



DC FAN LIFE EXPERIMENT REPORT

Available for these models with lower speed and same physical structure. All model may be followed by Rxx or Fxx series suffixes. This test report applies to FFB 40x40x28.0 mm series as the right table	FFB0412EHN-CF00			
	FFB0412GHN-CF00			

Representative Test P/N : FFB0412UHN-CF00

Equipment: 1.Oven: E24-F0056 On/Off Cycles: Every 500 hours

© **L₁₀ Expectancy: 44,000 hours minimum @ fan rated voltage and the temperature of 70°C**

According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 308,000 hours**

And we rely on a zero failure Weibull test strategy and accelerated testing technique, to determine the total test time (t) for verifying the above life estimation by the equations,

$$t = 1.036 \times \text{MTTF} \times [(B_{r;c}) \div n]^{0.91} \div A_F, \text{ and } A_F = 2^{(T_s - T_u)/10}$$

where, (B_{r;c}) is Poisson distribution factor with the failure number of r equal to 0 and the decimal confidence level of c equal to 0.90(90%).

Stress/Elevated Temperature Ts (°C)	Unstress Temperature Tu (°C)	Acceleration Factor A _F	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B _{r;c}	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 70 °C (hours)	Verified L ₁₀ 70 °C (hours)
80	70	2.00	56	2.303	8,744	21,745.0	765,937	109,420

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2008/7/1 2:00 PM	2010/3/29 3:38 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	21745.0

Herewith, we could assume as right on the basis of above test result. Besides, if the actual test time exceed the required, it comes out that those fans' L₁₀ expectancy and MTTF are greater than the warrant. (MTTF: means Mean Time To Failures, it should be used in a non-repairable system setting. Now we show the MTTF in our life report, that's because we will not repair the failed fans during life experiment. MTBF: means Mean Time Between failures, it should be used in a repairable system setting.

Fan permission criteria for the measurement after test:

- Speed can not drop of $\geq 15\%$ below the original measured rpm.
- Current cannot increase $> 15\%$ of original measure current.
- Noise cannot $> 3\text{dB}$ over the original measure noise.

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	45.25	17,331,185	2,475,884
30	32.00	12,254,998	1,750,714
40	16.00	6,127,499	875,357
50	8.00	3,063,750	437,679
60	4.00	1,531,875	218,839
70	2.00	765,937	109,420
80	1.00	382,969	54,710

Test Result	<input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject
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QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG08FNL099	6521.50	2011/10/28	Nan Yang	Tim Yi



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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FFB0412EHN-CF00				
FFB0412GHN-CF00				

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
8,744	2008/7/1 2:00 PM	2010/3/29 3:38 PM	56	0	21745.0

Representative Test P/N : FFB0412UHN-CF00	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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Equipment: 1.Oven: E24-F0056 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (mA) 810 Max.	Final Test Current Spec. (mA) 810 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 18500+-8%	Final Test Speed Spec. (RPM) 18500+-8%	Deviation (%)	Initial Test Noise Spec. (dB A) 62.5 Max	Final Test Noise Spec. (dB A) 62.5 Max	Deviation 3 dBMax.
1	711	683	-3.9	18018	17851	-0.9	57.8	55.2	-2.6
2	711	701	-1.4	17976	18372	2.2	57.3	55.4	-1.9
3	700	695	-0.7	18020	18242	1.2	57.4	55.4	-2.0
4	714	638	-10.6	18225	17056	-6.4	57.6	55.1	-2.5
5	717	676	-5.7	17715	18106	2.2	57.9	55.2	-2.7
6	716	687	-4.1	17536	18607	6.1	58.4	55.7	-2.7
7	709	678	-4.4	18355	18267	-0.5	57.9	55.1	-2.8
8	719	690	-4.0	17594	18254	3.8	57.8	55.4	-2.4
9	693	704	1.6	18082	18047	-0.2	57.5	55.5	-2.0
10	698	673	-3.6	17978	18395	2.3	57.9	55.2	-2.7
11	700	693	-1.0	17491	17878	2.2	57.6	55.6	-2.0
12	684	674	-1.5	17693	18119	2.4	58.2	55.4	-2.8
13	709	685	-3.4	17971	18056	0.5	57.4	55.2	-2.2
14	714	694	-2.8	17916	17758	-0.9	57.8	55.0	-2.8
15	703	712	1.3	17716	17920	1.2	57.7	55.7	-2.0
16	698	702	0.6	18059	18397	1.9	58.0	55.2	-2.8
17	713	729	2.2	18126	18497	2.0	57.9	55.2	-2.7
18	694	700	0.9	18224	18323	0.5	57.7	55.3	-2.4
19	712	701	-1.5	18023	18221	1.1	57.6	55.4	-2.2
20	703	671	-4.6	18422	18472	0.3	57.8	55.1	-2.7
21	717	712	-0.7	17942	17902	-0.2	57.2	55.3	-1.9
22	689	717	4.1	18096	18409	1.7	57.9	55.2	-2.7
23	689	675	-2.0	17981	18293	1.7	57.6	56.0	-1.6
24	719	682	-5.1	18035	17805	-1.3	57.4	55.2	-2.2
25	707	719	1.7	18117	18499	2.1	57.7	55.4	-2.3
26	716	678	-5.3	17898	18105	1.2	57.9	55.1	-2.8
27	710	625	-12.0	18104	18456	1.9	57.3	55.3	-2.0
28	717	715	-0.3	17911	17535	-2.1	58.1	55.4	-2.7
29	702	729	3.8	17073	18117	6.1	57.3	55.2	-2.1
30	681	715	5.0	18087	18652	3.1	57.5	55.2	-2.3
31	711	682	-4.1	17886	17861	-0.1	57.8	55.5	-2.3
32	720	716	-0.6	17448	18555	6.3	57.4	55.4	-2.0
33	721	657	-8.9	17805	18123	1.8	58.2	55.2	-3.0
34	709	679	-4.2	17521	18353	4.7	57.7	55.4	-2.3
35	712	684	-3.9	18228	17836	-2.2	58.1	55.3	-2.8

