



Single-Event-Effects Summary Report

IR RAD-Hard Gen-5 130V N-channel

SEE Qualifications of:

JANTXVR, F, G, H AND JANSR, F, G, H 2N7472U2 MIL-PRF-19500/684

JANTXVR, F, G, H AND JANSR, F, G, H 2N7475T1 MIL-PRF-19500/685

JANTXVR, F, G, H AND JANSR, F, G, H 2N7485U3 MIL-PRF-19500/704

JANTXVR, F, G, H AND JANSR, F, G, H 2N7488T3 MIL-PRF-19500/705

JANTXVR, F, G, H AND JANSR, F, G, H 2N7497T2 MIL-PRF-19500/706

JANTXVR, F, G, H AND JANSR, F, G, H 2N7500U5 MIL-PRF-19500/707

IRHNA57163SE, IRHNA53163SE, IRHNA56163SE, IRHNA58163SE SCV AND SCS

IRHMS57163SE, IRHMS53163SE, IRHMS56163SE, IRHMS58163SE SCV AND SCS

IRHNJ57133SE, IRHNJ53133SE, IRHNJ56133SE, IRHNJ58133SE SCV AND SCS

IRHY57133CMSE, IRHY53133CMSE, IRHY56133CMSE, IRHY58133CMSE SCV AND SCS

IRHF57133SE, IRHF53133SE, IRHF56133SE, IRHF58133SE SCV AND SCS

IRHE57133SE, IRHE53133SE, IRHE56133SE, IRHES58133SE SCV AND SCS

SEE Summary Report - RH, G5, N, SE, 130V



Fab-2 Wafer Lot: Q777749 Split A/B/C
SEE Test Date: October 30th 2008
SEE Test Facility: Texas A&M Cyclotron

Ion	Kr	Xe	Au	
LET	38.9	63.4	87.2	
Energy	315	348	372	
Range	39	32.5	28.4	
Run Numbers	145-151	440-461	939-947	for Split A
Run Numbers	152-157	462-476	948-953	for Split B
Run Numbers	158-161	477-489	954-956	for Split C

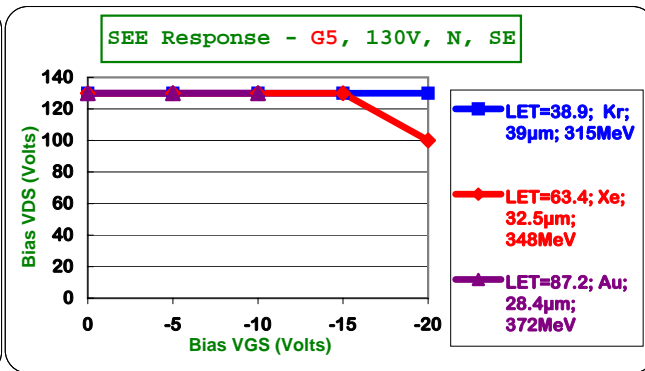
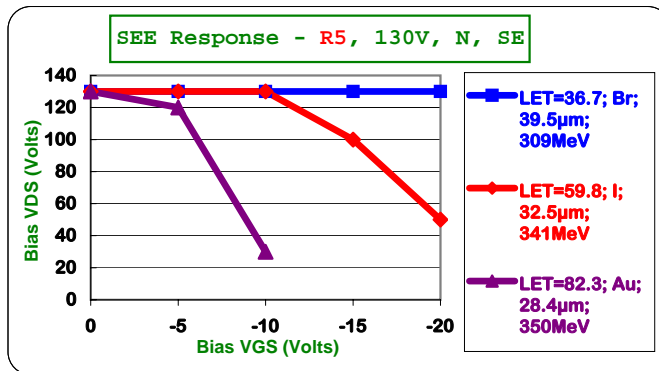
IR Fab-5 Specs

VGS Bias	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	130	130	130
-5	130	130	120
-10	130	130	30
-15	130	100	
-20	130	50	

