DOMINANT™
Opto Technologies
Innovating Illumination

RELIABILITY REPORT
Mini DomiLED™
AlInGaP: DNx-CJS
Long Term

Title: Mini DomiLED AlInGaP DNx-CJS 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 II requirement (JESD22-A113-B) • 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

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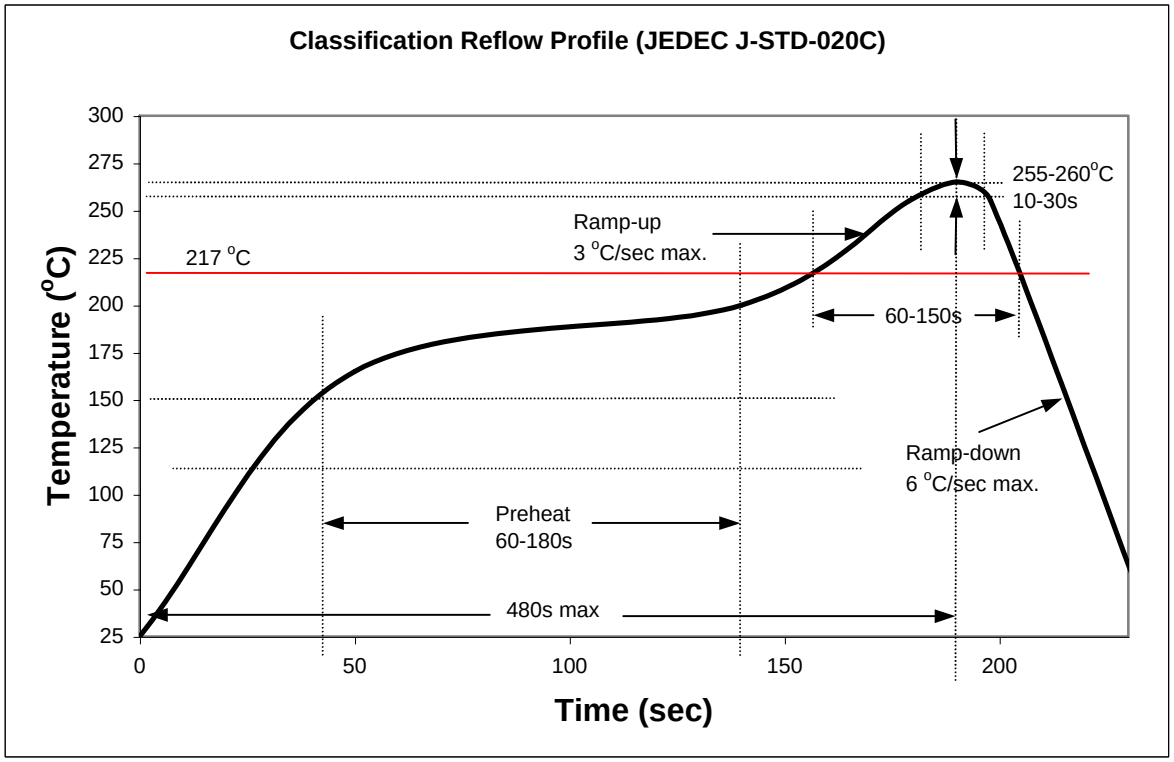
Recommended Pb Free IR-Reflow Soldering Profile



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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: DNA-CJS

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 = 30mA	80	0 hrs	0/80	0/80
				168 hrs	0/80	0/80
				504 hrs	0/80	0/80
				1000 hrs	0/80	0/80
				2000 hrs	0/80	0/80
				3000 hrs	0/80	0/80
				4000 hrs	0/80	0/80
				5000 hrs	0/80	0/80
				6000 hrs	0/80	0/80
				50000 hrs	-	0/80
2	High Temperature Operating Life Test (HTOL) JESD22A-108	a) IR re-flow soldering • Ta = 80°C • If = 30mA	80	0 hrs	0/80	0/80
				168 hrs	0/80	0/80
				504 hrs	0/80	0/80
				1000 hrs	0/80	0/80
				2000 hrs	0/80	0/80
				3000 hrs	0/80	0/80
				4000 hrs	0/80	0/80
				5000 hrs	0/80	0/80
				6000 hrs	0/80	0/80
				50000 hrs	-	0/80

Conclusions: All qualification samples passed.

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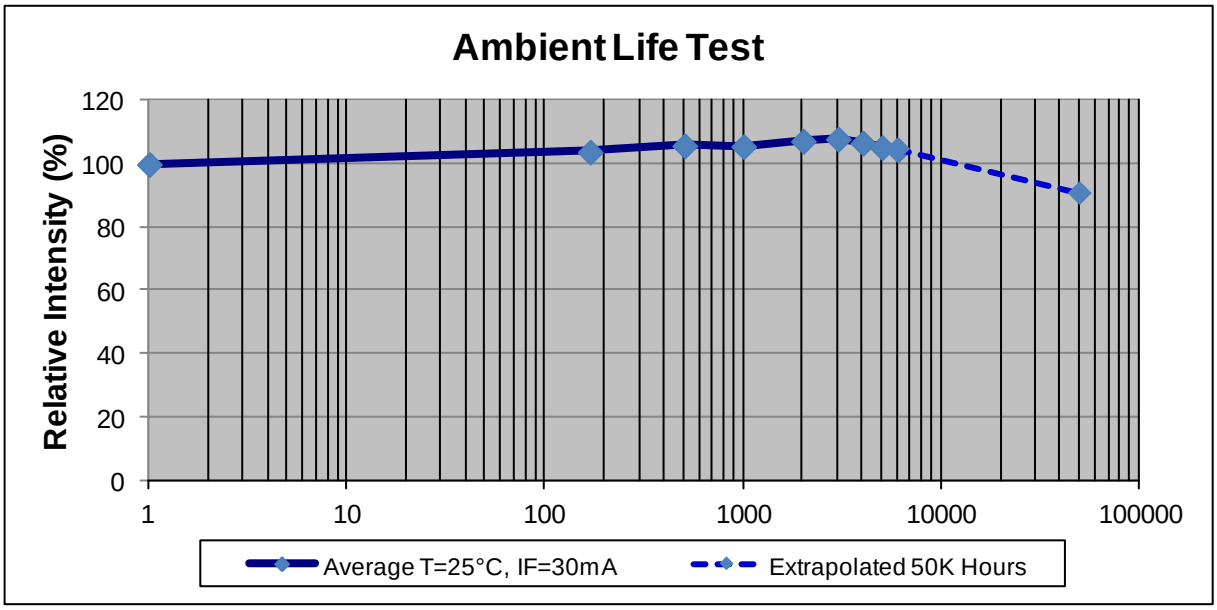
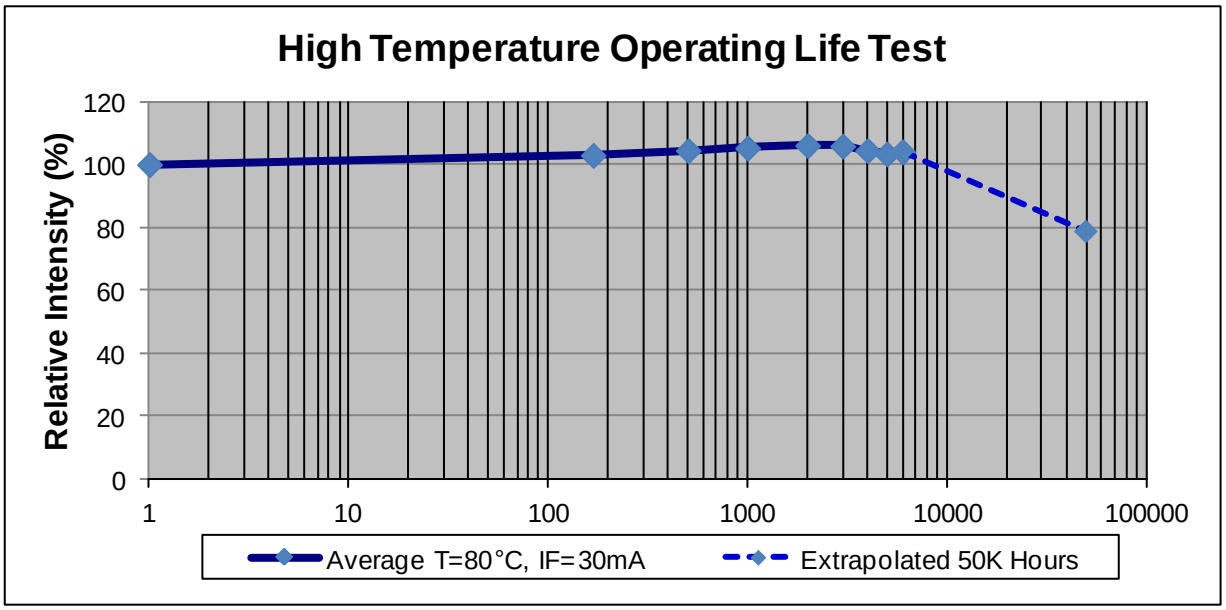
Iv Degradation Data





