UC1843B-SP Neutron Displacement Damage (NDD) Characterization

ABSTRACT

This report presents the effect of neutron displacement damage (NDD) on the UC1843B-SP device. The results show that devices remained within datasheet specifications up to 1 × 10^{12} n/cm^2. At 5 × 10^{12} and 1 × 10^{13} n/cm^2 some specifications went outside the range specified in the datasheet.

A sample size of nine units was exposed to radiation testing per (MIL-STD-883, Method 1017 for Neutron Irradiation) and an additional unirradiated sample device was used for correlation. All devices used in the experiment were from lot date code 1828B. Electrical testing was performed at Texas Instruments before and after neutron irradiation using the production test program for UC1843B-SP.

Contents

1 Overview 2
2 Test Procedures 3
3 Facility 3
4 Results 3
Appendix A Test Results 6

List of Figures

1 UC1843B-SP Device 2

List of Tables

1 Overview Information 2
2 Neutron Irradiation Conditions 3
3 UC1843B-SP Spec Table 4

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1 Overview

The UC1843B-SP is a current mode PWM controller. Start-up current is specified to be less than 0.5 mA and oscillator discharge is trimmed to 8.3 mA. During UVLO, the output stage can sink at least 10 mA at less than 1.2 V for VCC over 5 V. The devices are offered in an ultra small, thermally enhanced 10-pin ceramic flatpack package.

General device information and testing conditions are listed in Table 1.

Table 1. Overview Information

TI Part Number	UC1843B-SP
Device Function	Current Mode PWM Controller
Die Name	SMEXARC1843VLS
Technology	JI1
A/T Lot Number / Date Code	1828B
Unbiased Quantity Tested	9
Exposure Facility	VPT Rad
Neutron Fluence (1-MeV equivalent)	1.0×10^{12}, 5.0×10^{12}, 1.0×10^{13} n/cm^2
Irradiation Temperature	25°C
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Figure 1. UC1843B-SP Device

2 Test Procedures

The UC1843B-SP was electrically pre-tested using the production automated test equipment program.

General test procedures were IAW MIL-STD-883, Method 1017 for Neutron Irradiation of UC1843B-SP.

Table 2. Neutron Irradiation Conditions

Group	Sample Qty	Neutron Fluence (n/cm^2)	Bias
A	3	1.0×10^{12}	Unbiased
B	3	5.0×10^{12}	Unbiased
C	3	1.0×10^{13}	Unbiased

3 Facility

Devices were exposed via fast neutron irradiation (FNI) at the University of Massachusetts's Lowell Research Reactor (UMLRR). The facility is designed to give a fast flux level ≥ 1011 n/cm^2–s, with relatively low thermal fluence and gamma dose rates. Samples with a cross-sectional area as large as 30 cm (12 in) × 30 cm (12 in) and up to 15-cm (6-in) thick can be irradiated. The fast neutron flux is designed to be nearly uniform over the 30-cm (12-in) × 30-cm (12-in) area facing the core, and the fast fluence variation through the sample thickness is minimized via a single 180° rotation of the sample canister at the midpoint of the irradiation period. The FNI facility offers a significantly larger sample volume than previously available within the University of Massachusetts Lowell Research Reactor (UMLRR).

The fluences are calculated based on 1-MeV equivalences.

Detailed information of the radiation facility is available at the following link:

www.uml.edu/docs/FNI%20Brochure_tcm18-90375.pdf

4 Results

At 5.0×10^{12} and 1.0×10^{13} n/cm^2, some parametric measurements failed to remain within the range specified in the datasheet. All parametric measurements remained well within the UC1843B-SP Class V, radiation hardened current-mode PWM controller limits for 1.0×10^{12} n/cm^2 levels. The devices were no longer functional after exposure to 5.0×10^{12} and 1.0×10^{13} n/cm^2 level when tested in the ATE. The full parameter list and graphs are found in Appendix A.

Table 3 lists the UC1843B-SP specification compliance matrix.

Table 3. UC1843B-SP Spec Table

PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT	TEST NUMBER
REFERENCE						
Output voltage	TJ = 25°C, IO = 1 mA	4.85	5	5.1	V	1010.1, 1010.2
Line regulation	VIN = 12 to 25 V		6	20	mV	1010.3
Load regulation	IO = 1 to 20 mA		6	25	mV	1010.4
Output noise voltage	10 Hz ≤ ƒ ≤ 10 kHz, TJ = 25°C		50		uV	1010.7
Short-circuit output current		-30	-100	-180	mA	1010.6
OSCILLATOR						
Initial accuracy	TJ = 25°C(4)	47	52	57	kHz	1015.1, 1015.2
Voltage stability	VCC = 12 to 25 V		0.2%	1%		1015.3
Discharge current	V pin 4 = 2 V(5), TJ = 25°C	7.8	8.3	8.8	mA	1015.7
Discharge current	V pin 4 = 2 V(5), TJ = Full range	7.5		8.8		1015.7
ERROR AMPLIFIER						
Input voltage	VComp = 2.5 V	2.45	2.50	2.55	V	1020.1
Input bias current			-0.3	-1	uA	1020.6, 1020.7, 1020.8
Open-loop voltage gain	VO = 2 to 4 V	65	90		dB	1020.9
PSRR	VCC = 12 to 25 V	60	70		dB	1020.10
Output sink current	VFB = 2.7 V, VComp = 1.1 V	2	6		mA	1020.5
Output source current	VFB = 2.3 V, VComp = 5 V	-0.5	-0.8		mA	1020.4
High-level output voltage	VFB = 2.3 V, RL = 15 kΩ to ground	5	6		V	1020.2
Low-level output voltage	VFB = 2.7 V, RL = 15 kΩ to VREF		0.7	1.1	V	1020.3
CURRENT SENSE						
Gain(6) (7)		2.85	3	3.15	V/V	1025.2
Maximum input signal	VComp = 5 V(6)	0.9	1	1.1	V	1025.3
Input bias current			-2	-10	uA	1025.1
Delay to output	VISENSE = 0 to 2 V(2)		150	300	ns	1025.4
OUTPUT						
Output low-level voltage	ISINK = 20 mA		0.1	0.4	V	1030.6
	ISINK = 200 mA		1.5	2.2		1030.7
Output high-level voltage	ISOURCE = –20 mA	13	13.5		V	1030.1,
	ISOURCE = –200 mA	12	13.5			1030.2
Rise time	CL = 1 nF, TJ = 25°C(2)		50	150	ns	1030.9
Fall time	CL = 1 nF, TJ = 25°C(2)		50	150	ns	1030.10
UVLO saturation	VCC = 5 V, ISINK = 10 mA		0.7	1.2	V	1030.5
UNDERVOLTAGE LOCKOUT						
Start threshold		7.8	8.4	9	V	1035.1
Minimum operation voltage after turnon		7	7.6	8.2	V	1035.2

Table 3. UC1843B-SP Spec Table (continued)

PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT	TEST NUMBER
PWM						
Maximum duty cycle		94%	96%	100%		1030.11, 1030.12
Minimum duty cycle				0%		1030.13
TOTAL STANDBY CURRENT						
Start-up current			0.3	0.5	mA	1005.1
Operating supply current	VFB = VISENSE = 0 V		11	17	mA	1005.2, 1005.3
VCC Zener voltage	ICC = 25 mA	30	34		V	1035.4

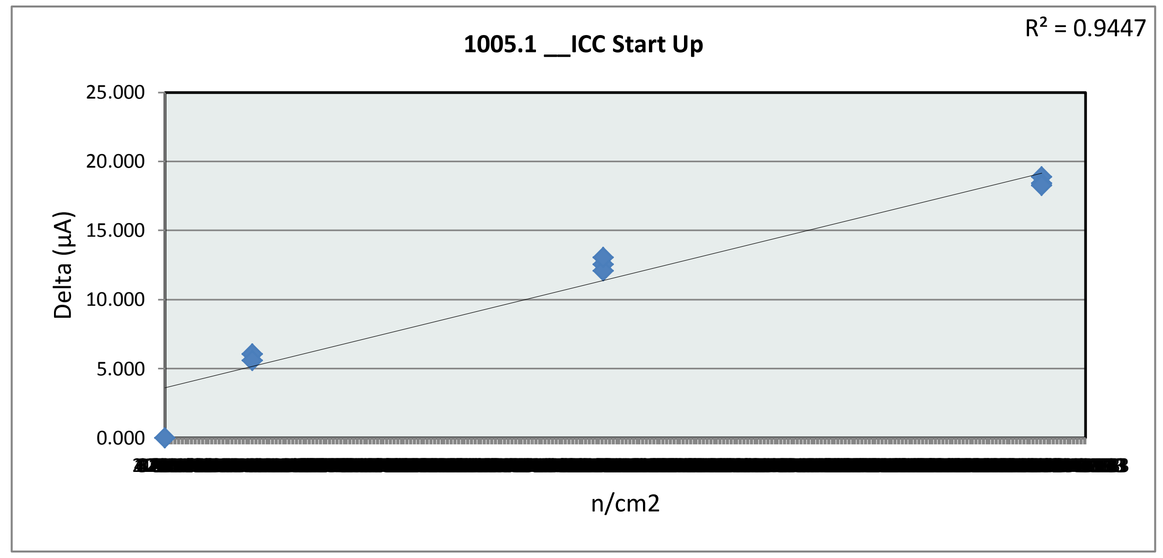
Test Results

Delta Threshold	10.00%

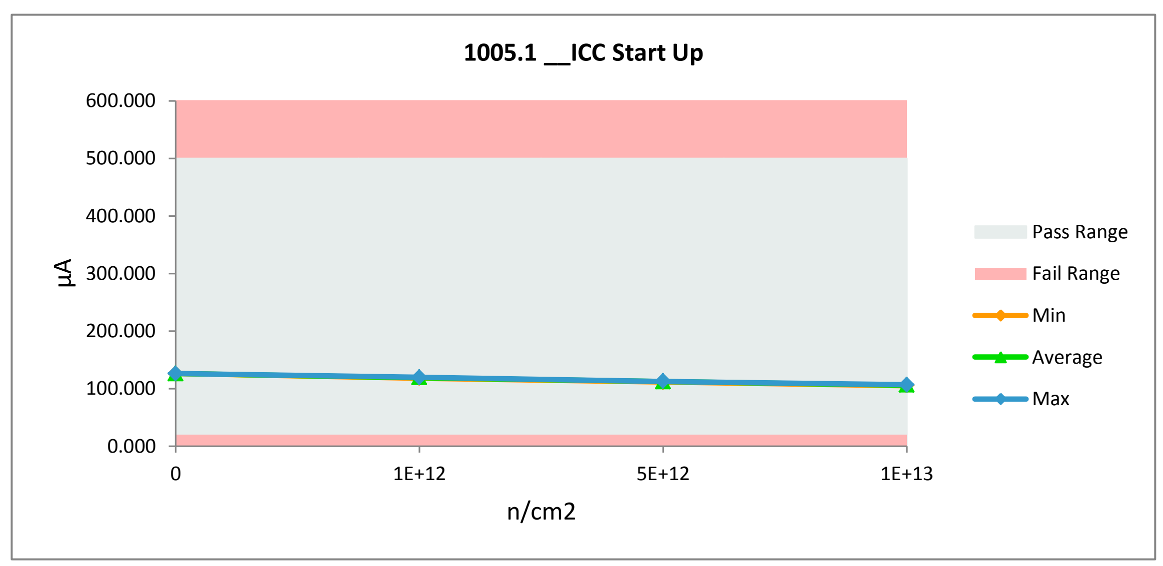
NDD Report
Device Name

NDD Report
Device Name

	1005.1 __ICC Start Up			
	Test Site			
	Tester			
	Test Number			
	Unit	µA	µA	
	Max Limit	500	500	
	Min Limit	20	20	
n/cm2	Serial #	Pre	Post	Delta
0	1	125.814	125.814	0.000
1E+12	1E12_11	125.110	119.059	6.051
1E+12	1E12_11	124.130	118.093	6.037
1E+12	1E12_12	125.222	119.626	5.596
5E+12	5E12_12	124.385	111.848	12.537
5E+12	5E12_12	123.380	111.310	12.071
5E+12	5E12_12	125.469	112.424	13.046
1E+13	1E13_12	125.178	106.315	18.863
1E+13	1E13_12	123.422	105.015	18.407
1E+13	1E13_12	124.275	106.024	18.251
	Max	125.814	125.814	18.863
	Average	124.639	113.553	11.086
	Min	123.380	105.015	0.000
	Std Dev	0.846	6.907	6.465



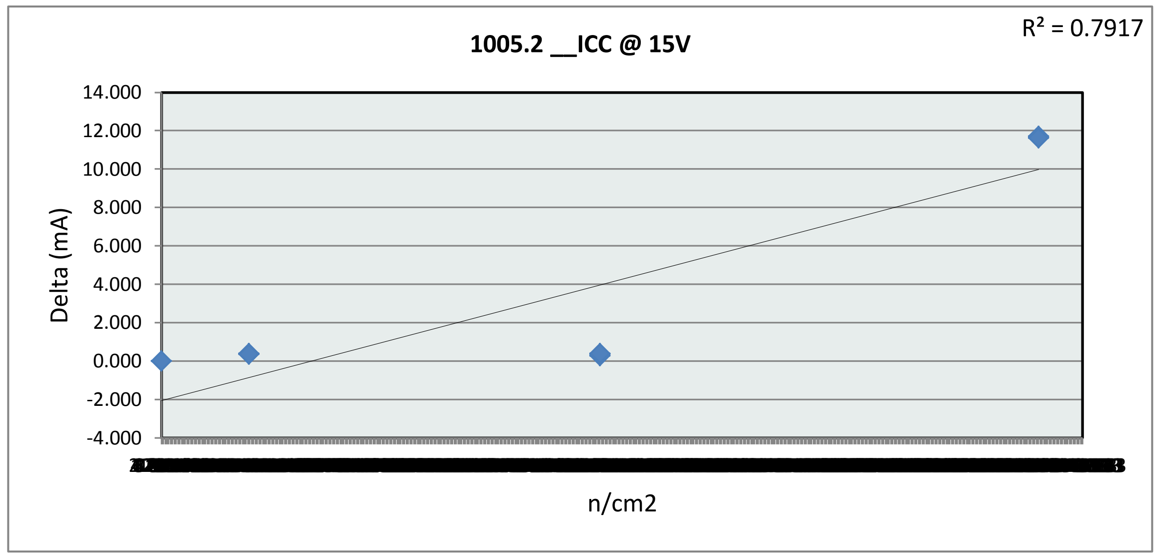
	1005.1 __ICC Start Up			
Test Site				
Tester				
Test Number				
Max Limit	500	µA		
Min Limit	20	µA		
n/cm2	0	1E+12	5E+12	1E+13
LL	20.000	20.000	20.000	20.000
Min	125.814	118.093	111.310	105.015
Average	125.814	118.926	111.860	105.785
Max	125.814	119.626	112.424	106.315
UL	500.000	500.000	500.000	500.000



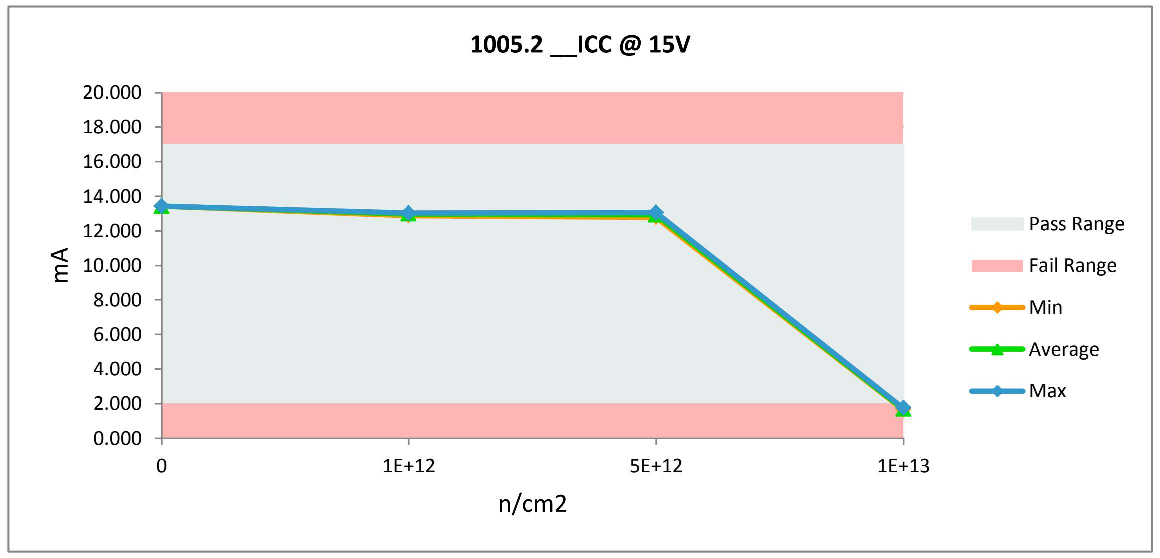
NDD Report
Device Name

	1005.2 __ICC @ 15V		
Test Site			
Tester			
Test Number			
Unit	mA	mA	
Max Limit	17	17	
Min Limit	2	2	

n/cm2	Serial #	Pre	Post	Delta
0	1	13.416	13.416	0.000
1E+12	1E12_11	13.253	12.886	0.367
1E+12	1E12_11	13.400	13.004	0.396
1E+12	1E12_12	13.394	13.022	0.372
5E+12	5E12_12	13.420	13.048	0.372
5E+12	5E12_12	13.227	12.940	0.287
5E+12	5E12_12	13.186	12.790	0.396
1E+13	1E13_12	13.309	1.655	11.655
1E+13	1E13_12	13.389	1.670	11.718
1E+13	1E13_12	13.368	1.743	11.625
	Max	13.420	13.416	11.718
	Average	13.336	9.618	3.719
	Min	13.186	1.655	0.000
	Std Dev	0.086	5.473	5.485



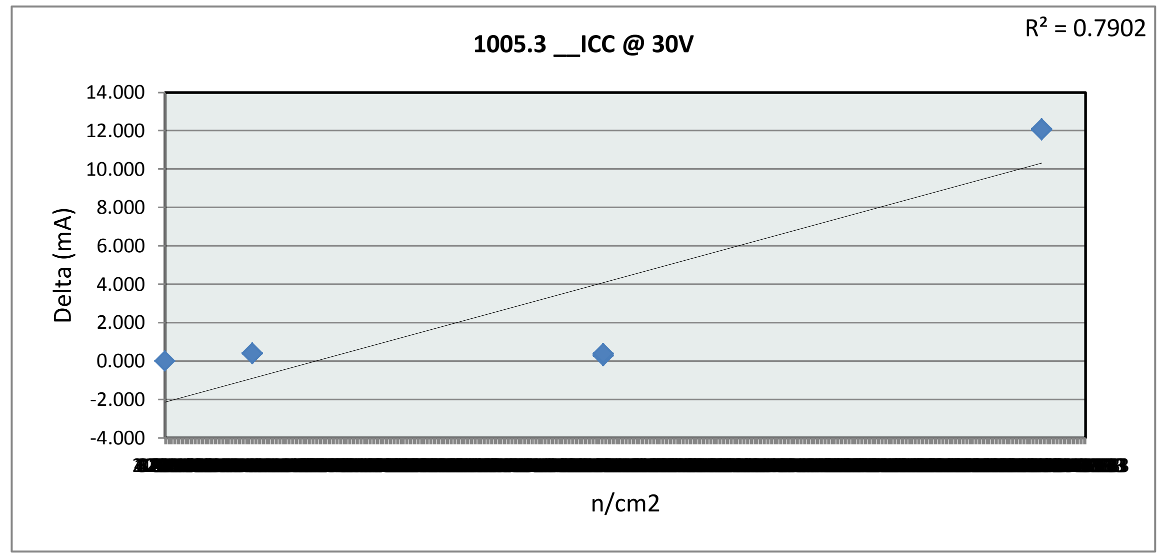
	1005.2 __ICC @ 15V			
Test Site				
Tester				
Test Number				
Max Limit	17	mA		
Min Limit	2	mA		
n/cm2	0	1E+12	5E+12	1E+13
LL	2.000	2.000	2.000	2.000
Min	13.416	12.886	12.790	1.655
Average	13.416	12.971	12.926	1.689
Max	13.416	13.022	13.048	1.743
UL	17.000	17.000	17.000	17.000



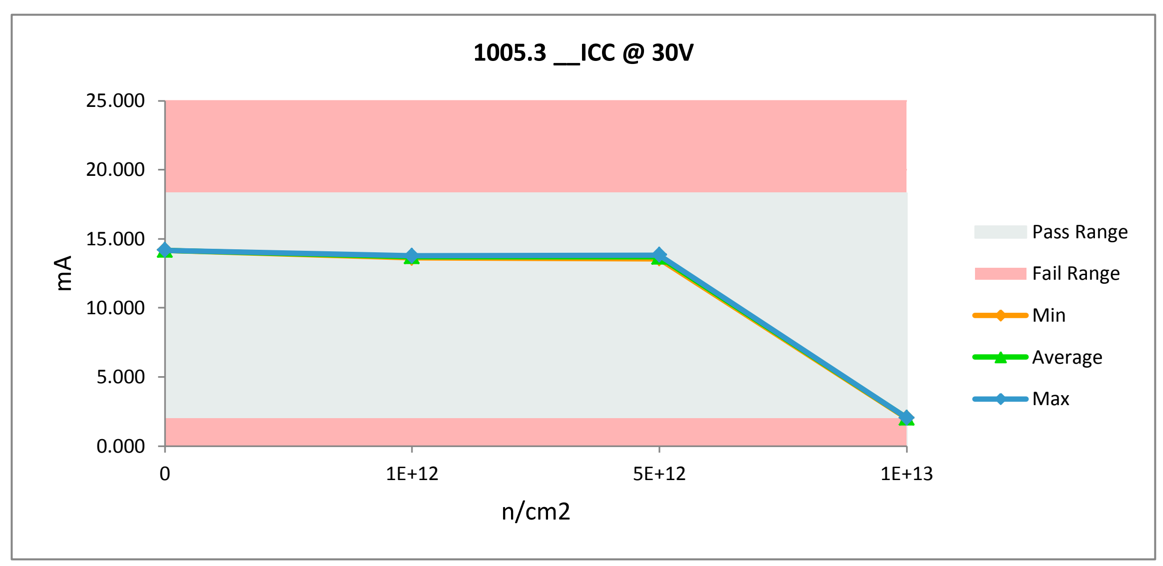
NDD Report
Device Name

	1005.3 __ICC @ 30V		
Test Site			
Tester			
Test Number			
Unit	mA	mA	
Max Limit	18.3	18.3	
Min Limit	2	2	

n/cm2	Serial #	Pre	Post	Delta
0	1	14.175	14.175	0.000
1E+12	1E12_11	14.002	13.617	0.385
1E+12	1E12_11	14.135	13.731	0.405
1E+12	1E12_12	14.153	13.770	0.383
5E+12	5E12_12	14.185	13.827	0.357
5E+12	5E12_12	13.978	13.712	0.266
5E+12	5E12_12	13.956	13.560	0.396
1E+13	1E13_12	14.070	2.021	12.049
1E+13	1E13_12	14.139	2.049	12.090
1E+13	1E13_12	14.116	2.046	12.069
	Max	14.185	14.175	12.090
	Average	14.091	10.251	3.840
	Min	13.956	2.021	0.000
	Std Dev	0.084	5.669	5.680

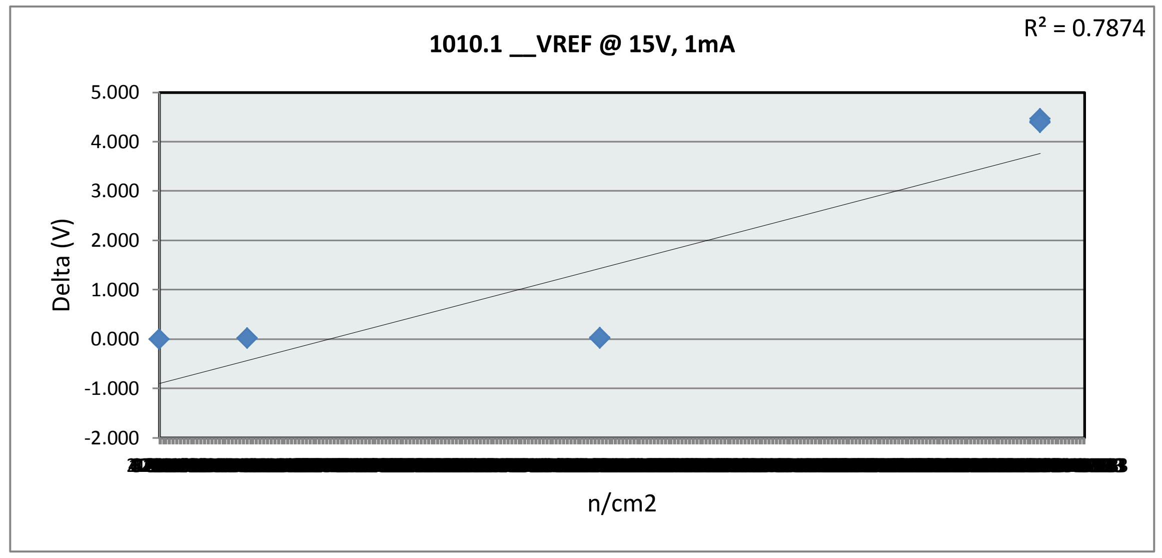


	1005.3 __ICC @ 30V			
Test Site				
Tester				
Test Number				
Max Limit	18.3	mA		
Min Limit	2	mA		
n/cm2	0	1E+12	5E+12	1E+13
LL	2.000	2.000	2.000	2.000
Min	14.175	13.617	13.560	2.021
Average	14.175	13.706	13.700	2.039
Max	14.175	13.770	13.827	2.049
UL	18.300	18.300	18.300	18.300

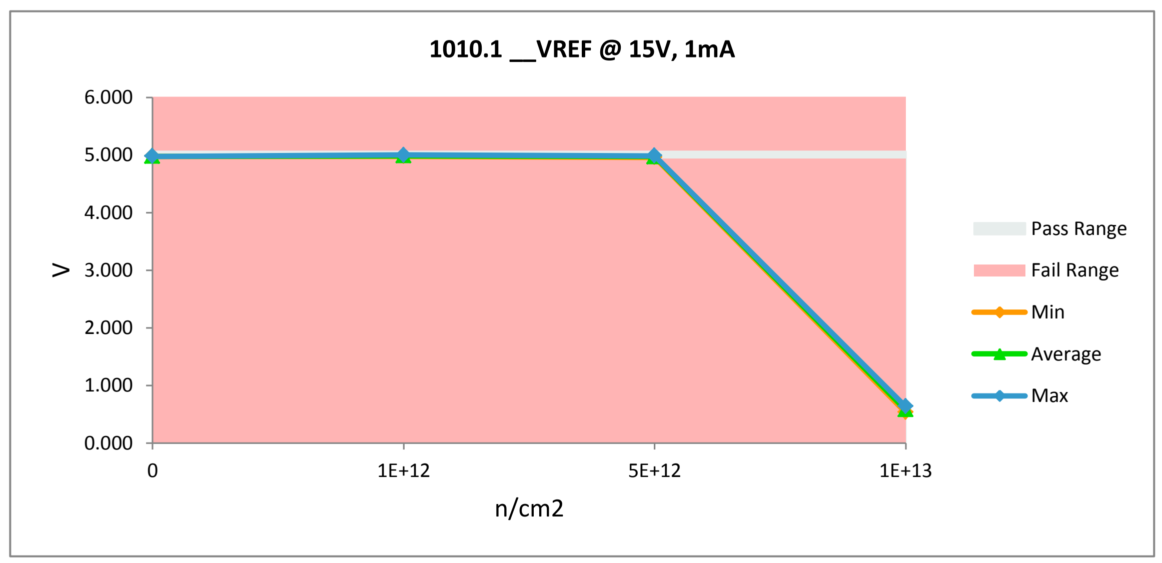


NDD Report
Device Name

		1010.1 __VREF @ 15V, 1mA		
	Test Site			
	Tester			
	Test Number			
	Unit	V	V	
	Max Limit	5.06	5.06	
	Min Limit	4.94	4.94	
n/cm2	Serial #	Pre	Post	Delta
0	1	4.974	4.974	0.000
1E+12	1E12_11	4.994	4.976	0.017
1E+12	1E12_11	5.003	4.984	0.019
1E+12	1E12_12	5.013	4.997	0.016
5E+12	5E12_12	5.009	4.985	0.024
5E+12	5E12_12	4.976	4.958	0.019
5E+12	5E12_12	5.000	4.966	0.034
1E+13	1E13_12	4.985	0.573	4.413
1E+13	1E13_12	5.003	0.533	4.470
1E+13	1E13_12	5.023	0.632	4.391
	Max	5.023	4.997	4.470
	Average	4.998	3.658	1.340
	Min	4.974	0.533	0.000
	Std Dev	0.016	2.125	2.128

