



**National Semiconductor Corporation
Radiation Effects Laboratory
South Portland, Maine 04106**

ANALOG TOTAL DOSE RADIATION REPORT

Customer: Rad Qual

Part Type: RMH6628J-MPR

Input Bias Circuit: 07082HRA2

Dose Rate: 53.04 RadS(Si)/sec.

Test Program Used: SC-LMH6628-RAD

Tester: SC-HP-RAD

Wafer Run Number: EM03033F

Wafer Number: # 4

Package Type: JCDIP008

Production Lot # 7W4083C019

IPI #: N/A

Disposition: Passed up to 300k Rads

Summary:

Passes Room Temp @: Pre-Rad, Post 100k Rads, Post 200k Rads, Post 300k Rads.

Part Out of Room Temp Spec @: N/A

Functional Failed @: N/A

Parameters over Limit: N/A

Review By: Mike Maher

Reviewed By QA: Mike Maher Apr. 2nd, 2003

Note:

These parts may be dose rate sensitive in a space environment and demonstrate enhanced low dose rate effect.

Standard Test Flow Sheet For Rad Testing Customer Special Attachment Rad Hard Linear

NSID# RMH6628J-MPR LOT# 7W4083C019 IPI# N/A

Test Program: SC-LMH6628-RAD

Machine: HP Operator: Shaw Mead/Richard Leong Bias Board: 07082HR

Start Time__09__:__00_AM__

Finish Time__13__:__35_PM__

Start Date: __03__/_26__/_03__

Finish Date: __03__/_26__/_03__

QA: __04__/_02__/_03__

Control Units s/n: #__1__ #__2__ #__ #__

Duts : #__3__ #__4__ #__5__ #__6__ #__7__

Duts : #__8__ #__ #__ #__ #__

Duts : #__ #__ #__ #__ #__

Duts : #__ #__ #__ #__ #__

Location Step	Operation Mtd/Cond	Qty In	Qty Out	Var	Mech	Rej	FF
PASS	Pre - Rad Read/Rec. Tp1	6	6	0	0	0	0
	<i>Irradiation</i> <i>100k</i> <i>Level</i>	6	6	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp2	6	6	0	0	0	0
	<i>Irradiation</i> <i>200k</i> <i>Level</i>	6	6	0	0	N/A	N/A
FAIL	Post Rad Read/Rec. Tp3	6	6	0	0	0	0

**Standard Test Flow Sheet For Rad Testing
Customer Special Attachment
Rad Hard Linear**

NSID# RMH6628J-MPR LOT# 7W4083C019 IPI# N/A

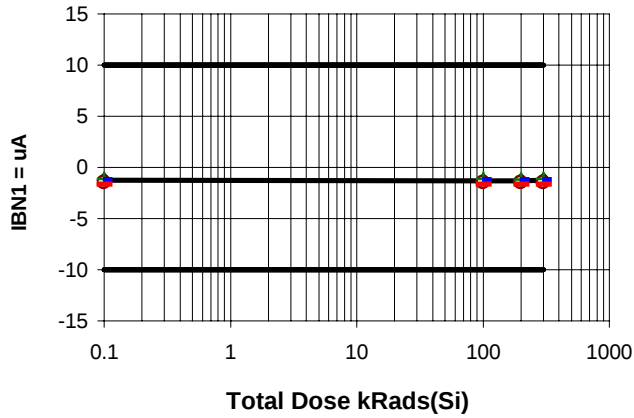
Location Step	Operation Mtd/Cond	Qty In	Qty Out	Var	Mech	Rej	FF
	<i>Irradiation</i> 300k <i>Level</i>	6	6	0	0	N/A	N/A
PASS	Post Rad Read/Rec. Tp4	6	6	0	0	0	0
	<i>Irradiation</i> ____k <i>Level</i>	0	0	0	0	N/A	N/A
N/A	Post Rad Read/Rec. Tp5	0	0	0	0	0	0
	<i>Irradiation</i> ____k <i>Level</i>	0	0	0	0	N/A	N/A
N/A	Post Rad Read/Rec. Tp6	0	0	0	0	0	0
	<i>Irradiation</i> ____k <i>Level</i>	0	0	0	0	N/A	N/A
N/A	Post Rad Read/Rec. Tp7	0	0	0	0	0	0
	<i>Irradiation</i> ____k <i>Level</i>	0	0	0	0	N/A	N/A