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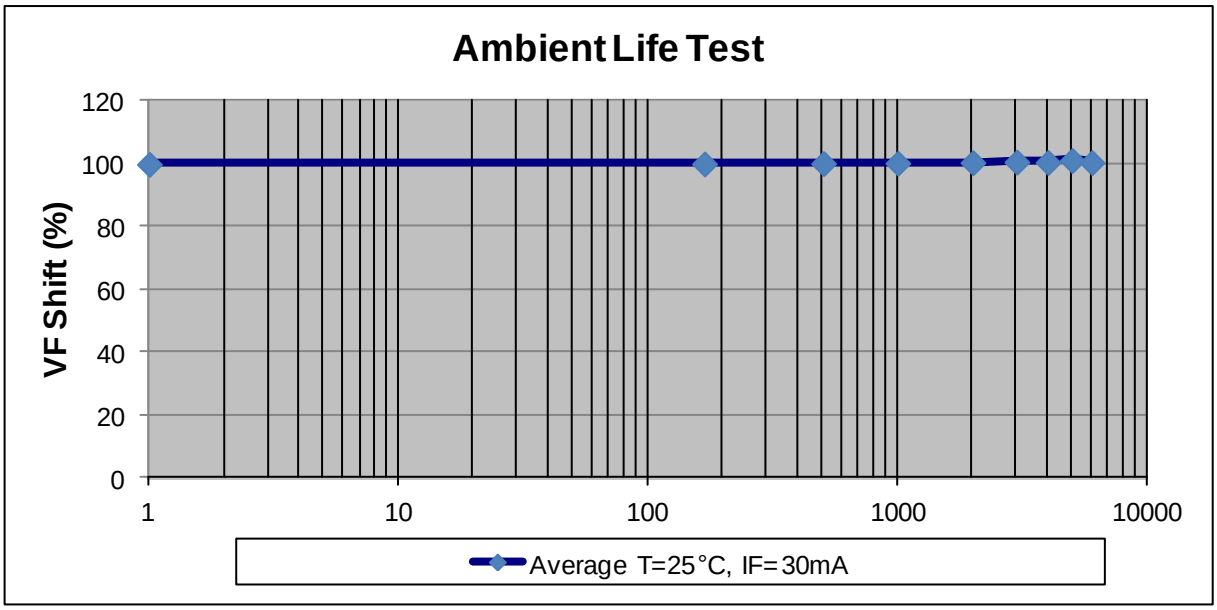
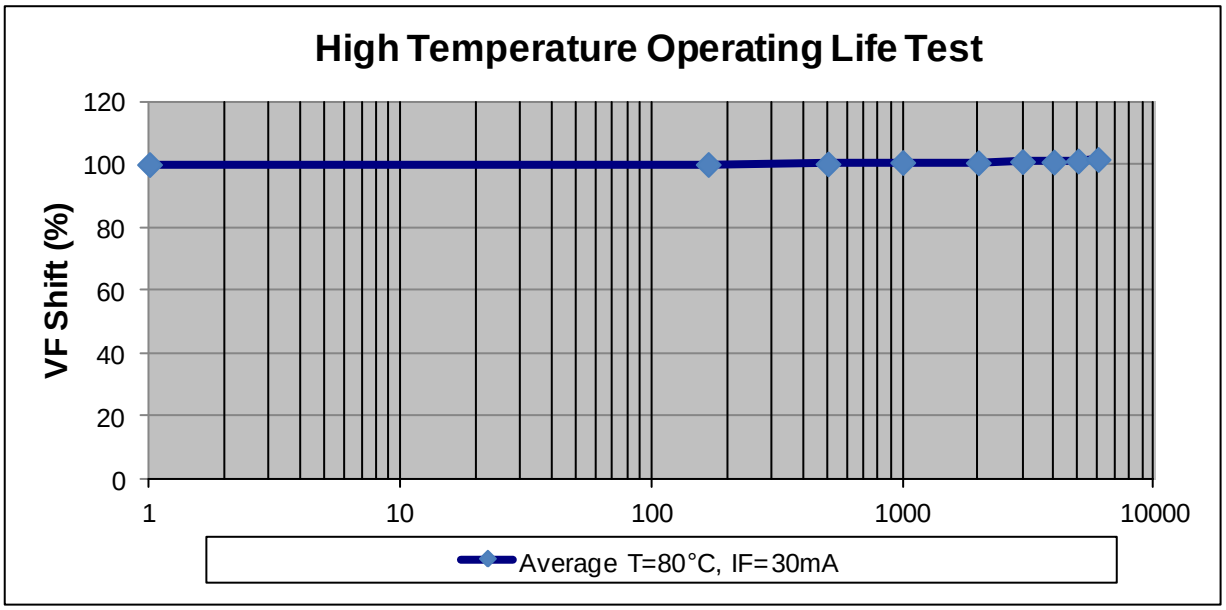
Vf Shift Data





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Reference Device: DNA-CJS

Reliability Test Data:

Ambient Life Test

T=25°C, IF=30mA

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	1.925	144.67	1.928	0.16	149.81	3.55	1.935	0.52	155.25	7.31	1.937	0.62	154.8	7.00
2	1.932	148.13	1.935	0.16	153.68	3.75	1.937	0.26	158.36	6.91	1.94	0.41	158.35	6.90
3	1.926	146.77	1.928	0.10	152.47	3.88	1.931	0.26	157.6	7.38	1.933	0.36	156.65	6.73
4	1.939	147.65	1.943	0.21	153.83	4.19	1.951	0.62	158.05	7.04	1.955	0.83	158.76	7.52
5	1.925	141.42	1.926	0.05	140.66	-0.54	1.93	0.26	144.37	2.09	1.933	0.42	143.94	1.78
6	1.932	139.22	1.936	0.21	138.05	-0.84	1.936	0.21	142.8	2.57	1.938	0.31	141.26	1.47
7	1.926	144.2	1.929	0.16	150.44	4.33	1.931	0.26	154.7	7.28	1.931	0.26	153.23	6.26
8	1.929	147.71	1.931	0.10	154.24	4.42	1.934	0.26	157.86	6.87	1.935	0.31	156.99	6.28
9	1.927	138.38	1.93	0.16	145	4.78	1.933	0.31	148.1	7.02	1.934	0.36	146.78	6.07
10	1.932	143.2	1.936	0.21	150.4	5.03	1.939	0.36	153.05	6.88	1.94	0.41	152.71	6.64
11	1.93	143.24	1.934	0.21	149.63	4.46	1.942	0.62	154.07	7.56	1.942	0.62	152.08	6.17
12	1.939	148.41	1.942	0.15	155.24	4.60	1.944	0.26	159.37	7.38	1.945	0.31	157.96	6.43
13	1.923	134.56	1.925	0.10	135.97	1.05	1.927	0.21	138.42	2.87	1.929	0.31	134.05	-0.38
14	1.933	138.88	1.935	0.10	140	0.81	1.941	0.41	141.81	2.11	1.943	0.52	141.05	1.56
15	1.924	141.97	1.928	0.21	149.36	5.21	1.93	0.31	152.57	7.47	1.931	0.36	150.78	6.21
16	1.936	145.48	1.937	0.05	151.26	3.97	1.939	0.15	155.81	7.10	1.94	0.21	155.09	6.61
17	1.933	147.49	1.935	0.10	154.14	4.51	1.938	0.26	158.14	7.22	1.939	0.31	156.74	6.27
18	1.931	149.51	1.934	0.16	155.39	3.93	1.936	0.26	159.16	6.45	1.938	0.36	158.45	5.98
19	1.927	137.71	1.929	0.10	145.1	5.37	1.931	0.21	148.34	7.72	1.934	0.36	146.07	6.07
20	1.941	140.94	1.94	-0.05	148.31	5.23	1.942	0.05	151.29	7.34	1.944	0.15	149.39	6.00
21	1.928	147.58	1.93	0.10	153.35	3.91	1.932	0.21	156.92	6.33	1.933	0.26	157.04	6.41
22	1.929	146.62	1.931	0.10	153.19	4.48	1.934	0.26	154.77	5.56	1.935	0.31	155.12	5.80
23	1.931	147.56	1.933	0.10	147.38	-0.12	1.935	0.21	149.83	1.54	1.937	0.31	150.13	1.74
24	1.929	140.26	1.931	0.10	139.85	-0.29	1.934	0.26	141.92	1.18	1.935	0.31	141.17	0.65
25	1.934	148.73	1.936	0.10	155.59	4.61	1.938	0.21	158.58	6.62	1.941	0.36	158.32	6.45
26	1.928	142.02	1.933	0.26	156.74	10.36	1.936	0.41	160.3	12.87	1.937	0.47	159.21	12.10
27	1.929	143.33	1.935	0.31	151.43	5.65	1.938	0.47	154.46	7.77	1.939	0.52	153.94	7.40
28	1.931	145.4	1.934	0.16	152.27	4.72	1.934	0.16	154.71	6.40	1.935	0.21	154.72	6.41
29	1.931	145.87	1.939	0.41	150.62	3.26	1.942	0.57	153.05	4.92	1.943	0.62	153.02	4.90
30	1.938	139.91	1.932	-0.31	152.69	9.13	1.933	-0.26	155.08	10.84	1.935	-0.15	155.59	11.21
31	1.931	148.31	1.931	0.00	148.24	-0.05	1.935	0.21	152.89	3.09	1.937	0.31	151.45	2.12
32	1.933	144.28	1.933	0.00	150.48	4.30	1.936	0.16	154.31	6.95	1.937	0.21	152.73	5.86
33	1.93	144.56	1.934	0.21	152.75	5.67	1.936	0.31	155.37	7.48	1.938	0.41	154.92	7.17
34	1.937	143.79	1.933	-0.21	149.5	3.97	1.935	-0.10	152.91	6.34	1.937	0.00	154.63	7.54
35	1.929	145.42	1.939	0.52	140.07	-3.68	1.942	0.67	141.65	-2.59	1.946	0.88	141.15	-2.94
36	1.926	143.4	1.929	0.16	151.98	5.98	1.931	0.26	153.46	7.02	1.931	0.26	154.16	7.50
37	1.926	143.61	1.929	0.16	151.54	5.52	1.931	0.26	154.69	7.72	1.932	0.31	153.96	7.21
38	1.931	133.95	1.934	0.16	133.22	-0.54	1.937	0.31	135.48	1.14	1.939	0.41	134.24	0.22
39	1.921	144.99	1.924	0.16	151.31	4.36	1.925	0.21	154.92	6.85	1.927	0.31	154.25	6.39
40	1.928	145.45	1.93	0.10	152.74	5.01	1.932	0.21	154.49	6.22	1.934	0.31	153.18	5.31

