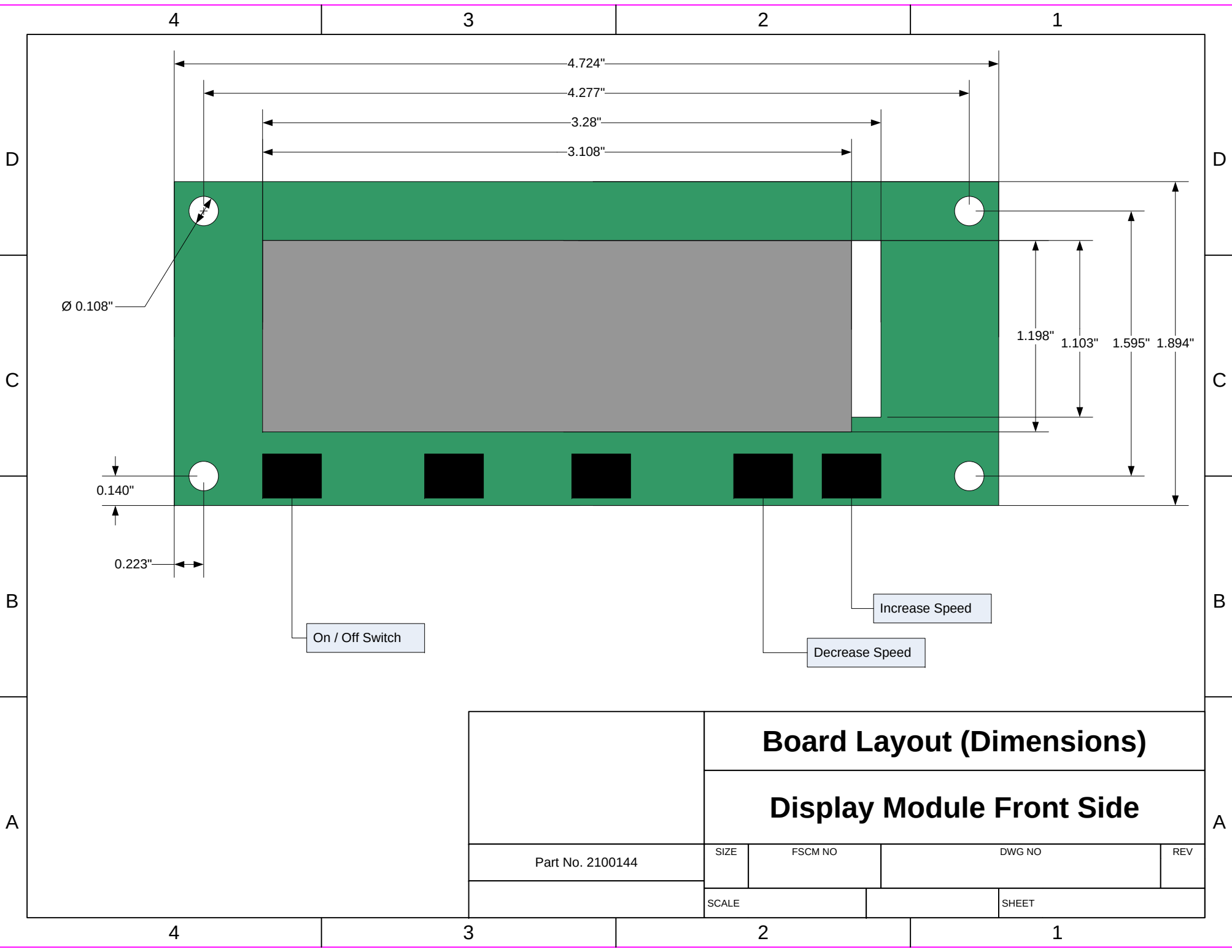




	Board Layout (Dimensions)			
	Display Module Front Side			
Part No. 2100144	SIZE	FSCM NO	DWG NO	REV
	SCALE			SHEET

SBU60 SERIES

63W Open Frame Switching Power Supplies For I.T.E.

Description:

The SBU60 series of compact, open frame constructed, AC/DC switching mode power supplies provide 63 Watts of continuous output power. They are suited for use in disc drive systems, microprocess or based systems, portable equipments and many other applications. All models meet FCC Part-15 class B and CISPR-22 class B emission Limits and are designed to comply with UL/c-UL(UL 60950),ITS/GS(EN 60950-1) and new CE requirements. All units are 100% burned in and tested.

