Total Ionizing Dose (TID) Biased Condition Testing

3-Terminal Adjustable Negative Regulators

LM137H1PQMLV

SMD # 5962P9951708VXA

HiRel Products Radiation Engineering / RHA Programs
2900 Semiconductor Drive
Santa Clara, CA 95052

Date: May 10, 2012
Prepared by: Thang Trinh
Product Engineer: Larry McGee
Radiation Engineer: Kirby Kruckmeyer
Email ID: Kirby.Kruckmeyer@ti.com

National Products from Texas Instruments

Lit # SNVY009

National Semiconductor Corporation
Radiation Effects Laboratory
South Portland, Maine 04106

ANALOG TOTAL DOSE RADIATION REPORT

Customer: Rad Wafer Qual.

Part Type: LM137H1PQMLV ***SMD#:*** 5962P9951708VXA

Input Bias Circuit: 09945IR

Dose Rate: 22.696 rad(Si)/sec

Test Program Used: RH00137HYE

Tester: L. Miller

Wafer Run Number: JM014X021

Wafer Number: 4

Package Type: HT039003

Production Lot #: 9L4157F019

IPI #: N/A

Disposition: Passes 30K

Summary:

Passes Room Temp @: 30K

Part Out of Room Temp Spec @: N/A

Functional Failed @: N/A

Parameters over Limit: N/A

Prepared by:	Thang Trinh	**10-May-12**
Reviewed by Product Engineer:	Larry McGee	**10-May-12**
Approved by Radiation Engineer:	Kirby Kruckmeyer	**10-May-12**

Standard Test Flow Sheet For Rad Testing

Customer Special Attachment
Rad Tolerant Linear

NSID# LM137H1PQMLV **LOT#** 9L4157F019, W #4 **IPI N/A**

Test Program: RH00137HYE

Machine: LTX 01-3 **Operator:** D0226 **Bias Board:** 09945IR

Start Time 1:26 P.M **Finish Time** 2:44 P.M

Start Date: 27-Jan-11 **Finish Date:** 27-Jan-11 **Radiation Officer:** 10-May-12

Control Units s/n: #1, #2

Duts : #3 #4 #5 #6 #7 #8

Location Step	Operation Mtd/Cond	Qty In	Qty Out	Var	Mech	Rej	FF
PASS	**Pre - Rad Read/Rec. Tp1**	6	6	0	0	0	0
	Irradiation 3k Level	6	6	0	0	N/A	N/A
PASS	**Post Rad Read/Rec. Tp2**	6	6	0	0	0	0
	Irradiation 10k Level	6	6	0	0	N/A	N/A
PASS	**Post Rad Read/Rec. Tp3**	6	6	0	0	0	0

Standard Test Flow Sheet For Rad Testing

Customer Special Attachment
Rad Tolerant Linear

NSID# LM137H1PQMLV **LOT#** 9L4157F019, W #4 **IPI#** N/A

Location Step	Operation Mtd/Cond	Qty In	Qty Out	Var	Mech	Rej	FF
	Irradiation ***30k*** ***Level***	6	6	0	0	N/A	N/A
PASS	**Post Rad Read/Rec. Tp4**	6	6	0	0	0	0

Notes: ***All irradiation's are done per (MAS-5010***

This report includes Data and Plots for each individual unit at each level of total doses.
It also includes data calculation for Standard Deviation, Maximum, Average and Minimum for both Raw Data and Delta between each of the Rad Level to Pre-Rad (0krad) data (page 6 – 30).
The Test #, Test Name, Test Condition and Limits are also included in this report (page 5).

**** Test Units were assembled in 3 leads , TO-39 Package.***

These parts may be dose rate sensitive in a space environment and demonstrate enhanced low dose rate effect.

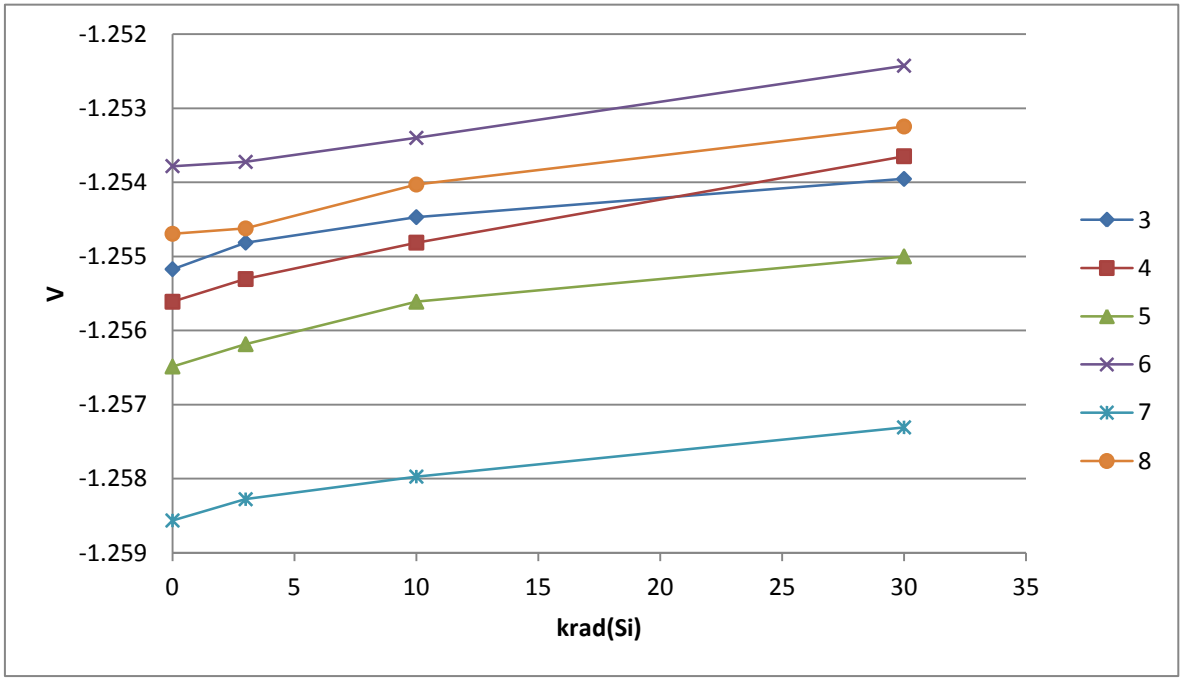
LM137H1PQMLV(RAD) TEST KEYS;								
TEST#	TEST NAME	CONDITIONS	LIMITS 25C PRE			30K POST RAD		
			MIN	MAX	UNITS	MIN	MAX	UNITS
1(00)	VO	-4.25V IN, 5mA LOAD	-1.275	-1.225	V	-1.275	-1.225	V
2(00)	VO	-4.25V IN, 0.5A LOAD	-1.275	-1.225	V	-1.275	-1.225	V
3(00)	VO	-41.25V IN, 5mA LOAD	-1.275	-1.225	V	-1.3	-1.225	V
4(00)	VO	-41.25V IN, -50mA LOAD	-1.275	-1.225	V	-1.3	-1.225	V
5(00)	VRLINE	5mA, -4.25V TO -41.25V	-9	9	mV	-9	50	mV
7(00)	VRLOAD	-6.25V, 5mA TO 0.5A	-12	12	mV	-12	12	mV
8(00)	VRLOAD	-41.25V, 5mA TO 50mA	-6	6	mV	-6	6	mV
9(00)	VRLOAD	-6.25V, 50mA TO 200mA	-6	6	mV	-6	6	mV
10(00)	VRTH		-5	5	mV	-5	5	mV
11(00)	IADJ	-4.25V	25	100	uA	25	100	uA
12(00)	IADJ	-41.25V	25	100	uA	25	140	uA
13(00)	DELTA IADJ	LINE	-5	5	uA	-70	20	uA
15(00)	DELTA IADJ	LOAD	-5	5	uA	-5	5	uA
16(00)	IOS	-4.25V	0.5	1.8	A	0.5	1.8	A
17(00)	VOUT5	RECOVERY	-1.275	-1.225	V	-1.3	-1.225	V
18(00)	IOS	40V	0.05	0.5	A	0.05	0.5	A
19(00)	VOUT6	RECOVERY	-1.275	-1.225	V	-1.275	-1.225	V
20(00)	IQ	-4.25V IN	0.2	3	mA	0.2	3	mA
21(00)	IQ	-14.25V IN	0.2	3	mA	0.2	3	mA
22(00)	IQ	-41.25V IN	1	5	mA	1	5	mA
23(00)	VSTART		-1.275	-1.225	V	-1.275	-1.225	V
69(00)	RIPPLE REJECTION		48		DB	48		DB
70(00)	V(NOISE)			120	uV		120	uV
71(00)	LINE TRANS RES			80	mV		80	mV
72(00)	LOAD TRANS RES			60	mV		60	mV

100 VO @ -4.25V IN, 5MA LOAD

Limit_Min -1.275 Limit_Max -1.225 V

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-1.2551718	-1.2548132	-1.2544689	-1.253953
4	-1.2556114	-1.2553053	-1.2548132	-1.2536469
5	-1.2564859	-1.2561846	-1.2556114	-1.2549992
6	-1.2537804	-1.2537231	-1.2533989	-1.2524242
7	-1.258565	-1.2582779	-1.2579727	-1.257308
8	-1.254694	-1.2546215	-1.2540293	-1.2532454
Average	-1.2557181	-1.2554876	-1.2550491	-1.2542628
MAX	-1.2537804	-1.2537231	-1.2533989	-1.2524242
MIN	-1.258565	-1.2582779	-1.2579727	-1.257308
STD_dev	0.00166178	0.0015889	0.00161364	0.00171502

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.00035859	0.00070286	0.0012188
4		0.00030613	0.00079823	0.00196457
5		0.00030136	0.00087452	0.00148678
6		5.722E-05	0.00038146	0.00135612
7		0.00028706	0.00059223	0.00125694
8		7.247E-05	0.00066471	0.00144863
Average		0.00023047	0.000669	0.00145531
MAX		0.00035859	0.00087452	0.00196457
MIN		5.722E-05	0.00038146	0.0012188
STD_dev		0.00013065	0.00017244	0.00027037

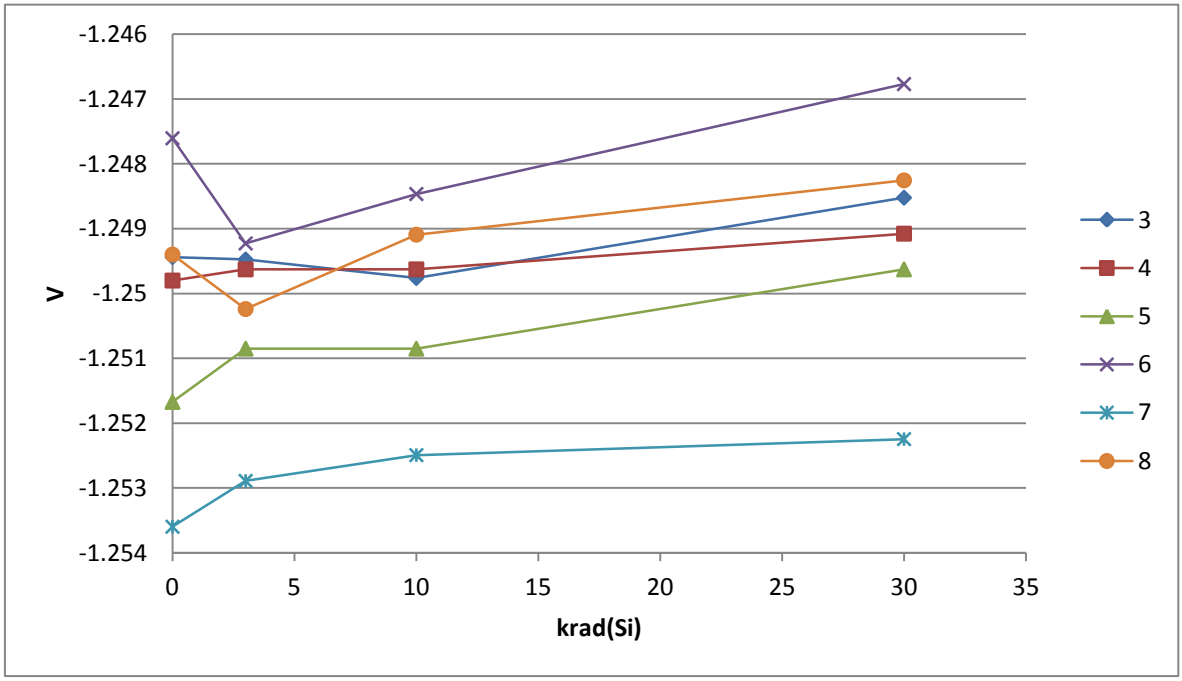


200 VO @ -4.25V IN, 0.5A LOAD

Limit_Min -1.275 Limit_Max -1.225 V

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-1.2494373	-1.2494755	-1.2497625	-1.2485228
4	-1.2498007	-1.2496281	-1.2496281	-1.2490768
5	-1.2516737	-1.2508516	-1.2508516	-1.2496281
6	-1.2476053	-1.2492275	-1.2484655	-1.246769
7	-1.2535992	-1.2528925	-1.2524948	-1.2522469
8	-1.2493992	-1.2502403	-1.2490931	-1.2482548
Average	-1.2502526	-1.2503859	-1.2500493	-1.249083
MAX	-1.2476053	-1.2492275	-1.2484655	-1.246769
MIN	-1.2535992	-1.2528925	-1.2524948	-1.2522469
STD_dev	0.00208923	0.00136133	0.00143573	0.00182547

