DELTA ELECTRONICS, INC.
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TAOYUAN SHIEN 333, TAIWAN, R. O. C.

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SPECIFICATION FOR APPROVAL
****

Customer:

Description:	DC FAN		
Customer P/N:		REV:	
Delta Model NO.:	EFB0412MD-R00		
Sample Rev:	00	Issue NO:	
Sample Issue Date:	MAY.11.2005.	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 - 13.8 VDC
START VOLTAGE (ENVIRONMENT TEMPERATURE AT 25°C)	≤ 5.0 VDC
INPUT CURRENT	0.06 (MAX. 0.10) A
INPUT POWER	0.72 (MAX. 1.20) W
SPEED	6300 R.P.M. (REF.)
MAX. AIR FLOW (AT ZERO STATIC PRESSURE)	0.203 (MIN. 0.176) M^3/MIN. 7.17 (MIN. 6.22) CFM
MAX.AIR PRESSURE (AT ZERO AIR FLOW)	5.54 (MIN. 4.18) mmH_2O 0.218 (MIN. 0.165) $inchH_2O$
ACOUSTICAL NOISE (AVG.)	24.0 (MAX. 27.0) dB-A
INSULATION TYPE	UL: CLASS A

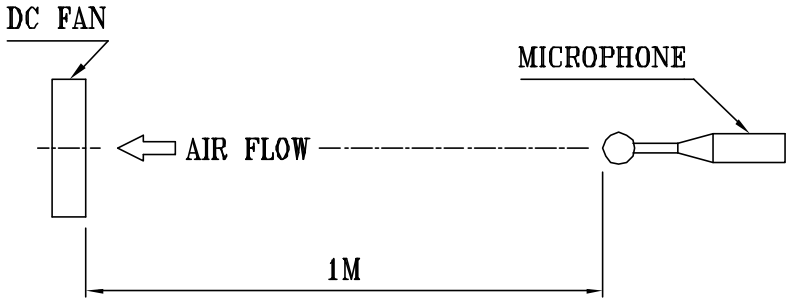
(continued)

PART NO:

DELTA MODEL: EFB0412MD-R00

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 CONTINOUS 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 1061 -F- AWG #24 BLACK WIRE NEGATIVE(-) RED WIRE POSITIVE(+) BLUE WIRE LOCK SIGNAL(-R00)

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: EFB0412MD-R00

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 ---------- 33 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.

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
HUMIDITY: 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 gRMS=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

