



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 BCB97x94x25.4 mm series as the right table	BCB1012UH	BCB1012EH			

Representative Test P/N :BCB1012UH-F00	
Equipment:60°C Burn-in Room	On/Off Cycles: Every 500 hours

◎ **L₁₀ Expectancy: 50,000 hours minimum @ fan rated voltage and the temperature of 40°C**
 According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 350,000 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) (Actual Test Temperature)	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 40 °C (hours)	Verified L ₁₀ 40 °C (hours)
60	40	4.00	56	2.303	4,968	4,969.0	350,052	50,007

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2004/12/29 10:00 PM	2006/1/13 7:15 PM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	4969.0

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	11.31	990,097	141,442
30	8.00	700,104	100,015
40	4.00	350,052	50,007
50	2.00	175,026	25,004
60	1.00	87,513	12,502

Fan permission criteria for the measurement after test :

1. For current, the limit is less than spec.(max.).
2. For speed, the allowable decrease is less than 15%.
3. For noise, the limit is less than spec.(max.). + 3 dB

Test Result	<input checked="" type="checkbox"/> Accept
	<input type="checkbox"/> Reject

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG03FNL370	4149.00	2006/1/13 8:00 PM	Guie.Lin	Gx.Xu



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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 applies to BCB97x94x25.4 mm series as the right table

BCB1012UH	BCB1012EH			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
4,968	2004/12/29 10:00 PM	2006/1/13 7:15 PM	56	0	4969.0

Representative Test P/N :BCB1012UH-F00	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:60°C Burn-in Room On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)
	Current Spec. (A) 3.84Max.	Current Spec. (A) 3.84Max.		Speed Spec. (RPM) 8556-10044	Speed Spec. (RPM) 8556-10044		Noise Spec. (dB A) 71.8Max	Noise Spec. (dB A) 71.8Max	
1	3.00	3.05	1.7	9097	9218	1.3	69.5	69.4	-0.1
2	3.14	3.20	1.9	9201	9317	1.3	69.7	69.7	0.0
3	3.04	3.11	2.3	9161	9204	0.5	69.7	69.5	-0.3
4	3.03	3.05	0.7	9193	9247	0.6	69.4	69.8	0.6
5	3.13	3.12	-0.3	9314	9253	-0.7	69.7	69.8	0.1
6	3.19	3.13	-1.9	9190	9213	0.3	69.9	69.4	-0.7
7	3.13	3.13	0.0	9284	9215	-0.7	69.5	69.5	0.0
8	3.22	3.23	0.3	9223	9193	-0.3	69.8	69.7	-0.1
9	3.01	3.02	0.3	9146	9141	-0.1	69.6	69.4	-0.3
10	3.14	3.16	0.6	9264	9263	0.0	69.8	69.9	0.1
11	3.13	3.13	0.0	9259	9246	-0.1	69.6	69.7	0.1
12	3.12	3.11	-0.3	9241	9183	-0.6	69.9	69.8	-0.1
13	3.14	3.14	0.0	8859	9330	5.3	69.8	69.5	-0.4
14	3.13	3.20	2.2	9186	9341	1.7	69.6	69.8	0.3
15	3.21	3.20	-0.3	9302	9235	-0.7	69.8	69.7	-0.1
16	3.23	3.24	0.3	9215	9211	0.0	69.7	69.8	0.1
17	3.18	3.14	-1.3	9240	9197	-0.5	69.9	69.8	-0.1
18	3.21	3.17	-1.2	9230	9237	0.1	69.6	69.8	0.3
19	3.19	3.19	0.0	9263	9283	0.2	69.7	69.9	0.3
20	3.11	3.11	0.0	9246	9254	0.1	69.5	69.4	-0.1
21	3.15	3.16	0.3	9262	9205	-0.6	69.5	69.8	0.4
22	3.00	3.01	0.3	9133	9102	-0.3	69.8	69.6	-0.3
23	2.95	2.94	-0.3	9160	9086	-0.8	69.6	69.9	0.4
24	3.12	3.14	0.6	9261	9203	-0.6	69.9	69.7	-0.3
25	3.13	3.09	-1.3	9259	9207	-0.6	69.8	69.5	-0.4
26	3.04	3.04	0.0	9197	9205	0.1	69.7	69.8	0.1
27	3.07	3.07	0.0	9107	9131	0.3	69.7	69.7	0.0
28	2.97	2.97	0.0	9025	9115	1.0	69.6	69.7	0.1
29	3.20	3.17	-0.9	9297	9284	-0.1	69.8	69.7	-0.1
30	3.18	3.20	0.6	9334	9288	-0.5	69.6	69.9	0.4
31	3.04	3.07	1.0	9212	9134	-0.8	69.6	69.5	-0.1
32	3.07	3.08	0.3	9231	9191	-0.4	69.9	69.8	-0.1
33	3.07	3.05	-0.7	9201	9201	0.0	69.5	69.5	0.0
34	2.97	2.97	0.0	9139	9114	-0.3	69.7	69.7	0.0
35	3.03	3.03	0.0	9178	9139	-0.4	69.8	69.9	0.1

