DOMINANT™
Opto Technologies
Innovating Illumination

RELIABILITY REPORT
Mini DomiLED
AlInGaP: DNx-AJS

Title: Mini DomiLED AlInGaP DNx-AJS 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-B) • IR re-flow soldering on FR4 board	• Bake @ 125°C, 24 hrs • Storage @ 85°C/60% RH, 168hrs • 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

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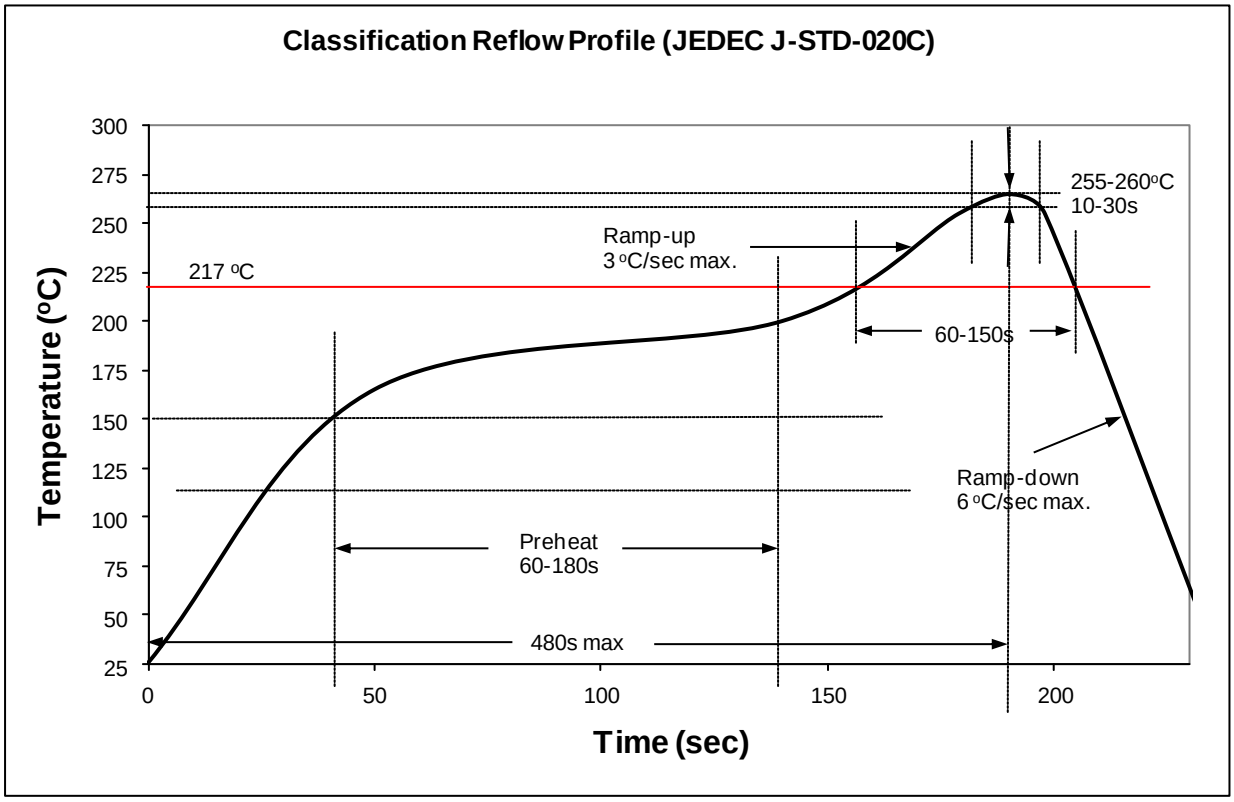
Reference Device: DNO-AJS

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: DNO-AJS

Result: No. of failure(s)

No	Test Type	Stress Condition	S/S	Test Point	Vf	Iv
1	Ambient Life Test (ALT)	a) IR re-flow soldering • Ta = 25°C • If = 20mA	90	0 hrs 168 hrs 504 hrs 1000 hrs	0/90 0/90 0/90 0/90	0/90 0/90 0/90 0/90
2	High Temperature Operating Life Test (HTOL) JESD22A-108	a) IR re-flow soldering • Ta = 90°C • If = 20mA	79	0 hrs 168 hrs 504 hrs 1000 hrs	0/79 0/79 0/79 0/79	0/79 0/79 0/79 0/79
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	83	0 hrs 168 hrs 504 hrs 1000 hrs	0/83 0/83 0/83 0/83	0/83 0/83 0/83 0/83
4	Wet Hot Reverse Biased Test (WHTRB) JESD22A-101	a) Pre-conditioning b) IR re-flow soldering • Ta = 85°C, 85% RH • VR = 10V	81	0 hrs 168 hrs 504 hrs 1000 hrs	0/81 0/81 0/81 0/81	0/81 0/81 0/81 0/81
5	Wet High Temperature Operating Life Test (WHTOL) JESD22A-101	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)	a) IR re-flow soldering • Ta = -40°C	90	0 hrs 168 hrs 504 hrs 1000 hrs	0/90 0/90 0/90 0/90	0/90 0/90 0/90 0/90
7	High Temperature Storage Test (HTS)	a) IR re-flow soldering • Ta = 100°C	90	0 hrs 168 hrs 504 hrs 1000 hrs	0/90 0/90 0/90 0/90	0/90 0/90 0/90 0/90

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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)	a) Pre-conditioning b) IR re-flow soldering • -55°C to 100°C, 15 min dwell, < 10 sec transfer	90	0 X 100 X 500 X 1000 X	0/90 0/90 0/90 0/90	0/90 0/90 0/90 0/90
9	Resistance to Soldering Heat Test (RTSH) JESD22A-111 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	a) 1500Ω 100pF, ±1000V b) 1500Ω 100pF, ±2000V	30 30	-	Pass	Pass
11	Electrostatic Discharge (ESD) – MM AEC Q101-001, Q101-005	a) 0Ω 200pF, ±100V b) 0Ω 200pF, ±200V	30 30	-	Pass	Pass
12	Electrostatic Discharge (ESD) – CDM AEC Q101-001, Q101-005	a) ±1000V	30	-	Pass	Pass
13	Terminal Strength Test MIL-STD-750 Method 2036	Force: 10N for 10 seconds	30	-	Pass	Pass

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

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Corrosion Test

Device: Representative

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

Conclusions: All qualification samples passed.

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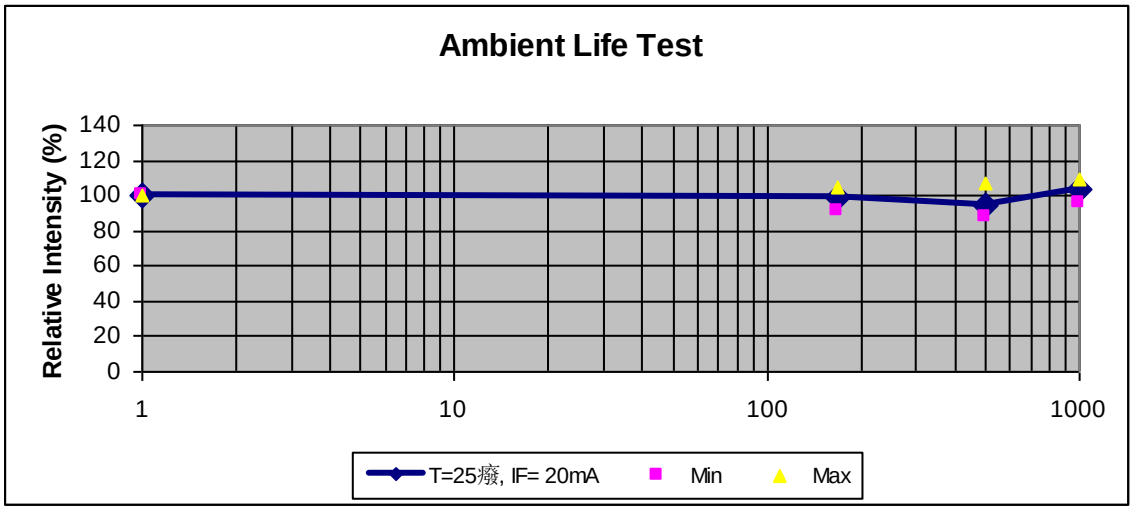
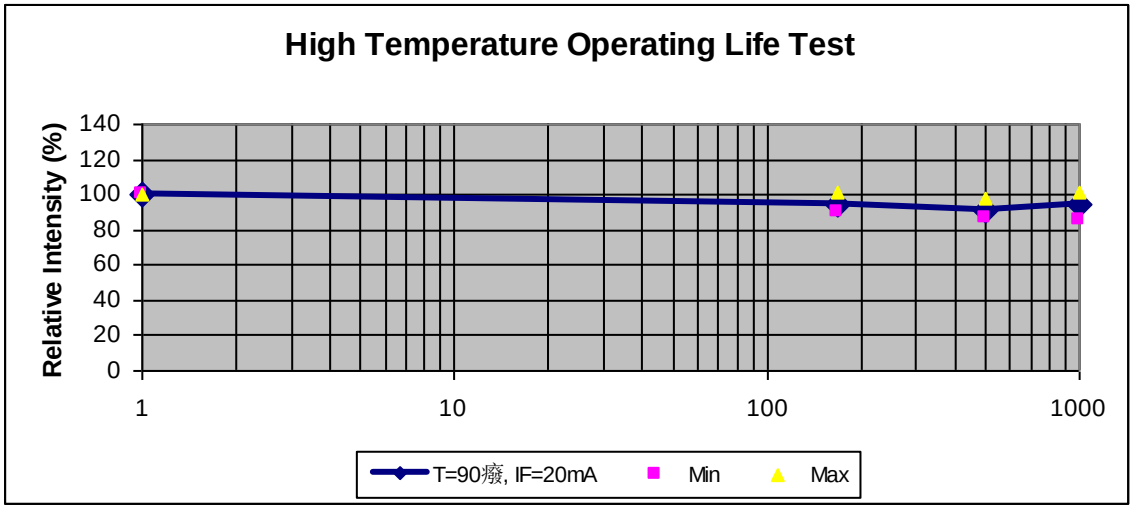
Reference Device: DNO-AJS

IV Degradation Data



Note:

168hrs max = 4.730%	504hrs max = 7.311%	1000hrs max = 8.951%
168hrs min = -8.734%	504hrs min = -12.309%	1000hrs min = -4.062%



Note:

168hrs max = 1.857%	504hrs max = -2.256%	1000hrs max = 1.869%
168hrs min = -9.792%	504hrs min = -14.062%	1000hrs min = -15.194%

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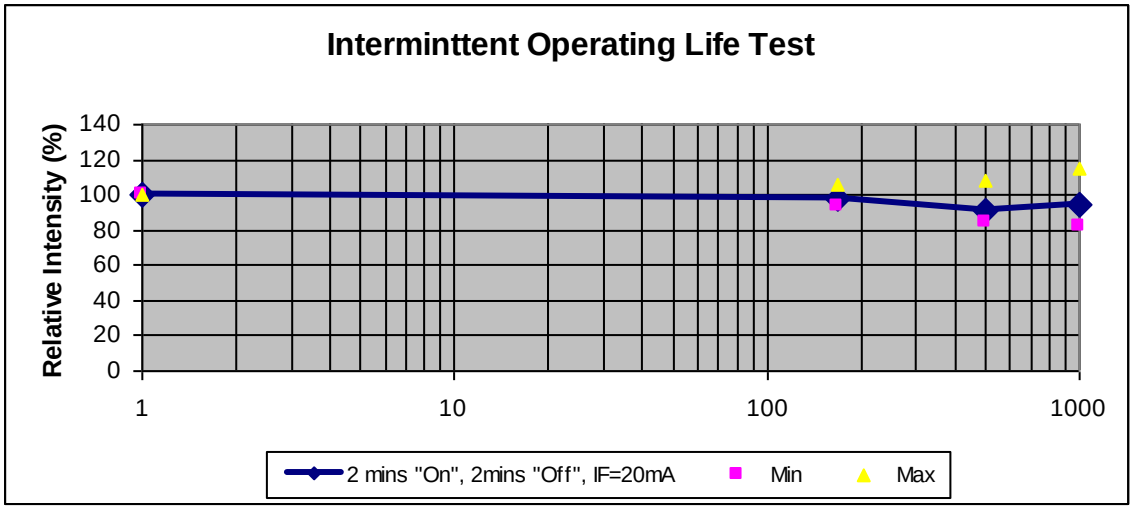
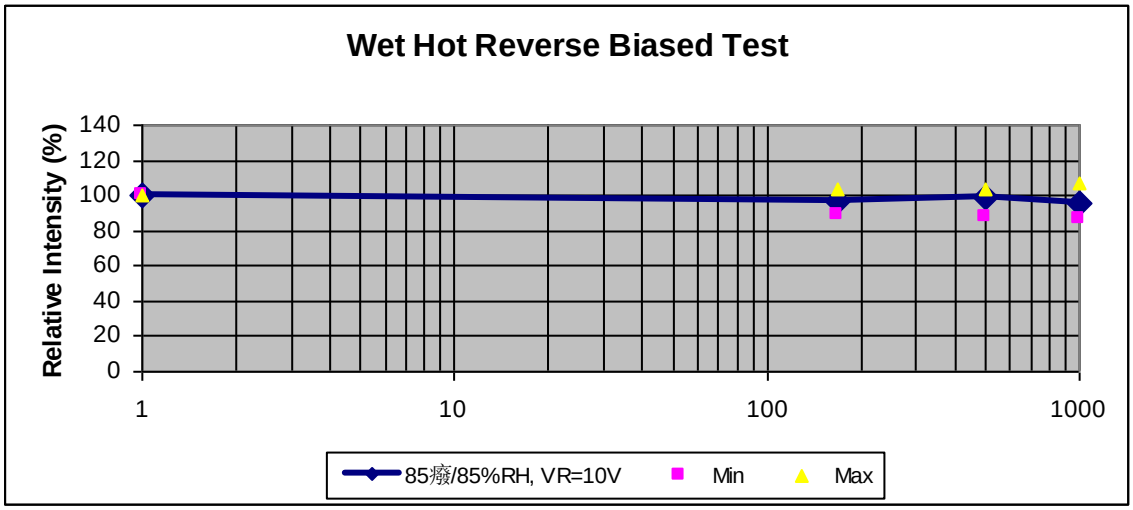


Note:

168hrs max = 5.376%　　504hrs max = 8.132%　　1000hrs max = 15.524%
168hrs min = -6.442%　　504hrs min = -16.252%　　1000hrs min = -18.062%



Note:

168hrs max = 3.297%　　504hrs max = 4.115%　　1000hrs max = 6.628%
168hrs min = -11.237%　　504hrs min = -11.789%　　1000hrs min = -13.293%

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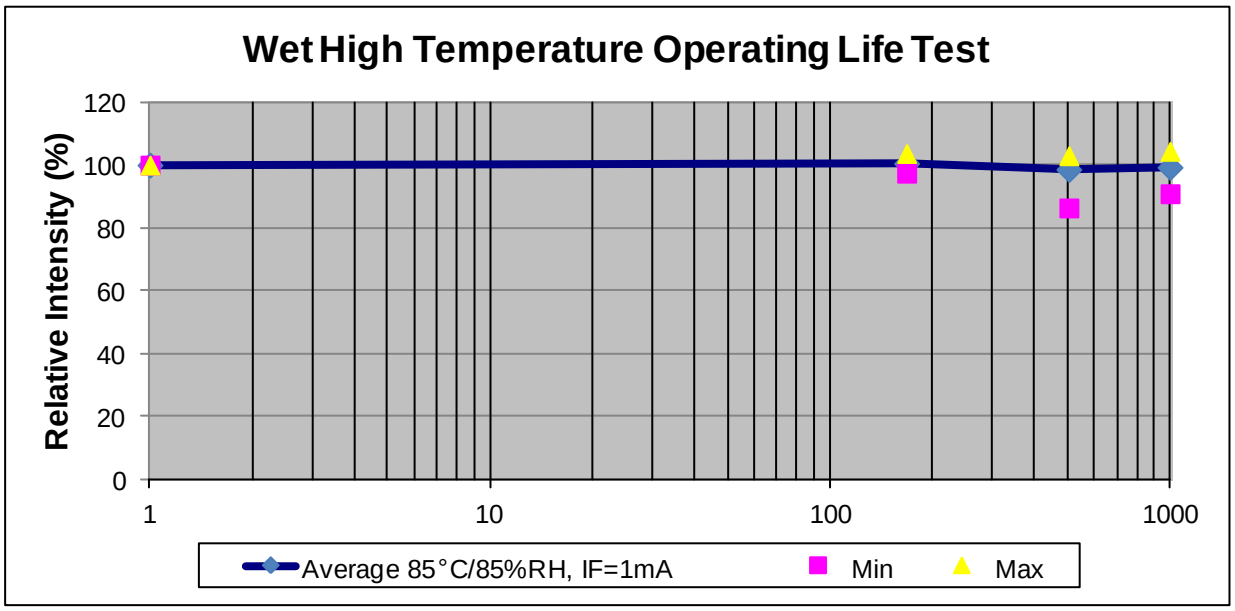
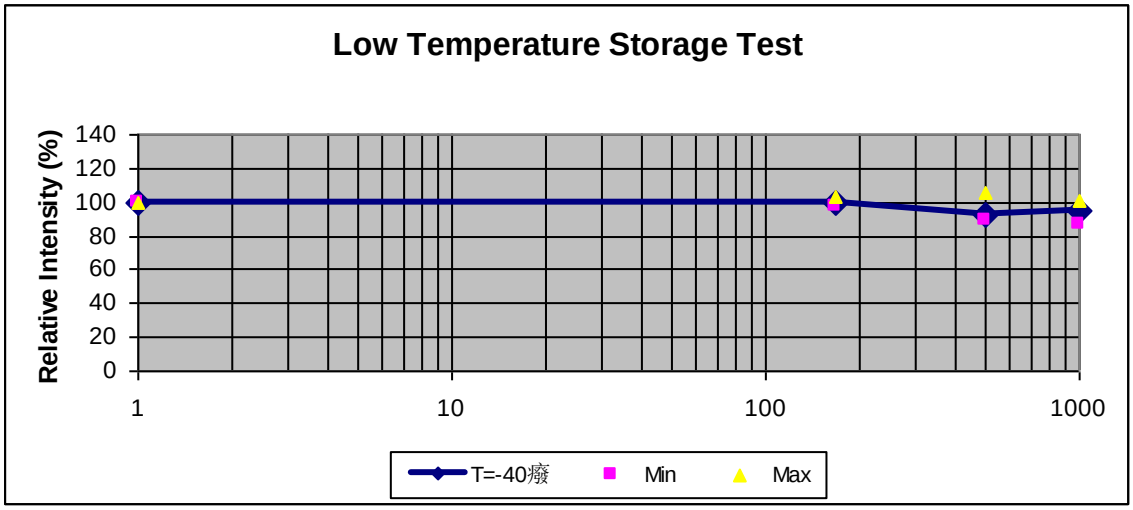


Note:

168hrs max = 3.675%　　504hrs max = 2.975%　　1000hrs max = 4.374%

168hrs min = -2.574%　　504hrs min = -13.636%　　1000hrs min = -9.119%



Note:

168hrs max = 2.687%　　504hrs max = 6.045%　　1000hrs max = 0.452%

168hrs min = -2.816%　　504hrs min = -11.142%　　1000hrs min = -13.750%

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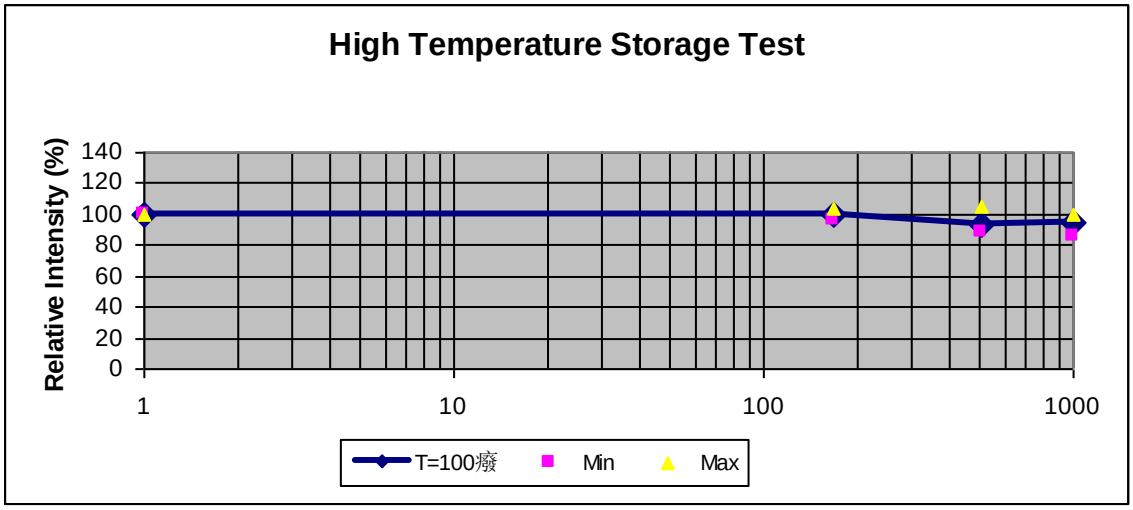
Reference Device: DNO-AJS

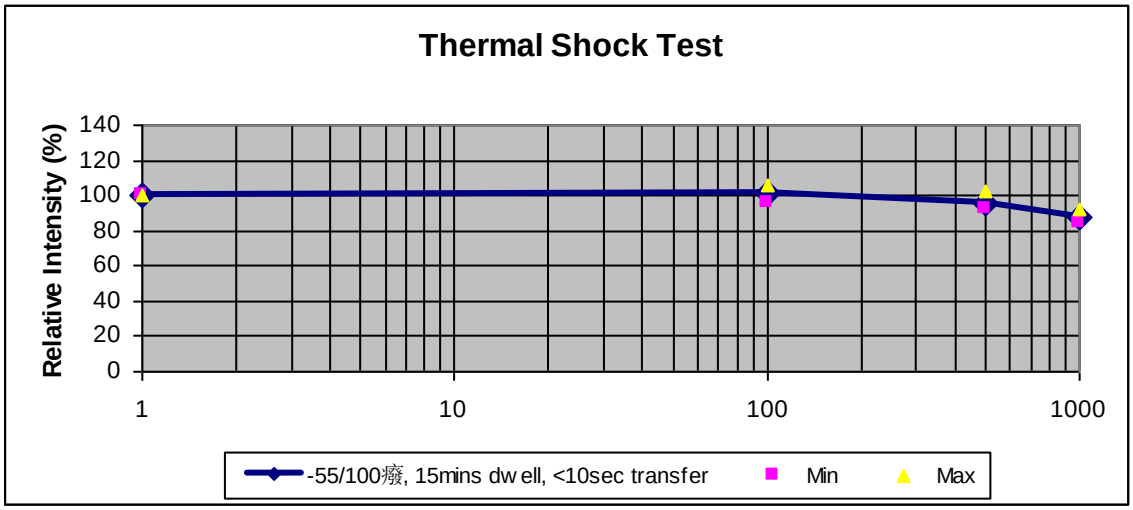


Note:

168hrs max = 3.829%
168hrs min = -4.136%

504hrs max = 5.278%
504hrs min = -11.464%

1000hrs max = -0.500%
1000hrs min = -15.076%



Note:

100X max = 5.533%
100X min = -3.925%

500X max = 2.474%
500X min = -8.280%

1000X max = -7.363%
1000X min = -15.967%

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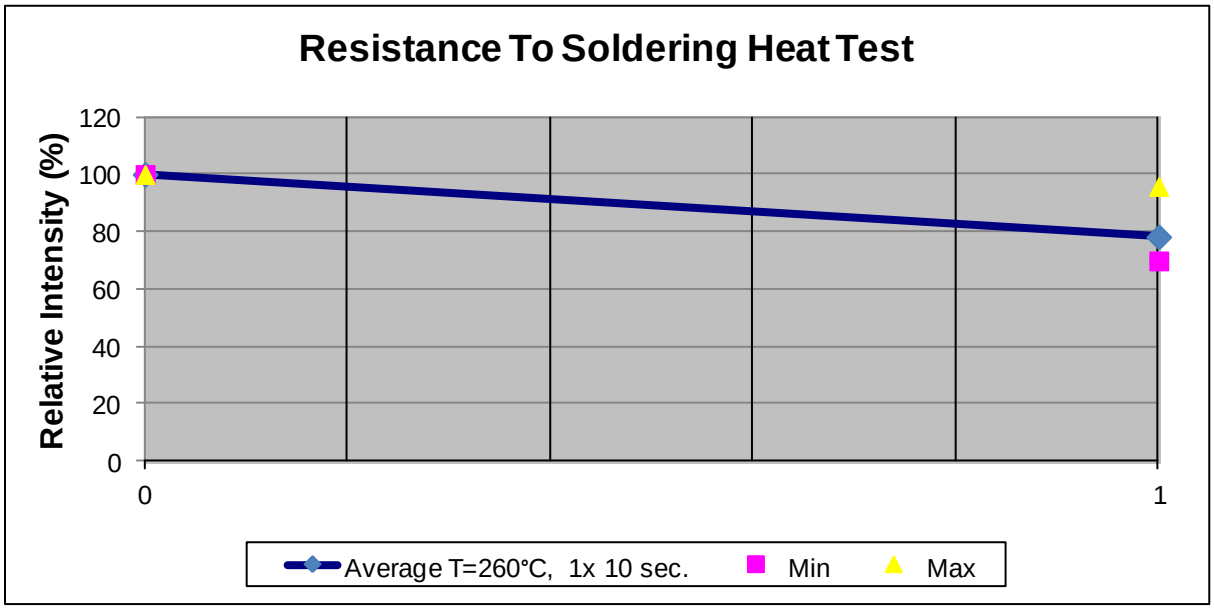
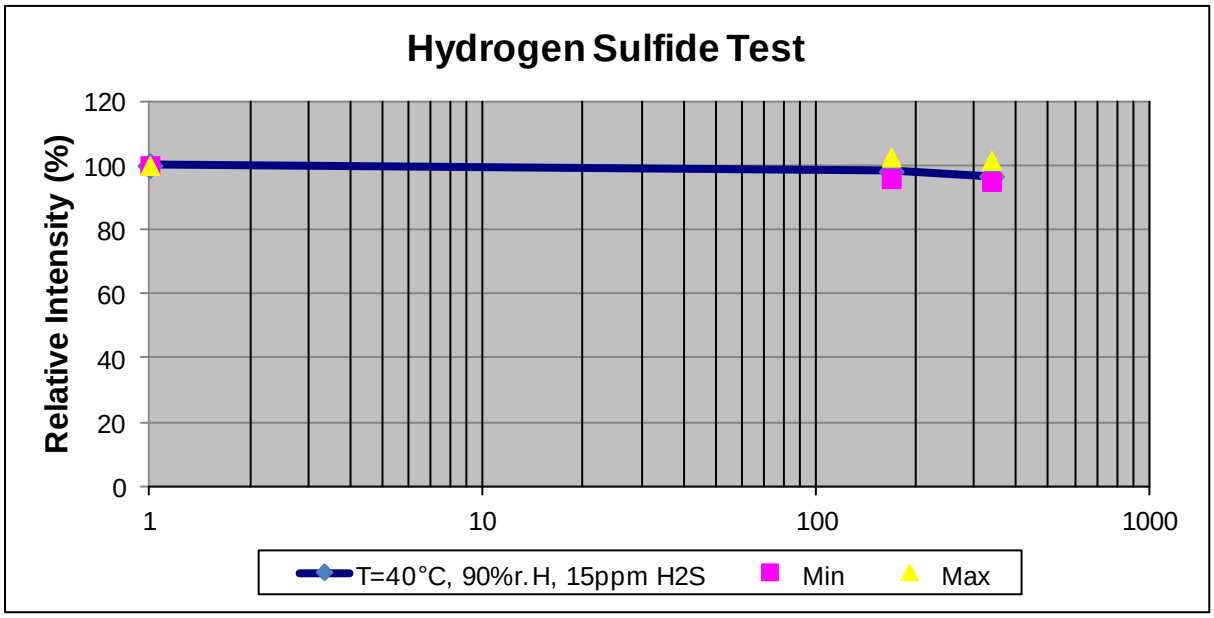


Note:

1X max = -4.211%

1X min = -30.171%



Note:

168hrs max = 0.799% 336hrs max = 3.916%

168hrs min = -1.883% 336hrs min = -0.362%

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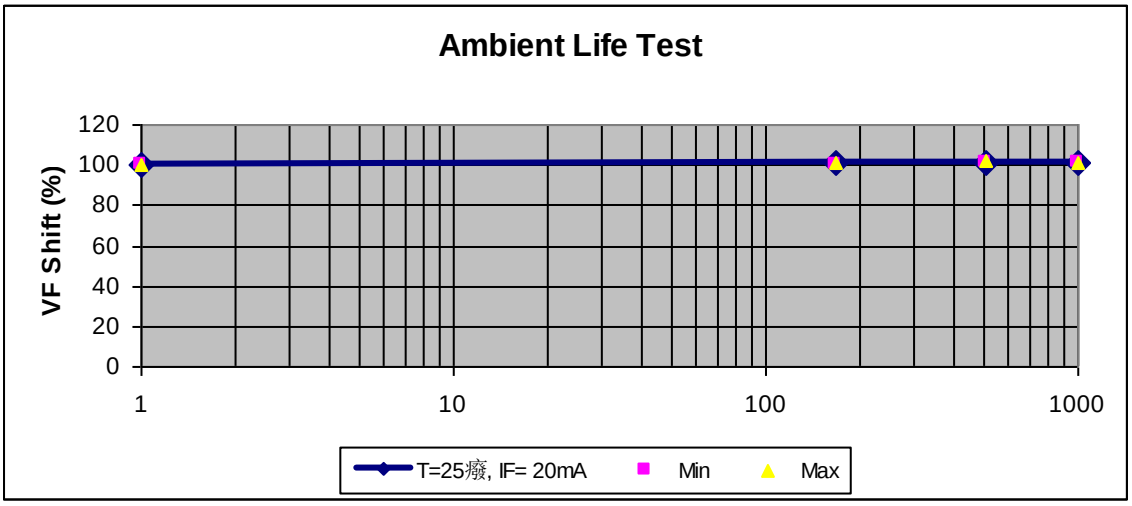
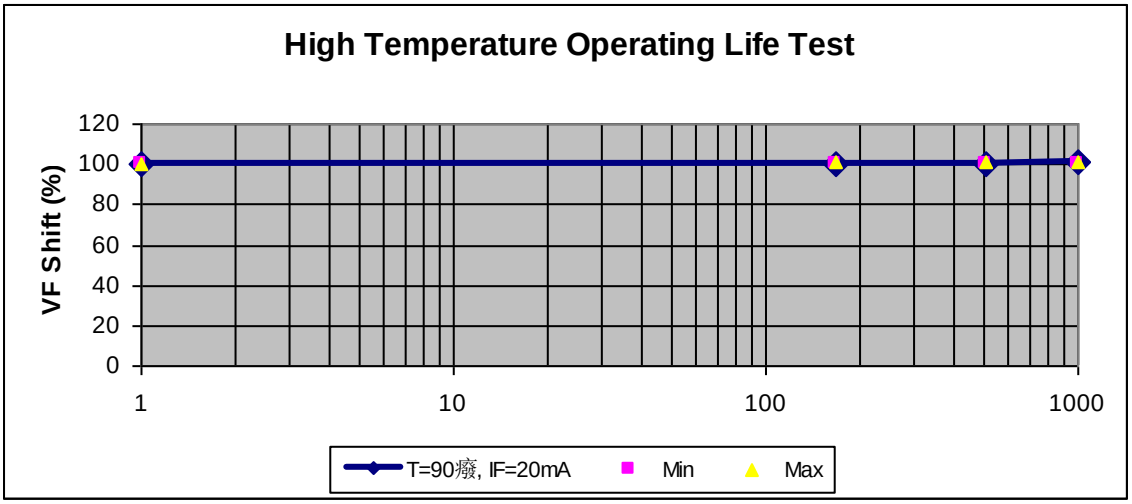
Vf Shift Data



Note:

168hrs max = 0.973%	504hrs max = 1.681%	1000hrs max = 1.461%
168hrs min = 0.649%	504hrs min = 0.702%	1000hrs min = 1.027%



Note:

168hrs max = 1.020%	504hrs max = 0.858%	1000hrs max = 1.233%
168hrs min = 0.107%	504hrs min = 0.107%	1000hrs min = 0.268%

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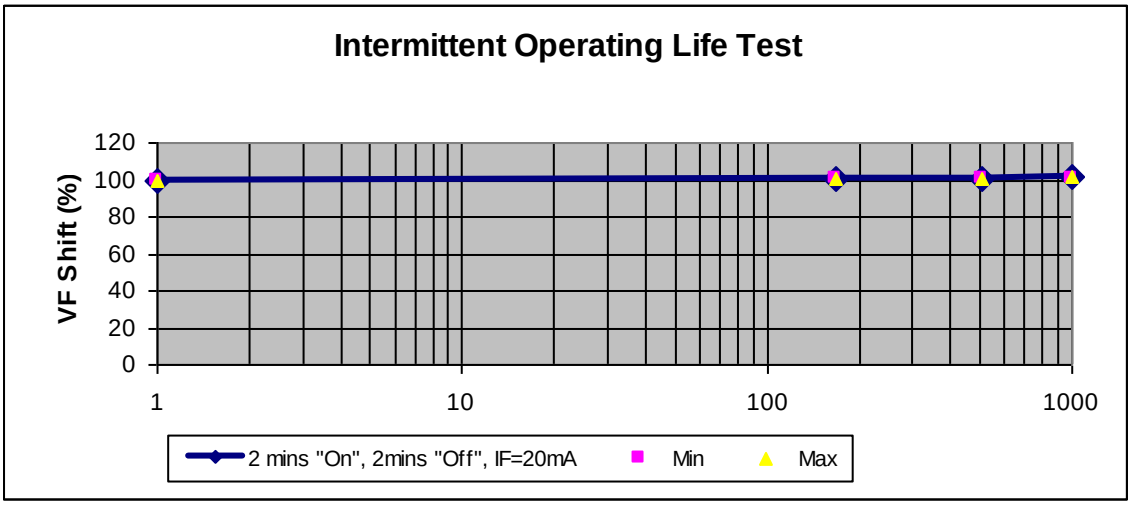
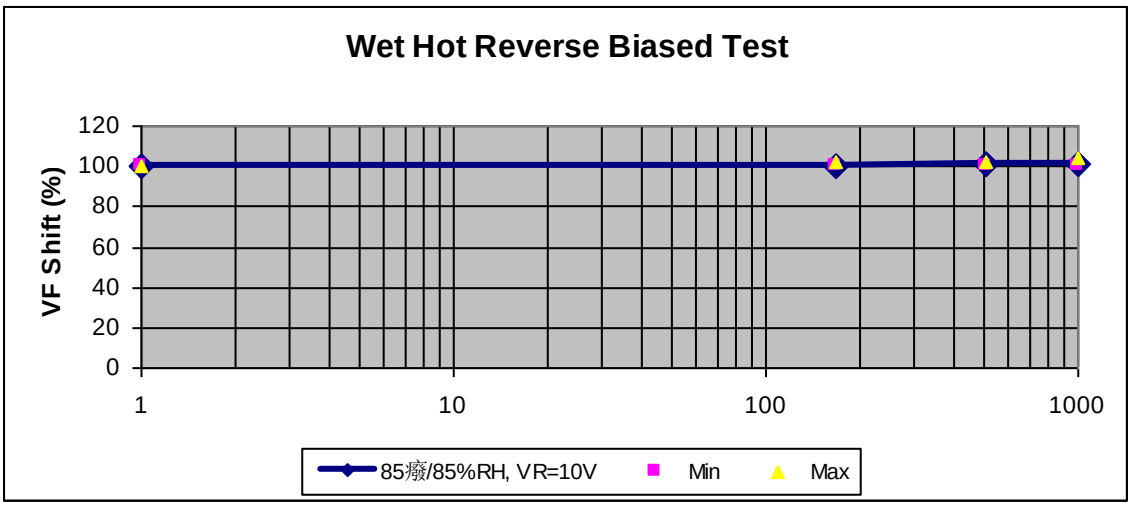


Note:

168hrs max = 0.919%	504hrs max = 0.865%	1000hrs max = 1.572%
168hrs min = 0.596%	504hrs min = 0.324%	1000hrs min = 0.648%



Note:

168hrs max = 2.201%	504hrs max = 2.477%	1000hrs max = 4.425%
168hrs min = 0.161%	504hrs min = -0.054%	1000hrs min = 0.162%

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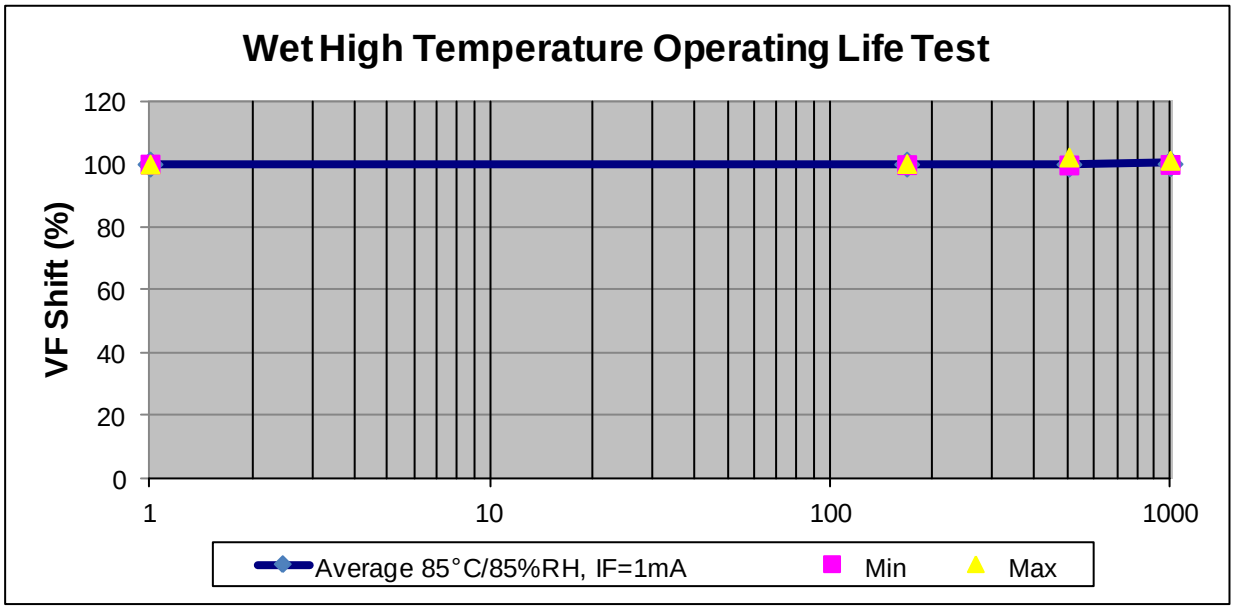
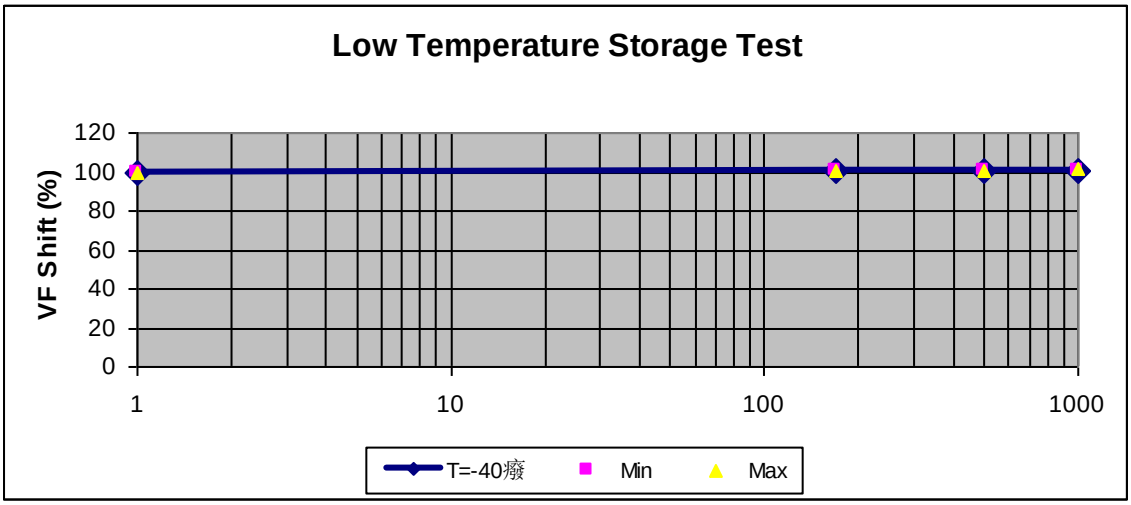


