

Total Ionizing Dose Test Report

RDHA710SE10A20K

Revision 1.0
September, 2004

International
IOR Rectifier

HI-REL PRODUCTS

Table of Contents

Introduction	3
Test Plan	3
Results	3
Summary	4
Figures 1 - 4	5 - 8
Appendix A – Electrical Data	9
Appendix B – Test Plan	20
Appendix C – Test Procedure	23
Appendix D – Bias Conditions	27

INTRODUCTION

A radiation evaluation was performed on the **RDHA710SE102QK Dual Channel 10 A, single-pole-single-throw, normally open, with common input Solid State Relay**, in a hermetic package, to determine the total dose tolerance of these parts. The irradiation was performed at the University of Massachusetts, Nuclear Research Facility using their Co⁶⁰ gamma ray source. During the radiation testing, three devices (sn 21, 40, AND 51) were irradiated under Bias condition A (On), three devices (sn 23, 50, 52) were irradiated under Bias Condition B (Off) and two devices were used as control samples. Data points were captured after each irradiation levels re: 25, 50, 300, 500, 750 and 1000Krads. The dose rate was 187rads/s(Si). Testing of the devices after each irradiation step was performed at the Nuclear Research Facility.

TEST PLAN

The Test Plan is included in Appendix B. In summary, the testing was conducted immediately after each irradiation step using a labview automated acquisition system. There were six irradiation steps to complete the 1000Krads TID level. The Gamma irradiation test board was divided into two sections for bias conditions and was designed to feedback the appropriate voltages while monitoring all leakage currents on all devices as the DUTs' are being irradiated.

Three devices were selected for each bias and radiation dose step. After six irradiation steps, all devices received their target radiation level and were taken back to the IR facility.

RESULTS

The pre and post radiation test results are shown graphically in Figures 1 thru 4 for both bias on and biased off devices. As outlined in the Test Plan, six devices were exposed to a total dose of 1000Krads steps. Figure 1 shows the RDson resistance of each channel for the bias on and biased off hybrids. Notice that the rdson data for the bias off devices are increasing in a more uniform manner than the bias on devices. This is due to the difference in potential (80volts) that is applied to the output (Drain to Source) during the off biased condition. During the Bias on condition, all outputs are tied together for zero potential. The IRH57130 MOSFET is used as the output stage in each channel of the hybrid. The graph indicates the affects or degradation of the devices for each radiation levels. Also included in the graph is the control device, which is used as the baseline refrence. The Rdson increased with radiation, but was still within specifications at 1000Krads. In Figure 2, all switching parameters are captured for the biased "on" conditions. The voltage threshold on the IRH57130 increased with radiation, coupled with the degradation of the gate drive voltage from the optocoupler, resulting in a change in Toff, Trise, and Tfall, however, Ton was not affected as shown in Figures 2. For the biased off conditions, all switching parameters were affected and responded similar to the biased on conditions as shown in Figure 4. All devices did remain within their parametric specification range.

SUMMARY

For Bias Condition A (see Appendix A), all devices passed parametric tests up to 1000 Krads. RDSON resistance (bias-on) had a maximum change of approximately 5% on average over the total dose spectrum. Toff, Trise, and Tfall were affected primarily by the degradation of the optocoupler output drive voltage and the increase in the gate voltage threshold of the MOSFET.

For Bias Condition B (see Appendix A), all devices passed parametric tests up to 1000 Krads, however, as noted in Figures 1, all tests show a slightly greater increase in degradation when compared to the bias-on devices. RDSON resistance had a maximum change of approximately 5.5% while Drain to Source resistance (Rdson). Toff, Trise, and Tfall were affected primarily by the degradation of the optocoupler output drive voltage and the increase in the gate voltage threshold of the MOSFET.

CONCLUSION

The performance of IR's RDHA710SE102QK Solid State Relay has demonstrated a strong degree of hardness to TID radiation. Devices in an bias(off) state, when exposed ionizing irradiation, appear to have the worst-case performance for output leakage currents and a higher increase drain to source resistance. The radiation sensitive switching parameters are Toff, Trise, and Tfall while Ton showed very little affect. All parameters passed their post radiation specifications and limits. Due to the device's robustness, it is usable in applications where it is subjected to Gamma radiations of up to 1000Krads.

Figure 1

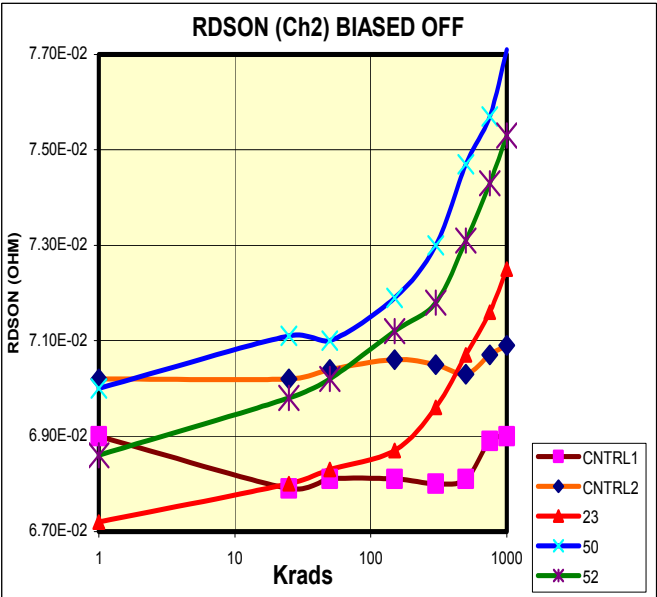
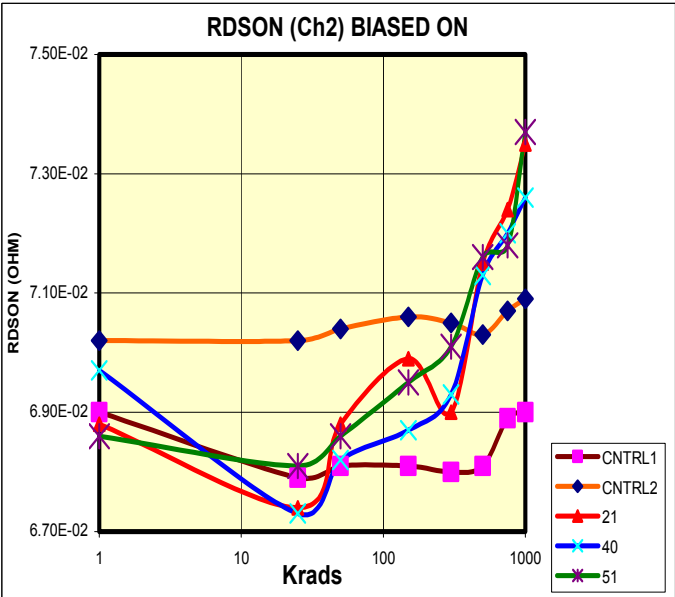
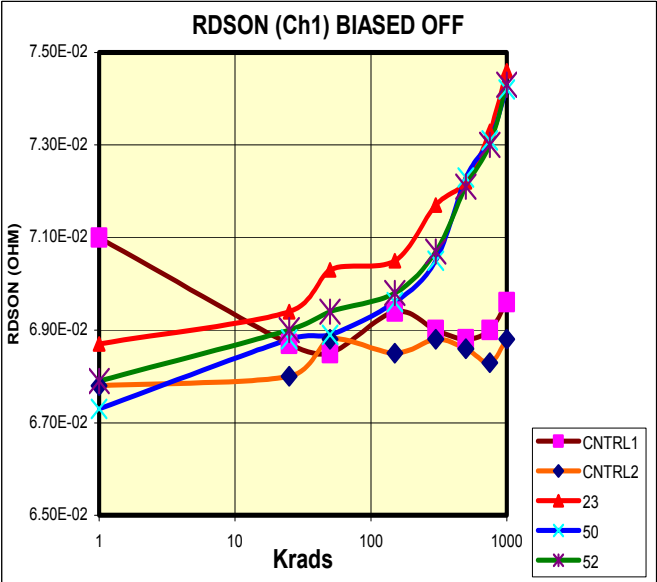
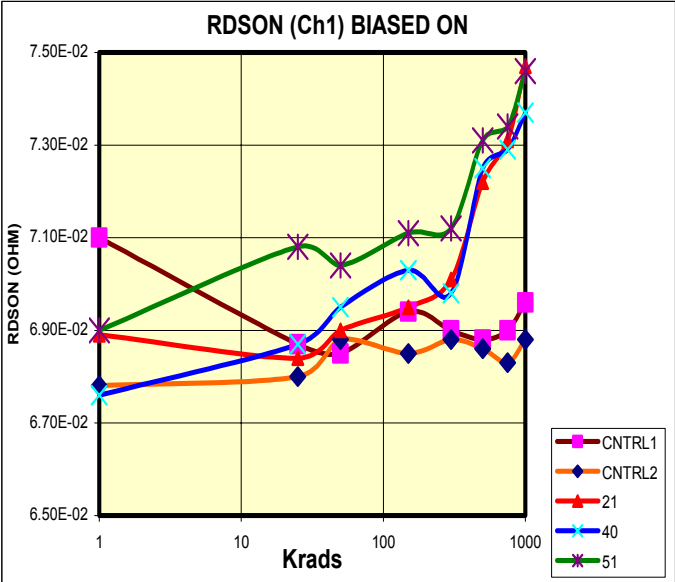


Figure 2 (bias on)

