International
IOR Rectifier

IRUH33P253B1M
(OMR9601SC)

Hybrid Linear Regulator

Single-Event Test Report

December 2005

International Rectifier currently does not have a DSCC approved Radiation Hardness Assurance Program for MIL-PRF-38534.

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INTRODUCTION

On December 7, International Rectifier Corp. (IR) tested the IRUH33P253B1M for Single Event Effects (SEE) hardness. The irradiation was performed at Texas A&M SEU Test Facility. During the SEE testing, 9 devices were selected and grouped into 3 to determine the single event effects for the minimum, nominal, and maximum input voltages. While the devices were being bombarded with the selected heavy ions, they also were being monitored for single event latch ups (SEL) and/or single event transients (SET). The Krypton (Kr), Xenon (Xe), and Gold (Au) ion species were selected to determine or qualify the SEE hardness of the linear regulator product type. The energy levels, Linear Energy Transfer (LET), and the Range of penetration for all ion particles chosen are defined in the table shown below.

Ion Species

Ions	Energy (MeV)	Angle (^{o})	Effective LET (MeV (mg/cm^2))	Range in Si (µ)
^{84}Kr	1032	0	27.8	134
^{129}Xe	1512	0	51.5	120
^{197}Au	2247	0	85.4	118

TEST PLAN

The complete Test Plan is included in Appendix B. In summary, the SEE testing was conducted while the devices were being monitored in situ. Each device selected was tested at least twice to monitor both positive and negative transients. All transients greater than 180mV were counted and recorded. All devices were grouped and tested based on 3 input voltages for qualification. Once devices were exposed to the specified ion particle, they were to be electrically tested at room temperature before proceeding to the next ion particle.

RESULTS

All devices were tested to a maximum LET of 85.4 MeV and did not have any occurrence of single event latch-up (SEL) over the entire input voltage range. The device can be considered latch-up immune up to 85 MeV over the entire input voltage range. During all single event exposures, none of the devices under test experienced any catastrophic event which would cause the part to be non functional.

The single event transient (SET) results show the part is sensitive to the amplitude of the input voltage. All devices were initially tested with 7 volts input with a 1 amp load while exposed to a linear energy transfer (LET) of 27.8MeV using the krypton ion beam. At 7 volts input, 0 positive transients occurred for all 3 devices with an LET exposure of 27.8 MeV. At the 51.5 MeV level, the devices were immune to the maximum input voltage 3.6 volts. At the 85.4 MeV level all devices tested were immune at 3.6 volts.

The results show the parts to be SET immune for the nominal (3.3V) and minimum (2.9V) input voltages. The results did not show any negative transients greater than 180mV at any input voltage.

When monitoring the transients, the oscilloscope in the test rack was set to detect and captured positive and negative transients for every run which would count in parallel with a frequency counter. The worst case bias for single-event transients was present when applying an input voltage set at 7 volts. The closer the input voltage got to 7 volts, the more susceptible the device was to SETs'. Below are some of the transient waveforms that were captured by the PXI test system.

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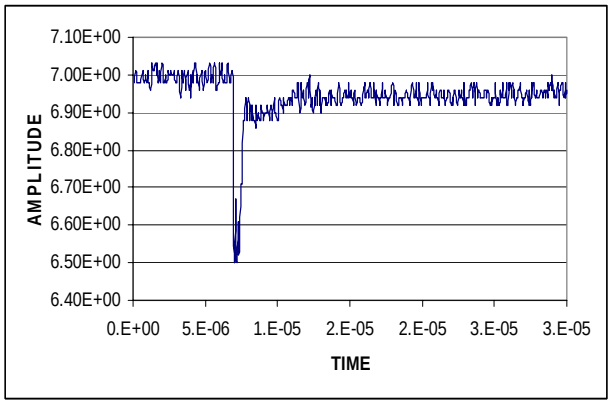
RUN #	ION SPECIE	LET	RANGE	S/N
48, 50	Xe	51.5MeV	120um	1748

S/N 48 INPUT TRANSIENT VIN = 7.0 V



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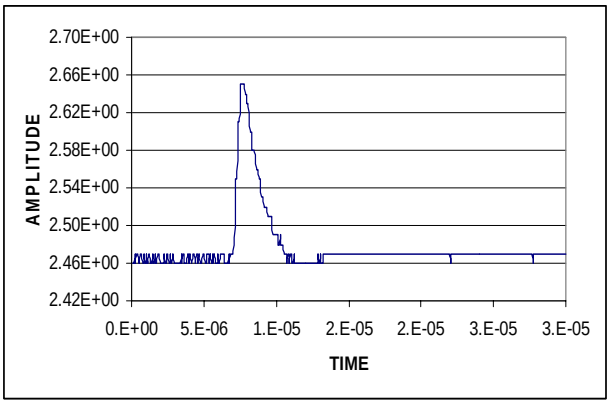
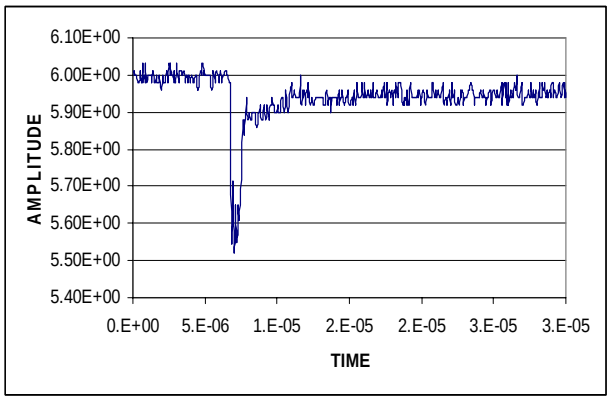
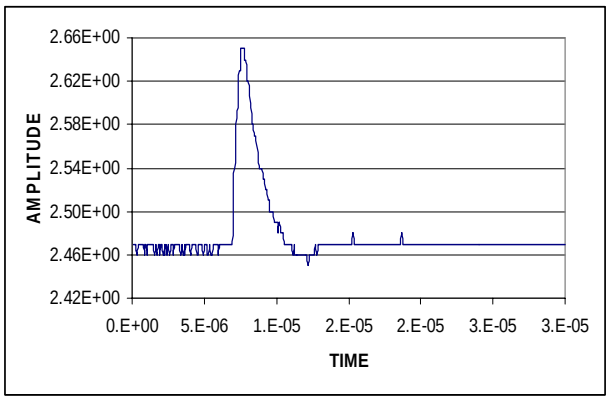