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Unit no.	2000 hrs	Delta VF	2000 hrs	Delta IV	3000 hrs	Delta VF	3000 hrs	Delta IV	4000 hrs	Delta VF	4000 hrs	Delta IV
	VF	%	IV	%	VF	%	IV	%	VF	%	IV	%
1	1.934	0.47	156.49	8.17	1.937	0.62	158.32	9.44	1.94	0.78	154.41	6.73
2	1.94	0.41	158.75	7.17	1.945	0.67	162.53	9.72	1.941	0.47	161.09	8.75
3	1.933	0.36	156.97	6.95	1.938	0.62	161.94	10.34	1.936	0.52	161.93	10.33
4	1.957	0.93	157.83	6.89	1.96	1.08	163.89	11.00	1.961	1.13	163.95	11.04
5	1.934	0.47	144.96	2.50	1.938	0.68	149.64	5.81	1.936	0.57	145.54	2.91
6	1.944	0.62	141.48	1.62	1.946	0.72	142.71	2.51	1.946	0.72	140.59	0.98
7	1.936	0.52	154.99	7.48	1.937	0.57	157.21	9.02	1.941	0.78	157.14	8.97
8	1.938	0.47	155.88	5.53	1.942	0.67	158.43	7.26	1.939	0.52	160.39	8.58
9	1.937	0.52	149.15	7.78	1.939	0.62	152.02	9.86	1.941	0.73	152.08	9.90
10	1.946	0.72	155.59	8.65	1.947	0.78	157.03	9.66	1.947	0.78	155.91	8.88
11	1.945	0.78	155.76	8.74	1.944	0.73	156.92	9.55	1.944	0.73	154.02	7.53
12	1.949	0.52	160.32	8.03	1.963	1.24	162.81	9.70	1.948	0.46	162.57	9.54
13	1.932	0.47	137.57	2.24	1.935	0.62	141.04	4.82	1.934	0.57	141.6	5.23
14	1.948	0.78	141.65	1.99	1.954	1.09	145.33	4.64	1.951	0.93	143.85	3.58
15	1.935	0.57	153.12	7.85	1.937	0.68	156.71	10.38	1.937	0.68	152.36	7.32
16	1.944	0.41	156.03	7.25	1.949	0.67	156.63	7.66	1.946	0.52	154.67	6.32
17	1.943	0.52	157.7	6.92	1.943	0.52	159.37	8.05	1.943	0.52	159.97	8.46
18	1.941	0.52	159.56	6.72	1.943	0.62	159.09	6.41	1.942	0.57	163.05	9.06
19	1.936	0.47	148.47	7.81	1.94	0.67	151.59	10.08	1.938	0.57	151.66	10.13
20	1.949	0.41	153.56	8.95	1.949	0.41	155.84	10.57	1.949	0.41	153.5	8.91
21	1.937	0.47	157.17	6.50	1.94	0.62	159.58	8.13	1.938	0.52	157.23	6.54
22	1.939	0.52	156.47	6.72	1.94	0.57	158.76	8.28	1.937	0.41	157.72	7.57
23	1.942	0.57	149.88	1.57	1.944	0.67	153.78	4.22	1.944	0.67	154.21	4.51
24	1.939	0.52	141.32	0.76	1.943	0.73	145.99	4.09	1.942	0.67	145.31	3.60
25	1.943	0.47	157.36	5.80	1.946	0.62	162.15	9.02	1.947	0.67	161.73	8.74
26	1.942	0.73	159.36	12.21	1.942	0.73	162.15	14.17	1.942	0.73	160.35	12.91
27	1.943	0.73	154.06	7.49	1.945	0.83	157.2	9.68	1.942	0.67	155.9	8.77
28	1.939	0.41	154.96	6.57	1.941	0.52	156.19	7.42	1.939	0.41	157.3	8.18
29	1.947	0.83	152.62	4.63	1.951	1.04	156.39	7.21	1.949	0.93	156.29	7.14
30	1.939	0.05	156.66	11.97	1.942	0.21	159.25	13.82	1.941	0.15	155.7	11.29
31	1.938	0.36	151.94	2.45	1.941	0.52	153.81	3.71	1.938	0.36	149.41	0.74
32	1.94	0.36	154.7	7.22	1.943	0.52	157.25	8.99	1.94	0.36	154.27	6.92
33	1.94	0.52	155.9	7.84	1.942	0.62	159.08	10.04	1.941	0.57	157.6	9.02
34	1.939	0.10	155.86	8.39	1.942	0.26	159.71	11.07	1.94	0.15	158.52	10.24
35	1.948	0.98	142.72	-1.86	1.952	1.19	147.11	1.16	1.95	1.09	141.59	-2.63
36	1.934	0.42	157.06	9.53	1.936	0.52	157.09	9.55	1.935	0.47	153.74	7.21
37	1.935	0.47	156.56	9.02	1.946	1.04	157.16	9.44	1.938	0.62	156.12	8.71
38	1.941	0.52	137.09	2.34	1.949	0.93	136.8	2.13	1.946	0.78	137.96	2.99
39	1.929	0.42	155.95	7.56	1.934	0.68	159.1	9.73	1.931	0.52	157.65	8.73
40	1.937	0.47	155.55	6.94	1.939	0.57	158.11	8.70	1.939	0.57	157.76	8.46

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Unit no.	5000 hrs	Delta VF	5000 hrs	Delta IV	6000 hrs	Delta VF	6000 hrs	Delta IV
	VF	%	IV	%	VF	%	IV	%
1	1.952	1.40	153.55	6.14	1.939	0.73	150.72	4.18
2	1.955	1.19	159.8	7.88	1.941	0.47	159.92	7.96
3	1.949	1.19	159.29	8.53	1.936	0.52	158.18	7.77
4	1.974	1.81	159.97	8.34	1.962	1.19	158.67	7.46
5	1.951	1.35	143.6	1.54	1.937	0.62	141.72	0.21
6	1.958	1.35	139.56	0.24	1.946	0.72	137.13	-1.50
7	1.948	1.14	154.28	6.99	1.936	0.52	153.7	6.59
8	1.951	1.14	158.38	7.22	1.939	0.52	156.77	6.13
9	1.949	1.14	148.94	7.63	1.939	0.62	147.06	6.27
10	1.956	1.24	152.85	6.74	1.946	0.72	150.57	5.15
11	1.979	2.54	151.7	5.91	1.943	0.67	151.19	5.55
12	1.961	1.13	159.11	7.21	1.95	0.57	161.7	8.95
13	1.945	1.14	136.91	1.75	1.935	0.62	137.9	2.48
14	1.963	1.55	140.78	1.37	1.952	0.98	140.12	0.89
15	1.948	1.25	149.94	5.61	1.935	0.57	148.12	4.33
16	1.955	0.98	153.47	5.49	1.945	0.46	152.31	4.69
17	1.954	1.09	156.81	6.32	1.944	0.57	157.32	6.66
18	1.952	1.09	158.98	6.33	1.941	0.52	159.66	6.79
19	1.948	1.09	147.72	7.27	1.936	0.47	146.54	6.41
20	1.959	0.93	149.06	5.76	1.948	0.36	147.84	4.90
21	1.981	2.75	154.97	5.01	1.937	0.47	153.89	4.28
22	1.951	1.14	150.07	2.35	1.938	0.47	155.22	5.87
23	1.954	1.19	150.42	1.94	1.944	0.67	148.81	0.85
24	1.952	1.19	141.04	0.56	1.942	0.67	140.22	-0.03
25	1.955	1.09	156.9	5.49	1.945	0.57	154.01	3.55
26	1.951	1.19	158.73	11.77	1.941	0.67	158.78	11.80
27	1.954	1.30	152.5	6.40	1.944	0.78	155.2	8.28
28	1.95	0.98	155.22	6.75	1.94	0.47	155.97	7.27
29	1.959	1.45	146.88	0.69	1.948	0.88	146.51	0.44
30	1.951	0.67	151.97	8.62	1.94	0.10	152.24	8.81
31	1.954	1.19	151.89	2.41	1.94	0.47	148.91	0.40
32	1.953	1.03	153.79	6.59	1.942	0.47	153.57	6.44
33	1.955	1.30	153.93	6.48	1.941	0.57	154.56	6.92
34	1.952	0.77	156.3	8.70	1.941	0.21	155.19	7.93
35	1.963	1.76	138.5	-4.76	1.951	1.14	137.8	-5.24
36	1.95	1.25	154.89	8.01	1.936	0.52	151.3	5.51
37	1.948	1.14	155	7.93	1.936	0.52	154.16	7.35
38	1.957	1.35	135.7	1.31	1.946	0.78	135.2	0.93
39	1.943	1.15	154.26	6.39	1.932	0.57	154.45	6.52
40	1.952	1.24	153.41	5.47	1.939	0.57	150.39	3.40