Features:

- Wide Input Voltage 90 to 264 VAC, 47 to 63 Hz
- Internal EMI filter
- Single to Quad Output
- Input connector mates with Molex housing 09-50-3051 and Molex 2478 series crimp terminal
- Output connector mates with Molex housing 09-50-3061 (or 09-50-3081) and Molex 2478 series crimp terminal
- Output Voltage Available From 3 VDC Thru 50 VDC
- Input Surge Current, Over Voltage and Over Load protection
- Over Voltage Protection (Crowbar Design)
- Size: 3"x5"x1.09"
- Class I
- 2 year warranty



Safety Approvals :



Electrical Characteristics:

Sym.	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Vin	Input Voltage	Operating Voltage	90		264	VAC
fin	Input Frequency		47		63	Hz
Po	Output Power Range	Vin=90 to 264VAC	0		63	W
Vo	Output Voltage Range		See rating chart			V
Io	Output Current Range		See rating chart			A
Iil	Input Current (Low Line)	Io=Full load, Vin=115VAC			1.6	A
Iih	Input Current (High Line)	Io=Full load, Vin=230VAC			1.0	A
Irl	Low Line Inrush Current	Io=Full load, 25°C, Cool start, Vin=115VAC		12	15	A
Irh	High Line Inrush Current	Io=Full load, 25°C, Cool start, Vin=230VAC		26	30	A
Eff	Efficiency	Io=Full Load, Vin=230VAC	70	80	88	%
REG-i	Line Regulation	Io=Full Load		0.5	1	%
REG-o	Load Regulation	Vin=230VAC		3	7	%
OVP	Over Voltage Protection		112		132	%
OCP	Over Current Protection		110		150	%
Ttr	Time of Transient Response	Io=Full Load to Half Load, Vin=100VAC			4	mS
Thold	Hold-Up Time	Io=Full Load, Vin=110VAC	12			mS
Ts	Start Up Time	Io=Full Load, Vin=100VAC	0.3	1	2	S
* Vrn	Ripple & Noise (Peak to Peak)	Full Load, Vin=90VAC		0.5	1	%
Ilk	Safety Ground Leakage Current	Io=Full Load, Vin=240VAC		0.4	0.75	mA
TC	Temperature Coefficient	All output	-0.04		0.04	%/°C

* Note: The Ripple & Noise which is under 3.3VDC at 2% max

Environmental :

Sym.	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Toper	Operating Temperature		0		70	°C
Tstg	Storage Temperature		-40		85	°C
Hr	Relative Humidity		5		95	%
MTBF	Operating Temperature at 25°C, Calculated per MIL-HDBK-217F		0.1			M Hrs
Pd	Derate linearly from 100% load at 40°C to 50% load at 70°C					

Safety Specifications:

Sym.	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Vps	Dielectric Withstanding Voltage for Primary to secondary	Primary to secondary	4242			VDC
Vpg	Dielectric Withstanding Voltage for Primary to Ground	Primary to ground	2121			VDC
Ris	Isolation Resistance	Test Voltage=500VDC	50			MΩ
CISPR	EMI requirements for CISPR-22	Vin=220VAC	B			CLASS
FCC	EMI requirements for FCC PART-15	Vin=110VAC	B			CLASS

SBU60 SERIES

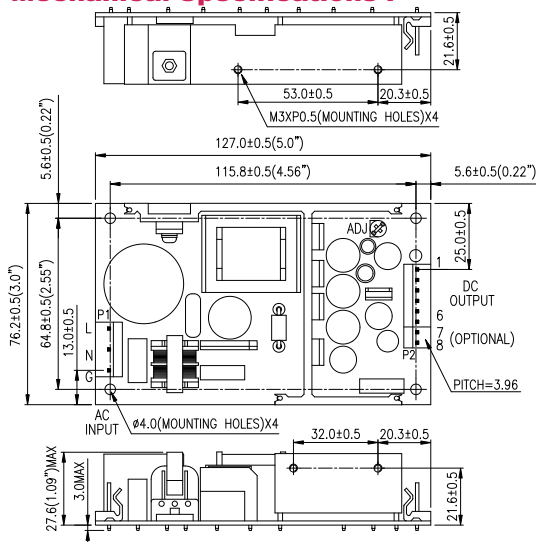
63W Open Frame Switching Power Supplies For I.T.E. Output Voltage And Current Rating Chart (Single Output) :

Model Number	Output Voltage	Output Current	Total Regulation	Maximum Output Power
SBU60-101	3 ~ 5 VDC	16.6 ~ 10.0 A	5%	50W
SBU60-102	5 ~ 6 VDC	11.0 ~ 9.16 A	5%	55W
SBU60-103	6 ~ 8 VDC	10.0 ~ 7.50 A	4%	60W
SBU60-104	8 ~ 11 VDC	7.87 ~ 5.72 A	3%	63W
SBU60-105	11 ~ 13 VDC	5.72 ~ 4.84 A	3%	63W
SBU60-106	13 ~ 16 VDC	4.84 ~ 3.93 A	3%	63W
SBU60-107	16 ~ 21 VDC	3.93 ~ 3.00 A	3%	63W
SBU60-108	21 ~ 27 VDC	3.00 ~ 2.33 A	2%	63W
SBU60-109	27 ~ 33 VDC	2.33 ~ 1.90 A	2%	63W
SBU60-110	33 ~ 40 VDC	1.90 ~ 1.57 A	2%	63W
SBU60-111	40 ~ 50 VDC	1.57 ~ 1.26 A	2%	63W

Output Voltage And Current Rating Chart (Multi Output) :