S/N 50 INPUT TRANSIENT VIN = 6.0 V

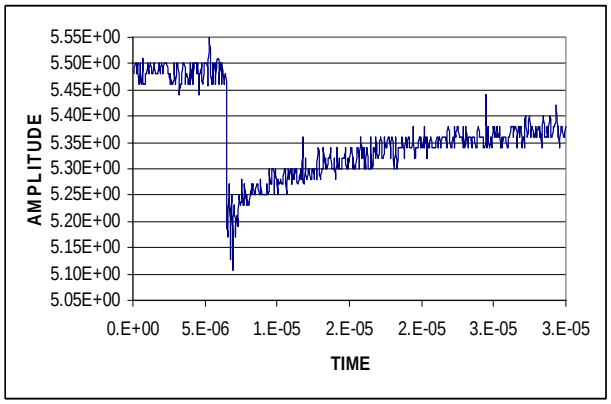


S/N 450 OUTPUT TRANSIENT VIN = 6.0 V

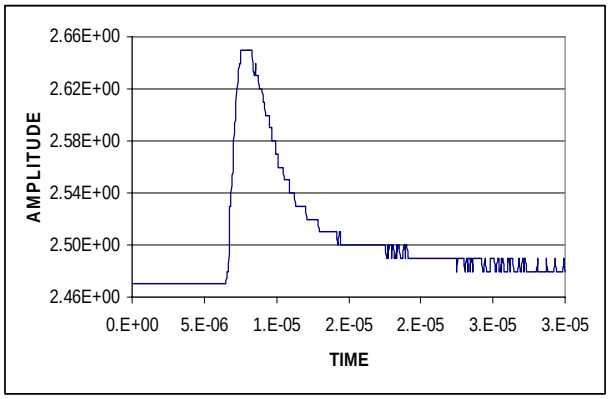


RUN #	ION SPECIE	LET	RANGE	S/N
53, 54	Xe	51.5MeV	120um	1756

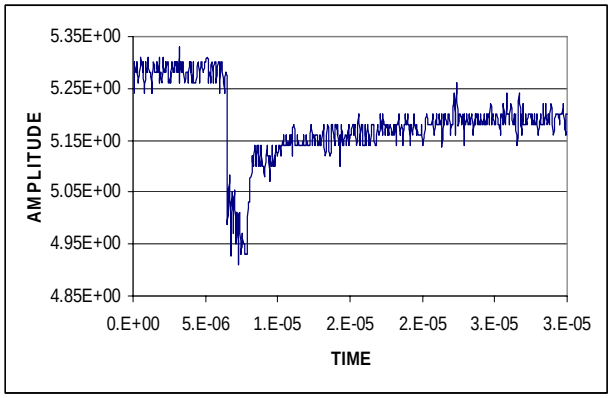
S/N 53 INPUT TRANSIENT VIN = 5.5 V



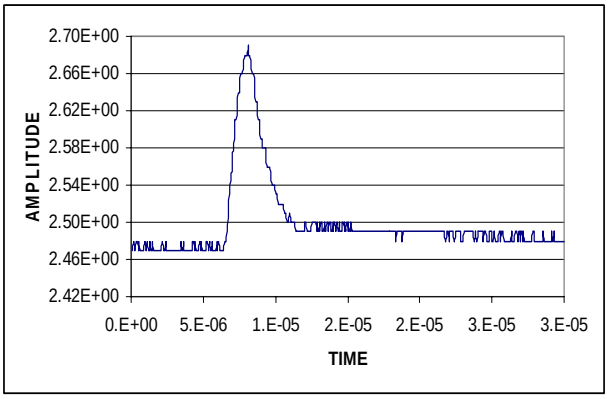
S/N 53 OUTPUT TRANSIENT VIN = 5.5 V



S/N 54 INPUT TRANSIENT VIN = 5.25 V



S/N 54 OUTPUT TRANSIENT VIN = 5.25 V



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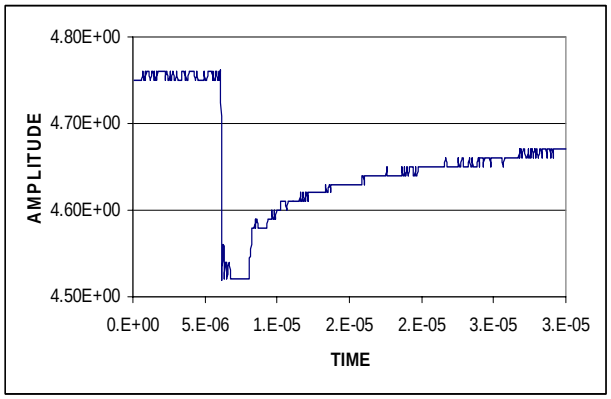
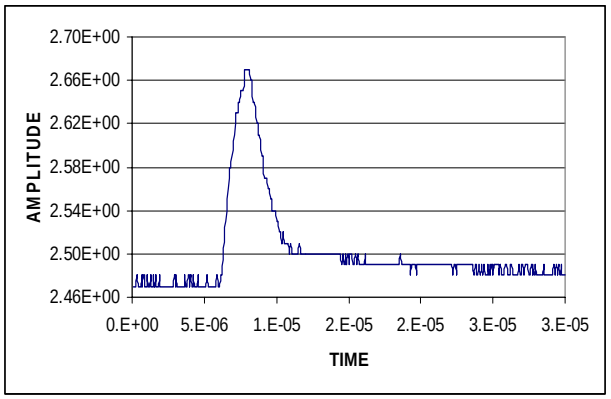
RUN #	ION SPECIE	LET	RANGE	S/N
55, 57	Xe	51.5MeV	120um	1756

S/N 55 INPUT TRANSIENT VIN = 4.75 V



S/N 55 OUTPUT TRANSIENT VIN = 4.75 V



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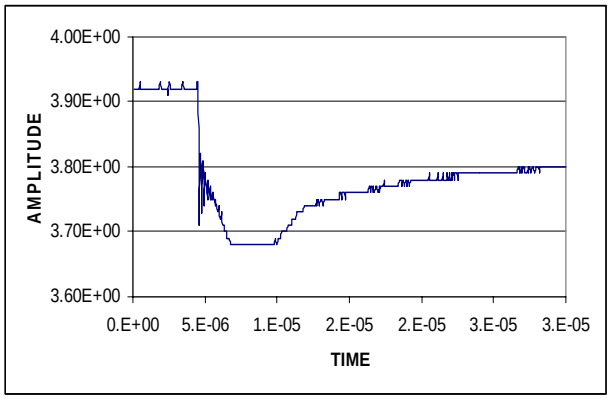
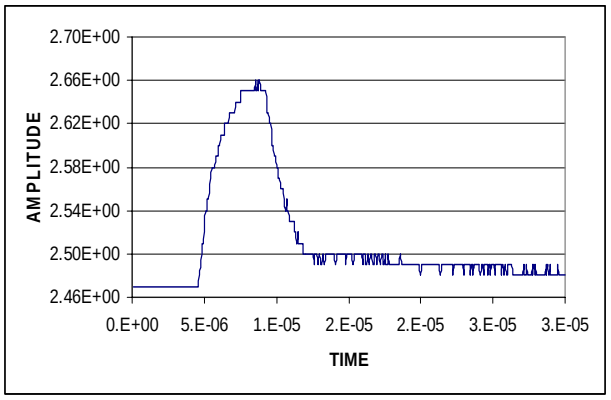


S/N 57 OUTPUT TRANSIENT VIN = 4.0 V



SUMMARY

Nine devices of part number IRUH33P253B1M, a positive fixed hybrid regulator were evaluated for Single-Event Transients (SET) and Single-Event Latch Up (SEL) with heavy ions. International Rectifier conducted the SET and SEL tests on December 07, 2005 at Texas A&M University. Both the Input and Output of the device under test were monitored for voltage change, current change, and transients. The devices were exposed to Krypton, Xenon, and Gold ions in open-air with a heat sink applied to every device under test.

Data does not indicate any SEL event up to a LET of 85.4 MeV under a constant resistive load current.

Transients were captured and recorded at a period of ~30us / frame.
Post irradiation tests resulted in all devices passing their specification limits.

The minimum and nominal voltages were 2.9 volts and 3.3 volts which were regulating under a continuous 3 amp load. When determining the maximum input voltage, the output load was a continuous 1 amp load. Under this condition, 3.6 volts was the maximum input voltage that showed immunity to transients with an LET of 85.4 MeV.

All devices were electrically tested and passed all specification limits after completing single event testing for each ion beam. Part number IRUH33P253B1M is single-event latch up immune (SEL).

