



Single-Event-Effects Summary Report

IR RAD-Hard Gen-5 30V P-channel

SEE Qualifications of:

JANTXVR, F AND JANSR, F 2N7523U2 MIL-PRF-19500/733

JANTXVR, F AND JANSR, F 2N7523T1 MIL-PRF-19500/733

JANTXVR, F AND JANSR, F 2N7519U3 MIL-PRF-19500/732

JANTXVR, F AND JANSR, F 2N7519T3 MIL-PRF-19500/732

IRHNA597Z60, IRHNA593Z60 SCV AND SCS

IRHMS597Z60, IRHMS593Z60 SCV AND SCS

IRHNJ597Z30, IRHNJ593Z30 SCV AND SCS

IRHY597Z30CM, IRHY593Z30CM SCV AND SCS

IRHF579Z30, IRHF593Z30 SCV AND SCS

IRHE597Z30, IRHE593Z30 SCV AND SCS



Fab-2 Wafer Lot: Q776752
SEE Test Date: Oct. 30th 2008
SEE Test Facility: Texas A&M Cyclotron
SEE Test Date: Dec. 2nd 2008
SEE Test Facility: Texas A&M Cyclotron

Ion	Kr	I	Au	
LET	39.5	63.4	86.1	MeV-cm ² /mg
Energy	287	326	342	MeV
Range	36	31	27	µm
Run Numbers	187-193	498-513	965-970	for Au upto VGS=10V
Run Numbers			5-17	for Au at VGS=15V

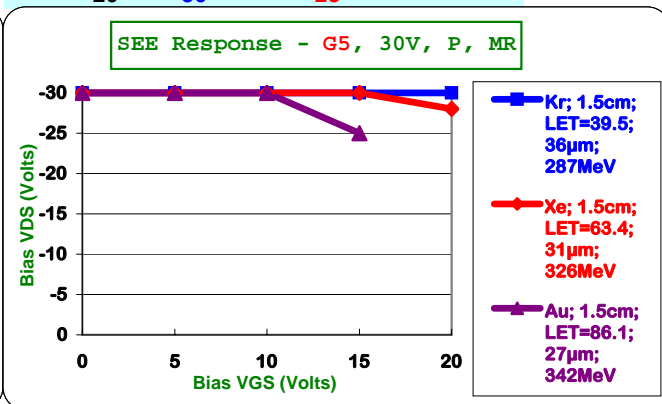
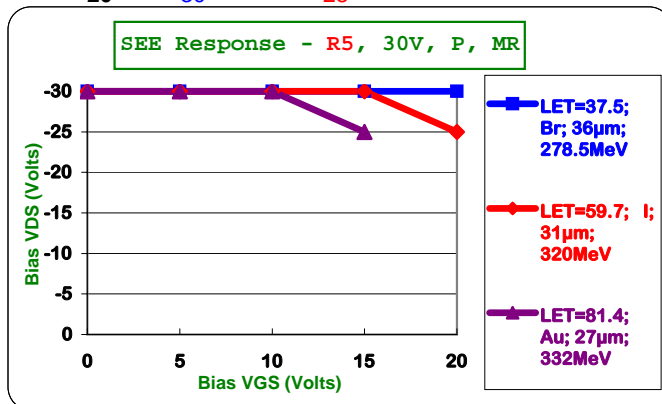
IR Fab-5 Specs

IR Fab-2 Qual to Specs

VGS (Volts)	VDS Bias (Volts)		
	LET=37.5; Br; 36µm; 278.5MeV	LET=59.7; I; 31µm; 320MeV	LET=81.4; Au; 27µm; 332MeV
0	-30	-30	-30
5	-30	-30	-30
10	-30	-30	-30
15	-30	-30	-25
20	-30	-25	

VGS (Volts)	VDS Bias (Volts)		
	Kr; 1.5cm; LET=39.5; 36µm; 287MeV	Xe; 1.5cm; LET=63.4; 31µm; 326MeV	Au; 1.5cm; LET=86.1; 27µm; 342MeV
0	-30	-30	-30
5	-30	-30	-30
10	-30	-30	-30
15	-30	-30	-25
20	-30	-28	