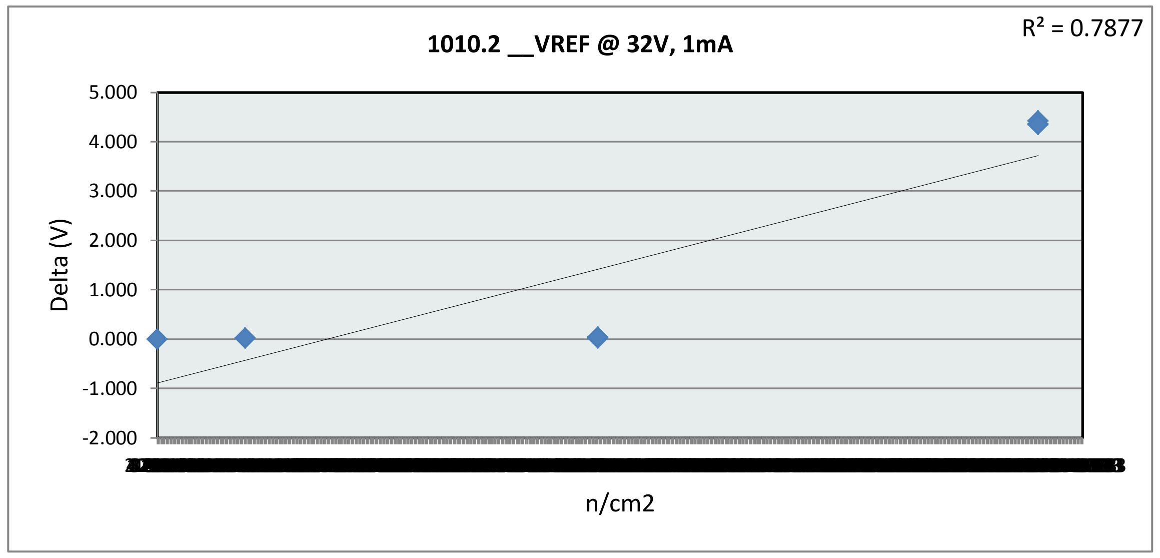


	1010.1 __VREF @ 15V, 1mA			
Test Site				
Tester				
Test Number				
Max Limit	5.06	V		
Min Limit	4.94	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	4.940	4.940	4.940	4.940
Min	4.974	4.976	4.958	0.533
Average	4.974	4.986	4.970	0.579
Max	4.974	4.998	4.985	0.633
UL	5.060	5.060	5.060	5.060

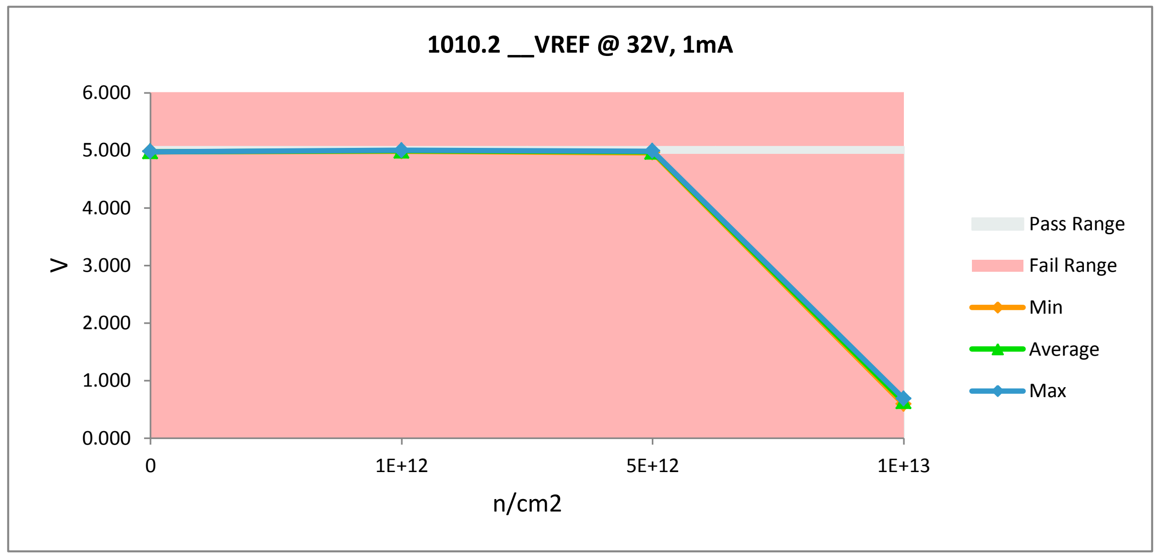


NDD Report
Device Name

	1010.2 __VREF @ 32V, 1mA			
	Test Site			
	Tester			
	Test Number			
	Unit	V	V	
	Max Limit	5.06	5.06	
	Min Limit	4.94	4.94	
n/cm2	Serial #	Pre	Post	Delta
0	1	4.975	4.975	0.000
1E+12	1E12_11	4.998	4.978	0.020
1E+12	1E12_11	5.007	4.985	0.021
1E+12	1E12_12	5.016	4.998	0.019
5E+12	5E12_12	5.012	4.985	0.027
5E+12	5E12_12	4.980	4.958	0.022
5E+12	5E12_12	5.006	4.969	0.037
1E+13	1E13_12	4.990	0.630	4.360
1E+13	1E13_12	5.006	0.588	4.418
1E+13	1E13_12	5.025	0.684	4.341
	Max	5.025	4.998	4.418
	Average	5.002	3.675	1.327
	Min	4.975	0.588	0.000
	Std Dev	0.016	2.099	2.102

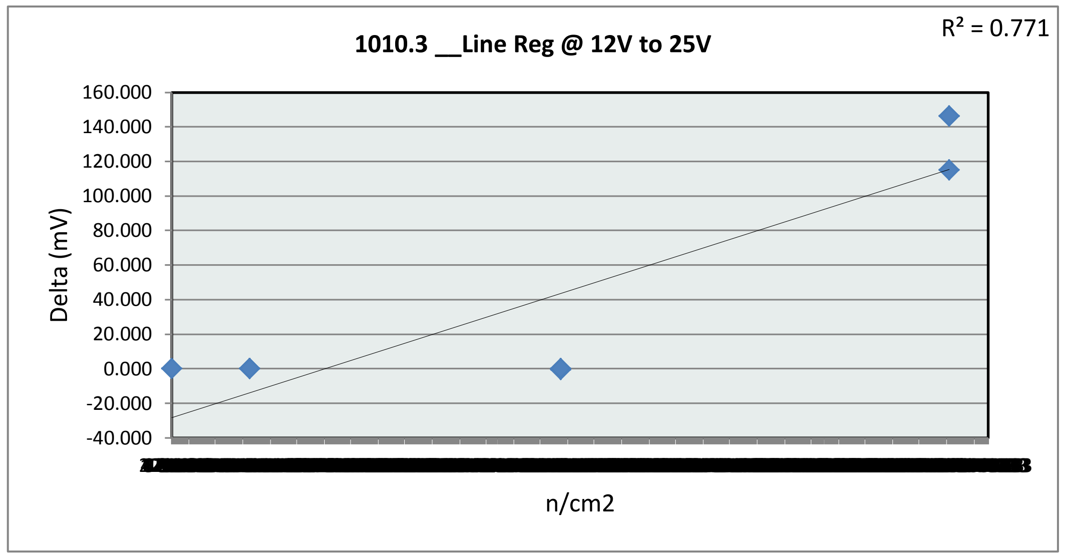


1010.2 __VREF @ 32V, 1mA				
Test Site				
Tester				
Test Number				
Max Limit	5.06	V		
Min Limit	4.94	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	4.940	4.940	4.940	4.940
Min	4.975	4.978	4.958	0.588
Average	4.975	4.987	4.971	0.634
Max	4.975	4.998	4.985	0.684
UL	5.060	5.060	5.060	5.060

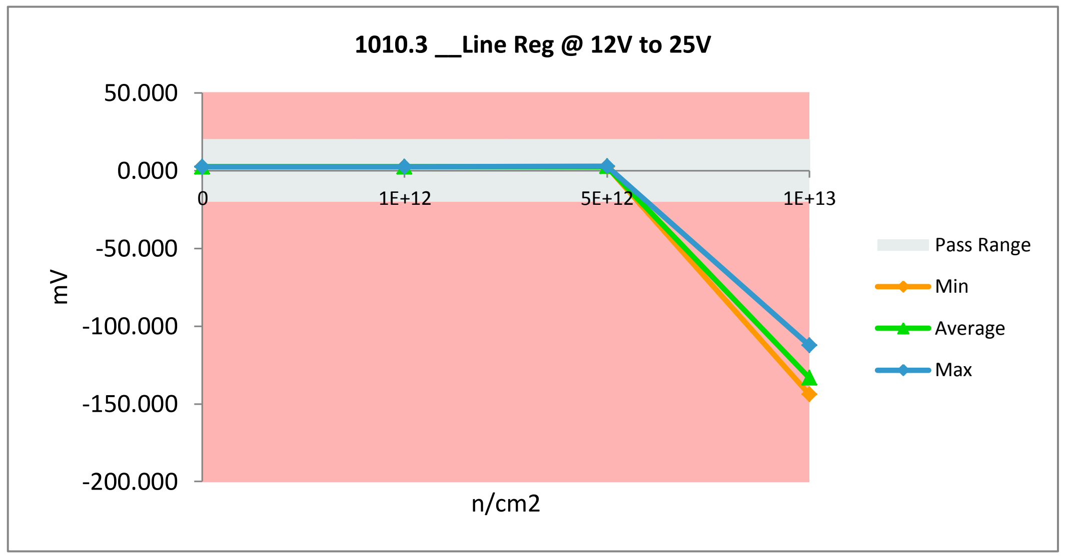


NDD Report
Device Name

1010.3 __Line Reg @ 12V to 25V				
Test Site				
Tester				
Test Number				
Unit		mV	mV	
Max Limit		20	20	
Min Limit		-20	-20	
n/cm2	Serial #	Pre	Post	Delta
0	1	2.525	2.525	0.000
1E+12	1E12_11	2.514	2.528	-0.014
1E+12	1E12_11	2.635	2.472	0.163
1E+12	1E12_12	2.442	2.472	-0.030
5E+12	5E12_12	2.471	2.676	-0.205
5E+12	5E12_12	2.165	2.534	-0.369
5E+12	5E12_12	2.702	2.758	-0.056
1E+13	1E13_12	2.530	-143.657	146.187
1E+13	1E13_12	2.725	-112.318	115.043
1E+13	1E13_12	2.329	-143.827	146.156
	Max	2.725	2.758	146.187
	Average	2.504	-38.184	40.687
	Min	2.165	-143.827	-0.369
	Std Dev	0.169	66.169	66.175



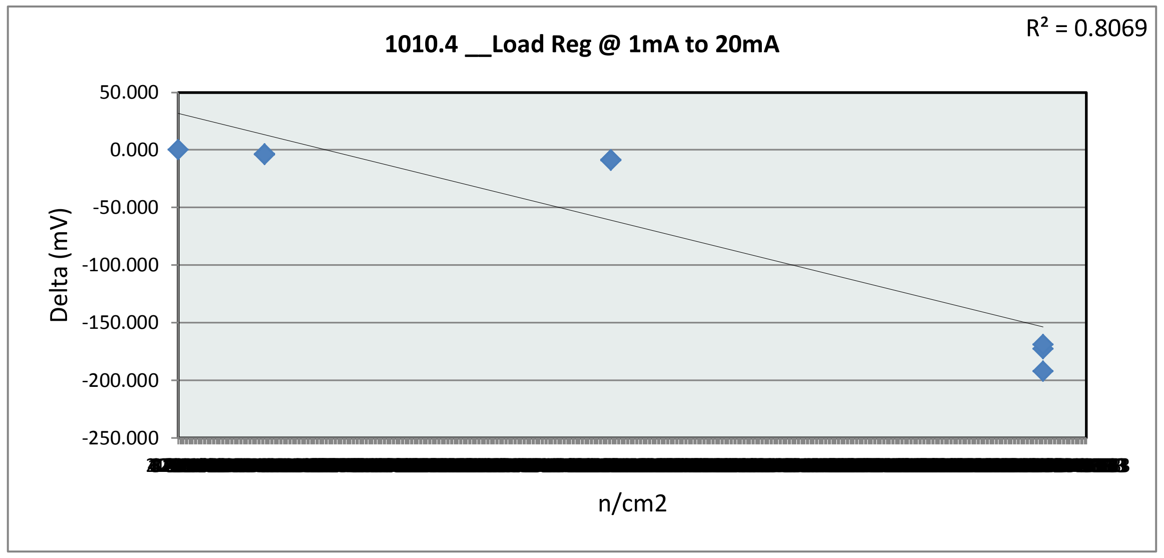
1010.3 __Line Reg @ 12V to 25				
Test Site				
Tester				
Test Number				
Max Limit	20	mV		
Min Limit	-20	mV		
n/cm2	0	1E+12	5E+12	1E+13
LL	-20.000	-20.000	-20.000	-20.000
Min	2.525	2.472	2.534	-143.827
Average	2.525	2.491	2.656	-133.267
Max	2.525	2.528	2.758	-112.318
UL	20.000	20.000	20.000	20.000



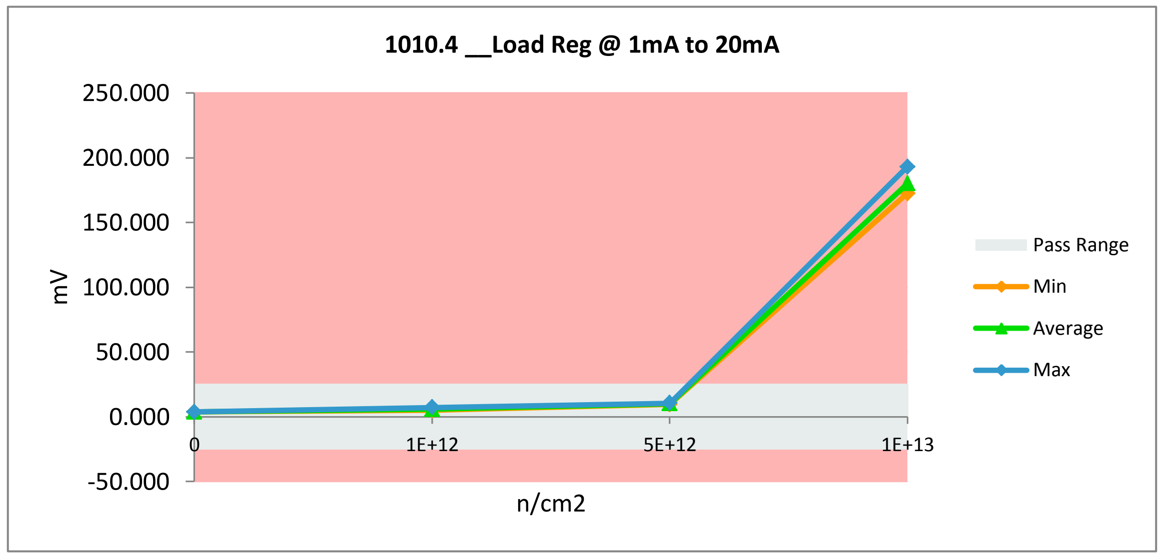
NDD Report
Device Name

	1010.4 __Load Reg @ 1mA to 20		
Test Site			
Tester			
Test Number			
Unit	mV	mV	
Max Limit	25	25	
Min Limit	-25	-25	

n/cm2	Serial #	Pre	Post	Delta
0	1	3.689	3.689	0.000
1E+12	1E12_11	1.268	5.311	-4.043
1E+12	1E12_11	1.230	4.905	-3.674
1E+12	1E12_12	3.179	7.273	-4.094
5E+12	5E12_12	1.947	10.529	-8.582
5E+12	5E12_12	1.790	10.410	-8.620
5E+12	5E12_12	0.537	9.523	-8.986
1E+13	1E13_12	1.011	192.977	-191.966
1E+13	1E13_12	1.744	174.582	-172.838
1E+13	1E13_12	3.185	172.405	-169.220
	Max	3.689	192.977	0.000
	Average	1.958	59.160	-57.202
	Min	0.537	3.689	-191.966
	Std Dev	1.053	83.581	83.609



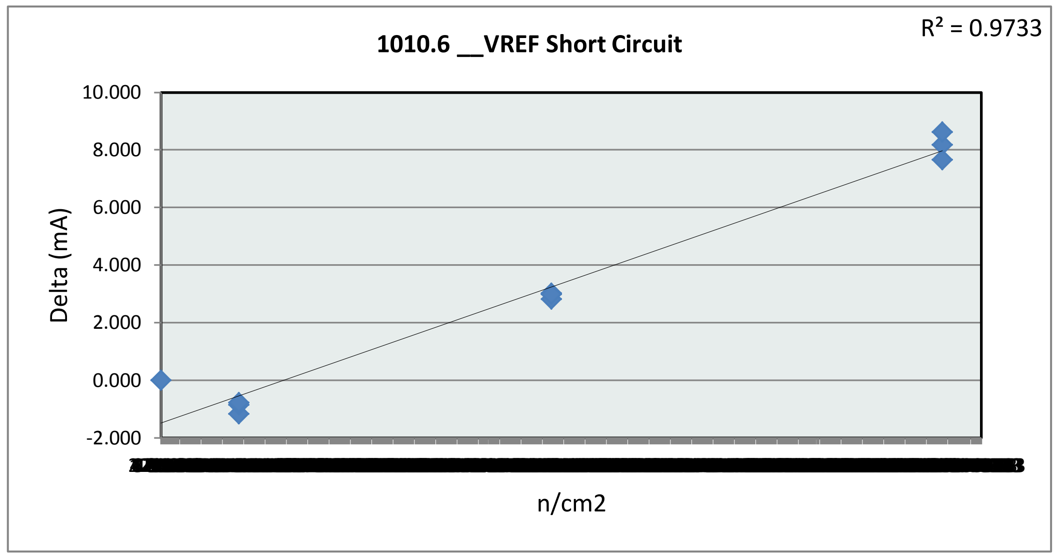
	1010.4 __Load Reg @ 1mA to 2			
Test Site				
Tester				
Test Number				
Max Limit	25	mV		
Min Limit	-25	mV		
n/cm2	0	1E+12	5E+12	1E+13
LL	-25.000	-25.000	-25.000	-25.000
Min	3.689	4.905	9.523	172.405
Average	3.689	5.830	10.154	179.988
Max	3.689	7.273	10.529	192.978
UL	25.000	25.000	25.000	25.000



NDD Report
Device Name

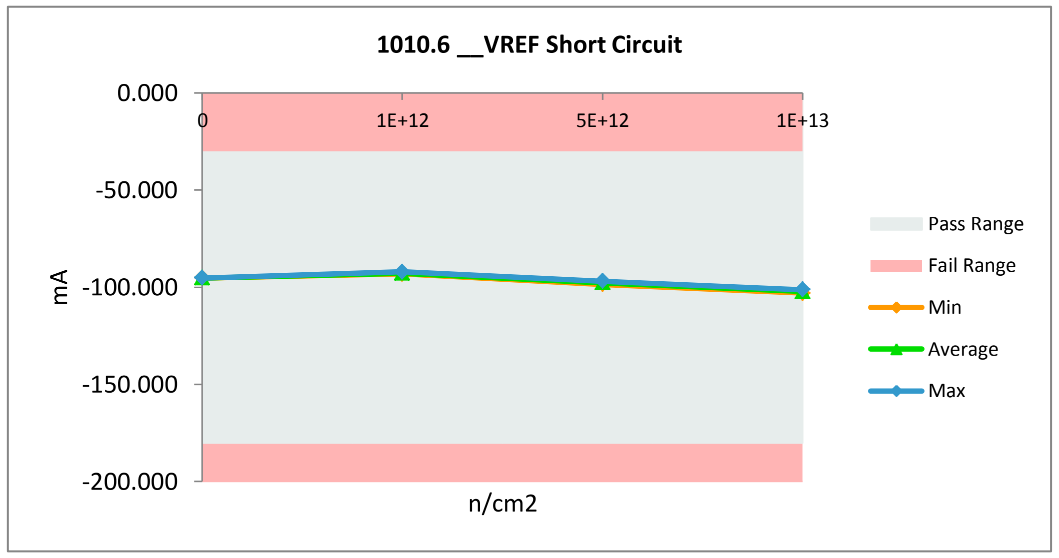
	1010.6 __VREF Short Circuit		
	Test Site		
	Tester		
	Test Number		
	Unit	mA	mA
	Max Limit	-30	-30
	Min Limit	-180	-180

n/cm2	Serial #	Pre	Post	Delta
0	1	-95.209	-95.209	0.000
1E+12	1E12_11	-93.242	-92.065	-1.177
1E+12	1E12_11	-94.051	-93.194	-0.857
1E+12	1E12_12	-93.798	-93.016	-0.782
5E+12	5E12_12	-93.762	-96.786	3.024
5E+12	5E12_12	-94.705	-97.530	2.825
5E+12	5E12_12	-95.530	-98.511	2.981
1E+13	1E13_12	-94.767	-102.948	8.181
1E+13	1E13_12	-93.571	-101.228	7.657
1E+13	1E13_12	-93.858	-102.474	8.616
	Max	-93.242	-92.065	8.616
	Average	-94.249	-97.296	3.047
	Min	-95.530	-102.948	-1.177
	Std Dev	0.756	3.984	3.883



1010.6 __VREF Short Circuit		
Test Site		
Tester		
Test Number		
Max Limit	-30	mA
Min Limit	-180	mA

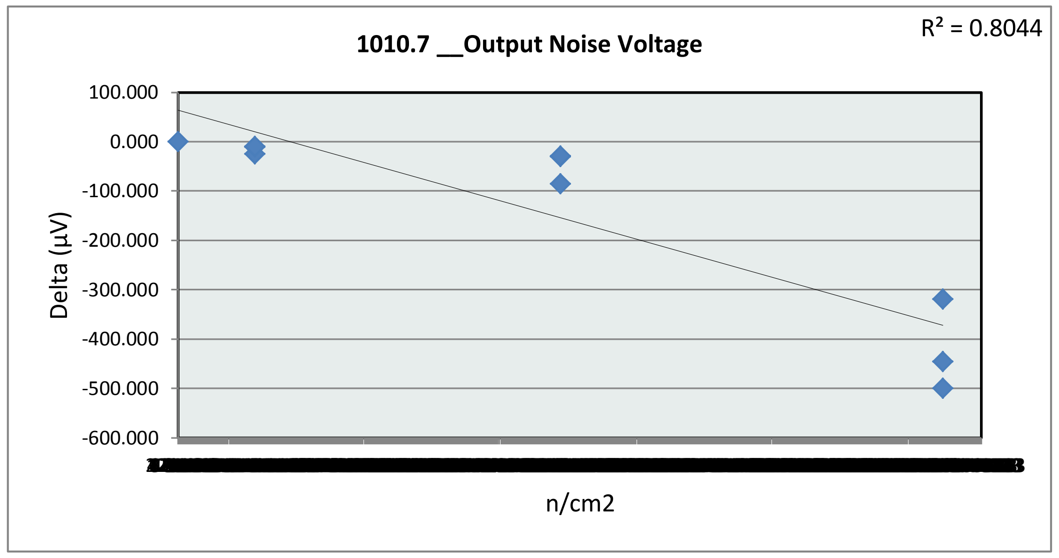
n/cm2	0	1E+12	5E+12	1E+13
LL	-180.000	-180.000	-180.000	-180.000
Min	-95.209	-93.194	-98.511	-102.948
Average	-95.209	-92.758	-97.609	-102.217
Max	-95.209	-92.065	-96.786	-101.228
UL	-30.000	-30.000	-30.000	-30.000



NDD Report
Device Name

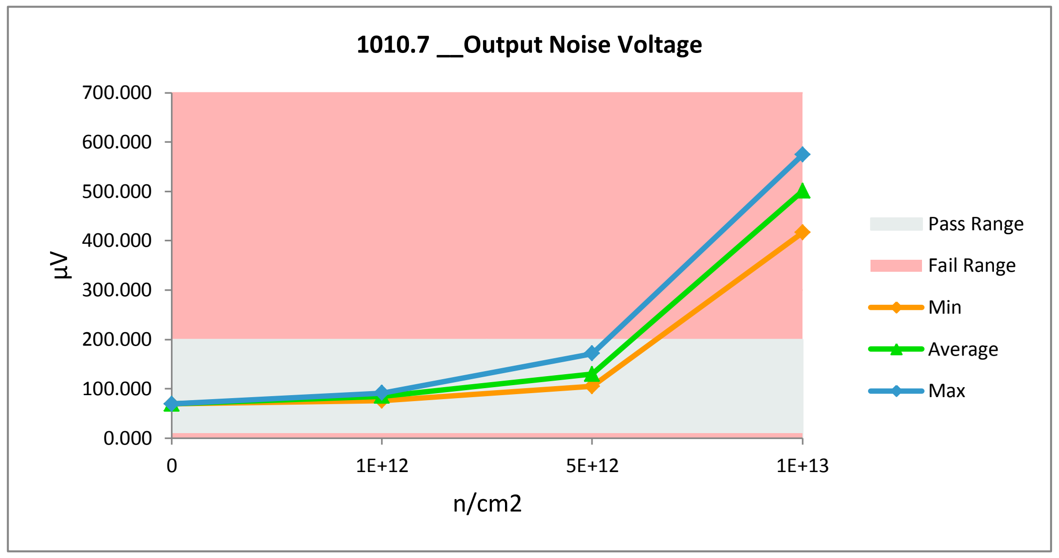
	1010.7 __Output Noise Voltage		
Test Site			
Tester			
Test Number			
Unit	µV	µV	
Max Limit	200	200	
Min Limit	10	10	

n/cm2	Serial #	Pre	Post	Delta
0	1	69.369	69.369	0.000
1E+12	1E12_11	66.100	91.426	-25.326
1E+12	1E12_11	64.972	75.739	-10.768
1E+12	1E12_12	76.937	86.963	-10.026
5E+12	5E12_12	74.337	104.969	-30.632
5E+12	5E12_12	84.287	113.424	-29.136
5E+12	5E12_12	85.861	170.965	-85.104
1E+13	1E13_12	74.366	573.865	-499.500
1E+13	1E13_12	66.138	512.199	-446.061
1E+13	1E13_12	96.628	416.139	-319.511
	Max	96.628	573.865	0.000
	Average	75.899	221.506	-145.606
	Min	64.972	69.369	-499.500
	Std Dev	10.320	198.263	196.761



