



# **Single-Event-Effects Summary Report**

## **IR RAD-Hard Gen-7 60V P-channel (Size-3 and Size-6)**

### ***SEE Qualifications of:***

**JANTXVR, F, G, H AND JANSR, F, G, H 2N7624U3 & U3C MIL-PRF-19500/757**  
**JANTXVR, F, G, H AND JANSR, F, G, H 2N7625T3 MIL-PRF-19500/757**  
**JANTXVR, F, G, H AND JANSR, F, G, H 2N7622U2 MIL-PRF-19500/TBA**  
**JANTXVR, F, G, H AND JANSR, F, G, H 2N7623T1 MIL-PRF-19500/TBA**  
**IRHLNJ 797034, 793034, 796034, 798034 SCV AND SCS (& IRHLNJC ...)**  
**IRHLYS 797034CM, 793034CM, 796034CM, 798034CM SCV AND SCS**  
**IRHLNA 797064, 793064, 796064, 798064 SCV AND SCS**  
**IRHLMS 797064, 793064, 796064, 798064 SCV AND SCS**

# SEE Summary Report - RH, G7, P, MR, 60V



Fab-2 Wafer Lot: Q774968  
SEE Test Date: August 12th 2008  
SEE Test Facility: Texas A&M Cyclotron

Ion	Kr	Xe	Au
LET	38.9	63.4	87.2
Energy	315	350	370
Range	39	32.6	28.4
Run Numbers	1 - 33	403-417	787-797

## IR Fab-5 Specs (Size-6)

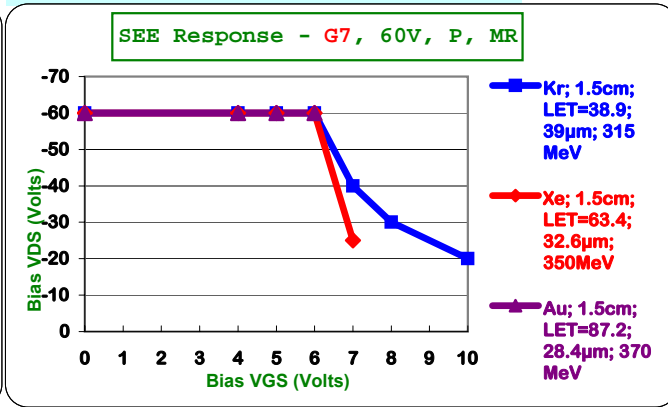
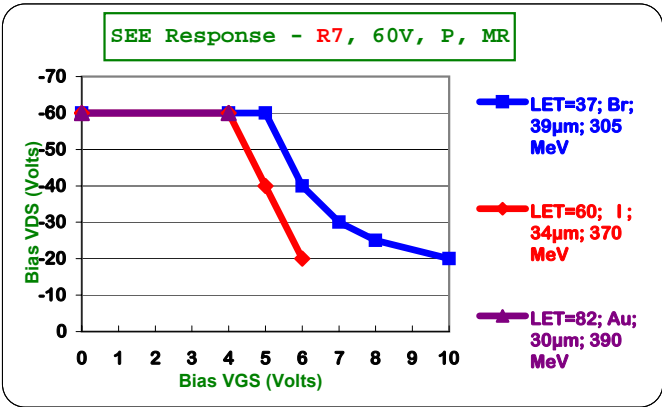
VDS Bias (Volts)

	LET=37; Br; 39µm; 305 MeV	LET=60; I; 34µm; 370 MeV	LET=82; Au; 30µm; 390 MeV
VGS Bias	MeV	MeV	MeV
0	-60	-60	-60
4	-60	-60	-60
5	-60	-40	
6	-40	-20	
7	-30		
8	-25		
10	-20		

## IR Fab-2 Qual to Specs

VDS Bias (Volts)

	Kr; 1.5cm; LET=38.9; 39µm; 315 MeV	Xe; 1.5cm; LET=63.4; 32.6µm; 350MeV	Au; 1.5cm; LET=87.2; 28.4µm; 370 MeV
VGS Bias	MeV	MeV	MeV
0	-60	-60	-60
4	-60	-60	-60
5	-60	-60	-60
6	-60	-60	-60
7	-40	-25	
8	-30		
10	-20		