Au: qual'ed upto 10V in Oct.'08
 Au: qual'ed at 15V in Dec.'08



Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
Tested on Oct. 30th 2008									
187	Kr	M1	10	4	20	6	5	-30	
188	Kr	M1	10	4	20	6	10	-30	
189	Kr	M1	10	4	20	6	15	-30	
190	Kr	M1	10	4	20	6	20	-30	
191	Kr	M2	11	4	18	6	20	-30	Curve-Point
192	Kr	M3	12	4	17	6	20	-30	Curve-Point
193	Kr	M9	18	4	11	6	20	-30	Curve-Point
Tested on Oct. 30th 2008									
498	Xe	M10	1	2	10	14	15	-26	
499	Xe	M10	1	2	10	14	15	-28	
500	Xe	M10	1	2	10	14	15	-30	
501	Xe	M10	1	2	10	14	20	-22	
502	Xe	M10	1	2	10	14	20	-24	
503	Xe	M10	1	2	10	14	20	-26	
504	Xe	M10	1	2	10	14	20	-28	
505	Xe	M10	1	2	10	14	20	-30	F
506	Xe	M11	2	2	9	14	15	-30	CurvePoint-1
507	Xe	M11	2	2	9	14	20	-28	CurvePoint-2
508	Xe	M12	3	2	8	14	20	-28	CurvePoint-2
509	Xe	M12	3	2	8	14	15	-30	CurvePoint-1
510	Xe	M13	4	2	7	14	15	-30	CurvePoint-1
511	Xe	M13	4	2	7	14	20	-28	CurvePoint-2
512	Xe	M14	5	2	6	14	20	-28	CurvePoint-2
513	Xe	M14	5	2	6	14	15	-30	CurvePoint-1
Tested on Oct. 30th 2008									
965	Au	M16	1	14	44	25	10	-10	
966	Au	M16	1	14	44	25	10	-20	
967	Au	M16	1	14	44	25	10	-30	CurvePoint-1
968	Au	M17	2	14	45	25	10	-30	CurvePoint-1
969	Au	M18	3	14	46	25	10	-30	CurvePoint-1
970	Au	M19	4	14	47	25	10	-30	CurvePoint-1



Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
Tested on Dec. 2nd 2008									
5	Au	A1	1	13	40	1	15	-10	
6	Au	A1	1	13	40	1	15	-12	
7	Au	A1	1	13	40	1	15	-14	
8	Au	A1	1	13	40	1	15	-16	
9	Au	A1	1	13	40	1	15	-18	
10	Au	A1	1	13	40	1	15	-20	
11	Au	A1	1	13	40	1	15	-22	
12	Au	A1	1	13	40	1	15	-24	
13	Au	A1	1	13	40	1	15	-26	
14	Au	A2	1	13	39	1	15	-25	Curve-Point Invalid run
15	Au	A2	2	13	39	1	15	-25	Curve-Point
16	Au	A3	3	13	38	1	15	-25	Curve-Point
17	Au	A4	4	14	43	1	15	-25	Curve-Point