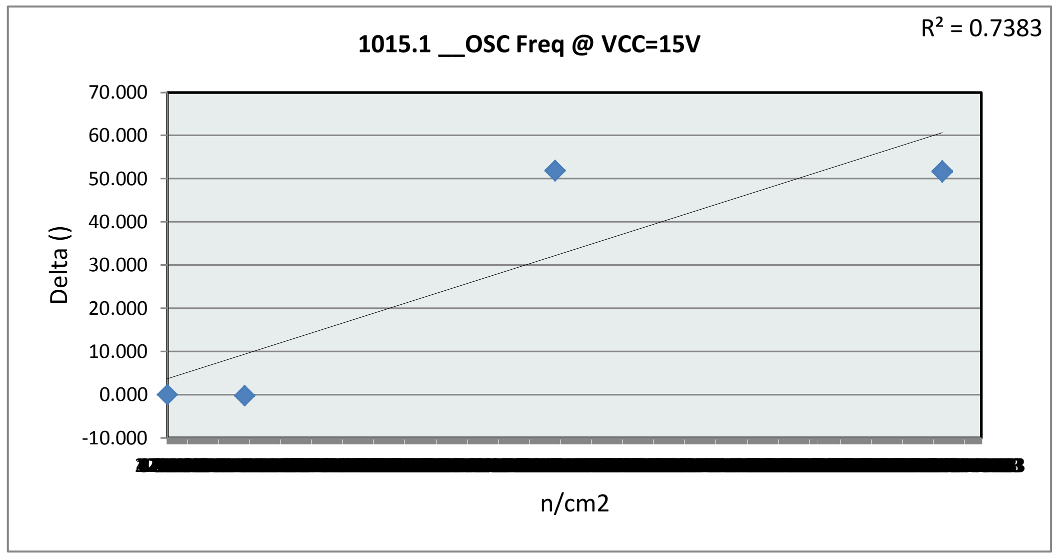
	1010.7 __Output Noise Voltage	
Test Site		
Tester		
Test Number		
Max Limit	200	µV
Min Limit	10	µV

n/cm2	0	1E+12	5E+12	1E+13
LL	10.000	10.000	10.000	10.000
Min	69.369	75.739	104.969	416.139
Average	69.369	84.709	129.786	500.734
Max	69.369	91.426	170.965	573.865
UL	200.000	200.000	200.000	200.000

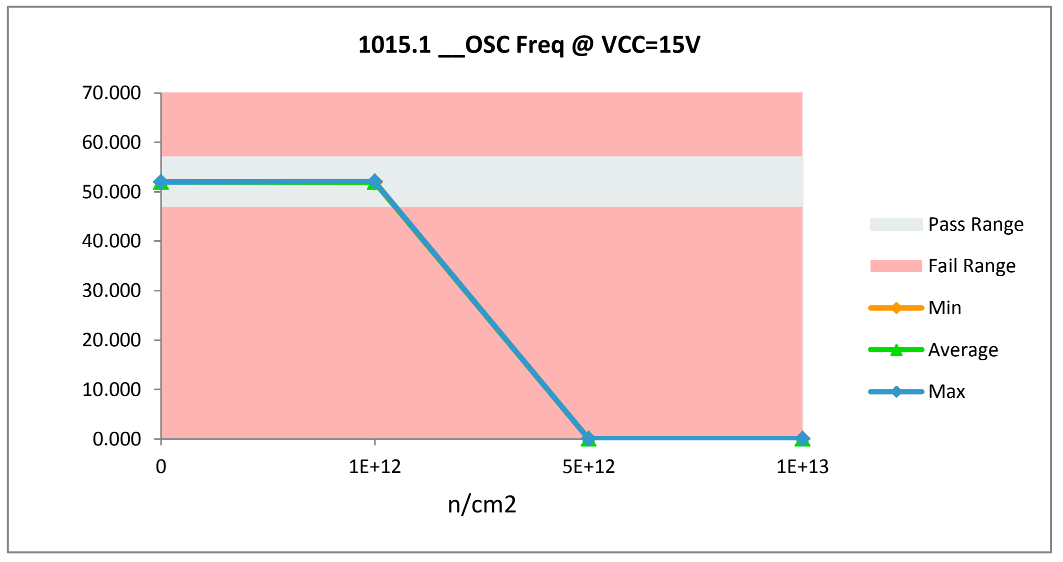


NDD Report
Device Name

		1015.1 __OSC Freq @ VCC=15V		
	Test Site			
	Tester			
	Test Number			
	Unit			
	Max Limit	57	57	
	Min Limit	47	47	
n/cm2	Serial #	Pre	Post	Delta
0	1	51.954	51.954	0.000
1E+12	1E12_11	51.841	52.076	-0.235
1E+12	1E12_11	51.582	51.812	-0.230
1E+12	1E12_12	51.785	51.998	-0.213
5E+12	5E12_12	51.921	0.000	51.921
5E+12	5E12_12	51.896	0.000	51.896
5E+12	5E12_12	51.815	0.000	51.815
1E+13	1E13_12	51.818	0.000	51.818
1E+13	1E13_12	51.776	0.000	51.776
1E+13	1E13_12	51.534	0.000	51.534
	Max	51.954	52.076	51.921
	Average	51.792	20.784	31.008
	Min	51.534	0.000	-0.235
	Std Dev	0.137	26.832	26.834

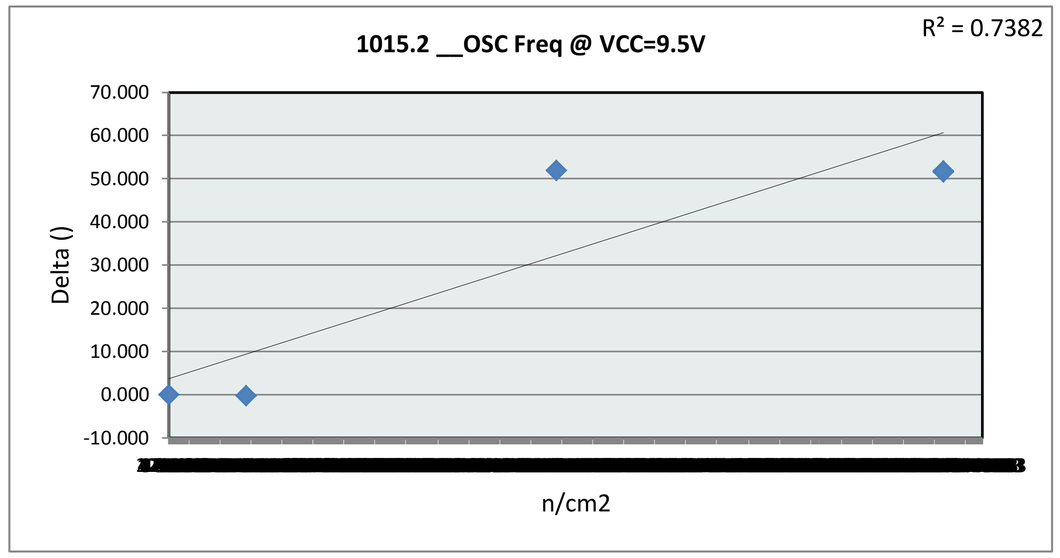


	1015.1 __OSC Freq @ VCC=15V			
Test Site				
Tester				
Test Number				
Max Limit	57			
Min Limit	47			
n/cm2	0	1E+12	5E+12	1E+13
LL	47.000	47.000	47.000	47.000
Min	51.954	51.812	0.000	0.000
Average	51.954	51.962	0.000	0.000
Max	51.954	52.076	0.000	0.000
UL	57.000	57.000	57.000	57.000

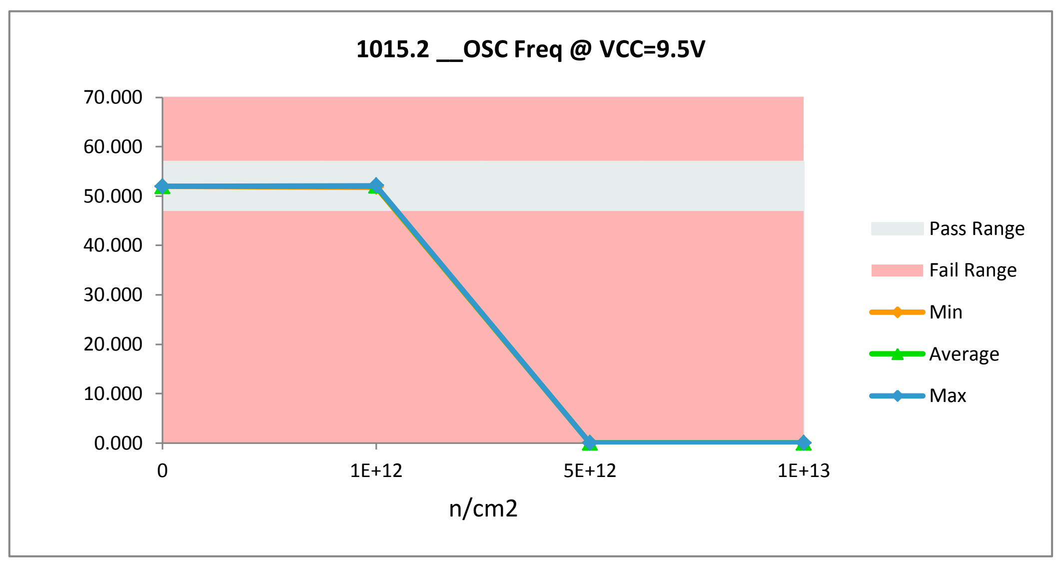


NDD Report
Device Name

		1015.2 __OSC Freq @ VCC=9.5V		
	Test Site			
	Tester			
	Test Number			
	Unit			
	Max Limit	57	57	
	Min Limit	47	47	
n/cm2	Serial #	Pre	Post	Delta
0	1	51.952	51.952	0.000
1E+12	1E12_11	51.847	52.084	-0.237
1E+12	1E12_11	51.570	51.805	-0.235
1E+12	1E12_12	51.798	52.021	-0.223
5E+12	5E12_12	51.920	0.000	51.920
5E+12	5E12_12	51.900	0.000	51.900
5E+12	5E12_12	51.842	0.000	51.842
1E+13	1E13_12	51.822	0.000	51.822
1E+13	1E13_12	51.787	0.000	51.787
1E+13	1E13_12	51.531	0.000	51.531
	Max	51.952	52.084	51.920
	Average	51.797	20.786	31.011
	Min	51.531	0.000	-0.237
	Std Dev	0.140	26.835	26.839



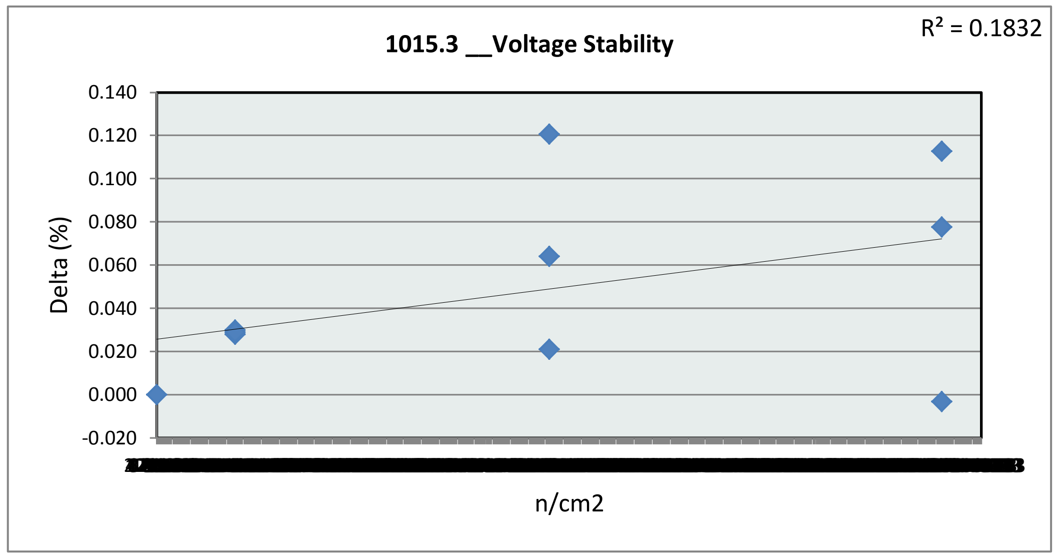
	1015.2 __OSC Freq @ VCC=9.5			
Test Site				
Tester				
Test Number				
Max Limit	57			
Min Limit	47			
n/cm2	0	1E+12	5E+12	1E+13
LL	47.000	47.000	47.000	47.000
Min	51.952	51.805	0.000	0.000
Average	51.952	51.970	0.000	0.000
Max	51.952	52.084	0.000	0.000
UL	57.000	57.000	57.000	57.000



NDD Report
Device Name

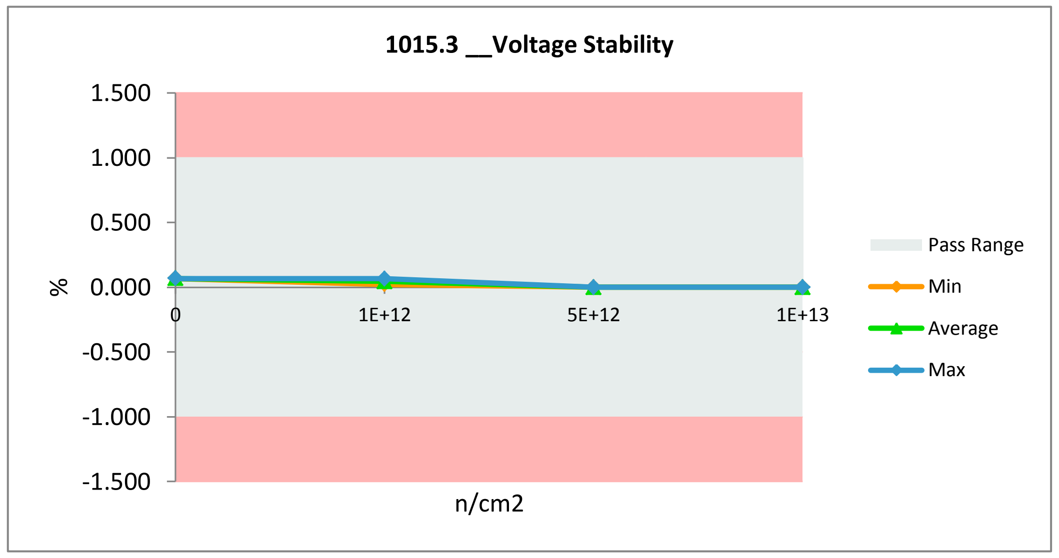
	1015.3 __Voltage Stability		
Test Site			
Tester			
Test Number			
Unit	%	%	
Max Limit	1	1	
Min Limit	-1	-1	

n/cm2	Serial #	Pre	Post	Delta
0	1	0.067	0.067	0.000
1E+12	1E12_11	0.050	0.022	0.028
1E+12	1E12_11	0.076	0.046	0.030
1E+12	1E12_12	0.095	0.066	0.029
5E+12	5E12_12	0.021	0.000	0.021
5E+12	5E12_12	0.120	0.000	0.120
5E+12	5E12_12	0.064	0.000	0.064
1E+13	1E13_12	0.078	0.000	0.078
1E+13	1E13_12	0.113	0.000	0.113
1E+13	1E13_12	-0.003	0.000	-0.003
	Max	0.120	0.067	0.120
	Average	0.068	0.020	0.048
	Min	-0.003	0.000	-0.003
	Std Dev	0.038	0.029	0.044



	1015.3 __Voltage Stability	
Test Site		
Tester		
Test Number		
Max Limit	1	%
Min Limit	-1	%

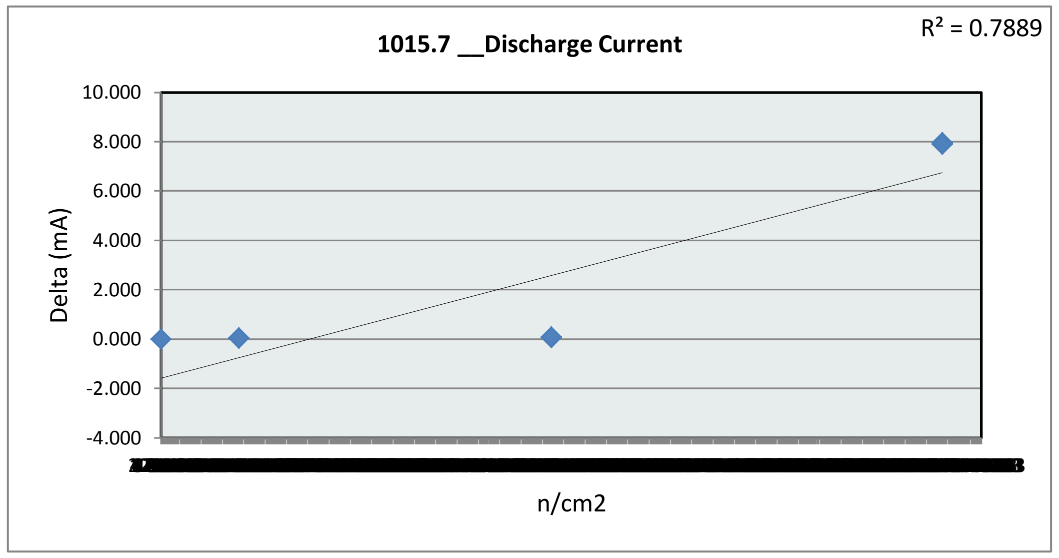
n/cm2	0	1E+12	5E+12	1E+13
LL	-1.000	-1.000	-1.000	-1.000
Min	0.067	0.022	0.000	0.000
Average	0.067	0.045	0.000	0.000
Max	0.067	0.066	0.000	0.000
UL	1.000	1.000	1.000	1.000



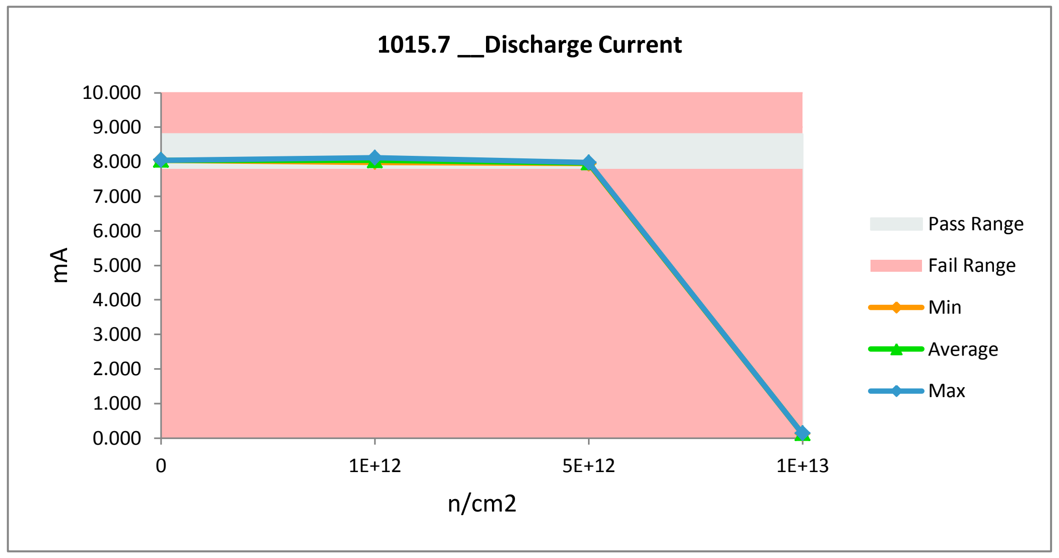
NDD Report
Device Name

	1015.7 __Discharge Current		
	Test Site		
	Tester		
	Test Number		
	Unit	mA	mA
	Max Limit	8.8	8.8
	Min Limit	7.8	7.8

n/cm2	Serial #	Pre	Post	Delta
0	1	8.043	8.043	0.000
1E+12	1E12_11	8.027	7.985	0.042
1E+12	1E12_11	8.052	8.005	0.047
1E+12	1E12_12	8.158	8.118	0.040
5E+12	5E12_12	8.043	7.977	0.065
5E+12	5E12_12	8.026	7.972	0.054
5E+12	5E12_12	8.033	7.949	0.085
1E+13	1E13_12	8.081	0.130	7.951
1E+13	1E13_12	8.020	0.134	7.886
1E+13	1E13_12	8.031	0.126	7.905
	Max	8.158	8.118	7.951
	Average	8.052	5.644	2.408
	Min	8.020	0.126	0.000
	Std Dev	0.041	3.805	3.800



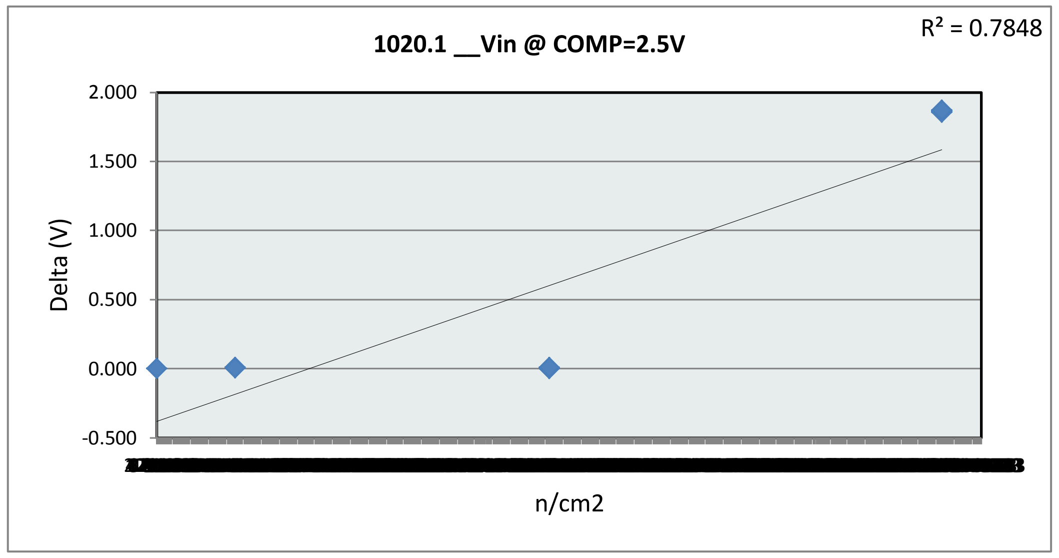
1015.7 __Discharge Current				
Test Site				
Tester				
Test Number				
Max Limit	8.8	mA		
Min Limit	7.8	mA		
n/cm2	0	1E+12	5E+12	1E+13
LL	7.800	7.800	7.800	7.800
Min	8.043	7.985	7.949	0.126
Average	8.043	8.036	7.966	0.130
Max	8.043	8.118	7.978	0.134
UL	8.800	8.800	8.800	8.800



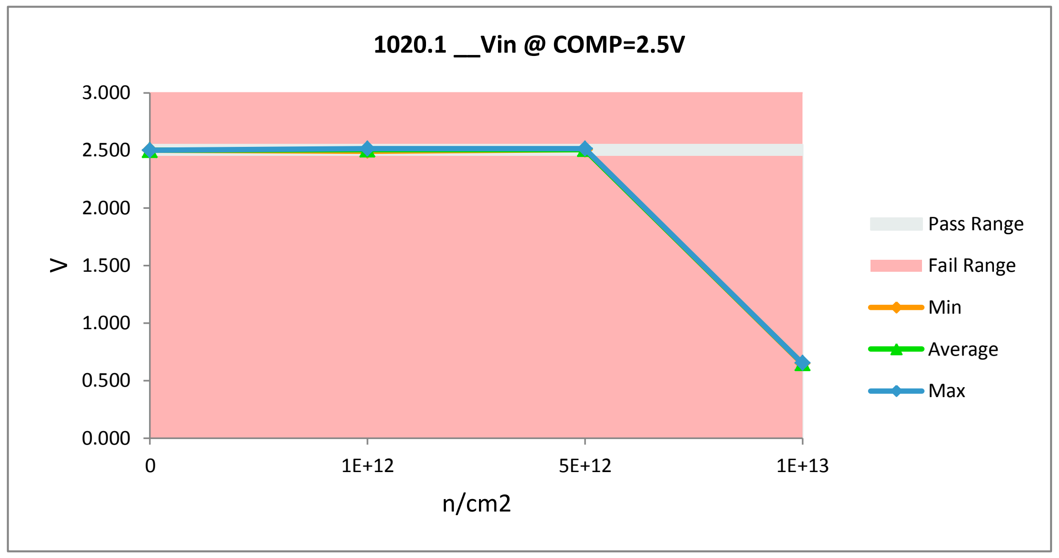
NDD Report
Device Name

	1020.1 __Vin @ COMP=2.5V			
Test Site				
Tester				
Test Number				
Unit	V	V		
Max Limit	2.55	2.55		
Min Limit	2.45	2.45		

n/cm2	Serial #	Pre	Post	Delta
0	1	2.499	2.499	0.000
1E+12	1E12_11	2.500	2.493	0.007
1E+12	1E12_11	2.513	2.506	0.007
1E+12	1E12_12	2.518	2.513	0.005
5E+12	5E12_12	2.515	2.512	0.003
5E+12	5E12_12	2.505	2.504	0.000
5E+12	5E12_12	2.513	2.505	0.007
1E+13	1E13_12	2.510	0.647	1.863
1E+13	1E13_12	2.505	0.648	1.857
1E+13	1E13_12	2.522	0.650	1.872
	Max	2.522	2.513	1.872
	Average	2.510	1.948	0.562
	Min	2.499	0.647	0.000
	Std Dev	0.008	0.897	0.898



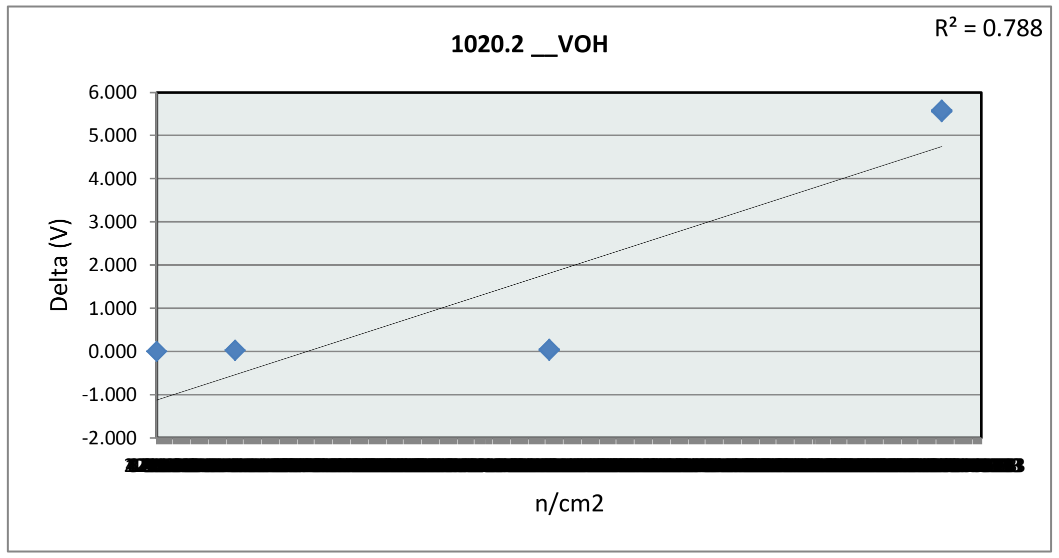
	1020.1 __Vin @ COMP=2.5V			
Test Site				
Tester				
Test Number				
Max Limit	2.55	V		
Min Limit	2.45	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	2.450	2.450	2.450	2.450
Min	2.499	2.493	2.505	0.647
Average	2.499	2.504	2.507	0.648
Max	2.499	2.513	2.512	0.650
UL	2.550	2.550	2.550	2.550



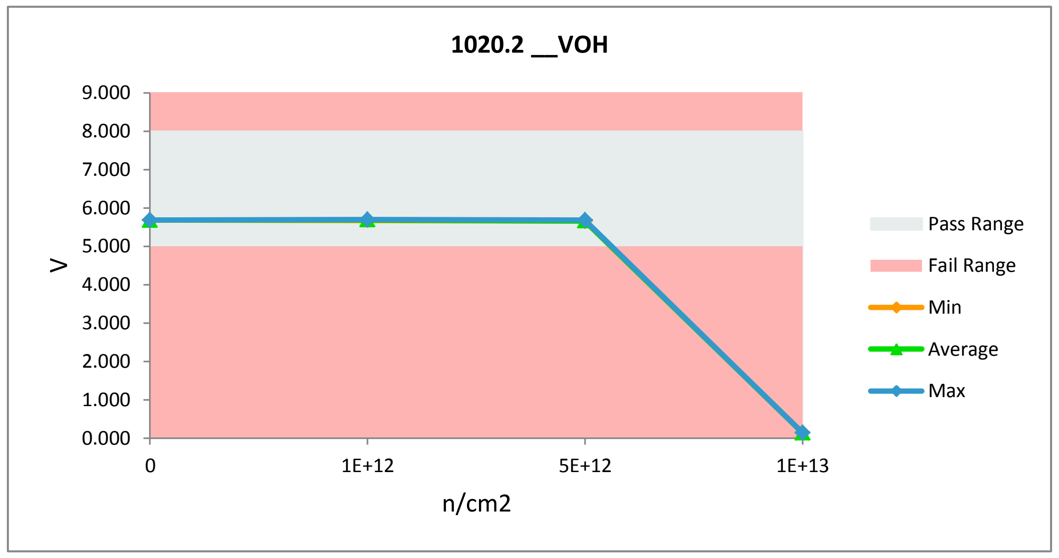
NDD Report
Device Name

	1020.2 __VOH		
Test Site			
Tester			
Test Number			
Unit	V	V	
Max Limit	8	8	
Min Limit	5	5	

n/cm2	Serial #	Pre	Post	Delta
0	1	5.681	5.681	0.000
1E+12	1E12_11	5.694	5.671	0.023
1E+12	1E12_11	5.715	5.691	0.024
1E+12	1E12_12	5.713	5.693	0.020
5E+12	5E12_12	5.712	5.677	0.035
5E+12	5E12_12	5.682	5.653	0.029
5E+12	5E12_12	5.694	5.649	0.045
1E+13	1E13_12	5.689	0.139	5.551
1E+13	1E13_12	5.712	0.136	5.576
1E+13	1E13_12	5.726	0.139	5.587
	Max	5.726	5.693	5.587
	Average	5.702	4.013	1.689
	Min	5.681	0.136	0.000
	Std Dev	0.015	2.674	2.679



