMR2C4
VCC	5.000 V	5.000 V	5.000 V	5.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VCC'	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE'	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V

LIMITS

MIN	70.000 DB	70.000 DB	70.000 DB	70.000 DB	76.000 DB	76.000 DB	76.000 DB	76.000 DB
MAX	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB

DATA RECORDS

Test Nb	**24.0**	**24.1**	**24.2**	**24.3**	**25.0**	**25.1**	**25.2**	**25.3**
Test	**CMR1C1**	**CMR1C2**	**CMR1C3**	**CMR1C4**	**CMR2C1**	**CMR2C2**	**CMR2C3**	**CMR2C4**
Unit	**DB**	**DB**	**DB**	**DB**	**DB**	**DB**	**DB**	**DB**
1	81.414	82.154	82.970	83.110	88.799	88.788	90.737	90.468
2	81.247	82.325	82.741	82.802	88.770	88.840	90.778	90.656
3	81.306	81.370	82.475	82.878	88.532	88.460	89.802	90.273
4	82.751	82.771	82.042	84.106	90.359	89.531	90.280	91.954
5	82.751	81.729	81.960	85.240	90.301	88.788	89.784	92.508
6	81.937	80.944	80.998	80.993	89.078	87.735	89.034	89.223
7	81.662	81.180	80.183	81.055	89.109	88.019	87.919	89.196
8	81.864	80.620	80.750	82.029	89.671	87.486	88.441	89.459
9	82.484	82.154	80.779	82.954	89.512	89.102	88.417	90.555
10	82.267	82.736	82.771	83.829	89.623	89.742	90.581	91.229
11	119.910	107.869	102.798	111.123	113.967	107.914	105.774	106.999
MEAN	85.418 DB	84.168 DB	83.679 DB	85.465 DB	91.611 DB	90.400 DB	91.050 DB	92.047 DB
SIGMA	11.453 DB	7.893 DB	6.413 DB	8.601 DB	7.439 DB	5.850 DB	4.985 DB	5.070 DB
MIN	81.247 DB	80.620 DB	80.183 DB	80.993 DB	88.532 DB	87.486 DB	87.919 DB	89.196 DB
MAX	119.910 DB	107.869 DB	102.798 DB	111.123 DB	113.967 DB	107.914 DB	105.774 DB	106.999 DB
QTY	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

REJECTED UNITS :

1,2,3,4,5,6,7,8,9,10

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10

ELECTRICAL MEASUREMENTS

AFTER 30 KRad

DC AT 25 °C

MOTOROLA

Motorola Semiconducteurs S.A.
Centre Electronique de Toulouse

MOTOROLA Semiconductors

HIGH RELIABILITY DIVISION

TRACEABILITY INFORMATION

PROCESS LOT NUMBER	NTTA0139J
DEVICE	TY38348H
SOURCE TYPE	LM139J
DATE CODE	9504
CUSTOMER	VARIOUS
CUSTOMER PART NUMBER	SCC 9103 004 05B
LOT SIZE	11
SERIAL NUMBER RANGE	1-11
MEASUREMENT TYPE	25 C RADIATION TESTING
DATE	03-MAR-95
COMMENTS	

TABLE 2A DC PARAMETERS
ELECTRICAL RECORDS AFTER 30 Krad

LM139J **Temperature : 25** **Lot:** **NTTA0139J** **Page: 1**

PARAMETERS TEST CONDITIONS

Test Nb	1.0	1.1	2.0	2.1	2.2	2.3	3.0	3.1	3.2	3.3
Test	ICC1	ICC2	IIL+CELL1	IIL+CELL2	IIL+CELL3	IIL+CELL4	IIL-CELL4	IIL-CELL3	IIL-CELL2	IIL-CELL1
VCC	5.000 V	30.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V
VEE	0.000 V	0.000 V								
VIN+			34.000 V	34.000 V	34.000 V	34.000 V				
VIN-							34.000 V	34.000 V	34.000 V	34.000 V

LIMITS

MIN	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A
MAX	2.000 mA	3.000 mA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA

DATA RECORDS

Test Nb **Test** **Unit**	**1.0** **ICC1** **mA**	**1.1** **ICC2** **mA**	**2.0** **IIL+CELL1** **nA**	**2.1** **IIL+CELL2** **nA**	**2.2** **IIL+CELL3** **nA**	**2.3** **IIL+CELL4** **nA**	**3.0** **IIL-CELL4** **nA**	**3.1** **IIL-CELL3** **nA**	**3.2** **IIL-CELL2** **nA**	**3.3** **IIL-CELL1** **nA**
1	0.776	1.044	106.000	173.000	149.000	142.000	3.000	99.000	150.000	129.000
2	0.766	1.069	97.000	158.000	176.000	178.000	28.000	123.000	151.000	166.000
3	0.750	1.020	106.000	184.000	184.000	162.000	9.000	119.000	160.000	171.000
4	0.785	1.047	94.000	163.000	148.000	158.000	20.000	91.000	139.000	155.000
5	0.768	1.053	118.000	123.000	120.000	164.000	24.000	82.000	190.000	174.000
6	0.752	1.024	115.000	177.000	177.000	163.000	9.000	104.000	160.000	175.000
7	0.749	1.022	138.000	179.000	201.000	181.000	83.000	163.000	197.000	198.000
8	0.748	1.022	144.000	173.000	163.000	162.000	80.000	157.000	188.000	198.000
9	0.760	1.026	99.000	165.000	177.000	161.000	3.000	99.000	141.000	174.000
10	0.774	1.068	167.000	143.000	128.000	180.000	90.000	146.000	170.000	201.000
11	0.942	1.190	76.000	17.000	8.000	13.000	86.000	16.000	3.000	40.000
MEAN	779.091uA	1.053mA	114.545nA	150.455nA	148.273nA	151.273nA	39.545nA	109.000nA	149.909nA	161.909nA
SIGMA	55.426uA	48.936uA	26.048nA	47.652nA	52.517nA	47.221nA	36.773nA	41.002nA	52.597nA	45.485nA
MIN	748.000uA	1.020mA	76.000nA	17.000nA	8.000nA	13.000nA	3.000nA	16.000nA	3.000nA	40.000nA
MAX	0.942mA	1.190mA	167.000nA	184.000nA	201.000nA	181.000nA	90.000nA	163.000nA	197.000nA	201.000nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1
Test	IOLCELL1	IOLCELL2	IOLCELL3	IOLCELL4	VOL1CELL4	VOL1CELL3	VOL1CELL2	VOL1CELL1	VOL2CELL1	VOL2CELL2
VCC	30.000 V	30.000 V	30.000 V	30.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V
VOUT	30.000 V	30.000 V	30.000 V	30.000 V						
VEE					0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
IOUT					4.000 mA	4.000 mA	4.000 mA	4.000 mA	8.000 mA	8.000 mA

LIMITS

	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1
MIN	0.000 A	0.000 A	0.000 A	0.000 A	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
MAX	1.000 uA	1.000 uA	1.000 uA	1.000 uA	400.000 mV	400.000 mV	400.000 mV	400.000 mV	1.500 V	1.500 V

DATA RECORDS

Test Nb	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1
Test	IOLCELL1	IOLCELL2	IOLCELL3	IOLCELL4	VOL1CELL4	VOL1CELL3	VOL1CELL2	VOL1CELL1	VOL2CELL1	VOL2CELL2
Unit	nA	nA	nA	nA	mV	mV	mV	mV	mV	mV
1	54.000	29.000	15.000	14.000	107.305	110.950	112.169	115.037	163.107	160.379
2	61.000	25.000	17.000	17.000	107.456	111.544	112.832	113.950	162.955	160.985
3	58.000	28.000	14.000	19.000	112.927	117.469	119.390	120.129	173.667	171.470
4	56.000	26.000	21.000	13.000	105.024	111.544	110.268	112.832	160.303	156.136
5	60.000	27.000	16.000	19.000	106.369	109.908	111.544	113.136	160.985	159.166
6	59.000	27.000	15.000	20.000	112.169	116.124	118.575	119.144	171.394	170.409
7	43.000	28.000	17.000	13.000	114.355	118.234	120.508	121.917	176.243	173.137
8	46.000	28.000	13.000	18.000	111.544	115.435	117.185	119.599	172.455	168.287
9	59.000	27.000	16.000	18.000	110.969	115.359	116.446	117.621	168.893	167.426
10	49.000	23.000	19.000	15.000	109.415	112.757	113.533	114.658	162.728	160.455
11	55.000	24.000	16.000	17.000	84.808	87.809	87.601	88.605	126.093	125.108
MEAN	54.545nA	26.545nA	16.273nA	16.636nA	107.486mV	111.558mV	112.732mV	114.239mV	163.529mV	161.178mV
SIGMA	6.023nA	1.864nA	2.240nA	2.501nA	8.079mV	8.357mV	9.014mV	9.050mV	13.617mV	13.249mV
MIN	43.000nA	23.000nA	13.000nA	13.000nA	84.808mV	87.809mV	87.601mV	88.605mV	126.093mV	125.108mV
MAX	61.000nA	29.000nA	21.000nA	20.000nA	114.355mV	118.234mV	120.508mV	121.917mV	176.243mV	173.137mV
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	6.2	6.3	7.0	7.1	7.2	7.3	8.0	8.1	8.2	8.3
Test	VOL2CELL3	VOL2CELL4	VIO3CELL1	IIB3-CELL1	IIB3+CELL1	IIO3CELL1	VIO3CELL2	IIB3-CELL2	IIB3+CELL2	IIO3CELL2
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
IOUT	8.000 mA	8.000 mA								
VT			1.400 V				1.400 V			

LIMITS

	6.2	6.3	7.0	7.1	7.2	7.3	8.0	8.1	8.2	8.3
MIN	0.000 V	0.000 V	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	1.500 V	1.500 V	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**6.2**	**6.3**	**7.0**	**7.1**	**7.2**	**7.3**	**8.0**	**8.1**	**8.2**	**8.3**
Test	**VOL2CELL3**	**VOL2CELL4**	**VIO3CELL1**	**IIB3-CELL1**	**IIB3+CELL1**	**IIO3CELL1**	**VIO3CELL2**	**IIB3-CELL2**	**IIB3+CELL2**	**IIO3CELL2**
Unit	**mV**	**mV**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1 F	158.030	153.077	-3.870	288.534 *	334.603 *	46.068 *	-2.959	278.836 *	349.151 *	70.315 *
2 F	159.848	154.971	-4.212	281.260 *	327.329 *	46.068 *	-3.105	293.384 *	356.425 *	63.041 *
3 F	170.106	163.940	-3.470	298.233 *	366.123 *	67.890 *	-3.384	300.658 *	370.973 *	70.315 *
4 F	158.257	150.652	-3.336	269.137 *	327.329 *	58.192 *	-2.740	273.986 *	339.452 *	65.466 *
5 F	156.893	153.077	-3.672	293.384 *	363.699 *	70.315 *	-3.125	249.740 *	286.110 *	36.370 *
6 F	167.426	162.273	-3.392	312.781 *	392.795 *	80.014 *	-3.672	317.630 *	395.219 *	77.589 *
7 F	171.091	166.516	-3.444	300.658 *	366.123 *	65.466 *	-3.236	312.781 *	395.219 *	82.438 *
8 F	165.834	161.667	-3.224	298.233 *	370.973 *	72.740 *	-4.103	293.384 *	354.000 *	60.616 *
9 F	166.213	160.379	-3.179	286.110 *	354.000 *	67.890 *	-3.000	298.233 *	366.123 *	67.890 *
10 F	160.152	156.742	-3.558	305.507 *	380.671 *	75.164 *	-1.895	257.014 *	293.384 *	36.370 *
11	125.184	121.243	-0.326	19.397	16.973	2.425	0.883	16.973	21.822	4.849
MEAN	159.912mV	154.958mV	-3.244mV	268.476nA	327.329nA	59.294nA	-2.758mV	262.965nA	320.716nA	57.751nA
SIGMA	12.576mV	12.279mV	1.012mV	83.474nA	105.097nA	21.805nA	1.327mV	84.309nA	105.126nA	22.869nA
MIN	125.184mV	121.243mV	-4.212mV	19.397nA	16.973nA	2.425nA	-4.103mV	16.973nA	21.822nA	4.849nA
MAX	171.091mV	166.516mV	-326.000uV	312.781nA	392.795nA	80.014nA	883.000uV	317.630nA	395.219nA	82.438nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1
Test	VIO3CELL3	IIB3-CELL3	IIB3+CELL3	IIO3CELL3	VIO3CELL4	IIB3-CELL4	IIB3+CELL4	IIO3CELL4	VIO4CELL1	IIB4-CELL1
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	2.000 V	2.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	-3.000 V	-3.000 V
VT	1.400 V				1.400 V				-1.600 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**9.0**	**9.1**	**9.2**	**9.3**	**10.0**	**10.1**	**10.2**	**10.3**	**11.0**	**11.1**
Test	**VIO3CELL3**	**IIB3-CELL3**	**IIB3+CELL3**	**IIO3CELL3**	**VIO3CELL4**	**IIB3-CELL4**	**IIB3+CELL4**	**IIO3CELL4**	**VIO4CELL1**	**IIB4-CELL1**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1 F	-2.401	249.740 *	276.411 *	26.671 *	-3.000	215.795 *	235.192 *	19.397	-3.489	247.315 *
2 F	-3.548	293.384 *	310.356 *	16.973	-3.978	261.863 *	278.836 *	16.973	-3.834	254.589 *
3 F	-4.401	281.260 *	303.083 *	21.822	-5.124 *	244.890 *	273.986 *	29.096 *	-3.140	269.137 *
4 F	-3.628	244.890 *	271.562 *	26.671 *	-2.806	210.945 *	230.343 *	19.397	-3.006	240.041 *
5 F	-4.393	218.219 *	210.945 *	7.274	-2.616	232.767 *	259.438 *	26.671 *	-3.354	264.288 *
6 F	-3.943	281.260 *	305.507 *	24.247	-3.962	244.890 *	271.562 *	26.671 *	-3.047	276.411 *
7 F	-4.430	293.384 *	324.904 *	31.521 *	-4.166	254.589 *	286.110 *	31.521 *	-3.087	266.712 *
8 F	-4.192	271.562 *	298.233 *	26.671 *	-4.121	235.192 *	261.863 *	26.671 *	-2.883	269.137 *
9 F	-4.563	273.986 *	303.083 *	29.096 *	-3.214	232.767 *	259.438 *	26.671 *	-2.854	259.438 *
10 F	-2.551	227.918 *	220.644 *	7.274	-2.825	244.890 *	288.534 *	43.644 *	-3.231	276.411 *
11	-0.524	16.973	21.822	4.849	-0.289	19.397	19.397	0.000	-0.326	14.548
MEAN	-3.507mV	241.143nA	258.777nA	20.279nA	-3.282mV	217.999nA	242.245nA	24.247nA	-2.932mV	239.821nA
SIGMA	1.235mV	78.563nA	86.639nA	9.655nA	1.255mV	67.573nA	76.224nA	10.789nA	0.910mV	75.581nA
MIN	-4.563mV	16.973nA	21.822nA	4.849nA	-5.124mV	19.397nA	19.397nA	0.000 A	-3.834mV	14.548nA
MAX	-524.000uV	293.384nA	324.904nA	31.521nA	-289.000uV	261.863nA	288.534nA	43.644nA	-326.000uV	276.411nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	11.2	11.3	12.0	12.1	12.2	12.3	13.0	13.1	13.2	13.3
Test	IIB4+CELL1	IIO4CELL1	VIO4CELL2	IIB4-CELL2	IIB4+CELL2	IIO4CELL2	VIO4CELL3	IIB4-CELL3	IIB4+CELL3	IIO4CELL3
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V
VT			-1.600 V				-1.600 V			

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb **Test** **Unit**	**11.2** **IIB4+CELL1** **nA**	**11.3** **IIO4CELL1** **nA**	**12.0** **VIO4CELL2** **mV**	**12.1** **IIB4-CELL2** **nA**	**12.2** **IIB4+CELL2** **nA**	**12.3** **IIO4CELL2** **nA**	**13.0** **VIO4CELL3** **mV**	**13.1** **IIB4-CELL3** **nA**	**13.2** **IIB4+CELL3** **nA**	**13.3** **IIO4CELL3** **nA**
1 F	298.233 *	50.918 *	-2.630	247.315 *	315.206 *	67.890 *	-2.020	235.192 *	249.740 *	14.548
2 F	295.808 *	41.219 *	-2.760	264.288 *	320.055 *	55.767 *	-3.166	276.411 *	283.685 *	7.274
3 F	329.754 *	60.616 *	-3.047	269.137 *	334.603 *	65.466 *	-3.978	264.288 *	271.562 *	7.274
4 F	293.384 *	53.342 *	-2.406	242.466 *	307.932 *	65.466 *	-3.233	230.343 *	247.315 *	16.973
5 F	329.754 *	65.466 *	-2.765	227.918 *	257.014 *	29.096 *	-3.999	210.945 *	191.548 *	19.397
6 F	354.000 *	77.589 *	-3.315	286.110 *	354.000 *	67.890 *	-3.524	261.863 *	278.836 *	16.973
7 F	332.178 *	65.466 *	-2.892	281.260 *	354.000 *	72.740 *	-3.981	276.411 *	295.808 *	19.397
8 F	332.178 *	63.041 *	-3.713	261.863 *	317.630 *	55.767 *	-3.759	254.589 *	269.137 *	14.548
9 F	320.055 *	60.616 *	-2.667	266.712 *	329.754 *	63.041 *	-4.129	257.014 *	273.986 *	16.973
10 F	344.301 *	67.890 *	-1.573	230.343 *	266.712 *	36.370 *	-2.181	215.795 *	201.247 *	14.548
11	19.397	4.849	0.873	14.548	19.397	4.849	-0.552	16.973	19.397	2.425
MEAN	295.367nA	55.547nA	-2.445mV	235.633nA	288.755nA	53.122nA	-3.138mV	227.257nA	234.751nA	13.666nA
SIGMA	93.642nA	19.350nA	1.224mV	75.747nA	94.459nA	21.039nA	1.120mV	73.296nA	78.671nA	5.558nA
MIN	19.397nA	4.849nA	-3.713mV	14.548nA	19.397nA	4.849nA	-4.129mV	16.973nA	19.397nA	2.425nA
MAX	354.000nA	77.589nA	873.000uV	286.110nA	354.000nA	72.740nA	-552.000uV	276.411nA	295.808nA	19.397nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	14.0	14.1	14.2	14.3	15.0	15.1	15.2	15.3	16.0	16.1
Test	VIO4CELL4	IIB4-CELL4	IIB4+CELL4	IIO4CELL4	VIO2CELL1	IIB2-CELL1	IIB2+CELL1	IIO2CELL1	VIO2CELL2	IIB2-CELL2
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT	-1.600 V				-13.000 V				-13.000 V	

LIMITS

	14.0	14.1	14.2	14.3	15.0	15.1	15.2	15.3	16.0	16.1
MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**14.0**	**14.1**	**14.2**	**14.3**	**15.0**	**15.1**	**15.2**	**15.3**	**16.0**	**16.1**
Test	**VIO4CELL4**	**IIB4-CELL4**	**IIB4+CELL4**	**IIO4CELL4**	**VIO2CELL1**	**IIB2-CELL1**	**IIB2+CELL1**	**IIO2CELL1**	**VIO2CELL2**	**IIB2-CELL2**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1 F	-2.667	193.973 *	213.370 *	19.397	-2.515	196.397 *	235.192 *	38.795 *	-1.831	196.397 *
2 F	-3.640	237.616 *	252.164 *	14.548	-2.859	206.096 *	240.041 *	33.945 *	-1.926	213.370 *
3 F	-4.740	223.068 *	247.315 *	24.247	-2.199	213.370 *	264.288 *	50.918 *	-2.216	215.795 *
4 F	-2.496	189.123 *	208.521 *	19.397	-2.113	189.123 *	227.918 *	38.795 *	-1.623	193.973 *
5 F	-2.342	215.795 *	232.767 *	16.973	-2.461	213.370 *	266.712 *	53.342 *	-1.937	184.274 *
6 F	-3.595	223.068 *	244.890 *	21.822	-2.095	220.644 *	281.260 *	60.616 *	-2.459	227.918 *
7 F	-3.798	227.918 *	259.438 *	31.521 *	-2.134	213.370 *	261.863 *	48.493 *	-2.023	223.068 *
8 F	-3.768	215.795 *	235.192 *	19.397	-1.949	213.370 *	266.712 *	53.342 *	-2.812	208.521 *
9 F	-2.874	213.370 *	232.767 *	19.397	-1.895	203.671 *	254.589 *	50.918 *	-1.856	213.370 *
10 F	-2.536	225.493 *	257.014 *	31.521 *	-2.303	218.219 *	276.411 *	58.192 *	-0.752	186.699 *
11	-0.298	16.973	16.973	0.000	-0.338	7.274	16.973	9.699	0.701	9.699
MEAN	-2.978mV	198.381nA	218.219nA	19.838nA	-2.078mV	190.446nA	235.633nA	45.187nA	-1.703mV	188.462nA
SIGMA	1.155mV	61.815nA	68.734nA	8.526nA	639.943uV	61.477nA	74.456nA	14.437nA	0.949mV	61.004nA
MIN	-4.740mV	16.973nA	16.973nA	0.000 A	-2.859mV	7.274nA	16.973nA	9.699nA	-2.812mV	9.699nA
MAX	-298.000uV	237.616nA	259.438nA	31.521nA	-338.000uV	220.644nA	281.260nA	60.616nA	701.000uV	227.918nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
Test	IIB2+CELL2	IIO2CELL2	VIO2CELL3	IIB2-CELL3	IIB2+CELL3	IIO2CELL3	VIO2CELL4	IIB2-CELL4	IIB2+CELL4	IIO2CELL4
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT			-13.000 V				-13.000 V			

