



DC FAN CUSTOMIZED 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 FFB40x40x28 mm series as the right table	FFB0412SHN-BR00	FFB0412VHN-BV29	FFB0412SHN-BF00	
	FFB0412SHN-SZ71	FFB0412VHN-PE05	FFB0412SHN-R00	
	FFB0412SHN-PM04	FFB0412VHN-B		
	FFB0412VHN-BR00	FFB0412SHN-AL1T		

Representative Test P/N : FFB0412SHN-F00(2)	
Equipment: 1.Oven: E24-F0108	On/Off Cycles: Every 500 hours

☉ **L₁₀ Expectancy: 30,000 hours minimum @ fan rated voltage and the temperature of 55°C**
 According to the equation for **Weibull distribution**, **MTTF \div 1.89 \times L₁₀ = 56,700 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,

$$t = 1.119 \times \text{MTTF} \times [(B_{r;c}) \div n]^{0.33} \div A_F, \text{ and } A_F = 1.5^{(T_s - T_u)/10}$$

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 T _s (°C) (Actual Test Temperature)	Unstress Temperature T _u (°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 55 °C (hours)	Verified L ₁₀ 55 °C (hours)
70	55	1.84	56	2.303	12,048	4,216.0	19,840	10,498

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2003/7/1 10:00 PM	2004/12/10 2:57 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	4216.0

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.)

Temperature for MTTF Estimation (°C)	Acceleration Factor A _F	Estimated MTTF (hours)	Estimated L ₁₀ (hours)
25	6.20	66,962	35,429
30	5.06	54,674	28,928
40	3.38	36,449	19,285
50	2.25	24,300	12,857
55	1.84	19,840	10,498
60	1.50	16,200	8,571
70	1.00	10,800	5,714

Fan permission criteria for the measurement after test :

1. Speed can not drop of \geq 15% below the original measured rpm.
2. Current cannot increase > 15% of original measure current.
3. Noise cannot >3dB over the original measure noise.

Test Method according to IPC-9591.

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
DG03FNL083	604.50	2004/1/18 6:30 PM	Huilin.Fu	Even.Liu

Note: The test sample equivalent to STD, Part number: FFB0412SHN-F00.



DC FAN FUNCTION TEST RECORD FOR CUSTOMIZED LIFE EXPERIMENT

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FFB0412SHN-SZ71	FFB0412VHN-PE05	FFB0412SHN-R00	
FFB0412SHN-PM04	FFB0412VHN-B		
FFB0412VHN-BR00	FFB0412SHN-AL1T		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
12,048	2003/7/1 10:00 PM	2004/12/10 2:57 AM	56	0	4216.0
Representative Test P/N : FFB0412SHN-F00(2)			Current Test Status		<input type="checkbox"/> In process <input type="checkbox"/> In process (exceed requested) <input checked="" type="checkbox"/> Termination

Equipment: 1.Oven: E24-F0108 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (mA)	Final Test Current Spec. (mA)	Deviation (%)	Initial Test Speed Spec. (RPM)	Final Test Speed Spec. (RPM)	Deviation (%)	Initial Test Noise Spec. (dB A)	Final Test Noise Check. (dB A)	Deviation 3 dB Max
	1300Max	1300Max		11880-14520	11880-14520		76.3 Max	76.3 Max	
1	0.39	0.39	0.0	13927	13364	-4.0	54.6	55.4	1.5
2	0.42	0.40	-4.8	13918	13341	-4.1	55.1	55.1	0.0
3	0.40	0.39	-2.5	13874	13224	-4.7	54.8	55.2	0.7
4	0.40	0.40	0.0	13527	13257	-2.0	54.7	45.9	-16.1
5	0.41	0.41	0.0	13629	13377	-1.8	54.9	55.6	1.3
6	0.40	0.40	0.0	13667	13348	-2.3	54.8	55.1	0.5
7	0.40	0.39	-2.5	13657	13360	-2.2	54.7	55.3	1.1
8	0.40	0.40	0.0	13695	12659	-7.6	54.6	46.9	-14.1
9	0.40	0.41	2.5	13657	13386	-2.0	55.2	55.4	0.4
10	0.41	0.41	0.0	13707	13430	-2.0	55.3	55.6	0.5
11	0.40	0.40	0.0	13659	13304	-2.6	55.1	55.7	1.1
12	0.39	0.39	0.0	13556	13407	-1.1	54.6	53.9	-1.3
13	0.42	0.42	0.0	13727	13450	-2.0	54.6	55.1	0.9
14	0.42	0.43	2.4	13849	13422	-3.1	55.2	55.1	-0.2
15	0.40	0.40	0.0	13447	13467	0.1	55.1	55.4	0.5
16	0.42	0.40	-4.8	13759	13541	-1.6	55.2	55.6	0.7
17	0.40	0.41	2.5	13394	13423	0.2	55.6	55.4	-0.4
18	0.41	0.41	0.0	13459	13364	-0.7	54.7	55.3	1.1
19	0.40	0.39	-2.5	13492	13354	-1.0	54.8	55.1	0.5
20	0.40	0.40	0.0	13779	13326	-3.3	54.9	55.6	1.3
21	0.40	0.41	2.5	13892	13442	-3.2	54.6	55.0	0.7
22	0.41	0.42	2.4	13886	13518	-2.7	55.1	55.1	0.0
23	0.41	0.40	-2.4	13729	13379	-2.5	55.0	55.0	0.0
24	0.41	0.40	-2.4	13859	13724	-1.0	55.2	55.2	0.0
25	0.41	0.40	-2.4	13807	13338	-3.4	54.9	55.3	0.7
26	0.42	0.40	-4.8	13827	13479	-2.5	54.8	55.4	1.1
27	0.41	0.40	-2.4	13525	13364	-1.2	54.7	55.1	0.7
28	0.39	0.38	-2.6	13574	13289	-2.1	54.6	55.0	0.7
29	0.40	0.42	5.0	13921	13380	-3.9	55.3	55.1	-0.4
30	0.41	0.41	0.0	13747	13230	-3.8	55.1	55.4	0.5
31	0.41	0.41	0.0	13794	13412	-2.8	54.6	55.6	1.8
32	0.41	0.40	-2.4	13729	13357	-2.7	55.3	55.6	0.5
33	0.43	0.42	-2.3	13749	13475	-2.0	55.1	55.3	0.4
34	0.42	0.41	-2.4	13827	13510	-2.3	54.6	55.3	1.3
35	0.42	0.40	-4.8	13987	13441	-3.9	54.7	55.2	0.9