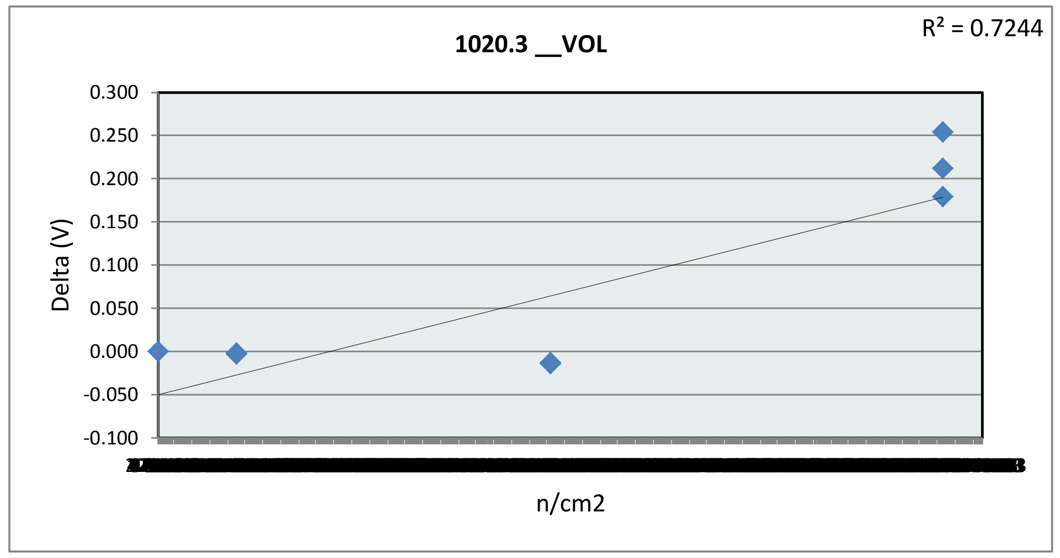
	1020.2 __VOH			
Test Site				
Tester				
Test Number				
Max Limit	8	V		
Min Limit	5	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	5.000	5.000	5.000	5.000
Min	5.681	5.671	5.649	0.136
Average	5.681	5.685	5.660	0.138
Max	5.681	5.693	5.677	0.139
UL	8.000	8.000	8.000	8.000



NDD Report
Device Name

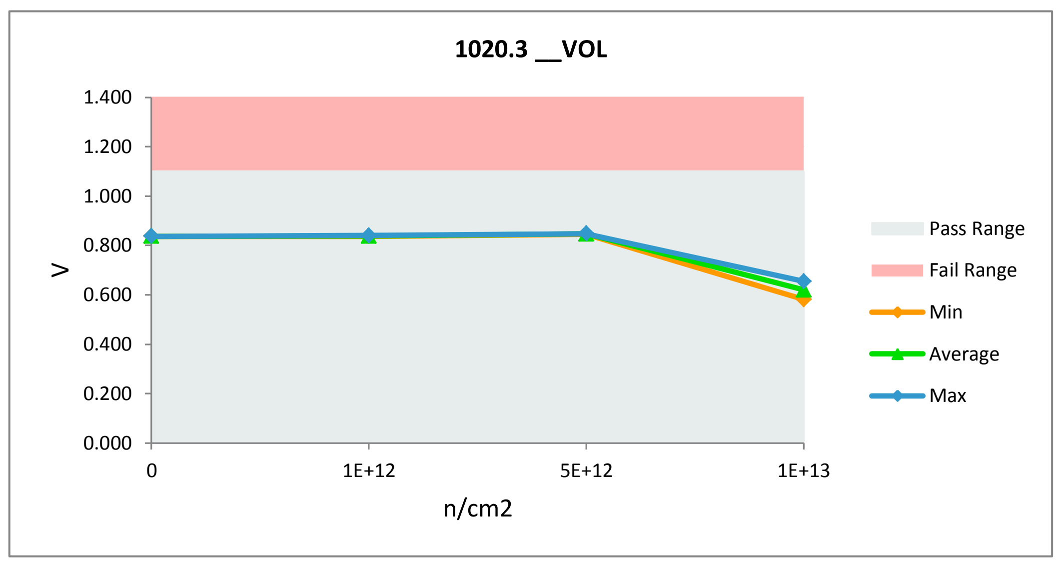
	1020.3 __VOL		
Test Site			
Tester			
Test Number			
Unit	V	V	
Max Limit	1.1	1.1	
Min Limit	0	0	

n/cm2	Serial #	Pre	Post	Delta
0	1	0.837	0.837	0.000
1E+12	1E12_11	0.836	0.837	-0.002
1E+12	1E12_11	0.838	0.840	-0.002
1E+12	1E12_12	0.835	0.838	-0.003
5E+12	5E12_12	0.833	0.847	-0.014
5E+12	5E12_12	0.835	0.848	-0.013
5E+12	5E12_12	0.832	0.846	-0.014
1E+13	1E13_12	0.835	0.623	0.212
1E+13	1E13_12	0.836	0.581	0.254
1E+13	1E13_12	0.833	0.655	0.179
	Max	0.838	0.848	0.254
	Average	0.835	0.775	0.060
	Min	0.832	0.581	-0.014
	Std Dev	0.002	0.109	0.109



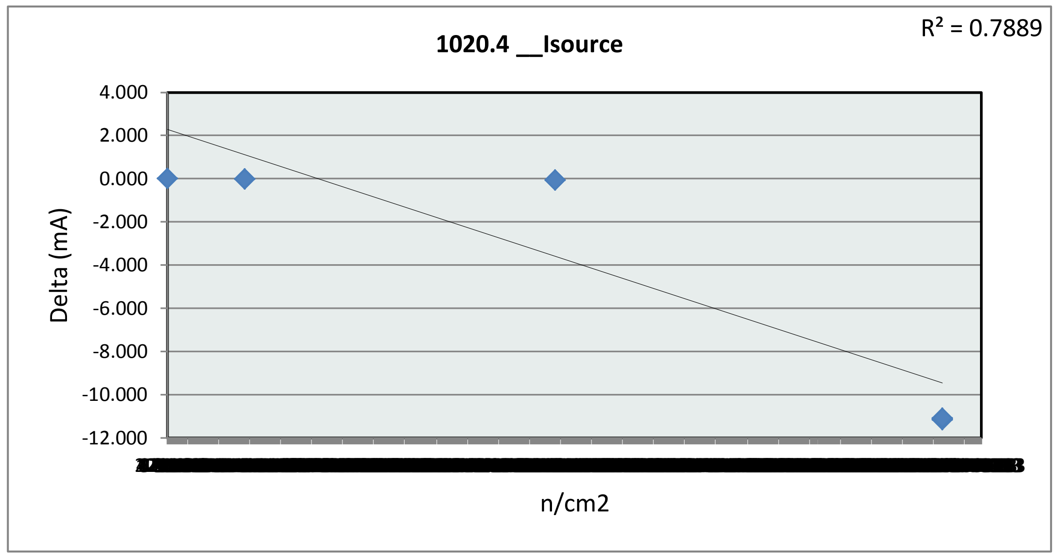
	1020.3 __VOL			
Test Site				
Tester				
Test Number				
Max Limit	1.1	V		
Min Limit	0	V		

n/cm2	0	1E+12	5E+12	1E+13
LL	0.000	0.000	0.000	0.000
Min	0.837	0.837	0.846	0.581
Average	0.837	0.839	0.847	0.620
Max	0.837	0.840	0.848	0.655
UL	1.100	1.100	1.100	1.100

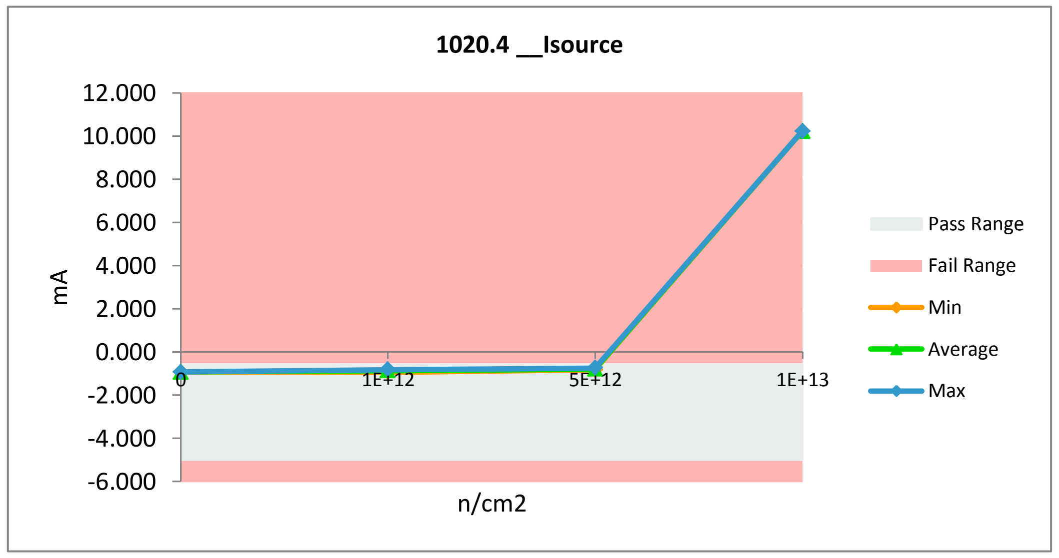


NDD Report
Device Name

		1020.4 __Isource		
	Test Site			
	Tester			
	Test Number			
	Unit	mA	mA	
	Max Limit	-0.5	-0.5	
	Min Limit	-5	-5	
n/cm2	Serial #	Pre	Post	Delta
0	1	-0.928	-0.928	0.000
1E+12	1E12_11	-0.826	-0.814	-0.013
1E+12	1E12_11	-0.958	-0.940	-0.018
1E+12	1E12_12	-0.861	-0.846	-0.015
5E+12	5E12_12	-0.876	-0.806	-0.070
5E+12	5E12_12	-0.894	-0.830	-0.064
5E+12	5E12_12	-0.803	-0.736	-0.067
1E+13	1E13_12	-0.879	10.235	-11.114
1E+13	1E13_12	-0.921	10.235	-11.156
1E+13	1E13_12	-0.868	10.235	-11.103
	Max	-0.803	10.235	0.000
	Average	-0.881	2.481	-3.362
	Min	-0.958	-0.940	-11.156
	Std Dev	0.047	5.352	5.357

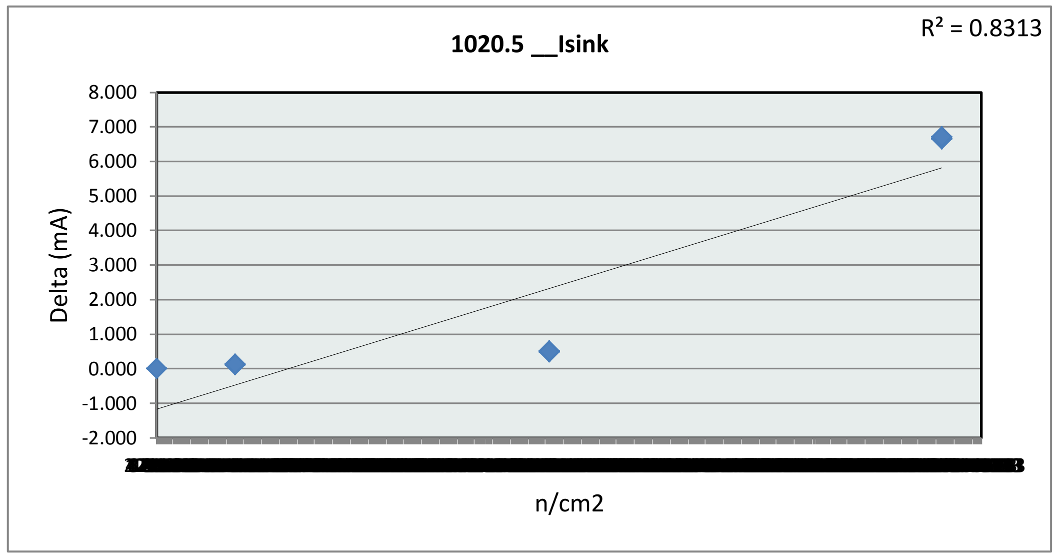


	1020.4 __Isource			
Test Site				
Tester				
Test Number				
Max Limit	-0.5	mA		
Min Limit	-5	mA		
n/cm2	0	1E+12	5E+12	1E+13
LL	-5.000	-5.000	-5.000	-5.000
Min	-0.928	-0.940	-0.830	10.235
Average	-0.928	-0.867	-0.791	10.235
Max	-0.928	-0.814	-0.736	10.235
UL	-0.500	-0.500	-0.500	-0.500

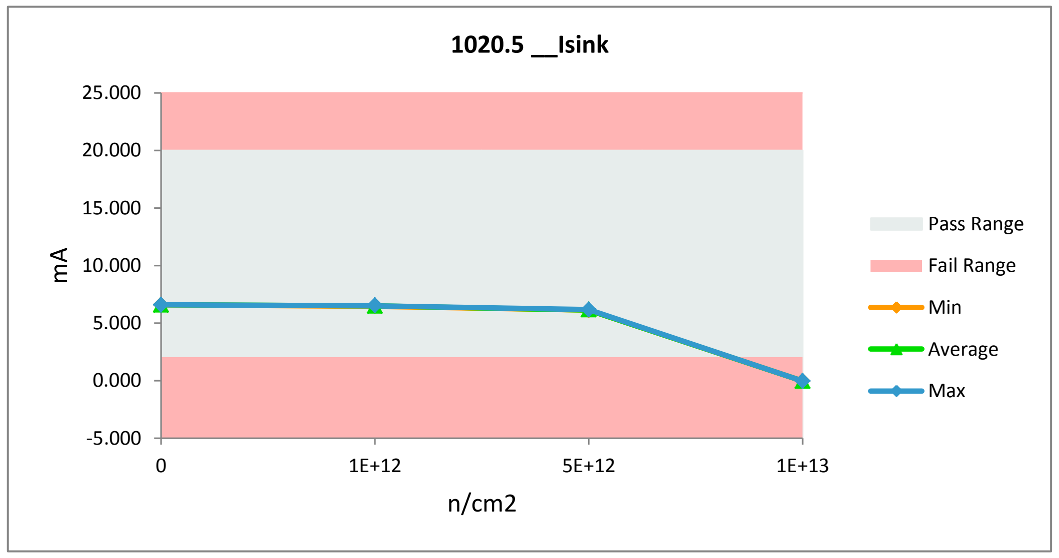


NDD Report
Device Name

		1020.5 __Isink		
	Test Site			
	Tester			
	Test Number			
	Unit	mA	mA	
	Max Limit	20	20	
	Min Limit	2	2	
n/cm2	Serial #	Pre	Post	Delta
0	1	6.563	6.563	0.000
1E+12	1E12_11	6.622	6.512	0.110
1E+12	1E12_11	6.573	6.451	0.122
1E+12	1E12_12	6.587	6.458	0.129
5E+12	5E12_12	6.669	6.157	0.512
5E+12	5E12_12	6.601	6.115	0.486
5E+12	5E12_12	6.616	6.113	0.503
1E+13	1E13_12	6.626	-0.043	6.669
1E+13	1E13_12	6.601	-0.041	6.641
1E+13	1E13_12	6.670	-0.044	6.714
	Max	6.670	6.563	6.714
	Average	6.613	4.424	2.189
	Min	6.563	-0.044	0.000
	Std Dev	0.036	3.087	3.101



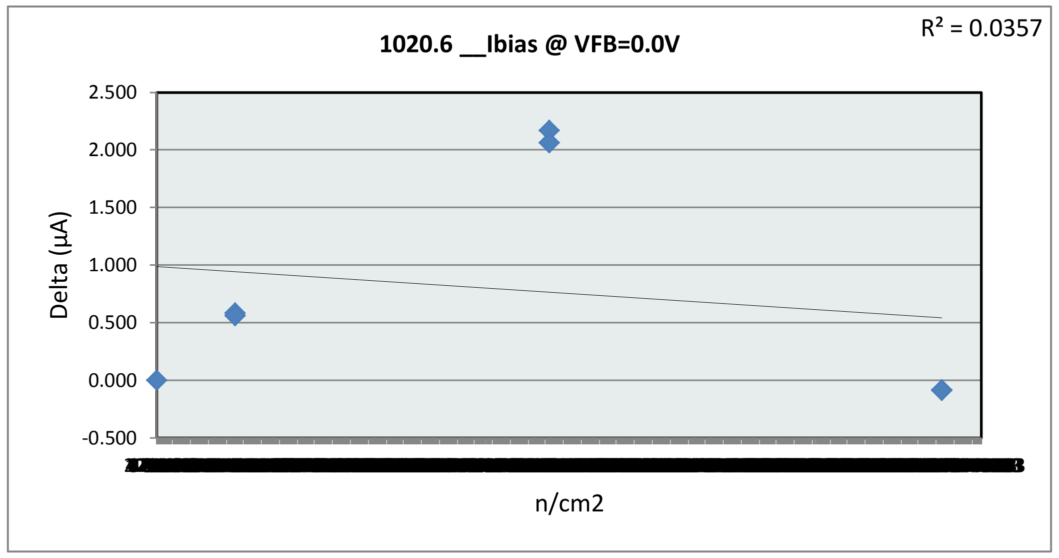
	1020.5 __Isink			
Test Site				
Tester				
Test Number				
Max Limit	20	mA		
Min Limit	2	mA		
n/cm2	0	1E+12	5E+12	1E+13
LL	2.000	2.000	2.000	2.000
Min	6.563	6.452	6.113	-0.044
Average	6.563	6.474	6.128	-0.043
Max	6.563	6.512	6.157	-0.041
UL	20.000	20.000	20.000	20.000



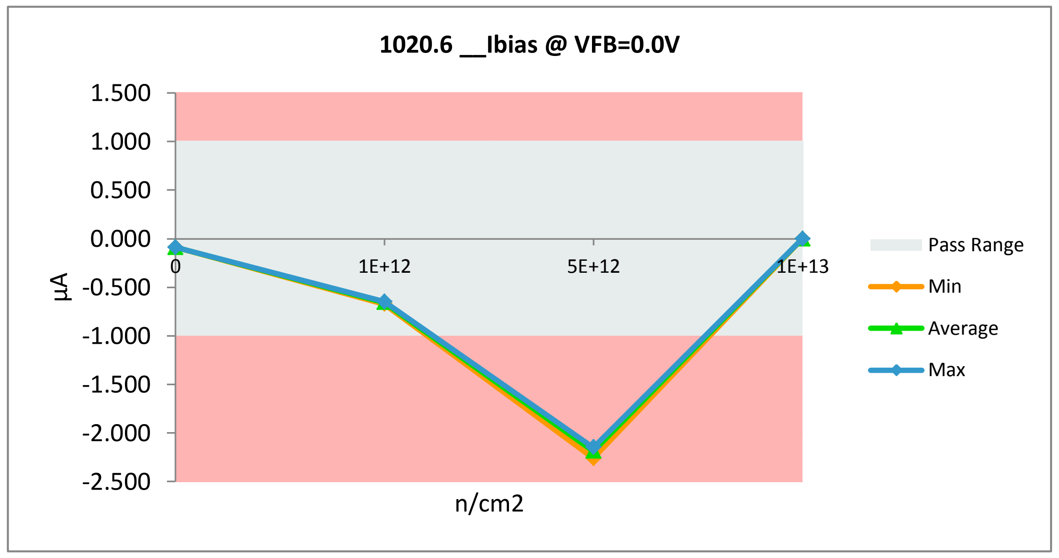
NDD Report
Device Name

	1020.6 __Ibias @ VFB=0.0V		
Test Site			
Tester			
Test Number			
Unit	µA	µA	
Max Limit	1	1	
Min Limit	-1	-1	

n/cm2	Serial #	Pre	Post	Delta
0	1	-0.089	-0.089	0.000
1E+12	1E12_11	-0.087	-0.647	0.560
1E+12	1E12_11	-0.087	-0.672	0.585
1E+12	1E12_12	-0.087	-0.650	0.562
5E+12	5E12_12	-0.088	-2.259	2.171
5E+12	5E12_12	-0.087	-2.149	2.062
5E+12	5E12_12	-0.085	-2.147	2.063
1E+13	1E13_12	-0.087	-0.001	-0.086
1E+13	1E13_12	-0.087	-0.001	-0.086
1E+13	1E13_12	-0.088	-0.001	-0.087
	Max	-0.085	-0.001	2.171
	Average	-0.087	-0.862	0.774
	Min	-0.089	-2.259	-0.087
	Std Dev	0.001	0.955	0.956

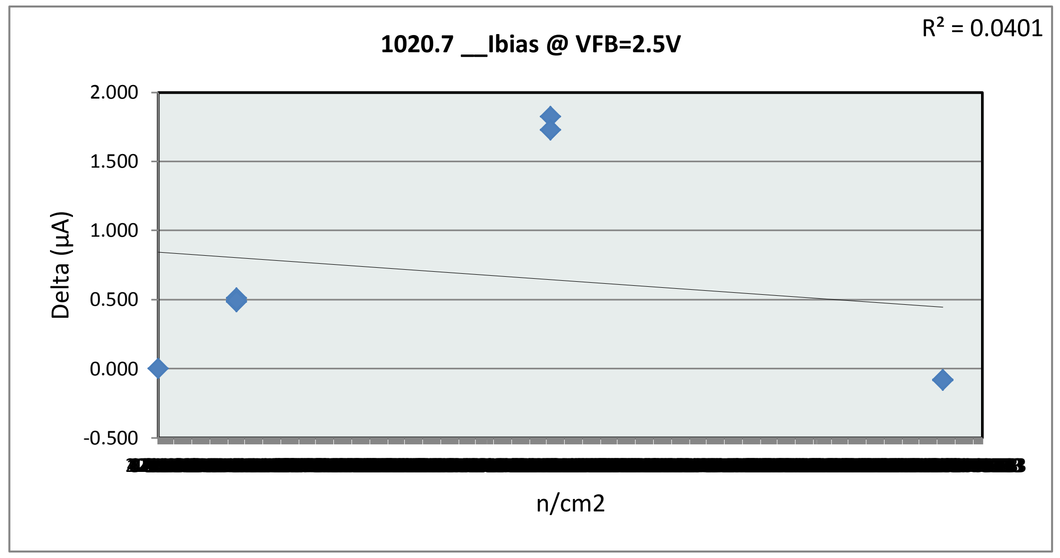


	1020.6 __Ibias @ VFB=0.0V			
Test Site				
Tester				
Test Number				
Max Limit	1	µA		
Min Limit	-1	µA		
n/cm2	0	1E+12	5E+12	1E+13
LL	-1.000	-1.000	-1.000	-1.000
Min	-0.089	-0.672	-2.259	-0.001
Average	-0.089	-0.656	-2.185	-0.001
Max	-0.089	-0.647	-2.147	-0.001
UL	1.000	1.000	1.000	1.000

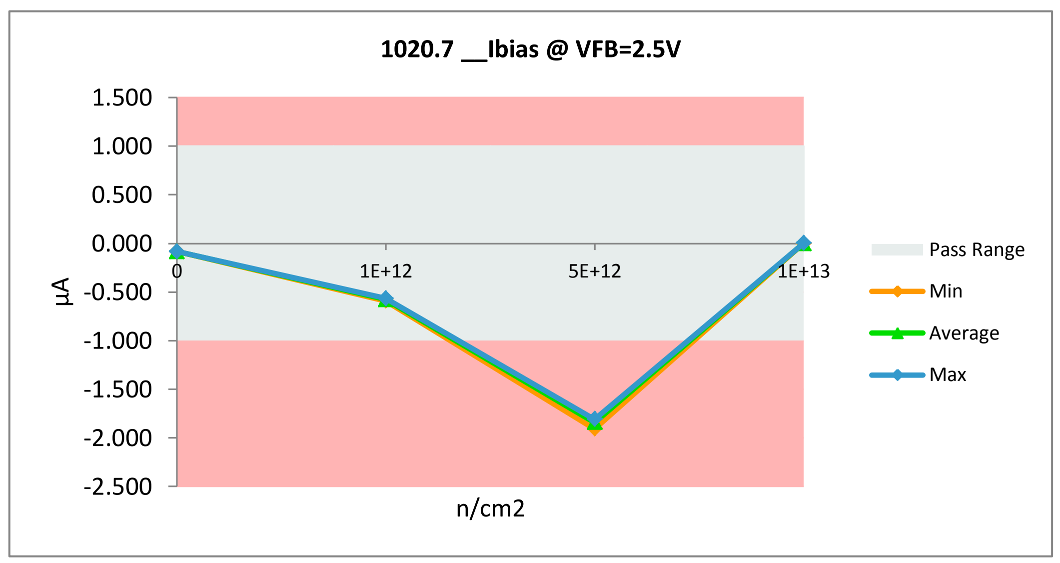


NDD Report
Device Name

		1020.7 __Ibias @ VFB=2.5V		
	Test Site			
	Tester			
	Test Number			
	Unit	µA	µA	
	Max Limit	1	1	
	Min Limit	-1	-1	
n/cm2	Serial #	Pre	Post	Delta
0	1	-0.083	-0.083	0.000
1E+12	1E12_11	-0.081	-0.567	0.486
1E+12	1E12_11	-0.081	-0.591	0.510
1E+12	1E12_12	-0.081	-0.572	0.491
5E+12	5E12_12	-0.082	-1.906	1.824
5E+12	5E12_12	-0.080	-1.809	1.729
5E+12	5E12_12	-0.079	-1.807	1.728
1E+13	1E13_12	-0.080	0.000	-0.081
1E+13	1E13_12	-0.081	0.000	-0.081
1E+13	1E13_12	-0.082	0.001	-0.082
	Max	-0.079	0.001	1.824
	Average	-0.081	-0.733	0.652
	Min	-0.083	-1.906	-0.082
	Std Dev	0.001	0.803	0.803

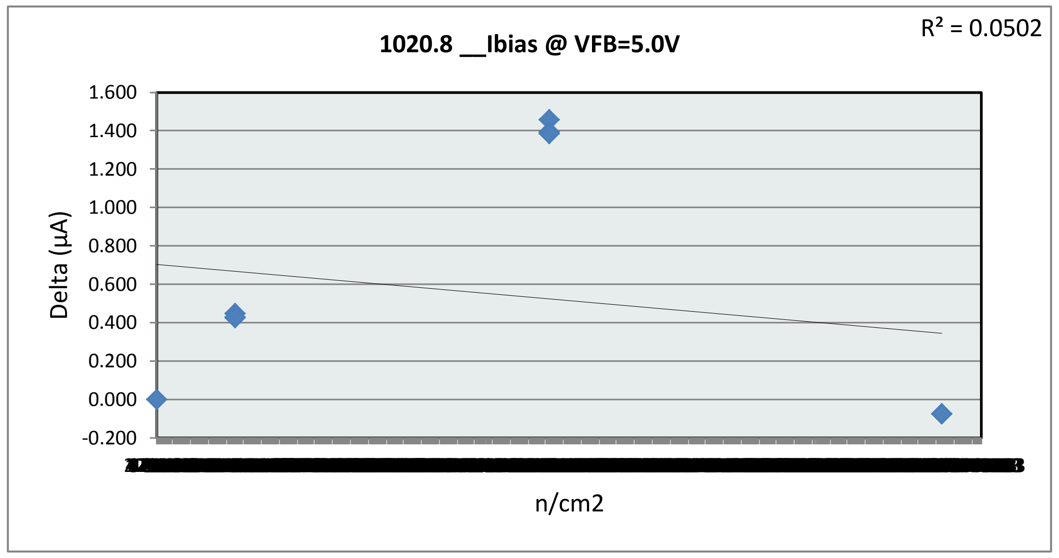


	1020.7 __Ibias @ VFB=2.5V			
Test Site				
Tester				
Test Number				
Max Limit	1	µA		
Min Limit	-1	µA		
n/cm2	0	1E+12	5E+12	1E+13
LL	-1.000	-1.000	-1.000	-1.000
Min	-0.083	-0.591	-1.906	0.000
Average	-0.083	-0.577	-1.841	0.000
Max	-0.083	-0.567	-1.807	0.001
UL	1.000	1.000	1.000	1.000