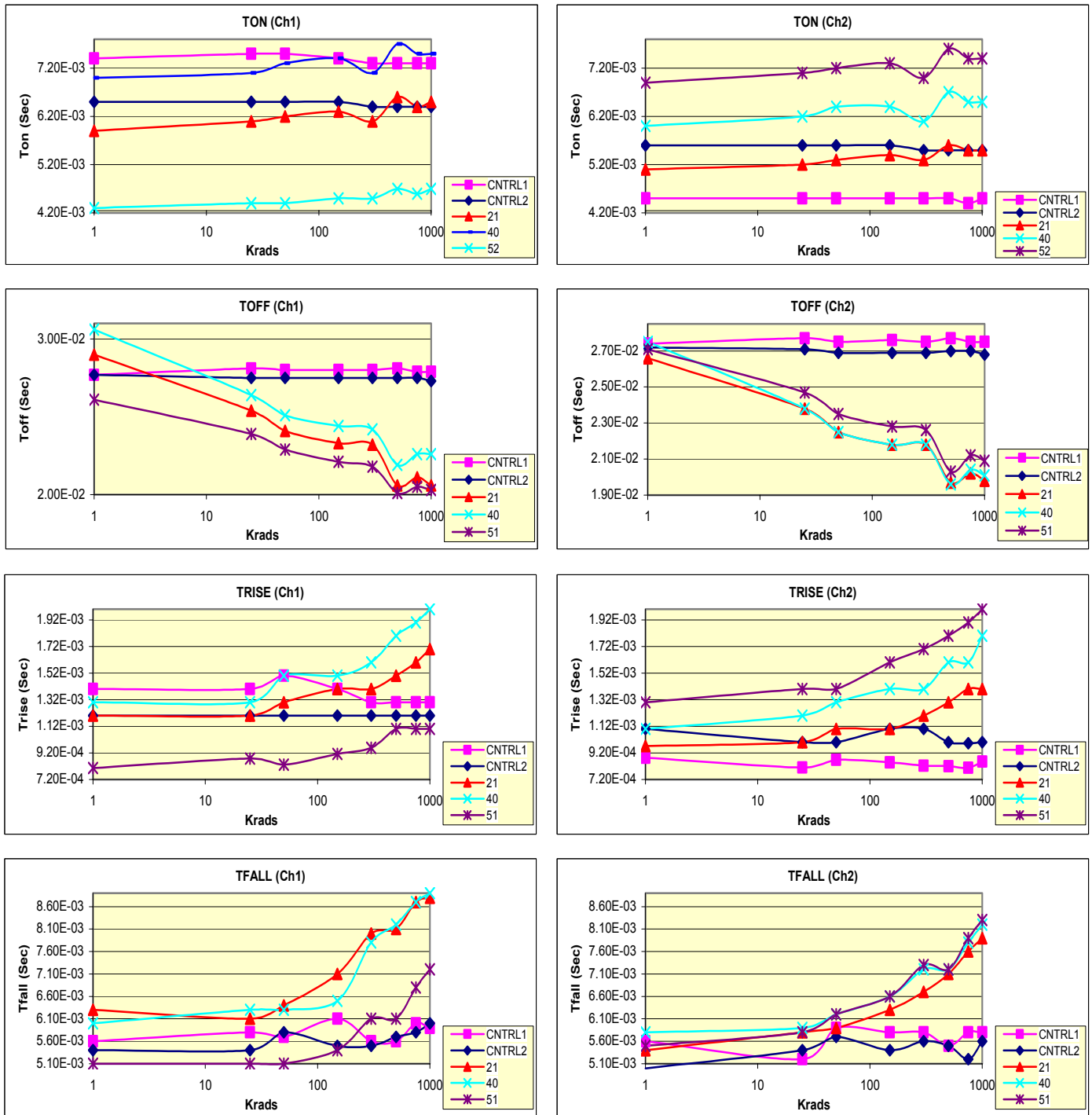
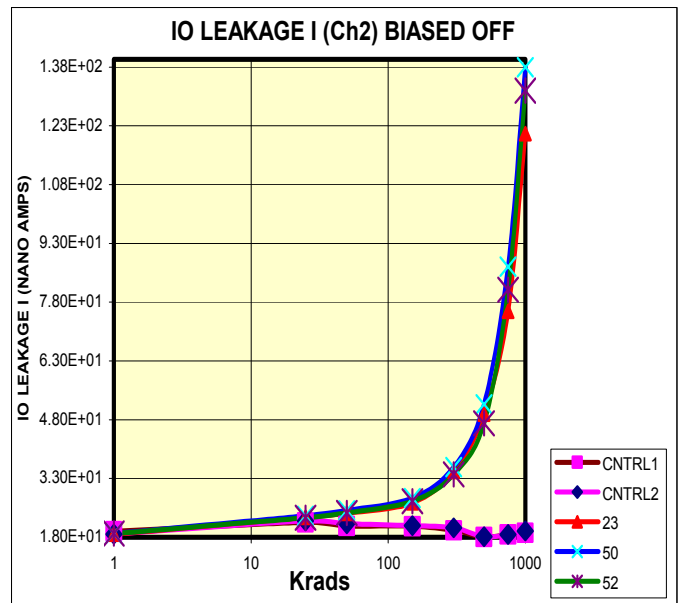
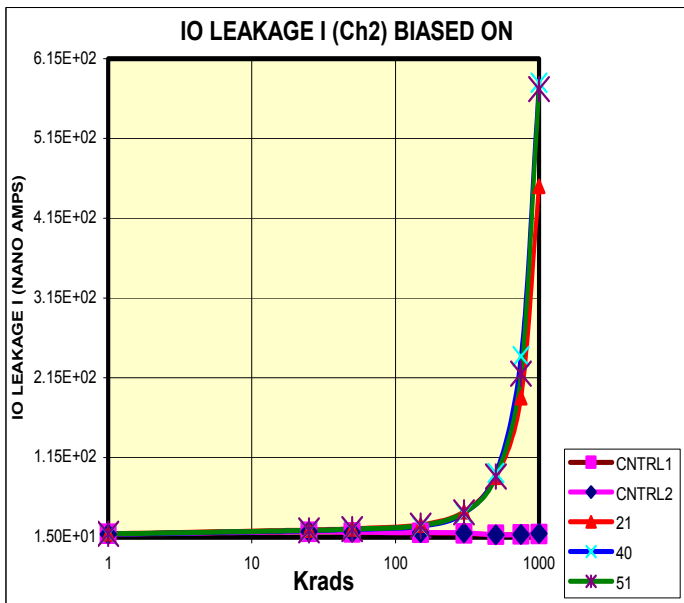
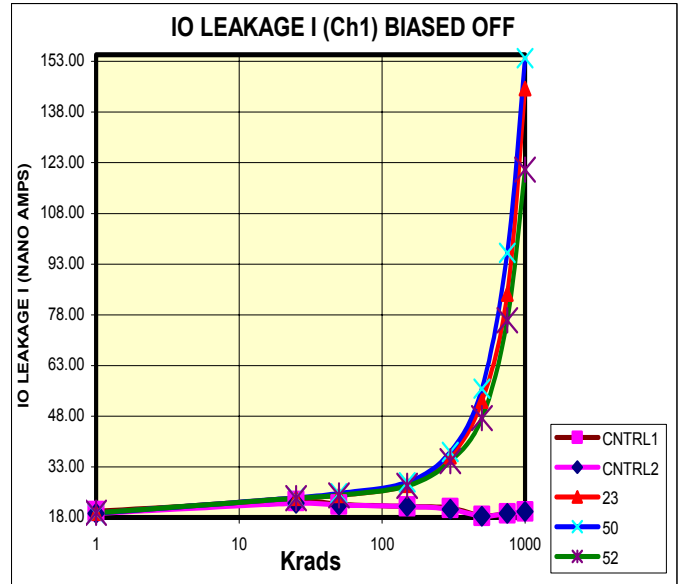
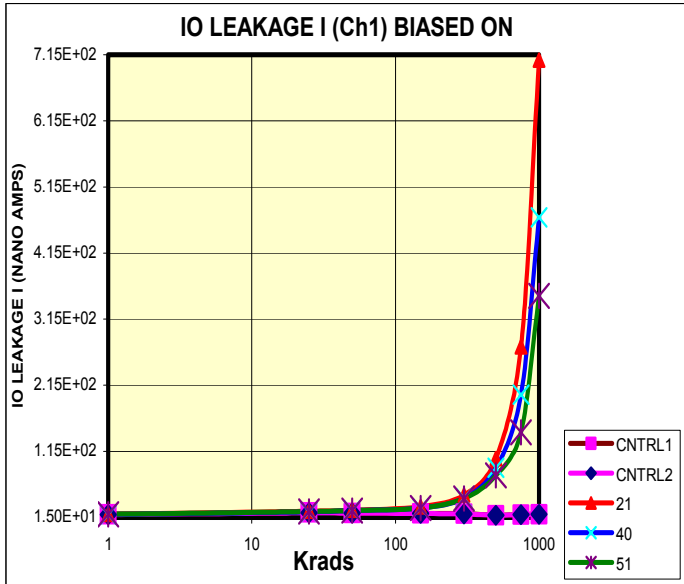


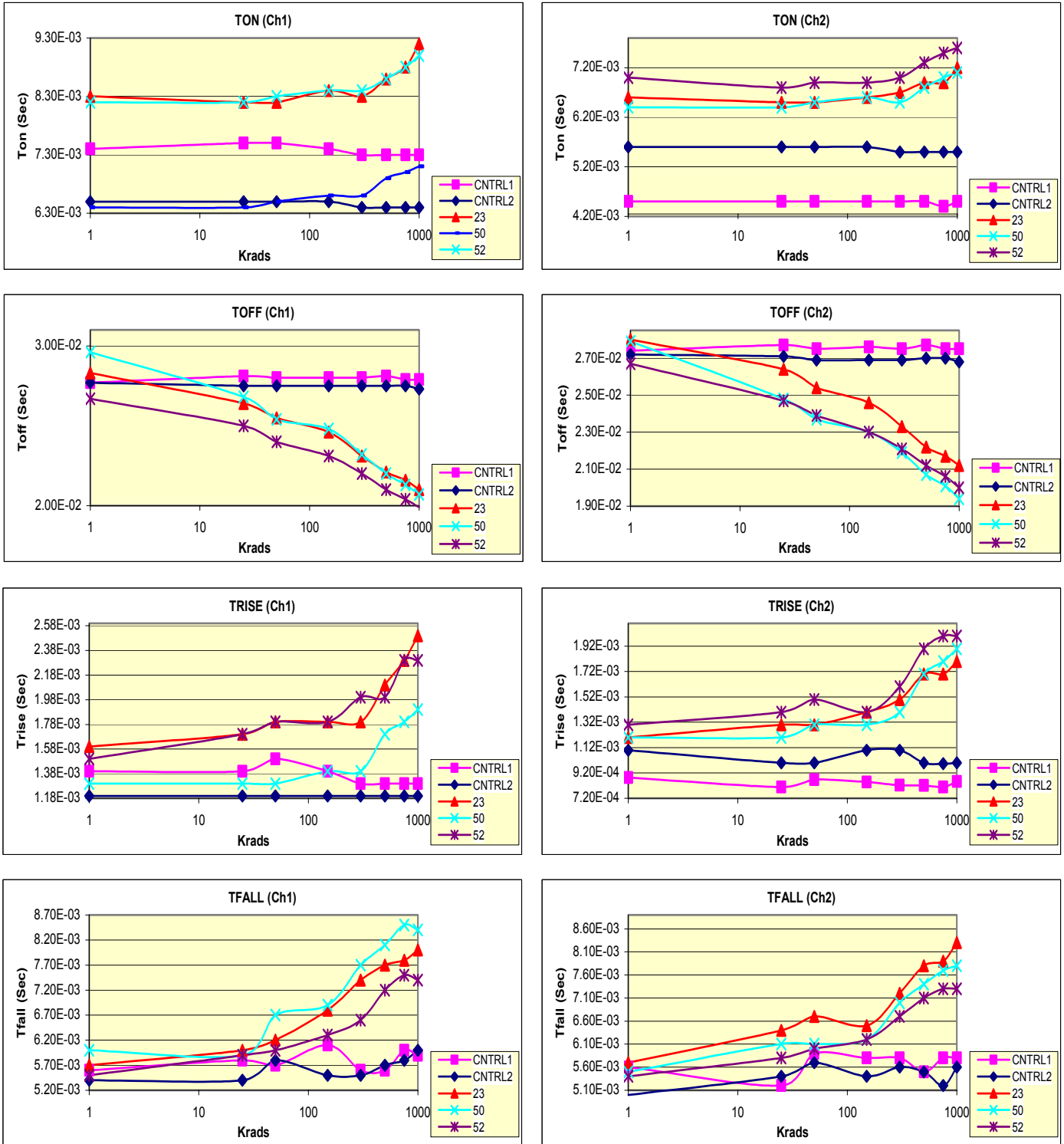
Figure 3



BIAS ON

BIAS OFF

Figure 4 (bias off)



Appendix A

Electrical Data

Bias Condition A (bias-on)