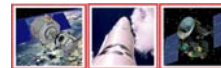


Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail	Blank=Pass
1	Kr	A1	1	1	6	1	5	-60		
2	Kr	A1	1	1	6	1	6	-60		
3	Kr	A1	1	1	6	1	7	-25		
4	Kr	A1	1	1	6	1	7	-30		
5	Kr	A1	1	1	6	1	7	-40		
6	Kr	A1	1	1	6	1	7	-50	F	SEGR
7	Kr	A2	2	1	1	1	8	-15		
8	Kr	A2	2	1	1	1	8	-20		
9	Kr	A2	2	1	1	1	8	-25		
10	Kr	A2	2	1	1	1	8	-30		
11	Kr	A2	2	1	1	1	8	-35		
12	Kr	A2	2	1	1	1	8	-40	F	SEGR
13	Kr	A3	3	1	2	1	10	-20		
14	Kr	A3	3	1	2	1	10	-25		
15	Kr	A3	3	1	2	1	10	-30	F	SEGR
16	Kr	A4	4	1	3	1	6	-60	F	Gate Stress Failure
17	Kr	A5	5	1	4	1	6	-60		▼GateStress OFF▼
18	Kr	A5	5	1	4	1	7	-40		
19	Kr	A5	5	1	4	1	8	-35	F	SEGR
20	Kr	A6	6	1	5	1	6	-60		CurvePoint-1
21	Kr	A6	6	1	5	1	7	-40		CurvePoint-2
22	Kr	A6	6	1	5	1	8	-30		CurvePoint-3
23	Kr	A6	6	1	5	1	10	-20		CurvePoint-4
24	Kr	A7	7	1	7	1	10	-20		CurvePoint-4
25	Kr	A7	7	1	7	1	8	-30		CurvePoint-3
26	Kr	A7	7	1	7	1	7	-40		CurvePoint-2
27	Kr	A7	7	1	7	1	6	-60		CurvePoint-1
28	Kr	A8	8	1	8	1	6	-60		CurvePoint-1
29	Kr	A8	8	1	8	1	7	-40		CurvePoint-2



Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
30	Kr	A8	8	1	8	1	8	-30	Lost Beam
31	Kr	A8	8	1	8	1	8	-30	CurvePoint-3
32	Kr	A8	8	1	8	1	10	-20	Not sure, thus repeat
33	Kr	A8	8	1	8	1	10	-20	CurvePoint-4
403	Xe	A10	1	2	13	11	4	-60	
404	Xe	A10	1	2	13	11	5	-60	
405	Xe	A10	1	2	13	11	6	-40	
406	Xe	A10	1	2	13	11	6	-50	
407	Xe	A10	1	2	13	11	6	-60	
408	Xe	A10	1	2	13	11	7	-30	F SEGR
409	Xe	A11	2	3	19	11	7	-10	
410	Xe	A11	2	3	19	11	7	-20	
411	Xe	A11	2	3	19	11	7	-25	CurvePoint-2
412	Xe	A12	3	2	11	11	6	-60	CurvePoint-1
413	Xe	A12	3	2	11	11	7	-25	CurvePoint-2
414	Xe	A13	4	3	18	11	7	-25	CurvePoint-2
415	Xe	A13	4	3	18	11	6	-60	CurvePoint-1
416	Xe	A14	5	2	10	11	6	-60	CurvePoint-1
417	Xe	A14	5	2	10	11	7	-25	CurvePoint-2
787	Au	A19	1	4	26	19	4	-40	
788	Au	A19	1	4	26	19	4	-50	
789	Au	A19	1	4	26	19	4	-60	
790	Au	A19	1	4	26	19	5	-60	CurvePoint-1
791	Au	A19	1	4	26	19	6	-60	CurvePoint-2
792	Au	A20	2	4	27	19	5	-60	CurvePoint-1
793	Au	A20	2	4	27	19	6	-60	CurvePoint-2
794	Au	A21	3	3	23	19	5	-60	CurvePoint-1
795	Au	A21	3	3	23	19	6	-60	CurvePoint-2
796	Au	A22	4	3	22	19	5	-60	CurvePoint-1
797	Au	A22	4	3	22	19	6	-60	CurvePoint-2