Note:

168hrs max = 0.165% 504hrs max = 2.247% 1000hrs max = 1.205%

168hrs min = -0.164% 504hrs min = -0.274% 1000hrs min = -0.110%



Note:

168hrs max = 0.973% 504hrs max = 0.865% 1000hrs max = 1.190%

168hrs min = 0.542% 504hrs min = 0.540% 1000hrs min = 0.758%

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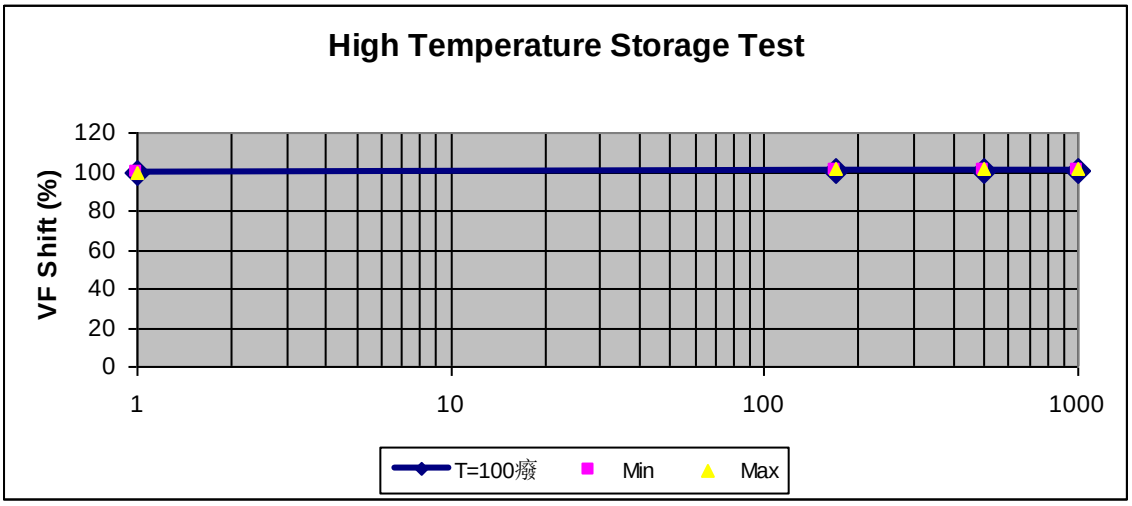
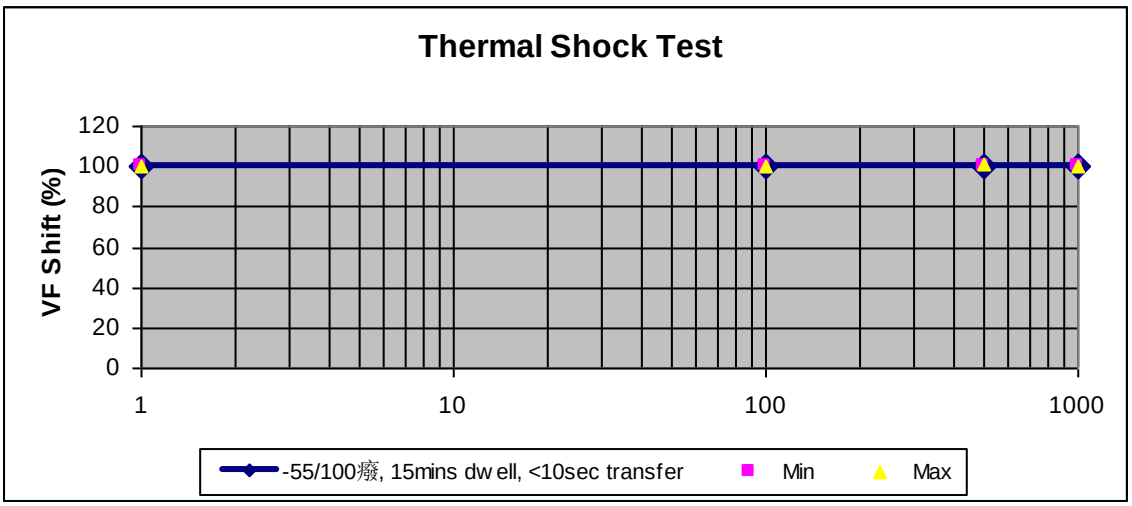


Note:

168hrs max = 1.029%
168hrs min = 0.703%

504hrs max = 1.082%
504hrs min = 0.596%

1000hrs max = 1.083%
1000hrs min = 0.758%



Note:

100X max = 0.488%
100X min = -0.216%

500X max = 0.708%
500X min = 0.326%

1000X max = 0.599%
1000X min =0.379%

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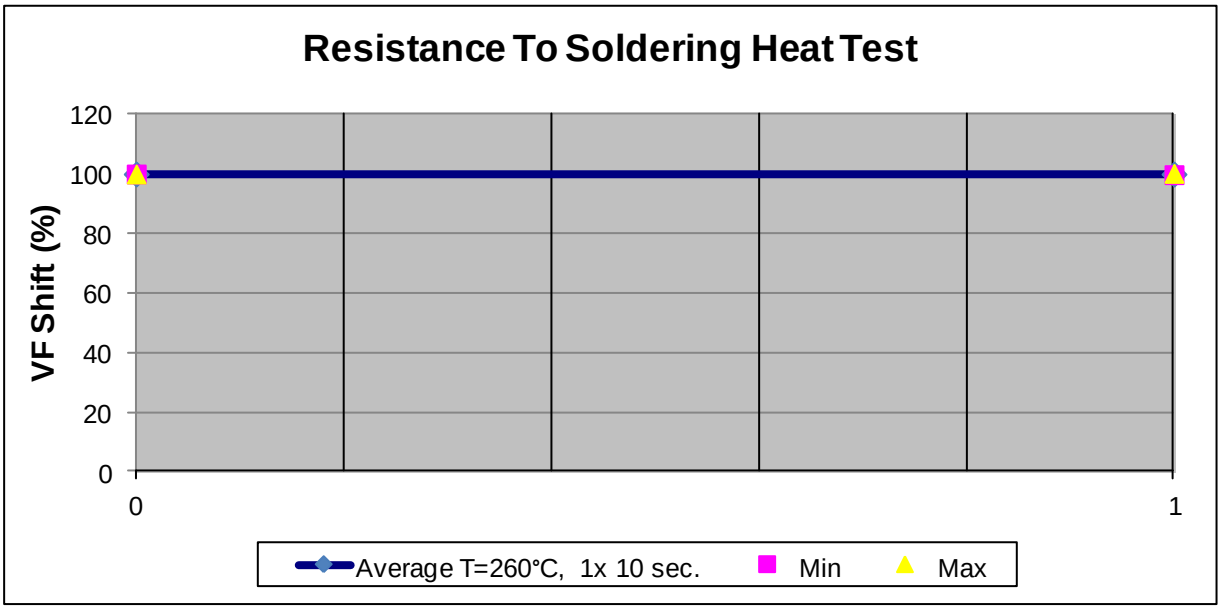
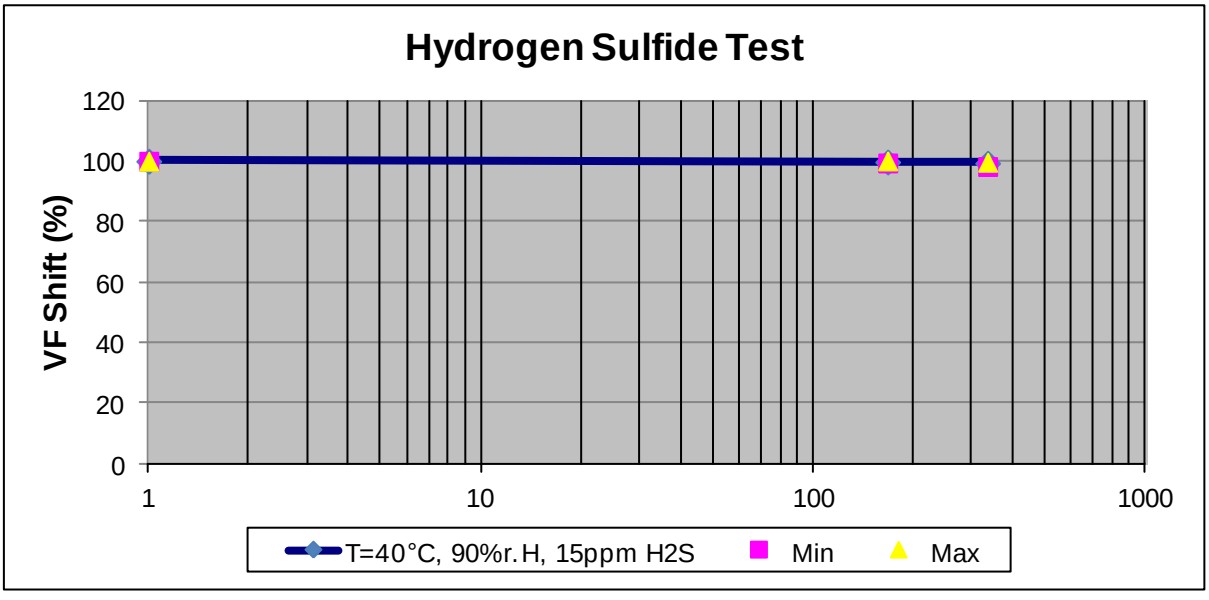


Note:

1X max = 0.213%

1X min = -0.213%



Note:

168hrs max = 0.615% 336hrs max = 0.803%

168hrs min = -0.204% 336hrs min = -0.051%

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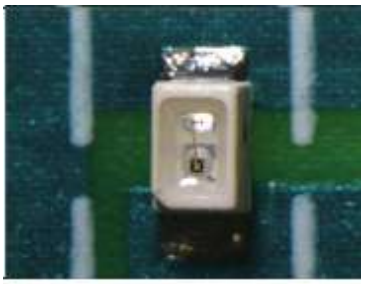
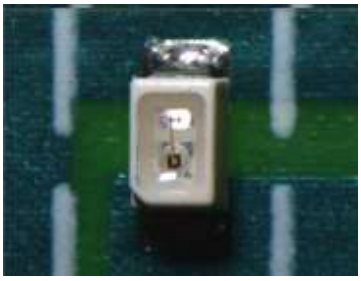
Corrosion Test

H2S

Before	After 336 hours
	

Observation: No black spots observed on metallic surface.

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Reliability Test Data:

Ambient Life Test

T=25°C, IF= 20mA

Unit no.	0 hr	0 hr	168 hr	Delta Vf	168 hrs	Delta Iv	504 hrs	Delta Vf	504 hrs	Delta Iv	1000 hrs	Delta Vf	1000 hrs	Delta Iv
	Vf	Iv	Vf	%	Iv	%	Vf	%	Iv	%	Vf	%	Iv	%
1	1.85	17.92	1.866	0.865	17.53	-2.176	1.87	1.081	16.04	-10.491	1.872	1.189	19.18	7.031
2	1.849	16.8	1.864	0.811	16.41	-2.321	1.87	1.136	14.91	-11.250	1.873	1.298	17.43	3.750
3	1.851	16.65	1.866	0.810	16.7	0.300	1.872	1.135	15.55	-6.607	1.875	1.297	18.06	8.468
4	1.849	17.61	1.865	0.865	17.67	0.341	1.87	1.136	17.24	-2.101	1.872	1.244	18.6	5.622
5	1.847	18.16	1.863	0.866	17.54	-3.414	1.869	1.191	16.77	-7.654	1.868	1.137	18.86	3.855
6	1.85	18.06	1.865	0.811	18.01	-0.277	1.871	1.135	17.27	-4.374	1.872	1.189	19.54	8.195
7	1.849	16.61	1.864	0.811	16.59	-0.120	1.868	1.028	15.84	-4.636	1.872	1.244	16.43	-1.084
8	1.851	17.87	1.868	0.918	17.68	-1.063	1.872	1.135	16.66	-6.771	1.874	1.243	18.15	1.567
9	1.849	17.75	1.865	0.865	16.57	-6.648	1.87	1.136	16.35	-7.887	1.873	1.298	18.88	6.366
10	1.85	16.56	1.867	0.919	17.06	3.019	1.872	1.189	15.76	-4.831	1.873	1.243	16.65	0.543
11	1.85	18.23	1.866	0.865	18.4	0.933	1.872	1.189	16.9	-7.296	1.873	1.243	18.89	3.620
12	1.846	17.74	1.862	0.867	17.25	-2.762	1.868	1.192	16.09	-9.301	1.871	1.354	18.2	2.593
13	1.843	17.49	1.857	0.760	17.11	-2.173	1.864	1.139	16.11	-7.890	1.867	1.302	18.13	3.659
14	1.844	17.84	1.86	0.868	17.93	0.504	1.867	1.247	16.72	-6.278	1.87	1.410	18.69	4.765
15	1.85	16.49	1.866	0.865	16.41	-0.485	1.873	1.243	16.14	-2.122	1.877	1.459	17.72	7.459
16	1.847	18.14	1.863	0.866	17.86	-1.544	1.869	1.191	17.45	-3.804	1.871	1.299	18.58	2.426
17	1.848	16.93	1.863	0.812	16.04	-5.257	1.869	1.136	15.72	-7.147	1.874	1.407	17.17	1.418
18	1.85	18.2	1.864	0.757	17.68	-2.857	1.869	1.027	17.6	-3.297	1.875	1.351	19.22	5.604
19	1.846	16.4	1.861	0.813	15.86	-3.293	1.868	1.192	15.28	-6.829	1.87	1.300	17.27	5.305
20	1.848	18.28	1.863	0.812	17.87	-2.243	1.87	1.190	17.4	-4.814	1.873	1.353	18.98	3.829
21	1.849	16.8	1.866	0.919	17.09	1.726	1.872	1.244	16.58	-1.310	1.873	1.298	17.96	6.905
22	1.845	18.22	1.86	0.813	17.59	-3.458	1.867	1.192	17.06	-6.367	1.868	1.247	18.88	3.622
23	1.85	18.05	1.866	0.865	17.52	-2.936	1.873	1.243	16.76	-7.147	1.875	1.351	18.6	3.047
24	1.849	18.09	1.864	0.811	17.44	-3.593	1.872	1.244	16.92	-6.468	1.875	1.406	18.62	2.930
25	1.845	17.29	1.859	0.759	16.59	-4.049	1.866	1.138	15.9	-8.039	1.868	1.247	17.65	2.082
26	1.851	17.88	1.867	0.864	17.92	0.224	1.873	1.189	17.24	-3.579	1.877	1.405	18.94	5.928
27	1.844	17.9	1.858	0.759	17.42	-2.682	1.864	1.085	17.35	-3.073	1.867	1.247	18.32	2.346
28	1.845	17.68	1.859	0.759	16.3	-7.805	1.865	1.084	16.02	-9.389	1.87	1.355	17.74	0.339
29	1.849	17.74	1.864	0.811	17.75	0.056	1.871	1.190	17.54	-1.127	1.874	1.352	19.02	7.215
30	1.849	18.03	1.865	0.865	17.92	-0.610	1.869	1.082	17.16	-4.825	1.874	1.352	18.97	5.214
31	1.848	16.81	1.863	0.812	16.05	-4.521	1.869	1.136	14.98	-10.886	1.871	1.245	17.11	1.785
32	1.85	18.32	1.865	0.811	17.61	-3.876	1.872	1.189	17.48	-4.585	1.875	1.351	18.9	3.166
33	1.85	16.72	1.866	0.865	16.51	-1.256	1.872	1.189	16.07	-3.888	1.877	1.459	17.61	5.323
34	1.848	17.8	1.864	0.866	17.74	-0.337	1.872	1.299	16.61	-6.685	1.875	1.461	18.89	6.124
35	1.85	16.87	1.867	0.919	16.87	0.000	1.872	1.189	15.84	-6.106	1.876	1.405	18.38	8.951
36	1.849	18.23	1.863	0.757	17.85	-2.084	1.867	0.973	17	-6.747	1.872	1.244	18.24	0.055
37	1.85	16.73	1.865	0.811	16.18	-3.288	1.868	0.973	15.3	-8.548	1.87	1.081	16.97	1.435
38	1.849	18.18	1.865	0.865	17.9	-1.540	1.869	1.082	17.79	-2.145	1.875	1.406	19.08	4.950
39	1.85	17.88	1.866	0.865	17.47	-2.293	1.873	1.243	17.05	-4.642	1.877	1.459	18.78	5.034
40	1.85	17.99	1.865	0.811	17.84	-0.834	1.871	1.135	17.18	-4.503	1.876	1.405	18.64	3.613
41	1.851	17.96	1.867	0.864	18.08	0.668	1.872	1.135	16.75	-6.737	1.876	1.351	18.74	4.343
42	1.851	17.99	1.866	0.810	17.78	-1.167	1.87	1.026	17.04	-5.281	1.875	1.297	18.78	4.391
43	1.849	18.1	1.863	0.757	18.15	0.276	1.867	0.973	16.48	-8.950	1.873	1.298	18.63	2.928
44	1.849	17.96	1.866	0.919	17.97	0.056	1.87	1.136	17.06	-5.011	1.876	1.460	18.62	3.675
45	1.846	18.58	1.86	0.758	18.58	0.000	1.864	0.975	17.74	-4.521	1.869	1.246	18.99	2.207

