DOMINANT™
Opto Technologies
Innovating Illumination

RELIABILITY REPORT
Mini DomiLED
InGaN White: DNW-EJG-RS2

Title: Mini DomiLED InGaN White in DNW-EJG-RS2 Product Qualification

Sample History: All parts were built and tested in DOMINANT Opto Technologies Sdn. Bhd.

Qualification Plan: All units are to be pre-conditioned before proceeding to the respective test

	Conditions
• Pre-conditioning as per JEDEC Level 2 requirement (JESD22-A113) • IR re-flow soldering on FR4 board	• Bake @ 125°C, 24 hrs • Storage @ 85°C/60% RH, 168 hrs • 3xIR re-flow soldering at 260°C/10 sec. min. (JEDEC)

Failure Criteria:

• Electrical Failures	• Vf shift >= 20% • Ir > 2x standard limits
• Light Output Degradation	• % Iv shift >= ±50%
• Visual Failures	• Broken or damaged package or lead • Solderability < 95% wetting • Dimension out of tolerance
• Corrosion Test	• Visible black spots on metallic surface
• Pull Test	• Pull Strength < 3gf • Reference: MIL-STD-750

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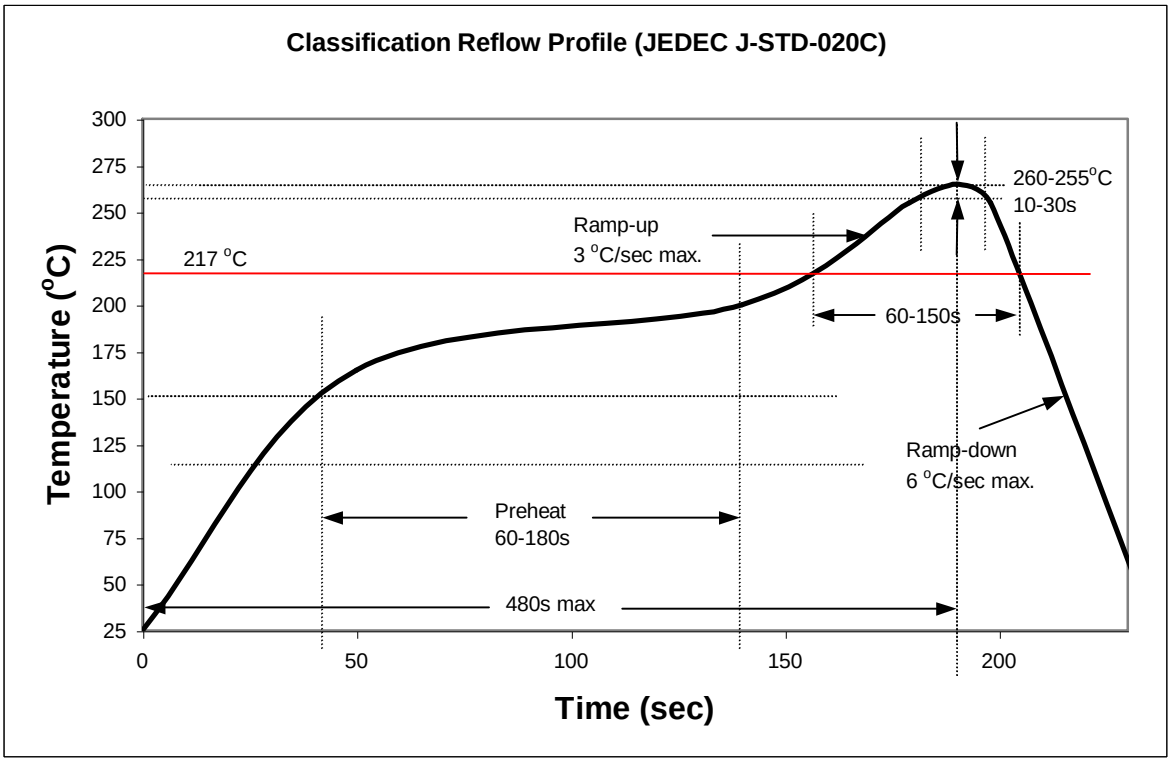
Recommended Pb Free IR-Reflow Soldering Profile



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Reliability Test Matrix:

IR/Convection Re-Flow Process at Peak Temperature 260°C for 10 seconds

Pre-conditioning @ 85°C/60% RH for 168 hours

Device: DNW-EJG

Result: No. of failure(s)

No	Test Type	Stress Condition	S/S	Test Point	Vf	Iv
1	Ambient Life Test (ALT) JESD22-A108	a) IR re-flow soldering • Ta = 25°C • If = 20mA	80	0 hrs 168 hrs 504 hrs 1000 hrs	0/80 0/80 0/80 0/80	0/80 0/80 0/80 0/80
2	High Temperature Operating Life Test (HTOL) JESD22-A108	a) IR re-flow soldering • Ta = 70°C • If = 20mA	80	0 hrs 168 hrs 504 hrs 1000 hrs	0/80 0/80 0/80 0/80	0/80 0/80 0/80 0/80
3	Intermittent Operating Life Test (IOL) MIL-STD-750 (Method 1037)	a) Pre-conditioning b) IR re-flow soldering • Ta = 25°C • 2 mins On, 2 mins Off • If = 20mA	80	0 hrs 168 hrs 504 hrs 1000 hrs	0/80 0/80 0/80 0/80	0/80 0/80 0/80 0/80
4	Wet High Temperature Reverse Biased Test (WHTRB) JESD22-A101	a) Pre-conditioning b) IR re-flow soldering • Ta = 85°C, 85% RH • VR = 4V	80	0 hrs 168 hrs 504 hrs 1000 hrs	0/80 0/80 0/80 0/80	0/80 0/80 0/80 0/80
5	Wet High Temperature Operating Life Test (WHTOL) JESD22-A101	a) Pre-conditioning b) IR re-flow soldering • Ta = 85°C, 85% RH • If = 1mA	80	0 hrs 168 hrs 504 hrs 1000 hrs	0/80 0/80 0/80 0/80	0/80 0/80 0/80 0/80
6	Low Temperature Storage Test (LTS) JESD22-A119	a) IR re-flow soldering • Ta = -40°C	80	0 hrs 168 hrs 504 hrs 1000 hrs	0/80 0/80 0/80 0/80	0/80 0/80 0/80 0/80
7	High Temperature Storage Test (HTS) JESD22-A103	a) IR re-flow soldering • Ta = 100°C	80	0 hrs 168 hrs 504 hrs 1000 hrs	0/80 0/80 0/80 0/80	0/80 0/80 0/80 0/80

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Result: No. of failure(s)

No	Test Type	Stress Condition	S/S	Test Point	Vf	Iv
8	Thermal Shock Test (TSK) JESD22-A106	a) Pre-conditioning b) IR re-flow soldering • -40°C to 100°C, 15 min dwell, < 10 sec transfer	80	0 X 100 X 500 X 1000 X	0/80 0/80 0/80 0/80	0/80 0/80 0/80 0/80
8a	Temperature Cycling Hot Test (TCHT) JESD22-A104 MIL-STD-750 Method 2037	• 125°C Test after test 8. • Decap and wire pull on all wires from 5 devices.	80	-	Pass	Pass
8b	Wire Bond Integrity (WBI) MIL-STD-750 Method 2037	a) IR re-flow soldering • Ta = 125°C b) Decap and wire pull on all wires from 5 devices	5	500hrs	-	-
9	Resistance to Soldering Heat Test (RTSH) JESD22-A111 MIL-STD-202G	a) Pre-conditioning • T solder = 260°C, • 1X (dipping)	30	0 X 1 X	0/30 0/30	0/30 0/30
10	Electrostatic Discharge (ESD) – HBM AEC Q101-001, Q101-005, JESD22-A114	a) 1500Ω 100pF, ±1000V b) 1500Ω 100pF, ±2000V	30 30	-	Pass	Pass
11	Electrostatic Discharge (ESD) – MM AEC Q101-001, Q101-005, JESD22-A115	a) 0Ω 200pF, ±100V b) 0Ω 200pF, ±200V	30 30	-	Pass	Pass
12	Electrostatic Discharge (ESD) – CDM AEC Q101-001, Q101-005 JESD22-C101	a) ±1000V	30	-	Pass	Pass

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Result: No. of failure(s)

No	Test Type	Stress Condition	S/S	Test Point	Vf	Iv
13	Terminal Strength Test* MIL-STD-750 Method 2036	Force: 10N for 10 seconds	30	-	Pass	Pass
14	Destructive Physical Analysis (DPA) AEC-Q101-004	• AEC-Q101-004 • Post WHTRB & TSK	2	-	Pass	Pass

*generic data

Conclusions: All qualified test are according to AEC-Q101 REV D standard.

All qualification samples passed.

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Corrosion Test

Result: No. of failure(s)

No	Test Type	Stress Condition	S/S	Test Point	Vf	Iv
1	Hydrogen Sulphide Test (H2S)* IEC 60068-2-43	a) IR re-flow soldering • H_2S 15PPM, 40°C/90%RH	3	0 hrs	0/3	0/3
				168 hrs	0/3	0/3
				336 hrs	0/3	0/3
			3	0 hrs	0/3	0/3
				168 hrs	0/3	0/3
				336 hrs	0/3	0/3
			3	0 hrs	0/3	0/3
				168 hrs	0/3	0/3
				336 hrs	0/3	0/3
2	Flowing Mixed Gas Test (FMG)* IEC 60068-2-60	a) IR re-flow soldering • Method 4 • 25°C, 75% RH	3	0 hrs	0/3	0/3
				168 hrs	0/3	0/3
				336 hrs	0/3	0/3
				504 hrs	0/3	0/3
			3	0 hrs	0/3	0/3
				168 hrs	0/3	0/3
				336 hrs	0/3	0/3
				504 hrs	0/3	0/3
			3	0 hrs	0/3	0/3
				168 hrs	0/3	0/3
				336 hrs	0/3	0/3
				504 hrs	0/3	0/3

*generic data

Conclusions: All qualification samples passed.

Note: Current part contain Ag plated surface. Although the part passed the stipulated test, DOMINANT do not assure that the part will be corrosion resistant under all environments.

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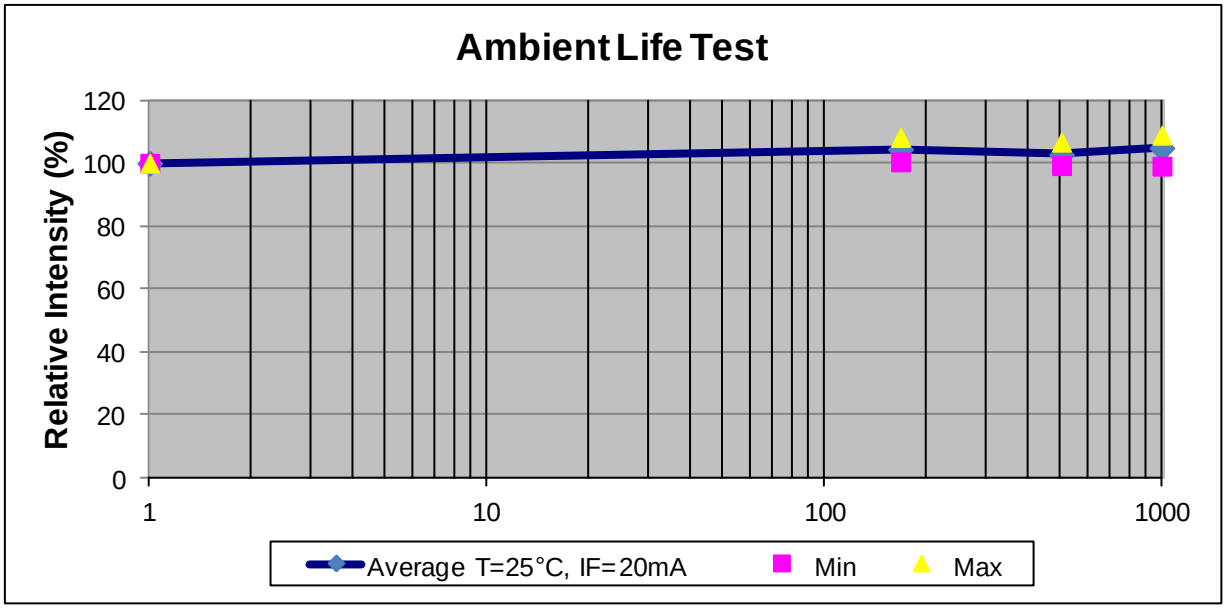
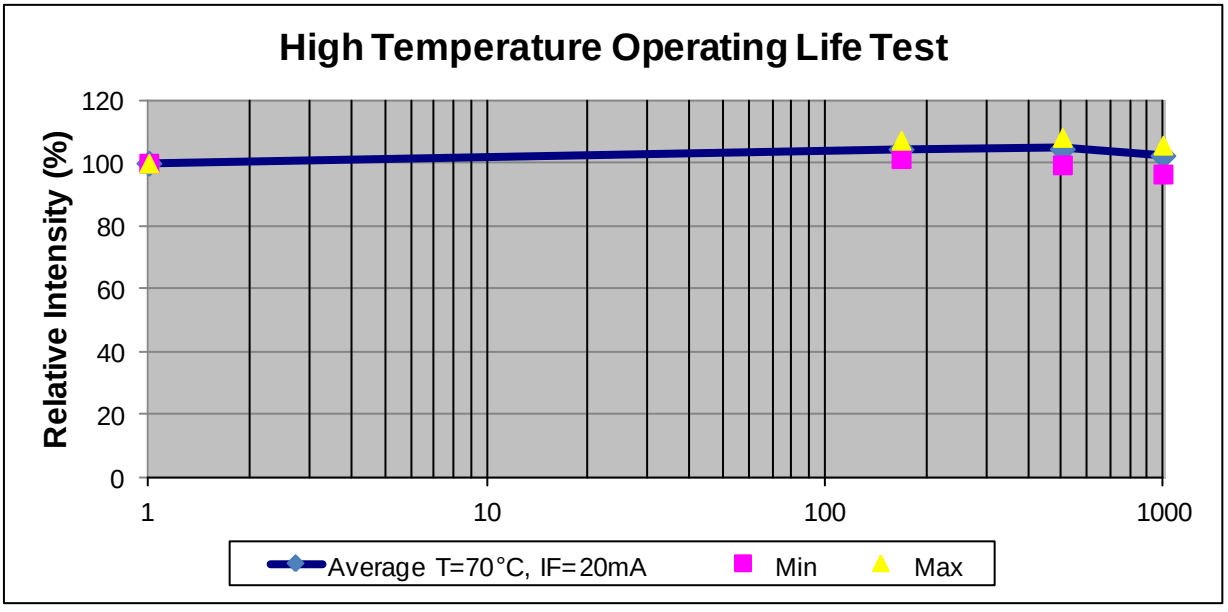
Iv Degradation Data



Note:

168hrs max = 8.210% 504hrs max = 6.714% 1000hrs max = 8.943%

168hrs min = 0.444% 504hrs min = -0.739% 1000hrs min = -0.917%



Note:

168hrs max = 7.294% 504hrs max = 8.205% 1000hrs max = 5.735%

168hrs min = 1.454% 504hrs min = -0.515% 1000hrs min = -3.444%

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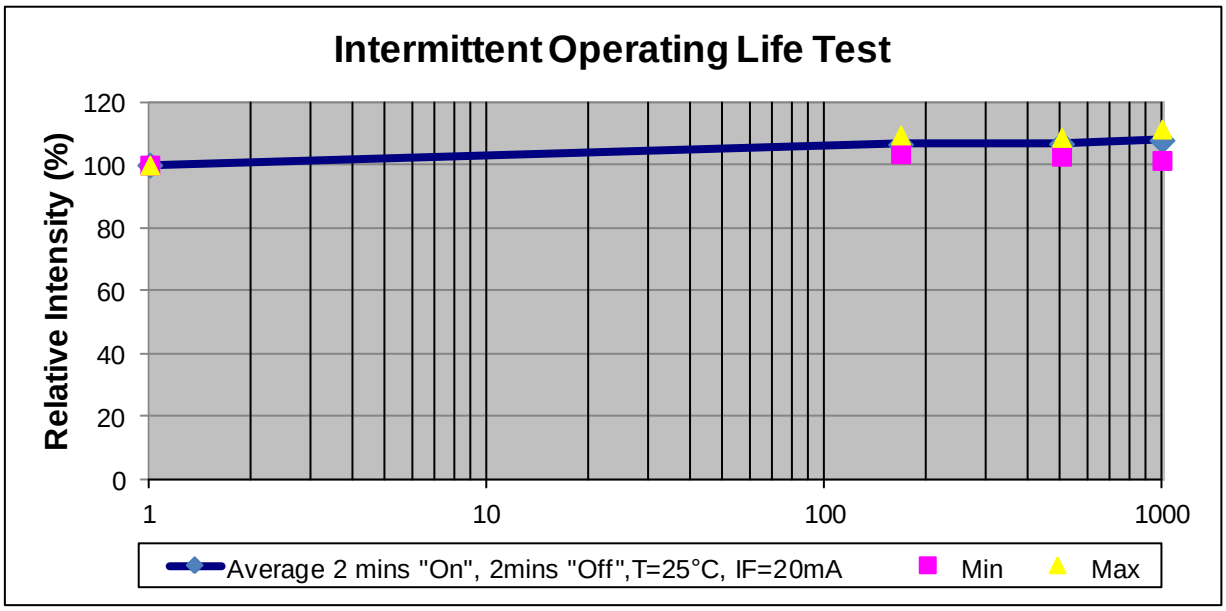
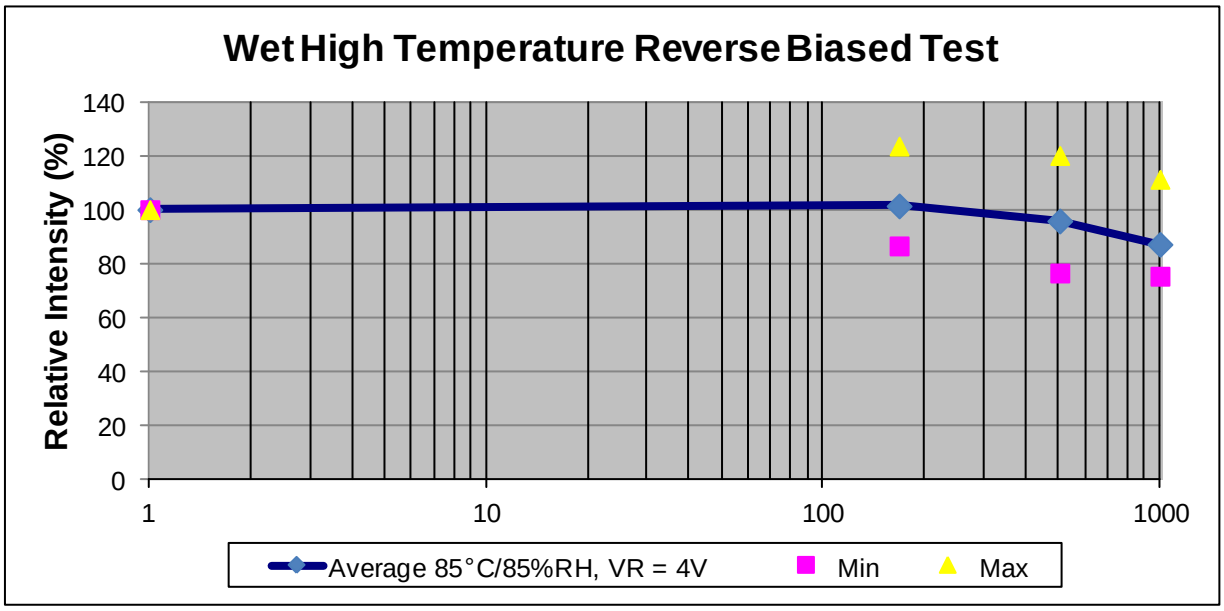


Note:

168hrs max = 9.573% 504hrs max = 8.803% 1000hrs max = 11.446%

168hrs min = 3.603% 504hrs min = 2.814% 1000hrs min = 1.469%



Note:

168hrs max = 23.605% 504hrs max = 20.109% 1000hrs max = 11.264%

168hrs min = -13.460% 504hrs min = -23.514% 1000hrs min = -24.704%

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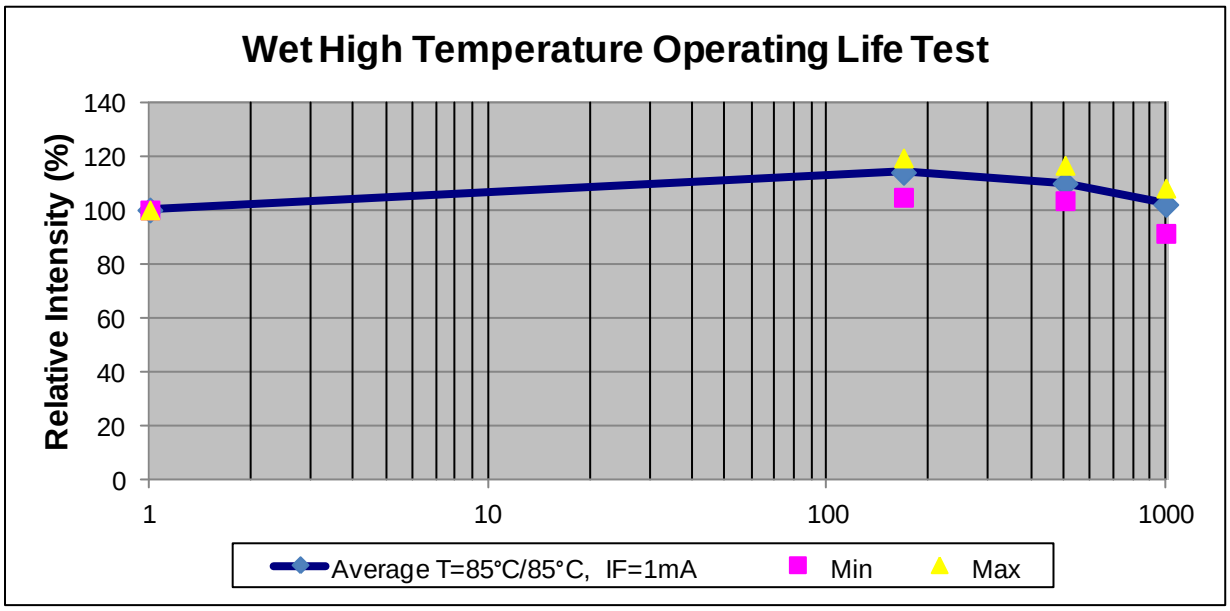
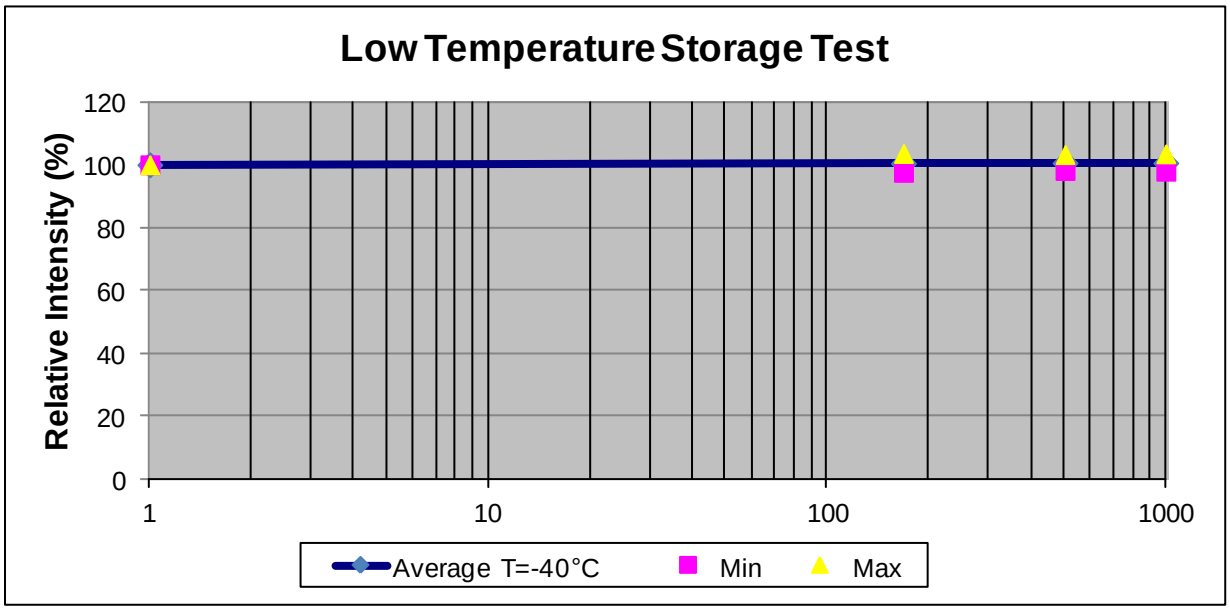