RadHard MOSFET - G5, Hex 6, 30V, P-channel

Expected Good Devices

SEE-Failed Devices

Post - SEE Electricals Data

SEE-UnTested Devices

Parameter	I DSS	I GSSf	I GSSr	V GS(th)	BV DSS	R DS(on)	VSD		
Conditions	VDS=-24V VGS=0V	VGS=-20V VDS=0V	VGS=20V VDS=0V	IDS=1mA VDS=VGS	IDSS=1mA	ID=56A VGS=12V	IS=56A		
Limits	10µA Max	-100nA Max	100nA Max	2V to 4V	30V Min	13mOhms	5V Max		
Unit	nA	nA	nA	V	V	mOhms	V		
SEE Id	Log Serial	Q776752 (TAMU 10-30-2008) IRHC597Z60						Good	
M15	5	0.69	0.10	0.09	3.164	36.3	9.49	2.456	Pass Un-Used Xe
M14	6	5.81	1.43	3.38	3.187	36.3	9.29	2.464	Pass 15V/-30V & 20V/-28V Xe
M13	7	6.60	1.47	3.25	3.162	36.2	9.26	2.500	Pass 15V/-30V & 20V/-28V Xe
M12	8	9.75	1.33	3.38	3.151	36.3	9.50	2.450	Pass 15V/-30V & 20V/-28V Xe
M11	9	6.37	1.42	3.25	3.178	36.3	9.29	2.461	Pass 15V/-30V & 20V/-28V Xe
M10	10	279.20	567400.00	283100.00	3.194	36.3	9.30	2.479	Failed Failed 20V/-30V Xe
M9	11	4.75	1.43	3.31	3.165	36.7	9.66	2.478	Pass 20V/-30V Kr
M8	12	4.24	1.58	3.81	3.156	36.7	9.48	2.487	Pass Un-Used Kr
M7	13	4.28	1.46	3.30	3.150	36.7	9.76	2.505	Pass Un-Used Kr
M6	14	4.24	1.38	3.57	3.167	36.7	9.71	2.488	Pass Un-Used Kr
M5	15	4.46	1.46	3.43	3.143	36.6	9.72	2.489	Pass Un-Used Kr
M4	16	4.25	1.49	3.67	3.185	36.7	9.77	2.477	Pass Un-Used Kr
M3	17	691.10	1.54	3.44	0.018	1.0	9.84	2.505	Failed Invalid (leaky b4 beam) Kr
M2	18	4.64	1.52	3.56	3.178	36.7	9.57	2.475	Pass 20V/-30V Kr
M1	20	5.22	1.53	3.40	3.159	36.7	9.70	2.529	Pass 20V/-30V Kr
M16	44	255900.00	4.46	4.23	3.175	30.8	9.85	2.507	Failed Invalid Au
M17	45	9.03	1.79	3.45	3.194	36.6	9.76	2.454	Pass 10V/-30V Au
M18	46	9.20	1.58	3.27	3.165	36.6	9.86	2.496	Pass 10V/-30V Au
M19	47	8.61	1.68	3.87	3.139	36.6	9.72	2.457	Pass 10V/-30V Au
M20	48	0.76	0.15	0.10	3.154	36.5	10.01	2.466	Pass Un-Used Au
M21	50	5.10	1.78	3.92	3.196	36.6	9.90	2.425	Pass Un-Used Au



RadHard MOSFET - G5, Hex 6, 30V, P-channel

Expected Good Devices

SEE-Failed Devices

Post - SEE Electricals Data

SEE-UnTested Devices

Parameter	I DSS	I GSSf	I GSSr	V GS(th)	BV DSS	R DS(on)	VSD			
Conditions	VDS=-24V VGS=0V	VGS=-20V VDS=0V	VGS=20V VDS=0V	IDS=1mA VDS=VGS	IDSS=1mA	ID=56A VGS=12V	IS=56A			
Limits	10µA Max	-100nA Max	100nA Max	2V to 4V	30V Min	13mOhms	5V Max			
Unit	nA	nA	nA	V	V	mOhms	V			
SEE Id	Log Serial	Q776752 (BNL 12-02-2008) IRHC597Z60						Good		
A3	38	14.57	2.58	4.04	3.153	36.3	9.79	2.481	Pass 15V-26V Au	
A2	39	14.88	2.63	3.49	3.162	36.3	9.88	2.449	Pass 15V-25V Au	
A1	40	38.70	2.51	3.39	3.159	36.3	9.82	2.603	Pass 15V-25V Au	
	41	8.18	2.59	4.04	3.182	36.6	9.88	2.482		
	42	8.29	2.75	3.05	3.182	36.6	9.92	2.519		
A4	43	230000.00	3.63	4.11	3.185	36.6	10.02	2.544	Pass 15V-25V Au	
After being baked at 125°C for 1 hour, the sample A4 is re-tested and passes:										
A4	1	209.70	2.23	6.33	3.210	36.7	10.10	2.563	Pass 15V-25V Au	

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	-30	-30	-30
5	-30	-30	-30
10	-30	-30	-30
15	-30	-30	-25
20	-30	-25	

Final QPL Specs

for 2N7519U3/732 (IRHNP597Z30), 2N7519U3C/732 (IRHNJC597Z30)
and 2N7519T3/732 (IRHY597Z30CM)
for 2N7523U2/733 (IRHNA597Z60), 2N7523U2C/733 (IRHNAC597Z60)
and 2N7523T1/733 (IRHMS597Z60)

