



Approval Specification for Cofan Part # 30-1072 Rev A

30mm Active Heatsink, 2 Ball Bearing, 30x10mm, 12VDC, 11,000 RPM
Fan, 2 Wire, Bergquist Thermal Tape, 150mm Wire Length, RoHS
Compliant

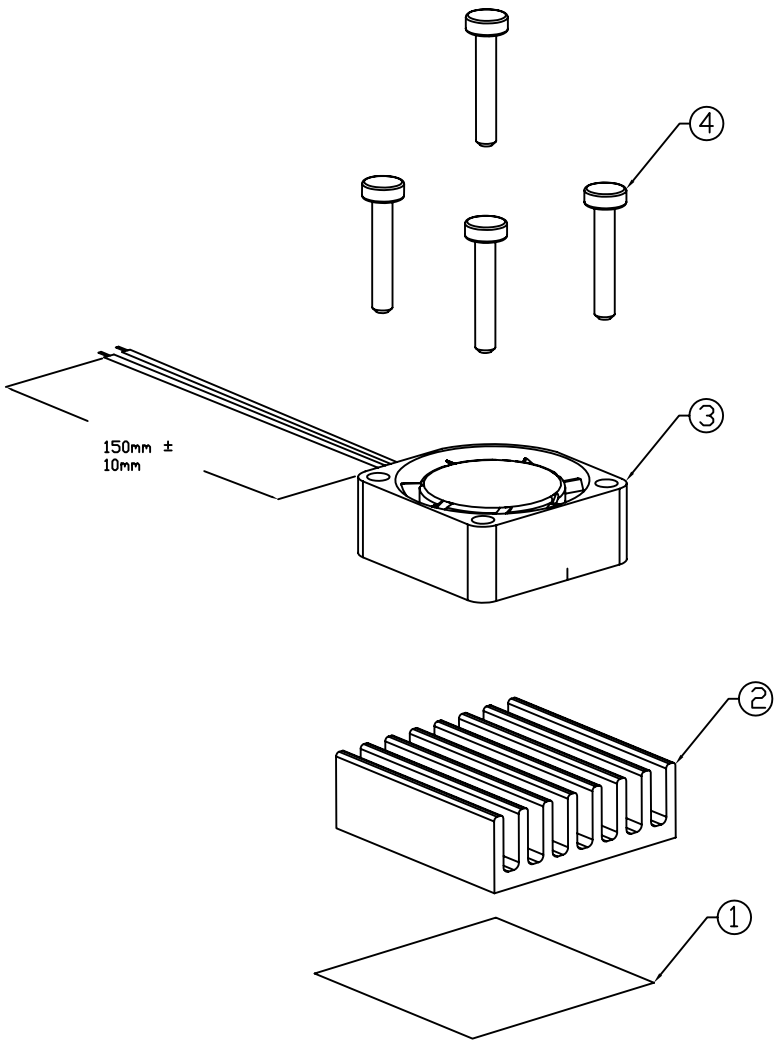
Revision Date: Feb 22, 2006

Cofan USA, 11 Fitch Ave, Lowell, MA 01850 • Phone: (978) 452-1111 • Fax: (978) 452-1112 • Email: info@cofan-usa.com • Website: www.cofan-usa.com • Toll Free: (800) 766-6097

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TO ORDER HEATSINK ASSY PER THIS
 DRAWING USE COFAN PART # 30-1072

- 1 MATERIAL ---
- 2 FINISH ---
- 3 BREAK ALL SHARP EDGES AND CORNERS.
- 4 ALL DIMENSIONS ARE TOLERANCED BY THE DECIMAL PLACE AND TOLERANCES IN THE TITLE BLOCK UNLESS NOTED BY A SEPARATE CALLOUT.
- 5 IS A CRITICAL INSPECTION POINT. NUMBERING TO BE USED FOR CROSS REFERENCE OF INSPECTION REPORT TO DRAWING FEATURE.



