

DELTA ELECTRONICS, INC.  
 252, SHANG YING ROAD, KUEI SAN  
 TAOYUAN HSIEN 333, TAIWAN, R. O. C.

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SPECIFICATION FOR APPROVAL  
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Customer:

Description:	DC FAN
Customer P/N:	REV:
Delta Model NO.:	FFB1212VHE-F00
Sample Rev:	00
Sample Issue Date:	DEC.08.2004.
	Issue NO:
	Quantity:

1. SCOPE:

THIS SPECIFICATION DEFINES THE ELECTRICAL AND MECHANICAL CHARACTERISTICS OF THE DC BRUSHLESS AXIAL FLOW FAN. THE FAN MOTOR IS WITH TWO PHASES AND FOUR POLES.

2. CHARACTERS:

ITEM	DESCRIPTION
RATED VOLTAGE	12 VDC
OPERATION VOLTAGE	7.0 - 13.2 VDC
INPUT CURRENT	1.00 (MAX. 1.50) A
INPUT POWER	12.00 (MAX. 18.00) W
SPEED	3200 R.P.M. (REF.)
MAX. AIR FLOW (AT ZERO STATIC PRESSURE)	4.300 (MIN. 3.870 ) M <sup>3</sup> /MIN. 151.85 (MIN. 136.67) CFM
MAX.AIR PRESSURE (AT ZERO AIRFLOW)	11.30 (MIN. 9.15 ) mmH <sub>2</sub> O 0.445 (MIN. 0.360) inchH <sub>2</sub> O
ACOUSTICAL NOISE (AVG.)	53.0 (MAX. 57.0) dB-A
INSULATION TYPE	UL: CLASS A

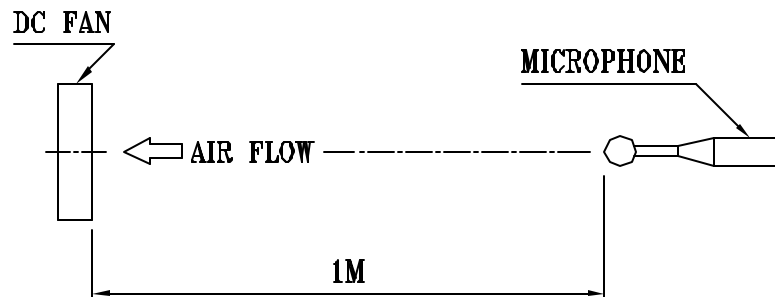
(continued)

PART NO:

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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
STARTING PROTECTION	START AT LOW SPEED , AFTER 10 SEC RUNNING AT FULL SPEED
LEAD WIRE	UL 1007 -F- AWG #24 BLACK WIRE NEGATIVE(-) RED WIRE POSITIVE(+) BLUE WIRE FREQUENCY(-F00)

- 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.

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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 ----- 370 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.

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8. BASIC RELIABILITY REQUIREMENT:

8-1. THERMAL CYCLING      LOW TEMPERATURE: -40°C  
                                 HIGH TEMPERATURE: +80°C  
                                 SOAK TIME: 30 MINUTES  
                                 TRANSITION TIME < 5 MINUTES  
                                 DUTY CYCLES: 5

8-2. HUMIDITY EXPOSURE      TEMPERATURE: +25°C ~ +65°C  
                                 HUMDITY: 90-98% RH @ +65°C  
   FOR 4 HOURS/CYCLE  
                                 POWER: NON-OPERATING  
                                 TEST TIME: 168 HOURS

8-3. VIBRATION                TEMPERATURE: +25°C  
                                 ORIENTATION: X, Y, Z  
                                 POWER: NON-OPERATING  
                                 VIBRATION LEVEL: OVERALL  $g_{RMS}=3.2$

FREQUENCY(Hz)	PSD( $G^2/Hz$ )
10	0.040
20	0.100
40	0.100
800	0.002
1000	0.002

TEST TIME: 2 HOURS ON EACH ORIENTATION

8-4. MECHANICAL SHOCK      TEMPERATURE: +20°C  
                                 ORIENTATION: X, Y, Z  
                                 POWER: NON-OPERATING  
                                 ACCELERATION: 20 G MIN.  
                                 PULSB: 11 ms HALF-SINE WAVE  
                                 NUMBER OF SHOCKS: 5 SHOCKS  
   FOR EACH DIRECTION

