



Single-Event-Effects Summary Report

IR RAD-Hard Gen-5 100V N-channel

SEE Qualifications of:

JANTXVR, F, G, H AND JANSR, F, G, H 2N7469U2 MIL-PRF-19500/673
JANTXVR, F, G, H AND JANSR, F, G, H 2N7471T1 MIL-PRF-19500/698
JANTXVR, F, G, H AND JANSR, F, G, H 2N7481U3 MIL-PRF-19500/703
JANTXVR, F, G, H AND JANSR, F, G, H 2N7484T3 MIL-PRF-19500/702
JANTXVR, F, G, H AND JANSR, F, G, H 2N7493T2 MIL-PRF-19500/701
JANTXVR, F, G, H AND JANSR, F, G, H 2N7496U5 MIL-PRF-19500/700
JANTXVR, F, G, H AND JANSR, F, G, H 2N7518 AND 2N7518U (N-Channel) MIL-PRF-19500/739
JANTXVR, F, G, H AND JANSR, F, G, H 2N7521U AND 2N7525 MIL-PRF-19500/740
JANTXVR, F, G, H AND JANSR, F, G, H 2N7503U8 MIL-PRF-19500/743
IRHNA57160, IRHNA53160, IRHNA56160, IRHNA58160 SCV AND SCS
IRHMS57160, IRHMS53160, IRHMS56160, IRHMS58160 SCV AND SCS
IRHNJ57130, IRHNJ53130, IRHNJ56130, IRHNJ58130 SCV AND SCS
IRHY57130CM, IRHY53130CM, IRHY56130CM, IRHY58130CM SCV AND SCS
IRHF57130, IRHF53130, IRHF56130, IRHF58130 SCV AND SCS
IRHE57130, IRHE53130, IRHE56130, IRHES58130 SCV AND SCS
IRHQ567110, IRHQ563110, IRHQ566110, IRHQ568110 SCV AND SCS (N-Channel Only)
IRHG567110, IRHG563110, IRHG566110, IRHG568110 SCV AND SCS (N-Channel Only)
IRHQ57110, IRHQ53110, IRHQ56110, IRHQ58110 SCV AND SCS
IRHG57110, IRHG53110, IRHG56110, IRHG58110 SCV AND SCS
IRHNM57110, IRHNM53110, IRHNM56110, IRHNM58110 SCV AND SCS



Fab-2 Wafer Lot: Q775702
SEE Test Date: Feb. 11-12th & March 6th 2009
SEE Test Facility: Brookhaven National Lab (BNL)

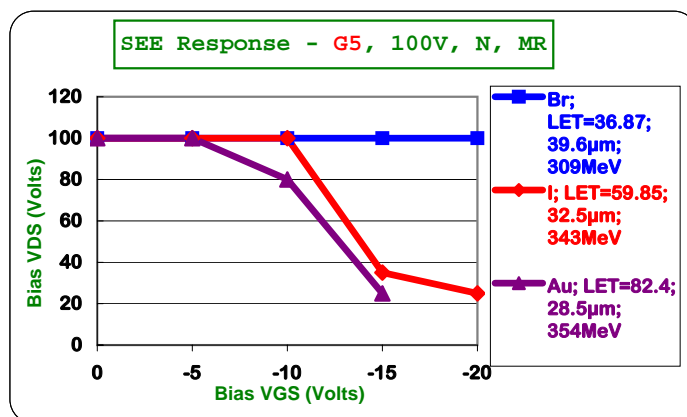
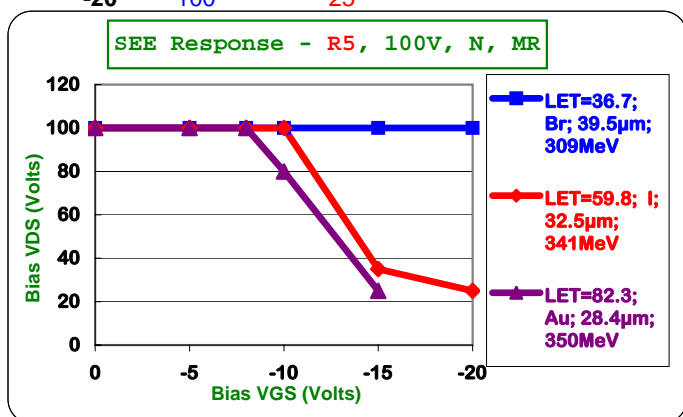
Ion	Br	I	Au	
LET	36.87	59.85	82.4	MeV-cm ² /mg
Energy	309	343	354	MeV
Range	39.6	32.5	28.5	μm
Run Numbers	175-188	506-541	n/a	at BNL February 11th & 12th 2009
Run Numbers	n/a	n/a	1-3, 12-18, 31-33	at BNL March 6th 2009

IR Fab-5 Specs

VGS (Volts)	VDS Bias (Volts)		
	LET=36.7; Br; 39.5μm; 309MeV	LET=59.8; I; 32.5μm; 341MeV	LET=82.3; Au; 28.4μm; 350MeV
0	100	100	100
-5	100	100	100
-8	100	100	100
-10	100	100	80
-15	100	35	25
-20	100	25	