T#1	IQIN										
Condition:	PIN 4, 6 = +0V PIN 5 = +5V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	2.78E-08	5.43E-08	2.20E-08	2.09E-08	2.23E-08	2.26E-08	2.12E-08	2.53E-08	0	2.00E-05	A
CNTRL2	2.16E-08	2.66E-08	2.56E-08	2.25E-08	2.57E-08	2.11E-08	2.35E-08	2.50E-08	0	2.00E-05	A
21	3.33E-08	5.06E-08	3.64E-08	3.80E-08	4.26E-08	6.53E-08	2.16E-07	5.37E-07	0	2.00E-05	A
40	3.88E-08	5.53E-08	4.62E-08	4.38E-08	5.50E-08	7.94E-08	1.98E-07	4.66E-07	0	2.00E-05	A
51	3.11E-08	5.60E-08	5.33E-08	5.23E-08	6.09E-08	8.02E-08	1.70E-07	4.84E-07	0	2.00E-05	A
Min	2.16E-08	2.66E-08	2.20E-08	2.09E-08	2.23E-08	2.11E-08	2.12E-08	2.50E-08	0	2.00E-05	A
Avg	3.05E-08	4.86E-08	3.67E-08	3.55E-08	4.13E-08	5.37E-08	1.26E-07	3.07E-07	0	2.00E-05	A
Max	3.88E-08	5.60E-08	5.33E-08	5.23E-08	6.09E-08	8.02E-08	2.16E-07	5.37E-07	0	2.00E-05	A
T#2	IDIN										
Condition:	PIN 5 = +5V PINS 4, 6 = +5V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.70E-02	2.50E-02	A
CNTRL2	1.96E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.70E-02	2.50E-02	A
21	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.70E-02	2.50E-02	A
40	1.95E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.70E-02	2.50E-02	A
51	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.70E-02	2.50E-02	A
Min	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.70E-02	2.50E-02	A
Avg	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.70E-02	2.50E-02	A
Max	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.70E-02	2.50E-02	A
T#3	IHSS (channel #1)										
Condition:	PIN 5 = +5V PIN 4 = +5V PIN 6 = +0V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	7.05E-10	6.42E-10	8.04E-10	7.64E-10	7.61E-10	6.46E-10	6.75E-10	6.90E-10	-1.00E-06	1.00E-06	A
CNTRL2	6.56E-10	7.53E-10	7.86E-10	7.73E-10	7.49E-10	6.58E-10	6.81E-10	7.02E-10	-1.00E-06	1.00E-06	A
21	7.35E-10	7.73E-10	7.83E-10	8.08E-10	9.04E-10	1.30E-09	1.80E-09	2.50E-09	-1.00E-06	1.00E-06	A
40	6.75E-10	7.64E-10	7.89E-10	7.91E-10	8.55E-10	1.10E-09	1.40E-09	1.90E-09	-1.00E-06	1.00E-06	A
51	7.37E-10	8.11E-10	8.20E-10	8.24E-10	9.20E-10	1.30E-09	1.60E-09	2.30E-09	-1.00E-06	1.00E-06	A
Min	6.56E-10	6.42E-10	7.83E-10	7.64E-10	7.49E-10	6.46E-10	6.75E-10	6.90E-10	-1.00E-06	1.00E-06	A
Avg	7.02E-10	7.49E-10	7.96E-10	7.92E-10	8.38E-10	1.00E-09	1.23E-09	1.62E-09	-1.00E-06	1.00E-06	A
Max	7.37E-10	8.11E-10	8.20E-10	8.24E-10	9.20E-10	1.30E-09	1.80E-09	2.50E-09	-1.00E-06	1.00E-06	A
T#4	IHSS (channel #2)										
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = +5V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	9.33E-10	1.10E-09	1.10E-09	1.10E-09	1.10E-09	8.66E-10	9.00E-10	1.00E-09	-1.00E-06	1.00E-06	A
CNTRL2	9.14E-10	1.10E-09	1.00E-09	1.00E-09	9.86E-10	9.37E-10	9.57E-10	9.27E-10	-1.00E-06	1.00E-06	A
21	8.34E-10	9.24E-10	9.27E-10	9.31E-10	1.00E-09	1.40E-09	1.90E-09	2.60E-09	-1.00E-06	1.00E-06	A
40	1.00E-09	1.20E-09	1.10E-09	1.10E-09	1.20E-09	1.50E-09	1.90E-09	2.30E-09	-1.00E-06	1.00E-06	A
51	8.88E-10	9.77E-10	9.80E-10	9.78E-10	1.00E-09	1.20E-09	1.40E-09	1.80E-09	-1.00E-06	1.00E-06	A
Min	8.34E-10	9.24E-10	9.27E-10	9.31E-10	9.86E-10	8.66E-10	9.00E-10	9.27E-10	-1.00E-06	1.00E-06	A
Avg	9.14E-10	1.06E-09	1.02E-09	1.02E-09	1.06E-09	1.18E-09	1.41E-09	1.73E-09	-1.00E-06	1.00E-06	A
Max	1.00E-09	1.20E-09	1.10E-09	1.10E-09	1.20E-09	1.50E-09	1.90E-09	2.60E-09	-1.00E-06	1.00E-06	A

Bias Condition A (bias-on)

T#5 IINPEAK (channel #1)											
Condition:	PIN 5 = +5.25V PIN 4 = +5.25V PIN 6 = +0V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	1.20E-09	1.10E-09	1.30E-09	1.30E-09	1.20E-09	1.10E-09	1.20E-09	1.20E-09	-1.00E-03	1.00E-03	A
CNTRL2	1.10E-09	1.20E-09	1.30E-09	1.20E-09	1.20E-09	1.10E-09	1.10E-09	1.20E-09	-1.00E-03	1.00E-03	A
21	1.20E-09	1.20E-09	1.30E-09	1.30E-09	1.40E-09	1.80E-09	2.30E-09	3.00E-09	-1.00E-03	1.00E-03	A
40	1.10E-09	1.20E-09	1.30E-09	1.30E-09	1.30E-09	1.60E-09	1.90E-09	2.40E-09	-1.00E-03	1.00E-03	A
51	1.20E-09	1.30E-09	1.30E-09	1.30E-09	1.40E-09	1.80E-09	2.20E-09	2.80E-09	-1.00E-03	1.00E-03	A
Min	1.10E-09	1.10E-09	1.30E-09	1.20E-09	1.20E-09	1.10E-09	1.10E-09	1.20E-09	-1.00E-03	1.00E-03	A
Avg	1.16E-09	1.20E-09	1.30E-09	1.28E-09	1.30E-09	1.48E-09	1.74E-09	2.12E-09	-1.00E-03	1.00E-03	A
Max	1.20E-09	1.30E-09	1.30E-09	1.30E-09	1.40E-09	1.80E-09	2.30E-09	3.00E-09	-1.00E-03	1.00E-03	A
T#6 IINPEAK (channel #2)											
Condition:	PIN 5 = +5.25V PIN 4 = 0V PIN 6 = +5.25V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	1.40E-09	1.50E-09	1.50E-09	1.50E-09	1.50E-09	1.40E-09	1.40E-09	1.50E-09	-1.00E-03	1.00E-03	A
CNTRL2	1.40E-09	1.50E-09	1.50E-09	1.50E-09	1.50E-09	1.40E-09	1.40E-09	1.40E-09	-1.00E-03	1.00E-03	A
21	1.20E-09	1.30E-09	1.30E-09	1.40E-09	1.40E-09	1.90E-09	2.40E-09	3.10E-09	-1.00E-03	1.00E-03	A
40	1.60E-09	1.70E-09	1.70E-09	1.70E-09	1.80E-09	2.10E-09	2.50E-09	3.00E-09	-1.00E-03	1.00E-03	A
51	1.30E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.60E-09	1.90E-09	2.30E-09	-1.00E-03	1.00E-03	A
Min	1.20E-09	1.30E-09	1.30E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	-1.00E-03	1.00E-03	A
Avg	1.38E-09	1.48E-09	1.48E-09	1.50E-09	1.52E-09	1.68E-09	1.92E-09	2.26E-09	-1.00E-03	1.00E-03	A
Max	1.60E-09	1.70E-09	1.70E-09	1.70E-09	1.80E-09	2.10E-09	2.50E-09	3.10E-09	-1.00E-03	1.00E-03	A
T#7 IILSS (channel #1)											
Condition:	PIN 5 = +5V PIN 4 = +0.8V PIN 6 = +0V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	-2.67E-10	-3.97E-10	-2.58E-10	-2.73E-10	-2.38E-10	-2.76E-10	-2.73E-10	-2.84E-10	-1.00E-06	1.00E-06	A
CNTRL2	-2.57E-10	-2.88E-10	-2.49E-10	-2.50E-10	-2.48E-10	-2.61E-10	-2.47E-10	-2.64E-10	-1.00E-06	1.00E-06	A
21	-2.43E-10	-3.23E-10	-2.63E-10	-2.62E-10	-1.65E-10	1.47E-10	4.95E-10	9.74E-10	-1.00E-06	1.00E-06	A
40	-2.55E-10	-2.92E-10	-2.76E-10	-2.74E-10	-2.03E-10	-1.01E-11	2.05E-10	4.79E-10	-1.00E-06	1.00E-06	A
51	-2.63E-10	-2.89E-10	-2.73E-10	-2.71E-10	-1.94E-10	9.19E-11	3.59E-10	7.75E-10	-1.00E-06	1.00E-06	A
Min	-2.67E-10	-3.97E-10	-2.76E-10	-2.74E-10	-2.48E-10	-2.76E-10	-2.73E-10	-2.84E-10	-1.00E-06	1.00E-06	A
Avg	-2.57E-10	-3.18E-10	-2.64E-10	-2.66E-10	-2.10E-10	-6.16E-11	1.08E-10	3.36E-10	-1.00E-06	1.00E-06	A
Max	-2.43E-10	-2.88E-10	-2.49E-10	-2.50E-10	-1.65E-10	1.47E-10	4.95E-10	9.74E-10	-1.00E-06	1.00E-06	A
T#8 IILSS (channel #2)											
Condition:	PIN 5 = +5V PIN 4 = +0V PIN 6 = +0.8V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	-2.07E-10	-2.58E-10	-1.89E-10	-2.14E-10	-2.00E-10	-2.30E-10	-2.35E-10	-2.22E-10	-1.00E-06	1.00E-06	A
CNTRL2	-2.28E-10	-2.56E-10	-2.41E-10	-2.43E-10	-2.35E-10	-2.31E-10	-2.31E-10	-2.53E-10	-1.00E-06	1.00E-06	A
21	-2.14E-10	-2.87E-10	-2.64E-10	-2.44E-10	-1.54E-10	1.70E-10	5.21E-10	1.00E-09	-1.00E-06	1.00E-06	A
40	-2.42E-10	-2.62E-10	-2.60E-10	-2.61E-10	-1.73E-10	5.29E-11	3.14E-10	6.37E-10	-1.00E-06	1.00E-06	A
51	-2.39E-10	-2.75E-10	-2.72E-10	-2.63E-10	-2.16E-10	-6.57E-11	7.63E-11	3.15E-10	-1.00E-06	1.00E-06	A
Min	-2.42E-10	-2.87E-10	-2.72E-10	-2.63E-10	-2.35E-10	-2.31E-10	-2.35E-10	-2.53E-10	-1.00E-06	1.00E-06	A
Avg	-2.26E-10	-2.68E-10	-2.45E-10	-2.45E-10	-1.95E-10	-6.07E-11	8.91E-11	2.95E-10	-1.00E-06	1.00E-06	A
Max	-2.07E-10	-2.56E-10	-1.89E-10	-2.14E-10	-1.54E-10	1.70E-10	5.21E-10	1.00E-09	-1.00E-06	1.00E-06	A

