



Single Event Effects Test Report

**Logic-Gate R7, 60V, P
R5, 60V, P**

November 2002 - B.N.L.

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INTRODUCTION

On August 27 and October 24, 2002 International Rectifier Corp. (IR) tested several product types for Single Event Effects (SEE) hardness. The irradiation was performed at Brookhaven National Laboratory, using the Tandem Van de Graaff (TVDG) generator. Three ion species were used to characterize and verify the SEE hardness of each product type. The product types submitted for evaluation and this report are included in Table 1 below:

Table 1 Product Types Tested

Product Type	BVDSS Rating	Gen. / Channel / Process	Wafer Lot
IRH7970Z4	60 Volts	Logic R7 / P / 60 Volts (Hex-Z)	ER24289
IRH597064	60 Volts	R5 / P / 60 Volts	ER24461 ER25077 ER30751

The wafer lot noted above is the lot from which from which the test samples originated. For each product type, the results of testing herein are applicable to all other wafer lots having the same design and process.

Additionally, Mr. Louis Jaquish of Defense Supply Center Columbus (DSCC-VQE) has performed an audit of IR for the purpose of assigning lab suitability and has granted IR a Letter of Lab Suitability for Test Method 1080 in June 1998.

TEST METHOD

The test method used as a guide in developing the test plan is MIL-STD-750, Test Method 1080. The test method establishes the basic requirements for the performance of the test. Additionally, DSCC has established a minimum acceptance level of three (3) devices for each insitu bias condition. Test method 1080, in conjunction with DSCC requirements, was utilized to write the test plan.

TEST PLAN and PROCEDURE

The test plan is included in Appendix C. In summary, the testing occurred in the following manner: All devices / test samples were built and electrically tested in TO-3 packages. The lid was removed from each test sample at the test site or the samples were produced without the lid. Up to 18 test samples were loaded onto the test board and placed into the beam line, under high vacuum conditions. The desired test sample was positioned into the beam line, and when ready the beam shutter was removed beginning the irradiation of the test sample. Once the desired fluence was achieved the beam was automatically shuttered and the bias removed. The biasing equipment then subjected the test samples to gate stresses up to 20V.

The Ion with its LET and Energy must be selected for a Range of at least twice the depletion depth of the die under test.

TEST FACILITY

The Tandem Van de Graaff (TVDG) generator is equipped with the necessary dosimetry to ensure the ion beam is meeting the customer expectation. A printout of the runs, included in Appendix B, also includes the beam parameters, i.e., LET, energy, Range, etc., for each run. Table 2 summarizes the beam criteria for the 3 ion species utilized.

Table 2. Ion Beam Criteria

Ion	LET MeV/(mg/cm²)	Energy MeV	Range μm
Br	37.45 – 37.46	278.5 – 279	36 – 36.1
I	59.72 – 59.73	320 – 322	31 – 31.1
Au	81.44 – 82.06	333 – 346	27.5 – 28.2

The fluence and flux specified for this test was 3E5 ions/cm² and 1E4 ions/cm²/sec, respectively. The beam diameter was set to 1.5 cm. The angle of incidence was set to zero (normal to the die surface).

RESULTS

The insitu bias conditions, where 0 failures occurred for each product type, are shown in Table 3. These results are shown graphically in Figure 1 as a plot of the Safe Operation Area (SOA). Each point on the graph, or insitu bias condition, has been verified by irradiating and subsequent electrical testing of a minimum of 3 devices, with no valid failures allowed. The devices were returned to IR and tested using production ATE. The results of the test were inspected and matched to the notes taken during the test, see Appendix F. The post-irradiation data correlates with the expected test results.

It should be noted that acceptance is assumed for product types operating at conditions below those tested herein. For example the IRH597064 was not tested under VGS bias conditions of 0V through -15V with the Br ion. The test engineer made a calculated risk assessment based on SEE Process History and chose to begin characterization and verification at VGS = -20V. The acceptance at the -20V was then extended to the lower VGS bias voltages. Furthermore the extension of more stressful conditions to less stressful conditions shall also apply to the LET conditions of the various ion species. For example successful operation using the Au ion (LET of 82.3 MeV/(mg/cm²)) shall also imply that the Br or I or any other ion with a LET < 82.3, shall also be acceptable and not require verification.

The different runs and respective test conditions are all tabulated in Appendices A and B. Table 4 may be used as an index to identify which runs apply to a specific product type with a specific ion. Unlisted Runs are not related to this report.

Table 3 Device Insitu Bias Conditions (VDS vs. VGS) with Ion Species

Device Type / Part Number	Ion	VGS=0V	VGS=5V	VGS=6V	VGS=7V	VGS=8V	VGS=10V
IRH7970Z4 (Logic R7, Hex-Z, 60Volts, P-ch)	Br	Qualified	- 60 V	- 60 V	- 50 V	- 35 V	- 25 V
	I	Qualified	Qualified	- 60 V	- 20 V		
	Au	Qualified	60 V				

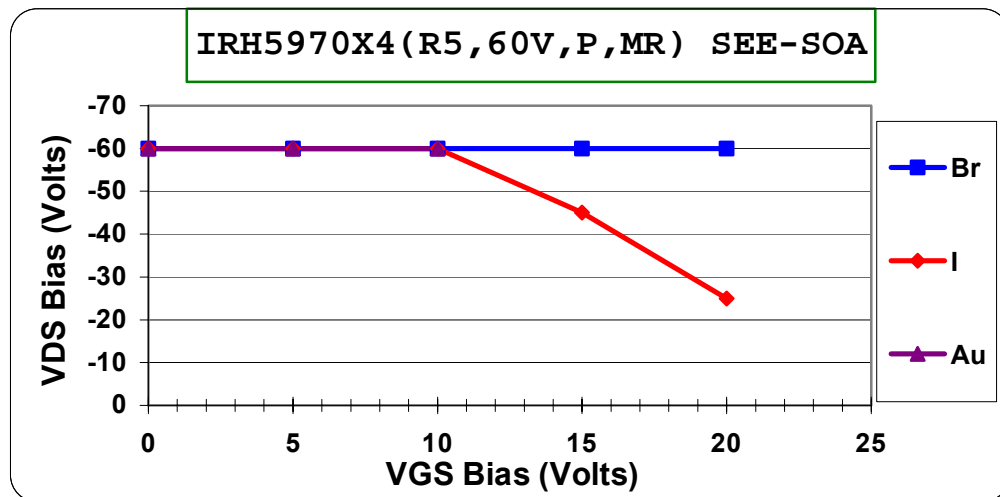
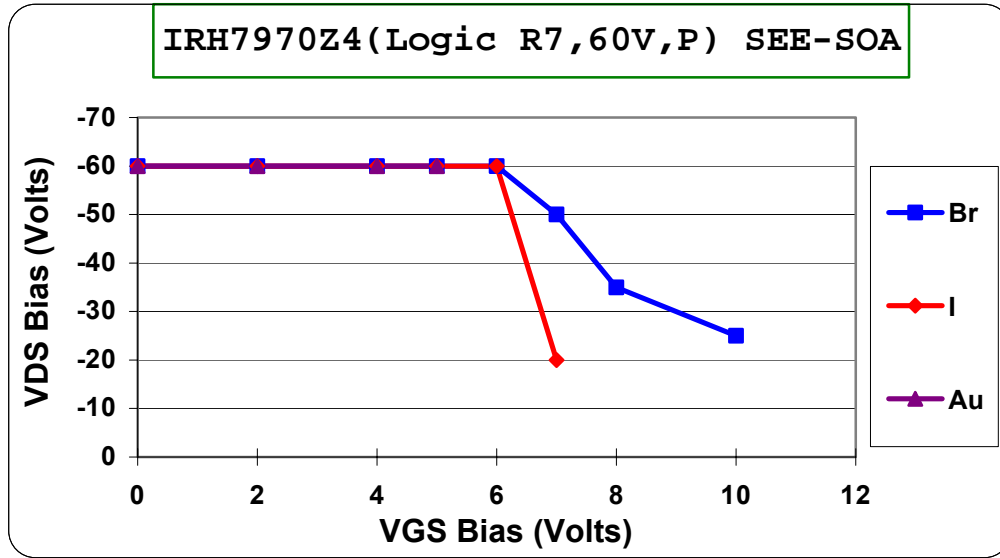
Device Type / Part Number	Ion	VGS=0V	VGS=5V	VGS=10V	VGS=15V	VGS=20V
IRH5970X4 (R5, 60 Volts, P-Channel)	Br	Qualified	Qualified	Qualified	Qualified	- 60 V
	I	Qualified	- 60 V	- 60 V	- 45 V	- 25 V
	Au	Qualified	- 60 V	- 60 V		

Note: “Qualified” indicates part is qualified by extension of insitu bias testing at higher VGS level. See [Concluding Tutorial](#) for more details.

Table 4 Run Number Index

Device Type / Part Number	Wafer Lot Number	Ion Specie	Run Date	Run Number
IRH7970Z4 (Logic R7, Hex- Z, 60Volts, P-ch)	ER24289	Br	08-27-2002	184 to 222
		I	08-27-2002	223 to 260
		Au	08-27-2002	425 to 429
IRH5970X4 (R5, 60 Volts, P- Channel)	ER24461	Br	08-27-2002	101 to 122
		I	08-27-2002	307 to 338
		Au	08-27-2002	405 to 412
	ER25077	Br	08-27-2002	123 to 149
		I	08-27-2002	339 to 357
		Au	08-27-2002	413 to 415
	ER30751	Br	10-24-2002	40 to 45
		I	10-24-2002	142 to 154
		Au	10-24-2002	211 to 219

Figure 1 Device Safe Operating Area



CONCLUSION

The 60-Volt P-Channel Logic-Gate R7 (IRHC7970Z4) and 60-Volt P-Channel R5 (IRHC5970x4) had demonstrated the good SEE Hardness.

The 60-Volt P-Channel Logic-Gate R7 (IRHC7970Z4) is well SEE-hard with both the Bromine and Iodine ions at 100% rated VDS and 6V VGS applied and with Gold ion at 100% rated VDS and 5V VGS applied.

The 60-Volt P-Channel R5 (IRHC5970x4) is well SEE-hard with both the Bromine ion at 100% rated VDS and 20V VGS applied, with Iodine ion at 100% rated VDS and 10V VGS applied and with Gold ion at 100% rated VDS and 5V VGS applied.

CONCLUDING TUTORIAL

The following is presented to help the reader understand the basis on which SEE Testing is extended to the other part numbers.

Extending Single Event Effects Testing

International Rectifier has designed Single Event Effects (SEE) experiments to maximize facility usage using four, industry accepted, assumptions as follows:

- I. Test results for one die size are representative of other die sizes, if the process and design rules are not changed. In other words the scaling of die size has no affect if all other variables are held constant. Please note that for a given voltage and technology, there are no differences in design and process for the various sizes of IR's radiation hardened MOSFET die, thus the assumption is valid. In reality, IR will always test the largest available die size. We consider this a worst-case scenario. The industry standard for acceptance of a given in-situ bias condition, is the acceptable performance of three or more devices at the specified conditions. Presently a supplier could achieve this standard with size 1 die thru size 6 die. We believe that use of the smaller die reduces the probability of failure, and thus reduces the chance of a SEE problem being discovered. The size 1 die are about one-fourth the size of the size 6 die. Thus successfully testing three size 6 die is roughly equivalent to testing 12 size 1 die. This results in a savings of valuable test time at the SEE test facility, without degrading the final test result.
- II. Acceptable test results taken at given VGS and VDS conditions are applicable to lower VGS and VDS conditions. In other words an acceptable test result (≥ 3 devices passing) at VGS = -15V and VDS = 200V, would also apply to VGS = -10, -5 or 0V at the same or lower VDS condition. In several cases parts have been tested at the worst-case in-situ bias condition of VGS = -20V and VDS = max rated BVDSS. With acceptable test results, the safe operation area, has been extended from VGS = 0 to -20V and VDS from 0 to the max rating. It is not necessary to verify every point below the accepted in-situ bias conditions. Again this saves valuable experiment time.
- III. Acceptable test results taken with a given LET, would also apply at other lower LETs. It is generally accepted that successful test results with Iodine, for example, implies the device would be hard against Bromine, Krypton, Nickel, etc., ion species with a lower LET. It is not necessary to test at each lower LET, again saving valuable test time.
- IV. The package used has no effect on the SEE hardness of a die. The die are characterized fully exposed to the ion beam. In other words the lid of the package is removed making the die visible. This removes the package as a variable when comparing test results. As a rule IR uses the common TO3 package for mounting die for SEE tests.

Each of the assumptions above is generally accepted within the industry. IR has verified their validity over the last several years and makes appropriate use of them to maximize the benefit for our customers.

Appendix A

Log Sheets

(SEE Run Data)

International Rectifier Corp.
SEE Test Report
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Test	Run	Ion	LET	Energy	Range	Flux	Fluence	Angle	BeamDia.	Device	S/N	Socket	VGS	VDS	Pass/Fail
Date	#		MeV.cm ² /mg	MeV	µm	#/cm ² /sec	#/cm ²	deg	cm.	Type		#	Volts	Volts	Blank=Pass
60V, P, MR, Logic R7 to Bromine											WL# ER24289				
08/27/02	184	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	2	-30	
08/27/02	185	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	2	-35	
08/27/02	186	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	2	-40	
08/27/02	187	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	2	-45	
08/27/02	188	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	2	-50	
08/27/02	189	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	2	-55	
08/27/02	190	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	2	-60	
08/27/02	191	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	5	-60	
08/27/02	192	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H2	2	5	-60	
08/27/02	193	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H3	4	5	-60	CurvePoint
08/27/02	194	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H4	5	5	-60	
08/27/02	195	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H4	5	6	-60	
08/27/02	196	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H4	5	8	-60	F 8.735E+04
08/27/02	197	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H5	6	7	-60	
08/27/02	198	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	6	-60	
08/27/02	199	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H1	1	7	-60	F 2.977E+05
08/27/02	200	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H6	7	6	-60	
08/27/02	202	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H8	9	6	-60	
08/27/02	203	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H9	10	6	-60	CurvePoint
08/27/02	204	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H10	11	7	-30	
08/27/02	205	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H10	11	7	-35	
08/27/02	206	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H10	11	7	-40	
08/27/02	207	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H10	11	7	-45	
08/27/02	208	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H10	11	7	-50	
08/27/02	209	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H10	11	7	-55	F 8.095E+04
08/27/02	210	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H11	12	7	-50	
08/27/02	211	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H12	13	7	-50	CurvePoint
08/27/02	212	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H13	14	8	-30	
08/27/02	213	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H13	14	8	-35	
08/27/02	214	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H13	14	8	-40	F 1.681E+05
08/27/02	215	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H14	15	8	-35	
08/27/02	216	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H15	16	8	-35	
08/27/02	217	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H16	17	10	-10	
08/27/02	218	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H16	17	10	-15	
08/27/02	219	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H16	17	10	-20	
08/27/02	220	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H16	17	10	-25	
08/27/02	221	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H16	17	10	-30	F 6.199E+04
08/27/02	222	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	H17	18	10	-25	EngCurvePoint

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Test	Run	Ion	LET	Energy	Range	Flux	Fluence	Angle	BeamDia.	Device	S/N	Socket	VGS	VDS	Pass/Fail
Date	#		MeV.cm ² /mg	MeV	μm	#/cm ² /sec	#/cm ²	deg	cm.	Type		#	Volts	Volts	Blank=Pass
60V, P, MR, Logic R7 to Iodine											WL# ER24289				
08/27/02	223	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	2	-30	
08/27/02	224	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	2	-35	
08/27/02	225	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	2	-40	
08/27/02	226	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	2	-45	
08/27/02	227	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	2	-50	
08/27/02	228	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	2	-55	
08/27/02	229	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	2	-60	
08/27/02	230	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	4	-60	
08/27/02	231	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	5	-60	
08/27/02	232	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	6	-60	
08/27/02	233	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	7	-60	
08/27/02	234	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	11	1	8	-60	F 6.529E+04
08/27/02	235	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	12	2	6	-60	
08/27/02	236	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	13	4	6	-60	
08/27/02	237	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	14	5	6	-60	CurvePoint
08/27/02	238	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	15	6	8	-30	
08/27/02	239	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	15	6	8	-35	
08/27/02	240	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	15	6	8	-40	
08/27/02	241	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	16	7	8	-35	F 7.397E+04
08/27/02	242	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	17	8	6	-60	
08/27/02	243	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	18	9	6	-60	
08/27/02	244	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	19	10	6	-60	CurvePoint
08/27/02	245	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	17	8	8	-25	F 4.550E+04
08/27/02	246	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	18	9	8	-10	
08/27/02	247	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	18	9	8	-15	
08/27/02	248	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	18	9	8	-20	
08/27/02	249	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	18	9	8	-25	F 7.646E+04
08/27/02	250	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	19	10	8	-20	
08/27/02	251	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	110	11	8	-20	
08/27/02	252	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	111	12	8	-20	CurvePoint
08/27/02	253	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	113	14	6	-60	
08/27/02	254	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	114	15	6	-60	
08/27/02	255	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	115	16	6	-60	CurvePoint
08/27/02	256	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	113	14	7	-30	F 1.414E+04
08/27/02	257	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	114	15	7	-25	
08/27/02	258	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	115	16	7	-25	F 7.833E+04
08/27/02	259	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	116	17	7	-20	
08/27/02	260	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	117	18	7	-20	

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Test	Run	Ion	LET	Energy	Range	Flux	Fluence	Angle	BeamDia.	Device	S/N	Socket	VGS	VDS	Pass/Fail
Date	#		MeV.cm ² /mg	MeV	µm	#/cm ² /sec	#/cm ²	deg	cm.	Type		#	Volts	Volts	Blank=Pass
60V, P, MR, Logic R7 to Gold										WL# ER24289					
08/27/02	425	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	J1	7	5	-50	
08/27/02	426	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	J1	7	5	-55	
08/27/02	427	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	J1	7	5	-60	
08/27/02	428	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	J2	8	5	-60	
08/27/02	429	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 7970Z4	J3	9	5	-60	CurvePoint
60V, P, MR, R5 to Bromine										WL# ER24461					
08/27/02	101	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	5	-48	
08/27/02	102	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	10	-48	
08/27/02	103	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	10	-48	
08/27/02	104	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	15	-48	
08/27/02	105	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	15	-50	
08/27/02	106	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	15	-55	
08/27/02	107	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	15	-60	
08/27/02	108	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	20	-50	
08/27/02	109	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	20	-55	
08/27/02	110	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D1	1	20	-60	
08/27/02	111	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D2	2	20	-60	
08/27/02	112	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D3	4	20	-60	CurvePoint
08/27/02	113	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D10	11	10	-40	
08/27/02	114	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D10	11	10	-50	
08/27/02	115	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D10	11	10	-55	
08/27/02	116	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D10	11	10	-60	
08/27/02	117	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D10	11	15	-60	
08/27/02	118	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D10	11	20	-50	
08/27/02	119	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D10	11	20	-55	
08/27/02	120	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D10	11	20	-60	
08/27/02	121	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D11	12	20	-60	
08/27/02	122	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D12	13	20	-60	CurvePoint
60V, P, MR, R5 to Bromine										WL# ER25077					
08/27/02	123	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	5	-40	
08/27/02	124	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	5	-50	
08/27/02	125	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	5	-55	
08/27/02	126	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	5	-60	
08/27/02	127	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	5	-60	
08/27/02	128	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	10	-60	
08/27/02	129	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	15	-60	
08/27/02	130	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	20	-50	
08/27/02	131	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	20	-55	

Test Date	Run #	Ion	LET MeV.cm ² /mg	Energy MeV	Range µm	Flux #/cm ² /sec	Fluence #/cm ²	Angle deg	BeamDia. cm.	Device Type	S/N	Socket #	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
60V, P, MR, R5 to Bromine (Continued)										WL# ER25077					
08/27/02	132	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E1	1	20	-60	
08/27/02	133	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E2	2	20	-55	
08/27/02	134	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E2	2	20	-60	
08/27/02	135	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E3	4	20	-60	CurvePoint
08/27/02	136	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E5	5	20	-60	CurvePoint+
08/27/02	137	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E6	6	20	-60	CurvePoint+
08/27/02	138	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E7	7	20	-60	CurvePoint+
08/27/02	139	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E8	8	20	-60	CurvePoint+
08/27/02	140	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E9	9	20	-60	CurvePoint+
08/27/02	141	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E10	10	20	-60	CurvePoint+
08/27/02	142	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E11	11	20	-60	CurvePoint+
08/27/02	143	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E12	12	20	-60	CurvePoint+
08/27/02	144	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E13	13	20	-60	CurvePoint+
08/27/02	145	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E14	14	20	-60	CurvePoint+
08/27/02	146	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E15	15	20	-60	CurvePoint+
08/27/02	147	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E16	16	20	-60	CurvePoint+
08/27/02	148	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E17	17	20	-60	CurvePoint+
08/27/02	149	Br-81	37.45	279	36.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E18	18	20	-60	CurvePoint+
60V, P, MR, R5 to Iodine										WL# ER25077					
08/27/02	307	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	5	-40	
08/27/02	308	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	5	-45	
08/27/02	309	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	5	-50	
08/27/02	310	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	5	-55	
08/27/02	311	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	5	-60	
08/27/02	312	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	10	-40	
08/27/02	313	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E20	2	5	-60	
08/27/02	314	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E21	4	5	-60	CurvePoint
08/27/02	315	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	10	-45	
08/27/02	316	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	10	-50	
08/27/02	317	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	10	-55	
08/27/02	318	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	10	-60	
08/27/02	319	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E20	2	10	-60	
08/27/02	320	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E21	4	10	-60	CurvePoint
08/27/02	321	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	15	-50	
08/27/02	322	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	15	-55	
08/27/02	323	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E19	1	15	-60	F 6.059E+04
08/27/02	324	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E20	2	15	-55	F 1.747E+05
08/27/02	325	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E21	4	15	-50	F 1.031E+05

Test Date	Run #	Ion	LET MeV.cm ² /mg	Energy MeV	Range µm	Flux #/cm ² /sec	Fluence #/cm ²	Angle deg	BeamDia. cm.	Device Type	S/N	Socket #	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
60V, P, MR, R5 to Iodine (Continued)										WL# ER25077					
08/27/02	326	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E22	5	15	-45	
08/27/02	327	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E23	6	15	-45	
08/27/02	328	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E24	7	15	-45	CurvePoint
08/27/02	329	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E22	5	20	-35	F 6.815E+04
08/27/02	330	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E23	6	20	-20	
08/27/02	331	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E23	6	20	-25	
08/27/02	332	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E23	6	20	-30	
08/27/02	333	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E24	7	20	-30	
08/27/02	334	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E25	8	20	-30	F 3.252E+03
I Run 334 INVALID (Part failed prior to Beam is turned ON)															
08/27/02	335	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E26	9	20	-30	F 2.086E+05
08/27/02	336	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E27	10	20	-25	
08/27/02	337	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E28	11	20	-25	
08/27/02	338	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	E29	12	20	-25	CurvePoint
60V, P, MR, R5 to Iodine										WL# ER24461					
08/27/02	339	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D18	1	5	-40	
08/27/02	340	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D18	1	5	-50	
08/27/02	341	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D18	1	5	-60	
08/27/02	342	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D19	2	5	-60	
08/27/02	343	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D20	4	5	-60	CurvePoint
08/27/02	344	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D18	1	10	-60	
08/27/02	345	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D19	2	10	-60	
08/27/02	346	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D20	4	10	-60	CurvePoint
08/27/02	347	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D21	5	15	-45	
08/27/02	348	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D21	5	15	-50	
08/27/02	349	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D21	5	15	-55	
08/27/02	350	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D21	5	15	-60	F 2.842E+05
08/27/02	351	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D22	6	15	-50	F 2.535E+05
08/27/02	352	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D23	7	15	-45	
08/27/02	353	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D25	9	15	-45	
08/27/02	354	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D26	10	15	-45	CurvePoint
08/27/02	355	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D27	11	20	-25	
08/27/02	356	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D28	12	20	-25	
08/27/02	357	I-127	59.73	322	31.1	1.00E+04	3.00E+05	0	1.50	IRH 597064	D29	13	20	-25	CurvePoint
60V, P, MR, R5 to Gold										WL# ER24461					
08/27/02	405	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	D35	1	5	-60	
08/27/02	406	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	D36	2	5	-60	
08/27/02	407	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	D37	4	5	-60	CurvePoint

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Test	Run	Ion	LET	Energy	Range	Flux	Fluence	Angle	BeamDia.	Device	S/N	Socket	VGS	VDS	Pass/Fail
Date	#		<i>MeV.cm²/mg</i>	<i>MeV</i>	<i>µm</i>	<i>#/cm²/sec</i>	<i>#/cm²</i>	<i>deg</i>	<i>cm.</i>	Type		#	<i>Volts</i>	<i>Volts</i>	<i>Blank=Pass</i>
60V, P, MR, R5 to Gold (Continued)											WL# ER24461				
08/27/02	408	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	D37	4	10	-60	
08/27/02	409	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	D35	1	10	-60	
08/27/02	410	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	D36	2	10	-60	CurvePoint
08/27/02	411	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	D38	5	10	-60	CurvePoint+
08/27/02	412	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	D39	6	10	-60	CurvePoint+
60V, P, MR, R5 to Gold											WL# ER25077				
08/27/02	413	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	E36	7	10	-60	
08/27/02	414	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	E37	8	10	-60	
08/27/02	415	Au-197	82.06	346	28.2	1.00E+04	3.00E+05	0	1.50	IRH 579064	E38	9	10	-60	CurvePoint

Test	Run	Ion	LET	Energy	Range	Flux	Fluence	Angle	BeamDia.	Device	S/N	Socket	VGS	VDS	Pass/Fail
Date	#		<i>MeV.cm²/mg</i>	<i>MeV</i>	<i>µm</i>	<i>#/cm²/sec</i>	<i>#/cm²</i>	<i>deg</i>	<i>cm.</i>	Type		#	<i>Volts</i>	<i>Volts</i>	<i>Blank=Pass</i>
60V, N, MR, Logic R7 to Bromine											WL# ER30484				
10/24/02	1	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A1	1	-5	40	F 1.059E+05
10/24/02	2	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A2	2	0	40	
10/24/02	3	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A2	2	0	50	F 2.413E+04
10/24/02	4	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A3	4	0	40	
10/24/02	5	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A3	4	0	45	F 2.372E+04
10/24/02	6	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A4	5	0	40	EngCurvePoint
10/24/02	7	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A4	5	0	42	
10/24/02	8	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A4	5	0	43	
10/24/02	9	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A4	5	0	44	
10/24/02	10	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A4	5	0	45	F 4.663E+04
10/24/02	11	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A5	6	0	40	
10/24/02	12	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A5	6	-2	40	
10/24/02	13	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A5	6	-4	40	
10/24/02	14	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A5	6	-5	40	F 2.096E+05
10/24/02	15	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A6	7	-4	40	
10/24/02	16	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A6	7	-5	30	
10/24/02	17	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A6	7	-5	35	F 4.583E+04
10/24/02	18	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A7	8	-4	30	
10/24/02	19	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A7	8	-5	30	
10/24/02	20	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A7	8	-6	30	F 2.000E+04

