



Single-Event-Effects Summary Report

IR RAD-Hard Gen-5 60V P-channel

SEE Qualifications of:

JANTXVR, F AND JANSR, F 2N7524U2 MIL-PRF-19500/733

JANTXVR, F AND JANSR, F 2N7524T1 MIL-PRF-19500/733

JANTXVR, F AND JANSR, F 2N7520U3 MIL-PRF-19500/732

JANTXVR, F AND JANSR, F 2N7520T3 MIL-PRF-19500/732

IRHNA597064, IRHNA593064 SCV AND SCS

IRHMS597064, IRHMS593064 SCV AND SCS

IRHNJ597034, IRHNJ593034 SCV AND SCS

IRHY597034CM, IRHY593034CM SCV AND SCS

IRHF579034, IRHF593034 SCV AND SCS

IRHE597034, IRHE593034 SCV AND SCS



Fab-2 Wafer Lot: E771053 Split B
SEE Test Date: March 25, 2008
SEE Test Facility: BNL Accelerator

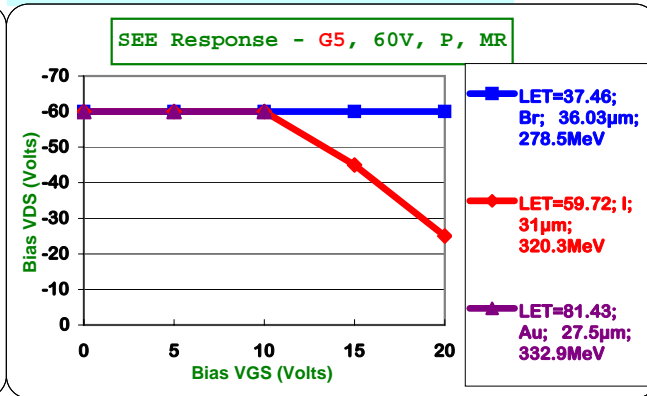
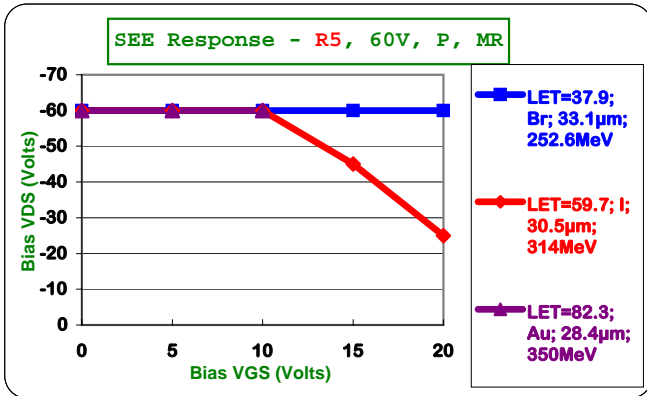
Ion	Br	I	Au	
LET	40	63.3	87.2	MeV-cm ² /mg
Energy	260	318	372	MeV
Range	0.1	30.5	28.4	µm
Run Numbers	174-191	481-505	774-787	for Split B

IR Fab-5 Specs

VGS (Volts)	VDS Bias (Volts)		
	LET=37.9; Br; 33.1µm; 252.6MeV	LET=59.7; I; 30.5µm; 314MeV	LET=82.3; Au; 28.4µm; 350MeV
0	-60	-60	-60
5	-60	-60	-60
10	-60	-60	-60
15	-60	-45	-60
20	-60	-25	-60

IR Fab-2 Qual to Specs

VGS (Volts)	VDS Bias (Volts)		
	LET=37.46; Br; 36.03µm; 278.5MeV	LET=59.72; I; 31µm; 320.3MeV	LET=81.43; Au; 27.5µm; 332.9MeV
0	-60	-60	-60
5	-60	-60	-60
10	-60	-60	-60
15	-60	-45	-60
20	-60	-25	-60



Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
174	Br	J1	10	11	40	4	0	-60	
175	Br	J1	10	11	40	4	0	-62	
176	Br	J1	10	11	40	4	0	-64	
177	Br	J1	10	11	40	4	5	-60	
178	Br	J1	10	11	40	4	5	-62	
179	Br	J1	10	11	40	4	5	-64	
180	Br	J1	10	11	40	4	10	-62	
181	Br	J1	10	11	40	4	10	-64	
182	Br	J1	10	11	40	4	15	-60	
183	Br	J1	10	11	40	4	15	-62	
184	Br	J1	10	11	40	4	15	-64	
185	Br	J1	10	11	40	4	20	-55	
186	Br	J1	10	11	40	4	20	-60	
187	Br	J1	10	11	40	4	20	-62	
188	Br	J1	10	11	40	4	20	-64	
189	Br	J2	11	11	39	4	20	-60	Curve-Point
190	Br	J3	12	11	38	4	20	-60	Curve-Point
191	Br	J4	13	11	37	4	20	-60	Curve-Point
481	I	J10	10	9	23	10	10	-50	
482	I	J10	10	9	23	10	10	-60	
483	I	J10	10	9	23	10	0	-62	
484	I	J10	10	9	23	10	0	-64	
485	I	J10	10	9	23	10	5	-62	
486	I	J10	10	9	23	10	5	-64	
487	I	J10	10	9	23	10	10	-62	
488	I	J10	10	9	23	10	10	-64	
489	I	J10	10	9	23	10	15	-35	
490	I	J10	10	9	23	10	15	-40	
491	I	J10	10	9	23	10	15	-45	
492	I	J10	10	9	23	10	15	-50	F
493	I	J11	11	9	24	10	20	-20	



Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
494	I	J11	11	9	24	10	20	-25	
495	I	J11	11	9	24	10	20	-30	
496	I	J11	11	9	24	10	20	-35	F
497	I	J12	12	10	25	10	10	-60	Curve-Point
498	I	J12	12	10	25	10	15	-45	Curve-Point
499	I	J12	12	10	25	10	20	-30	Curve-Point
500	I	J13	13	10	26	10	20	-30	Curve-Point
501	I	J13	13	10	26	10	15	-45	Curve-Point
502	I	J13	13	10	26	10	10	-60	Curve-Point
503	I	J14	15	10	28	10	10	-60	Curve-Point
504	I	J14	15	10	28	10	15	-45	Curve-Point
505	I	J14	15	10	28	10	20	-30	Curve-Point
774	Au	J19	5	11	41	16	0	-60	
775	Au	J19	5	11	41	16	0	-62	
776	Au	J19	5	11	41	16	0	-64	
777	Au	J19	5	11	41	16	5	-62	
778	Au	J19	5	11	41	16	5	-64	
779	Au	J19	5	11	41	16	10	-60	
780	Au	J19	5	11	41	16	10	-62	
781	Au	J19	5	11	41	16	10	-64	
782	Au	J20	6	12	42	16	5	-60	Curve-Point
783	Au	J20	6	12	42	16	10	-60	Curve-Point
784	Au	J21	7	12	43	16	5	-60	Curve-Point
785	Au	J21	7	12	43	16	10	-60	Curve-Point
786	Au	J22	8	12	44	16	5	-60	Curve-Point
787	Au	J22	8	12	44	16	10	-60	Curve-Point

RadHard MOSFET - G5, Hex 3, 60V, P-channel

Expected Good Devices

Post - SEE Electricals Data

SEE-Failed Devices

Parameter	I DSS	I GSSf	I GSSr	V GS(th)	BV DSS	R DS(on)	VSD
Conditions	VDS=-48V VGS=0V	VGS=-20V VDS=0V	VGS=20V VDS=0V	IDS=1mA VDS=VGS	IDSS=1mA	ID=13.3A VGS=12V	IS=21A
Limits	10µA Max	-100nA Max	100nA Max	2V to 4V	60V Min	85mOhms	5V Max
Unit	nA	nA	nA	V	V	mOhms	V

SEE-UnTested Devices

SEE Id	Log Serial	E771053B (BNL 03-25-2008) IRHC597034							Good	Split B
J1	1	1.68	0.15	0.12	3.125	65.4	56.40	3.237	Pass 20/-64	Br
J2	2	0.57	0.15	0.11	3.132	65.6	59.10	3.317	Pass 20/-60	Br
J3	3	0.63	0.15	0.23	3.104	65.4	56.59	3.231	Pass 20/-60	Br
J4	4	0.59	0.15	0.12	3.115	65.3	59.64	3.285	Pass 20/-60	Br
J5	5	0.47	0.15	0.12	3.143	65.7	57.83	3.182	Unused	
J6	6	0.47	0.15	0.13	3.111	65.5	56.56	3.209	Unused	
J7	7	0.40	0.15	0.12	3.136	65.6	57.29	3.200	Unused	
J8	8	0.47	0.15	0.15	3.112	65.5	56.61	3.219	Unused	
J9	9	0.53	0.15	0.36	3.151	65.7	55.87	3.244	Unused	
J10	10	10.27	999900.00	999900.00	3.135	65.6	56.50	3.319	Failed 15/-50	I
J11	11	4162.00	999900.00	945600.00	3.167	65.9	56.30	3.236	Failed 20/-35	I
J12	12	2.16	0.15	0.17	3.139	65.6	57.13	3.286	Pass 10/-60, 15/-45, 20/-30	I
J13	13	1.90	0.15	0.25	3.155	65.8	56.12	3.235	Pass 10/-60, 15/-45, 20/-30	I
J14	14	0.50	0.15	0.12	3.163	65.8	55.97	3.203	Pass 10/-60, 15/-45, 20/-30	I
J15	15	2.18	0.15	0.33	3.144	65.6	56.60	3.281	Unused	
J16	16	0.57	0.15	0.12	3.136	65.6	57.36	3.311	Unused	
J17	17	0.51	0.15	0.24	3.164	65.7	55.30	3.208	Unused	
J18	18	0.55	0.14	0.12	3.141	65.6	57.14	3.295	Unused	
J19	19	19.77	0.15	0.11	3.142	65.8	60.90	3.410	Pass 10/-64	Au
J20	20	5.17	0.15	0.12	3.145	65.9	57.38	3.239	Pass 5/-60, 10/-60	Au
J21	21	4.34	0.15	0.12	3.156	65.8	57.68	3.316	Pass 5/-60, 10/-60	Au
J22	22	3.62	0.14	0.11	3.191	66.0	56.66	3.320	Pass 5/-60, 10/-60	Au
J23	23	0.49	0.14	0.11	3.190	66.1	57.08	3.323	Unused	



VGS (Volts)	LET=38±5%; 35µm±7.5%; 270MeV±7.5%	LET=61±5%; 30µm±7.5%; 330MeV±7.5%	LET=84±5%; 28µm±7.5%; 350MeV±10%
0	-60	-60	-60
5	-60	-60	-60
10	-60	-60	-60
15	-60	-45	-60
20	-60	-25	-60

Final QPL Specs

for 2N7520U3/732 (IRH NJ597034) and 2N7520T3/732 (IRHY597034CM)

for 2N7524U2/733 (IRHNA597064) and 2N7524T1/733 (IRHMS597064)