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-3.815E-05	-0.0003252	0.00091457
4		0.00017261	0.00017261	0.00072384
5		0.00082207	0.00082207	0.00204563
6		-0.0016222	-0.0008602	0.00083637
7		0.00070668	0.00110436	0.00135231
8		-0.0008411	0.00030613	0.00114441
Average		-0.0001334	0.00020329	0.00116952
MAX		0.00082207	0.00110436	0.00204563
MIN		-0.0016222	-0.0008602	0.00072384
STD_dev		0.00094221	0.00072342	0.00048502

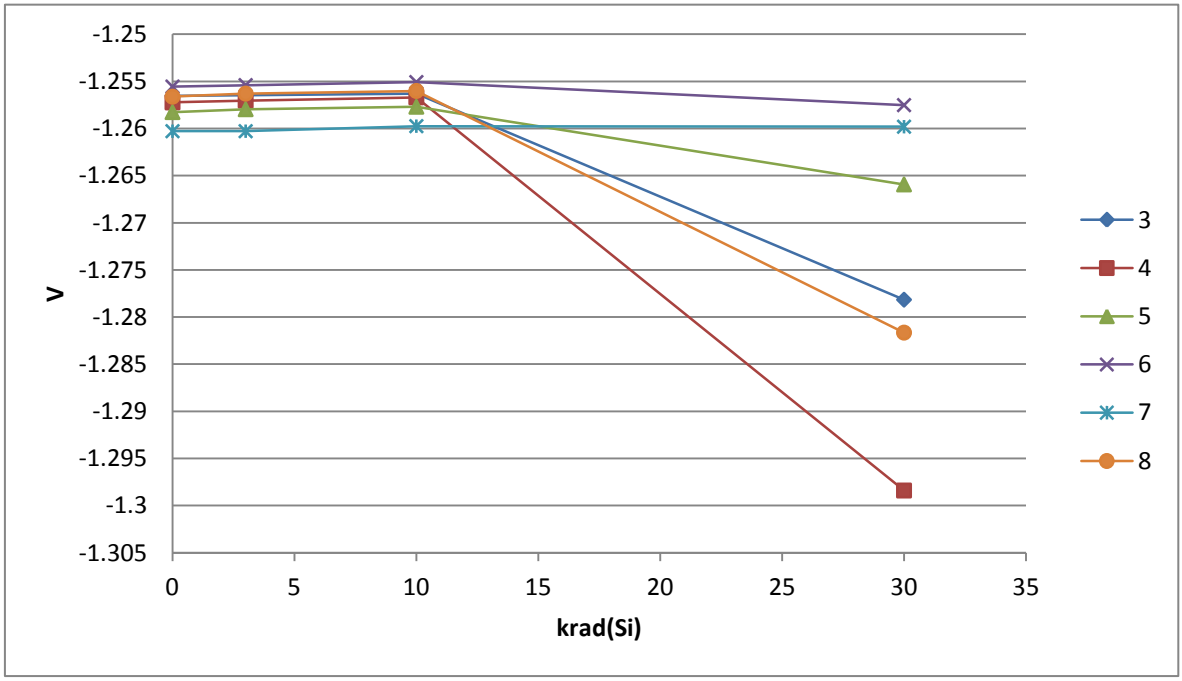


300 VO @ -41.25V IN, 5MA LOAD

Limit_Min -1.3 Limit_Max -1.225 V

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-1.2565241	-1.2564859	-1.2562952	-1.2781582
4	-1.2572317	-1.25704	-1.2566967	-1.2984018
5	-1.2582588	-1.2579536	-1.2576904	-1.265933
6	-1.2555542	-1.2554007	-1.2550764	-1.2575178
7	-1.2602854	-1.2602854	-1.2597494	-1.2598076
8	-1.2566195	-1.2562952	-1.2560129	-1.2816515
Average	-1.2574123	-1.2572435	-1.2569202	-1.2735783
MAX	-1.2555542	-1.2554007	-1.2550764	-1.2575178
MIN	-1.2602854	-1.2602854	-1.2597494	-1.2984018
STD_dev	0.00166576	0.00171277	0.00162856	0.01554594

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		3.815E-05	0.00022889	-0.0216341
4		0.00019169	0.00053501	-0.0411701
5		0.00030518	0.00056839	-0.0076742
6		0.00015354	0.00047779	-0.0019636
7		0	0.00053597	0.00047779
8		0.00032425	0.00060653	-0.025032
Average		0.0001688	0.0004921	-0.0161661
MAX		0.00032425	0.00060653	0.00047779
MIN		0	0.00022889	-0.0411701
STD_dev		0.00013348	0.00013577	0.01602839

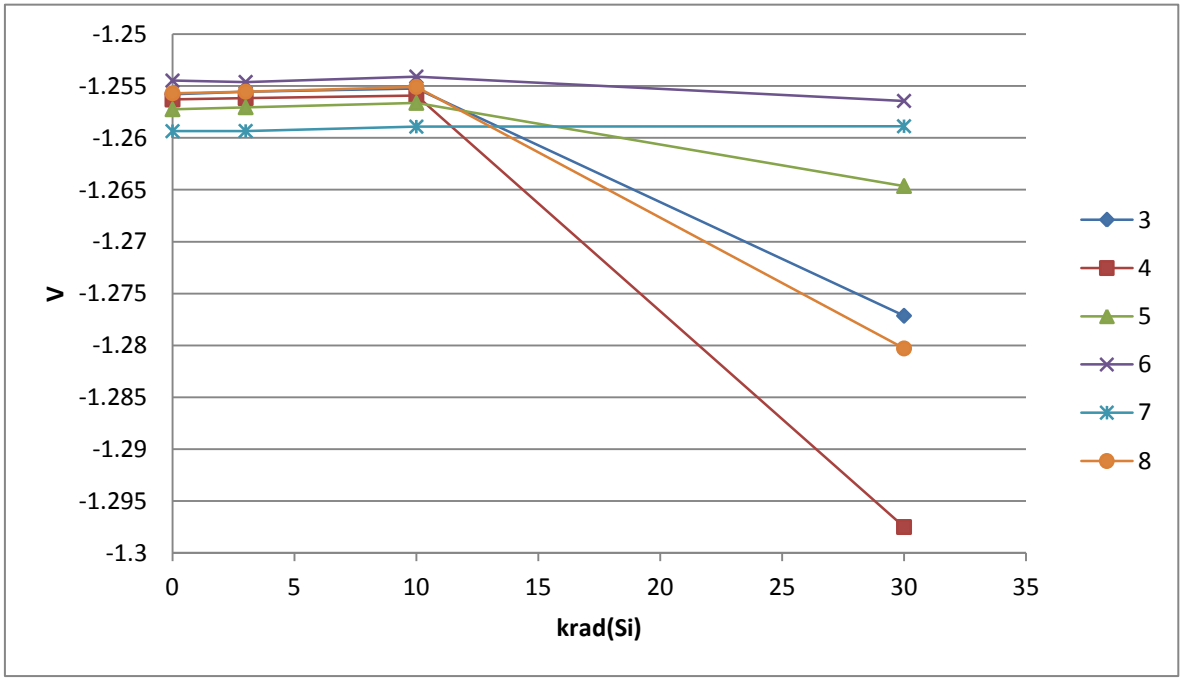


400 VO @ -41.25V IN, 50MA LOAD

Limit_Min -1.3 Limit_Max -1.225 V

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-1.2557831	-1.2555542	-1.2552481	-1.2771492
4	-1.2562952	-1.2561607	-1.2559166	-1.2975225
5	-1.2572317	-1.25704	-1.2566195	-1.2646341
6	-1.2544689	-1.2546024	-1.2540865	-1.2564287
7	-1.2593489	-1.2593298	-1.2589092	-1.2588711
8	-1.2556877	-1.2555351	-1.2550764	-1.2802992
Average	-1.2564692	-1.2563704	-1.255976	-1.2724841
MAX	-1.2544689	-1.2546024	-1.2540865	-1.2564287
MIN	-1.2593489	-1.2593298	-1.2589092	-1.2975225
STD_dev	0.00167253	0.00165771	0.00166918	0.01558508

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.00022888	0.00053501	-0.0213661
4		0.00013446	0.0003786	-0.0412273
5		0.00019169	0.00061226	-0.0074024
6		-0.0001335	0.00038243	-0.0019598
7		1.907E-05	0.00043964	0.00047779
8		0.00015258	0.0006113	-0.0246115
Average		9.8862E-05	0.00049321	-0.0160149
MAX		0.00022888	0.00061226	0.00047779
MIN		-0.0001335	0.0003786	-0.0412273
STD_dev		0.00013419	0.00010784	0.01601208

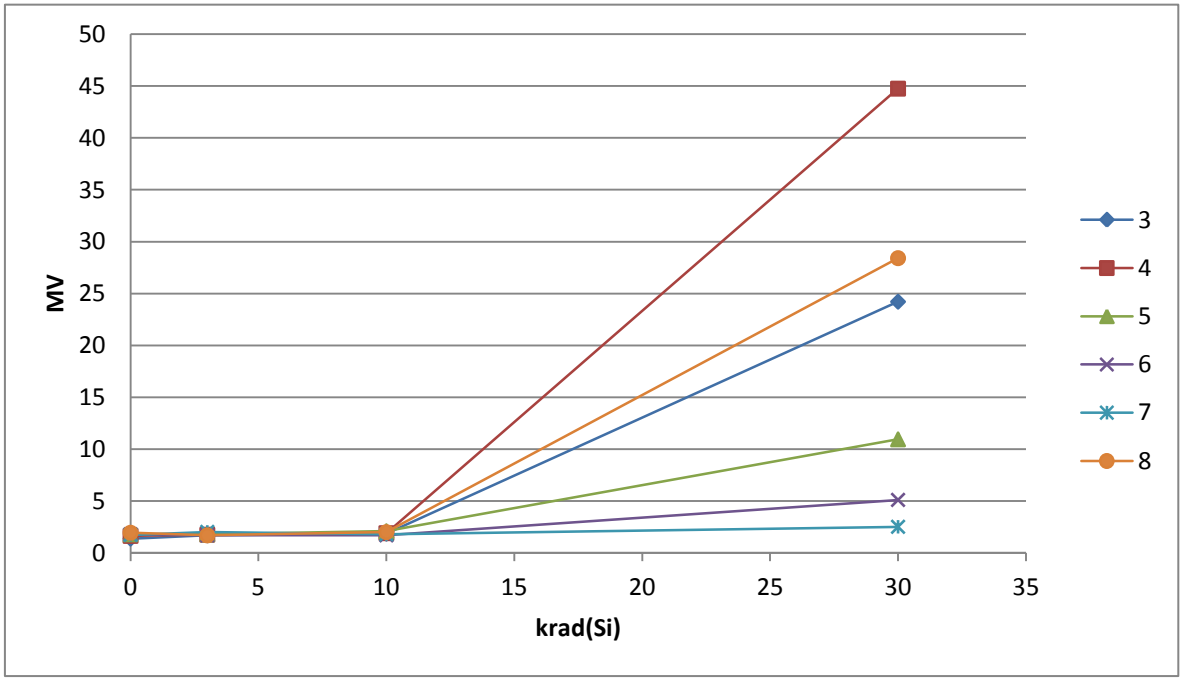


500 VRLINE @ 5MA,-4.25 TO -41.25V

Limit_Min -9 Limit_Max 50 MV

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	1.35231018	1.67274475	1.82628632	24.2052078
4	1.62029266	1.73473358	1.88350677	44.754982
5	1.77288055	1.76906586	2.07901001	10.933876
6	1.77383423	1.67751312	1.67751312	5.09357452
7	1.72042847	2.00748444	1.77669525	2.49958038
8	1.92546844	1.67369843	1.98364258	28.4061432
Average	1.69420242	1.75587336	1.87110901	19.3155607
MAX	1.92546844	2.00748444	2.07901001	44.754982
MIN	1.35231018	1.67274475	1.67751312	2.49958038
STD_dev	0.19445113	0.12940825	0.14452871	16.1802733

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.32043457	0.47397614	22.8528976
4		0.11444092	0.26321411	43.1346893
5		-0.0038147	0.30612946	9.16099545
6		-0.0963211	-0.0963211	3.31974029
7		0.28705597	0.05626678	0.77915191
8		-0.25177	0.05817414	26.4806748
Average		0.06167094	0.17690659	17.6213582
MAX		0.32043457	0.47397614	43.1346893
MIN		-0.25177	-0.0963211	0.77915191
STD_dev		0.22272709	0.20770296	16.2268943