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Unit no.	0 hr	0 hr	168 hr	Delta Vf	168 hrs	Delta Iv	504 hrs	Delta Vf	504 hrs	Delta Iv	1000 hrs	Delta Vf	1000 hrs	Delta Iv
	Vf	Iv	Vf	%	Iv	%	Vf	%	Iv	%	Vf	%	Iv	%
46	1.85	17.97	1.865	0.811	17.89	-0.445	1.872	1.189	16.93	-5.787	1.877	1.459	19.06	6.066
47	1.849	18.14	1.865	0.865	17.36	-4.300	1.87	1.136	17.05	-6.009	1.876	1.460	18.98	4.631
48	1.847	18.11	1.861	0.758	17.39	-3.976	1.865	0.975	16.44	-9.221	1.871	1.299	18.67	3.092
49	1.851	17.89	1.866	0.810	17.77	-0.671	1.869	0.972	17.05	-4.695	1.874	1.243	19.1	6.764
50	1.846	16.72	1.862	0.867	16.81	0.538	1.864	0.975	15.93	-4.725	1.865	1.029	17.19	2.811
51	1.849	16.55	1.864	0.811	16.73	1.088	1.866	0.919	15.75	-4.834	1.871	1.190	16.72	1.027
52	1.85	17.96	1.866	0.865	17.97	0.056	1.87	1.081	17.01	-5.290	1.875	1.351	18.93	5.401
53	1.848	18	1.864	0.866	17.91	-0.500	1.867	1.028	16.22	-9.889	1.873	1.353	18.71	3.944
54	1.849	17.87	1.863	0.757	18.04	0.951	1.865	0.865	16.6	-7.107	1.872	1.244	19.03	6.491
55	1.85	17.9	1.865	0.811	17.97	0.391	1.866	0.865	17.11	-4.413	1.874	1.297	19.33	7.989
56	1.85	18.32	1.864	0.757	18.09	-1.255	1.869	1.027	16.85	-8.024	1.874	1.297	18.64	1.747
57	1.851	18.06	1.866	0.810	17.95	-0.609	1.871	1.080	16.49	-8.693	1.876	1.351	18.8	4.097
58	1.849	16.48	1.865	0.865	16.02	-2.791	1.869	1.082	15.84	-3.883	1.876	1.460	17.59	6.735
59	1.849	18.12	1.864	0.811	17.71	-2.263	1.869	1.082	16.48	-9.051	1.874	1.352	18.74	3.422
60	1.847	18.31	1.86	0.704	17.84	-2.567	1.865	0.975	17.01	-7.100	1.871	1.299	18.72	2.239
61	1.851	16.79	1.868	0.918	16.67	-0.715	1.875	1.297	16.49	-1.787	1.873	1.189	17.45	3.931
62	1.844	18	1.859	0.813	17.13	-4.833	1.875	1.681	17.37	-3.500	1.866	1.193	17.9	-0.556
63	1.843	17.64	1.857	0.760	17.32	-1.814	1.87	1.465	17.44	-1.134	1.865	1.194	18.11	2.664
64	1.846	18.32	1.862	0.867	16.72	-8.734	1.872	1.408	16.08	-12.227	1.867	1.138	18.42	0.546
65	1.849	18.09	1.866	0.919	17.49	-3.317	1.867	0.973	17.06	-5.694	1.87	1.136	18.47	2.101
66	1.851	16.28	1.868	0.918	17.05	4.730	1.871	1.080	15.72	-3.440	1.875	1.297	17.73	8.907
67	1.851	17.98	1.869	0.972	18.06	0.445	1.864	0.702	16.97	-5.617	1.876	1.351	18.86	4.894
68	1.849	17.94	1.865	0.865	17.79	-0.836	1.863	0.757	16.82	-6.243	1.875	1.406	18.79	4.738
69	1.849	16.61	1.867	0.973	17.23	3.733	1.867	0.973	17.05	2.649	1.874	1.352	17.9	7.766
70	1.845	18.01	1.862	0.921	17.9	-0.611	1.871	1.409	17.29	-3.998	1.867	1.192	18.66	3.609
71	1.851	18.1	1.867	0.864	18.29	1.050	1.872	1.135	17	-6.077	1.874	1.243	18.86	4.199
72	1.846	18.07	1.859	0.704	17.66	-2.269	1.866	1.083	16.2	-10.349	1.87	1.300	18.43	1.992
73	1.851	16.57	1.868	0.918	16.95	2.293	1.875	1.297	15.99	-3.500	1.876	1.351	17.74	7.061
74	1.848	16.2	1.865	0.920	16.42	1.358	1.871	1.245	15.77	-2.654	1.872	1.299	17.46	7.778
75	1.85	16.36	1.867	0.919	16.66	1.834	1.872	1.189	17.39	6.296	1.872	1.189	17.28	5.623
76	1.849	16.71	1.864	0.811	17.03	1.915	1.866	0.919	15.56	-6.882	1.871	1.190	16.75	0.239
77	1.851	18.03	1.867	0.864	18.07	0.222	1.872	1.135	16.57	-8.098	1.875	1.297	18.7	3.716
78	1.848	18.15	1.864	0.866	17.96	-1.047	1.869	1.136	17.22	-5.124	1.873	1.353	17.99	-0.882
79	1.848	17.97	1.863	0.812	17.64	-1.836	1.87	1.190	17.96	-0.056	1.873	1.353	17.24	-4.062
80	1.845	17.7	1.859	0.759	16.95	-4.237	1.864	1.030	16.54	-6.554	1.866	1.138	17.88	1.017
81	1.848	17.44	1.862	0.758	17.47	0.172	1.865	0.920	16.28	-6.651	1.871	1.245	18.1	3.784
82	1.85	18	1.867	0.919	17.84	-0.889	1.87	1.081	16.93	-5.944	1.874	1.297	18.4	2.222
83	1.848	16.96	1.863	0.812	16.96	0.000	1.869	1.136	18.2	7.311	1.87	1.190	17.17	1.238
84	1.849	17.97	1.864	0.811	17.67	-1.669	1.869	1.082	17.1	-4.841	1.87	1.136	18.52	3.061
85	1.846	17.8	1.861	0.813	17.64	-0.899	1.864	0.975	17.35	-2.528	1.868	1.192	18.16	2.022
86	1.85	17.79	1.866	0.865	17.95	0.899	1.87	1.081	16.78	-5.677	1.872	1.189	18.31	2.923
87	1.85	18.06	1.865	0.811	17.95	-0.609	1.87	1.081	17.01	-5.814	1.869	1.027	17.82	-1.329
88	1.849	18.09	1.861	0.649	17.79	-1.658	1.868	1.028	17.06	-5.694	1.872	1.244	18.83	4.091
89	1.844	16.33	1.859	0.813	15.76	-3.491	1.865	1.139	14.32	-12.309	1.869	1.356	17.22	5.450
90	1.848	17.76	1.864	0.866	17.56	-1.126	1.87	1.190	17.1	-3.716	1.874	1.407	18.82	5.968
Average				0.835		-1.257		1.116		-5.495		1.294		3.820
Min				0.649		-8.734		0.702		-12.309		1.027		-4.062
Max				0.973		4.730		1.681		7.311		1.461		8.951

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High Temperature Operating Life Test

T=90°C, IF=20mA

Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
1	1.865	15.07	1.883	0.965	14.14	-6.171	1.881	0.858	14.1	-6.437	1.888	1.233	14.88	-1.261
2	1.865	14.85	1.882	0.912	13.95	-6.061	1.88	0.804	13.96	-5.993	1.886	1.126	14.66	-1.279
3	1.859	14.6	1.874	0.807	14.02	-3.973	1.873	0.753	13.07	-10.479	1.876	0.914	13.7	-6.164
4	1.857	14.8	1.871	0.754	14.14	-4.459	1.869	0.646	13.12	-11.351	1.873	0.862	13.84	-6.486
5	1.864	14.82	1.88	0.858	13.51	-8.839	1.879	0.805	13.41	-9.514	1.884	1.073	14.05	-5.196
6	1.865	15.56	1.879	0.751	14.67	-5.720	1.877	0.643	14.71	-5.463	1.885	1.072	15.4	-1.028
7	1.86	15.06	1.872	0.645	14.46	-3.984	1.873	0.699	13.04	-13.413	1.877	0.914	13.96	-7.304
8	1.865	14.81	1.879	0.751	13.83	-6.617	1.881	0.858	13.95	-5.807	1.887	1.180	14.7	-0.743
9	1.863	15.21	1.877	0.751	14.62	-3.879	1.878	0.805	13.67	-10.125	1.883	1.074	14.25	-6.312
10	1.865	14.91	1.882	0.912	13.45	-9.792	1.88	0.804	13.49	-9.524	1.887	1.180	14.23	-4.561
11	1.865	14.81	1.871	0.322	14.35	-3.106	1.87	0.268	13.83	-6.617	1.878	0.697	14.61	-1.350
12	1.862	14.86	1.866	0.215	13.93	-6.258	1.864	0.107	13.18	-11.306	1.874	0.644	14.13	-4.913
13	1.865	15.24	1.868	0.161	14.64	-3.937	1.869	0.214	14.19	-6.890	1.878	0.697	15.05	-1.247
14	1.864	15.46	1.868	0.215	14.64	-5.304	1.869	0.268	14.2	-8.150	1.878	0.751	15.02	-2.846
15	1.86	15.98	1.864	0.215	14.87	-6.946	1.862	0.108	14.38	-10.013	1.866	0.323	14.84	-7.134
16	1.864	15.04	1.869	0.268	14	-6.915	1.871	0.376	13.8	-8.245	1.876	0.644	12.96	-13.830
17	1.864	15.2	1.866	0.107	14.33	-5.724	1.87	0.322	14.02	-7.763	1.88	0.858	13.34	-12.237
18	1.862	15.09	1.864	0.107	14.12	-6.428	1.868	0.322	13.94	-7.621	1.873	0.591	12.9	-14.513
19	1.863	14.94	1.866	0.161	13.98	-6.426	1.869	0.322	13.71	-8.233	1.872	0.483	12.67	-15.194
20	1.863	14.92	1.868	0.268	14.23	-4.625	1.868	0.268	13.71	-8.110	1.87	0.376	12.87	-13.740
21	1.86	15.9	1.866	0.323	14.45	-9.119	1.864	0.215	14.13	-11.132	1.866	0.323	13.52	-14.969
22	1.865	15.45	1.873	0.429	14.84	-3.948	1.873	0.429	14.65	-5.178	1.873	0.429	14.24	-7.832
23	1.863	15.09	1.869	0.322	13.97	-7.422	1.869	0.322	13.81	-8.482	1.876	0.698	14.47	-4.109
24	1.865	14.8	1.872	0.375	14.14	-4.459	1.873	0.429	13.92	-5.946	1.873	0.429	14.29	-3.446
25	1.865	15.94	1.874	0.483	15.5	-2.760	1.873	0.429	15.09	-5.332	1.873	0.429	14.26	-10.540
26	1.857	14.84	1.865	0.431	13.5	-9.030	1.863	0.323	13.1	-11.725	1.868	0.592	14	-5.660
27	1.863	15.2	1.869	0.322	14.08	-7.368	1.868	0.268	13.66	-10.132	1.874	0.590	14.83	-2.434
28	1.865	15.2	1.871	0.322	14.09	-7.303	1.872	0.375	14.19	-6.645	1.87	0.268	13.82	-9.079
29	1.865	15.1	1.871	0.322	14.12	-6.490	1.873	0.429	14	-7.285	1.872	0.375	14.09	-6.689
30	1.864	14.98	1.873	0.483	14.23	-5.007	1.871	0.376	13.88	-7.343	1.874	0.536	15.26	1.869
31	1.858	15.11	1.866	0.431	14.33	-5.162	1.863	0.269	13.19	-12.707	1.869	0.592	13.9	-8.008
32	1.864	14.83	1.872	0.429	14.01	-5.529	1.874	0.536	14.1	-4.922	1.878	0.751	14.51	-2.158
33	1.864	15.04	1.87	0.322	14.27	-5.120	1.874	0.536	14.14	-5.984	1.875	0.590	14.47	-3.790
34	1.861	15.08	1.867	0.322	13.8	-8.488	1.867	0.322	13.58	-9.947	1.872	0.591	13.95	-7.493
35	1.862	14.99	1.871	0.483	13.97	-6.805	1.872	0.537	13.76	-8.205	1.875	0.698	14.18	-5.404
36	1.863	15.13	1.875	0.644	14.12	-6.675	1.872	0.483	13.71	-9.385	1.88	0.913	14.45	-4.494
37	1.864	14.75	1.874	0.536	13.95	-5.424	1.867	0.161	13.3	-9.831	1.879	0.805	14.29	-3.119
38	1.862	15.29	1.867	0.269	13.94	-8.829	1.865	0.161	13.22	-13.538	1.874	0.644	14.11	-7.717
39	1.864	15.1	1.871	0.376	14.21	-5.894	1.871	0.376	13.96	-7.550	1.878	0.751	14.75	-2.318
40	1.866	14.75	1.875	0.482	14.12	-4.271	1.873	0.375	13.79	-6.508	1.881	0.804	14.6	-1.017
41	1.862	15.09	1.871	0.483	14.09	-6.627	1.866	0.215	13.29	-11.928	1.872	0.537	14.04	-6.958
42	1.867	15.09	1.874	0.375	14.44	-4.307	1.872	0.268	13.86	-8.151	1.877	0.536	14.53	-3.711
43	1.863	15.19	1.867	0.215	13.84	-8.887	1.867	0.215	13.36	-12.047	1.87	0.376	13.92	-8.361
44	1.86	15.93	1.865	0.269	14.98	-5.964	1.864	0.215	13.69	-14.062	1.871	0.591	14.36	-9.856
45	1.863	15.26	1.872	0.483	13.91	-8.847	1.872	0.483	13.38	-12.320	1.875	0.644	14	-8.257

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Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
46	1.865	15.09	1.874	0.483	14.29	-5.302	1.875	0.536	14.07	-6.759	1.877	0.643	14.55	-3.579
47	1.861	15.16	1.868	0.376	13.82	-8.839	1.868	0.376	13.6	-10.290	1.871	0.537	13.93	-8.113
48	1.865	15.01	1.872	0.375	14.06	-6.329	1.876	0.590	13.73	-8.528	1.874	0.483	14.24	-5.130
49	1.863	14.79	1.868	0.268	13.48	-8.857	1.872	0.483	13.45	-9.060	1.872	0.483	13.67	-7.573
50	1.863	15.35	1.879	0.859	14.23	-7.296	1.873	0.537	13.77	-10.293	1.876	0.698	13.99	-8.860
51	1.858	14.51	1.873	0.807	13.48	-7.099	1.865	0.377	12.7	-12.474	1.865	0.377	13.18	-9.166
52	1.865	15.06	1.876	0.590	14.25	-5.378	1.875	0.536	14.12	-6.242	1.877	0.643	14.45	-4.050
53	1.862	14.91	1.879	0.913	14.88	-0.201	1.871	0.483	13.6	-8.786	1.871	0.483	13.88	-6.908
54	1.866	15.97	1.873	0.375	14.85	-7.013	1.877	0.589	14.96	-6.324	1.88	0.750	15.34	-3.945
55	1.864	15.18	1.875	0.590	13.87	-8.630	1.875	0.590	14.2	-6.456	1.881	0.912	14.72	-3.030
56	1.861	14.98	1.864	0.161	14.73	-1.669	1.868	0.376	13.46	-10.147	1.874	0.699	13.84	-7.610
57	1.865	15.25	1.874	0.483	13.95	-8.525	1.873	0.429	13.93	-8.656	1.879	0.751	14.51	-4.852
58	1.865	15.96	1.872	0.375	14.46	-9.398	1.875	0.536	15.6	-2.256	1.879	0.751	16.1	0.877
59	1.862	15.06	1.881	1.020	14.92	-0.930	1.871	0.483	13.73	-8.831	1.873	0.591	14.04	-6.773
60	1.864	15.13	1.88	0.858	14.4	-4.825	1.874	0.536	13.82	-8.658	1.88	0.858	14.66	-3.106
61	1.861	15	1.873	0.645	13.79	-8.067	1.867	0.322	13.41	-10.600	1.876	0.806	14.18	-5.467
62	1.861	15.97	1.874	0.699	15.06	-5.698	1.869	0.430	14.64	-8.328	1.876	0.806	15.36	-3.820
63	1.859	14.89	1.872	0.699	13.67	-8.193	1.87	0.592	13.44	-9.738	1.873	0.753	13.95	-6.313
64	1.861	15.02	1.875	0.752	13.87	-7.656	1.871	0.537	13.71	-8.722	1.874	0.699	14.11	-6.059
65	1.857	14.54	1.871	0.754	14.81	1.857	1.867	0.539	12.58	-13.480	1.871	0.754	13.12	-9.766
66	1.864	14.89	1.878	0.751	14.3	-3.962	1.876	0.644	14.09	-5.373	1.881	0.912	14.72	-1.142
67	1.859	14.67	1.87	0.592	13.25	-9.680	1.87	0.592	12.95	-11.725	1.875	0.861	13.7	-6.612
68	1.864	14.38	1.876	0.644	13.77	-4.242	1.876	0.644	13.67	-4.937	1.879	0.805	14.25	-0.904
69	1.864	15.04	1.878	0.751	13.98	-7.048	1.877	0.697	13.97	-7.114	1.878	0.751	14.35	-4.588
70	1.866	15.17	1.876	0.536	14.68	-3.230	1.874	0.429	14.5	-4.417	1.88	0.750	15.09	-0.527
71	1.864	14.66	1.87	0.322	13.33	-9.072	1.87	0.322	13.36	-8.868	1.873	0.483	13.86	-5.457
72	1.864	14.98	1.873	0.483	14.11	-5.808	1.876	0.644	14.11	-5.808	1.876	0.644	14.45	-3.538
73	1.864	14.86	1.873	0.483	14.11	-5.047	1.875	0.590	14.17	-4.643	1.876	0.644	14.51	-2.355
74	1.864	14.3	1.874	0.536	13.32	-6.853	1.872	0.429	13.25	-7.343	1.876	0.644	13.77	-3.706
75	1.865	15.06	1.877	0.643	14.25	-5.378	1.873	0.429	14.06	-6.640	1.878	0.697	14.6	-3.054
76	1.864	14.86	1.875	0.590	14.11	-5.047	1.873	0.483	13.87	-6.662	1.878	0.751	14.5	-2.423
77	1.864	15.89	1.872	0.429	14.82	-6.734	1.872	0.429	14.63	-7.930	1.877	0.697	15.35	-3.398
78	1.863	15.92	1.872	0.483	14.56	-8.543	1.872	0.483	14.48	-9.045	1.876	0.698	15.15	-4.837
79	1.864	15.18	1.874	0.536	14.18	-6.588	1.873	0.483	13.95	-8.103	1.876	0.644	14.35	-5.468
Average				0.506		-6.078		0.458		-8.488		0.692		-5.495
Min				0.107		-9.792		0.107		-14.062		0.268		-15.194
Max				1.020		1.857		0.858		-2.256		1.233		1.869

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Intermittent Operating Life Test