NOTES:
 1. Thermal Resistance 2.25°C/W

20-1120 Rev A

Item	Part Description	Part Number	Q'ty
4	Screw, M3x16, Point, Black Zinc	60-1019 Rev A	4
3	FAN, 12V, 30x10mm, 2 Ball, Lead Wire	F-3010H12B-TM01	1
2	HEATSINK, 30 x 30 x 10mm	20-1120 Rev A	1
1	BERGGQUIST BONDPLY 105, 30 x 30mm	70-1020	1

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED
 DIMENSIONS ARE IN MILLIMETRE
 TOLERANCES ARE:

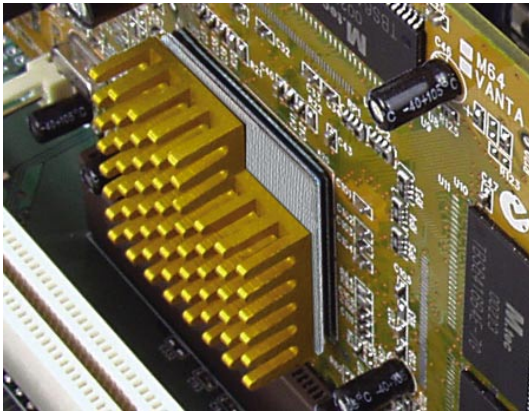
1 PLACE .X	± 0.5
2 PLACE .XX	± 0.25
3 PLACE .XXX	± 0.13
ANGLES EXCEPT 90°	± 1°
MAXIMUM SURFACE ROUGHNESS	125 √

MATERIAL:	1	CUSTOMER DRAWING NUMBER:	-	 1400 FULTON PL. UNIT A FREMONT CA 94539					
FINISH:	2	CUSTOMER PART NUMBER:	-	NAME: 30x30x20mm Active Heatsink, 12V, 2 Ball, Lead Wire, 150mm,					
DRAWN BY:	A. MONTEVIRGEN	COFAN DRAWING NUMBER:	30-1072	SCALE:	1:1	CUS REV:	-	COF REV:	A
APPR BY:		COFAN PART NUMBER:	30-1072	SHEET:	1 OF 1	DATE DRAWN:		Jul-26-2005	

Thermally Conductive, Pressure Sensitive Adhesive Tape

Features and Benefits

- Thermal impedance
0.86°C-in²/W (@100 psi)
- High bond strength to a variety of surfaces
- Double sided pressure sensitive adhesive tape
- High performance, thermally conductive acrylic adhesive
- Can be used instead of heat cure adhesive, screw mounting or clip mounting.



Typical Applications Include

- Mount heat sink onto BGA graphic processor or drive processor
- Mount heat spreader onto power converter PCB or onto motor control PCB

Configurations

Available:

- Sheet form or roll form
- Die-Cut parts
- Standard sheet size is 10" by 10"
- Standard roll size is 10" by 300"
- Die-Cut parts can be supplied on rolls or as individual parts
- Standard thickness of 0.005", 0.008" and 0.011"

In the case that these thickness will not work for your application, Bergquist will coat custom thickness of 0.004" to 0.012"