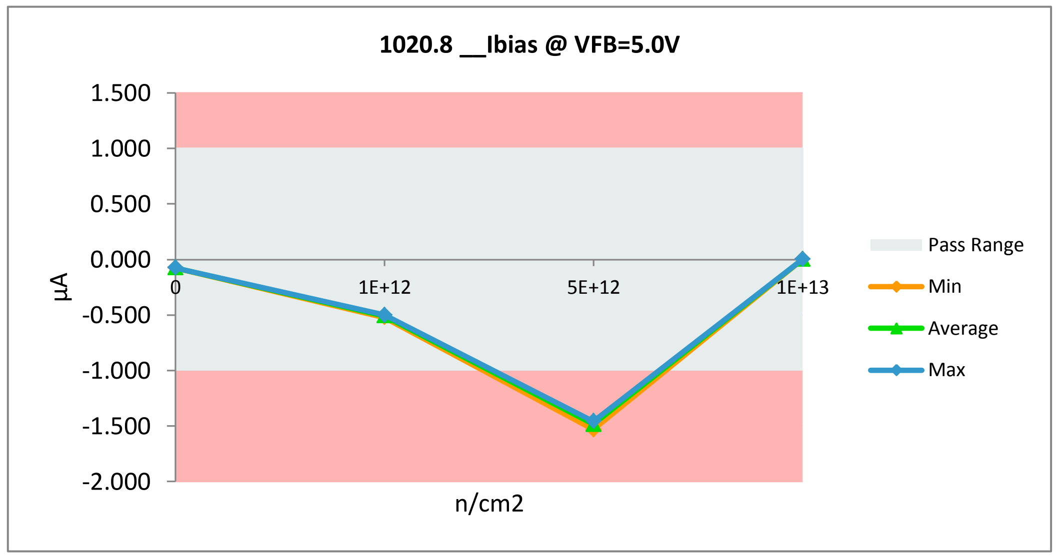


NDD Report
Device Name

		1020.8 __Ibias @ VFB=5.0V		
	Test Site			
	Tester			
	Test Number			
	Unit	µA	µA	
	Max Limit	1	1	
	Min Limit	-1	-1	
n/cm2	Serial #	Pre	Post	Delta
0	1	-0.075	-0.075	0.000
1E+12	1E12_11	-0.074	-0.500	0.426
1E+12	1E12_11	-0.074	-0.520	0.447
1E+12	1E12_12	-0.074	-0.502	0.428
5E+12	5E12_12	-0.074	-1.531	1.457
5E+12	5E12_12	-0.073	-1.464	1.392
5E+12	5E12_12	-0.072	-1.457	1.385
1E+13	1E13_12	-0.073	0.001	-0.075
1E+13	1E13_12	-0.073	0.001	-0.075
1E+13	1E13_12	-0.074	0.001	-0.075
	Max	-0.072	0.001	1.457
	Average	-0.074	-0.605	0.531
	Min	-0.075	-1.531	-0.075
	Std Dev	0.001	0.644	0.645



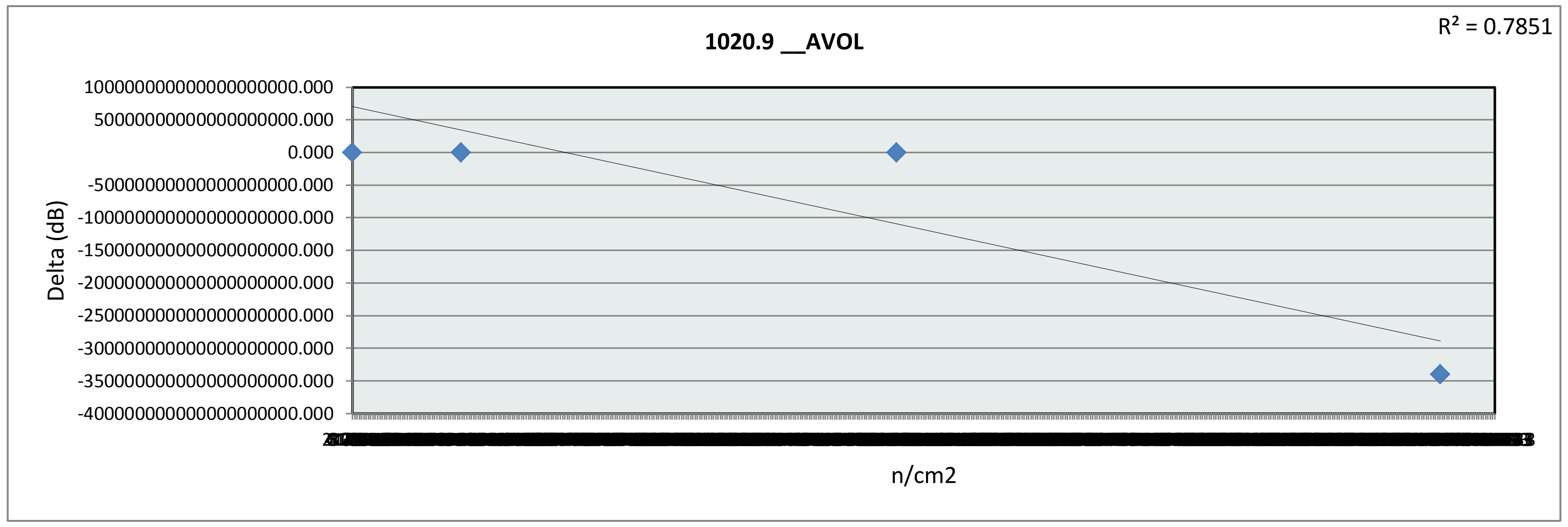
	1020.8 __Ibias @ VFB=5.0V			
Test Site				
Tester				
Test Number				
Max Limit	1	µA		
Min Limit	-1	µA		
n/cm2	0	1E+12	5E+12	1E+13
LL	-1.000	-1.000	-1.000	-1.000
Min	-0.075	-0.520	-1.532	0.001
Average	-0.075	-0.507	-1.484	0.001
Max	-0.075	-0.500	-1.457	0.001
UL	1.000	1.000	1.000	1.000



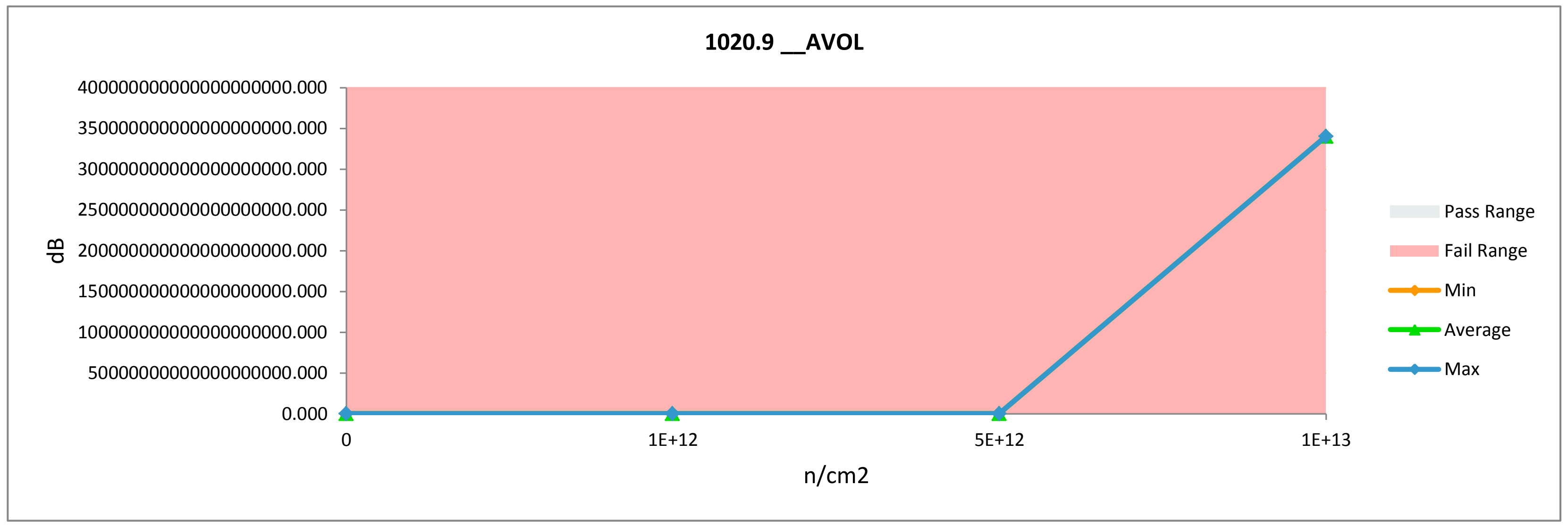
NDD Report
Device Name

	1020.9 __AVOL		
Test Site			
Tester			
Test Number			
Unit	dB	dB	
Max Limit	200	200	
Min Limit	65	65	

n/cm2	Serial #	Pre	Post	Delta
0	1	85.769	85.769	0.000
1E+12	1E12_11	86.864	82.494	4.370
1E+12	1E12_11	147.879	87.243	60.636
1E+12	1E12_12	100.275	80.484	19.791
5E+12	5E12_12	101.518	77.018	24.500
5E+12	5E12_12	106.818	77.090	29.728
5E+12	5E12_12	95.030	79.607	15.423
1E+13	1E13_12	92.201	3.40E+20	-3.40E+20
1E+13	1E13_12	94.237	3.40E+20	-3.40E+20
1E+13	1E13_12	93.848	3.40E+20	-3.40E+20
	Max	147.879	3.40E+20	6.06E+01
	Average	100.444	1.02E+20	-1.02E+20
	Min	85.769	7.70E+01	-3.40E+20
	Std Dev	17.861	1.64E+20	1.64E+20

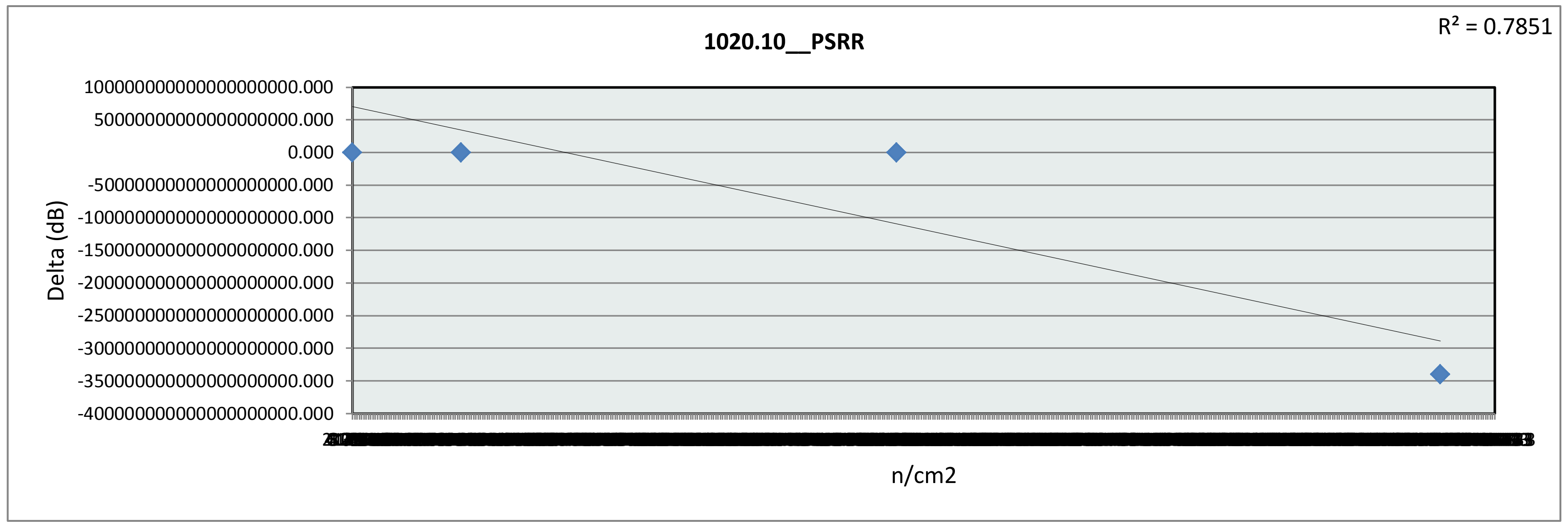


	1020.9 __AVOL			
Test Site				
Tester				
Test Number				
Max Limit	200	dB		
Min Limit	65	dB		
n/cm2	0	1E+12	5E+12	1E+13
LL	65.000	65.000	65.000	65.000
Min	85.769	80.484	77.018	3.40E+20
Average	85.769	83.407	77.905	3.40E+20
Max	85.769	87.243	79.607	3.40E+20
UL	200.000	200.000	200.000	200.000

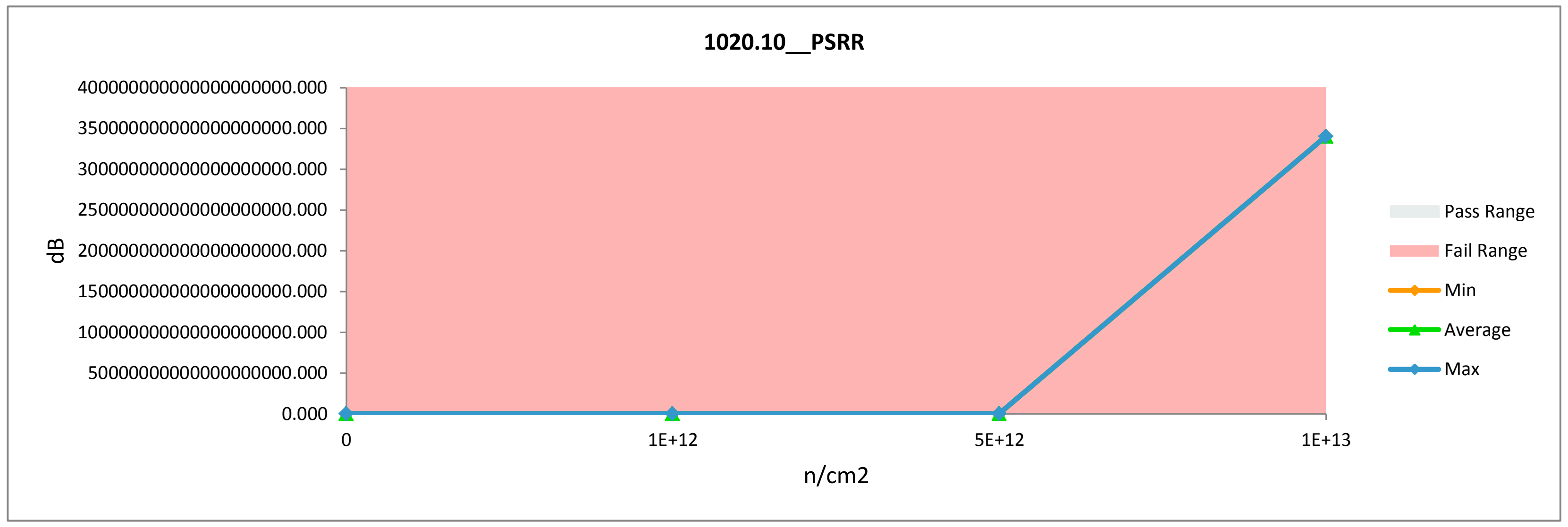


NDD Report
Device Name

1020.10__PSRR				
	Test Site			
	Tester			
	Test Number			
	Unit	dB	dB	
	Max Limit	130	130	
	Min Limit	60	60	
n/cm2	Serial #	Pre	Post	Delta
0	1	81.523	81.523	0.000
1E+12	1E12_11	80.907	81.446	-0.539
1E+12	1E12_11	81.196	81.580	-0.384
1E+12	1E12_12	82.997	82.617	0.379
5E+12	5E12_12	81.564	80.749	0.814
5E+12	5E12_12	82.132	82.506	-0.375
5E+12	5E12_12	80.365	81.577	-1.212
1E+13	1E13_12	81.630	3.40E+20	-3.40E+20
1E+13	1E13_12	80.673	3.40E+20	-3.40E+20
1E+13	1E13_12	83.110	3.40E+20	-3.40E+20
	Max	83.110	3.40E+20	8.14E-01
	Average	81.610	1.02E+20	-1.02E+20
	Min	80.365	8.07E+01	-3.40E+20
	Std Dev	0.916	1.64E+20	1.64E+20

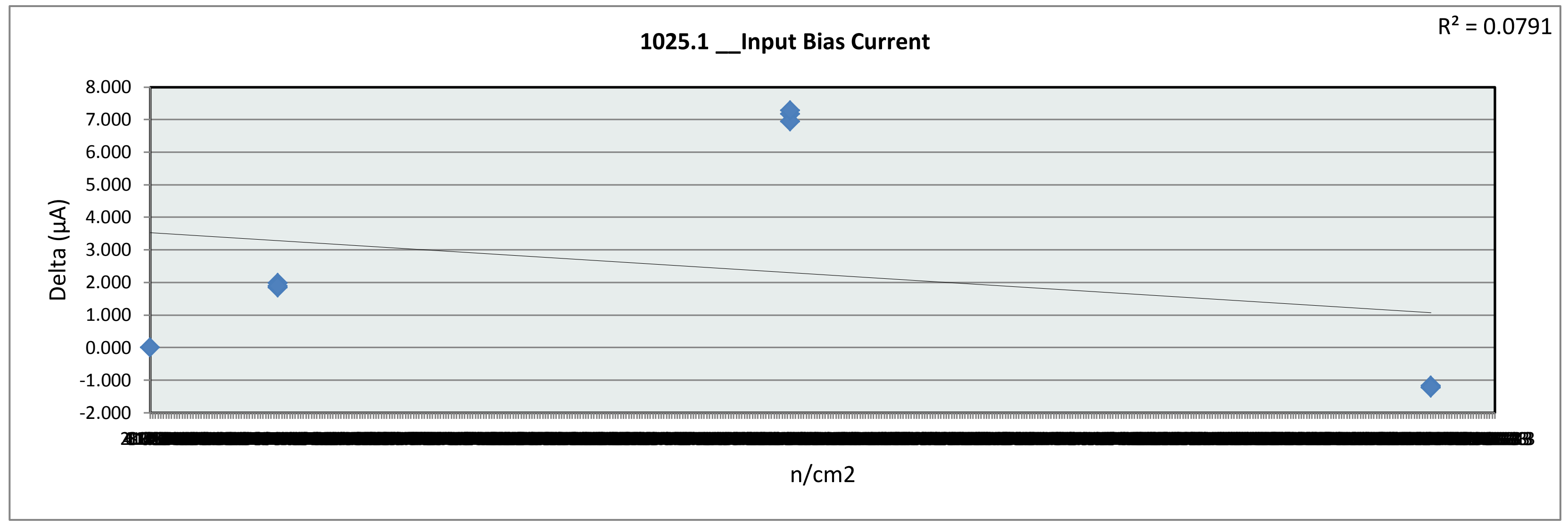


1020.10__PSRR				
Test Site				
Tester				
Test Number				
Max Limit	130	dB		
Min Limit	60	dB		
n/cm2	0	1E+12	5E+12	1E+13
LL	60.000	60.000	60.000	60.000
Min	81.523	81.446	80.750	3.40E+20
Average	81.523	81.881	81.611	3.40E+20
Max	81.523	82.617	82.506	3.40E+20
UL	130.000	130.000	130.000	130.000

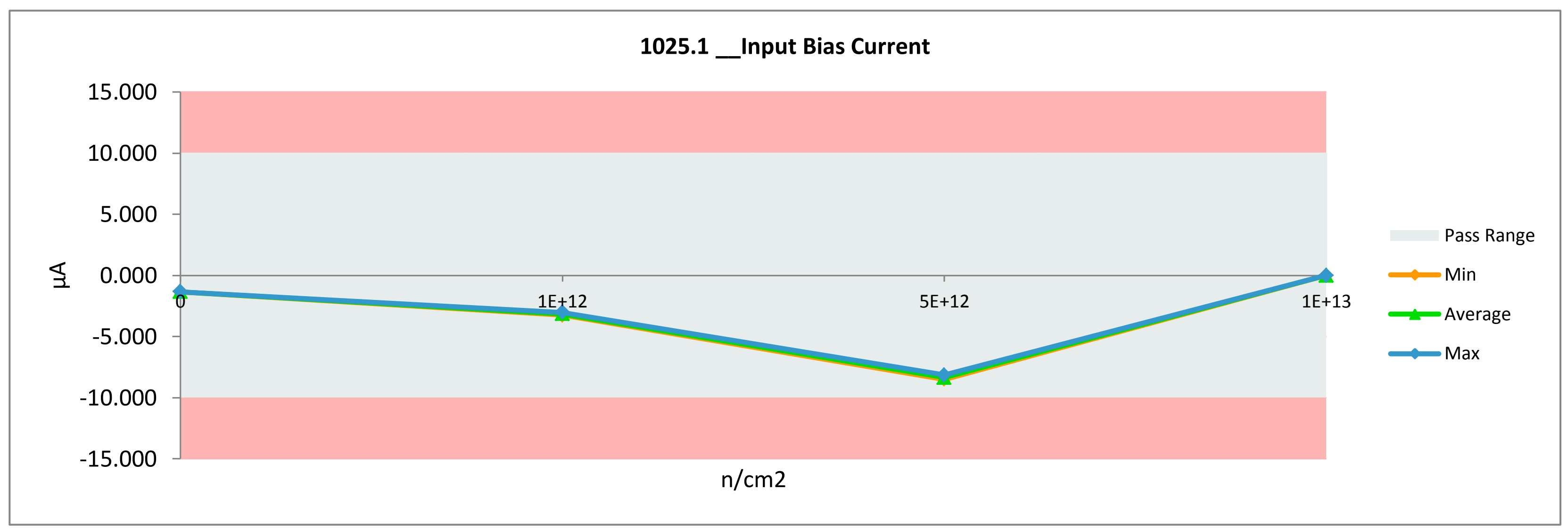


NDD Report
Device Name

		1025.1 __Input Bias Current		
Test Site				
Tester				
Test Number				
Unit		µA	µA	
Max Limit		10	10	
Min Limit		-10	-10	
n/cm2	Serial #	Pre	Post	Delta
0	1	-1.339	-1.339	0.000
1E+12	1E12_11	-1.181	-3.022	1.841
1E+12	1E12_11	-1.267	-3.256	1.989
1E+12	1E12_12	-1.274	-3.162	1.888
5E+12	5E12_12	-1.223	-8.401	7.178
5E+12	5E12_12	-1.196	-8.133	6.937
5E+12	5E12_12	-1.206	-8.492	7.286
1E+13	1E13_12	-1.174	0.000	-1.175
1E+13	1E13_12	-1.229	0.000	-1.229
1E+13	1E13_12	-1.222	0.000	-1.222
	Max	-1.174	0.000	7.286
	Average	-1.231	-3.581	2.349
	Min	-1.339	-8.492	-1.229
	Std Dev	0.050	3.530	3.541

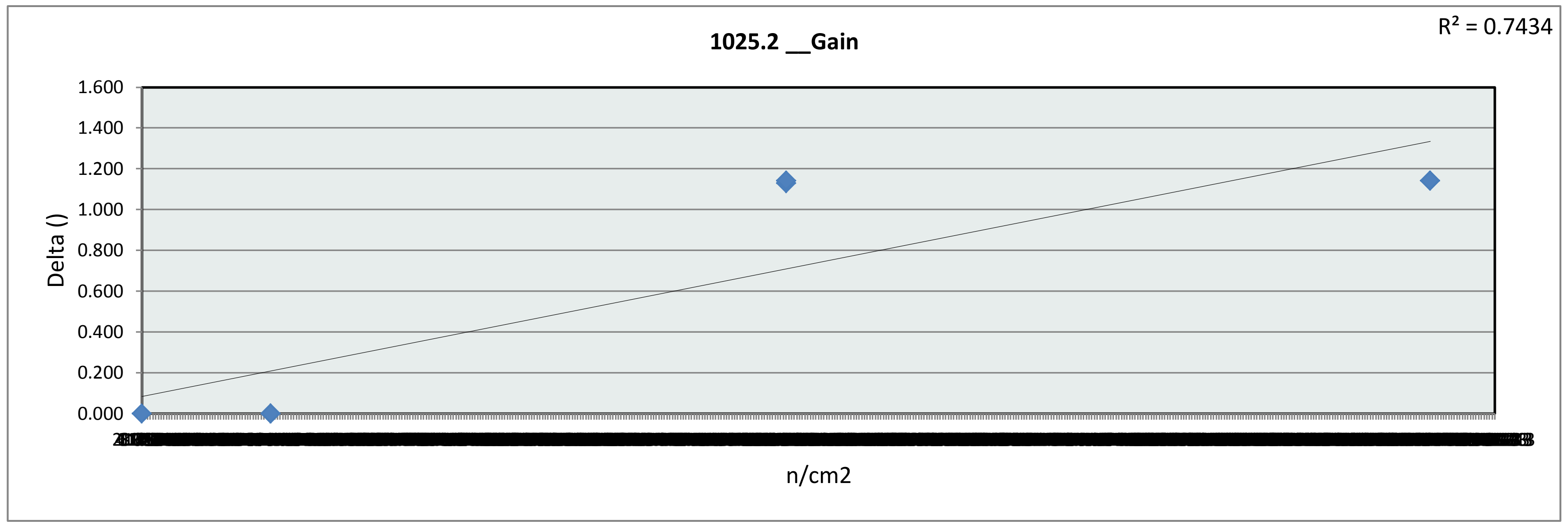


	1025.1 __Input Bias Current			
Test Site				
Tester				
Test Number				
Max Limit	10	µA		
Min Limit	-10	µA		
n/cm2	0	1E+12	5E+12	1E+13
LL	-10.000	-10.000	-10.000	-10.000
Min	-1.339	-3.256	-8.492	0.000
Average	-1.339	-3.147	-8.342	0.000
Max	-1.339	-3.022	-8.133	0.000
UL	10.000	10.000	10.000	10.000

