



## SPECIFICATION FOR APPROVAL

Customer       D P C      

Description       D C F A N      

Customer P/N:                                  R E V .         

Delta Model No.    FFB03612EHN-BGA    REV.    00   

Sample Issue No.   

Sample Issue Date    JUL.07.2011   

PLEASE SEND ONE COPY OF THIS SPECIFICATION BACK AFTER YOU SIGNED APPROVAL FOR PRODUCTION PRE-ARRANGMENT.

APPROVED BY:   

DATE :   

**DELTA ELECTRONICS, INC.**

**TAOYUAN PLANT**

**252, SHANG YING ROAD, KUEI SAN INDUSTRIAL ZONE TAOYUAN**

**SHIEN, TAIWAN, R.O.C.**

**TEL: 886-(0)3-3591968**

**FAX: 886-(0)3-3591991**

\*\*\* SAMPLE HISTORY \*\*\*

CUSTOMER: DPC  
 CUSTOMER P/N:  
 DELTA MODEL : FFB03612EHN-BGA

| REV. | DESCRIPTION | DRAWN        | CHECKED      |             |     | APPROVED     | ISSUE DATE |
|------|-------------|--------------|--------------|-------------|-----|--------------|------------|
|      |             |              | ME           | EE          | CE  |              |            |
| 00   | ISSUE SPEC  | 李君鴻 07/01'11 | 李君鴻 07/01'11 | 黃清彰07/01'11 | --- | 陳建樺 07/05'11 | 07/07'11   |
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 252, SHANG YING ROAD, KUEI SAN  
 TAOYUAN HSIEN 333, TAIWAN, R. O. C.

TEL : 886-(0)3-3591968  
 FAX : 886-(0)3-3591991

SPECIFICATION FOR APPROVAL  
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Customer: DPC  
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 Description: DC FAN  
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 Customer P/N: REV:  
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 Delta Model NO.: FFB03612EHN-BGA  
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 Sample Rev: 00 Issue NO:  
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 Sample Issue Date: JUL.07.2011 Quantity:  
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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                          | 10.8 - 13.2 VDC  |
| INPUT CURRENT                              | 0.33 (MAX. 0.40) A<br>CURRENT ON SAFETY LABEL : 0.75 A                             |
| INPUT POWER                                | 3.96 (MAX. 4.80) W   |
| SPEED                                      | 14500 R.P.M. (±10%)  |
| MAX. AIR FLOW<br>(AT ZERO STATIC PRESSURE) | 0.461 (MIN. 0.415 ) M <sup>3</sup> /MIN.<br>16.30 (MIN. 14.67 ) CFM                |
| MAX. AIR PRESSURE<br>(AT ZERO AIRFLOW)     | 25.40 (MIN. 20.57 ) mmH <sub>2</sub> O<br>1.000 (MIN. 0.810 ) inchH <sub>2</sub> O |
| ACOUSTICAL NOISE (AVG.)                    | 50.0 (MAX. 54.0 ) dB-A   |
| INSULATION TYPE                            | UL: CLASS A  |

(continued)

PART NO:

DELTA MODEL: FFB03612EHN-BGA

|                        |   |
|------------------------|---|
| INSULATION STRENGTH    | 10 MEG OHM MIN. AT 500 VDC<br>(BETWEEN FRAME AND (+) TERMINAL)  |
| DIELECTRIC STRENGTH    | 5 mA MAX. AT 500 VAC 50/60 Hz<br>ONE MINUTE, (BETWEEN FRAME AND<br>(+) TERMINAL)  |
| EXTERNAL COVER         | OPEN TYPE   |
| LIFE EXPECTANCE        | 50000 HOURS CONTINUOUS OPERATION<br>AT 40 °C WITH 15 ~ 65 %RH.  |
| ROTATION               | CLOCKWISE VIEW FROM NAME<br>PLATE SIDE  |
| OVER CURRENT SHUT DOWN | THE CURRENT WILL SHUT DOWN WHEN<br>LOCKING ROTOR.   |
| LEAD WIRE              | UL 1061 -F- AWG #28<br>BLACK WIRE NEGATIVE(-)<br>RED WIRE POSITIVE(+)<br>BLUE WIRE FREQUENCY(-F00)<br>YELLOW WIRE SPEED 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. THE CHARACTERS SHOWED IN PAGE 1 IS THE CONDITION OF BOTH FANS RUN.  
4. 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.