Typical Properties of Bond-Ply 100

Property	Imperial Value	Metric Value	Test Method			
Color	White	White	Visual			
Reinforcement Carrier	Fiberglass	Fiberglass	***			
Thickness, (inch) / (mm)	0.005, 0.008, 0.011	0.127, 0.203, 0.279	ASTM D374			
Temp Resistance, 30sec, (°F) / (°C)	392	200	***			
Elongation, (%45° to Warp & Fill)	70	70	ASTM D412			
Tensile Strength, (psi) / (MPa)	900	6	ASTM D412			
CTE, (ppm)	325	325	TMA			
Glass Transition, (°F) / (°C)	-22	-30	DSC			
Continuous Use Temp., (°F) / (°C)	-22 to 248	-30 to 120	***			
Adhesion	Imperial Value	Metric Value	Test Method			
Lap Shear @ RT, (psi) / (MPa)	100	0.7	ASTM D1002			
Lap Shear after 5hr @ 100°C	200	1.4	ASTM D1002			
Lap Shear after 2min @ 200°C	200	1.4	ASTM D1002			
Static Dead Weight Shear, (°F) / (°C)	302	150	PSTC#7			
Electrical	Imperial Value	Metric Value	Test Method			
Dielectric Breakdown Voltage, 0.005"	3000 VAC	3000 VAC	ASTM D149			
Dielectric Breakdown Voltage, 0.008"	6500 VAC	6500 VAC	ASTM D149			
Dielectric Breakdown Voltage, 0.011"	8500 VAC	8500 VAC	ASTM D149			
Thermal	Imperial Value	Metric Value	Test Method			
Thermal Conductivity, (W/m-K)	0.8	0.8	ASTM D5470			
Thermal Impedance vs. Pressure						
	Pressure (psi)	10	25	50	100	200
TO-220 Thermal Performance, (°C/W)	0.005"	4.39	4.02	3.48	3.15	3.05
TO-220 Thermal Performance, (°C/W)	0.008"	5.11	4.69	4.53	4.45	4.38
TO-220 Thermal Performance, (°C/W)	0.011"	6.26	5.92	5.73	5.63	5.53
Thermal Impedance, (°C-in ² /W) (I)	0.005"	0.78	0.61	0.58	0.55	0.54
Thermal Impedance, (°C-in ² /W) (I)	0.008"	1.28	0.94	0.90	0.86	0.84
Thermal Impedance, (°C-in ² /W) (I)	0.011"	2.47	1.22	1.19	1.14	1.11
1) Single layer test that includes interfacial resistance.						

Shelf Life: The double-sided pressure sensitive adhesive (PSA) inherent with Bond Ply products require the use of dual liners to protect the surfaces from environmental contamination and accidental contact. The adhesive bond strength between the PSA and the protective liner will typically increase while in storage conditions. Thus, the worst-case shelf life for Bond Ply products is limited not by the material characteristics of Bond Ply, but by the adhesion of the Bond Ply PSA to the protective liner. Bergquist recommends a 6 month shelf life at a maximum continuous storage temperature of 35°C, or 3 month shelf life at a maximum continuous storage temperature of 45°C, for maintenance of controlled adhesion to the liner. The shelf life of the Bond Ply material, without consideration of liner adhesion (which is often not critical for manual assembly processing), is recommended at 12 months from date of manufacture at a maximum continuous storage temperature of 60°C.

Bond-Ply®: U.S. Patent 5,090,484 and others.

Product Data Sheet / PDS-0602-001-01; Rev 01

www.bergquistcompany.com



Approval Specification for Cofan Part # F-3010H12B-TM01 Rev A

30x10mm Fan, 2 Ball Bearing, 12VDC, 11,000 RPM Fan, 2 Wire,
150mm Wire Length, RoHS Compliant

Revision Date: Feb 22, 2006

Cofan USA, 11 F I I A æ { Å } i ã * • Ó ç ã É 1 ^ { [] c É O É I í HJ www.cofan-usa.com (800) 766-6097

Cofan USA
46177 Warm Springs Blvd
Fremont, CA 94539
USA

TEL: (800) 766-6097
FAX: (510) 490-7931
www.cofan-usa.com

SPECIFICATION FOR APPROVAL

Rev A

1. SCOPE:

This specification defines the electrical and mechanical characteristics of the following DC brushless axial flow fan:

Item		Description	
1-1	Part Number	F-3010H12B	
1-2	Outline Dimensions	30 x 30 x 10 mm (see dimensions drawing #7)	
1-3	Bearing System	2 Ball Bearing	
1-4	Rated Voltage	12 VDC	
1-5	Operating Voltage	9.0 – 13.8 VDC	
1-6	Input Current	0.14 A (.09A in Running Conditions)	
1-7	Input Power	1.68 W	
1-8	Speed	11000 R.P.M.	a. 25°C, 65% RH, b. Free Air c. Rated Voltage
1-9	Max. Air Flow (At zero static pressure)	4.32 CFM .132 CMM	a. Rated Voltage b. AMCA Standard
1-10	Max. Air Pressure (At zero airflow)	5.73 mmH ₂ O .226 InH ₂ O	c. Rated Current
1-11	Acoustical Noise (Avg)	31.6 dBA	a. Rated Voltage b. Measured in a Non-Echo Chamber c. CNS 8753 Standard d. ISO 3744 Test Condition
1-12	Life Expectance	124,217 Hours 70,007 Hours	a. Continuous operation @ 25°C b. Continuous operation @ 45°C
1-13	Insulation Type	UL: Class A	
1-14	Weight	9 Grams	
1-15	Rotation	Clockwise from label side	