Model Number	Output #1				Output #2				Output #3				Output #4				Maximum Output Power
	Vonom	Iomin	Iomax	Regmax	Vonom	Iomin	Iomax	Regmax	Vonom	Iomin	Iomax	Regmax	Vonom	Iomin	Iomax	Regmax	
SBU60-200	+3.3V	1.4A	7A	6%	+12V	0.6A	3A	5%									59.1W
SBU60-201	+5V	0.7A	7A	5%	+12V	0.3A	3A	5%									63W
SBU60-202	+5V	0.7A	7A	5%	+15V	0.3A	3A	5%									63W
SBU60-203	+5V	0.7A	7A	5%	+24V	0.4A	2A	5%									63W
SBU60-204	+3.3V	1.4A	7A	6%	+5V	0.5A	5A	5%									48.1W
SBU60-215	+5V	0.7A	7A	5%					-24V	0.2A	2A	5%					63W
SBU60-218	+3.3V	0.5A	5A	6%	+48V	0.1A	1.25A	5%									63W
SBU60-219	+5V	0.1A	5A	5%	+28V	0.2A	2A	5%									63W
SBU60-220	+5V	0.5A	5A	5%	+35V	0.1A	1.5A	5%									63W
SBU60-221	+5V	0.5A	5A	5%	+36V	0.1A	1.5A	5%									63W
SBU60-300	+3.3V	1.2A	6A	6%	+12V	0.6A	3A	5%	-12V	0A	0.8A	5%					63W
SBU60-300-1	+3.3V	1.2A	6A	6%	+12V	0.6A	3A	5%	+12V	0A	0.8A	5%					63W
SBU60-301	+5V	0.6A	6A	5%	+12V	0.3A	3A	5%	-5V	0A	0.8A	5%					63W
SBU60-301-1	+5V	0.6A	6A	5%	+12V	0.3A	3A	5%	+5V	0A	0.8A	5%					63W
SBU60-302	+5V	0.6A	6A	5%	+12V	0.6A	3A	5%	-12V	0A	0.8A	5%					63W
SBU60-302-1	+5V	0.6A	6A	5%	+12V	0.6A	3A	5%	+12V	0A	0.8A	5%					63W
SBU60-303	+5V	0.6A	6A	5%	+15V	0.3A	3A	5%	-15V	0A	0.8A	5%					63W
SBU60-303-1	+5V	0.6A	6A	5%	+15V	0.3A	3A	5%	+15V	0A	0.8A	5%					63W
SBU60-304	+5V	1.2A	6A	5%	+24V	0.4A	2A	5%	-24V	0A	0.5A	5%					63W
SBU60-304-1	+5V	1.2A	6A	5%	+24V	0.4A	2A	5%	+24V	0A	0.5A	5%					63W
SBU60-305	+5V	1.2A	6A	5%	+24V	0.4A	2A	5%	-12V	0A	0.8A	5%					63W
SBU60-305-1	+5V	1.2A	6A	5%	+24V	0.4A	2A	5%	+12V	0A	0.8A	5%					63W
SBU60-306	+3.3V	1.2A	6A	6%	+12V	0.6A	3A	5%	-5V	0A	0.8A	5%					59.8W
SBU60-306-1	+3.3V	1.2A	6A	6%	+12V	0.6A	3A	5%	+5V	0A	0.8A	5%					59.8W
SBU60-307	+5V	0.6A	6A	5%	+10V	0.2A	2A	5%	-10V	0A	1A	5%					60W
SBU60-307-1	+5V	0.6A	6A	5%	+10V	0.2A	2A	5%	+10V	0A	1A	5%					60W
SBU60-308	+3.3V	0.5A	5A	6%	+5V	0.5A	5A	5%	+12V	0A	1A	5%					53.5W
SBU60-308-1	+3.3V	0.5A	5A	6%	+5V	0.5A	5A	5%	-12V	0A	1A	5%					53.5W
SBU60-400	+3.3V	1.2A	6A	6%	+12V	0.6A	3A	5%	-12V	0A	0.8A	5%	-5V	0A	0.8A	5%	63W
SBU60-400-1	+3.3V	1.2A	6A	6%	+12V	0.6A	3A	5%	-12V	0A	0.8A	5%	+5V	0A	0.8A	5%	63W
SBU60-400-2	+3.3V	1.2A	6A	6%	+12V	0.6A	3A	5%	+12V	0A	0.8A	5%	-5V	0A	0.8A	5%	63W
SBU60-400-3	+3.3V	1.2A	6A	6%	+12V	0.6A	3A	5%	+12V	0A	0.8A	5%	+5V	0A	0.8A	5%	63W
SBU60-401	+5V	0.6A	6A	5%	+12V	0.3A	3A	5%	-12V	0A	0.8A	5%	-5V	0A	0.8A	5%	63W
SBU60-401-1	+5V	0.6A	6A	5%	+12V	0.3A	3A	5%	-12V	0A	0.8A	5%	+5V	0A	0.8A	5%	63W
SBU60-401-2	+5V	0.6A	6A	5%	+12V	0.3A	3A	5%	+12V	0A	0.8A	5%	-5V	0A	0.8A	5%	63W
SBU60-401-3	+5V	0.6A	6A	5%	+12V	0.3A	3A	5%	+12V	0A	0.8A	5%	+5V	0A	0.8A	5%	63W
SBU60-402	+5V	1.2A	6A	5%	+12V	0.6A	3A	5%	-12V	0A	0.8A	5%	+12V	0A	0.8A	5%	63W
SBU60-402-1	+5V	1.2A	6A	5%	+12V	0.6A	3A	5%	+12V	0A	0.8A	5%	+12V	0A	0.8A	5%	63W
SBU60-402-2	+5V	1.2A	6A	5%	+12V	0.6A	3A	5%	+12V	0A	0.8A	5%	-12V	0A	0.8A	5%	63W
SBU60-402-3	+5V	1.2A	6A	5%	+12V	0.6A	3A	5%	-12V	0A	0.8A	5%	-12V	0A	0.8A	5%	63W
SBU60-403	+5V	1.2A	6A	5%	+12V	0.6A	3A	5%	-12V	0A	0.8A	5%	+24V	0A	0.8A	5%	63W
SBU60-403-1	+5V	1.2A	6A	5%	+12V	0.6A	3A	5%	+12V	0A	0.8A	5%	+24V	0A	0.8A	5%	63W
SBU60-403-2	+5V	1.2A	6A	5%	+12V	0.6A	3A	5%	+12V	0A	0.8A	5%	-24V	0A	0.8A	5%	63W
SBU60-403-3	+5V	1.2A	6A	5%	+12V	0.6A	3A	5%	-12V	0A	0.8A	5%	-24V	0A	0.8A	5%	63W
SBU60-404	+5V	0.6A	6A	5%	+15V	0.3A	3A	5%	-15V	0A	0.8A	5%	-5V	0A	0.8A	5%	63W
SBU60-404-1	+5V	0.6A	6A	5%	+15V	0.3A	3A	5%	-15V	0A	0.8A	5%	+5V	0A	0.8A	5%	63W
SBU60-404-2	+5V	0.6A	6A	5%	+15V	0.3A	3A	5%	+15V	0A	0.8A	5%	-5V	0A	0.8A	5%	63W
SBU60-404-3	+5V	0.6A	6A	5%	+15V	0.3A	3A	5%	+15V	0A	0.8A	5%	+5V	0A	0.8A	5%	63W
SBU60-423	+5V	0.1A	1A	5%	+24V	0.18A	1.8A	5%	-15V	0A	0.1A	5%	+12V	0A	0.8A	5%	59.3W