Bias Condition A (bias-on)

T#9	IO [leak] (channel #1)										
Condition:	PIN 5 = +5V PIN 4 = +0.8V PIN 6 = +0V PINS 1 TO 2 = 100V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	1.99E-08	2.29E-08	2.18E-08	2.13E-08	2.07E-08	1.85E-08	1.92E-08	1.98E-08	0.00E+00	2.50E-05	A
CNTRL2	1.92E-08	2.22E-08	2.17E-08	2.13E-08	2.04E-08	1.84E-08	1.92E-08	1.98E-08	0.00E+00	2.50E-05	A
21	1.96E-08	2.45E-08	2.61E-08	3.13E-08	4.92E-08	1.04E-07	2.73E-07	7.07E-07	0.00E+00	2.50E-05	A
40	1.93E-08	2.38E-08	2.53E-08	2.92E-08	4.41E-08	9.03E-08	2.01E-07	4.69E-07	0.00E+00	2.50E-05	A
51	1.98E-08	2.39E-08	2.54E-08	2.93E-08	4.34E-08	7.85E-08	1.44E-07	3.50E-07	0.00E+00	2.50E-05	A
Min	1.92E-08	2.22E-08	2.17E-08	2.13E-08	2.04E-08	1.84E-08	1.92E-08	1.98E-08	0.00E+00	2.50E-05	A
Avg	1.96E-08	2.35E-08	2.41E-08	2.65E-08	3.56E-08	6.19E-08	1.31E-07	3.13E-07	0.00E+00	2.50E-05	A
Max	1.99E-08	2.45E-08	2.61E-08	3.13E-08	4.92E-08	1.04E-07	2.73E-07	7.07E-07	0.00E+00	2.50E-05	A
T#10	IO [leak] (channel #2)										
Condition:	PIN 5 = +5V PIN 4 = +0.8V PIN 6 = +0V PINS 1 TO 2 = 80V								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	1.95E-08	2.18E-08	2.09E-08	2.04E-08	1.98E-08	1.81E-08	1.87E-08	1.91E-08	0.00E+00	2.50E-05	A
CNTRL2	1.88E-08	2.21E-08	2.15E-08	2.10E-08	2.04E-08	1.82E-08	1.87E-08	1.96E-08	0.00E+00	2.50E-05	A
21	1.94E-08	2.40E-08	2.58E-08	3.05E-08	4.70E-08	9.02E-08	1.90E-07	4.55E-07	0.00E+00	2.50E-05	A
40	1.91E-08	2.33E-08	2.50E-08	2.89E-08	4.50E-08	9.57E-08	2.42E-07	5.85E-07	0.00E+00	2.50E-05	A
51	1.95E-08	2.38E-08	2.54E-08	2.96E-08	4.64E-08	9.12E-08	2.20E-07	5.77E-07	0.00E+00	2.50E-05	A
Min	1.88E-08	2.18E-08	2.09E-08	2.04E-08	1.98E-08	1.81E-08	1.87E-08	1.91E-08	0.00E+00	2.50E-05	A
Avg	1.93E-08	2.30E-08	2.37E-08	2.61E-08	3.57E-08	6.27E-08	1.38E-07	3.31E-07	0.00E+00	2.50E-05	A
Max	1.95E-08	2.40E-08	2.58E-08	3.05E-08	4.70E-08	9.57E-08	2.42E-07	5.85E-07	0.00E+00	2.50E-05	A
T#11	Rdson (channel #1)										
Condition:	PIN 5 = +5V PIN 4 = +4.5V PIN 6 = +0V PINS 1 TO 2 = 10A								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	7.10E-02	6.87E-02	6.85E-02	6.94E-02	6.90E-02	6.88E-02	6.90E-02	6.96E-02	0.00E+00	1.45E-01	ohms
CNTRL2	6.78E-02	6.80E-02	6.88E-02	6.85E-02	6.88E-02	6.86E-02	6.83E-02	6.88E-02	0.00E+00	1.45E-01	ohms
21	6.89E-02	6.84E-02	6.90E-02	6.95E-02	7.01E-02	7.22E-02	7.31E-02	7.47E-02	0.00E+00	1.45E-01	ohms
40	6.76E-02	6.87E-02	6.95E-02	7.03E-02	6.98E-02	7.25E-02	7.29E-02	7.37E-02	0.00E+00	1.45E-01	ohms
51	6.90E-02	7.08E-02	7.04E-02	7.11E-02	7.12E-02	7.31E-02	7.34E-02	7.46E-02	0.00E+00	1.45E-01	ohms
Min	6.76E-02	6.80E-02	6.85E-02	6.85E-02	6.88E-02	6.86E-02	6.83E-02	6.88E-02	0.00E+00	1.45E-01	ohms
Avg	6.89E-02	6.89E-02	6.92E-02	6.98E-02	6.98E-02	7.10E-02	7.13E-02	7.23E-02	0.00E+00	1.45E-01	ohms
Max	7.10E-02	7.08E-02	7.04E-02	7.11E-02	7.12E-02	7.31E-02	7.34E-02	7.47E-02	0.00E+00	1.45E-01	ohms
T#12	Rdson (channel #2)										
Condition:	PIN 5 = +5V PIN 4 = +4.5V PIN 6 = +0V PINS 8 TO 7 = 10A								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	6.90E-02	6.79E-02	6.81E-02	6.81E-02	6.80E-02	6.81E-02	6.89E-02	6.90E-02	0.00E+00	1.45E-01	ohms
CNTRL2	7.02E-02	7.02E-02	7.04E-02	7.06E-02	7.05E-02	7.03E-02	7.07E-02	7.09E-02	0.00E+00	1.45E-01	ohms
21	6.88E-02	6.74E-02	6.88E-02	6.99E-02	6.90E-02	7.15E-02	7.24E-02	7.35E-02	0.00E+00	1.45E-01	ohms
40	6.97E-02	6.73E-02	6.82E-02	6.87E-02	6.93E-02	7.13E-02	7.20E-02	7.26E-02	0.00E+00	1.45E-01	ohms
51	6.86E-02	6.81E-02	6.86E-02	6.95E-02	7.01E-02	7.16E-02	7.18E-02	7.37E-02	0.00E+00	1.45E-01	ohms
Min	6.86E-02	6.73E-02	6.81E-02	6.81E-02	6.80E-02	6.81E-02	6.89E-02	6.90E-02	0.00E+00	1.45E-01	ohms
Avg	6.93E-02	6.82E-02	6.88E-02	6.94E-02	6.94E-02	7.06E-02	7.12E-02	7.19E-02	0.00E+00	1.45E-01	ohms
Max	7.02E-02	7.02E-02	7.04E-02	7.06E-02	7.05E-02	7.16E-02	7.24E-02	7.37E-02	0.00E+00	1.45E-01	ohms

Bias Condition A (bias-on)

T#13											
TON (channel #1)											
Condition:	PIN 5 = +5V PIN 4 = +4.5V PIN 6 = 0V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	7.40E-03	7.50E-03	7.50E-03	7.40E-03	7.30E-03	7.30E-03	7.30E-03	7.30E-03	1.00E-04	1.50E-02	Sec
CNTRL2	6.50E-03	6.50E-03	6.50E-03	6.50E-03	6.40E-03	6.40E-03	6.40E-03	6.40E-03	1.00E-04	1.50E-02	Sec
21	5.90E-03	6.10E-03	6.20E-03	6.30E-03	6.10E-03	6.60E-03	6.40E-03	6.50E-03	1.00E-04	1.50E-02	Sec
40	7.00E-03	7.10E-03	7.30E-03	7.40E-03	7.10E-03	7.70E-03	7.50E-03	7.50E-03	1.00E-04	1.50E-02	Sec
51	4.30E-03	4.40E-03	4.40E-03	4.50E-03	4.50E-03	4.70E-03	4.60E-03	4.70E-03	1.00E-04	1.50E-02	Sec
Min	4.30E-03	4.40E-03	4.40E-03	4.50E-03	4.50E-03	4.70E-03	4.60E-03	4.70E-03	1.00E-04	1.50E-02	Sec
Avg	6.22E-03	6.32E-03	6.38E-03	6.42E-03	6.28E-03	6.54E-03	6.44E-03	6.48E-03	1.00E-04	1.50E-02	Sec
Max	7.40E-03	7.50E-03	7.50E-03	7.40E-03	7.30E-03	7.70E-03	7.50E-03	7.50E-03	1.00E-04	1.50E-02	Sec
T#14											
TRISE (channel #1)											
Condition:	PIN 5 = +5V PIN 4 = +4.5V PIN 6 = 0V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	1.40E-03	1.40E-03	1.50E-03	1.40E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.00E-04	1.00E+00	Sec
CNTRL2	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.00E-04	1.00E+00	Sec
21	1.20E-03	1.20E-03	1.30E-03	1.40E-03	1.40E-03	1.50E-03	1.60E-03	1.70E-03	1.00E-04	1.00E+00	Sec
40	1.30E-03	1.30E-03	1.50E-03	1.50E-03	1.60E-03	1.80E-03	1.90E-03	2.00E-03	1.00E-04	1.00E+00	Sec
51	8.06E-04	8.77E-04	8.31E-04	9.12E-04	9.58E-04	1.10E-03	1.10E-03	1.10E-03	1.00E-04	1.00E+00	Sec
Min	8.06E-04	8.77E-04	8.31E-04	9.12E-04	9.58E-04	1.10E-03	1.10E-03	1.10E-03	1.00E-04	1.00E+00	Sec
Avg	1.18E-03	1.20E-03	1.27E-03	1.28E-03	1.29E-03	1.38E-03	1.42E-03	1.46E-03	1.00E-04	1.00E+00	Sec
Max	1.40E-03	1.40E-03	1.50E-03	1.50E-03	1.60E-03	1.80E-03	1.90E-03	2.00E-03	1.00E-04	1.00E+00	Sec
T#15											
TON (channel #2)											
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = +4.5V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.40E-03	4.50E-03	1.00E-04	1.50E-02	Sec
CNTRL2	5.60E-03	5.60E-03	5.60E-03	5.60E-03	5.50E-03	5.50E-03	5.50E-03	5.50E-03	1.00E-04	1.50E-02	Sec
21	5.10E-03	5.20E-03	5.30E-03	5.40E-03	5.30E-03	5.60E-03	5.50E-03	5.50E-03	1.00E-04	1.50E-02	Sec
40	6.00E-03	6.20E-03	6.40E-03	6.40E-03	6.10E-03	6.70E-03	6.50E-03	6.50E-03	1.00E-04	1.50E-02	Sec
51	6.90E-03	7.10E-03	7.20E-03	7.30E-03	7.00E-03	7.60E-03	7.40E-03	7.40E-03	1.00E-04	1.50E-02	Sec
Min	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.40E-03	4.50E-03	1.00E-04	1.50E-02	Sec
Avg	5.62E-03	5.72E-03	5.80E-03	5.84E-03	5.68E-03	5.98E-03	5.86E-03	5.88E-03	1.00E-04	1.50E-02	Sec
Max	6.90E-03	7.10E-03	7.20E-03	7.30E-03	7.00E-03	7.60E-03	7.40E-03	7.40E-03	1.00E-04	1.50E-02	Sec
T#16											
TRISE (channel #2)											
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = 4.5V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	8.84E-04	8.10E-04	8.68E-04	8.49E-04	8.25E-04	8.21E-04	8.09E-04	8.54E-04	1.00E-04	1.00E+00	Sec
CNTRL2	1.10E-03	1.00E-03	1.00E-03	1.10E-03	1.10E-03	1.00E-03	9.93E-04	1.00E-03	1.00E-04	1.00E+00	Sec
21	9.72E-04	1.00E-03	1.10E-03	1.10E-03	1.20E-03	1.30E-03	1.40E-03	1.40E-03	1.00E-04	1.00E+00	Sec
40	1.10E-03	1.20E-03	1.30E-03	1.40E-03	1.40E-03	1.60E-03	1.60E-03	1.80E-03	1.00E-04	1.00E+00	Sec
51	1.30E-03	1.40E-03	1.40E-03	1.60E-03	1.70E-03	1.80E-03	1.90E-03	2.00E-03	1.00E-04	1.00E+00	Sec
Min	8.84E-04	8.10E-04	8.68E-04	8.49E-04	8.25E-04	8.21E-04	8.09E-04	8.54E-04	1.00E-04	1.00E+00	Sec
Avg	1.07E-03	1.08E-03	1.13E-03	1.21E-03	1.24E-03	1.30E-03	1.34E-03	1.41E-03	1.00E-04	1.00E+00	Sec
Max	1.30E-03	1.40E-03	1.40E-03	1.60E-03	1.70E-03	1.80E-03	1.90E-03	2.00E-03	1.00E-04	1.00E+00	Sec