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Test	Run	Ion	LET	Energy	Range	Flux	Fluence	Angle	BeamDia.	Device	S/N	Socket	VGS	VDS	Pass/Fail
Date	#		<i>MeV.cm²/mg</i>	<i>MeV</i>	<i>µm</i>	<i>#/cm²/sec</i>	<i>#/cm²</i>	<i>deg</i>	<i>cm.</i>	Type		#	<i>Volts</i>	<i>Volts</i>	<i>Blank=Pass</i>
60V, N, MR, Logic R7 to Bromine (Continued)										WL# ER30484					
10/24/02	21	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A8	9	-5	30	EngCurvePoint
10/24/02	22	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A8	9	-4	40	EngCurvePoint
10/24/02	23	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A8	9	-6	20	
10/24/02	24	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A8	9	-6	25	
10/24/02	25	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A8	9	-7	20	
10/24/02	26	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A8	9	-7	25	
10/24/02	27	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A8	9	-8	20	
10/24/02	28	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A8	9	-8	25	
10/24/02	29	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A8	9	-8	30	F 1.881E+05
10/24/02	30	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A9	10	-6	25	
10/24/02	31	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A9	10	-8	25	
10/24/02	32	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A10	11	-6	25	EngCurvePoint
10/24/02	33	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A10	11	-8	20	F 1.948E+05
10/24/02	34	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A11	12	-7	20	
10/24/02	35	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A11	12	-8	15	
10/24/02	36	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A12	13	-7	20	
10/24/02	37	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A12	13	-8	15	
10/24/02	38	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A13	14	-7	20	EngCurvePoint
10/24/02	39	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A13	14	-8	15	EngCurvePoint
60V, N, MR, Logic R7 to Iodine										WL# ER30484					
10/24/02	128	I-127	59.72	320	31	9.8E+03	3.0E+05	0	1.50	IRH 770Z4	A18	1	-2	20	
10/24/02	129	I-127	59.72	320	31	9.3E+03	3.0E+05	0	1.50	IRH 770Z4	A18	1	-4	20	
10/24/02	130	I-127	59.72	320	31	8.6E+03	2.9E+04	0	1.50	IRH 770Z4	A18	1	-4	30	F 2.871E+04
10/24/02	131	I-127	59.72	320	31	9.4E+03	9.9E+04	0	1.50	IRH 770Z4	A19	2	-4	30	F 9.858E+04
10/24/02	132	I-127	59.72	320	31	9.4E+03	3.0E+05	0	1.50	IRH 770Z4	A20	4	-4	20	
10/24/02	133	I-127	59.72	320	31	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A21	5	-4	20	EngCurvePoint
10/24/02	134	I-127	59.72	320	31	9.3E+03	3.0E+05	0	1.50	IRH 770Z4	A22	6	-5	20	F 3.017E+05
10/24/02	135	I-127	59.72	320	31	9.5E+03	3.0E+05	0	1.50	IRH 770Z4	A23	7	-5	15	
10/24/02	136	I-127	59.72	320	31	9.5E+03	3.0E+05	0	1.50	IRH 770Z4	A23	7	-6	10	
10/24/02	137	I-127	59.72	320	31	9.1E+03	3.0E+05	0	1.50	IRH 770Z4	A24	8	-5	15	
10/24/02	138	I-127	59.72	320	31	9.8E+03	3.0E+05	0	1.50	IRH 770Z4	A24	8	-6	10	
10/24/02	139	I-127	59.72	320	31	9.7E+03	3.0E+05	0	1.50	IRH 770Z4	A25	9	-5	15	CurvePoint
10/24/02	140	I-127	59.72	320	31	9.4E+03	3.0E+05	0	1.50	IRH 770Z4	A25	9	-6	10	CurvePoint
10/24/02	141	I-127	59.72	320	31	7.8E+03	1.6E+04	0	1.50	IRH 770Z4	A26	10	-5	20	F 1.569E+04

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Test	Run	Ion	LET	Energy	Range	Flux	Fluence	Angle	BeamDia.	Device	S/N	Socket	VGS	VDS	Pass/Fail
Date	#		<i>MeV.cm²/mg</i>	<i>MeV</i>	<i>µm</i>	<i>#/cm²/sec</i>	<i>#/cm²</i>	<i>deg</i>	<i>cm.</i>	Type		#	<i>Volts</i>	<i>Volts</i>	<i>Blank=Pass</i>
60V, N, MR, Logic R7 to Gold											WL# ER30484				
10/24/02	234	Au-197	81.44	333	27.5	1.1E+04	3.0E+05	0	1.50	IRH 770Z4	A34	14	-2	10	
10/24/02	235	Au-197	81.44	333	27.5	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A34	14	-2	15	
10/24/02	236	Au-197	81.44	333	27.5	1.2E+04	3.0E+05	0	1.50	IRH 770Z4	A34	14	-2	20	
10/24/02	237	Au-197	81.44	333	27.5	1.1E+04	3.0E+05	0	1.50	IRH 770Z4	A34	14	-4	10	
10/24/02	238	Au-197	81.44	333	27.5	9.2E+03	3.0E+05	0	1.50	IRH 770Z4	A34	14	-4	15	
10/24/02	239	Au-197	81.44	333	27.5	1.1E+04	3.0E+05	0	1.50	IRH 770Z4	A34	14	-4	20	F 3.027E+05
10/24/02	240	Au-197	81.44	333	27.5	1.1E+04	3.0E+05	0	1.50	IRH 770Z4	A35	15	-2	20	
10/24/02	241	Au-197	81.44	333	27.5	1.1E+04	3.0E+05	0	1.50	IRH 770Z4	A35	15	-4	15	
10/24/02	242	Au-197	81.44	333	27.5	1.1E+04	3.0E+05	0	1.50	IRH 770Z4	A36	16	-2	20	
10/24/02	243	Au-197	81.44	333	27.5	1.0E+04	3.0E+05	0	1.50	IRH 770Z4	A36	16	-4	15	
10/24/02	244	Au-197	81.44	333	27.5	1.1E+04	7.7E+04	0	1.50	IRH 770Z4	A37	17	-2	20	F 7.654E+04
10/24/02	245	Au-197	81.44	333	27.5	1.1E+04	3.1E+05	0	1.50	IRH 770Z4	A38	18	-4	15	CurvePoint

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Test	Run	Ion	LET	Energy	Range	Flux	Fluence	Angle	BeamDia.	Device	S/N	Socket	VGS	VDS	Pass/Fail
Date	#		<i>MeV.cm²/mg</i>	<i>MeV</i>	<i>µm</i>	<i>#/cm²/sec</i>	<i>#/cm²</i>	<i>deg</i>	<i>cm.</i>	Type		#	Volts	Volts	<i>Blank=Pass</i>
60V, P, MR, R5 to Bromine										WL# ER30751					
10/24/02	40	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 597064	B1	1	20	-60	
10/24/02	43	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 597064	B2	2	20	-60	
10/24/02	44	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 597064	B3	4	20	-60	
10/24/02	45	Br-81	37.46	278.5	36	1.0E+04	3.0E+05	0	1.50	IRH 597064	B4	5	20	-60	CurvePoint
60V, P, MR, R5 to Iodine										WL# ER30751					
10/24/02	142	I-127	59.72	320	31	1.0E+04	3.1E+05	0	1.50	IRH 597064	B6	1	10	-60	
10/24/02	143	I-127	59.72	320	31	9.8E+03	3.0E+05	0	1.50	IRH 597064	B6	1	15	-45	
10/24/02	144	I-127	59.72	320	31	1.0E+04	3.0E+05	0	1.50	IRH 597064	B6	1	20	-25	
10/24/02	149	I-127	59.72	320	31	8.6E+03	3.0E+05	0	1.50	IRH 597064	B7	2	10	-60	
10/24/02	150	I-127	59.72	320	31	9.0E+03	3.0E+05	0	1.50	IRH 597064	B7	2	15	-45	
60V, P, MR, R5 to Iodine (Continued)										WL# ER30751					
10/24/02	151	I-127	59.72	320	31	9.7E+03	3.0E+05	0	1.50	IRH 597064	B7	2	20	-25	
10/24/02	152	I-127	59.72	320	31	9.3E+03	3.0E+05	0	1.50	IRH 597064	B8	4	10	-60	CurvePoint
10/24/02	153	I-127	59.72	320	31	8.9E+03	3.0E+05	0	1.50	IRH 597064	B8	4	15	-45	CurvePoint
10/24/02	154	I-127	59.72	320	31	8.4E+03	3.0E+05	0	1.50	IRH 597064	B8	4	20	-25	CurvePoint
60V, P, MR, R5 to Gold										WL# ER30751					
10/24/02	211	Au-197	81.44	333	27.5	1.1E+04	3.0E+05	0	1.50	IRH 597064	B11	1	5	-60	
10/24/02	212	Au-197	81.44	333	27.5	1.0E+04	3.0E+05	0	1.50	IRH 597064	B12	2	5	-60	
10/24/02	213	Au-197	81.44	333	27.5	1.0E+04	3.0E+05	0	1.50	IRH 597064	B13	4	5	-60	CurvePoint
10/24/02	214	Au-197	81.44	333	27.5	1.0E+04	3.0E+05	0	1.50	IRH 597064	B14	5	10	-30	
10/24/02	215	Au-197	81.44	333	27.5	1.0E+04	3.0E+05	0	1.50	IRH 597064	B14	5	10	-40	
10/24/02	216	Au-197	81.44	333	27.5	2.7E+03	2.9E+05	0	1.50	IRH 597064	B14	5	10	-45	
10/24/02	217	Au-197	81.44	333	27.5	1.5E+04	3.0E+05	0	1.50	IRH 597064	B14	5	10	-50	
10/24/02	218	Au-197	81.44	333	27.5	1.4E+04	3.0E+05	0	1.50	IRH 597064	B14	5	10	-55	
10/24/02	219	Au-197	81.44	333	27.5	1.5E+04	3.0E+05	0	1.50	IRH 597064	B14	5	10	60	

Appendix B

BNL Facility

Data & Graphs

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
0	08/27/02	10:05	Flux	Br-81	279	36.09	37.45	0	0	10.1	1.40E+04	1.42E+05	0.00E+00	0.00E+00	0	0.00E+00	-8.9	-0.8	3.8	5.9	93.6	7.3
1	08/27/02	10:07	1	Br-81	279	36.09	37.45	0	0	20.9	1.43E+04	3.00E+05	1.82E+02	6.60E+04	0	0.00E+00	-8.4	-0.8	3.8	5.3	94	A
2	08/27/02	10:09	1	Br-81	279	36.09	37.45	0	0	21.1	1.44E+04	3.03E+05	1.83E+02	6.62E+04	0	0.00E+00	-7.2	-1.3	4	4.5	94.6	A
3	08/27/02	10:10	1	Br-81	279	36.09	37.45	0	0	21.6	1.40E+04	3.03E+05	1.83E+02	6.64E+04	0	0.00E+00	-7.9	-2	5	4.9	94	A
4	08/27/02	0.425	1	Br-81	279	36.09	37.45	0	0	21.4	14180	303000	182.6	66550	0	0	-7.5	0.1	4.1	3.3	94.5	A
5	08/27/02	10:13	1	Br-81	279	36.09	37.45	0	0	22.3	1.36E+04	3.03E+05	1.82E+02	6.67E+04	0	0.00E+00	-7.7	-0.4	4.8	3.3	94.2	A
6	08/27/02	10:14	1	Br-81	279	36.09	37.45	0	0	23.2	1.30E+04	3.03E+05	1.83E+02	6.69E+04	0	0.00E+00	-8.4	-2	5.1	5.4	93.6	A
7	08/27/02	10:15	2	Br-81	279	36.09	37.45	0	0	22.9	1.33E+04	3.03E+05	1.83E+02	2.23E+05	0	0.00E+00	-8.2	-0.1	4.5	3.8	94	A
8	08/27/02	10:16	4	Br-81	279	36.09	37.45	0	0	22.6	1.33E+04	3.02E+05	1.82E+02	2.40E+04	0	0.00E+00	-7	-1.7	4.2	4.6	94.6	A
9	08/27/02	10:18	10	Br-81	279	36.09	37.45	0	0	22.3	1.36E+04	3.02E+05	1.82E+02	2.93E+04	0	0.00E+00	-6.8	0.2	4.4	2.2	94.7	A
10	08/27/02	10:24	13	Br-81	279	36.09	37.45	0	0	26.5	1.14E+04	3.02E+05	1.82E+02	1.97E+04	0	0.00E+00	-11	-2.1	4.5	8	92.4	A
11	08/27/02	10:28	16	Br-81	279	36.09	37.45	0	0	27.1	1.11E+04	3.02E+05	1.82E+02	1.99E+04	0	0.00E+00	-12	-1.6	4.5	8.8	91.6	A
0	08/27/02	11:17	Flux	Br-81	279	36.09	37.45	0	0	5.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0	0.00E+00	0	0	0	0	100	
12	08/27/02	12:04	1	Br-81	279	36.09	37.45	0	0	24.4	1.24E+04	3.03E+05	1.83E+02	6.71E+04	0	0.00E+00	-3.2	1.5	2.9	-1.1	96.4	A
13	08/27/02	12:09	2	Br-81	279	36.09	37.45	0	0	25.3	1.19E+04	3.02E+05	1.82E+02	2.23E+05	0	0.00E+00	-3.7	1.5	1.9	0.4	96.9	A
14	08/27/02	12:11	4	Br-81	279	36.09	37.45	0	0	24.5	1.24E+04	3.03E+05	1.82E+02	2.41E+04	0	0.00E+00	-2.5	1.5	2	-1	97.2	A
15	08/27/02	12:11	5	Br-81	279	36.09	37.45	0	0	23.8	1.27E+04	3.02E+05	1.82E+02	2.17E+04	0	0.00E+00	-2.3	1.5	2.6	-1.8	96.8	A
16	08/27/02	12:12	6	Br-81	279	36.09	37.45	0	0	25.4	1.20E+04	3.04E+05	1.83E+02	2.19E+04	0	0.00E+00	-3.7	1.3	2.3	0.1	96.7	A
17	08/27/02	12:13	7	Br-81	279	36.09	37.45	0	0	24.1	1.25E+04	3.02E+05	1.82E+02	2.54E+04	0	0.00E+00	-2.2	0.6	3.3	-1.6	96.8	A
18	08/27/02	12:16	8	Br-81	279	36.09	37.45	0	0	4	1.28E+04	5.12E+04	3.09E+01	1.44E+04	1	1.95E-05	-2	2	2	-1.9	96.9	A
19	08/27/02	12:17	9	Br-81	279	36.09	37.45	0	0	23.9	1.27E+04	3.03E+05	1.82E+02	2.39E+04	0	0.00E+00	-2.2	1.5	3	-2.3	96.4	A
20	08/27/02	12:19	9	Br-81	279	36.09	37.45	0	0	23.9	1.26E+04	3.02E+05	1.82E+02	2.41E+04	0	0.00E+00	-2	1.2	1.6	-0.8	97.7	A
21	08/27/02	12:20	9	Br-81	279	36.09	37.45	0	0	23.3	1.30E+04	3.02E+05	1.82E+02	2.43E+04	0	0.00E+00	-0.9	2	2.1	-3.2	96.6	A
22	08/27/02	12:21	9	Br-81	279	36.09	37.45	0	0	23.3	1.30E+04	3.03E+05	1.83E+02	2.45E+04	0	0.00E+00	-0.7	2.5	1.8	-3.5	96.5	A
23	08/27/02	12:22	9	Br-81	279	36.09	37.45	0	0	11.9	1.30E+04	1.55E+05	9.36E+01	2.46E+04	1	6.43E-06	-1.6	3.6	1.5	-3.5	95.8	A
24	08/27/02	12:25	10	Br-81	279	36.09	37.45	0	0	23.6	1.28E+04	3.03E+05	1.83E+02	2.95E+04	0	0.00E+00	-0.2	2.6	1.4	-3.8	96.5	A
25	08/27/02	12:26	10	Br-81	279	36.09	37.45	0	0	7.5	1.28E+04	9.63E+04	5.80E+01	2.96E+04	1	1.04E-05	-0.9	2.6	1.7	-3.3	96.5	A
26	08/27/02	12:27	11	Br-81	279	36.09	37.45	0	0	23.1	1.31E+04	3.02E+05	1.82E+02	2.06E+04	0	0.00E+00	0.3	1.6	2.2	-4.2	96.5	A
27	08/27/02	12:28	11	Br-81	279	36.09	37.45	0	0	1.3	1.29E+04	1.62E+04	9.76E+00	2.06E+04	1	6.17E-05	-0.7	5.3	0.2	-4.8	95.1	A
28	08/27/02	12:29	12	Br-81	279	36.09	37.45	0	0	23.4	1.30E+04	3.03E+05	1.82E+02	2.57E+04	0	0.00E+00	0.1	1.7	2.2	-4	96.5	A
29	08/27/02	12:30	13	Br-81	279	36.09	37.45	0	0	24	1.26E+04	3.03E+05	1.82E+02	1.99E+04	0	0.00E+00	-1.7	1.9	1.7	-2	97.1	A
30	08/27/02	12:31	14	Br-81	279	36.09	37.45	0	0	23.7	1.28E+04	3.02E+05	1.82E+02	1.42E+04	0	0.00E+00	-1.7	2	2.2	-2.4	96.7	A
31	08/27/02	12:32	14	Br-81	279	36.09	37.45	0	0	22.9	1.32E+04	3.03E+05	1.83E+02	1.44E+04	0	0.00E+00	0.9	2.3	1.7	-4.9	96.1	A
32	08/27/02	12:32	14	Br-81	279	36.09	37.45	0	0	1.1	1.31E+04	1.39E+04	8.35E+00	1.44E+04	1	7.21E-05	3.7	4.9	3.2	-11.9	91.6	A
33	08/27/02	12:33	15	Br-81	279	36.09	37.45	0	0	22.5	1.35E+04	3.02E+05	1.82E+02	2.47E+04	0	0.00E+00	2.6	2.4	1.4	-6.4	95.4	A
34	08/27/02	12:34	15	Br-81	279	36.09	37.45	0	0	22.9	1.32E+04	3.03E+05	1.82E+02	2.49E+04	0	0.00E+00	0.7	2.7	2.3	-5.7	95.4	A
35	08/27/02	12:35	16	Br-81	279	36.09	37.45	0	0	23	1.32E+04	3.03E+05	1.83E+02	2.00E+04	0	0.00E+00	0.8	2.4	2	-5.2	95.9	A
36	08/27/02	12:36	16	Br-81	279	36.09	37.45	0	0	23.1	1.31E+04	3.03E+05	1.82E+02	2.02E+04	0	0.00E+00	1.4	2	2	-5.4	95.9	A
37	08/27/02	12:37	17	Br-81	279	36.09	37.45	0	0	23	1.31E+04	3.02E+05	1.82E+02	1.95E+04	0	0.00E+00	0.5	2.8	1.7	-5	95.9	A
38	08/27/02	12:38	17	Br-81	279	36.09	37.45	0	0	23.1	1.31E+04	3.03E+05	1.82E+02	1.97E+04	0	0.00E+00	0.8	1.7	2.1	-4.6	96.3	A
39	08/27/02	12:38	18	Br-81	279	36.09	37.45	0	0	23.2	1.30E+04	3.02E+05	1.82E+02	1.64E+04	0	0.00E+00	0.1	2.3	2.1	-4.5	96.1	A
40	08/27/02	12:39	18	Br-81	279	36.09	37.45	0	0	4.6	1.28E+04	5.84E+04	3.52E+01	1.64E+04	1	1.71E-05	-0.2	2.7	1.5	-4	96.4	A
41	08/27/02	13:26	1	Br-81	279	36.09	37.45	0	0	24.6	1.23E+04	3.03E+05	1.82E+02	6.73E+04	0	0.00E+00	0.2	2.2	2.5	-4.8	95.9	A
42	08/27/02	13:27	1	Br-81	279	36.09	37.45	0	0	23.7	1.28E+04	3.03E+05	1.82E+02	6.75E+04	0	0.00E+00	3	2	2.1	-7	95	A
43	08/27/02	13:28	2	Br-81	279	36.09	37.45	0	0	24.4	1.24E+04	3.03E+05	1.82E+02	2.23E+05	0	0.00E+00	-0.4	2.5	2	-4	96.2	A

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
44	08/27/02	13:28	2	Br-81	279	36.09	37.45	0	0	23.9	1.27E+04	3.03E+05	1.82E+02	2.23E+05	0	0.00E+00	-0.1	2.3	2.7	-4.9	95.6	A
45	08/27/02	13:30	5	Br-81	279	36.09	37.45	0	0	4.3	1.28E+04	5.53E+04	3.33E+01	2.18E+04	1	1.81E-05	-0.3	5.9	1.3	-6.8	93.8	A
46	08/27/02	13:31	6	Br-81	279	36.09	37.45	0	0	23.7	1.28E+04	3.03E+05	1.83E+02	2.21E+04	0	0.00E+00	2.3	2.5	1.2	-6	95.6	A
47	08/27/02	13:32	7	Br-81	279	36.09	37.45	0	0	7.3	1.30E+04	9.48E+04	5.71E+01	2.54E+04	1	1.06E-05	2	1.5	3.4	-6.9	94.8	A
48	08/27/02	13:32	8	Br-81	279	36.09	37.45	0	0	2.2	1.29E+04	2.83E+04	1.70E+01	1.44E+04	1	3.54E-05	3.5	2.1	-0.9	-4.7	96.5	A
49	08/27/02	13:34	9	Br-81	279	36.09	37.45	0	0	23.2	1.30E+04	3.02E+05	1.82E+02	2.48E+04	0	0.00E+00	2.7	2.2	2.2	-7.1	94.9	A
50	08/27/02	13:34	10	Br-81	279	36.09	37.45	0	0	23.4	1.29E+04	3.02E+05	1.82E+02	2.98E+04	0	0.00E+00	2.5	2	2.5	-7	94.9	A
51	08/27/02	13:36	11	Br-81	279	36.09	37.45	0	0	23.3	1.30E+04	3.02E+05	1.82E+02	2.08E+04	0	0.00E+00	3.3	2.7	1.4	-7.4	94.8	A
52	08/27/02	13:37	12	Br-81	279	36.09	37.45	0	0	23.4	1.29E+04	3.02E+05	1.82E+02	2.59E+04	0	0.00E+00	3.1	1.9	1.4	-6.5	95.4	A
53	08/27/02	13:37	12	Br-81	279	36.09	37.45	0	0	23.3	1.29E+04	3.02E+05	1.82E+02	2.61E+04	0	0.00E+00	2.1	2.9	1.6	-6.6	95.1	A
54	08/27/02	13:38	12	Br-81	279	36.09	37.45	0	0	23.6	1.28E+04	3.02E+05	1.82E+02	2.63E+04	0	0.00E+00	2.2	1.6	2.3	-6.1	95.6	A
55	08/27/02	13:39	12	Br-81	279	36.09	37.45	0	0	23.6	1.28E+04	3.03E+05	1.82E+02	2.64E+04	0	0.00E+00	2.9	2	2.1	-7	95	A
56	08/27/02	13:40	12	Br-81	279	36.09	37.45	0	0	23.5	1.29E+04	3.02E+05	1.82E+02	2.66E+04	0	0.00E+00	3	2.9	2	-7.9	94.4	A
57	08/27/02	13:41	12	Br-81	279	36.09	37.45	0	0	23.4	1.29E+04	3.03E+05	1.82E+02	2.68E+04	0	0.00E+00	3	3.4	1.6	-8	94.2	A
58	08/27/02	13:41	12	Br-81	279	36.09	37.45	0	0	23.5	1.29E+04	3.02E+05	1.82E+02	2.70E+04	0	0.00E+00	3.3	2.1	1.5	-6.9	95.2	A
59	08/27/02	13:43	12	Br-81	279	36.09	37.45	0	0	15.2	1.30E+04	1.98E+05	1.19E+02	2.71E+04	1	5.05E-06	2.5	2.4	2.4	-7.3	94.7	A
60	08/27/02	13:44	13	Br-81	279	36.09	37.45	0	0	23.3	1.30E+04	3.02E+05	1.82E+02	2.01E+04	0	0.00E+00	3.4	2.9	0.9	-7.3	94.9	A
61	08/27/02	13:46	14	Br-81	279	36.09	37.45	0	0	23.2	1.30E+04	3.03E+05	1.82E+02	1.46E+04	0	0.00E+00	2.3	3.1	1.9	-7.3	94.7	A
62	08/27/02	13:46	15	Br-81	279	36.09	37.45	0	0	23.6	1.28E+04	3.03E+05	1.82E+02	2.50E+04	0	0.00E+00	-1.9	3.1	2.1	-3.4	95.8	A
63	08/27/02	14:09	1	Br-81	279	36.09	37.45	0	0	23.6	1.28E+04	3.02E+05	1.82E+02	6.76E+04	0	0.00E+00	-7.3	3.2	1.9	2.1	94.6	A
64	08/27/02	14:10	1	Br-81	279	36.09	37.45	0	0	23.7	1.27E+04	3.02E+05	1.82E+02	6.78E+04	0	0.00E+00	-7.1	3.2	2	1.9	94.7	A
65	08/27/02	14:11	1	Br-81	279	36.09	37.45	0	0	7.5	1.26E+04	9.40E+04	5.67E+01	6.79E+04	1	1.06E-05	-8.1	4.6	1.8	1.7	93.7	A
66	08/27/02	14:12	2	Br-81	279	36.09	37.45	0	0	23.1	1.31E+04	3.03E+05	1.83E+02	2.23E+05	0	0.00E+00	-5.2	3.2	2.1	-0.2	95.4	A
67	08/27/02	14:12	2	Br-81	279	36.09	37.45	0	0	23.1	1.31E+04	3.02E+05	1.82E+02	2.23E+05	0	0.00E+00	-5.8	3.5	1.7	0.6	95.2	A
68	08/27/02	14:13	4	Br-81	279	36.09	37.45	0	0	23.7	1.27E+04	3.02E+05	1.82E+02	2.43E+04	0	0.00E+00	-7.8	2.3	2.6	2.9	94.4	A
69	08/27/02	14:14	4	Br-81	279	36.09	37.45	0	0	26.4	1.14E+04	3.02E+05	1.82E+02	2.45E+04	0	0.00E+00	-9.2	0.7	1.8	6.7	93.6	A
70	08/27/02	14:15	5	Br-81	279	36.09	37.45	0	0	24.6	1.23E+04	3.02E+05	1.82E+02	2.20E+04	0	0.00E+00	-8.5	2.7	2.5	3.3	93.9	A
71	08/27/02	14:17	5	Br-81	279	36.09	37.45	0	0	2.5	1.23E+04	3.05E+04	1.84E+01	2.20E+04	0	0.00E+00	-8.5	0.9	1.5	6.1	94.1	A
! run 71 invalid																						
72	08/27/02	14:20	5	Br-81	279	36.09	37.45	0	0	24.6	1.23E+04	3.02E+05	1.82E+02	2.22E+04	0	0.00E+00	-8.3	2.8	2.4	3.2	94.1	A
73	08/27/02	14:21	6	Br-81	279	36.09	37.45	0	0	24.4	1.24E+04	3.02E+05	1.82E+02	2.23E+04	0	0.00E+00	-8.2	1.9	2.9	3.5	94.2	A
74	08/27/02	14:24	6	Br-81	279	36.09	37.45	0	0	24.3	1.24E+04	3.02E+05	1.82E+02	2.25E+04	0	0.00E+00	-8.4	3.6	2.2	2.6	93.9	A
75	08/27/02	14:25	6	Br-81	279	36.09	37.45	0	0	24.5	1.24E+04	3.02E+05	1.82E+02	2.27E+04	0	0.00E+00	-7.5	2.5	2	3	94.7	A
76	08/27/02	14:26	6	Br-81	279	36.09	37.45	0	0	23.8	1.27E+04	3.03E+05	1.82E+02	2.28E+04	0	0.00E+00	-6.7	2.1	2.5	2	95	A
77	08/27/02	14:27	6	Br-81	279	36.09	37.45	0	0	24.1	1.26E+04	3.03E+05	1.83E+02	2.30E+04	0	0.00E+00	-8.8	3.1	2.8	2.9	93.7	A
78	08/27/02	14:28	7	Br-81	279	36.09	37.45	0	0	24.4	1.24E+04	3.02E+05	1.82E+02	2.56E+04	0	0.00E+00	-8.3	2.3	2.9	3.1	94.1	A
79	08/27/02	14:29	8	Br-81	279	36.09	37.45	0	0	24.5	1.24E+04	3.02E+05	1.82E+02	1.46E+04	0	0.00E+00	-9.2	2.6	3.8	2.7	93.3	A
80	08/27/02	14:30	9	Br-81	279	36.09	37.45	0	0	24.5	1.24E+04	3.03E+05	1.83E+02	2.50E+04	0	0.00E+00	-8.3	2.2	3.5	2.6	93.9	A
81	08/27/02	14:31	9	Br-81	279	36.09	37.45	0	0	24.3	1.25E+04	3.02E+05	1.82E+02	2.51E+04	0	0.00E+00	-7.6	1.9	2.4	3.3	94.7	A
82	08/27/02	14:31	9	Br-81	279	36.09	37.45	0	0	24.1	1.26E+04	3.03E+05	1.82E+02	2.53E+04	0	0.00E+00	-8	3.2	2.1	2.7	94.2	A
83	08/27/02	14:32	9	Br-81	279	36.09	37.45	0	0	24.3	1.24E+04	3.03E+05	1.82E+02	2.55E+04	0	0.00E+00	-7.5	2.9	2.1	2.5	94.5	A
84	08/27/02	14:33	9	Br-81	279	36.09	37.45	0	0	24	1.26E+04	3.02E+05	1.82E+02	2.57E+04	0	0.00E+00	-7.2	2.6	1.4	3.3	94.9	A
85	08/27/02	14:33	9	Br-81	279	36.09	37.45	0	0	24.3	1.25E+04	3.02E+05	1.82E+02	2.59E+04	0	0.00E+00	-8.8	2.7	2.6	3.5	93.8	A
86	08/27/02	14:34	9	Br-81	279	36.09	37.45	0	0	24.1	1.25E+04	3.02E+05	1.82E+02	2.60E+04	0	0.00E+00	-8.3	2.4	1.8	4.2	94.3	A
87	08/27/02	14:34	9	Br-81	279	36.09	37.45	0	0	25.3	1.20E+04	3.03E+05	1.83E+02	2.62E+04	0	0.00E+00	-8	1.4	2.6	4.1	94.4	A

