



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 THB 150x172x50.8 mm series as the right table	THB1548DG-AM84			
	THB1548DG-AG98			

Representative Test P/N : THB1548AG	
Equipment: 1.Oven: E24-F0172	On/Off Cycles: Every 500 hours

◎ **L₁₀ Expectancy: 80,000 hours minimum @ fan rated voltage and the temperature of 40°C**
 According to the equation for **Weibull distribution**, **MTTF ≐ 7×L10 = 560,000 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 40 °C (hours)	Verified L ₁₀ 40 °C (hours)
70	40	8.00	56	2.303	3,975	6,975.0	982,739	140,391

Test Progress:

Date for Test Beginning	Date for Test Termination (at least)	Current Test Status			Current Total Test Time (hours)
2010/7/12 2:30 PM	2011/7/18 11:36 PM	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination	6975.0

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	22.63	2,779,605	397,086
30	16.00	1,965,477	280,782
40	8.00	982,739	140,391
50	4.00	491,369	70,196
60	2.00	245,685	35,098
70	1.00	122,842	17,549

- 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.

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
DG10FNL092	4938.50	2011/11/26	Nan Yang	Tim Yi



DC FAN FUNCTION TEST RECORD FOR LIFE EXPERIMENT

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THB1548DG-AM84	
THB1548DG-AG98	

Required Test Time (hrs)	Date for Test Beginning	Date for Test Termination	Sample Size (pcs):	Failure (pcs):	Current Total Test Time (hrs)
3,975	2010/7/12 2:30 PM	2011/7/18 11:36 PM	56	0	6975.0

Representative Test P/N : THB1548AG	Current Test Status	<input type="checkbox"/> In process	<input checked="" type="checkbox"/> In process (exceed requested)	<input type="checkbox"/> Termination
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Equipment: 1.Oven: E24-F0172 On/Off Cycles: Every 500 hours

Test Data Between Initial Test and Final Test

Sample No.	Initial Test Current Spec. (A) 3.60 Max.	Final Test Current Spec. (A) 3.60 Max.	Deviation (%)	Initial Test Speed Spec. (RPM) 6750-8250	Final Test Speed Spec. (RPM) 6750-8250	Deviation (%)	Initial Test Noise Spec. (dB A) 81.0 Max	Final Test Noise Spec. (dB A) 81.0 Max	Deviation 3 dBMax.
1	3.00	2.89	-3.7	7511	7211	-4.0	74.7	75.4	0.7
2	3.07	2.88	-6.2	7454	7065	-5.2	74.5	75.1	0.6
3	2.94	2.83	-3.9	7457	7119	-4.5	75.0	75.3	0.3
4	2.94	2.93	-0.4	7457	7118	-4.5	74.6	75.2	0.6
5	2.92	2.92	-0.2	7494	7115	-5.1	74.9	75.6	0.7
6	2.91	2.86	-1.6	7500	7204	-3.9	74.5	75.1	0.6
7	2.96	2.93	-0.8	7488	7238	-3.3	74.8	75.4	0.6
8	2.91	2.87	-1.4	7507	7238	-3.6	74.6	75.3	0.7
9	3.00	2.87	-4.5	7536	7216	-4.2	74.8	75.2	0.4
10	3.03	2.78	-8.5	7518	7123	-5.3	74.5	75.4	0.9
11	2.94	2.76	-5.9	7484	7096	-5.2	74.6	75.3	0.7
12	2.90	2.94	1.5	7497	7114	-5.1	74.8	75.4	0.6
13	2.92	2.84	-2.7	7529	7238	-3.9	75.0	75.2	0.2
14	2.97	2.81	-5.5	7469	6999	-6.3	74.9	75.5	0.6
15	2.92	2.89	-0.9	7502	7231	-3.6	74.5	75.4	0.9
16	2.93	2.70	-7.8	7504	6940	-7.5	75.1	75.3	0.2
17	2.96	3.03	2.5	7500	7272	-3.0	74.8	75.2	0.4
18	2.94	2.76	-6.1	7533	7054	-6.4	74.5	75.4	0.9
19	2.93	2.80	-4.5	7531	7117	-5.5	74.9	75.3	0.4
20	2.96	2.89	-2.6	7533	7111	-5.6	74.5	75.2	0.7
21	2.95	2.87	-2.6	7483	7175	-4.1	74.8	75.4	0.6
22	3.00	2.78	-7.2	7539	7029	-6.8	74.6	75.2	0.6
23	2.98	2.97	-0.5	7537	7184	-4.7	74.9	75.4	0.5
24	3.01	2.73	-9.3	7523	6964	-7.4	74.9	75.2	0.3
25	2.99	2.85	-4.6	7529	7128	-5.3	74.5	75.4	0.9
26	2.96	2.88	-2.9	7503	7260	-3.2	74.8	75.2	0.4
27	2.99	2.79	-6.8	7521	7352	-2.2	74.7	75.4	0.7
28	2.96	2.84	-4.0	7493	7160	-4.4	74.9	75.3	0.4
29	3.00	2.95	-1.7	7514	7225	-3.8	74.5	75.3	0.8
30	2.96	2.83	-4.4	7558	7104	-6.0	75.0	75.4	0.4
31	2.93	2.83	-3.3	7452	7008	-6.0	74.7	75.1	0.4
32	3.03	2.87	-5.5	7466	7117	-4.7	74.9	75.3	0.4
33	2.99	2.82	-5.7	7500	7025	-6.3	74.5	75.5	1.0
34	2.97	2.88	-3.2	7469	7131	-4.5	74.8	75.4	0.6
35	3.03	2.83	-6.6	7544	7133	-5.4	74.6	75.3	0.7

