Radiation Report

LM158QML-SP Neutron Displacement Damage (NDD) Characterization

ABSTRACT

This report presents the effect of neutron displacement damage (NDD) on the LM158QML-SP device. The results show that devices remained within data sheet specifications up to 1×10^{11} n/cm^2. At 1×10^{12} n/cm^2 some specifications went outside the range specified in the data sheet, but the devices remained functional.

A sample size of 10 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. Electrical testing was performed at Texas Instruments before and after neutron irradiation using the production test program for LM158QML-SP.

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Trademarks

1 Overview

The LM158QML-SP is a lower power operational amplifier. The device consists of two independent, high gain, internally frequency compensated operation amplifiers which were designed specifically to operate from a single power supply over a widde range of voltages. The device is offered in 8 pin and 10 pin ceramic packages as well as 8-pin and 10-pin metal cylindrical packages.

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

Table 1-1. Overview Information

TI Part Number	LM158QML-SP
Device Function	Dual Operational Amplifier
Technology	Bipolar
A/T Lot Number / Date Code	JM084R271
Unbiased Quantity Tested	10
Exposure Facility	VPT Inc.
Neutron Fluence (1-MeV equivalent)	1.0×10^{11}, 1.0×10^{12} n/cm^2
Irradiation Temperature	25°C
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2 Test Procedures

The LM158QML-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 LM158QML-SP.

Table 2-1. Neutron Irradiation Conditions

Group	Sample Qty	Neutron Fluence (n/cm^2)	Bias
A	5	1.0×10^{11}	Unbiased
B	3	1.0×10^{12}	Unbiased

3 Facility

Devices were exposed at Penn State University. The neutron beam labratory is located in the Research and Science center. The beams are thermalized by D2O and passed into the NBL. Devices are irradiated in the Fast Flux Tube.

The fluences are calculated based on 1-MeV equivalences.

4 Results

At 1.0×10^{12}, some parametric measurements failed to remain within the range specified in the data sheet. All parametric measurements remained well within the LM158QML-SP Class V, radiation lower power operational amplifier limits for 1.0×10^{11} n/cm^2 levels. The full parameter list and graphs are found in Appendix A.

Table 4-1 lists the LM158QML-SP specification compliance matrix.

Table 4-1. LM158QML-SP Spec Table

PARAMETER	TEST CONDITION	MIN	MAX	UNIT	TEST NUMBER
REFERENCE					
Input Offset Voltage	VIO; VCM = 0 V; V0 = 1.4 V	–4	4	mV	1001,2001
Input Offset Voltage	VIO; VCM = 28.5 V, VO = 1.4 V	–4	4	mV	1002,2002
Input Offset Voltage	VIO; +VCC = 5 V , VCM = 0 V, VO = 1.4 V	–4	4	mV	1003,2003
Input Offset Current	IIO; VO = 1.4 V, +VCC = 5 V	–10	10	nA	1004,2004
Positive Input Bias Current	+IIB; VO = 1.4 V, +VCC = 5 V	–60	–1	nA	1005,2005
Negative Input Bias Current	-IIB; VO = 1.4 V, +VCC = 5 V	–60	–1	nA	1006,2006
Power Supply Rejection Ratio	+PSRR; +VCC = 5 V TO 30 V, VO = 1.4 V	65		dB	1007,2007
Common Mode Rejection Ratio	CMRR; VCM = 28.5 V, VO = 1.4 V	70		dB	1008,2008
O/P Short Circuit Current	+IOS, VOUT = 0 V, +VCC = 5 V	–60		mA	1009,2009
O/P Sink Current	ISINK; +VCC = 15 V, VIN = 65 MV, VO = 200 MV	12		uA	1010,2010
O/P Sink Current	SINK CURR, +VCC = 15 V, VIN = 65 MV, VO = 2 V	10		mA	1011,2011
O/P Source Current	ISOURCE, +VCC = 15 V, VIN = 65 MV, VO = 2 V		–20	mA	1012,2012
Supply Current	ICC, VO = 1.4 V, RL= 100 K		3	mA	1013,2013
Supply Current	ICC, +VCC = 5 V, RL = 100 K, VO = 1.4 V		1.5	mA	1014,2014
Large Signal Gain	+AVS, RL= 2 K, VO = 1 V TO 11 V	50		V/mV	1015,2015
Output Voltage Low	VOL; ISINK = 1 UA		40	mV	1016,2016
I/P Voltage Differential	VDIFF; VIN = 32 V	–5	5	uA	1017,2017
I/P Voltage Differential	VDIFF; VIN = –32 V	–5	5	uA	1018,2018
Output Voltage Low	VOL; RL=10K		40	mV	1019,2019
Output Voltage Low	VOL; +VCC = 5 V, RL = 10 K		40	mV	1020,2020
Output Voltage High	VOH; RL = 2 K	26		V	1021,2021
Output Voltage High	VOH; RL = 10 K	27		V	1022,2022

A Test Results

Delta Threshold 10.00%

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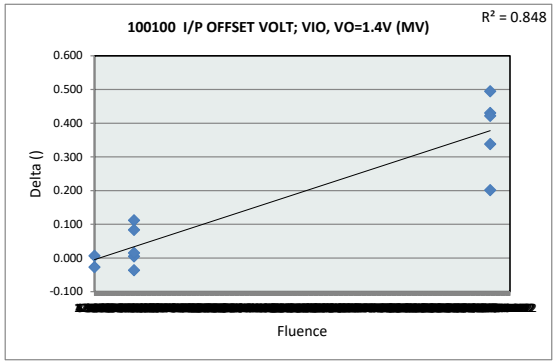
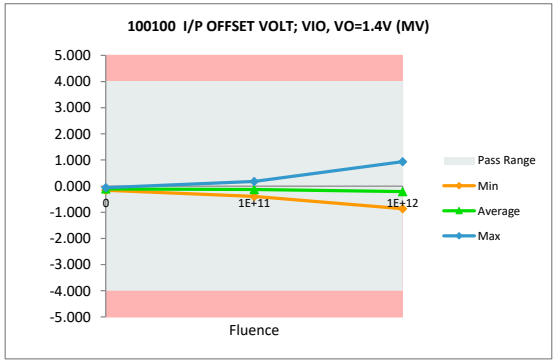
	100100 I/P OFFSET VOLT; VIO,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	4	4
Min Limit	-4	-4

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.151	-0.157	0.007
0	C2	-0.084	-0.057	-0.027
1E+11	18	-0.088	-0.052	-0.036
1E+11	19	-0.279	-0.392	0.112
1E+11	20	0.189	0.184	0.005
1E+11	21	-0.300	-0.383	0.083
1E+11	22	0.005	-0.010	0.015
1E+12	23	-0.073	-0.274	0.202
1E+12	24	-0.367	-0.862	0.495
1E+12	25	-0.061	-0.400	0.338
1E+12	26	-0.007	-0.438	0.431
1E+12	27	1.359	0.937	0.422
	Max	1.359	0.937	0.495
	Average	0.012	-0.159	0.171
	Min	-0.367	-0.862	-0.036
	Std Dev	0.450	0.438	0.199



	100100 I/P OFFSET VOLT; VIO		
Test Site			
Tester			
Test Number			
Max Limit	4		
Min Limit	-4		
Fluence	0	1E+11	1E+12
LL	-4.000	-4.000	-4.000
Min	-0.157	-0.392	-0.862
Average	-0.107	-0.131	-0.207
Max	-0.057	0.184	0.937
UL	4.000	4.000	4.000



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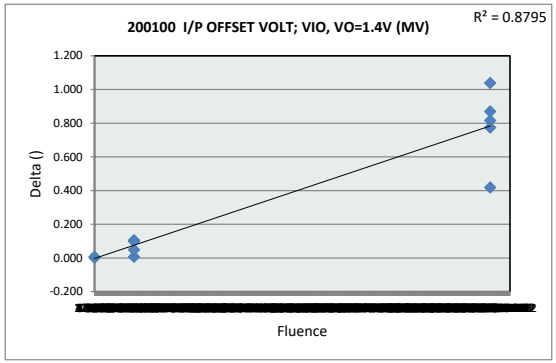
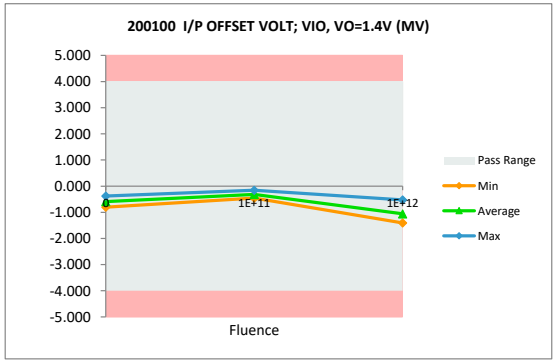
	200100 I/P OFFSET VOLT; VIO,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	4	4
Min Limit	-4	-4

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.372	-0.374	0.002
0	C2	-0.793	-0.801	0.008
1E+11	18	-0.131	-0.237	0.105
1E+11	19	-0.147	-0.155	0.008
1E+11	20	-0.232	-0.332	0.101
1E+11	21	-0.299	-0.398	0.099
1E+11	22	-0.407	-0.455	0.048
1E+12	23	-0.423	-1.198	0.775
1E+12	24	-0.090	-0.906	0.816
1E+12	25	-0.368	-1.407	1.039
1E+12	26	-0.106	-0.525	0.419
1E+12	27	-0.378	-1.249	0.871
	Max	-0.090	-0.155	1.039
	Average	-0.312	-0.670	0.358
	Min	-0.793	-1.407	0.002
	Std Dev	0.196	0.429	0.402



	200100 I/P OFFSET VOLT; VIO		
Test Site			
Tester			
Test Number			
Max Limit	4		
Min Limit	-4		
Fluence	0	1E+11	1E+12
LL	-4.000	-4.000	-4.000
Min	-0.801	-0.455	-1.407
Average	-0.587	-0.316	-1.057
Max	-0.374	-0.155	-0.525
UL	4.000	4.000	4.000



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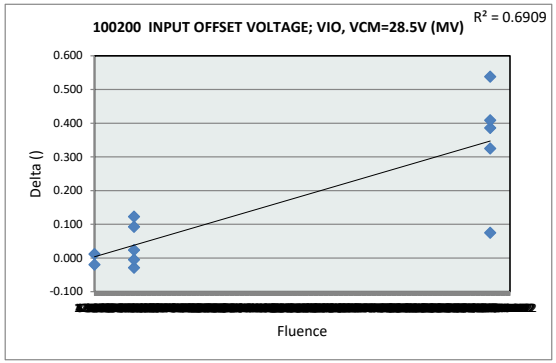
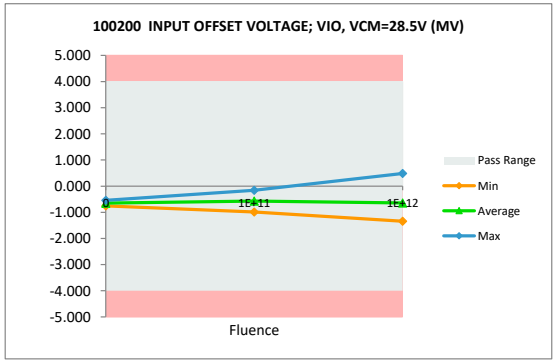
	100200 INPUT OFFSET VOLTAGE	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	4	4
Min Limit	-4	-4

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.742	-0.754	0.012
0	C2	-0.562	-0.542	-0.020
1E+11	18	-0.541	-0.513	-0.028
1E+11	19	-0.632	-0.725	0.093
1E+11	20	-0.131	-0.155	0.024
1E+11	21	-0.865	-0.988	0.123
1E+11	22	-0.473	-0.468	-0.005
1E+12	23	-0.576	-0.651	0.075
1E+12	24	-0.803	-1.341	0.538
1E+12	25	-0.572	-0.958	0.386
1E+12	26	-0.432	-0.758	0.325
1E+12	27	0.895	0.486	0.409
	Max	0.895	0.486	0.538
	Average	-0.453	-0.614	0.161
	Min	-0.865	-1.341	-0.028
	Std Dev	0.465	0.457	0.198



	100200 INPUT OFFSET VOLTA
Test Site	
Tester	
Test Number	
Max Limit	4
Min Limit	-4

Fluence	0	1E+11	1E+12
LL	-4.000	-4.000	-4.000
Min	-0.754	-0.988	-1.341
Average	-0.648	-0.570	-0.645
Max	-0.542	-0.155	0.486
UL	4.000	4.000	4.000



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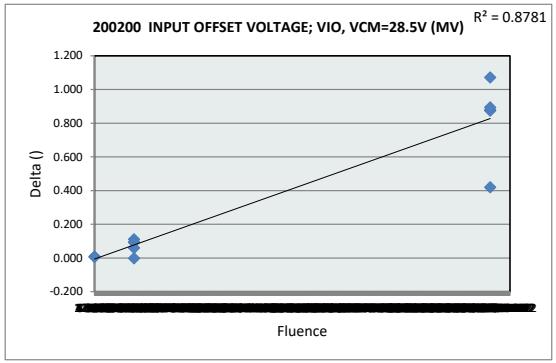
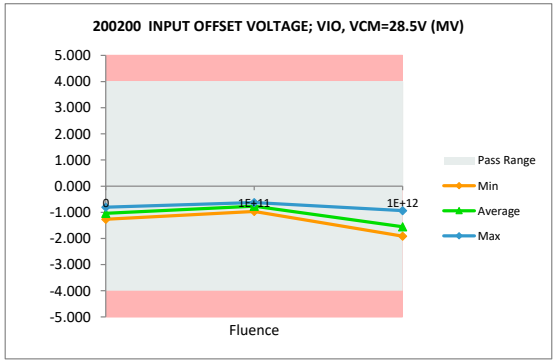
	200200 INPUT OFFSET VOLTAGE	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	4	4
Min Limit	-4	-4