Note:

168hrs max = 19.298% 504hrs max = 16.584% 1000hrs max = 8.103%

168hrs min = 4.717% 504hrs min = 3.442% 1000hrs min = -8.682%



Note:

168hrs max = 3.580% 504hrs max = 3.240% 1000hrs max = 3.473%

168hrs min = -2.402% 504hrs min = -1.829% 1000hrs min = -2.045%

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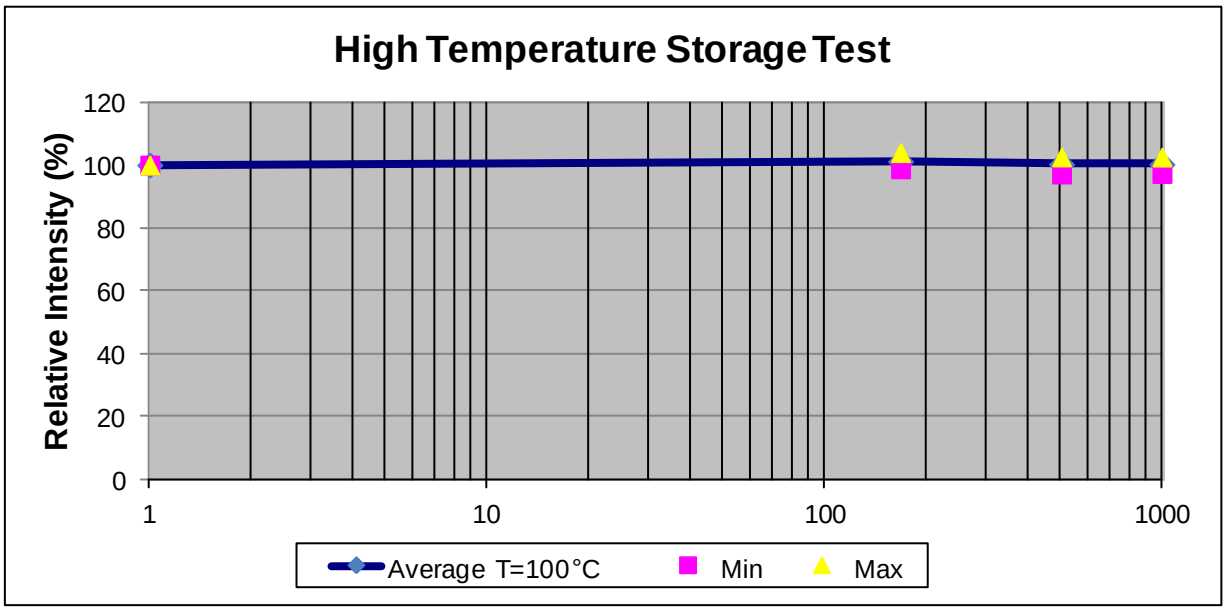
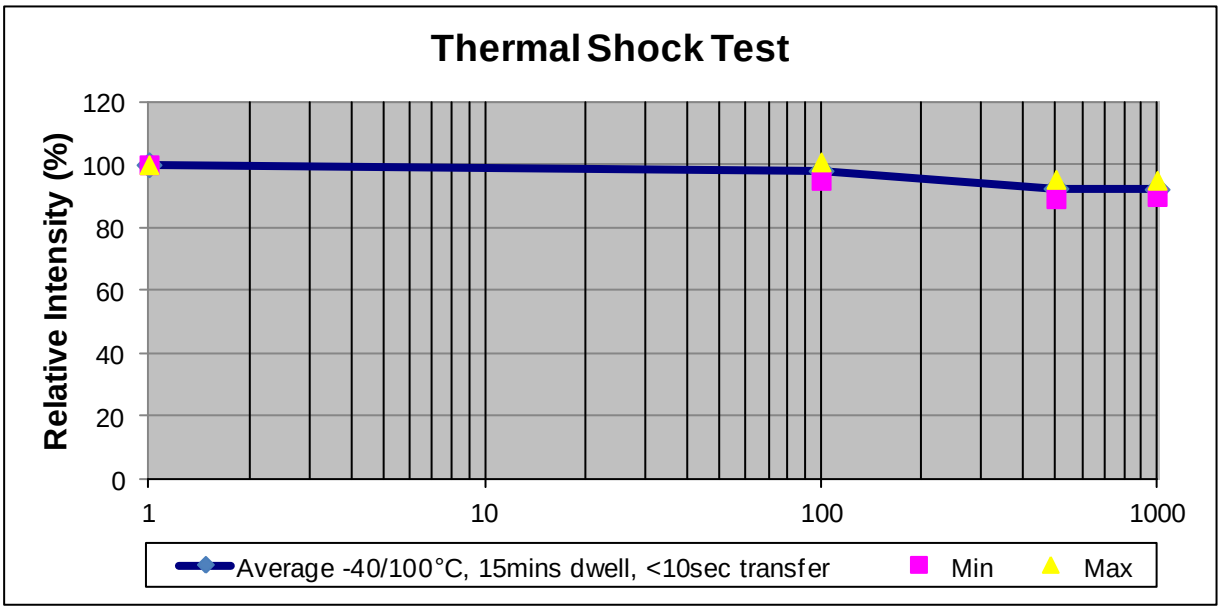


Note:

168hrs max = 3.980%
168hrs min = -1.184%

504hrs max = 2.586%
504hrs min = -2.841%

1000hrs max = 2.543%
1000hrs min = -2.678%



Note:

100X max = 0.916%
100X min = -4.957%

500X max = -4.648%
500X min = -10.800%

1000X max = -4.924%
1000X min = -10.110%

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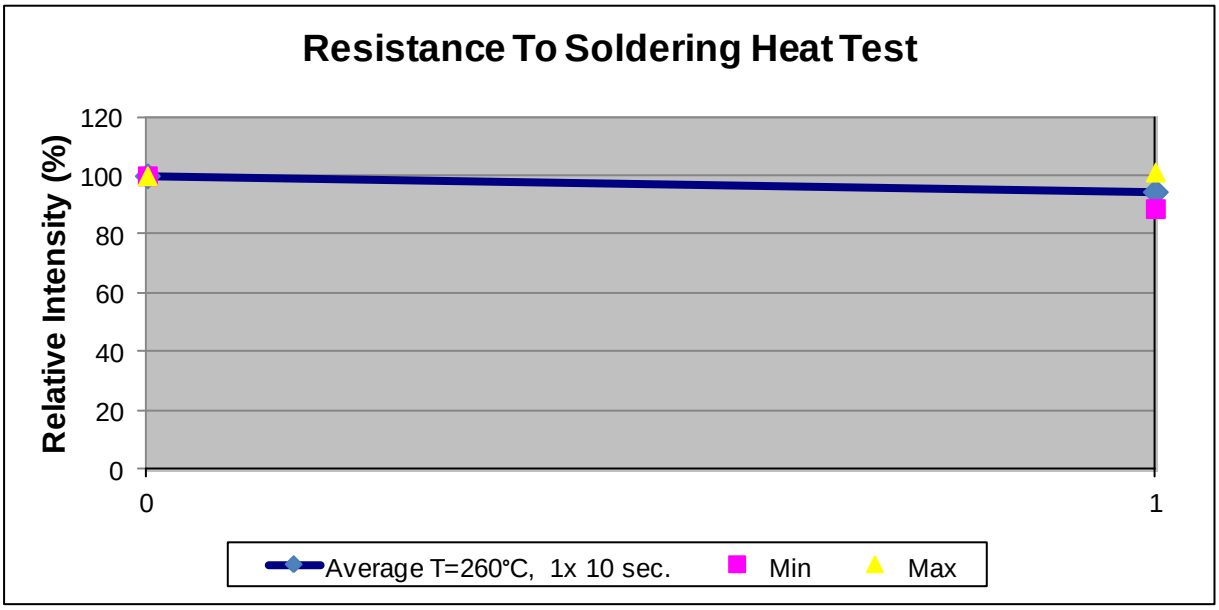
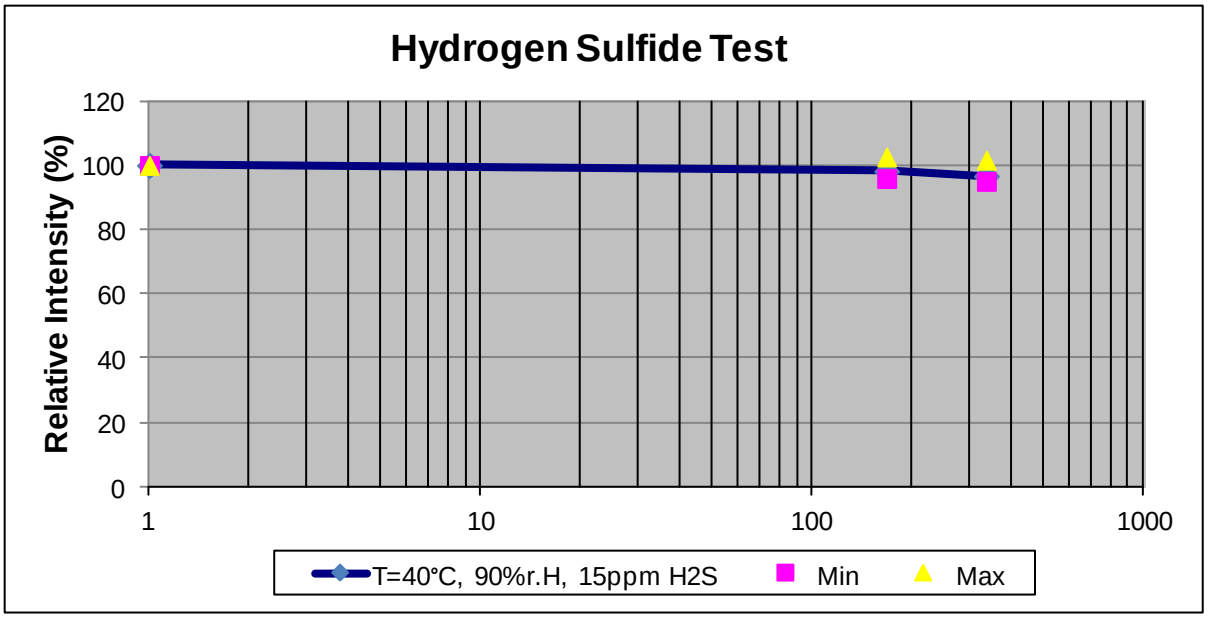


Note:

1X max = 1.259%

1X min = -11.194%



Note:

168hrs max = 2.108%

168hrs min = -0.945%

336hrs max = 2.145%

336hrs min = -0.283%

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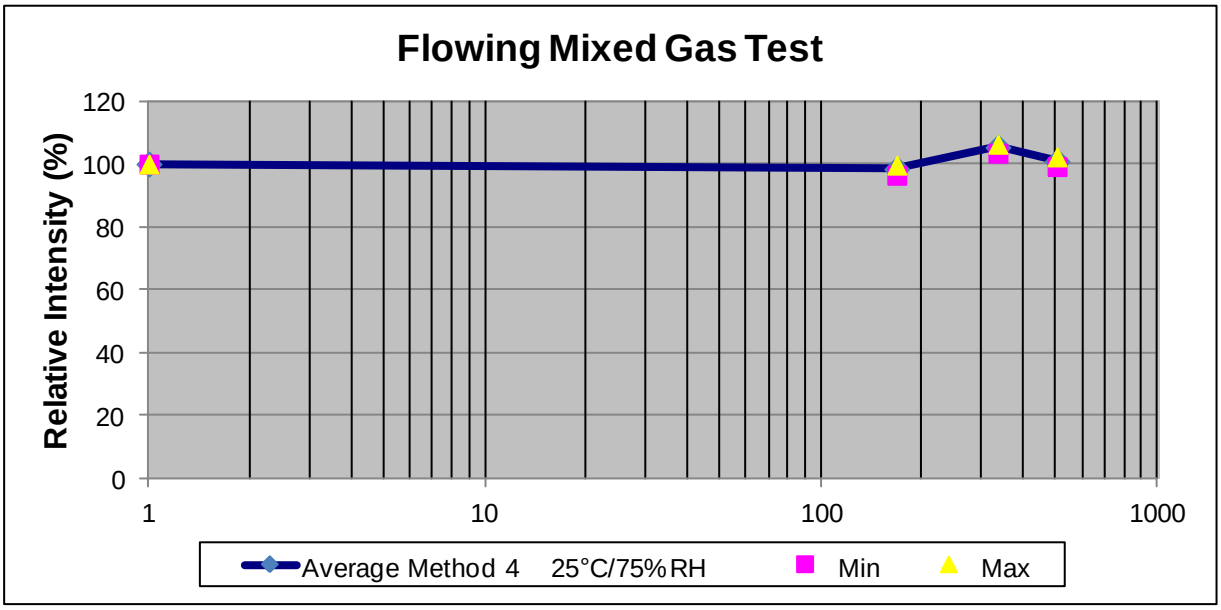

Note:

168hrs max = -0.352%
168hrs min = -3.578%

336hrs max = 6.295%
336hrs min = 3.447%

504hrs max = 2.268%
504hrs min = -0.803%

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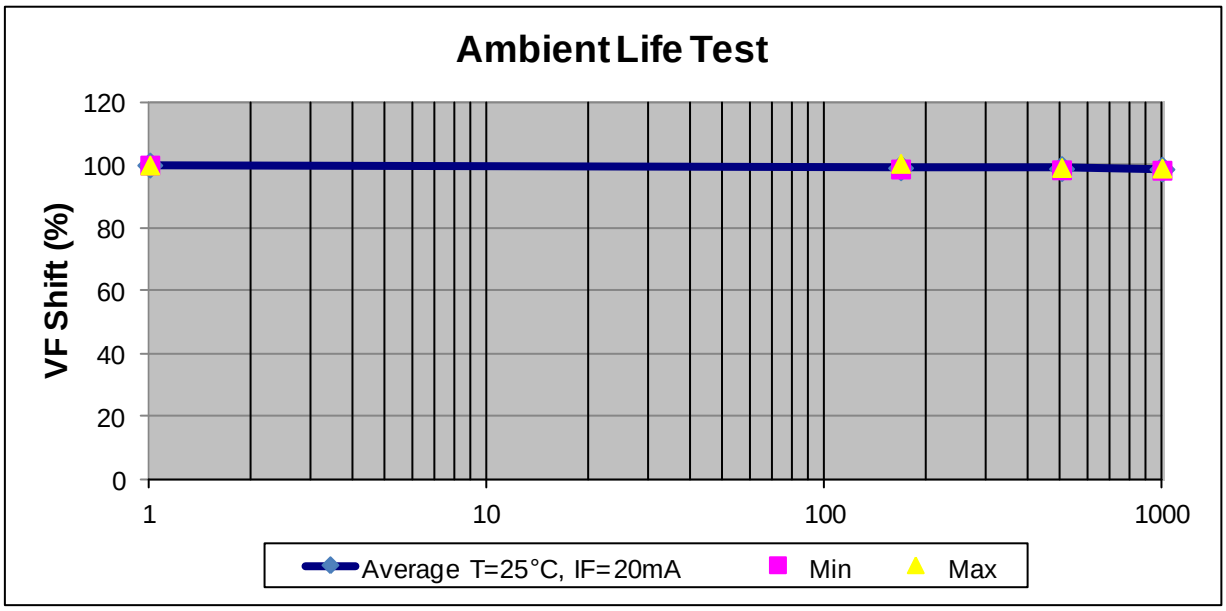
Vf Shift Data

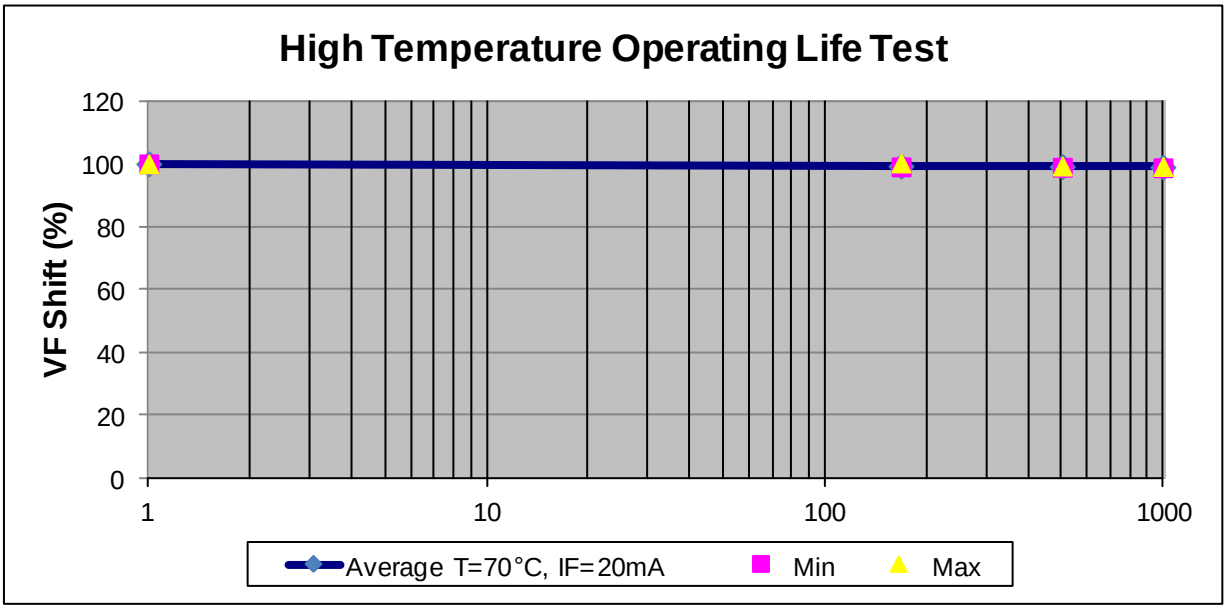


Note:

168hrs max = 0.551%
168hrs min = -1.250%

504hrs max = -0.776%
504hrs min = -1.498%

1000hrs max = -0.960%
1000hrs min = -1.634%



Note:

168hrs max = 0.281%
168hrs min = -0.962%

504hrs max = -0.686%
504hrs min = -1.080%

1000hrs max = -0.849%
1000hrs min = -1.245%

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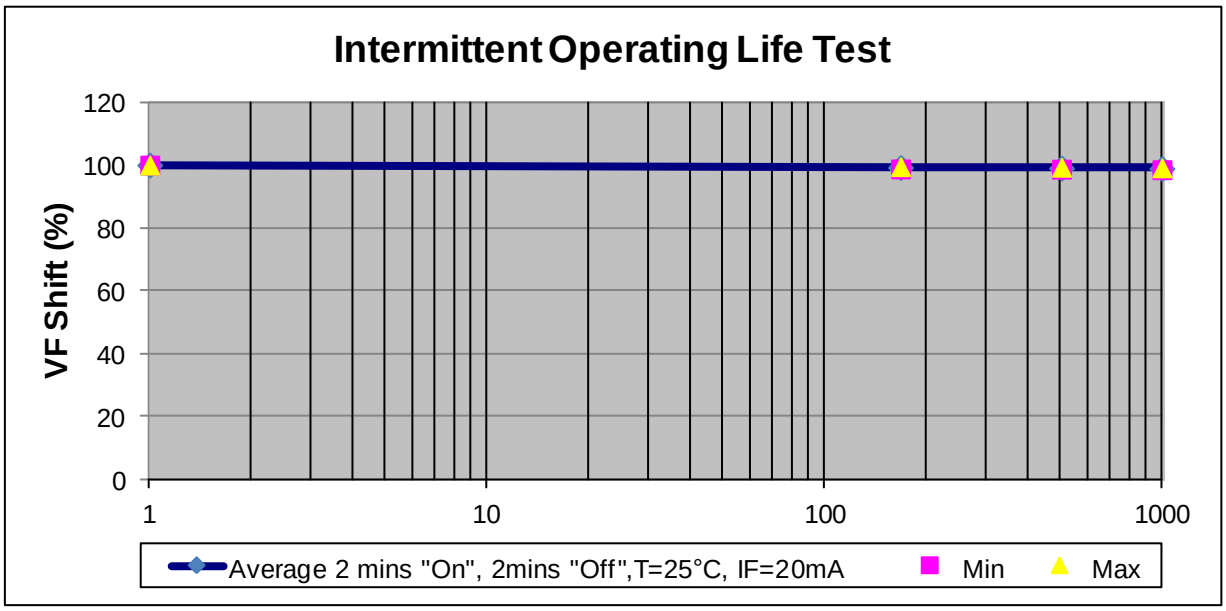
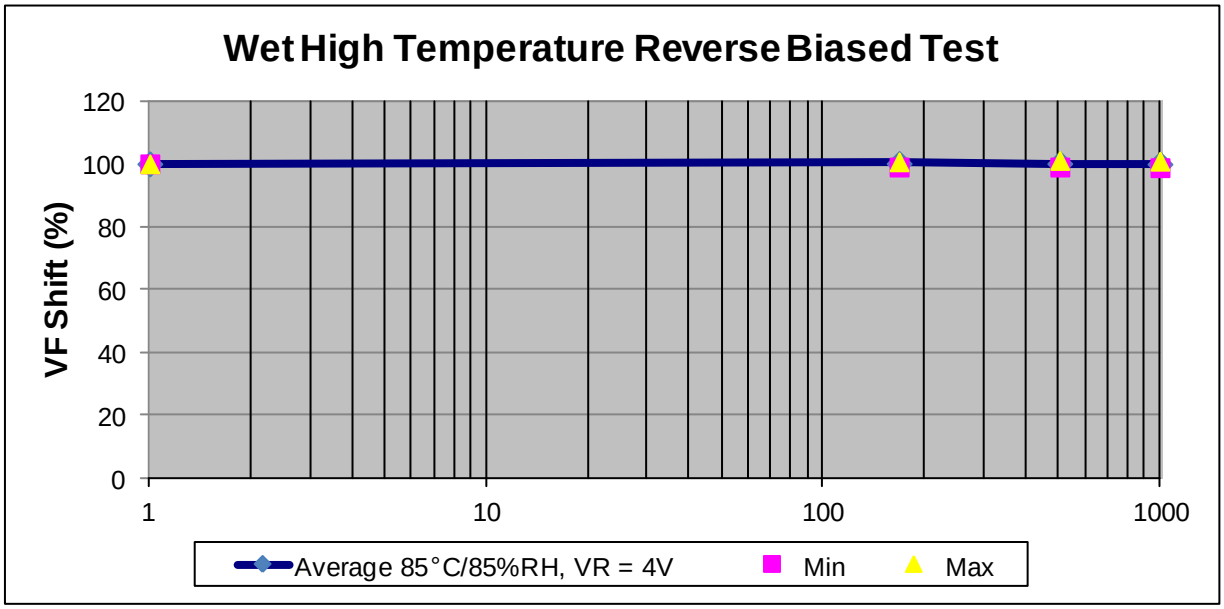


Note:

168hrs max = -0.513%
168hrs min = -1.229%

504hrs max = -0.685%
504hrs min = -1.297%

1000hrs max = -0.890%
1000hrs min = -1.468%



Note:

168hrs max = 0.650%
168hrs min = -1.010%

504hrs max = 1.091%
504hrs min = -1.010%

1000hrs max = 0.853%
1000hrs min = -1.213%

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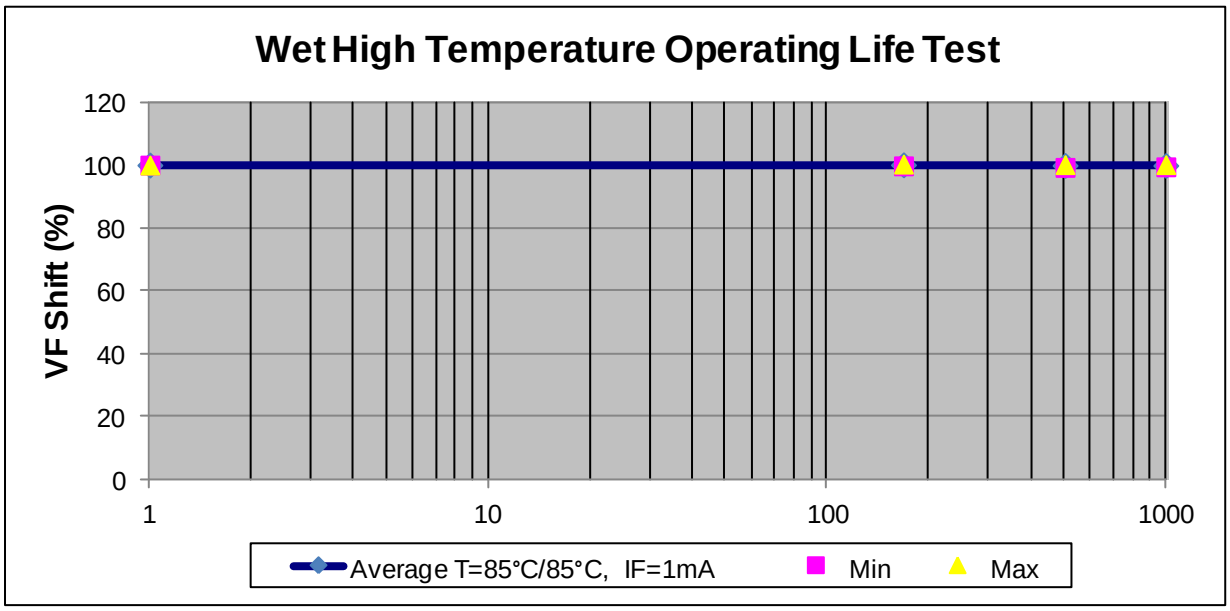
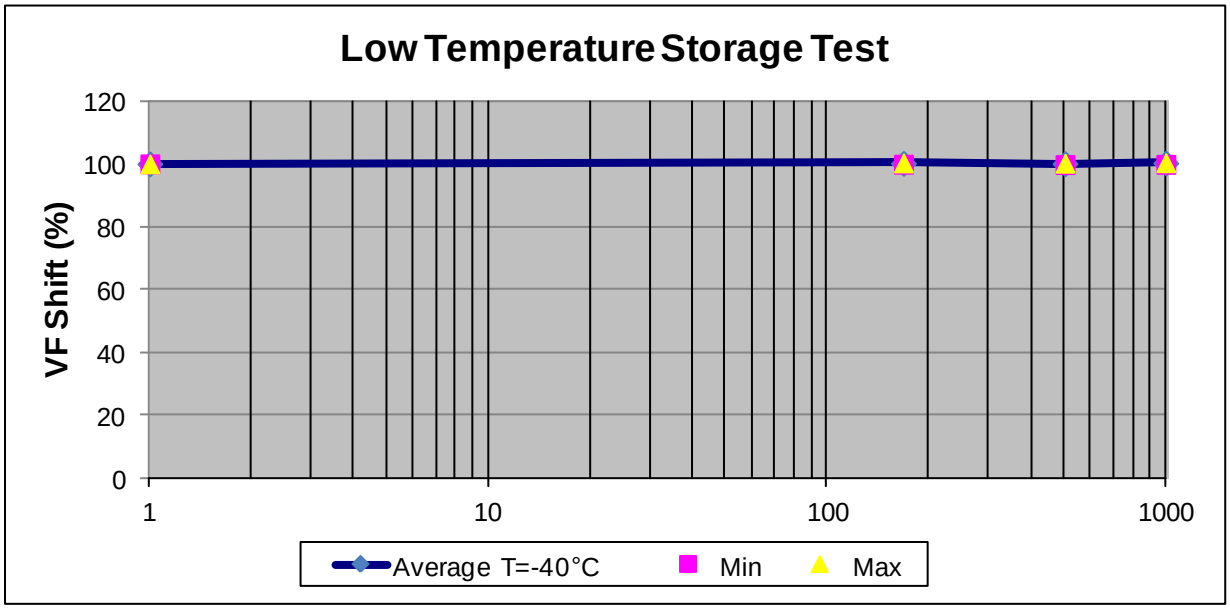


Note:

168hrs max = 0.313%
168hrs min = -0.240%

504hrs max = 0.139%
504hrs min = -0.735%

1000hrs max = 0.140%
1000hrs min = -0.549%



Note:

168hrs max = 0.284%
168hrs min = -0.105%

504hrs max = 0.191%
504hrs min = -0.214%

1000hrs max = 0.345%
1000hrs min = -0.150%

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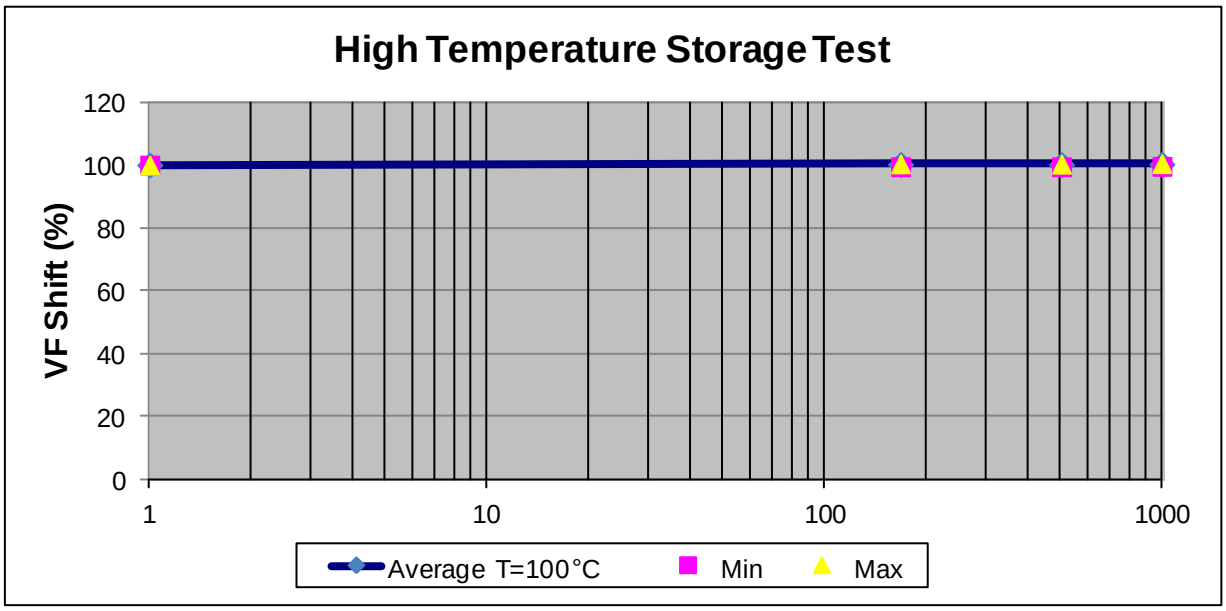
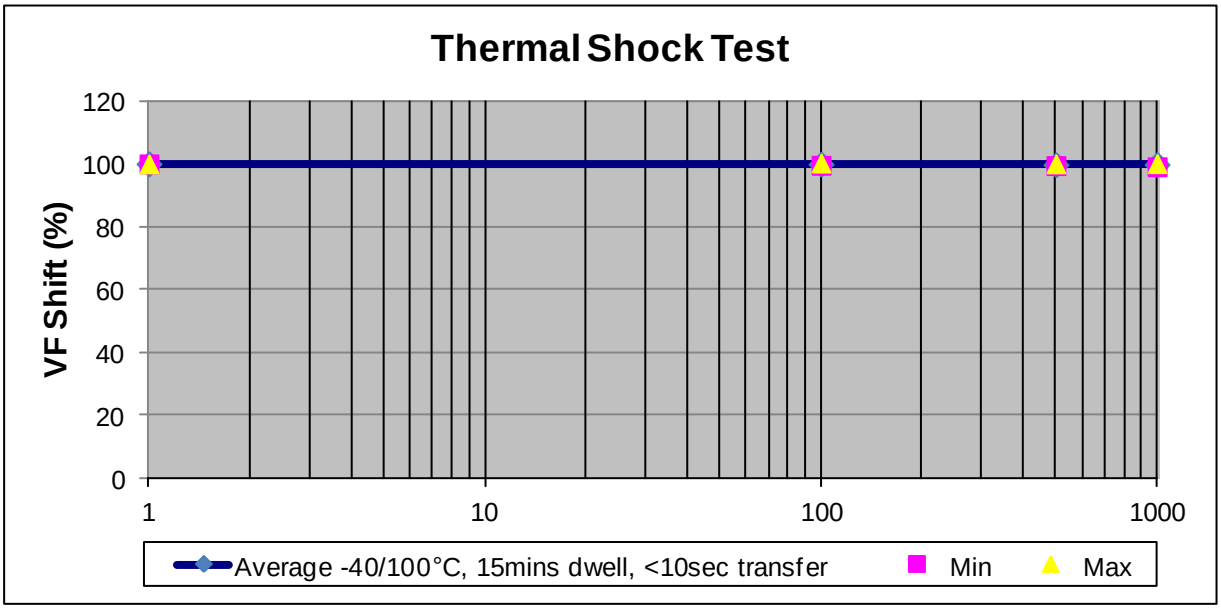


Note:

168hrs max = 0.380%
168hrs min = -0.519%

504hrs max = 0.301%
504hrs min = -0.525%

1000hrs max = 0.445%
1000hrs min = -0.410%



Note:

100X max = 0.240%
100X min = -0.444%

500X max = 0.000%
500X min = -0.547%

1000X max = 0.069%
1000X min = -0.921%

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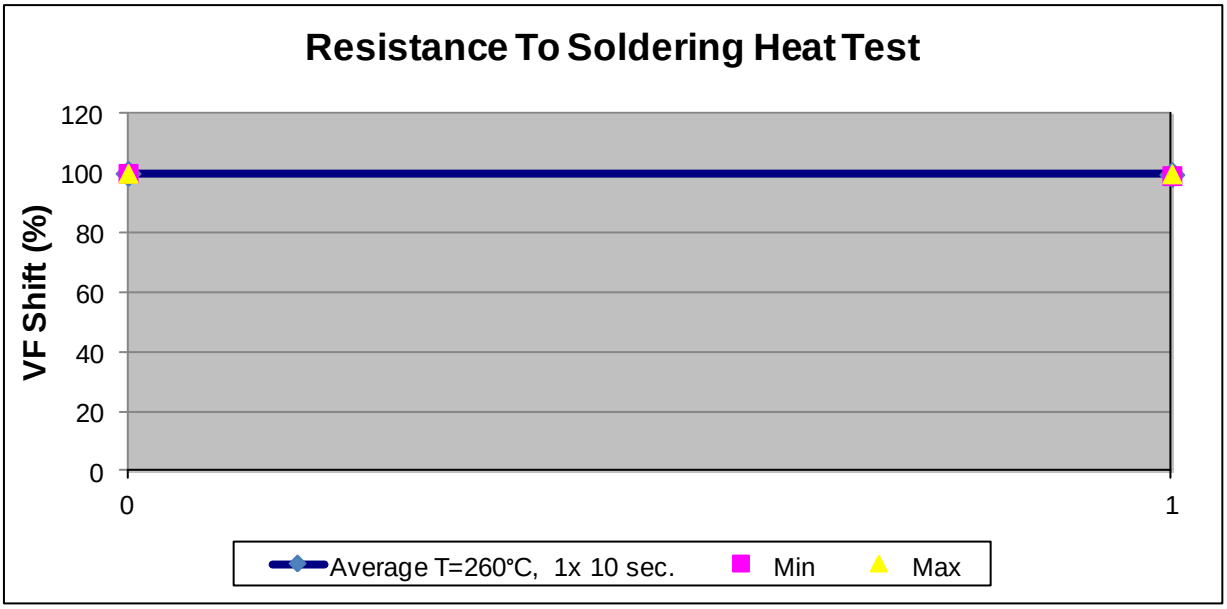
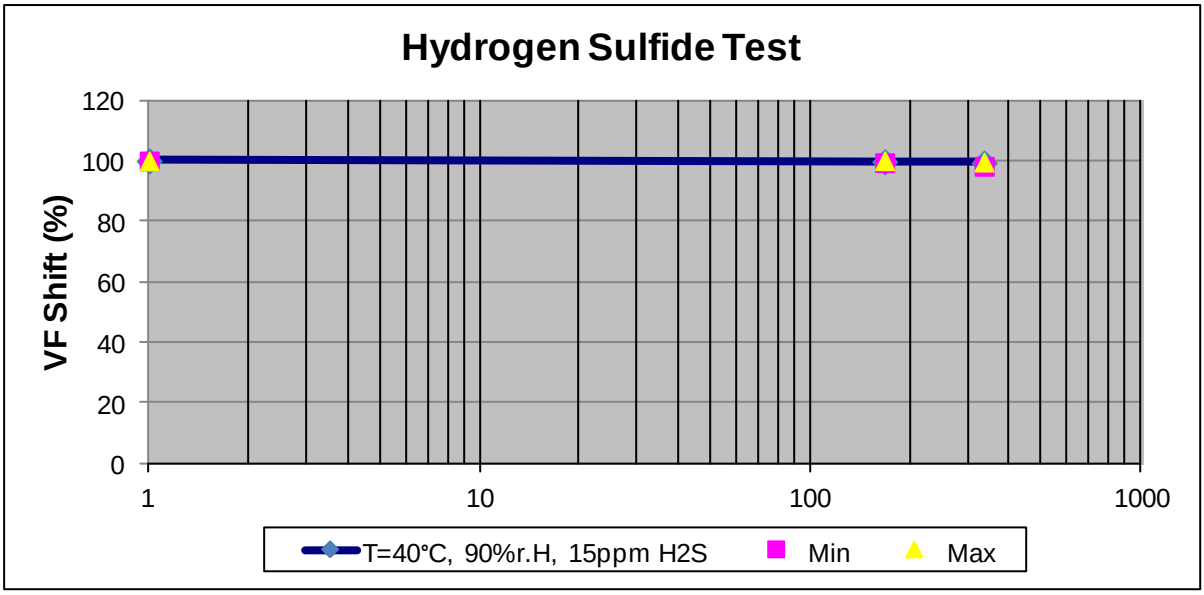


Note:

1X max = -0.182%

1X min = -0.756%



Note:

168hrs max = -0.145%

168hrs min = -0.326%

336hrs max = -0.181%

336hrs min = -0.398%

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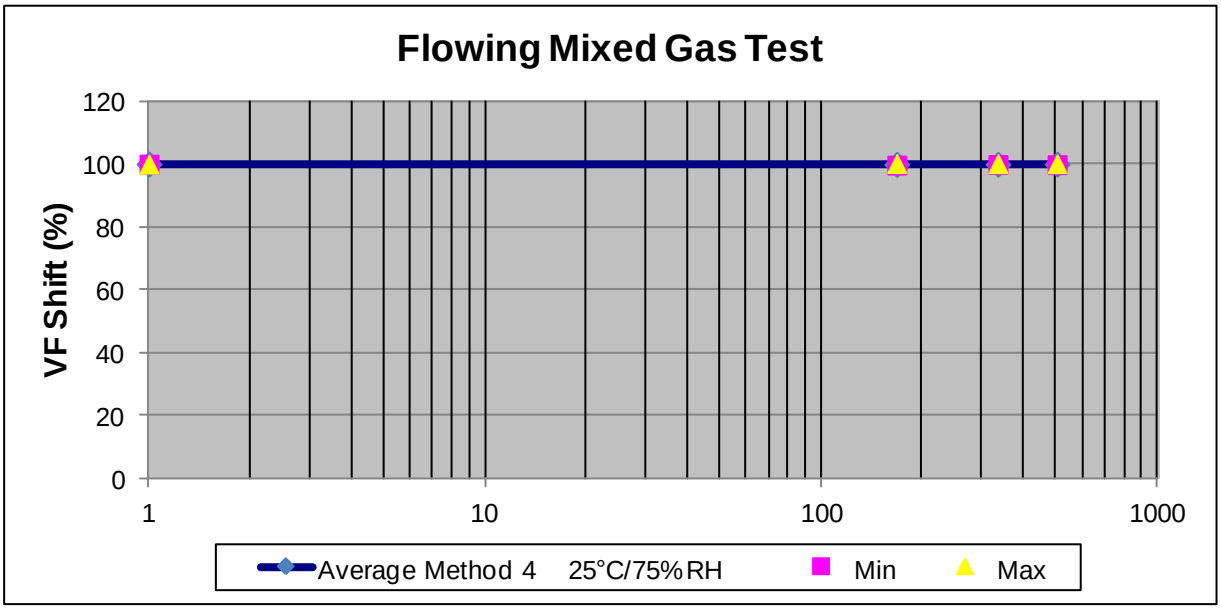

Note:

168hrs max = 0.145%
168hrs min = -0.327%

336hrs max = 0.109%
336hrs min = -0.146%

504hrs max = 0.109%
504hrs min = -0.181%

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Corrosion Test

H2S

Before	After 336 hours

Observation: No black spots observed on metallic surface.

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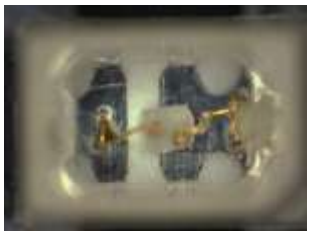
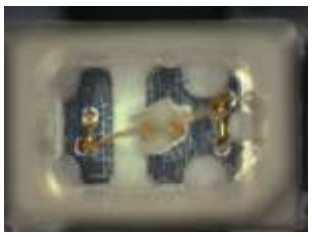
FMG

Before	After 504 hours
	
	

Observation: No black spots observed on metallic surface.

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Reliability Test Data:

Ambient Life Test

If = 20mA, T = 25°C

Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.9335	174.1395	2.9113	-0.76	180.6375	3.73	2.9059	-0.94	175.9573	1.04	2.9008	-1.11	176.2994	1.24
2	2.9258	170.9954	2.9044	-0.73	178.1241	4.17	2.8985	-0.93	172.3403	0.79	2.8919	-1.16	180.0277	5.28
3	2.9274	170.4387	2.9059	-0.73	171.1962	0.44	2.8993	-0.96	173.6694	1.90	2.8924	-1.20	179.9324	5.57
4	2.9264	171.1513	2.9056	-0.71	174.5736	2.00	2.9002	-0.90	175.542	2.57	2.8951	-1.07	183.3328	7.12
5	2.928	168.5715	2.9022	-0.88	178.3466	5.80	2.8963	-1.08	170.5306	1.16	2.8926	-1.21	179.8585	6.70
6	2.9286	169.4374	2.9039	-0.84	171.2435	1.07	2.8953	-1.14	173.8858	2.63	2.8911	-1.28	184.225	8.73
7	2.9371	165.231	2.9042	-1.12	172.6843	4.51	2.8966	-1.38	168.4457	1.95	2.8911	-1.57	175.6943	6.33
8	2.9266	169.371	2.9039	-0.78	178.9499	5.66	2.8966	-1.03	175.6256	3.69	2.8912	-1.21	182.9684	8.03
9	2.9369	164.231	2.9052	-1.08	177.1381	7.86	2.8966	-1.37	170.3296	3.71	2.8921	-1.53	177.4895	8.07
10	2.9367	170.321	2.9035	-1.13	179.3455	5.30	2.896	-1.39	173.5226	1.88	2.8921	-1.52	180.736	6.11
11	2.9342	171.4504	2.9066	-0.94	176.7837	3.11	2.9005	-1.15	173.0437	0.93	2.8951	-1.33	181.5241	5.88
12	2.929	171.7996	2.9027	-0.90	178.1698	3.71	2.898	-1.06	171.6022	-0.11	2.8919	-1.27	174.7126	1.70
13	2.9325	163.8117	2.9039	-0.98	173.3894	5.85	2.899	-1.14	170.7402	4.23	2.8921	-1.38	169.5787	3.52
14	2.9337	167.9269	2.9093	-0.83	177.3013	5.58	2.9047	-0.99	175.2396	4.35	2.9	-1.15	177.0653	5.44
15	2.9308	165.0947	2.9037	-0.92	175.2681	6.16	2.8988	-1.09	171.4444	3.85	2.8936	-1.27	176.4846	6.90
16	2.9367	171.236	2.9032	-1.14	181.8565	6.20	2.8954	-1.41	173.5942	1.38	2.8931	-1.48	181.2086	5.82
17	2.9371	168.369	2.9039	-1.13	178.0713	5.76	2.8961	-1.40	175.2804	4.10	2.8939	-1.47	176.4575	4.80
18	2.9367	165.925	2.9	-1.25	177.9096	7.22	2.8928	-1.49	172.8008	4.14	2.8887	-1.63	176.0621	6.11
19	2.9369	172.521	2.9091	-0.95	173.9894	0.85	2.9002	-1.25	176.3104	2.20	2.8963	-1.38	171.9491	-0.33
20	2.9362	173.369	2.9044	-1.08	180.2285	3.96	2.8961	-1.37	175.4225	1.18	2.8929	-1.47	179.7031	3.65
21	2.929	166.2722	2.905	-0.82	176.9608	6.43	2.8981	-1.05	170.465	2.52	2.8944	-1.18	173.8377	4.55
22	2.9295	171.6179	2.9067	-0.78	179.1354	4.38	2.8993	-1.03	180.1887	4.99	2.8936	-1.23	182.593	6.40
23	2.9312	166.6109	2.9057	-0.87	173.4268	4.09	2.8988	-1.11	170.9893	2.63	2.8943	-1.26	175.0179	5.05
24	2.9306	166.3904	2.9022	-0.97	174.4861	4.87	2.8948	-1.22	170.5459	2.50	2.8914	-1.34	176.9761	6.36
25	2.9278	169.9866	2.9022	-0.87	174.9846	2.94	2.8965	-1.07	175.7646	3.40	2.8917	-1.23	174.0293	2.38
26	2.9312	173.2245	2.9069	-0.83	179.3111	3.51	2.8973	-1.16	179.7446	3.76	2.8931	-1.30	178.9555	3.31
27	2.9349	160.028	2.9066	-0.96	170.3899	6.48	2.8958	-1.33	162.7796	1.72	2.8938	-1.40	167.0606	4.39
28	2.928	170.1965	2.9015	-0.91	177.821	4.48	2.8929	-1.20	175.7952	3.29	2.8901	-1.29	178.253	4.73
29	2.9306	170.4987	2.9052	-0.87	171.3246	0.48	2.8983	-1.10	177.2918	3.98	2.8941	-1.25	182.8545	7.25
30	2.9357	164.8967	2.9077	-0.95	168.8435	2.39	2.903	-1.11	167.5751	1.62	2.8965	-1.34	176.6449	7.12
31	2.9276	167.1384	2.9032	-0.83	176.661	5.70	2.8976	-1.02	172.8575	3.42	2.8902	-1.28	173.8743	4.03
32	2.9322	170.3847	2.9079	-0.83	179.4433	5.32	2.8997	-1.11	173.6416	1.91	2.8938	-1.31	178.6267	4.84
33	2.9261	168.599	2.9024	-0.81	170.2751	0.99	2.8963	-1.02	171.9756	2.00	2.8922	-1.16	179.2561	6.32
34	2.9355	163.765	2.9062	-1.00	175.7904	7.34	2.8998	-1.22	170.8173	4.31	2.8958	-1.35	175.9177	7.42
35	2.9364	171.457	2.9012	-1.20	180.0665	5.02	2.8924	-1.50	173.837	1.39	2.8897	-1.59	182.3406	6.35
36	2.9367	167.258	2.904	-1.11	175.7925	5.10	2.8966	-1.37	172.1323	2.91	2.8931	-1.48	179.3998	7.26
37	2.9335	165.5415	2.9054	-0.96	167.9618	1.46	2.8983	-1.20	168.0663	1.53	2.8924	-1.40	178.1471	7.61
38	2.9367	168.321	2.9079	-0.98	176.3102	4.75	2.9018	-1.19	173.5072	3.08	2.897	-1.35	170.2099	1.12
39	2.9367	169.147	2.9018	-1.19	176.0363	4.07	2.8961	-1.38	177.1773	4.75	2.8919	-1.53	178.2956	5.41
40	2.9264	167.0276	2.9	-0.90	168.5034	0.88	2.8953	-1.06	170.7533	2.23	2.8894	-1.26	175.465	5.05