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PART NO:  
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DELTA MODEL: FFB03612EHN-BGA  
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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 ----- 32 GRAMS

4. ENVIRONMENTAL:

- 4-1. OPERATING TEMPERATURE ----- -10 TO +70 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.

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PART NO:  
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DELTA MODEL: FFB03612EHN-BGA  
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8.P & Q CURVE:



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

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PART NO:  
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DELTA MODEL: FFB03612EHN-BGA  
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9. DIMENSION DRAWING:

LABEL:



DIMENSION UNIT: MM(INCH)

NOTES:

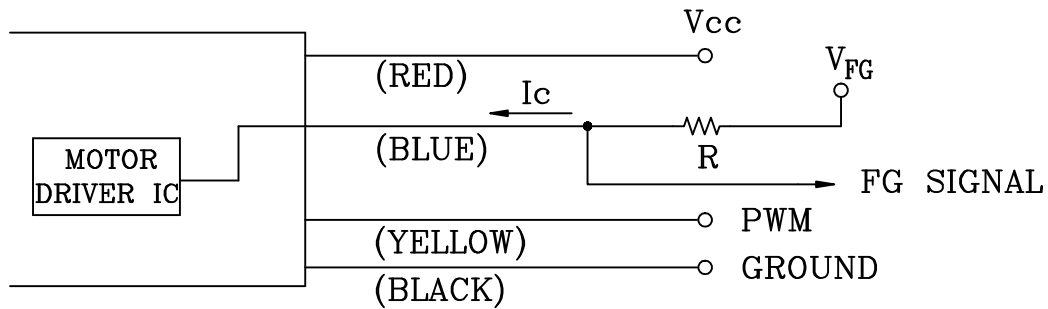
1. THIS PRODUCT IS RoHS COMPLIANT.
2. LEAD WIRE UL 1061 -F- AWG #28  
RED WIRE POSITIVE(+)  
BLACK WIRE NEGATIVE(-)  
BLUE WIRE FREQUENCY(-F00)  
YELLOW WIRE SPEED CONTROL(-PWM)

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PART NO:  
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DELTA MODEL: FFB03612EHN-BGA  
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### 10. FREQUENCY GENERATOR (FG) SIGNAL:

#### 1. OUTPUT CIRCUIT - OPEN COLLECTOR MODE:



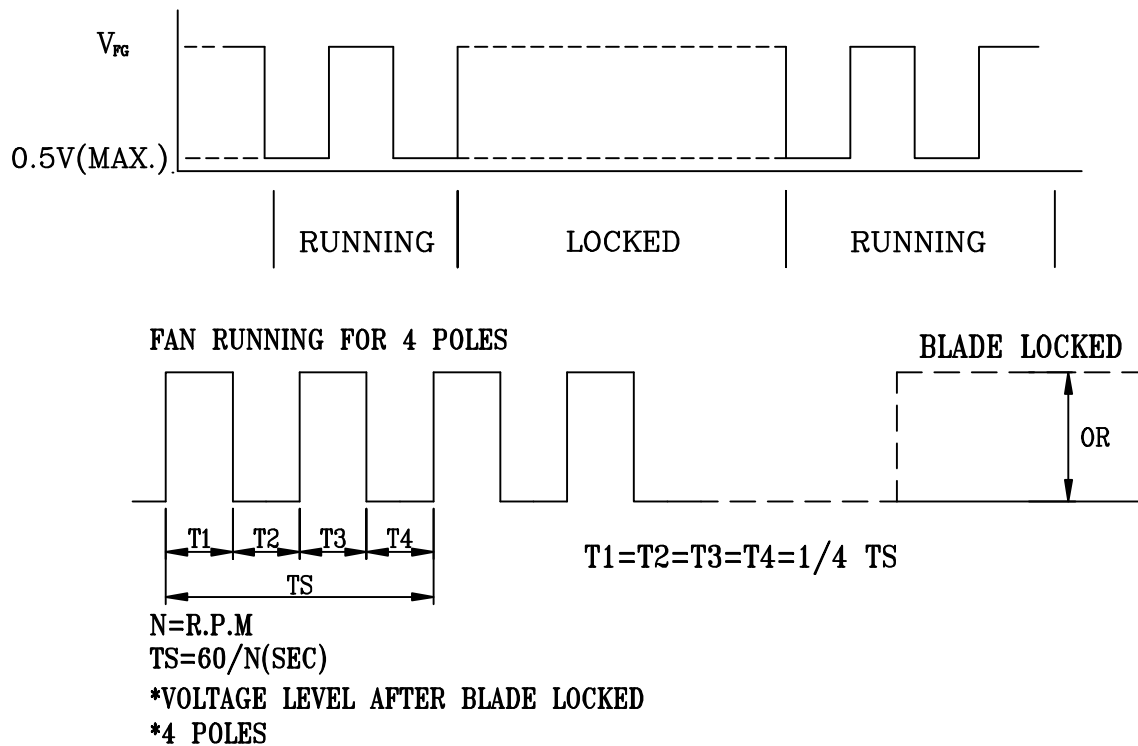
"+" LEAD WIRE & "-" LEAD WIRE.

#### 2. SPECIFICATION:

$$V_{FG} = 13.2V \text{ MAX. } I_c = 5mA \text{ MAX.}$$

$$V_{CE} = 0.5V \text{ MAX. } R \geq V_{FG} / I_c$$

#### 3. FREQUENCY GENERATOR WAVEFORM:





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PART NO:  
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DELTA MODEL: FFB03612EHN-BGA  
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11. PWM CONTROL SIGNAL:



- THE FREQUENCY FOR CONTROL SIGNAL OF THE FAN SHALL BE ABLE TO ACCEPT A 20KHZ~25KHZ.
- THE PREFERRED OPERATING POINT FOR THE FAN IS 25K HZ.
- AT 100% DUTY CYCLE,THE ROTOR WILL SPIN AT MAXIMUM SPEED.
- AT 0% DUTY CYCLE,THE ROTOR WILL SPIN AT STOP.
- WITH CONTROL SIGNAL LEAD DISCONNECTED,THE FAN WILL SPIN AT MAXIMUM SPEED.
- AT 12V 25KHZ 30% DUTY CYCLE ,THE FAN WILL BE ABLE TO START FROM A DEAD STOP .

12. SPEED VS PWM CONTROL SIGNAL:

(AT RATED VOLTAGE & PWM FREQUENCY=25KHZ & TEMP=25°C)

| DUTY CYCLE (%) | SPEED R.P.M. (REF.) | CURRENT (A) TYP. |
|----------------|---------------------|------------------|
| 100            | 14500±10%           | 0.33             |
| 50             | 6500+800/-650       | 0.08             |
| 0              | 0                   | 0.01             |

13. PWM CONTROL LEAD WIRE INPUT IMPEDANCE:



13-1. THE FAN SPEED WILL DEFAULT TO MAXIMUM WHEN THE SPEED CONTROL INPUT IS LEFT UNCONNECTED.



## ***Application Notice***

- 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 fan was 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, if there is no foolproof method to protect against such error specifically mentioned in this spec.**
- 7. Delta fans without special protection 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 room (ambient) temperature and relative humidity conditions of 25°C, 65% RH. The test value is only for fan performance itself.**
- 13. Be certain to connect an “4.7µF or greater” capacitor to the fan externally when the application calls for using multiple fans in parallel, to avoid any unstable power.**

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А