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.795	-0.803	0.008
0	C2	-1.261	-1.267	0.006
1E+11	18	-0.525	-0.637	0.112
1E+11	19	-0.628	-0.626	-0.002
1E+11	20	-0.644	-0.737	0.093
1E+11	21	-0.762	-0.857	0.094
1E+11	22	-0.906	-0.966	0.060
1E+12	23	-0.930	-1.810	0.880
1E+12	24	-0.520	-1.395	0.875
1E+12	25	-0.840	-1.912	1.072
1E+12	26	-0.515	-0.935	0.420
1E+12	27	-0.816	-1.711	0.894
	Max	-0.515	-0.626	1.072
	Average	-0.762	-1.138	0.376
	Min	-1.261	-1.912	-0.002
	Std Dev	0.217	0.467	0.427



	200200 INPUT OFFSET VOLTA		
Test Site			
Tester			
Test Number			
Max Limit	4		
Min Limit	-4		
Fluence	0	1E+11	1E+12
LL	-4.000	-4.000	-4.000
Min	-1.267	-0.966	-1.912
Average	-1.035	-0.765	-1.553
Max	-0.803	-0.626	-0.935
UL	4.000	4.000	4.000



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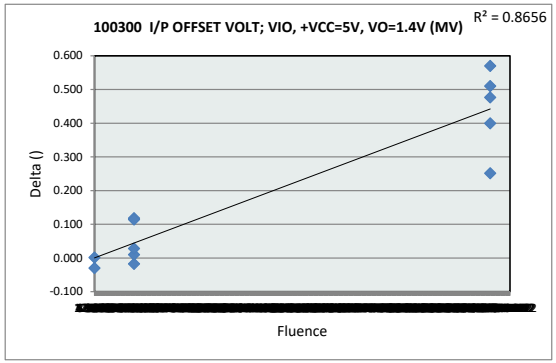
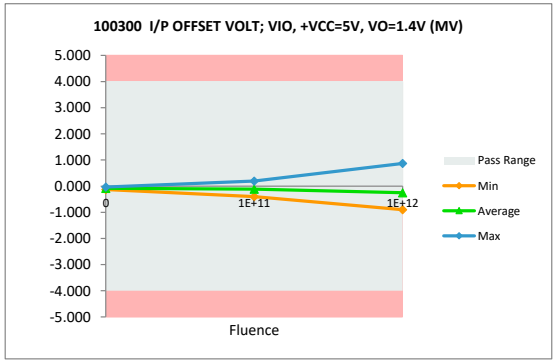
	100300 I/P OFFSET VOLT; VIO,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	4	4
Min Limit	-4	-4

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.127	-0.129	0.002
0	C2	-0.064	-0.034	-0.030
1E+11	18	-0.064	-0.047	-0.017
1E+11	19	-0.208	-0.326	0.118
1E+11	20	0.202	0.192	0.010
1E+11	21	-0.285	-0.399	0.114
1E+11	22	0.026	-0.003	0.028
1E+12	23	-0.069	-0.321	0.252
1E+12	24	-0.330	-0.900	0.570
1E+12	25	-0.049	-0.449	0.400
1E+12	26	0.023	-0.454	0.477
1E+12	27	1.379	0.869	0.510
	Max	1.379	0.869	0.570
	Average	0.036	-0.167	0.203
	Min	-0.330	-0.900	-0.030
	Std Dev	0.446	0.433	0.228



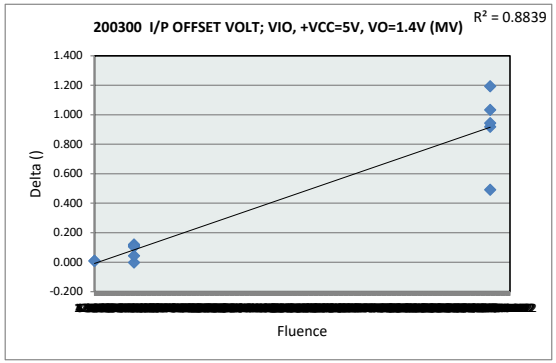
	100300 I/P OFFSET VOLT; VIO		
Test Site			
Tester			
Test Number			
Max Limit	4		
Min Limit	-4		
Fluence	0	1E+11	1E+12
LL	-4.000	-4.000	-4.000
Min	-0.129	-0.399	-0.900
Average	-0.081	-0.116	-0.251
Max	-0.034	0.192	0.869
UL	4.000	4.000	4.000



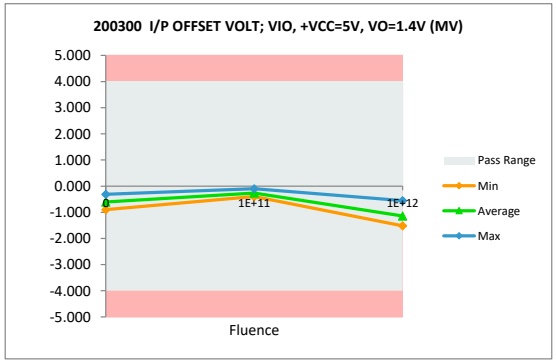
NDD Report
LM158QML-SP

	200300 I/P OFFSET VOLT; VIO,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	4	4
Min Limit	-4	-4

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.302	-0.311	0.009
0	C2	-0.891	-0.902	0.010
1E+11	18	-0.068	-0.188	0.120
1E+11	19	-0.099	-0.097	-0.002
1E+11	20	-0.159	-0.270	0.112
1E+11	21	-0.261	-0.366	0.104
1E+11	22	-0.353	-0.396	0.043
1E+12	23	-0.390	-1.310	0.919
1E+12	24	-0.019	-0.963	0.944
1E+12	25	-0.324	-1.517	1.193
1E+12	26	-0.061	-0.553	0.492
1E+12	27	-0.327	-1.360	1.033
	Max	-0.019	-0.097	1.193
	Average	-0.271	-0.686	0.415
	Min	-0.891	-1.517	-0.002
	Std Dev	0.234	0.502	0.471



	200300 I/P OFFSET VOLT; VIO		
Test Site			
Tester			
Test Number			
Max Limit	4		
Min Limit	-4		
Fluence	0	1E+11	1E+12
LL	-4.000	-4.000	-4.000
Min	-0.902	-0.396	-1.517
Average	-0.606	-0.264	-1.141
Max	-0.311	-0.097	-0.553
UL	4.000	4.000	4.000



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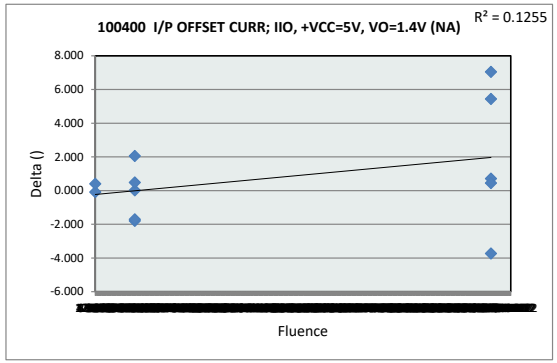
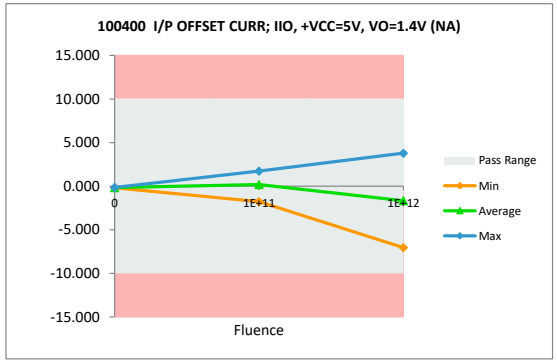
	100400 I/P OFFSET CURR; IIO,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	10	10
Min Limit	-10	-10

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.235	-0.147	-0.088
0	C2	0.217	-0.191	0.407
1E+11	18	-0.503	-0.527	0.024
1E+11	19	-0.083	1.711	-1.794
1E+11	20	0.024	1.726	-1.701
1E+11	21	0.273	-1.780	2.053
1E+11	22	0.292	-0.195	0.488
1E+12	23	0.483	-4.960	5.443
1E+12	24	0.400	-0.312	0.713
1E+12	25	0.054	3.789	-3.735
1E+12	26	0.637	0.183	0.454
1E+12	27	0.002	-7.047	7.050
	Max	0.637	3.789	7.050
	Average	0.130	-0.646	0.776
	Min	-0.503	-7.047	-3.735
	Std Dev	0.319	2.911	2.977



	100400 I/P OFFSET CURR; IIC		
Test Site			
Tester			
Test Number			
Max Limit	10		
Min Limit	-10		
Fluence	0	1E+11	1E+12
LL	-10.000	-10.000	-10.000
Min	-0.191	-1.780	-7.047
Average	-0.169	0.187	-1.669
Max	-0.147	1.726	3.789
UL	10.000	10.000	10.000



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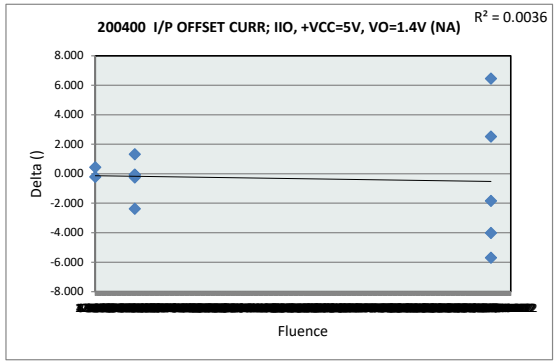
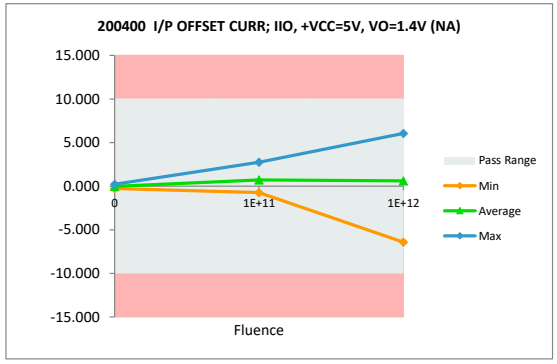
	200400 I/P OFFSET CURR; IIO,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	10	10
Min Limit	-10	-10

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.472	-0.268	-0.204
0	C2	0.656	0.218	0.437
1E+11	18	0.386	0.465	-0.079
1E+11	19	0.375	2.742	-2.366
1E+11	20	0.457	0.708	-0.251
1E+11	21	0.582	-0.742	1.324
1E+11	22	0.356	0.406	-0.049
1E+12	23	0.317	4.324	-4.007
1E+12	24	0.361	6.053	-5.693
1E+12	25	0.465	2.302	-1.838
1E+12	26	0.030	-6.424	6.453
1E+12	27	-0.737	-3.267	2.530
	Max	0.656	6.053	6.453
	Average	0.231	0.543	-0.312
	Min	-0.737	-6.424	-5.693
	Std Dev	0.423	3.277	3.110



	200400 I/P OFFSET CURR; IIC		
Test Site			
Tester			
Test Number			
Max Limit	10		
Min Limit	-10		
Fluence	0	1E+11	1E+12
LL	-10.000	-10.000	-10.000
Min	-0.268	-0.742	-6.424
Average	-0.025	0.716	0.598
Max	0.218	2.742	6.053
UL	10.000	10.000	10.000



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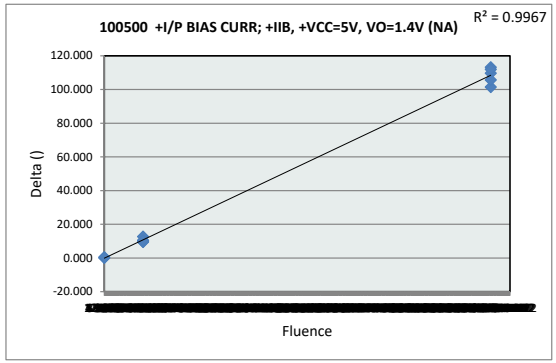
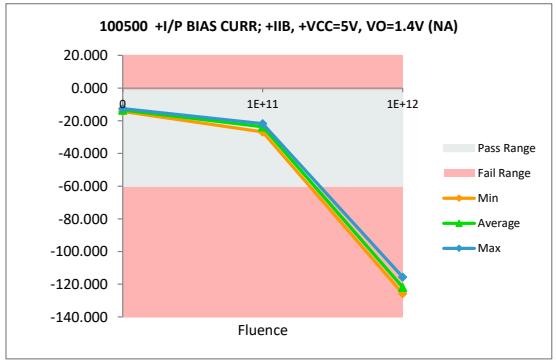
LM158QML-SP

	100500 +I/P BIAS CURR; +IIB,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	-1	-1
Min Limit	-60	-60

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-14.265	-14.297	0.032
0	C2	-12.065	-12.547	0.481
1E+11	18	-12.324	-22.762	10.439
1E+11	19	-12.555	-22.264	9.709
1E+11	20	-12.297	-21.784	9.487
1E+11	21	-13.984	-26.746	12.763
1E+11	22	-14.216	-24.620	10.404
1E+12	23	-14.015	-123.746	109.731
1E+12	24	-12.468	-125.755	113.288
1E+12	25	-14.015	-115.571	101.556
1E+12	26	-12.082	-124.098	112.016
1E+12	27	-14.040	-119.758	105.718
	Max	-12.065	-12.547	113.288
	Average	-13.194	-62.829	49.635
	Min	-14.265	-125.755	0.032
	Std Dev	0.948	52.248	52.148