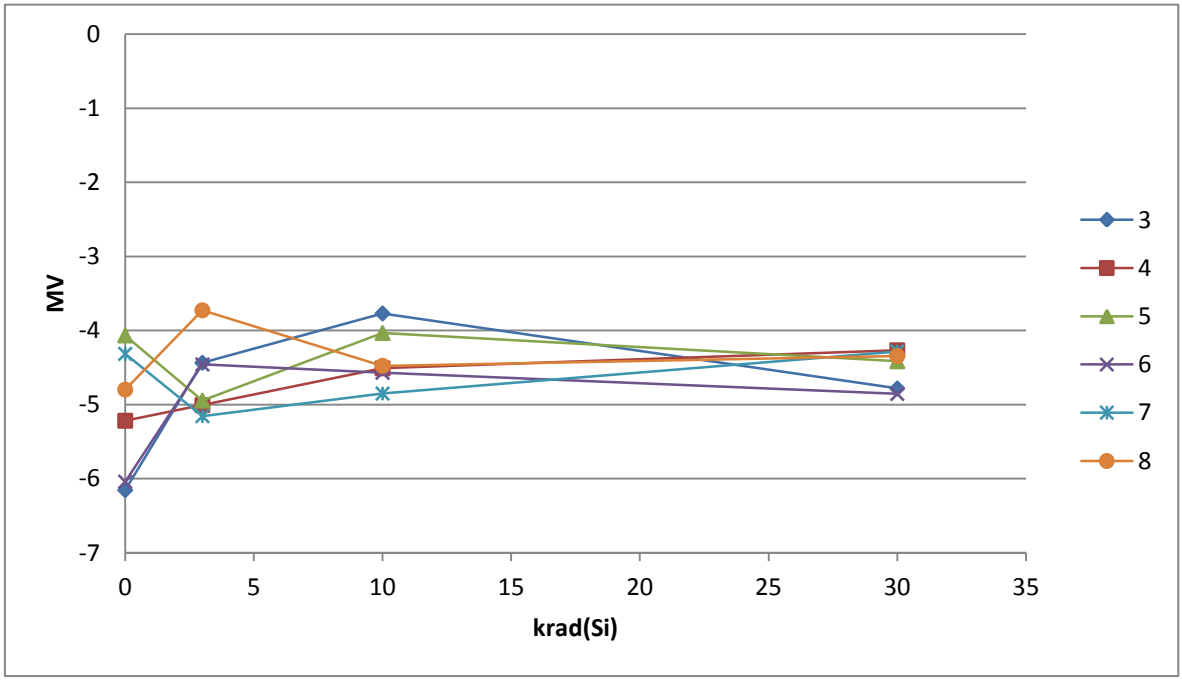


700 VRLOAD @ -6.25V, 5MA TO 0.5A

Limit_Min -12 Limit_Max 12 MV

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-6.155014	-4.4355393	-3.7698746	-4.7826767
4	-5.2185059	-5.0077438	-4.5108795	-4.2667389
5	-4.067421	-4.9467087	-4.0330887	-4.4155121
6	-6.0415268	-4.4584274	-4.5700073	-4.8561096
7	-4.3153763	-5.156517	-4.8513413	-4.2819977
8	-4.7979355	-3.7279129	-4.4765472	-4.3439865
Average	-5.0992966	-4.6221415	-4.3686231	-4.4911702
MAX	-4.067421	-3.7279129	-3.7698746	-4.2667389
MIN	-6.155014	-5.156517	-4.8513413	-4.8561096
STD_dev	0.87024879	0.52931233	0.39409138	0.2606402

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		1.71947479	2.38513947	1.37233734
4		0.21076202	0.70762634	0.95176697
5		-0.8792877	0.03433228	-0.3480911
6		1.58309936	1.47151947	1.18541717
7		-0.8411408	-0.535965	0.0333786
8		1.07002259	0.32138825	0.45394898
Average		0.47715505	0.73067347	0.60812632
MAX		1.71947479	2.38513947	1.37233734
MIN		-0.8792877	-0.535965	-0.3480911
STD_dev		1.16333737	1.05294065	0.67879739

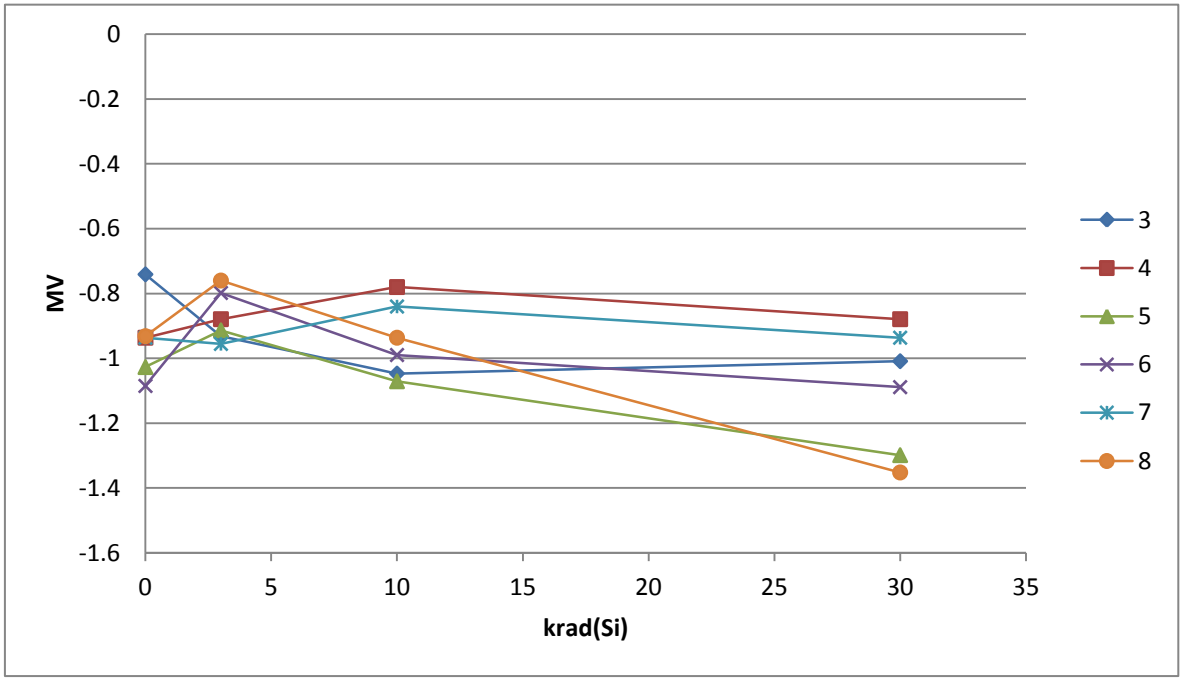


800 VRLOAD @ -41.25V, 5MA TO 50MA

Limit_Min -6 Limit_Max 6 MV

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-0.7410049	-0.9317398	-1.0471344	-1.0089874
4	-0.9365082	-0.8792877	-0.7801056	-0.8792877
5	-1.0271072	-0.91362	-1.0709763	-1.2989044
6	-1.0852814	-0.7982254	-0.9899139	-1.0890961
7	-0.9365082	-0.9555817	-0.8401871	-0.9365082
8	-0.9317398	-0.7600784	-0.9365082	-1.3523102
Average	-0.943025	-0.8730888	-0.9441376	-1.0941823
MAX	-0.7410049	-0.7600784	-0.7801056	-0.8792877
MIN	-1.0852814	-0.9555817	-1.0709763	-1.3523102
STD_dev	0.1169026	0.07784869	0.11537962	0.19332149

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.1907349	-0.3061295	-0.2679825
4		0.05722046	0.15640259	0.05722046
5		0.11348725	-0.043869	-0.2717972
6		0.28705597	0.09536743	-0.0038147
7		-0.0190735	0.09632111	0
8		0.17166138	-0.0047684	-0.4205704
Average		0.06993612	-0.0011126	-0.1511574
MAX		0.28705597	0.15640259	0.05722046
MIN		-0.1907349	-0.3061295	-0.4205704
STD_dev		0.16457188	0.16642687	0.1943014

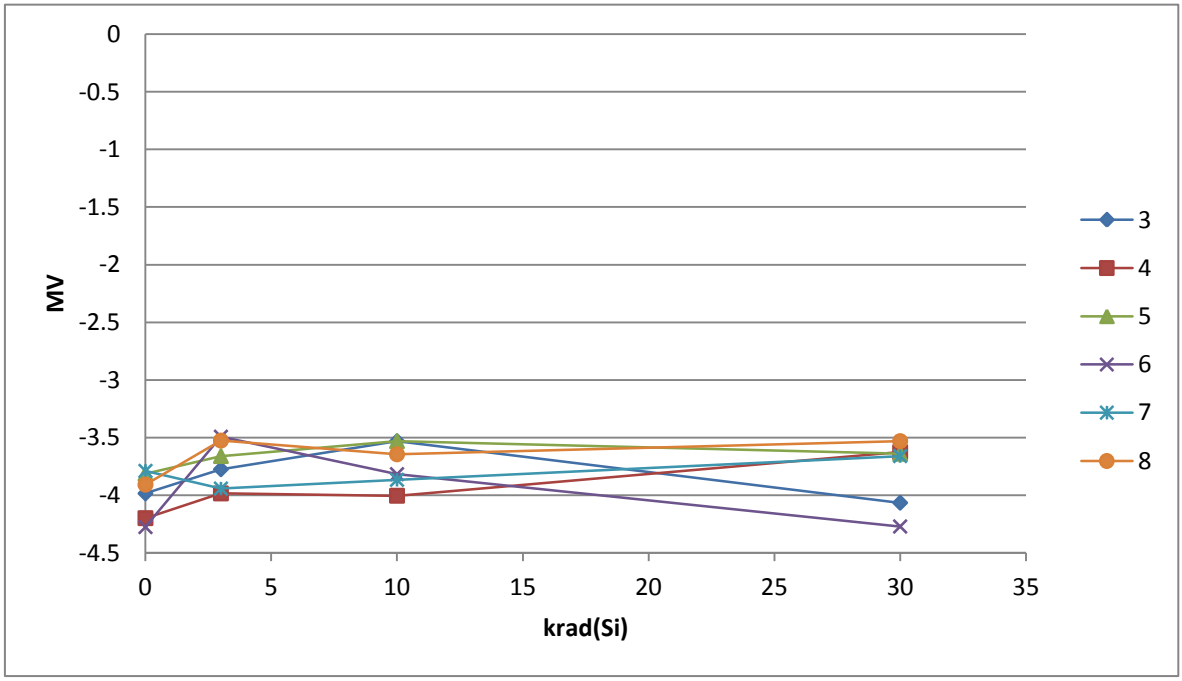


900 VRLOAD @ -6.25V, 5MA TO .2A

Limit_Min -6 Limit_Max 6 MV

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-3.985405	-3.7755966	-3.531456	-4.0664673
4	-4.1999817	-3.985405	-4.0054321	-3.6268234
5	-3.8137436	-3.6611557	-3.531456	-3.6411285
6	-4.2772293	-3.493309	-3.818512	-4.2724609
7	-3.7899017	-3.9434433	-3.8671494	-3.6611557
8	-3.909111	-3.5266876	-3.6458969	-3.531456
Average	-3.9958954	-3.7309329	-3.7333171	-3.7999153
MAX	-3.7899017	-3.493309	-3.531456	-3.531456
MIN	-4.2772293	-3.985405	-4.0054321	-4.2724609
STD_dev	0.20201695	0.20734592	0.19408963	0.29693366

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.20980835	0.45394898	-0.0810623
4		0.21457672	0.19454956	0.57315826
5		0.15258789	0.2822876	0.17261505
6		0.78392029	0.45871735	0.00476837
7		-0.1535416	-0.0772476	0.12874603
8		0.3824234	0.26321411	0.37765503
Average		0.26496251	0.26257833	0.19598007
MAX		0.78392029	0.45871735	0.57315826
MIN		-0.1535416	-0.0772476	-0.0810623
STD_dev		0.30869683	0.19778356	0.2423427