2. Major Material

Materials / Parts	Specification	Remarks
Plastic Material	Frame: PBT70%: + FIBER30%	UL: 94V-0
	Impeller: PBT85% + FIBER15%	UL: 94V-0
Lead Wire	(+) Red; (-) Black; (Signal) Yellow; AWG#26(2 Pin), #28(3Pin)	UL: 1007-F
Connector	Upon customer specifications custom connector can be installed at minimum extra charge	

3. Electrical Characteristics & Test Environmental:

Item	Specification / Condition
3-1	Operation Temperature -10°C ~ +70°C
3-2	Storage Temperature -40°C ~ +75°C
3-3	Operating Humidity 5 to 90% RH
3-4	Storage Humidity 5 to 95% RH
3-5	Locked Rotor Protection <ul style="list-style-type: none"> a. The current will shut down when rotation is locked b. Automatic restart after a continuous 72 hours rotation lock at rated voltage. c. Impedance of motor winding protects motor from fire after 72 hours of locked rotor condition at the rated voltage. d. Signal Alarm- Optional
3-6	Insulation Strength 10Meg Ohm min at 500VDC Between Frame and (+) terminal
3-7	Dielectric Strength Withstand 5 mA Max 500 VAC 60 Hz for one minute, (between frame and (+) terminal)
3-8	Vibration Test Vibration test in rest status, scan frequency : 5~55Hz 1OCT/Min. in the 3 directions(X.Y.Z), take 16 rotating scan for each axis.
3-9	Shock Test Test of acceleration 30G is applied in the 3 directions (X.Y.Z) and 6 faces, take 11± 1ms(Half Chord Wave), 3 times for each face.
3-10	Noise Level Measured in a semi-anechoic chamber. The fan is running in free air with Microphone at a distance of one meter from the fan intake.
3-11	Tolerance ±10% on rated power and current.
3-12	Polarity Protection Capable of withstanding reverse polarity connection

4. Safety Approvals

Safety Approvals	File No.
UL	E195760
CUL	E195760
TUV	B 04 03 52557 002
CE	EN5008-1

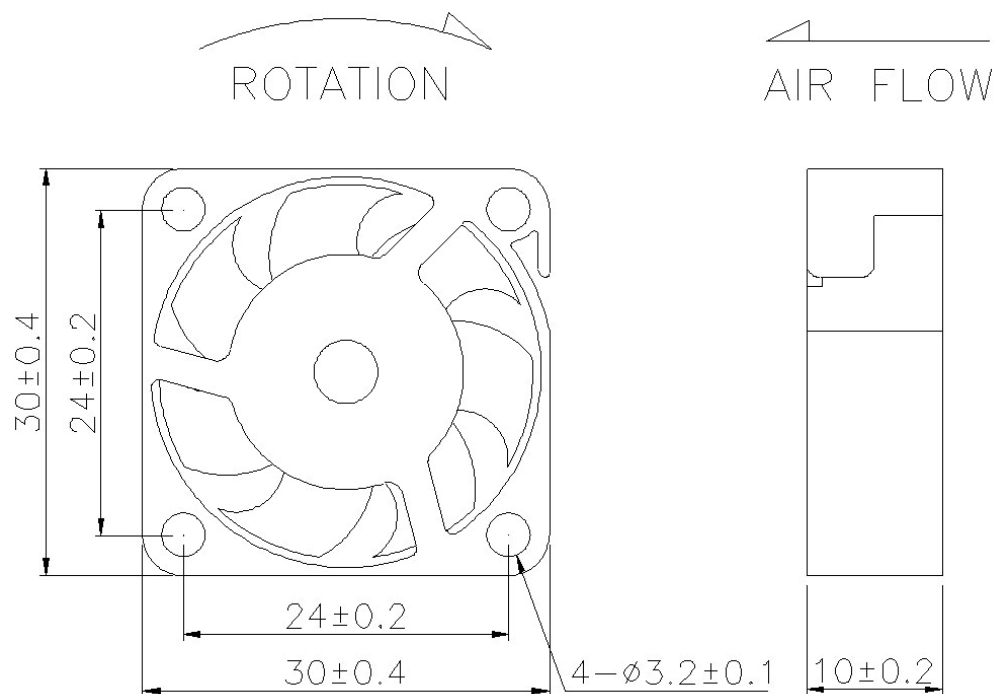
5. Ozone Depleting Substances, Lead Free and RoHS Compliance