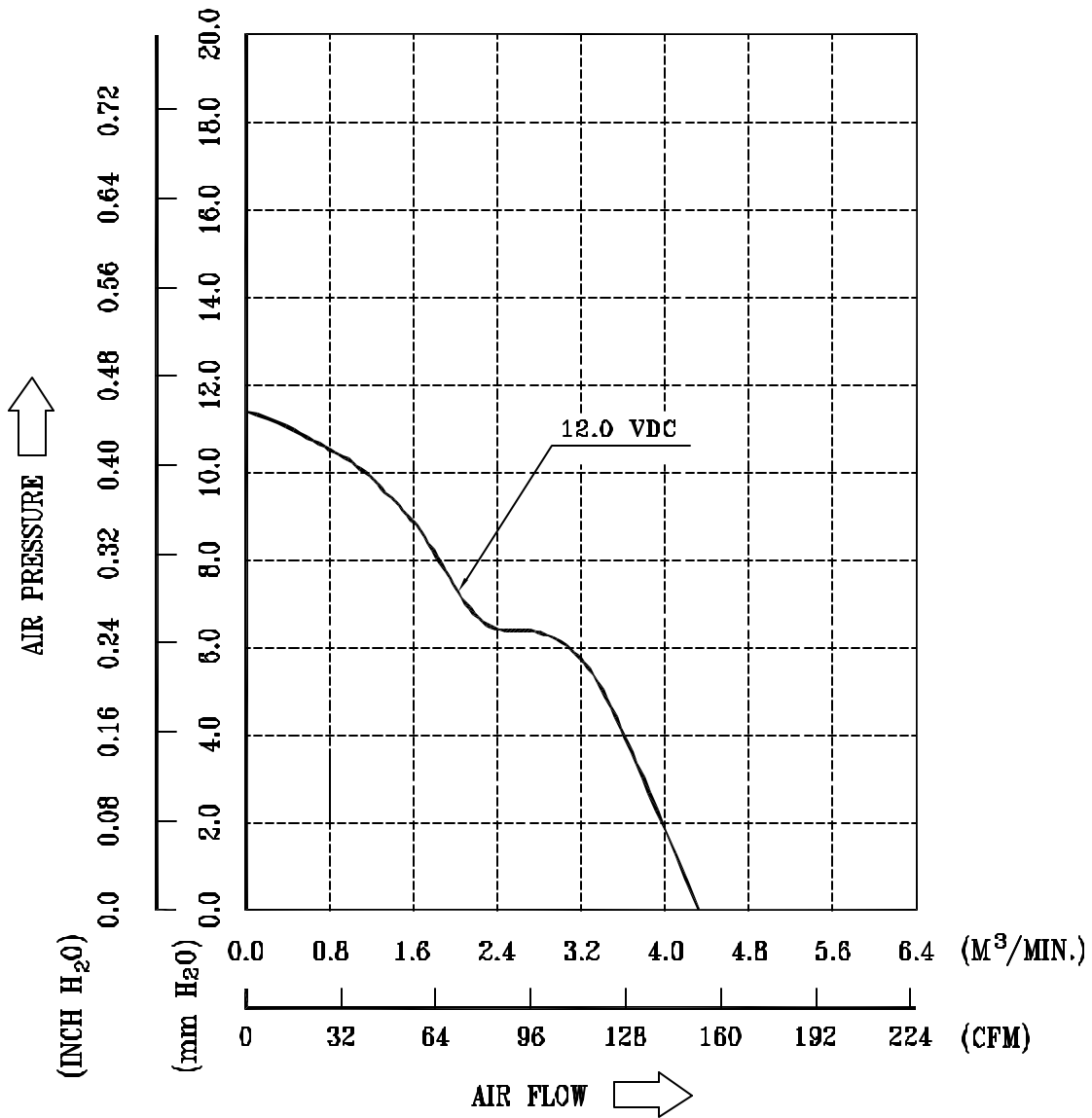
8-5. LIFE                      TEMPERATURE: MAX , OPERATING TEMPERATURE  
                                 POWER: OPERATING  
                                 DURATION: 1000 HOURS MIN.