Bias Condition A (bias-on)

T#17											
TOFF (channel #1)											
Condition:	PIN 5 = +5V PIN 4 = 4.5V@ 50 mS PIN 6 = 0V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	2.77E-02	2.81E-02	2.80E-02	2.80E-02	2.80E-02	2.81E-02	2.79E-02	2.79E-02	1.00E-04	5.00E-02	Sec
CNTRL2	2.77E-02	2.75E-02	2.75E-02	2.75E-02	2.75E-02	2.75E-02	2.75E-02	2.73E-02	1.00E-04	5.00E-02	Sec
21	2.90E-02	2.54E-02	2.41E-02	2.33E-02	2.32E-02	2.06E-02	2.11E-02	2.06E-02	1.00E-04	5.00E-02	Sec
40	3.06E-02	2.64E-02	2.51E-02	2.44E-02	2.42E-02	2.19E-02	2.26E-02	2.26E-02	1.00E-04	5.00E-02	Sec
51	2.61E-02	2.39E-02	2.29E-02	2.21E-02	2.18E-02	2.01E-02	2.05E-02	2.03E-02	1.00E-04	5.00E-02	Sec
Min	2.61E-02	2.39E-02	2.29E-02	2.21E-02	2.18E-02	2.01E-02	2.05E-02	2.03E-02	1.00E-04	5.00E-02	Sec
Avg	2.82E-02	2.63E-02	2.55E-02	2.51E-02	2.49E-02	2.36E-02	2.39E-02	2.37E-02	1.00E-04	5.00E-02	Sec
Max	3.06E-02	2.81E-02	2.80E-02	2.80E-02	2.80E-02	2.81E-02	2.79E-02	2.79E-02	1.00E-04	5.00E-02	Sec
T#18											
TFALL (channel #1)											
Condition:	PIN 5 = +5V PIN 4 = 4.5V@ 50 mS PIN 6 = 0V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	5.60E-03	5.80E-03	5.70E-03	6.10E-03	5.60E-03	5.60E-03	6.00E-03	5.90E-03	1.00E-03	1.00E+00	Sec
CNTRL2	5.40E-03	5.40E-03	5.80E-03	5.50E-03	5.50E-03	5.70E-03	5.80E-03	6.00E-03	1.00E-03	1.00E+00	Sec
21	6.30E-03	6.10E-03	6.40E-03	7.10E-03	8.00E-03	8.10E-03	8.70E-03	8.80E-03	1.00E-03	1.00E+00	Sec
40	6.00E-03	6.30E-03	6.30E-03	6.50E-03	7.80E-03	8.20E-03	8.70E-03	8.90E-03	1.00E-03	1.00E+00	Sec
51	5.10E-03	5.10E-03	5.10E-03	5.40E-03	6.10E-03	6.10E-03	6.80E-03	7.20E-03	1.00E-03	1.00E+00	Sec
Min	5.10E-03	5.10E-03	5.10E-03	5.40E-03	5.50E-03	5.60E-03	5.80E-03	5.90E-03	1.00E-03	1.00E+00	Sec
Avg	5.68E-03	5.74E-03	5.86E-03	6.12E-03	6.60E-03	6.74E-03	7.20E-03	7.36E-03	1.00E-03	1.00E+00	Sec
Max	6.30E-03	6.30E-03	6.40E-03	7.10E-03	8.00E-03	8.20E-03	8.70E-03	8.90E-03	1.00E-03	1.00E+00	Sec
T#19											
TOFF (channel #2)											
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = 4.5V @ 50mS PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	2.74E-02	2.77E-02	2.75E-02	2.76E-02	2.75E-02	2.77E-02	2.75E-02	2.75E-02	2.26E-02	5.00E-02	Sec
CNTRL2	2.72E-02	2.71E-02	2.69E-02	2.69E-02	2.69E-02	2.70E-02	2.70E-02	2.68E-02	1.00E-04	5.00E-02	Sec
21	2.66E-02	2.38E-02	2.25E-02	2.18E-02	2.18E-02	1.97E-02	2.02E-02	1.98E-02	1.00E-04	5.00E-02	Sec
40	2.75E-02	2.38E-02	2.25E-02	2.18E-02	2.18E-02	1.96E-02	2.04E-02	2.01E-02	1.00E-04	5.00E-02	Sec
51	2.71E-02	2.47E-02	2.35E-02	2.28E-02	2.26E-02	2.03E-02	2.12E-02	2.09E-02	1.00E-04	5.00E-02	Sec
Min	2.66E-02	2.38E-02	2.25E-02	2.18E-02	2.18E-02	1.96E-02	2.02E-02	1.98E-02	1.00E-04	5.00E-02	Sec
Avg	2.72E-02	2.54E-02	2.46E-02	2.42E-02	2.41E-02	2.29E-02	2.33E-02	2.30E-02	1.00E-04	5.00E-02	Sec
Max	2.75E-02	2.77E-02	2.75E-02	2.76E-02	2.75E-02	2.77E-02	2.75E-02	2.75E-02	1.00E-04	5.00E-02	Sec
T#20											
TFALL (channel #2)											
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = 4.5V @ 50mS PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	1	25	50	150	300	500	750	1000	Min	Max	
CNTRL1	5.60E-03	5.20E-03	5.90E-03	5.80E-03	5.80E-03	5.50E-03	5.80E-03	5.80E-03	1.00E-03	1.00E+00	Sec
CNTRL2	5.00E-03	5.40E-03	5.70E-03	5.40E-03	5.60E-03	5.50E-03	5.20E-03	5.60E-03	1.00E-03	1.00E+00	Sec
21	5.40E-03	5.80E-03	5.90E-03	6.30E-03	6.70E-03	7.10E-03	7.60E-03	7.90E-03	1.00E-03	1.00E+00	Sec
40	5.80E-03	5.90E-03	6.20E-03	6.60E-03	7.20E-03	7.20E-03	7.80E-03	8.20E-03	1.00E-03	1.00E+00	Sec
51	5.50E-03	5.80E-03	6.20E-03	6.60E-03	7.30E-03	7.20E-03	7.90E-03	8.30E-03	1.00E-03	1.00E+00	Sec
Min	5.00E-03	5.20E-03	5.70E-03	5.40E-03	5.60E-03	5.50E-03	5.20E-03	5.60E-03	1.00E-03	1.00E+00	Sec
Avg	5.46E-03	5.62E-03	5.98E-03	6.14E-03	6.52E-03	6.50E-03	6.86E-03	7.16E-03	1.00E-03	1.00E+00	Sec
Max	5.80E-03	5.90E-03	6.20E-03	6.60E-03	7.30E-03	7.20E-03	7.90E-03	8.30E-03	1.00E-03	1.00E+00	Sec

Bias Condition B (bias-off)

T#1	IQIN										
Condition:	PINS 4, 6 = +0V PIN 5 = +5V								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	2.78E-08	5.43E-08	2.20E-08	2.09E-08	2.23E-08	2.26E-08	2.12E-08	2.53E-08	0	2.00E-05	A
CNTRL2	2.16E-08	2.66E-08	2.56E-08	2.25E-08	2.57E-08	2.11E-08	2.35E-08	2.50E-08	0	2.00E-05	A
23	2.92E-08	5.41E-08	6.10E-08	4.31E-08	6.55E-08	6.07E-08	9.01E-08	1.77E-07	0	2.00E-05	A
50	4.27E-08	5.51E-08	6.18E-08	4.66E-08	7.16E-08	7.89E-08	1.41E-07	2.08E-07	0	2.00E-05	A
52	1.72E-08	5.61E-08	6.51E-08	5.12E-08	7.23E-08	7.83E-08	1.27E-07	1.59E-07	0	2.00E-05	A
Min	1.72E-08	2.66E-08	2.20E-08	2.09E-08	2.23E-08	2.11E-08	2.12E-08	2.50E-08	0	2.00E-05	A
Avg	2.77E-08	4.92E-08	4.71E-08	3.69E-08	5.15E-08	5.23E-08	8.05E-08	1.19E-07	0	2.00E-05	A
Max	4.27E-08	5.61E-08	6.51E-08	5.12E-08	7.23E-08	7.89E-08	1.41E-07	2.08E-07	0	2.00E-05	A
T#2	IDIN										
Condition:	PIN 5 = +5V PINS 4, 6 = +5V								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.70E-02	2.50E-02	A
CNTRL2	1.96E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.70E-02	2.50E-02	A
23	1.96E-02	1.96E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.70E-02	2.50E-02	A
50	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.70E-02	2.50E-02	A
52	1.96E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.70E-02	2.50E-02	A
Min	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.95E-02	1.70E-02	2.50E-02	A
Avg	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.70E-02	2.50E-02	A
Max	1.96E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.97E-02	1.70E-02	2.50E-02	A
T#3	IHSS (channel #1)										
Condition:	PIN 5 = +5V PIN 4 = +5V PIN 6 = +0V								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	7.05E-10	6.42E-10	8.04E-10	7.64E-10	7.61E-10	6.46E-10	6.75E-10	6.90E-10	-1.00E-06	1.00E-06	A
CNTRL2	6.56E-10	7.53E-10	7.86E-10	7.73E-10	7.49E-10	6.58E-10	6.81E-10	7.02E-10	-1.00E-06	1.00E-06	A
23	6.77E-10	7.91E-10	7.93E-10	8.05E-10	6.55E-10	7.60E-10	8.07E-10	8.69E-10	-1.00E-06	1.00E-06	A
50	8.92E-10	9.98E-10	1.00E-09	1.00E-09	9.93E-10	9.88E-10	1.00E-09	1.10E-09	-1.00E-06	1.00E-06	A
52	8.19E-10	9.62E-10	9.32E-10	9.58E-10	9.43E-10	9.06E-10	9.57E-10	1.00E-09	-1.00E-06	1.00E-06	A
Min	6.56E-10	6.42E-10	7.86E-10	7.64E-10	6.55E-10	6.46E-10	6.75E-10	6.90E-10	-1.00E-06	1.00E-06	A
Avg	7.50E-10	8.29E-10	8.63E-10	8.60E-10	8.20E-10	7.91E-10	8.24E-10	8.72E-10	-1.00E-06	1.00E-06	A
Max	8.92E-10	9.98E-10	1.00E-09	1.00E-09	9.93E-10	9.88E-10	1.00E-09	1.10E-09	-1.00E-06	1.00E-06	A
T#4	IHSS (channel #2)										
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = +5V								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	9.33E-10	1.10E-09	1.10E-09	1.10E-09	1.10E-09	8.66E-10	9.00E-10	1.00E-09	-1.00E-06	1.00E-06	A
CNTRL2	9.14E-10	1.10E-09	1.00E-09	1.00E-09	9.86E-10	9.37E-10	9.57E-10	9.27E-10	-1.00E-06	1.00E-06	A
23	8.01E-10	9.29E-10	9.19E-10	9.72E-10	9.05E-10	8.61E-10	9.10E-10	9.78E-10	-1.00E-06	1.00E-06	A
50	8.25E-10	9.55E-10	9.44E-10	9.39E-10	9.42E-10	8.87E-10	9.36E-10	9.94E-10	-1.00E-06	1.00E-06	A
52	6.97E-10	8.28E-10	8.15E-10	8.20E-10	7.91E-10	7.88E-10	8.16E-10	8.78E-10	-1.00E-06	1.00E-06	A
Min	6.97E-10	8.28E-10	8.15E-10	8.20E-10	7.91E-10	7.88E-10	8.16E-10	8.78E-10	-1.00E-06	1.00E-06	A
Avg	8.34E-10	9.82E-10	9.55E-10	9.66E-10	9.45E-10	8.68E-10	9.04E-10	9.56E-10	-1.00E-06	1.00E-06	A
Max	9.33E-10	1.10E-09	1.10E-09	1.10E-09	1.10E-09	9.37E-10	9.57E-10	1.00E-09	-1.00E-06	1.00E-06	A