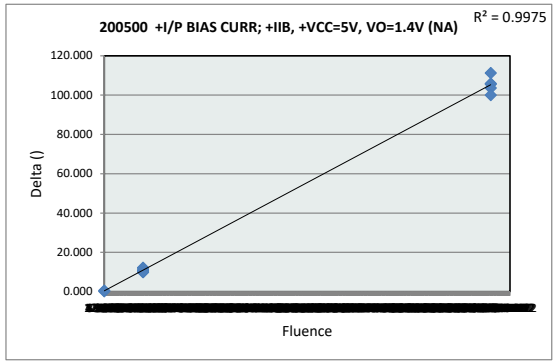
	100500 +I/P BIAS CURR; +IIB		
Test Site			
Tester			
Test Number			
Max Limit	-1		
Min Limit	-60		
Fluence	0	1E+11	1E+12
LL	-60.000	-60.000	-60.000
Min	-14.297	-26.746	-125.755
Average	-13.422	-23.635	-121.786
Max	-12.547	-21.784	-115.571
UL	-1.000	-1.000	-1.000



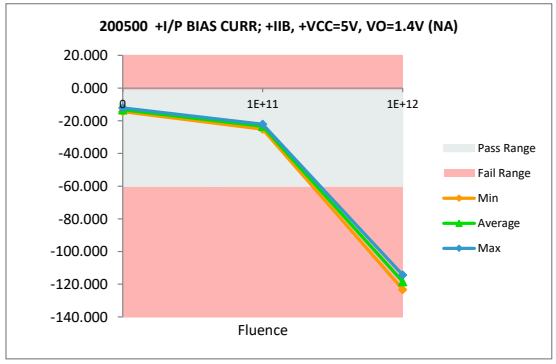
NDD Report
LM158QML-SP

	200500 +I/P BIAS CURR; +IIB,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	-1	-1
Min Limit	-60	-60

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-14.199	-14.411	0.212
0	C2	-11.486	-12.109	0.622
1E+11	18	-11.651	-22.436	10.785
1E+11	19	-12.044	-22.063	10.019
1E+11	20	-11.592	-23.851	12.259
1E+11	21	-13.548	-25.114	11.567
1E+11	22	-13.616	-23.635	10.019
1E+12	23	-13.535	-119.149	105.614
1E+12	24	-12.076	-117.980	105.903
1E+12	25	-13.695	-117.311	103.617
1E+12	26	-11.936	-123.197	111.261
1E+12	27	-14.206	-114.273	100.067
	Max	-11.486	-12.109	111.261
	Average	-12.799	-61.294	48.495
	Min	-14.206	-123.197	0.212
	Std Dev	1.081	50.572	50.343



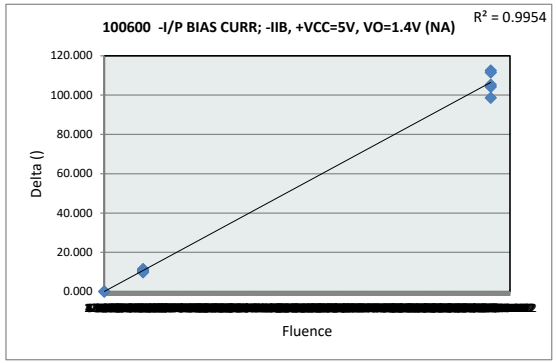
	200500 +I/P BIAS CURR; +III		
Test Site			
Tester			
Test Number			
Max Limit	-1		
Min Limit	-60		
Fluence	0	1E+11	1E+12
LL	-60.000	-60.000	-60.000
Min	-14.411	-25.114	-123.197
Average	-13.260	-23.420	-118.382
Max	-12.109	-22.063	-114.273
UL	-1.000	-1.000	-1.000



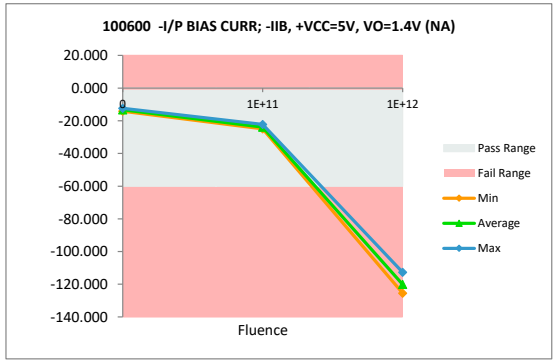
NDD Report
LM158QML-SP

	100600 -I/P BIAS CURR; -IIB, +	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	-1	-1
Min Limit	-60	-60

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-14.030	-14.150	0.120
0	C2	-12.282	-12.356	0.074
1E+11	18	-11.821	-22.235	10.414
1E+11	19	-12.473	-23.975	11.503
1E+11	20	-12.321	-23.509	11.188
1E+11	21	-14.257	-24.966	10.710
1E+11	22	-14.508	-24.425	9.916
1E+12	23	-14.498	-118.786	104.288
1E+12	24	-12.868	-125.443	112.575
1E+12	25	-14.069	-119.360	105.291
1E+12	26	-12.719	-124.281	111.562
1E+12	27	-14.042	-112.711	98.668
	Max	-11.821	-12.356	112.575
	Average	-13.324	-62.183	48.859
	Min	-14.508	-125.443	0.074
	Std Dev	0.994	51.378	51.123



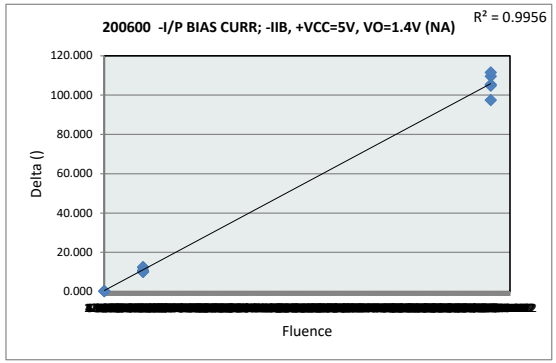
	100600 -I/P BIAS CURR; -IIB,		
Test Site			
Tester			
Test Number			
Max Limit	-1		
Min Limit	-60		
Fluence	0	1E+11	1E+12
LL	-60.000	-60.000	-60.000
Min	-14.150	-24.966	-125.443
Average	-13.253	-23.822	-120.116
Max	-12.356	-22.235	-112.711
UL	-1.000	-1.000	-1.000



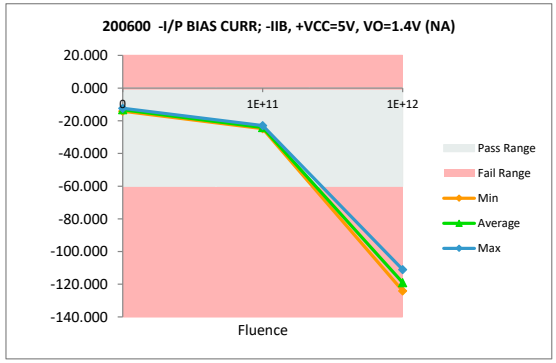
NDD Report
LM158QML-SP

	200600 -I/P BIAS CURR; -IIB, +	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	-1	-1
Min Limit	-60	-60

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-13.727	-14.143	0.416
0	C2	-12.142	-12.327	0.185
1E+11	18	-12.037	-22.901	10.864
1E+11	19	-12.420	-24.805	12.385
1E+11	20	-12.049	-24.559	12.510
1E+11	21	-14.130	-24.373	10.243
1E+11	22	-13.972	-24.041	10.069
1E+12	23	-13.852	-123.473	109.621
1E+12	24	-12.437	-124.033	111.596
1E+12	25	-14.159	-119.613	105.454
1E+12	26	-11.966	-116.773	104.808
1E+12	27	-13.469	-111.005	97.537
	Max	-11.966	-12.327	111.596
	Average	-13.030	-61.837	48.807
	Min	-14.159	-124.033	0.185
	Std Dev	0.920	50.701	50.576



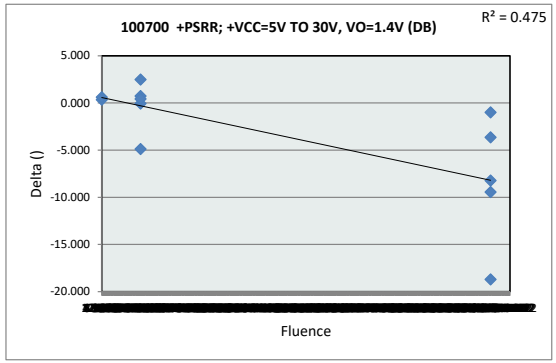
	200600 -I/P BIAS CURR; -IIB,		
Test Site			
Tester			
Test Number			
Max Limit	-1		
Min Limit	-60		
Fluence	0	1E+11	1E+12
LL	-60.000	-60.000	-60.000
Min	-14.143	-24.805	-124.033
Average	-13.235	-24.136	-118.980
Max	-12.327	-22.901	-111.005
UL	-1.000	-1.000	-1.000



NDD Report
LM158QML-SP

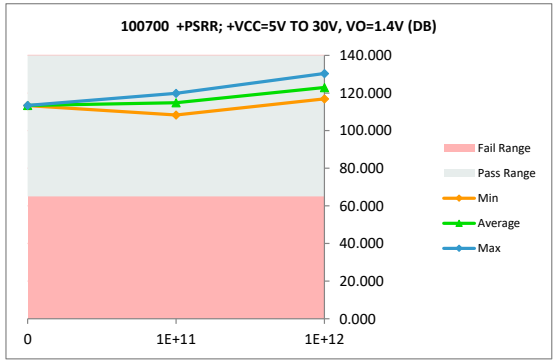
	100700 +PSRR; +VCC=5V TO 30	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	65	65

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	113.717	113.366	0.351
0	C2	114.031	113.419	0.612
1E+11	18	117.729	115.237	2.492
1E+11	19	108.259	108.322	-0.063
1E+11	20	116.113	115.372	0.742
1E+11	21	115.011	119.891	-4.879
1E+11	22	115.994	115.554	0.440
1E+12	23	116.872	125.089	-8.217
1E+12	24	111.687	130.390	-18.702
1E+12	25	116.140	119.778	-3.639
1E+12	26	113.200	122.638	-9.438
1E+12	27	115.909	116.900	-0.990
	Max	117.729	130.390	2.492
	Average	114.555	117.996	-3.441
	Min	108.259	108.322	-18.702
	Std Dev	2.614	5.953	6.103



	100700 +PSRR; +VCC=5V TO
Test Site	
Tester	
Test Number	
Max Limit	
Min Limit	65

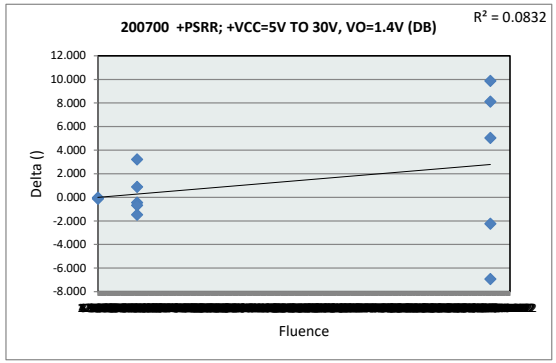
Fluence	0	1E+11	1E+12
LL	65.000	65.000	65.000
Min	113.366	108.322	116.900
Average	113.393	114.875	122.959
Max	113.419	119.891	130.390
UL			



NDD Report
LM158QML-SP

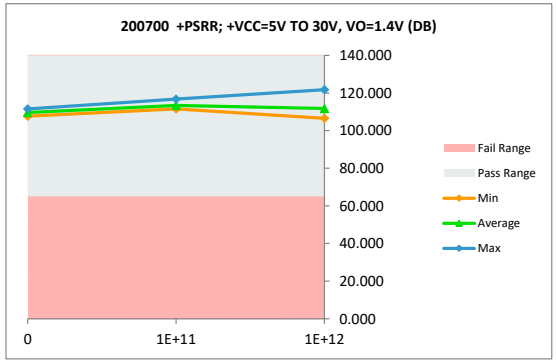
	200700 +PSRR; +VCC=5V TO 30	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	65	65

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	111.414	111.540	-0.126
0	C2	107.727	107.748	-0.021
1E+11	18	112.989	114.455	-1.466
1E+11	19	115.532	112.309	3.223
1E+11	20	111.136	111.575	-0.439
1E+11	21	116.150	116.825	-0.676
1E+11	22	112.722	111.834	0.888
1E+12	23	118.176	108.290	9.887
1E+12	24	112.058	114.289	-2.230
1E+12	25	114.666	106.545	8.121
1E+12	26	114.858	121.776	-6.917
1E+12	27	113.300	108.251	5.049
	Max	118.176	121.776	9.887
	Average	113.394	112.120	1.274
	Min	107.727	106.545	-6.917
	Std Dev	2.736	4.329	4.637



	200700 +PSRR; +VCC=5V TO
Test Site	
Tester	
Test Number	
Max Limit	
Min Limit	65

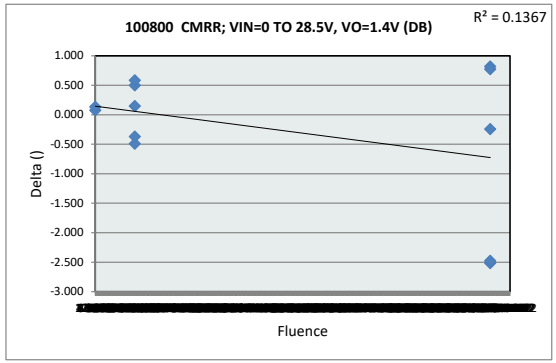
Fluence	0	1E+11	1E+12
LL	65.000	65.000	65.000
Min	107.748	111.575	106.545
Average	109.644	113.400	111.830
Max	111.540	116.825	121.776
UL			