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
88	08/27/02	14:36	9	Br-81	279	36.09	37.45	0	0	24.1	1.25E+04	3.02E+05	1.82E+02	2.64E+04	0	0.00E+00	-8.3	2.5	2.7	3.1	94.1	A
89	08/27/02	14:36	9	Br-81	279	36.09	37.45	0	0	24.1	1.26E+04	3.03E+05	1.82E+02	2.66E+04	0	0.00E+00	-8.6	2.1	3.5	3	93.8	A
90	08/27/02	14:37	9	Br-81	279	36.09	37.45	0	0	23.6	1.28E+04	3.03E+05	1.83E+02	2.68E+04	0	0.00E+00	-7.3	2.4	3.3	1.6	94.4	A
91	08/27/02	14:37	9	Br-81	279	36.09	37.45	0	0	24	1.26E+04	3.02E+05	1.82E+02	2.70E+04	0	0.00E+00	-7.5	3.2	2.5	1.7	94.3	A
92	08/27/02	14:38	9	Br-81	279	36.09	37.45	0	0	23.7	1.28E+04	3.03E+05	1.82E+02	2.71E+04	0	0.00E+00	-6.1	3.4	2.7	0	94.7	A
93	08/27/02	14:39	9	Br-81	279	36.09	37.45	0	0	23.7	1.27E+04	3.02E+05	1.82E+02	2.73E+04	0	0.00E+00	-7.5	2.9	2.4	2.2	94.5	A
94	08/27/02	14:40	9	Br-81	279	36.09	37.45	0	0	15.2	1.26E+04	1.91E+05	1.15E+02	2.74E+04	1	5.24E-06	-7.5	1.7	3.3	2.6	94.5	A
95	08/27/02	14:41	10	Br-81	279	36.09	37.45	0	0	15.9	1.22E+04	1.94E+05	1.17E+02	2.99E+04	1	5.16E-06	-9.3	1.9	2.3	5.1	93.6	A
96	08/27/02	14:43	11	Br-81	279	36.09	37.45	0	0	5.1	1.27E+04	6.47E+04	3.90E+01	2.09E+04	1	1.55E-05	-6.3	4.7	1.5	0.1	94.5	A
97	08/27/02	14:44	12	Br-81	279	36.09	37.45	0	0	21.4	1.27E+04	2.73E+05	1.64E+02	2.73E+04	1	3.67E-06	-5.9	3	1.6	1.3	95.4	A
98	08/27/02	14:45	13	Br-81	279	36.09	37.45	0	0	24.2	1.25E+04	3.03E+05	1.82E+02	2.03E+04	0	0.00E+00	-6.9	2.9	2.7	1.3	94.6	A
99	08/27/02	14:45	14	Br-81	279	36.09	37.45	0	0	24.3	1.24E+04	3.02E+05	1.82E+02	1.48E+04	0	0.00E+00	-7.5	2.7	2.3	2.5	94.5	A
100	08/27/02	14:46	15	Br-81	279	36.09	37.45	0	0	24	1.26E+04	3.02E+05	1.82E+02	2.52E+04	0	0.00E+00	-6	2.8	2.6	0.6	95.1	A
101	08/27/02	15:12	1	Br-81	279	36.09	37.45	0	0	30.6	9.85E+03	3.02E+05	1.82E+02	6.81E+04	0	0.00E+00	-13	0.3	2.6	9.6	91.4	A
102	08/27/02	15:13	1	Br-81	279	36.09	37.45	0	0	30.2	9.96E+03	3.01E+05	1.82E+02	6.83E+04	0	0.00E+00	-12	-0.1	2.7	9.5	91.6	A
103	08/27/02	15:15	1	Br-81	279	36.09	37.45	0	0	22.6	1.34E+04	3.03E+05	1.83E+02	6.84E+04	0	0.00E+00	-2.5	1.4	1.9	-0.8	97.3	A
104	08/27/02	15:16	1	Br-81	279	36.09	37.45	0	0	24.1	1.25E+04	3.02E+05	1.82E+02	6.86E+04	0	0.00E+00	-2.7	0.4	3.4	-1.1	96.7	A
105	08/27/02	15:26	1	Br-81	279	36.09	37.45	0	0	24.5	1.24E+04	3.03E+05	1.82E+02	6.88E+04	0	0.00E+00	-3.2	0.8	3.6	-1.1	96.3	A
106	08/27/02	15:31	1	Br-81	279	36.09	37.45	0	0	24.3	1.24E+04	3.02E+05	1.82E+02	6.90E+04	0	0.00E+00	-2.5	1	2.2	-0.7	97.3	A
107	08/27/02	15:32	1	Br-81	279	36.09	37.45	0	0	24.9	1.22E+04	3.03E+05	1.82E+02	6.92E+04	0	0.00E+00	-3.2	0.4	3.4	-0.6	96.6	A
108	08/27/02	15:41	1	Br-81	279	36.09	37.45	0	0	22.8	1.33E+04	3.03E+05	1.82E+02	6.93E+04	0	0.00E+00	-1	1.5	2.3	-2.8	96.9	A
109	08/27/02	15:42	1	Br-81	279	36.09	37.45	0	0	22.6	1.34E+04	3.03E+05	1.82E+02	6.95E+04	0	0.00E+00	-0.9	1.9	1.9	-2.8	97	A
110	08/27/02	15:43	1	Br-81	279	36.09	37.45	0	0	22.1	1.37E+04	3.03E+05	1.83E+02	6.97E+04	0	0.00E+00	-0.1	1.1	2.5	-3.4	96.9	A
111	08/27/02	15:44	2	Br-81	279	36.09	37.45	0	0	21.7	1.40E+04	3.03E+05	1.83E+02	2.24E+05	0	0.00E+00	-0.1	2.1	2.1	-4.1	96.4	A
112	08/27/02	15:44	4	Br-81	279	36.09	37.45	0	0	22.1	1.37E+04	3.02E+05	1.82E+02	2.47E+04	0	0.00E+00	-0.2	1.8	2.1	-3.7	96.6	A
113	08/27/02	15:48	11	Br-81	279	36.09	37.45	0	0	22.8	1.33E+04	3.03E+05	1.82E+02	2.10E+04	0	0.00E+00	-1.4	0.8	2.5	-1.9	97.3	A
114	08/27/02	15:49	11	Br-81	279	36.09	37.45	0	0	22.2	1.36E+04	3.02E+05	1.82E+02	2.12E+04	0	0.00E+00	-0.6	2.4	2.1	-3.9	96.2	A
115	08/27/02	15:50	11	Br-81	279	36.09	37.45	0	0	22.3	1.36E+04	3.03E+05	1.83E+02	2.14E+04	0	0.00E+00	-0.7	2.3	2.1	-3.7	96.4	A
116	08/27/02	15:51	11	Br-81	279	36.09	37.45	0	0	21.6	1.40E+04	3.03E+05	1.82E+02	2.16E+04	0	0.00E+00	0.8	2	2.6	-5.4	95.6	A
117	08/27/02	15:51	11	Br-81	279	36.09	37.45	0	0	22.1	1.37E+04	3.02E+05	1.82E+02	2.18E+04	0	0.00E+00	-1	1.9	2.8	-3.7	96.1	A
118	08/27/02	15:52	11	Br-81	279	36.09	37.45	0	0	21.8	1.39E+04	3.03E+05	1.83E+02	2.19E+04	0	0.00E+00	-0.2	2.8	2	-4.6	95.9	A
119	08/27/02	15:53	11	Br-81	279	36.09	37.45	0	0	22	1.37E+04	3.02E+05	1.82E+02	2.21E+04	0	0.00E+00	-0.3	2.1	2.1	-4	96.4	A
120	08/27/02	15:53	11	Br-81	279	36.09	37.45	0	0	22.2	1.36E+04	3.02E+05	1.82E+02	2.23E+04	0	0.00E+00	0	1.7	2.5	-4.1	96.4	A
121	08/27/02	15:54	12	Br-81	279	36.09	37.45	0	0	22.8	1.33E+04	3.03E+05	1.82E+02	2.75E+04	0	0.00E+00	-1.7	1.2	2.8	-2.4	96.7	A
122	08/27/02	15:55	13	Br-81	279	36.09	37.45	0	0	22.2	1.36E+04	3.02E+05	1.82E+02	2.05E+04	0	0.00E+00	-1.9	2.3	2.5	-2.9	96.2	A
123	08/27/02	16:36	1	Br-81	279	36.09	37.45	0	0	24.6	1.23E+04	3.03E+05	1.83E+02	6.99E+04	0	0.00E+00	-2.5	0.8	3.9	-2.2	96.1	A
124	08/27/02	16:37	1	Br-81	279	36.09	37.45	0	0	25.1	1.21E+04	3.02E+05	1.82E+02	7.01E+04	0	0.00E+00	-1.3	0.3	2.5	-1.4	97.6	A
125	08/27/02	16:38	1	Br-81	279	36.09	37.45	0	0	25.1	1.21E+04	3.03E+05	1.82E+02	7.03E+04	0	0.00E+00	-4.5	1.1	3.4	0	96	A
126	08/27/02	16:38	1	Br-81	279	36.09	37.45	0	0	25.6	1.18E+04	3.02E+05	1.82E+02	7.04E+04	0	0.00E+00	4.3	0.2	2.8	-7.4	94.8	A
127	08/27/02	16:40	1	Br-81	279	36.09	37.45	0	0	25	1.21E+04	3.02E+05	1.82E+02	7.06E+04	0	0.00E+00	-2.9	0	3.1	-0.2	97	A
128	08/27/02	16:41	1	Br-81	279	36.09	37.45	0	0	24.5	1.23E+04	3.02E+05	1.82E+02	7.08E+04	0	0.00E+00	-3.2	1.5	2.6	-0.9	96.6	A
129	08/27/02	16:42	1	Br-81	279	36.09	37.45	0	0	24.4	1.24E+04	3.02E+05	1.82E+02	7.10E+04	0	0.00E+00	-1.5	1.3	2.1	-1.9	97.2	A
130	08/27/02	16:43	1	Br-81	279	36.09	37.45	0	0	23.9	1.27E+04	3.03E+05	1.82E+02	7.12E+04	0	0.00E+00	-2.9	0.7	2.3	-0.1	97.3	A
131	08/27/02	16:43	1	Br-81	279	36.09	37.45	0	0	23.3	1.30E+04	3.02E+05	1.82E+02	7.13E+04	0	0.00E+00	-2.5	1.3	3.3	-2.1	96.3	A

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
132	08/27/02	16:44	1	Br-81	279	36.09	37.45	0	0	23.9	1.26E+04	3.02E+05	1.82E+02	7.15E+04	0	0.00E+00	-3.4	1.4	3.7	-1.6	95.9	A
133	08/27/02	16:46	2	Br-81	279	36.09	37.45	0	0	25.3	1.19E+04	3.02E+05	1.82E+02	2.24E+05	0	0.00E+00	-3.2	0.8	3.5	-1	96.4	A
134	08/27/02	16:46	2	Br-81	279	36.09	37.45	0	0	25.1	1.20E+04	3.02E+05	1.82E+02	2.24E+05	0	0.00E+00	-2.7	1.3	2.5	-1.1	96.9	A
135	08/27/02	16:47	4	Br-81	279	36.09	37.45	0	0	25.1	1.21E+04	3.02E+05	1.82E+02	2.49E+04	0	0.00E+00	-3.8	0.4	2.8	0.6	96.8	A
136	08/27/02	16:49	5	Br-81	279	36.09	37.45	0	0	24.7	1.23E+04	3.03E+05	1.83E+02	2.23E+04	0	0.00E+00	-2.6	0.9	3.4	-1.8	96.4	A
137	08/27/02	16:50	6	Br-81	279	36.09	37.45	0	0	24.4	1.24E+04	3.02E+05	1.82E+02	2.32E+04	0	0.00E+00	-3.4	1.6	2.3	-0.5	96.7	A
138	08/27/02	16:50	7	Br-81	279	36.09	37.45	0	0	25.6	1.18E+04	3.02E+05	1.82E+02	2.58E+04	0	0.00E+00	-3.7	0.2	3.3	0.2	96.6	A
139	08/27/02	16:51	8	Br-81	279	36.09	37.45	0	0	23.1	1.31E+04	3.03E+05	1.83E+02	1.48E+04	0	0.00E+00	-1.3	0.4	3.2	-2.2	97	A
140	08/27/02	16:52	9	Br-81	279	36.09	37.45	0	0	23.4	1.30E+04	3.03E+05	1.83E+02	2.76E+04	0	0.00E+00	-2.6	1.7	2.7	-1.8	96.5	A
141	08/27/02	16:53	10	Br-81	279	36.09	37.45	0	0	23.2	1.31E+04	3.03E+05	1.82E+02	3.01E+04	0	0.00E+00	-1.6	1.4	3.3	-3.1	96.2	A
142	08/27/02	16:54	11	Br-81	279	36.09	37.45	0	0	24	1.26E+04	3.03E+05	1.83E+02	2.25E+04	0	0.00E+00	-2.3	0.6	3.8	-2.1	96.3	A
143	08/27/02	16:55	12	Br-81	279	36.09	37.45	0	0	23.9	1.26E+04	3.02E+05	1.82E+02	2.76E+04	0	0.00E+00	-2.3	1.9	2.7	-2.3	96.3	A
144	08/27/02	16:55	13	Br-81	279	36.09	37.45	0	0	23.6	1.28E+04	3.03E+05	1.82E+02	2.07E+04	0	0.00E+00	-2.3	0.7	3.4	-1.8	96.6	A
145	08/27/02	16:56	14	Br-81	279	36.09	37.45	0	0	23.9	1.27E+04	3.03E+05	1.82E+02	1.50E+04	0	0.00E+00	-2.8	0.6	3.5	-1.3	96.5	A
146	08/27/02	16:57	15	Br-81	279	36.09	37.45	0	0	24.3	1.24E+04	3.02E+05	1.82E+02	2.54E+04	0	0.00E+00	-2.9	1.7	2.3	-1.1	96.8	A
147	08/27/02	16:57	16	Br-81	279	36.09	37.45	0	0	24.6	1.23E+04	3.03E+05	1.82E+02	2.04E+04	0	0.00E+00	-3	0.9	3.2	-1.1	96.6	A
148	08/27/02	16:58	17	Br-81	279	36.09	37.45	0	0	25.6	1.18E+04	3.03E+05	1.82E+02	1.99E+04	0	0.00E+00	-3.6	0.4	2.6	0.7	97	A
149	08/27/02	16:59	18	Br-81	279	36.09	37.45	0	0	24.7	1.23E+04	3.03E+05	1.82E+02	1.66E+04	0	0.00E+00	-3	1.3	3.4	-1.7	96.2	A
150	08/27/02	17:26	1	Br-81	279	36.09	37.45	0	0	33.9	8.91E+03	3.02E+05	1.82E+02	7.17E+04	0	0.00E+00	-6.2	-1.4	4.5	3.1	95.1	A
151	08/27/02	17:27	1	Br-81	279	36.09	37.45	0	0	32.5	9.27E+03	3.02E+05	1.82E+02	7.19E+04	0	0.00E+00	-6	-0.5	3	3.5	95.6	A
152	08/27/02	17:28	1	Br-81	279	36.09	37.45	0	0	31.6	9.55E+03	3.02E+05	1.82E+02	7.21E+04	0	0.00E+00	-5.9	-1.8	4.6	3	95.2	A
153	08/27/02	17:28	1	Br-81	279	36.09	37.45	0	0	31.3	9.65E+03	3.02E+05	1.82E+02	7.23E+04	0	0.00E+00	-5.6	-0.5	3	3.1	95.8	A
154	08/27/02	17:29	1	Br-81	279	36.09	37.45	0	0	31.8	9.48E+03	3.02E+05	1.82E+02	7.24E+04	0	0.00E+00	-5.3	-0.3	3.4	2.3	95.9	A
155	08/27/02	17:30	1	Br-81	279	36.09	37.45	0	0	34.1	8.84E+03	3.02E+05	1.82E+02	7.26E+04	0	0.00E+00	-7.1	-1.6	4.5	4.1	94.6	A
156	08/27/02	17:31	1	Br-81	279	36.09	37.45	0	0	31.8	9.48E+03	3.02E+05	1.82E+02	7.28E+04	0	0.00E+00	-6.3	-1	4.2	3.1	95.2	A
157	08/27/02	17:32	2	Br-81	279	36.09	37.45	0	0	29.8	1.01E+04	3.02E+05	1.82E+02	2.24E+05	0	0.00E+00	-2.7	-1.2	3.9	0	96.9	A
158	08/27/02	17:32	2	Br-81	279	36.09	37.45	0	0	19.8	1.53E+04	3.03E+05	1.82E+02	2.24E+05	0	0.00E+00	-0.9	3.6	2.7	-5.5	94.8	A
159	08/27/02	17:33	4	Br-81	279	36.09	37.45	0	0	19.6	1.54E+04	3.02E+05	1.82E+02	2.50E+04	0	0.00E+00	-2.1	2.8	2.5	-3.2	95.8	A
160	08/27/02	18:06	1	Br-81	279	36.09	37.45	0	0	20.9	1.45E+04	3.03E+05	1.82E+02	7.30E+04	0	0.00E+00	-6.9	1.5	3.4	2.1	94.8	A
161	08/27/02	18:07	1	Br-81	279	36.09	37.45	0	0	20.9	1.45E+04	3.03E+05	1.82E+02	7.32E+04	0	0.00E+00	-7.1	1.8	3.1	2.2	94.8	A
162	08/27/02	18:08	1	Br-81	279	36.09	37.45	0	0	20.6	1.47E+04	3.02E+05	1.82E+02	7.33E+04	0	0.00E+00	-7.8	0.8	4.7	2.3	94.1	A
163	08/27/02	18:08	1	Br-81	279	36.09	37.45	0	0	20.6	1.47E+04	3.03E+05	1.83E+02	7.35E+04	0	0.00E+00	-7.6	1.8	3.8	2.1	94.3	A
164	08/27/02	18:09	1	Br-81	279	36.09	37.45	0	0	21.1	1.43E+04	3.03E+05	1.83E+02	7.37E+04	0	0.00E+00	-8.5	1.6	3.6	3.3	94	A
165	08/27/02	18:10	1	Br-81	279	36.09	37.45	0	0	2.8	1.45E+04	4.05E+04	2.44E+01	7.37E+04	1	2.47E-05	-7.3	4.7	2.3	0.3	93.9	A
166	08/27/02	18:11	2	Br-81	279	36.09	37.45	0	0	20.6	1.47E+04	3.03E+05	1.83E+02	2.25E+05	0	0.00E+00	-5.8	2.6	3.1	0.2	95	A
167	08/27/02	18:12	4	Br-81	279	36.09	37.45	0	0	20.9	1.45E+04	3.02E+05	1.82E+02	2.52E+04	0	0.00E+00	-7.1	1.5	4.1	1.4	94.4	A
168	08/27/02	18:15	5	Br-81	279	36.09	37.45	0	0	21.1	1.43E+04	3.03E+05	1.82E+02	2.25E+04	0	0.00E+00	-8.1	1.8	3.4	2.8	94.1	A
169	08/27/02	18:17	5	Br-81	279	36.09	37.45	0	0	21	1.44E+04	3.03E+05	1.82E+02	2.27E+04	0	0.00E+00	-6.8	2.4	3.3	1.1	94.6	A
170	08/27/02	18:18	5	Br-81	279	36.09	37.45	0	0	20.5	1.47E+04	3.03E+05	1.83E+02	2.29E+04	0	0.00E+00	-6.3	2.2	3.1	1	95	A
171	08/27/02	18:21	5	Br-81	279	36.09	37.45	0	0	2.7	1.45E+04	3.86E+04	2.32E+01	2.29E+04	1	2.59E-05	-5.5	0.8	6.2	-1.5	94	A
172	08/27/02	18:21	6	Br-81	279	36.09	37.45	0	0	20.8	1.46E+04	3.04E+05	1.83E+02	2.34E+04	0	0.00E+00	-7.1	2.6	4	0.6	94.1	A
173	08/27/02	18:22	6	Br-81	279	36.09	37.45	0	0	21.3	1.42E+04	3.02E+05	1.82E+02	2.36E+04	0	0.00E+00	-8.1	1.2	3.3	3.6	94.3	A
174	08/27/02	18:23	7	Br-81	279	36.09	37.45	0	0	22.2	1.37E+04	3.03E+05	1.83E+02	2.60E+04	0	0.00E+00	6.1	1.2	2	-9.3	93.6	A
175	08/27/02	18:23	7	Br-81	279	36.09	37.45	0	0	22.3	1.35E+04	3.02E+05	1.82E+02	2.62E+04	0	0.00E+00	7.3	0.3	2.7	-10.3	92.9	A
176	08/27/02	18:25	8	Br-81	279	36.09	37.45	0	0	22.1	1.37E+04	3.03E+05	1.83E+02	1.50E+04	0	0.00E+00	6.6	0.9	2.9	-10.3	92.9	A

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(S)	TotalDose RAD(S)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
177	08/27/02	18:28	15	Br-81	279	36.09	37.45	0	0	21.7	1.40E+04	3.03E+05	1.83E+02	2.56E+04	0	0.00E+00	6.3	0.6	2.8	-9.7	93.3	A
178	08/27/02	18:32	15	Br-81	279	36.09	37.45	0	0	21.6	1.40E+04	3.03E+05	1.83E+02	2.58E+04	0	0.00E+00	6.2	0.9	1.7	-8.8	93.9	A
179	08/27/02	18:33	15	Br-81	279	36.09	37.45	0	0	21.2	1.42E+04	3.03E+05	1.82E+02	2.59E+04	0	0.00E+00	4.8	1.5	1.4	-7.7	94.7	A
180	08/27/02	18:34	15	Br-81	279	36.09	37.45	0	0	2.6	1.41E+04	3.65E+04	2.20E+01	2.60E+04	1	2.74E-05	5.6	0.2	4.1	-9.8	93.2	A
181	08/27/02	18:35	16	Br-81	279	36.09	37.45	0	0	21.1	1.44E+04	3.03E+05	1.82E+02	2.06E+04	0	0.00E+00	5.2	1.5	1.6	-8.4	94.2	A
182	08/27/02	18:36	17	Br-81	279	36.09	37.45	0	0	21.5	1.41E+04	3.03E+05	1.83E+02	2.01E+04	0	0.00E+00	5.5	0.2	3.8	-9.4	93.5	A
183	08/27/02	18:37	18	Br-81	279	36.09	37.45	0	0	21.3	1.43E+04	3.04E+05	1.83E+02	1.68E+04	0	0.00E+00	3.3	1.6	3.2	-8.1	94.2	A
0	08/27/02	19:28	Flux	Br-81	279	36.09	37.45	0	0	10.2	2.12E+04	2.15E+05	0.00E+00	0.00E+00	0	0.00E+00	-6.6	4.5	2.2	-0.1	94.2	9.2
184	08/27/02	19:28	1	Br-81	279	36.09	37.45	0	0	104.4	3.01E+03	3.14E+05	1.86E+02	7.39E+04	0	0.00E+00	-9	-1.1	5.7	4.4	93.3	A
185	08/27/02	19:29	1	Br-81	279	36.09	37.45	0	0	22.6	1.34E+04	3.03E+05	1.82E+02	7.41E+04	0	0.00E+00	-8.2	3.7	2.1	2.4	94	A
186	08/27/02	19:30	1	Br-81	279	36.09	37.45	0	0	22.1	1.37E+04	3.02E+05	1.82E+02	7.43E+04	0	0.00E+00	-7.5	4	2.3	1.2	94.1	A
187	08/27/02	19:30	1	Br-81	279	36.09	37.45	0	0	22	1.37E+04	3.02E+05	1.82E+02	7.45E+04	0	0.00E+00	-7.3	3.4	3	0.9	94.1	A
188	08/27/02	0.813	1	Br-81	279	36.09	37.45	0	0	21.6	13980	302200	182.1	74650	0	0	-7.3	4.1	3.3	-0.1	93.7	A
189	08/27/02	0.814	1	Br-81	279	36.09	37.45	0	0	21.7	13980	302900	182.5	74830	0	0	-6.3	3.6	2.3	0.4	94.7	A
190	08/27/02	0.814	1	Br-81	279	36.09	37.45	0	0	21.7	13930	302700	182.4	75010	0	0	-7	3.4	2.8	0.8	94.3	A
191	08/27/02	0.815	1	Br-81	279	36.09	37.45	0	0	21.7	13960	303100	182.6	75200	0	0	-6.9	4.8	2.2	-0.1	93.9	A
0	08/27/02	0.836	Flux	Br-81	279	36.09	37.45	0	0	10.1	0	0	0	0	0	0	0	0	0	0	100	9.2
0	08/27/02	0.838	Flux	Br-81	279	36.09	37.45	0	0	10.2	14700	149300	0	0	0	0	-8.3	4.8	3	0.5	93.2	10.9
192	08/27/02	0.838	2	Br-81	279	36.09	37.45	0	0	20.7	14870	307800	182.6	224600	0	0	-4.7	3.2	2.6	-1.2	95.2	A
193	08/27/02	0.838	4	Br-81	279	36.09	37.45	0	0	20.3	14920	302600	182.4	25400	0	0	-5.2	3.4	3.2	-1.4	94.7	A
194	08/27/02	0.839	5	Br-81	279	36.09	37.45	0	0	20	15130	302800	182.5	23090	0	0	-3.8	3.9	2.1	-2.1	95.3	A
195	08/27/02	0.84	5	Br-81	279	36.09	37.45	0	0	20.8	14610	303300	182.8	23270	0	0	-7.2	3.6	4	-0.4	93.6	A
196	08/27/02	0.84	5	Br-81	279	36.09	37.45	0	0	6	14620	87350	52.63	23320	1	1.15E-05	-5.3	3.8	2.3	-0.8	94.9	A
197	08/27/02	0.841	6	Br-81	279	36.09	37.45	0	0	20.9	14550	303500	182.9	23750	0	0	-6.2	3.9	3	-0.7	94.3	A
198	08/27/02	0.842	1	Br-81	279	36.09	37.45	0	0	21.4	14180	302900	182.5	75380	0	0	-6	3.7	2.9	-0.6	94.5	A
199	08/27/02	0.844	1	Br-81	279	36.09	37.45	0	0	20.3	14650	297700	179.3	75560	1	3.36E-06	-6.4	3.6	1.9	0.9	94.8	A
200	08/27/02	0.845	7	Br-81	279	36.09	37.45	0	0	20.4	14860	302700	182.4	26340	0	0	-5.1	3.6	2.9	-1.4	94.8	A
201	08/27/02	0.846	8	Br-81	279	36.09	37.45	0	0	0.3	14770	4904	2.955	14980	1	0.000204	-5.4	9.2	1.3	-5.2	91.6	A
!	run 201	invalid	bre beam																			
202	08/27/02	0.847	9	Br-81	279	36.09	37.45	0	0	21.8	13930	303200	182.7	27800	0	0	-9.7	2.7	3.3	3.7	93.2	A
203	08/27/02	0.847	10	Br-81	279	36.09	37.45	0	0	21.7	13920	302700	182.4	30230	0	0	-9.3	3.1	2	4.2	93.5	A
204	08/27/02	0.849	11	Br-81	279	36.09	37.45	0	0	23.3	12990	302800	182.4	22670	0	0	-11	2.7	2.6	5.9	92.5	A
205	08/27/02	0.849	11	Br-81	279	36.09	37.45	0	0	24.5	12360	302800	182.5	22860	0	0	-12	2.5	2.6	6.6	92.1	A
206	08/27/02	0.849	11	Br-81	279	36.09	37.45	0	0	24.5	12360	302400	182.2	23040	0	0	-13	2.7	2.6	8	91.2	A
207	08/27/02	0.85	11	Br-81	279	36.09	37.45	0	0	25.1	12090	303500	182.9	23220	0	0	-11	2.8	2.3	6	92.5	A
208	08/27/02	0.85	11	Br-81	279	36.09	37.45	0	0	24.1	12600	303500	182.9	23400	0	0	-13	3.7	2.1	7	91.4	A
209	08/27/02	0.851	11	Br-81	279	36.09	37.45	0	0	7.7	10550	80950	48.78	23450	1	1.24E-05	-7.2	1.3	2	3.9	95	A
210	08/27/02	0.851	12	Br-81	279	36.09	37.45	0	0	23.9	12660	302500	182.3	27810	0	0	-13	3.4	3.1	6.3	91.4	A
211	08/27/02	0.853	13	Br-81	279	36.09	37.45	0	0	25.1	12140	304800	183.7	20830	0	0	-14	2.5	3.2	7.9	91	A
212	08/27/02	0.854	14	Br-81	279	36.09	37.45	0	0	28.3	10710	302900	182.5	15130	0	0	-11	2.2	3.2	5.5	92.6	A
213	08/27/02	0.856	14	Br-81	279	36.09	37.45	0	0	22.3	13560	302400	182.2	15310	0	0	-9.8	2.4	3.7	3.7	93.1	A
214	08/27/02	0.856	14	Br-81	279	36.09	37.45	0	0	12.2	13730	168100	101.3	15410	1	5.95E-06	-9.5	4.4	2.2	2.8	93.1	A
215	08/27/02	0.856	15	Br-81	279	36.09	37.45	0	0	21.9	13850	303000	182.6	26150	0	0	-9.2	2.6	2.6	3.9	93.6	A
216	08/27/02	0.857	16	Br-81	279	36.09	37.45	0	0	21.9	13800	302600	182.3	20760	0	0	-9.5	2.9	3.1	3.5	93.3	A
217	08/27/02	0.858	17	Br-81	279	36.09	37.45	0	0	22.3	13580	303000	182.6	20230	0	0	-10	3.4	2.8	4	92.9	A