LIMITS

	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**16.2**	**16.3**	**17.0**	**17.1**	**17.2**	**17.3**	**18.0**	**18.1**	**18.2**	**18.3**
Test	**IIB2+CELL2**	**IIO2CELL2**	**VIO2CELL3**	**IIB2-CELL3**	**IIB2+CELL3**	**IIO2CELL3**	**VIO2CELL4**	**IIB2-CELL4**	**IIB2+CELL4**	**IIO2CELL4**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1 F	247.315 *	50.918 *	-0.939	177.000 *	198.822 *	21.822	-1.833	152.753 *	172.151 *	19.397
2 F	259.438 *	46.068 *	-2.090	210.945 *	230.343 *	19.397	-2.862	191.548 *	206.096 *	14.548
3 F	264.288 *	48.493 *	-2.783	198.822 *	218.219 *	19.397	-3.852	177.000 *	198.822 *	21.822
4 F	240.041 *	46.068 *	-2.142	169.726 *	198.822 *	29.096 *	-1.740	152.753 *	167.301 *	14.548
5 F	210.945 *	26.671 *	-2.903	160.027 *	157.603 *	2.425	-1.664	181.849 *	191.548 *	9.699
6 F	278.836 *	50.918 *	-2.370	208.521 *	220.644 *	12.123	-2.743	179.425 *	196.397 *	16.973
7 F	276.411 *	53.342 *	-2.771	203.671 *	235.192 *	31.521 *	-2.950	181.849 *	208.521 *	26.671 *
8 F	252.164 *	43.644 *	-2.581	193.973 *	213.370 *	19.397	-2.935	172.151 *	189.123 *	16.973
9 F	259.438 *	46.068 *	-2.965	191.548 *	220.644 *	29.096 *	-2.062	167.301 *	186.699 *	19.397
10 F	215.795 *	29.096 *	-1.073	164.877 *	167.301 *	2.425	-1.804	179.425 *	210.945 *	31.521 *
11	16.973	7.274	-0.492	12.123	16.973	4.849	-0.448	9.699	16.973	7.274
MEAN	229.240nA	40.778nA	-2.101mV	171.930nA	188.903nA	17.413nA	-2.263mV	158.705nA	176.780nA	18.075nA
SIGMA	73.674nA	14.047nA	872.020uV	55.877nA	62.077nA	10.670nA	0.917mV	50.864nA	54.793nA	6.974nA
MIN	16.973nA	7.274nA	-2.965mV	12.123nA	16.973nA	2.425nA	-3.852mV	9.699nA	16.973nA	7.274nA
MAX	278.836nA	53.342nA	-492.000uV	210.945nA	235.192nA	31.521nA	-448.000uV	191.548nA	210.945nA	31.521nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	19.0	19.1	19.2	19.3	20.0	20.1	20.2	20.3	21.0	21.1
Test	VIO1CELL1	IIB1-CELL1	IIB1+CELL1	IIO1CELL1	VIO1CELL2	IIB1-CELL2	IIB1+CELL2	IIO1CELL2	VIO1CELL3	IIB1-CELL3
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT	15.000 V				15.000 V				15.000 V	

LIMITS

	19.0	19.1	19.2	19.3	20.0	20.1	20.2	20.3	21.0	21.1
MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**19.0**	**19.1**	**19.2**	**19.3**	**20.0**	**20.1**	**20.2**	**20.3**	**21.0**	**21.1**
Test	**VIO1CELL1**	**IIB1-CELL1**	**IIB1+CELL1**	**IIO1CELL1**	**VIO1CELL2**	**IIB1-CELL2**	**IIB1+CELL2**	**IIO1CELL2**	**VIO1CELL3**	**IIB1-CELL3**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1 F	-4.067	312.781 *	370.973 *	58.192 *	-3.304	312.781 *	387.945 *	75.164 *	-2.427	278.836 *
2 F	-4.428	322.479 *	366.123 *	43.644 *	-3.415	329.754 *	395.219 *	65.466 *	-3.657	327.329 *
3 F	-3.635	341.876 *	409.767 *	67.890 *	-3.718	341.876 *	412.192 *	70.315 *	-4.541	315.206 *
4 F	-3.463	300.658 *	363.699 *	63.041 *	-3.005	305.507 *	375.822 *	70.315 *	-3.663	271.562 *
5 F	-3.795	332.178 *	404.918 *	72.740 *	-3.436	281.260 *	315.206 *	33.945 *	-4.479	244.890 *
6 F	-3.548	356.425 *	436.438 *	80.014 *	-4.054	361.274 *	441.288 *	80.014 *	-4.039	315.206 *
7 F	-3.604	344.301 *	412.192 *	67.890 *	-3.586	354.000 *	441.288 *	87.288 *	-4.559	329.754 *
8 F	-3.353	337.027 *	414.616 *	77.589 *	-4.497	329.754 *	392.795 *	63.041 *	-4.303	303.083 *
9 F	-3.311	329.754 *	392.795 *	63.041 *	-3.292	332.178 *	409.767 *	77.589 *	-4.697	307.932 *
10 F	-3.687	349.151 *	424.315 *	75.165 *	-2.147	286.110 *	327.329 *	41.219 *	-2.552	257.014 *
11	-0.287	19.397	21.822	2.425	0.815	16.973	21.822	4.849	-0.348	19.397
MEAN	-3.380mV	304.184nA	365.242nA	61.057nA	-3.058mV	295.588nA	356.425nA	60.837nA	-3.570mV	270.019nA
SIGMA	1.075mV	95.824nA	116.400nA	21.951nA	1.414mV	95.843nA	117.924nA	24.499nA	1.323mV	87.840nA
MIN	-4.428mV	19.397nA	21.822nA	2.425nA	-4.497mV	16.973nA	21.822nA	4.849nA	-4.697mV	19.397nA
MAX	-287.000uV	356.425nA	436.438nA	80.014nA	815.000uV	361.274nA	441.288nA	87.288nA	-348.000uV	329.754nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	21.2	21.3	22.0	22.1	22.2	22.3	23.0	23.1	23.2	23.3
Test	IIB1+CELL3	IIO1CELL3	VIO1CELL4	IIB1-CELL4	IIB1+CELL4	IIO1CELL4	AVSCELL1	AVSCELL2	AVSCELL3	AVSCELL4
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	15.000 V	15.000 V	15.000 V	15.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT			15.000 V				1.000 V	1.000 V	1.000 V	1.000 V
VT'							11.000 V	11.000 V	11.000 V	11.000 V

LIMITS

	21.2	21.3	22.0	22.1	22.2	22.3	23.0	23.1	23.2	23.3
MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	50.000	50.000	50.000	50.000
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 K	5.000 K	5.000 K	5.000 K

DATA RECORDS

Test Nb	21.2	21.3	22.0	22.1	22.2	22.3	23.0	23.1	23.2	23.3
Test	IIB1+CELL3	IIO1CELL3	VIO1CELL4	IIB1-CELL4	IIB1+CELL4	IIO1CELL4	AVSCELL1	AVSCELL2	AVSCELL3	AVSCELL4
Unit	nA	nA	mV	nA	nA	nA	V/MV	V/MV	V/MV	V/MV
1 F	303.083 *	24.247	-3.251	240.041 *	259.438 *	19.397	110.914	103.115	110.914	112.809
2 F	344.301 *	16.973	-4.284	293.384 *	312.781 *	19.397	92.299	86.834	87.409	89.181
3 F	334.603 *	19.397	-5.475 *	276.411 *	305.507 *	29.096 *	88.582	85.153	87.409	89.181
4 F	300.658 *	29.096 *	-3.014	235.192 *	252.164 *	16.973	105.590	95.643	103.927	107.307
5 F	232.767 *	12.123	-2.810	261.863 *	288.534 *	26.671 *	90.402	91.026	99.990	94.955
6 F	339.452 *	24.247	-4.282	276.411 *	300.658 *	24.247	86.266	83.011	86.266	89.181
7 F	363.699 *	33.945 *	-4.493	288.534 *	317.630 *	29.096 *	85.153	80.480	89.787	84.068
8 F	329.754 *	26.671 *	-4.452	264.288 *	288.534 *	24.247	91.658	86.266	91.658	91.026
9 F	337.027 *	29.096 *	-3.445	261.863 *	286.110 *	24.247	94.277	79.992	89.181	91.658
10 F	244.890 *	12.123	-3.023	276.411 *	317.630 *	41.219 *	97.768	87.409	93.608	89.181
11	24.247	4.849	-0.335	21.822	19.397	2.425	269.362	216.372	239.977	212.882
MEAN	286.771nA	21.161nA	-3.533mV	245.111nA	268.035nA	23.365nA	110.206	99.573	107.284	104.675
SIGMA	96.287nA	8.882nA	1.343mV	76.201nA	85.266nA	9.532nA	53.372	39.320	44.701	36.901
MIN	24.247nA	4.849nA	-5.475mV	21.822nA	19.397nA	2.425nA	85.153	79.992	86.266	84.068
MAX	363.699nA	33.945nA	-335.000uV	293.384nA	317.630nA	41.219nA	269.362	216.372	239.977	212.882
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	24.0	24.1	24.2	24.3	25.0	25.1	25.2	25.3
Test	CMR1C1	CMR1C2	CMR1C3	CMR1C4	CMR2C1	CMR2C2	CMR2C3	CMR2C4
VCC	5.000 V	5.000 V	5.000 V	5.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VCC'	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE'	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V

LIMITS

MIN	70.000 DB	70.000 DB	70.000 DB	70.000 DB	76.000 DB	76.000 DB	76.000 DB	76.000 DB
MAX	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB

DATA RECORDS

Test Nb Test Unit	**24.0** **CMR1C1** **DB**	**24.1** **CMR1C2** **DB**	**24.2** **CMR1C3** **DB**	**24.3** **CMR1C4** **DB**	**25.0** **CMR2C1** **DB**	**25.1** **CMR2C2** **DB**	**25.2** **CMR2C3** **DB**	**25.3** **CMR2C4** **DB**
1	77.938	79.206	77.920	79.086	85.128	85.576	85.493	85.911
2	77.998	78.785	77.889	78.969	85.033	85.482	85.041	85.881
3	79.176	78.988	77.016	77.860	85.800	85.411	84.044	84.739
4	79.196	79.067	77.598	79.714	86.338	86.133	85.297	86.842
5	79.494	78.412	77.640	80.791	86.437	85.429	84.992	87.760
6	78.785	78.485	77.097	78.249	85.702	84.889	84.494	85.201
7	78.476	78.814	76.490	78.228	85.595	85.067	83.891	85.177
8	78.901	77.724	76.808	78.575	85.997	84.410	84.223	85.322
9	79.306	79.086	76.804	78.907	85.923	85.796	84.174	86.126
10	79.266	79.381	78.178	80.342	86.116	86.047	85.547	87.223
11	137.974	109.345	100.781	110.368	114.672	107.798	105.752	107.900
MEAN	84.228 DB	81.572 DB	79.475 DB	81.917 DB	88.431 DB	87.458 DB	86.632 DB	88.007 DB
SIGMA	17.833 DB	9.223 DB	7.087 DB	9.479 DB	8.714 DB	6.765 DB	6.369 DB	6.663 DB
MIN	77.938 DB	77.724 DB	76.490 DB	77.860 DB	85.033 DB	84.410 DB	83.891 DB	84.739 DB
MAX	137.974 DB	109.345 DB	100.781 DB	110.368 DB	114.672 DB	107.798 DB	105.752 DB	107.900 DB
QTY	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

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REJECTED UNITS :

        1,2,3,4,5,6,7,8,9,10

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
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ELECTRICAL MEASUREMENTS

AFTER 50 KRad

DC AT 25 °C

MOTOROLA Semiconductors

HIGH RELIABILITY DIVISION

TRACEABILITY INFORMATION

PROCESS LOT NUMBER	**NTTA0139J**
DEVICE	**TY38348H**
SOURCE TYPE	**LM139J**
DATE CODE	**9504**
CUSTOMER	**VARIOUS**
CUSTOMER PART NUMBER	**SCC 9103 004 05B**
LOT SIZE	**11**
SERIAL NUMBER RANGE	**1-11**
MEASUREMENT TYPE	**25 C RADIATION TESTING**
DATE	**03-MAR-95**
COMMENTS	

TABLE 2A DC PARAMETERS
ELECTRICAL RECORDS AFTER 50 Krad

PARAMETERS TEST CONDITIONS

Test Nb	1.0	1.1	2.0	2.1	2.2	2.3	3.0	3.1	3.2	3.3
Test	ICC1	ICC2	IIL+CELL1	IIL+CELL2	IIL+CELL3	IIL+CELL4	IIL-CELL4	IIL-CELL3	IIL-CELL2	IIL-CELL1
VCC	5.000 V	30.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V	36.000 V
VEE	0.000 V	0.000 V								
VIN+			34.000 V	34.000 V	34.000 V	34.000 V				
VIN-							34.000 V	34.000 V	34.000 V	34.000 V

LIMITS

MIN	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A
MAX	2.000 mA	3.000 mA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA	1.000 uA

DATA RECORDS

Test Nb	**1.0**	**1.1**	**2.0**	**2.1**	**2.2**	**2.3**	**3.0**	**3.1**	**3.2**	**3.3**
Test	**ICC1**	**ICC2**	**IIL+CELL1**	**IIL+CELL2**	**IIL+CELL3**	**IIL+CELL4**	**IIL-CELL4**	**IIL-CELL3**	**IIL-CELL2**	**IIL-CELL1**
Unit	**mA**	**mA**	**nA**	**nA**	**nA**	**nA**	**nA**	**nA**	**nA**	**nA**
1	0.659	0.933	335.000	411.000	337.000	260.000	64.000	185.000	250.000	266.000
2	0.641	0.943	323.000	406.000	374.000	315.000	108.000	221.000	257.000	264.000
3	0.623	0.900	385.000	442.000	365.000	327.000	97.000	221.000	268.000	281.000
4	0.661	0.937	337.000	401.000	324.000	258.000	74.000	188.000	250.000	261.000
5	0.638	0.935	373.000	302.000	209.000	333.000	69.000	152.000	232.000	287.000
6	0.615	0.900	427.000	471.000	363.000	330.000	97.000	219.000	279.000	296.000
7	0.614	0.896	375.000	461.000	402.000	333.000	112.000	236.000	273.000	285.000
8	0.625	0.901	387.000	410.000	368.000	295.000	90.000	212.000	258.000	283.000
9	0.631	0.908	370.000	430.000	362.000	296.000	84.000	222.000	265.000	277.000
10	0.643	0.935	400.000	324.000	225.000	342.000	116.000	175.000	224.000	298.000
11	0.941	1.185	86.000	42.000	6.000	16.000	104.000	37.000	0.000	43.000
MEAN	662.818uA	0.943mA	345.273nA	372.727nA	303.182nA	282.273nA	92.273nA	188.000nA	232.364nA	258.273nA
SIGMA	93.587uA	82.295uA	91.187nA	121.263nA	116.068nA	92.952nA	17.692nA	56.080nA	78.810nA	72.431nA
MIN	614.000uA	896.000uA	86.000nA	42.000nA	6.000nA	16.000nA	64.000nA	37.000nA	0.000 A	43.000nA
MAX	0.941mA	1.185mA	427.000nA	471.000nA	402.000nA	342.000nA	116.000nA	236.000nA	279.000nA	298.000nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1
Test	IOLCELL1	IOLCELL2	IOLCELL3	IOLCELL4	VOL1CELL4	VOL1CELL3	VOL1CELL2	VOL1CELL1	VOL2CELL1	VOL2CELL2
VCC	30.000 V	30.000 V	30.000 V	30.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V
VOUT	30.000 V	30.000 V	30.000 V	30.000 V						
VEE					0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
IOUT					4.000 mA	4.000 mA	4.000 mA	4.000 mA	8.000 mA	8.000 mA

LIMITS

MIN	0.000 A	0.000 A	0.000 A	0.000 A	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
MAX	1.000 uA	1.000 uA	1.000 uA	1.000 uA	400.000 mV	400.000 mV	400.000 mV	400.000 mV	1.500 V	1.500 V

DATA RECORDS

Test Nb	**4.0**	**4.1**	**4.2**	**4.3**	**5.0**	**5.1**	**5.2**	**5.3**	**6.0**	**6.1**
Test	**IOLCELL1**	**IOLCELL2**	**IOLCELL3**	**IOLCELL4**	**VOL1CELL4**	**VOL1CELL3**	**VOL1CELL2**	**VOL1CELL1**	**VOL2CELL1**	**VOL2CELL2**
Unit	**nA**	**nA**	**nA**	**nA**	**mV**	**mV**	**mV**	**mV**	**mV**	**mV**
1	60.000	31.000	17.000	19.000	131.627	138.602	140.579	142.746	214.166	209.317
2	60.000	32.000	18.000	20.000	136.814	143.788	143.769	145.588	238.498	231.877
3	63.000	28.000	24.000	14.000	144.376	151.104	152.449	154.957	277.103	269.194
4	59.000	31.000	17.000	18.000	129.972	136.548	137.332	141.110	209.014	205.301
5	60.000	31.000	22.000	17.000	135.942	140.162	144.091	144.830	228.392	224.831
6	63.000	27.000	23.000	18.000	145.967	153.517	155.627	158.060	280.740	267.679
7	61.000	28.000	23.000	17.000	147.743	155.040	157.605	160.359	340.314	311.209
8	62.000	28.000	24.000	16.000	141.887	149.240	152.127	155.267	264.393	257.118
9	62.000	26.000	22.000	17.000	142.879	150.914	149.562	154.104	257.649	247.922
10	62.000	29.000	24.000	16.000	141.356	148.482	148.937	148.804	230.362	229.983
11	58.000	28.000	16.000	20.000	85.699	87.904	89.218	89.067	127.608	127.608
MEAN	60.909nA	29.000nA	20.909nA	17.455nA	134.933mV	141.391mV	142.845mV	144.990mV	242.567mV	234.731mV
SIGMA	1.640nA	1.949nA	3.208nA	1.809nA	17.297mV	18.787mV	18.856mV	19.640mV	53.313mV	46.812mV
MIN	58.000nA	26.000nA	16.000nA	14.000nA	85.699mV	87.904mV	89.218mV	89.067mV	127.608mV	127.608mV
MAX	63.000nA	32.000nA	24.000nA	20.000nA	147.743mV	155.040mV	157.605mV	160.359mV	340.314mV	311.209mV
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

PARAMETERS TEST CONDITIONS

Test Nb	6.2	6.3	7.0	7.1	7.2	7.3	8.0	8.1	8.2	8.3
Test	VOL2CELL3	VOL2CELL4	VIO3CELL1	IIB3-CELL1	IIB3+CELL1	IIO3CELL1	VIO3CELL2	IIB3-CELL2	IIB3+CELL2	IIO3CELL2
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
IOUT	8.000 mA	8.000 mA								
VT			1.400 V				1.400 V			