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

Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
1	1.849	18.09	1.866	0.919	17.39	-3.870	1.861	0.649	15.15	-16.252	1.874	1.352	15.86	-12.327
2	1.851	17.82	1.868	0.918	17.86	0.224	1.862	0.594	16.29	-8.586	1.876	1.351	17.62	-1.122
3	1.845	17.63	1.86	0.813	17.11	-2.950	1.855	0.542	15.71	-10.891	1.868	1.247	16.59	-5.899
4	1.849	16.76	1.866	0.919	16.58	-1.074	1.86	0.595	15.19	-9.368	1.873	1.298	16.57	-1.134
5	1.846	17.81	1.86	0.758	17.38	-2.414	1.855	0.488	15.71	-11.791	1.868	1.192	16.86	-5.334
6	1.85	18.18	1.865	0.811	18.21	0.165	1.864	0.757	15.88	-12.651	1.874	1.297	17.08	-6.051
7	1.852	17.99	1.868	0.864	18.29	1.668	1.867	0.810	16.8	-6.615	1.875	1.242	17.57	-2.335
8	1.851	18.49	1.867	0.864	18.57	0.433	1.866	0.810	17.07	-7.680	1.874	1.243	17.79	-3.786
9	1.851	16.79	1.867	0.864	16.76	-0.179	1.864	0.702	15.92	-5.182	1.873	1.189	16.43	-2.144
10	1.847	18.21	1.86	0.704	17.14	-5.876	1.858	0.596	16.47	-9.555	1.87	1.245	16.96	-6.864
11	1.851	17.93	1.865	0.756	17.72	-1.171	1.865	0.756	16.65	-7.139	1.874	1.243	17.36	-3.179
12	1.851	18.22	1.865	0.756	18.19	-0.165	1.865	0.756	16.55	-9.166	1.874	1.243	17.49	-4.007
13	1.849	18.13	1.863	0.757	17.85	-1.544	1.863	0.757	16.55	-8.715	1.869	1.082	16.98	-6.343
14	1.847	18.17	1.861	0.758	17.1	-5.889	1.859	0.650	17.18	-5.449	1.867	1.083	16.77	-7.705
15	1.845	17.91	1.858	0.705	17.5	-2.289	1.856	0.596	15.88	-11.334	1.865	1.084	16.58	-7.426
16	1.846	17.26	1.859	0.704	16.85	-2.375	1.855	0.488	14.52	-15.875	1.865	1.029	15.14	-12.283
17	1.85	16.46	1.865	0.811	16.26	-1.215	1.863	0.703	14.78	-10.207	1.871	1.135	15.52	-5.711
18	1.851	18.15	1.865	0.756	18.02	-0.716	1.863	0.648	17.08	-5.895	1.872	1.135	17.41	-4.077
19	1.846	17.67	1.86	0.758	16.66	-5.716	1.856	0.542	15.14	-14.318	1.866	1.083	16.19	-8.376
20	1.847	18.06	1.861	0.758	17.8	-1.440	1.859	0.650	15.72	-12.957	1.868	1.137	17.13	-5.150
21	1.852	17.59	1.866	0.756	17.64	0.284	1.863	0.594	16.9	-3.923	1.874	1.188	17.22	-2.103
22	1.851	18.18	1.864	0.702	17.77	-2.255	1.863	0.648	16.15	-11.166	1.873	1.189	17.05	-6.216
23	1.849	18.18	1.862	0.703	17.58	-3.300	1.861	0.649	16.31	-10.286	1.865	0.865	16.85	-7.316
24	1.852	16.85	1.866	0.756	16.43	-2.493	1.864	0.648	15.3	-9.199	1.872	1.080	16.24	-3.620
25	1.851	18.05	1.866	0.810	17.81	-1.330	1.865	0.756	16.48	-8.698	1.875	1.297	17.1	-5.263
26	1.849	17.76	1.862	0.703	17.28	-2.703	1.86	0.595	16.28	-8.333	1.869	1.082	16.81	-5.349
27	1.851	18.04	1.865	0.756	18.28	1.330	1.861	0.540	16.5	-8.537	1.87	1.026	17.23	-4.490
28	1.846	17.93	1.857	0.596	16.88	-5.856	1.855	0.488	15.75	-12.158	1.864	0.975	16.62	-7.306
29	1.846	16.74	1.86	0.758	16.02	-4.301	1.855	0.488	14.54	-13.142	1.867	1.138	15.93	-4.839
30	1.851	18.15	1.863	0.648	17.81	-1.873	1.859	0.432	16.9	-6.887	1.872	1.135	16.95	-6.612
31	1.852	18.37	1.866	0.756	17.69	-3.702	1.864	0.648	16.08	-12.466	1.874	1.188	17.57	-4.355
32	1.851	16.69	1.866	0.810	16.41	-1.678	1.864	0.702	15.29	-8.388	1.872	1.135	15.99	-4.194
33	1.851	18.12	1.866	0.810	17.68	-2.428	1.863	0.648	16.4	-9.492	1.871	1.080	17.14	-5.408
34	1.846	17.9	1.86	0.758	17.06	-4.693	1.858	0.650	15.28	-14.637	1.866	1.083	15.93	-11.006
35	1.848	18.3	1.862	0.758	18.01	-1.585	1.861	0.703	16.76	-8.415	1.867	1.028	16.93	-7.486
36	1.85	16.63	1.865	0.811	16.07	-3.367	1.865	0.811	15.31	-7.937	1.869	1.027	15.6	-6.194
37	1.847	17.95	1.86	0.704	17.06	-4.958	1.859	0.650	15.94	-11.198	1.864	0.920	16.82	-6.295
38	1.852	16.76	1.867	0.810	16.84	0.477	1.864	0.648	15.16	-9.547	1.87	0.972	15.9	-5.131
39	1.85	18.1	1.865	0.811	17.76	-1.878	1.863	0.703	16.88	-6.740	1.871	1.135	17.43	-3.702
40	1.85	18.09	1.866	0.865	17.54	-3.040	1.864	0.757	16.55	-8.513	1.871	1.135	16.19	-10.503
41	1.849	18.07	1.864	0.811	17.52	-3.044	1.862	0.703	16.52	-8.578	1.869	1.082	17.06	-5.589
42	1.852	17.94	1.868	0.864	17.66	-1.561	1.867	0.810	16.48	-8.138	1.873	1.134	17.44	-2.787
43	1.851	18.03	1.867	0.864	18.13	0.555	1.866	0.810	16.89	-6.323	1.871	1.080	17.52	-2.829
44	1.85	16.84	1.864	0.757	16.39	-2.672	1.863	0.703	14.8	-12.114	1.87	1.081	16.03	-4.810
45	1.852	18.17	1.867	0.810	17.92	-1.376	1.866	0.756	16.96	-6.659	1.873	1.134	17.21	-5.283

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Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
46	1.852	18.18	1.866	0.756	18.07	-0.605	1.865	0.702	16.27	-10.506	1.873	1.134	15.46	-14.961
47	1.851	18.05	1.867	0.864	17.93	-0.665	1.865	0.756	16.55	-8.310	1.874	1.243	17.25	-4.432
48	1.85	16.81	1.865	0.811	16.39	-2.499	1.864	0.757	15.57	-7.377	1.872	1.189	16.19	-3.688
49	1.85	18.32	1.865	0.811	18.09	-1.255	1.863	0.703	15.93	-13.046	1.871	1.135	15.56	-15.066
50	1.851	18.25	1.866	0.810	17.99	-1.425	1.864	0.702	16.81	-7.890	1.873	1.189	17.44	-4.438
51	1.85	18.3	1.866	0.865	18.39	0.492	1.865	0.811	17.33	-5.301	1.874	1.297	18.14	-0.874
52	1.852	17.95	1.866	0.756	17.13	-4.568	1.866	0.756	17.54	-2.284	1.873	1.134	18.02	0.390
53	1.851	18.03	1.868	0.918	18.56	2.940	1.864	0.702	16.96	-5.935	1.877	1.405	16.31	-9.540
54	1.852	17.95	1.866	0.756	17.81	-0.780	1.866	0.756	16.36	-8.858	1.865	0.702	16.37	-8.802
55	1.848	18.32	1.862	0.758	17.65	-3.657	1.861	0.703	16.14	-11.900	1.867	1.028	17.06	-6.878
56	1.846	16.73	1.862	0.867	16.31	-2.510	1.858	0.650	14.77	-11.715	1.866	1.083	16.12	-3.646
57	1.85	14.88	1.866	0.865	15.68	5.376	1.864	0.757	16.09	8.132	1.873	1.243	17.19	15.524
58	1.848	17.91	1.862	0.758	17.27	-3.573	1.863	0.812	16.16	-9.771	1.866	0.974	15.47	-13.624
59	1.847	18.24	1.861	0.758	17.66	-3.180	1.86	0.704	16.08	-11.842	1.874	1.462	17.15	-5.976
60	1.847	18.18	1.86	0.704	17.38	-4.400	1.861	0.758	15.34	-15.622	1.874	1.462	15.29	-15.897
61	1.846	17.54	1.859	0.704	16.41	-6.442	1.858	0.650	17.08	-2.623	1.874	1.517	17.54	0.000
62	1.852	17.53	1.867	0.810	17.55	0.114	1.866	0.756	16.44	-6.218	1.873	1.134	17.41	-0.685
63	1.845	16.63	1.859	0.759	16.23	-2.405	1.86	0.813	15.24	-8.358	1.874	1.572	15.35	-7.697
64	1.851	18.08	1.866	0.810	17.61	-2.600	1.864	0.702	16.06	-11.173	1.867	0.864	15.64	-13.496
65	1.851	18.03	1.866	0.810	18.02	-0.055	1.866	0.810	16.41	-8.985	1.872	1.135	17.49	-2.995
66	1.85	17.56	1.865	0.811	17.42	-0.797	1.866	0.865	16.32	-7.062	1.872	1.189	16.22	-7.631
67	1.849	17.84	1.865	0.865	17.69	-0.841	1.864	0.811	16.41	-8.016	1.872	1.244	16	-10.314
68	1.85	17.94	1.866	0.865	17.77	-0.948	1.866	0.865	16.58	-7.581	1.87	1.081	16.67	-7.079
69	1.849	16.44	1.862	0.703	15.92	-3.163	1.861	0.649	15.01	-8.698	1.872	1.244	15.8	-3.893
70	1.852	18.23	1.867	0.810	18.24	0.055	1.866	0.756	16.41	-9.984	1.864	0.648	16.57	-9.106
71	1.851	16.71	1.868	0.918	16.23	-2.873	1.863	0.648	15.53	-7.062	1.871	1.080	16.8	0.539
72	1.851	16.63	1.867	0.864	16.64	0.060	1.861	0.540	15.35	-7.697	1.871	1.080	15.33	-7.817
73	1.85	18.02	1.864	0.757	17.7	-1.776	1.861	0.595	15.96	-11.432	1.873	1.243	15.56	-13.651
74	1.851	16.55	1.865	0.756	16.26	-1.752	1.864	0.702	15.55	-6.042	1.869	0.972	15.9	-3.927
75	1.846	17.97	1.859	0.704	17.29	-3.784	1.859	0.704	15.88	-11.630	1.867	1.138	16.79	-6.566
76	1.85	17.99	1.865	0.811	17.51	-2.668	1.862	0.649	16.09	-10.561	1.873	1.243	16.99	-5.559
77	1.85	18.16	1.865	0.811	17.84	-1.762	1.861	0.595	15.89	-12.500	1.871	1.135	14.88	-18.062
78	1.85	16.56	1.866	0.865	16.73	1.027	1.862	0.649	15.81	-4.529	1.874	1.297	16.87	1.872
79	1.849	16.79	1.862	0.703	16.4	-2.323	1.855	0.324	16.68	-0.655	1.869	1.082	15.82	-5.777
80	1.847	18.15	1.858	0.596	17.56	-3.251	1.854	0.379	15.47	-14.766	1.867	1.083	16.71	-7.934
81	1.851	17.61	1.866	0.810	17.56	-0.284	1.858	0.378	16.3	-7.439	1.873	1.189	16.87	-4.202
82	1.85	17.72	1.864	0.757	17.33	-2.201	1.856	0.324	16.22	-8.465	1.871	1.135	16.63	-6.151
83	1.851	18.03	1.865	0.756	17.2	-4.603	1.86	0.486	16.31	-9.540	1.873	1.189	16.83	-6.656
Average				0.786		-1.897		0.666		-8.968		1.148		-5.887
Min				0.596		-6.442		0.324		-16.252		0.648		-18.062
Max				0.919		5.376		0.865		8.132		1.572		15.524

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Wet Hot Reverse Biased Test

85°C/85%RH, VR=10V

Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
1	1.851	14.6	1.862	0.594	14.09	-3.493	1.867	0.864	14.61	0.068	1.883	1.729	14.66	0.411
2	1.85	16.14	1.859	0.486	15.91	-1.425	1.863	0.703	15.66	-2.974	1.866	0.865	15.57	-3.532
3	1.854	16.27	1.865	0.593	15.92	-2.151	1.869	0.809	16.5	1.414	1.871	0.917	16.37	0.615
4	1.858	15.6	1.867	0.484	15.13	-3.013	1.874	0.861	15.4	-1.282	1.874	0.861	15.26	-2.179
5	1.854	15.39	1.866	0.647	14.84	-3.574	1.871	0.917	15.47	0.520	1.866	0.647	16.41	6.628
6	1.849	16.63	1.86	0.595	16.6	-0.180	1.864	0.811	16.46	-1.022	1.873	1.298	15.93	-4.209
7	1.855	16.61	1.867	0.647	16.44	-1.023	1.871	0.863	16.78	1.023	1.871	0.863	15.6	-6.081
8	1.855	14.88	1.865	0.539	14.66	-1.478	1.872	0.916	15.07	1.277	1.868	0.701	14.39	-3.293
9	1.853	15.36	1.865	0.648	15.38	0.130	1.868	0.809	15.01	-2.279	1.865	0.648	14.84	-3.385
10	1.85	15.47	1.861	0.595	15.42	-0.323	1.867	0.919	15.53	0.388	1.865	0.811	14.98	-3.167
11	1.849	16.46	1.86	0.595	16.07	-2.369	1.864	0.811	16.36	-0.608	1.87	1.136	15.43	-6.258
12	1.852	16.54	1.863	0.594	15.86	-4.111	1.868	0.864	16.23	-1.874	1.893	2.214	15.1	-8.706
13	1.85	16.52	1.86	0.541	15.54	-5.932	1.87	1.081	15.58	-5.690	1.876	1.405	15.15	-8.293
14	1.851	15.77	1.862	0.594	16.29	3.297	1.867	0.864	16.19	2.663	1.864	0.702	16.5	4.629
15	1.853	16.5	1.865	0.648	16.69	1.152	1.87	0.917	16.77	1.636	1.872	1.025	15.96	-3.273
16	1.858	15.78	1.861	0.161	15.92	0.887	1.864	0.323	15.87	0.570	1.866	0.431	16.42	4.056
17	1.852	16.88	1.862	0.540	16.31	-3.377	1.867	0.810	16.26	-3.673	1.871	1.026	15.94	-5.569
18	1.853	16.57	1.864	0.594	16.08	-2.957	1.869	0.863	16.44	-0.785	1.888	1.889	15.51	-6.397
19	1.853	16.8	1.865	0.648	16.66	-0.833	1.871	0.971	16.27	-3.155	1.899	2.482	14.66	-12.738
20	1.85	15.63	1.863	0.703	15.2	-2.751	1.866	0.865	15.54	-0.576	1.896	2.486	14.65	-6.270
21	1.852	15.36	1.865	0.702	15.69	2.148	1.87	0.972	15.1	-1.693	1.871	1.026	15.73	2.409
22	1.852	16.27	1.865	0.702	16.01	-1.598	1.869	0.918	16.5	1.414	1.869	0.918	16.37	0.615
23	1.85	16.7	1.861	0.595	16.65	-0.299	1.866	0.865	16.69	-0.060	1.875	1.351	15.05	-9.880
24	1.85	16.2	1.861	0.595	15.02	-7.284	1.863	0.703	15.43	-4.753	1.867	0.919	15.77	-2.654
25	1.852	16.48	1.861	0.486	15.97	-3.095	1.865	0.702	15.91	-3.459	1.875	1.242	16.49	0.061
26	1.851	16.43	1.865	0.756	16.24	-1.156	1.869	0.972	16.83	2.435	1.879	1.513	15.59	-5.113
27	1.852	16.51	1.868	0.864	16.66	0.909	1.868	0.864	16.57	0.363	1.869	0.918	16.06	-2.726
28	1.854	16.6	1.865	0.593	16.27	-1.988	1.869	0.809	16.46	-0.843	1.865	0.593	16.54	-0.361
29	1.848	16.62	1.857	0.487	16.11	-3.069	1.863	0.812	16.4	-1.324	1.866	0.974	16.15	-2.828
30	1.853	16.97	1.865	0.648	16.62	-2.062	1.869	0.863	16.73	-1.414	1.869	0.863	15.24	-10.194
31	1.855	16.82	1.865	0.539	15.42	-8.323	1.872	0.916	16.35	-2.794	1.871	0.863	15.11	-10.166
32	1.854	15.23	1.867	0.701	14.98	-1.641	1.871	0.917	15.25	0.131	1.867	0.701	15.74	3.349
33	1.85	16.61	1.861	0.595	16.01	-3.612	1.865	0.811	16.49	-0.722	1.865	0.811	16.48	-0.783
34	1.854	16.61	1.866	0.647	16.03	-3.492	1.87	0.863	16.47	-0.843	1.863	0.485	15.22	-8.368
35	1.848	16.24	1.857	0.487	15.64	-3.695	1.862	0.758	16.23	-0.062	1.87	1.190	16.21	-0.185
36	1.852	16.76	1.865	0.702	15.81	-5.668	1.869	0.918	16.58	-1.074	1.862	0.540	15.07	-10.084
37	1.817	15.84	1.857	2.201	15.19	-4.104	1.862	2.477	15.45	-2.462	1.867	2.752	15.8	-0.253
38	1.849	16.84	1.859	0.541	15.97	-5.166	1.864	0.811	16.79	-0.297	1.869	1.082	15.63	-7.185
39	1.85	16.73	1.86	0.541	14.85	-11.237	1.864	0.757	15.01	-10.281	1.914	3.459	15.2	-9.145
40	1.854	15.33	1.867	0.701	14.33	-6.523	1.873	1.025	15.58	1.631	1.87	0.863	15.56	1.500
41	1.851	16.4	1.864	0.702	15.66	-4.512	1.87	1.026	16.1	-1.829	1.869	0.972	15.48	-5.610
42	1.852	16.7	1.864	0.648	15.34	-8.144	1.867	0.810	16.6	-0.599	1.867	0.810	15.75	-5.689
43	1.853	15.58	1.86	0.378	14.68	-5.777	1.866	0.702	15.58	0.000	1.893	2.159	15.09	-3.145
44	1.851	16.67	1.863	0.648	16.21	-2.759	1.867	0.864	16.47	-1.200	1.87	1.026	14.96	-10.258
45	1.851	15.21	1.862	0.594	14.68	-3.485	1.868	0.918	15.45	1.578	1.87	1.026	15.5	1.907