5-1. None of our products or manufacturing processes contain or require the use of ozone-depleting chemicals such as PBB's, PBBO's, CFC's, PBBE's, PBDPE's or HCFC's.

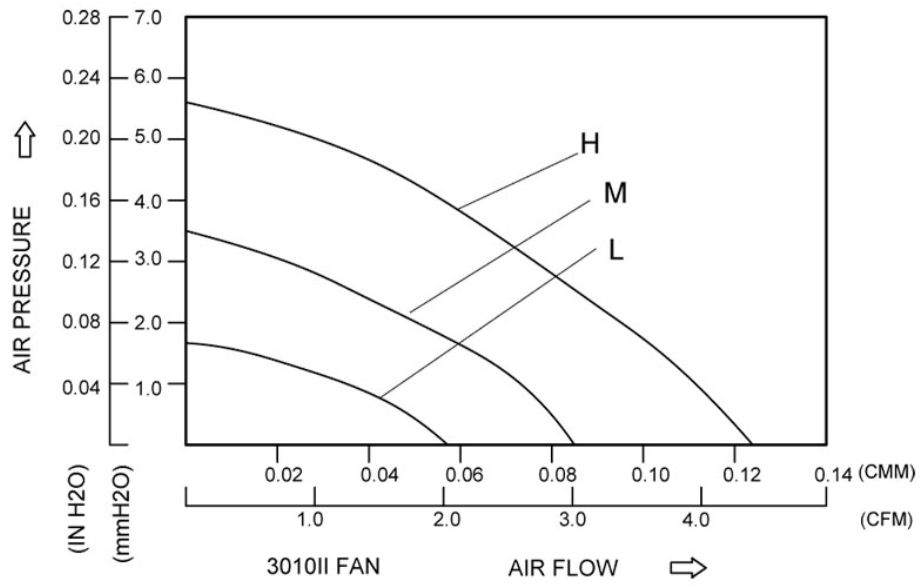
6. Production Location

6-1. Products will be produced in China and Taiwan

7. Dimensional Drawing



8. Performance Curve





COFAN USA[®]

DC Fans, Heat Sinks
CNC Milling, CNC Lathe
Sheet Metal, Custom Hardware
Prototype & Production, Assembly

46177 Warm Springs Blvd., Fremont, CA 94539
Tel (510)490-7533 · Fax (510)490-7931

<http://www.cofan-usa.com>

DC FAN LIFE TEST REPORT

Available for these models with lower speed and same physical structure because lower input voltage get lower motor temperature. Feasible low speed models in accordance with specification.

F-3010Y12B—XXX	F-3010Z12B XXX	-
-	-	-
-	-	-
Y may be H or lower speed; Z may be H or lower speed		

Representative test model : F-3010H12B—XXX

Prepared By : Yong Fang Zhang

Date : 2004/3/16

Review By : Mu Sheng Xu

Date : 2004/3/16

Approved By : Ming Xing Zhang

Date : 2004/3/16

FORMULA AND PARAMETER

1. L_{10} Expectancy : 70,000 hrs. minimum @ fan rated voltage and temperature of 40°C.

2. Formula : According to Weibull distribution, $MTTF \approx 7 \times L_{10} = 490000$ hours. Base on a safe coefficient---1.3 times, the target time of L_{10} is 91000 hours. And the target time of MTTF is 637000 hours.