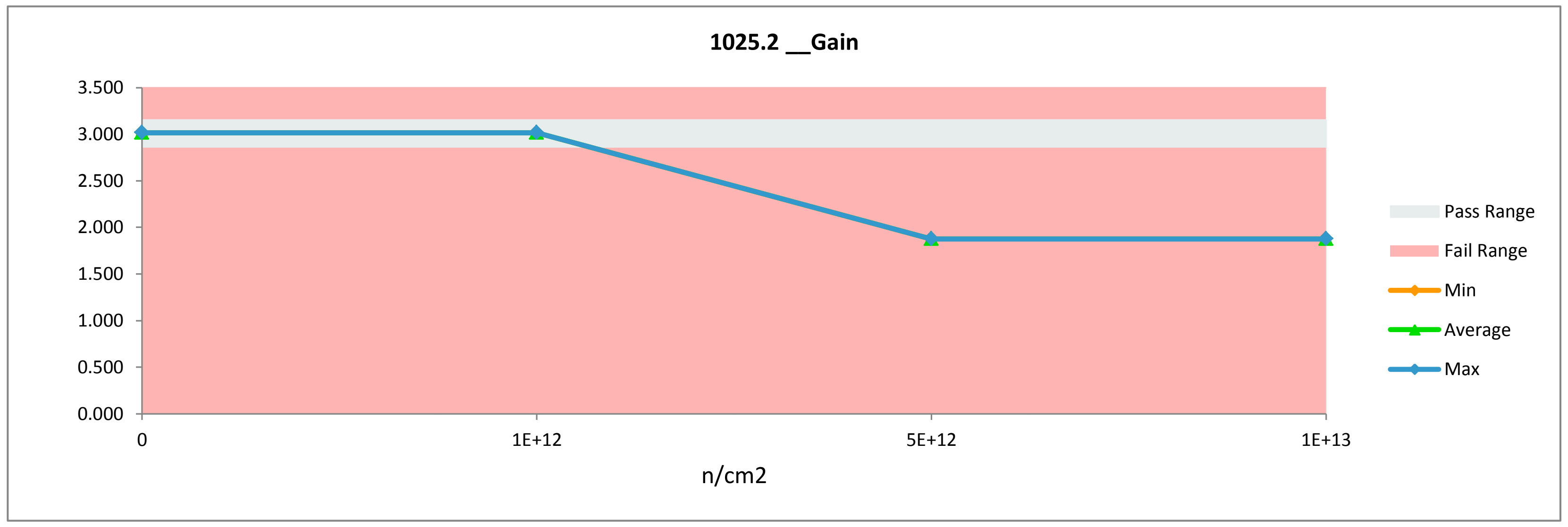


NDD Report
Device Name

		1025.2 __Gain		
Test Site				
Tester				
Test Number				
Unit				
Max Limit		3.15	3.15	
Min Limit		2.85	2.85	
n/cm2	Serial #	Pre	Post	Delta
0	1	3.016	3.016	0.000
1E+12	1E12_11	3.016	3.016	0.000
1E+12	1E12_11	3.016	3.016	0.000
1E+12	1E12_12	3.016	3.016	0.000
5E+12	5E12_12	3.003	1.875	1.128
5E+12	5E12_12	3.016	1.875	1.141
5E+12	5E12_12	3.016	1.875	1.141
1E+13	1E13_12	3.016	1.875	1.141
1E+13	1E13_12	3.016	1.875	1.141
1E+13	1E13_12	3.016	1.875	1.141
	Max	3.016	3.016	1.141
	Average	3.015	2.331	0.683
	Min	3.003	1.875	0.000
	Std Dev	0.004	0.589	0.588

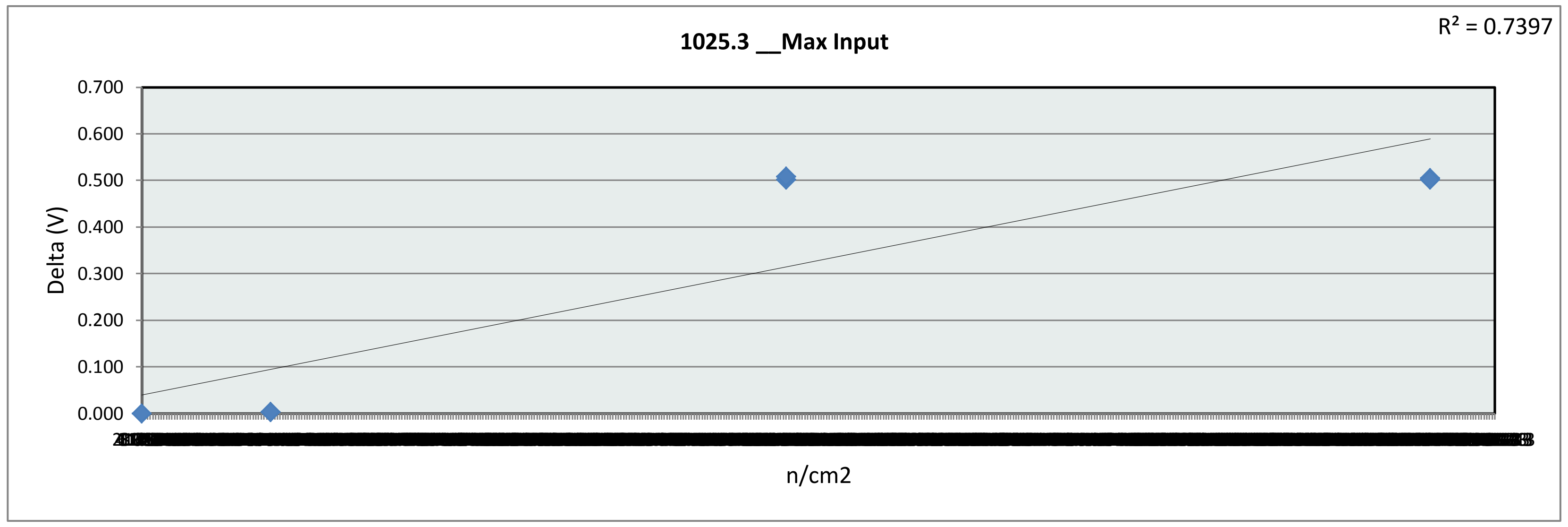


	1025.2 __Gain			
Test Site				
Tester				
Test Number				
Max Limit	3.15			
Min Limit	2.85			
n/cm2	0	1E+12	5E+12	1E+13
LL	2.850	2.850	2.850	2.850
Min	3.016	3.016	1.875	1.875
Average	3.016	3.016	1.875	1.875
Max	3.016	3.016	1.875	1.875
UL	3.150	3.150	3.150	3.150

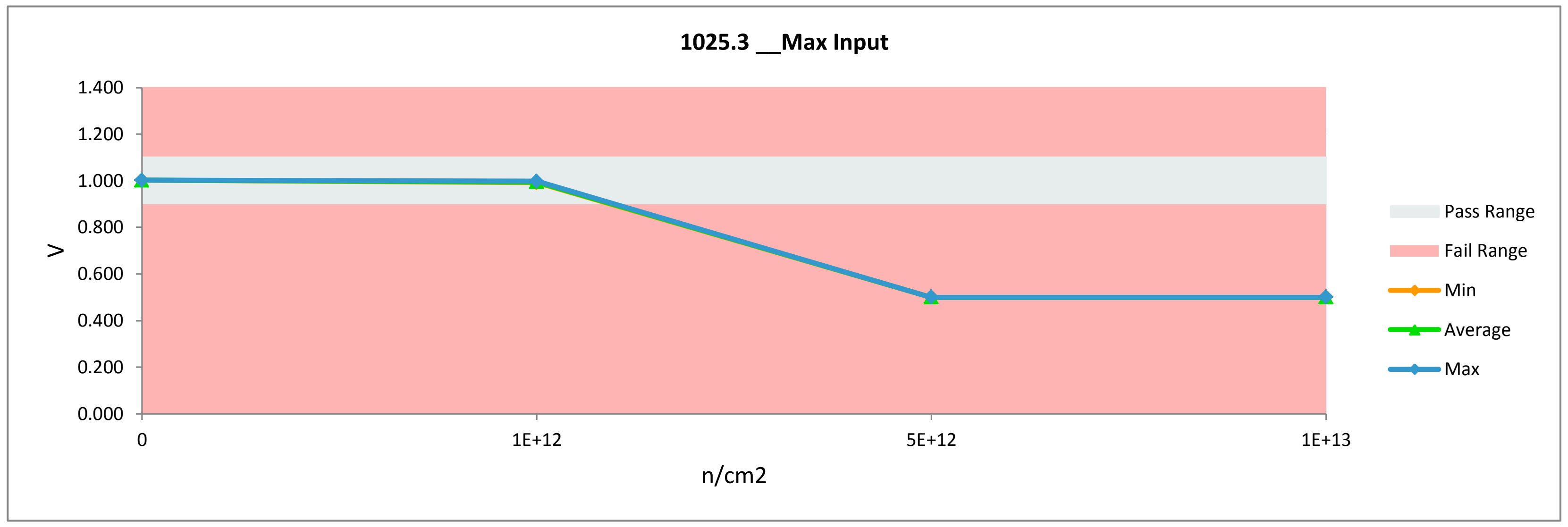


NDD Report
Device Name

		1025.3 __Max Input		
	Test Site			
	Tester			
	Test Number			
	Unit	V	V	
	Max Limit	1.1	1.1	
	Min Limit	0.9	0.9	
n/cm2	Serial #	Pre	Post	Delta
0	1	1.002	1.002	0.000
1E+12	1E12_11	1.002	0.998	0.003
1E+12	1E12_11	0.998	0.995	0.003
1E+12	1E12_12	0.995	0.992	0.003
5E+12	5E12_12	1.002	0.500	0.502
5E+12	5E12_12	1.002	0.500	0.502
5E+12	5E12_12	1.008	0.500	0.508
1E+13	1E13_12	1.002	0.500	0.502
1E+13	1E13_12	1.005	0.500	0.505
1E+13	1E13_12	1.002	0.500	0.502
	Max	1.008	1.002	0.508
	Average	1.002	0.699	0.303
	Min	0.995	0.500	0.000
	Std Dev	0.004	0.256	0.259

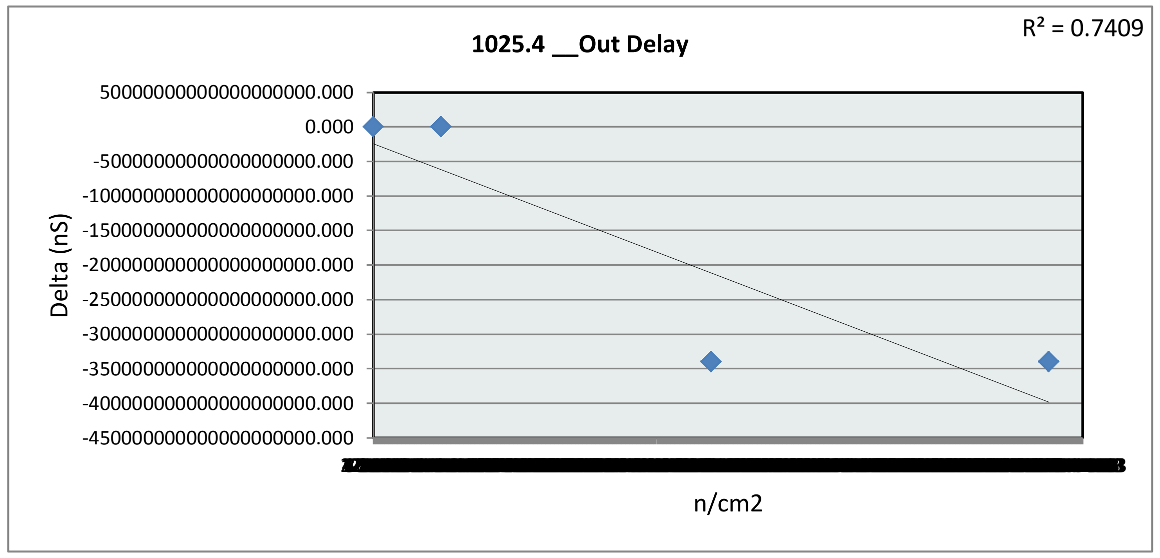


	1025.3 __Max Input			
Test Site				
Tester				
Test Number				
Max Limit	1.1	V		
Min Limit	0.9	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	0.900	0.900	0.900	0.900
Min	1.002	0.992	0.500	0.500
Average	1.002	0.995	0.500	0.500
Max	1.002	0.998	0.500	0.500
UL	1.100	1.100	1.100	1.100

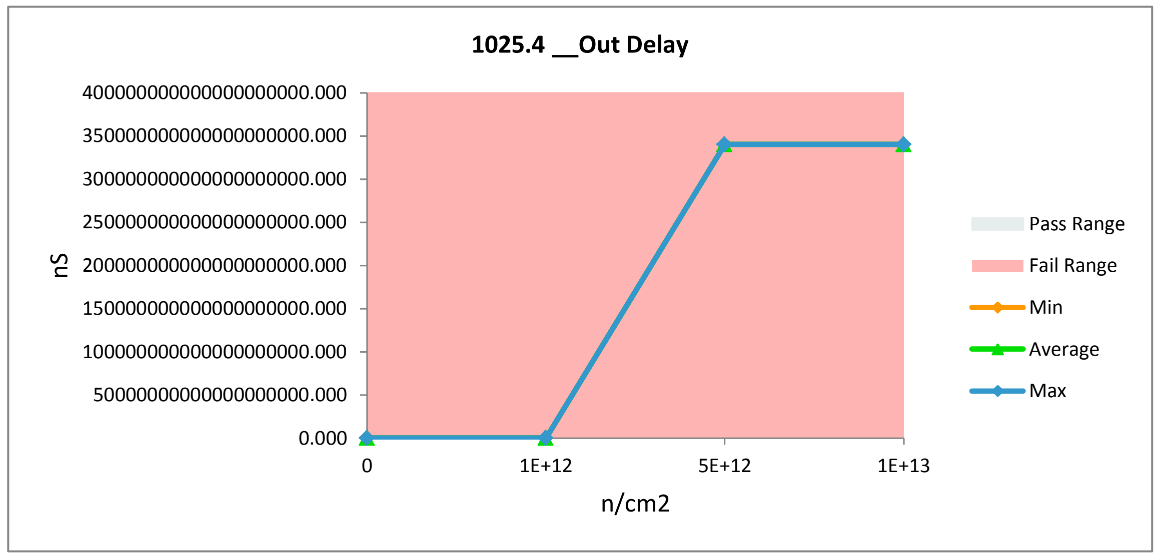


NDD Report
Device Name

		1025.4 __Out Delay		
	Test Site			
	Tester			
	Test Number			
	Unit	nS	nS	
	Max Limit	300	300	
	Min Limit	50	50	
n/cm2	Serial #	Pre	Post	Delta
0	1	140.449	140.449	0.000
1E+12	1E12_11	143.208	139.214	3.993
1E+12	1E12_11	143.366	138.346	5.020
1E+12	1E12_12	143.387	138.491	4.896
5E+12	5E12_12	145.838	3.40E+20	-3.40E+20
5E+12	5E12_12	146.540	3.40E+20	-3.40E+20
5E+12	5E12_12	145.105	3.40E+20	-3.40E+20
1E+13	1E13_12	143.919	3.40E+20	-3.40E+20
1E+13	1E13_12	145.759	3.40E+20	-3.40E+20
1E+13	1E13_12	144.569	3.40E+20	-3.40E+20
	Max	146.540	3.40E+20	5.02E+00
	Average	144.214	2.04E+20	-2.04E+20
	Min	140.449	1.38E+02	-3.40E+20
	Std Dev	1.765	1.76E+20	1.76E+20



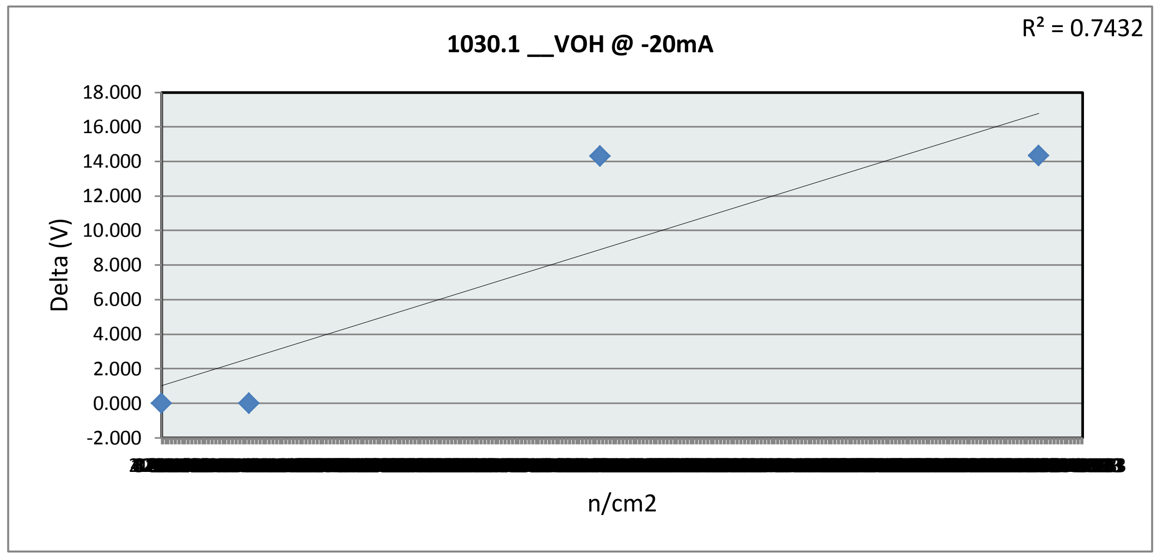
	1025.4 __Out Delay			
Test Site				
Tester				
Test Number				
Max Limit	300	nS		
Min Limit	50	nS		
n/cm2	0	1E+12	5E+12	1E+13
LL	50.000	50.000	50.000	50.000
Min	140.449	138.346	3.40E+20	3.40E+20
Average	140.449	138.684	3.40E+20	3.40E+20
Max	140.449	139.215	3.40E+20	3.40E+20
UL	300.000	300.000	300.000	300.000



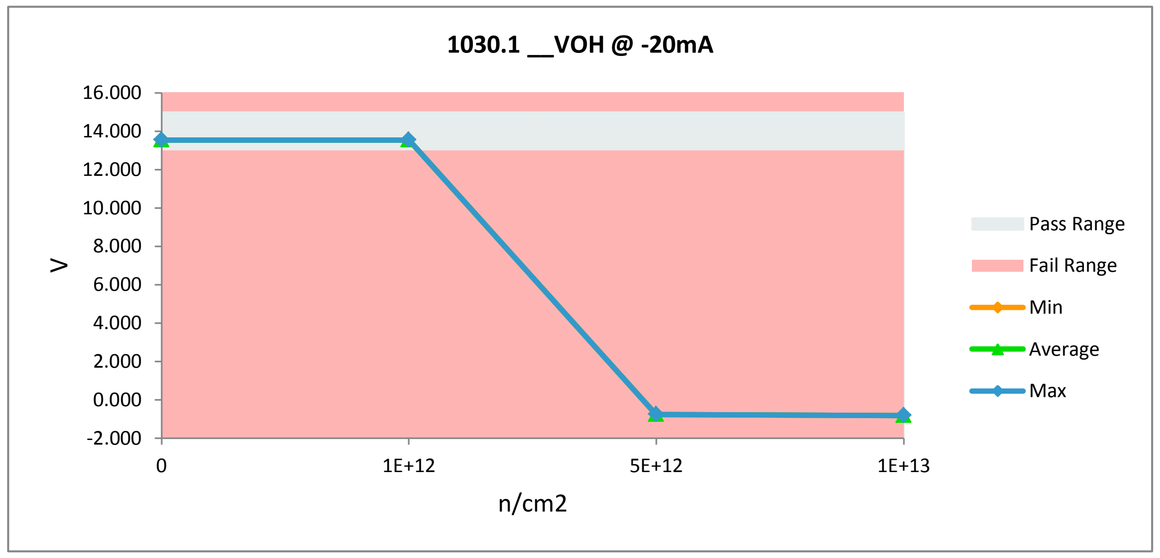
NDD Report
Device Name

	1030.1 __VOH @ -20mA		
Test Site			
Tester			
Test Number			
Unit	V	V	
Max Limit	15	15	
Min Limit	13	13	

n/cm2	Serial #	Pre	Post	Delta
0	1	13.538	13.538	0.000
1E+12	1E12_11	13.530	13.534	-0.004
1E+12	1E12_11	13.537	13.539	-0.002
1E+12	1E12_12	13.536	13.536	0.000
5E+12	5E12_12	13.538	-0.764	14.302
5E+12	5E12_12	13.537	-0.764	14.301
5E+12	5E12_12	13.536	-0.767	14.304
1E+13	1E13_12	13.536	-0.814	14.350
1E+13	1E13_12	13.537	-0.814	14.351
1E+13	1E13_12	13.538	-0.815	14.353
	Max	13.538	13.539	14.353
	Average	13.536	4.941	8.596
	Min	13.530	-0.815	-0.004
	Std Dev	0.002	7.398	7.399



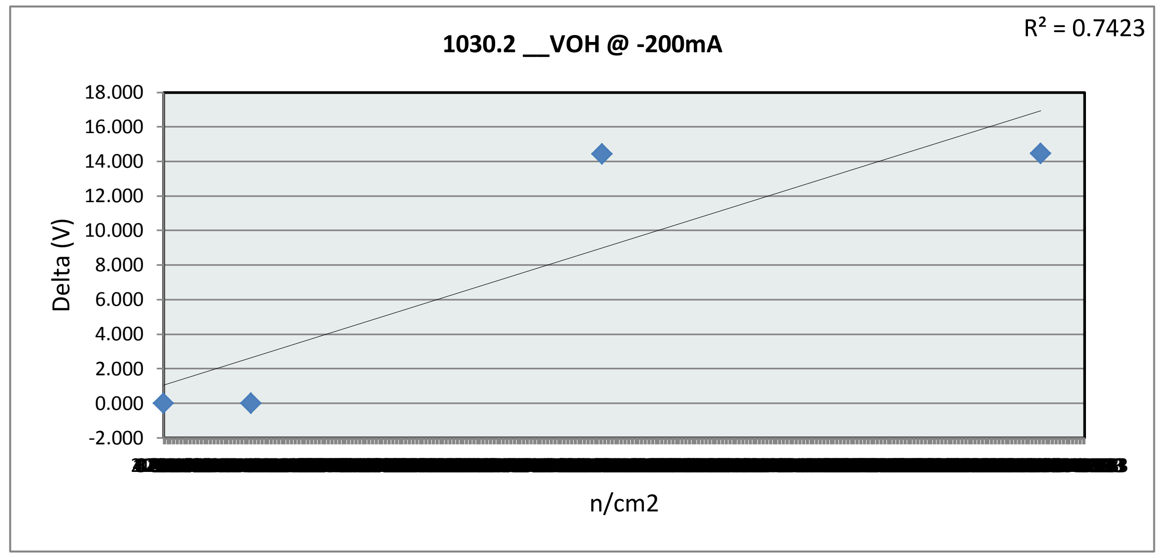
	1030.1 __VOH @ -20mA			
Test Site				
Tester				
Test Number				
Max Limit	15	V		
Min Limit	13	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	13.000	13.000	13.000	13.000
Min	13.538	13.534	-0.767	-0.815
Average	13.538	13.536	-0.765	-0.814
Max	13.538	13.539	-0.764	-0.814
UL	15.000	15.000	15.000	15.000



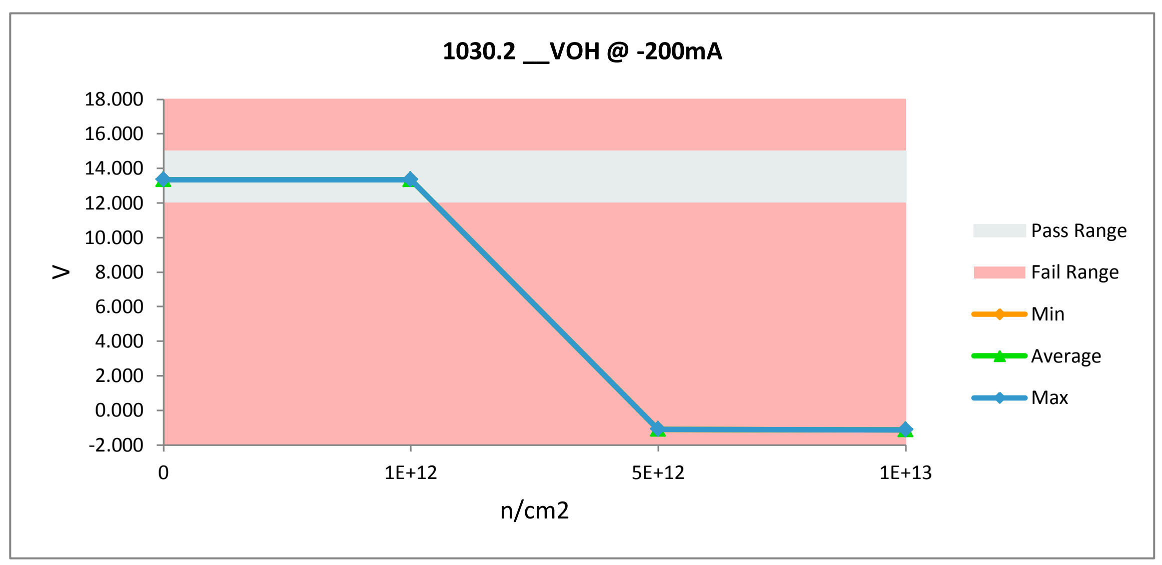
NDD Report
Device Name

	1030.2 __VOH @ -200mA		
Test Site			
Tester			
Test Number			
Unit	V	V	
Max Limit	15	15	
Min Limit	12	12	

n/cm2	Serial #	Pre	Post	Delta
0	1	13.357	13.357	0.000
1E+12	1E12_11	13.352	13.354	-0.001
1E+12	1E12_11	13.357	13.356	0.001
1E+12	1E12_12	13.354	13.352	0.001
5E+12	5E12_12	13.358	-1.086	14.444
5E+12	5E12_12	13.356	-1.084	14.440
5E+12	5E12_12	13.353	-1.086	14.439
1E+13	1E13_12	13.356	-1.113	14.469
1E+13	1E13_12	13.356	-1.115	14.471
1E+13	1E13_12	13.358	-1.116	14.473
	Max	13.358	13.357	14.473
	Average	13.356	4.682	8.674
	Min	13.352	-1.116	-0.001
	Std Dev	0.002	7.464	7.465



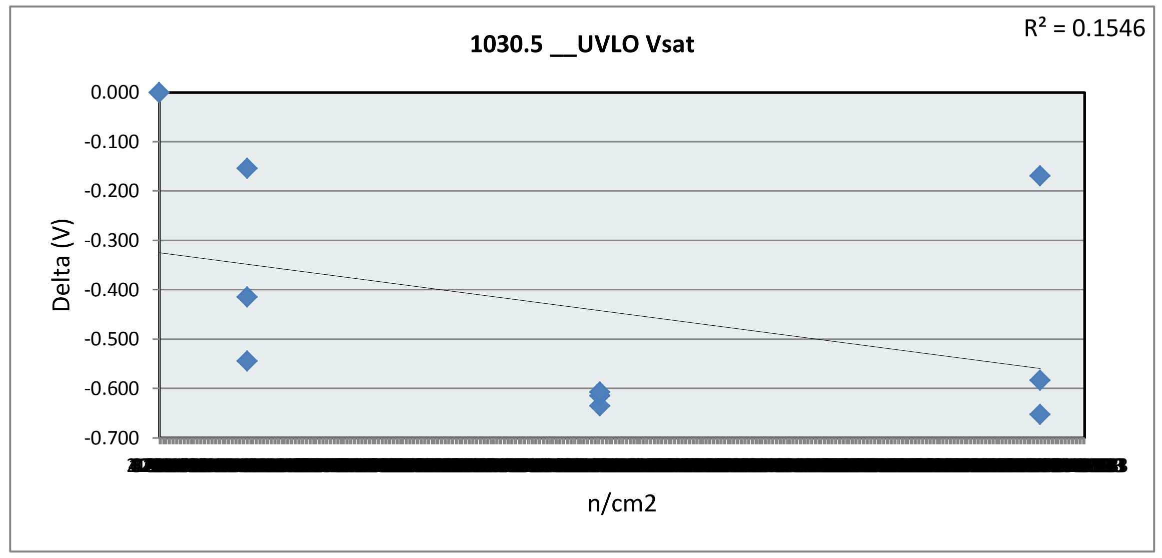
	1030.2 __VOH @ -200mA			
Test Site				
Tester				
Test Number				
Max Limit	15	V		
Min Limit	12	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	12.000	12.000	12.000	12.000
Min	13.357	13.352	-1.086	-1.116
Average	13.357	13.354	-1.085	-1.115
Max	13.357	13.356	-1.084	-1.113
UL	15.000	15.000	15.000	15.000