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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	1.921	139.27	1.924	0.16	139.74	0.34	1.927	0.31	140.2	0.67	1.929	0.42	139.81	0.39
42	1.923	141.56	1.926	0.16	150.29	6.17	1.927	0.21	152.01	7.38	1.929	0.31	151.31	6.89
43	1.922	141.24	1.926	0.21	149.35	5.74	1.927	0.26	152.2	7.76	1.929	0.36	151.8	7.48
44	1.929	143.97	1.931	0.10	151.55	5.26	1.933	0.21	153.13	6.36	1.935	0.31	154.79	7.52
45	1.927	144.96	1.929	0.10	152.1	4.93	1.931	0.21	154.01	6.24	1.933	0.31	155.96	7.59
46	1.929	146.85	1.931	0.10	155.39	5.82	1.933	0.21	158.7	8.07	1.934	0.26	157.92	7.54
47	1.932	148.75	1.934	0.10	156.61	5.28	1.935	0.16	158.86	6.80	1.937	0.26	158.11	6.29
48	1.922	139.1	1.925	0.16	146.48	5.31	1.925	0.16	149.38	7.39	1.928	0.31	148.92	7.06
49	1.928	142.91	1.932	0.21	150.52	5.33	1.934	0.31	153.34	7.30	1.935	0.36	153.17	7.18
50	1.928	145.66	1.93	0.10	152.26	4.53	1.932	0.21	155.56	6.80	1.935	0.36	156.56	7.48
51	1.935	138.61	1.938	0.16	140.38	1.28	1.941	0.31	141.9	2.37	1.943	0.41	141.95	2.41
52	1.932	144.61	1.935	0.16	153.55	6.18	1.939	0.36	155.6	7.60	1.939	0.36	155.75	7.70
53	1.933	134.47	1.935	0.10	136.29	1.35	1.938	0.26	136.91	1.81	1.94	0.36	138.03	2.65
54	1.934	146.29	1.938	0.21	155.36	6.20	1.939	0.26	156.9	7.25	1.941	0.36	158.4	8.28
55	1.926	146.35	1.928	0.10	153.38	4.80	1.931	0.26	155.28	6.10	1.933	0.36	158.78	8.49
56	1.959	143.86	1.966	0.36	149.58	3.98	1.97	0.56	153.88	6.97	1.97	0.56	154.46	7.37
57	1.934	138.03	1.934	0.00	138.25	0.16	1.937	0.16	140.63	1.88	1.94	0.31	141.24	2.33
58	1.931	146.25	1.933	0.10	153.04	4.64	1.935	0.21	155.49	6.32	1.936	0.26	155.79	6.52
59	1.93	145.5	1.932	0.10	152.08	4.52	1.933	0.16	154.89	6.45	1.936	0.31	154.92	6.47
60	1.936	142.06	1.941	0.26	148.45	4.50	1.943	0.36	151.51	6.65	1.945	0.46	152.64	7.45
61	1.938	149.02	1.941	0.15	155.68	4.47	1.944	0.31	159.37	6.95	1.945	0.36	159.42	6.98
62	1.928	146.92	1.93	0.10	153.72	4.63	1.932	0.21	157.12	6.94	1.933	0.26	157.73	7.36
63	1.923	145.27	1.925	0.10	152.42	4.92	1.927	0.21	155.03	6.72	1.928	0.26	155.71	7.19
64	1.917	138.76	1.92	0.16	138.6	-0.12	1.922	0.26	139.69	0.67	1.925	0.42	139.81	0.76
65	1.933	138.73	1.934	0.05	139.06	0.24	1.937	0.21	140.21	1.07	1.94	0.36	139.71	0.71
66	1.943	146.42	1.946	0.15	153.92	5.12	1.951	0.41	157.12	7.31	1.951	0.41	154.92	5.81
67	1.93	145.38	1.932	0.10	152.71	5.04	1.935	0.26	155.84	7.19	1.935	0.26	155.98	7.29
68	1.935	138.92	1.937	0.10	139.29	0.27	1.94	0.26	141.03	1.52	1.942	0.36	141	1.50
69	1.928	143.73	1.931	0.16	151.68	5.53	1.933	0.26	153.59	6.86	1.936	0.41	154.58	7.55
70	1.934	141.19	1.935	0.05	147.74	4.64	1.938	0.21	150.06	6.28	1.941	0.36	150.84	6.83
71	1.927	147.26	1.929	0.10	154.55	4.95	1.932	0.26	158.29	7.49	1.932	0.26	156.6	6.34
72	1.954	135.37	1.955	0.05	134.33	-0.77	1.958	0.20	135.34	-0.02	1.962	0.41	133.6	-1.31
73	1.93	146.59	1.932	0.10	153.94	5.01	1.934	0.21	156.67	6.88	1.936	0.31	156.89	7.03
74	1.926	144.59	1.929	0.16	151.94	5.08	1.931	0.26	156.19	8.02	1.934	0.42	152.96	5.79
75	1.924	142.73	1.927	0.16	149.83	4.97	1.928	0.21	152.64	6.94	1.93	0.31	152.97	7.17
76	1.937	149.08	1.939	0.10	156.48	4.96	1.942	0.26	160.85	7.90	1.943	0.31	159.07	6.70
77	1.949	146.82	1.949	0.00	153.64	4.65	1.955	0.31	157.85	7.51	1.957	0.41	156.38	6.51
78	1.932	142.28	1.933	0.05	149.27	4.91	1.934	0.10	152.1	6.90	1.936	0.21	150.34	5.66
79	1.923	148.36	1.925	0.10	155.38	4.73	1.927	0.21	157.8	6.36	1.93	0.36	158.59	6.90
80	1.924	141.25	1.925	0.05	147.06	4.11	1.927	0.16	148.74	5.30	1.93	0.31	151.37	7.16
Average				0.128		3.895		0.262		5.897		0.353		5.650
Min				-0.310		-3.679		-0.258		-2.592		-0.155		-2.936
Max				0.518		10.365		0.674		12.871		0.881		12.104