Mechanical Specifications :



PIN CHART

MODEL	PIN	1	2	3	4	5	6	7	8
SBU60-1XX	OUT	OUT	OUT	RTN	RTN	RTN			
SBU60-2XX	Vo2	Vo1	Vo1	COM	COM	N/C			
SBU60-215	N/C	Vo1	Vo1	COM	COM	Vo3			
SBU60-3XX	Vo2	Vo1	Vo1	COM	COM	Vo3			
SBU60-4XX	Vo2	Vo1	Vo1	COM	COM	Vo3	Vo4	Vo4	

Note: Vo1:Output#1 Vo2:Output#2 Vo3:Output#3 Vo4:Output#4

Note:

1. Dimensions are shown in inches or mm.
2. Weight: 250gs approx.
3. Input connector mates with Molex housing 09-50-3051 and Molex 2478 series crimp terminal.
4. Output connector mates with Molex housing 09-50-3061 (or 09-50-3081) and Molex 2478 series crimp terminal.

SPECIFICATION FOR APPROVAL

Customer: MUM INDUSTRIES

Description: DC FAN

Customer P/N: REV:

Delta Model NO.: AFB1212SHE-4F1A

Sample Rev: 01 Issue NO:

Sample Issue Date: JUL.13,2004 Quantity:

1. SCOPE:

THIS SPECIFICATION DEFINES THE ELECTRICAL AND MECHANICAL
CHARACTERISTICS OF THE DC BRUSHLESS AXIAL FLOW FAN.

2. CHARACTERS:

ITEM	DESCRIPTION
RATED VOLTAGE	12 VDC
OPERATION VOLTAGE	7.0 - 13.2 VDC
INPUT CURRENT	0.75(MAX. 0.90) A
INPUT POWER	9.00(MAX. 10.80) W
SPEED (REF.)	3700 R.P.M. (REF.)
MAX. AIR FLOW (AT ZERO STATIC PRESSURE)	4.300 (MIN. 3.950) M ³ /MIN. 151.85 (MIN. 139.49) CFM
MAX. AIR PRESSURE (AT ZERO AIRFLOW)	14.50 (MIN. 12.30) mmH ₂ O 0.571 (MIN. 0.484) inchH ₂ O
ACOUSTICAL NOISE (AVG.)	55.0 (MAX. 58.0) dB-A
INSULATION TYPE	UL: CLASS A

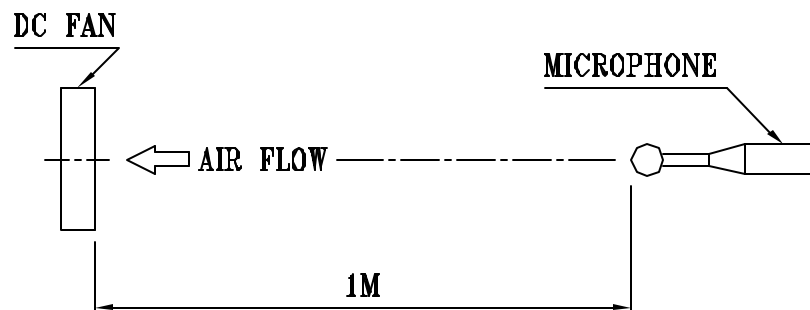
(continued)

