



## **SPECIFICATION FOR APPROVAL**

Customer : MITSUBISHI

Description : DC FAN

Customer Part No.

REV. :

Delta Model No. : QFR0824UHESS

REV. : 00

Sample Issue No. :

Sample Issue Date : JAN.22 2019

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: MITSUBISHI

CUSTOMER P/N:

DELTA MODEL: QFR0824UHESS

[illegible]

Delta Electronics, Inc.  
No.252, Shanying Rd., Guishan Dist.,  
Taoyuan City 333, Taiwan (R.O.C.)

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

## **STATEMENT OF DEVIATION**

☒ NONE

☐ DESCRIPTION:

Delta Electronics, Inc.  
No.252, Shanying Rd., Guishan Dist.,  
Taoyuan City 333, Taiwan (R.O.C.)

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## **SPECIFICATION FOR APPROVAL**

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Description : DC FAN

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rev. :

Delta model no. : QFR0824UHESS

Delta Safety Model No.: QFR0824UH

Sample revision. : 00

Issue no.:

Sample issue date : JAN.22 2019

Quantity :

### 1. SCOPE:

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

### 2. CHARACTERS:

| ITEM                                       | DESCRIPTION                                                                        |
|--------------------------------------------|------------------------------------------------------------------------------------|
| RATED VOLTAGE                              | 24 VDC                                                                             |
| OPERATION VOLTAGE                          | 20.4 - 27.6 VDC                                                                    |
| INPUT CURRENT(AVG.)<br>(AT RATED VOLTAGE)  | 0.26 (MAX. 0.36) A<br>SAFETY CURRENT ON LABEL : 0.44A                              |
| STARTUP CURRENT (MAX.)                     | MAX. 0.8A                                                                          |
| INPUT POWER(AVG.)<br>(AT RATED VOLTAGE)    | 6.24 (MAX. 8.64) W                                                                 |
| SPEED (AT RATED VOLTAGE)                   | 5400 ± 10% R.P.M.                                                                  |
| MAX. AIR FLOW<br>(AT ZERO STATIC PRESSURE) | 1.897 (MIN. 1.707 ) M <sup>3</sup> /MIN.<br>66.98 (MIN. 60.28 ) CFM                |
| MAX. AIR PRESSURE<br>(AT ZERO AIRFLOW)     | 13.46 (MIN. 10.90 ) mmH <sub>2</sub> O<br>0.530 (MIN. 0.429 ) inchH <sub>2</sub> O |
| ACOUSTICAL NOISE (AVG.)                    | 50.0 (MAX. 54.0) dB-A                                                              |
| INSULATION TYPE                            | UL: CLASS A                                                                        |
| INSULATION STRENGT                         | 10 MEG OHM MIN. AT 500 VDC<br>(BETWEEN FRAME AND (+) TERMINAL)                     |
| DIELECTRIC STRENGTH                        | 5 mA MAX. AT 500 VAC 50/60 Hz ONE MINUTE<br>(BETWEEN FRAME AND (+) TERMINAL)       |
| INGRESS PROTECTION                         | IP51 (IEC60529 STANDARD)                                                           |

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PART NO:

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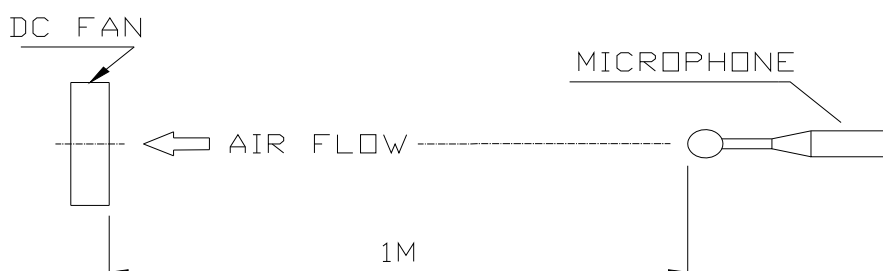
DELTA MODEL: QFR0824UHESS

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|                                             |                                                               |
|---------------------------------------------|---------------------------------------------------------------|
| LIFE EXPECTANCE (L10)<br>(AT LABEL VOLTAGE) | 100,000 HOURS CONTINUOUS OPERATION AT 60 °C WITH 15 ~ 65 %RH. |
| ROTATION                                    | CLOCKWISE VIEW FROM NAME PLATE SIDE.                          |
| LOCKED ROTOR PROTECTION                     | THE CURRENT WILL SHUT DOWN, WHEN ROTOR LOCKED AND FIXED.      |