CONCLUSION

Part number IRUH33P253B1M should be considered immune to single event latch-up for LET levels up to 85 MeV. The device should also be considered immune to single event transients greater than 200mV at input voltages of 3.6 volts or less for LET levels up to 85 MeV.

Appendix A

Electrical Data

Electrical Test Data (Pre SEE)

TEST	Vout1	Vout2	Vout3	Vout4	Vout5	Vdrop	Current Limit	Ripple Rej.	Vshdn	Vout @shdn	Ishdn*
Max Limit	2.625	2.625	2.625	2.625	2.625	0.4	---	200	200	1.6	---
Min Limit	2.375	2.375	2.375	2.375	2.375	0	3	65	40	1.0	---
Serial #	(V)	(V)	(V)	(V)	(V)	(V)	(A)	(dB)	(V)	(mV)	(mA)
1671	2.50	2.51	2.49	2.51	2.49	0.20	10.44	92.30	1.38	1.41	0.15
1690	2.50	2.51	2.49	2.51	2.49	0.21	9.76	95.57	1.40	2.17	0.15
1705	2.49	2.50	2.49	2.50	2.49	0.21	9.62	94.22	1.36	1.47	0.15
1748	2.49	2.50	2.48	2.50	2.48	0.22	10.49	91.44	1.40	1.81	0.16
1756	2.49	2.51	2.49	2.51	2.49	0.20	10.31	90.14	1.42	1.09	0.16
1758	2.50	2.50	2.50	2.50	2.49	0.22	10.03	95.96	1.32	0.89	0.15
1764	2.49	2.50	2.49	2.50	2.49	0.21	9.76	94.55	1.34	2.07	0.15
1785	2.50	2.51	2.49	2.51	2.49	0.20	10.53	95.20	1.38	1.73	0.15
1790	2.50	2.51	2.50	2.51	2.49	0.21	10.21	96.79	1.38	2.13	0.15

* Data collected for information purposes only.

Electrical Test Data (Post Kr)[1]

TEST	Vout1	Vout2	Vdrop	Current Limit	Ripple Rej.	Vshdn	Vout @shdn	Ishdn*
Max Limit	2.625	2.625	0.4	---	200	1.75	0.1	---
Min Limit	2.375	2.375	0	3	40	1	-0.1	---
Serial #	(V)	(V)	(V)	(A)	(dB)	(V)	(mV)	(mA)
1671	2.493	2.482	0.19	9.82	95.48	1.35	-0.906	0.148
1690	2.496	2.486	0.21	9.73	95.48	1.37	-0.331	0.147
1705	2.489	2.480	0.21	9.41	95.11	1.37	-0.647	0.151
1748	2.493	2.483	0.21	9.81	91.56	1.39	-0.693	0.156
1756	2.498	2.487	0.21	9.76	90.43	1.43	-1.196	0.161
1758	2.497	2.486	0.21	9.44	95.45	1.35	-1.052	0.146
1764	2.490	2.481	0.20	9.41	95.11	1.35	-0.791	0.150
1785	2.494	2.483	0.19	9.82	94.75	1.35	-1.065	0.147
1790	2.498	2.487	0.20	9.81	95.45	1.37	-1.785	0.149

* Data collected for information purposes only.

1 The test program used for the post beam exposure tests at Texas A&M was limited to 2 output voltage tests. Vout1 = Vin @ 3.3V, Iout @ 1.5A, Vout2 = Vin @ 3.8V, Iout @ 3A.

Electrical Test Data (Post Xe)[1]

TEST	Vout1	Vout2	Vdrop	Current Limit	Ripple Rej.	Vshdn	Vout @shdn	Ishdn*
Max Limit	2.625	2.625	0.4	---	200	1.75	0.1	---
Min Limit	2.375	2.375	0	3	40	1	-0.1	---
Serial #	(V)	(V)	(V)	(A)	(dB)	(V)	(mV)	(mV)
1671	2.494	2.483	0.19	9.85	94.80	1.35	-0.650	0.151
1690	2.497	2.487	0.21	9.44	95.48	1.35	-0.320	0.150
1705	2.488	2.480	0.21	9.17	94.75	1.35	-1.139	0.152
1748	2.487	2.479	0.20	9.71	91.39	1.39	-0.794	0.157
1756	2.494	2.484	0.20	9.44	89.84	1.39	-1.642	0.161
1758	2.489	2.482	0.21	9.44	96.22	1.33	-0.679	0.145
1764	2.489	2.481	0.20	9.39	95.11	1.33	-0.981	0.151
1785	2.494	2.484	0.19	9.85	95.15	1.33	-0.593	0.146
1790	2.492	2.482	0.20	9.49	95.86	1.35	-0.708	0.147

* Data collected for information purposes only.

Electrical Test Data (Post Au)[1]

TEST	Vout1	Vout2	Vdrop	Current Limit	Ripple Rej.	Vshdn	Vout @shdn	Ishdn*
Max Limit	2.625	2.625	0.4	---	200	1.75	0.1	---
Min Limit	2.375	2.375	0	3	40	1	-0.1	---
Serial #	(V)	(V)	(V)	(A)	(dB)	(V)	(mV)	(mV)
1671	2.494	2.483	0.18	9.72	95.49	1.39	-0.992	0.151
1690	2.500	2.490	0.20	9.63	95.16	1.37	-0.877	0.152
1705	2.490	2.481	0.20	9.45	94.72	1.34	-1.179	0.154
1748	2.488	2.480	0.20	9.72	91.84	1.39	-1.265	0.159
1756	2.496	2.486	0.20	9.76	90.42	1.43	-1.078	0.163
1758	2.492	2.482	0.20	9.49	95.87	1.32	-0.747	0.149
1764	2.492	2.482	0.20	9.17	95.53	1.34	-1.509	0.152
1785	2.496	2.485	0.20	9.86	95.53	1.34	-0.891	0.148
1790	2.494	2.484	0.20	9.49	96.28	1.37	-1.021	0.147

* Data collected for information purposes only.

1 The test program used for the post beam exposure tests at Texas A&M was limited to 2 output voltage tests. Vout1 = Vin @ 3.3V, Iout @ 1.5A, Vout2 = Vin @ 3.8V, Iout @ 3A.

Eagle Test data @ 25 C

TEST	Vout1	Vout2	Vout 3	Vout4	Vout5	O.C. Latch up	Vdrop	Ripple Rej.	Loop Stability	Loop Stability	Loop Stability	Loop Stability	Shn Threshold
Max Limit	2.625	2.625	2.625	2.625	2.625	10	0.4	200	15	16	16	17	17
Min Limit	2.375	2.375	2.375	2.375	2.375	3	0	40	0	0	0	0	0
Serial #	(V)	(V)	(V)	(V)	(V)	(A)	(V)	(dB)	(mV)	(mV)	(mV)	(mV)	(V)
1671	2.50	2.51	2.49	2.51	2.49	9.10	0.23	82.0	1.19	1.19	1.02	1.19	1.40
1690	2.50	2.51	2.49	2.51	2.49	8.38	0.28	83.2	1.19	1.19	1.02	1.02	1.40
1705	2.49	2.50	2.49	2.50	2.49	8.14	0.27	80.7	0.85	1.02	1.53	1.36	1.40
1748	2.49	2.50	2.49	2.50	2.49	8.62	0.26	77.4	0.85	1.36	1.02	1.02	1.42
1756	2.50	2.51	2.49	2.51	2.49	8.38	0.27	77.8	1.02	1.53	1.36	1.02	1.44
1758	2.50	2.50	2.49	2.50	2.49	8.14	0.26	83.6	1.53	1.36	1.19	1.19	1.37
1764	2.49	2.50	2.49	2.50	2.49	8.38	0.26	81.0	1.02	1.53	1.19	1.36	1.37
1785	2.50	2.51	2.49	2.51	2.49	8.50	0.26	78.3	1.53	1.19	1.02	1.70	1.38
1790	2.50	2.51	2.49	2.51	2.49	8.38	0.28	80.4	1.19	1.19	1.02	1.53	1.38