LIMITS

MIN	0.000 V	0.000 V	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	1.500 V	1.500 V	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**6.2**	**6.3**	**7.0**	**7.1**	**7.2**	**7.3**	**8.0**	**8.1**	**8.2**	**8.3**
Test	**VOL2CELL3**	**VOL2CELL4**	**VIO3CELL1**	**IIB3-CELL1**	**IIB3+CELL1**	**IIO3CELL1**	**VIO3CELL2**	**IIB3-CELL2**	**IIB3+CELL2**	**IIO3CELL2**
Unit	**mV**	**V**	**mV**	**nA**	**uA**	**nA**	**mV**	**nA**	**uA**	**nA**
1 F	208.483	0.198	-4.981	569.795 *	0.841 *	271.562 *	-4.056	574.644 *	0.878 *	303.083 *
2 F	239.483	0.230	-5.692 *	547.973 *	0.759 *	210.945 *	-4.202	577.069 *	0.841 *	264.288 *
3 F	282.028	0.267	-4.458	618.288 *	0.936 *	317.630 *	-4.424	623.137 *	0.941 *	317.630 *
4 F	204.467	0.196	-4.515	550.397 *	0.820 *	269.137 *	-3.944	567.370 *	0.853 *	286.110 *
5 F	224.831	0.219	-5.039 *	603.740 *	0.885 *	281.260 *	-4.628	489.781 *	0.647 *	157.603 *
6 F	287.436	0.265	-4.309	644.959 *	0.999 *	354.000 *	-4.531	669.206 *	1.011 *	341.876 *
7 F	356.207	4.250 *	-4.425	618.288 *	0.917 *	298.233 *	-4.048	644.959 *	0.994 *	349.151 *
8 F	256.437	0.246	-4.318	620.712 *	0.938 *	317.630 *	-5.289 *	601.315 *	0.885 *	283.685 *
9 F	263.786	0.249	-4.218	596.466 *	0.892 *	295.808 *	-4.010	615.863 *	0.924 *	307.932 *
10 F	236.376	0.230	-4.854	632.835 *	0.948 *	315.206 *	-3.312	501.904 *	0.684 *	181.849 *
11	126.396	0.121	-0.323	19.397	0.017	2.425	0.880	16.973	0.022	4.849
MEAN	244.175mV	588.265mV	-4.285mV	547.532nA	813.803nA	266.712nA	-3.779mV	534.747nA	789.116nA	254.369nA
SIGMA	57.940mV	1.215 V	1.384mV	178.079nA	272.625nA	94.971nA	1.622mV	180.191nA	278.617nA	102.339nA
MIN	126.396mV	121.471mV	-5.692mV	19.397nA	16.973nA	2.425nA	-5.289mV	16.973nA	21.822nA	4.849nA
MAX	356.207mV	4.250 V	-323.000uV	644.959nA	0.999uA	354.000nA	880.000uV	669.206nA	1.011uA	349.151nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1
Test	VIO3CELL3	IIB3-CELL3	IIB3+CELL3	IIO3CELL3	VIO3CELL4	IIB3-CELL4	IIB3+CELL4	IIO3CELL4	VIO4CELL1	IIB4-CELL1
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	2.000 V	2.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	-3.000 V	-3.000 V
VT	1.400 V				1.400 V				-1.600 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**9.0**	**9.1**	**9.2**	**9.3**	**10.0**	**10.1**	**10.2**	**10.3**	**11.0**	**11.1**
Test	**VIO3CELL3**	**IIB3-CELL3**	**IIB3+CELL3**	**IIO3CELL3**	**VIO3CELL4**	**IIB3-CELL4**	**IIB3+CELL4**	**IIO3CELL4**	**VIO4CELL1**	**IIB4-CELL1**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1 F	-4.478	504.329 *	637.685 *	133.356 *	-4.558	409.767 *	501.904 *	92.137 *	-4.564	497.055 *
2 F	-5.671 *	574.644 *	700.727 *	126.082 *	-5.528 *	487.356 *	606.165 *	118.808 *	-5.259 *	487.356 *
3 F	-6.464 *	574.644 *	710.425 *	135.781 *	-6.588 *	482.507 *	632.835 *	150.329 *	-4.143	540.699 *
4 F	-5.700 *	494.630 *	632.835 *	138.206 *	-4.406	400.069 *	499.480 *	99.411 *	-4.156	482.507 *
5 F	-6.596 *	419.466 *	383.096 *	36.370 *	-4.035	448.562 *	569.795 *	121.233 *	-4.707	531.000 *
6 F	-6.102 *	567.370 *	715.274 *	147.904 *	-5.428 *	477.657 *	618.288 *	140.630 *	-4.005	564.945 *
7 F	-6.405 *	601.315 *	785.589 *	184.274 *	-5.651 *	499.480 *	657.082 *	157.603 *	-4.087	540.699 *
8 F	-6.314 *	557.671 *	703.151 *	145.479 *	-5.656 *	458.260 *	581.918 *	123.658 *	-3.980	545.548 *
9 F	-6.610 *	564.945 *	715.274 *	150.329 *	-4.826	453.411 *	577.069 *	123.658 *	-3.902	523.726 *
10 F	-4.717	434.014 *	419.466 *	14.548	-4.028	484.932 *	664.356 *	179.425 *	-4.514	557.671 *
11	-0.524	16.973	21.822	4.849	-0.298	19.397	19.397	0.000	-0.318	16.973
MEAN	-5.416mV	482.727nA	584.122nA	110.653nA	-4.637mV	420.127nA	538.935nA	118.808nA	-3.967mV	480.744nA
SIGMA	1.778mV	165.654nA	225.312nA	61.390nA	1.642mV	136.632nA	180.672nA	46.803nA	1.276mV	156.258nA
MIN	-6.610mV	16.973nA	21.822nA	4.849nA	-6.588mV	19.397nA	19.397nA	0.000 A	-5.259mV	16.973nA
MAX	-524.000uV	601.315nA	785.589nA	184.274nA	-298.000uV	499.480nA	664.356nA	179.425nA	-318.000uV	564.945nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	11.2	11.3	12.0	12.1	12.2	12.3	13.0	13.1	13.2	13.3
Test	IIB4+CELL1	IIO4CELL1	VIO4CELL2	IIB4-CELL2	IIB4+CELL2	IIO4CELL2	VIO4CELL3	IIB4-CELL3	IIB4+CELL3	IIO4CELL3
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V
VT			-1.600 V				-1.600 V			

LIMITS

	11.2	11.3	12.0	12.1	12.2	12.3	13.0	13.1	13.2	13.3
MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**11.2**	**11.3**	**12.0**	**12.1**	**12.2**	**12.3**	**13.0**	**13.1**	**13.2**	**13.3**
Test	**IIB4+CELL1**	**IIO4CELL1**	**VIO4CELL2**	**IIB4-CELL2**	**IIB4+CELL2**	**IIO4CELL2**	**VIO4CELL3**	**IIB4-CELL3**	**IIB4+CELL3**	**IIO4CELL3**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1 F	739.521 *	242.466 *	-3.731	501.904 *	771.042 *	269.137 *	-3.905	453.411 *	567.370 *	113.959 *
2 F	671.631 *	184.274 *	-3.841	506.753 *	746.795 *	240.041 *	-5.119 *	523.726 *	620.712 *	96.986 *
3 F	821.959 *	281.260 *	-4.112	543.124 *	826.808 *	283.685 *	-5.868 *	518.877 *	627.986 *	109.110 *
4 F	720.124 *	237.616 *	-3.614	494.630 *	751.644 *	257.014 *	-5.126 *	446.137 *	560.096 *	113.959 *
5 F	785.589 *	254.589 *	-4.211	434.014 *	577.069 *	143.055 *	-5.972 *	383.096 *	344.301 *	38.795 *
6 F	877.727 *	312.781 *	-4.218	584.342 *	889.849 *	305.507 *	-5.500 *	514.028 *	632.835 *	118.808 *
7 F	804.986 *	264.288 *	-3.755	564.945 *	870.452 *	305.507 *	-5.829 *	543.124 *	693.452 *	150.329 *
8 F	824.384 *	278.836 *	-4.899	526.151 *	775.891 *	249.740 *	-5.721 *	501.904 *	623.137 *	121.233 *
9 F	780.740 *	257.014 *	-3.689	540.699 *	809.836 *	269.137 *	-6.013 *	506.753 *	632.835 *	126.082 *
10 F	836.507 *	278.836 *	-2.942	441.288 *	603.740 *	162.452 *	-4.137	397.644 *	375.822 *	21.822
11	16.973	0.000	0.887	14.548	21.822	7.274	-0.549	16.973	19.397	2.425
MEAN	716.376nA	235.633nA	-3.466mV	468.400nA	694.995nA	226.595nA	-4.885mV	436.879nA	517.995nA	92.137nA
SIGMA	239.119nA	84.626nA	1.523mV	157.509nA	243.502nA	89.538nA	1.607mV	148.906nA	198.509nA	48.165nA
MIN	16.973nA	0.000 A	-4.899mV	14.548nA	21.822nA	7.274nA	-6.013mV	16.973nA	19.397nA	2.425nA
MAX	877.727nA	312.781nA	887.000uV	584.342nA	889.849nA	305.507nA	-549.000uV	543.124nA	693.452nA	150.329nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	14.0	14.1	14.2	14.3	15.0	15.1	15.2	15.3	16.0	16.1
Test	VIO4CELL4	IIB4-CELL4	IIB4+CELL4	IIO4CELL4	VIO2CELL1	IIB2-CELL1	IIB2+CELL1	IIO2CELL1	VIO2CELL2	IIB2-CELL2
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT	-1.600 V				-13.000 V				-13.000 V	

LIMITS

	14.0	14.1	14.2	14.3	15.0	15.1	15.2	15.3	16.0	16.1
MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**14.0**	**14.1**	**14.2**	**14.3**	**15.0**	**15.1**	**15.2**	**15.3**	**16.0**	**16.1**
Test	**VIO4CELL4**	**IIB4-CELL4**	**IIB4+CELL4**	**IIO4CELL4**	**VIO2CELL1**	**IIB2-CELL1**	**IIB2+CELL1**	**IIO2CELL1**	**VIO2CELL2**	**IIB2-CELL2**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1 F	-4.102	363.699 *	443.713 *	80.014 *	-3.536	383.096 *	569.795 *	186.699 *	-2.935	390.370 *
2 F	-5.105 *	436.438 *	533.425 *	96.986 *	-4.212	385.521 *	535.849 *	150.329 *	-2.947	404.918 *
3 F	-6.136 *	426.740 *	557.671 *	130.932 *	-3.233	421.891 *	642.534 *	220.644 *	-3.309	426.740 *
4 F	-3.969	354.000 *	441.288 *	87.288 *	-3.196	363.699 *	552.822 *	189.123 *	-2.810	383.096 *
5 F	-3.686	400.069 *	506.753 *	106.685 *	-3.780	424.315 *	623.137 *	198.822 *	-3.258	349.151 *
6 F	-4.979	421.891 *	545.548 *	123.658 *	-3.079	438.863 *	683.753 *	244.890 *	-3.385	453.411 *
7 F	-5.208 *	441.288 *	579.494 *	138.206 *	-3.148	421.891 *	627.986 *	206.096 *	-2.935	441.288 *
8 F	-5.204 *	407.343 *	511.603 *	104.260 *	-3.052	424.315 *	642.534 *	218.219 *	-3.959	412.192 *
9 F	-4.397	400.069 *	511.603 *	111.534 *	-2.941	407.343 *	608.589 *	201.247 *	-2.865	424.315 *
10 F	-3.689	429.165 *	589.192 *	160.027 *	-3.582	438.863 *	661.932 *	223.068 *	-2.044	351.575 *
11	-0.311	16.973	16.973	0.000	-0.323	7.274	16.973	9.699	0.704	7.274
MEAN	-4.253mV	372.516nA	476.115nA	103.599nA	-3.098mV	374.279nA	560.537nA	186.258nA	-2.704mV	367.666nA
SIGMA	1.514mV	121.229nA	159.613nA	41.476nA	0.994mV	124.091nA	185.985nA	63.439nA	1.223mV	124.129nA
MIN	-6.136mV	16.973nA	16.973nA	0.000 A	-4.212mV	7.274nA	16.973nA	9.699nA	-3.959mV	7.274nA
MAX	-311.000uV	441.288nA	589.192nA	160.027nA	-323.000uV	438.863nA	683.753nA	244.890nA	704.000uV	453.411nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
Test	IIB2+CELL2	IIO2CELL2	VIO2CELL3	IIB2-CELL3	IIB2+CELL3	IIO2CELL3	VIO2CELL4	IIB2-CELL4	IIB2+CELL4	IIO2CELL4
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT			-13.000 V				-13.000 V			

LIMITS

	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
Test	IIB2+CELL2	IIO2CELL2	VIO2CELL3	IIB2-CELL3	IIB2+CELL3	IIO2CELL3	VIO2CELL4	IIB2-CELL4	IIB2+CELL4	IIO2CELL4
Unit	nA	nA	mV	nA	nA	nA	mV	nA	nA	nA
1 F	594.042 *	203.671 *	-2.533	332.178 *	441.288 *	109.110 *	-3.092	283.685 *	346.726 *	63.041 *
2 F	594.042 *	189.123 *	-3.757	385.521 *	497.055 *	111.534 *	-4.209	346.726 *	426.740 *	80.014 *
3 F	640.110 *	213.370 *	-4.393	375.822 *	492.206 *	116.384 *	-5.160 *	334.603 *	438.863 *	104.260 *
4 F	579.494 *	196.397 *	-3.749	322.479 *	438.863 *	116.384 *	-3.032	276.411 *	344.301 *	67.890 *
5 F	460.685 *	111.534 *	-4.551	288.534 *	278.836 *	9.699	-2.892	322.479 *	404.918 *	82.438 *
6 F	688.603 *	235.192 *	-4.044	373.397 *	497.055 *	123.658 *	-4.011	332.178 *	429.165 *	96.986 *
7 F	674.055 *	232.767 *	-4.382	417.041 *	545.548 *	128.507 *	-4.249	344.301 *	453.411 *	109.110 *
8 F	606.165 *	193.973 *	-4.254	366.123 *	492.206 *	126.082 *	-4.224	317.630 *	404.918 *	87.288 *
9 F	627.986 *	203.671 *	-4.576	368.548 *	497.055 *	128.507 *	-3.433	315.206 *	400.069 *	84.863 *
10 F	480.083 *	128.507 *	-2.709	295.808 *	305.507 *	9.699	-2.900	344.301 *	467.959 *	123.658 *
11	14.548	7.274	-0.491	12.123	16.973	4.849	-0.439	9.699	16.973	7.274
MEAN	541.801nA	174.134nA	-3.585mV	321.598nA	409.327nA	89.492nA	-3.422mV	293.384nA	375.822nA	82.438nA
SIGMA	188.558nA	67.385nA	1.240mV	109.841nA	154.604nA	52.693nA	1.226mV	96.956nA	125.226nA	30.612nA
MIN	14.548nA	7.274nA	-4.576mV	12.123nA	16.973nA	4.849nA	-5.160mV	9.699nA	16.973nA	7.274nA
MAX	688.603nA	235.192nA	-491.000uV	417.041nA	545.548nA	128.507nA	-439.000uV	346.726nA	467.959nA	123.658nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	19.0	19.1	19.2	19.3	20.0	20.1	20.2	20.3	21.0	21.1
Test	VIO1CELL1	IIB1-CELL1	IIB1+CELL1	IIO1CELL1	VIO1CELL2	IIB1-CELL2	IIB1+CELL2	IIO1CELL2	VIO1CELL3	IIB1-CELL3
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT	15.000 V				15.000 V				15.000 V	

LIMITS

	19.0	19.1	19.2	19.3	20.0	20.1	20.2	20.3	21.0	21.1
MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**19.0**	**19.1**	**19.2**	**19.3**	**20.0**	**20.1**	**20.2**	**20.3**	**21.0**	**21.1**
Test	**VIO1CELL1**	**IIB1-CELL1**	**IIB1+CELL1**	**IIO1CELL1**	**VIO1CELL2**	**IIB1-CELL2**	**IIB1+CELL2**	**IIO1CELL2**	**VIO1CELL3**	**IIB1-CELL3**
Unit	**mV**	**nA**	**uA**	**nA**	**mV**	**nA**	**uA**	**nA**	**mV**	**nA**
1 F	-5.303 *	674.055 *	0.965 *	290.959 *	-4.478	681.329 *	1.004 *	322.479 *	-4.786	589.192 *
2 F	-6.038 *	654.658 *	0.878 *	223.069 *	-4.601	681.329 *	0.977 *	295.809 *	-6.035 *	681.329 *
3 F	-4.640	737.096 *	1.086 *	349.151 *	-4.786	741.946 *	1.091 *	349.150 *	-6.825 *	686.178 *
4 F	-4.774	652.233 *	0.941 *	288.534 *	-4.333	664.356 *	0.980 *	315.206 *	-6.042 *	577.069 *
5 F	-5.264 *	712.850 *	1.021 *	307.931 *	-5.096 *	586.767 *	0.747 *	160.028 *	-7.054 *	489.781 *
6 F	-4.472	771.042 *	1.159 *	387.945 *	-4.893	795.288 *	1.171 *	375.822 *	-6.429 *	674.055 *
7 F	-4.612	739.521 *	1.069 *	329.752 *	-4.358	773.466 *	1.154 *	380.671 *	-6.746 *	715.274 *
8 F	-4.479	739.521 *	1.081 *	341.876 *	-5.744 *	715.274 *	1.021 *	305.506 *	-6.681 *	659.507 *
9 F	-4.407	708.001 *	1.030 *	322.478 *	-4.328	734.671 *	1.064 *	329.754 *	-6.993 *	664.356 *
10 F	-5.066 *	754.069 *	1.096 *	341.876 *	-3.678	596.466 *	0.790 *	193.973 *	-5.063 *	511.603 *
11	-0.286	21.822	0.019	2.425	0.820	16.973	0.022	4.849	-0.350	14.548
MEAN	-4.486mV	651.352nA	0.941uA	289.636nA	-4.134mV	635.260nA	0.911uA	275.750nA	-5.728mV	569.354nA
SIGMA	1.476mV	212.509nA	315.767nA	104.217nA	1.724mV	215.314nA	323.206nA	113.058nA	1.935mV	198.374nA
MIN	-6.038mV	21.822nA	19.397nA	2.425nA	-5.744mV	16.973nA	21.822nA	4.849nA	-7.054mV	14.548nA
MAX	-286.000uV	771.042nA	1.159uA	387.945nA	820.000uV	795.288nA	1.171uA	380.671nA	-350.000uV	715.274nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	21.2	21.3	22.0	22.1	22.2	22.3	23.0	23.1	23.2	23.3
Test	IIB1+CELL3	IIO1CELL3	VIO1CELL4	IIB1-CELL4	IIB1+CELL4	IIO1CELL4	AVSCELL1	AVSCELL2	AVSCELL3	AVSCELL4
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	15.000 V	15.000 V	15.000 V	15.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT			15.000 V				1.000 V	1.000 V	1.000 V	1.000 V
VT'							11.000 V	11.000 V	11.000 V	11.000 V

LIMITS

	21.2	21.3	22.0	22.1	22.2	22.3	23.0	23.1	23.2	23.3
MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	50.000	50.000	50.000	50.000
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 K	5.000 K	5.000 K	5.000 K

DATA RECORDS

Test Nb	**21.2**	**21.3**	**22.0**	**22.1**	**22.2**	**22.3**	**23.0**	**23.1**	**23.2**	**23.3**
Test	**IIB1+CELL3**	**IIO1CELL3**	**VIO1CELL4**	**IIB1-CELL4**	**IIB1+CELL4**	**IIO1CELL4**	**AVSCELL1**	**AVSCELL2**	**AVSCELL3**	**AVSCELL4**
Unit	**uA**	**nA**	**mV**	**nA**	**nA**	**nA**	**V/MV**	**V/MV**	**V/MV**	**V/MV**
1 F	0.730 *	140.630 *	-5.064 *	480.083 *	577.069 *	96.986 *	65.665	58.923	67.340	70.581
2 F	0.803 *	121.233 *	-6.035 *	579.494 *	695.877 *	116.384 *	55.927	49.995 *	51.963	55.691
3 F	0.820 *	133.356 *	-7.142 *	572.219 *	732.247 *	160.027 *	48.525 *	47.649 *	49.806 *	51.158
4 F	0.720 *	143.055 *	-4.880	470.384 *	569.795 *	99.411 *	65.994	59.187	66.999	68.743
5 F	0.441 *	48.493 *	-4.441	528.575 *	654.658 *	126.082 *	55.457	55.691	59.994	57.889
6 F	0.824 *	150.329 *	-5.941 *	569.795 *	712.850 *	143.055 *	49.249 *	47.307 *	49.249 *	54.766
7 F	0.909 *	193.973 *	-6.158 *	594.042 *	763.767 *	169.726 *	47.821 *	43.996 *	46.639 *	49.249 *
8 F	0.807 *	147.904 *	-6.205 *	543.124 *	666.780 *	123.658 *	50.185	50.377	52.795	54.995
9 F	0.822 *	157.603 *	-5.285 *	538.274 *	664.356 *	126.082 *	50.960	48.170 *	53.007	53.436
10 F	0.485 *	26.671 *	-4.364	572.219 *	766.192 *	193.973 *	55.457	51.963	56.165	54.995
11	0.024	9.699	-0.327	21.822	19.397	2.425	253.821	239.977	219.979	231.556
MEAN	671.410nA	115.722nA	-5.077mV	497.276nA	620.272nA	123.437nA	72.642	68.476	70.358	73.005
SIGMA	259.346nA	59.590nA	1.787mV	162.620nA	209.634nA	49.826nA	60.422	57.087	50.094	53.006
MIN	24.247nA	9.699nA	-7.142mV	21.822nA	19.397nA	2.425nA	47.821	43.996	46.639	49.249
MAX	0.909uA	193.973nA	-327.000uV	594.042nA	766.192nA	193.973nA	253.821	239.977	219.979	231.556
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	24.0	24.1	24.2	24.3	25.0	25.1	25.2	25.3
Test	CMR1C1	CMR1C2	CMR1C3	CMR1C4	CMR2C1	CMR2C2	CMR2C3	CMR2C4
VCC	5.000 V	5.000 V	5.000 V	5.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VCC'	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE'	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V