We depend on a zero failure Weibull test strategy and accelerated testing technique, to determinethe total test time (t) for verifying the above life estimation by the equation,

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

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

Sample size (n) : 27 pcs. Acceleration factor (A_F) : 16

Stress temperature (T_S) : 80 °C Unstress temperature (T_U) : 40 °C

Poisson coefficient ($B_{\gamma;c}$) : 2.3026

We get required test time with zero failure (t) 4,390 hrs.

3. Parameter :
1. For current, the limit is less than spec. (max.).
 2. For speed, the acceptable decrease is no more than initial 15%.
 3. For noise, the limit is no more than spec. +15%.

4. Test Date :

1. Date of test start 2003/9/13 16:00
2. Date of test termination (Estimate) 2003/9/13 16:00
3. Date of test termination (Actual) : 2004/3/14 14:00

✘ If the actual test time exceed the required, it comes out that those fans' life expectancy and MTTF are greater than warrant.

5. Test Equipments :

1. Thermostated container : GPO-090
2. DC power supply : GPC-6030D

RESULT

1. Current Test Status :

▶ **Customer Request**

▶ **New Product**

▶ **Component Change**

▶ **Routine Test**

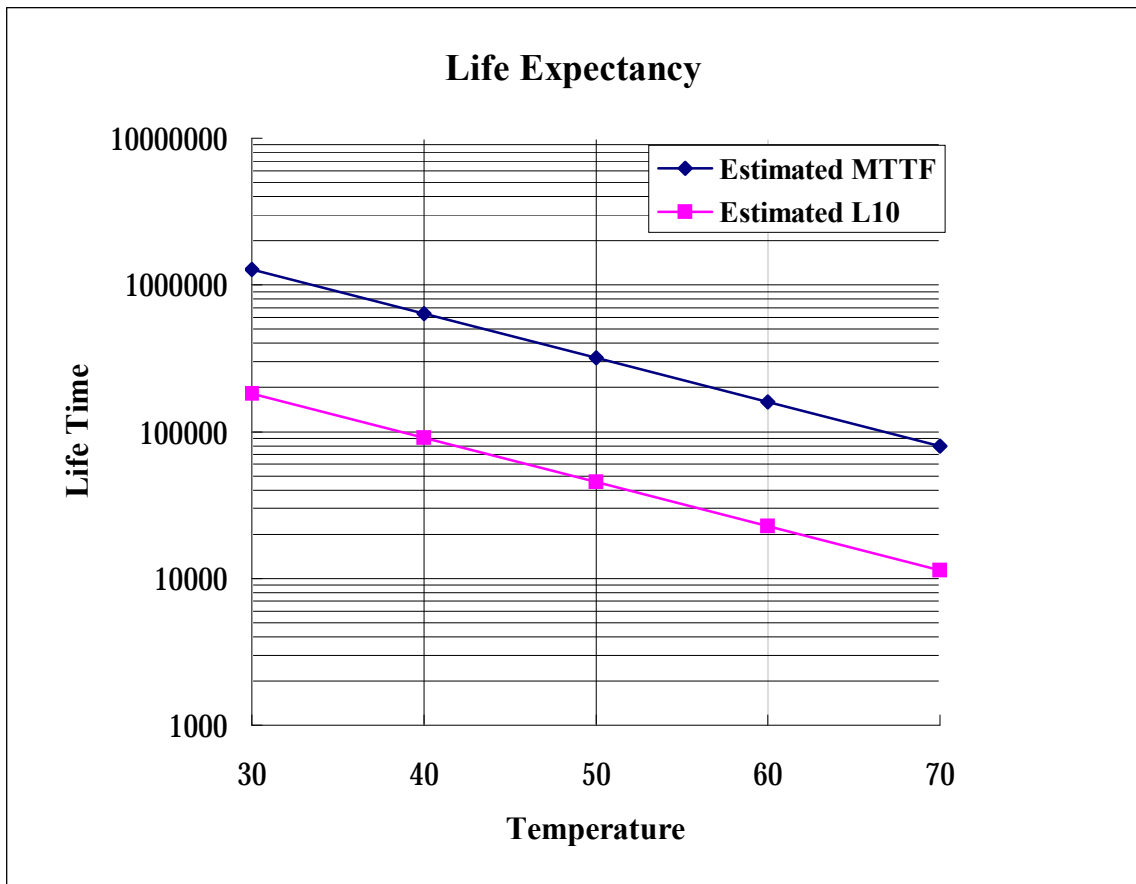
2. Actual Test Hours : 4,390 hrs.