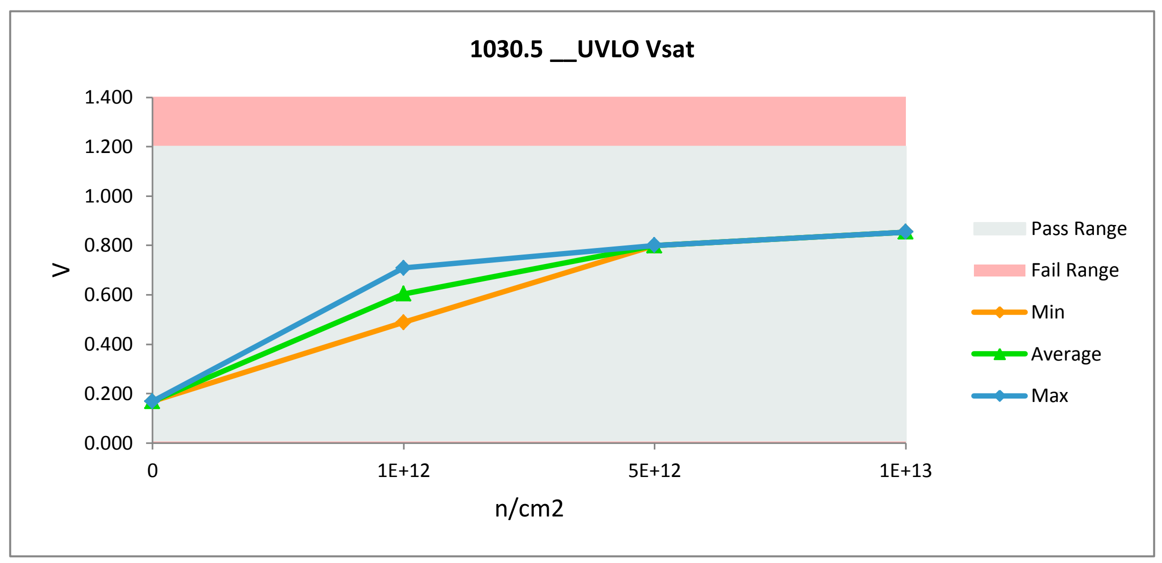
NDD Report
Device Name

	1030.5 __UVLO Vsat		
Test Site			
Tester			
Test Number			
Unit	V	V	
Max Limit	1.2	1.2	
Min Limit	0.005	0.005	

n/cm2	Serial #	Pre	Post	Delta
0	1	0.168	0.168	0.000
1E+12	1E12_11	0.200	0.615	-0.414
1E+12	1E12_11	0.164	0.708	-0.544
1E+12	1E12_12	0.334	0.488	-0.154
5E+12	5E12_12	0.164	0.799	-0.635
5E+12	5E12_12	0.184	0.800	-0.615
5E+12	5E12_12	0.191	0.799	-0.607
1E+13	1E13_12	0.685	0.854	-0.169
1E+13	1E13_12	0.201	0.854	-0.653
1E+13	1E13_12	0.271	0.854	-0.584
	Max	0.685	0.854	0.000
	Average	0.256	0.694	-0.438
	Min	0.164	0.168	-0.653
	Std Dev	0.160	0.220	0.241

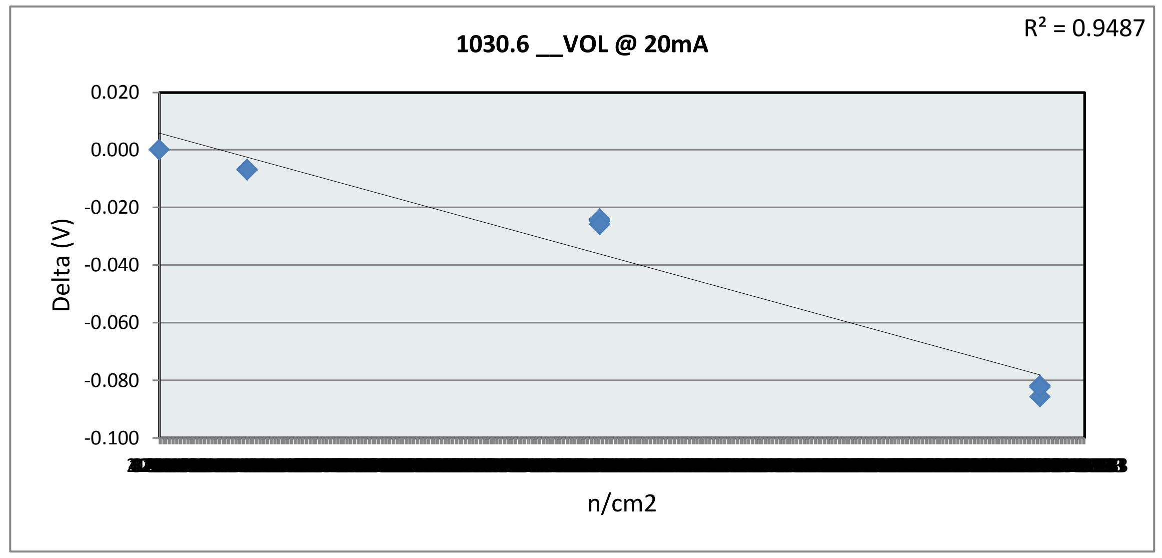


	1030.5 __UVLO Vsat			
Test Site				
Tester				
Test Number				
Max Limit	1.2	V		
Min Limit	0.005	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	0.005	0.005	0.005	0.005
Min	0.168	0.488	0.799	0.854
Average	0.168	0.604	0.799	0.854
Max	0.168	0.708	0.800	0.855
UL	1.200	1.200	1.200	1.200

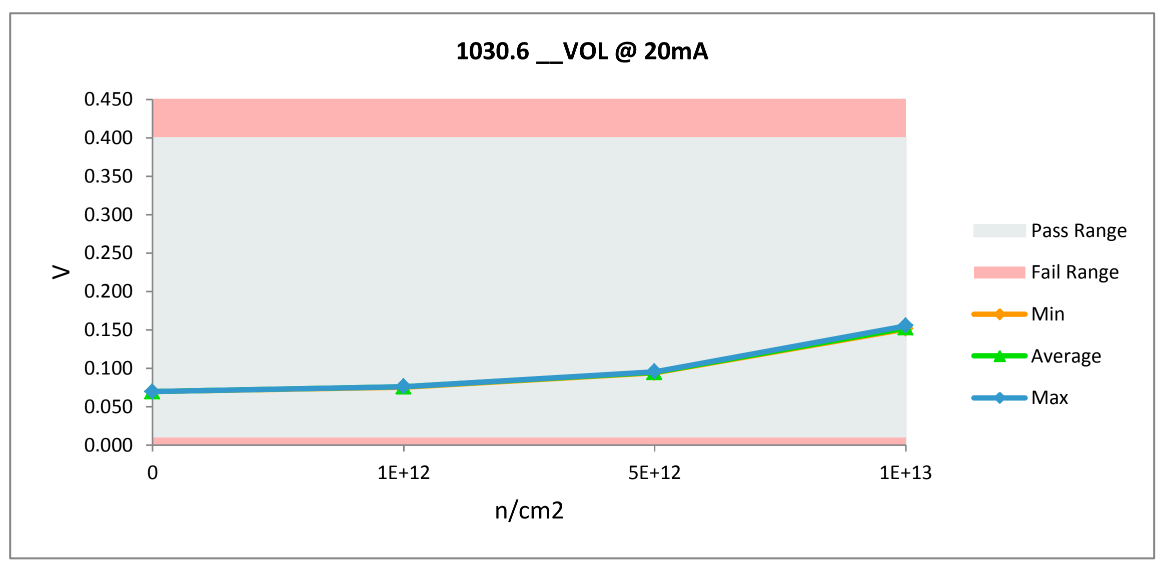


NDD Report
Device Name

		1030.6 __VOL @ 20mA		
	Test Site			
	Tester			
	Test Number			
	Unit	V	V	
	Max Limit	0.4	0.4	
	Min Limit	0.01	0.01	
n/cm2	Serial #	Pre	Post	Delta
0	1	0.069	0.069	0.000
1E+12	1E12_11	0.069	0.075	-0.007
1E+12	1E12_11	0.069	0.076	-0.007
1E+12	1E12_12	0.069	0.076	-0.007
5E+12	5E12_12	0.069	0.094	-0.025
5E+12	5E12_12	0.070	0.094	-0.024
5E+12	5E12_12	0.070	0.096	-0.026
1E+13	1E13_12	0.069	0.151	-0.082
1E+13	1E13_12	0.069	0.155	-0.086
1E+13	1E13_12	0.069	0.152	-0.083
	Max	0.070	0.155	0.000
	Average	0.069	0.104	-0.035
	Min	0.069	0.069	-0.086
	Std Dev	0.000	0.035	0.035



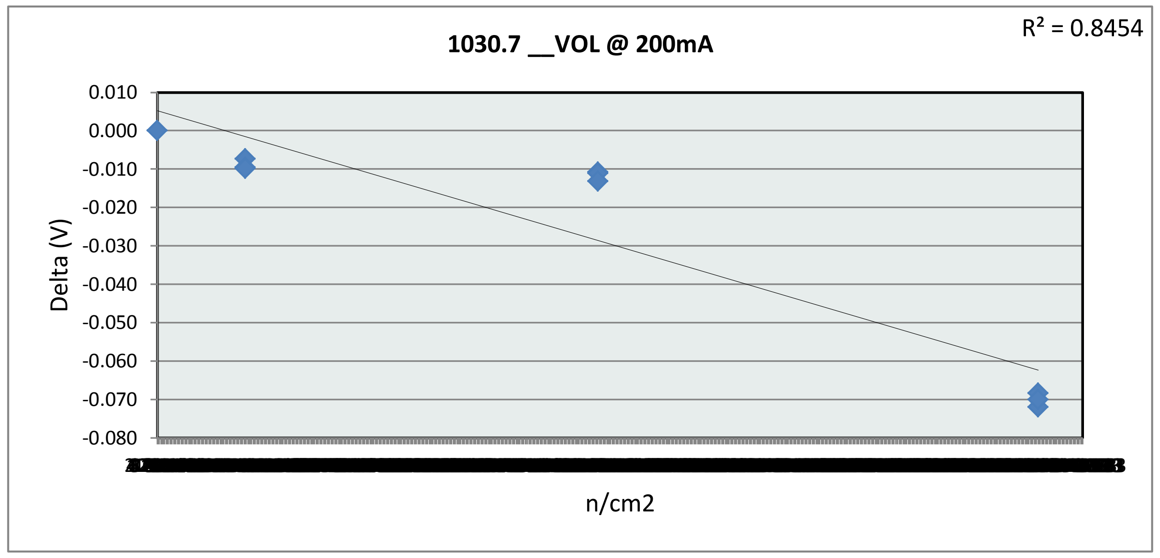
	1030.6 __VOL @ 20mA			
Test Site				
Tester				
Test Number				
Max Limit	0.4	V		
Min Limit	0.01	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	0.010	0.010	0.010	0.010
Min	0.069	0.076	0.094	0.151
Average	0.069	0.076	0.094	0.153
Max	0.069	0.076	0.096	0.155
UL	0.400	0.400	0.400	0.400



NDD Report
Device Name

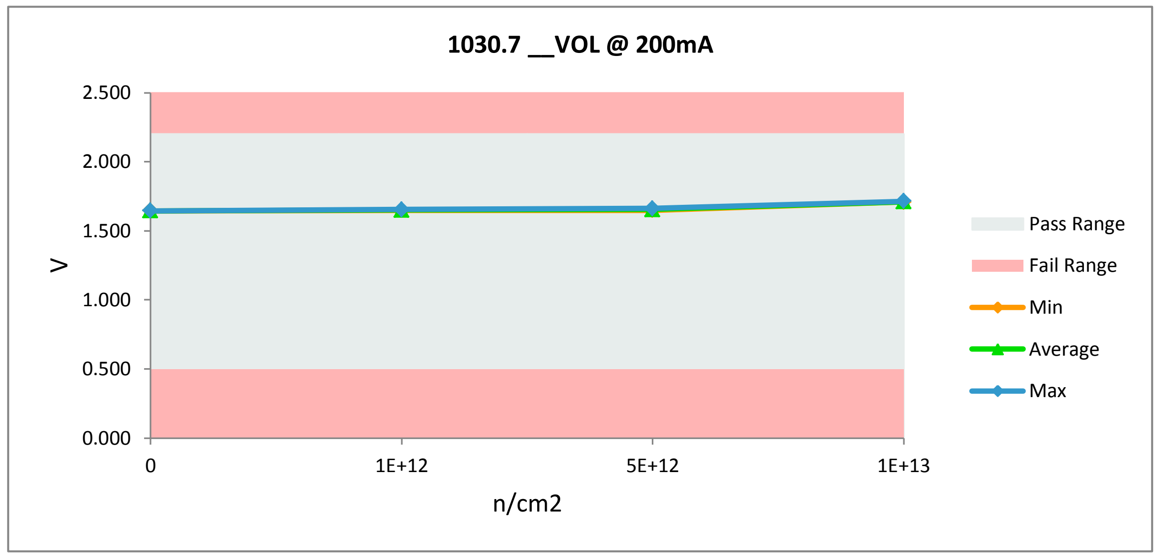
	1030.7 __VOL @ 200mA		
Test Site			
Tester			
Test Number			
Unit	V	V	
Max Limit	2.2	2.2	
Min Limit	0.5	0.5	

n/cm2	Serial #	Pre	Post	Delta
0	1	1.645	1.645	0.000
1E+12	1E12_11	1.643	1.651	-0.007
1E+12	1E12_11	1.640	1.650	-0.010
1E+12	1E12_12	1.644	1.654	-0.010
5E+12	5E12_12	1.638	1.648	-0.011
5E+12	5E12_12	1.643	1.654	-0.011
5E+12	5E12_12	1.650	1.663	-0.013
1E+13	1E13_12	1.640	1.708	-0.068
1E+13	1E13_12	1.643	1.714	-0.072
1E+13	1E13_12	1.640	1.710	-0.070
	Max	1.650	1.714	0.000
	Average	1.643	1.670	-0.027
	Min	1.638	1.645	-0.072
	Std Dev	0.003	0.029	0.030



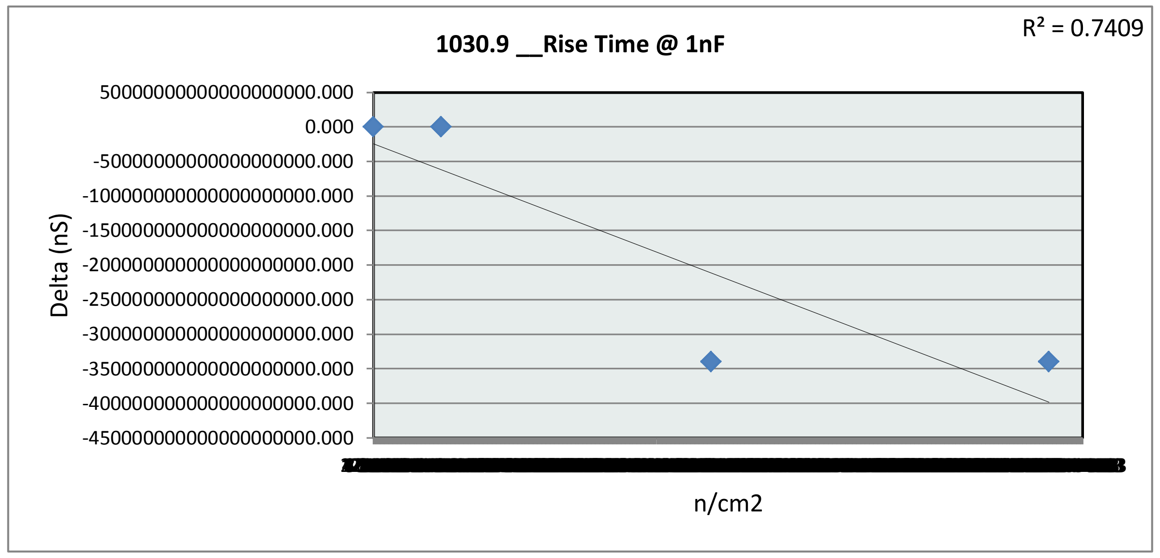
	1030.7 __VOL @ 200mA	
Test Site		
Tester		
Test Number		
Max Limit	2.2	V
Min Limit	0.5	V

n/cm2	0	1E+12	5E+12	1E+13
LL	0.500	0.500	0.500	0.500
Min	1.645	1.650	1.648	1.708
Average	1.645	1.652	1.655	1.711
Max	1.645	1.654	1.663	1.714
UL	2.200	2.200	2.200	2.200

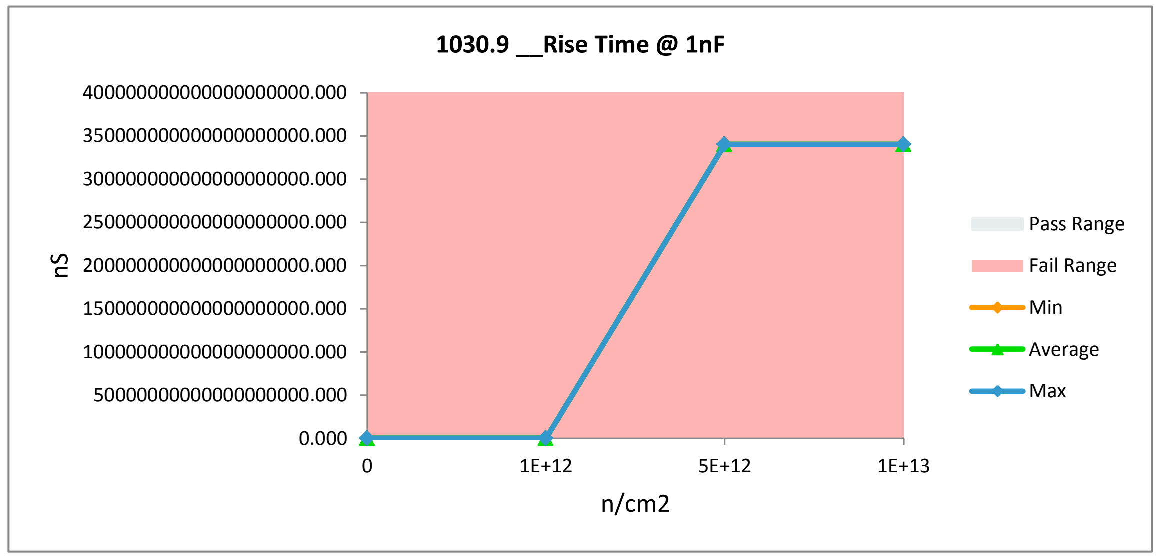


NDD Report
Device Name

		1030.9 __Rise Time @ 1nF		
	Test Site			
	Tester			
	Test Number			
	Unit	nS	nS	
	Max Limit	150	150	
	Min Limit	15	15	
n/cm2	Serial #	Pre	Post	Delta
0	1	45.339	45.339	0.000
1E+12	1E12_11	43.756	35.704	8.052
1E+12	1E12_11	44.723	36.081	8.642
1E+12	1E12_12	45.959	37.266	8.693
5E+12	5E12_12	45.753	3.40E+20	-3.40E+20
5E+12	5E12_12	45.127	3.40E+20	-3.40E+20
5E+12	5E12_12	46.854	3.40E+20	-3.40E+20
1E+13	1E13_12	44.558	3.40E+20	-3.40E+20
1E+13	1E13_12	45.331	3.40E+20	-3.40E+20
1E+13	1E13_12	45.464	3.40E+20	-3.40E+20
	Max	46.854	3.40E+20	8.69E+00
	Average	45.286	2.04E+20	-2.04E+20
	Min	43.756	3.57E+01	-3.40E+20
	Std Dev	0.842	1.76E+20	1.76E+20

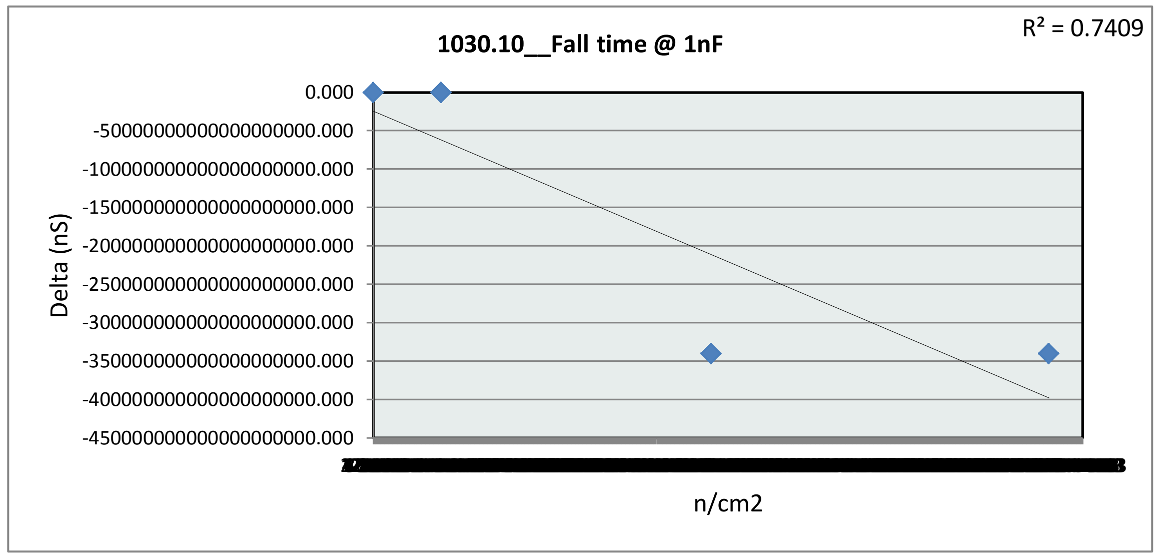


	1030.9 __Rise Time @ 1nF			
Test Site				
Tester				
Test Number				
Max Limit	150	nS		
Min Limit	15	nS		
n/cm2	0	1E+12	5E+12	1E+13
LL	15.000	15.000	15.000	15.000
Min	45.339	35.704	3.40E+20	3.40E+20
Average	45.339	36.350	3.40E+20	3.40E+20
Max	45.339	37.266	3.40E+20	3.40E+20
UL	150.000	150.000	150.000	150.000

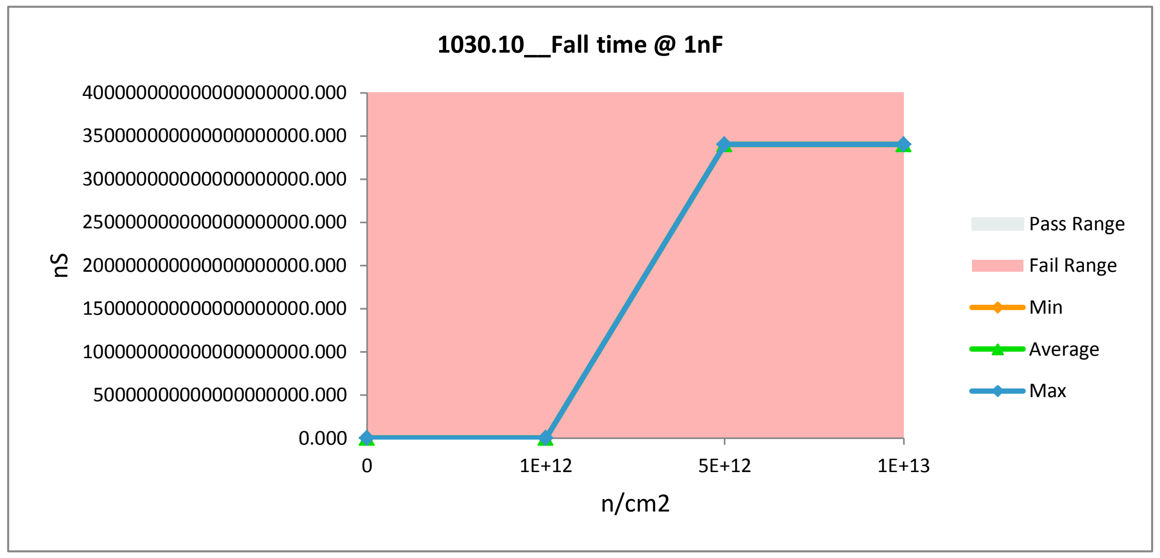


NDD Report
Device Name

		1030.10__Fall time @ 1nF		
Test Site				
Tester				
Test Number				
Unit		nS	nS	
Max Limit		150	150	
Min Limit		15	15	
n/cm2	Serial #	Pre	Post	Delta
0	1	38.828	38.828	0.000
1E+12	1E12_11	39.104	39.596	-0.492
1E+12	1E12_11	38.952	39.403	-0.451
1E+12	1E12_12	39.470	39.899	-0.429
5E+12	5E12_12	39.143	3.40E+20	-3.40E+20
5E+12	5E12_12	39.388	3.40E+20	-3.40E+20
5E+12	5E12_12	40.397	3.40E+20	-3.40E+20
1E+13	1E13_12	39.451	3.40E+20	-3.40E+20
1E+13	1E13_12	39.324	3.40E+20	-3.40E+20
1E+13	1E13_12	38.974	3.40E+20	-3.40E+20
	Max	40.397	3.40E+20	0.00E+00
	Average	39.303	2.04E+20	-2.04E+20
	Min	38.828	3.88E+01	-3.40E+20
	Std Dev	0.444	1.76E+20	1.76E+20

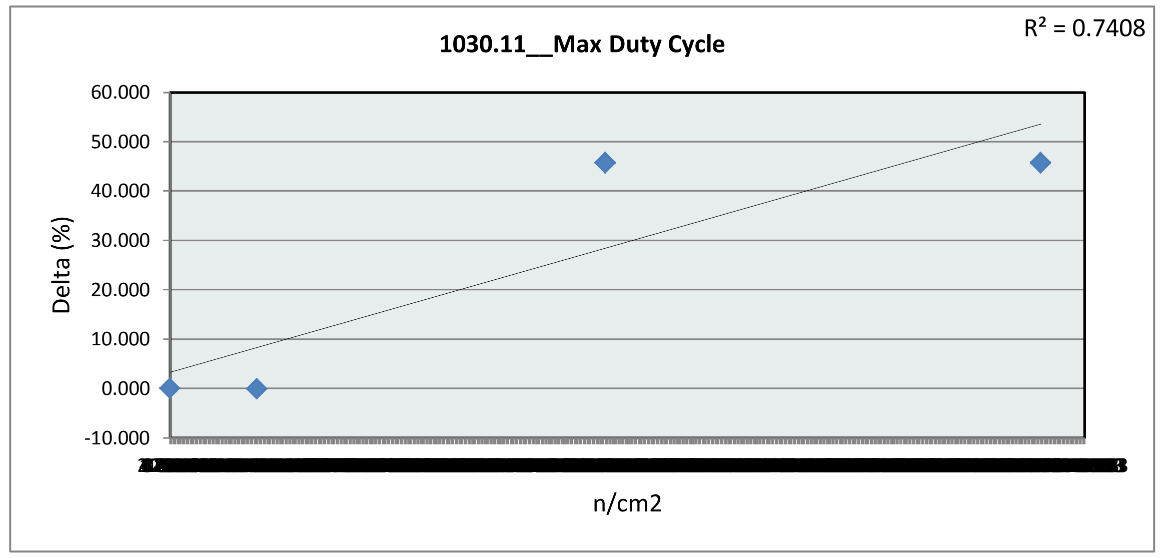


	1030.10__Fall time @ 1nF			
Test Site				
Tester				
Test Number				
Max Limit	150	nS		
Min Limit	15	nS		
n/cm2	0	1E+12	5E+12	1E+13
LL	15.000	15.000	15.000	15.000
Min	38.828	39.403	3.40E+20	3.40E+20
Average	38.828	39.633	3.40E+20	3.40E+20
Max	38.828	39.899	3.40E+20	3.40E+20
UL	150.000	150.000	150.000	150.000