LIMITS

MIN	70.000 DB	70.000 DB	70.000 DB	70.000 DB	76.000 DB	76.000 DB	76.000 DB	76.000 DB
MAX	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB

DATA RECORDS

Test Nb	**24.0**	**24.1**	**24.2**	**24.3**	**25.0**	**25.1**	**25.2**	**25.3**
Test	**CMR1C1**	**CMR1C2**	**CMR1C3**	**CMR1C4**	**CMR2C1**	**CMR2C2**	**CMR2C3**	**CMR2C4**
Unit	**DB**	**DB**	**DB**	**DB**	**DB**	**DB**	**DB**	**DB**
1	77.141	79.296	74.378	76.350	83.998	85.173	81.890	83.046
2	76.801	78.375	74.696	77.024	83.710	84.574	81.791	83.712
3	79.598	79.651	74.038	76.441	85.974	85.556	81.224	83.001
4	78.439	79.189	74.373	76.725	84.984	85.288	81.737	83.608
5	79.136	77.149	73.634	78.681	85.517	83.653	80.973	85.141
6	79.875	79.647	73.945	76.502	86.064	85.378	81.393	83.230
7	78.982	80.217	74.327	76.618	85.629	85.879	81.471	83.330
8	78.965	77.715	74.079	76.441	85.851	83.913	81.243	83.006
9	79.546	79.408	74.018	76.892	85.620	85.638	81.277	83.591
10	78.930	78.192	74.281	78.930	85.518	84.681	81.504	85.632
11	116.388	113.363	101.798	107.869	117.595	107.655	105.959	107.914
MEAN	82.164 DB	82.018 DB	76.688 DB	79.861 DB	88.224 DB	87.035 DB	83.678 DB	85.928 DB
SIGMA	11.392 DB	10.437 DB	8.333 DB	9.332 DB	9.772 DB	6.875 DB	7.395 DB	7.344 DB
MIN	76.801 DB	77.149 DB	73.634 DB	76.350 DB	83.710 DB	83.653 DB	80.973 DB	83.001 DB
MAX	116.388 DB	113.363 DB	101.798 DB	107.869 DB	117.595 DB	107.655 DB	105.959 DB	107.914 DB
QTY	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

REJECTED UNITS :

1,2,3,4,5,6,7,8,9,10

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10

ELECTRICAL MEASUREMENTS

AFTER 168 H ANNEALING

DC AT 25 °C

MOTOROLA

Motorola Semiconducteurs S.A.
Centre Electronique de Toulouse

MOTOROLA Semiconductors

HIGH RELIABILITY DIVISION

TRACEABILITY INFORMATION

PROCESS LOT NUMBER	**NTTA0139J**
DEVICE	**TY38348H**
SOURCE TYPE	**LM139J**
DATE CODE	**9504**
CUSTOMER	**VARIOUS**
CUSTOMER PART NUMBER	**SCC 9103 004 05B**
LOT SIZE	**11**
SERIAL NUMBER RANGE	**1-11**
MEASUREMENT TYPE	**25 C RADIATION TESTING**
DATE	**03-MAR-95**

COMMENTS

TABLE 2A DC PARAMETERS
ELECTRICAL RECORDS AFTER 168H ANNEALING

PARAMETERS TEST CONDITIONS

Test Nb	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1
Test	VIO3CELL3	IIB3-CELL3	IIB3+CELL3	IIO3CELL3	VIO3CELL4	IIB3-CELL4	IIB3+CELL4	IIO3CELL4	VIO4CELL1	IIB4-CELL1
VCC	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	5.000 V	2.000 V	2.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	-3.000 V	-3.000 V
VT	1.400 V				1.400 V				-1.600 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**9.0**	**9.1**	**9.2**	**9.3**	**10.0**	**10.1**	**10.2**	**10.3**	**11.0**	**11.1**
Test	**VIO3CELL3**	**IIB3-CELL3**	**IIB3+CELL3**	**IIO3CELL3**	**VIO3CELL4**	**IIB3-CELL4**	**IIB3+CELL4**	**IIO3CELL4**	**VIO4CELL1**	**IIB4-CELL1**
Unit	**mV**	**nA**	**uA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1 F	-2.225	463.042 *	0.744 *	281.219 *	-2.672	402.434 *	608.499 *	206.066 *	-2.381	438.798 *
2 F	-3.138	533.346 *	0.824 *	290.916 *	-3.290	475.163 *	724.866 *	249.703 *	-3.081	453.344 *
3 F	-3.722	516.376 *	0.834 *	317.583 *	-4.230	460.617 *	751.533 *	290.916 *	-1.579	470.315 *
4 F	-3.509	458.193 *	0.732 *	273.946 *	-2.540	397.585 *	601.227 *	203.641 *	-2.023	426.677 *
5 F	-4.570	424.252 *	0.495 *	70.305 *	-2.027	438.798 *	676.380 *	237.581 *	-2.400	470.315 *
6 F	-3.339	516.376 *	0.836 *	320.008 *	-2.983	460.617 *	739.412 *	278.795 *	-1.429	489.708 *
7 F	-3.541	535.771 *	0.916 *	380.615 *	-3.138	470.315 *	783.049 *	312.735 *	-1.416	480.011 *
8 F	-3.701	506.679 *	0.822 *	315.159 *	-3.314	446.072 *	693.350 *	247.279 *	-1.476	475.163 *
9 F	-3.977	506.679 *	0.834 *	327.281 *	-2.521	436.374 *	693.350 *	256.976 *	-1.485	460.617 *
10 F	-2.544	433.950 *	0.543 *	109.094 *	-1.855	465.466 *	780.625 *	315.159 *	-1.983	482.436 *
11	-0.522	16.970	0.022	4.849	-0.296	21.819	19.394	2.424	-0.327	16.970
MEAN	-3.163mV	446.512nA	691.146nA	244.634nA	-2.624mV	406.842nA	642.880nA	236.480nA	-1.780mV	424.032nA
SIGMA	1.085mV	147.675nA	257.002nA	123.246nA	1.014mV	130.268nA	215.484nA	86.173nA	715.906uV	136.337nA
MIN	-4.570mV	16.970nA	21.819nA	4.849nA	-4.230mV	21.819nA	19.394nA	2.424nA	-3.081mV	16.970nA
MAX	-522.000uV	535.771nA	0.916uA	380.615nA	-296.000uV	475.163nA	783.049nA	315.159nA	-327.000uV	489.708nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	11.2	11.3	12.0	12.1	12.2	12.3	13.0	13.1	13.2	13.3
Test	IIB4+CELL1	IIO4CELL1	VIO4CELL2	IIB4-CELL2	IIB4+CELL2	IIO4CELL2	VIO4CELL3	IIB4-CELL3	IIB4+CELL3	IIO4CELL3
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-3.000 V
VT			-1.600 V				-1.600 V			

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**11.2**	**11.3**	**12.0**	**12.1**	**12.2**	**12.3**	**13.0**	**13.1**	**13.2**	**13.3**
Test	**IIB4+CELL1**	**IIO4CELL1**	**VIO4CELL2**	**IIB4-CELL2**	**IIB4+CELL2**	**IIO4CELL2**	**VIO4CELL3**	**IIB4-CELL3**	**IIB4+CELL3**	**IIO4CELL3**
Unit	**uA**	**nA**	**mV**	**nA**	**uA**	**nA**	**mV**	**nA**	**nA**	**nA**
1 F	0.829 *	390.312 *	-1.445	448.496 *	0.861 *	412.131 *	-1.772	419.404 *	661.834 *	242.430 *
2 F	0.778 *	324.856 *	-1.834	480.011 *	0.858 *	378.191 *	-2.699	484.860 *	732.139 *	247.279 *
3 F	0.924 *	453.344 *	-1.612	477.587 *	0.933 *	455.769 *	-3.268	465.466 *	739.412 *	273.946 *
4 F	0.810 *	383.040 *	-1.335	441.223 *	0.841 *	400.010 *	-3.044	414.555 *	652.137 *	237.581 *
5 F	0.873 *	402.434 *	-2.129	416.980 *	0.676 *	259.400 *	-4.047	387.888 *	443.647 *	55.759 *
6 F	0.975 *	484.860 *	-1.481	504.254 *	0.994 *	489.708 *	-2.884	470.315 *	741.836 *	271.521 *
7 F	0.916 *	436.374 *	-1.202	494.558 *	0.984 *	489.709 *	-3.105	484.860 *	809.717 *	324.856 *
8 F	0.924 *	448.496 *	-2.366	467.890 *	0.882 *	414.555 *	-3.237	458.193 *	732.139 *	273.946 *
9 F	0.880 *	419.404 *	-1.183	477.587 *	0.916 *	438.798 *	-3.515	458.193 *	739.412 *	281.219 *
10 F	0.933 *	450.920 *	-0.770	429.101 *	0.713 *	283.643 *	-2.071	400.010 *	482.436 *	82.426 *
11	0.019	2.424	0.867	14.546	0.019	4.849	-0.545	16.970	19.394	2.424
MEAN	805.529nA	381.497nA	-1.317mV	422.930nA	789.000nA	366.069nA	-2.744mV	405.519nA	614.009nA	208.490nA
SIGMA	267.303nA	133.051nA	851.934uV	138.144nA	273.747nA	140.831nA	0.964mV	133.236nA	227.518nA	107.962nA
MIN	19.394nA	2.424nA	-2.366mV	14.546nA	19.394nA	4.849nA	-4.047mV	16.970nA	19.394nA	2.424nA
MAX	0.975uA	484.860nA	867.000uV	504.254nA	0.994uA	489.709nA	-545.000uV	484.860nA	809.717nA	324.856nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	14.0	14.1	14.2	14.3	15.0	15.1	15.2	15.3	16.0	16.1
Test	VIO4CELL4	IIB4-CELL4	IIB4+CELL4	IIO4CELL4	VIO2CELL1	IIB2-CELL1	IIB2+CELL1	IIO2CELL1	VIO2CELL2	IIB2-CELL2
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT	-1.600 V				-13.000 V				-13.000 V	

LIMITS

	14.0	14.1	14.2	14.3	15.0	15.1	15.2	15.3	16.0	16.1
MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**14.0**	**14.1**	**14.2**	**14.3**	**15.0**	**15.1**	**15.2**	**15.3**	**16.0**	**16.1**
Test	**VIO4CELL4**	**IIB4-CELL4**	**IIB4+CELL4**	**IIO4CELL4**	**VIO2CELL1**	**IIB2-CELL1**	**IIB2+CELL1**	**IIO2CELL1**	**VIO2CELL2**	**IIB2-CELL2**
Unit	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**
1 F	-2.295	358.797 *	535.771 *	176.974 *	-1.681	336.978 *	632.743 *	295.764 *	-0.998	341.826 *
2 F	-2.941	421.828 *	644.864 *	223.036 *	-2.333	361.221 *	610.924 *	249.703 *	-1.197	373.342 *
3 F	-3.859	404.858 *	666.683 *	261.825 *	-1.028	363.645 *	712.745 *	349.099 *	-1.140	370.918 *
4 F	-2.187	351.523 *	533.346 *	181.823 *	-1.408	336.978 *	618.197 *	281.219 *	-0.898	336.978 *
5 F	-1.743	390.312 *	603.651 *	213.338 *	-1.781	370.918 *	690.926 *	320.008 *	-1.459	336.978 *
6 F	-2.643	407.283 *	654.561 *	247.279 *	-0.911	375.767 *	753.958 *	378.191 *	-1.089	387.888 *
7 F	-2.801	416.980 *	690.926 *	273.946 *	-0.907	368.494 *	705.472 *	336.978 *	-0.752	383.040 *
8 F	-2.974	395.161 *	615.772 *	220.611 *	-0.924	368.494 *	710.320 *	341.826 *	-1.786	366.069 *
9 F	-2.187	387.888 *	613.348 *	225.460 *	-0.867	353.948 *	681.229 *	327.281 *	-0.716	368.494 *
10 F	-1.594	409.707 *	693.350 *	283.643 *	-1.392	380.615 *	729.715 *	349.099 *	-0.171	336.978 *
11	-0.310	16.970	16.970	0.000	-0.329	7.273	16.970	9.697	0.701	7.273
MEAN	-2.321mV	360.119nA	569.931nA	209.812nA	-1.233mV	329.485nA	623.927nA	294.442nA	-864.091uV	328.162nA
SIGMA	0.919mV	115.958nA	191.156nA	77.527nA	553.674uV	107.806nA	206.531nA	101.011nA	665.194uV	108.121nA
MIN	-3.859mV	16.970nA	16.970nA	0.000 A	-2.333mV	7.273nA	16.970nA	9.697nA	-1.786mV	7.273nA
MAX	-310.000uV	421.828nA	693.350nA	283.643nA	-329.000uV	380.615nA	753.958nA	378.191nA	701.000uV	387.888nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	16.2	16.3	17.0	17.1	17.2	17.3	18.0	18.1	18.2	18.3
Test	IIB2+CELL2	IIO2CELL2	VIO2CELL3	IIB2-CELL3	IIB2+CELL3	IIO2CELL3	VIO2CELL4	IIB2-CELL4	IIB2+CELL4	IIO2CELL4
VCC	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V
VT			-13.000 V				-13.000 V			

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA

DATA RECORDS

Test Nb	**16.2**	**16.3**	**17.0**	**17.1**	**17.2**	**17.3**	**18.0**	**18.1**	**18.2**	**18.3**
Test	**IIB2+CELL2**	**IIO2CELL2**	**VIO2CELL3**	**IIB2-CELL3**	**IIB2+CELL3**	**IIO2CELL3**	**VIO2CELL4**	**IIB2-CELL4**	**IIB2+CELL4**	**IIO2CELL4**
Unit	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**	**mV**	**nA**	**nA**	**nA**
1 F	654.561 *	312.735 *	-0.792	303.037 *	509.103 *	206.066 *	-1.612	278.795 *	414.555 *	135.761 *
2 F	673.956 *	300.613 *	-1.706	378.191 *	579.408 *	201.217 *	-2.395	334.553 *	504.254 *	169.701 *
3 F	715.169 *	344.251 *	-2.220	336.978 *	572.135 *	235.157 *	-3.250	315.159 *	513.952 *	198.793 *
4 F	640.016 *	303.037 *	-2.056	298.189 *	499.406 *	201.217 *	-1.583	276.370 *	407.283 *	130.912 *
5 F	533.346 *	196.368 *	-2.950	288.492 *	353.948 *	65.456 *	-1.247	312.735 *	472.739 *	160.004 *
6 F	761.230 *	373.342 *	-1.870	339.402 *	574.559 *	235.157 *	-2.108	317.583 *	504.254 *	186.671 *
7 F	753.958 *	370.918 *	-2.102	370.918 *	625.470 *	254.552 *	-2.228	324.856 *	533.346 *	208.490 *
8 F	678.804 *	312.735 *	-2.187	329.705 *	567.287 *	237.581 *	-2.395	310.310 *	475.163 *	164.853 *
9 F	700.623 *	332.129 *	-2.497	351.523 *	569.710 *	218.187 *	-1.586	305.462 *	472.739 *	167.277 *
10 F	557.590 *	220.611 *	-1.002	293.340 *	383.040 *	89.699 *	-1.110	324.856 *	540.619 *	215.763 *
11	16.970	9.697	-0.492	12.122	19.394	7.273	-0.447	9.697	19.394	9.697
MEAN	607.838nA	279.676nA	-1.807mV	300.172nA	477.587nA	177.415nA	-1.815mV	282.761nA	441.663nA	158.902nA
SIGMA	208.527nA	105.122nA	752.874uV	100.331nA	173.997nA	83.085nA	763.347uV	92.348nA	146.472nA	56.444nA
MIN	16.970nA	9.697nA	-2.950mV	12.122nA	19.394nA	7.273nA	-3.250mV	9.697nA	19.394nA	9.697nA
MAX	761.230nA	373.342nA	-492.000uV	378.191nA	625.470nA	254.552nA	-447.000uV	334.553nA	540.619nA	215.763nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	19.0	19.1	19.2	19.3	20.0	20.1	20.2	20.3	21.0	21.1
Test	VIO1CELL1	IIB1-CELL1	IIB1+CELL1	IIO1CELL1	VIO1CELL2	IIB1-CELL2	IIB1+CELL2	IIO1CELL2	VIO1CELL3	IIB1-CELL3
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT	15.000 V				15.000 V				15.000 V	

LIMITS

MIN	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	-5.000 mV	0.000 A
MAX	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 mV	100.000 nA

DATA RECORDS

Test Nb	**19.0**	**19.1**	**19.2**	**19.3**	**20.0**	**20.1**	**20.2**	**20.3**	**21.0**	**21.1**
Test	**VIO1CELL1**	**IIB1-CELL1**	**IIB1+CELL1**	**IIO1CELL1**	**VIO1CELL2**	**IIB1-CELL2**	**IIB1+CELL2**	**IIO1CELL2**	**VIO1CELL3**	**IIB1-CELL3**
Unit	**mV**	**nA**	**uA**	**nA**	**mV**	**nA**	**uA**	**nA**	**mV**	**nA**
1 F	-2.843	591.529 *	1.081 *	489.708 *	-1.941	596.378 *	1.118 *	521.224 *	-2.341	543.043 *
2 F	-3.621	608.499 *	1.011 *	402.434 *	-2.422	635.166 *	1.115 *	480.011 *	-3.282	627.894 *
3 F	-1.803	635.166 *	1.210 *	574.559 *	-2.032	642.440 *	1.222 *	579.407 *	-3.848	589.105 *
4 F	-2.384	574.559 *	1.055 *	480.011 *	-1.801	586.681 *	1.093 *	506.678 *	-3.658	533.346 *
5 F	-2.725	625.470 *	1.132 *	506.679 *	-2.822	562.438 *	0.878 *	315.159 *	-4.856	494.558 *
6 F	-1.623	659.410 *	1.280 *	620.622 *	-1.877	678.804 *	1.302 *	623.045 *	-3.433	608.499 *
7 F	-1.634	647.288 *	1.202 *	555.165 *	-1.576	671.531 *	1.290 *	618.197 *	-3.640	632.743 *
8 F	-1.700	640.016 *	1.205 *	564.862 *	-2.959	630.319 *	1.152 *	521.224 *	-3.846	591.529 *
9 F	-1.731	601.227 *	1.154 *	552.740 *	-1.573	640.016 *	1.195 *	555.164 *	-4.134	593.954 *
10 F	-2.254	649.713 *	1.212 *	562.438 *	-1.281	567.287 *	0.929 *	361.221 *	-2.702	509.103 *
11	-0.286	19.394	0.022	2.424	0.815	16.970	0.022	4.849	-0.339	16.970
MEAN	-2.055mV	568.388nA	1.051uA	482.877nA	-1.770mV	566.185nA	1.029uA	462.380nA	-3.280mV	521.886nA
SIGMA	863.584uV	184.018nA	350.595nA	169.842nA	1.003mV	186.253nA	359.040nA	179.677nA	1.184mV	173.787nA
MIN	-3.621mV	19.394nA	21.819nA	2.424nA	-2.959mV	16.970nA	21.819nA	4.849nA	-4.856mV	16.970nA
MAX	-286.000uV	659.410nA	1.280uA	620.622nA	815.000uV	678.804nA	1.302uA	623.045nA	-339.000uV	632.743nA
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	21.2	21.3	22.0	22.1	22.2	22.3	23.0	23.1	23.2	23.3
Test	IIB1+CELL3	IIO1CELL3	VIO1CELL4	IIB1-CELL4	IIB1+CELL4	IIO1CELL4	AVSCELL1	AVSCELL2	AVSCELL3	AVSCELL4
VCC	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	30.000 V	15.000 V	15.000 V	15.000 V	15.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VT			15.000 V				1.000 V	1.000 V	1.000 V	1.000 V
VT'							11.000 V	11.000 V	11.000 V	11.000 V