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Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
46	1.853	16.43	1.865	0.648	15.65	-4.747	1.869	0.863	16.45	0.122	1.872	1.025	15.05	-8.399
47	1.853	16.56	1.866	0.702	15.89	-4.046	1.868	0.809	16.23	-1.993	1.867	0.756	15.29	-7.669
48	1.846	16.54	1.858	0.650	15.79	-4.534	1.861	0.813	16.57	0.181	1.868	1.192	15.82	-4.353
49	1.852	15.51	1.864	0.648	14.58	-5.996	1.867	0.810	15.39	-0.774	1.87	0.972	16.01	3.224
50	1.853	16.04	1.865	0.648	16.53	3.055	1.869	0.863	16.7	4.115	1.87	0.917	15.61	-2.681
51	1.853	16.49	1.865	0.648	16.4	-0.546	1.869	0.863	16.72	1.395	1.891	2.051	15.58	-5.518
52	1.854	16.37	1.868	0.755	16.37	0.000	1.853	-0.054	15.79	-3.543	1.857	0.162	14.82	-9.469
53	1.841	16.11	1.852	0.598	15.74	-2.297	1.855	0.760	16.02	-0.559	1.871	1.630	15.28	-5.152
54	1.854	16.58	1.865	0.593	16.4	-1.086	1.868	0.755	16.65	0.422	1.873	1.025	15.66	-5.549
55	1.855	16.15	1.865	0.539	15.01	-7.059	1.871	0.863	15.92	-1.424	1.871	0.863	15.47	-4.211
56	1.851	16.7	1.863	0.648	15.22	-8.862	1.869	0.972	16.05	-3.892	1.869	0.972	14.48	-13.293
57	1.849	16.73	1.859	0.541	16.25	-2.869	1.864	0.811	16.49	-1.435	1.869	1.082	15.7	-6.157
58	1.859	16.53	1.866	0.377	14.99	-9.316	1.874	0.807	15.59	-5.687	1.869	0.538	16.22	-1.875
59	1.852	16.39	1.865	0.702	15.64	-4.576	1.868	0.864	16.56	1.037	1.868	0.864	15.97	-2.563
60	1.851	16.76	1.862	0.594	16.07	-4.117	1.867	0.864	16.25	-3.043	1.865	0.756	15.81	-5.668
61	1.848	16.39	1.859	0.595	16.31	-0.488	1.864	0.866	16.7	1.891	1.867	1.028	15.76	-3.844
62	1.851	15.63	1.862	0.594	14.85	-4.990	1.866	0.810	15.7	0.448	1.926	4.052	14.39	-7.933
63	1.852	15.33	1.865	0.702	15.15	-1.174	1.87	0.972	15.51	1.174	1.863	0.594	15.44	0.718
64	1.847	16.36	1.857	0.541	15.83	-3.240	1.862	0.812	16.23	-0.795	1.874	1.462	15.83	-3.240
65	1.851	16.3	1.862	0.594	15.5	-4.908	1.866	0.810	15.86	-2.699	1.87	1.026	16.2	-0.613
66	1.851	16.92	1.862	0.594	16.14	-4.610	1.866	0.810	16.98	0.355	1.901	2.701	15.34	-9.338
67	1.847	16.53	1.856	0.487	15.91	-3.751	1.868	1.137	16.16	-2.238	1.864	0.920	15.68	-5.142
68	1.846	16.42	1.858	0.650	15.95	-2.862	1.863	0.921	16.72	1.827	1.869	1.246	16.75	2.010
69	1.851	16.84	1.866	0.810	16.72	-0.713	1.867	0.864	17.23	2.316	1.87	1.026	16.14	-4.157
70	1.858	16.86	1.865	0.377	16	-5.101	1.869	0.592	16.96	0.593	1.87	0.646	15.29	-9.312
71	1.853	15.25	1.866	0.702	14.28	-6.361	1.868	0.809	15.22	-0.197	1.875	1.187	14.28	-6.361
72	1.852	15.61	1.865	0.702	15.3	-1.986	1.87	0.972	15.68	0.448	1.874	1.188	15.49	-0.769
73	1.852	16.65	1.865	0.702	15.94	-4.264	1.869	0.918	16.56	-0.541	1.871	1.026	15.86	-4.745
74	1.853	16.7	1.866	0.702	16.41	-1.737	1.869	0.863	16.81	0.659	1.868	0.809	15.9	-4.790
75	1.852	16.64	1.865	0.702	16.28	-2.163	1.868	0.864	16.69	0.300	1.869	0.918	15.27	-8.233
76	1.847	16.52	1.86	0.704	16.25	-1.634	1.864	0.920	16.6	0.484	1.87	1.245	15.39	-6.840
77	1.852	15.34	1.866	0.756	14.75	-3.846	1.868	0.864	15.47	0.847	1.873	1.134	15.19	-0.978
78	1.852	16.78	1.865	0.702	15.99	-4.708	1.868	0.864	16.46	-1.907	1.903	2.754	14.96	-10.846
79	1.854	16.71	1.865	0.593	15.71	-5.984	1.868	0.755	14.74	-11.789	1.882	1.510	14.86	-11.071
80	1.853	15.28	1.865	0.648	14.73	-3.599	1.869	0.863	14.6	-4.450	1.869	0.863	15.48	1.309
81	1.853	16.6	1.864	0.594	16.05	-3.313	1.869	0.863	16.05	-3.313	1.935	4.425	16.45	-0.904
Average				0.633		-3.180		0.861		-0.916		1.232		-4.151
Min				0.161		-11.237		-0.054		-11.789		0.162		-13.293
Max				2.201		3.297		2.477		4.115		4.425		6.628

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Wet High Temperature Operating Life Test

T=85°C/85°C, 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	IV	VF	%	IV	%	VF	%	IV	%	VF	%	IV	%
1	1.82	11.6	1.821	0.05	11.6	0.00	1.821	0.05	11.59	-0.09	1.823	0.16	11.66	0.52
2	1.822	12.93	1.822	0.00	12.82	-0.85	1.822	0.00	12.75	-1.39	1.823	0.05	12.73	-1.55
3	1.824	12.67	1.824	0.00	12.62	-0.39	1.824	0.00	12.6	-0.55	1.825	0.05	12.76	0.71
4	1.824	12.72	1.824	0.00	12.77	0.39	1.825	0.05	12.93	1.65	1.827	0.16	13.01	2.28
5	1.827	12.89	1.825	-0.11	12.56	-2.56	1.833	0.33	12.64	-1.94	1.834	0.38	12.64	-1.94
6	1.824	11.21	1.824	0.00	11.35	1.25	1.824	0.00	11.13	-0.71	1.825	0.05	11.26	0.45
7	1.82	12.41	1.821	0.05	12.55	1.13	1.821	0.05	12.53	0.97	1.822	0.11	12.54	1.05
8	1.822	12.78	1.822	0.00	12.91	1.02	1.822	0.00	12.67	-0.86	1.823	0.05	12.88	0.78
9	1.823	12.88	1.825	0.11	13.09	1.63	1.823	0.00	13.02	1.09	1.825	0.11	13.02	1.09
10	1.824	12.55	1.824	0.00	12.63	0.64	1.824	0.00	12.62	0.56	1.827	0.16	12.67	0.96
11	1.824	12.76	1.825	0.05	12.96	1.57	1.824	0.00	12.66	-0.78	1.827	0.16	12.73	-0.24
12	1.826	12.92	1.826	0.00	12.93	0.08	1.825	-0.05	12.43	-3.79	1.827	0.05	12.43	-3.79
13	1.824	12.51	1.823	-0.05	12.61	0.80	1.823	-0.05	12.43	-0.64	1.825	0.05	12.34	-1.36
14	1.825	12.92	1.824	-0.05	13.02	0.77	1.824	-0.05	12.91	-0.08	1.826	0.05	13	0.62
15	1.821	11.62	1.821	0.00	11.78	1.38	1.82	-0.05	11.78	1.38	1.823	0.11	11.83	1.81
16	1.825	13.07	1.825	0.00	12.91	-1.22	1.822	-0.16	12.33	-5.66	1.827	0.11	12.66	-3.14
17	1.823	12.77	1.823	0.00	12.81	0.31	1.822	-0.05	12.3	-3.68	1.824	0.05	12.18	-4.62
18	1.826	12.91	1.824	-0.11	12.97	0.46	1.824	-0.11	12.79	-0.93	1.827	0.05	12.87	-0.31
19	1.822	11.43	1.822	0.00	11.85	3.67	1.821	-0.05	11.77	2.97	1.823	0.05	11.93	4.37
20	1.823	12.79	1.824	0.05	12.92	1.02	1.823	0.00	12.75	-0.31	1.826	0.16	13.05	2.03
21	1.823	13.01	1.823	0.00	12.95	-0.46	1.822	-0.05	12.97	-0.31	1.825	0.11	12.91	-0.77
22	1.825	13.78	1.825	0.00	13.57	-1.52	1.824	-0.05	13.11	-4.86	1.827	0.11	13.43	-2.54
23	1.824	12.75	1.823	-0.05	12.75	0.00	1.822	-0.11	12.68	-0.55	1.826	0.11	12.75	0.00
24	1.825	12.72	1.828	0.16	12.74	0.16	1.866	2.25	12.45	-2.12	1.847	1.21	12.76	0.31
25	1.824	12.52	1.823	-0.05	12.61	0.72	1.822	-0.11	12.33	-1.52	1.826	0.11	11.55	-7.75
26	1.825	12.63	1.823	-0.11	12.45	-1.43	1.82	-0.27	12.06	-4.51	1.824	-0.05	12.09	-4.28
27	1.825	12.72	1.823	-0.11	12.62	-0.79	1.823	-0.11	11.9	-6.45	1.824	-0.05	11.56	-9.12
28	1.825	11.27	1.823	-0.11	11.19	-0.71	1.822	-0.16	11.05	-1.95	1.824	-0.05	10.98	-2.57
29	1.825	12.98	1.824	-0.05	13.01	0.23	1.823	-0.11	12.41	-4.39	1.825	0.00	12.7	-2.16
30	1.821	12.18	1.821	0.00	12.17	-0.08	1.819	-0.11	12.1	-0.66	1.821	0.00	12.32	1.15
31	1.824	12.77	1.825	0.05	13	1.80	1.825	0.05	12.83	0.47	1.826	0.11	12.85	0.63
32	1.821	12.16	1.823	0.11	12.28	0.99	1.823	0.11	11.96	-1.64	1.822	0.05	11.86	-2.47
33	1.825	12.84	1.826	0.05	12.95	0.86	1.825	0.00	12.85	0.08	1.827	0.11	12.9	0.47
34	1.824	11.64	1.823	-0.05	11.8	1.37	1.824	0.00	11.67	0.26	1.825	0.05	11.88	2.06
35	1.818	11.35	1.82	0.11	11.52	1.50	1.82	0.11	11.55	1.76	1.821	0.17	11.6	2.20
36	1.822	12.89	1.823	0.05	12.97	0.62	1.821	-0.05	12.31	-4.50	1.823	0.05	12.38	-3.96
37	1.825	12.93	1.825	0.00	12.99	0.46	1.822	-0.16	12.57	-2.78	1.826	0.05	12.39	-4.18
38	1.825	12.88	1.825	0.00	13.05	1.32	1.824	-0.05	12.58	-2.33	1.827	0.11	12.81	-0.54
39	1.826	12.83	1.827	0.05	13.05	1.71	1.824	-0.11	12.68	-1.17	1.828	0.11	12.98	1.17
40	1.825	12.67	1.826	0.05	12.86	1.50	1.824	-0.05	12.69	0.16	1.827	0.11	12.9	1.82

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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	IV	VF	%	IV	%	VF	%	IV	%	VF	%	IV	%
41	1.816	10.26	1.816	0.00	10.31	0.49	1.814	-0.11	10.13	-1.27	1.818	0.11	10.2	-0.58
42	1.824	13.02	1.823	-0.05	12.93	-0.69	1.822	-0.11	12.63	-3.00	1.826	0.11	12.74	-2.15
43	1.825	12.54	1.825	0.00	12.57	0.24	1.823	-0.11	12.3	-1.91	1.827	0.11	12.52	-0.16
44	1.824	12.78	1.824	0.00	12.85	0.55	1.822	-0.11	12.64	-1.10	1.825	0.05	12.63	-1.17
45	1.822	12.42	1.822	0.00	12.41	-0.08	1.821	-0.05	12.24	-1.45	1.824	0.11	12.46	0.32
46	1.821	12.58	1.823	0.11	12.75	1.35	1.819	-0.11	12.32	-2.07	1.823	0.11	12.46	-0.95
47	1.826	12.54	1.824	-0.11	12.56	0.16	1.822	-0.22	10.83	-13.64	1.825	-0.05	12.32	-1.75
48	1.825	12.79	1.827	0.11	12.94	1.17	1.832	0.38	12.53	-2.03	1.831	0.33	12.74	-0.39
49	1.82	12.64	1.821	0.05	12.9	2.06	1.818	-0.11	12.55	-0.71	1.822	0.11	12.62	-0.16
50	1.824	12.78	1.825	0.05	12.74	-0.31	1.824	0.00	12.51	-2.11	1.826	0.11	12.14	-5.01
51	1.822	12.2	1.821	-0.05	12.24	0.33	1.821	-0.05	12.15	-0.41	1.823	0.05	12.19	-0.08
52	1.823	12.81	1.821	-0.11	12.61	-1.56	1.822	-0.05	12.51	-2.34	1.823	0.00	12.42	-3.04
53	1.826	12.87	1.825	-0.05	12.87	0.00	1.824	-0.11	12.65	-1.71	1.827	0.05	12.84	-0.23
54	1.825	12.88	1.823	-0.11	13.1	1.71	1.822	-0.16	12.76	-0.93	1.827	0.11	13.11	1.79
55	1.824	12.49	1.824	0.00	12.66	1.36	1.823	-0.05	12.49	0.00	1.827	0.16	12.83	2.72
56	1.824	12.36	1.824	0.00	12.61	2.02	1.824	0.00	12.36	0.00	1.827	0.16	12.3	-0.49
57	1.825	13.05	1.823	-0.11	13	-0.38	1.822	-0.16	12.78	-2.07	1.825	0.00	12.89	-1.23
58	1.826	12.93	1.825	-0.05	13.08	1.16	1.824	-0.11	12.32	-4.72	1.828	0.11	12.1	-6.42
59	1.821	12.76	1.822	0.05	12.95	1.49	1.82	-0.05	12.71	-0.39	1.823	0.11	13	1.88
60	1.825	11.64	1.827	0.11	11.85	1.80	1.825	0.00	11.38	-2.23	1.828	0.16	11.72	0.69
61	1.822	12.17	1.822	0.00	12.22	0.41	1.823	0.05	12.15	-0.16	1.825	0.16	12.32	1.23
62	1.825	12.93	1.824	-0.05	12.68	-1.93	1.825	0.00	12.64	-2.24	1.827	0.11	12.59	-2.63
63	1.824	13.06	1.823	-0.05	12.93	-1.00	1.823	-0.05	12.92	-1.07	1.826	0.11	12.81	-1.91
64	1.824	12.81	1.824	0.00	12.82	0.08	1.824	0.00	12.83	0.16	1.827	0.16	12.87	0.47
65	1.822	12.16	1.825	0.16	12.12	-0.33	1.826	0.22	12.11	-0.41	1.827	0.27	12.23	0.58
66	1.823	12.73	1.822	-0.05	12.68	-0.39	1.824	0.05	12.66	-0.55	1.825	0.11	12.76	0.24
67	1.825	12.82	1.822	-0.16	12.49	-2.57	1.823	-0.11	12.43	-3.04	1.826	0.05	12.51	-2.42
68	1.822	12.9	1.821	-0.05	12.85	-0.39	1.821	-0.05	12.78	-0.93	1.823	0.05	12.76	-1.09
69	1.823	12.33	1.823	0.00	12.38	0.41	1.822	-0.05	12.35	0.16	1.826	0.16	12.41	0.65
70	1.822	12.42	1.824	0.11	12.62	1.61	1.823	0.05	12.43	0.08	1.827	0.27	12.75	2.66
71	1.824	13.05	1.825	0.05	13.12	0.54	1.821	-0.16	12.77	-2.15	1.826	0.11	13.12	0.54
72	1.823	13.11	1.823	0.00	13.2	0.69	1.821	-0.11	12.89	-1.68	1.825	0.11	12.99	-0.92
73	1.825	12.73	1.825	0.00	12.95	1.73	1.824	-0.05	12.71	-0.16	1.827	0.11	12.8	0.55
74	1.824	12.64	1.825	0.05	12.81	1.34	1.823	-0.05	12.53	-0.87	1.826	0.11	12.45	-1.50
75	1.821	12.16	1.823	0.11	12.43	2.22	1.821	0.00	12.26	0.82	1.824	0.16	12.37	1.73
76	1.824	12.91	1.824	0.00	13.04	1.01	1.822	-0.11	12.66	-1.94	1.823	-0.05	12.22	-5.34
77	1.823	12.53	1.822	-0.05	12.51	-0.16	1.82	-0.16	12.15	-3.03	1.821	-0.11	11.96	-4.55
78	1.824	12.29	1.824	0.00	12.55	2.12	1.822	-0.11	12.17	-0.98	1.824	0.00	12.18	-0.90
79	1.823	12.72	1.825	0.11	12.99	2.12	1.823	0.00	12.57	-1.18	1.825	0.11	12.84	0.94
80	1.82	11.26	1.822	0.11	11.51	2.22	1.82	0.00	11.33	0.62	1.822	0.11	11.4	1.24
Average				0.003		0.524		-0.014		-1.406		0.110		-0.721
Min				-0.164		-2.574		-0.274		-13.636		-0.110		-9.119
Max				0.165		3.675		2.247		2.975		1.205		4.374

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Low Temperature Storage Test

T= -40°C

Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
1	1.85	16.54	1.867	0.919	16.6	0.363	1.863	0.703	15.73	-4.897	1.868	0.973	15.56	-5.925
2	1.848	18.16	1.863	0.812	17.72	-2.423	1.859	0.595	16.33	-10.077	1.863	0.812	16.92	-6.828
3	1.848	18.13	1.862	0.758	17.84	-1.600	1.858	0.541	16.22	-10.535	1.863	0.812	17.09	-5.736
4	1.848	17	1.864	0.866	16.93	-0.412	1.859	0.595	15.52	-8.706	1.865	0.920	15.9	-6.471
5	1.846	18.26	1.861	0.813	18.5	1.314	1.859	0.704	16.96	-7.119	1.864	0.975	17.44	-4.491
6	1.851	18.33	1.867	0.864	18.66	1.800	1.867	0.864	16.9	-7.801	1.866	0.810	17.19	-6.219
7	1.848	16.92	1.864	0.866	17.04	0.709	1.862	0.758	15.61	-7.742	1.863	0.812	15.57	-7.979
8	1.849	16.74	1.864	0.811	16.55	-1.135	1.862	0.703	15.49	-7.467	1.866	0.919	15.6	-6.810
9	1.847	16.75	1.861	0.758	16.87	0.716	1.861	0.758	15.41	-8.000	1.863	0.866	15.85	-5.373
10	1.85	18.02	1.866	0.865	18.06	0.222	1.866	0.865	16.56	-8.102	1.867	0.919	16.75	-7.048
11	1.846	17.68	1.862	0.867	17.97	1.640	1.861	0.813	16.55	-6.391	1.863	0.921	16.93	-4.242
12	1.845	18.11	1.861	0.867	18.35	1.325	1.859	0.759	16.74	-7.565	1.861	0.867	17.15	-5.301
13	1.846	16.95	1.862	0.867	17	0.295	1.859	0.704	15.86	-6.431	1.86	0.758	15.78	-6.903
14	1.848	17.94	1.863	0.812	18.41	2.620	1.862	0.758	16.98	-5.351	1.863	0.812	16.84	-6.132
15	1.849	18.33	1.865	0.865	18.6	1.473	1.864	0.811	17.16	-6.383	1.865	0.865	17.31	-5.565
16	1.849	18.19	1.864	0.811	18.62	2.364	1.863	0.757	16.88	-7.202	1.866	0.919	17.36	-4.563
17	1.851	18.13	1.868	0.918	17.83	-1.655	1.865	0.756	17.05	-5.957	1.868	0.918	17.12	-5.571
18	1.847	18.24	1.861	0.758	18.47	1.261	1.859	0.650	16.72	-8.333	1.861	0.758	17.02	-6.689
19	1.848	16.85	1.862	0.758	17.02	1.009	1.861	0.703	15.81	-6.172	1.864	0.866	15.79	-6.291
20	1.85	18.01	1.867	0.919	18.15	0.777	1.865	0.811	16.44	-8.717	1.869	1.027	17	-5.608
21	1.851	16.65	1.868	0.918	17.02	2.222	1.866	0.810	15.44	-7.267	1.87	1.026	15.73	-5.526
22	1.847	16.85	1.864	0.920	16.82	-0.178	1.861	0.758	15.29	-9.258	1.866	1.029	15.42	-8.487
23	1.851	18.61	1.866	0.810	19.11	2.687	1.864	0.702	17.71	-4.836	1.869	0.972	17.37	-6.663
24	1.847	18.06	1.862	0.812	18.15	0.498	1.861	0.758	16.92	-6.312	1.865	0.975	17.18	-4.873
25	1.847	18.42	1.862	0.812	18.09	-1.792	1.861	0.758	17.49	-5.049	1.865	0.975	17.2	-6.623
26	1.848	18.07	1.864	0.866	18	-0.387	1.862	0.758	17.17	-4.981	1.865	0.920	16.93	-6.309
27	1.848	18.33	1.864	0.866	18.49	0.873	1.862	0.758	17.55	-4.255	1.866	0.974	17.33	-5.456
28	1.85	18.17	1.863	0.703	17.99	-0.991	1.863	0.703	16.64	-8.420	1.866	0.865	17.02	-6.329
29	1.851	17.82	1.864	0.702	17.87	0.281	1.866	0.810	16.86	-5.387	1.868	0.918	16.79	-5.780
30	1.849	18.4	1.863	0.757	18.2	-1.087	1.864	0.811	17.34	-5.761	1.867	0.973	15.87	-13.750
31	1.85	17.88	1.864	0.757	17.62	-1.454	1.864	0.757	16.93	-5.313	1.866	0.865	17.05	-4.642
32	1.85	16.9	1.864	0.757	16.53	-2.189	1.865	0.811	15.6	-7.692	1.867	0.919	16.04	-5.089
33	1.852	18	1.864	0.648	17.66	-1.889	1.865	0.702	16.86	-6.333	1.867	0.810	16.9	-6.111
34	1.851	17.92	1.864	0.702	18.07	0.837	1.862	0.594	16.71	-6.752	1.868	0.918	17.02	-5.022
35	1.846	16.36	1.859	0.704	16.55	1.161	1.856	0.542	15.28	-6.601	1.861	0.813	15.78	-3.545
36	1.849	18.63	1.863	0.757	18.84	1.127	1.862	0.703	16.89	-9.340	1.866	0.919	17.3	-7.139
37	1.851	17.99	1.866	0.810	18.03	0.222	1.865	0.756	16.18	-10.061	1.87	1.026	15.85	-11.895
38	1.845	17.73	1.857	0.650	17.81	0.451	1.856	0.596	16.69	-5.866	1.86	0.813	16.6	-6.373
39	1.848	17.31	1.861	0.703	17.7	2.253	1.86	0.649	17.06	-1.444	1.866	0.974	16.19	-6.470
40	1.852	18.42	1.866	0.756	18.47	0.271	1.864	0.648	16.83	-8.632	1.87	0.972	16.22	-11.944
41	1.849	16.74	1.863	0.757	16.86	0.717	1.86	0.595	15.04	-10.155	1.867	0.973	15.81	-5.556
42	1.851	18.25	1.867	0.864	18.66	2.247	1.864	0.702	16.72	-8.384	1.87	1.026	17.26	-5.425
43	1.847	16.8	1.86	0.704	16.83	0.179	1.857	0.541	15.74	-6.310	1.863	0.866	15.42	-8.214
44	1.847	18.29	1.861	0.758	18.52	1.258	1.859	0.650	16.95	-7.326	1.864	0.920	16.96	-7.272
45	1.845	16.69	1.856	0.596	16.92	1.378	1.857	0.650	15.69	-5.992	1.862	0.921	15.41	-7.669