IR Fab-2 Qual to Specs

VGS (Volts)	VDS Bias (Volts)		
	Br; LET=36.87; 39.6μm; 309MeV	I; LET=59.85; 32.5μm; 343MeV	Au; LET=82.4; 28.5μm; 354MeV
0	100	100	100
-5	100	100	100
-10	100	100	80
-15	100	35	25
-20	100	25	



Tested on Feb. 11th & 12th 2009

Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
175	Br	K1	1	21	32	6	-15	80	
176	Br	K1	1	21	32	6	-15	90	
177	Br	K1	1	21	32	6	-15	100	
178	Br	K1	1	21	32	6	-20	50	
179	Br	K1	1	21	32	6	-20	60	
180	Br	K1	1	21	32	6	-20	70	
181	Br	K1	1	21	32	6	-20	80	
182	Br	K1	1	21	32	6	-20	90	
183	Br	K1	1	21	32	6	-20	100	CurvePoint-1
184	Br	K2	2	21	33	6	-15	100	
185	Br	K2	2	21	33	6	-20	90	
186	Br	K2	2	21	33	6	-20	100	CurvePoint-1
187	Br	K3	3	21	34	6	-20	100	CurvePoint-1
188	Br	K4	4	21	35	6	-20	100	CurvePoint-1



Tested on Feb. 11th & 12th 2009

Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
506	I	K10	1	1	1	15	-10	90	
507	I	K10	1	1	1	15	-10	90	
508	I	K10	1	1	1	15	-10	100	
509	I	K10	1	1	1	15	-15	25	
510	I	K10	1	1	1	15	-15	30	
511	I	K10	1	1	1	15	-15	35	
512	I	K10	1	1	1	15	-15	36	
513	I	K10	1	1	1	15	-15	40	
514	I	K10	1	1	1	15	-15	60	
515	I	K10	1	1	1	15	-15	70	
516	I	K10	1	1	1	15	-15	80	
517	I	K10	1	1	1	15	-15	90	
518	I	K10	1	1	1	15	-15	100	
519	I	K10	1	1	1	15	-20	25	
520	I	K10	1	1	1	15	-20	50	F
521	I	K11	2	1	2	15	-10	100	
522	I	K11	2	1	2	15	-15	35	
523	I	K11	2	1	2	15	-15	100	
524	I	K11	2	1	2	15	-20	25	
525	I	K11	2	1	2	15	-20	30	
526	I	K11	2	1	2	15	-20	35	F
527	I	K12	3	1	3	15	-10	100	F, Invalid, F/A:
528	I	K13	4	1	4	15	-10	100	CurvePoint-1
529	I	K13	4	1	4	15	-15	35	CurvePoint-2
530	I	K13	4	1	4	15	-15	100	EngrgCurvePoint-2
531	I	K13	4	1	4	15	-20	25	CurvePoint-3
532	I	K14	5	1	5	15	-10	100	F, Invalid, F/A:
533	I	K15	6	1	6	15	-10	100	F, Invalid, F/A:
534	I	K16	7	1	7	15	-10	100	CurvePoint-1
535	I	K16	7	1	7	15	-15	35	CurvePoint-2
536	I	K16	7	1	7	15	-20	25	CurvePoint-3
537	I	K16	7	1	7	15	-15	100	EngrgCurvePoint-2
538	I	K17	8	1	8	15	-10	100	CurvePoint-1
539	I	K17	8	1	8	15	-15	35	CurvePoint-2
540	I	K17	8	1	8	15	-20	25	CurvePoint-3
541	I	K18	9	1	9	15	-10	100	F, Invalid, F/A:

Tested on March. 6th 2009

Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
1	Au	A1	1	24	41	1	-5	100	CurvePoint-1
2	Au	A2	2	24	43	1	-5	100	F Intermittent at Socket# 2
3	Au	A3	3	24	44	1	-5	100	CurvePoint-1
12	Au	A12	12	24	53	1	-10	80	CurvePoint-2
13	Au	A13	13	24	55	1	-10	80	CurvePoint-2
14	Au	A14	14	24	56	1	-10	80	CurvePoint-2
15	Au	A15	15	24	57	1	-15	25	CurvePoint-3
13	Au	A16	16	24	58	1	-15	25	CurvePoint-3
14	Au	A17	17	24	59	1	-15	25	CurvePoint-3
16	Au	A19	1	1	1	2	-5	100	CurvePoint-1
17	Au	A20	2	1	2	2	-5	100	F Intermittent at Socket# 2
18	Au	A21	3	1	3	2	-5	100	CurvePoint-1
31	Au	A34	16	1	18	2	-5	100	CurvePoint-1
32	Au	A35	17	1	19	2	-5	100	CurvePoint-1
33	Au	A36	18	1	20	2	-5	100	CurvePoint-1