NOTES:

1. ALL READINGS ARE MEASURED AFTER STABLY WARMING UP THROUGH 2 MINUTES.
2. STANDARD AIR PROPERTY IS AIR AT (Td) 25°C TEMPERATURE, (RH) 65% RELATIVE HUMIDITY , AND (Pb) 760 mmHg BAROMETRIC PRESSURE.
3. THE VALUES WRITTEN IN PARENS , ( ), ARE LIMITED SPEC.
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: QFR0824UHESS

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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-----88.0 GRAMS(REF.)

4. ENVIRONMENTAL:

- 4-1. OPERATING TEMPERATURE----- -20 TO +85 DEGREE C
- 4-2. STORAGE TEMPERATURE----- -40 TO +85 DEGREE C
- 4-3. OPERATING HUMIDITY----- 5 TO 95 % 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.
- 6-2. ALL MATERIALS MUST FOLLOW DELTA'S SPECIFICATION 10000-0162  
(ENVIRONMENT MANAGEMENT STANDARD)

7. PRODUCTION LOCATION

- 7-1. PRODUCTS WILL BE PRODUCED IN CHINA.

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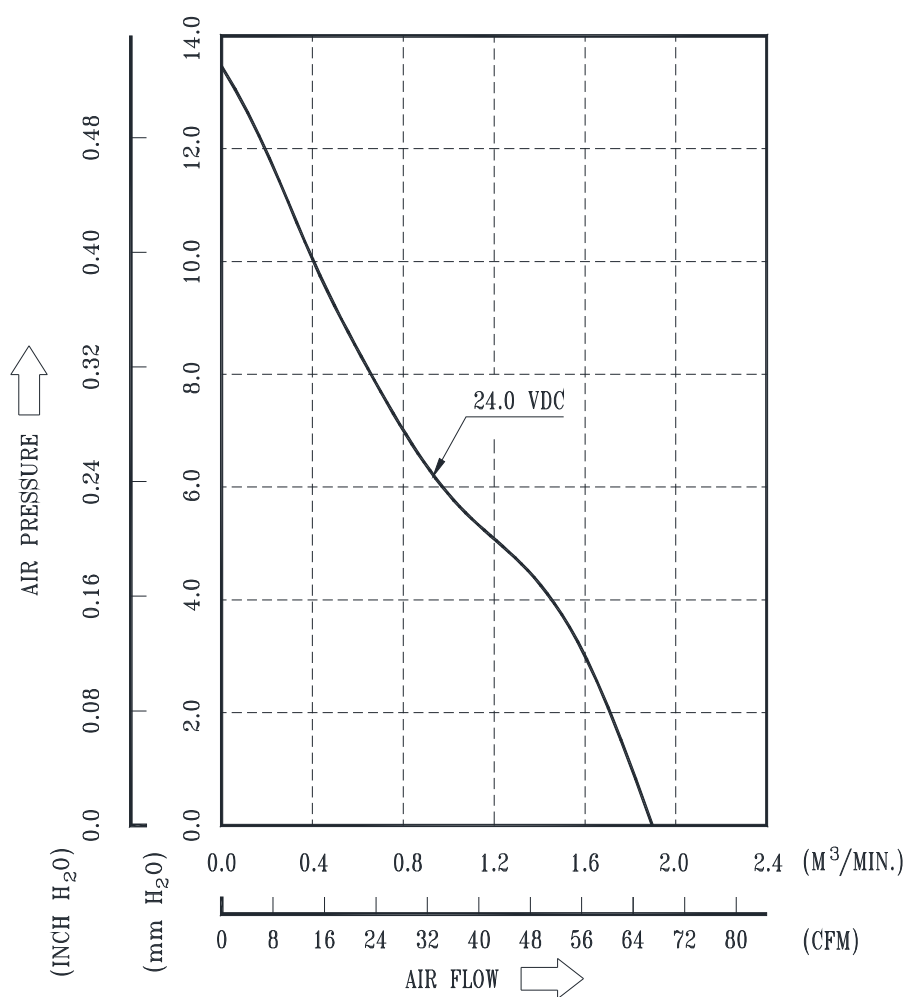
PART NO:

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8. P & Q CURVE:

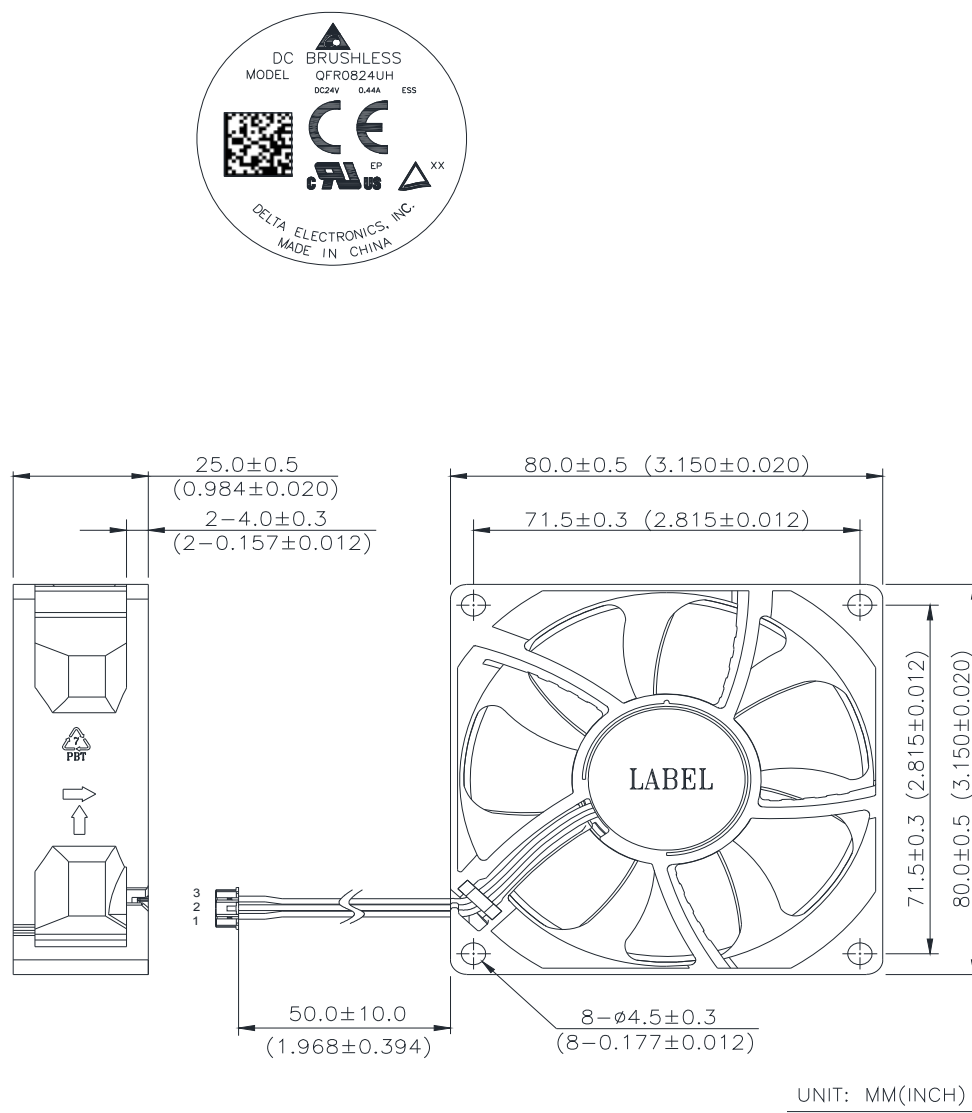


\*TEST CONDITION: INPUT VOLTAGE-----OPERATION VOLTAGE  
TEMPERATURE-----ROOM TEMPERATURE  
HUMIDITY-----65%RH

PART NO:

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9. DIMENSION DRAWING:



NOTES:

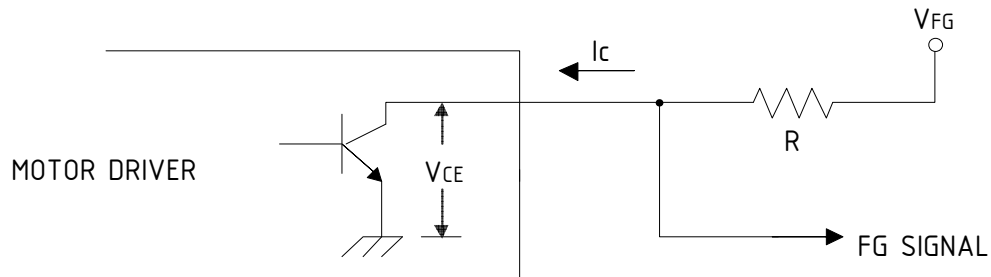
1. CABLE WIRE: UL3443 AWG#24  
PIN 1: RED WIRE----(+)  
PIN 2: BLACK WIRE----(-)  
PIN 3: YELLOW WIRE ----- (F00)
2. HOUSING: JST PAP-03V-S
3. TERMINAL: JST SPHD-001T-P0.5
4. THIS PRODUCT IS RoHS COMPLIANT