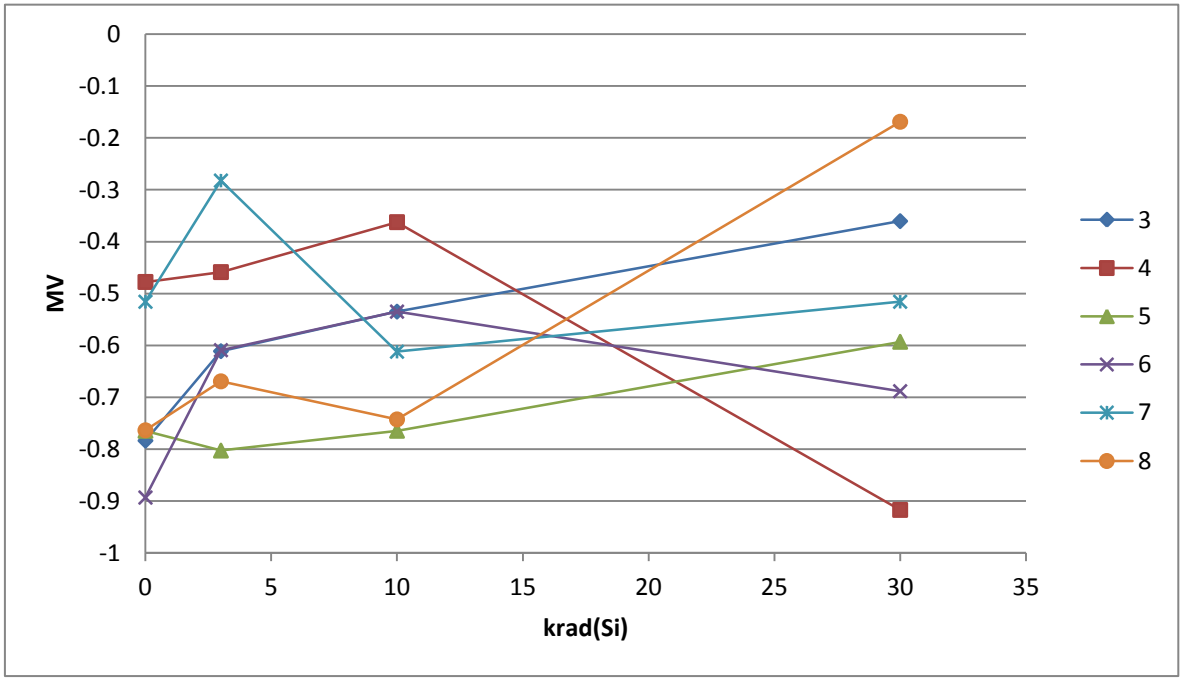


1000 VRTH

Limit_Min -5 Limit_Max 5 MV

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-0.7839203	-0.6113052	-0.5350113	-0.3604889
4	-0.4777908	-0.4587173	-0.3623962	-0.9174347
5	-0.7648468	-0.8029938	-0.7648468	-0.5931854
6	-0.8935928	-0.6093979	-0.5350113	-0.6885529
7	-0.5159378	-0.2822876	-0.6122589	-0.5159378
8	-0.7638931	-0.6694794	-0.7429123	-0.1688004
Average	-0.6999969	-0.5723635	-0.5920728	-0.5407333
MAX	-0.4777908	-0.2822876	-0.3623962	-0.1688004
MIN	-0.8935928	-0.8029938	-0.7648468	-0.9174347
STD_dev	0.16496305	0.180316	0.14984942	0.25997799

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.17261505	0.248909	0.4234314
4		0.01907349	0.11539459	-0.4396439
5		-0.038147	0	0.17166138
6		0.28419495	0.35858154	0.20503998
7		0.23365021	-0.0963211	0
8		0.09441376	0.02098084	0.59509277
Average		0.12763341	0.10792414	0.15926361
MAX		0.28419495	0.35858154	0.59509277
MIN		-0.038147	-0.0963211	-0.4396439
STD_dev		0.12501709	0.16951964	0.35945401

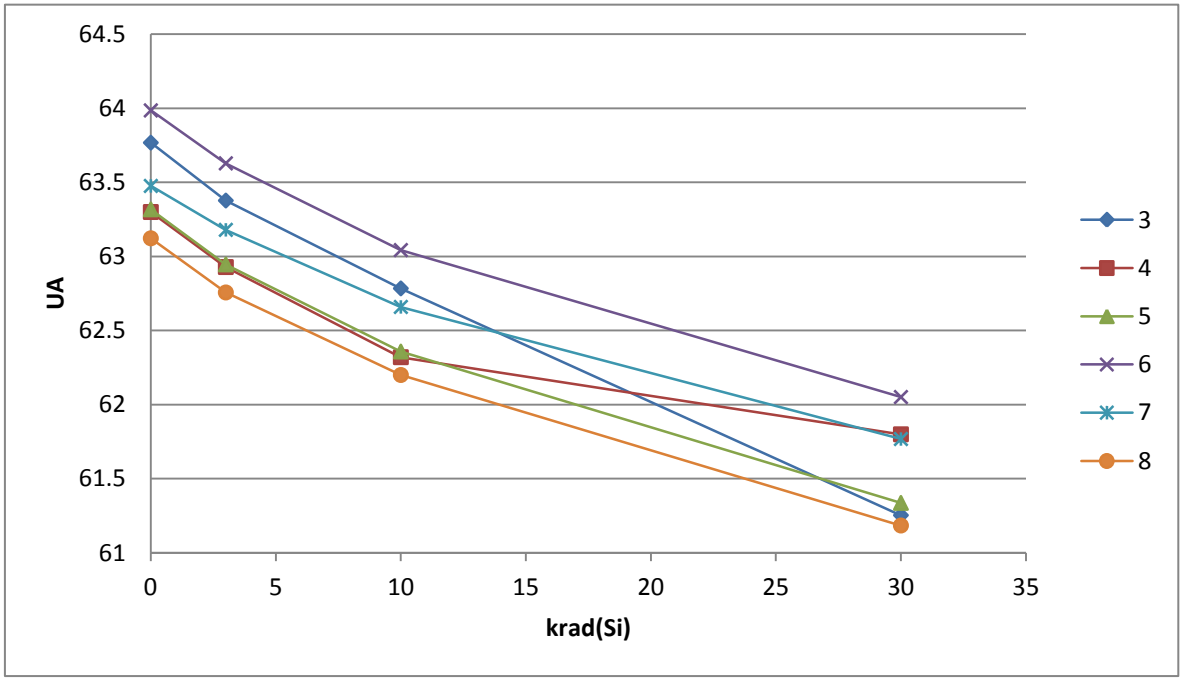


1100 IADJ @ -41.25V IN

Limit_Min 25 Limit_Max 100 UA

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	63.7680779	63.377346	62.7843399	61.2529259
4	63.3000755	62.9284172	62.3199005	61.799408
5	63.3179588	62.9463043	62.3580704	61.3364258
6	63.9858475	63.6285095	63.0429268	62.0508347
7	63.4760818	63.1795845	62.6590767	61.7674522
8	63.1225853	62.756897	62.199688	61.1837311
Average	63.4951045	63.1361764	62.5606671	61.5651296
MAX	63.9858475	63.6285095	63.0429268	62.0508347
MIN	63.1225853	62.756897	62.199688	61.1837311
STD_dev	0.32369507	0.32419349	0.32298863	0.35411062

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.3907319	-0.983738	-2.515152
4		-0.3716583	-0.980175	-1.5006675
5		-0.3716545	-0.9598884	-1.981533
6		-0.357338	-0.9429207	-1.9350128
7		-0.2964973	-0.8170051	-1.7086296
8		-0.3656883	-0.9228973	-1.9388542
Average		-0.358928	-0.9344374	-1.9299749
MAX		-0.2964973	-0.8170051	-1.5006675
MIN		-0.3907319	-0.983738	-2.515152
STD_dev		0.03250026	0.06191238	0.34014505

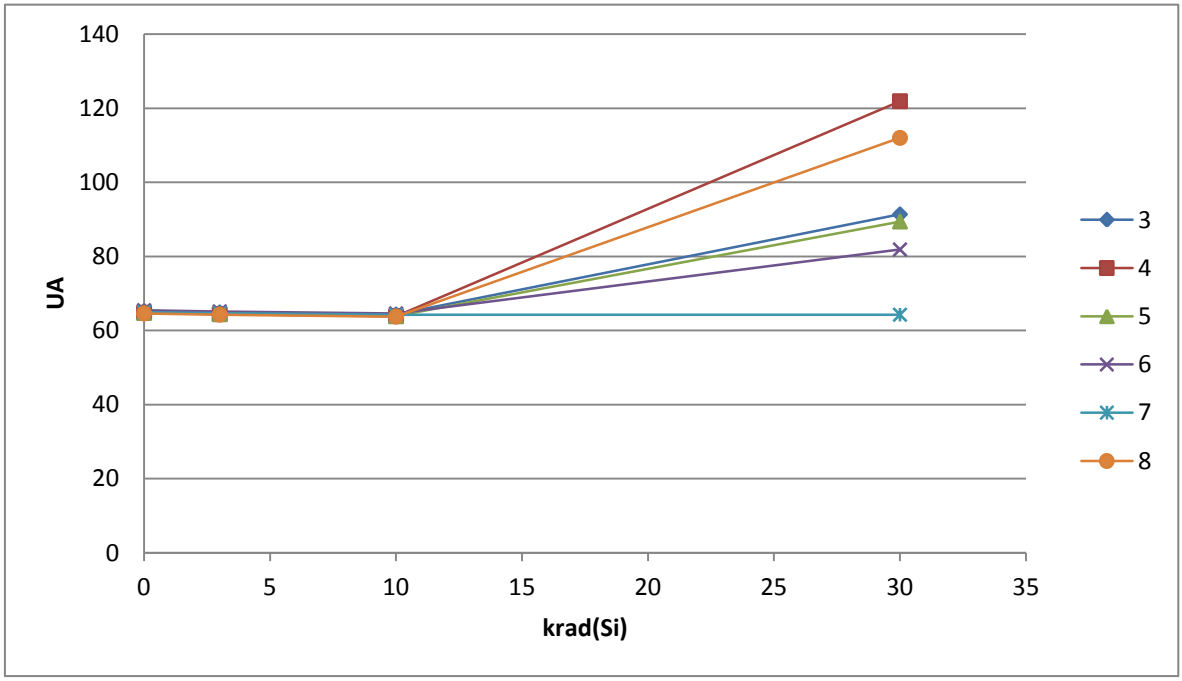


1200 IADJ @ -41.25V IN

Limit_Min 25 Limit_Max 140 UA

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	65.2515182	64.9051819	64.3336563	91.371315
4	64.7909317	64.4228592	63.8656349	121.923935
5	64.7861633	64.4180832	63.8999634	89.427948
6	65.4814758	65.1468124	64.6051025	81.8662949
7	64.9564743	64.697876	64.2143555	64.2704239
8	64.6194077	64.2847443	63.7621117	112.019203
Average	64.9809952	64.6459262	64.1134707	93.4798533
MAX	65.4814758	65.1468124	64.6051025	121.923935
MIN	64.6194077	64.2847443	63.7621117	64.2704239
STD_dev	0.32529799	0.33254262	0.3258289	20.7927999

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.3463363	-0.9178619	26.1197968
4		-0.3680725	-0.9252968	57.1330033
5		-0.3680801	-0.8861999	24.6417847
6		-0.3346634	-0.8763733	16.3848191
7		-0.2585983	-0.7421188	-0.6860504
8		-0.3346634	-0.857296	47.3997953
Average		-0.335069	-0.8675245	28.4988581
MAX		-0.2585983	-0.7421188	57.1330033
MIN		-0.3680801	-0.9252968	-0.6860504
STD_dev		0.0403832	0.06652785	20.9580795

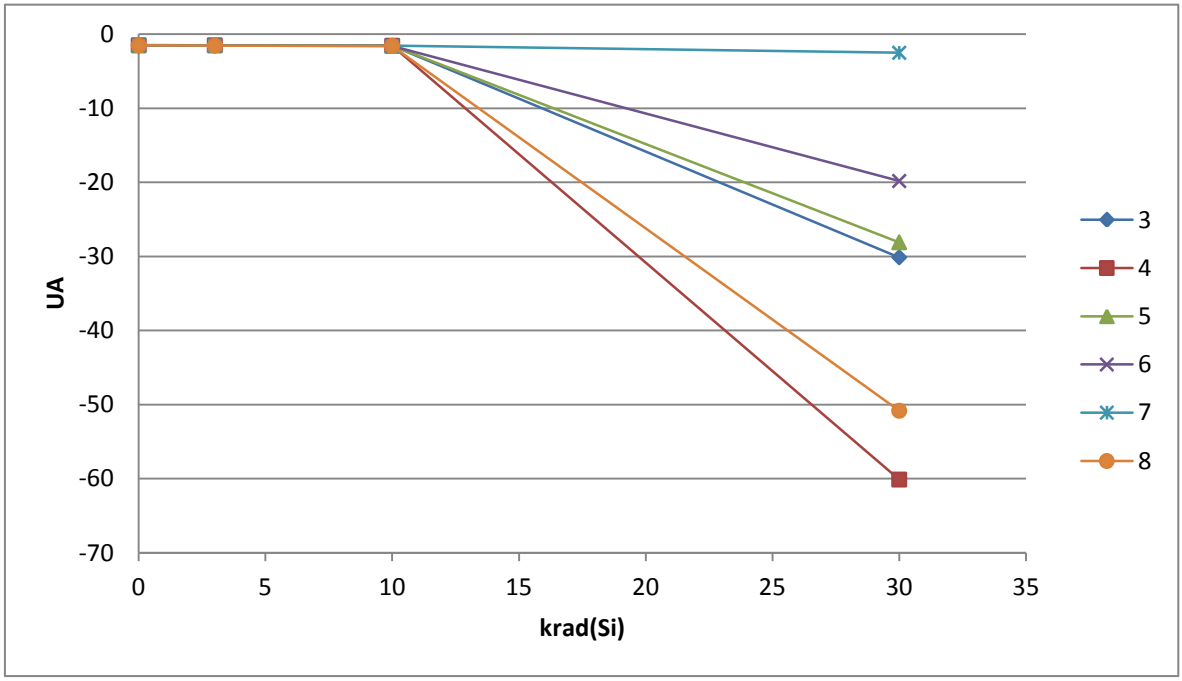


1300 DELTA IADJ (LINE)

Limit_Min -70 Limit_Max 20 UA

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-1.4834368	-1.5278347	-1.5493133	-30.118389
4	-1.4908583	-1.4944381	-1.5457336	-60.124527
5	-1.4682009	-1.4717807	-1.5418918	-28.091526
6	-1.4956313	-1.5183032	-1.5621772	-19.81546
7	-1.4803954	-1.5182886	-1.5552796	-2.5029731
8	-1.4968245	-1.5278492	-1.5624245	-50.835472
Average	-1.4858912	-1.5097491	-1.5528033	-31.914725
MAX	-1.4682009	-1.4717807	-1.5418918	-2.5029731
MIN	-1.4968245	-1.5278492	-1.5624245	-60.124527
STD_dev	0.01084669	0.0222568	0.00857662	20.8953326