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG08FNL099	6521.50	2011/10/28	Nan Yang	Tim Yi



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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FFB0412EHN-CF00	
FFB0412GHN-CF00	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
8,744	2008/7/1 2:00 PM	2010/3/29 3:38 PM	56	0	21745.0

Representative Test P/N : FFB0412UHN-CF00	Current Test Status	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination
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Equipment: 1.Oven: E24-F0056	On/Off Cycles: Every 500 hours
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Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec.	Final Test Current Spec.	Deviation (%)	Initial Test Speed Spec.	Final Test Speed Spec.	Deviation (%)	Initial Test Noise Spec.	Final Test Noise Spec.	Deviation
	(mA) 810 Max.	(mA) 810 Max.		(RPM) 18500+8%	(RPM) 18500+8%		(dB A) 62.5 Max	(dB A) 62.5 Max	
36	700	705	0.7	18076	18329	1.4	57.4	55.2	-2.2
37	720	706	-1.9	17858	17825	-0.2	57.9	55.4	-2.5
38	726	702	-3.3	18262	18460	1.1	57.6	55.2	-2.4
39	697	697	0.0	17786	18179	2.2	57.4	55.2	-2.2
40	725	701	-3.3	17897	18125	1.3	57.9	55.1	-2.8
41	729	697	-4.4	17845	18201	2.0	58.1	55.4	-2.7
42	705	710	0.7	18400	18062	-1.8	57.2	55.2	-2.0
43	711	656	-7.7	18524	18348	-1.0	57.9	55.3	-2.6
44	708	682	-3.7	18196	18574	2.1	57.3	55.2	-2.1
45	697	712	2.2	17954	18056	0.6	57.5	55.5	-2.0
46	706	717	1.6	17573	18194	3.5	57.9	55.2	-2.7
47	713	713	0.0	17217	18260	6.1	58.3	55.1	-3.2
48	701	668	-4.7	18126	17917	-1.2	57.4	55.4	-2.0
49	736	700	-4.9	17656	18234	3.3	57.8	55.3	-2.5
50	708	685	-3.2	18400	18027	-2.0	58.0	55.1	-2.9
51	697	673	-3.4	18031	18370	1.9	57.5	55.4	-2.1
52	721	709	-1.7	17726	18228	2.8	57.9	55.2	-2.7
53	700	718	2.6	18305	17871	-2.4	57.2	55.3	-1.9
54	719	664	-7.6	18303	17846	-2.5	57.4	55.2	-2.2
55	715	685	-4.2	18280	18125	-0.8	57.9	55.4	-2.5
56	706	694	-1.7	17568	18268	4.0	57.5	55.1	-2.4
X-Bar	708.5	692.2	-	17951.0	18157.8	-	57.70	55.30	-
σ	11.158	21.288	-	302.375	288.098	-	0.299	0.179	-

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