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## 10. FREQUENCY GENERATOR (FG) SIGNAL:

### 10-1. OUTPUT CIRCUIT - OPEN COLLECTOR MODE:



### CAUTION:

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

### 10-2. SPECIFICATION:

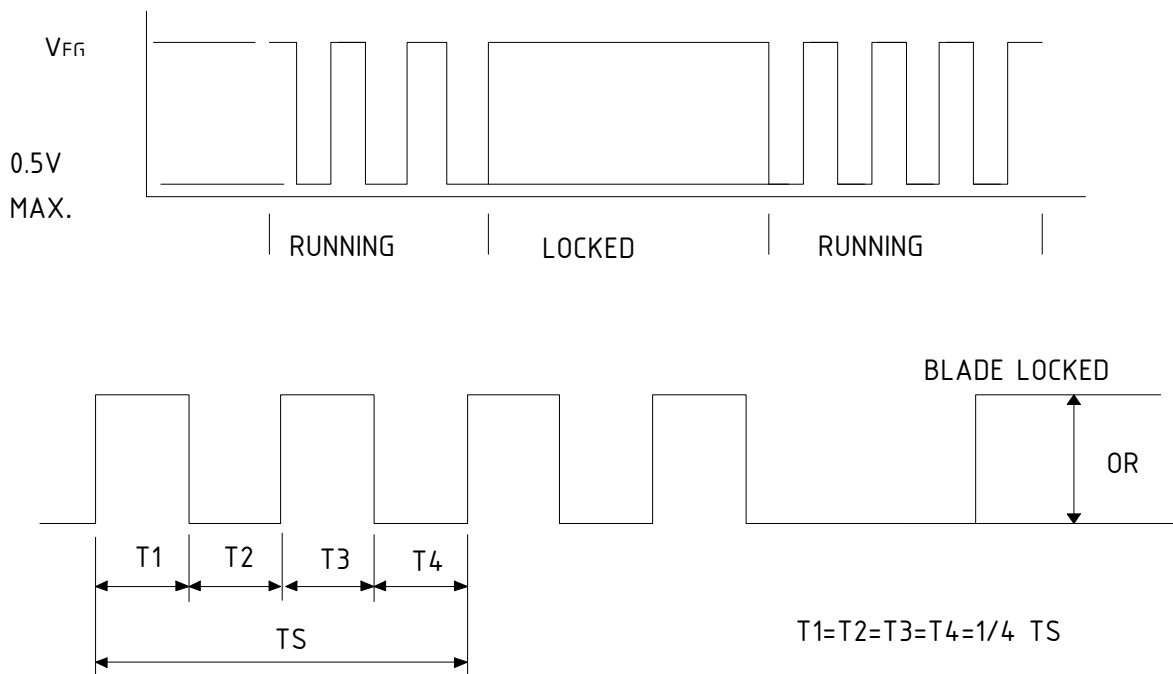
V<sub>FG</sub> = 5.0V (30V MAX.)

I<sub>c</sub> = 10mA MAX.

V<sub>CE</sub> = 0.5V MAX.

$R \geq V_{FG} / I_c$

## 11. FREQUENCY GENERATOR WAVEFORM:



N=R.P.M

TS=60/N(SEC)