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.0443978	-0.0658765	-28.634952
4		-0.0035797	-0.0548752	-58.633669
5		-0.0035797	-0.0736909	-26.623325
6		-0.0226718	-0.0665458	-18.319829
7		-0.0378932	-0.0748842	-1.0225776
8		-0.0310247	-0.0656	-49.338648
Average		-0.0238578	-0.0669121	-30.428833
MAX		-0.0035797	-0.0548752	-1.0225776
MIN		-0.0443978	-0.0748842	-58.633669
STD_dev		0.01728615	0.00717384	20.8909051

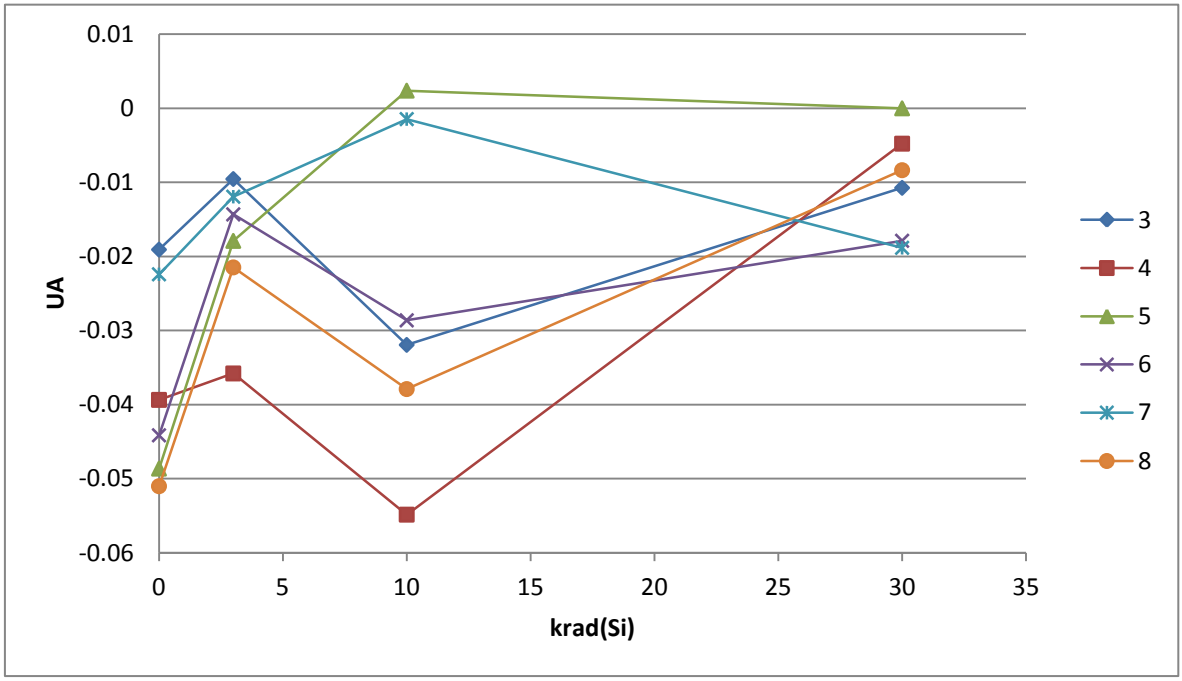


1500 DELTA IADJ (LOAD)

Limit_Min -5 Limit_Max 5 UA

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-0.0190776	-0.0095461	-0.0319415	-0.0107393
4	-0.0393629	-0.0357977	-0.0548607	-0.004773
5	-0.0486471	-0.0178989	0.00238651	0
6	-0.0441505	-0.0143191	-0.0286236	-0.0178843
7	-0.0224099	-0.0119326	-0.0014552	-0.0188302
8	-0.051019	-0.0214786	-0.0379077	-0.0083528
Average	-0.0374445	-0.0184955	-0.0254004	-0.0100966
MAX	-0.0190776	-0.0095461	0.00238651	0
MIN	-0.051019	-0.0357977	-0.0548607	-0.0188302
STD_dev	0.01357791	0.0094787	0.02201365	0.00735744

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.00953151	-0.0128639	0.00833825
4		0.00356522	-0.0154978	0.0345899
5		0.0307482	0.05103357	0.04864705
6		0.02983142	0.01552689	0.02626621
7		0.01047738	0.02095476	0.00357977
8		0.02954039	0.01311127	0.04266621
Average		0.01894902	0.01204413	0.0273479
MAX		0.0307482	0.05103357	0.04864705
MIN		0.00356522	-0.0154978	0.00357977
STD_dev		0.01238502	0.02446144	0.01826588

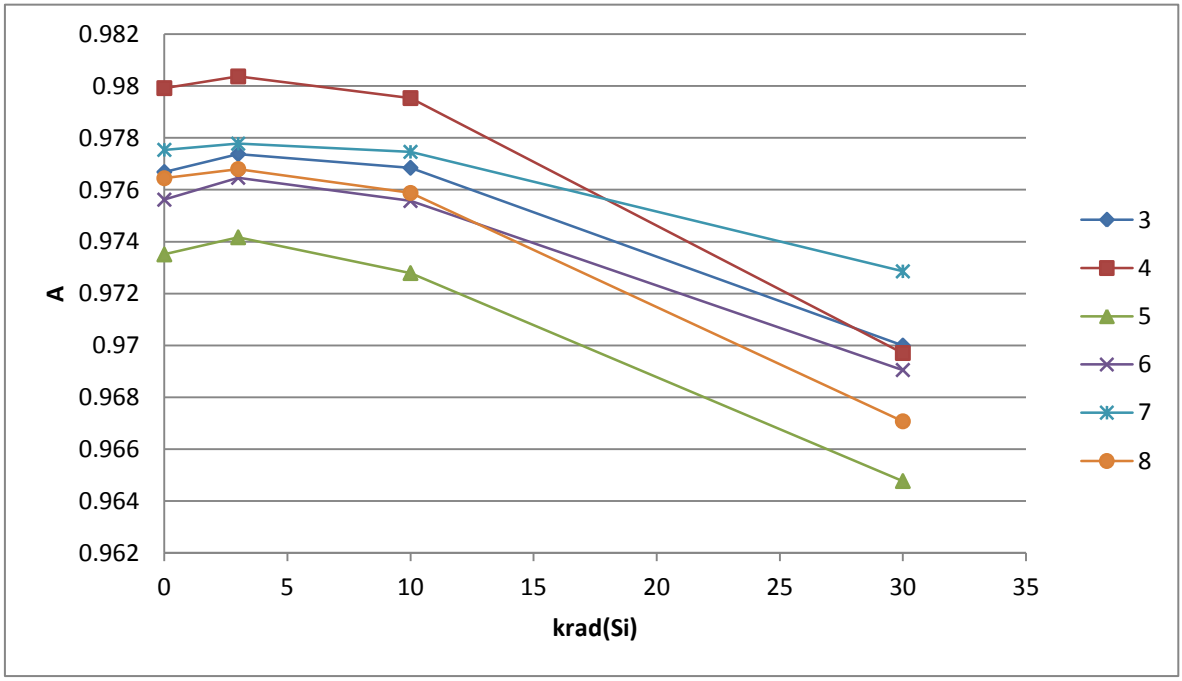


1600 IOS @ -4.25V

Limit_Min 0.5 Limit_Max 1.8 A

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	0.97668666	0.97737718	0.97684807	0.96999186
4	0.9799223	0.98037237	0.97953749	0.96970326
5	0.97350657	0.97416824	0.97278714	0.96476394
6	0.97561878	0.97646534	0.97557068	0.96904826
7	0.97754073	0.97777909	0.97746378	0.9728545
8	0.97644615	0.97679997	0.97587854	0.96706861
Average	0.9766202	0.97716036	0.97634762	0.96890507
MAX	0.9799223	0.98037237	0.97953749	0.9728545
MIN	0.97350657	0.97416824	0.97278714	0.96476394
STD_dev	0.00212054	0.00201557	0.00224376	0.00275529

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.00069052	0.00016141	-0.0066948
4		0.00045007	-0.0003848	-0.010219
5		0.00066167	-0.0007194	-0.0087426
6		0.00084656	-4.81E-05	-0.0065705
7		0.00023836	-7.695E-05	-0.0046862
8		0.00035381	-0.0005676	-0.0093775
Average		0.00054017	-0.0002726	-0.0077151
MAX		0.00084656	0.00016141	-0.0046862
MIN		0.00023836	-0.0007194	-0.010219
STD_dev		0.0002303	0.00033951	0.00207915

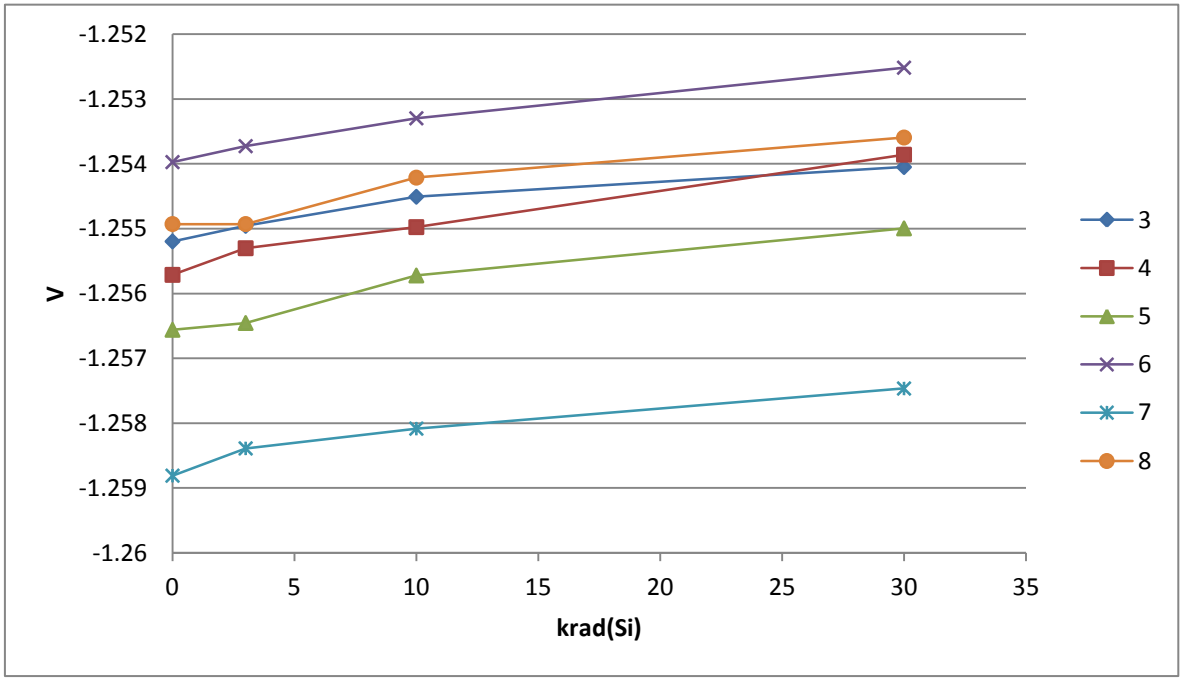


1700 VOUT5 (RECOV)

Limit_Min -1.3 Limit_Max -1.225 V

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-1.2551966	-1.2549572	-1.254508	-1.2540493
4	-1.2557125	-1.2553015	-1.2549763	-1.2538586
5	-1.2565603	-1.2564554	-1.2557221	-1.2549954
6	-1.253973	-1.253727	-1.2532969	-1.2525158
7	-1.258811	-1.2583904	-1.2580853	-1.2574663
8	-1.2549286	-1.2549286	-1.2542124	-1.2535934
Average	-1.2558637	-1.2556267	-1.2551335	-1.2544131
MAX	-1.253973	-1.253727	-1.2532969	-1.2525158
MIN	-1.258811	-1.2583904	-1.2580853	-1.2574663
STD_dev	0.00167863	0.00161092	0.00165511	0.00169544

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.00023937	0.00068855	0.00114727
4		0.00041103	0.00073624	0.00185394
5		0.00010491	0.00083828	0.00156498
6		0.00024605	0.00067616	0.00145722
7		0.00042057	0.00072575	0.00134468
8		0	0.00071621	0.00133515
Average		0.00023699	0.0007302	0.00145054
MAX		0.00042057	0.00083828	0.00185394
MIN		0	0.00067616	0.00114727
STD_dev		0.00016594	5.7599E-05	0.00024181

