



# 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 36x36x28.0 mm series as the right table	FFB03612EHN-BL49R	FFB03612EHN-VCL		
	FFB03612EHN-8K3DR			
	FFB03612EHN-TXQW			
<b>Representative Test P/N : FFB03612EHN-AE02R</b>				
<b>Equipment: 1.Oven: E24-T0161</b>			On/Off Cycles: Every 500 hours	

◎ **L<sub>10</sub> Expectancy: 70,000 hours minimum @ fan rated voltage and the temperature of 40°C**  
 According to the equation for **Weibull distribution**,  $MTTF \cong 7 \times L_{10} = 490,000$  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,

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

where, (B<sub>r,c</sub>) 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 <sub>s</sub> (°C) (Actual Test Temperature)	Unstress Temperature T <sub>u</sub> (°C)	Acceleration Factor A <sub>F</sub>	Quantity of Test Devices n (pcs)	Poisson Distribution Factor B <sub>r,c</sub>	Required test time with zero failure t (hours)	Actual test time with zero failure t (hours)	Verified MTTF 40 °C (hours)	Verified L <sub>10</sub> 40 °C (hours)
70	40	8.00	56	2.303	3,478	11,360.0	1,600,561	228,652

**Test Progress:**

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2010/8/20 2:30 PM	2011/10/28 4:46 AM	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination	11360.0

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' L<sub>10</sub> 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 <sub>F</sub>	Estimated MTTF (hours)	Estimated L <sub>10</sub> (hours)
25	22.63	4,527,070	646,724
30	16.00	3,201,122	457,303
40	8.00	1,600,561	228,652
50	4.00	800,280	114,326
60	2.00	400,140	57,163
70	1.00	200,070	28,581

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  $> 3\text{dB}$  over the original measure noise.

**Accept**  
 **Reject**

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG10FNL116	6928.50	2012/9/15	NaNa.Wang	Tim.Yi



## DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

Available for these models with lower speed and same physical structure. All model may be followed byRxx orFxx series suffixes. This test report applies to FFB 36x36x28.0 mm series as the right table	FFB03612EHN-BL49R	FFB03612EHN-CL		
	FFB03612EHN-8K3DR			
	FFB03612EHN-TXQW			

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,478	2010/8/20 2:30 PM	2011/10/28 4:46 AM	56	0	<b>11360.0</b>

Representative Test P/N : FFB03612EHN-AE02R	<b>Current Test Status</b>	<input type="checkbox"/> In process <input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination <input checked="" type="checkbox"/> Termination
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Equipment: 1.Oven: E24-T0161 On/Off Cycles: Every 500 hours

### Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) <b>630 TYP</b>	Final Test Current Spec. (A) <b>630 TYP</b>	Deviation (%)	Initial Test Speed Spec. (RPM) <b>19000 REF</b>	Final Test Speed Spec. (RPM) <b>19000 REF</b>	Deviation (%)	Initial Test Noise Spec. (dB A) <b>62.0 Max</b>	Final Test Noise Spec. (dB A) <b>62.0 Max</b>	Deviation <b>3 dBMax.</b>
1	648	638	-1.5	18691	18975	1.5	56.2	57.6	1.4
2	685	666	-2.8	18522	19500	5.3	56.5	58.0	1.5
3	648	634	-2.2	18926	19317	2.1	56.3	57.4	1.1
4	660	655	-0.8	18972	19573	3.2	56.8	57.9	1.1
5	648	618	-4.6	18467	18811	1.9	56.6	57.6	1.0
6	657	636	-3.2	18404	19028	3.4	56.4	57.5	1.1
7	661	656	-0.8	18565	19506	5.1	56.7	57.4	0.7
8	689	675	-2.0	18727	19384	3.5	56.9	57.5	0.6
9	695	641	-7.8	18638	19422	4.2	56.5	57.3	0.8
10	658	628	-4.6	18608	19277	3.6	56.8	57.2	0.4
11	647	684	5.7	18725	19426	3.7	56.4	57.5	1.1
12	695	636	-8.5	18926	19583	3.5	56.9	57.6	0.7
13	658	606	-7.9	18395	19094	3.8	56.6	57.5	0.9
14	642	621	-3.3	18244	19347	6.0	56.8	57.4	0.6
15	647	644	-0.5	18576	19040	2.5	56.5	57.3	0.8
16	659	667	1.2	18518	19242	3.9	56.4	57.5	1.1
17	665	659	-0.9	18525	19328	4.3	56.6	57.2	0.6
18	657	633	-3.7	18409	19051	3.5	56.8	57.8	1.0
19	651	624	-4.1	18396	19177	4.2	56.1	57.9	1.8
20	652	641	-1.7	18657	18961	1.6	56.9	57.6	0.7
21	638	607	-4.9	18269	18780	2.8	56.6	57.3	0.7
22	649	668	2.9	18626	19367	4.0	56.9	57.5	0.6
23	697	683	-2.0	18831	19673	4.5	56.1	57.9	1.8
24	635	629	-0.9	18627	19428	4.3	56.7	57.5	0.8
25	678	679	0.1	18636	19426	4.2	56.8	57.9	1.1
26	622	607	-2.4	18702	19210	2.7	57.0	57.6	0.6
27	626	625	-0.2	18964	18649	-1.7	56.1	57.3	1.2
28	672	651	-3.1	18549	19307	4.1	56.6	57.5	0.9
29	644	647	0.5	18522	19053	2.9	56.3	57.5	1.2
30	681	679	-0.3	18644	19325	3.7	56.9	57.4	0.5
31	644	630	-2.2	18627	19145	2.8	56.6	57.9	1.3
32	632	602	-4.7	18260	18847	3.2	56.4	57.1	0.7