PART NO:

DELTA MODEL: AFB1212SHE-4F1A

INSULATION STRENGTH	10 MEG OHM MIN. AT 500 VDC (BETWEEN FRAME AND (+) TERMINAL)
DIELECTRIC STRENGTH	5 mA MAX. AT 500 VAC 60 Hz ONE MINUTE, (BETWEEN FRAME AND (+) TERMINAL)
EXTERNAL COVER	OPEN TYPE
LIFE EXPECTANCE	70,000 HOURS CONTINUOUS OPERATION AT 40 °C WITH 15 ~ 65 %RH.
ROTATION	CLOCKWISE VIEW FROM NAME PLATE SIDE
OVER CURRENT SHUT DOWN	THE CURRENT WILL SHUT DOWN WHEN LOCKING ROTOR
LEAD WIRE	UL 1007 -F- AWG #24 BLACK WIRE NEGATIVE(-) RED WIRE POSITIVE(+) BLUE WIRE FREQUENCY(-F00) YELLOW WIRE CONTROL (-PWM)

- NOTES: 1. ALL READINGS ARE MEASURED AFTER STABLY WARMING UP
THROUGH 10 MINUTES.
2. THE VALUES WRITTEN IN PARENS , { }, ARE LIMITED SPEC.
3. ACOUSTICAL NOISE MEASURING CONDITION:



NOISE IS MEASURED AT RATED VOLTAGE IN FREE AIR IN ANECHOIC
CHAMBER WITH B & K SOUND LEVEL METER WITH MICROPHONE AT
A DISTANCE OF ONE METER FROM THE FAN INTAKE.

PART NO:

DELTA MODEL: AFB1212SHE-4F1A

3. MECHANICAL:

- 3-1. DIMENSIONS ----- SEE DIMENSIONS DRAWING
- 3-2. FRAME ----- PLASTIC UL: 94V-0
- 3-3. IMPELLER ----- PLASTIC UL: 94V-0
- 3-4. BEARING SYSTEM ----- TWO BALL BEARINGS
- 3-5. WEIGHT ----- 260 GRAMS

4. ENVIRONMENTAL:

- 4-1. OPERATING TEMPERATURE ----- -10 TO +60 DEGREE C
- 4-2. STORAGE TEMPERATURE ----- -40 TO +75 DEGREE C
- 4-3. OPERATING HUMIDITY ----- 5 TO 90 % RH
- 4-4. STORAGE HUMIDITY ----- 5 TO 95 % RH

5. PROTECTION:

5-1. LOCKED ROTOR PROTECTION

IMPEDANCE OF MOTOR WINDING PROTECTS MOTOR FROM FIRE IN 96 HOURS OF LOCKED ROTOR CONDITION AT THE RATED VOLTAGE.

5-2. POLARITY PROTECTION

BE CAPABLE OF WITHSTANDING IF REVERSE CONNECTION FOR POSITIVE AND NEGATIVE LEADS.

6. RE OZONE DEPLETING SUBSTANCES:

- 6-1. NO CONTAINING PBBs, PBBOs, CFCs, PBBEs, PBDPEs AND HCFCs.

7. PRODUCTION LOCATION

- 7-1. PRODUCTS WILL BE PRODUCED IN CHINA OR THAILAND OR TAIWAN.