Eagle Test data @ -55 C

TEST	Vout1	Vout2	Vout 3	Vout4	Vout5	O.C. Latch up	Vdrop	Ripple Rej.	Loop Stability	Loop Stability	Loop Stability	Loop Stability	Shn Threshold
Max Limit	2.625	2.625	2.625	2.625	2.625	10	0.4	200	15	16	16	17	17
Min Limit	2.375	2.375	2.375	2.375	2.375	3	0	40	0	0	0	0	0
Serial #	(V)	(V)	(V)	(V)	(V)	(A)	(V)	(dB)	(mV)	(mV)	(mV)	(mV)	(V)
1671	2.49	2.50	2.49	2.50	2.49	9.34	0.00	84.50	1.19	0.85	1.19	1.53	1.39
1690	2.50	2.51	2.50	2.51	2.50	8.26	0.20	79.70	1.19	1.53	1.02	1.36	1.39
1705	2.49	2.50	2.49	2.50	2.49	8.14	0.05	76.60	1.36	1.02	1.36	1.36	1.39
1748	2.49	2.50	2.49	2.50	2.49	8.86	0.07	78.80	1.19	1.36	1.36	1.19	1.41
1756	2.50	2.51	2.49	2.51	2.49	8.62	0.24	78.10	1.02	1.19	1.02	1.87	1.43
1758	2.49	2.50	2.49	2.50	2.49	8.38	0.22	83.20	1.19	1.02	1.53	1.53	1.37
1764	2.49	2.50	2.49	2.50	2.49	8.50	0.16	78.60	1.36	1.02	1.36	1.36	1.37
1785	2.50	2.50	2.49	2.50	2.49	8.98	0.09	81.70	1.19	1.36	1.36	1.19	1.37
1790	2.50	2.50	2.49	2.50	2.49	8.50	0.07	80.10	1.53	1.36	0.85	1.36	1.38

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Eagle Test data @ 125 C

TEST	Vout1	Vout2	Vout 3	Vout4	Vout5	O.C. Latch up	Vdrop	Ripple Rej.	Loop Stability	Loop Stability	Loop Stability	Loop Stability	Shn Threshold
Max Limit	2.625	2.625	2.625	2.625	2.625	10	0.4	200	15	16	16	17	17
Min Limit	2.375	2.375	2.375	2.375	2.375	3	0	40	0	0	0	0	0
Serial #	(V)	(V)	(V)	(V)	(V)	(A)	(V)	(dB)	(mV)	(mV)	(mV)	(mV)	(V)
1671	2.49	2.52	2.50	2.52	2.48	6.22	0.17	67.40	3.22	1.36	1.87	2.38	1.40
1690	2.50	2.52	2.48	2.52	2.48	7.06	0.21	81.30	1.02	1.53	1.36	1.36	1.39
1705	2.49	2.51	2.48	2.51	2.48	6.94	0.21	79.60	1.36	1.36	0.85	1.53	1.39
1748	2.49	2.51	2.46	2.51	2.47	7.18	0.44	79.50	4.41	1.02	1.53	1.87	1.43
1756	2.49	2.51	2.48	2.51	2.48	7.18	0.30	77.40	1.70	1.19	1.36	1.02	1.44
1758	2.49	2.51	2.48	2.51	2.48	6.94	0.13	81.00	1.19	1.19	1.19	1.02	1.36
1764	2.49	2.51	2.48	2.51	2.48	7.18	0.31	80.40	1.02	1.19	1.36	1.19	1.40
1785	2.49	2.52	2.46	2.52	2.48	7.18	0.12	77.80	1.53	1.36	1.19	1.19	1.37
1790	2.49	2.52	2.50	2.52	2.48	7.18	0.08	80.10	1.19	1.02	1.36	3.90	1.37

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Appendix B

Test Plan

Test Plan

1.0 Purpose

The purpose of this test is to qualify this product for single event latch-up and single event transients.

2.0 Test Responsibility

International Rectifier shall be responsible for conducting the tests, which shall be performed at Texas A&M's Cyclotron facility. International Rectifier shall be responsible for the final Test Report.

3.0 Test Facility

3.1 Accelerator

The Texas A&M Cyclotron shall be used to provide the necessary ion species and energy.

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 handle the individual test devices.

4.0 Test Devices

4.1 The IRUH33P253B1M devices are planned for SEE evaluation and all SEE test specifications should be referred to the T090067G.

4.2 All devices shall be built in their respective packages. Devices shall be properly packed in static-free containers.

4.3 All devices shall be verified for correct electrical performance (baseline) prior to SEE testing.

5.0 Test Method

Mil- PRF-38534 shall be used to establish procedure for all testing described herein.

6.0 Test Report

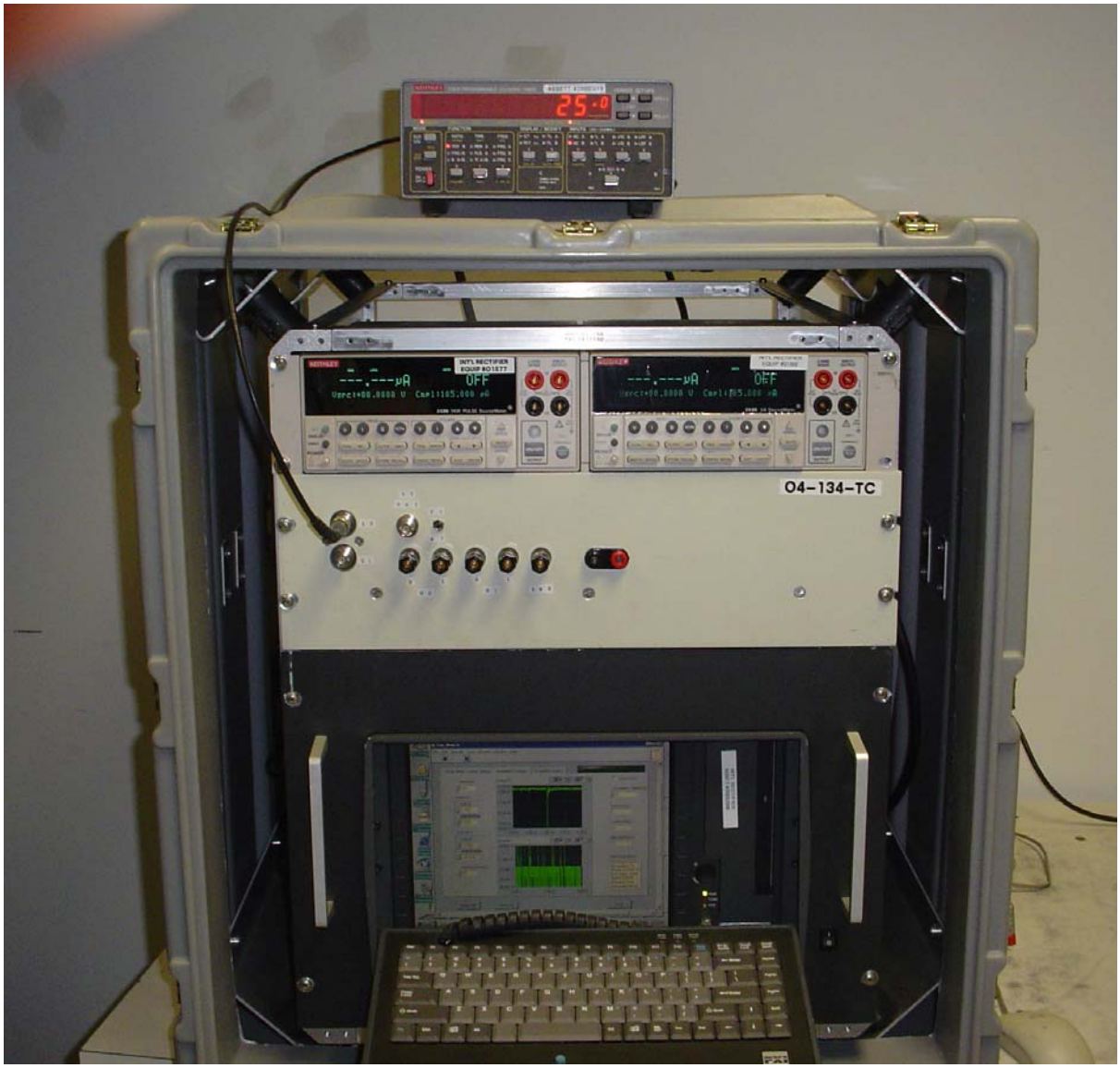
The Test Report shall include the following information:

a. Device type(s), serial numbers, wafer lot identification (per active component)
b. Test dates and personnel names
c. Facility, source type
d. Schematic of test circuit
e. Insitu bias conditions
f. Comments and observations
g. Pre and Post Electrical data
h. Summary descriptive including graphs (if applicable)

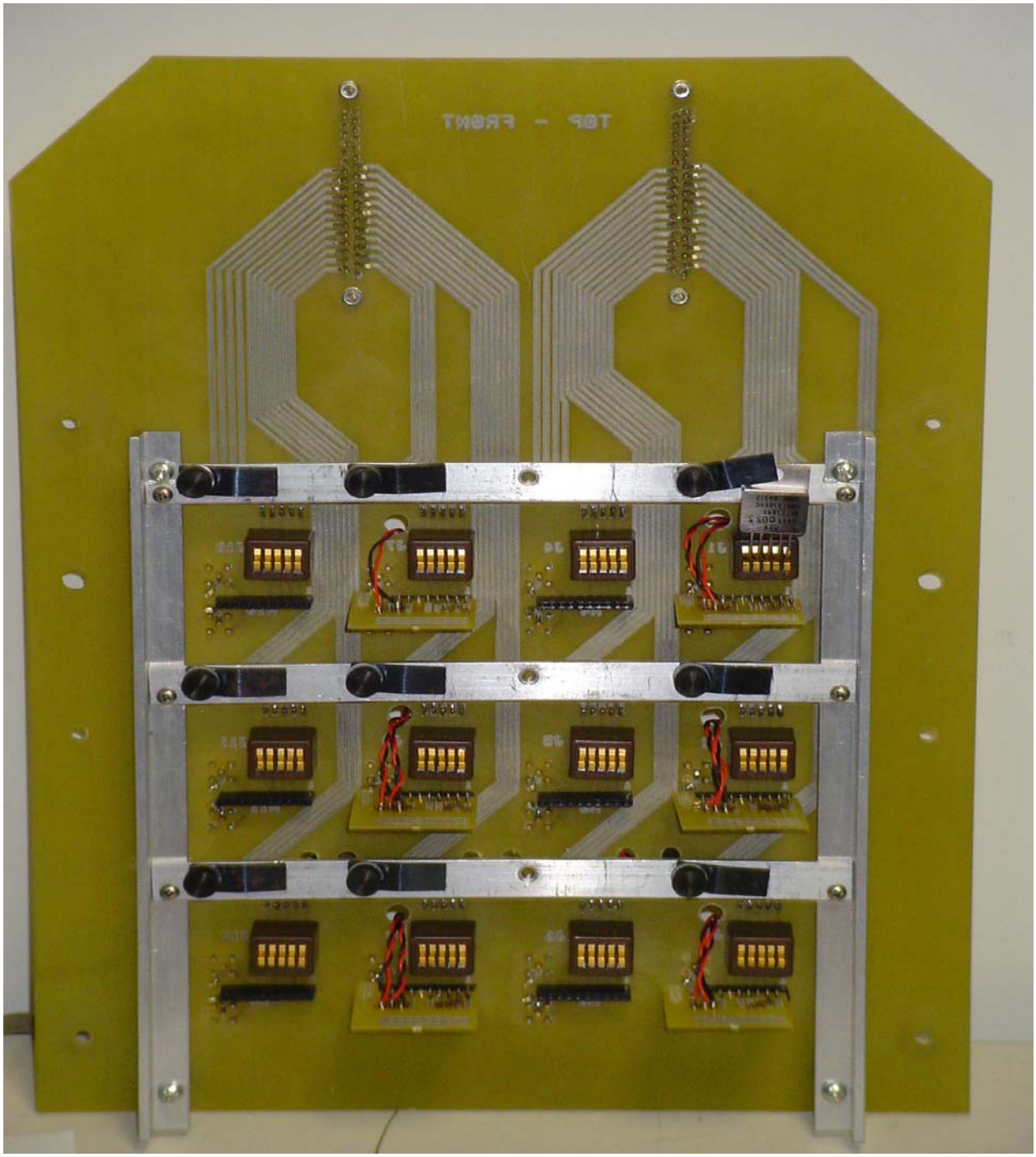
7.0 Record Keeping

All single event exposure information shall be recorded on the data file and used to correlate data from different exposure levels. The TAMU facility shall provide a hardcopy and a softcopy summary of all exposure runs showing key parameters such as; LET and ion specie, flux rate, fluence level, time duration for exposure, and comments regarding the tests including observations or deviations from the plan.

SEE Test Rack



SEE DUT BOARD



International
IOR Rectifier

Appendix C

Test Procedure

Specification # T090067G	Revision: A		ECN #	Date:
IR Base Part No. IRUH33P253B1M (OMR9601SC)				

PRODUCT DISCRIPTION: FIXED LOW DROPOUT VOLTAGE REGULATOR

Automatic Test **Tester: PXI TEST CONSOLE 04-134-TC**

Table 1: Pre Radiation Tests, 25C tests only

Prog. Ref.	Test	Symbol	Test Conditions	Rad Level:	Notes	MIN	MAX	Units
A	Output Voltage	V out	Vin = 3.30 Vdc	Pre Rad		2.475	2.525	Vdc
			Iout = 1.5 A					
A	Output Voltage	V out	Vin = 3.135 Vdc	Pre Rad		2.375	2.625	Vdc
			Iout = 50 mA					
A	Output Voltage	V out	Vin = 3.135 Vdc	Pre Rad		2.375	2.625	Vdc
			Iout = 3.0 A					
A	Output Voltage	V out	Vin = 3.465 Vdc	Pre Rad		2.375	2.625	Vdc
			Iout = 50 mA					
A	Output Voltage	V out	Vin = 3.465 Vdc	Pre Rad		2.375	2.625	Vdc
			Iout = 3.0 A					
A	Dropout Voltage	Vdrop	Iout = 3.0 A	Pre Rad		0	0.40	Vdc
A	Current Limit	I limit	Vin = 3.3 Vdc	Pre Rad		3.0	---	A
A	Ripple Rejection	Rrej	F= 120 Hz	Pre Rad		65	200	dB
			Iout = 50 mA					
A	Shutdown	Vshutdown	Vin = 5.0 Vdc, Vshutdown ramp	Pre Rad		1.0	1.6	V
	Threshold		from 0.8V to 4.8V, output					
A	Output voltage	Vout shdn	Vin = 3.3 Vdc	Pre Rad		-0.1	+0.1	V
	At Shutdown		Iout = 50 mA					
			Vshdn = +5 Vdc					
A	Shutdown	Ishutdown	Vin = 3.3 Vdc	Pre Rad	1	---	---	uA
	Pin Current		Iout = 50 mA					
			Vshdn = +5 Vdc					

Notes:
1. These tests are performed for information purposes only.