NDD Report
LM158QML-SP

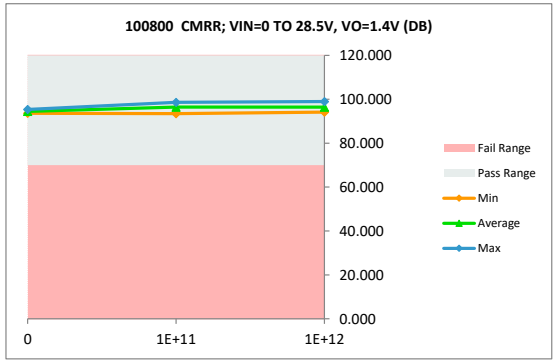
	100800 CMRR; VIN=0 TO 28.5V,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	70	70

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	93.666	93.589	0.077
0	C2	95.514	95.379	0.135
1E+11	18	95.972	95.823	0.149
1E+11	19	98.150	98.640	-0.489
1E+11	20	99.007	98.505	0.501
1E+11	21	94.058	93.471	0.587
1E+11	22	95.509	95.877	-0.368
1E+12	23	95.056	97.570	-2.514
1E+12	24	96.307	95.486	0.821
1E+12	25	94.932	94.157	0.775
1E+12	26	96.517	98.991	-2.474
1E+12	27	95.764	96.006	-0.242
	Max	99.007	98.991	0.821
	Average	95.871	96.124	-0.254
	Min	93.666	93.471	-2.514
	Std Dev	1.526	1.925	1.129



	100800 CMRR; VIN=0 TO 28.5		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	70		

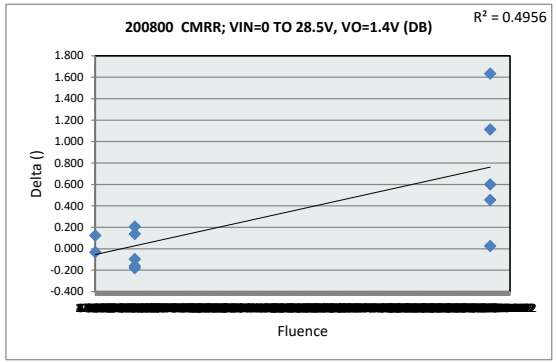
Fluence	0	1E+11	1E+12
LL	70.000	70.000	70.000
Min	93.589	93.471	94.157
Average	94.484	96.463	96.442
Max	95.379	98.640	98.991
UL			



NDD Report
LM158QML-SP

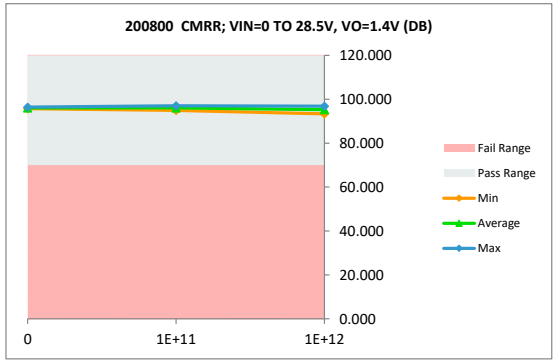
	200800 CMRR; VIN=0 TO 28.5V,	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	70	70

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	96.568	96.443	0.125
0	C2	95.696	95.727	-0.031
1E+11	18	97.191	97.052	0.139
1E+11	19	95.453	95.631	-0.179
1E+11	20	96.797	96.957	-0.160
1E+11	21	95.781	95.875	-0.095
1E+11	22	95.131	94.925	0.207
1E+12	23	94.999	93.365	1.634
1E+12	24	96.425	95.311	1.113
1E+12	25	95.629	95.028	0.601
1E+12	26	96.864	96.838	0.026
1E+12	27	96.258	95.801	0.457
	Max	97.191	97.052	1.634
	Average	96.066	95.746	0.320
	Min	94.999	93.365	-0.179
	Std Dev	0.717	1.041	0.556



	200800 CMRR; VIN=0 TO 28.5		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	70		

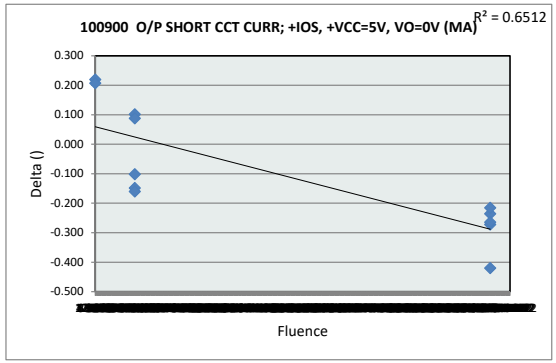
Fluence	0	1E+11	1E+12
LL	70.000	70.000	70.000
Min	95.727	94.925	93.365
Average	96.085	96.088	95.269
Max	96.443	97.052	96.838
UL			



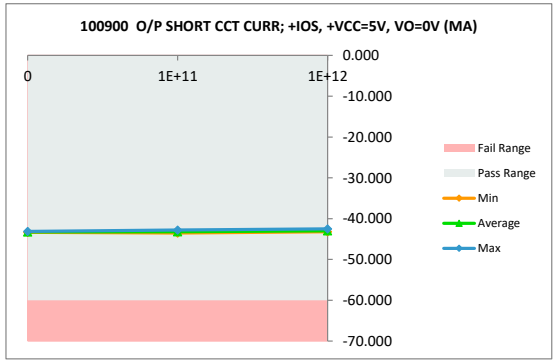
NDD Report
LM158QML-SP

	100900 O/P SHORT CCT CURR; +	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	-60	-60

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-42.906	-43.126	0.220
0	C2	-43.155	-43.362	0.207
1E+11	18	-43.201	-43.303	0.102
1E+11	19	-43.430	-43.519	0.088
1E+11	20	-42.880	-42.778	-0.101
1E+11	21	-43.380	-43.232	-0.148
1E+11	22	-43.345	-43.184	-0.160
1E+12	23	-42.919	-42.499	-0.419
1E+12	24	-43.441	-43.206	-0.235
1E+12	25	-43.408	-43.192	-0.215
1E+12	26	-43.397	-43.124	-0.272
1E+12	27	-43.177	-42.912	-0.264
	Max	-42.880	-42.499	0.220
	Average	-43.220	-43.120	-0.100
	Min	-43.441	-43.519	-0.419
	Std Dev	0.216	0.274	0.207



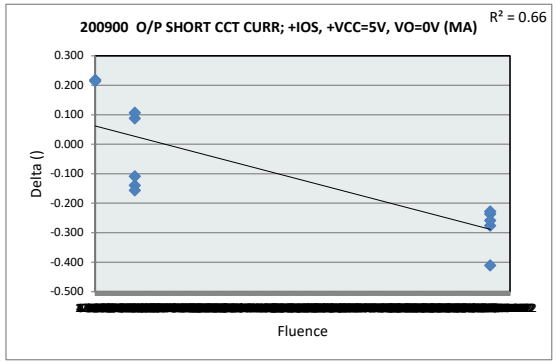
	100900 O/P SHORT CCT CURR		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	-60		
Fluence	0	1E+11	1E+12
LL	-60.000	-60.000	-60.000
Min	-43.362	-43.519	-43.206
Average	-43.244	-43.203	-42.987
Max	-43.126	-42.778	-42.499
UL			



NDD Report
LM158QML-SP

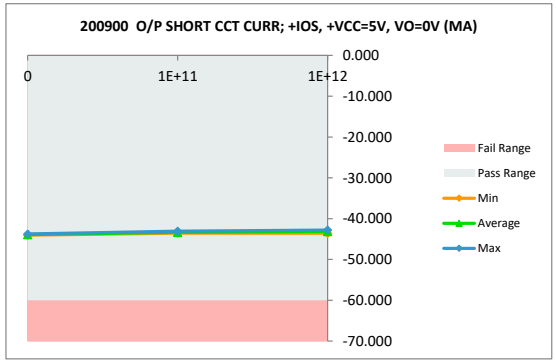
	200900 O/P SHORT CCT CURR; +	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	-60	-60

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-43.534	-43.753	0.219
0	C2	-43.830	-44.044	0.215
1E+11	18	-43.415	-43.503	0.088
1E+11	19	-43.444	-43.551	0.107
1E+11	20	-43.578	-43.469	-0.109
1E+11	21	-43.337	-43.197	-0.139
1E+11	22	-43.220	-43.064	-0.156
1E+12	23	-43.215	-42.805	-0.411
1E+12	24	-43.832	-43.596	-0.236
1E+12	25	-43.397	-43.169	-0.227
1E+12	26	-43.624	-43.349	-0.276
1E+12	27	-43.106	-42.848	-0.258
	Max	-43.106	-42.805	0.219
	Average	-43.461	-43.362	-0.099
	Min	-43.832	-44.044	-0.411
	Std Dev	0.231	0.365	0.207



	200900 O/P SHORT CCT CURR		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	-60		

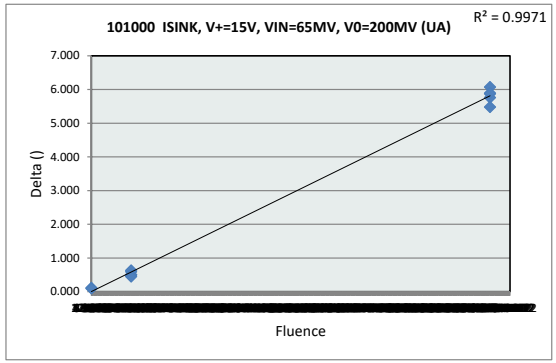
Fluence	0	1E+11	1E+12
LL	-60.000	-60.000	-60.000
Min	-44.044	-43.551	-43.596
Average	-43.899	-43.357	-43.153
Max	-43.753	-43.064	-42.805
UL			



NDD Report
LM158QML-SP

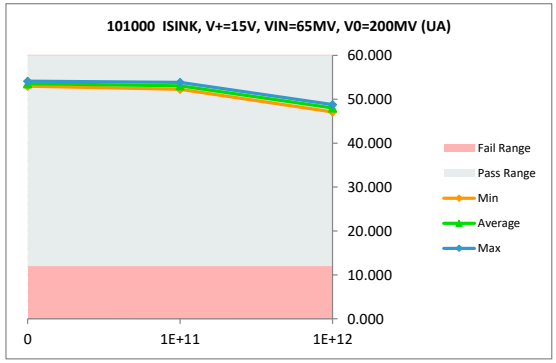
	101000 ISINK, V+=15V, VIN=65	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	12	12

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	54.250	54.136	0.114
0	C2	53.086	52.986	0.100
1E+11	18	52.862	52.266	0.595
1E+11	19	53.513	52.877	0.636
1E+11	20	53.038	52.535	0.503
1E+11	21	54.345	53.843	0.502
1E+11	22	54.173	53.721	0.452
1E+12	23	54.674	48.799	5.875
1E+12	24	53.330	47.255	6.075
1E+12	25	54.168	48.404	5.764
1E+12	26	53.013	47.120	5.893
1E+12	27	54.084	48.600	5.484
	Max	54.674	54.136	6.075
	Average	53.711	51.045	2.666
	Min	52.862	47.120	0.100
	Std Dev	0.634	2.749	2.790



	101000 ISINK, V+=15V, VIN=		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	12		

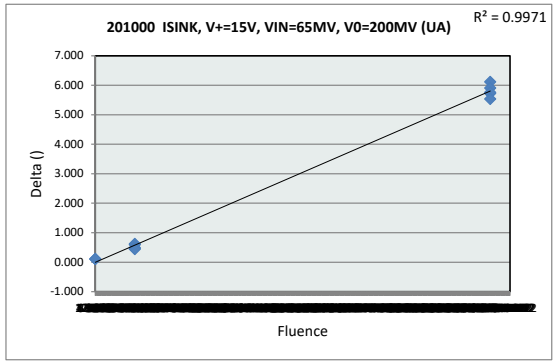
Fluence	0	1E+11	1E+12
LL	12.000	12.000	12.000
Min	52.986	52.266	47.120
Average	53.561	53.049	48.036
Max	54.136	53.843	48.799
UL			



NDD Report
LM158QML-SP

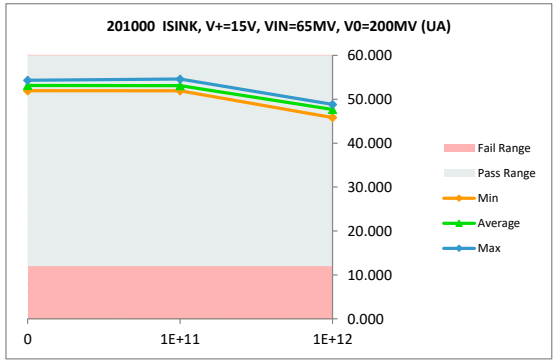
	201000 ISINK, V+=15V, VIN=65	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	12	12

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	54.447	54.342	0.105
0	C2	52.069	51.953	0.115
1E+11	18	52.558	51.938	0.620
1E+11	19	53.302	52.704	0.598
1E+11	20	52.577	52.082	0.495
1E+11	21	54.740	54.267	0.472
1E+11	22	55.062	54.617	0.445
1E+12	23	54.568	48.842	5.726
1E+12	24	52.541	46.424	6.116
1E+12	25	54.637	48.726	5.912
1E+12	26	51.593	45.833	5.760
1E+12	27	54.160	48.618	5.542
	Max	55.062	54.617	6.116
	Average	53.521	50.862	2.659
	Min	51.593	45.833	0.105
	Std Dev	1.211	3.070	2.790