LIMITS

MIN	0.000 A	0.000 A	-5.000 mV	0.000 A	0.000 A	0.000 A	50.000	50.000	50.000	50.000
MAX	100.000 nA	25.000 nA	5.000 mV	100.000 nA	100.000 nA	25.000 nA	5.000 K	5.000 K	5.000 K	5.000 K

DATA RECORDS

Test Nb	**21.2**	**21.3**	**22.0**	**22.1**	**22.2**	**22.3**	**23.0**	**23.1**	**23.2**	**23.3**
Test	**IIB1+CELL3**	**IIO1CELL3**	**VIO1CELL4**	**IIB1-CELL4**	**IIB1+CELL4**	**IIO1CELL4**	**AVSCELL1**	**AVSCELL2**	**AVSCELL3**	**AVSCELL4**
Unit	**uA**	**nA**	**mV**	**nA**	**uA**	**nA**	**V/MV**	**V/MV**	**V/MV**	**V/MV**
1 F	0.849 *	305.462 *	-3.020	472.739 *	0.696 *	223.036 *	75.421	72.921	78.564	79.034
2 F	0.945 *	317.583 *	-3.631	560.013 *	0.834 *	273.946 *	62.851	60.545	59.994	62.851
3 F	0.960 *	370.918	-4.586	540.619 *	0.865 *	324.856 *	62.258	58.923	64.071	62.258
4 F	0.832 *	298.189 *	-2.877	465.466 *	0.689 *	223.036 *	75.855	70.581	76.293	76.737
5 F	0.570 *	75.153 *	-2.296	511.527 *	0.776 *	264.249 *	65.994	63.455	69.834	68.743
6 F	0.960 *	351.523 *	-3.311	543.043 *	0.851 *	307.886 *	61.966	57.386	59.723	63.762
7 F	1.055 *	421.828 *	-3.445	557.590 *	0.907 *	349.099 *	60.824	55.457	60.268	59.454
8 F	0.943 *	351.523 *	-3.688	521.224 *	0.798 *	276.370 *	61.676	61.676	63.762	64.700
9 F	0.958 *	363.645 *	-2.796	513.952 *	0.795 *	281.219 *	65.665	60.268	62.851	62.851
10 F	0.628 *	118.791 *	-2.044	543.043 *	0.897 *	353.948 *	68.743	62.851	68.743	65.018
11	0.022	4.849	-0.326	21.819	0.019	2.424	235.691	253.821	219.979	235.691
MEAN	792.746nA	270.860nA	-2.911mV	477.367nA	738.750nA	261.824nA	81.540	79.808	80.371	81.918
SIGMA	295.546nA	138.109nA	1.105mV	154.276nA	249.161nA	96.559nA	51.398	57.950	46.745	51.366
MIN	21.819nA	4.849nA	-4.586mV	21.819nA	19.394nA	2.424nA	60.824	55.457	59.723	59.454
MAX	1.055uA	421.828nA	-326.000uV	560.013nA	0.907uA	353.948nA	235.691	253.821	219.979	235.691
QTY	11	11	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
REJECTED UNITS:

1,2,3,4,5,6,7,8,9,10

PARAMETERS TEST CONDITIONS

Test Nb	24.0	24.1	24.2	24.3	25.0	25.1	25.2	25.3
Test	CMR1C1	CMR1C2	CMR1C3	CMR1C4	CMR2C1	CMR2C2	CMR2C3	CMR2C4
VCC	5.000 V	5.000 V	5.000 V	5.000 V	30.000 V	30.000 V	30.000 V	30.000 V
VEE	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V	0.000 V
VCC'	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V	2.000 V
VEE'	-3.000 V	-3.000 V	-3.000 V	-3.000 V	-28.000 V	-28.000 V	-28.000 V	-28.000 V

LIMITS

MIN	70.000 DB	70.000 DB	70.000 DB	70.000 DB	76.000 DB	76.000 DB	76.000 DB	76.000 DB
MAX	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB	200.000 DB

DATA RECORDS

Test Nb **Test** **Unit**	**24.0** **CMR1C1** **DB**	**24.1** **CMR1C2** **DB**	**24.2** **CMR1C3** **DB**	**24.3** **CMR1C4** **DB**	**25.0** **CMR2C1** **DB**	**25.1** **CMR2C2** **DB**	**25.2** **CMR2C3** **DB**	**25.3** **CMR2C4** **DB**
1	79.206	81.401	76.429	78.019	87.636	89.459	85.139	85.974
2	78.376	79.126	76.680	78.681	86.740	87.177	84.991	87.105
3	82.042	81.756	76.393	78.151	91.156	89.934	84.710	86.433
4	80.596	81.609	76.200	78.587	89.152	89.831	84.850	86.710
5	81.010	78.246	75.182	80.457	89.442	86.248	83.340	88.526
6	82.954	82.601	76.398	78.891	91.901	91.016	85.064	87.334
7	82.267	82.756	76.740	78.969	91.713	90.626	85.205	87.236
8	81.850	79.367	76.214	78.914	91.139	87.557	84.542	86.708
9	81.517	81.905	76.247	79.060	90.211	90.285	84.664	87.288
10	81.142	79.616	76.050	81.217	90.230	88.039	84.332	89.538
11	128.430	106.757	102.213	106.151	116.220	107.798	105.256	107.294
MEAN	85.399 DB	83.195 DB	78.613 DB	81.554 DB	92.322 DB	90.725 DB	86.554 DB	89.104 DB
SIGMA	14.334 DB	7.960 DB	7.838 DB	8.212 DB	8.091 DB	5.871 DB	6.224 DB	6.113 DB
MIN	78.376 DB	78.246 DB	75.182 DB	78.019 DB	86.740 DB	86.248 DB	83.340 DB	85.974 DB
MAX	128.430 DB	106.757 DB	102.213 DB	106.151 DB	116.220 DB	107.798 DB	105.256 DB	107.294 DB
QTY	11	11	11	11	11	11	11	11

TOTAL PASSED DEVICES : 11
TOTAL FAILED DEVICES : 0
NO REJECTED UNITS.

```
REJECTED UNITS :

        1,2,3,4,5,6,7,8,9,10

TOTAL PASSED DEVICES : 1
TOTAL FAILED DEVICES : 10
```

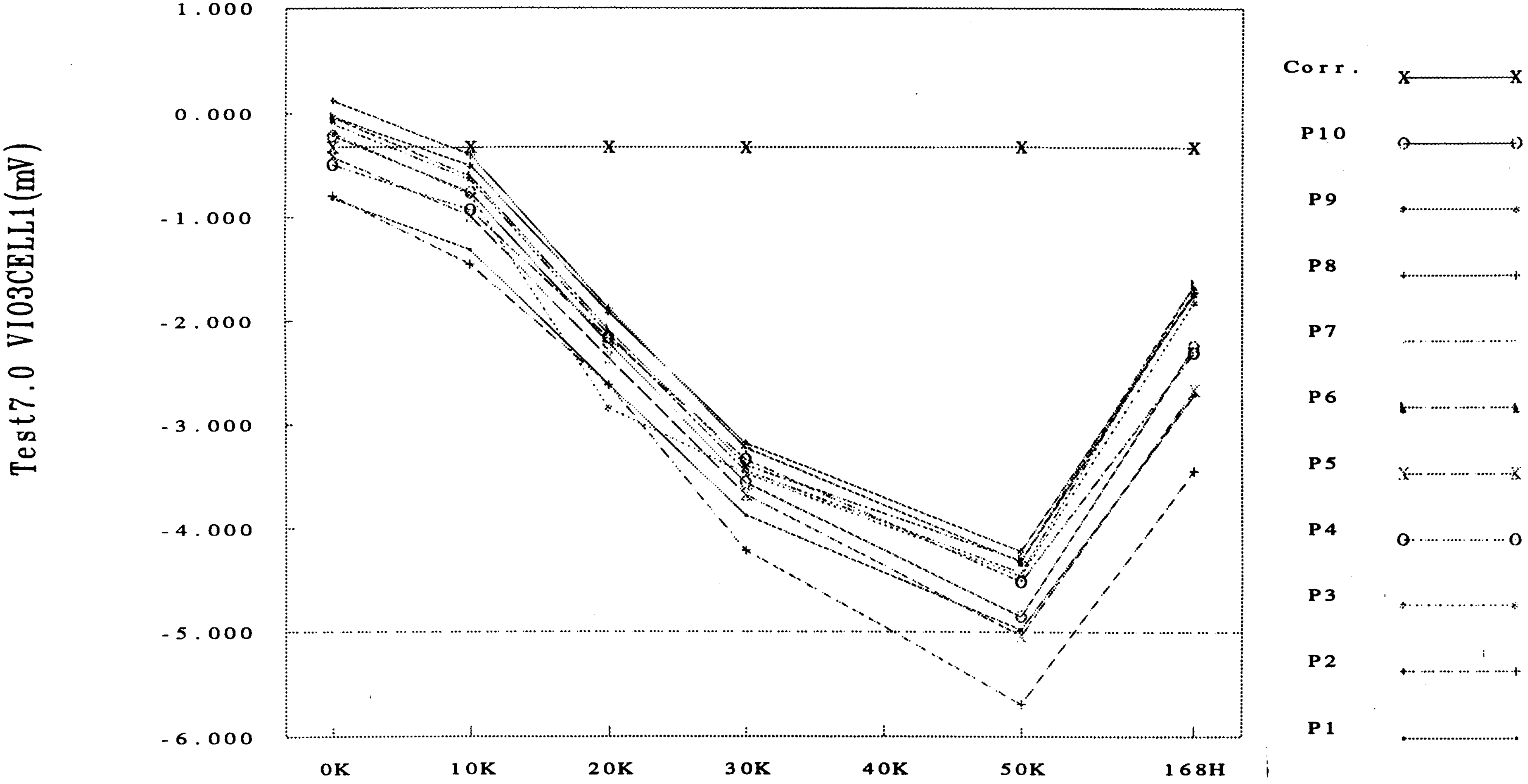
APPENDIX 2

DIAGRAMS FOR TABLE 4 PARAMETERS

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J   Lot:NTTA0139J   Date Code:9504   Date:03-MAR-95

Test Nb=7.0   Test =VIO3CELL1   VCC =5.000 V
VEE =0.000 V   VT =1.400 V



Limit min: -5.000 mV   Limit max: 5.000 mV

Devices Measurements

Test7.0 VIO3CELL1 (mV)

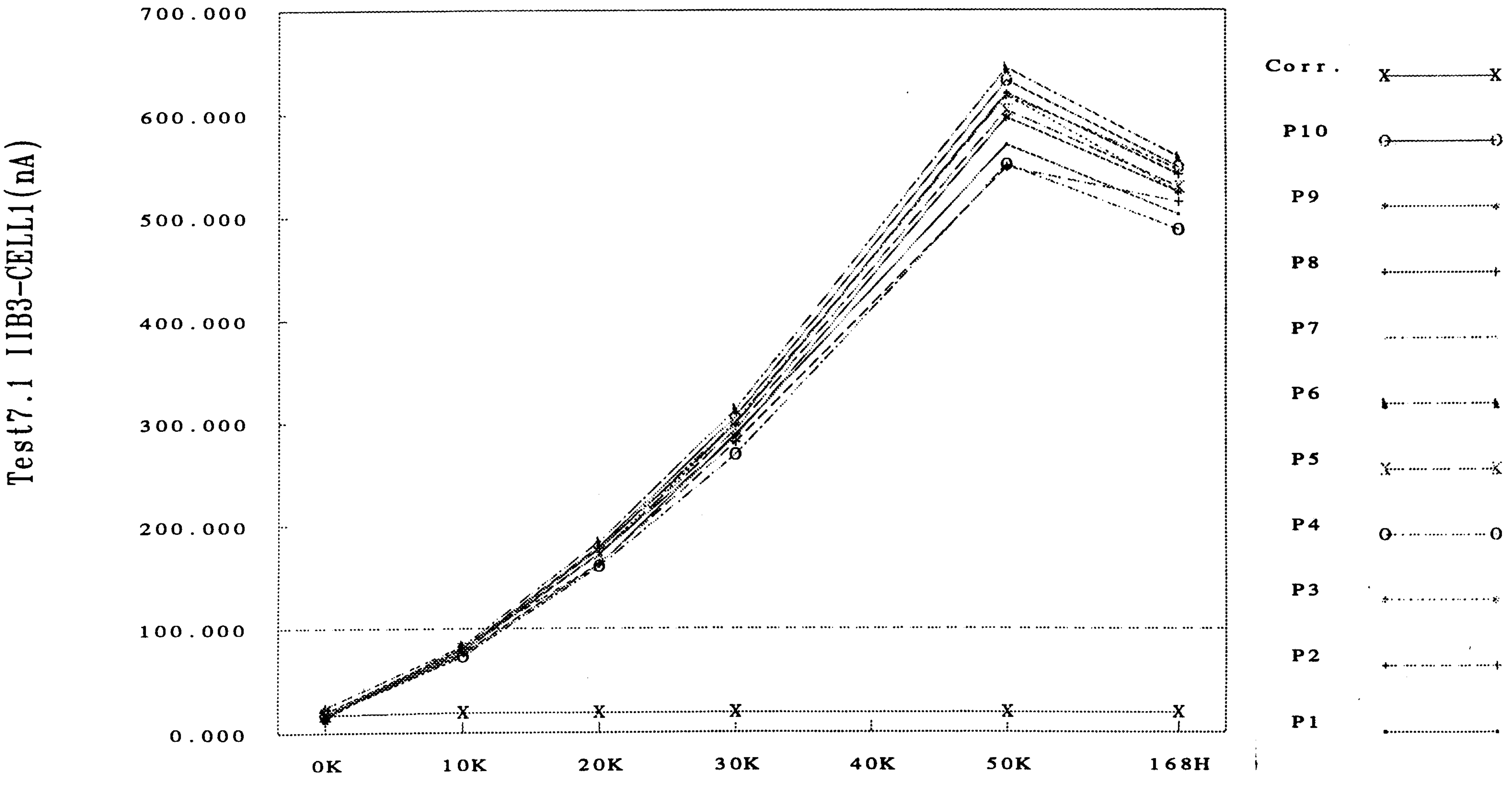
	0K	10K	20K	30K	50K	168H
Correl.	-0.327	-0.329	-0.326	-0.326	-0.323	-0.329
P1	-0.819	-1.311	-2.609	-3.870	-4.981	-2.710
P2	-0.794	-1.451	-2.617	-4.212	-5.692F	-3.442
P3	-0.189	-0.785	-2.840	-3.470	-4.458	-1.816
P4	-0.496	-0.931	-2.162	-3.336	-4.515	-2.303
P5	-0.421	-0.989	-2.357	-3.672	-5.039F	-2.667
P6	-0.038	-0.609	-2.083	-3.392	-4.309	-1.643
P7	-0.099	-0.643	-2.127	-3.444	-4.425	-1.647
P8	0.126	-0.401	-1.877	-3.224	-4.318	-1.718
P9	-0.032	-0.506	-1.911	-3.179	-4.218	-1.737
P10	-0.214	-0.764	-2.215	-3.558	-4.854	-2.246
MEAN	-297.600uV	-839.000uV	-2.280mV	-3.536mV	-4.681mV	-2.193mV
SIGMA	324.629uV	338.441uV	319.770uV	313.734uV	459.173uV	600.294uV
MIN	-819.000uV	-1.451mV	-2.840mV	-4.212mV	-5.692mV	-3.442mV
MAX	126.000uV	-401.000uV	-1.877mV	-3.179mV	-4.218mV	-1.643mV
CP	5.13406	4.92454	5.21208	5.31236	3.62972	2.77642
CPK	4.82848	4.0982	2.83558	1.55578	0.2316	1.55874

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=7.1 Test =IIB3-CELL1 VCC =5.000 V

VEE =0.000 V



Limit min: 0.000 nA Limit max: 100.000 nA

Devices Measurements

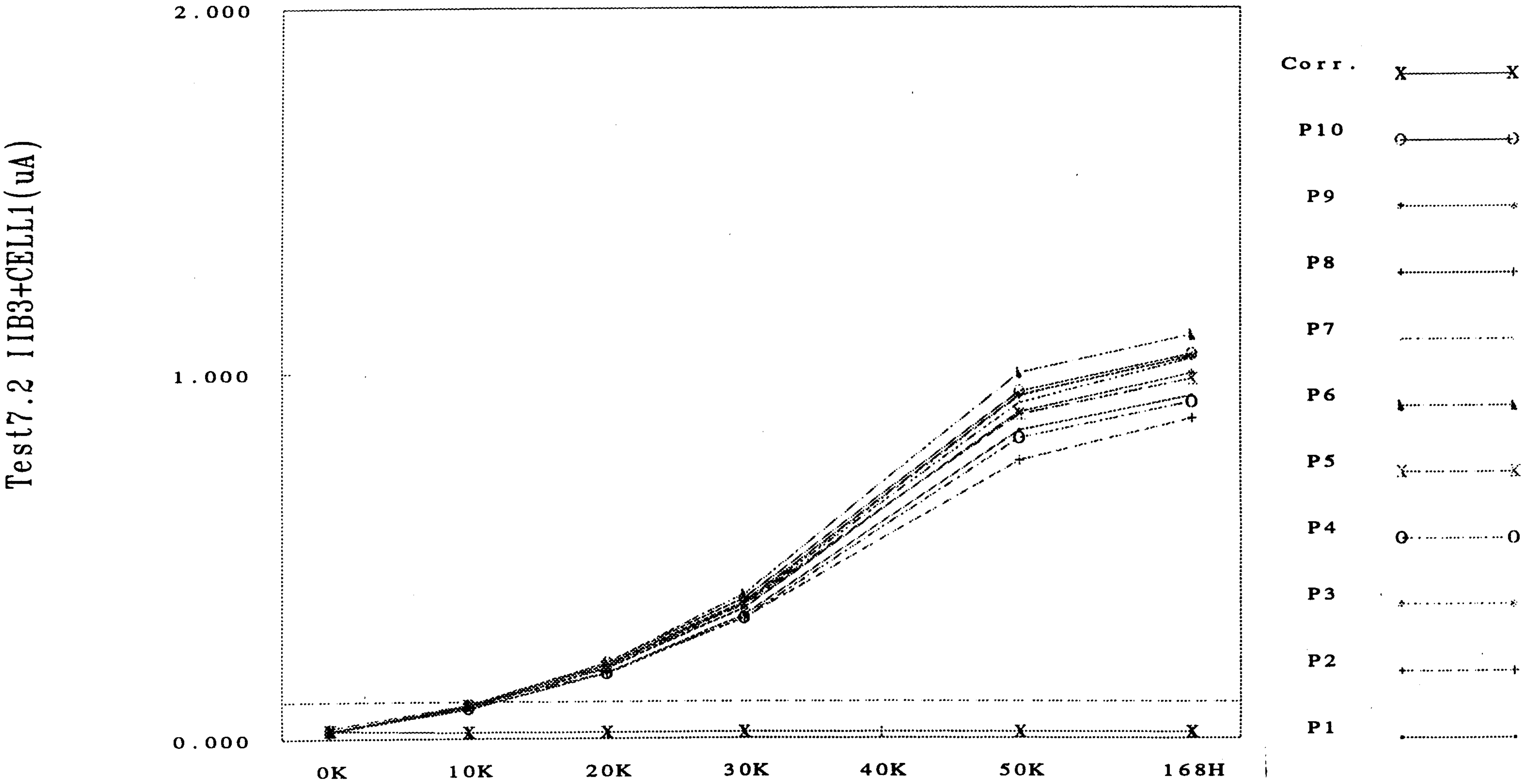
Test7.1 IIB3-CELL1(nA)

	0K	10K	20K	30K	50K	168H
Correl.	16.968	19.397	19.397	19.397	19.397	19.394
P1	16.968	75.164	162.452F	288.534F	569.795F	501.830F
P2	24.239	82.438	162.452F	281.260F	547.973F	513.952F
P3	14.544	80.014	172.151F	298.233F	618.288F	523.649F
P4	16.968	72.740	160.027F	269.137F	550.397F	487.284F
P5	16.968	80.014	172.151F	293.384F	603.740F	528.498F
P6	14.544	82.438	184.274F	312.781F	644.959F	557.590F
P7	16.968	80.014	177.000F	300.658F	618.288F	545.468F
P8	16.968	80.014	177.000F	298.233F	620.712F	540.619F
P9	16.968	77.589	172.151F	286.110F	596.466F	523.649F
P10	19.392	80.014	179.425F	305.507F	632.835F	547.892F
MEAN	17.453nA	79.044nA	171.908nA	293.384nA	600.345nA	527.043nA
SIGMA	2.752nA	3.067nA	8.038nA	12.625nA	33.833nA	21.870nA
MIN	14.544nA	72.740nA	160.027nA	269.137nA	547.973nA	487.284nA
MAX	24.239nA	82.438nA	184.274nA	312.781nA	644.959nA	557.590nA
CP	6.05692	5.43431	2.07355	1.32014	0.4926	0.7621
CPK	2.11419	2.27764	-2.9821	-5.1059	-4.9295	-6.5089