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG10FNL116	6928.50	2012/9/15	NaNa.Wang	Tim.Yi



## DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

Available for these models with lower speed and same physical structure. All model may be followed byRxx orFxx series suffixes. This test report applies to FFB 36x36x28.0 mm series as the right table				FFB03612EHN-BL49R	FFB03612EHNYCL				
FFB03612EHN-8K3DR									
FFB03612EHN-TXQW									
<b>Required Test Time (hrs)</b>	<b>Date for Test Beginning</b>	<b>Date for Test Termination</b>	<b>Sample Size (pcs):</b>	<b>Failure (pcs):</b>	<b>Current Total Test Time (hrs)</b>				
3,478	2010/8/20 2:30 PM	2011/10/28 4:46 AM	56	0	<b>11360.0</b>				
Representative Test P/N : FFB03612EHN-AE02R				<b>Current Test Status</b>	<input type="checkbox"/> In process	<input type="checkbox"/> In process (exceed requested)	<input checked="" type="checkbox"/> Termination		
Equipment: 1.Oven: E24-T0161						On/Off Cycles: Every 500 hours			
<b>Test Data Between Initial Test and Final Test</b>									
Sample No.	Initial Test Current Spec. ( A ) <b>630 TYP</b>	Final Test Current Spec. ( A ) <b>630 TYP</b>	Deviation (%)	Initial Test Speed Spec. ( RPM ) <b>19000 REF</b>	Final Test Speed Spec. ( RPM ) <b>19000 REF</b>	Deviation (%)	Initial Test Noise Spec. ( dB A ) <b>62.0 Max</b>	Final Test Noise Spec. ( dB A ) <b>62.0 Max</b>	Deviation <b>3 dBMax.</b>
33	651	636	-2.3	18993	19384	2.1	56.7	57.6	0.9
34	655	644	-1.7	18956	19299	1.8	56.9	57.2	0.3
35	700	678	-3.1	18774	19443	3.6	56.4	57.6	1.2
36	680	685	0.7	18778	19374	3.2	56.9	57.4	0.5
37	623	611	-1.9	18857	19150	1.6	56.6	57.5	0.9
38	642	663	3.3	18497	19159	3.6	56.5	57.3	0.8
39	616	596	-3.2	18641	19202	3.0	56.8	57.5	0.7
40	633	607	-4.1	18351	18958	3.3	56.1	57.4	1.3
41	687	678	-1.3	19329	19383	0.3	56.9	57.6	0.7
42	649	620	-4.5	18362	19245	4.8	56.6	57.2	0.6
43	672	631	-6.1	18693	19129	2.3	56.1	57.7	1.6
44	657	648	-1.4	19092	19408	1.7	56.8	57.2	0.4
45	680	626	-7.9	18823	18933	0.6	56.6	57.6	1.0
46	670	659	-1.6	18942	19457	2.7	56.3	57.4	1.1
47	657	662	0.8	18560	19062	2.7	56.2	57.6	1.4
48	665	654	-1.7	18700	19348	3.5	56.6	57.4	0.8
49	655	649	-0.9	19004	19187	1.0	56.1	57.6	1.5
50	655	642	-2.0	18936	19117	1.0	56.1	57.4	1.3
51	670	654	-2.4	19045	19804	4.0	56.8	57.1	0.3
52	665	692	4.1	19011	19581	3.0	56.6	57.6	1.0
53	670	653	-2.5	18696	19246	2.9	56.9	57.5	0.6
54	647	685	5.9	18475	18325	-0.8	56.5	57.3	0.8
55	671	646	-3.7	18573	19574	5.4	56.8	57.5	0.7
56	680	630	-7.4	18704	19014	1.7	56.6	57.6	1.0
X-Bar	658.8	645.0	-	18677.5	19232.8	-	56.57	57.50	-
$\sigma$	19.767	24.464	-	233.474	265.583	-	0.267	0.209	-
<b>QE File No.</b>	<b>Time-out for function test or others (hrs)</b>			<b>Issued Date</b>		<b>Reported By</b>		<b>Approved By</b>	
<b>DG10FNL116</b>	<b>6928.50</b>			<b>2012/9/15</b>		<b>NaNa.Wang</b>		<b>Tim.Yi</b>	