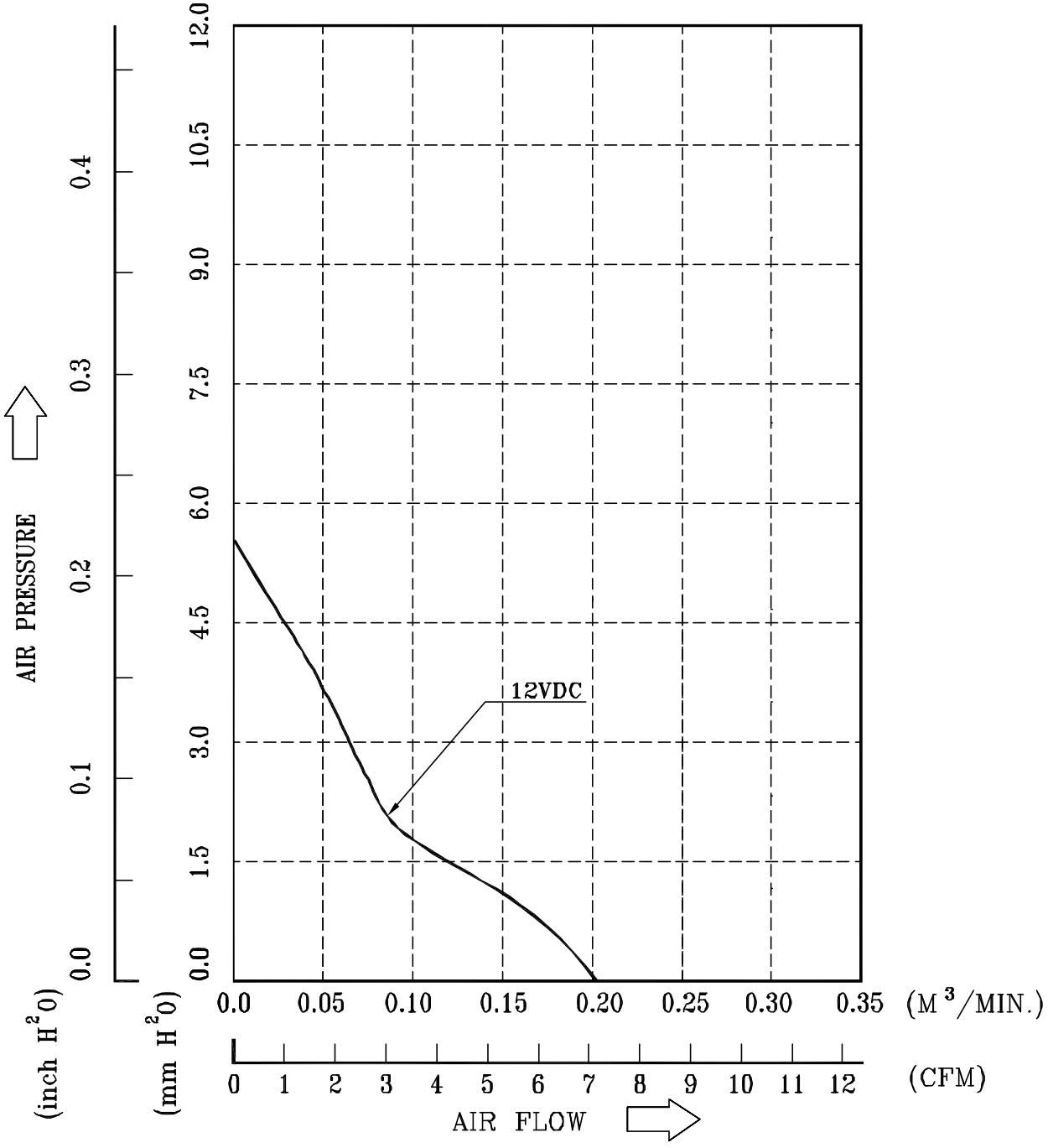
8-4. MECHANICAL SHOCK
TEMPERATURE: +20°C
ORIENTATION: X, Y, Z
POWER: NON-OPERATING
ACCELERATION: 20 G MIN.
PULSE: 11 ms HALF-SINE WAVE
NUMBER OF SHOCKS: 5 SHOCKS
FOR EACH DIRECTION

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

PART NO:

DELTA MODEL: EFB0412MD-R00

P & Q CURVE:



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

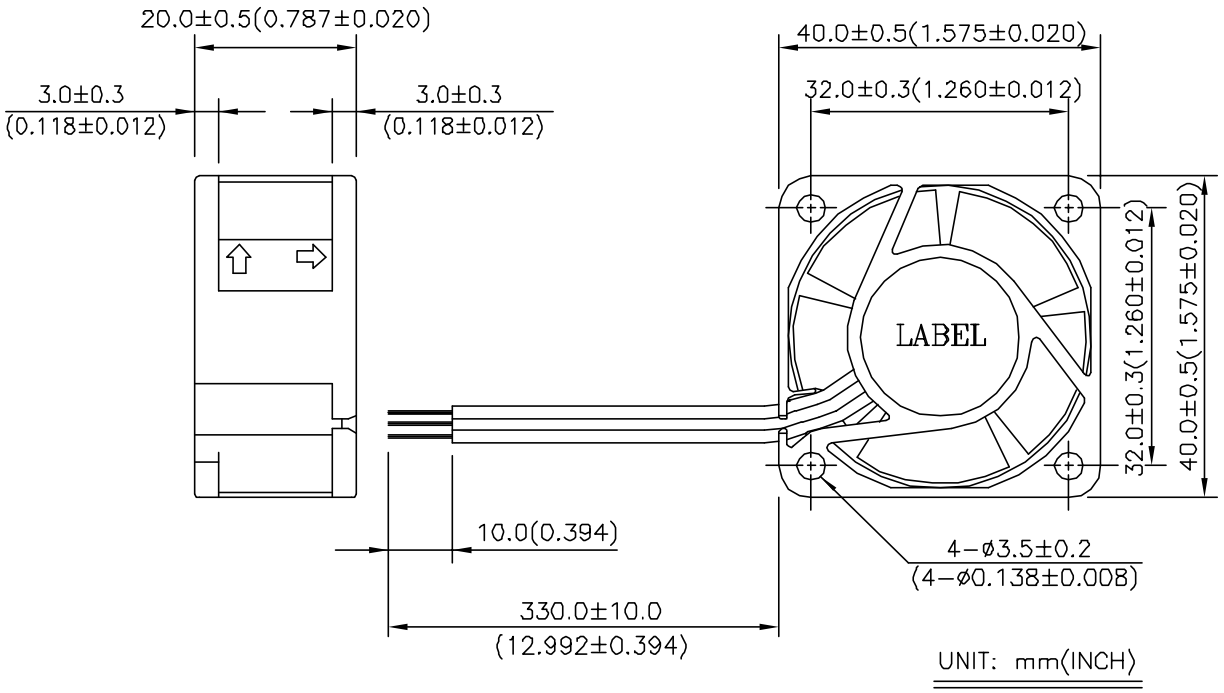
PART NO:

DELTA MODEL: EFB0412MD-R00

Attach: DIMENSIONS DRAWING

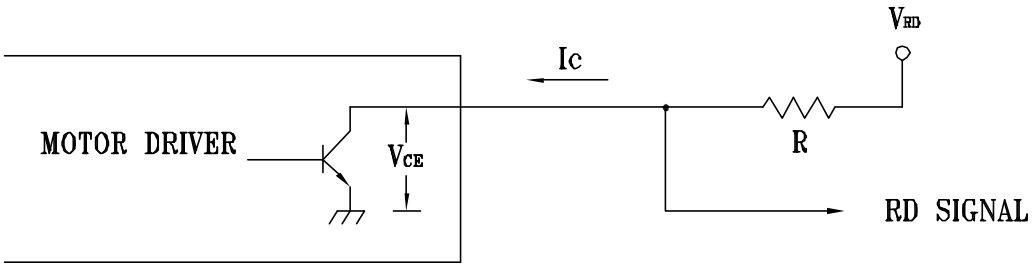
LABEL:





11. ROTATION DETECT (RD) SIGNAL:

1. OUTPUT CIRCUIT - OPEN COLLECTOR MODE:



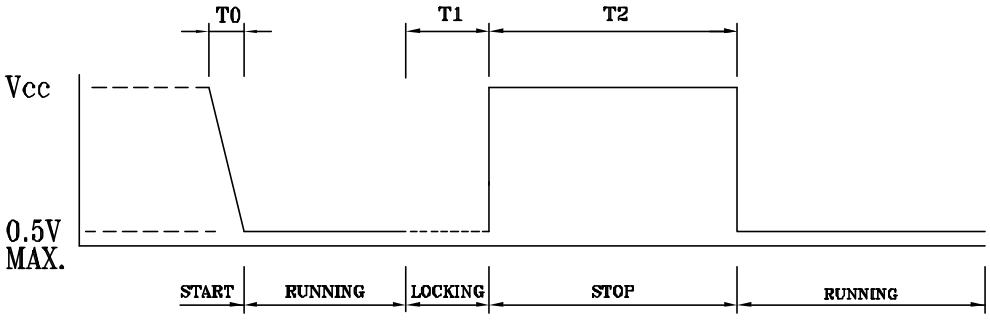
CAUTION:
THE LEAD WIRE OF RD SIGNAL CAN NOT TOUCH
THE LEAD WIRE OF POSITIVE OR NEGATIVE.