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=7.2 Test =IIB3+CELL1 VCC =5.000 V
VEE =0.000 V



Limit min: 0.000 uA Limit max: 0.100 uA

Devices Measurements

Test7.2 IIB3+CELL1(uA)

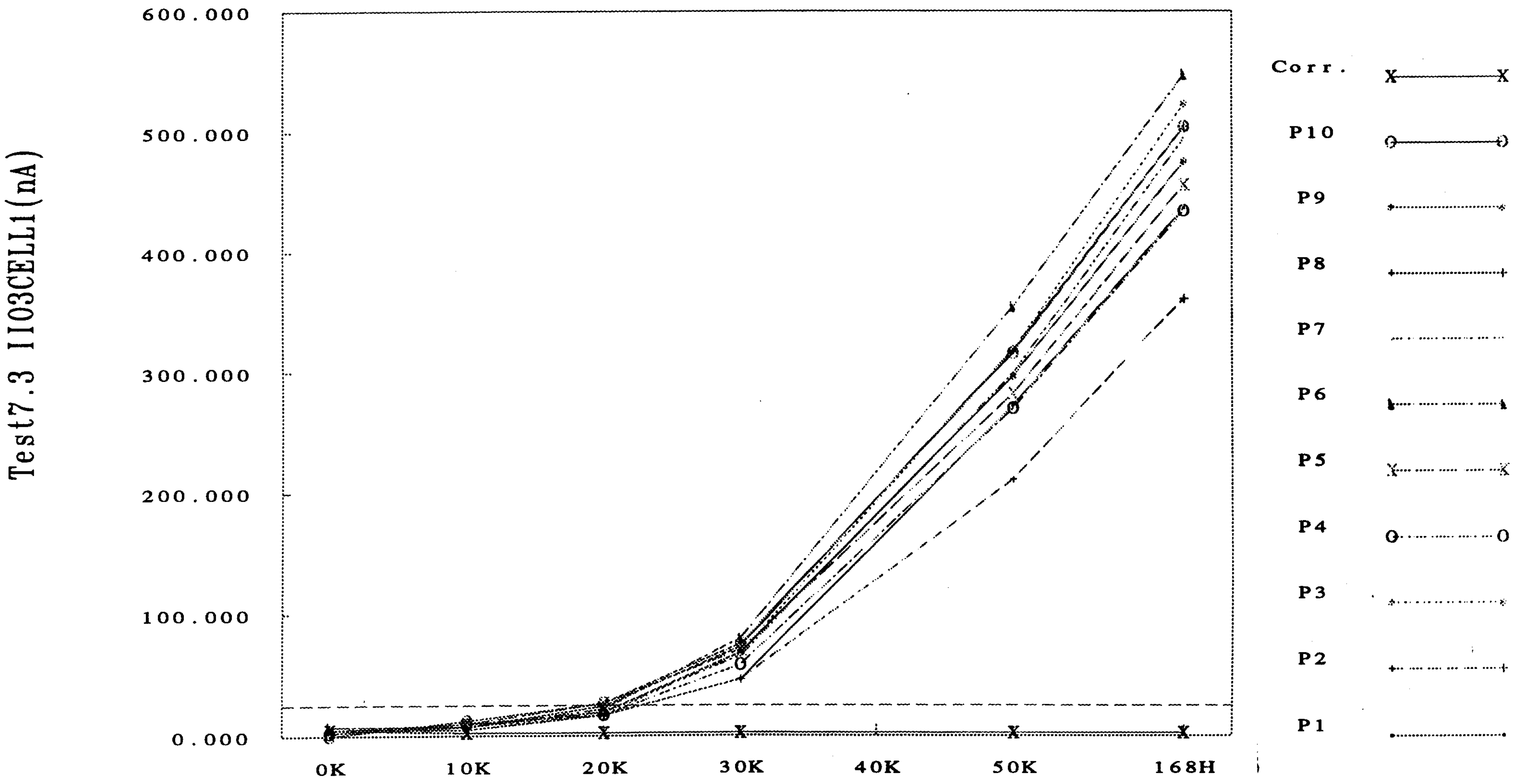
	0K	10K	20K	30K	50K	168H
Correl.	0.022	0.017	0.017	0.017	0.017	0.017
P1	0.022	0.080	0.179F	0.335F	0.841F	0.938F
P2	0.029	0.092	0.179F	0.327F	0.759F	0.875F
P3	0.022	0.087	0.189F	0.366F	0.936F	1.047F
P4	0.019	0.082	0.177F	0.327F	0.820F	0.921F
P5	0.022	0.090	0.199F	0.364F	0.885F	0.984F
P6	0.022	0.090	0.206F	0.393F	0.999F	1.105F
P7	0.019	0.090	0.196F	0.366F	0.917F	1.040F
P8	0.019	0.087	0.201F	0.371F	0.938F	1.045F
P9	0.022	0.085	0.192F	0.354F	0.892F	0.999F
P10	0.019	0.092	0.206F	0.381F	0.948F	1.052F
MEAN	21.573nA	87.530nA	192.518nA	358.365nA	893.487nA	1.001uA
SIGMA	2.902nA	4.033nA	11.034nA	22.363nA	70.563nA	71.138nA
MIN	19.392nA	80.014nA	177.000nA	327.329nA	758.918nA	875.173nA
MAX	29.087nA	92.137nA	206.096nA	392.795nA	0.999uA	1.105uA
CP	5.74371	4.13264	1.51042	0.7453	0.2362	0.2343
CPK	2.47818	1.03067	-2.7948	-3.8511	-3.7484	-4.2207

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=7.3 Test =IIO3CELL1 VCC =5.000 V

VEE =0.000 V



Limit min: 0.000 nA Limit max: 25.000 nA

Devices Measurements

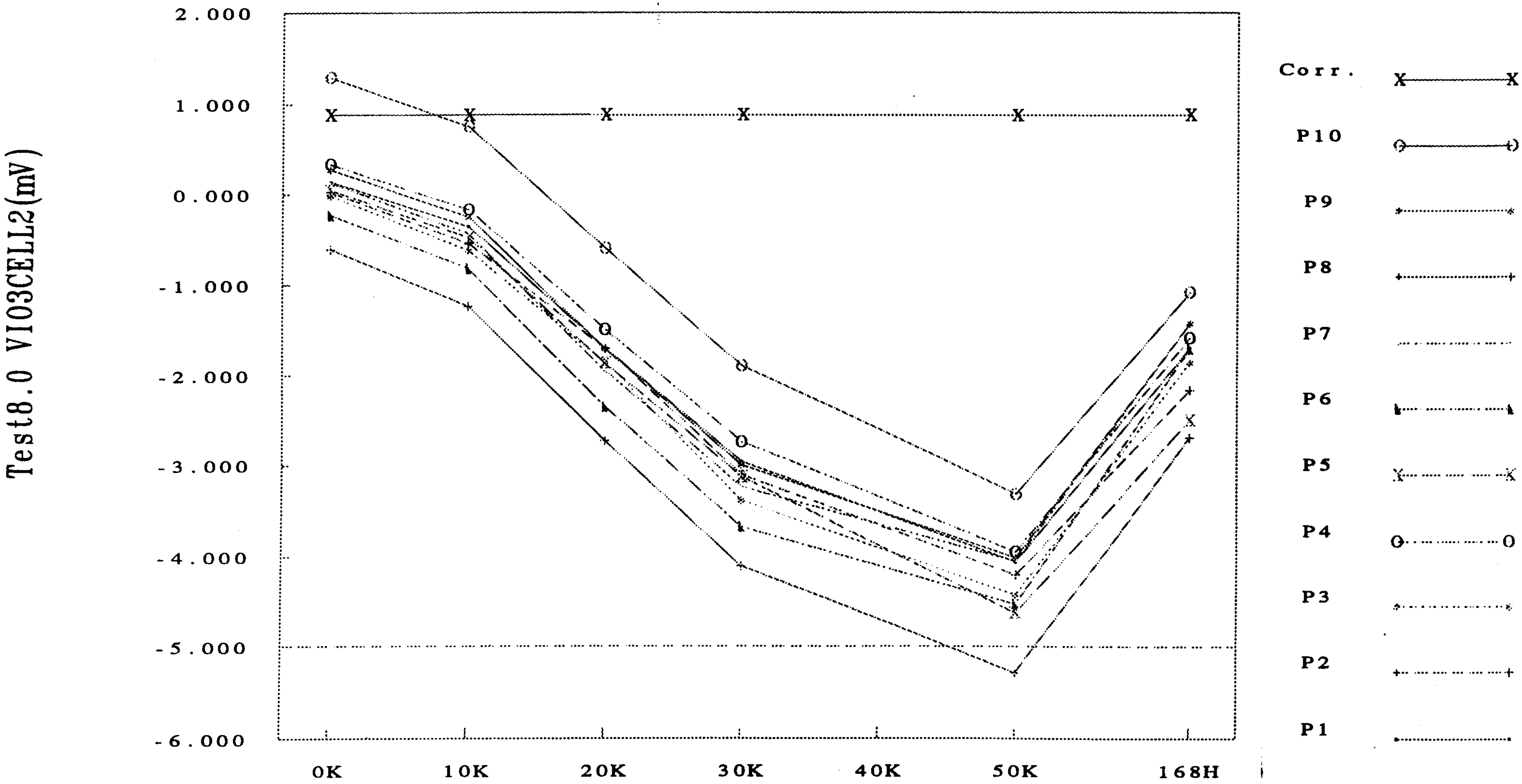
Test7.3 IIO3CELL1(nA)

	0K	10K	20K	30K	50K	168H
Correl.	4.848	2.425	2.425	2.425	2.425	2.424
P1	4.848	4.849	16.973	46.068F	271.562F	436.374F
P2	4.848	9.699	16.973	46.068F	210.945F	361.221F
P3	7.272	7.274	16.973	67.890F	317.630F	523.649F
P4	2.424	9.699	16.973	58.192F	269.137F	433.950F
P5	4.848	9.699	26.671F	70.315F	281.260F	455.769F
P6	7.272	7.274	21.822	80.014F	354.000F	547.892F
P7	2.424	9.699	19.397	65.466F	298.233F	494.557F
P8	2.424	7.274	24.247	72.740F	317.630F	504.254F
P9	4.848	7.274	19.397	67.890F	295.808F	475.163F
P10	0.000	12.123	26.671F	75.164F	315.206F	504.254F
MEAN	4.121nA	8.486nA	20.610nA	64.981nA	293.141nA	473.708nA
SIGMA	2.300nA	2.061nA	4.000nA	11.533nA	38.532nA	54.006nA
MIN	0.000A	4.849nA	16.973nA	46.068nA	210.945nA	361.221nA
MAX	7.272nA	12.123nA	26.671nA	80.014nA	354.000nA	547.892nA
CP	1.8119	2.02201	1.04159	0.3613	0.1081	0.0772
CPK	0.5973	1.37277	0.3658	-1.1556	-2.3196	-2.7695

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=8.0 Test =VIO3CELL2 VCC =5.000 V
VEE =0.000 V VT =1.400 V



Limit min: -5.000 mV Limit max: 5.000 mV

Devices Measurements

Test8.2 IIB3+CELL2(uA)

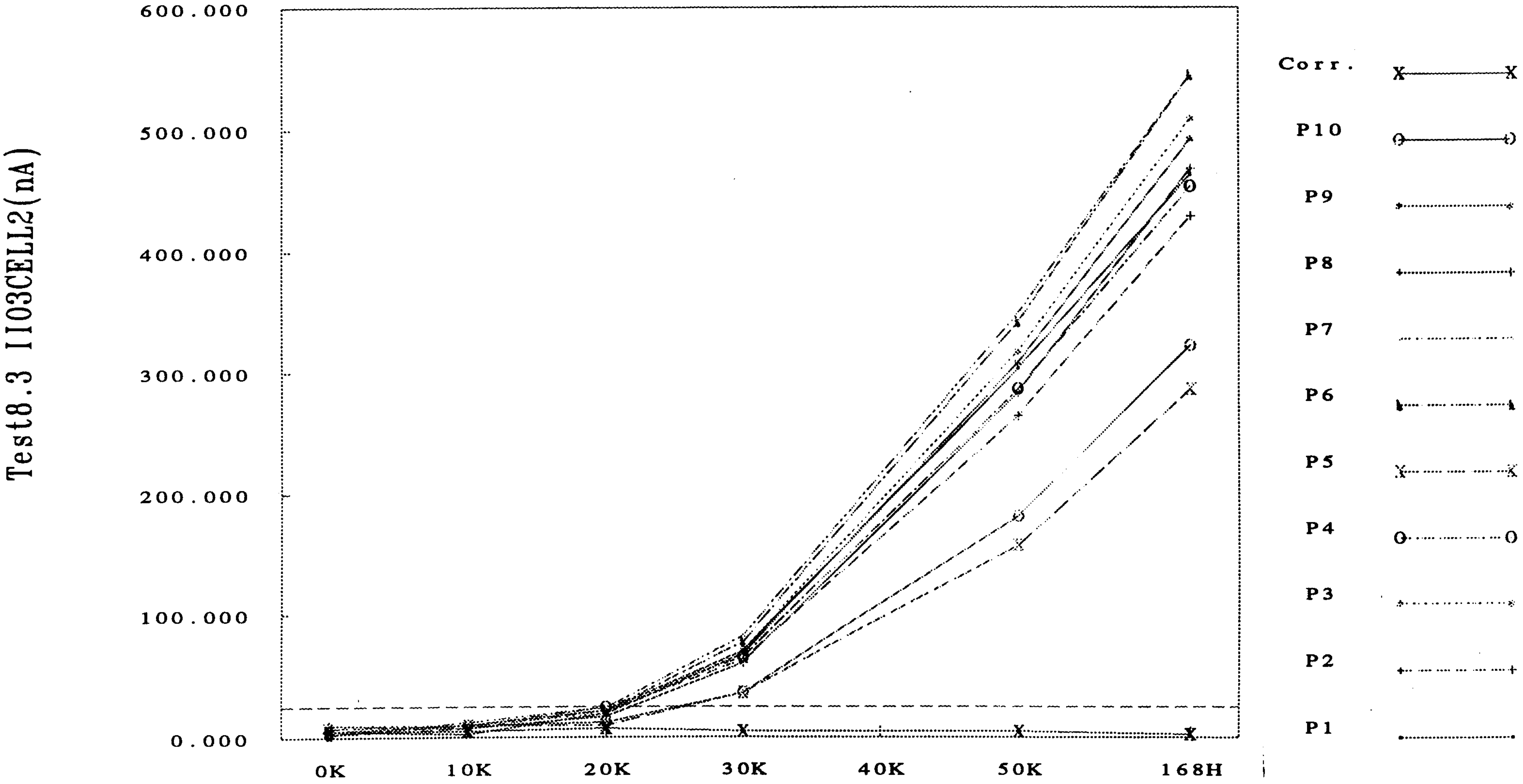
	0K	10K	20K	30K	50K	168H
Correl.	0.022	0.022	0.022	0.022	0.022	0.019
P1	0.022	0.082	0.187F	0.349F	0.878F	0.975F
P2	0.027	0.095	0.187F	0.356F	0.841F	0.965F
P3	0.024	0.087	0.199F	0.371F	0.941F	1.057F
P4	0.022	0.082	0.184F	0.339F	0.853F	0.955F
P5	0.024	0.082	0.165F	0.286F	0.647F	0.759F
P6	0.017	0.090	0.209F	0.395F	1.011F	1.125F
P7	0.019	0.092	0.211F	0.395F	0.994F	1.113F
P8	0.024	0.085	0.192F	0.354F	0.885F	1.001F
P9	0.022	0.085	0.196F	0.366F	0.924F	1.035F
P10	0.022	0.082	0.170F	0.293F	0.684F	0.805F
MEAN	22.300nA	86.318nA	189.851nA	350.606nA	865.845nA	0.979uA
SIGMA	2.752nA	4.456nA	14.905nA	36.882nA	119.564nA	119.488nA
MIN	16.968nA	82.438nA	164.877nA	286.110nA	647.384nA	758.806nA
MAX	26.663nA	94.562nA	210.945nA	395.219nA	1.011uA	1.125uA
CP	6.05705	3.73994	1.11819	0.4519	0.1394	0.1395
CPK	2.70144	1.02342	-2.0094	-2.2650	-2.1351	-2.4519

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=8.3 Test =IIO3CELL2 VCC =5.000 V

VEE =0.000 V



Limit min: 0.000 nA Limit max: 25.000 nA

Devices Measurements

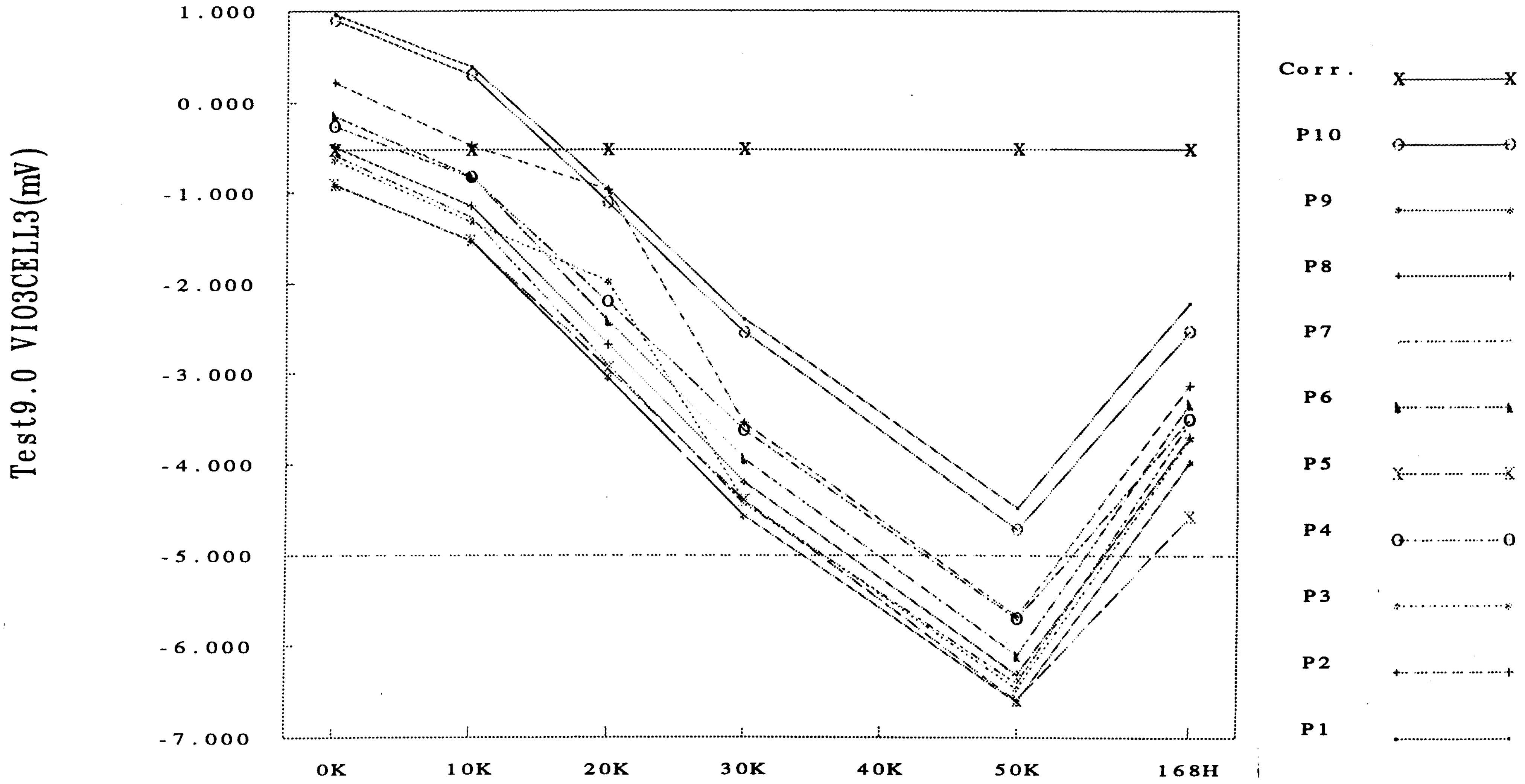
Test8.3 IIO3CELL2(nA)