Note: All irradiation's are done per MAS-5010

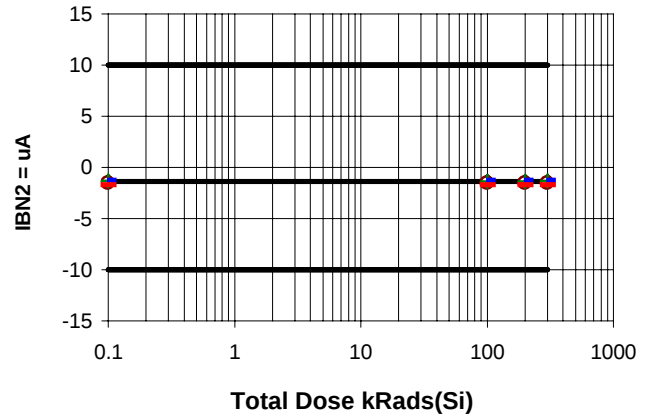


RMH6628J-MPR Total Dose Radiation Test Characteristics

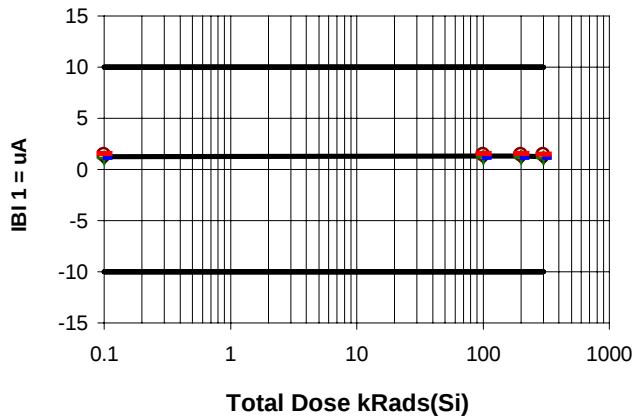
Input Bias Current (Non-Inverting 1)
vs Total Dose



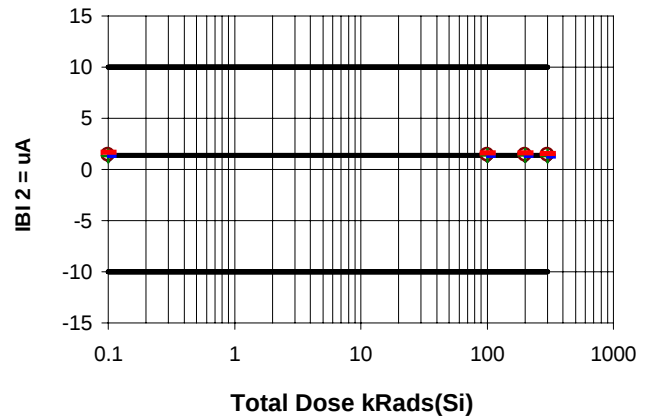
Input Bias Current (Non-Inverting 2)
vs Total Dose



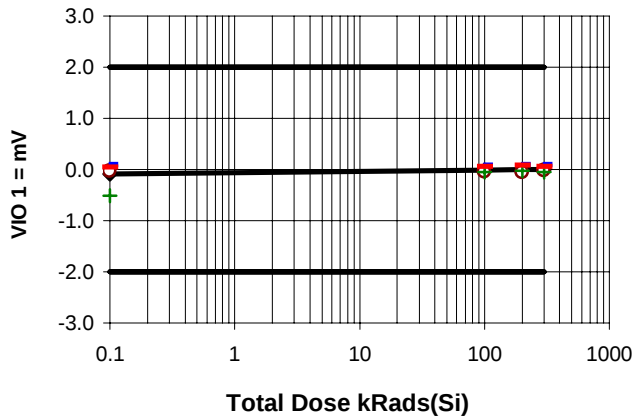
Input Bias Current (Inverting 1)
vs Total Dose



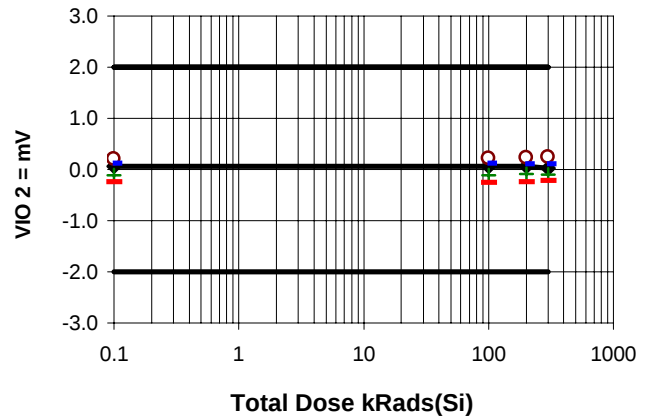
Input Bias Current (Inverting 2)
vs Total Dose



Input Offset Voltage 1
vs Total Dose



Input Offset Voltage 2
vs Total Dose



Note 1 : Solid lines indicate minimum and maximum limits of the Microcircuit Data Sheet (MDS).