Bias Condition B (bias-off)

T#5 IINPEAK (channel #1)											
Condition:	PIN 5 = +5.25V PIN 4 = +5.25V PIN 6 = +0V								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	1.20E-09	1.10E-09	1.30E-09	1.30E-09	1.20E-09	1.10E-09	1.20E-09	1.20E-09	-1.00E-03	1.00E-03	A
CNTRL2	1.10E-09	1.20E-09	1.30E-09	1.20E-09	1.20E-09	1.10E-09	1.10E-09	1.20E-09	-1.00E-03	1.00E-03	A
23	1.10E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.40E-09	-1.00E-03	1.00E-03	A
50	1.50E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.70E-09	1.70E-09	-1.00E-03	1.00E-03	A
52	1.40E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.70E-09	-1.00E-03	1.00E-03	A
Min	1.10E-09	1.10E-09	1.30E-09	1.20E-09	1.20E-09	1.10E-09	1.10E-09	1.20E-09	-1.00E-03	1.00E-03	A
Avg	1.26E-09	1.36E-09	1.42E-09	1.40E-09	1.38E-09	1.34E-09	1.38E-09	1.44E-09	-1.00E-03	1.00E-03	A
Max	1.50E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.60E-09	1.70E-09	1.70E-09	-1.00E-03	1.00E-03	A
T#6 IINPEAK (channel #2)											
Condition:	PIN 5 = +5.25V PIN 4 = 0V PIN 6 = +5.25V								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	1.40E-09	1.50E-09	1.50E-09	1.50E-09	1.50E-09	1.40E-09	1.40E-09	1.50E-09	-1.00E-03	1.00E-03	A
CNTRL2	1.40E-09	1.50E-09	1.50E-09	1.50E-09	1.50E-09	1.40E-09	1.40E-09	1.40E-09	-1.00E-03	1.00E-03	A
23	1.20E-09	1.30E-09	1.30E-09	1.40E-09	1.30E-09	1.30E-09	1.40E-09	1.40E-09	-1.00E-03	1.00E-03	A
50	1.30E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.40E-09	1.50E-09	-1.00E-03	1.00E-03	A
52	9.70E-10	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.20E-09	-1.00E-03	1.00E-03	A
Min	9.70E-10	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.20E-09	-1.00E-03	1.00E-03	A
Avg	1.25E-09	1.36E-09	1.36E-09	1.38E-09	1.36E-09	1.32E-09	1.34E-09	1.40E-09	-1.00E-03	1.00E-03	A
Max	1.40E-09	1.50E-09	1.50E-09	1.50E-09	1.50E-09	1.40E-09	1.40E-09	1.50E-09	-1.00E-03	1.00E-03	A
T#7 IILSS (channel #1)											
Condition:	PIN 5 = +5V PIN 4 = +0.8V PIN 6 = +0V								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	-2.67E-10	-3.97E-10	-2.58E-10	-2.73E-10	-2.38E-10	-2.76E-10	-2.73E-10	-2.84E-10	-1.00E-06	1.00E-06	A
CNTRL2	-2.57E-10	-2.88E-10	-2.49E-10	-2.50E-10	-2.48E-10	-2.61E-10	-2.47E-10	-2.64E-10	-1.00E-06	1.00E-06	A
23	-2.53E-10	-2.82E-10	-2.79E-10	-2.75E-10	-2.71E-10	-2.73E-10	-2.72E-10	-2.46E-10	-1.00E-06	1.00E-06	A
50	-2.62E-10	-2.53E-10	-2.80E-10	-2.78E-10	-2.77E-10	-2.68E-10	-2.69E-10	-2.28E-10	-1.00E-06	1.00E-06	A
52	-2.62E-10	-2.86E-10	-2.93E-10	-2.82E-10	-2.80E-10	-2.74E-10	-2.72E-10	-2.48E-10	-1.00E-06	1.00E-06	A
Min	-2.67E-10	-3.97E-10	-2.93E-10	-2.82E-10	-2.80E-10	-2.76E-10	-2.73E-10	-2.84E-10	-1.00E-06	1.00E-06	A
Avg	-2.60E-10	-3.01E-10	-2.72E-10	-2.72E-10	-2.63E-10	-2.70E-10	-2.67E-10	-2.54E-10	-1.00E-06	1.00E-06	A
Max	-2.53E-10	-2.53E-10	-2.49E-10	-2.50E-10	-2.38E-10	-2.61E-10	-2.47E-10	-2.28E-10	-1.00E-06	1.00E-06	A
T#8 IILSS (channel #2)											
Condition:	PIN 5 = +5V PIN 4 = +0V PIN 6 = +0.8V								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	-2.07E-10	-2.58E-10	-1.89E-10	-2.14E-10	-2.00E-10	-2.30E-10	-2.35E-10	-2.22E-10	-1.00E-06	1.00E-06	A
CNTRL2	-2.28E-10	-2.56E-10	-2.41E-10	-2.43E-10	-2.35E-10	-2.31E-10	-2.31E-10	-2.53E-10	-1.00E-06	1.00E-06	A
23	-2.40E-10	-2.51E-10	-2.72E-10	-2.68E-10	-2.74E-10	-2.66E-10	-2.65E-10	-2.53E-10	-1.00E-06	1.00E-06	A
50	-2.40E-10	-2.64E-10	-2.71E-10	-2.62E-10	-2.59E-10	-2.56E-10	-2.60E-10	-2.44E-10	-1.00E-06	1.00E-06	A
52	-2.52E-10	-2.68E-10	-2.63E-10	-2.73E-10	-2.67E-10	-2.49E-10	-2.57E-10	-2.39E-10	-1.00E-06	1.00E-06	A
Min	-2.52E-10	-2.68E-10	-2.72E-10	-2.73E-10	-2.74E-10	-2.66E-10	-2.65E-10	-2.53E-10	-1.00E-06	1.00E-06	A
Avg	-2.33E-10	-2.59E-10	-2.47E-10	-2.52E-10	-2.47E-10	-2.46E-10	-2.50E-10	-2.42E-10	-1.00E-06	1.00E-06	A
Max	-2.07E-10	-2.51E-10	-1.89E-10	-2.14E-10	-2.00E-10	-2.30E-10	-2.31E-10	-2.22E-10	-1.00E-06	1.00E-06	A

Bias Condition B (bias-off)

T#9	IO [leak] (channel #1)										U / M
Condition:	PIN 5 = +5V PIN 4 = +0.8V PIN 6 = +0V PINS 1 TO 2 = 100V								Limits		
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	1.99E-08	2.29E-08	2.18E-08	2.13E-08	2.07E-08	1.85E-08	1.92E-08	1.98E-08	0.00E+00	2.50E-05	A
CNTRL2	1.92E-08	2.22E-08	2.17E-08	2.13E-08	2.04E-08	1.84E-08	1.92E-08	1.98E-08	0.00E+00	2.50E-05	A
23	1.93E-08	2.37E-08	2.46E-08	2.76E-08	3.60E-08	5.25E-08	8.42E-08	1.45E-07	0.00E+00	2.50E-05	A
50	1.93E-08	2.38E-08	2.51E-08	2.84E-08	3.74E-08	5.61E-08	9.63E-08	1.54E-07	0.00E+00	2.50E-05	A
52	1.94E-08	2.37E-08	2.46E-08	2.74E-08	3.47E-08	4.74E-08	7.64E-08	1.21E-07	0.00E+00	2.50E-05	A
Min	1.92E-08	2.22E-08	2.17E-08	2.13E-08	2.04E-08	1.84E-08	1.92E-08	1.98E-08	0.00E+00	2.50E-05	A
Avg	1.94E-08	2.33E-08	2.36E-08	2.52E-08	2.98E-08	3.86E-08	5.91E-08	9.19E-08	0.00E+00	2.50E-05	A
Max	1.99E-08	2.38E-08	2.51E-08	2.84E-08	3.74E-08	5.61E-08	9.63E-08	1.54E-07	0.00E+00	2.50E-05	A
T#10	IO [leak] (channel #2)										U / M
Condition:	PIN 5 = +5V PIN 4 = +0.8V PIN 6 = +0V PINS 1 TO 2 = 80V								Limits		
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	1.95E-08	2.18E-08	2.09E-08	2.04E-08	1.98E-08	1.81E-08	1.87E-08	1.91E-08	0.00E+00	2.50E-05	A
CNTRL2	1.88E-08	2.21E-08	2.15E-08	2.10E-08	2.04E-08	1.82E-08	1.87E-08	1.96E-08	0.00E+00	2.50E-05	A
23	1.88E-08	2.31E-08	2.41E-08	2.68E-08	3.48E-08	4.94E-08	7.57E-08	1.21E-07	0.00E+00	2.50E-05	A
50	1.90E-08	2.35E-08	2.49E-08	2.80E-08	3.59E-08	5.19E-08	8.71E-08	1.38E-07	0.00E+00	2.50E-05	A
52	1.90E-08	2.34E-08	2.42E-08	2.72E-08	3.41E-08	4.71E-08	8.12E-08	1.32E-07	0.00E+00	2.50E-05	A
Min	1.88E-08	2.18E-08	2.09E-08	2.04E-08	1.98E-08	1.81E-08	1.87E-08	1.91E-08	0.00E+00	2.50E-05	A
Avg	1.90E-08	2.28E-08	2.31E-08	2.47E-08	2.90E-08	3.69E-08	5.63E-08	8.59E-08	0.00E+00	2.50E-05	A
Max	1.95E-08	2.35E-08	2.49E-08	2.80E-08	3.59E-08	5.19E-08	8.71E-08	1.38E-07	0.00E+00	2.50E-05	A
T#11	Rdson (channel #1)										U / M
Condition:	PIN 5 = +5V PIN 4 = +4.5V PIN 6 = +0V PINS 1 TO 2 = 10A								Limits		
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	7.10E-02	6.87E-02	6.85E-02	6.94E-02	6.90E-02	6.88E-02	6.90E-02	6.96E-02	0.00E+00	1.45E-01	ohms
CNTRL2	6.78E-02	6.80E-02	6.88E-02	6.85E-02	6.88E-02	6.86E-02	6.83E-02	6.88E-02	0.00E+00	1.45E-01	ohms
23	6.87E-02	6.94E-02	7.03E-02	7.05E-02	7.17E-02	7.22E-02	7.33E-02	7.46E-02	0.00E+00	1.45E-01	ohms
50	6.73E-02	6.88E-02	6.89E-02	6.96E-02	7.05E-02	7.23E-02	7.31E-02	7.42E-02	0.00E+00	1.45E-01	ohms
52	6.79E-02	6.90E-02	6.94E-02	6.98E-02	7.07E-02	7.21E-02	7.30E-02	7.43E-02	0.00E+00	1.45E-01	ohms
Min	6.73E-02	6.80E-02	6.85E-02	6.85E-02	6.88E-02	6.86E-02	6.83E-02	6.88E-02	0.00E+00	1.45E-01	ohms
Avg	6.85E-02	6.88E-02	6.92E-02	6.96E-02	7.01E-02	7.08E-02	7.13E-02	7.23E-02	0.00E+00	1.45E-01	ohms
Max	7.10E-02	6.94E-02	7.03E-02	7.05E-02	7.17E-02	7.23E-02	7.33E-02	7.46E-02	0.00E+00	1.45E-01	ohms
T#12	Rdson (channel #2)										U / M
Condition:	PIN 5 = +5V PIN 4 = +4.5V PIN 6 = +0V PINS 8 TO 7 = 10A								Limits		
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	6.90E-02	6.79E-02	6.81E-02	6.81E-02	6.80E-02	6.81E-02	6.89E-02	6.90E-02	0.00E+00	1.45E-01	ohms
CNTRL2	7.66E-02	7.02E-02	7.04E-02	7.06E-02	7.05E-02	7.03E-02	7.07E-02	7.09E-02	0.00E+00	1.45E-01	ohms
23	6.72E-02	6.80E-02	6.83E-02	6.87E-02	6.96E-02	7.07E-02	7.16E-02	7.25E-02	0.00E+00	1.45E-01	ohms
50	7.00E-02	7.11E-02	7.10E-02	7.19E-02	7.30E-02	7.47E-02	7.57E-02	7.71E-02	0.00E+00	1.45E-01	ohms
52	6.86E-02	6.98E-02	7.02E-02	7.12E-02	7.18E-02	7.31E-02	7.43E-02	7.53E-02	0.00E+00	1.45E-01	ohms
Min	6.72E-02	6.79E-02	6.81E-02	6.81E-02	6.80E-02	6.81E-02	6.89E-02	6.90E-02	0.00E+00	1.45E-01	ohms
Avg	7.03E-02	6.94E-02	6.96E-02	7.01E-02	7.06E-02	7.14E-02	7.22E-02	7.30E-02	0.00E+00	1.45E-01	ohms
Max	7.66E-02	7.11E-02	7.10E-02	7.19E-02	7.30E-02	7.47E-02	7.57E-02	7.71E-02	0.00E+00	1.45E-01	ohms