	0K	10K	20K	30K	50K	168H
Correl.	4.848	4.849	7.274	4.849	4.849	2.424
P1	4.848	9.699	21.822	70.315F	303.083F	463.042F
P2	2.424	7.274	21.822	63.041F	264.288F	429.102F
P3	9.696	9.699	19.397	70.315F	317.630F	509.103F
P4	4.848	9.699	24.247	65.466F	286.110F	453.344F
P5	7.272	9.699	9.699	36.370F	157.603F	286.067F
P6	2.424	9.699	21.822	77.589F	341.876F	545.468F
P7	2.424	12.123	24.247	82.438F	349.151F	545.467F
P8	9.696	7.274	16.973	60.616F	283.685F	467.889F
P9	4.848	2.425	19.397	67.890F	307.932F	492.133F
P10	4.848	9.699	12.123	36.370F	181.849F	322.432F
MEAN	5.333nA	8.729nA	19.155nA	63.041nA	279.321nA	451.405nA
SIGMA	2.752nA	2.606nA	4.910nA	15.462nA	63.462nA	86.643nA
MIN	2.424nA	2.425nA	9.699nA	36.370nA	157.603nA	286.067nA
MAX	9.696nA	12.123nA	24.247nA	82.438nA	349.151nA	545.468nA
CP	1.51408	1.59864	0.8487	0.2695	0.0657	0.0481
CPK	0.6459	1.11636	0.3968	-0.8201	-1.3358	-1.6405

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J   Lot:NTTA0139J   Date Code:9504   Date:03-MAR-95

Test Nb=9.0   Test =VIO3CELL3   VCC =5.000 V
VEE =0.000 V   VT =1.400 V



Limit min: -5.000 mV   Limit max: 5.000 mV

Devices Measurements

Test9.0 VIO3CELL3(mV)

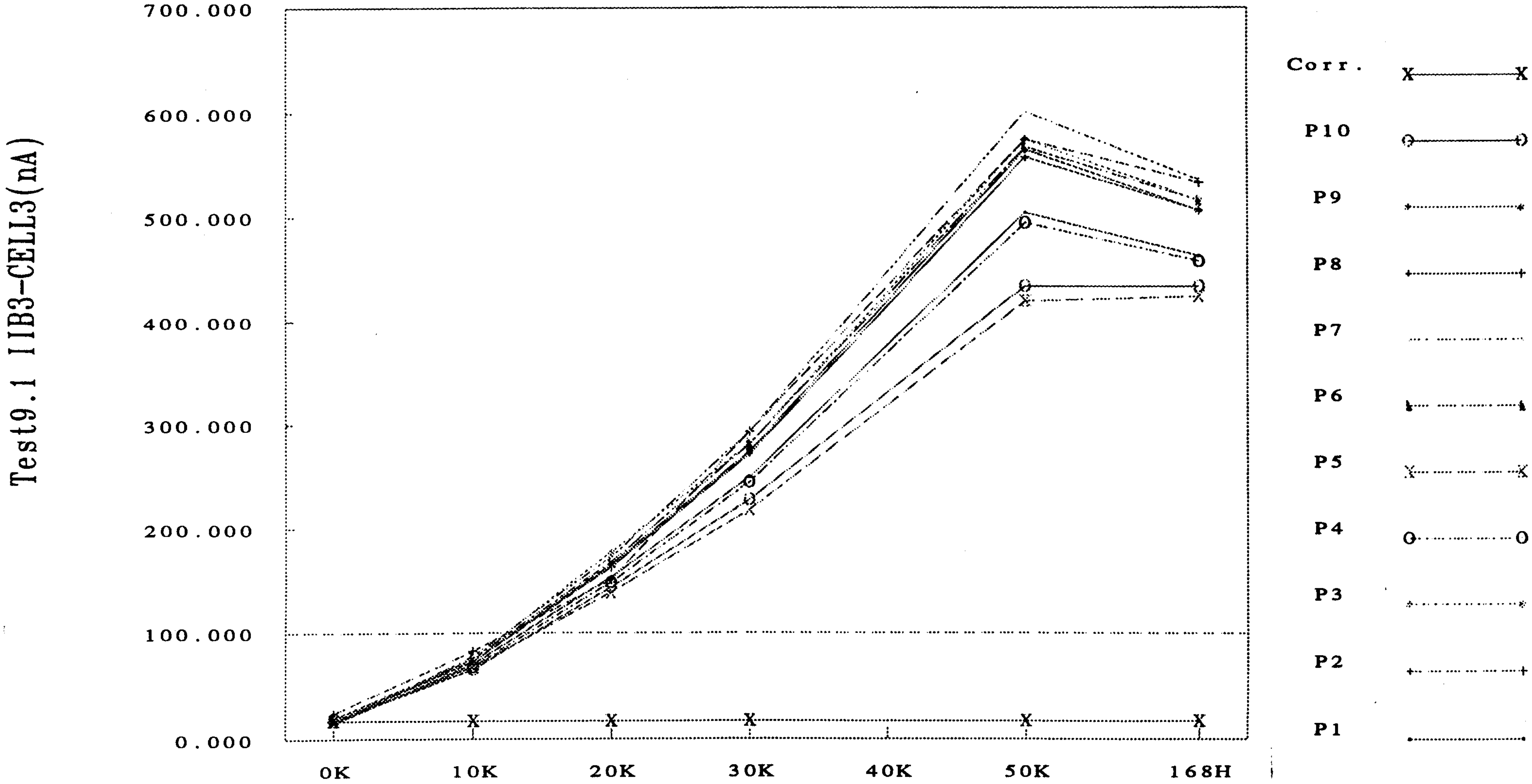
	0K	10K	20K	30K	50K	168H
Correl.	-0.527	-0.527	-0.527	-0.524	-0.524	-0.522
P1	0.962	0.392	-0.965	-2.401	-4.478	-2.225
P2	0.223	-0.484	-0.970	-3.548	-5.671F	-3.138
P3	-0.640	-1.325	-1.980	-4.401	-6.464F	-3.722
P4	-0.267	-0.831	-2.207	-3.628	-5.700F	-3.509
P5	-0.911	-1.530	-2.950	-4.393	-6.596F	-4.570
P6	-0.153	-0.819	-2.421	-3.943	-6.102F	-3.339
P7	-0.588	-1.272	-2.903	-4.430	-6.405F	-3.541
P8	-0.494	-1.149	-2.684	-4.192	-6.314F	-3.701
P9	-0.915	-1.532	-3.051	-4.563	-6.610F	-3.977
P10	0.900	0.300	-1.111	-2.551	-4.717	-2.544
MEAN	-188.300uV	-825.000uV	-2.124mV	-3.805mV	-5.906mV	-3.427mV
SIGMA	682.465uV	700.375uV	835.268uV	780.034uV	766.487uV	675.486uV
MIN	-0.915mV	-1.532mV	-3.051mV	-4.563mV	-6.610mV	-4.570mV
MAX	0.962mV	392.000uV	-0.965mV	-2.401mV	-4.478mV	-2.225mV
CP	2.44213	2.37968	1.99537	2.13666	2.17442	2.46736
CPK	2.35016	1.98703	1.14766	0.5107	-0.3939	0.7764

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=9.1 Test =IIB3-CELL3 VCC =5.000 V

VEE =0.000 V



Limit min: 0.000 nA Limit max: 100.000 nA

Devices Measurements

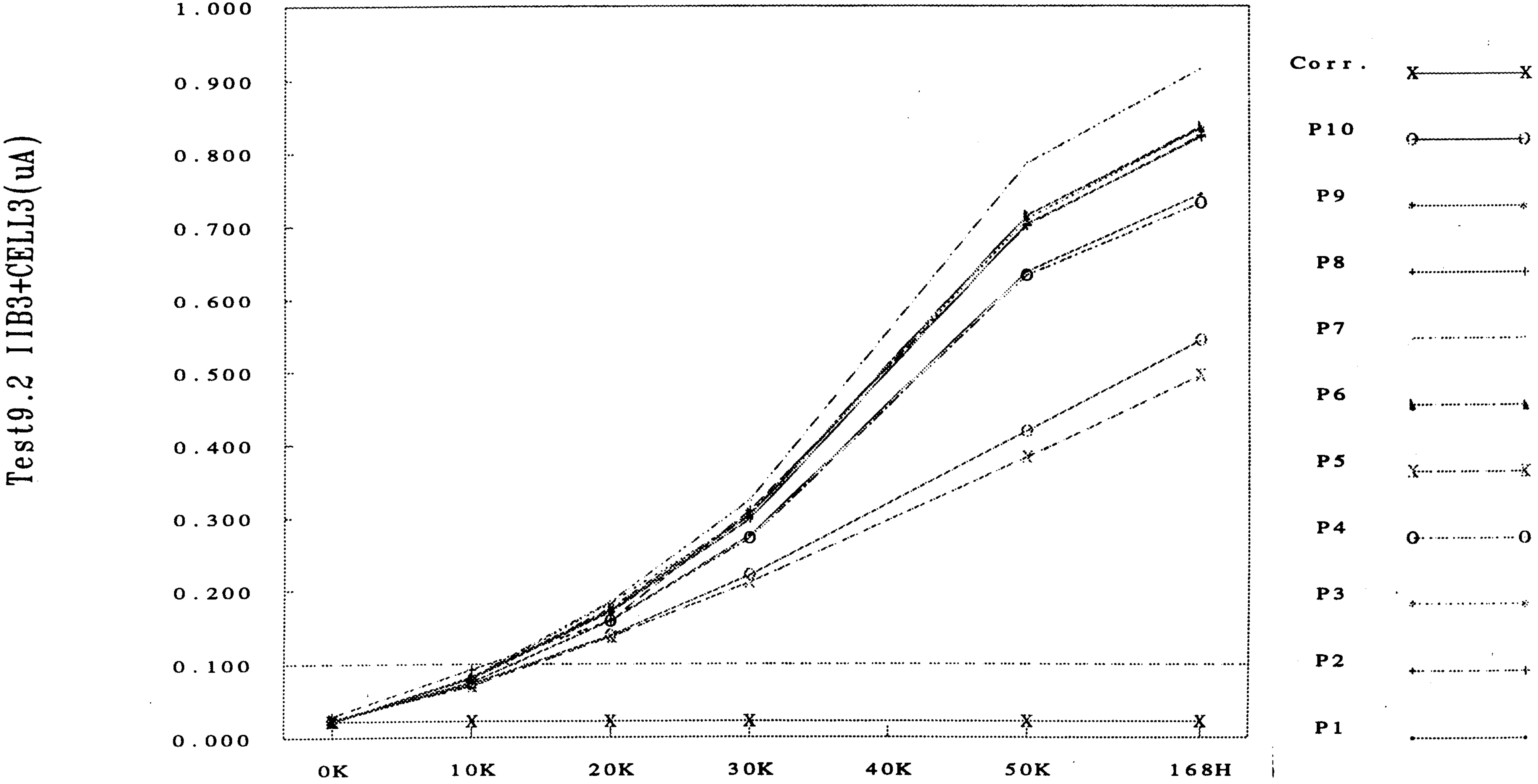
Test9.1 IIB3-CELL3(nA)

	0K	10K	20K	30K	50K	168H
Correl.	16.968	16.973	16.973	16.973	16.973	16.970
P1	14.544	70.315	152.753F	249.740F	504.329F	463.042F
P2	24.239	82.438	150.329F	293.384F	574.644F	533.346F
P3	16.968	75.164	177.000F	281.260F	574.644F	516.376F
P4	16.968	67.890	147.904F	244.890F	494.630F	458.193F
P5	16.968	67.890	138.206F	218.219F	419.466F	424.252F
P6	19.392	75.164	167.301F	281.260F	567.370F	516.376F
P7	14.544	77.589	172.151F	293.384F	601.315F	535.771F
P8	19.392	72.740	162.452F	271.562F	557.671F	506.679F
P9	16.968	72.740	164.877F	273.986F	564.945F	506.679F
P10	16.968	65.466	143.055F	227.918F	434.014F	433.950F
MEAN	17.695nA	72.740nA	157.603nA	263.560nA	529.303nA	489.466nA
SIGMA	2.810nA	5.112nA	12.982nA	26.758nA	63.062nA	40.990nA
MIN	14.544nA	65.466nA	138.206nA	218.219nA	419.466nA	424.252nA
MAX	24.239nA	82.438nA	177.000nA	293.384nA	601.315nA	535.771nA
CP	5.93041	3.26058	1.28384	0.6229	0.2643	0.4066
CPK	2.09878	1.7777	-1.4791	-2.0375	-2.2692	-3.1672

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=9.2 Test =IIB3+CELL3 VCC =5.000 V
VEE =0.000 V



Limit min: 0.000 uA Limit max: 0.100 uA

Devices Measurements

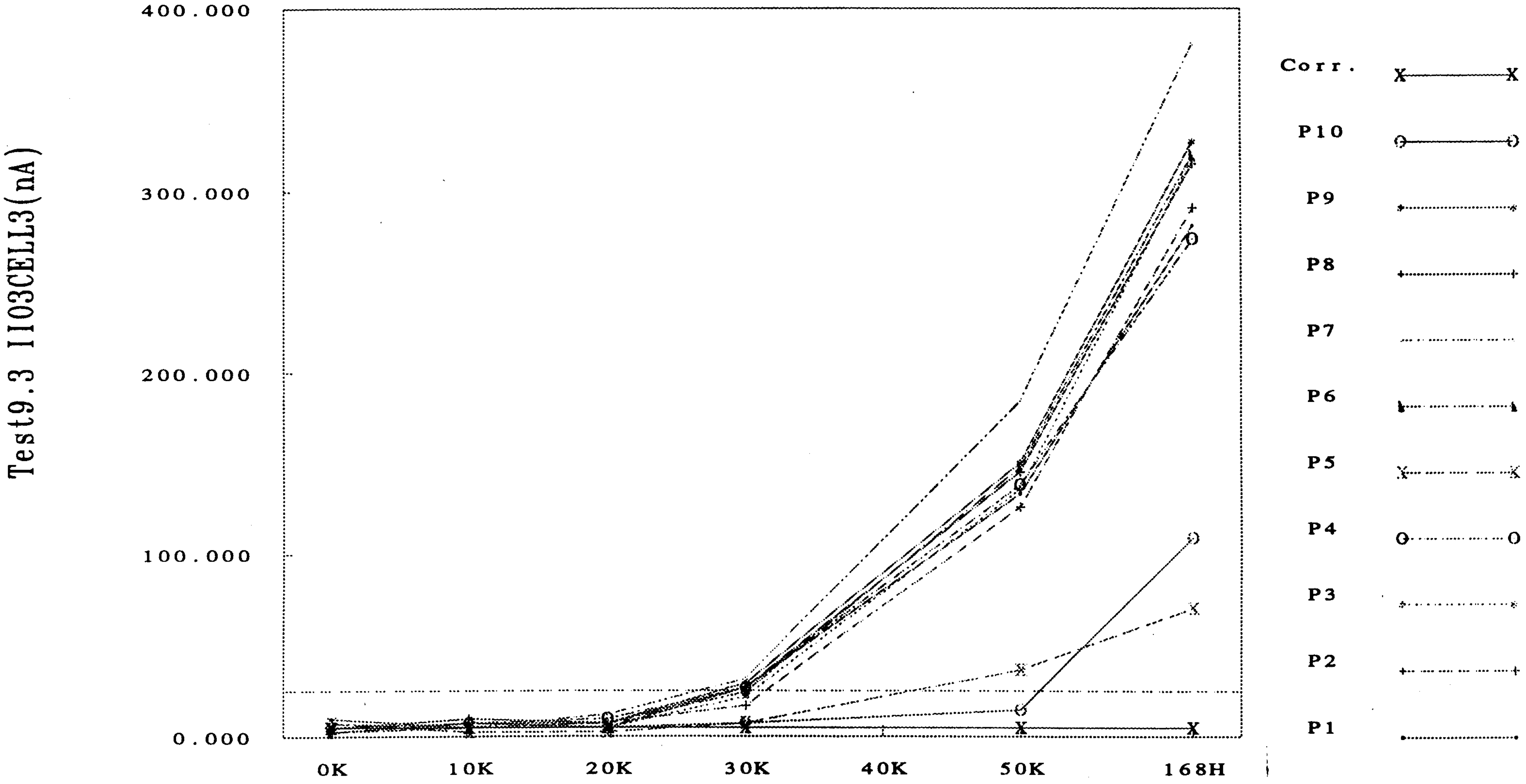
Test9.2 IIB3+CELL3(uA)

	0K	10K	20K	30K	50K	168H
Correl.	0.022	0.022	0.022	0.022	0.022	0.022
P1	0.024	0.075	0.158F	0.276F	0.638F	0.744F
P2	0.029	0.092	0.158F	0.310F	0.701F	0.824F
P3	0.022	0.080	0.182F	0.303F	0.710F	0.834F
P4	0.022	0.075	0.158F	0.272F	0.633F	0.732F
P5	0.024	0.070	0.136F	0.211F	0.383F	0.495F
P6	0.022	0.080	0.175F	0.306F	0.715F	0.836F
P7	0.022	0.082	0.184F	0.325F	0.786F	0.916F
P8	0.022	0.080	0.170F	0.298F	0.703F	0.822F
P9	0.022	0.082	0.172F	0.303F	0.715F	0.834F
P10	0.022	0.073	0.138F	0.221F	0.419F	0.543F
MEAN	23.027nA	79.044nA	162.937nA	282.473nA	640.352nA	758.079nA
SIGMA	2.356nA	6.176nA	16.713nA	38.444nA	133.273nA	136.505nA
MIN	21.815nA	70.315nA	135.781nA	210.945nA	383.096nA	494.558nA
MAX	29.087nA	92.137nA	184.274nA	324.904nA	785.589nA	0.916uA
CP	7.07503	2.69844	0.9972	0.4335	0.1251	0.1221
CPK	3.25833	1.13098	-1.2553	-1.5822	-1.3515	-1.6070

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=9.3 Test =IIO3CELL3 VCC =5.000 V
VEE =0.000 V



Limit min: 0.000 nA Limit max: 25.000 nA

Devices Measurements

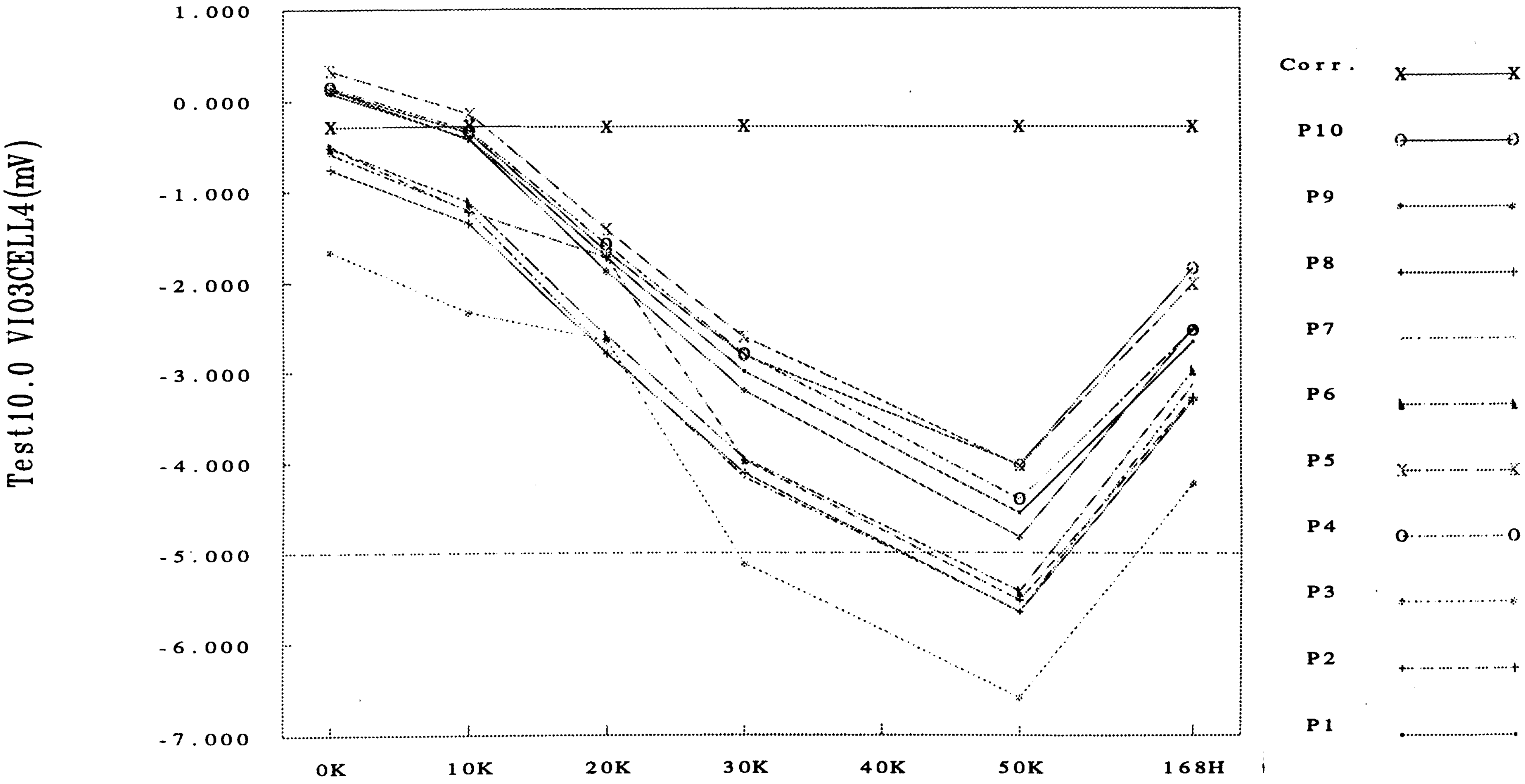
Test9.3 IIO3CELL3(nA)