3. Verified MTTF : 637,011 hrs.

4. Verified L₁₀ : 91,002 hrs.

5. Other Value Of MTTF and L₁₀

Temperature Value	25	30	40	50	60	70
A_F	45.25	32	16	8	4	2
Estimated MTTF	1801739	1274022	637011	318506	159253	79626
Estimated L ₁₀	257391	182003	91002	45501	22750	11375



TEST DATA

Sample No.	Current		Deviation	Speed		Deviation	Noise		Deviation
	0.1 Max.	0.2 Max.	%	11000 Ref.	9350 Min.	%	31 dBA	36 dBA	dBA
	Initial	Final		Initial	Final		Initial	Final	
1	0.13	0.14	7.69	11367	11939	5.03	29.9	31.5	1.6
2	0.12	0.10	-16.67	10367	11086	6.94	30.6	35.1	4.5
3	0.12	0.14	16.67	11437	10714	-6.32	30.1	33.9	3.8
4	0.12	0.11	-8.33	11314	11074	-2.12	30.2	32.8	2.6
5	0.12	0.13	8.33	10664	10965	2.82	30.5	34.2	3.7
6	0.12	0.10	-16.67	10927	10636	-2.66	30.7	32.7	2.0
7	0.12	0.11	-8.33	11142	10932	-1.88	30.7	34.6	3.9
8	0.12	0.11	-8.33	10417	9726	-6.63	29.8	31.4	1.6
9	0.13	0.12	-7.69	10914	10762	-1.39	30.6	32.5	1.9
10	0.13	0.12	-7.69	10894	11212	2.92	30.8	34.1	3.3
11	0.12	0.10	-16.67	11128	11647	4.66	30.3	33.3	3.0
12	0.12	0.12	0.00	10710	11355	6.02	30.0	34.1	4.1
13	0.13	0.14	7.69	11199	10630	-5.08	30.2	32.4	2.2
14	0.12	0.11	-8.33	10556	11133	5.47	31.2	33.6	2.4
15	0.12	0.11	-8.33	11065	10865	-1.81	30.3	34.2	3.9
16	0.12	0.11	-8.33	10664	11081	3.91	31.3	34.2	2.9
17	0.12	0.11	-8.33	10766	10428	-3.14	30.1	33.1	3.0
18	0.12	0.13	8.33	10873	11068	1.79	30.7	34.1	3.4
19	0.12	0.13	8.33	10911	11592	6.24	30.1	31.7	1.6
20	0.12	0.12	0.00	11184	11621	3.91	30.8	32.8	2.0
21	0.12	0.11	-8.33	11037	11120	0.75	30.3	32.1	1.8
22	0.12	0.11	-8.33	11494	11557	0.55	30.7	32.4	1.7
23	0.12	0.12	0.00	10871	11504	5.82	31.0	34.0	3.0
24	0.12	0.11	-8.33	11055	10887	-1.52	30.8	33.4	2.6
25	0.13	0.12	-7.69	10601	10342	-2.44	30.5	34.4	3.9
26	0.12	0.10	-16.67	10317	10190	-1.23	30.9	32.8	1.9
27	0.12	0.11	-8.33	10960	10289	-6.12	31.3	33.8	2.5
-	-	-	-	-	-	-	-	-	-
Max.	0.13	0.14	16.67	11494	11939	6.94	31.3	35.1	4.5
Min.	0.12	0.10	-16.67	10317	9726	-6.63	29.8	31.4	1.6
\bar{x}	0.12	0.12	0.00	10919.8	10976.1	0.00	30.53	33.30	0.0
σ	0.004	0.012	0.000	316.70	511.50	0.00	0.420	1.000	0.0