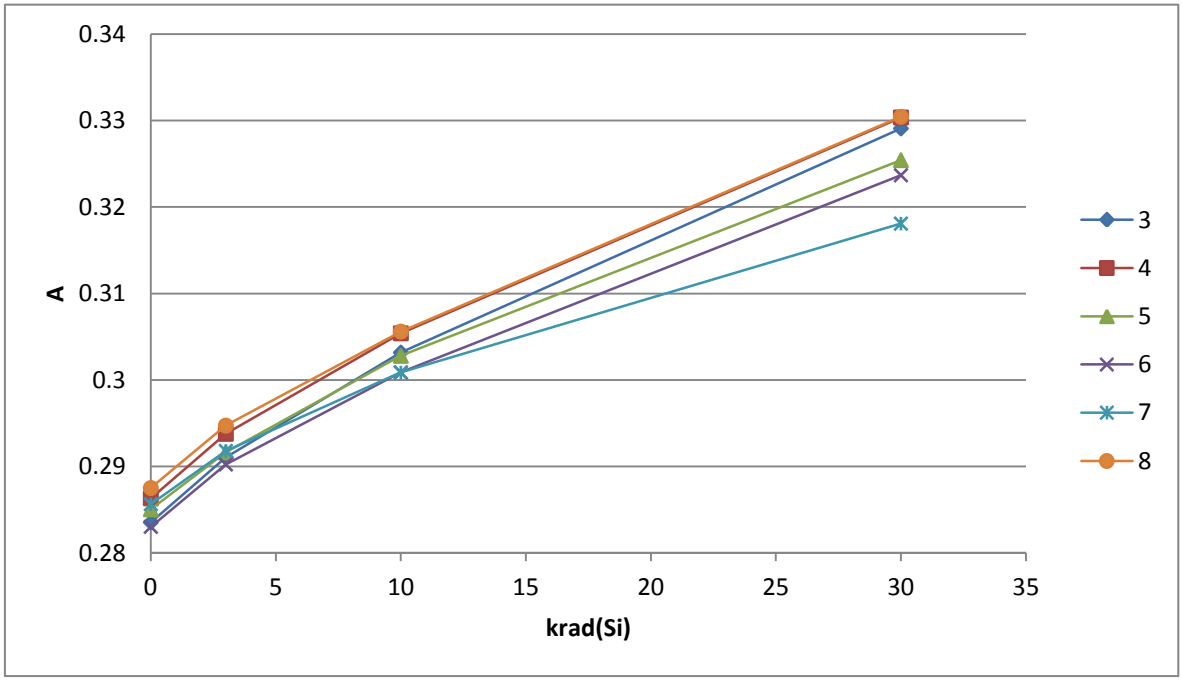


1800 IOS @ -40V

Limit_Min 0.05 Limit_Max 0.5 A

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	0.28350949	0.29101986	0.30316836	0.32909864
4	0.28629303	0.29375744	0.30538636	0.33036637
5	0.2850253	0.29160458	0.30278355	0.32542789
6	0.28299964	0.29022348	0.30085409	0.32368124
7	0.28561211	0.29177773	0.30085409	0.31808323
8	0.28748596	0.29470772	0.30558628	0.33044332
Average	0.28515425	0.2921818	0.30310545	0.32618345
MAX	0.28748596	0.29470772	0.30558628	0.33044332
MIN	0.28299964	0.29022348	0.30085409	0.31808323
STD_dev	0.0016916	0.00170555	0.00207855	0.00482881

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.00751036	0.01965886	0.04558915
4		0.00746441	0.01909333	0.04407334
5		0.00657928	0.01775825	0.04040259
6		0.00722384	0.01785445	0.0406816
7		0.00616562	0.01524198	0.03247112
8		0.00722176	0.01810032	0.04295737
Average		0.00702755	0.0179512	0.0410292
MAX		0.00751036	0.01965886	0.04558915
MIN		0.00616562	0.01524198	0.03247112
STD_dev		0.00053741	0.00152508	0.0046375

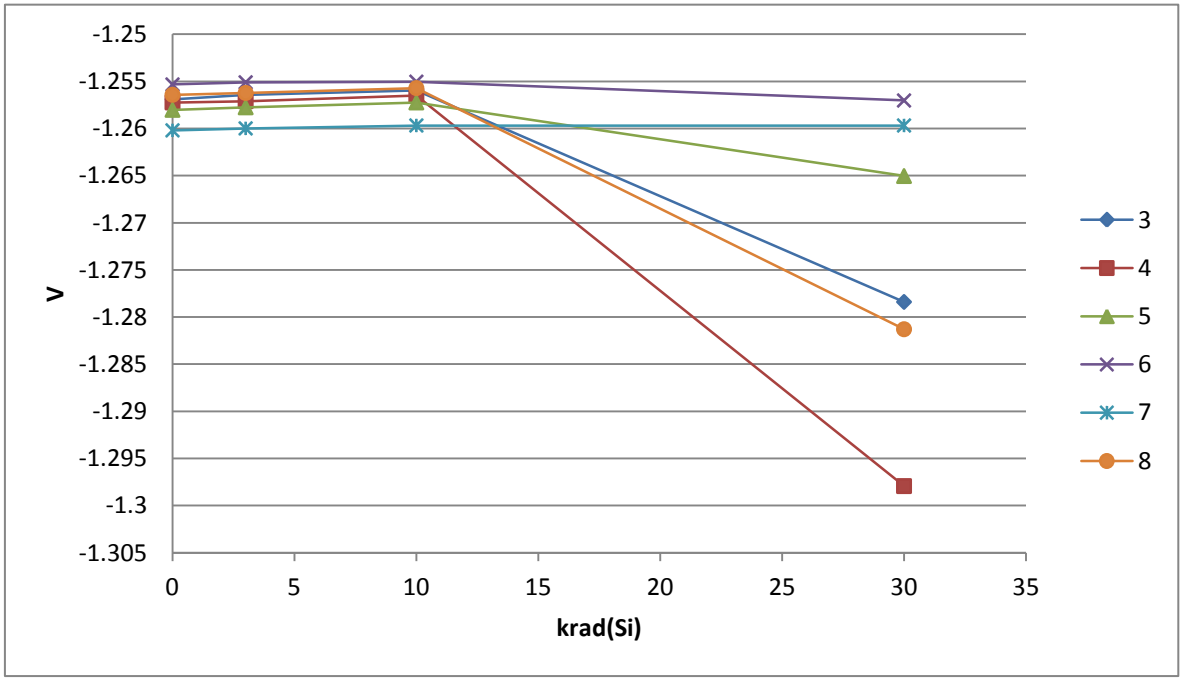


1900 VOUT6 (RECOV)

Limit_Min -1.275 Limit_Max -1.225 V

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-1.256896	-1.2564182	-1.2559595	-1.2783966
4	-1.2572365	-1.257102	-1.2564955	-1.2979326
5	-1.2580195	-1.2577524	-1.2572365	-1.2650404
6	-1.2553291	-1.2551041	-1.2550278	-1.2570257
7	-1.2601938	-1.259984	-1.2596779	-1.2596779
8	-1.2564182	-1.2562275	-1.2557116	-1.2812929
Average	-1.2573489	-1.257098	-1.2566848	-1.2732277
MAX	-1.2553291	-1.2551041	-1.2550278	-1.2570257
MIN	-1.2601938	-1.259984	-1.2596779	-1.2979326
STD_dev	0.00165569	0.00167051	0.00164425	0.01558994

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.00047779	0.00093651	-0.0215006
4		0.00013447	0.000741	-0.0406961
5		0.00026703	0.00078297	-0.007021
6		0.00022507	0.00030136	-0.0016966
7		0.0002098	0.00051593	0.00051593
8		0.00019074	0.00070667	-0.0248747
Average		0.00025082	0.00066407	-0.0158788
MAX		0.00047779	0.00093651	0.00051593
MIN		0.00013447	0.00030136	-0.0406961
STD_dev		0.00011939	0.00022343	0.01598008

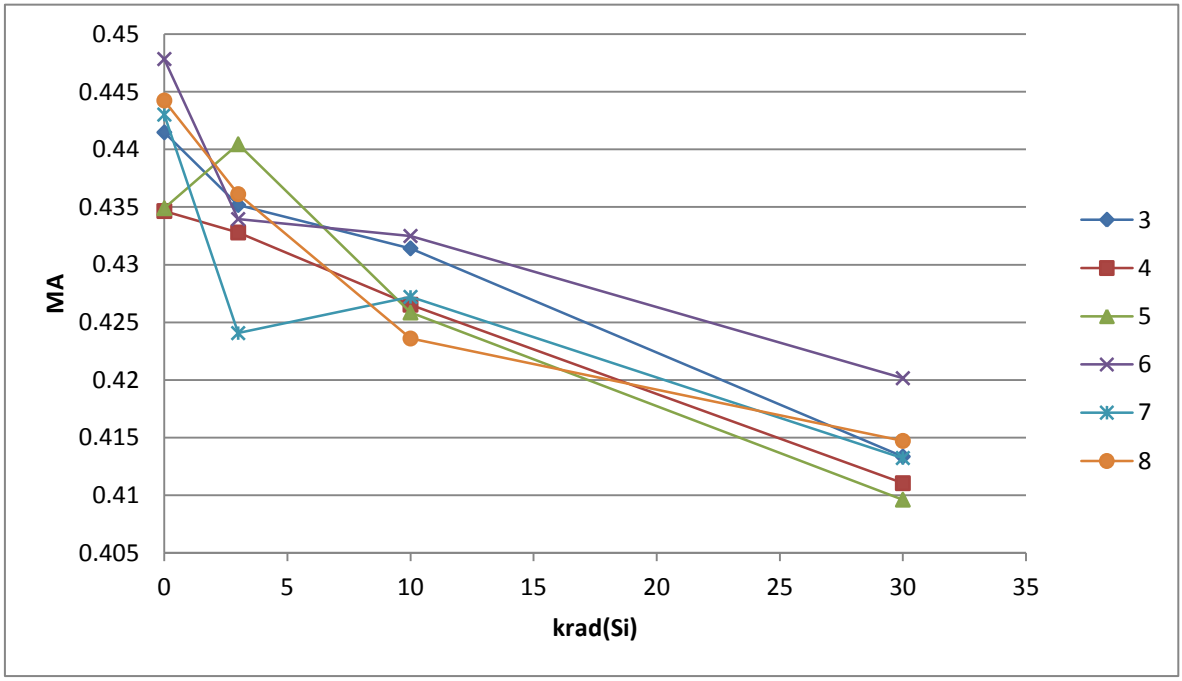


2000 IQ @ -4.25V IN

Limit_Min 0.2 Limit_Max 3 MA

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	0.44148555	0.43517864	0.43141678	0.41334868
4	0.43465501	0.43279305	0.42652386	0.41103411
5	0.43490017	0.44045293	0.42584515	0.40960544
6	0.44784904	0.43395767	0.4324913	0.42014569
7	0.44302735	0.42405841	0.42720231	0.41321665
8	0.44424856	0.43612137	0.42359135	0.41470584
Average	0.44102761	0.43376035	0.42784513	0.41367607
MAX	0.44784904	0.44045293	0.4324913	0.42014569
MIN	0.43465501	0.42405841	0.42359135	0.40960544
STD_dev	0.0052777	0.005431	0.00342337	0.00365471

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.0063069	-0.0100688	-0.0281369
4		-0.001862	-0.0081311	-0.0236209
5		0.00555277	-0.009055	-0.0252947
6		-0.0138914	-0.0153577	-0.0277033
7		-0.0189689	-0.015825	-0.0298107
8		-0.0081272	-0.0206572	-0.0295427
Average		-0.0072673	-0.0131825	-0.0273515
MAX		0.00555277	-0.0081311	-0.0236209
MIN		-0.0189689	-0.0206572	-0.0298107
STD_dev		0.00867226	0.00489558	0.00243874