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(S)	TotalDose RAD(S)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
0	08/27/02	0.858	Flux	Br-81	279	36.09	37.45	0	0	10.2	13570	138000	0	0	0	0	-9.1	2.5	3.6	3.1	93.5	10.4
218	08/27/02	0.858	17	Br-81	279	36.09	37.45	0	0	22.4	13390	300600	182	20410	0	0	-9.4	3.3	2.3	3.9	93.4	A
219	08/27/02	0.859	17	Br-81	279	36.09	37.45	0	0	22.3	13580	302700	182.4	20590	0	0	-9	2	2.2	4.8	93.8	A
220	08/27/02	0.859	17	Br-81	279	36.09	37.45	0	0	22.6	13370	302300	182.1	20780	0	0	-9.7	3.6	0.6	5.5	93.3	A
221	08/27/02	0.86	17	Br-81	279	36.09	37.45	0	0	4.7	13120	61990	37.35	20810	1	1.61E-05	-11	4.9	1.5	4.8	92.2	A
222	08/27/02	0.86	18	Br-81	279	36.09	37.45	0	0	22.6	13390	302300	182.1	16980	0	0	-11	3.4	2.8	4.7	92.4	A
0	08/27/02	0.886	Flux	I-127	322	31.12	59.73	0	0	10.2	11320	115400	0	0	0	0	3.8	1.2	3.1	-8.1	94.3	4.7
223	08/27/02	0.886	1	I-127	322	31.12	59.73	0	0	25.5	11230	286100	290.1	75850	0	0	3.1	2.1	1.4	-6.6	95.4	C
224	08/27/02	0.887	1	I-127	322	31.12	59.73	0	0	26.9	11240	302300	290.5	76140	0	0	4	1.8	1.4	-7.2	95	C
225	08/27/02	0.888	1	I-127	322	31.12	59.73	0	0	26.8	11300	302500	290.7	76430	0	0	3.6	1.5	2.1	-7.2	95	C
226	08/27/02	0.888	1	I-127	322	31.12	59.73	0	0	26.9	11210	301900	290.1	76720	0	0	3.2	1.5	2.4	-7.1	95	C
227	08/27/02	0.889	1	I-127	322	31.12	59.73	0	0	27.1	11170	302400	290.7	77010	0	0	3.7	1.3	2.1	-7	95.1	C
228	08/27/02	0.89	1	I-127	322	31.12	59.73	0	0	27.2	11130	302300	290.5	77300	0	0	3.5	1.5	0.6	-5.6	96	C
229	08/27/02	0.89	1	I-127	322	31.12	59.73	0	0	27.3	11060	301600	289.9	77590	0	0	3.3	1.3	1.9	-6.5	95.4	C
230	08/27/02	0.89	1	I-127	322	31.12	59.73	0	0	27.3	11050	302000	290.2	77880	0	0	3.2	0.9	2.3	-6.4	95.5	C
231	08/27/02	0.891	1	I-127	322	31.12	59.73	0	0	27.1	11150	302400	290.7	78170	0	0	3.7	1	2	-6.8	95.3	C
232	08/27/02	0.892	1	I-127	322	31.12	59.73	0	0	27.4	11020	302300	290.6	78460	0	0	3.4	1.7	1	-6.1	95.7	C
233	08/27/02	0.892	1	I-127	322	31.12	59.73	0	0	26.7	11310	302400	290.7	78750	0	0	4.9	0.9	1.2	-7	95.1	C
234	08/27/02	0.893	1	I-127	322	31.12	59.73	0	0	5.8	11310	65290	62.75	78820	1	1.53E-05	4.4	1.1	1.9	-7.4	94.8	C
235	08/27/02	0.894	2	I-127	322	31.12	59.73	0	0	26.5	11440	302600	290.8	224900	0	0	4.8	1.4	2.1	-8.3	94.3	C
236	08/27/02	0.894	4	I-127	322	31.12	59.73	0	0	26.5	11420	302300	290.6	25700	0	0	4.7	1	1.8	-7.4	94.9	C
237	08/27/02	0.896	5	I-127	322	31.12	59.73	0	0	26.3	11460	301800	290.1	23610	0	0	5.8	1.2	0.9	-7.9	94.5	C
238	08/27/02	0.897	6	I-127	322	31.12	59.73	0	0	26.5	11380	301600	289.9	24040	0	0	4.7	1.3	1.7	-7.7	94.7	C
239	08/27/02	0.897	6	I-127	322	31.12	59.73	0	0	26.6	11360	302000	290.3	24330	0	0	4.4	1.7	2.2	-8.3	94.2	C
240	08/27/02	0.898	6	I-127	322	31.12	59.73	0	0	26.6	11350	302200	290.5	24620	0	0	5.5	1.3	0.9	-7.7	94.6	C
241	08/27/02	0.899	7	I-127	322	31.12	59.73	0	0	6.5	11300	73970	71.09	26410	1	1.35E-05	4.6	3	0.7	-8.3	94.2	C
242	08/27/02	0.901	8	I-127	322	31.12	59.73	0	0	27	11220	302400	290.6	15270	0	0	4.5	1.7	1.9	-8.1	94.4	C
243	08/27/02	0.902	9	I-127	322	31.12	59.73	0	0	26.9	11250	302300	290.6	28090	0	0	5.1	1.8	0.5	-7.4	94.8	C
244	08/27/02	0.902	10	I-127	322	31.12	59.73	0	0	26.6	11390	302500	290.7	30520	0	0	5	0.9	1.4	-7.3	94.9	C
245	08/27/02	0.904	8	I-127	322	31.12	59.73	0	0	4.1	11060	45500	43.73	15320	1	2.2E-05	5.3	-0.1	2.3	-7.6	94.6	C
246	08/27/02	0.906	9	I-127	322	31.12	59.73	0	0	27	11180	302100	290.3	28380	0	0	4.2	1.5	1.8	-7.5	94.8	C
0	08/27/02	0.907	Flux	I-127	322	31.12	59.73	0	0	10.1	11100	112700	0	0	0	0	4.7	2.1	0.8	-7.6	94.7	5.4
247	08/27/02	0.907	9	I-127	322	31.12	59.73	0	0	27.1	11210	304200	290.4	28670	0	0	4.9	1.9	0.8	-7.6	94.7	C
248	08/27/02	0.908	9	I-127	322	31.12	59.73	0	0	26.9	11220	302000	290.3	28960	0	0	3.7	1.5	1.2	-6.4	95.6	C
249	08/27/02	0.908	9	I-127	322	31.12	59.73	0	0	6.8	11220	76460	73.49	29030	1	1.31E-05	4.7	0.6	2.1	-7.4	94.8	C
250	08/27/02	0.91	10	I-127	322	31.12	59.73	0	0	27.2	11100	302300	290.6	30810	0	0	3.4	2.1	1.9	-7.4	94.8	C
251	08/27/02	0.91	11	I-127	322	31.12	59.73	0	0	27.3	11080	302500	290.7	23740	0	0	4.5	1.1	1.9	-7.4	94.9	C
252	08/27/02	0.911	12	I-127	322	31.12	59.73	0	0	27.5	10990	301700	290	28100	0	0	3	1.8	2.1	-7	95.1	C
253	08/27/02	0.912	14	I-127	322	31.12	59.73	0	0	27.4	11020	302200	290.4	15700	0	0	4	1.4	1.6	-7	95.2	C
254	08/27/02	0.913	15	I-127	322	31.12	59.73	0	0	27.5	10970	301600	289.9	26440	0	0	4	0.9	1.6	-6.5	95.5	C
255	08/27/02	0.913	16	I-127	322	31.12	59.73	0	0	27.8	10880	302600	290.9	21050	0	0	3.5	1.5	0.9	-5.9	95.9	C
256	08/27/02	0.914	14	I-127	322	31.12	59.73	0	0	1.3	10500	14140	13.59	15720	1	7.07E-05	4.4	1.9	1	-7.3	94.9	C
257	08/27/02	0.915	15	I-127	322	31.12	59.73	0	0	27.9	10840	302400	290.6	26730	0	0	2.2	1.4	1.8	-5.4	96.1	C
258	08/27/02	0.915	16	I-127	322	31.12	59.73	0	0	7.3	10750	78330	75.28	21130	1	1.28E-05	2.7	2	2.1	-6.8	95.1	C
259	08/27/02	0.916	17	I-127	322	31.12	59.73	0	0	28.6	10570	302200	290.4	21100	0	0	1.7	1.3	2	-5	96.3	C

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(S)	TotalDose RAD(S)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
260	08/27/02	0.917	18	I-127	322	31.12	59.73	0	0	28.7	10530	302200	290.5	17270	0	0	2.9	1.1	2	-6	95.7	C
0	08/27/02	0.936	Flux	I-127	322	31.12	59.73	0	0	10.2	10620	108000	0	0	0	0	2.9	1.5	2	-6.4	95.4	6.5
261	08/27/02	0.936	1	I-127	322	31.12	59.73	0	0	28.9	10570	305700	290.7	79110	0	0	3.3	1.9	1	-6.2	95.6	C
262	08/27/02	0.937	1	I-127	322	31.12	59.73	0	0	28.7	10500	301500	289.7	79400	0	0	2.8	1.5	1.7	-6	95.8	C
263	08/27/02	0.938	1	I-127	322	31.12	59.73	0	0	28.9	10460	302200	290.4	79690	0	0	2.4	1.6	1.9	-5.9	95.7	C
264	08/27/02	0.938	1	I-127	322	31.12	59.73	0	0	1.4	10240	14560	13.99	79700	1	6.87E-05	0.8	4.2	1.1	-6	95	C
265	08/27/02	0.939	2	I-127	322	31.12	59.73	0	0	28.9	10460	302000	290.2	225200	0	0	1.9	1.5	2.2	-5.7	95.8	C
266	08/27/02	0.939	2	I-127	322	31.12	59.73	0	0	29.4	10280	302500	290.7	225500	0	0	1.9	1.6	1.6	-5.1	96.3	C
267	08/27/02	0.94	4	I-127	322	31.12	59.73	0	0	28.7	10540	302000	290.2	25990	0	0	2.4	1.3	2.4	-6.2	95.5	C
268	08/27/02	0.941	5	I-127	322	31.12	59.73	0	0	29.2	10370	302400	290.6	23910	0	0	1.3	2.5	2.6	-6.4	95	C
269	08/27/02	0.942	6	I-127	322	31.12	59.73	0	0	29	10420	301900	290.2	24910	0	0	2.1	1.9	2.1	-6.1	95.5	C
270	08/27/02	0.944	2	I-127	322	31.12	59.73	0	0	29.6	10200	301800	290	225800	0	0	1.7	1.6	1.8	-5.1	96.2	C
271	08/27/02	0.944	4	I-127	322	31.12	59.73	0	0	29.1	10370	301800	290	26280	0	0	2	1.5	1.5	-5	96.4	C
272	08/27/02	0.945	5	I-127	322	31.12	59.73	0	0	29.1	10390	302000	290.2	24200	0	0	1.7	1.6	2.5	-5.8	95.6	C
273	08/27/02	0.946	6	I-127	322	31.12	59.73	0	0	29.7	10170	301700	290	25200	0	0	1.1	1.5	2.8	-5.4	95.8	C
274	08/27/02	0.947	6	I-127	322	31.12	59.73	0	0	29.8	10120	301800	290.1	25490	0	0	0.8	2.1	2.9	-5.8	95.4	C
275	08/27/02	0.947	6	I-127	322	31.12	59.73	0	0	1.4	9792	13490	12.97	25500	1	7.41E-05	-0.1	3.9	-1.4	-2.5	96.9	C
276	08/27/02	0.95	7	I-127	322	31.12	59.73	0	0	29.9	10090	302000	290.3	26700	0	0	1	2	1.3	-4.3	96.7	C
277	08/27/02	0.951	7	I-127	322	31.12	59.73	0	0	29.7	10170	301500	289.8	26990	0	0	1.3	2.2	1.8	-5.3	96	C
278	08/27/02	0.952	8	I-127	322	31.12	59.73	0	0	29.3	10330	302200	290.5	15610	0	0	2.3	1.2	1.6	-5.1	96.3	C
279	08/27/02	0.952	9	I-127	322	31.12	59.73	0	0	29.4	10290	302500	290.7	29320	0	0	1.7	1.9	2	-5.5	95.9	C
280	08/27/02	0.953	10	I-127	322	31.12	59.73	0	0	30.4	9916	301400	289.7	31100	0	0	0.5	1.3	2	-3.9	96.8	C
281	08/27/02	0.955	10	I-127	322	31.12	59.73	0	0	29.3	10310	302000	290.3	31390	0	0	1.3	2.4	1.4	-5	96.1	C
282	08/27/02	0.956	10	I-127	322	31.12	59.73	0	0	29.3	10320	302400	290.6	31680	0	0	2.1	1.4	2.3	-5.7	95.8	C
283	08/27/02	0.956	10	I-127	322	31.12	59.73	0	0	1.3	10050	13380	12.86	31690	1	7.47E-05	4.3	-1	0.9	-4.2	96.6	C
284	08/27/02	0.957	11	I-127	322	31.12	59.73	0	0	29.1	10370	301700	290	24030	0	0	2.3	1.8	2.4	-6.6	95.2	C
0	08/27/02	0.958	Flux	I-127	322	31.12	59.73	0	0	10.1	10090	102300	0	0	0	0	1.7	2.7	1.2	-5.6	95.8	4.5
285	08/27/02	0.958	12	I-127	322	31.12	59.73	0	0	29.5	10040	296500	290.4	28390	0	0	1.5	2.2	1.9	-5.6	95.8	C
286	08/27/02	0.958	13	I-127	322	31.12	59.73	0	0	29.9	10090	301600	289.9	21120	0	0	2.1	1.7	1.6	-5.4	96.1	C
287	08/27/02	0.967	1	I-127	322	31.12	59.73	0	0	28.3	10670	302300	290.6	79990	0	0	6.4	1.6	1.5	-9.6	93.4	C
288	08/27/02	0.968	1	I-127	322	31.12	59.73	0	0	28.4	10630	302000	290.2	80280	0	0	6.9	1.4	0.5	-8.8	93.8	C
289	08/27/02	0.969	1	I-127	322	31.12	59.73	0	0	28.3	10670	301500	289.8	80570	0	0	7.1	0.3	1.7	-9.1	93.6	C
290	08/27/02	0.969	1	I-127	322	31.12	59.73	0	0	28.3	10650	301900	290.1	80860	0	0	6.9	2.1	1.7	-10.7	92.7	C
291	08/27/02	0.969	1	I-127	322	31.12	59.73	0	0	28.3	10680	302100	290.3	81150	0	0	6.5	1.2	1.8	-9.6	93.4	C
292	08/27/02	0.97	1	I-127	322	31.12	59.73	0	0	28.1	10740	302100	290.4	81440	0	0	6.9	0.3	1.6	-8.7	93.8	C
293	08/27/02	0.971	1	I-127	322	31.12	59.73	0	0	28.3	10700	302400	290.6	81730	0	0	6.2	0.9	1.5	-8.6	94	C
294	08/27/02	0.972	2	I-127	322	31.12	59.73	0	0	28.2	10710	301500	289.8	226100	0	0	7.1	0.7	0.9	-8.7	93.8	C
295	08/27/02	0.972	4	I-127	322	31.12	59.73	0	0	28.1	10720	301900	290.1	26570	0	0	6.2	1.2	0.5	-7.9	94.4	C
296	08/27/02	0.973	1	I-127	322	31.12	59.73	0	0	28.2	10700	301700	289.9	82020	0	0	5.5	1.3	1.5	-8.3	94.3	C
297	08/27/02	0.974	1	I-127	322	31.12	59.73	0	0	28.1	10740	301900	290.2	82310	0	0	6.8	1.5	1	-9.2	93.6	C
298	08/27/02	0.974	1	I-127	322	31.12	59.73	0	0	28.1	10750	301800	290.1	82600	0	0	6.4	1.8	0.7	-8.9	93.8	C
299	08/27/02	0.975	2	I-127	322	31.12	59.73	0	0	28	10770	301900	290.2	226400	0	0	7	1	1.6	-9.6	93.4	C
300	08/27/02	0.976	4	I-127	322	31.12	59.73	0	0	28.1	10760	302200	290.4	26860	0	0	6.5	1.1	0.9	-8.5	94	C
301	08/27/02	0.976	1	I-127	322	31.12	59.73	0	0	28.1	10720	301600	289.9	82890	0	0	6.4	1.3	1.1	-8.8	93.9	C
302	08/27/02	0.977	1	I-127	322	31.12	59.73	0	0	28.2	10710	301700	290	83180	0	0	5.6	1.5	1.9	-9	93.9	C

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
303	08/27/02	0.977	1	I-127	322	31.12	59.73	0	0	1.3	10560	14050	13.51	83200	1	7.12E-05	4.6	3.1	0.8	-8.6	94	C
304	08/27/02	0.978	2	I-127	322	31.12	59.73	0	0	28	10800	302200	290.4	226700	0	0	5.5	1.6	1.8	-8.9	93.9	C
0	08/27/02	0.979	Flux	I-127	322	31.12	59.73	0	0	10.2	10890	110500	0	0	0	0	6.4	2.5	0.6	-9.5	93.4	6.4
305	08/27/02	0.979	4	I-127	322	31.12	59.73	0	0	28.1	10940	307500	290.3	27150	0	0	6.3	1	1.2	-8.5	94.1	C
306	08/27/02	0.979	5	I-127	322	31.12	59.73	0	0	27.6	10950	302700	290.9	24490	0	0	6.5	1.7	1.1	-9.3	93.6	C
307	08/27/02	0.994	1	I-127	322	31.12	59.73	0	0	28.7	10510	302200	290.4	83490	0	0	4.1	2.1	1.6	-7.8	94.6	C
308	08/27/02	0.994	1	I-127	322	31.12	59.73	0	0	28.9	10460	301800	290.1	83780	0	0	4.1	2.2	1.3	-7.5	94.8	C
309	08/27/02	0.995	1	I-127	322	31.12	59.73	0	0	28.9	10450	302200	290.4	84070	0	0	3.4	1.9	2.1	-7.4	94.8	C
310	08/27/02	0.996	1	I-127	322	31.12	59.73	0	0	28.7	10540	302200	290.5	84360	0	0	3.4	1.4	2.1	-6.9	95.2	C
311	08/27/02	0.996	1	I-127	322	31.12	59.73	0	0	28.6	10540	301400	289.7	84650	0	0	4	2.1	0.8	-6.9	95.2	C
312	08/27/02	0.997	1	I-127	322	31.12	59.73	0	0	28.5	10600	302000	290.3	84940	0	0	5.4	1.1	1.6	-8.1	94.4	C
313	08/27/02	0.997	2	I-127	322	31.12	59.73	0	0	29.1	10380	302100	290.3	227000	0	0	3.4	1.8	2.1	-7.3	94.9	C
314	08/27/02	0.998	4	I-127	322	31.12	59.73	0	0	28.7	10510	302200	290.5	27440	0	0	3.4	1.7	1	-6.1	95.7	C
315	08/27/02	0.999	1	I-127	322	31.12	59.73	0	0	28.6	10570	302000	290.2	85230	0	0	3.2	1.9	1.6	-6.7	95.3	C
316	08/27/02	0.999	1	I-127	322	31.12	59.73	0	0	28.7	10540	302000	290.2	85520	0	0	3.4	1.9	2.2	-7.5	94.7	C
0	08/28/02	0	Flux	I-127	322	31.12	59.73	0	0	10.2	10490	106500	0	0	0	0	5.2	0.3	1.1	-6.5	95.3	6.1
317	08/28/02	0	1	I-127	322	31.12	59.73	0	0	28.5	10560	301100	290.1	85810	0	0	3.6	1.2	1.7	-6.5	95.5	C
318	08/28/02	7E-04	1	I-127	322	31.12	59.73	0	0	28.3	10660	301700	290	86100	0	0	4	2.1	1.7	-7.9	94.5	C
319	08/28/02	0.001	2	I-127	322	31.12	59.73	0	0	28.4	10660	302300	290.5	227300	0	0	4.3	1.9	1.1	-7.4	94.9	C
320	08/28/02	0.001	4	I-127	322	31.12	59.73	0	0	28.3	10680	302000	290.3	27730	0	0	4.5	0.8	1.6	-6.8	95.2	C
321	08/28/02	0.002	1	I-127	322	31.12	59.73	0	0	28.3	10690	302100	290.4	86390	0	0	5	0.9	1.8	-7.7	94.7	C
322	08/28/02	0.003	1	I-127	322	31.12	59.73	0	0	28.4	10640	301900	290.2	86680	0	0	4.9	1.6	1.4	-7.9	94.5	C
323	08/28/02	0.003	1	I-127	322	31.12	59.73	0	0	5.6	10730	60590	58.23	86740	1	1.65E-05	3.9	1.8	1.1	-6.9	95.2	C
324	08/28/02	0.004	2	I-127	322	31.12	59.73	0	0	16.4	10680	174700	167.9	227400	1	5.72E-06	5.6	1.6	1.8	-9	93.8	C
325	08/28/02	0.006	4	I-127	322	31.12	59.73	0	0	9.8	10560	103100	99.13	27830	1	9.7E-06	3.4	1.8	2.3	-7.4	94.8	C
326	08/28/02	0.008	5	I-127	322	31.12	59.73	0	0	29.9	10070	301500	289.8	24780	0	0	3.5	2	1	-6.5	95.4	C
327	08/28/02	0.008	6	I-127	322	31.12	59.73	0	0	29.3	10350	302700	290.9	25790	0	0	1.8	1.3	1.6	-4.7	96.6	C
328	08/28/02	0.009	7	I-127	322	31.12	59.73	0	0	28.9	10440	301500	289.8	27280	0	0	3.9	1.7	0.8	-6.4	95.5	C
329	08/28/02	0.01	5	I-127	322	31.12	59.73	0	0	6.7	10240	68150	65.5	24840	1	1.47E-05	3.4	1.5	1.6	-6.5	95.5	C
330	08/28/02	0.011	6	I-127	322	31.12	59.73	0	0	28.8	10500	301800	290.1	26080	0	0	4.5	1.1	1.7	-7.3	95	C
331	08/28/02	0.011	6	I-127	322	31.12	59.73	0	0	29.2	10370	302600	290.8	26370	0	0	3.4	2	2.1	-7.5	94.7	C
332	08/28/02	0.012	6	I-127	322	31.12	59.73	0	0	28.8	10490	302400	290.6	26660	0	0	4.3	1.2	1.1	-6.6	95.4	C
333	08/28/02	0.013	7	I-127	322	31.12	59.73	0	0	29.1	10400	302300	290.6	27570	0	0	2.8	2.7	1.3	-6.9	95.1	C
334	08/28/02	0.013	8	I-127	322	31.12	59.73	0	0	0.3	10770	3252	3.125	15610	1	0.000308	14.4	-0.1	-2.6	-11.7	90.1	C
! run run 334 invalid pre beam																						
335	08/28/02	0.015	9	I-127	322	31.12	59.73	0	0	20.3	10270	208600	200.5	29520	1	4.79E-06	3.1	1.9	1.6	-6.6	95.4	C
336	08/28/02	0.016	10	I-127	322	31.12	59.73	0	0	29.5	10250	302200	290.4	31980	0	0	3.5	1.9	1.4	-6.8	95.2	C
337	08/28/02	0.017	11	I-127	322	31.12	59.73	0	0	29.3	10310	301700	290	24320	0	0	4	1.3	1.6	-6.9	95.2	C
338	08/28/02	0.017	12	I-127	322	31.12	59.73	0	0	30	10080	302100	290.4	28680	0	0	2.9	1.3	1.5	-5.7	96	C
0	08/28/02	0.026	Flux	I-127	322	31.12	59.73	0	0	10.1	10020	101400	0	0	0	0	2.8	3.2	0.5	-6.4	95.3	6.2
339	08/28/02	0.026	1	I-127	322	31.12	59.73	0	0	30.1	10020	301700	289.9	87030	0	0	2.7	2.6	0.2	-5.5	96	C
340	08/28/02	0.026	1	I-127	322	31.12	59.73	0	0	28.9	10450	302400	290.6	87320	0	0	2.9	2.4	0.8	-6	95.7	C
341	08/28/02	0.027	1	I-127	322	31.12	59.73	0	0	29.5	10240	302300	290.5	87610	0	0	3.1	2.1	1	-6.2	95.6	C
342	08/28/02	0.028	2	I-127	322	31.12	59.73	0	0	29.5	10230	301700	290	227700	0	0	3.1	1.7	1.1	-5.9	95.9	C
343	08/28/02	0.028	4	I-127	322	31.12	59.73	0	0	29.2	10320	301900	290.2	28120	0	0	2.7	2	1.5	-6.2	95.6	C