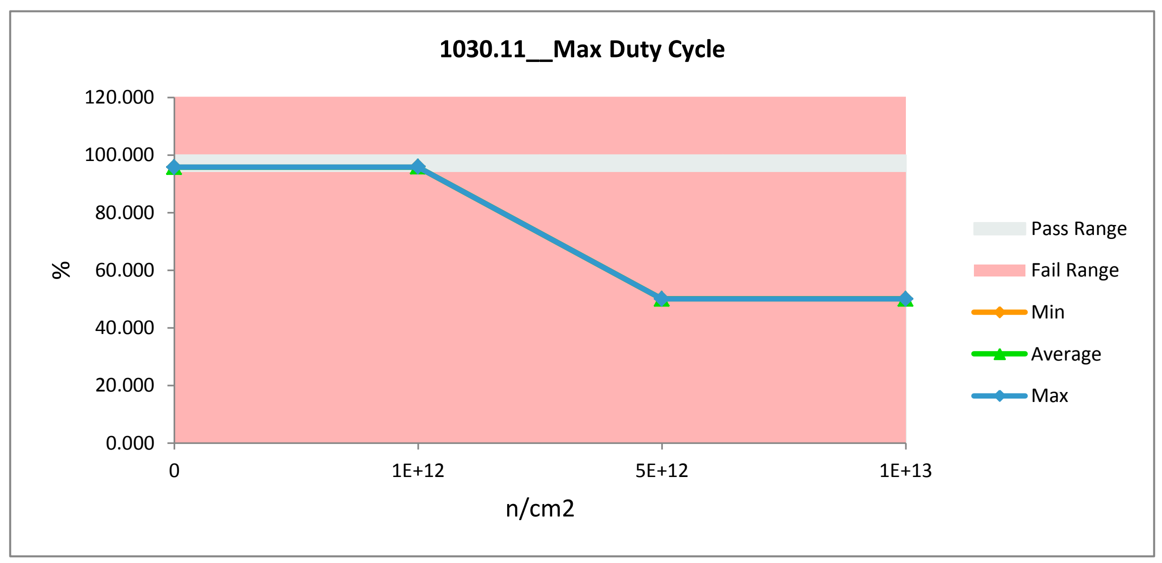


NDD Report
Device Name

		1030.11__Max Duty Cycle		
Test Site				
Tester				
Test Number				
Unit		%	%	
Max Limit		100	100	
Min Limit		94	94	
n/cm2	Serial #	Pre	Post	Delta
0	1	95.738	95.738	0.000
1E+12	1E12_11	95.727	95.818	-0.091
1E+12	1E12_11	95.728	95.823	-0.096
1E+12	1E12_12	95.730	95.827	-0.098
5E+12	5E12_12	95.723	50.000	45.723
5E+12	5E12_12	95.743	50.000	45.743
5E+12	5E12_12	95.697	50.000	45.697
1E+13	1E13_12	95.755	50.000	45.755
1E+13	1E13_12	95.715	50.000	45.715
1E+13	1E13_12	95.717	50.000	45.717
	Max	95.755	95.827	45.755
	Average	95.727	68.321	27.406
	Min	95.697	50.000	-0.098
	Std Dev	0.016	23.652	23.649



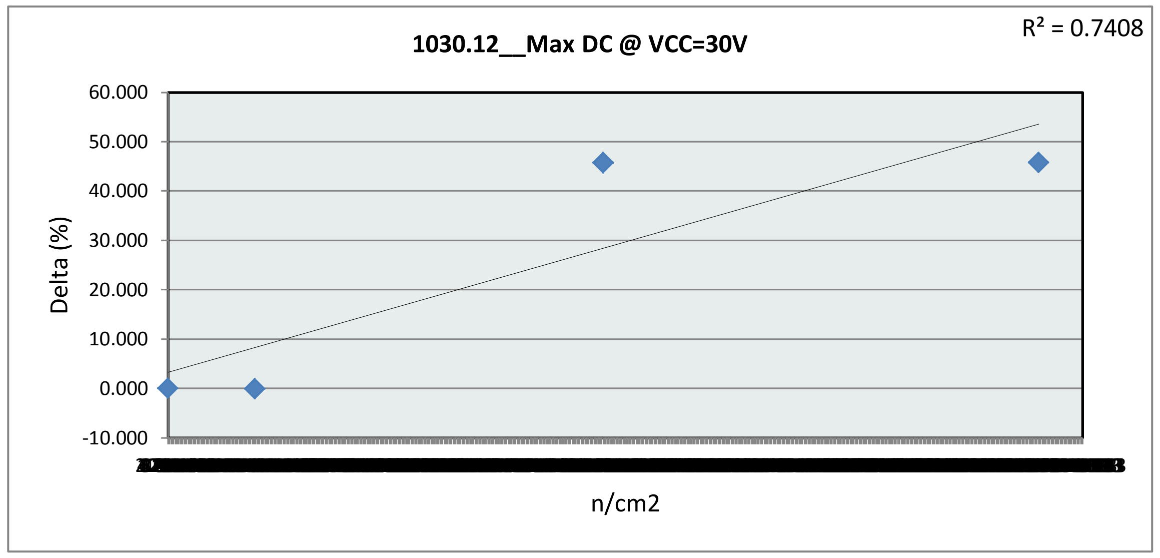
	1030.11__Max Duty Cycle			
Test Site				
Tester				
Test Number				
Max Limit	100	%		
Min Limit	94	%		
n/cm2	0	1E+12	5E+12	1E+13
LL	94.000	94.000	94.000	94.000
Min	95.738	95.818	50.000	50.000
Average	95.738	95.823	50.000	50.000
Max	95.738	95.827	50.000	50.000
UL	100.000	100.000	100.000	100.000



NDD Report
Device Name

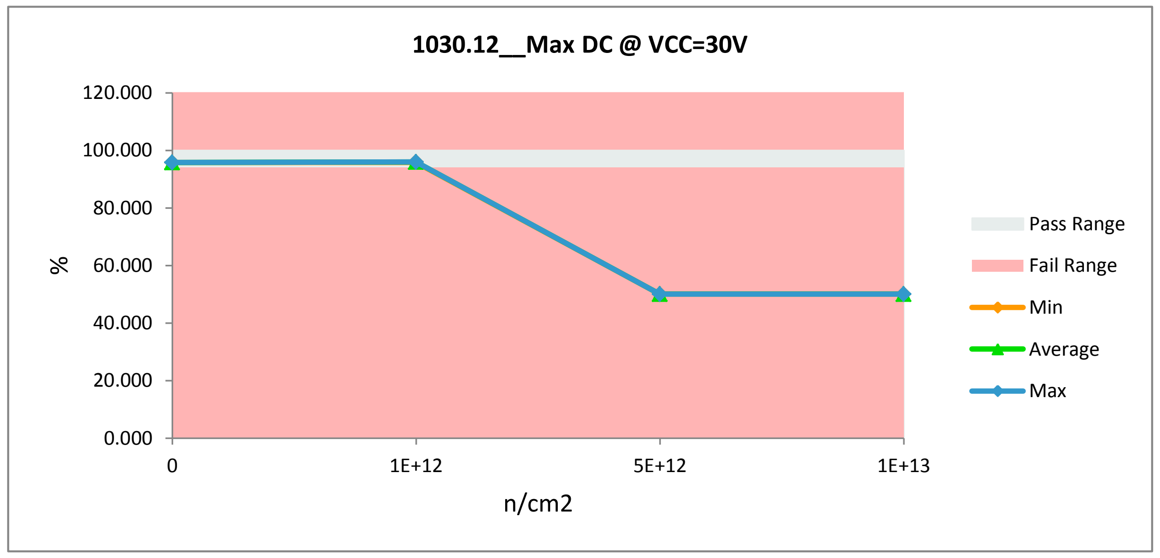
	1030.12__Max DC @ VCC=30V		
	Test Site			
	Tester			
	Test Number			
	Unit	%	%	
	Max Limit	100	100	
	Min Limit	94	94	

n/cm2	Serial #	Pre	Post	Delta
0	1	95.745	95.745	0.000
1E+12	1E12_11	95.752	95.844	-0.092
1E+12	1E12_11	95.749	95.850	-0.101
1E+12	1E12_12	95.747	95.853	-0.105
5E+12	5E12_12	95.745	50.000	45.745
5E+12	5E12_12	95.763	50.000	45.763
5E+12	5E12_12	95.714	50.000	45.714
1E+13	1E13_12	95.777	50.000	45.777
1E+13	1E13_12	95.737	50.000	45.737
1E+13	1E13_12	95.735	50.000	45.735
	Max	95.777	95.853	45.777
	Average	95.746	68.329	27.417
	Min	95.714	50.000	-0.105
	Std Dev	0.017	23.663	23.661



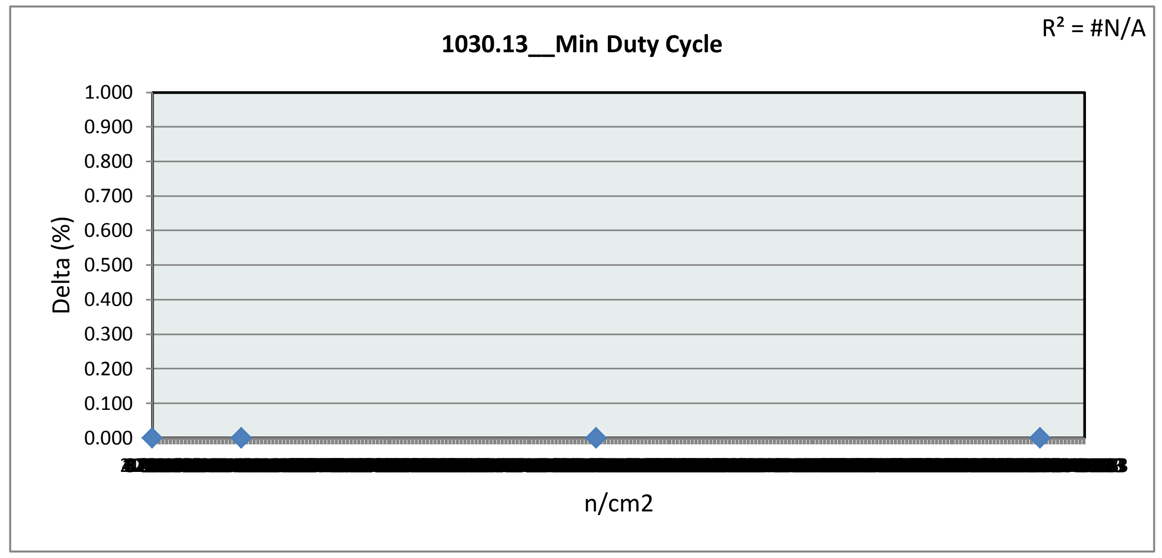
	1030.12__Max DC @ VCC=30V	
Test Site		
Tester		
Test Number		
Max Limit	100	%
Min Limit	94	%

n/cm2	0	1E+12	5E+12	1E+13
LL	94.000	94.000	94.000	94.000
Min	95.746	95.844	50.000	50.000
Average	95.746	95.849	50.000	50.000
Max	95.746	95.853	50.000	50.000
UL	100.000	100.000	100.000	100.000

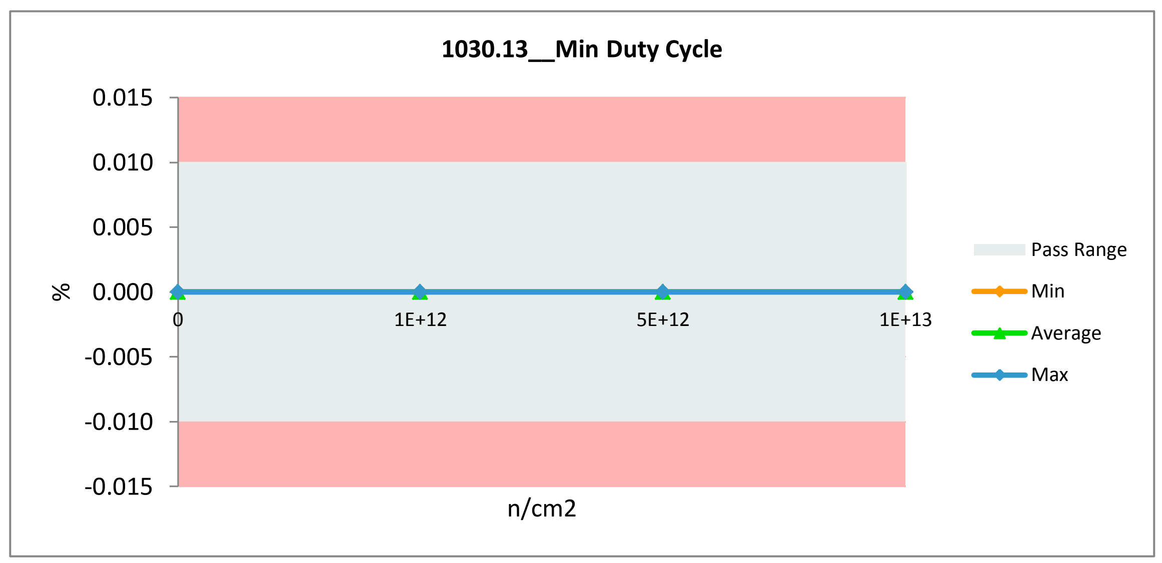


NDD Report
Device Name

		1030.13__Min Duty Cycle		
Test Site				
Tester				
Test Number				
Unit		%	%	
Max Limit		0.01	0.01	
Min Limit		-0.01	-0.01	
n/cm2	Serial #	Pre	Post	Delta
0	1	0.000	0.000	0.000
1E+12	1E12_11	0.000	0.000	0.000
1E+12	1E12_11	0.000	0.000	0.000
1E+12	1E12_12	0.000	0.000	0.000
5E+12	5E12_12	0.000	0.000	0.000
5E+12	5E12_12	0.000	0.000	0.000
5E+12	5E12_12	0.000	0.000	0.000
1E+13	1E13_12	0.000	0.000	0.000
1E+13	1E13_12	0.000	0.000	0.000
1E+13	1E13_12	0.000	0.000	0.000
	Max	0.000	0.000	0.000
	Average	0.000	0.000	0.000
	Min	0.000	0.000	0.000
	Std Dev	0.000	0.000	0.000

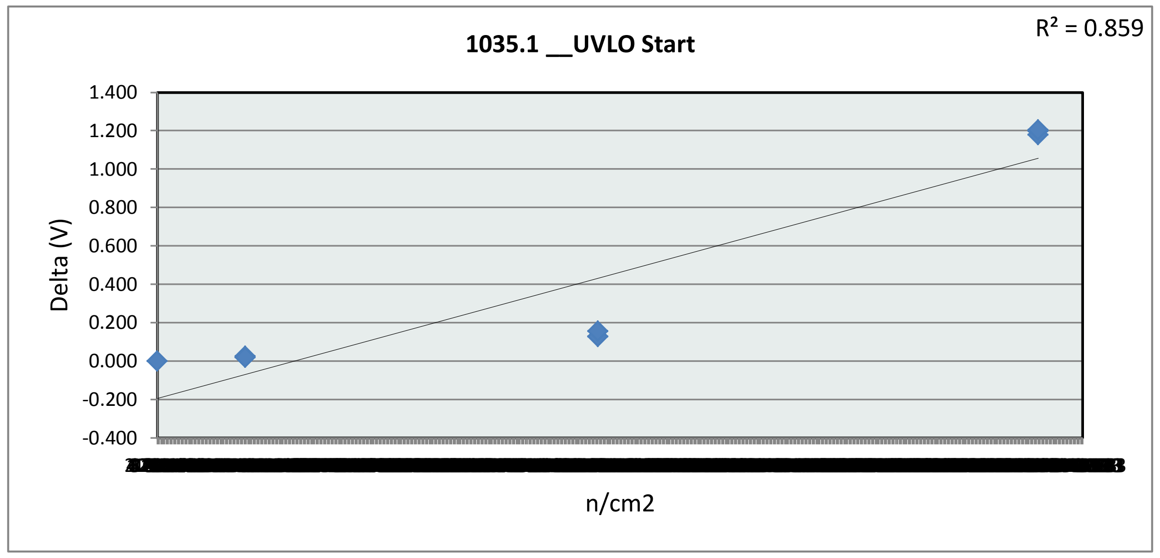


	1030.13__Min Duty Cycle			
Test Site				
Tester				
Test Number				
Max Limit	0.01	%		
Min Limit	-0.01	%		
n/cm2	0	1E+12	5E+12	1E+13
LL	-0.010	-0.010	-0.010	-0.010
Min	0.000	0.000	0.000	0.000
Average	0.000	0.000	0.000	0.000
Max	0.000	0.000	0.000	0.000
UL	0.010	0.010	0.010	0.010

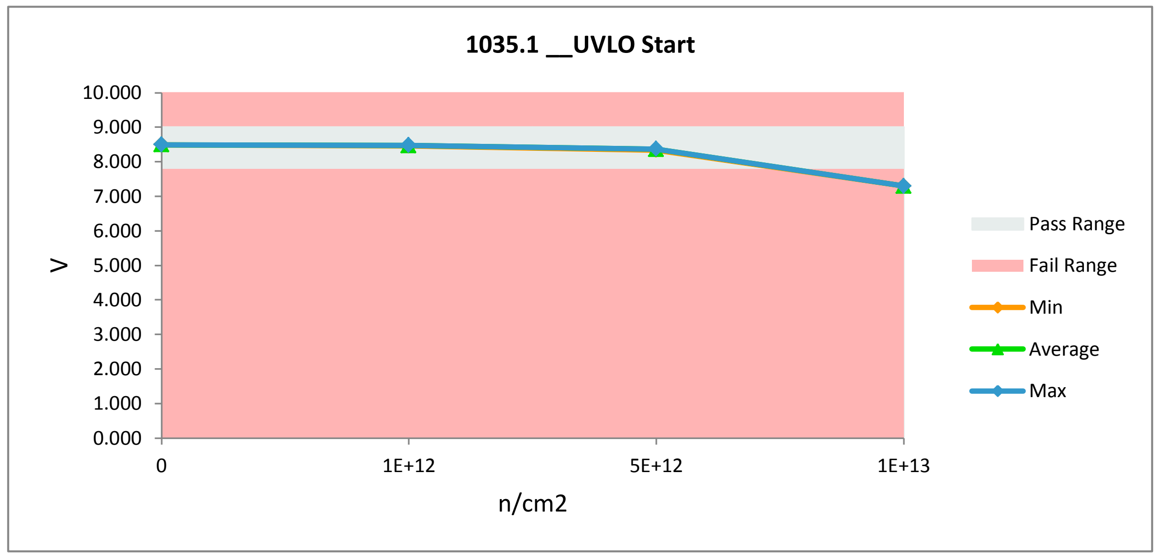


NDD Report
Device Name

		1035.1 __UVLO Start		
	Test Site			
	Tester			
	Test Number			
	Unit	V	V	
	Max Limit	9	9	
	Min Limit	7.8	7.8	
n/cm2	Serial #	Pre	Post	Delta
0	1	8.492	8.492	0.000
1E+12	1E12_11	8.492	8.474	0.018
1E+12	1E12_11	8.492	8.468	0.024
1E+12	1E12_12	8.480	8.462	0.018
5E+12	5E12_12	8.492	8.366	0.126
5E+12	5E12_12	8.492	8.366	0.126
5E+12	5E12_12	8.498	8.342	0.156
1E+13	1E13_12	8.498	7.300	1.198
1E+13	1E13_12	8.480	7.300	1.180
1E+13	1E13_12	8.504	7.300	1.204
	Max	8.504	8.492	1.204
	Average	8.492	8.087	0.405
	Min	8.480	7.300	0.000
	Std Dev	0.008	0.545	0.547

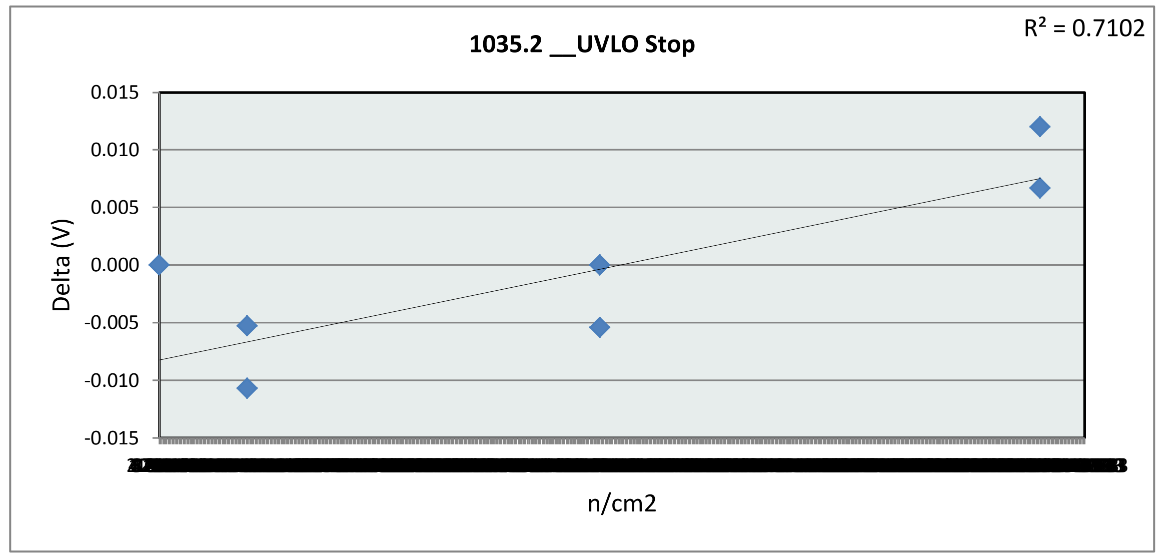


	1035.1 __UVLO Start			
Test Site				
Tester				
Test Number				
Max Limit	9	V		
Min Limit	7.8	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	7.800	7.800	7.800	7.800
Min	8.492	8.462	8.342	7.300
Average	8.492	8.468	8.358	7.300
Max	8.492	8.474	8.366	7.300
UL	9.000	9.000	9.000	9.000

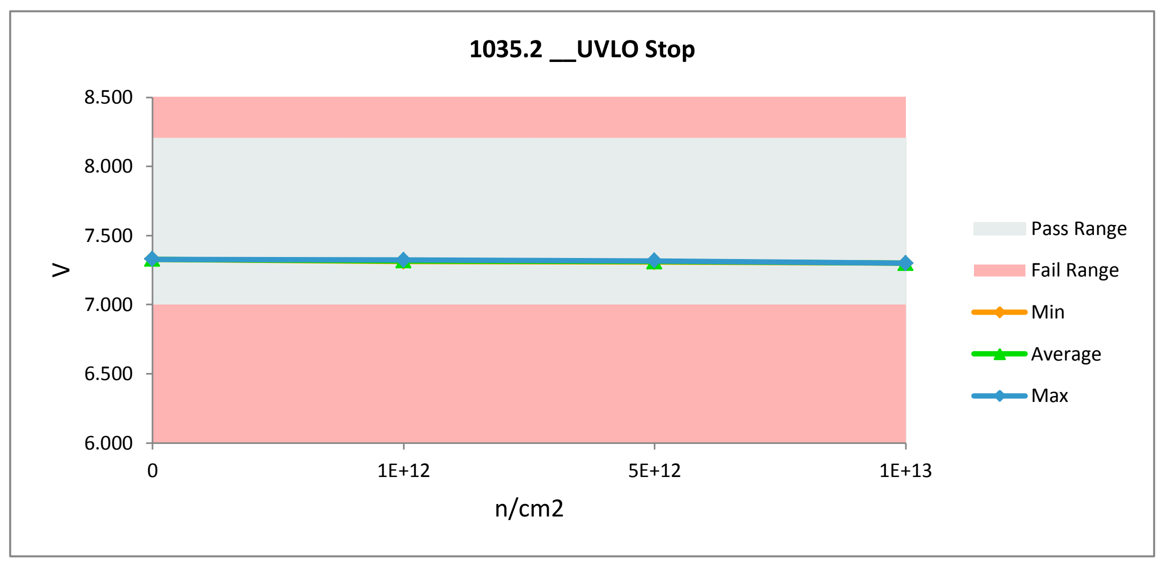


NDD Report
Device Name

		1035.2 __UVLO Stop		
	Test Site			
	Tester			
	Test Number			
	Unit	V	V	
	Max Limit	8.2	8.2	
	Min Limit	7	7	
n/cm2	Serial #	Pre	Post	Delta
0	1	7.328	7.328	0.000
1E+12	1E12_11	7.312	7.323	-0.011
1E+12	1E12_11	7.307	7.317	-0.011
1E+12	1E12_12	7.307	7.312	-0.005
5E+12	5E12_12	7.312	7.312	0.000
5E+12	5E12_12	7.317	7.317	0.000
5E+12	5E12_12	7.301	7.307	-0.005
1E+13	1E13_12	7.312	7.300	0.012
1E+13	1E13_12	7.307	7.300	0.007
1E+13	1E13_12	7.307	7.300	0.007
	Max	7.328	7.328	0.012
	Average	7.311	7.312	-0.001
	Min	7.301	7.300	-0.011
	Std Dev	0.007	0.010	0.008



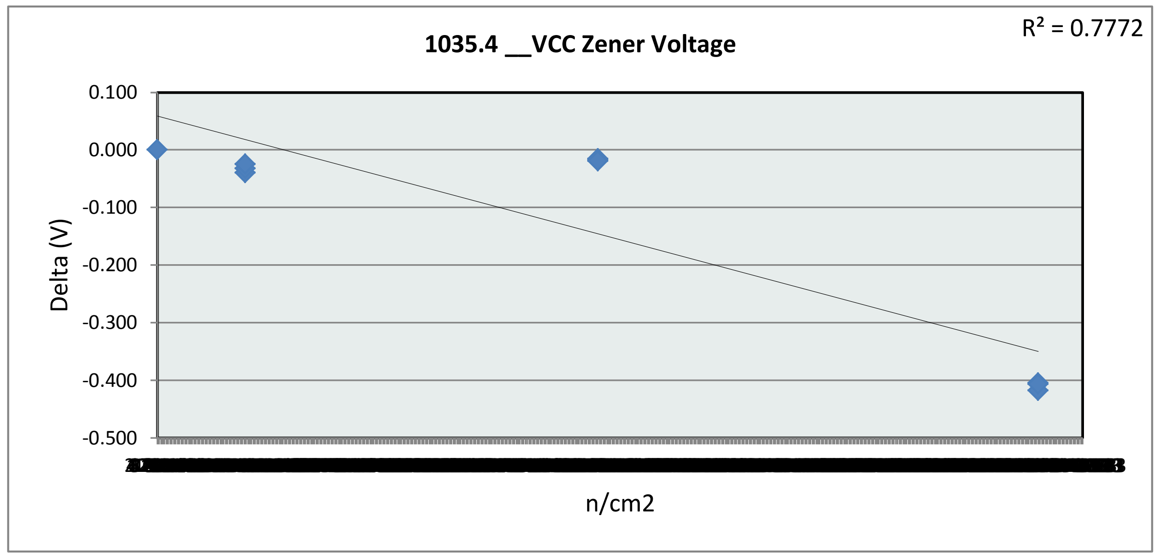
	1035.2 __UVLO Stop			
Test Site				
Tester				
Test Number				
Max Limit	8.2 V			
Min Limit	7 V			
n/cm2	0	1E+12	5E+12	1E+13
LL	7.000	7.000	7.000	7.000
Min	7.328	7.312	7.307	7.300
Average	7.328	7.317	7.312	7.300
Max	7.328	7.323	7.317	7.300
UL	8.200	8.200	8.200	8.200



NDD Report
Device Name

	1035.4 __VCC Zener Voltage		
Test Site			
Tester			
Test Number			
Unit	V	V	
Max Limit	45	45	
Min Limit	30	30	

n/cm2	Serial #	Pre	Post	Delta
0	1	32.201	32.201	0.000
1E+12	1E12_11	32.152	32.191	-0.039
1E+12	1E12_11	32.162	32.193	-0.032
1E+12	1E12_12	32.145	32.169	-0.024
5E+12	5E12_12	32.172	32.187	-0.016
5E+12	5E12_12	32.167	32.185	-0.018
5E+12	5E12_12	32.141	32.160	-0.019
1E+13	1E13_12	32.139	32.543	-0.405
1E+13	1E13_12	32.158	32.576	-0.418
1E+13	1E13_12	32.163	32.569	-0.406
	Max	32.201	32.576	0.000
	Average	32.160	32.298	-0.138
	Min	32.139	32.160	-0.418
	Std Dev	0.018	0.184	0.188



	1035.4 __VCC Zener Voltage			
Test Site				
Tester				
Test Number				
Max Limit	45	V		
Min Limit	30	V		
n/cm2	0	1E+12	5E+12	1E+13
LL	30.000	30.000	30.000	30.000
Min	32.201	32.169	32.161	32.544
Average	32.201	32.184	32.177	32.563
Max	32.201	32.193	32.187	32.576
UL	45.000	45.000	45.000	45.000