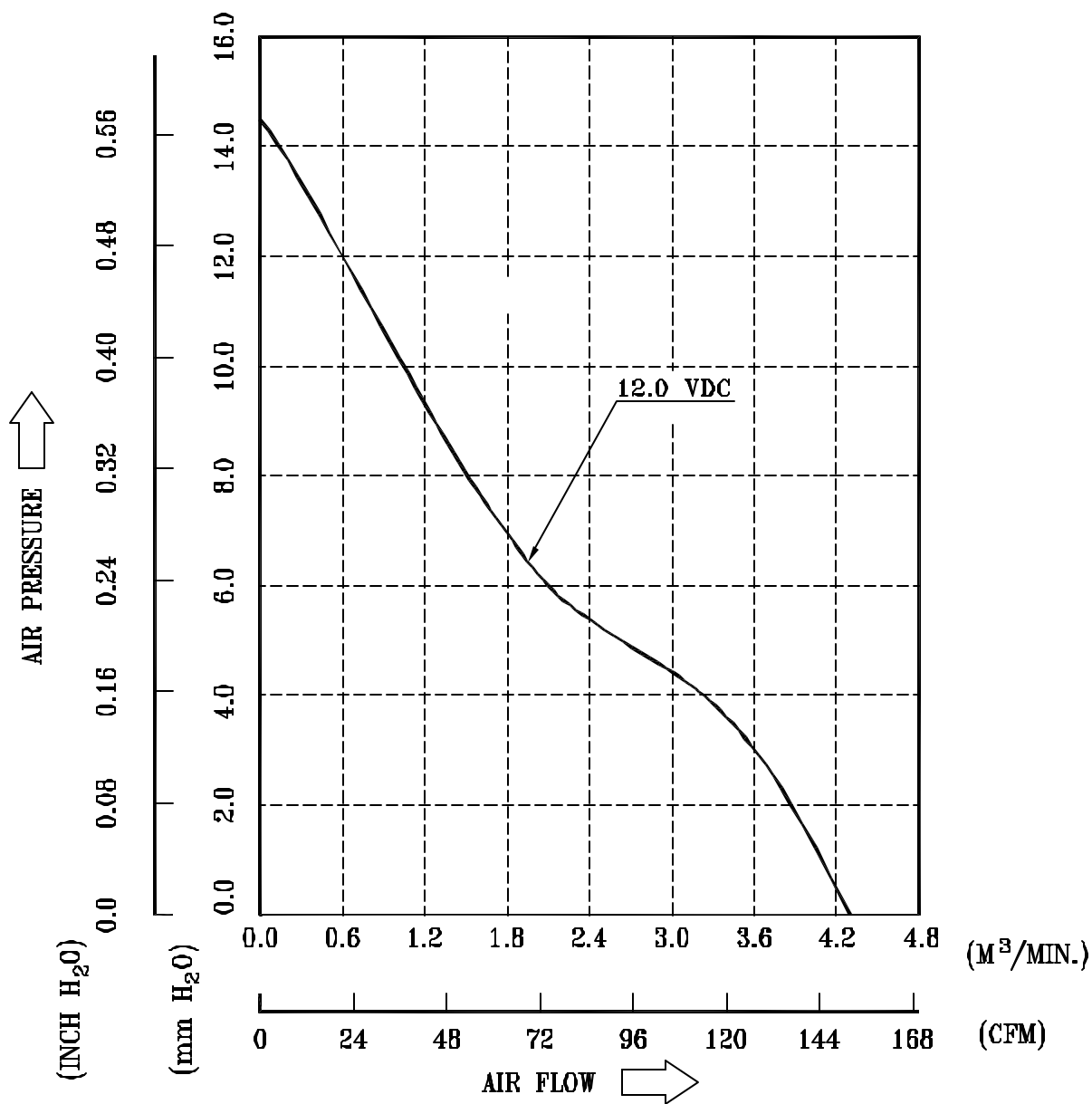
8. CURRENT CHARACTERISTIC

- 8-1. THE IN-RUSH CURRENT MAXIMUM IS 4.00A AT DC:12V.

PART NO:

DELTA MODEL: AFB1212SHE-4F1A

9. P & Q CURVE:



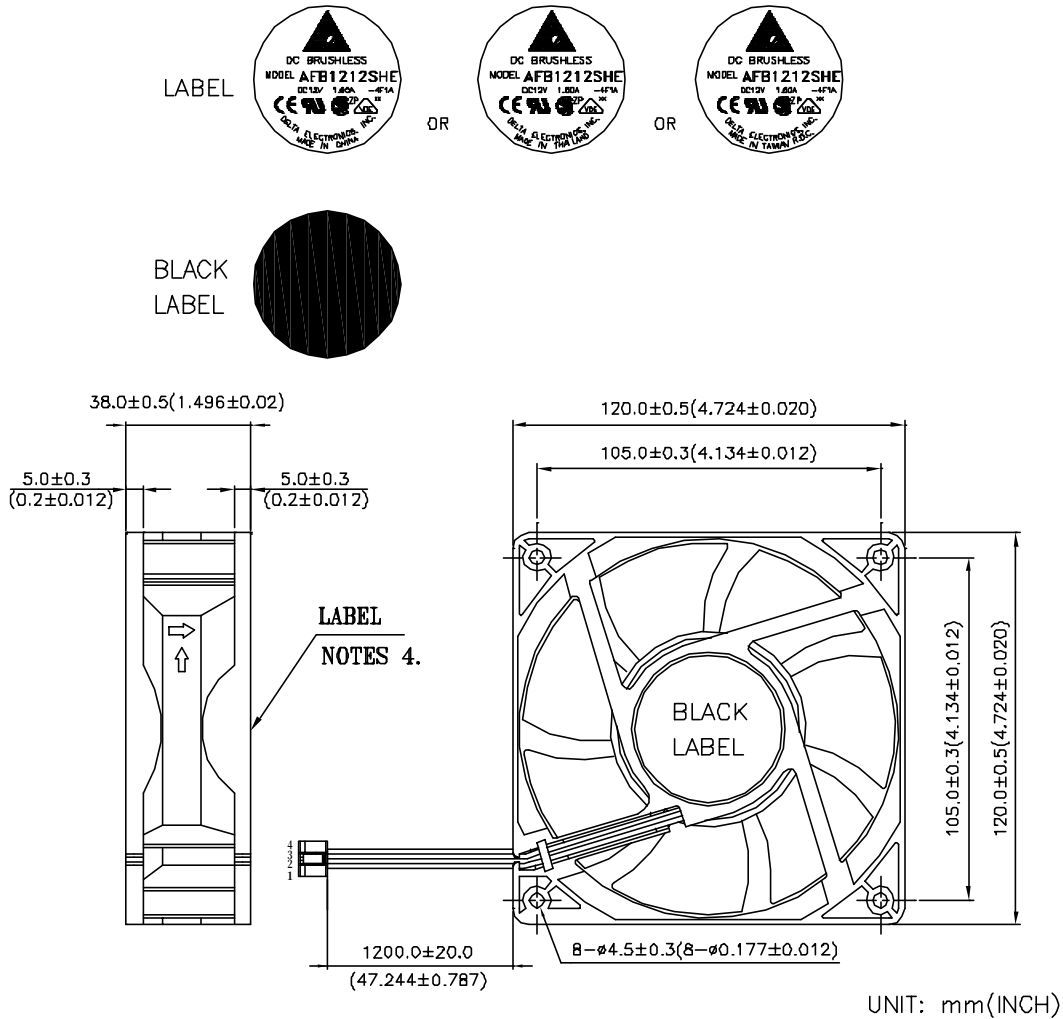
* TEST CONDITION: INPUT VOLTAGE ----- OPERATION VOLTAGE
TEMPERATURE ----- ROOM TEMPERATURE
HUMIDITY ----- 65%RH