	0K	10K	20K	30K	50K	168H
Correl.	4.848	4.849	4.849	4.849	4.849	4.849
P1	9.696	4.849	4.849	26.671F	133.356F	281.219F
P2	4.848	9.699	7.274	16.973	126.082F	290.916F
P3	4.848	4.849	4.849	21.822	135.781F	317.583F
P4	4.848	7.274	9.699	26.671F	138.206F	273.946F
P5	7.272	2.425	2.425	7.274	36.370F	70.305F
P6	2.424	4.849	7.274	24.247	147.904F	320.008F
P7	7.272	4.849	12.123	31.521F	184.274F	380.615F
P8	2.424	7.274	7.274	26.671F	145.479F	315.159F
P9	4.848	9.699	7.274	29.096F	150.329F	327.281F
P10	4.848	7.274	4.849	7.274	14.548	109.094F
MEAN	5.333nA	6.304nA	6.789nA	21.822nA	121.233nA	268.613nA
SIGMA	2.228nA	2.343nA	2.753nA	8.629nA	53.097nA	99.247nA
MIN	2.424nA	2.425nA	2.425nA	7.274nA	14.548nA	70.305nA
MAX	9.696nA	9.699nA	12.123nA	31.521nA	184.274nA	380.615nA
CP	1.87056	1.77866	1.51367	0.4828	0.0785	0.0420
CPK	0.7980	0.8970	0.8221	0.1228	-0.6041	-0.8182

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=10.0 Test =VIO3CELL4 VCC =5.000 V
VEE =0.000 V VT =1.400 V



Limit min: -5.000 mV Limit max: 5.000 mV

Devices Measurements

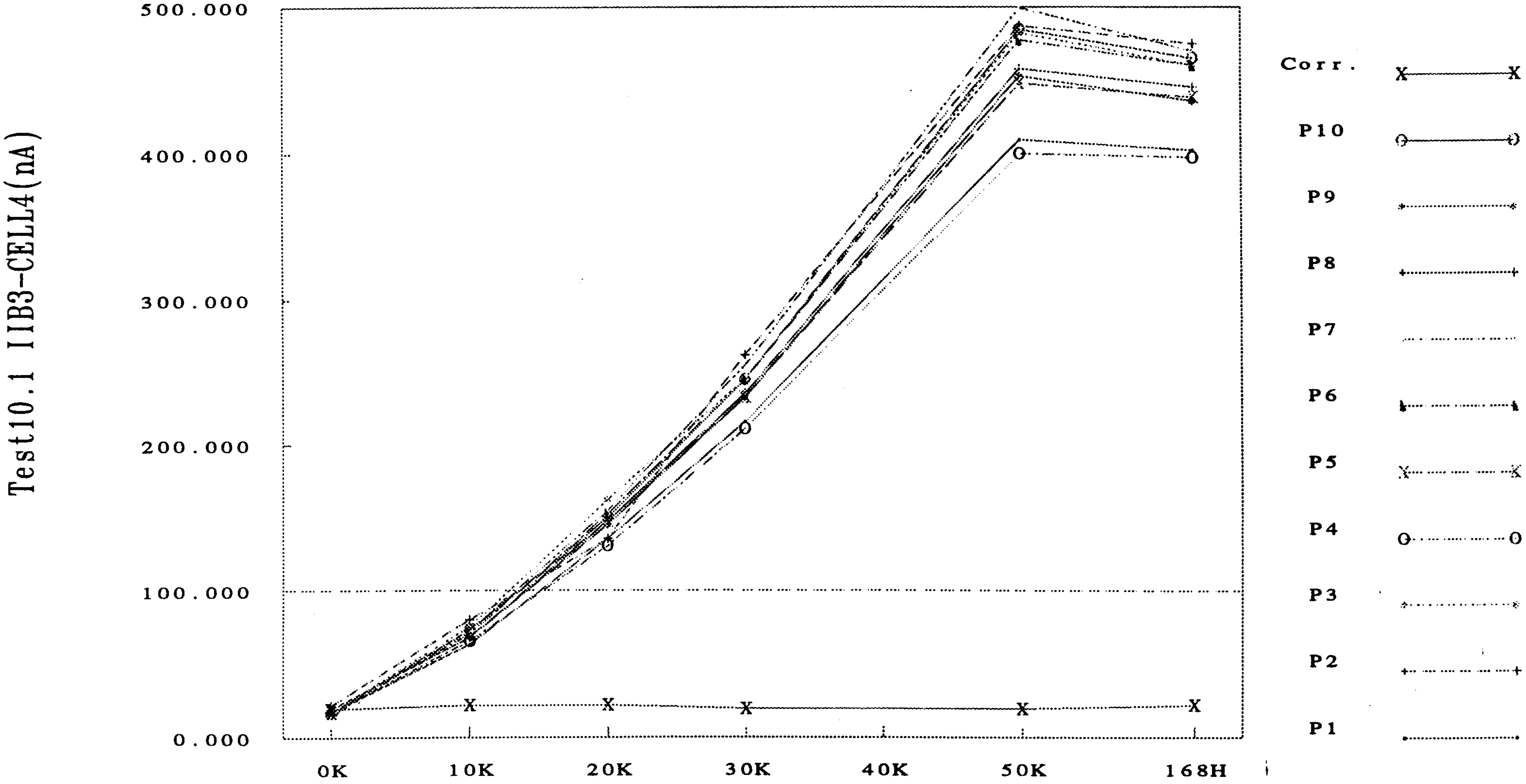
Test10.0 VIO3CELL4(mV)

	0K	10K	20K	30K	50K	168H
Correl.	-0.290	-0.285	-0.293	-0.289	-0.298	-0.296
P1	0.084	-0.419	-1.728	-3.000	-4.558	-2.672
P2	-0.516	-1.220	-1.728	-3.978	-5.528F	-3.290
P3	-1.664	-2.336	-2.649	-5.124F	-6.588F	-4.230
P4	0.150	-0.329	-1.584	-2.806	-4.406	-2.540
P5	0.334	-0.142	-1.420	-2.616	-4.035	-2.027
P6	-0.516	-1.120	-2.597	-3.962	-5.428F	-2.983
P7	-0.587	-1.211	-2.775	-4.166	-5.651F	-3.138
P8	-0.759	-1.349	-2.798	-4.121	-5.656F	-3.314
P9	0.123	-0.430	-1.878	-3.214	-4.826	-2.521
P10	0.126	-0.358	-1.659	-2.825	-4.028	-1.855
MEAN	-322.500uV	-891.400uV	-2.082mV	-3.581mV	-5.070mV	-2.857mV
SIGMA	610.475uV	679.633uV	551.467uV	809.189uV	832.851uV	692.565uV
MIN	-1.664mV	-2.336mV	-2.798mV	-5.124mV	-6.588mV	-4.230mV
MAX	334.000uV	-142.000uV	-1.420mV	-2.616mV	-4.028mV	-1.855mV
CP	2.73012	2.4523	3.02224	2.05968	2.00116	2.40651
CPK	2.55402	2.01511	1.76402	0.5845	-0.0282	1.03143

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=10.1 Test =IIB3-CELL4 VCC =5.000 V
VEE =0.000 V



Limit min: 0.000 nA Limit max: 100.000 nA

Devices Measurements

Test10.1 IIB3-CELL4(nA)

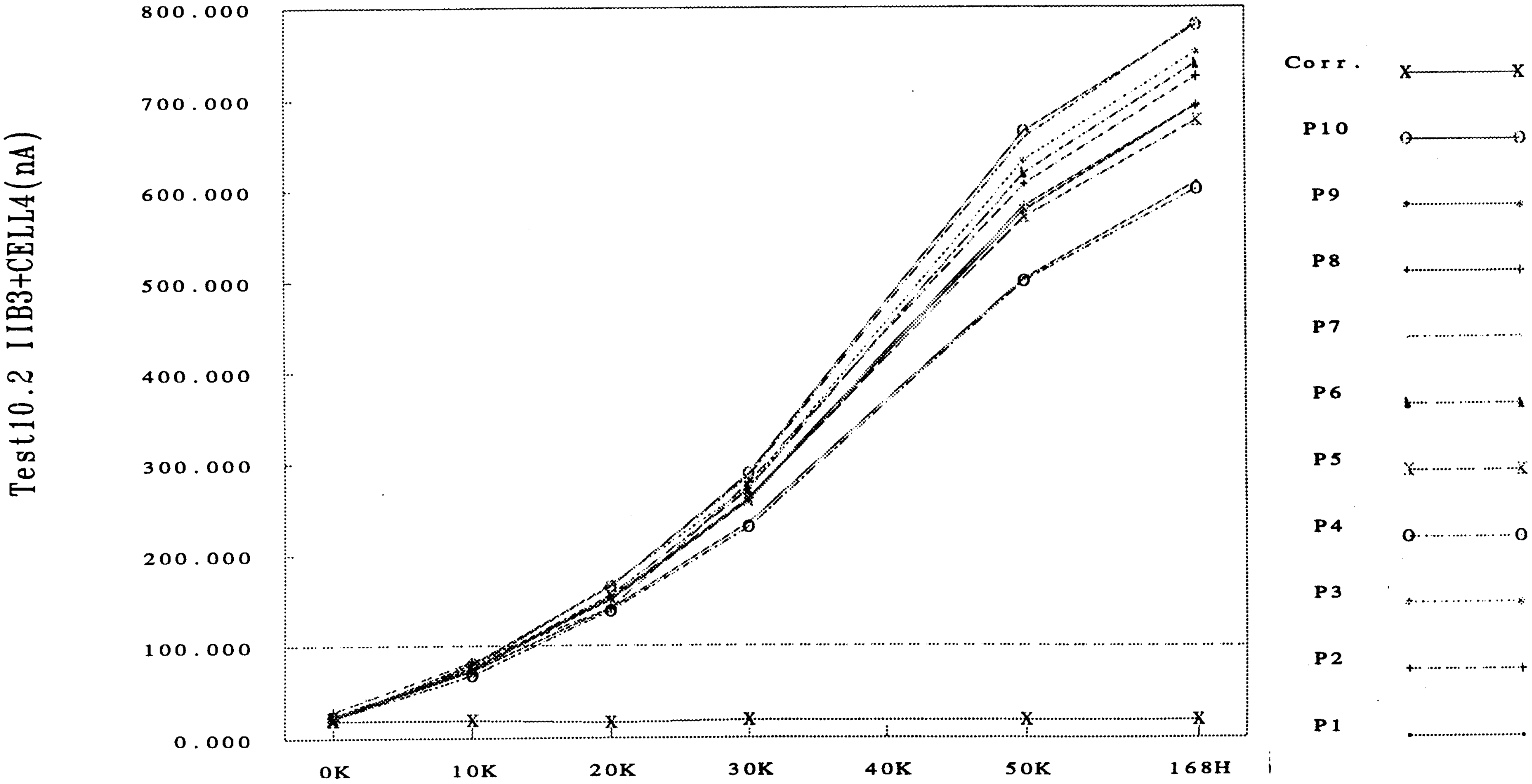
	0K	10K	20K	30K	50K	168H
Correl.	19.392	21.822	21.822	19.397	19.397	21.819
P1	16.968	63.041	135.781F	215.795F	409.767F	402.434F
P2	21.815	80.014	135.781F	261.863F	487.356F	475.163F
P3	16.968	75.164	162.452F	244.890F	482.507F	460.617F
P4	16.968	65.466	130.932F	210.945F	400.069F	397.585F
P5	16.968	72.740	147.904F	232.767F	448.562F	438.798F
P6	16.968	70.315	152.753F	244.890F	477.657F	460.617F
P7	14.544	72.740	155.178F	254.589F	499.480F	470.315F
P8	19.392	67.890	147.904F	235.192F	458.260F	446.072F
P9	19.392	67.890	145.479F	232.767F	453.411F	436.374F
P10	16.968	72.740	150.329F	244.890F	484.932F	465.466F
MEAN	17.695nA	70.800nA	146.449nA	237.859nA	460.200nA	445.344nA
SIGMA	1.995nA	4.956nA	9.779nA	15.897nA	33.398nA	27.142nA
MIN	14.544nA	63.041nA	130.932nA	210.945nA	400.069nA	397.585nA
MAX	21.815nA	80.014nA	162.452nA	261.863nA	499.480nA	475.163nA
CP	8.35261	3.36292	1.70434	1.04839	0.4990	0.6141
CPK	2.95601	1.96395	-1.5833	-2.8906	-3.5950	-4.2412

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J　Lot:NTTA0139J　Date Code:9504　Date:03-MAR-95

Test Nb=10.2　Test =IIB3+CELL4　VCC =5.000 V

VEE =0.000 V



Limit min: 0.000 nA　Limit max: 100.000 nA

Devices Measurements

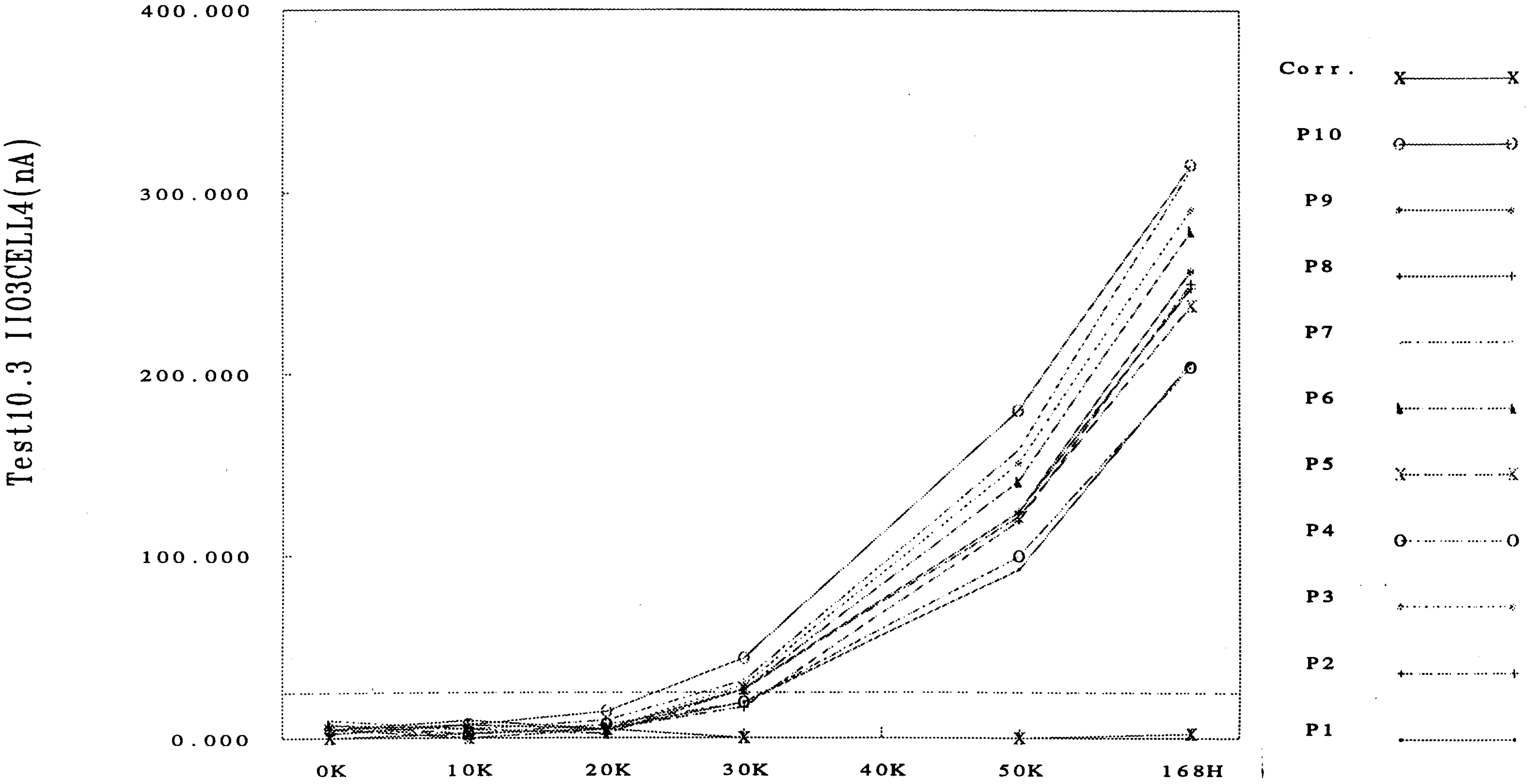
Test10.2 IIB3+CELL4(nA)

	0K	10K	20K	30K	50K	168H
Correl.	19.392	19.397	16.973	19.397	19.397	19.394
P1	21.815	72.740	140.630F	235.192F	501.904F	608.499F
P2	29.087	82.438	140.630F	278.836F	606.165F	724.866F
P3	24.239	75.164	167.301F	273.986F	632.835F	751.533F
P4	21.815	67.890	138.206F	230.343F	499.480F	601.227F
P5	21.815	72.740	152.753F	259.438F	569.795F	676.380F
P6	24.239	75.164	155.178F	271.562F	618.288F	739.412F
P7	24.239	77.589	164.877F	286.110F	657.082F	783.049F
P8	21.815	75.164	152.753F	261.863F	581.918F	693.350F
P9	21.815	75.164	150.329F	259.438F	577.069F	693.350F
P10	21.815	80.014	164.877F	288.534F	664.356F	780.625F
MEAN	23.269nA	75.407nA	152.753nA	264.530nA	590.889nA	705.229nA
SIGMA	2.342nA	4.033nA	10.661nA	19.646nA	57.264nA	63.880nA
MIN	21.815nA	67.890nA	138.206nA	230.343nA	499.480nA	601.227nA
MAX	29.087nA	82.438nA	167.301nA	288.534nA	664.356nA	783.049nA
CP	7.11701	4.13254	1.56332	0.8483	0.2910	0.2609
CPK	3.31217	2.03266	-1.6494	-2.7915	-2.8574	-3.1581

TOTAL DOSE RADIATION TESTING
MOTOROLA FRANCE

Source:LM139J Lot:NTTA0139J Date Code:9504 Date:03-MAR-95

Test Nb=10.3 Test =IIO3CELL4 VCC =5.000 V
VEE =0.000 V



Limit min: 0.000 nA Limit max: 25.000 nA

Devices Measurements

Test10.3 IIO3CELL4(nA)

	0K	10K	20K	30K	50K	168H
Correl.	0.000	2.425	4.849	0.000	0.000	2.424
P1	4.848	9.699	4.849	19.397	92.137F	206.066F
P2	7.272	2.425	4.849	16.973	118.808F	249.703F
P3	7.272	0.000	4.849	29.096F	150.329F	290.916F
P4	4.848	2.425	7.274	19.397	99.411F	203.641F
P5	4.848	0.000	4.849	26.671F	121.233F	237.581F
P6	7.272	4.849	2.425	26.671F	140.630F	278.795F
P7	9.696	4.849	9.699	31.521F	157.603F	312.735F
P8	2.424	7.274	4.849	26.671F	123.658F	247.279F
P9	2.424	7.274	4.849	26.671F	123.658F	256.976F
P10	4.848	7.274	14.548	43.644F	179.425F	315.159F
MEAN	5.575nA	4.607nA	6.304nA	26.671nA	130.689nA	259.885nA
SIGMA	2.300nA	3.323nA	3.467nA	7.582nA	26.621nA	39.437nA
MIN	2.424nA	0.000A	2.425nA	16.973nA	92.137nA	203.641nA
MAX	9.696nA	9.699nA	14.548nA	43.644nA	179.425nA	315.159nA
CP	1.8119	1.25405	1.20182	0.5496	0.1565	0.1057
CPK	0.8081	0.4622	0.6061	-0.0735	-1.3234	-1.9853