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Unit no.	2000 hrs	Delta VF	2000 hrs	Delta IV	3000 hrs	Delta VF	3000 hrs	Delta IV	4000 hrs	Delta VF	4000 hrs	Delta IV
	VF	%	IV	%	VF	%	IV	%	VF	%	IV	%
41	1.934	0.68	143.47	3.02	1.936	0.78	144.07	3.45	1.936	0.78	141.61	1.68
42	1.933	0.52	155.81	10.07	1.935	0.62	156.23	10.36	1.934	0.57	156.25	10.38
43	1.934	0.62	154.56	9.43	1.937	0.78	155.05	9.78	1.934	0.62	155.69	10.23
44	1.939	0.52	155.65	8.11	1.941	0.62	158.33	9.97	1.94	0.57	157.3	9.26
45	1.937	0.52	158.74	9.51	1.938	0.57	160.48	10.71	1.937	0.52	157.96	8.97
46	1.939	0.52	161.59	10.04	1.939	0.52	157.82	7.47	1.94	0.57	155.84	6.12
47	1.941	0.47	162.57	9.29	1.942	0.52	160.17	7.68	1.942	0.52	159.32	7.11
48	1.932	0.52	153.68	10.48	1.932	0.52	151.66	9.03	1.932	0.52	152.13	9.37
49	1.939	0.57	161.01	12.67	1.945	0.88	158.91	11.20	1.946	0.93	157.31	10.08
50	1.938	0.52	160.07	9.89	1.94	0.62	157.04	7.81	1.938	0.52	154.65	6.17
51	1.949	0.72	142.91	3.10	1.951	0.83	140	1.00	1.95	0.78	139.5	0.64
52	1.944	0.62	158.02	9.27	1.947	0.78	157.86	9.16	1.942	0.52	156.89	8.49
53	1.945	0.62	141.16	4.98	1.948	0.78	141.06	4.90	1.946	0.67	140.53	4.51
54	1.944	0.52	160.44	9.67	1.948	0.72	159.28	8.88	1.945	0.57	159.58	9.08
55	1.937	0.57	160.2	9.46	1.94	0.73	158.63	8.39	1.94	0.73	155.65	6.35
56	1.974	0.77	156.29	8.64	1.956	-0.15	156	8.44	1.952	-0.36	153.53	6.72
57	1.945	0.57	144.31	4.55	1.966	1.65	143.86	4.22	1.948	0.72	142.59	3.30
58	1.94	0.47	160.32	9.62	1.943	0.62	159.81	9.27	1.941	0.52	157.12	7.43
59	1.939	0.47	159.46	9.59	1.941	0.57	158.33	8.82	1.94	0.52	156.88	7.82
60	1.95	0.72	156.74	10.33	1.953	0.88	156.13	9.90	1.951	0.77	151.26	6.48
61	1.948	0.52	158.29	6.22	1.953	0.77	160.34	7.60	1.953	0.77	156.47	5.00
62	1.937	0.47	159.39	8.49	1.942	0.73	159.92	8.85	1.938	0.52	156.99	6.85
63	1.932	0.47	158.54	9.13	1.935	0.62	158.06	8.80	1.938	0.78	157.61	8.49
64	1.928	0.57	142.96	3.03	1.931	0.73	143.65	3.52	1.931	0.73	141.35	1.87
65	1.944	0.57	143.72	3.60	1.946	0.67	143.94	3.76	1.944	0.57	139.91	0.85
66	1.957	0.72	155.86	6.45	1.963	1.03	157.07	7.27	1.958	0.77	155.41	6.14
67	1.939	0.47	157.19	8.12	1.943	0.67	157.4	8.27	1.941	0.57	155.67	7.08
68	1.946	0.57	145.54	4.77	1.951	0.83	145.53	4.76	1.946	0.57	143.39	3.22
69	1.939	0.57	157.66	9.69	1.941	0.67	157.57	9.63	1.939	0.57	154.25	7.32
70	1.944	0.52	155.24	9.95	1.946	0.62	155.37	10.04	1.944	0.52	150.21	6.39
71	1.936	0.47	162.1	10.08	1.94	0.67	159.48	8.30	1.937	0.52	156.29	6.13
72	1.968	0.72	136.27	0.66	2.018	3.28	135.51	0.10	1.971	0.87	133.18	-1.62
73	1.939	0.47	159.77	8.99	1.942	0.62	157.96	7.76	1.94	0.52	154.77	5.58
74	1.937	0.57	160.87	11.26	1.939	0.67	158.6	9.69	1.938	0.62	154.98	7.19
75	1.934	0.52	160.69	12.58	1.936	0.62	157.36	10.25	1.933	0.47	147.48	3.33
76	1.947	0.52	163.1	9.40	1.95	0.67	161.81	8.54	1.949	0.62	159.24	6.82
77	1.961	0.62	161.51	10.01	1.966	0.87	160.91	9.60	1.964	0.77	157.94	7.57
78	1.94	0.41	156.09	9.71	1.942	0.52	155.52	9.31	1.94	0.41	153.83	8.12
79	1.933	0.52	162.49	9.52	1.935	0.62	161.14	8.61	1.936	0.68	157.54	6.19
80	1.933	0.47	156.42	10.74	1.935	0.57	154.39	9.30	1.931	0.36	148.63	5.22
Average		0.538		7.338		0.725		8.018		0.601		6.759
Min		0.052		-1.857		-0.153		0.103		-0.357		-2.634
Max		0.985		12.665		3.275		14.174		1.135		12.907

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Unit no.	5000 hrs	Delta VF	5000 hrs	Delta IV	6000 hrs	Delta VF	6000 hrs	Delta IV
	VF	%	IV	%	VF	%	IV	%
41	1.948	1.41	139.93	0.47	1.935	0.73	137.41	-1.34
42	1.945	1.14	153.58	8.49	1.932	0.47	152.38	7.64
43	1.945	1.20	153.18	8.45	1.932	0.52	151.15	7.02
44	1.95	1.09	154.96	7.63	1.939	0.52	153.31	6.49
45	1.949	1.14	152.75	5.37	1.936	0.47	150.63	3.91
46	1.948	0.98	156.35	6.47	1.938	0.47	154.56	5.25
47	1.95	0.93	157.46	5.86	1.941	0.47	157.4	5.82
48	1.943	1.09	149.78	7.68	1.931	0.47	149.15	7.23
49	1.951	1.19	155.79	9.01	1.938	0.52	154.48	8.10
50	1.954	1.35	154.75	6.24	1.938	0.52	150.74	3.49
51	1.963	1.45	138.21	-0.29	1.953	0.93	136.49	-1.53
52	1.953	1.09	154.08	6.55	1.943	0.57	152.88	5.72
53	1.959	1.35	138.1	2.70	1.946	0.67	136.6	1.58
54	1.956	1.14	158.05	8.04	1.945	0.57	154.17	5.39
55	1.95	1.25	154.25	5.40	1.942	0.83	151.26	3.35
56	1.962	0.15	152.21	5.80	1.949	-0.51	150.13	4.36
57	1.958	1.24	139.56	1.11	1.947	0.67	140.62	1.88
58	1.952	1.09	155.52	6.34	1.94	0.47	156.32	6.89
59	1.951	1.09	156.38	7.48	1.939	0.47	155.27	6.71
60	1.964	1.45	151.96	6.97	1.951	0.77	149.94	5.55
61	1.966	1.44	156.63	5.11	1.951	0.67	154.68	3.80
62	1.948	1.04	153.52	4.49	1.938	0.52	154.83	5.38
63	1.945	1.14	156	7.39	1.933	0.52	154.79	6.55
64	1.94	1.20	137.42	-0.97	1.931	0.73	137.5	-0.91
65	1.959	1.35	139.72	0.71	1.946	0.67	137.9	-0.60
66	1.97	1.39	154.22	5.33	1.959	0.82	154.13	5.27
67	1.95	1.04	153.64	5.68	1.94	0.52	155.93	7.26
68	1.957	1.14	141.58	1.91	1.948	0.67	141.93	2.17
69	1.952	1.24	154.13	7.24	1.94	0.62	152.98	6.44
70	1.955	1.09	149.17	5.65	1.944	0.52	147.22	4.27
71	1.948	1.09	156.09	6.00	1.936	0.47	153.04	3.93
72	1.981	1.38	131.95	-2.53	1.971	0.87	131.08	-3.17
73	1.953	1.19	156.3	6.62	1.941	0.57	152.51	4.04
74	1.95	1.25	155.22	7.35	1.937	0.57	153.42	6.11
75	1.947	1.20	147.87	3.60	1.934	0.52	145.44	1.90
76	1.959	1.14	159.6	7.06	1.949	0.62	156.7	5.11
77	1.974	1.28	157.9	7.55	1.963	0.72	157.32	7.15
78	1.956	1.24	153.95	8.20	1.94	0.41	151.95	6.80
79	1.946	1.20	158.26	6.67	1.932	0.47	155.94	5.11
80	1.946	1.14	149.75	6.02	1.932	0.42	147.62	4.51
Average		1.223		5.341		0.581		4.597
Min		0.153		-4.759		-0.510		-5.240
Max		2.749		11.766		1.186		11.801

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High Temperature Operating Life Test