Bias Condition B (bias-off)

T#13	TON (channel #1)										
Condition:	PIN 5 = +5V PIN 4 = +4.5V PIN 6 = 0V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	7.40E-03	7.50E-03	7.50E-03	7.40E-03	7.30E-03	7.30E-03	7.30E-03	7.30E-03	1.00E-04	1.50E-02	Sec
CNTRL2	6.50E-03	6.50E-03	6.50E-03	6.50E-03	6.40E-03	6.40E-03	6.40E-03	6.40E-03	1.00E-04	1.50E-02	Sec
23	8.30E-03	8.20E-03	8.20E-03	8.40E-03	8.30E-03	8.60E-03	8.80E-03	9.20E-03	1.00E-04	1.50E-02	Sec
50	6.40E-03	6.40E-03	6.50E-03	6.60E-03	6.60E-03	6.90E-03	7.00E-03	7.10E-03	1.00E-04	1.50E-02	Sec
52	8.20E-03	8.20E-03	8.30E-03	8.40E-03	8.40E-03	8.60E-03	8.80E-03	9.00E-03	1.00E-04	1.50E-02	Sec
Min	6.40E-03	6.40E-03	6.50E-03	6.50E-03	6.40E-03	6.40E-03	6.40E-03	6.40E-03	1.00E-04	1.50E-02	Sec
Avg	7.36E-03	7.36E-03	7.40E-03	7.46E-03	7.40E-03	7.56E-03	7.66E-03	7.80E-03	1.00E-04	1.50E-02	Sec
Max	8.30E-03	8.20E-03	8.30E-03	8.40E-03	8.40E-03	8.60E-03	8.80E-03	9.20E-03	1.00E-04	1.50E-02	Sec
T#14	TRISE (channel #1)										
Condition:	PIN 5 = +5V PIN 4 = +4.5V PIN 6 = 0V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	1.40E-03	1.40E-03	1.50E-03	1.40E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.00E-04	1.00E+00	Sec
CNTRL2	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.00E-04	1.00E+00	Sec
23	1.60E-03	1.70E-03	1.80E-03	1.80E-03	1.80E-03	2.10E-03	2.30E-03	2.50E-03	1.00E-04	1.00E+00	Sec
50	1.30E-03	1.30E-03	1.30E-03	1.40E-03	1.40E-03	1.70E-03	1.80E-03	1.90E-03	1.00E-04	1.00E+00	Sec
52	1.50E-03	1.70E-03	1.80E-03	1.80E-03	2.00E-03	2.00E-03	2.30E-03	2.30E-03	1.00E-04	1.00E+00	Sec
Min	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.20E-03	1.00E-04	1.00E+00	Sec
Avg	1.40E-03	1.46E-03	1.52E-03	1.52E-03	1.54E-03	1.66E-03	1.78E-03	1.84E-03	1.00E-04	1.00E+00	Sec
Max	1.60E-03	1.70E-03	1.80E-03	1.80E-03	2.00E-03	2.10E-03	2.30E-03	2.50E-03	1.00E-04	1.00E+00	Sec
T#15	TON (channel #2)										
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = +4.5V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.40E-03	4.50E-03	1.00E-04	1.50E-02	Sec
CNTRL2	5.60E-03	5.60E-03	5.60E-03	5.60E-03	5.50E-03	5.50E-03	5.50E-03	5.50E-03	1.00E-04	1.50E-02	Sec
23	6.60E-03	6.50E-03	6.50E-03	6.60E-03	6.70E-03	6.90E-03	6.90E-03	7.20E-03	1.00E-04	1.50E-02	Sec
50	6.40E-03	6.40E-03	6.50E-03	6.60E-03	6.50E-03	6.80E-03	7.00E-03	7.10E-03	1.00E-04	1.50E-02	Sec
52	7.00E-03	6.80E-03	6.90E-03	6.90E-03	7.00E-03	7.30E-03	7.50E-03	7.60E-03	1.00E-04	1.50E-02	Sec
Min	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.50E-03	4.40E-03	4.50E-03	1.00E-04	1.50E-02	Sec
Avg	6.02E-03	5.96E-03	6.00E-03	6.04E-03	6.04E-03	6.20E-03	6.26E-03	6.38E-03	1.00E-04	1.50E-02	Sec
Max	7.00E-03	6.80E-03	6.90E-03	6.90E-03	7.00E-03	7.30E-03	7.50E-03	7.60E-03	1.00E-04	1.50E-02	Sec
T#16	TRISE (channel #2)										
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = 4.5V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	8.84E-04	8.10E-04	8.68E-04	8.49E-04	8.25E-04	8.21E-04	8.09E-04	8.54E-04	1.00E-04	1.00E+00	Sec
CNTRL2	1.10E-03	1.00E-03	1.00E-03	1.10E-03	1.10E-03	1.00E-03	9.93E-04	1.00E-03	1.00E-04	1.00E+00	Sec
23	1.20E-03	1.30E-03	1.30E-03	1.40E-03	1.50E-03	1.70E-03	1.70E-03	1.80E-03	1.00E-04	1.00E+00	Sec
50	1.20E-03	1.20E-03	1.30E-03	1.30E-03	1.40E-03	1.70E-03	1.80E-03	1.90E-03	1.00E-04	1.00E+00	Sec
52	1.30E-03	1.40E-03	1.50E-03	1.40E-03	1.60E-03	1.90E-03	2.00E-03	2.00E-03	1.00E-04	1.00E+00	Sec
Min	8.84E-04	8.10E-04	8.68E-04	8.49E-04	8.25E-04	8.21E-04	8.09E-04	8.54E-04	1.00E-04	1.00E+00	Sec
Avg	1.14E-03	1.14E-03	1.19E-03	1.21E-03	1.28E-03	1.42E-03	1.46E-03	1.51E-03	1.00E-04	1.00E+00	Sec
Max	1.30E-03	1.40E-03	1.50E-03	1.40E-03	1.60E-03	1.90E-03	2.00E-03	2.00E-03	1.00E-04	1.00E+00	Sec

Bias Condition B (bias-off)