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Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
46	1.849	17.93	1.867	0.973	18.07	0.781	1.864	0.811	17.09	-4.685	1.871	1.190	17.27	-3.681
47	1.85	18.01	1.867	0.919	18.02	0.056	1.864	0.757	16.47	-8.551	1.869	1.027	17.24	-4.275
48	1.846	16.89	1.861	0.813	17.03	0.829	1.859	0.704	16.09	-4.737	1.863	0.921	15.91	-5.802
49	1.847	17.84	1.863	0.866	17.93	0.504	1.859	0.650	16.69	-6.446	1.865	0.975	17.02	-4.596
50	1.85	18.24	1.867	0.919	18.58	1.864	1.864	0.757	16.96	-7.018	1.87	1.081	17.37	-4.770
51	1.848	18.32	1.862	0.758	18.2	-0.655	1.861	0.703	16.51	-9.880	1.866	0.974	17.3	-5.568
52	1.851	18.5	1.865	0.756	18.42	-0.432	1.863	0.648	17.29	-6.541	1.869	0.972	17.63	-4.703
53	1.844	18.18	1.854	0.542	17.71	-2.585	1.854	0.542	16.23	-10.726	1.859	0.813	16.85	-7.316
54	1.847	18.11	1.86	0.704	17.6	-2.816	1.859	0.650	16.57	-8.504	1.864	0.920	17.2	-5.025
55	1.848	18.3	1.861	0.703	17.98	-1.749	1.861	0.703	17.06	-6.776	1.866	0.974	17.4	-4.918
56	1.851	18.62	1.865	0.756	18.75	0.698	1.862	0.594	17.44	-6.337	1.871	1.080	17.6	-5.478
57	1.851	18.11	1.864	0.702	18.24	0.718	1.862	0.594	16.91	-6.626	1.87	1.026	17.42	-3.810
58	1.851	18.15	1.866	0.810	18.1	-0.275	1.863	0.648	16.42	-9.532	1.87	1.026	16.88	-6.997
59	1.849	17.62	1.865	0.865	17.55	-0.397	1.862	0.703	16.02	-9.081	1.869	1.082	16.78	-4.767
60	1.85	18.28	1.864	0.757	18.63	1.915	1.863	0.703	17.55	-3.993	1.869	1.027	17.26	-5.580
61	1.851	17.78	1.866	0.810	17.73	-0.281	1.866	0.810	16.72	-5.962	1.87	1.026	17.14	-3.600
62	1.846	18.04	1.859	0.704	17.58	-2.550	1.858	0.650	16.03	-11.142	1.864	0.975	17.1	-5.211
63	1.847	17.85	1.86	0.704	17.57	-1.569	1.859	0.650	16.15	-9.524	1.865	0.975	17	-4.762
64	1.847	18.17	1.86	0.704	17.92	-1.376	1.857	0.541	16.48	-9.301	1.864	0.920	17.08	-5.999
65	1.85	16.72	1.864	0.757	16.82	0.598	1.862	0.649	15.57	-6.878	1.87	1.081	16.08	-3.828
66	1.853	16.81	1.866	0.702	17.17	2.142	1.864	0.594	16.15	-3.926	1.87	0.917	15.98	-4.938
67	1.852	18.01	1.864	0.648	17.69	-1.777	1.863	0.594	16.84	-6.496	1.87	0.972	17.31	-3.887
68	1.851	16.76	1.862	0.594	16.82	0.358	1.861	0.540	15.54	-7.279	1.868	0.918	16.04	-4.296
69	1.851	16.66	1.865	0.756	16.72	0.360	1.862	0.594	15.44	-7.323	1.869	0.972	15.76	-5.402
70	1.849	18.53	1.865	0.865	18.59	0.324	1.861	0.649	17.3	-6.638	1.866	0.919	17.62	-4.911
71	1.844	17.89	1.858	0.759	17.66	-1.286	1.855	0.597	16.72	-6.540	1.863	1.030	17.04	-4.751
72	1.85	18.02	1.864	0.757	18.28	1.443	1.862	0.649	16.59	-7.936	1.869	1.027	17.19	-4.606
73	1.85	18.23	1.864	0.757	18.33	0.549	1.86	0.541	16.89	-7.351	1.869	1.027	17.51	-3.950
74	1.85	16.75	1.863	0.703	16.54	-1.254	1.861	0.595	15.78	-5.791	1.868	0.973	16.04	-4.239
75	1.849	18.15	1.865	0.865	18.04	-0.606	1.862	0.703	16.61	-8.485	1.867	0.973	17.5	-3.581
76	1.847	16.88	1.862	0.812	16.88	0.000	1.86	0.704	15.32	-9.242	1.864	0.920	15.98	-5.332
77	1.847	16.85	1.861	0.758	16.75	-0.593	1.859	0.650	15.15	-10.089	1.864	0.920	15.99	-5.104
78	1.851	18.4	1.865	0.756	18.31	-0.489	1.862	0.594	16.76	-8.913	1.868	0.918	17.23	-6.359
79	1.846	17.7	1.86	0.758	17.21	-2.768	1.857	0.596	18.77	6.045	1.863	0.921	17.78	0.452
80	1.852	17.85	1.866	0.756	18.28	2.409	1.863	0.594	16.48	-7.675	1.869	0.918	16.95	-5.042
81	1.851	17.77	1.864	0.702	17.68	-0.506	1.866	0.810	16.81	-5.402	1.87	1.026	16.74	-5.796
82	1.849	17.98	1.864	0.811	18.27	1.613	1.863	0.757	17.23	-4.171	1.868	1.028	17.56	-2.336
83	1.849	18.07	1.862	0.703	17.73	-1.882	1.861	0.649	16.91	-6.419	1.865	0.865	17.07	-5.534
84	1.848	18.37	1.861	0.703	18.11	-1.415	1.859	0.595	17.46	-4.954	1.866	0.974	17.32	-5.716
85	1.85	16.86	1.866	0.865	16.92	0.356	1.865	0.811	15.58	-7.592	1.869	1.027	16.17	-4.093
86	1.85	18.13	1.863	0.703	18.01	-0.662	1.864	0.757	16.83	-7.170	1.867	0.919	17.14	-5.461
87	1.851	16.62	1.865	0.756	16.85	1.384	1.866	0.810	15.45	-7.040	1.87	1.026	15.85	-4.633
88	1.846	18.14	1.859	0.704	17.81	-1.819	1.859	0.704	17.26	-4.851	1.864	0.975	17.48	-3.638
89	1.85	17.99	1.864	0.757	17.86	-0.723	1.862	0.649	16.89	-6.115	1.868	0.973	16.71	-7.115
90	1.849	18.41	1.864	0.811	18.1	-1.684	1.863	0.757	16.78	-8.854	1.868	1.028	17.32	-5.921
Average				0.779		0.068		0.690		-6.990		0.946		-5.653
Min				0.542		-2.816		0.540		-11.142		0.758		-13.750
Max				0.973		2.687		0.865		6.045		1.190		0.452

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High Temperature Storage Test

T=100°C

Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
1	1.845	17.54	1.861	0.867	17.32	-1.254	1.862	0.921	16.31	-7.013	1.862	0.921	17.05	-2.794
2	1.85	16.14	1.864	0.757	16.25	0.682	1.863	0.703	15.22	-5.700	1.868	0.973	15.62	-3.222
3	1.846	16.44	1.859	0.704	15.76	-4.136	1.861	0.813	15.14	-7.908	1.863	0.921	15.66	-4.745
4	1.846	17.62	1.86	0.758	17.18	-2.497	1.862	0.867	15.6	-11.464	1.864	0.975	16.8	-4.654
5	1.844	17.72	1.858	0.759	17.45	-1.524	1.858	0.759	16.63	-6.151	1.863	1.030	16.84	-4.966
6	1.85	18.09	1.867	0.919	18.48	2.156	1.869	1.027	16.83	-6.965	1.868	0.973	17.3	-4.367
7	1.85	17.63	1.867	0.919	17.26	-2.099	1.866	0.865	16.43	-6.807	1.867	0.919	16.69	-5.332
8	1.848	17.96	1.863	0.812	17.48	-2.673	1.863	0.812	16.23	-9.633	1.866	0.974	17.06	-5.011
9	1.846	17.92	1.861	0.813	17.63	-1.618	1.861	0.813	17.59	-1.842	1.864	0.975	17.05	-4.855
10	1.85	18.29	1.866	0.865	18.3	0.055	1.866	0.865	16.99	-7.108	1.868	0.973	17.24	-5.741
11	1.847	17.93	1.866	1.029	18.15	1.227	1.866	1.029	17.25	-3.793	1.866	1.029	16.49	-8.031
12	1.848	17.97	1.865	0.920	18.06	0.501	1.864	0.866	16.9	-5.954	1.866	0.974	16.81	-6.455
13	1.85	16.11	1.865	0.811	15.91	-1.241	1.864	0.757	14.86	-7.759	1.867	0.919	15.1	-6.269
14	1.847	16.77	1.862	0.812	16.62	-0.894	1.862	0.812	15.5	-7.573	1.863	0.866	15.83	-5.605
15	1.847	16.69	1.865	0.975	17.23	3.235	1.865	0.975	16.88	1.138	1.865	0.975	15.7	-5.932
16	1.848	18.07	1.865	0.920	18.27	1.107	1.863	0.812	16.71	-7.526	1.867	1.028	16.42	-9.131
17	1.85	18.15	1.866	0.865	17.77	-2.094	1.865	0.811	16.38	-9.752	1.867	0.919	17.01	-6.281
18	1.85	16.64	1.864	0.757	16.86	1.322	1.865	0.811	15.4	-7.452	1.867	0.919	15.38	-7.572
19	1.848	18.24	1.865	0.920	18.72	2.632	1.862	0.758	17.08	-6.360	1.865	0.920	17.22	-5.592
20	1.849	18.06	1.867	0.973	18.32	1.440	1.865	0.865	16.85	-6.700	1.867	0.973	17.25	-4.485
21	1.85	17.59	1.866	0.865	17.66	0.398	1.866	0.865	16.89	-3.980	1.867	0.919	16.98	-3.468
22	1.849	17.9	1.865	0.865	17.26	-3.575	1.865	0.865	16.97	-5.196	1.866	0.919	16.92	-5.475
23	1.848	17.89	1.862	0.758	17.8	-0.503	1.863	0.812	16.7	-6.652	1.865	0.920	16.81	-6.037
24	1.85	17.78	1.863	0.703	17.58	-1.125	1.866	0.865	16.15	-9.168	1.866	0.865	16.85	-5.231
25	1.846	18.2	1.861	0.813	18.32	0.659	1.863	0.921	17.2	-5.495	1.863	0.921	17.22	-5.385
26	1.85	17.71	1.866	0.865	17.7	-0.056	1.868	0.973	16.34	-7.736	1.868	0.973	16.88	-4.687
27	1.85	18.01	1.866	0.865	18.13	0.666	1.867	0.919	16.39	-8.995	1.869	1.027	16.98	-5.719
28	1.847	18.11	1.862	0.812	18.05	-0.331	1.863	0.866	16.71	-7.731	1.864	0.920	17.1	-5.577
29	1.85	17.86	1.865	0.811	17.71	-0.840	1.866	0.865	16.34	-8.511	1.866	0.865	16.57	-7.223
30	1.848	18.15	1.863	0.812	18.28	0.716	1.865	0.920	16.93	-6.722	1.865	0.920	17.24	-5.014
31	1.85	18.03	1.866	0.865	17.93	-0.555	1.865	0.811	16.88	-6.378	1.867	0.919	17.41	-3.439
32	1.85	18	1.865	0.811	17.7	-1.667	1.867	0.919	16.96	-5.778	1.867	0.919	17.2	-4.444
33	1.849	18.15	1.864	0.811	18.2	0.275	1.863	0.757	16.54	-8.871	1.864	0.811	17.2	-5.234
34	1.846	18.14	1.862	0.867	17.82	-1.764	1.86	0.758	16.42	-9.482	1.862	0.867	17.03	-6.119
35	1.85	16.58	1.867	0.919	16.67	0.543	1.866	0.865	15.21	-8.263	1.867	0.919	15.8	-4.704
36	1.847	18.11	1.864	0.920	17.84	-1.491	1.862	0.812	16.24	-10.326	1.865	0.975	16.61	-8.283
37	1.851	18.26	1.866	0.810	18.08	-0.986	1.864	0.702	16.96	-7.119	1.868	0.918	17.29	-5.312
38	1.848	16.73	1.863	0.812	16.46	-1.614	1.861	0.703	15.02	-10.221	1.866	0.974	15.69	-6.216
39	1.847	16.96	1.862	0.812	17.14	1.061	1.858	0.596	16.36	-3.538	1.861	0.758	15.96	-5.896
40	1.847	18.3	1.863	0.866	18.68	2.077	1.86	0.704	16.9	-7.650	1.863	0.866	17.34	-5.246
41	1.846	17.64	1.863	0.921	17.88	1.361	1.861	0.813	16.97	-3.798	1.863	0.921	16.75	-5.045
42	1.846	16.51	1.864	0.975	16.55	0.242	1.862	0.867	15.32	-7.208	1.865	1.029	15.77	-4.482
43	1.849	18.09	1.864	0.811	17.63	-2.543	1.864	0.811	16.77	-7.297	1.867	0.973	16.98	-6.136
44	1.846	16.74	1.86	0.758	16.64	-0.597	1.862	0.867	15.75	-5.914	1.863	0.921	16.07	-4.002
45	1.844	17.79	1.857	0.705	17.98	1.068	1.859	0.813	16.66	-6.352	1.861	0.922	16.98	-4.553

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Unit no.	0 hr	0 hr	168 hr	Delta Vf %	168 hrs	Delta Iv %	504 hrs	Delta Vf %	504 hrs	Delta Iv %	1000 hrs	Delta Vf %	1000 hrs	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
46	1.846	17.6	1.861	0.813	17.24	-2.045	1.863	0.921	16.5	-6.250	1.863	0.921	16.81	-4.489
47	1.847	17.91	1.864	0.920	17.93	0.112	1.865	0.975	16.64	-7.091	1.867	1.083	17.01	-5.025
48	1.849	16.63	1.862	0.703	16.29	-2.044	1.864	0.811	15.94	-4.149	1.866	0.919	15.81	-4.931
49	1.848	16.5	1.862	0.758	16.48	-0.121	1.862	0.758	15.29	-7.333	1.865	0.920	15.7	-4.848
50	1.845	18.27	1.859	0.759	18.49	1.204	1.858	0.705	17.35	-5.036	1.861	0.867	17.33	-5.145
51	1.85	16.24	1.866	0.865	16.16	-0.493	1.867	0.919	14.81	-8.805	1.869	1.027	15.51	-4.495
52	1.849	17.97	1.863	0.757	18.23	1.447	1.865	0.865	16.73	-6.900	1.867	0.973	17.18	-4.396
53	1.847	17.96	1.862	0.812	17.83	-0.724	1.863	0.866	16.91	-5.846	1.866	1.029	17.2	-4.232
54	1.846	18	1.86	0.758	17.8	-1.111	1.861	0.813	16.67	-7.389	1.864	0.975	17.23	-4.278
55	1.85	18.09	1.866	0.865	18.46	2.045	1.865	0.811	17.45	-3.538	1.867	0.919	16.77	-7.297
56	1.849	17.96	1.865	0.865	18.17	1.169	1.866	0.919	16.77	-6.626	1.867	0.973	17.06	-5.011
57	1.848	18.05	1.864	0.866	17.38	-3.712	1.865	0.920	16.87	-6.537	1.866	0.974	17.33	-3.989
58	1.846	17.73	1.86	0.758	17.72	-0.056	1.861	0.813	16.24	-8.404	1.864	0.975	16.8	-5.245
59	1.846	16.65	1.861	0.813	16.65	0.000	1.862	0.867	15.86	-4.745	1.862	0.867	15.82	-4.985
60	1.844	18.02	1.861	0.922	18.37	1.942	1.86	0.868	16.69	-7.381	1.862	0.976	17.11	-5.050
61	1.849	17.96	1.866	0.919	18.51	3.062	1.866	0.919	17.5	-2.561	1.865	0.865	17.26	-3.898
62	1.85	17.97	1.867	0.919	17.58	-2.170	1.866	0.865	17.03	-5.231	1.867	0.919	17.36	-3.395
63	1.846	16.41	1.862	0.867	16.3	-0.670	1.86	0.758	15.36	-6.399	1.862	0.867	15.68	-4.449
64	1.849	17.75	1.865	0.865	17.47	-1.577	1.863	0.757	17.01	-4.169	1.867	0.973	15.62	-12.000
65	1.849	18.17	1.865	0.865	18.6	2.367	1.864	0.811	17.62	-3.027	1.867	0.973	16.22	-10.732
66	1.849	18.02	1.866	0.919	17.95	-0.388	1.867	0.973	16.23	-9.933	1.866	0.919	17.11	-5.050
67	1.847	17.98	1.864	0.920	17.9	-0.445	1.866	1.029	16.36	-9.010	1.866	1.029	17.31	-3.726
68	1.85	17.94	1.866	0.865	18.12	1.003	1.864	0.757	17.02	-5.128	1.866	0.865	17.1	-4.682
69	1.847	16.71	1.862	0.812	16.67	-0.239	1.864	0.920	16.33	-2.274	1.864	0.920	16	-4.249
70	1.847	18.1	1.864	0.920	18.55	2.486	1.866	1.029	16.76	-7.403	1.863	0.866	16.39	-9.448
71	1.85	18.12	1.867	0.919	18.49	2.042	1.868	0.973	17.03	-6.015	1.868	0.973	16.39	-9.547
72	1.85	17.84	1.866	0.865	17.98	0.785	1.866	0.865	16.56	-7.175	1.868	0.973	16.23	-9.025
73	1.849	17.66	1.863	0.757	17.46	-1.133	1.865	0.865	16.49	-6.625	1.866	0.919	16.74	-5.210
74	1.848	17.62	1.864	0.866	17.78	0.908	1.865	0.920	16.2	-8.059	1.865	0.920	16.82	-4.540
75	1.849	17.76	1.866	0.919	18.44	3.829	1.867	0.973	17.58	-1.014	1.868	1.028	17.06	-3.941
76	1.842	16.3	1.859	0.923	16.89	3.620	1.86	0.977	15.46	-5.153	1.86	0.977	15.81	-3.006
77	1.848	17.61	1.866	0.974	18.21	3.407	1.868	1.082	16.92	-3.918	1.867	1.028	17.07	-3.066
78	1.848	17.86	1.863	0.812	17.99	0.728	1.865	0.920	16.5	-7.615	1.866	0.974	16.93	-5.207
79	1.848	17.7	1.864	0.866	17.58	-0.678	1.863	0.812	16.23	-8.305	1.865	0.920	16.61	-6.158
80	1.849	17.79	1.866	0.919	18.08	1.630	1.866	0.919	16.39	-7.870	1.865	0.865	16.5	-7.251
81	1.848	16.72	1.866	0.974	16.97	1.495	1.865	0.920	15.74	-5.861	1.866	0.974	15.99	-4.366
82	1.849	18.05	1.866	0.919	18.3	1.385	1.864	0.811	16.97	-5.983	1.865	0.865	17.08	-5.374
83	1.845	18	1.86	0.813	17.39	-3.389	1.86	0.813	18.95	5.278	1.862	0.921	17.91	-0.500
84	1.848	17.69	1.864	0.866	17.64	-0.283	1.864	0.866	17.71	0.113	1.864	0.866	16.86	-4.692
85	1.845	18.04	1.86	0.813	18.35	1.718	1.86	0.813	16.79	-6.929	1.862	0.921	17.11	-5.155
86	1.849	17.38	1.867	0.973	17.75	2.129	1.865	0.865	16.27	-6.387	1.867	0.973	16.73	-3.740
87	1.848	17.75	1.864	0.866	17.43	-1.803	1.865	0.920	16.78	-5.465	1.865	0.920	16.93	-4.620
88	1.846	17.86	1.86	0.758	17.76	-0.560	1.862	0.867	16.55	-7.335	1.862	0.867	16.98	-4.927
89	1.846	17.71	1.862	0.867	18.15	2.484	1.864	0.975	16.52	-6.719	1.864	0.975	15.04	-15.076
90	1.848	18.07	1.864	0.866	18.59	2.878	1.865	0.920	17.7	-2.048	1.865	0.920	16.82	-6.918
Average				0.851		0.089		0.859		-6.277		0.939		-5.459
Min				0.703		-4.136		0.596		-11.464		0.758		-15.076
Max				1.029		3.829		1.082		5.278		1.083		-0.500