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9. P & Q CURVE:



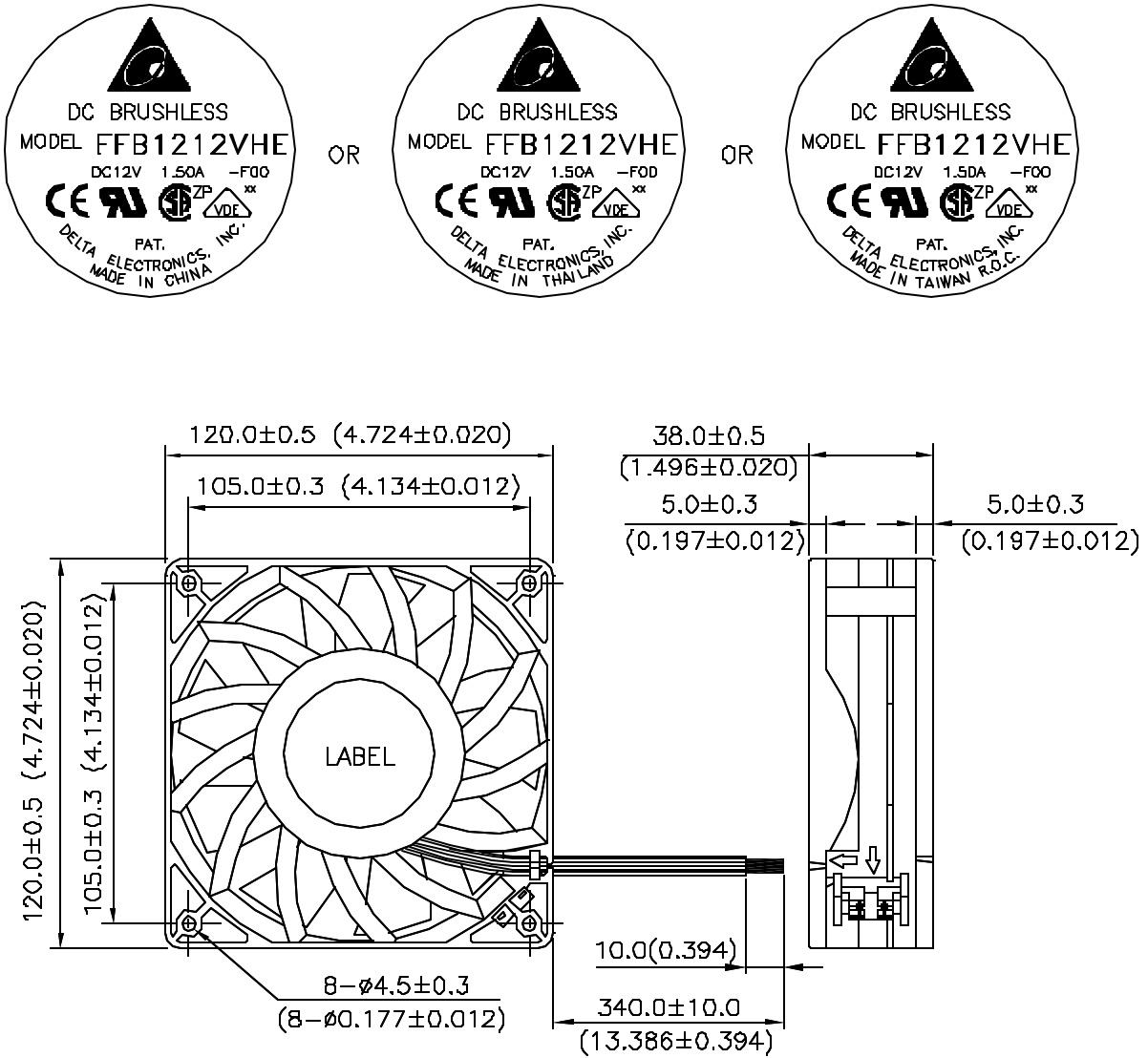
\* TEST CONDITION: INPUT VOLTAGE ----- OPERATION VOLTAGE  
TEMPERATURE ----- ROOM TEMPERATURE  
HUMIDITY ----- 65%RH

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10. DIMENSION DRAWING:

LABEL:



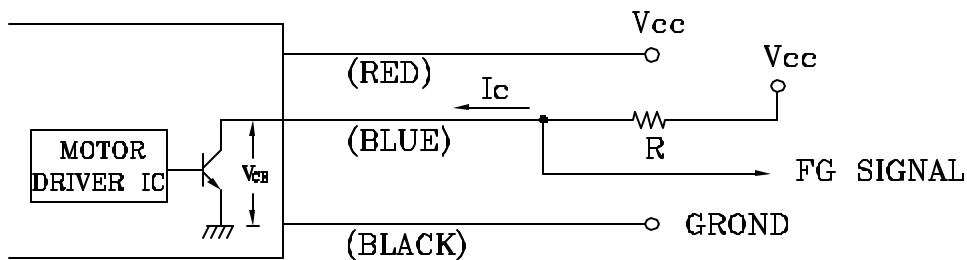
UNIT: mm(INCH)

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### 11. ROTATION DETECT (RD) SIGNAL:

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



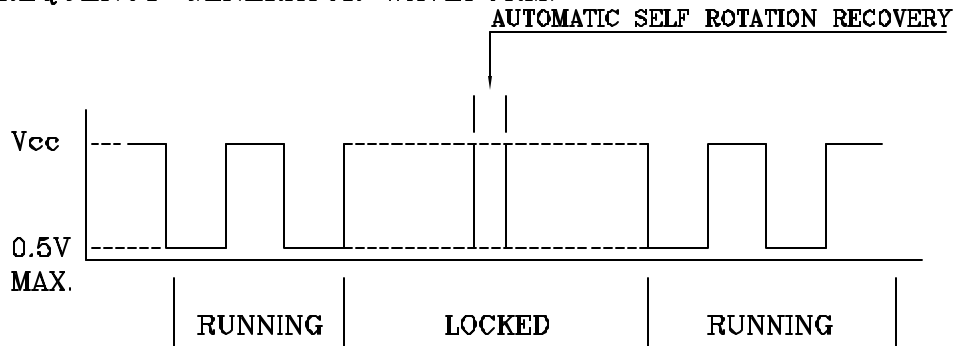
CAUTION: THE FG SIGNAL LEAD WIRE MUST BE KEPT AWAY FROM  
" + " LEAD WIRE & " - " LEAD WIRE.

#### 2. SPECIFICATION:

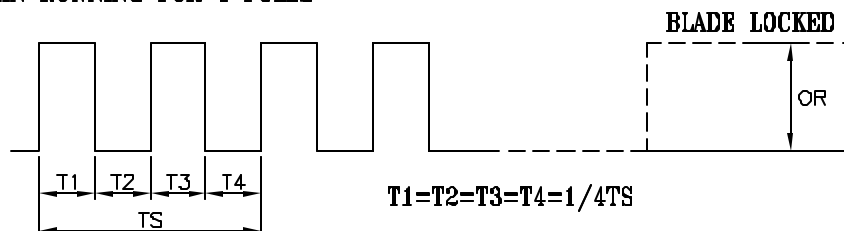
$$V_{cc} = 13.2 \text{ V MAX. } I_c = 5\text{mA MAX.}$$