RadHard MOSFET - G5, Hex 3, 100V, N-channel

Expected Good Devices

SEE-Failed Devices

Post - SEE Electricals Data

SEE-UnTested Devices

Parameter Conditions	I DSS VDS=-80V VGS=0V Limits Unit	I GSSf VGS=-20V VDS=0V Limits Unit	I GSSr VGS=20V VDS=0V Limits Unit	V GS(th) IDS=1mA VDS=VGS Limits Unit	BV DSS IDSS=1mA Limits Unit	R DS(on) ID=16A VGS=12V Limits Unit	VSD IS=15A Limits Unit		
Q775702 (BNL 02-11&12-2009) IRHC57130									
SEE Id	Log Serial								Good Matched Electricals to SEE
K10	1	728700.00	999900.00	999900.00	3.280	115.6	57.23	0.977	Failed -20V / 50V I
K11	2	532500.00	999900.00	999900.00	3.257	118.3	55.93	0.980	Failed -20V / 35V I
K12	3	9999000.00	999900.00	999900.00	0.204	0.2	66.00	0.983	Invalid I
K13	4	7.87	170.30	229.70	3.211	118.9	54.30	0.978	Pass -10/100V, -15/35V, -20/25V I
K14	5	9999000.00	999900.00	999900.00	0.211	0.2	182.30	0.978	Invalid I
K15	6	9999000.00	999900.00	999900.00	0.186	0.2	180.30	0.976	Invalid I
K16	7	2.12	0.39	0.12	3.232	118.9	54.43	0.981	Pass -10/100V, -15/35V, -20/25V I
K17	8	1.41	0.32	0.12	3.239	117.2	55.08	0.975	Pass -10/100V, -15/35V, -20/25V I
K18	9	9999000.00	999900.00	999900.00	0.189	0.2	184.30	0.975	Invalid I
K1	32	1.00	0.18	0.11	3.227	118.2	54.51	0.980	Pass -20V / 100V Br
K2	33	0.54	0.23	0.12	3.245	118.3	54.63	0.980	Pass -20V / 100V Br
K3	34	0.35	0.18	0.12	3.114	117.6	54.66	0.981	Pass -20V / 100V Br
K4	35	0.34	0.21	0.12	3.283	118.1	54.33	0.981	Pass -20V / 100V Br
K5	36	0.26	0.23	0.12	3.233	117.9	54.33	0.986	Unused Br
K6	37	0.28	0.24	0.12	3.242	118.1	54.72	0.983	Unused Br
K7	38	0.26	0.27	0.12	3.248	118.0	54.49	0.981	Unused Br
K8	39	0.31	0.25	0.12	3.146	118.1	54.33	0.980	Unused Br
K9	40	0.30	0.38	0.12	3.182	118.3	54.43	0.981	Unused Br
Q775702 (BNL 03-06-2009) IRHC57130									
SEE Id	Log Serial								Good Matched Electricals to SEE
A1	A1	16.39	1.10	1.74		118.8			Pass -5V / 100V Au
A2	A2	5000000.00	5000000.00	#####		0.1			Invalid - Socket Intermittent
A3	A3	10.71	1.26	1.97		118.8			Pass -5V / 100V Au
A12	A12	25.70	1.18	2.40		119.1			Pass -10V / 80V Au
A13	A13	30.43	1.08	1.67		118.9			Pass -10V / 80V Au
A14	A14	24.30	1.09	1.68		118.2			Pass -10V / 80V Au
A15	A15	87.08	1.11	2.03		118.7			Pass -15V / 25V Au
A16	A16	166.97	1.27	2.18		118.7			Pass -15V / 25V Au
A17	A17	146.74	0.88	2.41		117.1			Pass -15V / 25V Au
A19	A19	149.01	1.10	1.74		119.2			Pass -5V / 100V Au
A20	A20	5000000.00	5000000.00	#####		0.2			Invalid - Socket Intermittent
A21	A21	163.90	1.28	1.98		119.4			Pass -5V / 100V Au
A34	A34	140.59	1.37	2.10		119.4			Pass -5V / 100V Au
A35	A35	158.14	1.42	2.11		119.7			Pass -5V / 100V Au
A36	A36	140.98	1.39	2.06		119.5			Pass -5V / 100V Au



VGS (Volts)	LET=38±5%; 38µm±7.5%; 300MeV±7.5%	LET=61±5%; 31µm±10%; 330MeV±7.5%	LET=84±5%; 28µm±7.5%; 350MeV±10%
0	100	100	100
-5	100	100	100
-10	100	100	80
-15	100	35	25
-20	100	25	

Final QPL Specs

for 2N7469U2/673 (IRHNA57160) and 2N7471T1/698 (IRHMS57160)
 for 2N7481U3/703 (IRHNJ57130) and 2N7484T3/702 (IRHY57130CM)
 for 2N7493T2/701 (IRHF57130) and 2N7496U5/700 (IRHE57130)
 for 2N7518U/739 (IRHQ567110) and 2N7518/739 (IRHG567110) [N-ch ONLY]
 for 2N7521U/740 (IRHQ57110) and 2N7525/740 (IRHG57110)
 for 2N7503U8/743 (IRHNM57110)