IR Fab-2 Qual to Specs

VGS Bias	VDS Bias (Volts)		
	LET=38.9; Kr; 39µm; 315MeV	LET=63.4; Xe; 32.5µm; 348MeV	LET=87.2; Au; 28.4µm; 372MeV
0	130	130	130
-5	130	130	130
-10	130	130	130
-15	130	130	130
-20	130	100	

Xe: 90V (A) & 100V (B&C)



Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass	
145	Kr	I1	1	3	15	5	-5	130		
146	Kr	I1	1	3	15	5	-10	130		
147	Kr	I1	1	3	15	5	-15	130		
148	Kr	I1	1	3	15	5	-20	130	CurvePoint	Split A
149	Kr	I2	2	3	16	5	-20	130	CurvePoint	
150	Kr	I3	3	3	17	5	-20	130	CurvePoint	
151	Kr	I4	4	3	18	5	-20	130	CurvePoint	
152	Kr	J1	7	13	45	5	-10	130		
153	Kr	J1	7	13	45	5	-15	130		
154	Kr	J1	7	13	45	5	-20	130	CurvePoint	Split B
155	Kr	J2	8	13	46	5	-20	130	CurvePoint	
156	Kr	J3	9	13	47	5	-20	130	CurvePoint	
157	Kr	J4	10	13	48	5	-20	130	CurvePoint	
158	Kr	K1	13	23	35	5	-20	130	CurvePoint	Split C
159	Kr	K2	14	23	36	5	-20	130	CurvePoint	
160	Kr	K3	15	23	37	5	-20	130	CurvePoint	
161	Kr	K4	16	23	38	5	-20	130	CurvePoint	
440	Xe	I7	13	3	14	12	-10	80		
441	Xe	I7	13	3	14	12	-10	90		
442	Xe	I7	13	3	14	12	-10	100		
443	Xe	I7	13	3	14	12	-10	110		
444	Xe	I7	13	3	14	12	-10	120		
445	Xe	I7	13	3	14	12	-10	130		
446	Xe	I7	13	3	14	12	-15	100		Split A
447	Xe	I7	13	3	14	12	-15	110		
448	Xe	I7	13	3	14	12	-15	120		
449	Xe	I7	13	3	14	12	-15	130		
450	Xe	I7	13	3	14	12	-20	70		
451	Xe	I7	13	3	14	12	-20	80		
452	Xe	I7	13	3	14	12	-20	90		