	201000 ISINK, V+=15V, VIN=		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	12		

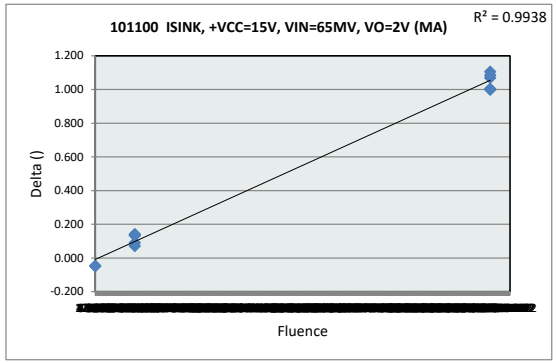
Fluence	0	1E+11	1E+12
LL	12.000	12.000	12.000
Min	51.953	51.938	45.833
Average	53.148	53.122	47.688
Max	54.342	54.617	48.842
UL			



NDD Report
LM158QML-SP

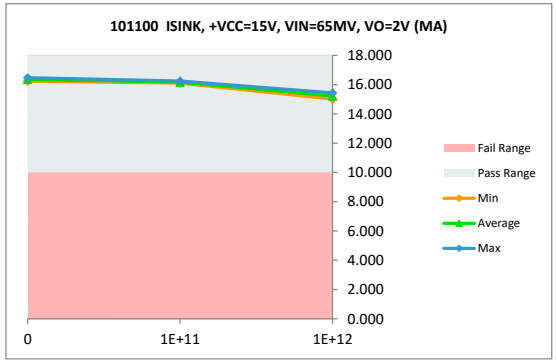
	101100 ISINK, +VCC=15V, VIN=	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	10	10

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	16.432	16.478	-0.046
0	C2	16.195	16.243	-0.049
1E+11	18	16.223	16.151	0.072
1E+11	19	16.191	16.101	0.090
1E+11	20	16.233	16.099	0.134
1E+11	21	16.385	16.243	0.142
1E+11	22	16.377	16.242	0.135
1E+12	23	16.401	15.295	1.106
1E+12	24	16.097	15.026	1.070
1E+12	25	16.377	15.372	1.005
1E+12	26	16.100	15.015	1.086
1E+12	27	16.439	15.440	0.999
	Max	16.439	16.478	1.106
	Average	16.288	15.809	0.479
	Min	16.097	15.015	-0.049
	Std Dev	0.127	0.534	0.512



	101100 ISINK, +VCC=15V, VI		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	10		

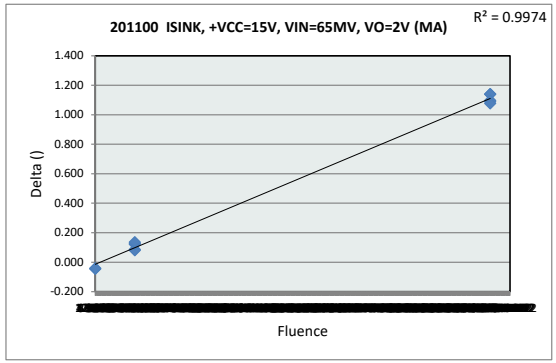
Fluence	0	1E+11	1E+12
LL	10.000	10.000	10.000
Min	16.243	16.099	15.015
Average	16.360	16.167	15.230
Max	16.478	16.243	15.440
UL			



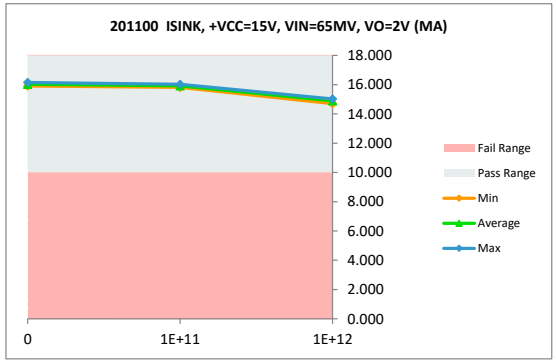
NDD Report
LM158QML-SP

	201100 ISINK, +VCC=15V, VIN=	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	10	10

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	16.106	16.151	-0.045
0	C2	15.868	15.910	-0.041
1E+11	18	15.976	15.889	0.087
1E+11	19	15.963	15.882	0.081
1E+11	20	15.941	15.820	0.121
1E+11	21	16.125	15.996	0.129
1E+11	22	16.159	16.023	0.137
1E+12	23	16.164	15.024	1.140
1E+12	24	15.843	14.703	1.141
1E+12	25	16.113	15.022	1.091
1E+12	26	15.813	14.715	1.097
1E+12	27	16.068	14.991	1.077
	Max	16.164	16.151	1.141
	Average	16.012	15.510	0.501
	Min	15.813	14.703	-0.045
	Std Dev	0.127	0.562	0.540



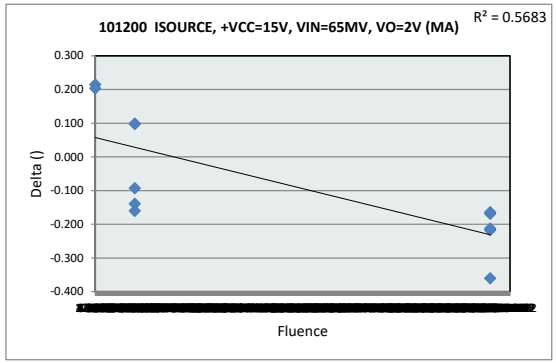
	201100 ISINK, +VCC=15V, VI		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	10		
Fluence	0	1E+11	1E+12
LL	10.000	10.000	10.000
Min	15.910	15.820	14.703
Average	16.030	15.922	14.891
Max	16.151	16.023	15.024
UL			



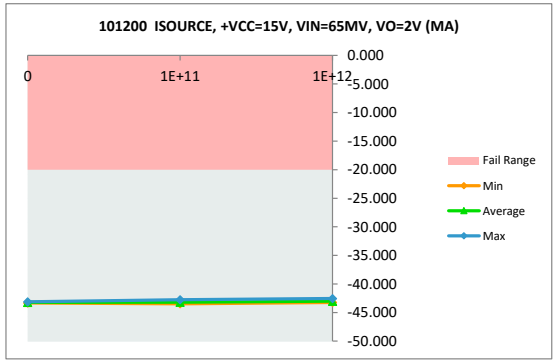
NDD Report
LM158QML-SP

	101200 ISOURCE, +VCC=15V, VI	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	-20	-20
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-42.906	-43.121	0.215
0	C2	-43.125	-43.329	0.204
1E+11	18	-43.180	-43.278	0.098
1E+11	19	-43.380	-43.479	0.099
1E+11	20	-42.844	-42.751	-0.093
1E+11	21	-43.361	-43.222	-0.139
1E+11	22	-43.335	-43.175	-0.160
1E+12	23	-42.906	-42.546	-0.360
1E+12	24	-43.411	-43.243	-0.169
1E+12	25	-43.374	-43.210	-0.164
1E+12	26	-43.358	-43.141	-0.217
1E+12	27	-43.160	-42.948	-0.212
	Max	-42.844	-42.546	0.215
	Average	-43.195	-43.120	-0.075
	Min	-43.411	-43.479	-0.360
	Std Dev	0.210	0.258	0.183



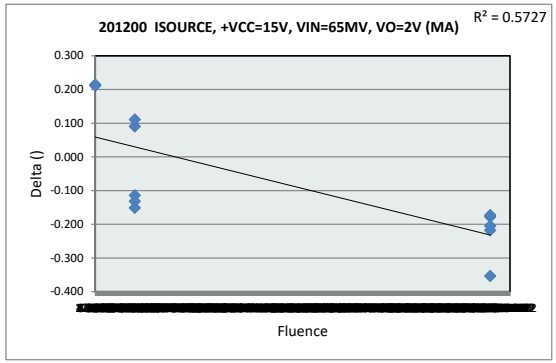
	101200 ISOURCE, +VCC=15V,		
Test Site			
Tester			
Test Number			
Max Limit	-20		
Min Limit			
Fluence	0	1E+11	1E+12
LL			
Min	-43.329	-43.479	-43.243
Average	-43.225	-43.181	-43.017
Max	-43.121	-42.751	-42.546
UL	-20.000	-20.000	-20.000



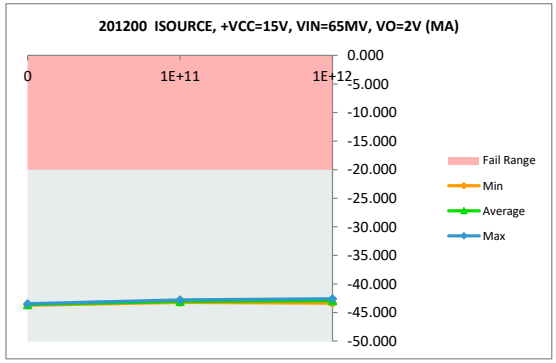
NDD Report
LM158QML-SP

	201200 ISOURCE, +VCC=15V, VI	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	-20	-20
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-43.242	-43.457	0.215
0	C2	-43.520	-43.732	0.212
1E+11	18	-43.111	-43.201	0.091
1E+11	19	-43.119	-43.231	0.111
1E+11	20	-43.273	-43.159	-0.114
1E+11	21	-43.060	-42.929	-0.132
1E+11	22	-42.953	-42.802	-0.151
1E+12	23	-42.939	-42.586	-0.353
1E+12	24	-43.533	-43.356	-0.177
1E+12	25	-43.103	-42.930	-0.173
1E+12	26	-43.308	-43.090	-0.218
1E+12	27	-42.815	-42.611	-0.204
	Max	-42.815	-42.586	0.215
	Average	-43.165	-43.090	-0.074
	Min	-43.533	-43.732	-0.353
	Std Dev	0.221	0.340	0.184



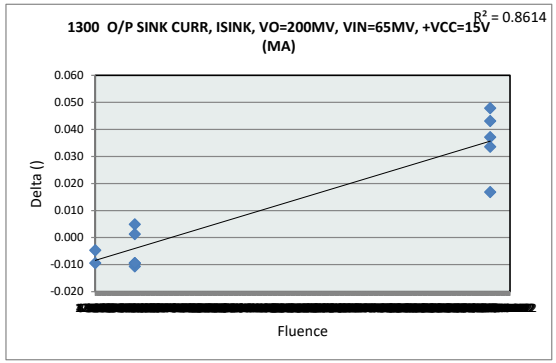
	201200 ISOURCE, +VCC=15V,		
Test Site			
Tester			
Test Number			
Max Limit	-20		
Min Limit			
Fluence	0	1E+11	1E+12
LL			
Min	-43.732	-43.231	-43.356
Average	-43.594	-43.064	-42.914
Max	-43.457	-42.802	-42.586
UL	-20.000	-20.000	-20.000



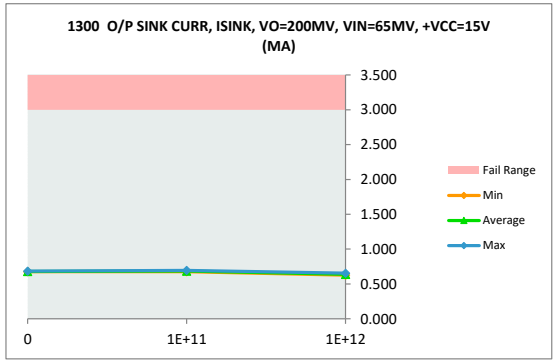
NDD Report
LM158QML-SP

	1300 O/P SINK CURR, ISINK, VC	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	3	3
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	0.667	0.676	-0.009
0	C2	0.679	0.683	-0.005
1E+11	18	0.684	0.694	-0.011
1E+11	19	0.696	0.694	0.001
1E+11	20	0.674	0.683	-0.009
1E+11	21	0.684	0.679	0.005
1E+11	22	0.666	0.675	-0.009
1E+12	23	0.660	0.626	0.034
1E+12	24	0.698	0.655	0.043
1E+12	25	0.684	0.636	0.048
1E+12	26	0.675	0.638	0.037
1E+12	27	0.654	0.637	0.017
	Max	0.698	0.694	0.048
	Average	0.677	0.665	0.012
	Min	0.654	0.626	-0.011
	Std Dev	0.013	0.025	0.023



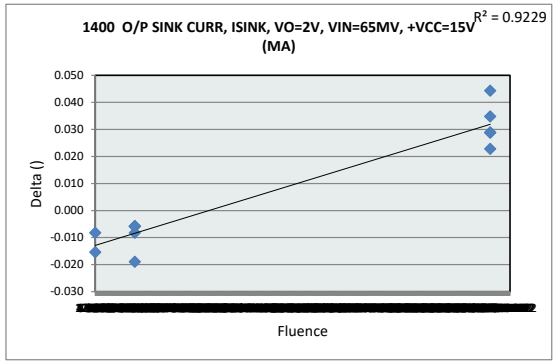
	1300 O/P SINK CURR, ISINK,		
Test Site			
Tester			
Test Number			
Max Limit	3		
Min Limit			
Fluence	0	1E+11	1E+12
LL			
Min	0.676	0.675	0.626
Average	0.680	0.685	0.638
Max	0.683	0.694	0.655
UL	3.000	3.000	3.000