QE File No.	Time-out for function test or others (hours)	Issued Date	Reported By	Approved By
DG10FNL092	4938.50	2011/11/26	Nan Yang	Tim Yi



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3,975	2010/7/12 2:30 PM	2011/7/18 11:36 PM	56	0	6975.0

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36	3.03	3.04	0.2	7538	7275	-3.5	75.0	75.2	0.2
37	3.01	2.98	-1.0	7542	7188	-4.7	74.8	75.1	0.3
38	2.96	2.93	-1.0	7486	7236	-3.3	74.6	75.5	0.9
39	2.99	2.88	-3.6	7502	7194	-4.1	75.1	75.4	0.3
40	2.99	2.83	-5.2	7508	7060	-6.0	74.5	75.1	0.6
41	2.99	2.84	-4.9	7475	7158	-4.2	75.1	75.5	0.4
42	2.98	2.94	-1.3	7479	7121	-4.8	74.8	75.4	0.6
43	2.98	2.96	-0.8	7455	7080	-5.0	74.5	75.1	0.6
44	2.99	2.95	-1.2	7500	7134	-4.9	74.9	75.5	0.6
45	2.97	2.82	-5.2	7459	7176	-3.8	75.1	75.4	0.3
46	2.97	2.91	-2.3	7476	7233	-3.3	74.7	75.3	0.6
47	2.96	2.90	-1.8	7451	7119	-4.5	74.9	75.1	0.2
48	2.95	2.88	-2.3	7473	7202	-3.6	74.5	75.4	0.9
49	2.97	2.57	-13.6	7483	6799	-9.1	74.8	75.3	0.5
50	3.05	2.85	-6.3	7507	7185	-4.3	74.6	75.4	0.8
51	3.03	2.90	-4.3	7486	7221	-3.5	74.9	75.4	0.5
52	2.94	2.85	-3.3	7469	7097	-5.0	74.5	75.5	1.0
53	2.95	2.86	-2.8	7524	7229	-3.9	74.7	75.2	0.5
54	2.92	2.82	-3.3	7455	7144	-4.2	74.2	75.1	0.9
55	2.95	2.86	-3.0	7497	7024	-6.3	75.0	75.3	0.3
56	2.94	2.88	-1.8	7468	7163	-4.1	74.8	75.4	0.6
X-Bar	2.970	2.863	-	7497.6	7140.2	-	74.74	75.31	-
σ	0.038	0.078	-	28.522	95.401	-	0.206	0.130	-

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