Automatic Test			Tester: PXI TEST CONSOLE 04-134-TC					
Table 2: Post Radiation Tests, 25C tests only								
Prog. Ref.	Test	Symbol	Test Conditions	Rad Level:	Notes	MIN	MAX	Units
B	Output Voltage	V out	Vin = 3.30 Vdc	Post Rad		2.375	2.625	Vdc
			Iout = 1.5 A					
B	Output Voltage	V out	Vin = 3.135 Vdc	Post Rad		2.375	2.625	Vdc
			Iout = 50 mA					
B	Output Voltage	V out	Vin = 3.135 Vdc	Post Rad		2.375	2.625	Vdc
			Iout = 3.0 A					
B	Output Voltage	V out	Vin = 3.465 Vdc	Post Rad		2.375	2.625	Vdc
			Iout = 50 mA					
B	Output Voltage	V out	Vin = 3.465 Vdc	Post Rad		2.375	2.625	Vdc
			Iout = 3.0 A					
B	Dropout Voltage	Vdrop	Iout = 3.0 A	Post Rad		0	0.4	Vdc
B	Current Limit	I limit	Vin = 3.3 Vdc	Post Rad		3.0	---	A
B	Ripple Rejection	Rrej	F= 120 Hz	Post Rad		40	200	dB
			Iout = 50 mA					
B	Shutdown	Vshutdown	Vin = 5.0 Vdc, Vshutdown ramp	Post Rad		1.0	1.75	V
	Threshold		from 0.8V to 4.8V, output					
B	Output voltage	Vout shdn	Vin = 3.3 Vdc	Post Rad		-0.1	+0.1	V
	At Shutdown		Iout = 50 mA					
			Vshdn = +5 Vdc					
B	Shutdown	Ishutdown	Vin = 3.3 Vdc	Post Rad	1	---	---	uA
	Pin Current		Iout = 50 mA					
			Vshdn = +5 Vdc					

Notes:
1. These tests are performed for information purposes only.

Table 5: Single Event Effects Test Requirements [5]											
Test Information											
Bias Condition	1	2	3								
	Vin = 2.9V, Io = 3A	Vin = 3.3V, Io = 3A	Vin = 7.0V, Io = 1A								
Program Card Number	05-049-TA	05-049-TA	05-050-TA								
Board Number	05-001-TF										
Test Program	05-047-TS										
Test Console	04-134-TC										
Chamber	Air										
15A MeV Beams Texas A&M only											
Step	Ion Specie	LET (MeV)	Total Energy (MeV)	Range (um)	Avg Flux ions/cm^2/sec	Total Fluence ions/cm^2	Test Limits [6]		
							Min	Max	Units
1	Krypton ^{84}Kr	27.8	1032	134	1 e^4 min 2 e^6 max	1 e^6	2.375	2.625	V
							-200	200	mVpp
2	Xenon ^{129}Xe	51.5	1512	120	1 e^4 min 2 e^6 max	1 e^6	2.375	2.625	V
							-200	200	mVpp
3	Gold ^{197}Au	85.4	2247	118	1 e^4 min 2 e^6 max	1 e^6	2.375	2.625	V
							-200	200	mVpp

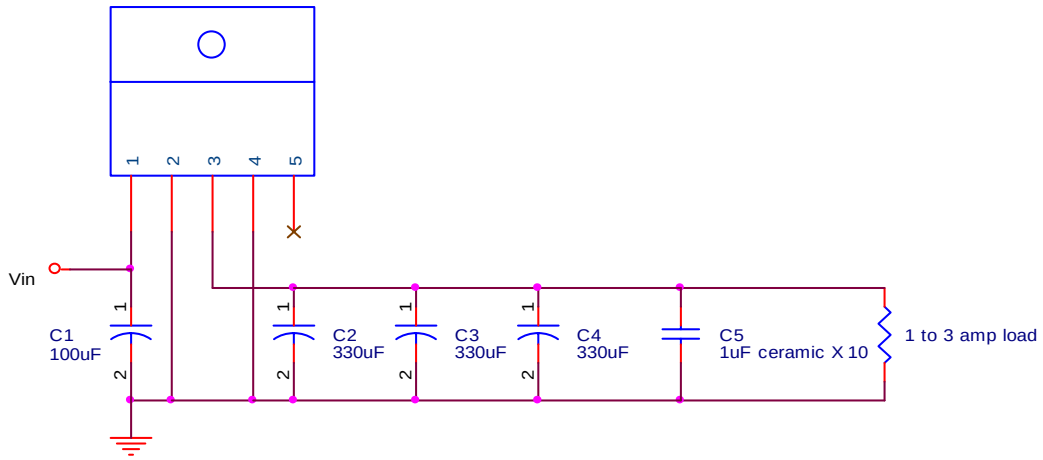
5. Performed during initial qualification of the device and retested only when specified by Quality Assurance due to a change per MIL-PRF-38534. The sample size for the hybrid qualification is 10 devices; 3 of the devices will be irradiated in circuit with the maximum input voltage applied at 1A load; 3 of the devices will be irradiated in circuit with the minimum input voltage applied at 3A load; 3 of the devices will be irradiated in circuit with the nominal input voltage applied at 3A load;1 device will not be irradiated and used as a control sample.

6. Each device is tested in-flux for output voltage tolerance and transients under the specified load per document T030062G and test program 05-047-TS. After the devices are subjected to a particular ion specie they are tested per the post irradiation specifications of table 2.

Table 6: SEE Parameters [7]											
Socket Number	Transient Positive Max (mV)	Transient Negative Max (mV)	Supply Volt Max (V)	Supply Volt Min (V)	Compliance Limit (A)	Supply Curr Max (A)	Supply Curr Min (A)	Vin Max (V)	Vin Min (V)	Vout Max (V)	Vout Min (V)
1	200	-200	8.0	7.7	5.0	1.1	0.9	7.2	6.8	2.625	2.375
2	200	-200	8.0	7.7	5.0	1.1	0.9	7.2	6.8	2.625	2.375
3	200	-200	8.0	7.7	5.0	1.1	0.9	7.2	6.8	2.625	2.375
7	200	-200	6.3	5.7	5.0	3.2	2.8	3.4	3.2	2.625	2.375
8	200	-200	6.3	5.7	5.0	3.2	2.8	3.4	3.2	2.625	2.375
9	200	-200	6.3	5.7	5.0	3.2	2.8	3.4	3.2	2.625	2.375
7	200	-200	6.0	5.3	5.0	3.2	2.8	2.8	3.0	2.625	2.375
8	200	-200	6.0	5.3	5.0	3.2	2.8	2.8	3.0	2.625	2.375
9	200	-200	6.0	5.3	5.0	3.2	2.8	2.8	3.0	2.625	2.375

7. Sockets 7, 8, and 9 are used for both the nominal and minimum input voltage tests. The supply voltage may need to be adjusted within the specified range in order to have the input voltage (Vin) meet the requirments listed in this table. The supply voltage may vary by socket position depending on the supply current. No other sockets are used for this product due to the size of the program card.