Note 2 : Dose Rate = 53.04 Rads(Si)/sec, Vcc = +/- 5V, Av = +2, Rf = 100 Ohms, Vcc = +/- 5V, RI = 100 Ohms; unless specified otherwise.



RMH6628J-MPR

Total Dose Radiation Test Characteristics

Input Bias Current (Non-Inverting 1)

vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-1.278	-1.595	-0.937	0.237	0
100	-1.288	-1.604	-0.952	0.233	0
200	-1.294	-1.606	-0.956	0.232	0
300	-1.280	-1.603	-0.938	0.237	0

Input Bias Current (Non-Inverting 2)

vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-1.366	-1.681	-0.917	0.267	0
100	-1.374	-1.690	-0.934	0.261	0
200	-1.385	-1.700	-0.944	0.261	0
300	-1.368	-1.693	-0.932	0.261	0

Input Bias Current (Inverting 1)

vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	1.275	0.895	1.546	0.242	0
100	1.287	0.932	1.581	0.232	0
200	1.283	0.913	1.572	0.238	0
300	1.262	0.918	1.514	0.228	0

Input Bias Current (Inverting 2)

vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	1.374	0.922	1.662	0.254	0
100	1.372	0.930	1.632	0.239	0
200	1.373	0.945	1.656	0.238	0
300	1.346	0.936	1.556	0.219	0

Input Offset Voltage 1

vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-0.088	-0.513	0.104	0.219	0
100	-0.007	-0.058	0.089	0.064	0
200	-0.002	-0.068	0.094	0.075	0
300	-0.006	-0.072	0.097	0.070	0

Input Offset Voltage 2

vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	0.058	-0.238	0.270	0.195	0
100	0.058	-0.244	0.293	0.202	0
200	0.063	-0.232	0.304	0.198	0
300	0.020	-0.210	0.236	0.159	0

Note 1 : Solid lines indicate minimum and maximum limits of the Microcircuit Data Sheet (MDS).

Note 2 : Dose Rate = 53.04 Rads(Si)/sec, Vcc = +/- 5V, Av = +2, Rf = 100 Ohms, Vcc = +/-5V, RI = 100 Ohms; unless specified otherwise.



RMH6628J-MPR Total Dose Radiation Test Characteristics

Input Bias Current (Non-Inverting 1) vs Total Dose

Dose	D1	D2	D3	D4	D5	D6
0.1	-1.4315	-1.1513	-1.1659	-1.5955	-0.9370	-1.3865
100	-1.4277	-1.1556	-1.1911	-1.6044	-0.9515	-1.3955
200	-1.4316	-1.1697	-1.1950	-1.6058	-0.9555	-1.4068
300	-1.4165	-1.1478	-1.1777	-1.6026	-0.9379	-1.3969

Input Bias Current (Non-Inverting 2) vs Total Dose

Dose	D1	D2	D3	D4	D5	D6
0.1	-1.5027	-1.3376	-1.2478	-1.6811	-0.9174	-1.5120
100	-1.4954	-1.3487	-1.2630	-1.6900	-0.9338	-1.5156
200	-1.5061	-1.3630	-1.2741	-1.6997	-0.9437	-1.5240
300	-1.4796	-1.3410	-1.2559	-1.6927	-0.9316	-1.5083

Input Bias Current (Inverting 1) vs Total Dose

Dose	D1	D2	D3	D4	D5	D6
0.1	1.4476	1.1479	1.1920	1.5462	0.8949	1.4215
100	1.4438	1.1673	1.2062	1.5814	0.9315	1.3936
200	1.4347	1.1684	1.1926	1.5722	0.9129	1.4181
300	1.4443	1.1256	1.1689	1.5139	0.9183	1.3989

Input Bias Current (Inverting 2) vs Total Dose

Dose	D1	D2	D3	D4	D5	D6
0.1	1.4455	1.3285	1.3506	1.6622	0.9219	1.5368
100	1.4370	1.3646	1.3649	1.6316	0.9296	1.5030
200	1.4545	1.3439	1.3569	1.6558	0.9449	1.4831
300	1.4244	1.3257	1.3394	1.5562	0.9363	1.4943

Input Offset Voltage 1 vs Total Dose

Dose	D1	D2	D3	D4	D5	D6
0.1	-0.0429	-0.5125	0.1036	0.0554	-0.0623	-0.0684
100	-0.0476	-0.0454	0.0893	0.0588	-0.0582	-0.0396
200	-0.0572	-0.0197	0.0940	0.0899	-0.0677	-0.0522
300	-0.0309	-0.0492	0.0968	0.0672	-0.0455	-0.0717