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
344	08/28/02	0.029	1	I-127	322	31.12	59.73	0	0	29.6	10210	302300	290.5	87900	0	0	2.3	2	2.2	-6.6	95.2	C
345	08/28/02	0.03	2	I-127	322	31.12	59.73	0	0	29.6	10200	301600	289.9	228000	0	0	2.7	1.7	0.5	-4.9	96.5	C
346	08/28/02	0.03	4	I-127	322	31.12	59.73	0	0	29.7	10160	302200	290.4	28410	0	0	2.6	1.8	1.4	-5.8	95.9	C
347	08/28/02	0.031	5	I-127	322	31.12	59.73	0	0	29.8	10130	302200	290.5	25130	0	0	2.2	1.6	1.4	-5.1	96.3	C
348	08/28/02	0.032	5	I-127	322	31.12	59.73	0	0	29.9	10080	301600	289.9	25420	0	0	2.3	2.3	1.5	-6.2	95.5	C
349	08/28/02	0.033	5	I-127	322	31.12	59.73	0	0	30.6	9882	301900	290.2	25710	0	0	1.6	2.1	1.8	-5.5	95.9	C
350	08/28/02	0.033	5	I-127	322	31.12	59.73	0	0	28.6	9955	284200	273.2	25990	1	3.52E-06	1.2	2.3	1.8	-5.2	96	C
351	08/28/02	0.035	6	I-127	322	31.12	59.73	0	0	25.6	9911	253500	243.7	26910	1	3.95E-06	2.3	2	1	-5.2	96.2	C
352	08/28/02	0.036	7	I-127	322	31.12	59.73	0	0	30.7	9827	301900	290.2	27860	0	0	0.7	2.8	1.2	-4.7	96.2	C
353	08/28/02	0.038	9	I-127	322	31.12	59.73	0	0	30.7	9826	301800	290.1	29810	0	0	2.2	2	1.4	-5.7	95.9	C
354	08/28/02	0.039	10	I-127	322	31.12	59.73	0	0	30.6	9852	301800	290.1	32270	0	0	2.4	2.6	0.8	-5.7	95.8	C
355	08/28/02	0.04	11	I-127	322	31.12	59.73	0	0	31.7	9516	302000	290.3	24610	0	0	0.5	1.3	0.8	-2.7	97.8	C
356	08/28/02	0.04	12	I-127	322	31.12	59.73	0	0	31.2	9670	301700	289.9	28970	0	0	0.7	2.3	1.4	-4.4	96.5	C
357	08/28/02	0.041	13	I-127	322	31.12	59.73	0	0	31.1	9706	302000	290.3	21410	0	0	1.4	2.3	2.2	-6	95.4	C
0	08/28/02	0.068	Flux	I-127	322	31.12	59.73	0	0	10.2	10180	103500	0	0	0	0	1.2	2.9	1.8	-5.8	95.4	4.5
358	08/28/02	0.068	1	I-127	322	31.12	59.73	0	0	29.5	10100	297600	290.6	88190	0	0	1.6	2.6	2.4	-6.6	95	C
359	08/28/02	0.068	1	I-127	322	31.12	59.73	0	0	30.1	10050	302100	290.4	88480	0	0	1.9	2.8	1.5	-6.2	95.3	C
360	08/28/02	0.069	1	I-127	322	31.12	59.73	0	0	29.9	10110	301900	290.1	88770	0	0	2.9	2	1.7	-6.6	95.3	C
361	08/28/02	0.069	1	I-127	322	31.12	59.73	0	0	30.1	10050	302200	290.5	89060	0	0	2.7	1.9	1.3	-5.8	95.8	C
362	08/28/02	0.07	2	I-127	322	31.12	59.73	0	0	30	10030	301400	289.7	228300	0	0	1.8	1.8	1.7	-5.2	96.2	C
363	08/28/02	0.071	4	I-127	322	31.12	59.73	0	0	30	10080	302100	290.3	28700	0	0	2.4	2.3	1.6	-6.3	95.4	C
364	08/28/02	0.072	5	I-127	322	31.12	59.73	0	0	1.7	9740	16630	15.98	26000	1	6.02E-05	0	4.7	1.3	-6	94.7	C
365	08/28/02	0.075	7	I-127	322	31.12	59.73	0	0	5.7	10060	57560	55.32	27910	1	1.74E-05	2	2.2	1.4	-5.6	95.9	C
366	08/28/02	0.077	9	I-127	322	31.12	59.73	0	0	1.3	9922	12610	12.12	29830	1	7.93E-05	2.3	3.1	-1.2	-4.1	96.6	C
367	08/28/02	0.078	10	I-127	322	31.12	59.73	0	0	29.7	10170	301800	290	32560	1	3.31E-06	2.7	1.8	1.7	-6.2	95.6	C
368	08/28/02	0.079	11	I-127	322	31.12	59.73	0	0	29.7	10160	301800	290.1	24900	0	0	3.7	1.8	1.2	-6.6	95.4	C
369	08/28/02	0.08	12	I-127	322	31.12	59.73	0	0	29.6	10210	302200	290.4	29260	0	0	3.8	0.9	1.3	-6.1	95.8	C
370	08/28/02	0.081	13	I-127	322	31.12	59.73	0	0	29.6	10200	302300	290.5	21710	0	0	3.3	1.6	2.2	-7	95.1	C
371	08/28/02	0.081	14	I-127	322	31.12	59.73	0	0	1.7	10330	17950	17.25	15730	1	5.57E-05	1	2.1	6.2	-9.2	92.5	C
372	08/28/02	0.082	15	I-127	322	31.12	59.73	0	0	29.5	10250	302200	290.4	27020	0	0	3.7	1.8	1.6	-7.1	95	C
373	08/28/02	0.083	16	I-127	322	31.12	59.73	0	0	29.3	10300	301700	290	21420	0	0	3.9	1.8	1.7	-7.4	94.9	C
374	08/28/02	0.083	17	I-127	322	31.12	59.73	0	0	29.4	10270	302100	290.3	21390	0	0	3	1.5	1.7	-6.2	95.6	C
0	08/28/02	0.113	Flux	I-127	322	31.12	59.73	0	0	10.1	9992	101300	0	0	0	0	1.7	2.3	0.8	-4.8	96.4	7.7
375	08/28/02	0.113	1	I-127	322	31.12	59.73	0	0	31.4	9908	310700	289.7	89350	0	0	1.6	2.4	0.8	-4.8	96.4	C
376	08/28/02	0.114	2	I-127	322	31.12	59.73	0	0	30	10040	301700	290	228600	0	0	0.9	1.8	2.2	-4.9	96.1	C
377	08/28/02	0.115	4	I-127	322	31.12	59.73	0	0	30.1	10030	301500	289.8	28990	0	0	0.9	2.6	1.8	-5.3	95.8	C
378	08/28/02	0.117	5	I-127	322	31.12	59.73	0	0	30.5	9883	301900	290.2	26290	0	0	1.4	2.2	1.3	-4.8	96.3	C
379	08/28/02	0.117	6	I-127	322	31.12	59.73	0	0	30.5	9893	301600	289.9	27490	0	0	1.2	1.9	1.9	-5.1	96.1	C
380	08/28/02	0.118	7	I-127	322	31.12	59.73	0	0	30.4	9928	302100	290.3	28200	0	0	0.7	1.3	2	-4	96.8	C
381	08/28/02	0.121	10	I-127	322	31.12	59.73	0	0	31.2	9685	301800	290.1	32850	0	0	0.2	2.4	2	-4.6	96.1	C
382	08/28/02	0.122	10	I-127	322	31.12	59.73	0	0	30.8	9807	302000	290.3	33140	0	0	1.2	1.9	0.6	-3.7	97.2	C
383	08/28/02	0.122	10	I-127	322	31.12	59.73	0	0	31	9743	301900	290.1	33430	0	0	0.3	3.5	1.3	-5	95.7	C
384	08/28/02	0.122	11	I-127	322	31.12	59.73	0	0	4.8	9886	47390	45.54	24950	1	2.11E-05	0.7	2.4	0.1	-3.2	97.3	C
385	08/28/02	0.124	12	I-127	322	31.12	59.73	0	0	30.7	9855	302300	290.5	29550	0	0	-0.1	2.8	1.3	-4	96.4	C
386	08/28/02	0.125	13	I-127	322	31.12	59.73	0	0	30.5	9927	302600	290.8	22000	0	0	1.4	1.7	1.8	-4.9	96.3	C

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μ m	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
387	08/28/02	0.126	14	I-127	322	31.12	59.73	0	0	29.9	10080	301600	289.9	16020	0	0	1.2	1.8	1.6	-4.6	96.5	C
388	08/28/02	0.128	15	I-127	322	31.12	59.73	0	0	1.7	9905	17010	16.34	27040	1	5.88E-05	2.2	4.1	-1.3	-5	95.8	C
389	08/28/02	0.128	16	I-127	322	31.12	59.73	0	0	1.3	9708	13000	12.49	21430	1	7.69E-05	-0.6	4.2	0.5	-4.1	95.8	C
390	08/28/02	0.129	17	I-127	322	31.12	59.73	0	0	30.5	9901	302200	290.5	21680	0	0	1	1.9	2.2	-5.1	96	C
391	08/28/02	0.13	18	I-127	322	31.12	59.73	0	0	30.2	10010	301800	290.1	17560	0	0	0.9	1.9	1.3	-4.2	96.7	C
0	08/28/02	0.156	Flux	Au-197	346	28.22	82.06	0	0	10.2	13130	133900	0	0	0	0	-3.8	-1.3	5	0.1	95.9	3.2
392	08/28/02	0.156	1	Au-197	346	28.22	82.06	0	0	22.1	13120	289700	399.1	89750	0	0	-3.6	-1.5	4	1.1	96.5	T
393	08/28/02	0.157	2	Au-197	346	28.22	82.06	0	0	22.9	13220	302600	399.5	229000	0	0	-4.3	-1.5	4.6	1.2	96	T
394	08/28/02	0.158	4	Au-197	346	28.22	82.06	0	0	22.8	13290	303000	400	29390	0	0	-3.7	-1.3	3.8	1.1	96.6	T
395	08/28/02	0.158	5	Au-197	346	28.22	82.06	0	0	22.5	13450	303100	400.2	26690	0	0	-3.4	-1.6	4.8	0.2	96.2	T
396	08/28/02	0.159	6	Au-197	346	28.22	82.06	0	0	22.7	13340	303200	400.4	27890	0	0	-4.6	-1.4	4.7	1.4	95.8	T
397	08/28/02	0.16	1	Au-197	346	28.22	82.06	0	0	22.7	13340	303100	400.2	90150	0	0	-4.3	-0.7	4.4	0.7	96	T
398	08/28/02	0.161	7	Au-197	346	28.22	82.06	0	0	2.2	13450	29760	39.29	28240	1	3.36E-05	-4.9	1.7	3.3	-0.1	95.6	T
399	08/28/02	0.162	8	Au-197	346	28.22	82.06	0	0	21.8	13910	303600	400.9	16010	0	0	-8.3	-1.3	4.2	5.4	93.9	T
400	08/28/02	0.162	9	Au-197	346	28.22	82.06	0	0	24	12580	301700	398.3	30220	0	0	-8.2	-1.7	5.3	4.6	93.8	T
401	08/28/02	0.163	10	Au-197	346	28.22	82.06	0	0	34.4	8784	302000	398.8	33830	0	0	-7.4	-1.8	3.8	5.4	94.4	T
402	08/28/02	0.164	12	Au-197	346	28.22	82.06	0	0	34.6	8726	301800	398.5	29950	0	0	-8.6	-2	5.9	4.7	93.4	T
403	08/28/02	0.165	13	Au-197	346	28.22	82.06	0	0	33.5	9115	304900	402.7	22400	0	0	-8.4	-1.9	5.1	5.2	93.7	T
0	08/28/02	0.165	Flux	Au-197	346	28.22	82.06	0	0	10.2	18040	183200	0	0	0	0	-7.9	-1.1	4.9	4.1	94.1	3.2
404	08/28/02	0.166	14	Au-197	346	28.22	82.06	0	0	26	11710	304500	402.1	16830	0	0	-7.8	-1.2	4.5	4.5	94.2	T
405	08/28/02	0.176	1	Au-197	346	28.22	82.06	0	0	17.8	17070	303800	401.1	90550	0	0	-7.7	-2.4	5.3	4.8	93.9	T
406	08/28/02	0.176	2	Au-197	346	28.22	82.06	0	0	17.9	16950	304300	401.8	229400	0	0	-7.7	-3	4.7	6	93.8	T
407	08/28/02	0.176	4	Au-197	346	28.22	82.06	0	0	19.7	15450	304300	401.7	29790	0	0	-8.1	-1.7	5.8	4	93.7	T
408	08/28/02	0.177	4	Au-197	346	28.22	82.06	0	0	19.5	15750	306700	405	30190	0	0	-8	-2.1	4.9	5.2	93.9	T
409	08/28/02	0.178	1	Au-197	346	28.22	82.06	0	0	19.6	15670	307600	406.1	90960	0	0	-8.4	-1.1	4.3	5.2	93.9	T
410	08/28/02	0.178	2	Au-197	346	28.22	82.06	0	0	19.5	15640	304400	401.9	229800	0	0	-7.3	-2.6	4.5	5.3	94.2	T
411	08/28/02	0.179	5	Au-197	346	28.22	82.06	0	0	19.3	15750	304700	402.3	27090	0	0	-8.6	-1.5	4.6	5.5	93.7	T
412	08/28/02	0.18	6	Au-197	346	28.22	82.06	0	0	19.5	15670	305900	404	28290	0	0	-8.6	-1.6	4.6	5.5	93.7	T
413	08/28/02	0.181	7	Au-197	346	28.22	82.06	0	0	19.3	15730	303000	400	28640	0	0	-8.1	-2.2	4.8	5.5	93.8	T
414	08/28/02	0.181	8	Au-197	346	28.22	82.06	0	0	19.2	15810	303100	400.2	16410	0	0	-8.1	-2.8	5	5.9	93.6	T
415	08/28/02	0.182	9	Au-197	346	28.22	82.06	0	0	19.1	15890	303500	400.8	30620	0	0	-9	-1.4	5.3	5.1	93.3	T
416	08/28/02	0.183	12	Au-197	346	28.22	82.06	0	0	31.9	9479	302000	398.7	30350	0	0	-8.1	-2	5.1	5.1	93.8	T
417	08/28/02	0.184	13	Au-197	346	28.22	82.06	0	0	32.4	9330	302200	399	22800	0	0	-8	-2.2	5.4	4.9	93.8	T
418	08/28/02	0.185	14	Au-197	346	28.22	82.06	0	0	32.1	9406	302000	398.8	17230	0	0	-8.7	-1.1	5.2	4.6	93.6	T
419	08/28/02	0.185	12	Au-197	346	28.22	82.06	0	0	3.6	9574	34010	44.9	30400	1	2.94E-05	-11	-2	5.6	6.9	92.3	T
0	08/28/02	0.194	Flux	Au-197	346	28.22	82.06	0	0	10.1	9635	97700	0	0	0	0	-7.8	-1.3	4.4	4.7	94.2	4.4
420	08/28/02	0.194	1	Au-197	346	28.22	82.06	0	0	31.6	9680	305500	398.9	91360	0	0	-7.9	-2.8	5.1	5.6	93.7	T
421	08/28/02	0.195	1	Au-197	346	28.22	82.06	0	0	1.5	9824	15050	19.87	91380	1	6.64E-05	-9.6	0.5	3.4	5.7	93.4	T
422	08/28/02	0.196	2	Au-197	346	28.22	82.06	0	0	30.8	9781	301700	398.3	230200	0	0	-8.5	-1.6	4.2	5.8	93.8	T
423	08/28/02	0.196	4	Au-197	346	28.22	82.06	0	0	30.6	9892	302300	399.2	30590	0	0	-9.4	-1.5	5	5.8	93.1	T
424	08/28/02	0.197	5	Au-197	346	28.22	82.06	0	0	32.3	9331	301500	398.1	27490	0	0	-7.9	-2.1	4.7	5.3	94	T
425	08/28/02	0.199	7	Au-197	346	28.22	82.06	0	0	32.2	9381	302200	399.1	29040	0	0	-8.5	-1.3	4.9	4.9	93.7	T
426	08/28/02	0.2	7	Au-197	346	28.22	82.06	0	0	31.7	9519	301600	398.2	29440	0	0	-8.4	-1.9	5.4	5	93.6	T
427	08/28/02	0.201	7	Au-197	346	28.22	82.06	0	0	31.6	9558	301700	398.4	29840	0	0	-8	-2.2	5	5.2	93.9	T
428	08/28/02	0.201	8	Au-197	346	28.22	82.06	0	0	31.5	9584	301600	398.3	16810	0	0	-7.9	-2.5	5.3	5.1	93.8	T
429	08/28/02	0.201	9	Au-197	346	28.22	82.06	0	0	31.6	9546	302100	398.9	31020	0	0	-8.7	-1.4	4.7	5.4	93.6	T

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
0	10/24/02	5:41	Flux	Br-81	278.5	36.03	37.46	0	0	10.2	1.03E+04	1.05E+05	0.00E+00	0.00E+00	0	0.00E+00	-18	0.6	1.2	16	87.8	6.2
1	10/24/02	5:42	1	Br-81	278.5	36.03	37.46	0	0	12	8.82E+03	1.06E+05	6.01E+01	9.15E+04	1	9.44E-06	-19	-1.1	2.3	17.5	87	S
2	10/24/02	5:47	2	Br-81	278.5	36.03	37.46	0	0	28.1	1.07E+04	3.02E+05	1.82E+02	2.30E+05	0	0.00E+00	-2.8	2.4	4.5	-4.1	94.5	S
3	10/24/02	5:48	2	Br-81	278.5	36.03	37.46	0	0	1.9	1.26E+04	2.41E+04	1.45E+01	2.30E+05	1	4.15E-05	-2.5	4.1	5.1	-6.7	92.9	S
4	10/24/02	0.244	4	Br-81	278.5	36.03	37.46	0	0	24.6	12350	303300	182.8	30780	0	0	-2.5	3.9	2.8	-4.1	94.8	S
5	10/24/02	5:52	4	Br-81	278.5	36.03	37.46	0	0	1.8	1.31E+04	2.37E+04	1.43E+01	3.08E+04	1	4.22E-05	-1.8	1.6	3.4	-3.2	96	S
6	10/24/02	5:54	5	Br-81	278.5	36.03	37.46	0	0	23.6	1.28E+04	3.02E+05	1.82E+02	2.77E+04	0	0.00E+00	-0.4	3	2.9	-5.5	96	S
7	10/24/02	5:55	5	Br-81	278.5	36.03	37.46	0	0	20.6	1.47E+04	3.03E+05	1.83E+02	2.79E+04	0	0.00E+00	1.9	4.2	2.1	-8.2	93.8	S
8	10/24/02	5:56	5	Br-81	278.5	36.03	37.46	0	0	19.5	1.56E+04	3.03E+05	1.83E+02	2.81E+04	0	0.00E+00	5.8	5.1	0.3	-11.2	92.2	S
9	10/24/02	5:57	5	Br-81	278.5	36.03	37.46	0	0	20.1	1.51E+04	3.04E+05	1.83E+02	2.82E+04	0	0.00E+00	-0.4	3.8	2.3	-5.7	94.8	S
10	10/24/02	5:58	5	Br-81	278.5	36.03	37.46	0	0	2.7	1.75E+04	4.66E+04	2.81E+01	2.83E+04	1	2.14E-05	3.1	7.1	0.4	-10.7	91.9	S
11	10/24/02	5:59	6	Br-81	278.5	36.03	37.46	0	0	18.2	1.67E+04	3.02E+05	1.82E+02	2.85E+04	0	0.00E+00	2.6	3.6	2.7	-9	93.4	S
12	10/24/02	6:00	6	Br-81	278.5	36.03	37.46	0	0	21.1	1.44E+04	3.04E+05	1.83E+02	2.87E+04	0	0.00E+00	-0.9	3.1	3.3	-5.4	94.8	S
13	10/24/02	6:01	6	Br-81	278.5	36.03	37.46	0	0	19	1.59E+04	3.03E+05	1.83E+02	2.89E+04	0	0.00E+00	2.8	3.4	2.1	-8.3	94	S
14	10/24/02	6:02	6	Br-81	278.5	36.03	37.46	0	0	13.6	1.54E+04	2.10E+05	1.26E+02	2.90E+04	1	4.77E-06	1.8	4.1	2	-7.9	94	S
15	10/24/02	6:07	7	Br-81	278.5	36.03	37.46	0	0	20.7	1.46E+04	3.03E+05	1.82E+02	3.00E+04	0	0.00E+00	1.1	3.6	2.9	-7.5	94	S
16	10/24/02	6:08	7	Br-81	278.5	36.03	37.46	0	0	19.5	1.55E+04	3.03E+05	1.82E+02	3.02E+04	0	0.00E+00	3.4	3.8	1.6	-8.8	93.7	S
17	10/24/02	6:09	7	Br-81	278.5	36.03	37.46	0	0	2.7	1.72E+04	4.58E+04	2.76E+01	3.02E+04	1	2.18E-05	6.3	4.4	0.4	-11.1	92.3	S
18	10/24/02	6:10	8	Br-81	278.5	36.03	37.46	0	0	18.3	1.66E+04	3.04E+05	1.83E+02	1.70E+04	0	0.00E+00	6.1	3.8	0.6	-10.4	92.8	S
0	10/24/02	6:11	Flux	Br-81	278.5	36.03	37.46	0	0	10.1	1.59E+04	1.62E+05	0.00E+00	0.00E+00	0	0.00E+00	4.8	4.2	0.4	-9.5	93.3	8.4
19	10/24/02	6:13	8	Br-81	278.5	36.03	37.46	0	0	20.4	1.52E+04	3.10E+05	1.83E+02	1.72E+04	0	0.00E+00	2.5	4	2.1	-8.5	93.7	S
20	10/24/02	6:14	8	Br-81	278.5	36.03	37.46	0	0	1.4	1.47E+04	2.00E+04	1.21E+01	1.72E+04	1	5.00E-05	0.4	0.8	5.2	-6.4	94.4	S
21	10/24/02	6:15	9	Br-81	278.5	36.03	37.46	0	0	20	1.52E+04	3.03E+05	1.83E+02	3.12E+04	0	0.00E+00	3.9	4	1.8	-9.8	93.1	S
22	10/24/02	6:18	9	Br-81	278.5	36.03	37.46	0	0	19.7	1.54E+04	3.03E+05	1.83E+02	3.14E+04	0	0.00E+00	3.3	4.2	1.5	-9	93.5	S
23	10/24/02	6:18	9	Br-81	278.5	36.03	37.46	0	0	21.2	1.43E+04	3.03E+05	1.82E+02	3.16E+04	0	0.00E+00	-0.7	3.1	3.1	-5.4	94.9	S
24	10/24/02	6:19	9	Br-81	278.5	36.03	37.46	0	0	23.7	1.27E+04	3.02E+05	1.82E+02	3.17E+04	0	0.00E+00	-5.2	3	2.6	-0.4	95.3	S
25	10/24/02	6:20	9	Br-81	278.5	36.03	37.46	0	0	17.2	1.77E+04	3.04E+05	1.83E+02	3.19E+04	0	0.00E+00	3.6	3.7	1.1	-8.4	94	S
26	10/24/02	6:21	9	Br-81	278.5	36.03	37.46	0	0	17.8	1.70E+04	3.04E+05	1.83E+02	3.21E+04	0	0.00E+00	-14	0.6	3.1	10.2	90.7	S
27	10/24/02	6:22	9	Br-81	278.5	36.03	37.46	0	0	17.3	1.75E+04	3.04E+05	1.83E+02	3.23E+04	0	0.00E+00	-13	1.1	2.5	9.5	91.2	S
28	10/24/02	6:23	9	Br-81	278.5	36.03	37.46	0	0	21.7	1.39E+04	3.03E+05	1.83E+02	3.25E+04	0	0.00E+00	-18	-1.7	3	16.5	87.6	S
29	10/24/02	6:25	9	Br-81	278.5	36.03	37.46	0	0	10.9	1.72E+04	1.88E+05	1.13E+02	3.26E+04	1	5.32E-06	-1.2	5.1	-1.7	-2.2	96.2	S
30	10/24/02	6:26	10	Br-81	278.5	36.03	37.46	0	0	19.6	1.55E+04	3.04E+05	1.83E+02	3.40E+04	0	0.00E+00	-5.1	3.3	0.8	1	95.9	S
31	10/24/02	6:27	10	Br-81	278.5	36.03	37.46	0	0	17.7	1.71E+04	3.03E+05	1.82E+02	3.42E+04	0	0.00E+00	-0.5	5.1	-0.3	-4.3	95.5	S
32	10/24/02	6:29	11	Br-81	278.5	36.03	37.46	0	0	18.1	1.67E+04	3.03E+05	1.83E+02	2.51E+04	0	0.00E+00	-0.3	4.2	0.3	-4.2	95.9	S
33	10/24/02	6:31	11	Br-81	278.5	36.03	37.46	0	0	12.3	1.59E+04	1.95E+05	1.17E+02	2.52E+04	1	5.13E-06	-3	3.8	0.6	-1.4	96.3	S
34	10/24/02	6:32	12	Br-81	278.5	36.03	37.46	0	0	19.9	1.53E+04	3.04E+05	1.83E+02	3.06E+04	0	0.00E+00	-2.5	3.5	1	-2	96.3	S
35	10/24/02	6:33	12	Br-81	278.5	36.03	37.46	0	0	19.5	1.55E+04	3.02E+05	1.82E+02	3.08E+04	0	0.00E+00	-4.2	3.7	1.3	-0.8	95.8	S
36	10/24/02	6:35	13	Br-81	278.5	36.03	37.46	0	0	19	1.60E+04	3.03E+05	1.82E+02	2.30E+04	0	0.00E+00	-0.7	3.3	0.9	-3.5	96.3	S
37	10/24/02	6:36	13	Br-81	278.5	36.03	37.46	0	0	20.7	1.46E+04	3.03E+05	1.82E+02	2.32E+04	0	0.00E+00	-4.5	2.6	1.7	0.3	96.1	S
38	10/24/02	6:37	14	Br-81	278.5	36.03	37.46	0	0	20.4	1.48E+04	3.03E+05	1.83E+02	1.74E+04	0	0.00E+00	-3	2.8	0.7	-0.6	96.9	S
39	10/24/02	6:38	14	Br-81	278.5	36.03	37.46	0	0	19.4	1.56E+04	3.02E+05	1.82E+02	1.76E+04	0	0.00E+00	-2.2	3.5	1.7	-3	95.8	S
0	10/24/02	7:11	Flux	Br-81	278.5	36.03	37.46	0	0	10.2	1.36E+04	1.38E+05	0.00E+00	0.00E+00	0	0.00E+00	0.3	3.9	1.9	-6.2	94.8	6.8
40	10/24/02	7:11	1	Br-81	278.5	36.03	37.46	0	0	24.4	1.22E+04	2.98E+05	1.82E+02	9.16E+04	0	0.00E+00	-4	2.6	1.8	-0.4	96.2	S
41	10/24/02	7:12	2	Br-81	278.5	36.03	37.46	0	0	22.9	1.32E+04	3.02E+05	1.82E+02	2.30E+05	0	0.00E+00	-0.2	2.5	1.6	-3.9	96.4	S
42	10/24/02	7:12	3	Br-81	278.5	36.03	37.46	0	0	21.9	1.38E+04	3.02E+05	1.82E+02	4.91E+03	0	0.00E+00	0.1	4.2	1.2	-5.5	95.1	S