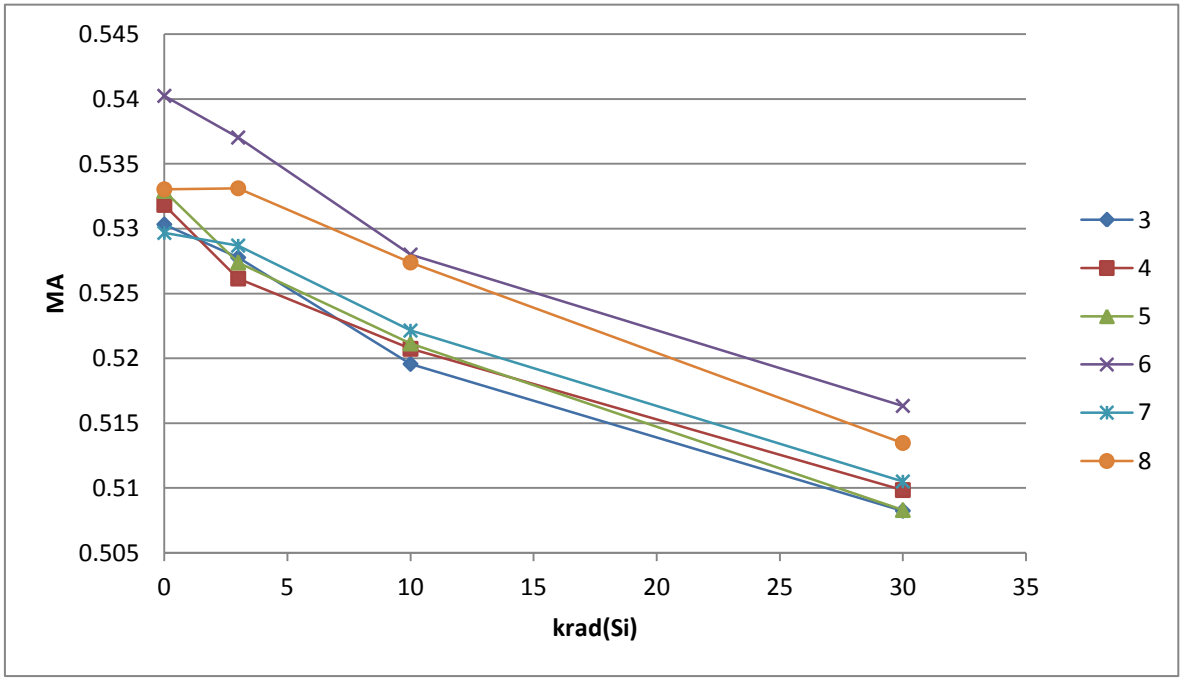


2100 IQ @ -14.25V IN

Limit_Min 0.2 Limit_Max 3 MA

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	0.53032881	0.52776933	0.51956248	0.50823486
4	0.5318327	0.52615207	0.52073133	0.50983298
5	0.53290719	0.52739215	0.52114183	0.50829142
6	0.54024696	0.53703159	0.52799541	0.51632851
7	0.52967316	0.52869296	0.52214086	0.5104928
8	0.53303921	0.53311467	0.52739215	0.51346725
Average	0.53300467	0.53002546	0.52316068	0.51110797
MAX	0.54024696	0.53703159	0.52799541	0.51632851
MIN	0.52967316	0.52615207	0.51956248	0.50823486
STD_dev	0.00379722	0.00418168	0.00361233	0.00319412

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.0025595	-0.0107663	-0.022094
4		-0.0056806	-0.0111014	-0.0219997
5		-0.005515	-0.0117654	-0.0246158
6		-0.0032154	-0.0122516	-0.0239185
7		-0.0009802	-0.0075323	-0.0191804
8		7.546E-05	-0.0056471	-0.019572
Average		-0.0029792	-0.009844	-0.0218967
MAX		7.546E-05	-0.0056471	-0.0191804
MIN		-0.0056806	-0.0122516	-0.0246158
STD_dev		0.00233611	0.00264113	0.00220514

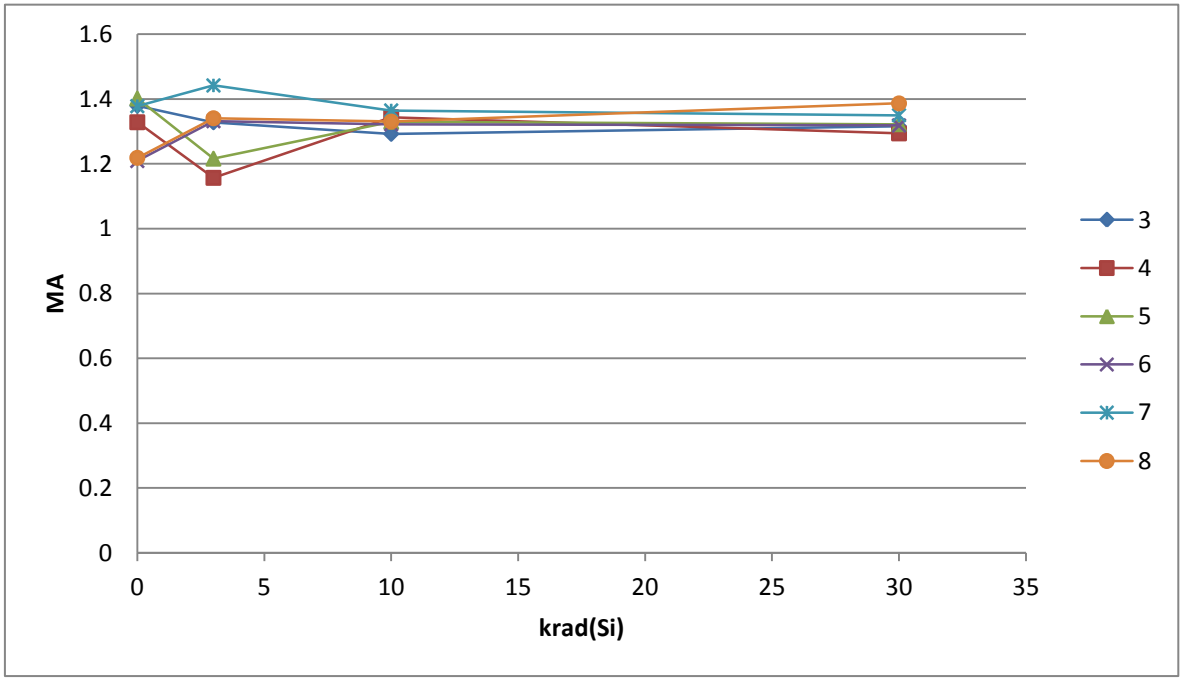


2200 IQ @ -41.25V IN

Limit_Min 1 Limit_Max 5 MA

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	1.37950242	1.32825184	1.29259193	1.31589103
4	1.32843435	1.15688539	1.34408033	1.29407322
5	1.40165555	1.21604395	1.32992423	1.32233882
6	1.20890868	1.33164322	1.32233882	1.31848872
7	1.37797439	1.44204402	1.36485815	1.34990835
8	1.21867144	1.3407948	1.33042085	1.38666761
Average	1.31919114	1.30261054	1.33070239	1.33122796
MAX	1.40165555	1.44204402	1.36485815	1.38666761
MIN	1.20890868	1.15688539	1.29259193	1.29407322
STD_dev	0.08514126	0.10112339	0.02395256	0.03249465

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.0512506	-0.0869105	-0.0636114
4		-0.171549	0.01564598	-0.0343611
5		-0.1856116	-0.0717313	-0.0793167
6		0.12273454	0.11343014	0.10958004
7		0.06406963	-0.0131162	-0.028066
8		0.12212336	0.11174941	0.16799617
Average		-0.0165806	0.01151125	0.01203682
MAX		0.12273454	0.11343014	0.16799617
MIN		-0.1856116	-0.0869105	-0.0793167
STD_dev		0.14067028	0.08680429	0.10165346

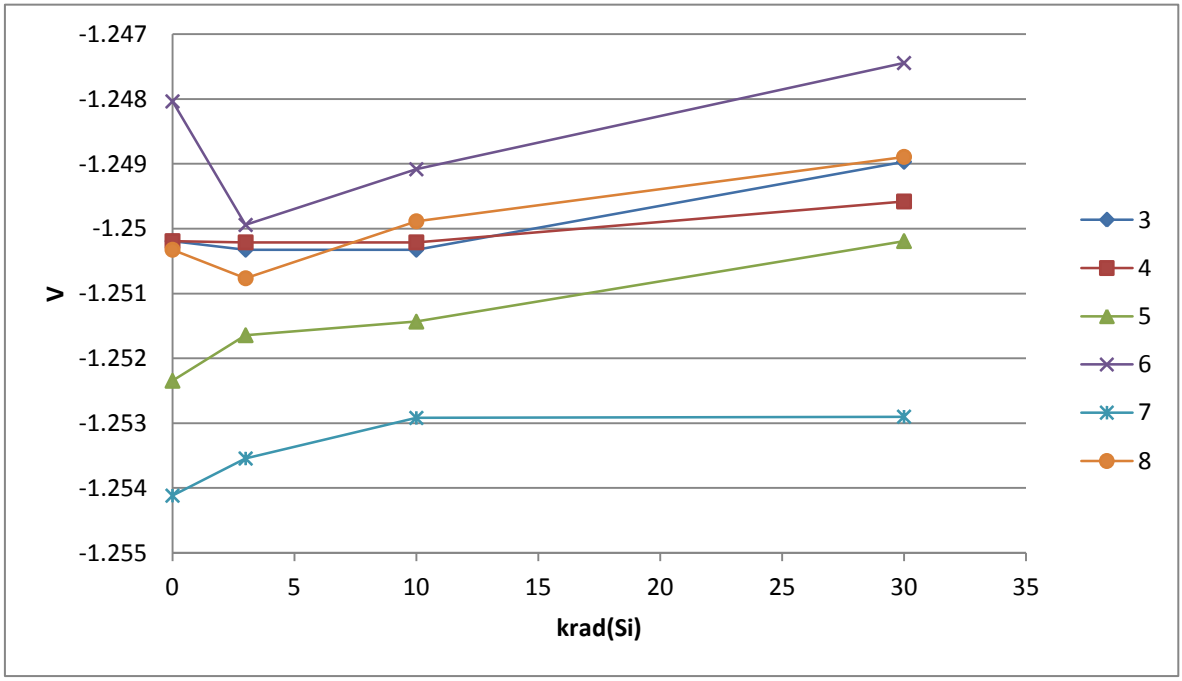


2300 VSTART

Limit_Min -1.275 Limit_Max -1.225 V

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	-1.2501917	-1.2503252	-1.2503252	-1.2489681
4	-1.2501917	-1.2502108	-1.2502108	-1.2495804
5	-1.252347	-1.2516441	-1.2514343	-1.2501917
6	-1.2480364	-1.2499428	-1.2490835	-1.2474442
7	-1.2541199	-1.2535467	-1.2529202	-1.2529011
8	-1.2503252	-1.2507649	-1.2498856	-1.2488918
Average	-1.2508686	-1.2510724	-1.2506433	-1.2496629
MAX	-1.2480364	-1.2499428	-1.2490835	-1.2474442
MIN	-1.2541199	-1.2535467	-1.2529202	-1.2529011
STD_dev	0.00209712	0.00135059	0.00134945	0.00183152

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.0001335	-0.0001335	0.00122357
4		-1.907E-05	-1.907E-05	0.00061131
5		0.00070286	0.00091266	0.0021553
6		-0.0019064	-0.0010471	0.00059223
7		0.00057316	0.00119972	0.00121879
8		-0.0004396	0.00043964	0.00143337
Average		-0.0002038	0.00022538	0.00120576
MAX		0.00070286	0.00119972	0.0021553
MIN		-0.0019064	-0.0010471	0.00059223
STD_dev		0.00094013	0.00080938	0.00058029

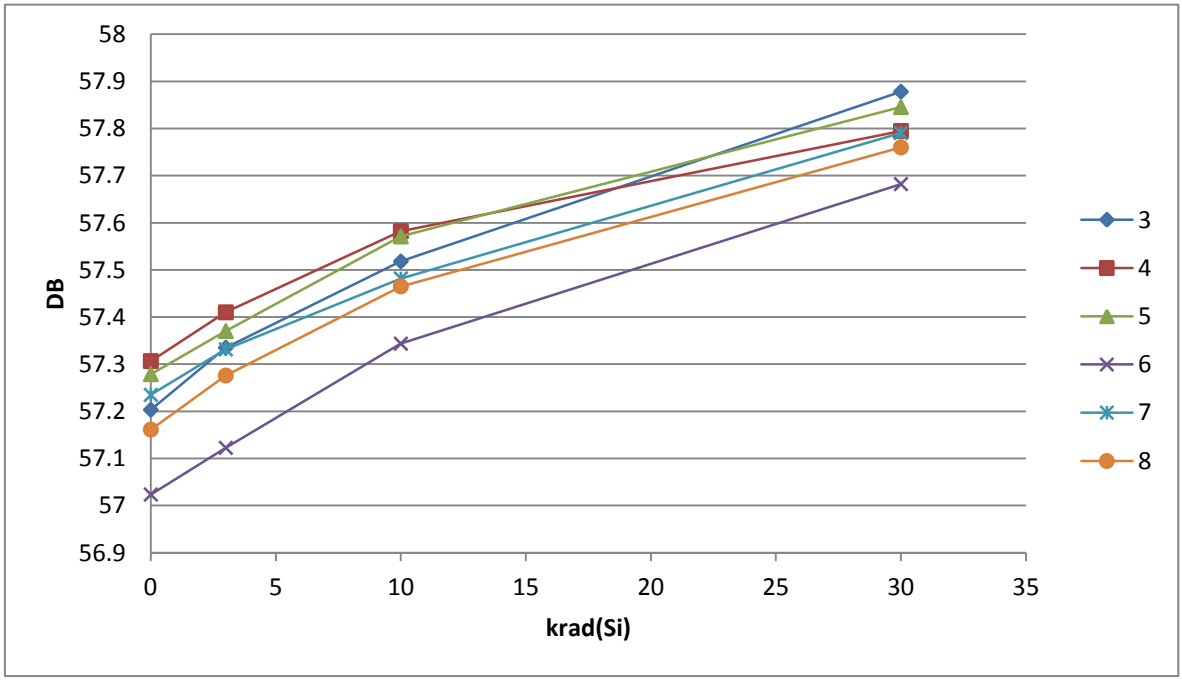


6900 RIPPLE REJECTION

Limit_Min 48 Limit_Max NA DB

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	57.203186	57.3351135	57.5180511	57.8781891
4	57.3065033	57.4099884	57.5820007	57.7947388
5	57.2787476	57.370224	57.5709229	57.8454437
6	57.0234375	57.1225433	57.3435211	57.6820679
7	57.2349243	57.3314362	57.4819031	57.7903748
8	57.1612396	57.2758942	57.4649506	57.7599792
Average	57.2013397	57.3075333	57.4935583	57.7917989
MAX	57.3065033	57.4099884	57.5820007	57.8781891
MIN	57.0234375	57.1225433	57.3435211	57.6820679
STD_dev	0.10142969	0.10097675	0.08703177	0.06841796