Input Offset Voltage 2 vs Total Dose

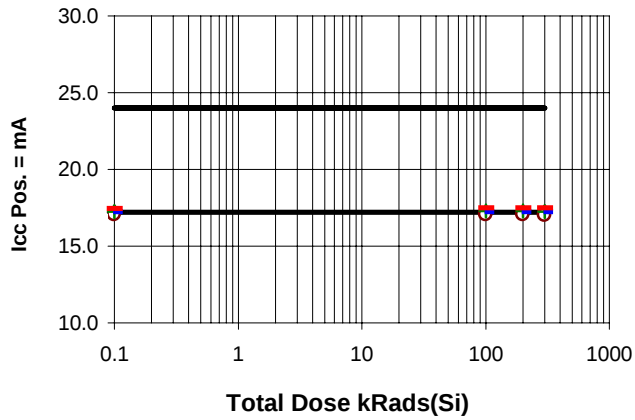
Dose	D1	D2	D3	D4	D5	D6
0.1	0.2039	-0.1124	0.1294	-0.2377	0.0953	0.2701
100	0.2172	-0.1105	0.1235	-0.2439	0.0677	0.2929
200	0.2201	-0.0864	0.1164	-0.2320	0.0572	0.3045
300	0.2364	-0.1012	0.1063	-0.2097	0.0862	0.0003

Note : Dose Rate = 53.04 Rads(Si)/sec, Vcc = +/- 5V, Av = +2, Rf = 100 Ohms, Vcc = +/-5V, RI = 100 Ohms; unless specified otherwise

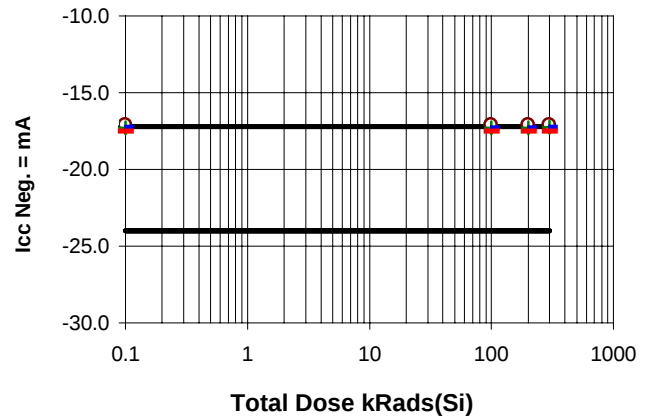


RMH6628J-MPR Total Dose Radiation Test Characteristics

Supply Current Positive (RL = Infinity)
vs Total Dose



Supply Current Negative (RL = Infinity)
vs Total Dose



Note 1 : Solid lines indicate minimum and maximum limits of the Microcircuit Data Sheet (MDS).

Note 2 : Dose Rate = 53.04 Rads(Si)/sec, Vcc = +/- 5V, Av = +2, Rf = 100 Ohms, Vcc = +/-5V, RI = 100 Ohms; unless specified otherwise.



RMH6628J-MPR

Total Dose Radiation Test Characteristics

Supply Current Positive (RL = Infinity)

vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	17.195	17.071	17.264	0.107	0
100	17.203	17.071	17.273	0.114	0
200	17.203	17.071	17.275	0.115	0
300	17.190	17.056	17.263	0.116	0

Supply Current Negative (RL = Infinity)

vs Total Dose

Dose	Avg.	Min.	Max.	S. Dev.	Fail ¹
0.1	-17.204	-17.271	-17.082	0.106	0
100	-17.212	-17.280	-17.082	0.113	0
200	-17.213	-17.282	-17.082	0.113	0
300	-17.199	-17.270	-17.067	0.114	0

Note 1 : Solid lines indicate minimum and maximum limits of the Microcircuit Data Sheet (MDS).

Note 2 : Dose Rate = 53.04 Rads(Si)/sec, Vcc = +/- 5V, Av = +2, Rf = 100 Ohms, Vcc = +/-5V, RI = 100 Ohms; unless specified otherwise.



RMH6628J-MPR Total Dose Radiation Test Characteristics

Supply Current Positive (RL = Infinity) vs Total Dose

Dose	D1	D2	D3	D4
0.1	17.0711	17.2636	17.2495	17.4779
100	17.0711	17.2731	17.2635	17.4892
200	17.0707	17.2747	17.2640	17.4901
300	17.0561	17.2629	17.2502	17.4796

Supply Current Negative (RL = Infinity) vs Total Dose

Dose	D1	D2	D3	D4
0.1	-17.0816	-17.2710	-17.2601	-17.4861
100	-17.0816	-17.2797	-17.2743	-17.4980
200	-17.0825	-17.2818	-17.2740	-17.4981
300	-17.0674	-17.2696	-17.2604	-17.4877