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG03FNL083	604.50	2004/1/18	Huiling.Fu	Even.Liu



DC FAN FUNCTION TEST RECORD

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	FFB0412VHN-BR00	FFB0412SHN-AL1T		

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
12,048	2003/7/1 10:00 PM	2004/12/10 2:57 AM	56	0	4216.0

Representative Test P/N : FFB0412SHN-F00(2)	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-F0108	On/Off Cycles: Every 500 hours
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Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (mA) 1300Max	Final Test Current Spec. (mA) 1300Max	Deviation (%)	Initial Test Speed Spec. (RPM) 11880-14520	Final Test Speed Spec. (RPM) 11880-14520	Deviation (%)	Initial Test Noise Spec. (dB A) 76.3 Max	Final Test Noise Check. (dB A) 76.3 Max	Deviation 3 dB Max
36	0.42	0.40	-4.8	13759	13254	-3.7	54.6	55.2	1.1
37	0.43	0.43	0.0	13745	13347	-2.9	54.5	55.7	2.2
38	0.41	0.40	-2.4	13794	13357	-3.2	54.0	55.6	3.0
39	0.40	0.40	0.0	13762	13256	-3.7	55.0	55.5	0.9
40	0.40	0.40	0.0	13849	13370	-3.5	54.8	55.4	1.1
41	0.42	0.42	0.0	13847	13424	-3.1	54.7	55.7	1.8
42	0.41	0.41	0.0	13719	13433	-2.1	55.2	55.6	0.7
43	0.42	0.42	0.0	13692	13376	-2.3	55.1	55.2	0.2
44	0.40	0.44	10.0	13794	13306	-3.5	54.8	55.8	1.8
45	0.42	0.42	0.0	13827	13379	-3.2	54.7	55.7	1.8
46	0.41	0.41	0.0	13639	13424	-1.6	54.6	55.6	1.8
47	0.41	0.40	-2.4	13827	13401	-3.1	55.4	55.7	0.5
48	0.40	0.41	2.5	13946	13307	-4.6	55.3	55.2	-0.2
49	0.40	0.41	2.5	13735	13401	-2.4	54.7	55.1	0.7
50	0.42	0.43	2.4	13579	13479	-0.7	54.5	55.0	0.9
51	0.41	0.41	0.0	13394	13311	-0.6	54.4	55.7	2.4
52	0.40	0.41	2.5	13690	13370	-2.3	54.6	55.1	0.9
53	0.41	0.40	-2.4	13857	13581	-2.0	54.6	55.2	1.1
54	0.40	0.41	2.5	13827	13458	-2.7	55.3	55.6	0.5
55	0.42	0.42	0.0	13874	13350	-3.8	55.6	55.1	-0.9
56	0.40	0.40	0.0	13449	13245	-1.5	54.6	55.7	2.0
X-Bar	0.408	0.407	-	13727.455	13374.673	-	54.877	55.013	-
σ	0.010	0.012	-	147.217	133.489	-	0.321	1.703	-

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DG03FNL083	604.50	2004/1/18	Huiling.Fu	Even.Liu