TOFF (channel #1)											
Condition:	PIN 5 = +5V PIN 4 = 4.5V@ 50 mS PIN 6 = 0V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	2.77E-02	2.81E-02	2.80E-02	2.80E-02	2.80E-02	2.81E-02	2.79E-02	2.79E-02	1.00E-04	5.00E-02	Sec
CNTRL2	2.77E-02	2.75E-02	2.75E-02	2.75E-02	2.75E-02	2.75E-02	2.75E-02	2.73E-02	1.00E-04	5.00E-02	Sec
23	2.83E-02	2.64E-02	2.55E-02	2.46E-02	2.31E-02	2.21E-02	2.16E-02	2.10E-02	1.00E-04	5.00E-02	Sec
50	2.96E-02	2.68E-02	2.54E-02	2.48E-02	2.32E-02	2.20E-02	2.13E-02	2.07E-02	1.00E-04	5.00E-02	Sec
52	2.67E-02	2.50E-02	2.40E-02	2.31E-02	2.20E-02	2.10E-02	2.04E-02	1.99E-02	1.00E-04	5.00E-02	Sec
Min	2.67E-02	2.50E-02	2.40E-02	2.31E-02	2.20E-02	2.10E-02	2.04E-02	1.99E-02	1.00E-04	5.00E-02	Sec
Avg	2.80E-02	2.68E-02	2.61E-02	2.56E-02	2.48E-02	2.41E-02	2.37E-02	2.34E-02	1.00E-04	5.00E-02	Sec
Max	2.96E-02	2.81E-02	2.80E-02	2.80E-02	2.80E-02	2.81E-02	2.79E-02	2.79E-02	1.00E-04	5.00E-02	Sec
TFALL (channel #1)											
Condition:	PIN 5 = +5V PIN 4 = 4.5V@ 50 mS PIN 6 = 0V PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	5.60E-03	5.80E-03	5.70E-03	6.10E-03	5.60E-03	5.60E-03	6.00E-03	5.90E-03	1.00E-03	1.00E+00	Sec
CNTRL2	5.40E-03	5.40E-03	5.80E-03	5.50E-03	5.50E-03	5.70E-03	5.80E-03	6.00E-03	1.00E-03	1.00E+00	Sec
23	5.70E-03	6.00E-03	6.20E-03	6.80E-03	7.40E-03	7.70E-03	7.80E-03	8.00E-03	1.00E-03	1.00E+00	Sec
50	6.00E-03	5.90E-03	6.70E-03	6.90E-03	7.70E-03	8.10E-03	8.50E-03	8.40E-03	1.00E-03	1.00E+00	Sec
52	5.50E-03	5.90E-03	6.00E-03	6.30E-03	6.60E-03	7.20E-03	7.50E-03	7.40E-03	1.00E-03	1.00E+00	Sec
Min	5.40E-03	5.40E-03	5.70E-03	5.50E-03	5.50E-03	5.60E-03	5.80E-03	5.90E-03	1.00E-03	1.00E+00	Sec
Avg	5.64E-03	5.80E-03	6.08E-03	6.32E-03	6.56E-03	6.86E-03	7.12E-03	7.14E-03	1.00E-03	1.00E+00	Sec
Max	6.00E-03	6.00E-03	6.70E-03	6.90E-03	7.70E-03	8.10E-03	8.50E-03	8.40E-03	1.00E-03	1.00E+00	Sec
TOFF (channel #2)											
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = 4.5V @ 50mS PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	2.74E-02	2.77E-02	2.75E-02	2.76E-02	2.75E-02	2.77E-02	2.75E-02	2.75E-02	2.26E-02	5.00E-02	Sec
CNTRL2	2.72E-02	2.71E-02	2.69E-02	2.69E-02	2.69E-02	2.70E-02	2.70E-02	2.68E-02	1.00E-04	5.00E-02	Sec
23	2.80E-02	2.64E-02	2.54E-02	2.46E-02	2.33E-02	2.22E-02	2.17E-02	2.12E-02	1.00E-04	5.00E-02	Sec
50	2.79E-02	2.48E-02	2.37E-02	2.30E-02	2.19E-02	2.07E-02	2.01E-02	1.94E-02	1.00E-04	5.00E-02	Sec
52	2.67E-02	2.47E-02	2.39E-02	2.30E-02	2.21E-02	2.12E-02	2.06E-02	2.00E-02	1.00E-04	5.00E-02	Sec
Min	2.67E-02	2.47E-02	2.37E-02	2.30E-02	2.19E-02	2.07E-02	2.01E-02	1.94E-02	1.00E-04	5.00E-02	Sec
Avg	2.74E-02	2.61E-02	2.55E-02	2.50E-02	2.43E-02	2.38E-02	2.34E-02	2.30E-02	1.00E-04	5.00E-02	Sec
Max	2.80E-02	2.77E-02	2.75E-02	2.76E-02	2.75E-02	2.77E-02	2.75E-02	2.75E-02	1.00E-04	5.00E-02	Sec
TFALL (channel #2)											
Condition:	PIN 5 = +5V PIN 4 = 0V PIN 6 = 4.5V @ 50mS PINS 1 TO 2 = 30V RCL = 70HMS, 100uF								Limits		U / M
Serial #	0K	25K	50K	150K	300K	500K	750K	1000K	Min	Max	
CNTRL1	5.60E-03	5.20E-03	5.90E-03	5.80E-03	5.80E-03	5.50E-03	5.80E-03	5.80E-03	1.00E-03	1.00E+00	Sec
CNTRL2	5.00E-03	5.40E-03	5.70E-03	5.40E-03	5.60E-03	5.50E-03	5.20E-03	5.60E-03	1.00E-03	1.00E+00	Sec
23	5.70E-03	6.40E-03	6.70E-03	6.50E-03	7.20E-03	7.80E-03	7.90E-03	8.30E-03	1.00E-03	1.00E+00	Sec
50	5.50E-03	6.10E-03	6.10E-03	6.20E-03	7.00E-03	7.40E-03	7.70E-03	7.80E-03	1.00E-03	1.00E+00	Sec
52	5.40E-03	5.80E-03	6.00E-03	6.20E-03	6.70E-03	7.10E-03	7.30E-03	7.30E-03	1.00E-03	1.00E+00	Sec
Min	5.00E-03	5.20E-03	5.70E-03	5.40E-03	5.60E-03	5.50E-03	5.20E-03	5.60E-03	1.00E-03	1.00E+00	Sec
Avg	5.44E-03	5.78E-03	6.08E-03	6.02E-03	6.46E-03	6.66E-03	6.78E-03	6.96E-03	1.00E-03	1.00E+00	Sec
Max	5.70E-03	6.40E-03	6.70E-03	6.50E-03	7.20E-03	7.80E-03	7.90E-03	8.30E-03	1.00E-03	1.00E+00	Sec

Appendix B

Test Plan

Test Plan

1.0 Purpose

The purpose of this test is to characterize and qualify this device for TID effects for International Rectifier's hybrid SSR devices. The data resulting from the tests may be used as qualification for Standard Military Drawings (SMD) and shall be incorporated in the IR data sheets.

2.0 Test Responsibility

International Rectifier shall be responsible for conducting the tests, which shall be performed at the University of Massachusetts Research Reactor facility. International Rectifier shall be responsible for the final Test Report.

3.0 Test Facility

3.1 Nuclear Reactor

The University of Massachusetts Research Reactor shall be used to provide the source for Gamma radiation. UMRR will also provide information on dose rate, total dose, irradiation test times and dosimetry for this evaluation..

3.2 Test Equipment

The necessary test equipment including interface board, cables, power supplies, measurement system, etc. shall be provided by International Rectifier.

3.3 Sample Size

Sample size shall be determined based on device type, characterization parameters. As a minimum, the sample size shall meet the requirements of Mil- PRF-38534. Sample size for this TID evaluation equals 8 devices (hybrids). Each device consists of 2 channels.

4 Test Devices

4.2 The RDHA710SE102QK devices are planned for TID characterization and evaluation.

4.2 All devices shall be built in their respective packages. Devices shall be properly sealed and packed in static-free containers.

4.3 All devices shall be verified for correct electrical performance (baseline) prior to arrival at UMRR.

5 Test Method

Mil- PRF-38534 shall be used to establish procedure for all testing described herein. See Appendix C Test Procedure.

6 Record Keeping

The Reactor facility shall provide dosimetry data for the CO⁶⁰. Each exposure run shall be cataloged with the appropriate lot# and group letter in order to maintain correlation to the appropriate data set. IR will be responsible for collecting and compiling the test data.

7 Test Report

The Test Report shall include the following information:

- a. Device type(s), serial numbers, wafer lot identification (per active component)
- b. Test dates
- c. Facility, source type
- d. Schematic of test circuit
- e. Insitu bias conditions
- f. Comments and observations
- g. Pre and Post Electrical data
- h. Summary descriptive including graphs (if applicable)

Appendix C

Test Procedure

Test Procedure

1.0 Preliminary Setup

- 1.01 Perform baseline testing on each device prior irradiation. Remove any device that fails pre-rad test limits and replace with known good unit.
- 1.02 Divide the 8 selected units into 3 groups. Two groups will contain 3 devices each. One group will contain two devices to be used for controls and will not be exposed to radiation.
- 1.03 Prepare devices for transportation to the Radiation facility. Devices must be stored in a static free container. Device pins must be shorted.

2.0 Test Equipment

- 2.01 Keithley model 2410 (2ea)
- 2.02 Test Board TF-xx (1ea)
- 2.03 15ft power supply cable
- 2.04 LABVIEW ATE

3.0 Radiation Setup (Umass – Radiation Facility)

- 3.01 Prepare the QF299 form with the appropriate information re: Part Type, Description, Part No, etc.
- 3.02 Select two devices for controls. Record their serial numbers on the QF299 form as control units.
- 3.03 Record on the QF299 form the serial numbers that are designated for “biased on” socket on the test board TF-xx-xx. Add the remaining devices in the designated “biased off” socket.

- 3.04 Move the test board TF-xx into the Gama room and insert into the irradiation fixture.
- 3.05 In the test room connect the two Keithley 2400 sources to the appropriate connectors on the Power Supply rack. One for Voltage Input source and one for Voltage Output source.
- 3.06 Adjust the Voltage Input Keithley for “constant current” mode. Set the voltage level to 5.0 volts and the current to 20ma.
- 3.07 Adjust the Voltage Output Keithley for “constant voltage” mode. Set the voltage level to 80 volts.
- 3.08 Enable the outputs of each Keithley.
- 3.09 Measure the Voltage Input and the Voltage Output on each socket on the test board TF-xx.

Note: If voltage is out of tolerance, correct the problem and retest.

- 3.10 Secure the Gama room and notify reactor personnel to place the colbat60 on the rack and set the exposure time to the pre-determined level.

Note: Record the time the cobalt 60 is in place on the QF299 form.
- 3.11 When the exposure run is complete, record the time on the QF299 form.
- 3.12 Disable the outputs of each Keithley.
- 3.13 Remove the test board TF-xx-xx from the Gama room to the test room where the DUTs’ will be tested using a Labview ATE. Repeat procedures 3.04 to 3.13 until TID exposure steps are completed.
- 3.14 Radiation exposure is complete.

4.0 Return to IR facility

4.01 After TID is completed, all devices will be transported back to IR Leominster for storage.

4.02 Place devices in a static free container. Device pins must be shorted.

Note: Maintain the devices at an ambient of 25C or less.

Appendix D

Bias Conditions

Condition A

For the biased “on” state, 10ma @ 5Vdc is sourced to each individual channel input. There are 2 Solid-state relays in each package, therefore a total of 20mAmps is sourced per each hybrid. All outputs have the Drain to source shorted together without current flow. The diode drop from each optocoupler is measured, monitored, and recorded.

Condition B

For the biased “off” state, all inputs are shorted together for 0 potential. The outputs of each device have 80 volts applied it. The leakage currents on the outputs are monitored while the devices are exposed to radiation.

BIAS A

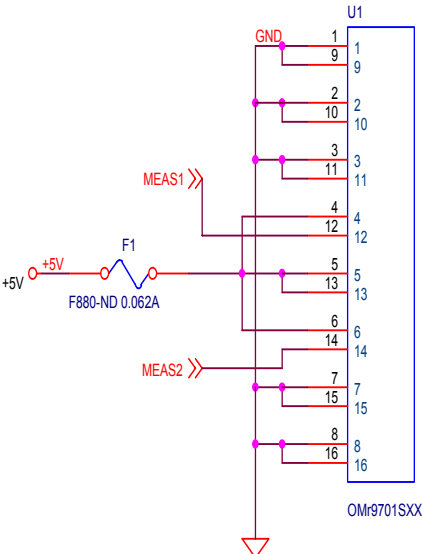


Figure 5

BIAS B

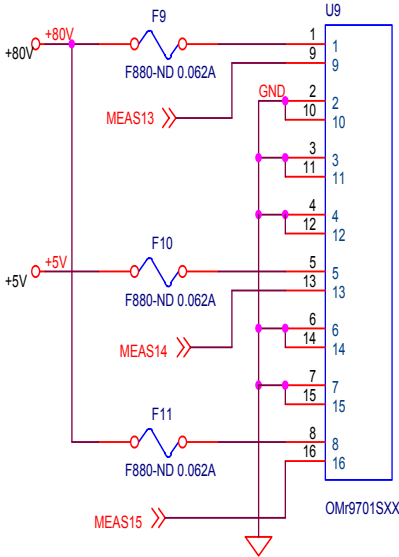


Figure 6

TID Burn-In Circuit for RDHA710SE10A2QK (Ch1 – Ch2)

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DUT Board