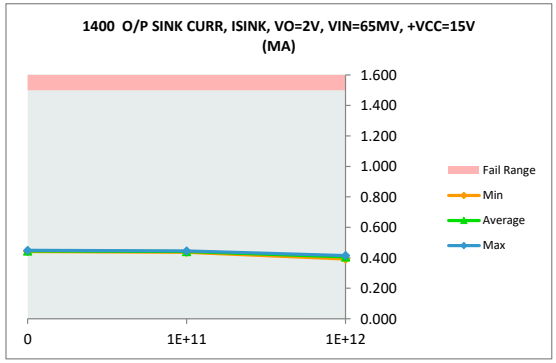
NDD Report
LM158QML-SP

	1400 O/P SINK CURR, ISINK, VO	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	1.5	1.5
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	0.426	0.441	-0.015
0	C2	0.441	0.449	-0.008
1E+11	18	0.426	0.445	-0.019
1E+11	19	0.438	0.443	-0.006
1E+11	20	0.430	0.436	-0.006
1E+11	21	0.436	0.445	-0.008
1E+11	22	0.430	0.436	-0.006
1E+12	23	0.444	0.409	0.035
1E+12	24	0.438	0.415	0.023
1E+12	25	0.436	0.408	0.029
1E+12	26	0.436	0.392	0.044
1E+12	27	0.436	0.408	0.029
	Max	0.444	0.449	0.044
	Average	0.435	0.427	0.008
	Min	0.426	0.392	-0.019
	Std Dev	0.006	0.020	0.022



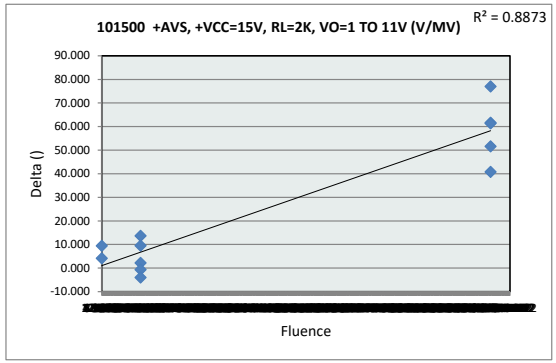
	1400 O/P SINK CURR, ISINK,		
Test Site			
Tester			
Test Number			
Max Limit	1.5		
Min Limit			
Fluence	0	1E+11	1E+12
LL			
Min	0.441	0.436	0.392
Average	0.445	0.441	0.406
Max	0.449	0.445	0.415
UL	1.500	1.500	1.500



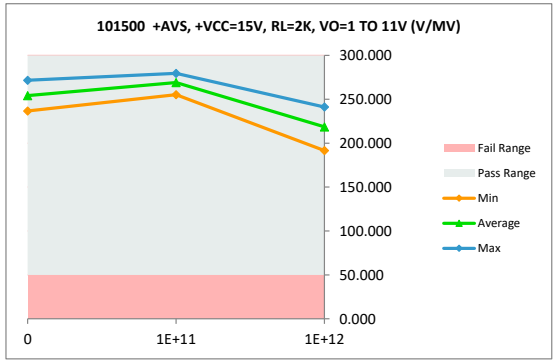
NDD Report
LM158QML-SP

	101500 +AVS, +VCC=15V, RL=2	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	50	50

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	240.841	236.635	4.206
0	C2	281.165	271.684	9.481
1E+11	18	270.374	268.139	2.234
1E+11	19	289.141	279.563	9.578
1E+11	20	270.716	271.380	-0.664
1E+11	21	267.080	271.049	-3.970
1E+11	22	268.955	255.270	13.685
1E+12	23	265.752	214.151	51.601
1E+12	24	285.418	208.401	77.016
1E+12	25	302.852	241.192	61.660
1E+12	26	278.620	237.845	40.776
1E+12	27	253.008	191.590	61.418
	Max	302.852	279.563	77.016
	Average	272.827	245.575	27.252
	Min	240.841	191.590	-3.970
	Std Dev	16.387	28.916	29.119



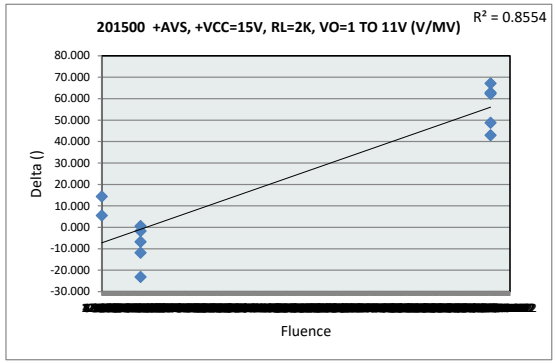
	101500 +AVS, +VCC=15V, RL=		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	50		
Fluence	0	1E+11	1E+12
LL	50.000	50.000	50.000
Min	236.635	255.270	191.591
Average	254.159	269.080	218.636
Max	271.684	279.563	241.192
UL			



NDD Report
LM158QML-SP

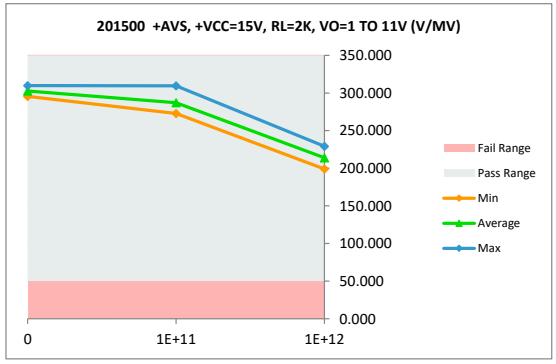
	201500 +AVS, +VCC=15V, RL=2	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	50	50

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	309.973	295.548	14.424
0	C2	315.431	309.893	5.538
1E+11	18	286.513	309.578	-23.065
1E+11	19	282.863	294.683	-11.820
1E+11	20	278.971	285.694	-6.723
1E+11	21	271.003	272.712	-1.709
1E+11	22	273.397	272.807	0.590
1E+12	23	273.366	210.509	62.857
1E+12	24	266.182	199.038	67.144
1E+12	25	246.048	203.058	42.990
1E+12	26	291.514	229.217	62.297
1E+12	27	276.803	228.033	48.770
	Max	315.431	309.893	67.144
	Average	281.005	259.231	21.774
	Min	246.048	199.038	-23.065
	Std Dev	18.704	42.394	32.803



	201500 +AVS, +VCC=15V, RL=		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	50		

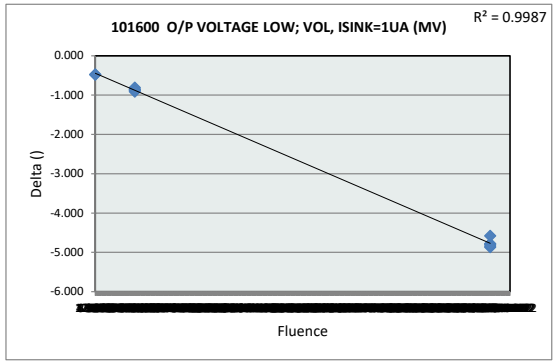
Fluence	0	1E+11	1E+12
LL	50.000	50.000	50.000
Min	295.548	272.712	199.038
Average	302.721	287.095	213.971
Max	309.893	309.578	229.217
UL			



NDD Report
LM158QML-SP

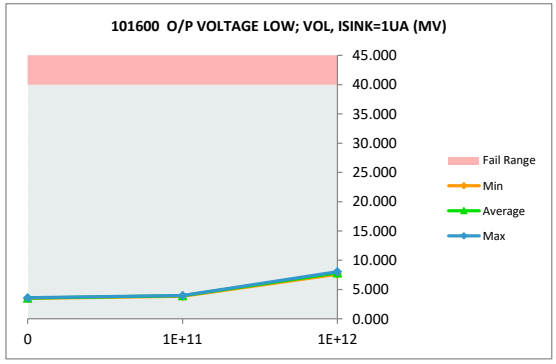
	101600 O/P VOLTAGE LOW; VOL	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	40	40
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	3.012	3.484	-0.472
0	C2	3.115	3.597	-0.482
1E+11	18	3.051	3.962	-0.911
1E+11	19	3.110	3.957	-0.847
1E+11	20	3.115	3.978	-0.863
1E+11	21	3.043	3.849	-0.806
1E+11	22	3.060	3.942	-0.882
1E+12	23	2.996	7.776	-4.780
1E+12	24	3.177	8.042	-4.865
1E+12	25	2.984	7.776	-4.792
1E+12	26	3.127	7.966	-4.839
1E+12	27	3.027	7.606	-4.579
	Max	3.177	8.042	-0.472
	Average	3.068	5.495	-2.426
	Min	2.984	3.484	-4.865
	Std Dev	0.060	2.072	2.075



	101600 O/P VOLTAGE LOW; V		
Test Site			
Tester			
Test Number			
Max Limit	40		
Min Limit			

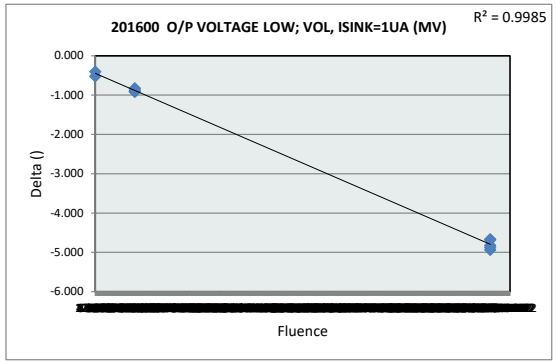
Fluence	0	1E+11	1E+12
LL			
Min	3.484	3.849	7.606
Average	3.540	3.938	7.833
Max	3.597	3.978	8.042
UL	40.000	40.000	40.000



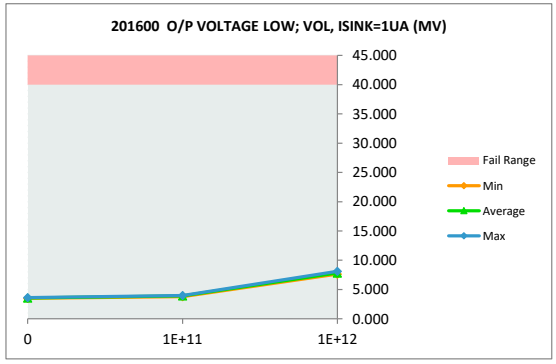
NDD Report
LM158QML-SP

	201600 O/P VOLTAGE LOW; VOL	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	40	40
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	2.984	3.501	-0.517
0	C2	3.212	3.616	-0.403
1E+11	18	3.005	3.921	-0.916
1E+11	19	3.077	3.976	-0.899
1E+11	20	3.120	3.957	-0.837
1E+11	21	2.965	3.790	-0.825
1E+11	22	3.008	3.902	-0.894
1E+12	23	2.936	7.761	-4.824
1E+12	24	3.177	8.112	-4.934
1E+12	25	2.963	7.642	-4.679
1E+12	26	3.137	8.009	-4.872
1E+12	27	2.965	7.632	-4.667
	Max	3.212	8.112	-0.403
	Average	3.046	5.485	-2.439
	Min	2.936	3.501	-4.934
	Std Dev	0.095	2.080	2.087



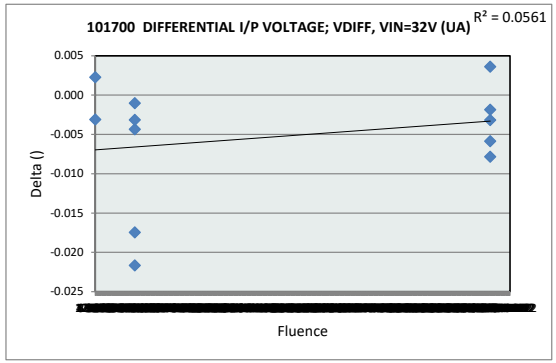
	201600 O/P VOLTAGE LOW; V		
Test Site			
Tester			
Test Number			
Max Limit	40		
Min Limit			
Fluence	0	1E+11	1E+12
LL			
Min	3.501	3.790	7.632
Average	3.558	3.909	7.831
Max	3.616	3.976	8.112
UL	40.000	40.000	40.000



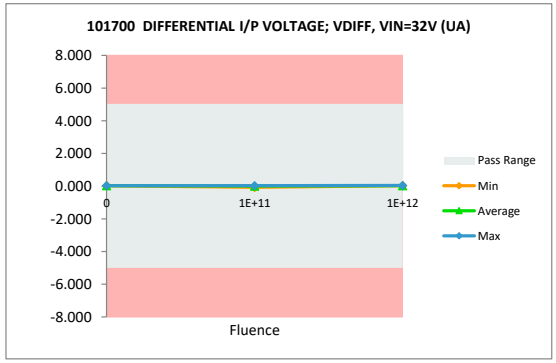
NDD Report
LM158QML-SP

	101700 DIFFERENTIAL I/P VOLT	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	5	5
Min Limit	-5	-5

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	0.026	0.029	-0.003
0	C2	0.028	0.026	0.002
1E+11	18	0.026	0.030	-0.004
1E+11	19	0.027	0.030	-0.003
1E+11	20	-0.092	-0.070	-0.022
1E+11	21	0.027	0.028	-0.001
1E+11	22	0.004	0.021	-0.017
1E+12	23	0.029	0.025	0.004
1E+12	24	0.025	0.027	-0.002
1E+12	25	0.026	0.029	-0.003
1E+12	26	0.017	0.025	-0.008
1E+12	27	0.040	0.046	-0.006
	Max	0.040	0.046	0.004
	Average	0.015	0.021	-0.005
	Min	-0.092	-0.070	-0.022
	Std Dev	0.035	0.029	0.007