T=80°C, IF=30mA

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	1.94	146.55	1.94	0.00	153.57	4.79	1.938	-0.10	152.51	4.07	1.951	0.57	156.51	6.80
2	1.931	141.02	1.93	-0.05	145.79	3.38	1.93	-0.05	146.79	4.09	1.941	0.52	149.05	5.69
3	1.933	145.9	1.935	0.10	153.49	5.20	1.94	0.36	154.21	5.70	1.947	0.72	157.44	7.91
4	1.925	144.18	1.926	0.05	151.54	5.10	1.926	0.05	152.99	6.11	1.937	0.62	156.34	8.43
5	1.926	143.21	1.926	0.00	150.08	4.80	1.928	0.10	152.82	6.71	1.936	0.52	153.86	7.44
6	1.931	148.11	1.931	0.00	156.04	5.35	1.935	0.21	157.92	6.62	1.94	0.47	157.75	6.51
7	1.943	148.04	1.941	-0.10	153.31	3.56	1.946	0.15	155.72	5.19	1.955	0.62	158.29	6.92
8	1.932	149.8	1.931	-0.05	155.34	3.70	1.932	0.00	155.97	4.12	1.942	0.52	158.42	5.75
9	1.934	146.43	1.932	-0.10	152.35	4.04	1.935	0.05	152.72	4.30	1.943	0.47	150.9	3.05
10	1.936	139.47	1.942	0.31	138.98	-0.35	1.947	0.57	139.77	0.22	1.959	1.19	141.24	1.27
11	1.93	147.76	1.928	-0.10	154.45	4.53	1.93	0.00	156.54	5.94	1.937	0.36	157.55	6.63
12	1.927	141.35	1.926	-0.05	142.44	0.77	1.929	0.10	149.13	5.50	1.936	0.47	148.62	5.14
13	1.928	144.52	1.93	0.10	151.18	4.61	1.933	0.26	154.17	6.68	1.939	0.57	154.58	6.96
14	1.944	147.67	1.944	0.00	153.61	4.02	1.947	0.15	155.71	5.44	1.957	0.67	156.85	6.22
15	1.931	145.62	1.93	-0.05	150.97	3.67	1.932	0.05	153.25	5.24	1.939	0.41	154.61	6.17
16	1.935	144.64	1.932	-0.16	149.46	3.33	1.934	-0.05	153.17	5.90	1.941	0.31	153.46	6.10
17	1.928	149.62	1.927	-0.05	155.54	3.96	1.929	0.05	157.87	5.51	1.935	0.36	155.93	4.22
18	1.926	142.67	1.925	-0.05	147.9	3.67	1.927	0.05	150.6	5.56	1.933	0.36	151.63	6.28
19	1.93	143.34	1.929	-0.05	148.64	3.70	1.932	0.10	151.48	5.68	1.938	0.41	152.6	6.46
20	1.93	143.69	1.932	0.10	148.48	3.33	1.934	0.21	150.23	4.55	1.941	0.57	152.69	6.26
21	1.938	139.24	1.937	-0.05	136.86	-1.71	1.944	0.31	140.23	0.71	1.954	0.83	141.3	1.48
22	1.93	143.55	1.928	-0.10	147.4	2.68	1.932	0.10	148.19	3.23	1.937	0.36	149.14	3.89
23	1.931	149.84	1.93	-0.05	154.38	3.03	1.933	0.10	158.25	5.61	1.939	0.41	159.15	6.21
24	1.93	147.82	1.928	-0.10	150.89	2.08	1.93	0.00	154.61	4.59	1.937	0.36	156.22	5.68
25	1.934	149.6	1.932	-0.10	153.51	2.61	1.934	0.00	157.01	4.95	1.941	0.36	158.39	5.88
26	1.931	149.11	1.928	-0.16	152.16	2.05	1.932	0.05	154.44	3.57	1.94	0.47	156.81	5.16
27	1.927	142.41	1.922	-0.26	145.44	2.13	1.925	-0.10	148.99	4.62	1.933	0.31	149.69	5.11
28	1.949	148.44	1.946	-0.15	152.42	2.68	1.954	0.26	154.32	3.96	1.964	0.77	155.24	4.58
29	1.932	148.89	1.93	-0.10	152.74	2.59	1.932	0.00	153.9	3.36	1.939	0.36	155.73	4.59
30	1.933	148.07	1.929	-0.21	149.11	0.70	1.933	0.00	154.9	4.61	1.94	0.36	156.28	5.54
31	1.935	149.73	1.934	-0.05	154.92	3.47	1.937	0.10	157.37	5.10	1.943	0.41	157.03	4.88
32	1.932	152.37	1.935	0.16	158.62	4.10	1.938	0.31	160.41	5.28	1.944	0.62	159.42	4.63
33	1.934	147.61	1.933	-0.05	154.7	4.80	1.936	0.10	156	5.68	1.942	0.41	155.7	5.48
34	1.935	149.43	1.938	0.16	156.21	4.54	1.94	0.26	157.57	5.45	1.947	0.62	157	5.07
35	1.927	146.95	1.925	-0.10	152.41	3.72	1.927	0.00	154.85	5.38	1.933	0.31	154.67	5.25
36	1.936	139.2	1.937	0.05	138.92	-0.20	1.943	0.36	141.11	1.37	1.952	0.83	140.64	1.03
37	1.929	145.33	1.93	0.05	151.8	4.45	1.931	0.10	151.67	4.36	1.938	0.47	152.92	5.22
38	1.938	149.17	1.94	0.10	153.55	2.94	1.943	0.26	156.29	4.77	1.951	0.67	158.52	6.27
39	1.927	143.26	1.927	0.00	147.44	2.92	1.93	0.16	151.38	5.67	1.936	0.47	153.41	7.09
40	1.931	141.32	1.927	-0.21	145.37	2.87	1.932	0.05	149.22	5.59	1.938	0.36	151.48	7.19

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Unit no.	2000 hrs	Delta VF	2000 hrs	Delta IV	3000 hrs	Delta VF	3000 hrs	Delta IV	4000 hrs	Delta VF	4000 hrs	Delta IV
	VF	%	IV	%	VF	%	IV	%	VF	%	IV	%
1	1.947	0.36	154.18	5.21	1.951	0.57	154.46	5.40	1.949	0.46	150.88	2.95
2	1.937	0.31	149.24	5.83	1.944	0.67	147.97	4.93	1.941	0.52	147.25	4.42
3	1.943	0.52	156.59	7.33	1.947	0.72	154.26	5.73	1.948	0.78	155.54	6.61
4	1.934	0.47	153.04	6.15	1.938	0.68	152.67	5.89	1.939	0.73	153.6	6.53
5	1.932	0.31	152.26	6.32	1.94	0.73	151.93	6.09	1.936	0.52	150.95	5.40
6	1.941	0.52	160.36	8.27	1.946	0.78	160.6	8.43	1.944	0.67	156.08	5.38
7	1.954	0.57	161.06	8.79	1.96	0.87	158.6	7.13	1.949	0.31	158.74	7.23
8	1.94	0.41	157.24	4.97	1.947	0.78	159.42	6.42	1.944	0.62	159.58	6.53
9	1.958	1.24	141.75	-3.20	1.954	1.03	156.8	7.08	1.943	0.47	155.55	6.23
10	1.932	-0.21	158.6	13.72	1.967	1.60	142.92	2.47	1.965	1.50	137.48	-1.43
11	1.932	0.10	149.4	1.11	1.945	0.78	158.06	6.97	1.94	0.52	155.54	5.27
12	1.936	0.47	155.96	10.34	1.94	0.67	149.13	5.50	1.937	0.52	147.68	4.48
13	1.956	1.45	157.88	9.24	1.942	0.73	155.28	7.45	1.939	0.57	155.57	7.65
14	1.937	-0.36	156.78	6.17	1.962	0.93	158.58	7.39	1.962	0.93	155.29	5.16
15	1.941	0.52	155.52	6.80	1.942	0.57	156.8	7.68	1.94	0.47	152.37	4.64
16	1.933	-0.10	159.31	10.14	1.944	0.47	154.69	6.95	1.943	0.41	151.11	4.47
17	1.931	0.16	152.54	1.95	1.94	0.62	158.3	5.80	1.938	0.52	156.79	4.79
18	1.935	0.47	151.08	5.89	1.936	0.52	151.94	6.50	1.934	0.42	151.54	6.22
19	1.955	1.30	144.47	0.79	1.943	0.67	152.95	6.70	1.939	0.47	150.87	5.25
20	1.937	0.36	146.39	1.88	1.944	0.73	152.53	6.15	1.942	0.62	149.93	4.34
21	1.937	-0.05	162.16	16.46	1.961	1.19	143.77	3.25	1.959	1.08	140.34	0.79
22	1.934	0.21	155.03	8.00	1.942	0.62	146.38	1.97	1.941	0.57	146.07	1.76
23	1.939	0.41	161.02	7.46	1.943	0.62	161.57	7.83	1.941	0.52	162.25	8.28
24	1.94	0.52	161.01	8.92	1.941	0.57	156.36	5.78	1.941	0.57	156.26	5.71
25	1.933	-0.05	152.66	2.05	1.945	0.57	159.96	6.93	1.943	0.47	156.73	4.77
26	1.964	1.71	157.21	5.43	1.943	0.62	158.52	6.31	1.943	0.62	155.97	4.60
27	1.938	0.57	157.06	10.29	1.936	0.47	151.43	6.33	1.933	0.31	149.38	4.89
28	1.939	-0.51	160.54	8.15	1.972	1.18	157.02	5.78	1.971	1.13	156.85	5.67
29	1.941	0.47	157.18	5.57	1.943	0.57	156.7	5.25	1.941	0.47	152.13	2.18
30	1.94	0.36	159.26	7.56	1.943	0.52	160.46	8.37	1.941	0.41	156.22	5.50
31	1.937	0.10	156.63	4.61	1.947	0.62	158.23	5.68	1.947	0.62	155.36	3.76
32	1.941	0.47	157.99	3.69	1.947	0.78	161.14	5.76	1.948	0.83	159.44	4.64
33	1.929	-0.26	155.79	5.54	1.944	0.52	158.92	7.66	1.942	0.41	157.36	6.61
34	1.953	0.93	138.71	-7.17	1.95	0.78	160.41	7.35	1.949	0.72	157.58	5.45
35	1.937	0.52	153.33	4.34	1.935	0.42	153.88	4.72	1.932	0.26	151.74	3.26
36	1.95	0.72	157.24	12.96	1.959	1.19	138.98	-0.16	1.956	1.03	134.5	-3.38
37	1.933	0.21	151.5	4.25	1.942	0.67	153.54	5.65	1.94	0.57	148.8	2.39
38	1.934	-0.21	150.29	0.75	1.957	0.98	157.97	5.90	1.955	0.88	157.59	5.64
39	1.932	0.26	154.89	8.12	1.94	0.67	154.26	7.68	1.937	0.52	150.89	5.33
40	1.995	3.31	156.88	11.01	1.946	0.78	153.03	8.29	1.939	0.41	147.96	4.70