SEE Summary Report - RH, G5, N, SE, 130V



Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass	
453	Xe	I7	13	3	14	12	-20	100	F	
454	Xe	I8	14	3	13	12	-15	130		CurvePoint-1
455	Xe	I8	14	3	13	12	-20	90		CurvePoint-2
456	Xe	I9	15	3	12	12	-20	90		CurvePoint-2
457	Xe	I9	15	3	12	12	-15	130		CurvePoint-1
458	Xe	I10	16	3	11	12	-15	130		CurvePoint-1
459	Xe	I10	16	3	11	12	-20	90		CurvePoint-2
460	Xe	I11	17	3	10	12	-20	90		CurvePoint-2
461	Xe	I11	17	3	10	12	-15	130		CurvePoint-1
462	Xe	J7	1	12	35	13	-15	110		
463	Xe	J7	1	12	35	13	-15	120		
464	Xe	J7	1	12	35	13	-15	130		
465	Xe	J7	1	12	35	13	-20	80		
466	Xe	J7	1	12	35	13	-20	90		
467	Xe	J7	1	12	35	13	-20	100		
468	Xe	J7	1	12	35	13	-20	110	F	
469	Xe	J8	2	12	36	13	-15	130		CurvePoint-1
470	Xe	J8	2	12	36	13	-20	100		CurvePoint-2
471	Xe	J9	3	12	37	13	-20	100		CurvePoint-2
472	Xe	J9	3	12	37	13	-15	130		CurvePoint-1
473	Xe	J10	4	12	38	13	-15	130		CurvePoint-1
474	Xe	J10	4	12	38	13	-20	100		CurvePoint-2
475	Xe	J11	5	12	39	13	-20	100		CurvePoint-2
476	Xe	J11	5	12	39	13	-15	130		CurvePoint-1
477	Xe	K7	7	24	44	13	-15	110		
478	Xe	K7	7	24	44	13	-15	120		
479	Xe	K7	7	24	44	13	-15	130		
480	Xe	K7	7	24	44	13	-20	80		
481	Xe	K7	7	24	44	13	-20	90		
482	Xe	K7	7	24	44	13	-20	100		
483	Xe	K7	7	24	44	13	-20	110	F	
484	Xe	K8	8	24	45	13	-20	100		CurvePoint-2
485	Xe	K8	8	24	45	13	-15	130		CurvePoint-1
486	Xe	K9	9	24	46	13	-15	130		CurvePoint-1
487	Xe	K9	9	24	46	13	-20	100		CurvePoint-2
488	Xe	K10	10	24	48	13	-20	100		CurvePoint-2
489	Xe	K10	10	24	48	13	-15	130		CurvePoint-1
939	Au	I13	13	3	3	23	-10	100		Invalid
940	Au	I13	13	3	3	23	-10	110		Invalid
941	Au	I13	13	3	3	23	-10	110		Invalid
942	Au	I14	14	3	5	23	-10	110		Invalid
943	Au	I15	15	3	6	23	-10	110		
944	Au	I15	15	3	6	23	-10	120		
945	Au	I15	15	3	6	23	-10	130		CurvePoint-1
946	Au	I16	16	3	7	23	-10	130		CurvePoint-1
947	Au	I17	17	3	8	23	-10	130		CurvePoint-1
948	Au	J13	1	9	29	24	-10	100		
949	Au	J13	1	9	29	24	-10	110		
950	Au	J13	1	9	29	24	-10	120		
951	Au	J13	1	9	29	24	-10	130		CurvePoint-1
952	Au	J14	2	9	30	24	-10	130		CurvePoint-1
953	Au	J15	3	12	31	24	-10	130		CurvePoint-1
954	Au	K13	7	20	29	24	-10	130		CurvePoint-1
955	Au	K14	8	23	34	24	-10	130		CurvePoint-1
956	Au	K15	9	20	30	24	-10	130		CurvePoint-1



RadHard MOSFET - G5, Hex 3, 130V, N-channel, SE

Q777749-A-POST.dta Tes

Device name : tst Lc

Expected Good Devices

SEE-Failed Devices

Post - SEE Electricals Data

SEE-UnTested Devices

Qty : 19 T P : 0 Rate

Parameter	I DSS	I GSSf	I GSSr	BV DSS	V GS(th)	R DS(on)	VSD		
Conditions	VDS=-104V VGS=0V	VGS=-20V VDS=0V	VGS=20V VDS=0V	IDSS=1mA	IDS=1mA VDS=VGS	ID=12.5A VGS=12V	IS=20A		
Limits	10µA Max	-100nA Max	100nA Max	130V Min	2.5V to 4.5V	80mOhms	1.2V Max		
Unit	nA	nA	nA	V	V	Ohms	V		
SEE Id	Log Serial	Q777749A (TAMU 10-30-2008) IRH57133SE						Good Matched Electricals to SEE	
I13	3	7.31	1.28	1.64	139.0	3.957	71.68	1.039	Invalid Au
I14	5	10.30	1.34	1.70	139.1	3.773	71.56	1.037	Invalid Au
I15	6	10.38	1.43	1.59	139.2	3.581	72.96	1.042	Pass -10V / 130V Au
I16	7	17.52	1.37	1.70	138.9	3.734	72.16	1.042	Pass -10V / 130V Au
I17	8	11.05	1.32	1.57	138.9	3.679	71.62	1.035	Pass -10V / 130V Au
Un-used	2	19.25	1.37	1.60	139.3	3.738	71.83	1.038	Un-used
Un-used	9	7.53	1.37	1.62	138.9	3.749	71.52	1.031	Un-used
I11	10	8.85	1.42	1.61	139.1	3.973	71.41	1.038	Failed -20V / 100V Xe
I10	11	8.97	1.37	1.47	139.1	3.935	71.70	1.042	Pass -15/130V & -20/90V Xe
I9	12	8.96	1.33	1.61	139.1	3.928	71.85	1.044	Pass -15/130V & -20/90V Xe
I8	13	8.69	1.41	1.62	139.1	3.589	72.49	1.042	Pass -15/130V & -20/90V Xe
I7	14	577500.00	999900.00	999900.00	139.2	3.744	72.68	1.031	Pass -15/130V & -20/90V Xe
I1	15	7.48	1.41	1.78	138.8	3.525	72.09	1.039	Pass -20V / 130V Kr
I2	16	7.06	1.18	1.54	138.6	3.601	72.32	1.037	Pass -20V / 130V Kr
I3	17	7.25	1.44	1.53	139.3	3.640	72.69	1.056	Pass -20V / 130V Kr
I4	18	7.18	1.36	1.74	139.4	3.847	71.79	1.032	Pass -20V / 130V Kr
Un-used	19	7.11	1.36	1.48	139.3	3.624	71.86	1.040	Un-used
Un-used	20	7.08	1.26	1.58	139.5	3.813	72.71	1.043	Un-used