I last two runs are invalid because bias at socket 1

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm ² /mg	Tilt deg	Roll deg	Time sec	Flux #/cm ² /sec	Fluence #/cm ²	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm ²	Left %	Top %	Bottom %	Right %	Unif %	Center %
43	10/24/02	7:25	2	Br-81	278.5	36.03	37.46	0	0	22.9	1.32E+04	3.02E+05	1.82E+02	2.31E+05	0	0.00E+00	-1.4	3.4	1.1	-3.2	96.2	S
44	10/24/02	7:26	4	Br-81	278.5	36.03	37.46	0	0	21.5	1.40E+04	3.02E+05	1.82E+02	3.10E+04	0	0.00E+00	0.2	3	1.7	-4.8	95.9	S
45	10/24/02	7:27	5	Br-81	278.5	36.03	37.46	0	0	20.7	1.46E+04	3.03E+05	1.83E+02	2.84E+04	0	0.00E+00	2.6	3.5	1	-7.1	94.8	S
46	10/24/02	7:38	8	Br-81	278.5	36.03	37.46	0	0	2.3	1.42E+04	3.29E+04	1.98E+01	1.72E+04	1	3.04E-05	4.4	3.6	-0.3	-7.7	94.5	S
47	10/24/02	7:39	9	Br-81	278.5	36.03	37.46	0	0	1.2	1.23E+04	1.52E+04	9.19E+00	3.26E+04	1	6.56E-05	0.5	2.2	2.1	-4.8	96	S
48	10/24/02	7:40	10	Br-81	278.5	36.03	37.46	0	0	1.1	1.23E+04	1.36E+04	8.19E+00	3.42E+04	1	7.36E-05	-3.1	6.1	6.2	-9.3	90.6	S
0	10/24/02	7:43	Flux	Br-81	278.5	36.03	37.46	0	0	10.2	1.12E+04	1.13E+05	0.00E+00	0.00E+00	0	0.00E+00	-5.2	3.1	2.9	-0.7	95	7.3
49	10/24/02	7:43	12	Br-81	278.5	36.03	37.46	0	0	25.2	1.21E+04	3.04E+05	1.82E+02	3.10E+04	0	0.00E+00	-3.6	3.6	1.3	-1.2	96	S
50	10/24/02	7:44	13	Br-81	278.5	36.03	37.46	0	0	27.6	1.09E+04	3.02E+05	1.82E+02	2.34E+04	0	0.00E+00	-5.4	2.7	1.5	1.2	95.8	S
51	10/24/02	7:47	14	Br-81	278.5	36.03	37.46	0	0	23.9	1.26E+04	3.03E+05	1.82E+02	1.78E+04	0	0.00E+00	-0.9	3.9	0.3	-3.3	96.3	S
52	10/24/02	7:52	14	Br-81	278.5	36.03	37.46	0	0	21.6	1.40E+04	3.03E+05	1.83E+02	1.79E+04	0	0.00E+00	2.4	4.3	-0.2	-6.5	95	S
53	10/24/02	7:53	15	Br-81	278.5	36.03	37.46	0	0	24.1	1.25E+04	3.02E+05	1.82E+02	2.72E+04	0	0.00E+00	-1.5	4.3	1	-3.7	95.6	S
54	10/24/02	7:54	16	Br-81	278.5	36.03	37.46	0	0	23	1.32E+04	3.03E+05	1.82E+02	2.16E+04	0	0.00E+00	0.7	4.5	-0.3	-4.9	95.6	S
0	10/24/02	8:39	Flux	Br-81	278.5	36.03	37.46	0	0	10.2	1.51E+04	1.53E+05	0.00E+00	0.00E+00	0	0.00E+00	2.7	5.1	0	-7.9	94	7.4
55	10/24/02	8:40	1	Br-81	278.5	36.03	37.46	0	0	23	1.32E+04	3.03E+05	1.83E+02	4.39E+04	0	0.00E+00	0.1	3.4	0.1	-3.6	96.6	S
56	10/24/02	8:43	1	Br-81	278.5	36.03	37.46	0	0	24.8	1.22E+04	3.02E+05	1.82E+02	4.41E+04	0	0.00E+00	-3.1	3.8	1.4	-2.1	95.8	S
57	10/24/02	8:44	1	Br-81	278.5	36.03	37.46	0	0	23.3	1.30E+04	3.03E+05	1.82E+02	4.43E+04	0	0.00E+00	-0.7	3.6	0.1	-3	96.6	S
58	10/24/02	8:45	1	Br-81	278.5	36.03	37.46	0	0	25.5	1.19E+04	3.02E+05	1.82E+02	4.44E+04	0	0.00E+00	-4	2	2.4	-0.4	96.2	S
59	10/24/02	8:55	1	Br-81	278.5	36.03	37.46	0	0	25.4	1.19E+04	3.03E+05	1.83E+02	4.48E+04	0	0.00E+00	-4.1	2.9	0.7	0.5	96.5	S
60	10/24/02	8:57	1	Br-81	278.5	36.03	37.46	0	0	25.4	1.19E+04	3.02E+05	1.82E+02	4.50E+04	0	0.00E+00	-3.2	2.5	1	-0.3	96.9	S
61	10/24/02	8:57	1	Br-81	278.5	36.03	37.46	0	0	23.5	1.28E+04	3.02E+05	1.82E+02	4.52E+04	0	0.00E+00	-2.5	3.1	0.9	-1.4	96.7	S
62	10/24/02	8:58	1	Br-81	278.5	36.03	37.46	0	0	24.4	1.24E+04	3.02E+05	1.82E+02	4.54E+04	0	0.00E+00	-3.2	3.4	0.9	-1	96.4	S
63	10/24/02	8:59	1	Br-81	278.5	36.03	37.46	0	0	23.8	1.27E+04	3.03E+05	1.83E+02	4.56E+04	0	0.00E+00	-3.2	3.1	1.6	-1.5	96.2	S
64	10/24/02	8:59	1	Br-81	278.5	36.03	37.46	0	0	25	1.21E+04	3.03E+05	1.83E+02	4.57E+04	0	0.00E+00	-3.2	3.3	1	-1.1	96.4	S
65	10/24/02	9:02	1	Br-81	278.5	36.03	37.46	0	0	2.4	1.04E+04	2.46E+04	1.48E+01	4.58E+04	1	4.06E-05	-5	4.9	-1.2	1.3	95.5	S
66	10/24/02	9:04	2	Br-81	278.5	36.03	37.46	0	0	29.8	1.01E+04	3.02E+05	1.82E+02	3.55E+04	0	0.00E+00	-5.4	2	1.5	1.8	96	S
67	10/24/02	9:05	2	Br-81	278.5	36.03	37.46	0	0	20.7	1.28E+04	2.66E+05	1.60E+02	3.56E+04	1	3.76E-06	0.3	4.7	-0.6	-4.5	95.7	S
68	10/24/02	9:07	3	Br-81	278.5	36.03	37.46	0	0	28.9	1.04E+04	3.02E+05	1.82E+02	2.64E+04	0	0.00E+00	-4.3	1.4	1.5	1.4	96.8	S
69	10/24/02	9:08	3	Br-81	278.5	36.03	37.46	0	0	27.4	1.10E+04	3.02E+05	1.82E+02	2.66E+04	0	0.00E+00	-2.8	2.3	0.7	-0.2	97.3	S
70	10/24/02	9:09	3	Br-81	278.5	36.03	37.46	0	0	28.1	1.08E+04	3.02E+05	1.82E+02	2.68E+04	0	0.00E+00	-4.1	2.9	1.2	0.1	96.4	S
0	10/24/02	9:10	Flux	Br-81	278.5	36.03	37.46	0	0	10.2	1.17E+04	1.19E+05	0.00E+00	0.00E+00	0	0.00E+00	-3	2.6	0.8	-0.5	97	6.3
71	10/24/02	9:10	3	Br-81	278.5	36.03	37.46	0	0	29.2	1.02E+04	2.99E+05	1.82E+02	2.69E+04	0	0.00E+00	-5.5	3.1	0.5	1.8	95.8	S
72	10/24/02	9:11	3	Br-81	278.5	36.03	37.46	0	0	18.7	1.06E+04	1.97E+05	1.19E+02	2.71E+04	1	5.07E-06	-5.5	2.9	1	1.6	95.8	S
73	10/24/02	9:13	4	Br-81	278.5	36.03	37.46	0	0	26.7	1.13E+04	3.02E+05	1.82E+02	2.85E+04	0	0.00E+00	-3.9	3.5	0.3	0.1	96.4	S
74	10/24/02	9:14	4	Br-81	278.5	36.03	37.46	0	0	27.5	1.10E+04	3.02E+05	1.82E+02	2.87E+04	0	0.00E+00	-4.1	3.6	0.1	0.4	96.3	S
75	10/24/02	9:14	4	Br-81	278.5	36.03	37.46	0	0	28.4	1.07E+04	3.03E+05	1.82E+02	2.89E+04	0	0.00E+00	-4.4	2.2	1.1	1.1	96.6	S
76	10/24/02	9:25	1	Br-81	278.5	36.03	37.46	0	0	26.6	1.14E+04	3.03E+05	1.82E+02	4.61E+04	0	0.00E+00	-4.6	3.8	0.5	0.3	95.9	S
77	10/24/02	9:26	1	Br-81	278.5	36.03	37.46	0	0	26.7	1.13E+04	3.02E+05	1.82E+02	4.63E+04	0	0.00E+00	-4.5	2.7	1.1	0.8	96.3	S
78	10/24/02	9:27	1	Br-81	278.5	36.03	37.46	0	0	27	1.12E+04	3.02E+05	1.82E+02	4.65E+04	0	0.00E+00	-3.6	3.4	0.2	0	96.6	S
0	10/24/02	10:18	Flux	I-127	320	30.97	59.72	0	0	10.2	1.33E+04	1.36E+05	0.00E+00	0.00E+00	0	0.00E+00	-2.2	4.1	0.6	-2.4	96.1	4.9
79	10/24/02	10:18	2	I-127	320	30.97	59.72	0	0	22.6	1.33E+04	2.99E+05	2.91E+02	3.59E+04	0	0.00E+00	-2.1	3.1	0.9	-2	96.7	D
80	10/24/02	10:19	2	I-127	320	30.97	59.72	0	0	23	1.31E+04	3.02E+05	2.90E+02	3.62E+04	0	0.00E+00	-2.1	3.3	0.5	-1.6	96.8	D
81	10/24/02	10:19	2	I-127	320	30.97	59.72	0	0	23.8	1.27E+04	3.03E+05	2.91E+02	3.65E+04	0	0.00E+00	-1.6	4	0.3	-2.7	96.3	D
82	10/24/02	10:20	2	I-127	320	30.97	59.72	0	0	23.7	1.28E+04	3.03E+05	2.91E+02	3.68E+04	0	0.00E+00	-0.4	3.7	0.3	-3.6	96.4	D

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm ² /mg	Tilt deg	Roll deg	Time sec	Flux #/cm ² /sec	Fluence #/cm ²	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm ²	Left %	Top %	Bottom %	Right %	Unif %	Center %
83	10/24/02	10:21	2	I-127	320	30.97	59.72	0	0	23.5	1.29E+04	3.03E+05	2.91E+02	3.71E+04	0	0.00E+00	-1.4	4.1	-0.3	-2.4	96.5	D
84	10/24/02	10:21	2	I-127	320	30.97	59.72	0	0	23.3	1.30E+04	3.03E+05	2.91E+02	3.74E+04	0	0.00E+00	-0.7	3.9	-0.8	-2.4	96.8	D
85	10/24/02	10:23	2	I-127	320	30.97	59.72	0	0	25.6	1.18E+04	3.02E+05	2.90E+02	3.77E+04	0	0.00E+00	3.2	4.3	-0.8	-6.7	94.9	D
86	10/24/02	10:23	2	I-127	320	30.97	59.72	0	0	24.4	1.24E+04	3.03E+05	2.91E+02	3.80E+04	0	0.00E+00	-0.3	3.8	-0.5	-3	96.7	D
87	10/24/02	10:24	2	I-127	320	30.97	59.72	0	0	24.8	1.22E+04	3.02E+05	2.90E+02	3.83E+04	0	0.00E+00	0	3.1	0.9	-4	96.3	D
88	10/24/02	10:24	2	I-127	320	30.97	59.72	0	0	23.7	1.28E+04	3.03E+05	2.91E+02	3.86E+04	0	0.00E+00	-2.4	3.4	0.8	-1.8	96.5	D
89	10/24/02	10:25	2	I-127	320	30.97	59.72	0	0	24.2	1.25E+04	3.03E+05	2.91E+02	3.88E+04	0	0.00E+00	0	2.5	1	-3.6	96.8	D
90	10/24/02	10:26	2	I-127	320	30.97	59.72	0	0	23.5	1.29E+04	3.02E+05	2.91E+02	3.91E+04	0	0.00E+00	-2.7	3	1.2	-1.4	96.6	D
91	10/24/02	10:27	2	I-127	320	30.97	59.72	0	0	23.9	1.26E+04	3.02E+05	2.91E+02	3.94E+04	0	0.00E+00	-3.6	3.7	1.7	-1.8	95.7	D
92	10/24/02	10:28	2	I-127	320	30.97	59.72	0	0	24.9	1.21E+04	3.03E+05	2.91E+02	3.97E+04	0	0.00E+00	0.6	3.5	0.1	-4.2	96.3	D
93	10/24/02	10:29	2	I-127	320	30.97	59.72	0	0	24.9	1.22E+04	3.03E+05	2.91E+02	4.00E+04	0	0.00E+00	-1.6	3.1	0.5	-1.9	97	D
94	10/24/02	10:31	2	I-127	320	30.97	59.72	0	0	24.6	1.23E+04	3.02E+05	2.90E+02	4.03E+04	0	0.00E+00	-2.3	3.3	0.8	-1.7	96.6	D
! all previous iodine runs are invalid due to bias at socket 1																						
95	10/24/02	10:34	2	I-127	320	30.97	59.72	0	0	27.1	1.11E+04	3.02E+05	2.90E+02	4.06E+04	0	0.00E+00	1	4.5	-1.3	-4.1	96.1	D
96	10/24/02	10:35	2	I-127	320	30.97	59.72	0	0	27.1	1.11E+04	3.03E+05	2.91E+02	4.09E+04	0	0.00E+00	-0.7	3.9	0.3	-3.5	96.2	D
97	10/24/02	10:36	2	I-127	320	30.97	59.72	0	0	27.1	1.12E+04	3.03E+05	2.91E+02	4.12E+04	0	0.00E+00	0.5	3.2	0	-3.7	96.7	D
98	10/24/02	10:36	2	I-127	320	30.97	59.72	0	0	27.7	1.09E+04	3.02E+05	2.90E+02	4.15E+04	0	0.00E+00	1.2	4.1	-0.2	-5.1	95.8	D
99	10/24/02	10:38	2	I-127	320	30.97	59.72	0	0	19.3	1.09E+04	2.11E+05	2.03E+02	4.17E+04	1	4.74E-06	-0.7	3.7	0.5	-3.5	96.3	D
100	10/24/02	10:39	3	I-127	320	30.97	59.72	0	0	26.4	1.15E+04	3.02E+05	2.90E+02	2.73E+04	0	0.00E+00	-2.5	3	0.2	-0.7	97.1	D
101	10/24/02	10:40	3	I-127	320	30.97	59.72	0	0	27.2	1.11E+04	3.02E+05	2.90E+02	2.76E+04	0	0.00E+00	-2.4	2.8	1	-1.4	96.9	D
102	10/24/02	10:41	3	I-127	320	30.97	59.72	0	0	29.3	1.03E+04	3.03E+05	2.91E+02	2.79E+04	0	0.00E+00	0.3	2.7	1.1	-4	96.5	D
103	10/24/02	10:42	3	I-127	320	30.97	59.72	0	0	29.6	1.02E+04	3.02E+05	2.90E+02	2.82E+04	0	0.00E+00	1.5	3.6	-0.3	-4.9	96	D
104	10/24/02	10:42	3	I-127	320	30.97	59.72	0	0	30.2	1.00E+04	3.02E+05	2.90E+02	2.85E+04	0	0.00E+00	1.3	2.2	0.3	-3.8	97	D
105	10/24/02	10:45	3	I-127	320	30.97	59.72	0	0	2.5	8.93E+03	2.22E+04	2.14E+01	2.85E+04	1	4.50E-05	3.4	1.4	0.4	-5.3	96.2	D
106	10/24/02	10:47	4	I-127	320	30.97	59.72	0	0	31.1	9.70E+03	3.01E+05	2.90E+02	2.91E+04	0	0.00E+00	-0.2	3.1	0.7	-3.5	96.6	D
107	10/24/02	10:47	4	I-127	320	30.97	59.72	0	0	29.7	1.02E+04	3.02E+05	2.90E+02	2.94E+04	0	0.00E+00	-3.3	2.8	1.6	-1.1	96.4	D
0	10/24/02	10:48	Flux	I-127	320	30.97	59.72	0	0	10.2	9.67E+03	9.83E+04	0.00E+00	0.00E+00	0	0.00E+00	-0.7	2.7	0.9	-2.9	96.9	4.5
108	10/24/02	10:48	4	I-127	320	30.97	59.72	0	0	30.8	9.74E+03	3.00E+05	2.90E+02	2.97E+04	0	0.00E+00	0.1	2.8	1.2	-4	96.4	D
109	10/24/02	10:49	4	I-127	320	30.97	59.72	0	0	7.6	9.54E+03	7.30E+04	7.01E+01	2.98E+04	1	1.37E-05	0.8	3.4	2.2	-6.4	94.8	D
0	10/24/02	11:20	Flux	I-127	320	30.97	59.72	0	0	10.2	9.53E+03	9.68E+04	0.00E+00	0.00E+00	0	0.00E+00	-1.1	1.4	2.1	-2.4	97.2	3.6
110	10/24/02	11:20	1	I-127	320	30.97	59.72	0	0	7.9	9.06E+03	7.20E+04	6.98E+01	4.66E+04	1	1.39E-05	-1.4	2.6	0.6	-1.7	97.3	D
111	10/24/02	11:23	2	I-127	320	30.97	59.72	0	0	33.4	9.05E+03	3.02E+05	2.90E+02	4.20E+04	0	0.00E+00	0.4	2.9	0.4	-3.7	96.8	D
112	10/24/02	11:24	2	I-127	320	30.97	59.72	0	0	31.3	9.65E+03	3.02E+05	2.90E+02	4.22E+04	0	0.00E+00	-3.2	1.3	2.9	-0.9	96.5	D
113	10/24/02	11:25	2	I-127	320	30.97	59.72	0	0	11.8	9.32E+03	1.10E+05	1.06E+02	4.23E+04	1	9.09E-06	1.3	1.4	0.5	-3.2	97.6	D
114	10/24/02	11:27	3	I-127	320	30.97	59.72	0	0	30.1	1.01E+04	3.02E+05	2.90E+02	2.88E+04	0	0.00E+00	-3.1	2.1	1	0.1	97.2	D
115	10/24/02	11:28	3	I-127	320	30.97	59.72	0	0	30.4	9.92E+03	3.02E+05	2.90E+02	2.91E+04	0	0.00E+00	-3.5	2	1.8	-0.2	96.8	D
116	10/24/02	11:29	3	I-127	320	30.97	59.72	0	0	29.4	9.85E+03	2.89E+05	2.78E+02	2.94E+04	1	3.46E-06	-3.1	2.6	1.5	-0.9	96.7	D
117	10/24/02	11:31	4	I-127	320	30.97	59.72	0	0	29.4	1.03E+04	3.02E+05	2.90E+02	3.01E+04	0	0.00E+00	-2.5	2.3	1.8	-1.6	96.7	D
118	10/24/02	11:32	4	I-127	320	30.97	59.72	0	0	32.6	9.26E+03	3.02E+05	2.90E+02	3.04E+04	0	0.00E+00	3.7	2.9	-0.9	-5.7	95.8	D
119	10/24/02	11:33	4	I-127	320	30.97	59.72	0	0	32	9.46E+03	3.02E+05	2.90E+02	3.07E+04	0	0.00E+00	1.4	3.8	-0.7	-4.5	96.2	D
120	10/24/02	11:42	1	I-127	320	30.97	59.72	0	0	29.5	1.03E+04	3.02E+05	2.90E+02	4.68E+04	0	0.00E+00	-1.1	3.1	1.3	-3.3	96.3	D
121	10/24/02	11:44	1	I-127	320	30.97	59.72	0	0	28.3	1.07E+04	3.02E+05	2.90E+02	4.71E+04	1	3.31E-06	-3.5	2.5	1.4	-0.4	96.7	D
122	10/24/02	11:45	2	I-127	320	30.97	59.72	0	0	27.5	1.10E+04	3.02E+05	2.90E+02	4.26E+04	0	0.00E+00	-4.5	2.3	1.9	0.2	96.2	D
123	10/24/02	11:45	2	I-127	320	30.97	59.72	0	0	28.5	1.06E+04	3.02E+05	2.90E+02	4.29E+04	0	0.00E+00	-2	1.8	1.2	-1	97.5	D
124	10/24/02	11:47	3	I-127	320	30.97	59.72	0	0	28.8	1.05E+04	3.02E+05	2.90E+02	2.97E+04	0	0.00E+00	-3.8	2	1.9	-0.1	96.6	D

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
125	10/24/02	11:48	3	I-127	320	30.97	59.72	0	0	30.5	9.90E+03	3.02E+05	2.91E+02	3.00E+04	0	0.00E+00	-0.8	3.2	1.2	-3.6	96.3	D
126	10/24/02	11:50	4	I-127	320	30.97	59.72	0	0	30.6	9.88E+03	3.02E+05	2.90E+02	3.10E+04	0	0.00E+00	-0.3	2.9	1.1	-3.7	96.5	D
0	10/24/02	11:51	Flux	I-127	320	30.97	59.72	0	0	10.2	1.03E+04	1.04E+05	0.00E+00	0.00E+00	0	0.00E+00	-0.4	2.1	1.4	-3.1	97	4.1
127	10/24/02	11:51	4	I-127	320	30.97	59.72	0	0	29.4	1.03E+04	3.03E+05	2.90E+02	3.12E+04	0	0.00E+00	-2.1	2.8	1.1	-1.9	96.8	D
128	10/24/02	12:17	1	I-127	320	30.97	59.72	0	0	30.8	9.82E+03	3.03E+05	2.91E+02	9.19E+04	0	0.00E+00	-3.1	2.5	1.8	-1.2	96.5	D
129	10/24/02	12:18	1	I-127	320	30.97	59.72	0	0	32.7	9.25E+03	3.02E+05	2.91E+02	9.22E+04	0	0.00E+00	-0.8	2.6	1	-2.8	97	D
130	10/24/02	12:20	1	I-127	320	30.97	59.72	0	0	3.3	8.65E+03	2.87E+04	2.76E+01	9.23E+04	1	3.48E-05	1.9	4.4	-0.6	-5.7	95.4	D
0	10/24/02	12:23	Flux	I-127	320	30.97	59.72	0	0	10.1	9.19E+03	9.29E+04	0.00E+00	0.00E+00	0	0.00E+00	-2.5	3	1.9	-2.4	96.2	2.5
131	10/24/02	12:23	2	I-127	320	30.97	59.72	0	0	10.5	9.42E+03	9.86E+04	9.63E+01	2.31E+05	1	1.01E-05	-4.3	2.6	2.9	-1.2	95.5	D
! last run invalid vds was 30v																						
132	10/24/02	12:25	4	I-127	320	30.97	59.72	0	0	32	9.43E+03	3.02E+05	2.90E+02	3.13E+04	0	0.00E+00	-1.9	2.9	1.1	-2.2	96.7	D
133	10/24/02	12:26	5	I-127	320	30.97	59.72	0	0	30.3	9.97E+03	3.02E+05	2.90E+02	2.87E+04	0	0.00E+00	-4.1	1.9	1.8	0.4	96.6	D
134	10/24/02	12:30	6	I-127	320	30.97	59.72	0	0	32.5	9.30E+03	3.02E+05	2.90E+02	2.96E+04	1	3.31E-06	1.3	2.5	0.6	-4.4	96.6	D
135	10/24/02	12:33	7	I-127	320	30.97	59.72	0	0	31.9	9.46E+03	3.01E+05	2.90E+02	3.05E+04	0	0.00E+00	1	3.1	0.7	-4.8	96.1	D
136	10/24/02	12:34	7	I-127	320	30.97	59.72	0	0	31.8	9.49E+03	3.01E+05	2.90E+02	3.08E+04	0	0.00E+00	-0.1	2.6	1.1	-3.6	96.7	D
137	10/24/02	12:37	8	I-127	320	30.97	59.72	0	0	33.1	9.12E+03	3.02E+05	2.90E+02	1.75E+04	0	0.00E+00	-0.3	2.9	0.7	-3.3	96.8	D
138	10/24/02	12:37	8	I-127	320	30.97	59.72	0	0	30.9	9.77E+03	3.02E+05	2.90E+02	1.78E+04	0	0.00E+00	-2.4	2.7	1.9	-2.3	96.3	D
139	10/24/02	12:38	9	I-127	320	30.97	59.72	0	0	31.2	9.68E+03	3.02E+05	2.90E+02	3.29E+04	0	0.00E+00	-2.1	3.2	1.1	-2.2	96.5	D
140	10/24/02	12:39	9	I-127	320	30.97	59.72	0	0	32	9.45E+03	3.02E+05	2.90E+02	3.32E+04	0	0.00E+00	0.4	2.9	0.4	-3.7	96.8	D
141	10/24/02	12:41	10	I-127	320	30.97	59.72	0	0	2	7.82E+03	1.57E+04	1.51E+01	3.42E+04	1	6.37E-05	3.5	4.1	-2.3	-5.3	95.6	D
0	10/24/02	13:06	Flux	I-127	320	30.97	59.72	0	0	10.2	9.22E+03	9.36E+04	0.00E+00	0.00E+00	0	0.00E+00	3.9	3.5	-1.1	-6.3	95.3	3.8
142	10/24/02	13:07	1	I-127	320	30.97	59.72	0	0	29.7	1.03E+04	3.06E+05	2.90E+02	9.25E+04	0	0.00E+00	1.3	3.3	-0.2	-4.3	96.5	D
143	10/24/02	13:07	1	I-127	320	30.97	59.72	0	0	30.9	9.78E+03	3.02E+05	2.90E+02	9.28E+04	0	0.00E+00	2.1	3.3	-0.8	-4.6	96.3	D
144	10/24/02	13:08	1	I-127	320	30.97	59.72	0	0	30	1.01E+04	3.02E+05	2.90E+02	9.31E+04	0	0.00E+00	-1.4	4.7	-0.3	-3	96	D
145	10/24/02	13:09	2	I-127	320	30.97	59.72	0	0	31.7	9.51E+03	3.02E+05	2.90E+02	2.31E+05	0	0.00E+00	1.2	2.2	0.1	-3.5	97.3	D
146	10/24/02	13:10	2	I-127	320	30.97	59.72	0	0	32.7	9.21E+03	3.02E+05	2.90E+02	2.31E+05	0	0.00E+00	3.7	3.4	-1	-6.1	95.4	D
147	10/24/02	13:11	2	I-127	320	30.97	59.72	0	0	30.5	9.89E+03	3.01E+05	2.90E+02	2.32E+05	0	0.00E+00	0.2	2.7	0.8	-3.7	96.7	D
148	10/24/02	13:12	4	I-127	320	30.97	59.72	0	0	33.5	8.99E+03	3.01E+05	2.90E+02	3.16E+04	0	0.00E+00	2.2	2.4	0.4	-5.1	96.3	D
! previous 4 runs are invalid bias set at socket 1																						
149	10/24/02	13:15	2	I-127	320	30.97	59.72	0	0	35.2	8.58E+03	3.02E+05	2.90E+02	2.32E+05	0	0.00E+00	6	3.7	-2.1	-7.6	94.2	D
150	10/24/02	13:16	2	I-127	320	30.97	59.72	0	0	33.3	9.04E+03	3.01E+05	2.90E+02	2.32E+05	0	0.00E+00	4.3	4.4	-1.6	-7.1	94.6	D
151	10/24/02	13:17	2	I-127	320	30.97	59.72	0	0	31	9.74E+03	3.02E+05	2.91E+02	2.32E+05	0	0.00E+00	0.8	4.5	-0.2	-5.1	95.5	D
152	10/24/02	13:18	4	I-127	320	30.97	59.72	0	0	32.4	9.31E+03	3.02E+05	2.90E+02	3.19E+04	0	0.00E+00	2.7	4.5	-1.1	-6.2	95.1	D
153	10/24/02	13:19	4	I-127	320	30.97	59.72	0	0	33.9	8.91E+03	3.02E+05	2.90E+02	3.21E+04	0	0.00E+00	5	4.3	-2.4	-6.9	94.5	D
154	10/24/02	13:20	4	I-127	320	30.97	59.72	0	0	35.8	8.42E+03	3.02E+05	2.90E+02	3.24E+04	0	0.00E+00	6.3	3.8	-2	-8	93.9	D
155	10/24/02	13:23	7	I-127	320	30.97	59.72	0	0	35.2	8.59E+03	3.02E+05	2.90E+02	3.11E+04	0	0.00E+00	6	4.9	-2.7	-8.3	93.6	D
156	10/24/02	13:25	7	I-127	320	30.97	59.72	0	0	22.5	1.34E+04	3.02E+05	2.90E+02	3.14E+04	0	0.00E+00	3.1	3.7	-1.8	-5.1	95.8	D
157	10/24/02	13:26	7	I-127	320	30.97	59.72	0	0	21	1.44E+04	3.03E+05	2.91E+02	3.17E+04	0	0.00E+00	-0.1	3.2	-0.8	-2.3	97.3	D
158	10/24/02	13:27	7	I-127	320	30.97	59.72	0	0	21.2	1.43E+04	3.02E+05	2.91E+02	3.20E+04	0	0.00E+00	1	4.4	-0.9	-4.5	96	D
159	10/24/02	13:28	8	I-127	320	30.97	59.72	0	0	22.8	1.33E+04	3.03E+05	2.91E+02	1.81E+04	0	0.00E+00	4.8	4.3	-2	-7.2	94.5	D
160	10/24/02	13:29	8	I-127	320	30.97	59.72	0	0	23.1	1.31E+04	3.03E+05	2.91E+02	1.84E+04	0	0.00E+00	5.9	4	-3	-6.9	94.4	D
161	10/24/02	13:30	8	I-127	320	30.97	59.72	0	0	22.9	1.32E+04	3.03E+05	2.91E+02	1.87E+04	0	0.00E+00	4.1	3.2	-0.8	-6.5	95.2	D
162	10/24/02	13:30	8	I-127	320	30.97	59.72	0	0	23.4	1.29E+04	3.02E+05	2.91E+02	1.89E+04	0	0.00E+00	6.5	4.3	-3	-7.8	93.8	D
163	10/24/02	13:31	9	I-127	320	30.97	59.72	0	0	2.9	1.43E+04	4.11E+04	3.95E+01	3.32E+04	1	2.43E-05	1.2	6.4	-4.1	-3.5	95.2	D
164	10/24/02	13:33	10	I-127	320	30.97	59.72	0	0	20.5	1.48E+04	3.03E+05	2.91E+02	3.45E+04	0	0.00E+00	1.6	4.4	-2	-4	96.2	D