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Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
41	2.9318	163.2184	2.9027	-0.99	169.9443	4.12	2.8971	-1.18	170.2629	4.32	2.8902	-1.42	168.2441	3.08
42	2.928	162.133	2.904	-0.82	166.5686	2.74	2.8997	-0.97	169.5078	4.55	2.8933	-1.19	176.6332	8.94
43	2.9281	166.8001	2.905	-0.79	175.9023	5.46	2.9	-0.96	170.5646	2.26	2.8953	-1.12	171.3192	2.71
44	2.9342	165.0069	2.9057	-0.97	174.548	5.78	2.8988	-1.21	170.1169	3.10	2.8956	-1.32	169.1994	2.54
45	2.92	170.3326	2.9236	0.12	174.1468	2.24	2.8872	-1.12	169.0735	-0.74	2.8818	-1.31	177.1117	3.98
46	2.9236	168.6404	2.9002	-0.80	176.6914	4.77	2.8954	-0.96	169.3717	0.43	2.8901	-1.15	176.5938	4.72
47	2.9293	164.2904	2.903	-0.90	172.4616	4.97	2.897	-1.10	166.6042	1.41	2.8906	-1.32	173.9304	5.87
48	2.931	167.135	2.9034	-0.94	176.0289	5.32	2.8968	-1.17	169.8684	1.64	2.8921	-1.33	174.0158	4.12
49	2.9298	168.2108	2.9024	-0.94	173.5184	3.16	2.8954	-1.17	176.4011	4.87	2.8899	-1.36	173.053	2.88
50	2.9355	166.3193	2.9057	-1.02	176.8166	6.31	2.9003	-1.20	168.1797	1.12	2.8973	-1.30	176.8701	6.34
51	2.9318	168.8057	2.9062	-0.87	170.4839	0.99	2.9013	-1.04	170.3915	0.94	2.8971	-1.18	179.3968	6.27
52	2.9338	170.0818	2.9093	-0.84	178.859	5.16	2.9037	-1.03	173.8716	2.23	2.9	-1.15	176.3944	3.71
53	2.9285	172.7461	2.903	-0.87	178.0241	3.06	2.8985	-1.02	178.0546	3.07	2.8949	-1.15	175.959	1.86
54	2.9301	168.9961	2.9008	-1.00	176.0458	4.17	2.8953	-1.19	172.0355	1.80	2.8914	-1.32	174.5427	3.28
55	2.9249	166.8766	2.9012	-0.81	176.5411	5.79	2.8941	-1.05	168.5873	1.03	2.8914	-1.15	176.3231	5.66
56	2.9248	166.3002	2.9005	-0.83	176.6671	6.23	2.8949	-1.02	173.5179	4.34	2.8907	-1.17	178.0551	7.07
57	2.9347	164.8267	2.9062	-0.97	173.1004	5.02	2.9005	-1.17	166.8048	1.20	2.8966	-1.30	173.8951	5.50
58	2.9232	166.404	2.9393	0.55	175.2594	5.32	2.8949	-0.97	177.5759	6.71	2.8919	-1.07	174.2842	4.74
59	2.9337	166.3576	2.9056	-0.96	173.4794	4.28	2.8995	-1.17	172.9143	3.94	2.8966	-1.26	173.0607	4.03
60	2.9273	166.9721	2.9039	-0.80	176.1256	5.48	2.8998	-0.94	169.512	1.52	2.8931	-1.17	176.8935	5.94
61	2.9315	167.4347	2.9029	-0.98	173.954	3.89	2.8985	-1.13	175.1562	4.61	2.8911	-1.38	165.8997	-0.92
62	2.928	165.6581	2.9029	-0.86	174.8269	5.53	2.8968	-1.07	170.0111	2.63	2.8907	-1.27	173.1681	4.53
63	2.9288	171.229	2.9077	-0.72	179.7182	4.96	2.903	-0.88	174.2878	1.79	2.8965	-1.10	179.5477	4.86
64	2.9285	171.9558	2.904	-0.84	179.2299	4.23	2.8978	-1.05	183.4935	6.71	2.8926	-1.23	174.8482	1.68
65	2.9318	164.137	2.9039	-0.95	172.5271	5.11	2.8973	-1.18	170.5806	3.93	2.8928	-1.33	172.5796	5.14
66	2.9278	165.894	2.9056	-0.76	166.6839	0.48	2.8993	-0.97	167.4869	0.96	2.8933	-1.18	170.984	3.07
67	2.9362	160.6508	2.9135	-0.77	169.056	5.23	2.9071	-0.99	166.9177	3.90	2.9015	-1.18	166.3061	3.52
68	2.9268	163.1962	2.9015	-0.86	173.0805	6.06	2.8946	-1.10	170.3164	4.36	2.889	-1.29	171.5587	5.12
69	2.9296	171.1338	2.9012	-0.97	180.8176	5.66	2.8965	-1.13	175.3565	2.47	2.8906	-1.33	179.6317	4.97
70	2.9256	169.185	2.9076	-0.62	178.3858	5.44	2.9029	-0.78	175.0147	3.45	2.8975	-0.96	177.812	5.10
71	2.9308	170.2336	2.9052	-0.87	175.6183	3.16	2.8998	-1.06	175.2317	2.94	2.8943	-1.25	174.1968	2.33
72	2.9244	166.6933	2.9007	-0.81	174.6777	4.79	2.8954	-0.99	170.736	2.43	2.8901	-1.17	174.0946	4.44
73	2.9286	166.902	2.9027	-0.88	175.2164	4.98	2.8963	-1.10	170.1207	1.93	2.8911	-1.28	173.5456	3.98
74	2.9377	165.8995	2.9082	-1.00	179.5204	8.21	2.9024	-1.20	168.8534	1.78	2.8976	-1.37	175.8489	6.00
75	2.9281	166.0275	2.9029	-0.86	176.3612	6.22	2.8971	-1.06	167.5155	0.90	2.8909	-1.27	177.582	6.96
76	2.9283	168.1287	2.9045	-0.81	169.7004	0.93	2.8981	-1.03	170.3872	1.34	2.8899	-1.31	177.9246	5.83
77	2.9291	165.5891	2.9076	-0.73	176.1445	6.37	2.9018	-0.93	172.8196	4.37	2.8944	-1.18	175.3967	5.92
78	2.9317	164.6736	2.9057	-0.89	173.288	5.23	2.8998	-1.09	169.4573	2.90	2.8921	-1.35	171.4373	4.11
79	2.9298	166.3399	2.9047	-0.86	173.8409	4.51	2.8988	-1.06	174.0895	4.66	2.8909	-1.33	172.2479	3.55
80	2.9295	169.1734	2.9047	-0.85	176.5926	4.39	2.8993	-1.03	176.5356	4.35	2.8929	-1.25	174.6712	3.25
Average				-0.873		4.443		-1.117		2.720		-1.287		4.879
Min				-1.250		0.444		-1.498		-0.739		-1.634		-0.917
Max				0.551		8.210		-0.776		6.714		-0.960		8.943

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High Temperature Operating Life Test

T=70°C, IF= 20mA

Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.9246	163.509	2.9037	-0.71	173.4213	6.06	2.899	-0.88	169.9156	3.92	2.8951	-1.01	165.905	1.47
2	2.934	168.0877	2.9093	-0.84	175.8285	4.61	2.9039	-1.03	175.169	4.21	2.899	-1.19	171.6322	2.11
3	2.9256	166.6753	2.9044	-0.72	175.5419	5.32	2.9	-0.88	174.8106	4.88	2.8963	-1.00	169.884	1.93
4	2.9269	169.2381	2.9056	-0.73	179.0074	5.77	2.9007	-0.90	178.3718	5.40	2.8973	-1.01	178.0084	5.18
5	2.9362	166.5779	2.9098	-0.90	170.852	2.57	2.9062	-1.02	173.9012	4.40	2.9035	-1.11	168.8987	1.39
6	2.9308	166.764	2.9093	-0.73	173.5835	4.09	2.9074	-0.80	174.6834	4.75	2.902	-0.98	165.2371	-0.92
7	2.9237	167.1192	2.9286	0.17	171.4456	2.59	2.8981	-0.88	174.8366	4.62	2.8943	-1.01	172.971	3.50
8	2.9327	172.8123	2.9052	-0.94	176.0965	1.90	2.9015	-1.06	171.922	-0.52	2.8978	-1.19	166.8613	-3.44
9	2.9295	169.2996	2.904	-0.87	173.9491	2.75	2.8998	-1.01	174.2416	2.92	2.8949	-1.18	170.9545	0.98
10	2.9248	167.5843	2.9032	-0.74	171.1598	2.13	2.9008	-0.82	169.5275	1.16	2.8936	-1.07	162.9762	-2.75
11	2.9308	170.9464	2.9052	-0.87	173.4321	1.45	2.902	-0.98	170.3383	-0.36	2.8943	-1.25	166.4903	-2.61
12	2.9296	162.5872	2.904	-0.87	169.037	3.97	2.9015	-0.96	171.3761	5.41	2.8933	-1.24	170.3701	4.79
13	2.9332	166.7591	2.9099	-0.79	172.4384	3.41	2.9064	-0.91	176.3097	5.73	2.899	-1.17	176.3228	5.74
14	2.9281	160.9132	2.9044	-0.81	172.1748	7.00	2.9008	-0.93	164.3875	2.16	2.8965	-1.08	161.6306	0.45
15	2.9325	166.7614	2.9084	-0.82	173.6524	4.13	2.9061	-0.90	176.9635	6.12	2.9008	-1.08	172.6491	3.53
16	2.9226	167.786	2.901	-0.74	173.8098	3.59	2.8986	-0.82	175.9986	4.89	2.8934	-1.00	169.6756	1.13
17	2.9333	166.533	2.9064	-0.92	171.5093	2.99	2.9034	-1.02	173.2915	4.06	2.8983	-1.19	167.8786	0.81
18	2.9251	169.9861	2.9042	-0.71	176.81	4.01	2.9005	-0.84	174.5593	2.69	2.8958	-1.00	170.7701	0.46
19	2.9234	169.2853	2.9005	-0.78	175.0375	3.40	2.899	-0.83	177.7707	5.01	2.8934	-1.03	176.024	3.98
20	2.9216	166.0203	2.9298	0.28	171.8651	3.52	2.897	-0.84	172.4103	3.85	2.8924	-1.00	165.9841	-0.02
21	2.9242	164.7816	2.9007	-0.80	170.769	3.63	2.898	-0.90	175.1627	6.30	2.8933	-1.06	171.4031	4.02
22	2.9288	168.6615	2.9079	-0.71	174.7056	3.58	2.9045	-0.83	178.0577	5.57	2.8998	-0.99	173.9909	3.16
23	2.9394	165.0075	2.9114	-0.95	170.7446	3.48	2.9082	-1.06	171.3507	3.84	2.9052	-1.16	169.784	2.89
24	2.9283	160.0909	2.9039	-0.83	169.9892	6.18	2.8998	-0.97	173.1255	8.14	2.8965	-1.09	167.2426	4.47
25	2.9362	164.3551	2.9082	-0.95	170.4063	3.68	2.9045	-1.08	170.9759	4.03	2.9002	-1.23	164.988	0.39
26	2.9253	162.8377	2.9	-0.86	174.5204	7.17	2.8971	-0.96	174.0078	6.86	2.8929	-1.11	167.1531	2.65
27	2.9317	166.3213	2.9052	-0.90	174.1924	4.73	2.9013	-1.04	171.6459	3.20	2.8973	-1.17	170.0494	2.24
28	2.9248	168.2192	2.9057	-0.65	177.9476	5.78	2.9024	-0.77	177.3285	5.42	2.8963	-0.97	172.6209	2.62
29	2.9283	168.5695	2.9049	-0.80	174.8136	3.70	2.9029	-0.87	175.272	3.98	2.8978	-1.04	173.6494	3.01
30	2.93	165.58	2.9018	-0.96	170.0347	2.69	2.9003	-1.01	176.3246	6.49	2.8968	-1.13	173.2727	4.65
31	2.9281	170.444	2.9049	-0.79	177.332	4.04	2.9018	-0.90	172.1925	1.03	2.8978	-1.03	166.6155	-2.25
32	2.9242	170.2355	2.9027	-0.74	176.4879	3.67	2.901	-0.79	178.0663	4.60	2.8965	-0.95	172.5246	1.34
33	2.9317	164.0081	2.9131	-0.63	172.4824	5.17	2.9108	-0.71	174.1349	6.17	2.9061	-0.87	168.7319	2.88
34	2.9318	173.5332	2.9057	-0.89	183.1663	5.55	2.905	-0.91	184.2692	6.19	2.9032	-0.98	183.1111	5.52
35	2.9249	168.2339	2.903	-0.75	172.603	2.60	2.9005	-0.83	175.0997	4.08	2.8976	-0.93	173.6455	3.22
36	2.9274	168.4771	2.9064	-0.72	174.1722	3.38	2.9042	-0.79	175.2214	4.00	2.9024	-0.85	170.2686	1.06
37	2.9283	165.66	2.9106	-0.60	176.264	6.40	2.9082	-0.69	177.6933	7.26	2.902	-0.90	173.5825	4.78
38	2.9266	174.2735	2.9018	-0.85	183.5334	5.31	2.9015	-0.86	185.1989	6.27	2.898	-0.98	183.3571	5.21
39	2.937	163.2435	2.9104	-0.91	169.2921	3.71	2.9082	-0.98	169.5675	3.87	2.9022	-1.18	165.5437	1.41
40	2.9315	173.0811	2.9114	-0.69	179.5295	3.73	2.9079	-0.81	180.7394	4.42	2.9008	-1.05	176.9301	2.22

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Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
41	2.9273	170.372	2.9054	-0.75	180.5892	6.00	2.9034	-0.82	180.1082	5.71	2.8976	-1.01	174.939	2.68
42	2.9264	166.6871	2.9069	-0.67	176.3674	5.81	2.9032	-0.79	180.364	8.21	2.8966	-1.02	175.9702	5.57
43	2.931	165.9363	2.9084	-0.77	170.2995	2.63	2.905	-0.89	173.4836	4.55	2.9002	-1.05	171.1216	3.12
44	2.9317	162.209	2.9071	-0.84	170.6071	5.18	2.903	-0.98	164.6157	1.48	2.8983	-1.14	158.5078	-2.28
45	2.9349	165.5564	2.9094	-0.87	170.807	3.17	2.9056	-1.00	173.0197	4.51	2.8998	-1.20	168.1316	1.56
46	2.9317	166.2873	2.9076	-0.82	176.9607	6.42	2.9049	-0.91	177.4332	6.70	2.9	-1.08	171.8156	3.32
47	2.931	166.6722	2.9079	-0.79	173.2506	3.95	2.904	-0.92	174.197	4.51	2.8998	-1.06	175.5253	5.31
48	2.9263	168.1331	2.9056	-0.71	174.025	3.50	2.9005	-0.88	172.2957	2.48	2.8958	-1.04	170.2421	1.25
49	2.928	168.0661	2.9059	-0.75	175.1315	4.20	2.9017	-0.90	174.641	3.91	2.8949	-1.13	170.6726	1.55
50	2.936	162.8159	2.9096	-0.90	171.5769	5.38	2.9076	-0.97	172.2403	5.79	2.9007	-1.20	168.3945	3.43
51	2.9264	168.6013	2.903	-0.80	174.0163	3.21	2.8998	-0.91	177.0991	5.04	2.8948	-1.08	173.9133	3.15
52	2.9306	167.4121	2.9059	-0.84	176.9251	5.68	2.9024	-0.96	178.3908	6.56	2.898	-1.11	176.8626	5.65
53	2.9231	168.2956	2.9062	-0.58	173.0644	2.83	2.9018	-0.73	177.6082	5.53	2.8981	-0.86	173.1539	2.89
54	2.9283	163.0832	2.9128	-0.53	170.7417	4.70	2.9082	-0.69	172.4464	5.74	2.9025	-0.88	168.4422	3.29
55	2.933	167.9879	2.9146	-0.63	174.4933	3.87	2.9121	-0.71	176.2647	4.93	2.9081	-0.85	174.0548	3.61
56	2.9248	166.1235	2.903	-0.75	175.9125	5.89	2.8995	-0.87	177.3318	6.75	2.8958	-0.99	172.9564	4.11
57	2.9216	168.1144	2.9049	-0.57	175.8422	4.60	2.8997	-0.75	176.5479	5.02	2.8954	-0.90	174.4315	3.76
58	2.9303	174.1613	2.912	-0.62	180.5594	3.67	2.9067	-0.81	181.3912	4.15	2.9015	-0.98	175.3591	0.69
59	2.9264	168.1104	2.9066	-0.68	173.3444	3.11	2.9002	-0.90	176.2492	4.84	2.8948	-1.08	173.484	3.20
60	2.9276	169.2218	2.9069	-0.71	176.4201	4.25	2.9015	-0.89	175.7999	3.89	2.8961	-1.08	172.013	1.65
61	2.9327	162.4887	2.9133	-0.66	170.0267	4.64	2.9082	-0.84	165.187	1.66	2.9027	-1.02	161.4732	-0.62
62	2.9263	167.5299	2.9069	-0.66	174.6237	4.23	2.9008	-0.87	172.9924	3.26	2.8956	-1.05	166.7324	-0.48
63	2.929	166.8196	2.9136	-0.53	178.2935	6.88	2.9084	-0.70	178.1958	6.82	2.9034	-0.87	176.0623	5.54
64	2.9286	165.1768	2.9079	-0.71	173.7532	5.19	2.9015	-0.93	172.7184	4.57	2.8961	-1.11	168.6751	2.12
65	2.9312	162.5372	2.9086	-0.77	174.3931	7.29	2.9018	-1.00	172.7784	6.30	2.8961	-1.20	170.4405	4.86
66	2.9291	166.3525	2.9128	-0.56	174.1461	4.68	2.9049	-0.83	174.0608	4.63	2.9005	-0.98	168.5136	1.30
67	2.9303	166.5853	2.9093	-0.72	172.9935	3.85	2.9037	-0.91	172.6871	3.66	2.8985	-1.09	166.527	-0.03
68	2.9306	166.4762	2.9123	-0.62	175.7298	5.56	2.9064	-0.83	172.2133	3.45	2.9018	-0.98	168.8599	1.43
69	2.9291	164.9607	2.9111	-0.61	172.1183	4.34	2.9067	-0.76	172.4453	4.54	2.9029	-0.89	174.0045	5.48
70	2.9273	164.9453	2.9052	-0.75	173.7606	5.34	2.9005	-0.92	171.7174	4.11	2.8958	-1.08	172.202	4.40
71	2.9291	163.56	2.9086	-0.70	173.7295	6.22	2.904	-0.86	167.3209	2.30	2.8997	-1.00	166.9039	2.04
72	2.9254	163.3364	2.9054	-0.68	172.2225	5.44	2.9	-0.87	163.6743	0.21	2.8946	-1.05	160.6466	-1.65
73	2.9288	165.3167	2.9074	-0.73	175.6113	6.23	2.9024	-0.90	175.9545	6.43	2.8956	-1.13	172.6897	4.46
74	2.9298	169.8	2.9121	-0.60	177.4109	4.48	2.9074	-0.76	178.0903	4.88	2.9015	-0.97	176.0523	3.68
75	2.9256	167.2774	2.9061	-0.67	176.843	5.72	2.9012	-0.83	177.907	6.35	2.8963	-1.00	176.1248	5.29
76	2.9232	167.5703	2.9071	-0.55	176.8854	5.56	2.9018	-0.73	180.1782	7.52	2.8973	-0.89	175.3786	4.66
77	2.9264	167.555	2.9076	-0.64	174.4237	4.10	2.901	-0.87	172.9503	3.22	2.8956	-1.05	169.0366	0.88
78	2.9232	163.7516	2.9047	-0.63	173.7567	6.11	2.8985	-0.84	174.4162	6.51	2.8931	-1.03	172.5365	5.36
79	2.9264	168.6026	2.9074	-0.65	175.4223	4.04	2.9018	-0.84	171.5897	1.77	2.8973	-0.99	168.652	0.03
80	2.9266	167.977	2.9074	-0.66	177.5006	5.67	2.9024	-0.83	177.8693	5.89	2.8975	-0.99	177.1418	5.46
Average				-0.722		4.464		-0.878		4.568		-1.045		2.436
Min				-0.962		1.454		-1.080		-0.515		-1.245		-3.444
Max				0.281		7.294		-0.686		8.205		-0.849		5.735

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Intermittent Operating Life Test

2 mins "On", 2mins "Off", IF=20mA

Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.923	156.65	2.905	-0.62	169.14	7.97	2.894	-0.99	167.07	6.65	2.895	-0.96	172.83	10.33
2	2.933	157.05	2.913	-0.68	167.87	6.89	2.904	-0.99	170.29	8.43	2.903	-1.02	168.54	7.32
3	2.919	155.97	2.902	-0.58	166.89	7.00	2.895	-0.82	166.21	6.57	2.893	-0.89	168.56	8.07
4	2.931	155.81	2.911	-0.68	166.32	6.75	2.902	-0.99	165.67	6.33	2.899	-1.09	169.42	8.73
5	2.929	155.12	2.906	-0.79	165.97	6.99	2.903	-0.89	166.59	7.39	2.897	-1.09	170.91	10.18
6	2.925	158.88	2.902	-0.79	167.48	5.41	2.9	-0.85	166.81	4.99	2.892	-1.13	170.19	7.12
7	2.929	149.95	2.898	-1.06	159.88	6.62	2.897	-1.09	162.57	8.42	2.894	-1.19	165.86	10.61
8	2.919	155.82	2.901	-0.62	167.7	7.62	2.895	-0.82	167.07	7.22	2.893	-0.89	168.25	7.98
9	2.92	155.17	2.903	-0.58	164.37	5.93	2.897	-0.79	163.89	5.62	2.893	-0.92	157.45	1.47
10	2.934	154.6	2.911	-0.78	166.09	7.43	2.906	-0.95	168.21	8.80	2.903	-1.06	170.63	10.37
11	2.928	154.54	2.901	-0.92	164.61	6.52	2.898	-1.02	165.06	6.81	2.893	-1.20	170.57	10.37
12	2.93	155.28	2.906	-0.82	164.44	5.90	2.901	-0.99	163.77	5.47	2.896	-1.16	164.54	5.96
13	2.924	156.44	2.902	-0.75	166.5	6.43	2.895	-0.99	166.67	6.54	2.891	-1.13	166.3	6.30
14	2.927	156.63	2.906	-0.72	166.45	6.27	2.902	-0.85	167.56	6.98	2.898	-0.99	170.33	8.75
15	2.917	158.85	2.898	-0.65	167.31	5.33	2.895	-0.75	167.11	5.20	2.89	-0.93	167.58	5.50
16	2.929	153.75	2.907	-0.75	162.9	5.95	2.897	-1.09	164.85	7.22	2.894	-1.19	168.87	9.83
17	2.926	153.44	2.902	-0.82	162.9	6.17	2.897	-0.99	163.61	6.63	2.89	-1.23	168.5	9.81
18	2.928	155.3	2.902	-0.89	165.85	6.79	2.901	-0.92	166.53	7.23	2.894	-1.16	169.79	9.33
19	2.923	158.11	2.899	-0.82	167.73	6.08	2.895	-0.96	162.56	2.81	2.894	-0.99	165.42	4.62
20	2.927	150.98	2.906	-0.72	160.83	6.52	2.897	-1.02	162.25	7.46	2.893	-1.16	165.41	9.56
21	2.923	158.16	2.905	-0.62	167.52	5.92	2.895	-0.96	171.61	8.50	2.891	-1.09	173.93	9.97
22	2.925	160.46	2.91	-0.51	169.25	5.48	2.904	-0.72	171.5	6.88	2.898	-0.92	170.81	6.45
23	2.926	153.88	2.904	-0.75	164.5	6.90	2.897	-0.99	166.31	8.08	2.891	-1.20	170.07	10.52
24	2.927	153.77	2.909	-0.61	168.49	9.57	2.9	-0.92	166.97	8.58	2.899	-0.96	170.23	10.70
25	2.92	158.71	2.905	-0.51	168.49	6.16	2.896	-0.82	169.9	7.05	2.893	-0.92	174.74	10.10
26	2.931	151.56	2.905	-0.89	161.03	6.25	2.898	-1.13	160.81	6.10	2.895	-1.23	162.97	7.53
27	2.928	156.26	2.905	-0.79	166.9	6.81	2.901	-0.92	168.98	8.14	2.898	-1.02	173.1	10.78
28	2.929	155.51	2.902	-0.92	166.76	7.23	2.895	-1.16	167.16	7.49	2.894	-1.19	168.97	8.66
29	2.932	154.7	2.905	-0.92	164.8	6.53	2.898	-1.16	164.63	6.42	2.898	-1.16	166.27	7.48
30	2.921	154.12	2.901	-0.68	163.67	6.20	2.894	-0.92	163.68	6.20	2.891	-1.03	165.46	7.36
31	2.931	151.69	2.902	-0.99	162.47	7.11	2.9	-1.06	163.11	7.53	2.895	-1.23	165.58	9.16
32	2.931	154.44	2.903	-0.96	165	6.84	2.9	-1.06	165.19	6.96	2.895	-1.23	167.12	8.21
33	2.92	161.56	2.904	-0.55	170.17	5.33	2.9	-0.68	171.03	5.86	2.894	-0.89	172.53	6.79
34	2.925	153.82	2.903	-0.75	166.48	8.23	2.897	-0.96	166.03	7.94	2.892	-1.13	168.06	9.26
35	2.927	153.68	2.907	-0.68	163.66	6.49	2.899	-0.96	163.55	6.42	2.894	-1.13	162.68	5.86
36	2.926	153.51	2.903	-0.79	165.32	7.69	2.897	-0.99	166.51	8.47	2.891	-1.20	169.34	10.31
37	2.922	152.12	2.899	-0.79	159.45	4.82	2.897	-0.86	159.6	4.92	2.89	-1.10	161.34	6.06
38	2.923	155.04	2.899	-0.82	166.57	7.44	2.895	-0.96	166.64	7.48	2.891	-1.09	168.81	8.88
39	2.927	153.66	2.903	-0.82	164.93	7.33	2.895	-1.09	164.06	6.77	2.893	-1.16	165.77	7.88
40	2.93	153.49	2.904	-0.89	164.11	6.92	2.9	-1.02	164.01	6.85	2.894	-1.23	165.92	8.10