RadHard MOSFET - G5, Hex 3, 130V, N-channel, SE

Expected Good Devices

SEE-Failed Devices

Post - SEE Electricals Data

SEE-UnTested Devices

Q777749-B-POST.dta Tes

Device name : tst Lc

Expected Good Devices

SEE-Failed Devices

Post - SEE Electricals Data

SEE-UnTested Devices

Qty : 18 T P : 0 Rate

Parameter	I DSS	I GSSf	I GSSr	BV DSS	V GS(th)	R DS(on)	VSD		
Conditions	VDS=-104V VGS=0V	VGS=-20V VDS=0V	VGS=20V VDS=0V	IDSS=1mA	IDS=1mA VDS=VGS	ID=12.5A VGS=12V	IS=20A		
Limits	10µA Max	-100nA Max	100nA Max	130V Min	2.5V to 4.5V	80mOhms	1.2V Max		
Unit	nA	nA	nA	V	V	Ohms	V		
SEE Id	Log Serial	Q777749B (TAMU 10-30-2008) IRH57133SE						Good Matched Electricals to SEE	
J13	29	21.10	1.21	1.50	139.9	3.655	73.35	1.039	Pass -10V / 130V Au
J14	30	10.02	1.19	1.46	139.9	3.611	73.28	1.041	Pass -10V / 130V Au
J15	31	9.78	1.19	1.51	139.0	3.940	72.68	1.044	Pass -10V / 130V Au
Un-used	32	6.51	1.19	1.32	139.0	3.942	72.44	1.042	Un-used
Un-used	33	6.41	1.12	1.42	138.9	3.941	72.39	1.043	Un-used
Un-used	34	6.48	1.13	1.39	138.9	3.939	72.57	1.046	Un-used
J7	35	1304000.00	999900.00	999900.00	40.8	3.892	74.63	1.039	Failed -20V / 110V Xe
J8	36	7.73	1.15	1.29	139.3	4.195	72.93	1.046	Pass -15/130V & -20/100V Xe
J9	37	7.83	1.06	1.46	139.3	4.181	72.65	1.039	Pass -15/130V & -20/100V Xe
J10	38	7.67	1.14	1.41	139.2	4.206	72.39	1.036	Pass -15/130V & -20/100V Xe
J11	39	7.52	1.09	1.40	139.2	4.182	72.44	1.040	Pass -15/130V & -20/100V Xe
Un-used	40	6.18	1.10	1.38	139.4	4.129	72.51	1.038	Un-used
J1	45	6.66	1.06	1.38	139.5	3.689	72.00	1.032	Pass -20V / 130V Kr
J2	46	6.21	1.07	1.35	139.4	3.747	73.02	1.045	Pass -20V / 130V Kr
J3	47	6.23	1.09	1.34	139.3	3.720	73.00	1.045	Pass -20V / 130V Kr
J4	48	6.18	1.01	1.32	139.3	3.739	72.42	1.036	Pass -20V / 130V Kr
Un-used	49	6.04	1.10	1.35	139.4	3.734	72.48	1.039	Un-used
Un-used	50	6.04	1.00	1.25	139.4	3.758	73.08	1.047	Un-used