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Thermal Shock Test

-55/100°C, 15mins dwell, <10sec transfer

Unit no.	0	0	100X	Delta Vf %	100X	Delta Iv %	500X	Delta Vf %	500X	Delta Iv %	1000X	Delta Vf %	1000X	Delta Iv %
	Vf	Iv	Vf		Iv		Vf		Iv		Vf		Iv	
1	1.848	16.56	1.844	-0.216	15.91	-3.925	1.857	0.487	15.22	-8.092	1.856	0.433	13.99	-15.519
2	1.842	17.57	1.844	0.109	17.58	0.057	1.854	0.651	16.78	-4.496	1.853	0.597	15.03	-14.456
3	1.851	18.28	1.853	0.108	18.22	-0.328	1.863	0.648	17.97	-1.696	1.859	0.432	15.84	-13.348
4	1.844	18.02	1.848	0.217	18.04	0.111	1.857	0.705	17.92	-0.555	1.852	0.434	16.58	-7.991
5	1.837	17.52	1.843	0.327	17.62	0.571	1.85	0.708	16.68	-4.795	1.848	0.599	15.28	-12.785
6	1.843	17.58	1.848	0.271	17.74	0.910	1.853	0.543	16.86	-4.096	1.852	0.488	15	-14.676
7	1.843	17.65	1.85	0.380	17.56	-0.510	1.855	0.651	16.65	-5.666	1.853	0.543	15.03	-14.844
8	1.842	17.96	1.849	0.380	18.02	0.334	1.855	0.706	17.41	-3.062	1.851	0.489	15.48	-13.808
9	1.835	16.86	1.841	0.327	16.98	0.712	1.847	0.654	16.13	-4.330	1.844	0.490	14.28	-15.302
10	1.843	17.73	1.85	0.380	17.86	0.733	1.854	0.597	17.11	-3.497	1.854	0.597	15.17	-14.439
11	1.845	17.34	1.852	0.379	17.49	0.865	1.855	0.542	16.48	-4.960	1.855	0.542	14.92	-13.956
12	1.841	17.39	1.849	0.435	17.54	0.863	1.852	0.598	16.43	-5.520	1.851	0.543	15.19	-12.651
13	1.839	16.94	1.845	0.326	17.3	2.125	1.851	0.653	16.07	-5.136	1.847	0.435	14.56	-14.050
14	1.845	17.29	1.852	0.379	17.61	1.851	1.856	0.596	16.26	-5.957	1.853	0.434	15.2	-12.088
15	1.838	17.7	1.845	0.381	17.8	0.565	1.848	0.544	16.8	-5.085	1.847	0.490	15.23	-13.955
16	1.843	17.65	1.851	0.434	17.9	1.416	1.853	0.543	16.6	-5.949	1.852	0.488	15.35	-13.031
17	1.844	17.5	1.852	0.434	17.84	1.943	1.856	0.651	16.75	-4.286	1.854	0.542	14.92	-14.743
18	1.839	17.15	1.846	0.381	17.53	2.216	1.851	0.653	16.77	-2.216	1.848	0.489	14.84	-13.469
19	1.841	17.3	1.848	0.380	17.67	2.139	1.853	0.652	16.73	-3.295	1.85	0.489	15.17	-12.312
20	1.846	17.92	1.854	0.433	18.24	1.786	1.856	0.542	16.99	-5.190	1.856	0.542	16.33	-8.873
21	1.837	17	1.844	0.381	17.24	1.412	1.848	0.599	16.32	-4.000	1.845	0.435	14.57	-14.294
22	1.846	17.57	1.853	0.379	17.82	1.423	1.857	0.596	16.81	-4.326	1.854	0.433	15.22	-13.375
23	1.836	17.14	1.844	0.436	17.49	2.042	1.849	0.708	16.64	-2.917	1.845	0.490	14.7	-14.236
24	1.838	16.2	1.844	0.326	16.45	1.543	1.85	0.653	15.58	-3.827	1.847	0.490	13.78	-14.938
25	1.845	17.88	1.851	0.325	18.14	1.454	1.857	0.650	17.07	-4.530	1.855	0.542	15.88	-11.186
26	1.848	17.79	1.856	0.433	18.12	1.855	1.859	0.595	16.38	-7.926	1.859	0.595	15.39	-13.491
27	1.838	17.24	1.844	0.326	17.44	1.160	1.849	0.598	16.74	-2.900	1.848	0.544	14.52	-15.777
28	1.839	17.37	1.846	0.381	17.31	-0.345	1.851	0.653	16.56	-4.663	1.849	0.544	14.82	-14.680
29	1.843	17.75	1.851	0.434	18.08	1.859	1.856	0.705	17.79	0.225	1.854	0.597	15.92	-10.310
30	1.837	17.27	1.845	0.435	17.51	1.390	1.849	0.653	16.76	-2.953	1.848	0.599	15.48	-10.365
31	1.841	17.53	1.849	0.435	17.83	1.711	1.852	0.598	16.89	-3.651	1.851	0.543	15.4	-12.151
32	1.844	17.87	1.853	0.488	18.19	1.791	1.856	0.651	17.12	-4.197	1.854	0.542	16.06	-10.129
33	1.845	17.6	1.854	0.488	18	2.273	1.858	0.705	17.69	0.511	1.854	0.488	15.4	-12.500
34	1.839	17.26	1.846	0.381	17.42	0.927	1.85	0.598	16.6	-3.824	1.848	0.489	15.36	-11.008
35	1.844	17.58	1.851	0.380	17.91	1.877	1.854	0.542	16.75	-4.721	1.854	0.542	15.85	-9.841
36	1.827	16.67	1.835	0.438	16.88	1.260	1.837	0.547	16.28	-2.340	1.837	0.547	14.56	-12.657
37	1.838	16.26	1.845	0.381	16.57	1.907	1.848	0.544	16.59	2.030	1.846	0.435	14.57	-10.394
38	1.845	17.7	1.851	0.325	18	1.695	1.854	0.488	17.47	-1.299	1.852	0.379	15.64	-11.638
39	1.841	16.21	1.849	0.435	16.58	2.283	1.849	0.435	15.34	-5.367	1.85	0.489	14.38	-11.289
40	1.835	17.61	1.842	0.381	17.31	-1.704	1.843	0.436	16.17	-8.177	1.845	0.545	15.58	-11.528
41	1.834	17.27	1.841	0.382	17.29	0.116	1.843	0.491	15.84	-8.280	1.843	0.491	14.92	-13.607
42	1.834	17	1.84	0.327	17.33	1.941	1.842	0.436	15.76	-7.294	1.842	0.436	14.89	-12.412
43	1.842	17.73	1.85	0.434	18.13	2.256	1.853	0.597	17.12	-3.440	1.851	0.489	15.6	-12.014
44	1.842	17.43	1.85	0.434	17.88	2.582	1.854	0.651	17.05	-2.180	1.852	0.543	15.1	-13.368
45	1.843	17.5	1.849	0.326	17.69	1.086	1.849	0.326	16.63	-4.971	1.852	0.488	15.23	-12.971

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Unit no.	0	0	100X	Delta Vf	100X	Delta Iv	500X	Delta Vf	500X	Delta Iv	1000X	Delta Vf	1000X	Delta Iv
	Vf	Iv	Vf	%	Iv	%	Vf	%	Iv	%	Vf	%	Iv	%
46	1.847	18.07	1.854	0.379	18.43	1.992	1.857	0.541	17.54	-2.933	1.857	0.541	15.3	-15.329
47	1.839	17.76	1.847	0.435	17.99	1.295	1.85	0.598	17.24	-2.928	1.85	0.598	15.64	-11.937
48	1.843	16.91	1.85	0.380	17.18	1.597	1.854	0.597	16.38	-3.134	1.853	0.543	14.84	-12.241
49	1.842	17.31	1.85	0.434	17.5	1.098	1.851	0.489	16.56	-4.333	1.851	0.489	14.77	-14.674
50	1.839	16.55	1.847	0.435	16.69	0.846	1.849	0.544	15.83	-4.350	1.85	0.598	14.52	-12.266
51	1.843	17.74	1.851	0.434	18.03	1.635	1.853	0.543	16.36	-7.779	1.852	0.488	15.12	-14.769
52	1.846	17.7	1.854	0.433	18.03	1.864	1.858	0.650	17.04	-3.729	1.857	0.596	15.72	-11.186
53	1.838	17.2	1.844	0.326	17.43	1.337	1.849	0.598	16.69	-2.965	1.846	0.435	14.97	-12.965
54	1.845	18.61	1.853	0.434	18.88	1.451	1.857	0.650	17.81	-4.299	1.854	0.488	16.51	-11.284
55	1.844	17.86	1.851	0.380	18.2	1.904	1.852	0.434	17.27	-3.303	1.853	0.488	15.52	-13.102
56	1.845	17.25	1.852	0.379	17.46	1.217	1.853	0.434	16.51	-4.290	1.854	0.488	15.09	-12.522
57	1.845	17.55	1.852	0.379	17.99	2.507	1.852	0.379	16.53	-5.812	1.855	0.542	15.72	-10.427
58	1.83	16.69	1.838	0.437	17.27	3.475	1.837	0.383	16.14	-3.295	1.84	0.546	14.23	-14.739
59	1.843	17.88	1.851	0.434	18.41	2.964	1.854	0.597	16.96	-5.145	1.852	0.488	15.78	-11.745
60	1.845	18.14	1.852	0.379	18.49	1.929	1.855	0.542	17.28	-4.741	1.855	0.542	16.44	-9.372
61	1.836	17.16	1.842	0.327	17.35	1.107	1.843	0.381	16.45	-4.138	1.844	0.436	14.42	-15.967
62	1.842	17.9	1.848	0.326	18.26	2.011	1.85	0.434	16.94	-5.363	1.851	0.489	15.6	-12.849
63	1.841	17.8	1.848	0.380	18.07	1.517	1.848	0.380	16.78	-5.730	1.85	0.489	15.78	-11.348
64	1.837	17.69	1.843	0.327	18.03	1.922	1.846	0.490	16.4	-7.292	1.845	0.435	15.92	-10.006
65	1.84	17.77	1.847	0.380	18	1.294	1.848	0.435	16.57	-6.753	1.849	0.489	16.46	-7.372
66	1.841	17.62	1.848	0.380	17.77	0.851	1.849	0.435	16.49	-6.413	1.849	0.435	15.17	-13.905
67	1.843	16.18	1.851	0.434	16.43	1.545	1.853	0.543	15.62	-3.461	1.853	0.543	13.74	-15.080
68	1.839	17.65	1.846	0.381	17.85	1.133	1.849	0.544	16.48	-6.629	1.848	0.489	15.12	-14.334
69	1.842	17.87	1.848	0.326	18.04	0.951	1.849	0.380	16.62	-6.995	1.851	0.489	15.55	-12.983
70	1.836	17.31	1.842	0.327	17.54	1.329	1.843	0.381	16.05	-7.279	1.845	0.490	15.3	-11.612
71	1.841	17.59	1.848	0.380	18.15	3.184	1.849	0.435	16.43	-6.595	1.851	0.543	15.8	-10.176
72	1.837	17.08	1.844	0.381	17.57	2.869	1.845	0.435	16.51	-3.337	1.847	0.544	14.9	-12.763
73	1.839	17.69	1.847	0.435	18.03	1.922	1.849	0.544	16.63	-5.992	1.85	0.598	15.6	-11.815
74	1.843	17.54	1.85	0.380	17.87	1.881	1.852	0.488	16.31	-7.013	1.853	0.543	15.61	-11.003
75	1.839	17.14	1.845	0.326	17.45	1.809	1.845	0.326	15.97	-6.826	1.849	0.544	15.33	-10.560
76	1.848	18.07	1.856	0.433	18.5	2.380	1.856	0.433	17.1	-5.368	1.859	0.595	15.93	-11.843
77	1.846	16.68	1.855	0.488	17.09	2.458	1.856	0.542	15.9	-4.676	1.857	0.596	14.5	-13.070
78	1.832	16.84	1.84	0.437	17.32	2.850	1.841	0.491	16.1	-4.394	1.842	0.546	15.16	-9.976
79	1.843	17.16	1.851	0.434	17.73	3.322	1.851	0.434	16.55	-3.555	1.853	0.543	15.52	-9.557
80	1.839	17.17	1.846	0.381	18.12	5.533	1.845	0.326	16.85	-1.864	1.849	0.544	15.65	-8.853
81	1.846	17.27	1.853	0.379	17.33	0.347	1.853	0.379	15.91	-7.875	1.856	0.542	15.12	-12.449
82	1.842	17.25	1.849	0.380	17.89	3.710	1.849	0.380	16.28	-5.623	1.852	0.543	15.68	-9.101
83	1.839	16.22	1.847	0.435	16.51	1.788	1.848	0.489	15.44	-4.809	1.848	0.489	14.33	-11.652
84	1.841	17.89	1.849	0.435	18.34	2.515	1.849	0.435	16.85	-5.813	1.85	0.489	15.77	-11.850
85	1.846	18.34	1.855	0.488	18.68	1.854	1.853	0.379	17.26	-5.889	1.857	0.596	16.4	-10.578
86	1.843	17.35	1.85	0.380	17.63	1.614	1.851	0.434	16.77	-3.343	1.853	0.543	15.3	-11.816
87	1.841	17.44	1.848	0.380	17.59	0.860	1.849	0.435	16.54	-5.161	1.851	0.543	15.4	-11.697
88	1.845	17.56	1.853	0.434	17.73	0.968	1.854	0.488	16.47	-6.207	1.854	0.488	15.23	-13.269
89	1.851	16.57	1.858	0.378	17.21	3.862	1.859	0.432	16.98	2.474	1.86	0.486	15.35	-7.363
90	1.837	17.07	1.843	0.327	17.41	1.992	1.844	0.381	16.1	-5.682	1.846	0.490	15.15	-11.248
Average				0.377		1.541		0.532		-4.484		0.514		-12.346
Min				-0.216		-3.925		0.326		-8.280		0.379		-15.967
Max				0.488		5.533		0.708		2.474		0.599		-7.363

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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	IV	VF	%	IV	%
1	1.825	7.94	1.827	0.11	5.93	-25.31
2	1.853	8.09	1.851	-0.11	6.17	-23.73
3	1.832	7.81	1.83	-0.11	6.09	-22.02
4	1.838	7.44	1.835	-0.16	6.22	-16.40
5	1.825	8.05	1.824	-0.05	5.99	-25.59
6	1.879	7.99	1.875	-0.21	6.51	-18.52
7	1.83	7.59	1.832	0.11	5.3	-30.17
8	1.832	8.51	1.829	-0.16	6.29	-26.09
9	1.822	7.76	1.819	-0.16	5.55	-28.48
10	1.826	8.05	1.826	0.00	6.31	-21.61
11	1.832	8.24	1.831	-0.05	5.85	-29.00
12	1.828	8.26	1.827	-0.05	6.12	-25.91
13	1.832	8.24	1.83	-0.11	6.45	-21.72
14	1.826	7.9	1.829	0.16	6.86	-13.16
15	1.829	7.99	1.827	-0.11	6.15	-23.03
16	1.827	7.92	1.824	-0.16	6.19	-21.84
17	1.829	8.34	1.83	0.05	6.79	-18.59
18	1.823	7.19	1.826	0.16	5.66	-21.28
19	1.864	7.59	1.864	0.00	6.22	-18.05
20	1.827	7.48	1.828	0.05	6.28	-16.04
21	1.828	8.09	1.826	-0.11	5.67	-29.91
22	1.828	7.54	1.826	-0.11	5.4	-28.38
23	1.825	8	1.826	0.05	6.32	-21.00
24	1.829	8.4	1.829	0.00	6.72	-20.00
25	1.832	8.02	1.831	-0.05	6.46	-19.45
26	1.829	7.97	1.831	0.11	6.45	-19.07
27	1.826	8.14	1.826	0.00	6.05	-25.68
28	1.828	7.33	1.83	0.11	5.82	-20.60
29	1.826	8.15	1.826	0.00	6.59	-19.14
30	1.876	7.6	1.88	0.21	7.28	-4.21
Average				-0.020		-21.800
Min				-0.213		-30.171
Max				0.213		-4.211

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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	IV	VF	%	IV	%	VF	%	IV	%
1	1.927	135.71	1.930	0.16	134.39	-0.97	1.934	0.36	138.47	2.03
2	1.993	116.69	2.004	0.55	117.47	0.67	2.009	0.80	121.02	3.71
3	1.949	127.72	1.952	0.15	128.09	0.29	1.957	0.41	130.85	2.45
4	1.945	132.76	1.948	0.15	130.26	-1.88	1.953	0.41	132.28	-0.36
5	1.955	133.90	1.958	0.15	134.97	0.80	1.964	0.46	135.52	1.21
6	1.943	135.50	1.951	0.41	135.32	-0.13	1.949	0.31	137.58	1.54
7	1.950	138.38	1.962	0.62	137.58	-0.58	1.963	0.67	141.73	2.42
8	1.959	138.36	1.955	-0.20	137.47	-0.64	1.958	-0.05	141.11	1.99
9	1.956	136.88	1.964	0.41	137.71	0.61	1.967	0.56	142.24	3.92
Average				0.267		-0.205		0.437		2.100
Min				-0.204		-1.883		-0.051		-0.362
Max				0.615		0.799		0.803		3.916

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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

Charged 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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Reference Device: DNO-AJS