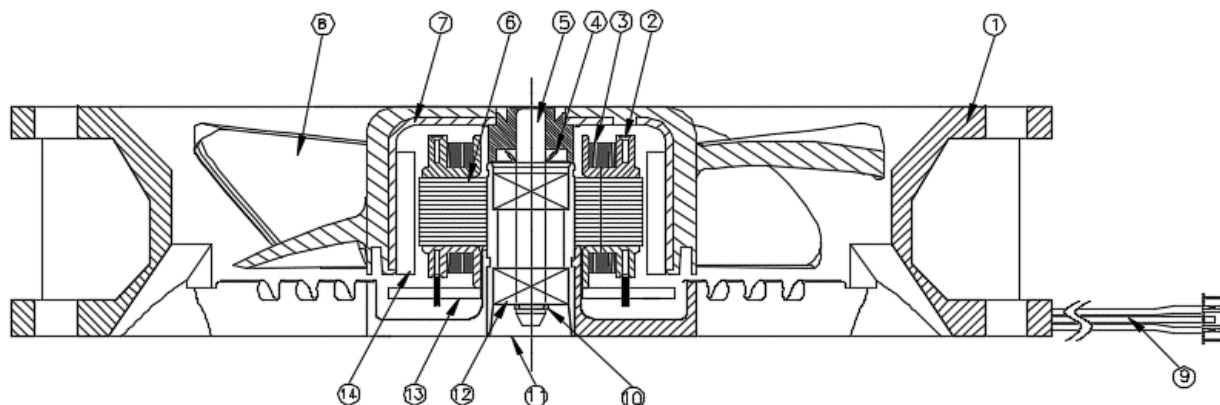
\*VOLTAGE LEVEL AFTER BLADE LOCKED

\*4 POLES

PART NO:

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## 12. COMPONENT BOM LIST:



| SYM NO. | SYM.Name   | COMMON                      | RATING & SPEC    | VENDOR                                                                                    | DESCRIPTION                             |
|---------|------------|-----------------------------|------------------|-------------------------------------------------------------------------------------------|-----------------------------------------|
| 1       | FRAME      | N/A                         | N/A              | N/A                                                                                       | PBT+30%GF V-0                           |
| 2       | FASTENER   | N/A                         | N/A              | N/A                                                                                       | METAL, BLACK, SK5-M                     |
| 3       | LABEL      | N/A                         | N/A              | N/A                                                                                       | SPEC PE 24mm T0.1                       |
| 4       | BEARING    | N/A                         | N/A              | N/A                                                                                       | SUJ                                     |
| 5       | P.C.BOARD  | N/A                         | N/A              | N/A                                                                                       | FR-4                                    |
| 6       | COVER      | N/A                         | N/A              | N/A                                                                                       | PBT V-0 & PA66 V-0                      |
| 7       | CABLE ASSY | N/A                         | N/A              | N/A                                                                                       | UL3443 #24 ; JST PAP-03V-S              |
| 8       | SI-STEEL   | N/A                         | N/A              | N/A                                                                                       | 50A600, T0.50                           |
| 9       | CU-WIRE    | N/A                         | N/A              | N/A                                                                                       | 2UEWN MW-80C                            |
| 10      | IMPELLER   | N/A                         | N/A              | N/A                                                                                       | PBT 30% GF V-0                          |
| 11      | CASE       | N/A                         | N/A              | N/A                                                                                       | SPCC                                    |
| 12      | SHAFT      | N/A                         | N/A              | N/A                                                                                       | SUS                                     |
| 13      | SPRING     | N/A                         | N/A              | N/A                                                                                       | SUS                                     |
| 14      | MAGNET     | N/A                         | N/A              | DONGGUAN FUCI ELECTRONIC CO.LTD.<br>GUANGZHOU GOLDEN SOUTH PLASTIC MAGNET.                | RUBBER                                  |
| 15      | RESISTOR   | R17,R18                     | 1/4W 0.75ohm     | TA-I TECHNOLOGY CO.,LTD.<br>WALSIN TECHNOLOGY CORPORATION<br>YAGEO CORPORATION            | RES SMD CS 1/4W 0.75ohm F 0805          |
|         |            | R11,R12                     | 1/10W 200ohm     |                                                                                           | RES SMD 1/10W 200ohm F 0603             |
|         |            | R5                          | 1/10W 510ohm     |                                                                                           | RES SMD 1/10W 510ohm F 0603             |
|         |            | R24                         | 1/10W 4.7Kohm    |                                                                                           | RES SMD 1/10W 4.7Kohm F 0603            |
|         |            | R25                         | 1/10W 10Kohm     |                                                                                           | RES SMD 1/10W 10Kohm F 0402             |
|         |            | R10                         | 1/10W 20Kohm     |                                                                                           | RES SMD 1/10W 20Kohm F 0603             |
|         |            | R27                         | 1/10W 24.9Kohm   |                                                                                           | RES SMD 1/10W 24.9Kohm F 0603           |
|         |            | R1,R2,R3,R4,R6,<br>R7,R8,R9 | 1/8W 2.2Kohm     |                                                                                           | RES SMD 1/8W 2.2Kohm F 0805             |
|         |            | R14,R15                     | 1/16W 510ohm     |                                                                                           | RES SMD 1/16W 510ohm F 0402             |
|         |            | R26,R32                     | 1/16W 1Kohm      |                                                                                           | RES SMD 1/16W 1Kohm F 0402              |
|         |            | R28                         | 1/16W 4.7Kohm    |                                                                                           | RES SMD 1/16W 4.7Kohm F 0402            |
|         |            | R16,R19,R20,R30,R31         | 1/16W 10Kohm     |                                                                                           | RES SMD 1/16W 10Kohm F 0402             |
|         |            | R22,R29                     | 1/16W 20Kohm     |                                                                                           | RES SMD 1/16W 20Kohm F 0402             |
|         |            | R23                         | 1/16W 49.9Kohm   |                                                                                           | RES SMD 1/16W 49.9Kohm F 0402           |
|         |            | R33                         | 1/16W 0ohm       |                                                                                           | RES SMD 1/16W 0ohm J 0402               |
| 16      | FUSE       | F1                          | 1.5A 63VDC       | AEM, INC.<br>LITTELFUSE FAR EAST PTE LTD.                                                 | FUSE F 1.5A 63VDC SMD 0603              |
| 17      | CAPACITOR  | C8                          | 50V 470pF        | SAMSUNG ELECTRO-MECHANICS CO., LTD.<br>WALSIN TECHNOLOGY CORPORATION<br>YAGEO CORPORATION | CAP MC SMD 50V 470pF K X7R 0603         |
|         |            | C5,C7                       | 50V 1000pF       |                                                                                           | CAP MC SMD 50V 1000pF K X7R 0603 0.87   |
|         |            | C9                          | 50V 1uF          |                                                                                           | CAP MC SMD 50V 1uF K X7R 0603 0.8 0%    |
|         |            | C1                          | 50V 4.7uF        |                                                                                           | CAP MC SMD 50V 4.7uF K X7R 1206         |
|         |            | C4                          | 16V 0.47uF       |                                                                                           | CAP MC SMD 16V 0.47uF K X7R 0603        |
|         |            | C6                          | 25V 1uF          |                                                                                           | CAP MC SMD 25V 1uF K X7R 0603 0.8       |
| 18      | DIODE      | D2,D3,D4                    | 500mA 30V        | ROHM CO.,LTD.<br>NEXPERIA B.V.                                                            | DIO SBD 500mA 30V UMD2-2P SMD           |
|         |            | D1                          | 2A 30V           | VISHAY SEMICONDUCTOR<br>TAIWAN SEMICONDUCTOR CO.,LTD.                                     | DIO SBD 2A 30V POWERDI323-2P SMD        |
|         |            | ZD1                         | 0.5W 11.4-12.6V  | ON Semiconductor Corporation<br>VISHAY SEMICONDUCTOR                                      | DIO ZEN 0.5W 11.4-12.6V SOD-123-2P SMD  |
| 19      | TR         | Q3                          | 60V 1A           | NEXPERIA B.V.<br>DIODES INC.                                                              | TR 60V 1A SOT-23-3P 250 SMD             |
| 20      | MOSFET     | Q4                          | 60V 300mA 2ohm   | NEXPERIA B.V.<br>DIODES INC.                                                              | FET 60V 300mA 2ohm LL SOT-23-3P SMD     |
|         |            | Q5                          | 60V 200mA 2.4ohm | VISHAY SEMICONDUCTOR<br>ROHM CO.,LTD.                                                     | FET 60V 200mA 2.4ohm LL SMT-6P N*2 SMD  |
|         |            | Q1,Q2                       | 60V 3.6A 65mohm  | Sinopower Semiconductor, Inc.<br>ON Semiconductor Corporation                             | FET 60V 3.6A 65mohm LL DFN33-8P N+P SMD |
| 21      | IC DRIVER  | U1                          | BD69730FV-GE2    | ROHM CO.,LTD.                                                                             | IC DRIVER MOTOR 20V SSOP-16P SMD        |
| 22      | IC HALL    | U2                          | F-RANK           | Asahi Kasei Microdevices Corporatio<br>Nippon Ceramic Co., LTD                            | IC HALL ELEMENT F-RANK SOP-4P SMD       |



## ***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.**