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Unit no.	5000 hrs	Delta VF	5000 hrs	Delta IV	6000 hrs	Delta VF	6000 hrs	Delta IV
	VF	%	IV	%	VF	%	IV	%
1	1.963	1.19	152.03	3.74	1.971	1.60	152.71	4.20
2	1.95	0.98	147.31	4.46	1.959	1.45	149.38	5.93
3	1.958	1.29	154.13	5.64	1.965	1.66	156.46	7.24
4	1.947	1.14	153.8	6.67	1.955	1.56	154.25	6.98
5	1.944	0.93	149.87	4.65	1.951	1.30	148.02	3.36
6	1.951	1.04	155.28	4.84	1.962	1.61	155.95	5.29
7	1.959	0.82	156.45	5.68	1.962	0.98	156.85	5.95
8	1.95	0.93	157.57	5.19	1.962	1.55	159.69	6.60
9	1.949	0.78	153.92	5.12	1.96	1.34	156.76	7.05
10	1.972	1.86	133.83	-4.04	1.982	2.38	133.3	-4.42
11	1.945	0.78	153.52	3.90	1.955	1.30	154.59	4.62
12	1.944	0.88	147.14	4.10	1.953	1.35	149.18	5.54
13	1.947	0.99	153.33	6.10	1.955	1.40	155.75	7.77
14	1.969	1.29	154.29	4.48	1.978	1.75	156.72	6.13
15	1.947	0.83	149.94	2.97	1.955	1.24	149.68	2.79
16	1.951	0.83	150.13	3.80	1.958	1.19	150.46	4.02
17	1.946	0.93	156.27	4.44	1.953	1.30	157.75	5.43
18	1.943	0.88	150.63	5.58	1.95	1.25	151.64	6.29
19	1.948	0.93	150.68	5.12	1.957	1.40	152.29	6.24
20	1.948	0.93	148.59	3.41	1.958	1.45	147.74	2.82
21	1.966	1.44	132.72	-4.68	1.976	1.96	139.4	0.11
22	1.946	0.83	143.41	-0.10	1.956	1.35	147.76	2.93
23	1.949	0.93	158.92	6.06	1.957	1.35	161.25	7.61
24	1.946	0.83	154.33	4.40	1.957	1.40	155.95	5.50
25	1.95	0.83	154	2.94	1.959	1.29	154.11	3.01
26	1.949	0.93	153.38	2.86	1.958	1.40	154.94	3.91
27	1.94	0.67	148.89	4.55	1.95	1.19	150.99	6.02
28	1.982	1.69	154.79	4.28	1.989	2.05	156.73	5.58
29	1.947	0.78	152.95	2.73	1.957	1.29	155.06	4.14
30	1.949	0.83	154.26	4.18	1.957	1.24	152.64	3.09
31	1.953	0.93	152.58	1.90	1.962	1.40	152.58	1.90
32	1.952	1.04	158.87	4.27	1.961	1.50	160.74	5.49
33	1.95	0.83	156.36	5.93	1.958	1.24	157.28	6.55
34	1.957	1.14	156.4	4.66	1.965	1.55	153.16	2.50
35	1.942	0.78	150.69	2.55	1.949	1.14	148.45	1.02
36	1.967	1.60	134.41	-3.44	1.975	2.01	134.54	-3.35
37	1.948	0.98	149.94	3.17	1.977	2.49	152.03	4.61
38	1.964	1.34	156.54	4.94	1.973	1.81	157.55	5.62
39	1.946	0.99	151.46	5.72	1.954	1.40	151.24	5.57
40	1.949	0.93	148.04	4.76	1.954	1.19	146.77	3.86

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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	1.924	143.24	1.927	0.16	151.71	5.91	1.929	0.26	155.26	8.39	1.936	0.62	155.27	8.40
42	1.957	148.69	1.96	0.15	153.39	3.16	1.964	0.36	153.81	3.44	1.993	1.84	158.08	6.32
43	1.939	141.36	1.947	0.41	143.21	1.31	1.953	0.72	145.45	2.89	1.966	1.39	145.72	3.08
44	1.923	138.56	1.928	0.26	146.9	6.02	1.933	0.52	149.08	7.59	1.945	1.14	151.04	9.01
45	1.931	127.85	1.935	0.21	129.44	1.24	1.939	0.41	131.19	2.61	1.95	0.98	132.78	3.86
46	1.938	143.01	1.939	0.05	142.42	-0.41	1.943	0.26	143.61	0.42	1.957	0.98	146.38	2.36
47	1.936	148.23	1.936	0.00	154.44	4.19	1.941	0.26	156.58	5.63	1.948	0.62	158.35	6.83
48	1.928	147.23	1.927	-0.05	153.72	4.41	1.93	0.10	156.81	6.51	1.938	0.52	157.58	7.03
49	1.94	146.62	1.942	0.10	153.44	4.65	1.946	0.31	156.13	6.49	1.97	1.55	156.46	6.71
50	1.931	139.12	1.935	0.21	145.07	4.28	1.938	0.36	147.41	5.96	1.947	0.83	149.1	7.17
51	1.94	142.37	1.942	0.10	142.18	-0.13	1.948	0.41	141.25	-0.79	1.959	0.98	144.24	1.31
52	1.923	140.47	1.923	0.00	146.1	4.01	1.925	0.10	146.64	4.39	1.933	0.52	151.32	7.72
53	1.93	146.66	1.929	-0.05	153.22	4.47	1.931	0.05	153.78	4.85	1.938	0.41	153.93	4.96
54	1.931	149.18	1.94	0.47	155.2	4.04	1.945	0.73	156.33	4.79	1.953	1.14	158.67	6.36
55	1.924	139.18	1.924	0.00	148.75	6.88	1.926	0.10	148.82	6.93	1.933	0.47	149.14	7.16
56	1.948	142.82	1.951	0.15	140.19	-1.84	1.958	0.51	139.39	-2.40	1.969	1.08	143.68	0.60
57	1.929	145.98	1.93	0.05	151.53	3.80	1.936	0.36	152.83	4.69	1.941	0.62	153.48	5.14
58	1.928	142.4	1.935	0.36	141.04	-0.96	1.942	0.73	142.14	-0.18	1.953	1.30	144.19	1.26
59	1.928	144.72	1.928	0.00	150.81	4.21	1.929	0.05	151.05	4.37	1.937	0.47	154.65	6.86
60	1.929	145.67	1.929	0.00	150.78	3.51	1.933	0.21	151.05	3.69	1.939	0.52	153.82	5.59
61	1.929	143.67	1.931	0.10	148.34	3.25	1.931	0.10	150.78	4.95	1.938	0.47	151.82	5.67
62	1.928	141.6	1.935	0.36	147.58	4.22	1.946	0.93	151.53	7.01	1.951	1.19	150.75	6.46
63	1.941	143.02	1.944	0.15	140.34	-1.87	1.95	0.46	144.39	0.96	1.963	1.13	145.37	1.64
64	1.935	140.58	1.939	0.21	139.7	-0.63	1.945	0.52	142.5	1.37	1.957	1.14	142.99	1.71
65	1.929	146.66	1.931	0.10	149.15	1.70	1.932	0.16	153.7	4.80	1.939	0.52	154.96	5.66
66	1.938	145.14	1.94	0.10	140.24	-3.38	1.954	0.83	145.75	0.42	1.972	1.75	146.21	0.74
67	1.939	140.35	1.938	-0.05	136.67	-2.62	1.945	0.31	138.82	-1.09	1.955	0.83	139.33	-0.73
68	1.938	146.88	1.936	-0.10	148.9	1.38	1.94	0.10	152.95	4.13	1.947	0.46	154.84	5.42
69	1.936	149.94	1.933	-0.15	152.5	1.71	1.936	0.00	158.23	5.53	1.944	0.41	155.98	4.03
70	1.927	144.22	1.925	-0.10	147.68	2.40	1.929	0.10	151.84	5.28	1.936	0.47	152.35	5.64
71	1.929	143.83	1.927	-0.10	149.52	3.96	1.929	0.00	150.39	4.56	1.937	0.41	150.65	4.74
72	1.941	147.75	1.94	-0.05	152.42	3.16	1.941	0.00	154.16	4.34	1.948	0.36	155.13	4.99
73	1.936	142.74	1.936	0.00	148.41	3.97	1.939	0.15	149.77	4.93	1.945	0.46	151.74	6.31
74	1.928	148.31	1.929	0.05	154.07	3.88	1.93	0.10	156.29	5.38	1.938	0.52	158.19	6.66
75	1.93	146.97	1.931	0.05	152.4	3.69	1.933	0.16	154.61	5.20	1.941	0.57	156.22	6.29
76	1.931	145.72	1.933	0.10	151.08	3.68	1.936	0.26	151.41	3.90	1.945	0.73	152.99	4.99
77	1.936	147.67	1.935	-0.05	153.52	3.96	1.939	0.15	155.9	5.57	1.946	0.52	154.84	4.86
78	1.937	146.26	1.937	0.00	152.98	4.59	1.94	0.15	155.45	6.28	1.949	0.62	154.87	5.89
79	1.926	141.11	1.926	0.00	146.35	3.71	1.93	0.21	148.67	5.36	1.937	0.57	149	5.59
80	1.93	148.45	1.93	0.00	153.76	3.58	1.933	0.16	155.96	5.06	1.94	0.52	156.89	5.69
Average				0.023		2.934		0.205		4.441		0.651		5.255
Min				-0.259		-3.376		-0.104		-2.402		0.310		-0.727
Max				0.466		6.876		0.934		8.392		1.840		9.007