Assembly Solution Report

Top down fan test

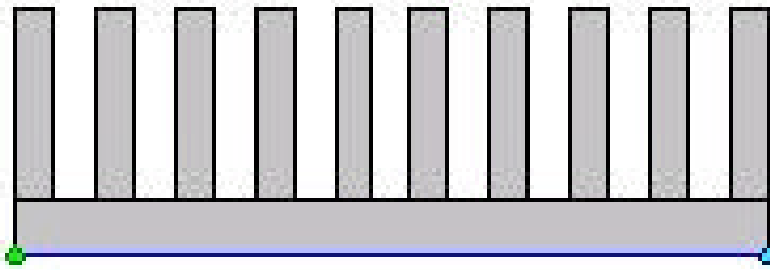
Assembly

General

Description	New assembly
Report date	Friday, November 18, 2005
Assembly file	

Heat sink

Profile	30 x 30 x 10mm Heatsink
Branches	11
Emmissivity	0.90
Length	1.181 in
Type	Regular uniform
Average fin length	0.303 in
Average gap size	0.066 in
Heat sink surface area	0.06630 ft ²
Effective heat sink surface area	0.06522 ft ²
Approximate heat sink mass	0.03292 lb



Ambient conditions

Air temperature	25.00 C
Wall temperature	25.00 C
Ambient pressure	406.794 in of H2O

Convection details

Type	Forced
-------------	--------

Assembly

General

Filename :
Description : New assembly
Report date : 11/18/2005

Heat sink

Profile : 30 x 30 x 10mm Heatsink
Branches : 11
Blocks : 29
Elements : 580
Materials : aluminum
Surface color : 0.90
Length : 1.181 in
Orientation : Base horizontal with fins upwards
Extrusion type : Regular uniform
Average fin height : 0.303 in
Average fin thickness : 0.059 in
Average gap size : 0.066 in

Ambient Conditions

Air temperature : 25.00 C
Surrounding wall temp : 25.00 C
Ambient pressure : 406.794 in of H2O

Convection Details

Convection type : Forced
Air flow determination: top-down fan
Fan name :
Flow rate : 4.43000 cfm
Radiation included : Yes
Approx. pressure drop : 0.5099618 in of H2O
Exit air temperature : 25.00 C
Avg. air temperature : 25.00 C
Under fan htc : 73.98421 W/m² K
Base htc : 274.82989 W/m² K
Effective htc : 108.23976 W/m² K

Solver Options

Maximum iterations : 5000
Minimum iterations : 500
Convergence criteria : 1.0000
Relaxation factor : 1.20
Inner loops : 10

Solution

Date : Friday, November 18, 2005 (8:33:12 AM)

Heat source 1

Description : 8 Watt Intel Low Power CPU
Dimensions : 0.394 x 0.394 in
Location : 0.391,0.380 in
Orientation : Horizontal
Average load : 8.00 Watt
Base temperature : 43.51 C (18.51 C above ambient)
(18.51 C above ambient at inlet)
Junction temperature : 44.31 C

Heat sink

Thermal resistance : 2.241 C/W
Maximum thermal resistance : 2.314 C/W
Temperature avg. thermal resis. : 2.056 C/W
Efficiency (f) : 0.95263
Average temperature of heat sink : 41.45 C (16.45 C above ambient)
Heat sink surface area : 0.06629709 ft²
Effective heat sink surface area : 0.06522067 ft²
Approximate heat sink mass : 0.03292 lb

Solution

Heat source 1

Description

8 Watt Intel Low Power CPU

Size

0.394 in x 0.394 in

Location

0.588 in x 0.577 in

Base temperature

43.51 C

Heat sink

Thermal resistance

2.314 C/W

Average temperature

41.45 C