RadHard MOSFET - G5, Hex 3, 130V, N-channel, SE

Expected Good Devices

SEE-Failed Devices

Post - SEE Electricals Data

SEE-UnTested Devices

Parameter	I DSS	I GSSf	I GSSr	BV DSS	V GS(th)	R DS(on)	VSD
Conditions	VDS=-104V VGS=0V	VGS=-20V VDS=0V	VGS=20V VDS=0V	IDSS=1mA	IDS=1mA VDS=VGS	ID=12.5A VGS=12V	IS=20A
Limits	10µA Max	-100nA Max	100nA Max	130V Min	2.5V to 4.5V	80mOhms	1.2V Max
Unit	nA	nA	nA	V	V	Ohms	V

Q777749-C-POST.dta Tes
Device name : tst Lc
C

SEE Id	Log Serial	Q777749C (TAMU 10-30-2008) IRH57133SE						Good Matched Electricals to SEE			
K13	29	10.95	1.29	1.53	138.0	4.038	71.53	1.037	Pass	-10V / 130V	Au
K15	30	10.39	1.24	1.49	138.0	3.981	71.81	1.040	Pass	-10V / 130V	Au
Un-used	31	7.27	1.22	1.67	138.5	4.053	72.64	1.039	Un-used		
Un-used	32	7.44	1.23	1.77	138.5	3.971	72.20	1.035	Un-used		
Un-used	33	7.29	1.37	1.59	138.5	3.948	72.52	1.037	Un-used		
K14	34	11.19	1.34	1.62	138.7	4.048	72.56	1.032	Pass	-10V / 130V	Au
K1	35	7.61	1.35	1.77	138.7	3.981	72.37	1.032	Pass	-20V / 130V	Kr
K2	36	7.33	1.30	1.56	139.4	4.401	72.52	1.030	Pass	-20V / 130V	Kr
K3	37	7.68	1.42	1.56	139.4	4.375	72.87	1.037	Pass	-20V / 130V	Kr
K4	38	7.53	1.29	1.73	139.3	4.259	73.02	1.046	Pass	-20V / 130V	Kr
Un-used	39	7.52	1.37	1.64	139.4	4.271	72.41	1.031	Un-used		
Un-used	40	7.72	1.41	1.81	139.3	4.158	72.37	1.030	Un-used		
K7	44	1129000.00	999900.00	999900.00	61.9	4.287	75.09	1.038	Failed	-20V / 110V	Xe
K8	45	9.02	1.39	1.69	138.6	4.028	72.28	1.028	Pass	-15/130V & -20/100V	Xe
K9	46	9.02	1.36	1.72	139.3	4.188	73.03	1.034	Pass	-15/130V & -20/100V	Xe
K10	48	9.06	1.48	1.74	139.2	3.935	73.59	1.038	Pass	-15/130V & -20/100V	Xe
Un-used	49	8.00	1.44	1.82	139.2	4.155	73.40	1.038	Un-used		
Un-used	50	8.08	1.41	1.83	139.1	3.915	72.97	1.037	Un-used		

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	130	130	130
-5	130	130	120
-10	130	130	30
-15	130	100	
-20	130	50	

Final QPL Specs

for 2N7472U2/684 (IRHNA57163SE), 2N7472U2C/673 (IRHNAC57163SE)
for 2N7475T1/685 (IRHMS57163SE)
for 2N7485U3/704 (IRHNJ57133SE), 2N7485U3C/704 (IRHNJ57133SE),
for 2N7488T3/705 (IRHY57133CMSE)
for 2N7497T2/706 (IRHF57133SE) & 2N7500U5/707 (IRHE57133SE)