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Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
41	2.931	156.15	2.91	-0.72	166.28	6.49	2.906	-0.85	166.01	6.31	2.901	-1.02	168.2	7.72
42	2.917	154.49	2.892	-0.86	163.23	5.66	2.885	-1.10	162.36	5.09	2.881	-1.23	163.47	5.81
43	2.925	160.07	2.903	-0.75	170.51	6.52	2.897	-0.96	170.25	6.36	2.895	-1.03	172.08	7.50
44	2.919	157.37	2.899	-0.69	163.04	3.60	2.893	-0.89	163.34	3.79	2.888	-1.06	162.38	3.18
45	2.925	155.57	2.905	-0.68	166.43	6.98	2.902	-0.79	167	7.35	2.895	-1.03	168.12	8.07
46	2.926	149.73	2.899	-0.92	159.9	6.79	2.895	-1.06	160.48	7.18	2.891	-1.20	162.44	8.49
47	2.929	151.87	2.902	-0.92	162.87	7.24	2.898	-1.06	163.81	7.86	2.893	-1.23	165.94	9.26
48	2.924	156.41	2.901	-0.79	166.95	6.74	2.895	-0.99	169.75	8.53	2.892	-1.09	172.54	10.31
49	2.927	153.93	2.902	-0.85	165.67	7.63	2.893	-1.16	166.04	7.87	2.892	-1.20	167.62	8.89
50	2.933	154.72	2.905	-0.95	163.51	5.68	2.9	-1.13	163.58	5.73	2.896	-1.26	163.63	5.76
51	2.925	155.3	2.9	-0.85	164.45	5.89	2.896	-0.99	164.74	6.08	2.891	-1.16	165.3	6.44
52	2.931	152.81	2.905	-0.89	162.54	6.37	2.899	-1.09	164.59	7.71	2.895	-1.23	166.54	8.99
53	2.927	155.76	2.903	-0.82	166.04	6.60	2.896	-1.06	165.91	6.52	2.893	-1.16	168.53	8.20
54	2.924	156.91	2.906	-0.62	168.57	7.43	2.899	-0.85	166.84	6.33	2.893	-1.06	165.31	5.35
55	2.928	154.17	2.902	-0.89	163.81	6.25	2.896	-1.09	162.25	5.24	2.891	-1.26	161.02	4.44
56	2.927	157.84	2.903	-0.82	167.02	5.82	2.9	-0.92	165.43	4.81	2.894	-1.13	165.64	4.94
57	2.926	157.37	2.901	-0.85	167.66	6.54	2.894	-1.09	168.17	6.86	2.89	-1.23	170.21	8.16
58	2.925	157.73	2.901	-0.82	167.15	5.97	2.894	-1.06	166.43	5.52	2.892	-1.13	169.34	7.36
59	2.928	154.63	2.905	-0.79	163.93	6.01	2.896	-1.09	164.14	6.15	2.893	-1.20	166.09	7.41
60	2.922	154.28	2.901	-0.72	165.6	7.34	2.896	-0.89	166.69	8.04	2.892	-1.03	169.35	9.77
61	2.926	157.55	2.902	-0.82	167.82	6.52	2.899	-0.92	166.43	5.64	2.894	-1.09	169.71	7.72
62	2.922	159.83	2.902	-0.68	168.47	5.41	2.896	-0.89	169.71	6.18	2.892	-1.03	168.09	5.17
63	2.924	157.31	2.903	-0.72	167.79	6.66	2.895	-0.99	167.71	6.61	2.893	-1.06	168.96	7.41
64	2.925	153.89	2.902	-0.79	164.35	6.80	2.894	-1.06	164.09	6.63	2.891	-1.16	166.24	8.03
65	2.93	149.47	2.904	-0.89	162.31	8.59	2.899	-1.06	162.61	8.79	2.894	-1.23	162.4	8.65
66	2.933	157.8	2.908	-0.85	171.91	8.94	2.905	-0.95	170.14	7.82	2.901	-1.09	169.31	7.29
67	2.927	154.32	2.9	-0.92	164.89	6.85	2.896	-1.06	166.74	8.05	2.891	-1.23	171.51	11.14
68	2.925	160.58	2.905	-0.68	170.78	6.35	2.898	-0.92	170.19	5.98	2.896	-0.99	172.93	7.69
69	2.927	154.38	2.907	-0.68	166.1	7.59	2.899	-0.96	167.96	8.80	2.898	-0.99	172.05	11.45
70	2.925	157.78	2.902	-0.79	168.18	6.59	2.897	-0.96	168.76	6.96	2.893	-1.09	169.2	7.24
71	2.924	153.25	2.9	-0.82	163.04	6.39	2.896	-0.96	162.03	5.73	2.891	-1.13	164.84	7.56
72	2.922	152.84	2.899	-0.79	163.54	7.00	2.895	-0.92	165.43	8.24	2.888	-1.16	167.47	9.57
73	2.919	157.11	2.899	-0.69	164.13	4.47	2.895	-0.82	162.46	3.41	2.888	-1.06	160.96	2.45
74	2.931	154.97	2.905	-0.89	163.72	5.65	2.904	-0.92	166.1	7.18	2.897	-1.16	166.72	7.58
75	2.929	145.99	2.893	-1.23	154.47	5.81	2.891	-1.30	154.89	6.10	2.886	-1.47	156.74	7.36
76	2.924	150.66	2.898	-0.89	161.7	7.33	2.895	-0.99	160.85	6.76	2.89	-1.16	161.52	7.21
77	2.93	157.85	2.903	-0.92	166.67	5.59	2.9	-1.02	167.26	5.96	2.896	-1.16	168.87	6.98
78	2.928	156.24	2.901	-0.92	164.2	5.09	2.895	-1.13	165.28	5.79	2.891	-1.26	166.22	6.39
79	2.92	159.89	2.9	-0.68	171.65	7.36	2.897	-0.79	173.15	8.29	2.893	-0.92	174.08	8.87
80	2.927	154.23	2.903	-0.82	165.93	7.59	2.897	-1.02	167.07	8.33	2.892	-1.20	169.68	10.02
Average				-0.787		6.574		-0.974		6.775		-1.114		7.926
Min				-1.229		3.603		-1.297		2.814		-1.468		1.469
Max				-0.513		9.573		-0.685		8.803		-0.890		11.446

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Wet High Temperature Reverse Biased Test

85°C/85%RH, VR=4V

Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.935	154.7	2.939	0.14	135.63	-12.33	2.937	0.07	129.15	-16.52	2.929	-0.20	125.64	-18.78
2	2.942	116.11	2.946	0.14	134.82	16.11	2.945	0.10	123.34	6.23	2.939	-0.10	114.03	-1.79
3	2.954	149.38	2.942	-0.41	134.86	-9.72	2.942	-0.41	125.72	-15.84	2.936	-0.61	115.68	-22.56
4	2.932	152.42	2.936	0.14	141.39	-7.24	2.937	0.17	132	-13.40	2.93	-0.07	119.72	-21.45
5	2.926	135.56	2.929	0.10	138.34	2.05	2.929	0.10	118.05	-12.92	2.923	-0.10	109.2	-19.45
6	2.937	154.04	2.94	0.10	142.76	-7.32	2.94	0.10	140.94	-8.50	2.933	-0.14	127.73	-17.08
7	2.938	136.23	2.942	0.14	150.05	10.14	2.942	0.14	124.91	-8.31	2.935	-0.10	124.42	-8.67
8	2.934	131.61	2.939	0.17	136.7	3.87	2.943	0.31	113.7	-13.61	2.931	-0.10	104.14	-20.87
9	2.933	136.08	2.935	0.07	145.08	6.61	2.938	0.17	139.57	2.56	2.93	-0.10	127.65	-6.19
10	2.938	152.85	2.941	0.10	141.25	-7.59	2.942	0.14	138.98	-9.07	2.935	-0.10	122.6	-19.79
11	2.922	142.49	2.931	0.31	127.54	-10.49	2.921	-0.03	118.69	-16.70	2.916	-0.21	114.04	-19.97
12	2.936	125.15	2.937	0.03	134.68	7.61	2.939	0.10	129.32	3.33	2.932	-0.14	121.91	-2.59
13	2.94	132.21	2.956	0.54	140.25	6.08	2.94	0.00	129.19	-2.28	2.937	-0.10	107.56	-18.64
14	2.937	124.99	2.94	0.10	134.04	7.24	2.939	0.07	122.71	-1.82	2.948	0.37	107.29	-14.16
15	2.934	128.57	2.934	0.00	136.14	5.89	2.937	0.10	129.99	1.10	2.929	-0.17	123.55	-3.90
16	2.928	156.13	2.931	0.10	144.22	-7.63	2.932	0.14	128.03	-18.00	2.924	-0.14	117.56	-24.70
17	2.929	123.5	2.926	-0.10	141.67	14.71	2.928	-0.03	133.22	7.87	2.921	-0.27	122.29	-0.98
18	2.931	154.22	2.935	0.14	146.13	-5.25	2.936	0.17	142.03	-7.90	2.928	-0.10	132.08	-14.36
19	2.932	149.78	2.934	0.07	129.62	-13.46	2.934	0.07	114.56	-23.51	2.921	-0.38	118.19	-21.09
20	2.936	155.42	2.937	0.03	140.56	-9.56	2.94	0.14	134.94	-13.18	2.934	-0.07	127.3	-18.09
21	2.933	126.99	2.936	0.10	146.17	15.10	2.935	0.07	118.52	-6.67	2.929	-0.14	98.31	-22.58
22	2.934	113.44	2.938	0.14	137.17	20.92	2.937	0.10	131.86	16.24	2.933	-0.03	110.66	-2.45
23	2.941	118.04	2.945	0.14	137.69	16.65	2.944	0.10	135.32	14.64	2.938	-0.10	109.39	-7.33
24	2.928	153.03	2.931	0.10	141.01	-7.85	2.931	0.10	139.23	-9.02	2.926	-0.07	122.29	-20.09
25	2.938	136.96	2.94	0.07	140.47	2.56	2.94	0.07	135.5	-1.07	2.935	-0.10	128.96	-5.84
26	2.934	142.29	2.938	0.14	129.65	-8.88	2.938	0.14	126.26	-11.27	2.93	-0.14	122.48	-13.92
27	2.932	136.08	2.924	-0.27	142.52	4.73	2.923	-0.31	130.28	-4.26	2.918	-0.48	121.52	-10.70
28	2.933	144.17	2.935	0.07	142.66	-1.05	2.936	0.10	141.02	-2.18	2.929	-0.14	120.66	-16.31
29	2.931	124.22	2.933	0.07	140.98	13.49	2.932	0.03	129.57	4.31	2.926	-0.17	117.59	-5.34
30	2.937	131.19	2.943	0.20	140.54	7.13	2.94	0.10	139.83	6.59	2.935	-0.07	126.94	-3.24
31	2.932	141.26	2.936	0.14	138.32	-2.08	2.936	0.14	135.14	-4.33	2.929	-0.10	120.6	-14.63
32	2.933	129.97	2.936	0.10	135.45	4.22	2.935	0.07	125.52	-3.42	2.929	-0.14	116.34	-10.49
33	2.934	151.69	2.93	-0.14	140.26	-7.54	2.929	-0.17	130.35	-14.07	2.925	-0.31	125.46	-17.29
34	2.938	139.48	2.934	-0.14	136.64	-2.04	2.947	0.31	127.11	-8.87	2.928	-0.34	119.69	-14.19
35	2.937	153.39	2.94	0.10	140.48	-8.42	2.94	0.10	136.71	-10.87	2.933	-0.14	126.55	-17.50
36	2.929	132.99	2.934	0.17	142.83	7.40	2.935	0.20	135.08	1.57	2.927	-0.07	119.61	-10.06
37	2.935	151.05	2.939	0.14	140.27	-7.14	2.939	0.14	128.8	-14.73	2.942	0.24	119.38	-20.97
38	2.93	144.92	2.934	0.14	145.53	0.42	2.934	0.14	129.8	-10.43	2.929	-0.03	114.3	-21.13
39	2.937	135.09	2.941	0.14	134.35	-0.55	2.939	0.07	125.07	-7.42	2.934	-0.10	119.25	-11.73
40	2.934	144.48	2.937	0.10	138.94	-3.83	2.936	0.07	134.54	-6.88	2.93	-0.14	118.62	-17.90

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Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
41	2.917	147.11	2.92	0.10	143.15	-2.69	2.919	0.07	140.18	-4.71	2.914	-0.10	134.68	-8.45
42	2.931	137.01	2.935	0.14	133.27	-2.73	2.935	0.14	128.03	-6.55	2.929	-0.07	110.72	-19.19
43	2.929	150.55	2.933	0.14	132.79	-11.80	2.929	0.00	134.26	-10.82	2.936	0.24	126.12	-16.23
44	2.935	130.74	2.939	0.14	132.2	1.12	2.936	0.03	122.39	-6.39	2.931	-0.14	114.96	-12.07
45	2.939	135.37	2.942	0.10	144.26	6.57	2.94	0.03	129.93	-4.02	2.935	-0.14	108.68	-19.72
46	2.941	116.35	2.944	0.10	128.43	10.38	2.942	0.03	121.72	4.62	2.936	-0.17	114.28	-1.78
47	2.933	157.24	2.936	0.10	141.14	-10.24	2.937	0.14	136.26	-13.34	2.931	-0.07	124.98	-20.52
48	2.969	147.44	2.939	-1.01	143.18	-2.89	2.939	-1.01	138.05	-6.37	2.933	-1.21	113.14	-23.26
49	2.923	123.4	2.942	0.65	134.4	8.91	2.926	0.10	119.88	-2.85	2.934	0.38	112.1	-9.16
50	2.929	138.1	2.933	0.14	145.25	5.18	2.931	0.07	141.87	2.73	2.925	-0.14	131.93	-4.47
51	2.934	145.58	2.937	0.10	131.7	-9.53	2.937	0.10	136.37	-6.33	2.931	-0.10	118.89	-18.33
52	2.934	125.25	2.937	0.10	133.7	6.75	2.935	0.03	128.97	2.97	2.934	0.00	119.29	-4.76
53	2.93	149.8	2.936	0.20	144.36	-3.63	2.936	0.20	140.22	-6.40	2.955	0.85	129.98	-13.23
54	2.933	140.06	2.937	0.14	146	4.24	2.937	0.14	133.59	-4.62	2.931	-0.07	119.22	-14.88
55	2.932	141.1	2.937	0.17	143.3	1.56	2.936	0.14	134.33	-4.80	2.929	-0.10	118.48	-16.03
56	2.934	128.9	2.934	0.00	131.47	1.99	2.934	0.00	126.29	-2.02	2.928	-0.20	118.51	-8.06
57	2.932	141.2	2.936	0.14	146.01	3.41	2.935	0.10	141.05	-0.11	2.93	-0.07	127.78	-9.50
58	2.933	128.55	2.934	0.03	134.95	4.98	2.934	0.03	128.87	0.25	2.928	-0.17	113.89	-11.40
59	2.928	137.92	2.933	0.17	139.32	1.02	2.933	0.17	133.34	-3.32	2.928	0.00	117.19	-15.03
60	2.935	147.82	2.939	0.14	145.51	-1.56	2.937	0.07	131.81	-10.83	2.932	-0.10	123.58	-16.40
61	2.932	154.79	2.936	0.14	140.24	-9.40	2.964	1.09	132.48	-14.41	2.931	-0.03	121.86	-21.27
62	2.932	113.28	2.937	0.17	140.02	23.61	2.936	0.14	136.06	20.11	2.929	-0.10	126.04	11.26
63	2.922	114.61	2.926	0.14	131.11	14.40	2.922	0.00	122.27	6.68	2.917	-0.17	113.03	-1.38
64	2.936	135.29	2.94	0.14	141.47	4.57	2.939	0.10	130.04	-3.88	2.938	0.07	121.64	-10.09
65	2.931	139.4	2.934	0.10	137.1	-1.65	2.934	0.10	133.1	-4.52	2.933	0.07	121.24	-13.03
66	2.933	125.92	2.937	0.14	138.38	9.90	2.937	0.14	130.54	3.67	2.932	-0.03	116.01	-7.87
67	2.928	150.22	2.931	0.10	135.86	-9.56	2.931	0.10	130.03	-13.44	2.925	-0.10	115.52	-23.10
68	2.922	143.12	2.929	0.24	137.3	-4.07	2.929	0.24	130.17	-9.05	2.921	-0.03	117.8	-17.69
69	2.936	134.69	2.942	0.20	142.37	5.70	2.94	0.14	137.83	2.33	2.932	-0.14	125.67	-6.70
70	2.934	150.15	2.937	0.10	143.41	-4.49	2.937	0.10	136.13	-9.34	2.932	-0.07	128	-14.75
71	2.93	143.06	2.933	0.10	140.56	-1.75	2.932	0.07	130.12	-9.05	2.928	-0.07	123.69	-13.54
72	2.94	125.79	2.953	0.44	145.29	15.50	2.943	0.10	137.27	9.13	2.936	-0.14	112.23	-10.78
73	2.936	150.06	2.938	0.07	138.48	-7.72	2.938	0.07	133.89	-10.78	2.934	-0.07	114.26	-23.86
74	2.926	134.08	2.929	0.10	139.85	4.30	2.929	0.10	133.02	-0.79	2.925	-0.03	123.29	-8.05
75	2.928	152.59	2.931	0.10	142.37	-6.70	2.929	0.03	138.34	-9.34	2.922	-0.20	133.46	-12.54
76	2.934	129.69	2.937	0.10	137.46	5.99	2.935	0.03	135.58	4.54	2.931	-0.10	118.75	-8.44
77	2.93	147.73	2.934	0.14	140.83	-4.67	2.934	0.14	138.78	-6.06	2.932	0.07	112.33	-23.96
78	2.928	121.93	2.935	0.24	140.97	15.62	2.934	0.20	138.52	13.61	2.929	0.03	125.35	2.80
79	2.93	114.2	2.932	0.07	132.48	16.01	2.935	0.17	127.21	11.39	2.946	0.55	122.2	7.01
80	2.93	132.56	2.935	0.17	133.88	1.00	2.934	0.14	130.33	-1.68	2.928	-0.07	113.8	-14.15
Average				0.103		1.382		0.087		-4.205		-0.092		-12.892
Min				-1.010		-13.460		-1.010		-23.514		-1.213		-24.704
Max				0.650		23.605		1.091		20.109		0.853		11.264

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Wet High Temperature Operating Life Test

85°C/85%RH, IF=1mA

Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.852	169.26	2.849	-0.11	191.42	13.09	2.851	-0.04	180.69	6.75	2.839	-0.46	161.22	-4.75
2	2.866	177.68	2.869	0.10	198.97	11.98	2.862	-0.14	187.6	5.58	2.865	-0.03	172.1	-3.14
3	2.854	172.5	2.855	0.04	195.6	13.39	2.846	-0.28	184.14	6.75	2.85	-0.14	171.66	-0.49
4	2.836	167.21	2.839	0.11	193.48	15.71	2.829	-0.25	184.88	10.57	2.828	-0.28	167.39	0.11
5	2.869	170.05	2.872	0.10	193.72	13.92	2.863	-0.21	185.05	8.82	2.862	-0.24	166.13	-2.31
6	2.881	173.7	2.879	-0.07	185.11	6.57	2.873	-0.28	182.08	4.82	2.874	-0.24	172	-0.98
7	2.883	176.88	2.885	0.07	203.36	14.97	2.878	-0.17	191.93	8.51	2.877	-0.21	180.64	2.13
8	2.858	173.24	2.861	0.10	201	16.02	2.856	-0.07	191.24	10.39	2.861	0.10	179.95	3.87
9	2.839	169.15	2.841	0.07	188.3	11.32	2.836	-0.11	184.04	8.80	2.834	-0.18	162.73	-3.80
10	2.857	172.25	2.853	-0.14	192.2	11.58	2.849	-0.28	183.16	6.33	2.851	-0.21	173.66	0.82
11	2.865	167.07	2.867	0.07	192.46	15.20	2.86	-0.17	178.08	6.59	2.861	-0.14	159.15	-4.74
12	2.879	168.17	2.883	0.14	199.69	18.74	2.877	-0.07	188.72	12.22	2.878	-0.03	181.43	7.88
13	2.864	175.54	2.867	0.10	199.45	13.62	2.858	-0.21	191.47	9.07	2.858	-0.21	183.06	4.28
14	2.872	172.66	2.873	0.03	196.75	13.95	2.869	-0.10	189.26	9.61	2.869	-0.10	185.43	7.40
15	2.857	172.08	2.857	0.00	195.09	13.37	2.847	-0.35	187.98	9.24	2.849	-0.28	178.7	3.85
16	2.861	171.67	2.864	0.10	199.92	16.46	2.857	-0.14	188.5	9.80	2.857	-0.14	178.58	4.03
17	2.859	169.9	2.863	0.14	198.34	16.74	2.857	-0.07	187.59	10.41	2.857	-0.07	178.2	4.89
18	2.861	170.13	2.861	0.00	196.98	15.78	2.855	-0.21	189.96	11.66	2.85	-0.38	175.95	3.42
19	2.906	175.76	2.902	-0.14	209.53	19.21	2.892	-0.48	198.7	13.05	2.893	-0.45	169.1	-3.79
20	2.864	168.83	2.865	0.03	201.41	19.30	2.858	-0.21	189.8	12.42	2.857	-0.24	176.05	4.28
21	2.841	168.76	2.843	0.07	198.18	17.43	2.838	-0.11	188.78	11.86	2.837	-0.14	170.9	1.27
22	2.87	171.93	2.873	0.10	197.81	15.05	2.868	-0.07	185.87	8.11	2.869	-0.03	173.31	0.80
23	2.85	172.14	2.853	0.11	180.26	4.72	2.847	-0.11	178.83	3.89	2.846	-0.14	179.54	4.30
24	2.846	175.81	2.847	0.04	197.7	12.45	2.843	-0.11	188.71	7.34	2.842	-0.14	175.56	-0.14
25	2.868	172.47	2.867	-0.03	203.3	17.88	2.861	-0.24	194.8	12.95	2.86	-0.28	177.8	3.09
26	2.874	171.97	2.877	0.10	199.13	15.79	2.869	-0.17	190.4	10.72	2.865	-0.31	179.85	4.58
27	2.85	175.27	2.853	0.11	194.97	11.24	2.844	-0.21	187.89	7.20	2.845	-0.18	177.32	1.17
28	2.866	172.08	2.869	0.10	192.94	12.12	2.86	-0.21	184.15	7.01	2.865	-0.03	166.78	-3.08
29	2.849	176.52	2.854	0.18	192.61	9.12	2.846	-0.11	185.02	4.82	2.852	0.11	173.29	-1.83
30	2.854	177.06	2.854	0.00	199.71	12.79	2.847	-0.25	192.24	8.57	2.846	-0.28	182.52	3.08
31	2.867	172.98	2.87	0.10	202.16	16.87	2.864	-0.10	194.68	12.54	2.862	-0.17	184.52	6.67
32	2.87	176.22	2.874	0.14	201.16	14.15	2.865	-0.17	196.29	11.39	2.862	-0.28	160.92	-8.68
33	2.912	172.14	2.905	-0.24	196.55	14.18	2.9	-0.41	190.36	10.58	2.896	-0.55	186.01	8.06
34	2.857	175.62	2.861	0.14	194.99	11.03	2.851	-0.21	186.38	6.13	2.852	-0.18	172.68	-1.67
35	2.852	176.94	2.85	-0.07	199.15	12.55	2.846	-0.21	194.33	9.83	2.846	-0.21	175.4	-0.87
36	2.874	172.66	2.879	0.17	202.22	17.12	2.875	0.03	195.24	13.08	2.87	-0.14	183.35	6.19
37	2.852	182.39	2.856	0.14	199.76	9.52	2.851	-0.04	195.35	7.11	2.853	0.04	186.38	2.19
38	2.84	174.13	2.842	0.07	199.96	14.83	2.839	-0.04	193.51	11.13	2.834	-0.21	185.51	6.54
39	2.843	175.37	2.841	-0.07	202.5	15.47	2.836	-0.25	194.65	10.99	2.839	-0.14	185.03	5.51
40	2.842	178.95	2.845	0.11	199.7	11.60	2.841	-0.04	193.3	8.02	2.843	0.04	186.48	4.21