Single Event Efffects Test Circuit



Appendix D

Log Sheets

DATE : 12/06/05			OPERATORS : A. SANCHEZ, C. DICIENZO					FACILITY : TEXAS A&M					PAGE 1 OF 5	
RUN #	ION SPECIE	LET *MeV.cm²/mg*	ENERGY **MeV**	RANGE *μm*	AVG FLUX *#/ cm²/sec*	FLUENCE *#/ cm²*	ANGLE *deg*	BEAM D *cm*	START TEMP deg C	STOP TEMP deg C	PART #	S/N	SKT #	COMMENTS
1	Kr	27.8	1032	134	4.21E3	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	INVALID RUN
2	Kr	27.8	1032	134	1.32E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	INVALID RUN
3	Kr	27.8	1032	134	1.30E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 521 trans 7vin
4	Kr	27.8	1032	134	1.33E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Neg trig. 0 trans 7vin
5	Kr	27.8	1032	134	1.25E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	Pos trig. 434 trans 7vin
6	Kr	27.8	1032	134	1.42E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	Neg trig. 7 trans 7vin shutter error
7	Kr	27.8	1032	134	1.41E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Pos trig. 467 trans 7vin
8	Kr	27.8	1032	134	1.28E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Neg trig. 0 trans 7vin
9	Kr	27.8	1032	134	1.24E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	84	7	Pos trig. 0 trans 3.3vin
10	Kr	27.8	1032	134	1.04E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	84	7	Neg trig. 14 trans 3.3vin shutter error
11	Kr	27.8	1032	134	1.19E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	62	8	Pos trig. 0 trans 3.3vin
12	Kr	27.8	1032	134	1.28E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	62	8	Neg trig. 0 trans 3.3vin
13	Kr	27.8	1032	134	1.33E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	63	9	Pos trig. 0 trans 3.3vin
14	Kr	27.8	1032	134	1.40E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	63	9	Neg trig. 0 trans 3.3vin
15	Kr	27.8	1032	134	1.78E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Neg trig. 0 trans 5.5vin
16	Kr	27.8	1032	134	2.08E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Neg trig. 0 trans 6.5vin
17	Kr	27.8	1032	134	2.04E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 444 trans 5.5vin
18	Kr	27.8	1032	134	1.1E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 0 trans 3.3vin
19	Kr	27.8	1032	134	2.39E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 114 trans 4.5vin
20	Kr	27.8	1032	134	1.98E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 0 trans 4.0vin
21	Kr	27.8	1032	134	1.99E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 90 trans 4.25vin
22	Kr	27.8	1032	134	2.12E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	Pos trig. 0 trans 4.0vin
23	Kr	27.8	1032	134	1.52E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Pos trig. 64 trans 4.0vin
24	Kr	27.8	1032	134	1.62E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Pos trig. 0 trans 3.72vin
25	Kr	27.8	1032	134	1.77E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	83	7	Pos trig. 0 trans 2.9vin
26	Kr	27.8	1032	134	1.87E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	83	7	Neg trig. 0 trans 2.9vin
27	Kr	27.8	1032	134	1.99E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	51	8	Pos trig. 0 trans 2.9vin
28	Kr	27.8	1032	134	2.05E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	51	8	Neg trig. 0 trans 2.9vin
29	Kr	27.8	1032	134	1.02E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	64	9	Pos trig. 0 trans 2.9vin

30	Kr	27.8	1032	134	1.31E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	64	9	Neg trig. 0 trans 2.9vin

DATE : 12/06/05			OPERATORS : A. SANCHEZ, C. DICIENZO					FACILITY : TEXAS A&M					PAGE 2 OF 5	
RUN #	ION SPECIE	LET *MeV.cm²/mg*	ENERGY **MeV**	RANGE *μm*	AVG FLUX *#/ cm²/sec*	FLUENCE *#/ cm²*	ANGLE *deg*	BEAM D *cm*	START TEMP deg C	STOP TEMP deg C	PART #	S/N	SKT #	COMMENTS
31	Kr	27.8	1032	134	1.66E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Pos trig. 1 trans 7vin erroneous
32	Kr	27.8	1032	134	1.96E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Neg trig. 0 trans 7vin
33	Kr	27.8	1032	134	2.07E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Pos trig. 0 trans 7vin
34	Kr	27.8	1032	134	2.10E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1756	2	Pos trig. 0 trans 7vin
35	Kr	27.8	1032	134	2.11E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1756	2	Neg trig. 0 trans 7vin
36	Kr	27.8	1032	134	2.20E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1758	3	Pos trig. 0 trans 7vin
37	Kr	27.8	1032	134	1.86E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1758	3	Neg trig. 0 trans 7vin
38	Kr	27.8	1032	134	2.05E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1764	7	Pos trig. 0 trans 3.3vin
39	Kr	27.8	1032	134	2.22E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1764	7	Neg trig. 0 trans 3.3vin
40	Kr	27.8	1032	134	2.24E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1705	8	Pos trig. 0 trans 3.3vin
41	Kr	27.8	1032	134	2.30E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1705	8	Neg trig. 0 trans 3.3vin
42	Kr	27.8	1032	134	2.22E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1671	9	Pos trig. 0 trans 3.3vin
43	Kr	27.8	1032	134	2.62E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1671	9	Neg trig. 0 trans 3.3vin
44	Kr	27.8	1032	134	1.72E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1690	7	Pos trig. 0 trans 2.9vin
45	Kr	27.8	1032	134	1.7E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1690	7	Neg trig. 0 trans 2.9vin
46	Kr	27.8	1032	134	1.65E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1785	8	Pos trig. 0 trans 2.9vin
47	Kr	27.8	1032	134	1.56E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1785	8	Neg trig. 0 trans 2.9vin
48	Kr	27.8	1032	134	1.57E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1790	9	Pos trig. 0 trans 2.9vin
49	Kr	27.8	1032	134	9.37E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1790	9	Neg trig. 0 trans 2.9vin
50	Xe	51.5	1512	120	6.95E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Pos trig. 110 trans 7vin
51	Xe	51.5	1512	120	5.31E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Pos trig. 0 trans 5.5vin
52	Xe	51.5	1512	120	5.70E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Pos trig. 99 trans 6vin
53	Xe	51.5	1512	120	5.27E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Neg trig. 0 trans 5.5vin
54	Xe	51.5	1512	120	3.85E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1756	2	Neg trig. 0 trans 5.5vin
55	Xe	51.5	1512	120	4.21E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1756	2	Pos trig. 4 trans 5.5vin

56	Xe	51.5	1512	120	3.60E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1756	2	Pos trig. 26 trans 5.25vin
57	Xe	51.5	1512	120	4.50E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1756	2	Pos trig. 60 trans 4.75vin
58	Xe	51.5	1512	120	5.33E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1756	2	Pos trig. 0 trans 4vin
59	Xe	51.5	1512	120	6.68E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1758	3	Pos trig. 10 trans 4vin
60	Xe	51.5	1512	120	1.0E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1758	3	Pos trig. 4 trans 3.6vin