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.1319275	0.3148651	0.6750031
4		0.1034851	0.2754974	0.4882355
5		0.0914764	0.2921753	0.5666961
6		0.0991058	0.3200836	0.6586304
7		0.0965119	0.2469788	0.5554505
8		0.1146546	0.303711	0.5987396
Average		0.10619355	0.29221853	0.5904592
MAX		0.1319275	0.3200836	0.6750031
MIN		0.0914764	0.2469788	0.4882355
STD_dev		0.01484403	0.0273775	0.0694313

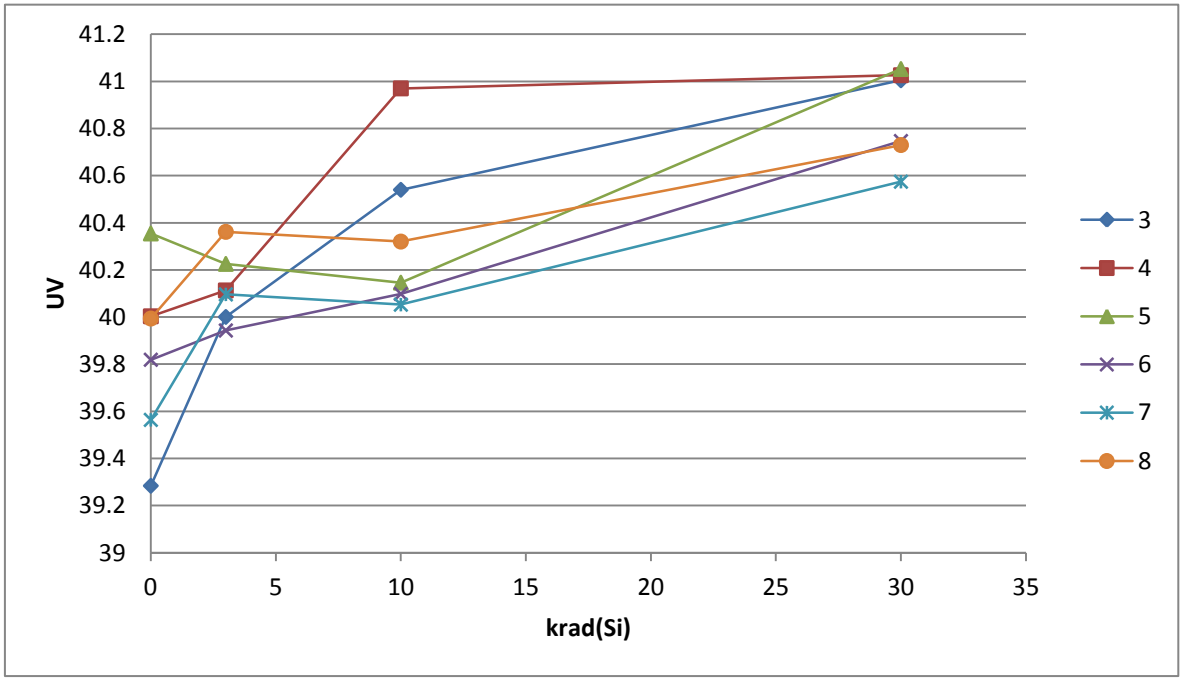


7000 V (NOISE)

Limit_Min NA Limit_Max 120 UV

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	39.2839432	40.0004196	40.539978	41.0046616
4	40.0031853	40.1129799	40.9703217	41.0261993
5	40.3546448	40.2255402	40.1460266	41.0525246
6	39.8187981	39.942955	40.0981522	40.746685
7	39.5636177	40.0962181	40.0526619	40.5743484
8	39.9936104	40.3615112	40.3202591	40.7299232
Average	39.8362999	40.1232707	40.3545666	40.8557237
MAX	40.3546448	40.3615112	40.9703217	41.0525246
MIN	39.2839432	39.942955	40.0526619	40.5743484
STD_dev	0.37444321	0.15209305	0.35073992	0.19842494

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		0.7164764	1.2560348	1.7207184
4		0.1097946	0.9671364	1.023014
5		-0.1291046	-0.2086182	0.6978798
6		0.1241569	0.2793541	0.9278869
7		0.5326004	0.4890442	1.0107307
8		0.3679008	0.3266487	0.7363128
Average		0.28697075	0.51826667	1.01942377
MAX		0.7164764	1.2560348	1.7207184
MIN		-0.1291046	-0.2086182	0.6978798
STD_dev		0.31060494	0.52322043	0.36981724

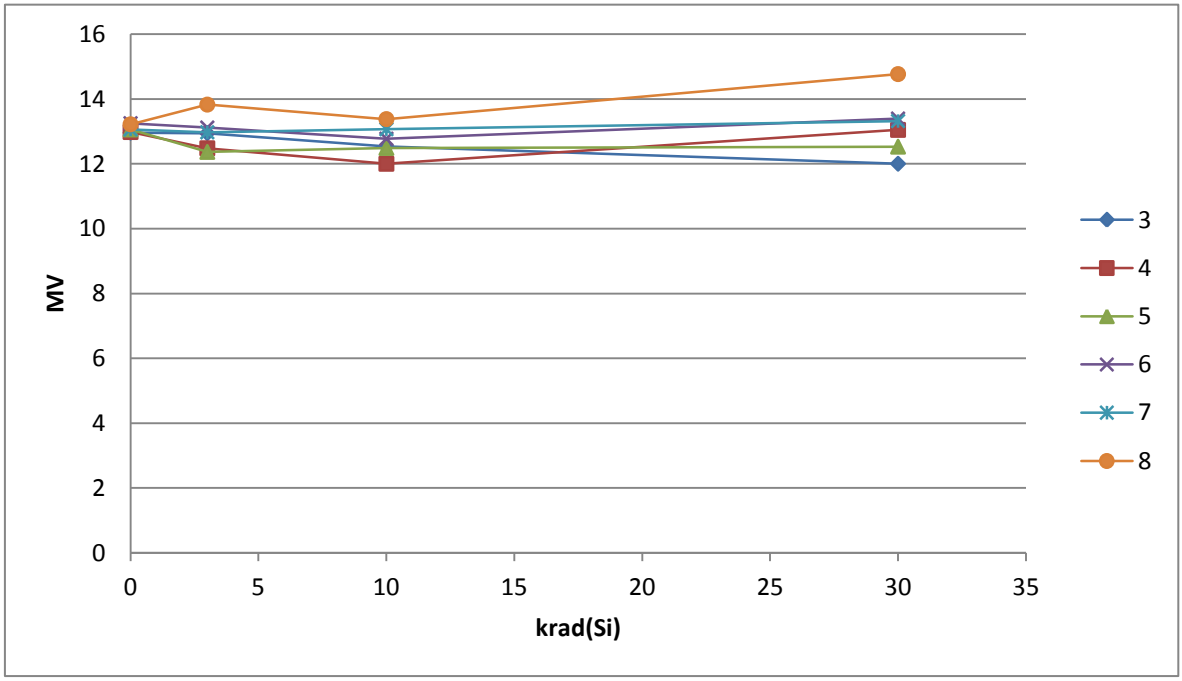


7100 LINE TRANSIENT RESPONSE--RISING EDGE

Limit_Min NA Limit_Max 80 MV

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	12.9622183	12.9461622	12.5350542	12.0038357
4	12.9822683	12.4811716	12.0031424	13.0492077
5	13.061307	12.369256	12.4913492	12.5312881
6	13.2527943	13.1188784	12.7763968	13.3966427
7	13.0651217	12.9739046	13.0688772	13.3215189
8	13.2212858	13.8294916	13.381403	14.7703772
Average	13.0908326	12.9531441	12.7093705	13.1788117
MAX	13.2527943	13.8294916	13.381403	14.7703772
MIN	12.9622183	12.369256	12.0031424	12.0038357
STD_dev	0.1209217	0.52146254	0.48208772	0.93995202

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.0160561	-0.4271641	-0.9583826
4		-0.5010967	-0.9791259	0.0669394
5		-0.692051	-0.5699578	-0.5300189
6		-0.1339159	-0.4763975	0.1438484
7		-0.0912171	0.0037555	0.2563972
8		0.6082058	0.1601172	1.5490914
Average		-0.1376885	-0.3814621	0.08797915
MAX		0.6082058	0.1601172	1.5490914
MIN		-0.692051	-0.9791259	-0.9583826
STD_dev		0.45004664	0.41122616	0.85364773

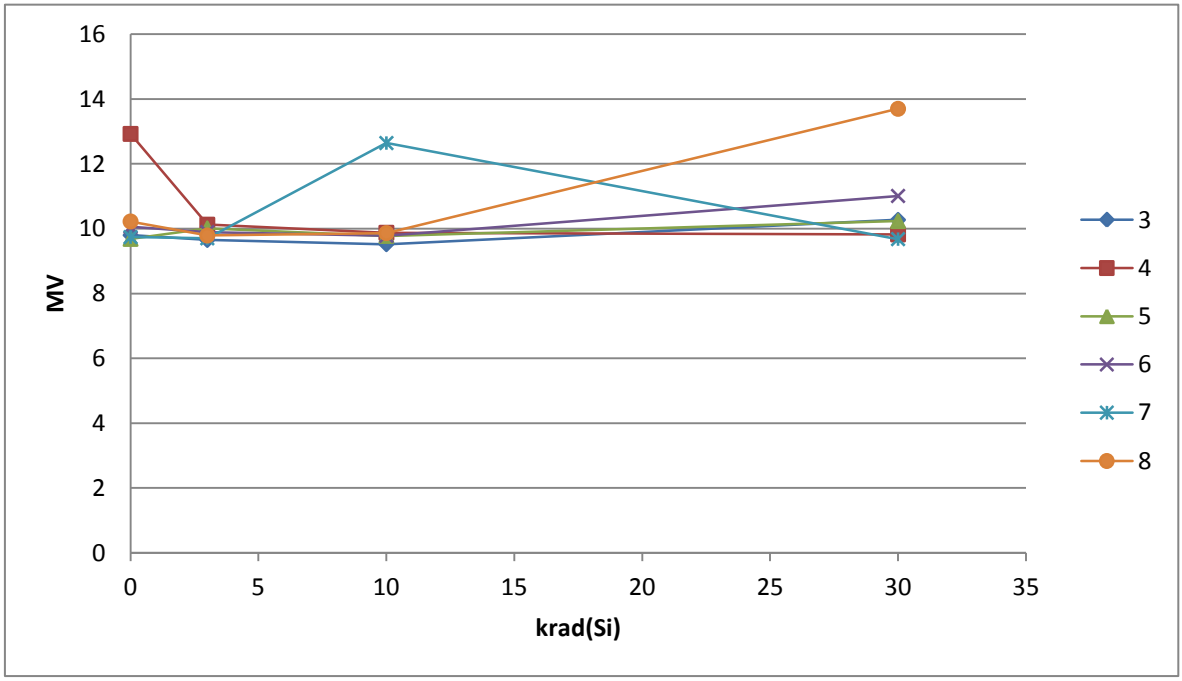


7200 LOAD TRANSIENT RESPONSE--RISING EDGE

Limit_Min NA Limit_Max 80 MV

Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3	9.79973412	9.64987659	9.51947689	10.2723875
4	12.9249802	10.1244373	9.87422466	9.82217503
5	9.68441772	10.0106039	9.77588081	10.2334995
6	10.057848	9.89433002	9.78256798	11.0101662
7	9.73863125	9.7032299	12.6429462	9.67838955
8	10.2218609	9.78836441	9.8637228	13.6994648
Average	10.4045787	9.86180702	10.2431366	10.7860138
MAX	12.9249802	10.1244373	12.6429462	13.6994648
MIN	9.68441772	9.64987659	9.51947689	9.67838955
STD_dev	1.25171774	0.18309994	1.18264718	1.50088918

Delta				
Device ID	0.0 krad	3.0 krad	10.0 krad	30.0 krad
3		-0.1498575	-0.2802572	0.47265338
4		-2.8005429	-3.0507555	-3.1028052
5		0.32618618	0.09146309	0.54908178
6		-0.163518	-0.27528	0.9523182
7		-0.0354013	2.90431495	-0.0602417
8		-0.4334965	-0.3581381	3.4776039
Average		-0.5427717	-0.1614421	0.38143507
MAX		0.32618618	2.90431495	3.4776039
MIN		-2.8005429	-3.0507555	-3.1028052
STD_dev		1.13315482	1.89085827	2.11109467



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