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Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
41	2.851	172.98	2.856	0.18	187.37	8.32	2.851	0.00	181.44	4.89	2.847	-0.14	170.86	-1.23
42	2.836	173.68	2.838	0.07	194.06	11.73	2.833	-0.11	187.38	7.89	2.829	-0.25	176.85	1.83
43	2.85	173.83	2.853	0.11	200.75	15.49	2.85	0.00	195.4	12.41	2.851	0.04	182.82	5.17
44	2.838	170.98	2.841	0.11	196.56	14.96	2.84	0.07	184.35	7.82	2.839	0.04	165.12	-3.43
45	2.86	181.52	2.862	0.07	210.6	16.02	2.856	-0.14	201.57	11.05	2.857	-0.10	195.09	7.48
46	2.866	175.71	2.872	0.21	200.4	14.05	2.866	0.00	194.35	10.61	2.87	0.14	185.96	5.83
47	2.878	174.74	2.882	0.14	199.71	14.29	2.877	-0.03	194.64	11.39	2.873	-0.17	185.97	6.43
48	2.847	181.57	2.849	0.07	194.03	6.86	2.845	-0.07	187.82	3.44	2.846	-0.04	175.87	-3.14
49	2.861	174.62	2.867	0.21	199.16	14.05	2.863	0.07	192.48	10.23	2.857	-0.14	184.88	5.88
50	2.876	174.79	2.885	0.31	203.19	16.25	2.88	0.14	193.43	10.66	2.88	0.14	183.26	4.85
51	2.84	177.23	2.846	0.21	204.84	15.58	2.843	0.11	198.87	12.21	2.84	0.00	181.18	2.23
52	2.829	173.23	2.826	-0.11	200.97	16.01	2.821	-0.28	196.04	13.17	2.821	-0.28	185.27	6.95
53	2.836	176.19	2.834	-0.07	201.01	14.09	2.829	-0.25	192.35	9.17	2.831	-0.18	181.05	2.76
54	2.846	176.88	2.85	0.14	204.42	15.57	2.846	0.00	195.78	10.69	2.842	-0.14	186.68	5.54
55	2.858	176.23	2.864	0.21	202.76	15.05	2.858	0.00	196.23	11.35	2.862	0.14	184.79	4.86
56	2.849	176.01	2.852	0.11	203.12	15.40	2.85	0.04	197.11	11.99	2.847	-0.07	185.53	5.41
57	2.865	174.02	2.869	0.14	198.67	14.17	2.862	-0.10	192.34	10.53	2.862	-0.10	168.12	-3.39
58	2.859	178.17	2.857	-0.07	199.78	12.13	2.853	-0.21	193.57	8.64	2.859	0.00	180.51	1.31
59	2.853	173.89	2.857	0.14	198.12	13.93	2.853	0.00	194.19	11.67	2.849	-0.14	184.56	6.14
60	2.849	175.02	2.855	0.21	202.2	15.53	2.851	0.07	196.61	12.34	2.851	0.07	184.74	5.55
61	2.848	175.79	2.852	0.14	203.15	15.56	2.847	-0.04	198.7	13.03	2.849	0.04	178.46	1.52
62	2.871	170.69	2.874	0.10	191.21	12.02	2.871	0.00	185.16	8.48	2.871	0.00	173.08	1.40
63	2.853	174.15	2.855	0.07	195.3	12.14	2.85	-0.11	191.74	10.10	2.849	-0.14	180.95	3.90
64	2.861	172.88	2.863	0.07	201.06	16.30	2.851	-0.35	201.55	16.58	2.85	-0.38	182.34	5.47
65	2.849	172.03	2.853	0.14	197	14.51	2.85	0.04	196.24	14.07	2.852	0.11	185.97	8.10
66	2.849	171.62	2.854	0.18	195.77	14.07	2.848	-0.04	190.93	11.25	2.846	-0.11	183.57	6.96
67	2.837	171.64	2.839	0.07	193.64	12.82	2.835	-0.07	188.06	9.57	2.838	0.04	181.5	5.74
68	2.884	177.86	2.886	0.07	205.81	15.71	2.884	0.00	202.23	13.70	2.877	-0.24	190.85	7.30
69	2.816	174.11	2.819	0.11	195.99	12.57	2.815	-0.04	189.21	8.67	2.811	-0.18	164.57	-5.48
70	2.859	173.67	2.862	0.10	199.01	14.59	2.856	-0.10	193.51	11.42	2.857	-0.07	180.8	4.11
71	2.858	175.29	2.858	0.00	201.43	14.91	2.854	-0.14	194.85	11.16	2.853	-0.17	179.85	2.60
72	2.859	172.34	2.862	0.10	197.64	14.68	2.838	-0.73	188.64	9.46	2.859	0.00	168.92	-1.98
73	2.849	175.35	2.85	0.04	202.76	15.63	2.849	0.00	196.72	12.19	2.845	-0.14	186.79	6.52
74	2.894	172.03	2.9	0.21	196.67	14.32	2.894	0.00	188.9	9.81	2.891	-0.10	180.27	4.79
75	2.852	179.83	2.853	0.04	203.98	13.43	2.849	-0.11	196.49	9.26	2.843	-0.32	175.13	-2.61
76	2.85	173.65	2.852	0.07	196.53	13.18	2.85	0.00	188.82	8.74	2.842	-0.28	159.81	-7.97
77	2.853	178.41	2.858	0.18	199.73	11.95	2.849	-0.14	197.21	10.54	2.847	-0.21	168.51	-5.55
78	2.853	179.83	2.858	0.18	208.58	15.99	2.855	0.07	205.14	14.07	2.853	0.00	174.42	-3.01
79	2.845	181.06	2.847	0.07	202.76	11.98	2.842	-0.11	193.93	7.11	2.84	-0.18	174.25	-3.76
80	2.858	172.07	2.86	0.07	197.17	14.59	2.855	-0.10	192.68	11.98	2.857	-0.03	176.35	2.49
Average				0.080		13.966		-0.119		9.850		-0.135		2.024
Min				-0.240		4.717		-0.735		3.442		-0.549		-8.682
Max				0.313		19.298		0.139		16.584		0.140		8.103

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Low Temperature Storage Test

T=-40°C

Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.9401	170.1932	2.937	-0.11	173.0916	1.70	2.9338	-0.21	170.9859	0.47	2.9357	-0.15	170.6491	0.27
2	2.9256	172.6646	2.9332	0.26	174.0924	0.83	2.93	0.15	175.2815	1.52	2.9328	0.25	175.9768	1.92
3	2.9263	168.5923	2.9312	0.17	169.5847	0.59	2.9273	0.03	170.7015	1.25	2.9313	0.17	170.5566	1.17
4	2.9306	169.945	2.9382	0.26	168.6296	-0.77	2.9352	0.16	168.6574	-0.76	2.9381	0.26	168.2673	-0.99
5	2.9306	172.6926	2.9382	0.26	169.1567	-2.05	2.935	0.15	171.3435	-0.78	2.9372	0.23	171.084	-0.93
6	2.9251	175.4117	2.9281	0.10	171.4078	-2.28	2.9256	0.02	173.0073	-1.37	2.932	0.24	173.647	-1.01
7	2.9293	176.6065	2.9323	0.10	172.3641	-2.40	2.9306	0.04	175.3121	-0.73	2.936	0.23	175.6524	-0.54
8	2.9305	169.7965	2.9354	0.17	171.1068	0.77	2.933	0.09	172.2355	1.44	2.9376	0.24	172.488	1.59
9	2.9327	172.7907	2.9391	0.22	174.1114	0.76	2.9367	0.14	173.0688	0.16	2.9397	0.24	173.961	0.68
10	2.933	164.8031	2.9396	0.23	164.5334	-0.16	2.9372	0.14	164.7139	-0.05	2.9399	0.24	164.4232	-0.23
11	2.9271	172.9514	2.9318	0.16	169.8932	-1.77	2.9296	0.09	174.2753	0.77	2.9335	0.22	174.4985	0.89
12	2.9301	174.1548	2.9355	0.18	175.3926	0.71	2.9323	0.08	174.0885	-0.04	2.9369	0.23	174.5099	0.20
13	2.9291	168.6505	2.9354	0.22	169.0533	0.24	2.9306	0.05	168.6503	0.00	2.9352	0.21	168.6773	0.02
14	2.9305	167.3074	2.9376	0.24	168.5851	0.76	2.934	0.12	168.8424	0.92	2.9372	0.23	168.2213	0.55
15	2.9291	170.0758	2.9354	0.22	171.8883	1.07	2.9318	0.09	171.822	1.03	2.9352	0.21	171.6855	0.95
16	2.9305	168.578	2.9362	0.19	170.1317	0.92	2.9315	0.03	170.0193	0.85	2.9364	0.20	170.7434	1.28
17	2.9305	169.3364	2.936	0.19	171.1559	1.07	2.9325	0.07	168.9327	-0.24	2.937	0.22	168.725	-0.36
18	2.9344	167.0314	2.9401	0.19	166.1257	-0.54	2.9372	0.10	165.957	-0.64	2.9416	0.25	165.9678	-0.64
19	2.9301	174.9272	2.9364	0.22	173.0125	-1.09	2.9317	0.05	173.9784	-0.54	2.9367	0.23	173.1521	-1.01
20	2.9298	172.4491	2.9357	0.20	169.4492	-1.74	2.9322	0.08	171.6484	-0.46	2.9362	0.22	171.1427	-0.76
21	2.9295	163.8309	2.9352	0.19	164.0919	0.16	2.9323	0.10	164.5365	0.43	2.937	0.26	164.3784	0.33
22	2.9246	170.2969	2.9303	0.19	169.1088	-0.70	2.9264	0.06	167.671	-1.54	2.9328	0.28	167.021	-1.92
23	2.9266	167.6273	2.933	0.22	173.6289	3.58	2.9286	0.07	173.058	3.24	2.9344	0.27	173.4492	3.47
24	2.9263	167.3231	2.933	0.23	168.6351	0.78	2.929	0.09	167.7165	0.24	2.934	0.26	167.4641	0.08
25	2.9259	168.8113	2.932	0.21	174.2584	3.23	2.9285	0.09	170.7075	1.12	2.9327	0.23	170.5347	1.02
26	2.9271	166.7197	2.9325	0.18	170.2233	2.10	2.9288	0.06	166.5657	-0.09	2.9337	0.23	166.3667	-0.21
27	2.9163	158.0637	2.9216	0.18	160.4626	1.52	2.9187	0.08	158.8566	0.50	2.9231	0.23	158.6603	0.38
28	2.928	163.5308	2.9359	0.27	168.9511	3.31	2.9332	0.18	166.1355	1.59	2.9367	0.30	166.6446	1.90
29	2.9266	160.3668	2.9349	0.28	163.9272	2.22	2.9322	0.19	162.4909	1.32	2.935	0.29	162.6915	1.45
30	2.9298	162.8467	2.9374	0.26	161.187	-1.02	2.934	0.14	162.3876	-0.28	2.9374	0.26	162.3864	-0.28
31	2.9327	166.6141	2.9372	0.15	168.145	0.92	2.9342	0.05	164.4268	-1.31	2.9379	0.18	164.2785	-1.40
32	2.9293	172.2306	2.9328	0.12	176.4931	2.47	2.9298	0.02	175.181	1.71	2.9349	0.19	175.7359	2.04
33	2.9249	172.0859	2.93	0.17	172.3821	0.17	2.9271	0.08	172.2157	0.08	2.9317	0.23	172.7425	0.38
34	2.9266	171.5806	2.9322	0.19	170.2263	-0.79	2.9291	0.09	168.8433	-1.60	2.9327	0.21	168.0714	-2.05
35	2.9386	165.1527	2.944	0.18	166.0863	0.57	2.9402	0.05	165.5316	0.23	2.944	0.18	165.3342	0.11
36	2.9295	170.9617	2.9347	0.18	171.4347	0.28	2.9325	0.10	169.9649	-0.58	2.9352	0.19	169.7143	-0.73
37	2.9298	170.7981	2.9357	0.20	171.2311	0.25	2.931	0.04	171.5241	0.43	2.9359	0.21	171.9365	0.67
38	2.9344	168.3709	2.9406	0.21	169.6516	0.76	2.935	0.02	167.3059	-0.63	2.9397	0.18	167.7511	-0.37
39	2.9349	170.408	2.9411	0.21	174.6756	2.50	2.9365	0.05	169.2275	-0.69	2.9408	0.20	169.3949	-0.59
40	2.9322	175.2804	2.9377	0.19	175.178	-0.06	2.9337	0.05	174.2272	-0.60	2.9372	0.17	174.4503	-0.47

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Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
41	2.9269	171.029	2.9312	0.15	169.0033	-1.18	2.9276	0.02	167.9014	-1.83	2.931	0.14	167.655	-1.97
42	2.9338	170.4329	2.9386	0.16	170.7243	0.17	2.9355	0.06	170.354	-0.05	2.9394	0.19	170.3818	-0.03
43	2.9268	172.8444	2.9327	0.20	172.6817	-0.09	2.9305	0.13	174.3999	0.90	2.9335	0.23	174.9857	1.24
44	2.9278	164.4609	2.9349	0.24	166.0517	0.97	2.931	0.11	166.4192	1.19	2.9344	0.23	166.1572	1.03
45	2.9246	172.4865	2.9301	0.19	170.8855	-0.93	2.9271	0.09	171.0134	-0.85	2.93	0.18	171.6982	-0.46
46	2.9274	166.5117	2.9318	0.15	169.8906	2.03	2.9298	0.08	167.5582	0.63	2.9335	0.21	167.6122	0.66
47	2.9296	171.2387	2.9342	0.16	173.6899	1.43	2.9308	0.04	173.5892	1.37	2.9364	0.23	173.9713	1.60
48	2.9327	166.6743	2.9384	0.19	169.1547	1.49	2.9342	0.05	171.8543	3.11	2.9397	0.24	171.1219	2.67
49	2.9248	171.4494	2.931	0.21	171.1093	-0.20	2.9276	0.10	171.7317	0.16	2.9315	0.23	171.4446	0.00
50	2.9332	173.2838	2.9389	0.19	173.3851	0.06	2.9364	0.11	173.5121	0.13	2.9391	0.20	173.1852	-0.06
51	2.9261	168.9794	2.9285	0.08	171.0407	1.22	2.9281	0.07	171.3697	1.41	2.9335	0.25	171.7487	1.64
52	2.9335	171.8215	2.9386	0.17	172.1497	0.19	2.9347	0.04	174.1913	1.38	2.9423	0.30	174.2028	1.39
53	2.9285	167.6091	2.9349	0.22	172.0157	2.63	2.9293	0.03	170.657	1.82	2.9376	0.31	170.8833	1.95
54	2.929	170.5326	2.9357	0.23	174.2499	2.18	2.9303	0.04	176.0387	3.23	2.9369	0.27	176.1482	3.29
55	2.9285	168.4375	2.935	0.22	171.3578	1.73	2.9313	0.10	171.1301	1.60	2.9359	0.25	171.1223	1.59
56	2.9306	168.0565	2.9349	0.15	169.2022	0.68	2.9333	0.09	169.7516	1.01	2.9381	0.26	169.7009	0.98
57	2.9278	164.4448	2.934	0.21	167.9799	2.15	2.9298	0.07	169.2781	2.94	2.9374	0.33	169.5976	3.13
58	2.9317	168.1892	2.9342	0.09	166.4411	-1.04	2.9333	0.05	167.879	-0.18	2.9396	0.27	167.5103	-0.40
59	2.931	163.9913	2.9347	0.13	164.3017	0.19	2.9315	0.02	163.4797	-0.31	2.9372	0.21	163.9068	-0.05
60	2.9268	172.1941	2.9318	0.17	171.9209	-0.16	2.9286	0.06	170.1147	-1.21	2.9333	0.22	170.4853	-0.99
61	2.9258	169.068	2.9288	0.10	169.6298	0.33	2.9273	0.05	171.369	1.36	2.9322	0.22	171.3167	1.33
62	2.9298	167.7091	2.9333	0.12	166.9439	-0.46	2.9323	0.09	170.8531	1.87	2.9381	0.28	170.8446	1.87
63	2.9237	169.1611	2.9285	0.16	167.5972	-0.92	2.9276	0.13	171.6313	1.46	2.9338	0.35	171.0853	1.14
64	2.9251	166.7678	2.9301	0.17	168.3326	0.94	2.9269	0.06	169.9921	1.93	2.9345	0.32	169.1611	1.44
65	2.9274	165.5455	2.934	0.23	165.9409	0.24	2.9291	0.06	168.3319	1.68	2.9362	0.30	168.6756	1.89
66	2.9295	166.9917	2.931	0.05	165.0407	-1.17	2.9253	-0.14	167.4486	0.27	2.936	0.22	167.5366	0.33
67	2.9251	172.7321	2.928	0.10	172.3867	-0.20	2.9227	-0.08	173.7358	0.58	2.9322	0.24	173.6949	0.56
68	2.9374	164.2224	2.9404	0.10	164.9759	0.46	2.936	-0.05	165.6953	0.90	2.9443	0.23	165.2894	0.65
69	2.9278	164.3942	2.9312	0.12	165.4432	0.64	2.9268	-0.03	166.1683	1.08	2.934	0.21	166.4687	1.26
70	2.931	165.4802	2.9349	0.13	165.8317	0.21	2.9293	-0.06	166.5054	0.62	2.9376	0.23	166.5134	0.62
71	2.935	168.2601	2.9369	0.06	168.0607	-0.12	2.9354	0.01	170.1078	1.10	2.9414	0.22	170.6533	1.42
72	2.9359	165.2137	2.9387	0.10	164.0888	-0.68	2.936	0.00	165.3839	0.10	2.9433	0.25	165.3271	0.07
73	2.9317	162.8125	2.9357	0.14	163.4112	0.37	2.9312	-0.02	164.8564	1.26	2.9389	0.25	164.507	1.04
74	2.9293	166.144	2.9325	0.11	167.075	0.56	2.9293	0.00	166.9409	0.48	2.9364	0.24	166.0164	-0.08
75	2.9295	158.6915	2.9327	0.11	160.9074	1.40	2.9303	0.03	162.9221	2.67	2.9364	0.24	162.7193	2.54
76	2.9281	169.7039	2.9322	0.14	171.0206	0.78	2.9285	0.01	170.5125	0.48	2.9355	0.25	170.8454	0.67
77	2.9281	160.2148	2.9333	0.18	159.174	-0.65	2.9285	0.01	162.1908	1.23	2.9362	0.28	162.7452	1.58
78	2.9301	168.3771	2.9354	0.18	170.6798	1.37	2.9281	-0.07	171.0164	1.57	2.9369	0.23	171.7578	2.01
79	2.9288	169.6266	2.9345	0.19	171.8075	1.29	2.9263	-0.09	172.6753	1.80	2.9354	0.23	172.0844	1.45
80	2.9295	168.4732	2.9359	0.22	169.0919	0.37	2.9274	-0.07	169.963	0.88	2.9369	0.25	169.1306	0.39
Average				0.174		0.464		0.053		0.576		0.231		0.578
Min				-0.105		-2.402		-0.214		-1.829		-0.150		-2.045
Max				0.284		3.580		0.191		3.240		0.345		3.473

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High Temperature Storage Test

T=100°C

Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.934	158.8888	2.9421	0.28	162.2798	2.13	2.9411	0.24	160.2933	0.88	2.9414	0.25	160.3274	0.91
2	2.9258	168.259	2.9337	0.27	171.7331	2.06	2.9306	0.16	167.6151	-0.38	2.9322	0.22	167.4379	-0.49
3	2.9278	166.8553	2.9362	0.29	170.9416	2.45	2.932	0.14	166.4868	-0.22	2.9349	0.24	166.1057	-0.45
4	2.931	166.044	2.9396	0.29	170.1051	2.45	2.9345	0.12	167.5068	0.88	2.9377	0.23	167.6315	0.96
5	2.9256	168.8147	2.9338	0.28	171.5403	1.61	2.9296	0.14	167.6595	-0.68	2.9322	0.23	167.3837	-0.85
6	2.9295	164.4337	2.9352	0.19	165.4148	0.60	2.9317	0.08	164.8556	0.26	2.9357	0.21	164.0975	-0.20
7	2.9303	163.3378	2.9354	0.17	166.3611	1.85	2.9338	0.12	162.8641	-0.29	2.9379	0.26	162.6381	-0.43
8	2.9266	169.97	2.931	0.15	172.7957	1.66	2.9293	0.09	171.7676	1.06	2.933	0.22	171.4398	0.86
9	2.9308	168.8169	2.9372	0.22	171.467	1.57	2.9342	0.12	170.1242	0.77	2.9374	0.23	170.7658	1.15
10	2.9335	163.7885	2.9392	0.19	166.8278	1.86	2.937	0.12	166.1426	1.44	2.9386	0.17	166.7537	1.81
11	2.9325	168.6726	2.9377	0.18	169.1549	0.29	2.9365	0.14	166.9989	-0.99	2.9392	0.23	166.0681	-1.54
12	2.929	169.9232	2.936	0.24	172.3363	1.42	2.934	0.17	169.7126	-0.12	2.9372	0.28	169.9517	0.02
13	2.9263	169.2987	2.9327	0.22	173.0009	2.19	2.9308	0.15	169.933	0.37	2.933	0.23	169.7105	0.24
14	2.929	164.8482	2.9355	0.22	164.5693	-0.17	2.9328	0.13	164.0645	-0.48	2.935	0.20	164.8462	0.00
15	2.9312	165.6382	2.9382	0.24	168.5478	1.76	2.9357	0.15	165.9122	0.17	2.9377	0.22	165.6293	-0.01
16	2.9365	163.4659	2.9376	0.04	163.7079	0.15	2.9389	0.08	164.6433	0.72	2.9418	0.18	164.4353	0.59
17	2.95	166.0146	2.9347	-0.52	164.0486	-1.18	2.9345	-0.53	162.8616	-1.90	2.9379	-0.41	162.8677	-1.90
18	2.9325	165.3463	2.9376	0.17	164.8538	-0.30	2.935	0.09	163.7981	-0.94	2.9409	0.29	163.4044	-1.17
19	2.9254	169.0169	2.9308	0.18	172.0618	1.80	2.9263	0.03	168.8689	-0.09	2.932	0.23	168.1822	-0.49
20	2.9258	170.1383	2.935	0.31	169.0464	-0.64	2.9317	0.20	165.3046	-2.84	2.936	0.35	165.5813	-2.68
21	2.9295	169.9893	2.9355	0.20	172.3857	1.41	2.933	0.12	170.8404	0.50	2.9367	0.25	170.6372	0.38
22	2.9283	165.6359	2.9344	0.21	168.6451	1.82	2.9317	0.12	167.2889	1.00	2.9367	0.29	167.3277	1.02
23	2.9288	161.5156	2.9365	0.26	167.4067	3.65	2.9322	0.12	165.693	2.59	2.9372	0.29	165.6234	2.54
24	2.9214	170.2321	2.9308	0.32	170.6172	0.23	2.9266	0.18	167.4448	-1.64	2.9306	0.31	167.4146	-1.66
25	2.9261	168.3246	2.9372	0.38	169.5887	0.75	2.9349	0.30	165.7875	-1.51	2.9374	0.39	165.0934	-1.92
26	2.9317	168.5873	2.9376	0.20	169.8605	0.76	2.937	0.18	168.2335	-0.21	2.9414	0.33	168.9298	0.20
27	2.9182	165.8275	2.9293	0.38	168.4327	1.57	2.9246	0.22	167.0247	0.72	2.9312	0.45	167.464	0.99
28	2.9239	171.7776	2.9328	0.30	175.6431	2.25	2.9276	0.13	171.2434	-0.31	2.9332	0.32	171.7915	0.01
29	2.929	165.1161	2.9374	0.29	166.7478	0.99	2.9335	0.15	167.5056	1.45	2.9372	0.28	167.9166	1.70
30	2.9335	165.6964	2.9397	0.21	167.891	1.32	2.9376	0.14	167.5428	1.11	2.9408	0.25	167.3453	1.00
31	2.931	165.1566	2.9369	0.20	170.5692	3.28	2.937	0.20	167.7143	1.55	2.9399	0.30	167.668	1.52
32	2.9259	170.6295	2.9305	0.16	172.73	1.23	2.9301	0.14	171.4573	0.49	2.9342	0.28	171.0182	0.23
33	2.9283	162.9332	2.9335	0.18	166.5095	2.19	2.9296	0.04	164.53	0.98	2.9355	0.25	164.6405	1.05
34	2.9239	162.4363	2.9286	0.16	163.4023	0.59	2.9246	0.02	160.3012	-1.31	2.93	0.21	160.6234	-1.12
35	2.9276	166.112	2.9337	0.21	169.211	1.87	2.9296	0.07	165.6895	-0.25	2.9344	0.23	165.889	-0.13
36	2.93	166.3963	2.936	0.20	167.195	0.48	2.9345	0.15	165.2113	-0.71	2.9387	0.30	165.0979	-0.78
37	2.9306	172.3208	2.9364	0.20	172.5549	0.14	2.9335	0.10	169.3554	-1.72	2.9384	0.27	169.7596	-1.49
38	2.9264	165.39	2.9312	0.16	166.6165	0.74	2.9293	0.10	164.8435	-0.33	2.9332	0.23	164.7734	-0.37
39	2.9259	165.9305	2.9327	0.23	172.534	3.98	2.9306	0.16	168.2893	1.42	2.9332	0.25	168.5702	1.59
40	2.9283	170.4194	2.9359	0.26	172.8066	1.40	2.9344	0.21	170.6017	0.11	2.9369	0.29	170.0513	-0.22