$$V_{ce} = 0.5\text{V MAX. } R \geq V_{cc}/I_c$$

#### 3. FREQUENCY GENERATOR WAVEFORM:



FAN RUNNING FOR 4 POLES



$N = \text{R.P.M}$

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

\*VOLTAGE LEVEL AFTER BLADE LOCKED

\*4 POLES



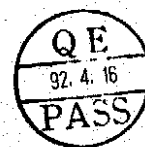
## **Descriptions:**

- 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.**



1248, followed by VHE; Model WFB followed by 1248, followed by HHE.  
 Model EFB followed by 0912 or 0924, followed by H, HH, L, M, SH or VH.  
 Model WFB followed by 1212 or 1224, followed by H, HE, HH, HHE, L, LE, M or ME; Model WFB followed by 1248, followed by HE, LE or ME; Model WFC followed by 1212, 1212, followed by B or BE.  
 Model BFB followed by 1212, 1224 followed by HE.  
 Model BFB followed by 0305, 03505, followed by HP, LP, MP.  
 Model AFB or ASB followed by 0505 or 0512, followed by HA, LA or MA.  
 Model BFB followed by 0712, 0724, followed by H, L, M.  
 Model BFC followed by 1212, followed by A, B; Models BFC1212C, BFC1224C, BFC1248C.  
 Model EFB followed by 0512, followed by HHA, HA, LA or MA, and EFB0505HA, EFB0505MA, EFB0505LA, followed by FOO or STD.; Model EFB followed by 0505, followed by HA, LA or MA, followed by FOO or STD.  
 Model AFC followed by 0512, 0612, 0712, 0812, 0824, 0912 or 0924, followed by "A", "AB", "AD", "B", "BB", "BD" or "C"; Model AFC followed by 0912, followed by "A" or "B", followed by -(H), -(HH), -(M); Model ASC followed by 0612, 0812, 0912 followed by "A" or "B".  
 Model ASB followed by 0605, followed by H, L, M; Model ASB followed by 0612, followed by H-SB, L-SB or M-SB; Model ASB followed by 0812 or 0824, followed by H, HH, L, LL or M; Model ASB followed by 0912, 0924, followed by H, HH, L, L-V, M; Model ASB followed by 0924 followed by H, HH, L or M, Model ASB0812L-SB, H-SB or M-SB; Model ASB0912L-SB, H-SB or M-SB; Model DSB followed by 0612, 0812, followed by H, H-N, L, L-N, M, M-N.  
 Model AFB followed by 0612, followed by H, HH, L, M, followed by SB; Model AFB followed by 0812, followed by H, L or M, followed by SB; Model AFB followed by 0912, followed by H, L or M, followed by SB.  
 Model AFB followed by 1212, followed by HE, HHE, LE, ME, SHE, VHE; Model AFB followed by 1224, followed by HE, HHE, LE, ME, SHE, VHE; Model AFB followed by 1248, followed by HE, HHE, LE, ME, VHE; Model EFB followed by 1212, followed by HE, HHE, LE, ME, SHE, VHE; Model EFB followed by 1224, followed by HE, HHE, LE, ME, SHE, VHE; Model EFB followed by 1248, followed by HE, HHE, LE, ME, SHE, VHE.  
 Model BFB followed by 1012, followed by H, HH, L, LL or M; Model BFB followed by 1024, followed by H, HH, L, LL or M; Model BFB followed by 1212, followed by H, HH, L, LL, M or VH; Model BFB followed by 1224, followed by H, HH, L, LL or M; Model BFB followed by 1248, followed by H, HH, L, LL or M.  
 Model BFB followed by 1212, 1224, followed by HE, HHE, LE, ME or VH; Model BFB followed by 1248, followed by HE, LE or ME; Model BFB followed by 1612, followed by H, L or M; Model BFB followed by 1624, followed by H, L or M; Model BFB followed by 1648, followed by H, L or M.  
 Models BFB0405HE, -LE, -ME, BFB0412HE, -HHE, -LE, -ME.  
 Models AUB0812H, -HH, -L, -LB, -M, -SHB, -VH, AUB0824H, -HH, -L, -LB, -M, -SHB, -VH.  
 Model BFB followed by 0505, 0512, 0524, followed by H, HH, L or M; Model BSB followed by 0505, 0512, 0524, followed by H, HH, L or M.  
 Models EFB1212 -H, -HF, -HH, -HHE, -L, -LF, -M, -MF, -SH, -VH, -VHE, EFB1224 -H, -HF, -HH, -HHE, -L, -LF, -M, -ME, -SH, -VH, -VHE, EFB1248 -H, -HH, -L, -M, -SH, -VH.  
 Model EFB followed by 0405, followed by HD, HHD, LD, LLD, MD, VHD; Model EFB followed by 0412, followed by HD, HHD, LD, LLD, MD, VHD; Model EFB followed by 0424, followed by HD, HHD, LD, LLD, MD, VHD.  
 Models BFB0305HA, -HHA, -LA, -MA, BFB0312HA, -HHA, -LA, -MA.  
 Models AFB1512H, -L, -M, AFB1548H, -L, -M, AFB1712H, -L, -M, AFB1748H, -L, -M, EFB1248HE, -HHE, -LF, -ME, -VHE, EFB1548HG, -HHG, -LG, -MG, -VHG, EFB1748HG, -HHG, -LG, -MG, -VHG.  
 Models AFB0305LK, -MK, -HK, AFB0405LK, -MK, -HK.  
 Model BFB03505 followed by HR, LR, MR; Model BFB03505 followed by HA, HHA, LA, MA; Model BFB03512 followed by HA, HHA, LA, MA.  
 Models AFB02505LB, -MB, -HB, -HHE.  
 Model SFB followed by 0112, followed by H, HH, M or VH; Model SUB followed by 0112, 0212, followed by H, HH, M or VH.  
 Model EFB followed by 1512, 1712, followed by HG, HHG, LG, MG; Model EFB followed by 1524, 1724, followed by HG, HHG, LG, MG, SHG or VHG.  
 Model EFB followed by 0912, 0924, followed by HE, HHE, LE or ME.  
 Model FFB followed by 0848, followed by SHE; Model FFB followed by 0912 or 0924, followed by EHE, HHE, SHE or VHE; Model FFB followed by 0948, followed by HHE, SHE or VHE; Model FFB followed by 1212 or 1224, followed by EHE, HE, HHE, SHE or VHE; Model FFB followed by 1248, followed by EHE, SHE or VHE.  
 Model EFC followed by 1212 or 1224, followed by DE; Model EFC0412 followed by AD or BD.  
 Model BFB followed by 0405, 0412, 04505, 04512, 0505 or 0512, followed by HA, HHA, LA or MA.  
 Model EUB followed by 0405, 0412 or 0424, followed by HD, HHD, LD, LLD or MD; Model EUB followed by 0412 or 0424, followed by VHD.  
 Model ASB followed by 0605, followed by HB, HHB, LB or MB; Model ASB followed by 0612 or 0624, followed by HB, HHB, LB, MB or VHB; Model AUB followed by 0605, followed by HB, HHB, LB or MB; Model AUB followed by 0612 or 0624, followed by HB, HHB, LB, MB or VHB.  
 Model AFB followed by 1524, 1724, followed by H, HH, L or M; Model EFC followed by 1248, followed by EE; Model FFB followed by 0812, 0824, followed by HHE, SHE or VHE; Model FFB0848 followed by HHE, VHE or SHE.  
 Model BFB followed by 0405, 0505 or 04505, followed by HP, LP or MP.  
 Model EFB followed by 0612, followed by HA, HHA, LA or MA.  
 Model AUB followed by 0612, 0624 or 0648, followed by EH, SH or VH.  
 Model EFB followed by 0812 or 0824, followed by HE, HHE, LE or ME.  
 Model ASB followed by 0605, followed by HD, HHD, LD or MD; Model ASB followed by 0612 or 0624, followed by HD, HHD, LD, MD or VHD; Model AUB followed by 0605, 0612 or 0624, followed by HD, HHD, LD or MD; Model AUB followed by 0612 or 0624, followed by VHD.  
 Model EFB followed by 0912 or 0924, followed by HF, HHE, LF, ME, SHF or VHE.  
 Model EFB followed by 1312 or 1324, followed by HE, HHE, LE, ME, SHE or VHE; Model EFB followed by 1348, followed by HE, HHE, LE, ME or VHE.  
 Model ASB followed by 0712 or 0724, followed by H, HH, L, M or VH; Model AUB followed by 0712 or 0724, followed by H, HH, L, M or VH.  
 Model EFB followed by 0812 or 0824, followed by EHF, HF, HHE, LF, ME, SHF or VHE.  
 Model EFC followed by 0912, followed by AE or BE.  
 Model HFB followed by 0605, 0612 or 0624, followed by HB, HD, HHB, HHD, LB, LD, MB or MD.  
 Model AFB followed by 1212 or 1224, followed by H, HH, L, M, SH or VH.  
 Model KFB followed by 03205, followed by HP, LP or MP; Model KFB followed by 03205, followed by HA, LA or MA.  
 Model FFB followed by 1312, 1324, 1348, followed by EHE, SHE or VHE.