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Unit no.	2000 hrs	Delta VF	2000 hrs	Delta IV	3000 hrs	Delta VF	3000 hrs	Delta IV	4000 hrs	Delta VF	4000 hrs	Delta IV
	VF	%	IV	%	VF	%	IV	%	VF	%	IV	%
41	1.965	2.13	143.64	0.28	1.938	0.73	154.27	7.70	1.938	0.73	153.58	7.22
42	1.942	-0.77	149.28	0.40	2.013	2.86	156.64	5.35	1.992	1.79	157.56	5.97
43	1.948	0.46	132.31	-6.40	1.973	1.75	144.78	2.42	1.976	1.91	144.32	2.09
44	1.956	1.72	144.03	3.95	1.95	1.40	149.07	7.59	1.948	1.30	149.23	7.70
45	1.945	0.73	158.53	24.00	1.956	1.29	134.42	5.14	1.957	1.35	130.87	2.36
46	1.933	-0.26	157.59	10.20	1.964	1.34	142.15	-0.60	1.962	1.24	141.73	-0.90
47	1.968	1.65	156.39	5.50	1.952	0.83	156.73	5.73	1.95	0.72	155.87	5.15
48	1.942	0.73	146.32	-0.62	1.941	0.67	155.77	5.80	1.936	0.41	157.63	7.06
49	1.957	0.88	141.15	-3.73	1.976	1.86	155.94	6.36	1.977	1.91	156.25	6.57
50	1.93	-0.05	151.94	9.22	1.951	1.04	146.33	5.18	1.947	0.83	145.23	4.39
51	1.935	-0.26	159.57	12.08	1.965	1.29	144.58	1.55	1.964	1.24	142.28	-0.06
52	1.95	1.40	160.73	14.42	1.963	2.08	151.06	7.54	1.933	0.52	151.04	7.52
53	1.929	-0.05	148.94	1.55	1.959	1.50	157.61	7.47	1.938	0.41	158.05	7.77
54	1.972	2.12	144.23	-3.32	1.955	1.24	160.31	7.46	1.956	1.29	158.83	6.47
55	1.942	0.94	159.07	14.29	1.945	1.09	150.16	7.89	1.935	0.57	147.23	5.78
56	1.955	0.36	147.18	3.05	1.979	1.59	143.24	0.29	1.976	1.44	136.99	-4.08
57	1.936	0.36	157.13	7.64	1.945	0.83	157.05	7.58	1.945	0.83	154.52	5.85
58	1.936	0.41	154.63	8.59	1.962	1.76	145.29	2.03	1.966	1.97	144.61	1.55
59	1.934	0.31	151.59	4.75	1.941	0.67	156.35	8.04	1.94	0.62	153.21	5.87
60	1.95	1.09	152.54	4.72	1.943	0.73	155.31	6.62	1.943	0.73	151.23	3.82
61	1.962	1.71	145.98	1.61	1.946	0.88	153.55	6.88	1.944	0.78	150.65	4.86
62	1.958	1.56	143.87	1.60	1.955	1.40	152.52	7.71	1.951	1.19	149.94	5.89
63	1.937	-0.21	158.26	10.66	1.972	1.60	145.26	1.57	1.969	1.44	143.61	0.41
64	1.98	2.33	149.64	6.44	1.968	1.71	144.55	2.82	1.964	1.50	138.92	-1.18
65	1.956	1.40	143.38	-2.24	1.942	0.67	157.31	7.26	1.939	0.52	154.11	5.08
66	1.947	0.46	158.41	9.14	1.991	2.73	148.82	2.54	1.992	2.79	144.08	-0.73
67	1.94	0.05	160.38	14.27	1.963	1.24	141.71	0.97	1.96	1.08	138.48	-1.33
68	1.933	-0.26	154.21	4.99	1.953	0.77	157.18	7.01	1.951	0.67	156.46	6.52
69	1.936	0.00	151.43	0.99	1.947	0.57	161.77	7.89	1.944	0.41	158.52	5.72
70	1.946	0.99	155.12	7.56	1.94	0.67	154.84	7.36	1.936	0.47	152.15	5.50
71	1.942	0.67	153.91	7.01	1.941	0.62	152.86	6.28	1.941	0.62	149.63	4.03
72	1.937	-0.21	161.04	8.99	1.952	0.57	156.67	6.04	1.951	0.52	155.46	5.22
73	1.94	0.21	157.89	10.61	1.947	0.57	153.26	7.37	1.947	0.57	153.49	7.53
74	1.945	0.88	154.66	4.28	1.942	0.73	160.44	8.18	1.94	0.62	157.59	6.26
75	1.947	0.88	157.7	7.30	1.944	0.73	157.52	7.18	1.942	0.62	153.42	4.39
76	1.95	0.98	157.41	8.02	1.95	0.98	153.32	5.22	1.949	0.93	151.29	3.82
77	1.934	-0.10	149.37	1.15	1.951	0.77	157.16	6.43	1.949	0.67	154.81	4.84
78	1.939	0.10	159.22	8.86	1.954	0.88	156.84	7.23	1.952	0.77	155.31	6.19
79	1.943	0.88	154.26	9.32	1.938	0.62	152.03	7.74	1.937	0.57	148.69	5.37
80	1.938	0.41	160.4	8.05	1.943	0.67	158.12	6.51	1.941	0.57	155.12	4.49
Average		0.565		6.061		0.942		5.879		0.794		4.446
Min		-0.766		-7.174		0.415		-0.601		0.259		-4.082
Max		3.314		23.997		2.862		8.433		2.786		8.282

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Unit no.	5000 hrs	Delta VF	5000 hrs	Delta IV	6000 hrs	Delta VF	6000 hrs	Delta IV
	VF	%	IV	%	VF	%	IV	%
41	1.944	1.04	151.63	5.86	1.961	1.92	153.88	7.43
42	1.96	0.15	155.96	4.89	1.967	0.51	157.43	5.88
43	1.983	2.27	141.19	-0.12	1.991	2.68	142.44	0.76
44	1.956	1.72	148.34	7.06	1.964	2.13	149.16	7.65
45	1.965	1.76	128.44	0.46	1.972	2.12	127.43	-0.33
46	1.969	1.60	139.07	-2.76	1.978	2.06	140.4	-1.83
47	1.957	1.08	155.71	5.05	1.965	1.50	157.91	6.53
48	1.945	0.88	155.49	5.61	1.954	1.35	157.26	6.81
49	1.974	1.75	155.22	5.87	1.982	2.16	157.51	7.43
50	1.956	1.29	143.38	3.06	1.964	1.71	142.03	2.09
51	1.97	1.55	139.49	-2.02	1.98	2.06	140.8	-1.10
52	1.938	0.78	146.25	4.11	1.948	1.30	148.79	5.92
53	1.944	0.73	154.22	5.15	1.954	1.24	156.85	6.95
54	1.961	1.55	157.29	5.44	1.971	2.07	156.01	4.58
55	1.939	0.78	142.35	2.28	1.948	1.25	142.61	2.46
56	1.986	1.95	137.35	-3.83	1.997	2.52	137.91	-3.44
57	1.951	1.14	153.82	5.37	1.96	1.61	156.1	6.93
58	1.97	2.18	143.09	0.48	1.98	2.70	144.41	1.41
59	1.947	0.99	153.04	5.75	1.955	1.40	154.68	6.88
60	1.949	1.04	150.54	3.34	1.956	1.40	148.57	1.99
61	1.948	0.98	147.92	2.96	1.958	1.50	149.77	4.25
62	1.959	1.61	148.44	4.83	1.97	2.18	152.4	7.63
63	1.979	1.96	141.53	-1.04	1.991	2.58	143.15	0.09
64	1.976	2.12	138.1	-1.76	1.983	2.48	138.54	-1.45
65	1.949	1.04	152.23	3.80	1.961	1.66	151.33	3.18
66	1.996	2.99	140.23	-3.38	2.012	3.82	142.19	-2.03
67	1.965	1.34	137.19	-2.25	1.978	2.01	139.79	-0.40
68	1.958	1.03	153.7	4.64	1.968	1.55	155.68	5.99
69	1.952	0.83	157.49	5.04	1.961	1.29	158.89	5.97
70	1.945	0.93	149.77	3.85	1.952	1.30	147.67	2.39
71	1.945	0.83	147.31	2.42	1.955	1.35	144.78	0.66
72	1.957	0.82	153.26	3.73	1.966	1.29	155.54	5.27
73	1.955	0.98	151.53	6.16	1.962	1.34	151.74	6.31
74	1.949	1.09	158.17	6.65	1.957	1.50	158.19	6.66
75	1.95	1.04	153.37	4.35	1.959	1.50	152.01	3.43
76	1.955	1.24	149.59	2.66	1.963	1.66	151.95	4.28
77	1.958	1.14	154.64	4.72	1.966	1.55	154.39	4.55
78	1.959	1.14	154.03	5.31	1.969	1.65	156.63	7.09
79	1.945	0.99	148.04	4.91	1.954	1.45	149.56	5.99
80	1.949	0.98	153.93	3.69	1.958	1.45	154.17	3.85
Average		1.148		3.373		1.626		4.053
Min		0.153		-4.683		0.511		-4.424
Max		2.993		7.058		3.818		7.771

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Reference Device: DNA-CJS