PART NO:

DELTA MODEL: AFB1212SHE-4F1A

10. DIMENSION DRAWING:

LABEL:



NOTE : 1. UL 1007 -F- AWG #24

PIN 1 : BLACK WIRE: POSITIVE(+)

PIN 2 : BLACK WIRE: TACHOMETER OUTPUT (PWM)

PIN 3 : BLACK WIRE: SPEED CONTROL (F00)

PIN 4 : BLACK WIRE: NEGATIVE(-)

2. HOUSING :MOLEX 51067-0400 OR EQUIVALENT

3. TERMINAL :MOLEX 50217-8100 OR EQUIVALENT

4. LABEL ON CENTER OF ROTOR IN INLET SIDE.

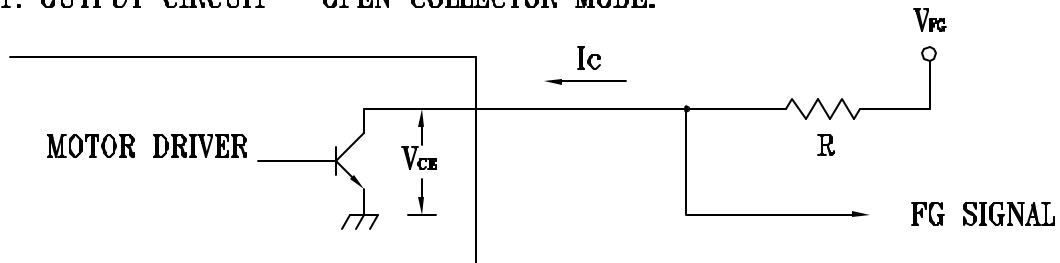
5. BLACK LABEL ON CENTER OF FRAME IN OUTLET SIDE.

PART NO:

DELTA MODEL: AFB1212SHE-4F1A

11. ROTATION DETECT (FG) SIGNAL:

1. OUTPUT CIRCUIT - OPEN COLLECTOR MODE:



CAUTION:

THE LEAD WIRE OF RD SIGNAL CAN NOT TOUCH
THE LEAD WIRE OF POSITIVE OR NEGATIVE.