FFB0824HHE	24	230	STD, R00, F00
FFB0824SHE	24	510	STD, R00, F00
FFB0824VHE	24	360	STD, R00, F00
FFB0848HHE	48	120	STD, R00, F00
FFB0848SHE	48	240	STD, R00, F00
FFB0848VHE	48	170	STD, R00, F00
FFB SERIES:			
FFB0912EHE	12	1500	F00, R00, STD
FFB0912HHE	12	530	F00, R00, STD
FFB0912SHE	12	1130	F00, R00, STD
FFB0912VHE	12	750	F00, R00, STD
FFB0924EHE	24	750	F00, R00, STD
FFB0924HHE	24	270	F00, R00, STD
FFB0924SHE	24	600	F00, R00, STD
FFB0924VHE	24	420	F00, R00, STD
FFB1212HE	12	840	F00, R00, STD
FFB1212HHE	12	1120	F00, R00, STD
FFB1212VHE	12	1500	F00, R00, STD
FFB1212SHE	12	2250	F00, R00, STD
FFB1224HE	24	500	F00, R00, STD
FFB1224HHE	24	630	F00, R00, STD
FFB1224VHE	24	840	F00, R00, STD
FFB1224SHE	24	1200	F00, R00, STD
FFB1224EHE	24	1500	F00, R00, STD