2. SPECIFICATION:

V_{CE} (sat)=0.5V MAX. V_{RD} =15V MAX.

I_C =5mA MAX. $R \geq V_{RD}/I_C$

3. ROTATION DETECT WAVEFORM:



T0=48ns TYP.

T1=670±160ns

T2=980±300ms

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.**

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, -HHF, -L, -LF, -M, -MF, -SH, -VH, -VHF, EFB1224 -H, -HF, -HH, -HHF, -L, -LF, -M, -MF, -SH, -VH, -VHF, 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, EFB1248HF, -HHF, -LF, -MF, -VHF, EFB1548HG, -HHG, -LG, -MG, -VHG, EFB1748HG, -HHG, -

DSB0812L	12	110	R00 RR0 F00
DSB0812M	12	140	R00 RR0 F00
DSB0812L-N	12	110	
DSB0812M-N	12	140	
DSB0812H-N	12	210	
EFB SERIES			-
EFB0405HD	5	380	F00 R00 STD
EFB0405HHD	5	450	F00 R00 STD
EFB0405LD	5	160	F00 R00 STD
EFB0405LLD	5	100	F00 R00 STD
EFB0405MD	5	240	F00 R00 STD
EFB0405VHD	5	500	F00 R00 STD
EFB0412HD	12	120	F00 R00 STD
EFB0412HHD	12	150	F00 R00 STD
EFB0412LD	12	80	F00 R00 STD
EFB0412LLD	12	60	F00 R00 STD
EFB0412MD	12	100	F00 R00 STD
EFB0412VHD	12	180	F00 R00 STD
EFB0424HD	24	100	F00 R00 STD
EFB0424HHD	24	120	F00 R00 STD
EFB0424LD	24	60	F00 R00 STD
EFB0424LLD	24	50	F00 R00 STD
EFB0424MD	24	80	F00 R00 STD
EFB0424VHD	24	140	F00 R00 STD
EFB0512LA	12	80	-
EFB0512MA	12	120	-
EFB0512HA	12	150	-

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

Delta Electronics Inc.
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NEIHU TAIPEI (114), Taiwan

Aktenzeichen / *File ref.*	letzte Änderung / *updated*	Datum / *Date*
11641-2611-0001 / 32Y3F F13 / SFK	2001-06-05	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
BFB0524L/M/H/HH (R00,F00,STD)	DC 24 V	4,00
BSB0505L/M (R00,F00,STD)	DC 5 V	2,00
BSB0512L/M/H/HH (R00,F00,STD)	DC 12 V	4,00
BSB0524L/M/H/HH (R00,F00,STD)	DC 24 V	4,00
AUB0612L/M/H/HH	DC 12 V	4,00
AUB0624L/M/H/HH	DC 24 V	4,00
AUB0912L/M/H/HH/VH	DC 12 V	5,00
AUB0924L/M/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
EFB1212L/M/H/HH/VH/SH	DC 12 V	6,00
EFB1224L/M/H/HH/VH/SH	DC 24 V	6,00
EFB0912L/M/H/HH/VH/SH	DC 12 V	6,00
EFB0924L/M/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

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DELTA Electronics:

CTA4100A 03GEEG3E 06AN2 15GENG3E DSOL-1341-12 MDS-400APB24AA PFB1224UHEP0 PM05S050A M55339/14-00306 PL01S4805A DSOL-0844-24 FFB1224SHE 02BEEG3H 06BEEG3G ASB02505SHA-AY6B PJT-12V40WBAA 30DPGS5C AFB0624VH-A FFB0912HHE PMT-48V75W2BA AFB0524HHD BFB1248GH-A ACS3-CNTB0600 AFB0724VH-AF00 AFL12AUHE-C DTC1000C FFB0824SHE-F00 S24SP05012PDFA PMC-24V075W1AA SK-1015-STD