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Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV	1000 hrs	Delta VF	1000 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
41	2.9269	172.4946	2.9301	0.11	177.3521	2.82	2.9291	0.08	175.0371	1.47	2.9362	0.32	175.0162	1.46
42	2.9286	167.2207	2.9327	0.14	167.8767	0.39	2.9305	0.06	165.1522	-1.24	2.9367	0.28	165.2158	-1.20
43	2.9369	169.7877	2.9406	0.13	167.9317	-1.09	2.9401	0.11	166.7382	-1.80	2.9436	0.23	166.0436	-2.21
44	2.9291	165.9672	2.9338	0.16	166.7518	0.47	2.9338	0.16	164.8037	-0.70	2.9367	0.26	164.7634	-0.73
45	2.9269	169.609	2.9333	0.22	169.2375	-0.22	2.9332	0.22	169.7182	0.06	2.9357	0.30	169.6134	0.00
46	2.928	162.4258	2.933	0.17	161.0218	-0.86	2.9338	0.20	161.5017	-0.57	2.9376	0.33	161.2326	-0.73
47	2.9259	159.8095	2.9312	0.18	161.699	1.18	2.93	0.14	160.9846	0.74	2.9347	0.30	160.5907	0.49
48	2.9291	170.5944	2.9352	0.21	173.6362	1.78	2.933	0.13	171.8698	0.75	2.9367	0.26	171.342	0.44
49	2.9293	165.8192	2.9355	0.21	167.2612	0.87	2.9338	0.15	164.8154	-0.61	2.937	0.26	164.5882	-0.74
50	2.9303	166.9794	2.9365	0.21	168.354	0.82	2.9364	0.21	168.8106	1.10	2.9387	0.29	168.9387	1.17
51	2.9323	168.3263	2.9377	0.18	172.1851	2.29	2.9359	0.12	169.7817	0.86	2.9416	0.32	169.5908	0.75
52	2.9231	166.2939	2.9276	0.15	167.2992	0.60	2.9273	0.14	165.4474	-0.51	2.932	0.30	165.5595	-0.44
53	2.9268	164.0452	2.9303	0.12	167.3718	2.03	2.9296	0.10	165.5218	0.90	2.9357	0.30	165.0108	0.59
54	2.9249	166.7057	2.9313	0.22	168.2265	0.91	2.9312	0.22	168.7061	1.20	2.9365	0.40	168.829	1.27
55	2.9248	168.674	2.9305	0.19	169.844	0.69	2.9283	0.12	170.8416	1.29	2.9335	0.30	170.181	0.89
56	2.9276	161.0435	2.9345	0.24	163.5206	1.54	2.933	0.18	162.6801	1.02	2.9389	0.39	162.7044	1.03
57	2.9288	168.211	2.9349	0.21	168.2214	0.01	2.9322	0.12	166.3526	-1.10	2.9394	0.36	166.6867	-0.91
58	2.9317	166.4355	2.9365	0.16	168.4091	1.19	2.9332	0.05	164.0542	-1.43	2.9397	0.27	164.0804	-1.42
59	2.9357	163.2868	2.9409	0.18	166.9462	2.24	2.9392	0.12	165.9025	1.60	2.9436	0.27	165.036	1.07
60	2.9253	163.6095	2.9306	0.18	164.2288	0.38	2.9293	0.14	166.0235	1.48	2.933	0.26	166.1257	1.54
61	2.933	167.6847	2.9396	0.23	169.7741	1.25	2.9382	0.18	170.0159	1.39	2.9419	0.30	170.6157	1.75
62	2.9293	168.326	2.9338	0.15	170.5487	1.32	2.933	0.13	169.7347	0.84	2.9377	0.29	169.1389	0.48
63	2.9296	166.6776	2.933	0.12	167.1861	0.31	2.9344	0.16	166.1922	-0.29	2.9389	0.32	166.4461	-0.14
64	2.9278	162.889	2.93	0.08	164.7015	1.11	2.9323	0.15	165.0462	1.32	2.9359	0.28	165.59	1.66
65	2.9313	169.6493	2.936	0.16	169.6047	-0.03	2.937	0.19	166.4028	-1.91	2.9397	0.29	166.3193	-1.96
66	2.9237	159.864	2.9303	0.23	163.5405	2.30	2.931	0.25	163.2406	2.11	2.9349	0.38	163.7581	2.44
67	2.9322	163.5644	2.9382	0.20	167.7767	2.58	2.9379	0.19	164.0663	0.31	2.9419	0.33	164.7929	0.75
68	2.9237	163.1646	2.9298	0.21	162.5243	-0.39	2.9274	0.13	163.1808	0.01	2.9325	0.30	163.2971	0.08
69	2.9369	162.6426	2.9416	0.16	164.4832	1.13	2.9401	0.11	164.6794	1.25	2.9441	0.25	164.9902	1.44
70	2.9248	168.3402	2.9301	0.18	169.7914	0.86	2.9303	0.19	168.1967	-0.09	2.9333	0.29	168.0078	-0.20
71	2.928	165.6256	2.9264	-0.05	168.6026	1.80	2.9335	0.19	168.1798	1.54	2.9377	0.33	168.1152	1.50
72	2.9271	161.2286	2.9306	0.12	163.291	1.28	2.9318	0.16	163.7184	1.54	2.9364	0.32	163.1072	1.17
73	2.9293	158.8355	2.9338	0.15	159.6682	0.52	2.9345	0.18	159.0686	0.15	2.9374	0.28	159.6572	0.52
74	2.9254	166.6225	2.9308	0.18	166.2538	-0.22	2.9303	0.17	165.2852	-0.80	2.9327	0.25	165.0991	-0.91
75	2.9295	163.13	2.9327	0.11	165.0668	1.19	2.934	0.15	163.7782	0.40	2.9364	0.24	163.7001	0.35
76	2.9281	167.5667	2.9359	0.27	168.1197	0.33	2.9362	0.28	167.8461	0.17	2.9389	0.37	167.1802	-0.23
77	2.9246	164.7596	2.9295	0.17	168.3711	2.19	2.93	0.18	166.6389	1.14	2.9335	0.30	166.7643	1.22
78	2.9271	164.3644	2.9327	0.19	165.9177	0.95	2.9312	0.14	166.2283	1.13	2.9354	0.28	166.7909	1.48
79	2.9295	166.4543	2.9355	0.20	166.5384	0.05	2.9347	0.18	170.0597	2.17	2.9374	0.27	170.1806	2.24
80	2.9291	165.9648	2.936	0.24	167.2978	0.80	2.9345	0.18	167.7609	1.08	2.937	0.27	167.4819	0.91
Average				0.190		1.144		0.138		0.244		0.272		0.222
Min				-0.519		-1.184		-0.525		-2.841		-0.410		-2.678
Max				0.380		3.980		0.301		2.586		0.445		2.543

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Thermal Shock Test

-40°C to 100°C, 15 min dwell, < 10 sec transfer

Unit no.	0x	0x	100x	Delta VF	100x	Delta IV	500x	Delta VF	500x	Delta IV	1000x	Delta VF	1000x	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.931	152.47	2.918	-0.44	145.61	-4.50	2.919	-0.41	139.87	-8.26	2.921	-0.34	139.85	-8.28
2	2.923	153.68	2.917	-0.21	151.11	-1.67	2.916	-0.24	143.23	-6.80	2.913	-0.34	143.7	-6.49
3	2.926	153.27	2.916	-0.34	152.94	-0.22	2.913	-0.44	143.84	-6.15	2.913	-0.44	144.44	-5.76
4	2.922	157.24	2.917	-0.17	153.55	-2.35	2.913	-0.31	145	-7.78	2.913	-0.31	146.85	-6.61
5	2.922	150.42	2.922	0.00	144.33	-4.05	2.916	-0.21	136.31	-9.38	2.92	-0.07	138.12	-8.18
6	2.931	151.24	2.922	-0.31	148.04	-2.12	2.92	-0.38	140.89	-6.84	2.923	-0.27	139.42	-7.82
7	2.924	156.24	2.918	-0.21	152.04	-2.69	2.915	-0.31	146.92	-5.97	2.916	-0.27	145.1	-7.13
8	2.927	155.34	2.924	-0.10	152.04	-2.12	2.911	-0.55	142.59	-8.21	2.917	-0.34	145.8	-6.14
9	2.929	152.67	2.918	-0.38	150.09	-1.69	2.917	-0.41	141.59	-7.26	2.918	-0.38	138.8	-9.08
10	2.926	157.76	2.922	-0.14	154.8	-1.88	2.917	-0.31	145.62	-7.70	2.918	-0.27	143.51	-9.03
11	2.927	154.05	2.924	-0.10	152.66	-0.90	2.925	-0.07	139.93	-9.17	2.928	0.03	138.98	-9.78
12	2.924	156.56	2.923	-0.03	154.35	-1.41	2.917	-0.24	145.3	-7.19	2.917	-0.24	144.78	-7.52
13	2.926	156.96	2.924	-0.07	156.01	-0.61	2.92	-0.21	144.4	-8.00	2.919	-0.24	141.64	-9.76
14	2.926	155.64	2.924	-0.07	150.33	-3.41	2.917	-0.31	142.7	-8.31	2.919	-0.24	142.61	-8.37
15	2.923	154.19	2.92	-0.10	150.14	-2.63	2.916	-0.24	143.55	-6.90	2.919	-0.14	142.43	-7.63
16	2.928	156.74	2.925	-0.10	155.51	-0.78	2.919	-0.31	144.85	-7.59	2.923	-0.17	144.22	-7.99
17	2.921	156.4	2.917	-0.14	156.11	-0.19	2.912	-0.31	149.13	-4.65	2.914	-0.24	147.26	-5.84
18	2.925	152.55	2.919	-0.21	152.01	-0.35	2.919	-0.21	144.17	-5.49	2.918	-0.24	143.14	-6.17
19	2.932	155.25	2.929	-0.10	154.38	-0.56	2.922	-0.34	147.85	-4.77	2.905	-0.92	142.98	-7.90
20	2.924	152.51	2.919	-0.17	148.59	-2.57	2.916	-0.27	142.11	-6.82	2.92	-0.14	138.15	-9.42
21	2.925	155.83	2.922	-0.10	155	-0.53	2.914	-0.38	145.14	-6.86	2.917	-0.27	144	-7.59
22	2.918	159.76	2.914	-0.14	151.84	-4.96	2.911	-0.24	146.87	-8.07	2.914	-0.14	146.07	-8.57
23	2.925	155.06	2.913	-0.41	151.37	-2.38	2.911	-0.48	143.46	-7.48	2.914	-0.38	139.94	-9.75
24	2.926	154.89	2.925	-0.03	153.07	-1.18	2.916	-0.34	142.29	-8.13	2.918	-0.27	144.46	-6.73
25	2.924	157.66	2.919	-0.17	154.51	-2.00	2.915	-0.31	146.61	-7.01	2.918	-0.21	145.69	-7.59
26	2.925	160.01	2.921	-0.14	157.04	-1.86	2.915	-0.34	148.83	-6.99	2.918	-0.24	149.93	-6.30
27	2.926	152.74	2.92	-0.21	152.01	-0.48	2.919	-0.24	142.77	-6.53	2.921	-0.17	144.28	-5.54
28	2.921	153.73	2.919	-0.07	146.65	-4.61	2.919	-0.07	140.12	-8.85	2.921	0.00	140.15	-8.83
29	2.926	154.94	2.925	-0.03	154.74	-0.13	2.926	0.00	142.16	-8.25	2.921	-0.17	143.71	-7.25
30	2.931	147.45	2.922	-0.31	146.17	-0.87	2.924	-0.24	138.36	-6.16	2.924	-0.24	138.05	-6.38
31	2.925	157.73	2.916	-0.31	154.1	-2.30	2.919	-0.21	145.42	-7.80	2.922	-0.10	145.93	-7.48
32	2.928	153.99	2.928	0.00	155.4	0.92	2.922	-0.20	145.41	-5.57	2.923	-0.17	145.37	-5.60
33	2.927	157.87	2.918	-0.31	152.32	-3.52	2.916	-0.38	145.2	-8.03	2.918	-0.31	143.24	-9.27
34	2.932	156.05	2.931	-0.03	153.26	-1.79	2.924	-0.27	146.02	-6.43	2.924	-0.27	143.02	-8.35
35	2.92	154.83	2.914	-0.21	151.84	-1.93	2.909	-0.38	144.74	-6.52	2.914	-0.21	145.1	-6.28
36	2.928	157.52	2.927	-0.03	156.2	-0.84	2.919	-0.31	147.18	-6.56	2.921	-0.24	146.96	-6.70
37	2.934	150.32	2.93	-0.14	146.99	-2.22	2.93	-0.14	136.28	-9.34	2.926	-0.27	139.26	-7.36
38	2.925	161.52	2.927	0.07	154.86	-4.12	2.923	-0.07	146.94	-9.03	2.924	-0.03	147.88	-8.44
39	2.923	151.65	2.924	0.03	151.1	-0.36	2.919	-0.14	141.98	-6.38	2.921	-0.07	142.22	-6.22
40	2.919	151.72	2.916	-0.10	147.38	-2.86	2.911	-0.27	141.6	-6.67	2.912	-0.24	141.19	-6.94

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Unit no.	0x	0x	100x	Delta VF	100x	Delta IV	500x	Delta VF	500x	Delta IV	1000x	Delta VF	1000x	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
41	2.928	150.63	2.924	-0.14	147.53	-2.06	2.916	-0.41	139.19	-7.59	2.919	-0.31	138.98	-7.73
42	2.923	158.11	2.923	0.00	157.77	-0.22	2.916	-0.24	145.36	-8.06	2.918	-0.17	147.34	-6.81
43	2.928	163.09	2.927	-0.03	158.38	-2.89	2.915	-0.44	150.18	-7.92	2.919	-0.31	150.07	-7.98
44	2.925	157.46	2.921	-0.14	155.49	-1.25	2.914	-0.38	146.67	-6.85	2.918	-0.24	145.57	-7.55
45	2.919	159.12	2.921	0.07	152.48	-4.17	2.917	-0.07	145.15	-8.78	2.921	0.07	145.52	-8.55
46	2.919	159.73	2.922	0.10	156.4	-2.08	2.918	-0.03	147.76	-7.49	2.919	0.00	146.3	-8.41
47	2.924	156.42	2.924	0.00	152.5	-2.51	2.914	-0.34	142.35	-9.00	2.919	-0.17	142.44	-8.94
48	2.922	154.9	2.921	-0.03	152.11	-1.80	2.912	-0.34	140.37	-9.38	2.915	-0.24	139.24	-10.11
49	2.923	154.93	2.919	-0.14	152.09	-1.83	2.911	-0.41	143.79	-7.19	2.916	-0.24	142.37	-8.11
50	2.93	152.09	2.926	-0.14	148.64	-2.27	2.922	-0.27	140.12	-7.87	2.923	-0.24	137.85	-9.36
51	2.933	153.12	2.931	-0.07	154.43	0.86	2.92	-0.44	144.97	-5.32	2.925	-0.27	145.58	-4.92
52	2.927	153.98	2.922	-0.17	153.46	-0.34	2.922	-0.17	142.46	-7.48	2.92	-0.24	140.72	-8.61
53	2.93	153.86	2.92	-0.34	151.91	-1.27	2.924	-0.20	143.04	-7.03	2.923	-0.24	144.7	-5.95
54	2.931	151.39	2.922	-0.31	151.27	-0.08	2.924	-0.24	142.15	-6.10	2.923	-0.27	140.24	-7.37
55	2.927	158.44	2.927	0.00	155.96	-1.57	2.915	-0.41	147.1	-7.16	2.919	-0.27	146.75	-7.38
56	2.922	155.05	2.921	-0.03	152.88	-1.40	2.913	-0.31	144.16	-7.02	2.915	-0.24	140.99	-9.07
57	2.923	154	2.921	-0.07	148.81	-3.37	2.91	-0.44	141.98	-7.81	2.914	-0.31	140.42	-8.82
58	2.933	155.35	2.924	-0.31	151.44	-2.52	2.922	-0.38	142.24	-8.44	2.923	-0.34	140.17	-9.77
59	2.926	151.93	2.927	0.03	151.72	-0.14	2.921	-0.17	139.96	-7.88	2.925	-0.03	143.82	-5.34
60	2.926	158.46	2.925	-0.03	155.64	-1.78	2.915	-0.38	145.14	-8.41	2.918	-0.27	142.6	-10.01
61	2.934	154.45	2.933	-0.03	150.29	-2.69	2.927	-0.24	140.74	-8.88	2.929	-0.17	140.05	-9.32
62	2.919	150.25	2.926	0.24	148.93	-0.88	2.916	-0.10	139.62	-7.07	2.919	0.00	135.7	-9.68
63	2.928	156.74	2.929	0.03	153.48	-2.08	2.924	-0.14	146.98	-6.23	2.925	-0.10	143.16	-8.66
64	2.924	158.35	2.919	-0.17	155.4	-1.86	2.917	-0.24	147	-7.17	2.916	-0.27	144.95	-8.46
65	2.926	153.25	2.923	-0.10	150.96	-1.49	2.919	-0.24	144.08	-5.98	2.919	-0.24	144.11	-5.96
66	2.917	154.08	2.919	0.07	151.77	-1.50	2.916	-0.03	143.78	-6.68	2.918	0.03	144.07	-6.50
67	2.93	159.62	2.922	-0.27	153.68	-3.72	2.923	-0.24	144.5	-9.47	2.923	-0.24	145.21	-9.03
68	2.921	151.17	2.917	-0.14	146.69	-2.96	2.914	-0.24	140.63	-6.97	2.916	-0.17	139.84	-7.49
69	2.927	154.39	2.928	0.03	150.72	-2.38	2.916	-0.38	142.47	-7.72	2.919	-0.27	142.53	-7.68
70	2.928	156.55	2.924	-0.14	151.34	-3.33	2.915	-0.44	140.13	-10.49	2.917	-0.38	141.61	-9.54
71	2.922	151.69	2.923	0.03	148.26	-2.26	2.919	-0.10	140.62	-7.30	2.918	-0.14	137.24	-9.53
72	2.921	140.93	2.926	0.17	137.79	-2.23	2.921	0.00	125.71	-10.80	2.921	0.00	128	-9.17
73	2.925	152.38	2.923	-0.07	150.78	-1.05	2.918	-0.24	143.58	-5.78	2.919	-0.21	143.89	-5.57
74	2.934	148.83	2.932	-0.07	148.5	-0.22	2.924	-0.34	139.51	-6.26	2.926	-0.27	138.24	-7.12
75	2.924	148.53	2.925	0.03	144.03	-3.03	2.922	-0.07	134.06	-9.74	2.925	0.03	135.07	-9.06
76	2.93	152.8	2.925	-0.17	150.24	-1.68	2.92	-0.34	139.48	-8.72	2.922	-0.27	141.57	-7.35
77	2.926	153.66	2.92	-0.21	146.86	-4.43	2.915	-0.38	139.69	-9.09	2.917	-0.31	142.49	-7.27
78	2.929	154.34	2.92	-0.31	150.27	-2.64	2.915	-0.48	141.01	-8.64	2.918	-0.38	141.53	-8.30
79	2.929	154.93	2.924	-0.17	151.18	-2.42	2.919	-0.34	142.22	-8.20	2.921	-0.27	144.71	-6.60
80	2.928	155.14	2.923	-0.17	151.02	-2.66	2.915	-0.44	140.52	-9.42	2.919	-0.31	143.3	-7.63
Average				-0.114		-1.911		-0.277		-7.541		-0.223		-7.785
Min				-0.444		-4.957		-0.547		-10.800		-0.921		-10.110
Max				0.240		0.916		0.000		-4.648		0.069		-4.924

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Temperature Cycling Hot Test (TCHT)

Wire Pull Test (Specification Limit as per MIL-STD-750: minimum 3gf)

N-Pad

Unit #	Result (gf)	CODE	Remark
#1	24.05	2	PASS
#2	21.51	2	PASS
#3	24.00	2	PASS
#4	16.11	2	PASS
#5	15.74	2	PASS
Average	20.28		
Std Dev	4.11		
Max	24.05		
Min	15.74		

P-Pad

Unit #	Result (gf)	CODE	Remark
#1	12.92	2	PASS
#2	14.88	2	PASS
#3	14.99	2	PASS
#4	15.33	2	PASS
#5	25.38	3	PASS
Average	16.70		
Std Dev	5.36		
Max	25.38		
Min	12.92		

Conclusion: Based on this wire pull result, this part number/lot has Passed the Wire Pull Test.

Coding break types in the wire pull test:

Code 1: Lifted 1st ball bond
Code 2: Broken neck
Code 3: Break at mid span of wire
Code 4: Break at heel of stitch bond
Code 5: Lifted stitch bond

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Wire Bond Integrity (WBI)

Wire Pull Test (Specification Limit as per MIL-STD-750: minimum 3gf))

N-Pad

Unit #	Result (gf)	CODE	Remark
#1	20.66	2	PASS
#2	14.24	2	PASS
#3	15.24	2	PASS
#4	14.69	2	PASS
#5	15.49	2	PASS
Average	16.06		
Std Dev	2.61		
Max	20.66		
Min	14.24		

P-Pad

Unit #	Result (gf)	CODE	Remark
#1	12.92	2	PASS
#2	13.84	2	PASS
#3	17.29	2	PASS
#4	10.34	2	PASS
#5	15.53	2	PASS
Average	13.98		
Std Dev	2.63		
Max	17.29		
Min	10.34		

Conclusion: Based on this wire pull result, this part number/lot has Passed the Wire Pull test.