# VDE Prüf- und Zertifizierungsinstitut

## Gutachten mit Fertigungsüberwachung

Ausweis-Nr. /  
Licence No. 001764 ÜG

Blatt /  
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Name und Sitz des Genehmigungs-Inhabers / Name and registered seat of the Licence holder

Delta Electronics Inc.  
186 Ruey Kuang Road  
NEIHU TAIPEI (114), Taiwan

Aktenzeichen / File ref.

11641-2611-0001 / 32Y3F F13 / SFK

letzte Änderung / updated

2001-06-05

Datum / Date

1994-06-08

Dieses Blatt gilt nur in Verbindung mit Blatt 1 des Gutachtens mit Fertigungsüberwachung Nr. 001764 ÜG.  
*This supplement is only valid in conjunction with page 1 of the Licence No. 001764 ÜG.*

Jahresgebühren-Einheiten /  
Annual fee units

AFC0824C	DC 24 V	1,00
AFC0912C	DC 12 V	1,00
AFC0924C	DC 24 V	1,00
AFC0612AD	DC 12 V	1,00
AFC0612BD	DC 12 V	1,00
EFB1212LF/MF/HF/HHF/VHF (R00,F00,STD)	DC 12 V	5,00
EFB1224LF/MF/HF/HHF/VHF (R00,F00,STD)	DC 24 V	5,00
AFB0524LB/MB/HB/HHB (R00,F00,STD)	DC 24 V	4,00
BFB0524LM/H/HH (R00,F00,STD)	DC 24 V	4,00
BSB0505LM (R00,F00,STD)	DC 5 V	2,00
BSB0512LM/H/HH (R00,F00,STD)	DC 12 V	4,00
BSB0524LM/H/HH (R00,F00,STD)	DC 24 V	4,00
AUB0612LM/H/HH	DC 12 V	4,00
AUB0624LM/H/HH	DC 24 V	4,00
AUB0912LM/H/HH/VH	DC 12 V	5,00
AUB0924LM/H/HH/VH	DC 24 V	5,00
EFB0405LLD/LD/MD/HD/HHD/VHD	DC 5 V	6,00
EFB0412LLD/LD/MD/HD/HHD/VHD	DC 12 V	6,00
EFB0424LLD/LD/MD/HD/HHD/VHD	DC 24 V	6,00
AFB0605HH	DC 5 V	2,00
EFB1248LF/MF/HF/HHF/VHF	DC 48 V	5,00
DSB0812L-N/M-N/H-N	DC 12 V	3,00
BFB0305LA/MA/HA/HHA	DC 5 V	4,00
BFB0312LA/MA/HA/HHA	DC 12 V	4,00
AFB0305LK/MK/HK	DC 5 V	3,00
AFB0405LK/MK/HK	DC 5 V	3,00
BFB03505LA/MA/HA/HHA	DC 5 V	4,00
BFB03512LA/MA/HA/HHA	DC 12 V	4,00
SFB0112M/H/HH/VH	DC 12 V	4,00
SUB0112M/H/HH/VH	DC 12 V	4,00
EFB1212LM/H/HH/VH/SH	DC 12 V	6,00
EFB1224LM/H/HH/VH/SH	DC 24 V	6,00
EFB0912LM/H/HH/VH/SH	DC 12 V	6,00
EFB0924LM/H/HH/VH/SH	DC 24 V	6,00
AFB02505LB/MB/HB/HHB	DC 5 V	4,00
FFB1212HE/HHE/VHE/SHE	DC 12 V	4,00
FFB1224HE/HHE/VHE/SHE/EHE	DC 24 V	5,00
EFB1712LG/MG/HG/HHG	DC 12 V	4,00
EFB1724LG/MG/HG/HHG/VHG/SHG	DC 24 V	6,00
EFB1512LG/MG/HG/HHG	DC 12 V	4,00

Fortsetzung siehe Blatt 9 /