2. SPECIFICATION:

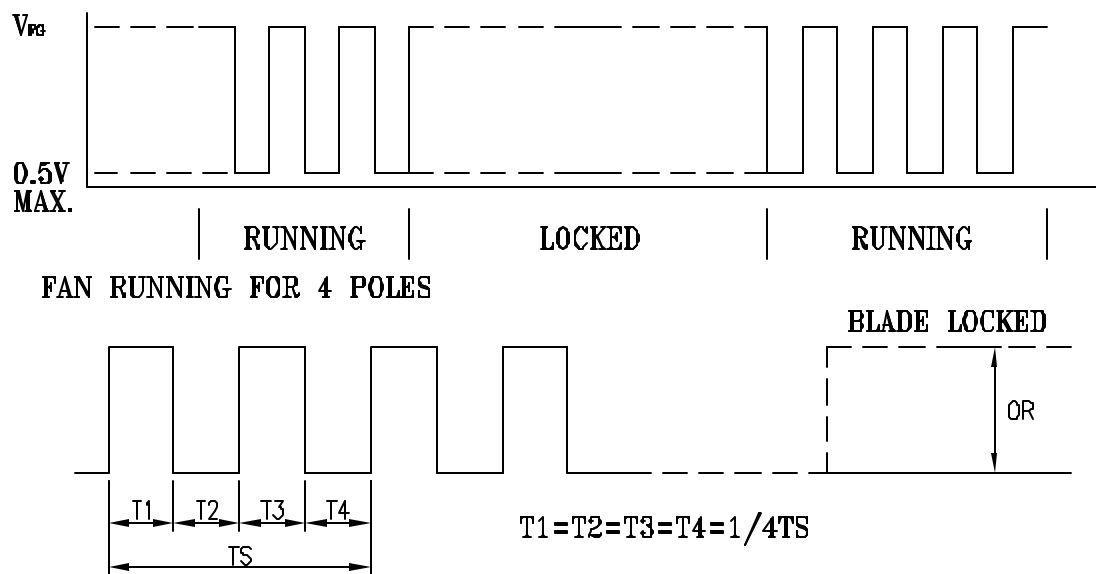
$$V_{CE(sat)} = 0.5V \text{ MAX}$$

$$V_{FG} = 18.0V \text{ MAX}$$

$$I_c = 5mA \text{ MAX.}$$

$$R \geq V_{FG} / I_c$$

3. FREQUENCY GENERATOR WAVEFORM:



N=R.P.M

$$T_S = 60/N(\text{SEC})$$

*VOLTAGE LEVEL AFTER BLADE LOCKED

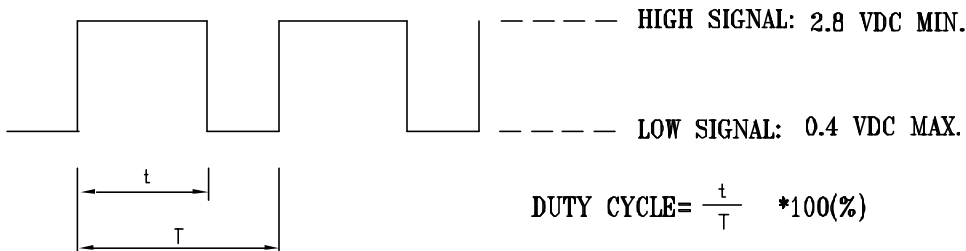
*4 POLES

PART NO:

DELTA MODEL: AFB1212SHE-4F1A

12. PWM CONTROL SIGNAL:

SIGNAL VOLTAGE RANGE: 0~15.0 VDC

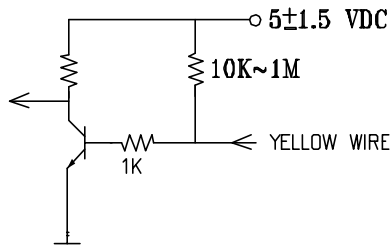


- THE FREQUENCY FOR CONTROL SIGNAL OF THE FAN SHALL BE ABLE TO ACCEPT A 30~300 KHZ.
- THE PREFERRED OPERATING POINT FOR THE FAN IS 25.0KHZ.
- AT 100% DUTY CYCLE, THE ROTOR WILL SPIN AT MAXIMUM SPEED.
- AT 0% DUTY CYCLE, THE ROTOR WILL 0 RPM .
- WITH CONTROL SIGNAL LEAD DISCONNECTED, THE FAN WILL SPIN AT MAXIMUM SPEED.
- AT 25K HZ 30% DUTY CYCLE , THE FAN WILL BE ABLE TO START FROM A DEAD STOP .

13. SPEED VS PWM CONTROL SIGNAL: (AT RATED VOLTAGE & PWM FREQUENCY=25.0KHZ)

DUTY CYCLE (%)	SPEED R.P.M. (REF.)	CURRENT (A) TYP.
100	3700 ± 10%	0.75
70	2590±10%	0.34
50	1850±200RPM	0.17
30	1110±200RPM	0.08
0	0	0.01

14. PWM CONTROL LEAD WIRE INPUT IMPEDANCE:



14-1. THE FAN SPEED WILL DEFAULT TO MAXIMUM WHEN THE SPEED CONTROLL INPUT IS LEFT UNCONNECTED.



Descriptions:

- 1. Delta will not guarantee the performance of the products if the application condition falls outside the parameters set forth in the specification.**
- 2. A written request should be submitted to Delta prior to approval if deviation from this specification is required.**
- 3. Please exercise caution when handling fans. Damage may be caused when pressure is applied to the impeller, if the fans are handled by the lead wires, or if the fans are hard-dropped to the production floor.**
- 4. Except as pertains to some special designs, there is no guarantee that the products will be free from any such safety problems or failures as caused by the introduction of powder, droplets of water or encroachment of insect into the hub.**
- 5. The above-mentioned conditions are representative of some unique examples and viewed as the first point of reference prior to all other information.**
- 6. It is very important to establish the correct polarity before connecting the fan to the power source. Positive (+) and Negative (-). Damage may be caused to the fans if connection is with reverse polarity, as there is no foolproof method to protect against such error.**
- 7. Delta fans are not suitable where any corrosive fluids are introduced to their environment.**
- 8. Please ensure all fans are stored according to the storage temperature limits specified. Do not store fans in a high humidity environment. We highly recommend performance testing is conducted before shipping, if the fans have been stored over 6 months.**
- 9. Not all fans are provided with the Lock Rotor Protection feature. If you impair the rotation of the impeller for the fans that do not have this function, the performance of those fans will lead to failure.**
- 10. Please be cautious when mounting the fan. Incorrect mounting of fans may cause excess resonance, vibration and subsequent noise.**
- 11. It is important to consider safety when testing the fans. A suitable fan guard should be fitted to the fan to guard against any potential for personal injury.**
- 12. Except where specifically stated, all tests are carried out at relative (ambient) temperature and humidity conditions of 25°C, 65%. The test value is only for fan performance itself.**
- 13. Be certain to connect an “over 4.7μF” capacitor to the fan externally when the application calls for using multiple fans in parallel, to avoid any unstable power.**