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Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
165	10/24/02	13:34	10	I-127	320	30.97	59.72	0	0	20.7	1.47E+04	3.03E+05	2.91E+02	3.48E+04	0	0.00E+00	0.4	5	-1.2	-4.2	95.8	D
166	10/24/02	13:35	10	I-127	320	30.97	59.72	0	0	22.3	1.36E+04	3.03E+05	2.91E+02	3.51E+04	0	0.00E+00	2.8	3.7	-0.8	-5.7	95.6	D
167	10/24/02	13:35	10	I-127	320	30.97	59.72	0	0	21.8	1.39E+04	3.03E+05	2.91E+02	3.54E+04	0	0.00E+00	2.9	3.9	-1.6	-5.2	95.8	D
0	10/24/02	13:38	Flux	I-127	320	30.97	59.72	0	0	10.1	1.55E+04	1.57E+05	0.00E+00	0.00E+00	0	0.00E+00	1.3	4.1	-1	-4.4	96.1	4.8
168	10/24/02	13:38	12	I-127	320	30.97	59.72	0	0	19.3	1.59E+04	3.07E+05	2.92E+02	3.12E+04	0	0.00E+00	2.2	4.9	-1.6	-5.5	95.3	D
169	10/24/02	13:39	12	I-127	320	30.97	59.72	0	0	20.3	1.50E+04	3.04E+05	2.92E+02	3.15E+04	0	0.00E+00	5.8	4.6	-2.3	-8	93.8	D
170	10/24/02	13:40	12	I-127	320	30.97	59.72	0	0	22.7	1.33E+04	3.02E+05	2.90E+02	3.18E+04	0	0.00E+00	8	4.4	-3.4	-9	92.8	D
171	10/24/02	13:40	12	I-127	320	30.97	59.72	0	0	21	1.44E+04	3.03E+05	2.91E+02	3.21E+04	0	0.00E+00	6.4	4.1	-3.3	-7.1	94.1	D
172	10/24/02	13:41	13	I-127	320	30.97	59.72	0	0	20.3	1.49E+04	3.03E+05	2.91E+02	2.36E+04	0	0.00E+00	4.5	4.4	-1.5	-7.4	94.4	D
173	10/24/02	13:42	13	I-127	320	30.97	59.72	0	0	20.6	1.48E+04	3.04E+05	2.92E+02	2.39E+04	0	0.00E+00	6	4.8	-2.8	-8	93.7	D
174	10/24/02	13:43	13	I-127	320	30.97	59.72	0	0	18.8	1.62E+04	3.04E+05	2.92E+02	2.42E+04	0	0.00E+00	1.4	3.9	-0.7	-4.6	96.1	D
175	10/24/02	0.572	13	I-127	320	30.97	59.72	0	0	19.4	1.57E+04	3.03E+05	2.92E+02	2.45E+04	0	0.00E+00	2.1	5.1	-2.2	-5	95.4	D
176	10/24/02	0.572	14	I-127	320	30.97	59.72	0	0	21.5	1.41E+04	3.03E+05	2.91E+02	1.82E+04	0	0.00E+00	6.1	3.1	-1.3	-7.9	94.2	D
177	10/24/02	0.573	14	I-127	320	30.97	59.72	0	0	21.3	1.42E+04	3.03E+05	2.91E+02	1.85E+04	0	0.00E+00	5.7	4	-1.9	-7.8	94.1	D
178	10/24/02	0.574	14	I-127	320	30.97	59.72	0	0	20.3	1.49E+04	3.03E+05	2.91E+02	1.88E+04	0	0.00E+00	1.7	4.4	-0.1	-6	95.2	D
179	10/24/02	0.574	14	I-127	320	30.97	59.72	0	0	22.1	1.37E+04	3.02E+05	2.91E+02	1.91E+04	0	0.00E+00	7.5	4.7	-3.5	-8.8	93	D
180	10/24/02	0.575	15	I-127	320	30.97	59.72	0	0	3.2	1.29E+04	4.11E+04	3.95E+01	2.72E+04	1	2.43E-05	7.1	5.4	-4	-8.4	93	D
181	10/24/02	0.576	16	I-127	320	30.97	59.72	0	0	20.5	1.48E+04	3.03E+05	2.91E+02	2.19E+04	0	0.00E+00	2.5	3.4	-1	-4.9	96.1	D
182	10/24/02	0.576	16	I-127	320	30.97	59.72	0	0	22.6	1.34E+04	3.03E+05	2.91E+02	2.22E+04	0	0.00E+00	6.8	4.7	-3.3	-8.2	93.4	D
183	10/24/02	0.576	16	I-127	320	30.97	59.72	0	0	20.4	1.48E+04	3.02E+05	2.91E+02	2.25E+04	0	0.00E+00	2.8	4.6	-1.4	-6	95.2	D
184	10/24/02	0.576	16	I-127	320	30.97	59.72	0	0	21.8	1.39E+04	3.03E+05	2.91E+02	2.28E+04	0	0.00E+00	5.8	3.9	-2.4	-7.3	94.3	D
185	10/24/02	0.577	16	I-127	320	30.97	59.72	0	0	23.2	1.30E+04	3.02E+05	2.91E+02	2.30E+04	0	0.00E+00	8.4	4.5	-3.9	-9	92.7	D
186	10/24/02	0.58	16	I-127	320	30.97	59.72	0	0	4.3	1.45E+04	6.25E+04	6.01E+01	2.31E+04	1	1.60E-05	5.4	5.4	-4.1	-6.7	94	D
187	10/24/02	0.581	11	I-127	320	30.97	59.72	0	0	4.2	1.55E+04	6.60E+04	6.34E+01	2.53E+04	1	1.52E-05	2	4.8	-2.3	-4.5	95.7	D
0	10/24/02	0.598	Flux	I-127	320	30.97	59.72	0	0	10.2	1.45E+04	1.47E+05	0.00E+00	0.00E+00	0	0.00E+00	2.3	4.1	-1	-5.4	95.6	3.5
188	10/24/02	0.598	1	I-127	320	30.97	59.72	0	0	21.7	1.38E+04	3.00E+05	2.91E+02	9.34E+04	0	0.00E+00	4.7	4.1	-2.1	-6.7	94.7	D
189	10/24/02	0.602	1	I-127	320	30.97	59.72	0	0	21.5	1.41E+04	3.03E+05	2.91E+02	9.37E+04	0	0.00E+00	2.8	4.1	-1.1	-5.8	95.4	D
I previous two runs invalid wrong part in socket																						
190	10/24/02	0.614	1	I-127	320	30.97	59.72	0	0	21.7	1.40E+04	3.03E+05	2.91E+02	9.40E+04	0	0.00E+00	3	3.8	-1.6	-5.3	95.8	D
191	10/24/02	0.614	1	I-127	320	30.97	59.72	0	0	20.4	1.48E+04	3.02E+05	2.90E+02	9.43E+04	0	0.00E+00	-0.1	4.3	-1.4	-2.8	96.6	D
192	10/24/02	0.615	1	I-127	320	30.97	59.72	0	0	3.2	1.43E+04	4.53E+04	4.35E+01	9.43E+04	1	2.21E-05	2.6	2.2	-0.4	-4.3	96.8	D
193	10/24/02	0.615	2	I-127	320	30.97	59.72	0	0	23.8	1.27E+04	3.03E+05	2.91E+02	2.33E+05	0	0.00E+00	6.4	4.6	-3.3	-7.6	93.8	D
194	10/24/02	0.616	2	I-127	320	30.97	59.72	0	0	19.9	1.52E+04	3.02E+05	2.90E+02	2.33E+05	0	0.00E+00	-1.4	4.1	0	-2.7	96.4	D
195	10/24/02	0.617	2	I-127	320	30.97	59.72	0	0	12.6	1.29E+04	1.62E+05	1.56E+02	2.33E+05	1	6.17E-06	3.7	4.9	-1.9	-6.7	94.6	D
196	10/24/02	0.617	4	I-127	320	30.97	59.72	0	0	23.1	1.31E+04	3.02E+05	2.91E+02	3.27E+04	0	0.00E+00	4.9	4.5	-2.1	-7.3	94.3	D
197	10/24/02	0.618	5	I-127	320	30.97	59.72	0	0	21.5	1.41E+04	3.02E+05	2.91E+02	2.90E+04	0	0.00E+00	2.9	5.3	-1.9	-6.3	94.8	D
198	10/24/02	0.619	6	I-127	320	30.97	59.72	0	0	23.8	1.27E+04	3.03E+05	2.91E+02	2.99E+04	0	0.00E+00	6.2	5	-2.8	-8.4	93.5	D
0	10/24/02	0.619	Flux	I-127	320	30.97	59.72	0	0	10.1	1.28E+04	1.30E+05	0.00E+00	0.00E+00	0	0.00E+00	6.6	5.4	-3.9	-8.1	93.3	5.1
199	10/24/02	0.619	7	I-127	320	30.97	59.72	0	0	22.1	1.39E+04	3.07E+05	2.91E+02	3.22E+04	0	0.00E+00	2.8	5.4	-1.3	-6.9	94.5	D
200	10/24/02	0.619	8	I-127	320	30.97	59.72	0	0	22.3	1.36E+04	3.02E+05	2.90E+02	1.92E+04	0	0.00E+00	4.5	4.3	-2.8	-5.9	95	D
201	10/24/02	0.62	9	I-127	320	30.97	59.72	0	0	21.7	1.39E+04	3.03E+05	2.91E+02	3.35E+04	0	0.00E+00	1.6	4.3	-1.6	-4.3	96.1	D
0	10/24/02	0.645	Flux	Br-81	278.5	36.03	37.46	0	0	10.2	1.25E+04	1.28E+05	0.00E+00	0.00E+00	0	0.00E+00	-5.7	1.7	0.1	3.8	96	8.1
202	10/24/02	0.645	10	Br-81	278.5	36.03	37.46	0	0	24.6	1.26E+04	3.11E+05	1.82E+02	3.55E+04	0	0.00E+00	-3.9	1.1	-0.3	3	97.1	A
203	10/24/02	0.646	10	Br-81	278.5	36.03	37.46	0	0	23.3	1.30E+04	3.02E+05	1.82E+02	3.57E+04	0	0.00E+00	-2.6	1.3	0.1	1.2	98	A
204	10/24/02	0.646	10	Br-81	278.5	36.03	37.46	0	0	3.2	1.32E+04	4.24E+04	2.55E+01	3.57E+04	1	2.36E-05	1.9	0.2	-0.3	-1.8	98.5	A

International Rectifier Corp.
SEE Test Report
November 2002 - B.N.L.

Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm ² /mg	Tilt deg	Roll deg	Time sec	Flux #/cm ² /sec	Fluence #/cm ²	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm ²	Left %	Top %	Bottom %	Right %	Unif %	Center %
205	10/24/02	0.647	11	Br-81	278.5	36.03	37.46	0	0	23.5	1.29E+04	3.02E+05	1.82E+02	2.55E+04	0	0.00E+00	-3	2.4	-1.4	1.9	97.4	A
206	10/24/02	0.648	12	Br-81	278.5	36.03	37.46	0	0	23.6	1.28E+04	3.03E+05	1.82E+02	3.23E+04	0	0.00E+00	-0.3	1.8	-1.1	-0.5	98.7	A
207	10/24/02	0.649	13	Br-81	278.5	36.03	37.46	0	0	24.2	1.25E+04	3.03E+05	1.83E+02	2.47E+04	0	0.00E+00	-4.7	1.7	0.1	2.9	96.6	A
208	10/24/02	0.649	14	Br-81	278.5	36.03	37.46	0	0	1.9	1.26E+04	2.45E+04	1.48E+01	1.91E+04	1	4.09E-05	-4.7	0.8	-0.1	4	96.5	A
209	10/24/02	0.649	15	Br-81	278.5	36.03	37.46	0	0	3.5	1.30E+04	4.54E+04	2.74E+01	2.73E+04	1	2.20E-05	-0.9	2.5	-2	0.4	98.1	A
210	10/24/02	0.651	16	Br-81	278.5	36.03	37.46	0	0	2.8	1.27E+04	3.53E+04	2.13E+01	2.31E+04	1	2.83E-05	-1.2	1.9	-3	2.3	97.5	A
0	10/24/02	0.666	Flux	Au-197	333	27.53	81.44	0	0	10.2	1.08E+04	1.10E+05	0.00E+00	0.00E+00	0	0.00E+00	-3.7	-1	3	1.8	96.9	6.2
211	10/24/02	0.666	1	Au-197	333	27.53	81.44	0	0	26.5	1.12E+04	2.97E+05	3.97E+02	9.47E+04	0	0.00E+00	-2.3	-1.3	3.1	0.5	97.5	C
212	10/24/02	0.667	2	Au-197	333	27.53	81.44	0	0	29.6	1.02E+04	3.02E+05	3.96E+02	2.34E+05	0	0.00E+00	-4.4	-2.6	3.3	3.7	96	C
213	10/24/02	0.667	4	Au-197	333	27.53	81.44	0	0	28.8	1.05E+04	3.02E+05	3.96E+02	3.31E+04	0	0.00E+00	-3.9	-2.6	2.7	3.9	96.3	C
214	10/24/02	0.667	5	Au-197	333	27.53	81.44	0	0	29.1	1.04E+04	3.02E+05	3.96E+02	2.94E+04	0	0.00E+00	-3.8	-2.2	3.7	2.3	96.5	C
215	10/24/02	0.668	5	Au-197	333	27.53	81.44	0	0	29.4	1.03E+04	3.02E+05	3.96E+02	2.98E+04	0	0.00E+00	-4.7	-2.9	4.4	3.2	95.7	C
0	10/24/02	0.669	Flux	Au-197	333	27.53	81.44	0	0	10.2	2.56E+03	2.60E+04	0.00E+00	0.00E+00	0	0.00E+00	-5.2	-3.1	4.6	3.7	95.3	3.1
216	10/24/02	0.67	5	Au-197	333	27.53	81.44	0	0	106.4	2.74E+03	2.92E+05	3.94E+02	3.02E+04	0	0.00E+00	-6.2	-3.3	3.6	5.9	94.6	C
0	10/24/02	0.68	Flux	Au-197	333	27.53	81.44	0	0	10.2	1.42E+04	1.44E+05	0.00E+00	0.00E+00	0	0.00E+00	-11	-1.5	0.5	12.4	91.1	3.3
217	10/24/02	0.68	5	Au-197	333	27.53	81.44	0	0	20.6	1.48E+04	3.03E+05	3.97E+02	3.06E+04	0	0.00E+00	-5.1	0.2	2.5	2.4	96.3	C
218	10/24/02	0.681	5	Au-197	333	27.53	81.44	0	0	22.3	1.36E+04	3.03E+05	3.97E+02	3.10E+04	0	0.00E+00	-12	-1.7	1.2	12.5	90.9	C
219	10/24/02	0.681	5	Au-197	333	27.53	81.44	0	0	20.8	1.45E+04	3.03E+05	3.97E+02	3.14E+04	0	0.00E+00	-11	-2	1.4	11.4	91.6	C
220	10/24/02	0.683	6	Au-197	333	27.53	81.44	0	0	22.1	1.37E+04	3.04E+05	3.98E+02	3.03E+04	0	0.00E+00	-12	-1.4	1.8	11.2	91.4	C
221	10/24/02	0.683	6	Au-197	333	27.53	81.44	0	0	22.2	1.37E+04	3.03E+05	3.97E+02	3.07E+04	0	0.00E+00	-11	-2.4	2.6	10.9	91.6	C
222	10/24/02	0.684	7	Au-197	333	27.53	81.44	0	0	24.1	1.26E+04	3.03E+05	3.97E+02	3.26E+04	0	0.00E+00	-12	-2.3	2.1	12.2	90.9	C
223	10/24/02	0.684	8	Au-197	333	27.53	81.44	0	0	23.9	1.27E+04	3.03E+05	3.97E+02	1.96E+04	0	0.00E+00	-11	-1.7	1.6	11.1	91.6	C
224	10/24/02	0.685	9	Au-197	333	27.53	81.44	0	0	5.5	1.23E+04	6.81E+04	8.92E+01	3.36E+04	1	1.47E-05	-11	-0.3	3.1	8.3	92.3	C
225	10/24/02	0.685	10	Au-197	333	27.53	81.44	0	0	23.6	1.28E+04	3.02E+05	3.96E+02	3.61E+04	0	0.00E+00	-12	-0.7	2.7	9.7	91.7	C
226	10/24/02	0.688	11	Au-197	333	27.53	81.44	0	0	27.9	1.08E+04	3.02E+05	3.96E+02	2.58E+04	0	0.00E+00	-12	-2.2	1.8	12	91.1	C
227	10/24/02	0.688	12	Au-197	333	27.53	81.44	0	0	26.8	1.13E+04	3.02E+05	3.96E+02	3.27E+04	0	0.00E+00	-11	-2	1.5	11.7	91.4	C
228	10/24/02	0.688	13	Au-197	333	27.53	81.44	0	0	26.4	1.15E+04	3.02E+05	3.96E+02	2.51E+04	0	0.00E+00	-12	-2.3	2.6	11.5	91.2	C
229	10/24/02	0.689	13	Au-197	333	27.53	81.44	0	0	29.1	1.04E+04	3.02E+05	3.96E+02	2.55E+04	0	0.00E+00	-12	-2.4	1.4	13	90.6	C
230	10/24/02	0.69	6	Au-197	333	27.53	81.44	0	0	28.6	1.06E+04	3.02E+05	3.96E+02	3.11E+04	0	0.00E+00	-12	-1.5	0.5	12.9	90.8	C
231	10/24/02	0.691	6	Au-197	333	27.53	81.44	0	0	29.9	1.01E+04	3.02E+05	3.95E+02	3.15E+04	0	0.00E+00	-13	-3	0.9	15.2	89.5	C
232	10/24/02	0.691	7	Au-197	333	27.53	81.44	0	0	28.4	1.06E+04	3.02E+05	3.96E+02	3.30E+04	0	0.00E+00	-12	-2.7	2.1	12.6	90.7	C
233	10/24/02	0.692	7	Au-197	333	27.53	81.44	0	0	26.9	1.12E+04	3.02E+05	3.96E+02	3.34E+04	0	0.00E+00	-12	-1.3	1.2	12.5	90.8	C
234	10/24/02	0.693	14	Au-197	333	27.53	81.44	0	0	28.5	1.06E+04	3.01E+05	3.95E+02	1.95E+04	0	0.00E+00	-11	-1.4	0.8	12	91.2	C
235	10/24/02	0.694	14	Au-197	333	27.53	81.44	0	0	30.1	1.01E+04	3.02E+05	3.96E+02	1.99E+04	0	0.00E+00	-13	-2.6	1	14.1	90.1	C
236	10/24/02	0.694	14	Au-197	333	27.53	81.44	0	0	24.9	1.21E+04	3.02E+05	3.96E+02	2.03E+04	0	0.00E+00	-8.2	-0.2	2.1	6.3	94.2	C
237	10/24/02	0.695	14	Au-197	333	27.53	81.44	0	0	27.9	1.09E+04	3.03E+05	3.97E+02	2.07E+04	0	0.00E+00	-12	-1.3	1	12	91.1	C
238	10/24/02	0.697	14	Au-197	333	27.53	81.44	0	0	32.8	9.21E+03	3.02E+05	3.95E+02	2.11E+04	0	0.00E+00	-6.9	0	0.2	6.7	94.7	C
239	10/24/02	0.697	14	Au-197	333	27.53	81.44	0	0	26.5	1.14E+04	3.03E+05	3.97E+02	2.15E+04	1	3.30E-06	5.1	3.3	-2	-6.4	95	C
240	10/24/02	0.698	15	Au-197	333	27.53	81.44	0	0	26.5	1.14E+04	3.03E+05	3.97E+02	2.77E+04	0	0.00E+00	5.6	3.2	-0.7	-8.1	94.2	C
241	10/24/02	0.699	15	Au-197	333	27.53	81.44	0	0	26.9	1.12E+04	3.02E+05	3.96E+02	2.80E+04	0	0.00E+00	5	3.9	-1.2	-7.7	94.3	C
242	10/24/02	0.699	16	Au-197	333	27.53	81.44	0	0	26.4	1.15E+04	3.02E+05	3.96E+02	2.35E+04	0	0.00E+00	5.6	3.8	-0.8	-8.6	93.8	C
243	10/24/02	0.7	16	Au-197	333	27.53	81.44	0	0	29.4	1.03E+04	3.03E+05	3.96E+02	2.39E+04	0	0.00E+00	2.2	3.2	-0.5	-4.9	96.2	C
244	10/24/02	0.701	17	Au-197	333	27.53	81.44	0	0	7	1.09E+04	7.65E+04	1.00E+02	2.18E+04	1	1.31E-05	4.4	4.3	-0.4	-8.3	94	C
0	10/24/02	0.701	Flux	Au-197	333	27.53	81.44	0	0	10.2	1.10E+04	1.11E+05	0.00E+00	0.00E+00	0	0.00E+00	3.9	2.6	-0.5	-6	95.7	4.5
245	10/24/02	0.702	18	Au-197	333	27.53	81.44	0	0	28.8	1.06E+04	3.05E+05	3.95E+02	1.80E+04	0	0.00E+00	0.8	3.5	-0.1	-4.2	96.4	C

International Rectifier Corp.
 SEE Test Report
 November 2002 - B.N.L.

Run #	Date	Time	Device ID	Ion	Energy MeV	Range μm	LET(Si) MeV.cm2/mg	Tilt deg	Roll deg	Time sec	Flux #/cm2/sec	Fluence #/cm2	Dose RAD(Si)	TotalDose RAD(Si)	Upsets	CrossSec cm2	Left %	Top %	Bottom %	Right %	Unif %	Center %
246	10/24/02	0.716	1	Au-197	333	27.53	81.44	0	0	29.9	1.01E+04	3.02E+05	3.96E+02	4.75E+04	0	0.00E+00	0.9	3.6	-0.1	-4.3	96.3	C
247	10/24/02	0.717	1	Au-197	333	27.53	81.44	0	0	28.1	1.07E+04	3.02E+05	3.95E+02	4.79E+04	0	0.00E+00	2.7	3.5	0	-6.1	95.4	C
248	10/24/02	0.717	1	Au-197	333	27.53	81.44	0	0	26.9	1.13E+04	3.02E+05	3.96E+02	4.83E+04	0	0.00E+00	4.4	3.3	-0.7	-6.9	95	C
249	10/24/02	0.718	1	Au-197	333	27.53	81.44	0	0	26.6	1.14E+04	3.03E+05	3.97E+02	4.87E+04	0	0.00E+00	4.9	4	-1.1	-7.8	94.3	C
250	10/24/02	0.719	1	Au-197	333	27.53	81.44	0	0	26.1	1.16E+04	3.02E+05	3.96E+02	4.91E+04	0	0.00E+00	6.1	3.4	-1.9	-7.6	94.2	C
251	10/24/02	0.719	1	Au-197	333	27.53	81.44	0	0	1.8	1.11E+04	2.05E+04	2.69E+01	4.91E+04	1	4.87E-05	3.6	4	2.8	-10.5	92.5	C
252	10/24/02	0.72	2	Au-197	333	27.53	81.44	0	0	29.2	1.03E+04	3.02E+05	3.96E+02	4.33E+04	0	0.00E+00	2	3	0.4	-5.4	95.9	C
253	10/24/02	0.721	3	Au-197	333	27.53	81.44	0	0	28.8	1.05E+04	3.02E+05	3.96E+02	3.04E+04	0	0.00E+00	2.8	4	-1.3	-5.4	95.7	C
254	10/24/02	0.722	4	Au-197	333	27.53	81.44	0	0	26.9	1.12E+04	3.02E+05	3.96E+02	3.16E+04	0	0.00E+00	3.7	2.6	0.1	-6.3	95.5	C
255	10/24/02	0.728	1	Au-197	333	27.53	81.44	0	0	9.1	1.01E+04	9.20E+04	1.21E+02	4.93E+04	1	1.09E-05	4.4	2	0.1	-6.4	95.4	C
0	10/24/02	0.729	Flux	Au-197	333	27.53	81.44	0	0	10.2	1.07E+04	1.09E+05	0.00E+00	0.00E+00	0	0.00E+00	9.2	1.3	-2	-8.6	93.1	2.2
256	10/24/02	0.73	2	Au-197	333	27.53	81.44	0	0	10.7	1.08E+04	1.16E+05	1.55E+02	4.35E+04	1	8.63E-06	8.9	2.3	-2.1	-9.1	92.9	C
257	10/24/02	0.73	3	Au-197	333	27.53	81.44	0	0	28.6	1.06E+04	3.02E+05	3.96E+02	3.08E+04	0	0.00E+00	8.1	2.6	-1.8	-8.8	93.3	C
258	10/24/02	0.731	3	Au-197	333	27.53	81.44	0	0	30.3	9.96E+03	3.02E+05	3.95E+02	3.12E+04	0	0.00E+00	4.8	3	-0.5	-7.3	94.7	C
259	10/24/02	0.731	3	Au-197	333	27.53	81.44	0	0	31.4	9.63E+03	3.02E+05	3.96E+02	3.15E+04	0	0.00E+00	3.3	3.4	-0.1	-6.6	95.2	C
260	10/24/02	0.732	4	Au-197	333	27.53	81.44	0	0	32.7	9.24E+03	3.02E+05	3.96E+02	3.20E+04	0	0.00E+00	0.5	3	0.9	-4.4	96.3	C
261	10/24/02	0.738	1	Au-197	333	27.53	81.44	0	0	17.7	9.09E+03	1.61E+05	2.11E+02	4.95E+04	1	6.23E-06	1.9	3.1	-0.3	-4.8	96.3	C
262	10/24/02	0.739	2	Au-197	333	27.53	81.44	0	0	33	9.14E+03	3.02E+05	3.95E+02	4.39E+04	0	0.00E+00	2.5	3.9	0.1	-6.6	95.1	C
263	10/24/02	0.74	3	Au-197	333	27.53	81.44	0	0	31.5	9.57E+03	3.02E+05	3.95E+02	3.19E+04	0	0.00E+00	4	3.4	-0.2	-7.2	94.8	C
264	10/24/02	0.74	4	Au-197	333	27.53	81.44	0	0	28.5	1.06E+04	3.02E+05	3.96E+02	3.24E+04	0	0.00E+00	10.5	2.7	-3.4	-9.8	92	C

Appendix C

International Rectifier

Test Plan

and

Procedure

Test Plan, Single Event Effects (BNL, TDVG Accelerator)

1.0 Purpose

The purpose of this test is to characterize and establish Single Event Effects (SEE) Safe-Operating-Area (SOA) curves for several International Rectifier Corp. (IR) Power MOSFET devices. The data resulting from the tests shall be used for qualification to several US Government military slash sheets and shall be incorporated in the IR data sheets.

