



Single-Event-Effects Summary Report

IR RAD-Hard Gen-5 200V N-channel

SEE Qualifications of:

JANTXVR, F, G, H AND JANSR, F, G, H 2N7473U2 MIL-PRF-19500/684

JANTXVR, F, G, H AND JANSR, F, G, H 2N7476T1 MIL-PRF-19500/685

JANTXVR, F, G, H AND JANSR, F, G, H 2N7486U3 MIL-PRF-19500/704

JANTXVR, F, G, H AND JANSR, F, G, H 2N7489T3 MIL-PRF-19500/705

JANTXVR, F, G, H AND JANSR, F, G, H 2N7498T2 MIL-PRF-19500/706

JANTXVR, F, G, H AND JANSR, F, G, H 2N7501U5 MIL-PRF-19500/707

IRHNA57260SE, IRHNA53260SE, IRHNA56260SE, IRHNA58260SE SCV AND SCS

IRHMS57260SE, IRHMS53260SE, IRHMS56260SE, IRHMS58260SE SCV AND SCS

IRHNJ57230SE, IRHNJ53230SE, IRHNJ56230SE, IRHNJ58230SE SCV AND SCS

IRHY57230CMSE, IRHY53230CMSE, IRHY56230CMSE, IRHY58230CMSE SCV AND SCS

IRHF57230SE, IRHF53230SE, IRHF56230SE, IRHF58230SE SCV AND SCS

IRHE57230SE, IRHE53230SE, IRHE56230SE, IRHES58230SE SCV AND SCS

SEE Summary Report - RH, G5, N, SE, 200V



Fab-2 Wafer Lot: Q778784
 SEE Test Date: Feb. 11-12th 2009
 SEE Test Facility: Brookhaven National Lab (BNL)

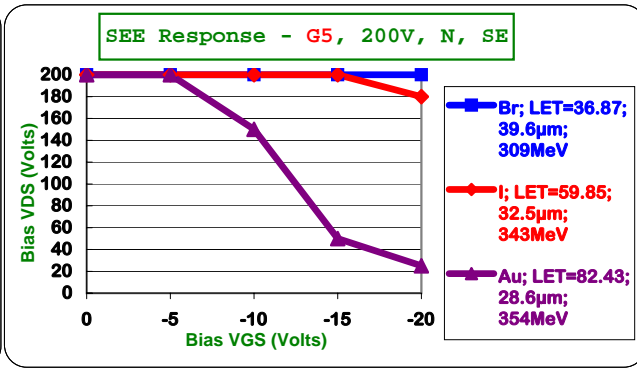
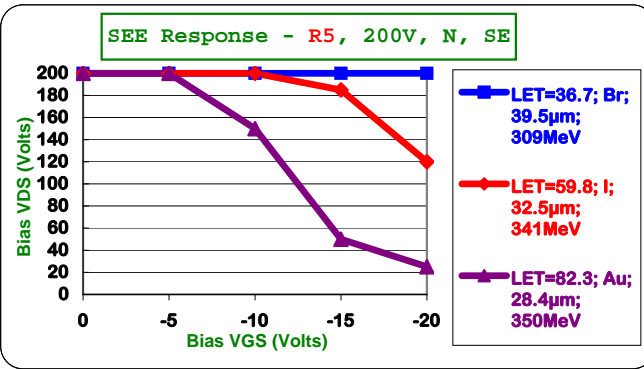
Ion	Br	I	Au
LET	36.87	59.85	82.43
Energy	309	343	354
Range	39.6	32.5	28.6
Run Numbers	142-147	448-473	815-836

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	200	200	200
-5	200	200	200
-10	200	200	150
-15	200	185	50
-20	200	120	25

IR Fab-2 Qual to Specs

VGS Bias	VDS Bias (Volts)		
	Br; LET=36.87; 39.6µm; 309MeV	I; LET=59.85 ; 32.5µm; 343MeV	Au; LET=82.43; 28.6µm; 354MeV
0	200	200	200
-5	200	200	200
-10	200	200	150
-15	200	200	50
-20	200	180	25



Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
142	Br	I1	1	7	21	5	-20	180	
143	Br	I1	1	7	21	5	-20	200	CurvePoint
144	Br	I2	2	7	22	5	-20	180	
145	Br	I2	2	7	22	5	-20	200	CurvePoint
146	Br	I3	3	7	23	5	-20	200	CurvePoint
147	Br	I4	4	7	28	5	-20	200	CurvePoint
448	I	I9	1	6	20	14	-10	140	
449	I	I9	1	6	20	14	-10	160	
450	I	I9	1	6	20	14	-10	180	
451	I	I9	1	6	20	14	-10	190	
452	I	I9	1	6	20	14	-10	200	
453	I	I9	1	6	20	14	-15	160	
454	I	I9	1	6	20	14	-15	170	
455	I	I9	1	6	20	14	-15	180	
456	I	I9	1	6	20	14	-15	185	
457	I	I9	1	6	20	14	-15	190	
458	I	I9	1	6	20	14	-15	195	
459	I	I9	1	6	20	14	-15	200	CurvePoint-1
460	I	I9	1	6	20	14	-20	120	
461	I	I9	1	6	20	14	-20	140	
462	I	I9	1	6	20	14	-20	150	
463	I	I9	1	6	20	14	-20	160	
464	I	I9	1	6	20	14	-20	170	
465	I	I9	1	6	20	14	-20	180	
466	I	I9	1	6	20	14	-20	190	
467	I	I9	1	6	20	14	-20	200	CurvePoint-2
468	I	I10	2	6	19	14	-15	200	
469	I	I10	2	6	19	14	-20	200	F
470	I	I11	3	6	18	14	-20	160	
471	I	I11	3	6	18	14	-20	180	
472	I	I11	3	6	18	14	-20	190	
473	I	I11	3	6	18	14	-20	200	F

SEE Summary Report - RH, G5, N, SE, 200V



Run No.	Ion	DUT Id	Socket	Wafer	Serial	Batch	VGS Volts	VDS Volts	Pass/Fail Blank=Pass
474	I	I12	4	6	17	14	-15	200	CurvePoint-1
475	I	I12	4	6	17	14	-20	180	CurvePoint-2
476	I	I13	5	6	16	14	-15	200	CurvePoint-1
477	I	I13	5	6	16	14	-20	180	CurvePoint-2
478	I	I14	6	6	15	14	-15	200	CurvePoint-1
479	I	I14	6	6	15	14	-20	180	CurvePoint-2
480	I	I15	7	6	14	14	-15	200	CurvePoint-1
481	I	I15	7	6	14	14	-20	180	CurvePoint-2
815	Au	I19	1	5	1	23	-10	150	
816	Au	I19	1	5	1	23	-10	160	
817	Au	I19	1	5	1	23	-10	170	
818	Au	I19	1	5	1	23	-10	180	
819	Au	I19	1	5	1	23	-10	190	
820	Au	I19	1	5	1	23	-10	200	
821	Au	I19	1	5	1	23	-15	50	
822	Au	I19	1	5	1	23	-20	25	
823	Au	I19	1	5	1	23	-15	60	F
824	Au	I20	2	5	2	23	-5	200	CurvePoint-1
825	Au	I20	2	5	2	23	-10	150	CurvePoint-2
826	Au	I20	2	5	2	23	-15	50	CurvePoint-3
827	Au	I20	2	5	2	23	-20	25	CurvePoint-4
828	Au	I21	3	5	3	23	-5	200	CurvePoint-1
829	Au	I21	3	5	3	23	-10	150	CurvePoint-2
830	Au	I21	3	5	3	23	-15	50	CurvePoint-3
831	Au	I21	3	5	3	23	-20	25	CurvePoint-4
832	Au	I22	4	5	4	23	-5	200	CurvePoint-1
833	Au	I22	4	5	4	23	-10	150	CurvePoint-2
834	Au	I22	4	5	4	23	-15	50	CurvePoint-3
835	Au	I22	4	5	4	23	-20	25	CurvePoint-4
836	Au	I23	5	5	5	23	-5	200	F F/A:



RadHard MOSFET - G5, Hex 3, 200V, N-channel, SE

Expected Good Devices

SEE-Failed Devices

SEE-UnTested Devices

Post - SEE Electricals Data

Parameter	I DSS	I GSSf	I GSSr	BV DSS	V GS(th)	R DS(on)	VSD		
Conditions	VDS=-160V VGS=0V	VGS=-20V VDS=0V	VGS=20V VDS=0V	IDSS=1mA	IDS=1mA VDS=VGS	ID=7.8A VGS=12V	IS=12A		
Limits	10µA Max	-100nA Max	100nA Max	200V Min	2.5V to 4.5V	220mOhms	1.2V Max		
Unit	nA	nA	nA	V	V	Ohms	V		
SEE Id	Log Serial	Q778784 BNL 02-11&12-2009) IRH57230SE						Good Matched Electricals to SEE	
I28	10	0.48	0.38	0.14	231.3	3.940	220.70	0.902	Invalid Au
I18	11	0.48	0.41	0.15	226.4	3.884	215.20	0.901	Un-used
I17	12	0.44	0.37	0.13	231.3	3.959	219.10	0.902	Un-used
I16	13	0.47	0.37	0.14	231.4	3.964	219.70	0.904	Un-used
I15	14	2.56	0.36	0.14	232.6	3.989	220.20	0.903	Pass -15/200V & -20/180V I
I14	15	2.79	0.39	0.13	237.0	4.032	224.70	0.902	Pass -15/200V & -20/180V I
I13	16	2.50	0.37	0.13	233.2	3.994	221.00	0.902	Pass -15/200V & -20/180V I
I12	17	2.75	0.36	0.13	233.5	4.010	220.10	0.902	Pass -15/200V & -20/180V I
I11	18	9999000.00	999900.00	999900.00	1.0	0.043	360.20	0.902	Failed -20V / 200V I
I10	19	1222000.00	999900.00	999900.00	95.6	4.019	223.90	0.903	Failed -20V / 200V I
I9	20	24.23	0.39	0.14	229.9	3.959	221.10	0.904	Pass -15/200V & -20/200V I
I1	21	0.64	0.41	0.14	242.3	4.277	220.70	0.903	Pass -20V / 200V Br
I2	22	0.68	0.38	0.13	242.4	4.284	221.60	0.904	Pass -20V / 200V Br
I3	23	0.56	0.40	0.15	225.7	3.852	218.90	0.902	Pass -20V / 200V Br
I4	28	0.57	0.37	0.15	226.5	3.919	216.40	0.901	Pass -20V / 200V Br
I5	29	0.39	0.39	0.13	233.6	3.995	220.30	0.902	Un-used
I6	30	0.38	0.36	0.13	235.9	4.019	223.90	0.903	Un-used
I7	31	0.47	0.36	0.14	232.2	3.954	219.40	0.902	Un-used
I8	32	0.53	0.36	0.13	232.3	3.971	221.40	0.903	Un-used
	33	0.43	0.38	0.13	230.8	3.949	220.60	0.905	Un-used
I19	1	1200000.00	999900.00	999900.00	98.6	3.991	223.70	0.903	Failed -15V / 60V Au
I20	2	16.75	0.38	0.14	233.8	3.933	220.60	0.902	Pass -5/200,-10/150,-15/50,-20/25 Au
I21	3	17.75	0.40	0.14	233.8	3.895	219.60	0.901	Pass -5/200,-10/150,-15/50,-20/25 Au
I22	4	17.96	0.39	0.15	231.2	3.952	219.30	0.904	Pass -5/200,-10/150,-15/50,-20/25 Au
I23	5	9999000.00	999900.00	999900.00	0.1	0.008	366.90	0.901	Failed -5V / 200V Au
I24	6	0.49	0.39	0.15	232.9	3.913	219.60	0.902	Un-used
I25	7	0.51	0.36	0.13	222.5	3.798	216.50	0.903	Un-used
I26	8	0.48	0.41	0.14	227.3	3.820	219.30	0.904	Un-used
I27	9	0.44	0.36	0.13	230.0	3.891	220.30	0.902	Un-used



Final QPL Specs

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	200	200	200
-5	200	200	200
-10	200	200	150
-15	200	185	50
-20	200	120	25

for 2N7473U2/684 (IRHNA57260SE), 2N7473U2C/673 (IRHNAC57260SE)
 for 2N7476T1/685 (IRHMS57260SE)
 for 2N7486U3/704 (IRHNJ57230SE), 2N7486U3C/704 (IRHNJ57230SE),
 for 2N7489T3/705 (IRHY57230CMSE)
 for 2N7498T2/706 (IRHF57230SE) & 2N7501U5/707 (IRHE57230SE)