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG03FNL370	4149.00	2006/1/13 8:00 PM	Guie.Lin	Gx.Xu



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4,968	2004/12/29 10:00 PM	2006/1/13 7:15 PM	56	0	4969.0

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Equipment:60°C Burn-in Room	On/Off Cycles: Every 500 hours
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Test Data Between Initial Test and Final Test

Sample No.	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)	Initial Test	Final Test	Deviation (%)
	Current Spec. (A)	Current Spec. (A)		Speed Spec. (RPM)	Speed Spec. (RPM)		Noise Spec. (dB A)	Noise Spec. (dB A)	
	3.84Max.	3.84Max.		8556-10044	8556-10044		71.8Max	71.8Max	
36	3.03	3.05	0.7	9204	9106	-1.1	69.6	69.5	-0.1
37	3.05	3.04	-0.3	9233	9229	0.0	69.9	69.7	-0.3
38	3.08	3.05	-1.0	9249	9223	-0.3	70.0	69.4	-0.9
39	3.11	3.10	-0.3	9223	9219	0.0	69.8	69.8	0.0
40	3.13	3.12	-0.3	9268	9253	-0.2	69.3	69.7	0.6
41	3.14	3.16	0.6	9210	9237	0.3	69.9	69.9	0.0
42	3.08	3.11	1.0	9283	9244	-0.4	69.5	69.6	0.1
43	2.90	2.90	0.0	9290	9307	0.2	69.7	69.9	0.3
44	3.05	3.05	0.0	9167	9131	-0.4	69.5	69.7	0.3
45	3.04	3.04	0.0	9179	9193	0.2	69.8	69.5	-0.4
46	3.15	3.11	-1.3	9245	9239	-0.1	69.6	69.8	0.3
47	3.05	3.08	1.0	9147	9197	0.5	69.9	69.7	-0.3
48	3.14	3.14	0.0	9255	9267	0.1	69.7	69.9	0.3
49	3.16	3.15	-0.3	9291	9282	-0.1	69.8	69.8	0.0
50	3.17	3.12	-1.6	9247	9210	-0.4	69.8	69.5	-0.4
51	3.17	3.15	-0.6	9177	9241	0.7	69.6	69.8	0.3
52	3.16	3.16	0.0	9266	9263	0.0	69.9	69.8	-0.1
53	3.14	3.15	0.3	9201	9215	0.2	69.5	69.9	0.6
54	3.11	3.12	0.3	9153	9229	0.8	69.9	69.6	-0.4
55	3.07	3.10	1.0	9276	9215	-0.7	69.8	69.7	-0.1
56	3.17	3.15	-0.6	9284	9303	0.2	69.4	69.8	0.6
X-Bar	3.103	3.105	-	9213.8	9217.9	-	69.70	69.70	-
σ	0.074	0.071	-	77.320	59.225	-	0.159	0.157	-

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DG03FNL370	4149.00	2006/1/13 8:00 PM	Guie.Lin	Gx.Xu