DATE : 12/06/05			OPERATORS : A. SANCHEZ, C. DICIENZO					FACILITY : TEXAS A&M					PAGE __3__ OF __5__	
RUN #	ION SPECIE	LET *MeV.cm²/mg*	ENERGY **MeV**	RANGE *μm*	AVG FLUX *#/ cm²/sec*	FLUENCE *#/ cm²*	ANGLE *deg*	BEAM D *cm*	START TEMP deg C	STOP TEMP deg C	PART #	S/N	SKT #	COMMENTS
61	Xe	51.5	1512	120	9.16E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1758	3	Neg trig. 0 trans 3.6vin
62	Xe	51.5	1512	120	1.0E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1690	7	Pos trig. 0 trans 2.9vin
63	Xe	51.5	1512	120	1.08E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1690	7	Neg trig. 0 trans 2.9vin
64	Xe	51.5	1512	120	1.0E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1785	8	Pos trig. 0 trans 2.9vin
65	Xe	51.5	1512	120	1.24E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1785	8	Neg trig. 0 trans 2.9vin
66	Xe	51.5	1512	120	1.3E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1790	9	INVALID RUN
67	Xe	51.5	1512	120	1.46E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1790	9	Pos trig. 0 trans 2.9vin
68	Xe	51.5	1512	120	1.4E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1790	9	Neg trig. 0 trans 2.9vin
69	Xe	51.5	1512	120	1.48E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 0 trans 3.5vin
70	Xe	51.5	1512	120	1.42E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Neg trig. 0 trans 3.5vin
71	Xe	51.5	1512	120	1.69E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	INVALID RUN
72	Xe	51.5	1512	120	1.41E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	Pos trig. 0 trans 3.5vin
73	Xe	51.5	1512	120	1.49E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	Neg trig. 0 trans 3.5vin
74	Xe	51.5	1512	120	1.47E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Pos trig. 0 trans 3.5vin
75	Xe	51.5	1512	120	1.49E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Neg trig. 0 trans 3.5vin
76	Xe	51.5	1512	120	1.49E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Pos trig. 0 trans 4vin
77	Xe	51.5	1512	120	1.53E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Pos trig. 451 trans 4.2vin
78	Xe	51.5	1512	120	1.45E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 0 trans 3.8vin
79	Xe	51.5	1512	120	1.19E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	Pos trig. 0 trans 3.8vin
80	Xe	51.5	1512	120	9.91E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1764	7	Pos trig. 0 trans 3.3vin

81	Xe	51.5	1512	120	8.68E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1764	7	Neg trig. 0 trans 3.3vin
82	Xe	51.5	1512	120	1.15E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1705	8	Pos trig. 0 trans 3.3vin
83	Xe	51.5	1512	120	1.14E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1705	8	Neg trig. 0 trans 3.3vin
84	Xe	51.5	1512	120	1.28E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1671	9	Pos trig. 0 trans 3.3vin
85	Xe	51.5	1512	120	1.37E5	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1671	9	Neg trig. 0 trans 3.3vin
86	Xe	51.5	1512	120	1.69E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	84	7	Pos trig. 0 trans 3.3vin
87	Xe	51.5	1512	120	1.67E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	84	7	Neg trig. 0 trans 3.3vin
88	Xe	51.5	1512	120	1.72E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	62	8	INVALID RUN
89	Xe	51.5	1512	120	2.04E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	62	8	Pos trig. 0 trans 3.3vin
90	Xe	51.5	1512	120	1.4E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	62	8	Neg trig. 0 trans 3.3vin

DATE : 12/06/05			OPERATORS : A. SANCHEZ, C. DICIENZO					FACILITY : TEXAS A&M					PAGE 4 OF 5	
RUN #	ION SPECIE	LET *MeV.cm²/mg*	ENERGY **MeV**	RANGE *µm*	AVG FLUX *#/ cm²/sec*	FLUENCE *#/ cm²*	ANGLE *deg*	BEAM D *cm*	START TEMP deg C	STOP TEMP deg C	PART #	S/N	SKT #	COMMENTS
91	Xe	51.5	1512	120	1.42E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	63	9	Pos trig. 0 trans 3.3vin
92	Xe	51.5	1512	120	1.24E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	63	9	Neg trig. 0 trans 3.3vin
93	Xe	51.5	1512	120	1.67E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	83	7	Pos trig. 0 trans 2.9vin
94	Xe	51.5	1512	120	1.66E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	83	7	Neg trig. 0 trans 2.9vin
95	Xe	51.5	1512	120	2.02E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	51	8	Pos trig. 0 trans 2.9vin
96	Xe	51.5	1512	120	1.71E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	51	8	Neg trig. 0 trans 2.9vin
97	Xe	51.5	1512	120	2.31E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	64	9	Pos trig. 0 trans 2.9vin
98	Xe	51.5	1512	120	1.76E5	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	64	9	Neg trig. 0 trans 2.9vin
99	Au	85.4	2247	118	1.75E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	83	7	Pos trig. 0 trans 2.9vin
100	Au	85.4	2247	118	1.64E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	83	7	Neg trig. 0 trans 2.9vin
101	Au	85.4	2247	118	1.47E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	51	8	Pos trig. 0 trans 2.9vin
102	Au	85.4	2247	118	1.55E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	51	8	Neg trig. 0 trans 2.9vin
103	Au	85.4	2247	118	1.31E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	64	9	Pos trig. 0 trans 2.9vin

104	Au	85.4	2247	118	1.37E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	64	9	Neg trig. 0 trans 2.9vin
105	Au	85.4	2247	118	1.36E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Neg trig. 0 trans 7vin
106	Au	85.4	2247	118	1.42E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 171 trans 4.2vin
107	Au	85.4	2247	118	1.56E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	53	1	Pos trig. 0 trans 3.8vin
108	Au	85.4	2247	118	1.66E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	Neg trig. 0 trans 7vin
109	Au	85.4	2247	118	2.16E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	Pos trig. 158 trans 4.2vin
110	Au	85.4	2247	118	2.33E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	56	2	Pos trig. 0 trans 3.8vin
111	Au	85.4	2247	118	2.31E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Neg trig. 0 trans 7vin
112	Au	85.4	2247	118	3.27E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Pos trig. 254 trans 4.2vin
113	Au	85.4	2247	118	3.62E4	1.0E6	0	1.5	24C	24C	IRHU33PA13B20K	54	3	Pos trig. 0 trans 3.8vin
114	Au	85.4	2247	118	4.29E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1690	7	INVALID RUN
115	Au	85.4	2247	118	2.63E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1690	7	Pos trig. 0 trans 2.9vin
116	Au	85.4	2247	118	2.54E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1690	7	Neg trig. 0 trans 2.9vin
117	Au	85.4	2247	118	2.59E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1785	8	Pos trig. 0 trans 2.9vin
118	Au	85.4	2247	118	2.6E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1785	8	Neg trig. 0 trans 2.9vin
119	Au	85.4	2247	118	2.62E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1790	9	Pos trig. 0 trans 2.9vin
120	Au	85.4	2247	118	0	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1790	9	INVALID RUN

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RUN #	ION SPECIE	LET *MeV.cm²/mg*	ENERGY **MeV**	RANGE *μm*	AVG FLUX *#/ cm²/sec*	FLUENCE *#/ cm²*	ANGLE *deg*	BEAM D *cm*	START TEMP deg C	STOP TEMP deg C	PART #	S/N	SKT #	COMMENTS
121	Au	85.4	2247	118	2.34E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1790	9	Neg trig. 0 trans 2.9vin
122	Au	85.4	2247	118	3.52E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Neg trig. 0 trans 7vin
123	Au	85.4	2247	118	4.76E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Pos trig. multi trans 4.3vin
124	Au	85.4	2247	118	5.07E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1748	1	Pos trig. multi trans 3.8vin
125	Au	85.4	2247	118	4.63E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1756	2	Neg trig. 0 trans 7vin
126	Au	85.4	2247	118	4.88E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1756	2	Pos trig. 0 trans 3.8vin
127	Au	85.4	2247	118	3.98E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1758	3	Neg trig. 0 trans 7vin
128	Au	85.4	2247	118	3.84E4	1.0E6	0	1.5	24C	24C	IRUH33P253B1M	1758	3	Pos trig. 0 trans 3.8vin