2.0 Test Responsibility

IR shall be responsible for conducting the tests, which shall be performed at the Brookhaven National Laboratory (BNL), Tandem Van De Graaff (TDVG) Accelerator. IR shall be responsible for the SEE testing of devices-under-test (DUT) and final Test Report.

3.0 Test Facility

3.1 Accelerator

The Brookhaven National Laboratory, Tandem Van De Graaff Accelerator (TDVG) shall be used to provide the necessary ion species and energy. Brookhaven National Laboratory (BNL) shall provide adequate dosimeter for verification of the ion beam parameters.

3.2 Test Equipment

The necessary test equipment including the test interface board, cables, power supplies, etc. shall be provided by IR. IR shall provide the equipment needed to de-lid and handle the individual test devices.

4.0 Test Devices

4.1 The following device types are planned for characterization :

IRH7970Z4	(Hex-Z, 60V, P-channel, R7, LOGIC Process)	Depletion Depth=9 μ m typical
IRH597064	(Hex-6, 60V, P-channel, R5, MR Process)	Depletion Depth=9 μ m typical
IRH770Z4	(Hex-Z, 60V, N-channel, R7, LOGIC Process)	Depletion Depth=7 μ m typical
IRH67G30	(Hex-3, 1000V, N-channel, R6, MR Process)	Depletion Depth=110 μ m typical

4.2 All devices shall be built in TO-3 packages. The devices shall be properly sealed and packed for transportation to BNL.

4.3 All devices shall be verified for correct electrical performance prior to arrival at BNL.

5.0 Test Method

The MIL-STD-750, Method 1080 shall be used to set procedure for all testing described herein.

6.0 Ion Specie and Energy

There are three (3) available ion specie, each with different energy level, at BNL. All parts will be first tested with one specie of lowest energy (LET) level before the TDVG is switched to the next ion specie with higher energy level.

a. Bromine	$_{35}\text{Br}^{79}$	Energy = 309 MeV	LET = 36.7 MeV/(mg/cm ²)	Range = 39.5 μ m
b. Iodine	$_{63}\text{I}^{127}$	Energy = 341 MeV	LET = 59.8 MeV/(mg/cm ²)	Range = 32.5 μ m
c. Gold	$_{79}\text{Au}^{197}$	Energy = 350 MeV	LET = 82.3 MeV/(mg/cm ²)	Range = 28.4 μ m

7.0 Record Keeping

Each irradiation shall be assigned a run number. This number will be used to correlate data from different sources.

7.1 TDVG Output

The TDVG shall provide a hardcopy summary of all test runs showing key parameters such as run, date, time, flux, fluence, ion, energy, LET, and range. A separate output of beam diagnostics shall also be provided.

7.2 IR Output

IR shall also keep a written log of each run including run, ion, device tested, VDS and VGS biases. IR shall also record comments regarding the test including observations or deviations from test plan.

8.0 Characterizations and Verification

Characterization and Verification may be accomplished simultaneously. Characterization implies that the SOA curve is set using at least one (1) device at each insitu bias. Verification is simply an extension of the characterization, demonstrating two (2) additional devices passing at each insitu bias, for a total of three (3) devices per insitu bias condition.

9.0 Test Procedure

The IR Product Engineer assigned to this test shall control the following test procedure based on Test Method 1080. IR shall be responsible to direct the ion specie, beam characteristics, insitu bias conditions and device selection.

9.1 Nominal Beam Characteristics are :
Flux = 1×10^4 (1E4) ions/cm²/sec.
Fluence = 3×10^5 (3E5) ions/cm².
Beam Diameter = 1.5 cm.

9.2 Initial Starting Point : typically at VDS = Rated VDS and VGS = 0.

9.3 Irradiate the device at the selected flux and fluence.

9.4 Post irradiation, test IGSS at VGS = 20 V.

9.5 Based on apparent pass or fail, select next operating conditions.

9.6 Repeat with new device.

10. Test Report

The Test Report shall include the following information :

- a. Device Type(s), serial numbers, wafer lot identification, date code (if applicable).
- b. Test dates and personnel names.
- c. Facility, accelerator type.
- d. Ion specie, energy, LET, range, flux and fluence.
- e. Schematic of test circuit used.
- f. Dosimeter for each ion beam used.
- g. Insitu bias conditions.
- h. Comments and observations.
- i. Pre and post electrical test results.
- j. Summary description including curves.

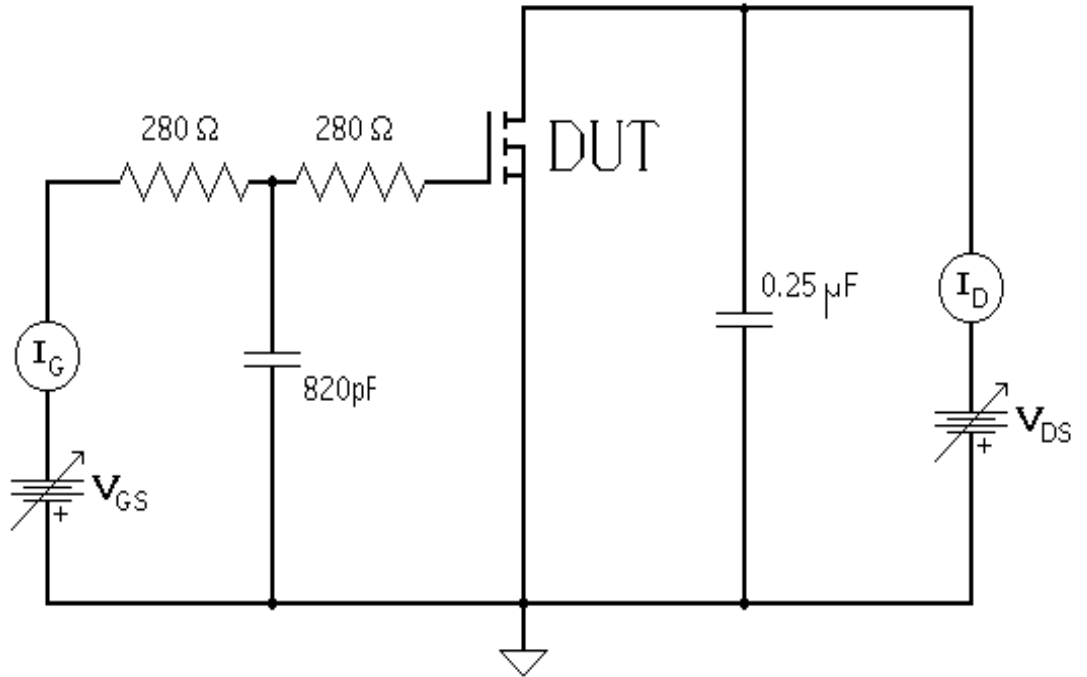
Appendix D

Test Circuit

Schematic

Diagram

Reference: MIL-STD-750, Method 1080
Details of Test Method can be reviewed from DSCC Website:
www.dscclla.Downloads/MilSpec/Docs/MIL-STD-750/std750_1000.pdf



Test Circuit Schematic Diagram

Appendix E

BNL TVDG

Ion Species, Surface LET and Range



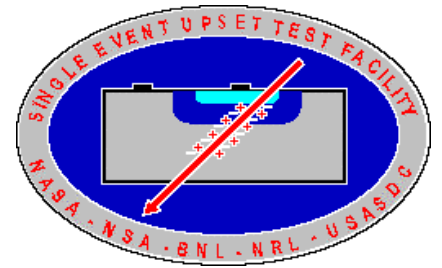
Available Ion Species

Z	Symbol	Mass AMU	Max Energy MeV	In Silicon		In GaAs		
				Surface LET MeV mg/cm ²	Range Microns	Surface LET MeV mg/cm ²	Range Microns	
1	¹ H ¹	1.0079	29	28.77	0.015	4591	0.012	2660
1	² D ²	2.0140	29	14.40	0.026	2699	0.017	1620
3	⁷ Li ⁷	7.0160	58	8.27	0.366	403	0.269	250
5	¹¹ B ¹¹	11.0093	87	7.90	1.04	220	0.766	138
6	¹² C ¹²	12.0000	102	8.50	1.42	193	1.04	120
7	¹⁴ N ¹⁴	14.0067	116	8.28	1.95	163	1.43	102
8	¹⁶ O ¹⁶	15.9994	131	8.19	2.53	145	1.86	90.8
9	¹⁹ F ¹⁹	18.9954	145	7.63	3.31	126	2.43	79.8
11	²³ Na ²³	22.9898	170	7.39	4.88	105	3.51	69.3
12	²⁴ Mg ²⁴	23.9927	180	7.50	5.65	97.2	4.14	61.8
13	²⁷ Al ²⁷	26.9815	192	7.12	6.70	89.7	4.90	57.4
14	²⁸ Si ²⁸	28.0855	203	7.23	7.55	85.3	5.51	54.6
15	³¹ P ³¹	30.9738	206	6.65	8.88	76.0	6.46	49.1
16	³² S ³²	31.9822	217	6.79	9.79	73.4	7.13	47.4
17	³⁵ Cl ³⁵	34.9688	224	6.41	11.1	68.5	8.08	44.4
19	³⁹ K ³⁹	38.9637	235	6.03	13.7	60.9	9.90	39.9
20	⁴⁰ Ca ⁴⁰	39.9753	242	6.05	14.8	58.7	10.7	38.5
21	⁴⁵ Sc ⁴⁵	44.9559	242	5.38	16.7	54.1	12.0	35.8
22	⁴⁸ Ti ⁴⁸	47.9479	253	5.28	18.1	53.2	13.0	35.4
23	⁵¹ V ⁵¹	50.9420	253	4.97	19.7	50.1	14.1	33.5
24	⁵² Cr ⁵²	51.9405	264	5.08	20.8	49.9	14.9	33.3
25	⁵⁵ Mn ⁵⁵	54.9380	264	4.81	22.5	47.4	16.1	31.9



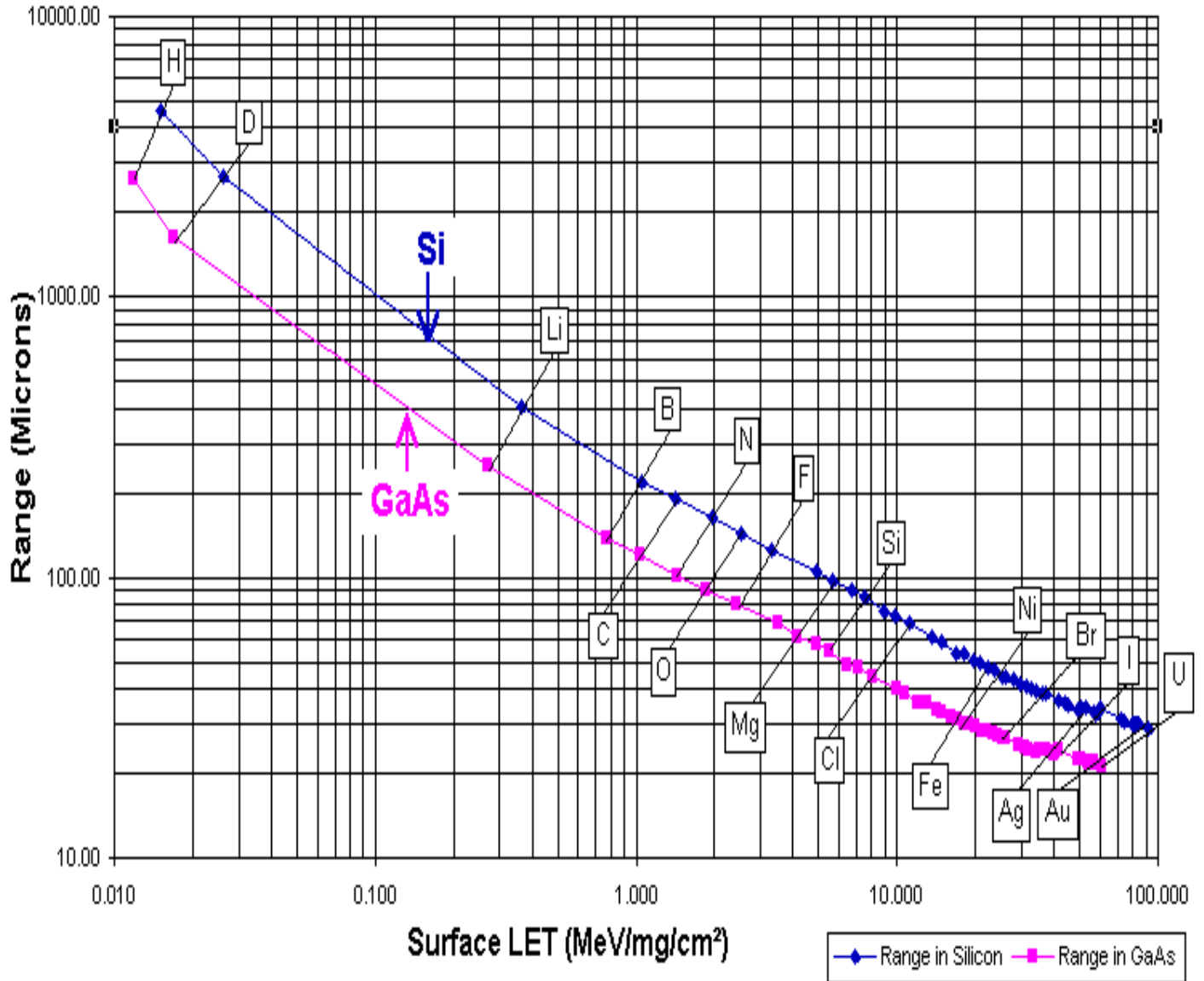
Available Ion Species

Z	Symbol	Mass AMU	Max		In Silicon		In GaAs	
			Energy MeV	Energy <u>MeV</u> AMU	Surface LET <u>MeV</u> mg/cm ²	Range Microns	Surface LET <u>MeV</u> mg/cm ²	Range Microns
26	⁵⁶ Fe	55.9349	270	4.83	23.7	46.4	17.0	31.2
27	⁵⁹ Co	58.9332	270	4.58	25.4	44.4	18.1	30.0
28	⁵⁸ Ni	57.9353	280	4.83	26.3	44.3	18.8	29.9
29	⁶³ Cu	62.9296	285	4.53	28.0	43.4	20.0	29.4
30	⁶⁴ Zn	63.9291	285	4.46	29.4	41.9	21.0	28.4
31	⁶⁹ Ga	68.9257	290	4.21	31.2	41.3	22.1	28.2
32	⁷² Ge	71.9221	290	4.03	32.7	40.0	23.3	27.6
33	⁷⁵ As	74.9216	295	3.94	34.2	39.6	24.2	27.2
34	⁸⁰ Se	79.9165	295	3.69	35.9	38.6	25.3	26.7
35	⁷⁹ Br	78.9183	305	3.86	36.9	38.7	26.1	26.7
38	⁸⁸ Sr	87.9056	305	3.47	41.4	36.3	29.0	25.3
40	⁹⁰ Zr	89.9047	315	3.50	43.9	35.7	30.8	24.9
41	⁹³ Nb	92.9060	313	3.37	45.3	34.9	31.7	24.4
44	¹⁰² Ru	101.9043	320	3.14	49.3	34.0	34.3	23.9
45	¹⁰³ Rh	102.9055	330	3.21	50.4	34.3	35.2	24.1
47	¹⁰⁷ Ag	106.9051	345	3.23	52.9	34.5	36.9	24.2
50	¹²⁰ Sn	119.9022	340	2.84	56.6	33.2	39.2	23.6
51	¹²¹ Sb	120.9038	340	2.81	57.8	32.7	40.0	23.3
52	¹³⁰ Te	129.9062	350	2.69	58.9	33.5	40.7	23.9
53	¹²⁷ I	126.9045	370	2.92	60.1	34.3	41.7	24.3
65	¹⁵⁹ Tb	158.9250	370	2.33	72.4	31.2	49.5	22.5
67	¹⁶⁵ Ho	164.9303	370	2.24	74.2	30.8	50.5	22.3
73	¹⁸¹ Ta	180.9480	375	2.07	79.2	30.2	53.7	21.9
74	¹⁸⁴ W	183.9510	375	2.04	79.9	30.1	54.1	21.9
75	¹⁸⁷ Re	186.9560	372	1.99	80.5	29.8	54.4	21.7
76	¹⁹² Os	191.9614	377	1.96	81.3	30.0	54.9	21.9
77	¹⁹³ Ir	192.9633	377	1.95	82.1	29.8	55.4	21.7
78	¹⁹⁵ Pt	194.9648	380	1.95	83.0	29.8	56.0	21.8
79	¹⁹⁷ Au	196.9665	390	1.98	84.1	30.2	56.8	22.0
92	²³⁸ U	238.1243	385	1.62	91.3	29.1	60.8	21.4



Range vs Surface LET

For typical TVDG ions.



Appendix F

Post-SEE

Electrical

Measurements

RadHard MOSFET - LOGIC R7, Hex Z, 60V, P-channel								
Post - SEE Electricals Data								
Parameter	I GSSf	I GSSr	V GS(th)	BV DSS	I DSS	R DS(on)	V SD	
Conditions	VGS=12V VDS=0V	VGS=-12V VDS=0V	VDS=VGS ID=250µA	IDSS=250µA	VDS=48V VGS=0V	ID=0.4A VGS=10V	IS=0.6A VGS=0V	
Limits	100 nA Max	-100 nA Max	0.5 V to 1.8 V	60 V Min	10 µA Max	1.20 Ω Max	5.0 V Max	
Unit	nA	nA	V	V	nA	Ω	V	
DUT Serial								
H 2	0.68	0.00	1.235	63.73	3.08	1.03	2.12	
H 3	0.68	0.00	1.228	63.75	2.54	1.04	2.11	
H 5	0.63	0.00	1.221	64.25	3.09	1.04	2.10	
H 6	0.57	0.00	1.433	64.55	2.36	1.06	2.26	
H 8	0.01	0.00	1.411	64.11	2.54	0.91	2.16	
H 9	0.00	0.00	1.440	64.91	2.67	1.02	2.23	
H 11	999900.00	999900.00	1.440	0.00	#####	5.79	1.15	Mech. Damaged
H 12	0.06	0.00	1.414	63.70	1.75	0.95	2.17	
H 14	1.13	0.00	1.381	63.16	1.98	0.92	2.06	
H 15	0.49	0.00	1.420	64.24	2.43	0.93	2.15	
H 17	0.53	0.00	1.398	64.65	2.52	0.99	2.14	
I 2	0.67	0.00	1.241	63.82	1.53	0.98	2.08	
I 3	0.68	0.00	1.216	64.13	3.95	0.98	2.06	
I 4	0.55	0.00	1.208	63.82	1.60	0.98	2.06	
I 9	999900.00	999900.00	0.000	64.63	5.02	72.67	2.23	Mech. Damaged
I 10	0.41	0.00	1.414	64.61	4.70	1.04	2.24	
I 11	0.44	0.00	1.438	63.52	1.76	1.01	2.18	
I 14	0.21	0.00	1.390	63.22	4.53	1.05	2.11	
I 16	0.01	0.00	1.374	63.44	115.70	1.98	2.28	
I 17	0.42	0.00	1.378	63.31	1.75	0.86	2.08	
J 1	0.78	0.00	1.230	64.32	124.90	1.01	2.06	
J 2	0.67	0.00	1.231	63.81	2.55	1.06	2.14	
J 3	0.00	0.00	1.438	64.93	2.04	1.09	2.26	

RadHard MOSFET - R5, Hex 6, 60V, P-channel									
Post - SEE Electricals Data									
Parameter	I GSSf	I GSSr	I DSS	BV DSS	V GS(th)	R DS(on)	R DS(on)	V SD	
Conditions	VGS=20V VDS=0V	VGS=-20V VDS=0V	VGS=48V VGS=0V	IDSS=1mA	ID=1mA VDS=VGS	ID=63A VGS=12V	ID=75A VGS=12V	ID=75A VGS=0V	
Limits	100 nA Max	-100 nA Max	10 μ A Max	60 V Min	2.0 V to 4.0 V	25 m Ω Max	35 m Ω Max	5.0 V Max	
Unit	nA	nA	nA	V	V	m Ω	m Ω	V	
Ser#									
WL#	B1	1.550	15.950	3.699	63.52	2.912	9.233	9.082	3.033
Wwafer Lot ER30751	B2	1.579	0.600	505.000	62.89	2.921	9.326	9.228	3.041
	B3	5.179	1.650	3.919	62.71	2.910	9.446	9.286	3.125
	B4	1.795	0.850	1.470	62.77	2.875	9.803	9.586	3.106
	B6	30.700	2.620	4.245	62.83	2.838	9.142	8.986	2.991
	B7	1.229	0.000	11.850	63.41	2.952	9.336	9.185	3.051
	B8	20.200	24.800	1420.000	63.13	2.881	9.430	9.262	3.047
	B11	0.515	4.020	11.850	63.05	2.920	9.503	9.344	3.040
	B12	18.490	12.240	39.350	63.67	2.923	9.596	9.450	2.980
	B13	18.000	23.200	5999.000	63.11	2.914	9.484	9.333	3.042

International Rectifier Corp.
SEE Test Report
November 2002 - B.N.L.

RadHard MOSFET - R5, Hex 6, 60V, P-channel

Post - SEE Electricals Data										
Parameter	I GSSf	I GSSr	I DSS	BV DSS	V GS(th)	R DS(on)	R DS(on)	V SD		
Conditions	VGS=20V VDS=0V	VGS=-20V VDS=0V	VDS=48V VGS=0V	IDSS=1.0mA	VDS=VGS ID=1.0mA	ID=45.5A VGS=12V	ID=72A VGS=12V	IS=0.72A VGS=0V		
Limits	100 nA Max	-100 nA Max	10 µA Max	60 V Min	2.0 V to 4.0 V	25 mΩ Max	35 mΩ Max	5.0 V Max		
Unit	nA	nA	nA	V	V	mΩ	mΩ	V		
WL#	Ser#									
Wwafer lot ER24461	D1	31.890	22.390	2006.000	63.39	2.709	9.714	9.668	3.015	
	D2	1.159	0.060	2089.000	63.61	2.691	9.612	9.520	3.025	
	D3	8.399	21.250	1.327	63.45	2.710	9.855	9.770	2.956	
	D10	33.600	23.350	4.072	63.30	3.529	11.420	11.290	3.087	
	D11	28.200	1.300	1.727	63.27	3.525	10.890	10.790	3.069	
	D12	29.790	8.590	4.484	63.27	2.750	10.640	10.470	3.088	
	D18	1.679	1.190	10.170	63.51	2.718	9.873	9.772	2.948	
	D19	2.239	0.270	1289.000	63.44	2.711	10.030	9.934	2.965	
	D20	3.509	2.270	5.303	63.65	2.688	9.650	9.561	3.069	
	D23	28.290	7.030	4.587	63.27	2.757	10.400	10.260	3.062	
	D25	1.599	23.150	2.705	63.98	2.745	10.890	10.720	3.209	
	D26	6.880	4.190	269.000	64.71	2.761	10.900	10.740	3.201	
	D27	35.690	4.400	2.968	63.23	3.519	11.100	11.380	3.192	
	D28	1.719	2.000	2.984	63.34	3.510	10.970	10.860	3.147	
	D29	2.130	14.090	5.490	63.14	2.744	10.630	10.470	3.135	
	D35	1.212	18.800	7.650	63.76	2.728	10.220	10.100	3.140	
	D36	2.349	0.510	16.290	64.05	2.759	10.870	10.700	3.178	
	D37	0.909	2.330	22.230	63.47	3.502	10.710	10.620	3.169	
	D38	2.290	20.390	7.520	63.19	2.749	10.600	10.440	3.097	
D39	30.400	1.220	6.835	63.48	3.456	11.650	11.520	3.189		
Wwafer lot ER25077	E1	1.165	10.590	5.839	63.40	2.896	9.582	9.414	3.238	
	E2	2.815	1.950	2.285	63.03	2.889	9.436	9.273	3.234	
	E3	4.239	0.590	2.799	63.81	2.911	9.579	9.418	3.187	
	E5	33.690	4.250	1.399	62.75	2.887	9.714	9.554	3.006	
	E6	6.139	1.950	3.519	62.93	2.939	9.615	9.458	3.122	
	E7	0.990	1.710	2.015	64.02	2.908	9.682	9.516	3.259	
	E8	1.060	18.390	3.220	63.90	2.913	9.547	9.397	3.240	
	E9	1.485	18.550	2.560	63.46	3.570	9.931	9.781	2.947	
	E10	30.590	7.890	1.252	63.80	3.574	10.050	9.889	2.959	
	E11	1.279	0.800	1.766	64.23	3.563	9.947	9.794	3.007	
	E12	2.439	2.650	2.150	63.21	3.571	9.828	9.685	2.941	
	E13	32.790	7.190	1.123	64.13	3.598	9.928	9.778	2.963	
	E14	3.900	1.140	1.279	63.69	3.629	10.000	9.852	2.967	
	E15	32.630	11.890	1.035	63.99	3.562	10.030	9.865	3.097	
	E16	32.420	13.890	1.285	63.92	3.563	9.976	9.820	3.066	
	E17	31.190	11.190	1.413	63.74	3.571	9.865	9.708	3.046	
	E18	0.140	0.500	1.996	63.21	3.622	9.957	9.793	2.982	
	E22	999900.000	999900.000	231000.000	63.49	2.903	9.504	9.353	3.206	No Lid On - Device blown.
	E23	17.590	3.200	5.262	62.88	2.941	9.598	9.450	3.103	
	E24	3.225	1.930	3.467	63.99	2.923	9.834	9.676	3.277	
E27	32.500	9.500	2.109	63.05	3.543	9.906	9.753	2.891		
E28	3.012	0.730	2.229	64.29	3.570	9.963	9.812	3.013		
E29	1.320	21.690	3.070	64.70	3.569	9.888	9.741	3.020		
E36	7.600	3.200	6.999	63.47	2.907	9.453	9.301	3.183		
E37	2.394	0.550	7.891	64.13	2.919	9.733	9.578	3.277		
E38	37.900	9.020	1906.000	63.09	3.573	10.030	9.874	2.907		