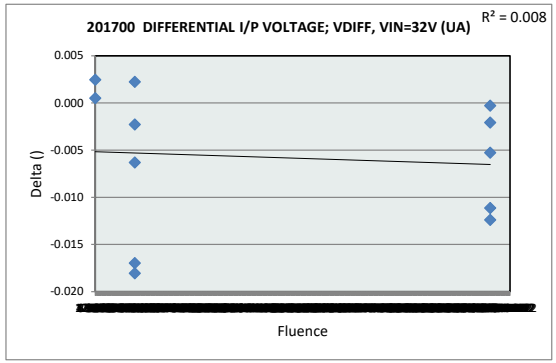
	101700 DIFFERENTIAL I/P VO		
Test Site			
Tester			
Test Number			
Max Limit	5		
Min Limit	-5		
Fluence	0	1E+11	1E+12
LL	-5.000	-5.000	-5.000
Min	0.026	-0.070	0.025
Average	0.027	0.008	0.030
Max	0.029	0.030	0.046
UL	5.000	5.000	5.000



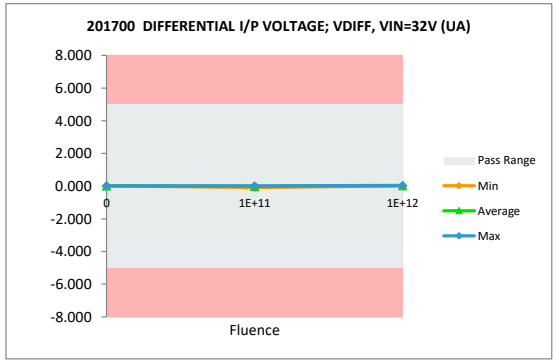
NDD Report
LM158QML-SP

	201700 DIFFERENTIAL I/P VOLT	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	5	5
Min Limit	-5	-5

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	0.020	0.020	0.001
0	C2	0.022	0.019	0.002
1E+11	18	0.019	0.022	-0.002
1E+11	19	0.016	0.023	-0.006
1E+11	20	-0.102	-0.086	-0.017
1E+11	21	0.021	0.019	0.002
1E+11	22	-0.004	0.015	-0.018
1E+12	23	0.018	0.018	0.000
1E+12	24	0.019	0.021	-0.002
1E+12	25	0.018	0.024	-0.005
1E+12	26	0.008	0.019	-0.011
1E+12	27	0.034	0.046	-0.012
	Max	0.034	0.046	0.002
	Average	0.007	0.013	-0.006
	Min	-0.102	-0.086	-0.018
	Std Dev	0.036	0.032	0.007



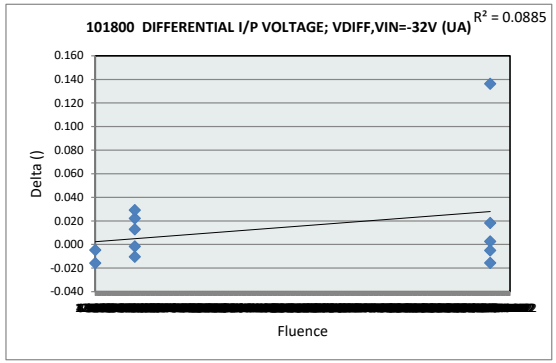
	201700 DIFFERENTIAL I/P VO		
Test Site			
Tester			
Test Number			
Max Limit	5		
Min Limit	-5		
Fluence	0	1E+11	1E+12
LL	-5.000	-5.000	-5.000
Min	0.019	-0.086	0.018
Average	0.019	-0.002	0.026
Max	0.020	0.023	0.046
UL	5.000	5.000	5.000



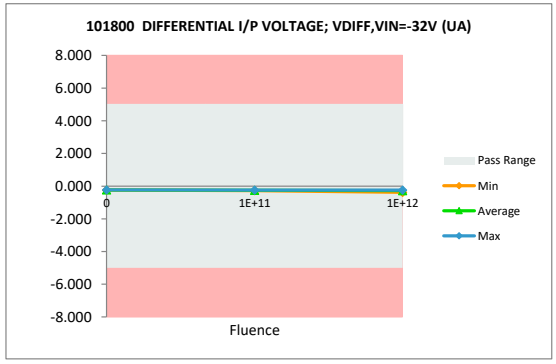
NDD Report
LM158QML-SP

	101800 DIFFERENTIAL I/P VOLT	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	5	5
Min Limit	-5	-5

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.244	-0.228	-0.016
0	C2	-0.243	-0.238	-0.005
1E+11	18	-0.238	-0.261	0.022
1E+11	19	-0.248	-0.261	0.013
1E+11	20	-0.244	-0.234	-0.010
1E+11	21	-0.240	-0.238	-0.002
1E+11	22	-0.241	-0.271	0.029
1E+12	23	-0.240	-0.376	0.136
1E+12	24	-0.243	-0.246	0.003
1E+12	25	-0.230	-0.248	0.018
1E+12	26	-0.248	-0.244	-0.005
1E+12	27	-0.256	-0.241	-0.016
	Max	-0.230	-0.228	0.136
	Average	-0.243	-0.257	0.014
	Min	-0.256	-0.376	-0.016
	Std Dev	0.006	0.040	0.041



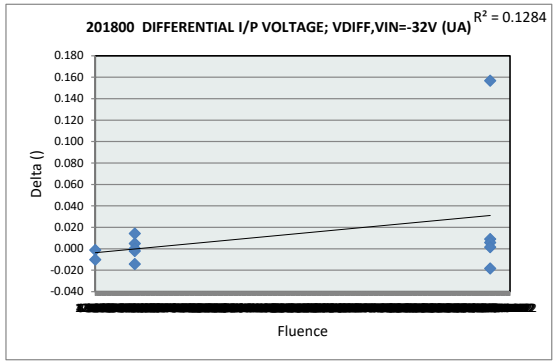
	101800 DIFFERENTIAL I/P VO		
Test Site			
Tester			
Test Number			
Max Limit	5		
Min Limit	-5		
Fluence	0	1E+11	1E+12
LL	-5.000	-5.000	-5.000
Min	-0.238	-0.271	-0.376
Average	-0.233	-0.253	-0.271
Max	-0.228	-0.234	-0.241
UL	5.000	5.000	5.000



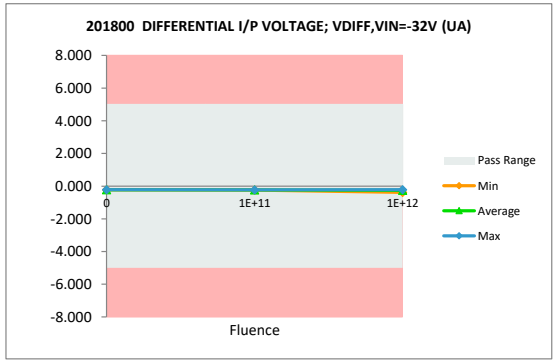
NDD Report
LM158QML-SP

	201800 DIFFERENTIAL I/P VOLT	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	5	5
Min Limit	-5	-5

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	-0.222	-0.220	-0.001
0	C2	-0.227	-0.217	-0.010
1E+11	18	-0.229	-0.234	0.005
1E+11	19	-0.241	-0.239	-0.002
1E+11	20	-0.242	-0.228	-0.014
1E+11	21	-0.225	-0.226	0.000
1E+11	22	-0.222	-0.236	0.014
1E+12	23	-0.221	-0.378	0.157
1E+12	24	-0.225	-0.234	0.009
1E+12	25	-0.234	-0.215	-0.018
1E+12	26	-0.219	-0.225	0.006
1E+12	27	-0.225	-0.227	0.002
	Max	-0.219	-0.215	0.157
	Average	-0.228	-0.240	0.012
	Min	-0.242	-0.378	-0.018
	Std Dev	0.008	0.044	0.046



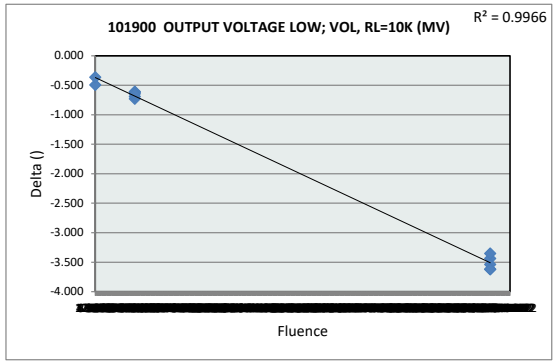
	201800 DIFFERENTIAL I/P VO		
Test Site			
Tester			
Test Number			
Max Limit	5		
Min Limit	-5		
Fluence	0	1E+11	1E+12
LL	-5.000	-5.000	-5.000
Min	-0.220	-0.239	-0.378
Average	-0.219	-0.232	-0.256
Max	-0.217	-0.226	-0.215
UL	5.000	5.000	5.000



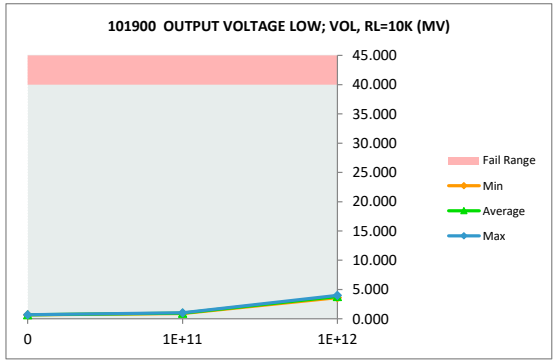
NDD Report
LM158QML-SP

	101900 OUTPUT VOLTAGE LOW;	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	40	40
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	0.177	0.671	-0.494
0	C2	0.330	0.692	-0.362
1E+11	18	0.270	0.998	-0.727
1E+11	19	0.364	0.979	-0.615
1E+11	20	0.330	1.019	-0.689
1E+11	21	0.297	0.902	-0.606
1E+11	22	0.270	0.914	-0.644
1E+12	23	0.258	3.695	-3.436
1E+12	24	0.382	4.000	-3.618
1E+12	25	0.230	3.769	-3.539
1E+12	26	0.328	3.945	-3.617
1E+12	27	0.258	3.609	-3.350
	Max	0.382	4.000	-0.362
	Average	0.291	2.099	-1.808
	Min	0.177	0.671	-3.618
	Std Dev	0.059	1.511	1.509



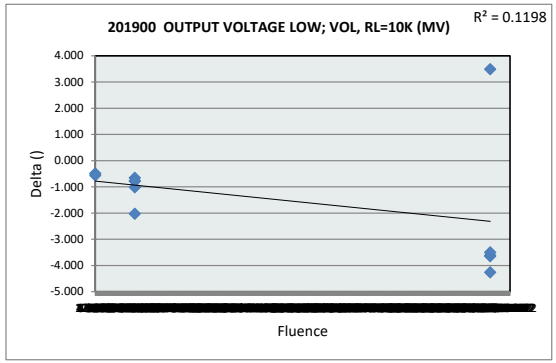
	101900 OUTPUT VOLTAGE LOV		
Test Site			
Tester			
Test Number			
Max Limit	40		
Min Limit			
Fluence	0	1E+11	1E+12
LL			
Min	0.671	0.902	3.609
Average	0.681	0.962	3.803
Max	0.692	1.019	4.000
UL	40.000	40.000	40.000



NDD Report
LM158QML-SP

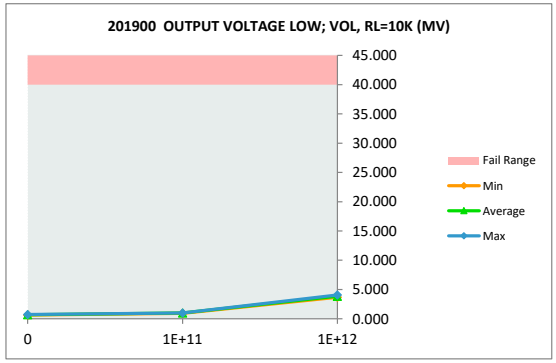
	201900 OUTPUT VOLTAGE LOW;	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	40	40
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	0.153	0.637	-0.484
0	C2	0.172	0.733	-0.560
1E+11	18	0.356	1.007	-0.651
1E+11	19	-0.009	1.007	-1.016
1E+11	20	0.211	0.991	-0.780
1E+11	21	-1.085	0.943	-2.027
1E+11	22	0.170	0.943	-0.773
1E+12	23	0.289	3.902	-3.612
1E+12	24	0.423	4.066	-3.643
1E+12	25	0.254	3.749	-3.496
1E+12	26	-0.357	3.902	-4.259
1E+12	27	7.162	3.673	3.489
	Max	7.162	4.066	3.489
	Average	0.645	2.129	-1.484
	Min	-1.085	0.637	-4.259
	Std Dev	2.093	1.533	2.126



	201900 OUTPUT VOLTAGE LOV		
Test Site			
Tester			
Test Number			
Max Limit	40		
Min Limit			

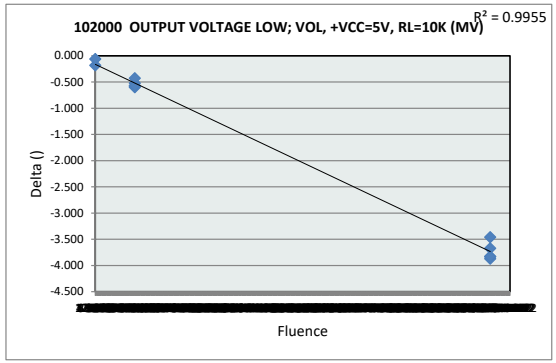
Fluence	0	1E+11	1E+12
LL			
Min	0.637	0.943	3.673
Average	0.685	0.978	3.858
Max	0.733	1.007	4.066
UL	40.000	40.000	40.000