# SEE Summary Report - RH, G7, P, MR, 60V



## RadHard MOSFET - G7, Hex 3, 60V, P-channel

### Post - SEE Electricals Data

SEE Id	Log Serial	Parameter	I GSSf	I GSSr	I DSS	BV DSS	V GS(th)	R DS(on)	VSD	Good	Split D
		Conditions	VDS=10V VGS=0V	VGS=-10V VDS=0V	VGS=48V VDS=0V	IDS=0.25mA	IDS=0.25mA	ID=17A	IS=20A		
		Limits	100nA Max nA	-100nA Max nA	1µA Max nA	60V Min V	1V to 2V V	95mOhms mOhms	5V Max V		
<b>Q774968 (TAMU 08-12-2008) IRHLC797034</b>											
A1	6		999900.00	667900.00	99.63	65.74	1.430	57.64	2.855	Failed 7/-50	Kr
A2	1		999900.00	554500.00	12.39	65.77	1.440	58.94	2.829	Failed 8/-40	Kr
A3	2		999900.00	587800.00	30.62	65.79	1.434	58.23	2.827	Failed 10/-30	Kr
A4	3		999900.00	70040.00	38.99	65.78	1.433	57.23	2.882	Failed 6/-60(GS)	Kr
A5	4		999900.00	626200.00	56.43	65.77	1.429	57.85	2.834	Failed 8/-35	Kr
A6	5		0.13	0.26	0.94	65.78	1.432	57.85	2.828	Pass 6/-60, 7/-40, 8/-30, 10 Kr	
A7	7		173.20	245.70	0.74	65.75	1.410	59.00	2.777	Pass 6/-60, 7/-40, 8/-30, 10 Kr	
A8	8		0.20	0.31	0.82	65.63	1.413	57.94	2.788	Pass 6/-60, 7/-40, 8/-30, 10 Kr	
A9	9		0.18	0.25	0.75	66.06	1.445	59.17	2.912	Un-Tested	Kr
A10	13		999900.00	361100.00	87.89	66.07	1.439	60.47	2.929	Failed Failed 7/-30	Xe
A11	19		0.10	0.41	1.60	64.97	1.421	51.19	2.790	Pass 7/-25	Xe
A12	11		22.47	20.22	1.28	66.20	1.448	60.88	2.967	Pass 6/-60, 7/-25	Xe
A13	18		0.12	0.20	1.61	65.02	1.416	50.64	2.760	Pass 6/-60, 7/-25	Xe
A14	10		0.15	0.29	1.27	66.27	1.461	60.88	2.969	Pass 6/-60, 7/-25	Xe
A15	7		173.20	245.70	0.74	65.75	1.410	59.00	2.777	Un-Tested	Xe
A16	16		0.14	0.26	1.09	66.25	1.452	60.00	2.955	Un-Tested	Xe
A17	15		0.13	0.26	0.60	66.28	1.467	61.88	2.992	Un-Tested	Xe
A18	14		0.12	0.36	0.66	66.35	1.462	62.70	3.044	Un-Tested	Xe
A19	26		97.07	141.30	8.37	65.43	1.428	55.78	2.881	Pass 5/-60, 6/-60	Au
A20	27		0.15	0.24	3.99	65.45	1.434	56.44	2.883	Pass 5/-60, 6/-60	Au
A21	23		0.15	0.40	3.94	64.95	1.433	51.91	2.789	Pass 5/-60, 6/-60	Au
A22	22		0.21	0.40	4.07	65.11	1.413	51.18	2.795	Pass 5/-60, 6/-60	Au
A23	24		0.12	0.28	0.84	65.03	1.403	51.86	2.758	Un-Tested	Au
A24	25		0.12	0.34	1.00	65.37	1.422	55.93	2.849	Un-Tested	Au
<b>Re-Test</b>											
A19	26		64.68	74.98	7.13	65.37	1.432	55.70	2.879	Pass 5/-60, 6/-60	Au
A7	7		145.70	136.70	3.88	65.89	1.402	59.70	2.777	Pass 6/-60, 7/-40, 8/-30, 10 Kr	

#### Failure Analysis on sample A7:

Failure Analysis shows surface contamination.  
Clean and bake and re-test resulted in Passing.



## Final QPL Specs

for **2N7624U3/757** (IRHLNJ797034) & **2N7625T3/757** (IRHLYS797034CM)  
for **2N7622U2/tba** (IRHLNA797064) & **2N7623T1/tba** (IRHLMS797064)

VGS Bias	LET=38±5%; 38µm±7.5%; 300MeV±7.5%	LET=62±5%; 33µm±7.5%; 355MeV±7.5%	LET=85±5%; 29µm±7.5%; 380MeV±10%
0	-60	-60	-60
2	-60	-60	-60
4	-60	-60	-60
5	-60	-60	-60
6	-60	-60	-60
7	-40		