Coding break types in the wire pull test:

Code 1: Lifted 1st ball bond
Code 2: Broken neck
Code 3: Break at mid span of wire
Code 4: Break at heel of stitch bond
Code 5: Lifted stitch bond

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Resistance to Soldering Heat Test

T=260°C

Unit no.	0 X	0 X	1 X	Delta VF	1 X	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%
1	3.298	440.12	3.287	-0.33	412.7	-6.23
2	3.295	438.12	3.275	-0.61	418.15	-4.56
3	3.286	430.21	3.27	-0.49	431.43	0.28
4	3.298	432.27	3.279	-0.58	402.9	-6.79
5	3.304	433.74	3.292	-0.36	439.2	1.26
6	3.299	423.59	3.284	-0.45	426.33	0.65
7	3.306	413.63	3.281	-0.76	380.38	-8.04
8	3.29	433.93	3.276	-0.43	415.5	-4.25
9	3.292	422.46	3.281	-0.33	397.79	-5.84
10	3.292	428	3.273	-0.58	406.44	-5.04
11	3.304	435.22	3.292	-0.36	424.98	-2.35
12	3.299	438.55	3.287	-0.36	396.03	-9.70
13	3.302	431.76	3.296	-0.18	405.39	-6.11
14	3.295	436.53	3.285	-0.30	424.69	-2.71
15	3.307	420.85	3.295	-0.36	410.49	-2.46
16	3.289	435.4	3.283	-0.18	407.14	-6.49
17	3.305	433.76	3.292	-0.39	385.53	-11.12
18	3.306	419.55	3.295	-0.33	382.14	-8.92
19	3.302	434.3	3.29	-0.36	407.01	-6.28
20	3.299	433.32	3.289	-0.30	411.6	-5.01
21	3.306	429.76	3.293	-0.39	417.61	-2.83
22	3.3	435.69	3.288	-0.36	401.17	-7.92
23	3.293	439.65	3.28	-0.39	427.67	-2.72
24	3.297	419.05	3.283	-0.42	387.33	-7.57
25	3.31	427.69	3.294	-0.48	391.29	-8.51
26	3.303	441.38	3.294	-0.27	402.16	-8.89
27	3.297	437.45	3.287	-0.30	421.28	-3.70
28	3.304	445.16	3.291	-0.39	395.33	-11.19
29	3.302	431.44	3.29	-0.36	404.09	-6.34
30	3.307	440.81	3.285	-0.67	423.56	-3.91
Average				-0.404		-5.443
Min				-0.756		-11.194
Max				-0.182		1.259

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Hydrogen Sulphide Test

40°C/90%RH, 15ppm

Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	336 hrs	Delta VF	336 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.757	159.37	2.748	-0.33	160.06	0.43	2.749	-0.29	159.30	-0.04
2	2.763	153.29	2.754	-0.33	152.29	-0.65	2.755	-0.29	153.44	0.10
3	2.748	162.20	2.741	-0.25	161.15	-0.65	2.741	-0.25	164.05	1.14
4	2.764	158.04	2.757	-0.25	159.63	1.01	2.756	-0.29	161.43	2.15
5	2.763	158.94	2.755	-0.29	158.01	-0.59	2.752	-0.40	158.49	-0.28
6	2.763	161.95	2.759	-0.14	160.42	-0.94	2.758	-0.18	163.62	1.03
7	2.738	158.58	2.732	-0.22	159.79	0.76	2.731	-0.26	160.22	1.03
8	2.749	164.10	2.741	-0.29	166.77	1.63	2.740	-0.33	164.21	0.07
9	2.750	162.22	2.742	-0.29	165.64	2.11	2.742	-0.29	165.32	1.91
Average				-0.266		0.345		-0.286		0.789
Min				-0.326		-0.945		-0.398		-0.283
Max				-0.145		2.108		-0.181		2.145

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Flowing Mixed Gas Test

Method 4 25°C/75%RH

Unit no.	0 hrs	0 hrs	168 hrs	Delta VF	168 hrs	Delta IV	336 hrs	Delta VF	336 hrs	Delta IV	504 hrs	Delta VF	504 hrs	Delta IV
	VF(V)	IV(mcd)	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%	VF(V)	%	IV(mcd)	%
1	2.755	176.77	2.746	-0.33	174.25	-1.43	2.752	-0.11	185.95	5.19	2.75	-0.18	175.35	-0.80
2	2.75	173.04	2.745	-0.18	169.27	-2.18	2.746	-0.15	182.07	5.22	2.748	-0.07	172.84	-0.12
3	2.73	174.6	2.727	-0.11	172.26	-1.34	2.728	-0.07	185.52	6.25	2.729	-0.04	178.56	2.27
4	2.777	182.57	2.772	-0.18	180.49	-1.14	2.774	-0.11	193.31	5.88	2.778	0.04	181.83	-0.41
5	2.757	178.3	2.761	0.15	176.71	-0.89	2.754	-0.11	189.02	6.01	2.756	-0.04	178.14	-0.09
6	2.749	176.07	2.749	0.00	169.77	-3.58	2.752	0.11	182.14	3.45	2.752	0.11	178.07	1.14
7	2.755	180.91	2.753	-0.07	177.89	-1.67	2.758	0.11	189.89	4.96	2.754	-0.04	184.65	2.07
8	2.759	174.61	2.756	-0.11	171.34	-1.87	2.758	-0.04	182.77	4.67	2.759	0.00	177.65	1.74
9	2.735	173.16	2.732	-0.11	172.55	-0.35	2.731	-0.15	184.06	6.29	2.733	-0.07	175.63	1.43
Average				-0.105		-1.605		-0.057		5.327		-0.032		0.803
Min				-0.327		-3.578		-0.146		3.447		-0.181		-0.803
Max				0.145		-0.352		0.109		6.295		0.109		2.268

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Electrostatic Discharge (ESD) Testing Report

Human Body Model (HBM)

Sample	± 1000V	± 2000V
#01	PASS	PASS
#02	PASS	PASS
#03	PASS	PASS
#04	PASS	PASS
#05	PASS	PASS
#06	PASS	PASS
#07	PASS	PASS
#08	PASS	PASS
#09	PASS	PASS
#10	PASS	PASS
#11	PASS	PASS
#12	PASS	PASS
#13	PASS	PASS
#14	PASS	PASS
#15	PASS	PASS
#16	PASS	PASS
#17	PASS	PASS
#18	PASS	PASS
#19	PASS	PASS
#20	PASS	PASS
#21	PASS	PASS
#22	PASS	PASS
#23	PASS	PASS
#24	PASS	PASS
#25	PASS	PASS
#26	PASS	PASS
#27	PASS	PASS
#28	PASS	PASS
#29	PASS	PASS
#30	PASS	PASS

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Electrostatic Discharge (ESD) Testing Report

Machine Model (MM)

Sample	± 100V	± 200V
#01	PASS	PASS
#02	PASS	PASS
#03	PASS	PASS
#04	PASS	PASS
#05	PASS	PASS
#06	PASS	PASS
#07	PASS	PASS
#08	PASS	PASS
#09	PASS	PASS
#10	PASS	PASS
#11	PASS	PASS
#12	PASS	PASS
#13	PASS	PASS
#14	PASS	PASS
#15	PASS	PASS
#16	PASS	PASS
#17	PASS	PASS
#18	PASS	PASS
#19	PASS	PASS
#20	PASS	PASS
#21	PASS	PASS
#22	PASS	PASS
#23	PASS	PASS
#24	PASS	PASS
#25	PASS	PASS
#26	PASS	PASS
#27	PASS	PASS
#28	PASS	PASS
#29	PASS	PASS
#30	PASS	PASS

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Electrostatic Discharge (ESD) Testing Report

Charge Device Model (CDM)

Sample	± 250V	± 500V	± 1000V
#01	PASS	PASS	PASS
#02	PASS	PASS	PASS
#03	PASS	PASS	PASS
#04	PASS	PASS	PASS
#05	PASS	PASS	PASS
#06	PASS	PASS	PASS
#07	PASS	PASS	PASS
#08	PASS	PASS	PASS
#09	PASS	PASS	PASS
#10	PASS	PASS	PASS
#11	PASS	PASS	PASS
#12	PASS	PASS	PASS
#13	PASS	PASS	PASS
#14	PASS	PASS	PASS
#15	PASS	PASS	PASS
#16	PASS	PASS	PASS
#17	PASS	PASS	PASS
#18	PASS	PASS	PASS
#19	PASS	PASS	PASS
#20	PASS	PASS	PASS
#21	PASS	PASS	PASS
#22	PASS	PASS	PASS
#23	PASS	PASS	PASS
#24	PASS	PASS	PASS
#25	PASS	PASS	PASS
#26	PASS	PASS	PASS
#27	PASS	PASS	PASS
#28	PASS	PASS	PASS
#29	PASS	PASS	PASS
#30	PASS	PASS	PASS

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Destructive Physical Analysis (DPA) Report

WHTRB

1.0 DPA DETAILS

Ref. #	DPA170195
Package	Mini DomiLED
Part Number	DNW-EJG
Reliability Test	WHTRB

2.0 ANALYSIS RESULT

Optical Inspection

2.1 Units were proceed for optical inspection. Results were shown in fig below.

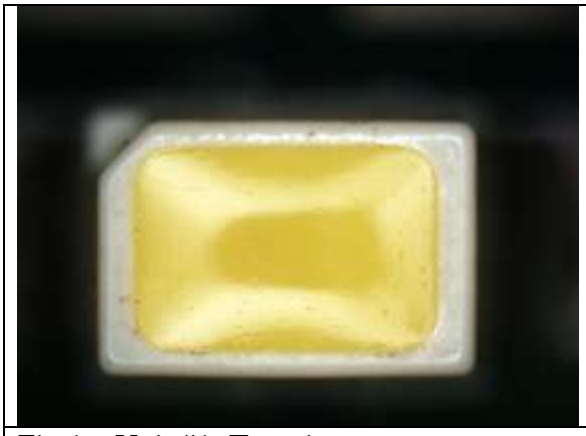

Fig 1a: Unit #1: Top view

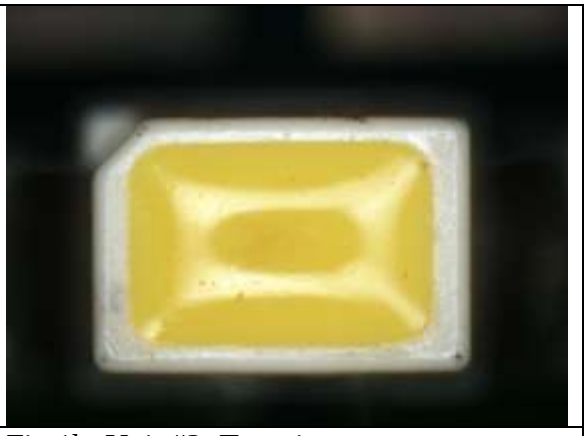

Fig 1b: Unit #2: Top view

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Chemical Decapsulation

2.2 Both units were then proceed for chemical decapsulation & results were shown in fig below.

Unit #1

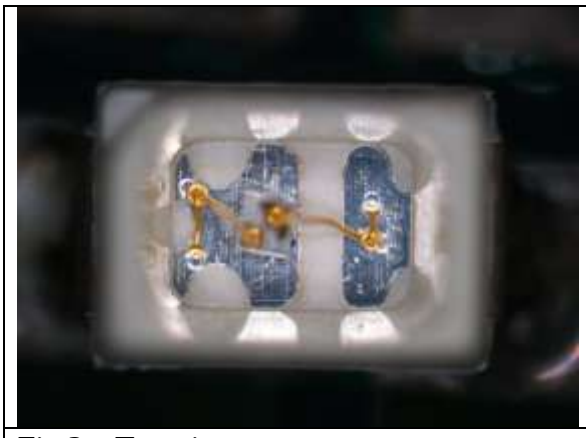

Fig 2a: Top view

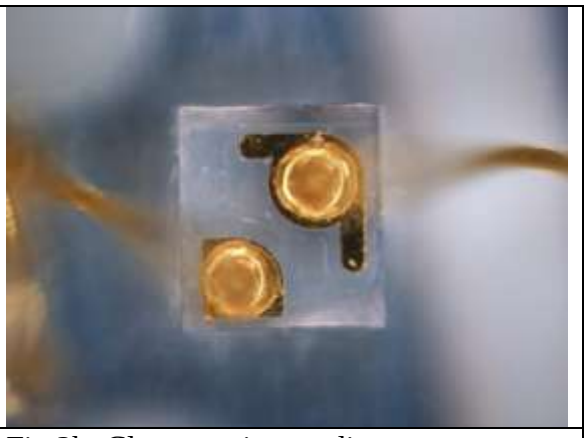

Fig 2b: Close up view to die

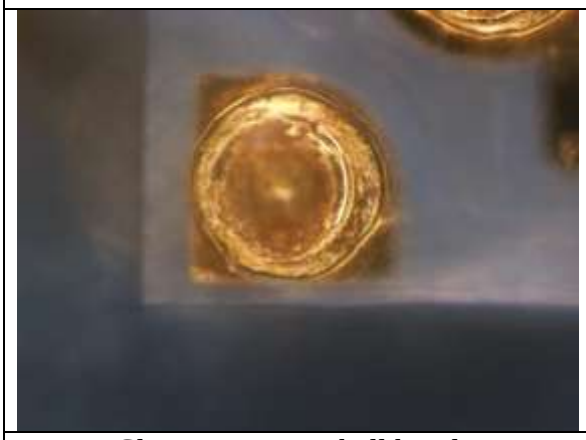

Fig 2c: Close up view to ball bonding at N-Pad

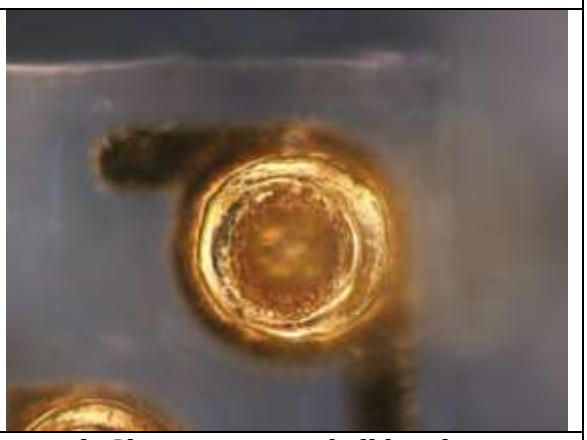

Fig 2d: Close up view to ball bonding at P-Pad

Fig 2e: Close up view to stitch bonding at cathode lead frame pad

Fig 2f: Close up view to stitch bonding at anode lead frame pad

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Unit #2

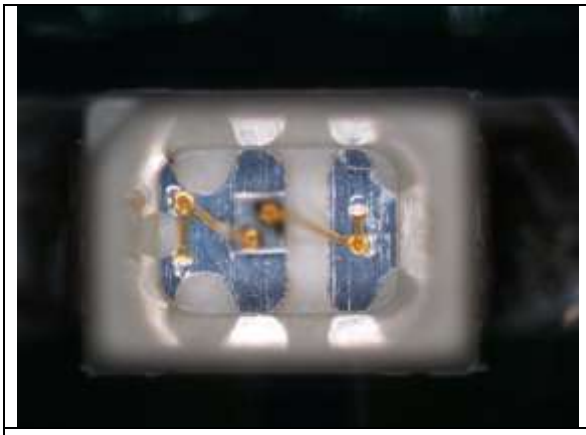

Fig 3a: Top view

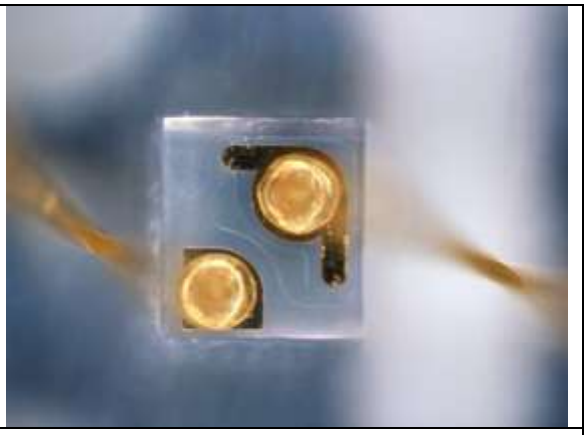

Fig 3b: Close up view to die

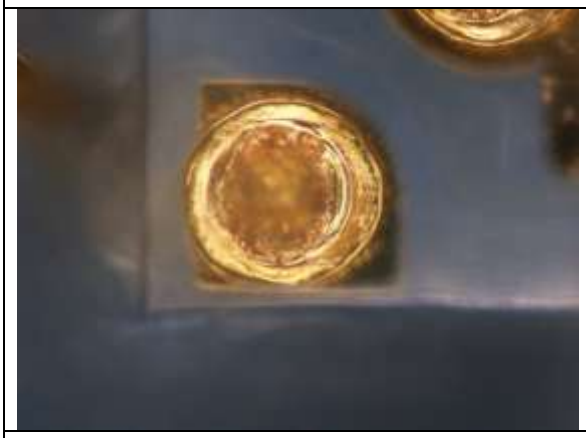

Fig 3c: Close up view to ball bonding at N-Pad

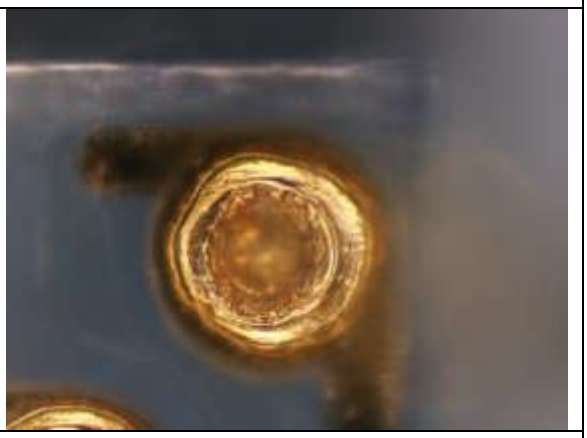

Fig 3d: Close up view to ball bonding at P-Pad

Fig 3e: Close up view to stitch bonding at cathode lead frame pad

Fig 3f: Close up view to stitch bonding at anode lead frame pad

3.0 OBSERVATION & CONCLUSION

3.1 No abnormality was observed during initial optical inspection & after chemical decapsulation.

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TSK

1.0 DPA DETAILS

Ref. #	DPA170196
Package	Mini DomiLED
Part Number	DNW-EJG
Reliability Test	TSK

2.0 ANALYSIS RESULT

Optical Inspection

2.1 Units were proceed for optical inspection. Results were shown in fig below.

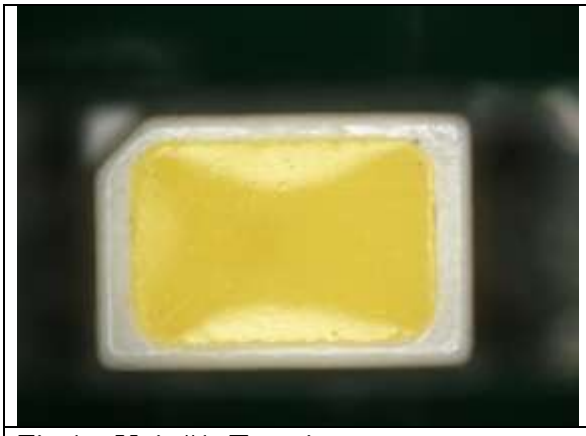

Fig 1a: Unit #1: Top view

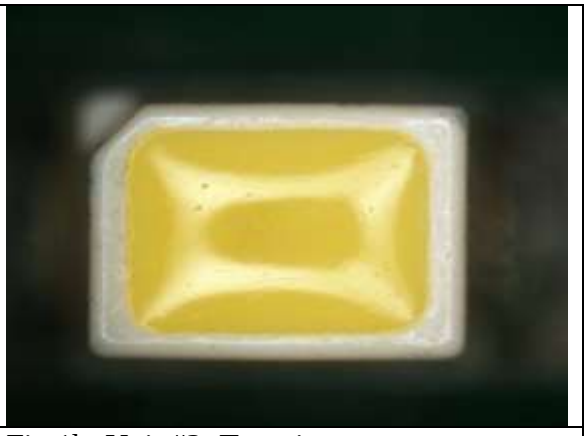

Fig 1b: Unit #2: Top view

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Chemical Decapsulation

2.2 Both units were then proceed for chemical decapsulation & results were shown in fig below.

Unit #1

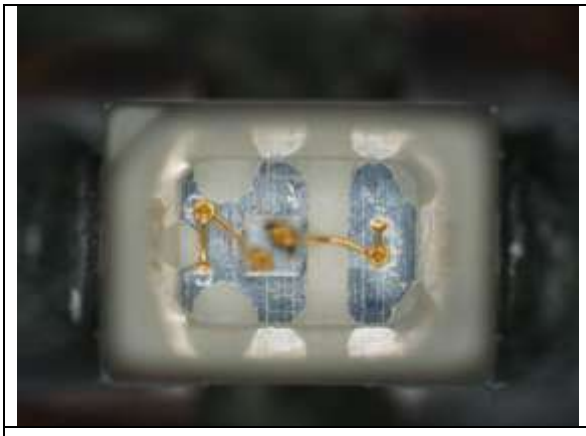

Fig 2a: Top view

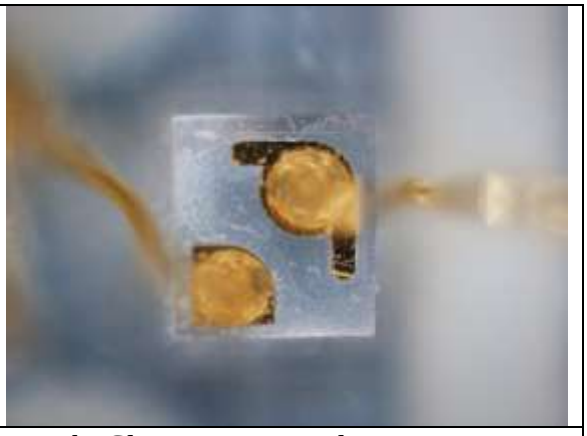

Fig 2b: Close up view to die

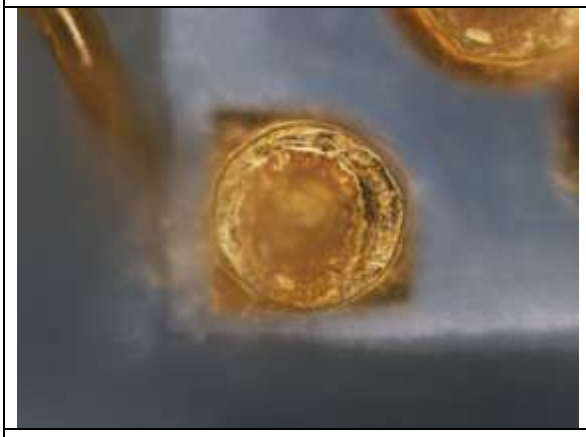

Fig 2c: Close up view to ball bonding at N-Pad

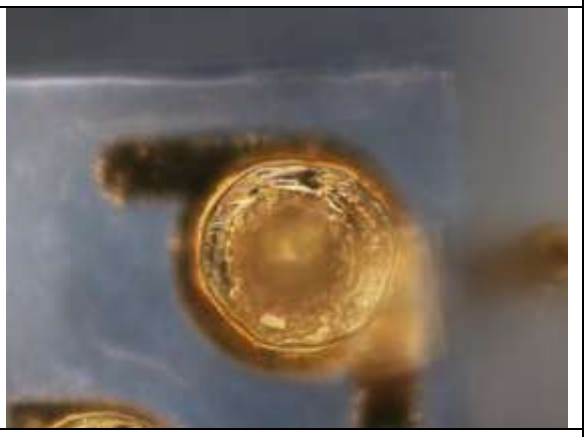

Fig 2d: Close up view to ball bonding at P-Pad

Fig 2e: Close up view to stitch bonding at cathode lead frame pad

Fig 2f: Close up view to stitch bonding at anode lead frame pad

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Unit #2

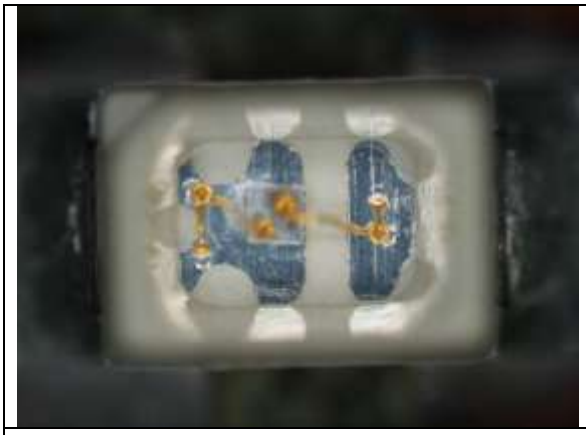

Fig 3a: Top view

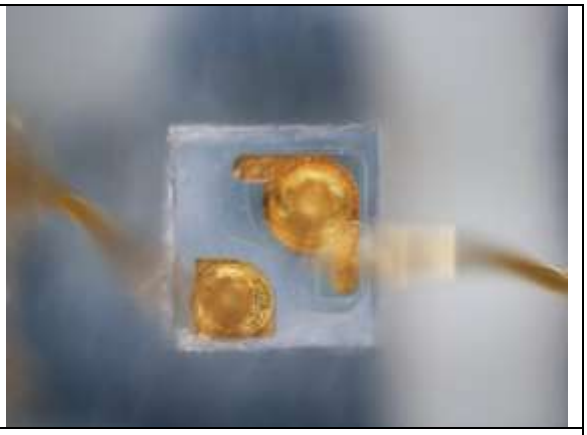

Fig 3b: Close up view to die

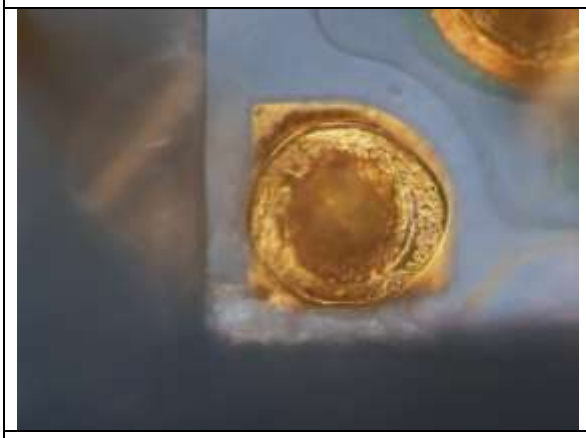

Fig 3c: Close up view to ball bonding at N-Pad

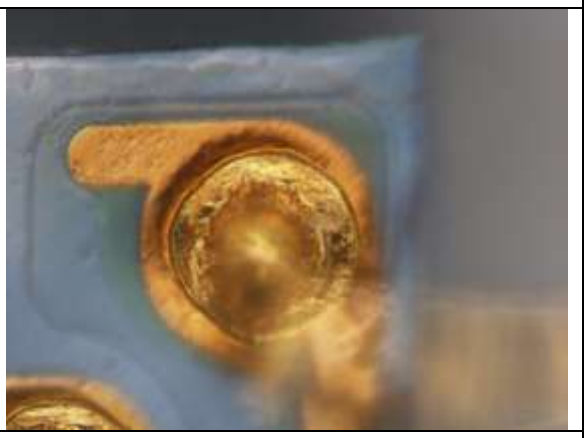

Fig 3d: Close up view to ball bonding at P-Pad

Fig 3e: Close up view to stitch bonding at cathode lead frame pad

Fig 3f: Close up view to stitch bonding at anode lead frame pad

3.0 OBSERVATION & CONCLUSION

3.1 No abnormality was observed during initial optical inspection & after chemical decapsulation.

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