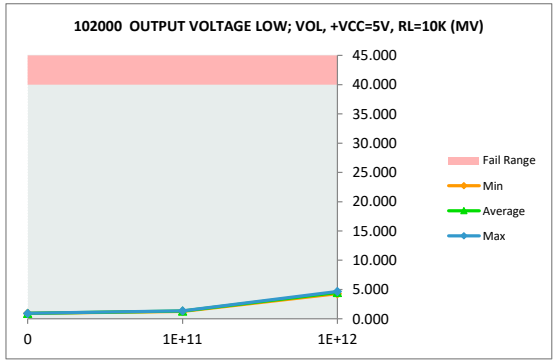
NDD Report
LM158QML-SP

	102000 OUTPUT VOLTAGE LOW;	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	40	40
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	0.763	0.943	-0.179
0	C2	0.864	0.924	-0.060
1E+11	18	0.783	1.360	-0.578
1E+11	19	0.747	1.344	-0.596
1E+11	20	0.840	1.360	-0.520
1E+11	21	0.754	1.324	-0.571
1E+11	22	0.840	1.267	-0.427
1E+12	23	0.661	4.532	-3.870
1E+12	24	0.837	4.665	-3.827
1E+12	25	0.716	4.388	-3.672
1E+12	26	0.750	4.579	-3.830
1E+12	27	0.823	4.284	-3.460
	Max	0.864	4.665	-0.060
	Average	0.781	2.581	-1.799
	Min	0.661	0.924	-3.870
	Std Dev	0.061	1.694	1.716



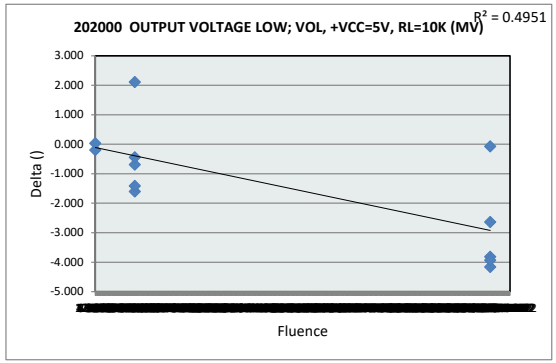
	102000 OUTPUT VOLTAGE LOV		
Test Site			
Tester			
Test Number			
Max Limit	40		
Min Limit			
Fluence	0	1E+11	1E+12
LL			
Min	0.924	1.267	4.284
Average	0.933	1.331	4.490
Max	0.943	1.360	4.665
UL	40.000	40.000	40.000



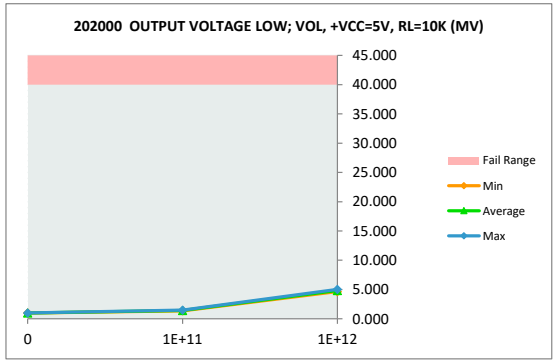
NDD Report
LM158QML-SP

	202000 OUTPUT VOLTAGE LOW;	
Test Site		
Tester		
Test Number		
Unit		
Max Limit	40	40
Min Limit		

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	0.806	0.998	-0.191
0	C2	1.014	0.979	0.036
1E+11	18	0.792	1.477	-0.685
1E+11	19	3.546	1.436	2.110
1E+11	20	0.957	1.400	-0.444
1E+11	21	-0.228	1.372	-1.601
1E+11	22	-0.057	1.351	-1.408
1E+12	23	0.966	4.782	-3.815
1E+12	24	0.869	5.025	-4.157
1E+12	25	0.823	4.753	-3.930
1E+12	26	2.282	4.918	-2.635
1E+12	27	4.577	4.649	-0.072
	Max	4.577	5.025	2.110
	Average	1.362	2.762	-1.399
	Min	-0.228	0.979	-4.157
	Std Dev	1.418	1.830	1.917



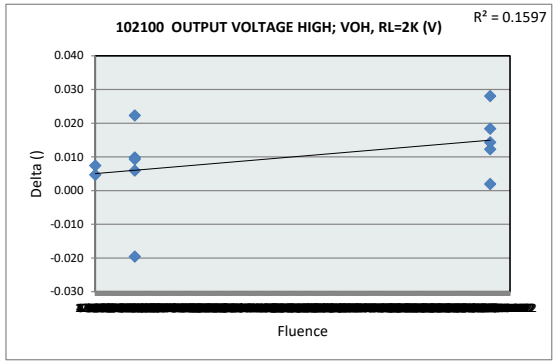
	202000 OUTPUT VOLTAGE LOV		
Test Site			
Tester			
Test Number			
Max Limit	40		
Min Limit			
Fluence	0	1E+11	1E+12
LL			
Min	0.979	1.351	4.649
Average	0.988	1.407	4.825
Max	0.998	1.477	5.025
UL	40.000	40.000	40.000



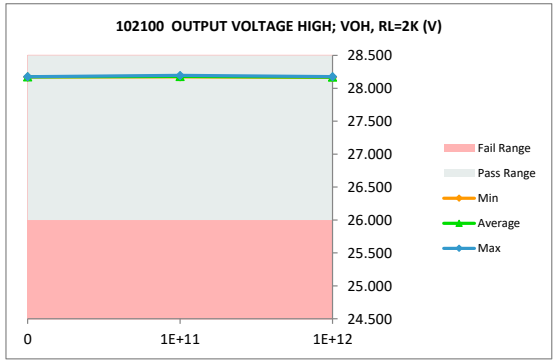
NDD Report
LM158QML-SP

	102100 OUTPUT VOLTAGE HIGH	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	26	26

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	28.181	28.176	0.005
0	C2	28.180	28.172	0.007
1E+11	18	28.197	28.174	0.022
1E+11	19	28.177	28.197	-0.020
1E+11	20	28.184	28.174	0.010
1E+11	21	28.185	28.179	0.006
1E+11	22	28.191	28.181	0.009
1E+12	23	28.184	28.166	0.018
1E+12	24	28.178	28.176	0.002
1E+12	25	28.195	28.167	0.028
1E+12	26	28.180	28.168	0.012
1E+12	27	28.192	28.178	0.014
	Max	28.197	28.197	0.028
	Average	28.185	28.176	0.010
	Min	28.177	28.166	-0.020
	Std Dev	0.007	0.008	0.012



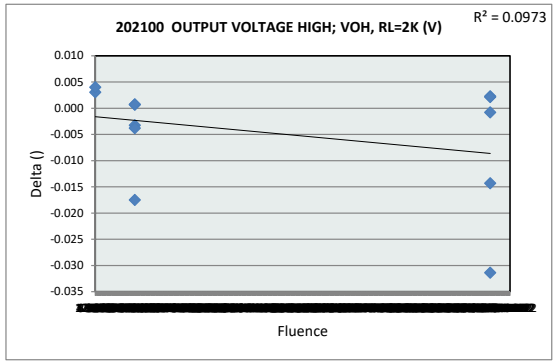
	102100 OUTPUT VOLTAGE HIG		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	26		
Fluence	0	1E+11	1E+12
LL	26.000	26.000	26.000
Min	28.172	28.174	28.166
Average	28.174	28.181	28.171
Max	28.176	28.197	28.178
UL			



NDD Report
LM158QML-SP

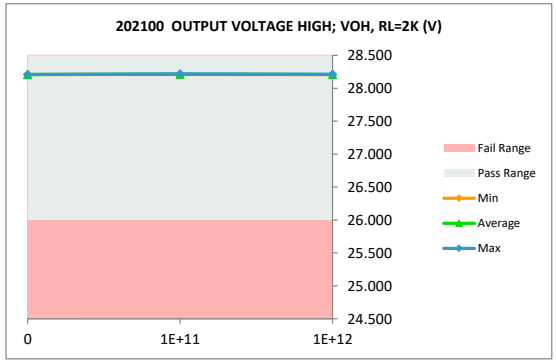
	202100 OUTPUT VOLTAGE HIGH	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	26	26

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	28.213	28.210	0.003
0	C2	28.213	28.209	0.004
1E+11	18	28.214	28.213	0.001
1E+11	19	28.212	28.211	0.001
1E+11	20	28.214	28.217	-0.003
1E+11	21	28.202	28.219	-0.017
1E+11	22	28.212	28.216	-0.004
1E+12	23	28.213	28.214	-0.001
1E+12	24	28.211	28.208	0.002
1E+12	25	28.213	28.211	0.002
1E+12	26	28.196	28.210	-0.014
1E+12	27	28.179	28.210	-0.031
	Max	28.214	28.219	0.004
	Average	28.208	28.212	-0.005
	Min	28.179	28.208	-0.031
	Std Dev	0.011	0.004	0.011



	202100 OUTPUT VOLTAGE HIG		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	26		

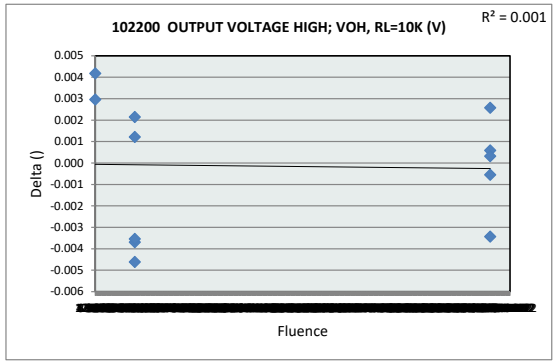
Fluence	0	1E+11	1E+12
LL	26.000	26.000	26.000
Min	28.209	28.211	28.208
Average	28.209	28.215	28.211
Max	28.210	28.219	28.214
UL			



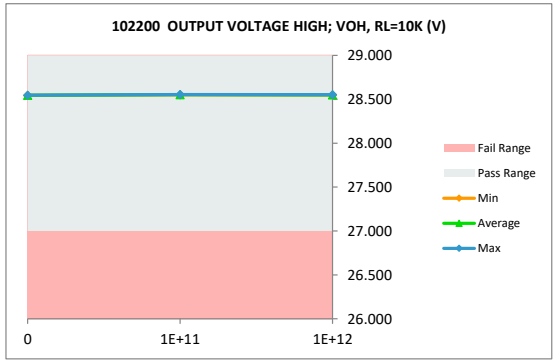
NDD Report
LM158QML-SP

	102200 OUTPUT VOLTAGE HIGH	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	27	27

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	28.549	28.545	0.004
0	C2	28.550	28.547	0.003
1E+11	18	28.554	28.552	0.002
1E+11	19	28.552	28.551	0.001
1E+11	20	28.551	28.554	-0.004
1E+11	21	28.550	28.554	-0.004
1E+11	22	28.550	28.554	-0.005
1E+12	23	28.549	28.553	-0.003
1E+12	24	28.551	28.548	0.003
1E+12	25	28.550	28.549	0.001
1E+12	26	28.550	28.550	-0.001
1E+12	27	28.550	28.549	0.000
	Max	28.554	28.554	0.004
	Average	28.551	28.551	0.000
	Min	28.549	28.545	-0.005
	Std Dev	0.001	0.003	0.003



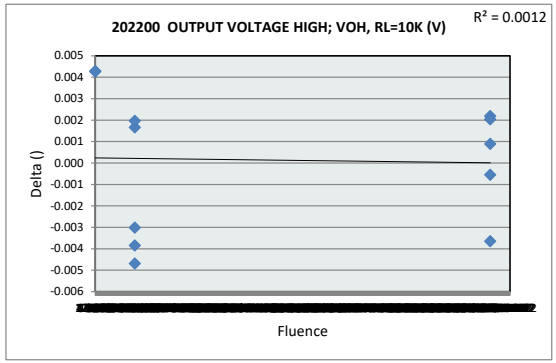
	102200 OUTPUT VOLTAGE HIG		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	27		
Fluence	0	1E+11	1E+12
LL	27.000	27.000	27.000
Min	28.545	28.551	28.548
Average	28.546	28.553	28.550
Max	28.547	28.554	28.553
UL			



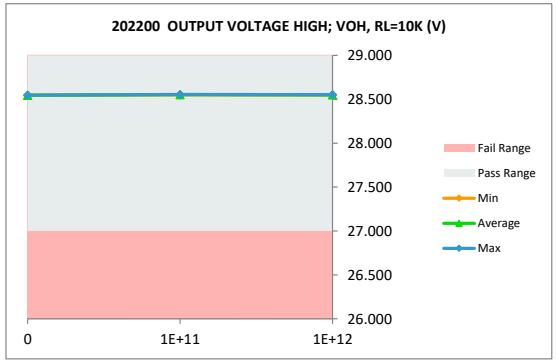
NDD Report
LM158QML-SP

	202200 OUTPUT VOLTAGE HIGH	
Test Site		
Tester		
Test Number		
Unit		
Max Limit		
Min Limit	27	27

Fluence	Serial #	PRE NDD	POST NDD	Delta
0	C1	28.549	28.545	0.004
0	C2	28.552	28.548	0.004
1E+11	18	28.554	28.552	0.002
1E+11	19	28.553	28.551	0.002
1E+11	20	28.553	28.556	-0.003
1E+11	21	28.551	28.554	-0.004
1E+11	22	28.549	28.554	-0.005
1E+12	23	28.549	28.552	-0.004
1E+12	24	28.551	28.549	0.002
1E+12	25	28.550	28.549	0.001
1E+12	26	28.552	28.550	0.002
1E+12	27	28.549	28.549	-0.001
	Max	28.554	28.556	0.004
	Average	28.551	28.551	0.000
	Min	28.549	28.545	-0.005
	Std Dev	0.002	0.003	0.003



	202200 OUTPUT VOLTAGE HIG		
Test Site			
Tester			
Test Number			
Max Limit			
Min Limit	27		
Fluence	0	1E+11	1E+12
LL	27.000	27.000	27.000
Min	28.545	28.551	28.549
Average	28.546	28.553	28.550
Max	28.548	28.556	28.552
UL			



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