# SPECIFICATION FOR APPROVAL

Customer : STD

Description : DC FAN

Customer Part No. _____ REV. : _____

Delta Model No. : BSB0205HP-00EFG REV. : 01

Sample Issue No. : _____

Sample Issue Date : 2019/7/4

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

APPROVED BY:

DATE :

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# STATEMENT OF DEVIATION

■ NONE

□ DESCRIPTION:

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# Specification For Approval

Customer : STD

Description : DC FAN

Customer P/N : Rev. :

Delta model no. : BSB0205HP-00EFG Delta Safety Model No.: BSB0205HP-00

Sample revision. : 01 Issue no.:

Sample issue date : 2019/7/4 Quantity :

1. SCOPE:
THIS SPECIFICATION DEFINES THE ELECTRICAL AND MECHANICAL CHARACTERISTICS OF THE DC BRUSHLESS BLOWER FLOW FAN.

2. CHARACTERS:

| ITEM | DESCRIPTION |
|---|---|
| RATED VOLTAGE | 5.0V |
| OPERATING VOLTAGE | 2.0 - 5.5 VDC |
| INPUT CURRENT(AVG.) # | 0.08 (MAX 0.15) A<br>SAFETY CURRENT ON LABEL: TBD |
| INPUT POWER(AVG.) | 0.40 (MAX 0.75) W |
| SPEED | 12000±25%R.P.M. @5.0V<br>9600±25% R.P.M @3.3V |
| MAX. AIR FLOW<br>(AT ZERO STATIC PRESSURE) | 0.57 (MIN. 0.43) CFM @5.0V<br>0.45(MIN. 0.33) CFM @3.3V |
| MAX. AIR PRESSURE<br>(AT ZERO AIRFLOW) | 11.35 (MIN. 6.38) mm$H_2O$ @5.0V<br>6.73 (MIN. 3.33) mmH2O @3.3V |
| ACOUSTICAL NOISE (AVG.)<br>TEST DISTANCE : 0.3M | 35.9 (MAX. 44.9) dB-A @5.0V<br>29.5 (MAX. 36.9) dB-A @3.3V |
| 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) |

# THE MAX VALUE OF CONSUMING CURRENT DOES NOT REPRESENT THE PEAK VALUE. THE PEAK VALUE NEED MEASURE BY OSCILLOSCOPE.

(continued)

PART NO:

DELTA MODEL: BSB0205HP-00EFG

3.MECHANICAL:

3-1. DIMENSIONS---------- SEE DIMENSIONS DRAWING

3-2. FRAME---------- PLASTIC UL: 94V-0
(THE CONTACT OF HALOGEN LESS THAN 1500 PPM FOR USING EDX ...ETC)

3-3. PILLOW---------- PLASTIC UL: 94V-0
(THE CONTACT OF HALOGEN LESS THAN 1500 PPM FOR USING EDX ...ETC)

3-4. IMPELLER---------- PLASTIC UL: 94V-0
(THE CONTACT OF HALOGEN LESS THAN 1500 PPM FOR USING EDX ...ETC)

3-5. BEARING SYSTEM---------- SLEEVE BEARINGS

3-6. WEIGHT---------- 1.5 GRAMS(REF.)

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. IP55 PROTECTION

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.

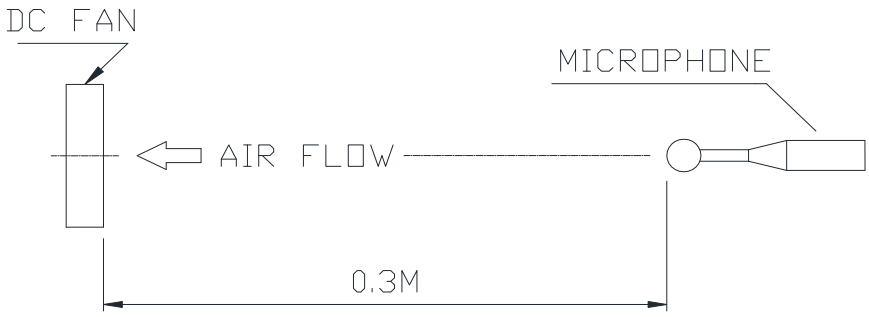
PART NO:

DELTA MODEL: BSB0205HP-00EFG

| | |
|---|---|
| LIFE EXPECTANCE (L10)<br>(AT LABEL VOLTAGE) | 30,000 HOURS CONTINUOUS OPERATION AT 40 °C WITH 15 ~ 65 %RH. |
| ROTATION | CLOCKWISE VIEW FROM NAME PLATE SIDE |
| LOCKED PROTECTION | THE FAN WILL SHUT DOWN WHEN LOCKED ROTOR. |

NOTES:

1. ALL READINGS ARE MEASURED AFTER STABLY WARMING UP THROUGH 10 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:

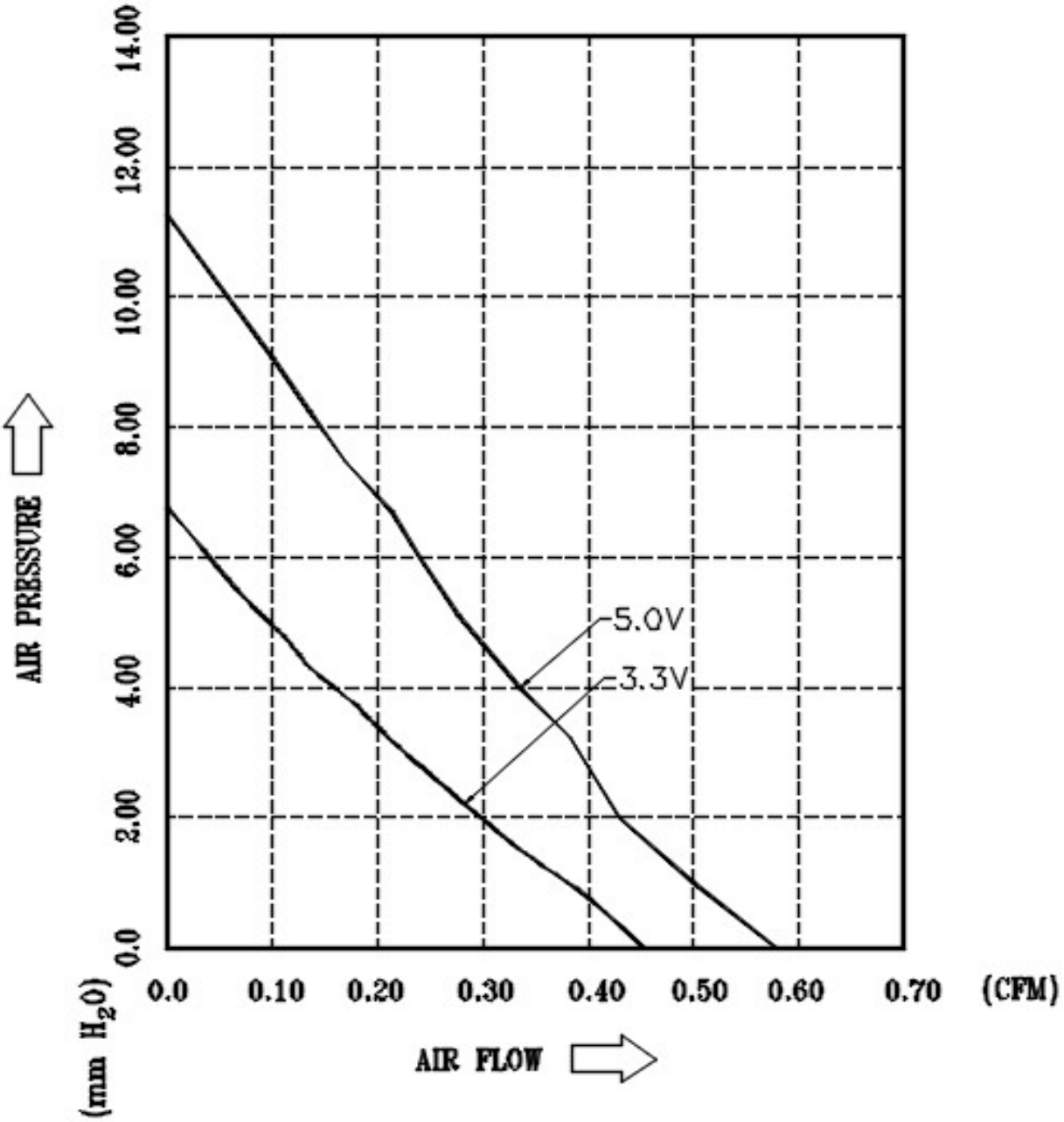



NOISE IS MEASURED AT RATED VOLTAGE IN FREE AIR IN ANECHOIC CHAMBER WITH B & K SOUND LEVEL METER WITH MICROPHONE AT A DISTANCE OF ONE METER FROM THE FAN INTAKE.

PART NO:

DELTA MODEL: BSB0205HP-00EFG

8. P & Q CURVE:

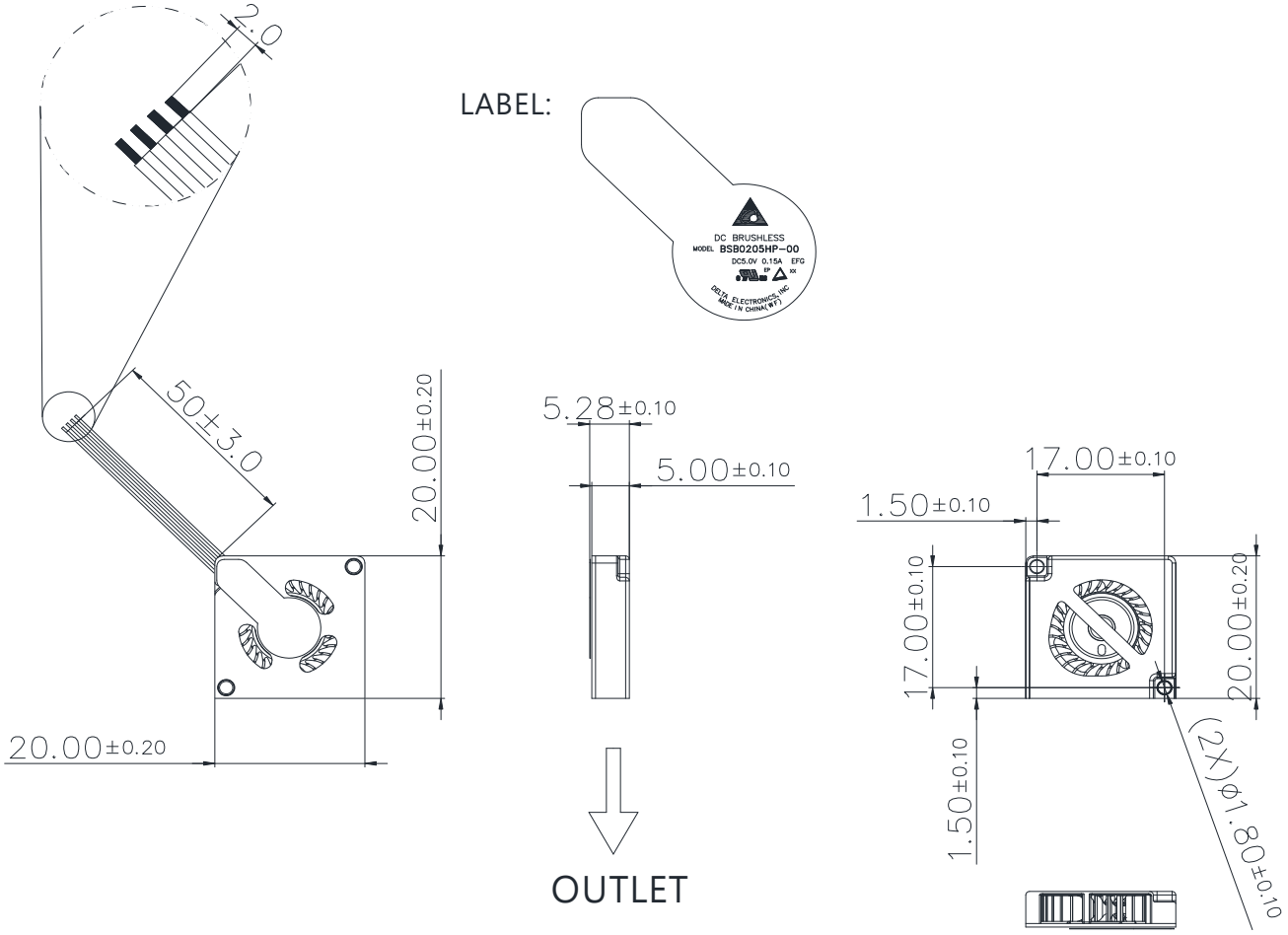



* TEST CONDITION: INPUT VOLTAGE ----- OPERATION VOLTAGE
TEMPERATURE ------ ROOM TEMPERATURE
HUMIDITY ---------- 65%RH

PART NO:

DELTA MODEL: BSB0205HP-00EFG

## 9. DIMENSION DRAWING:

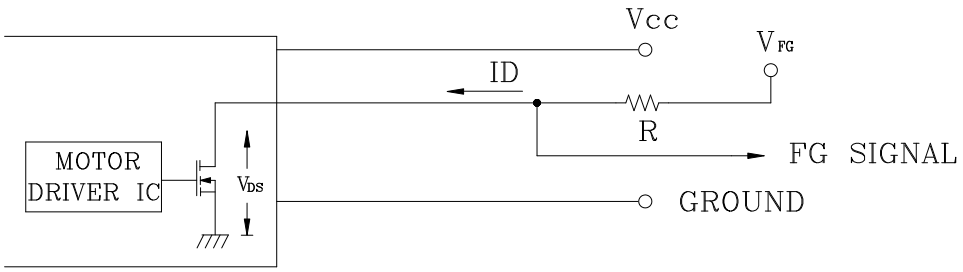



NOTES :

1. LEAD WIRE: UL:10064 #32 OD 0.38±0.05
   PIN 1: BLACK WIRE---(-)
   PIN 2: RED WIRE---(+)
   PIN 3: YELLOW WIRE---(F00)
   PIN 4: BLUE WIRE---(PWM)
2. THIS PRODUCT IS RoHS COMPLIANT.
3. DELTA'S RESTRICTIONS ON HALOGEN APPLY ONLY TO BROMINATED AND CHLORINATED COMPOUNDS. NO OTHER HALOGEN IS RESTRICTED. SUBSTANCES RESTRICTIONS FOR HALOGEN-FREE(INCLUDE FAN PLASTIC PARTS, PWB BOARD, IC, ELECTRICAL MATERIALS & CABLE ASSY),
   a. BROMINE(Br) < 900 PPM,
   b. CHLORINE(Cl) < 900 PPM
   c. (Br) + (Cl) < 1500 PPM.

10.FREQUENCY GENERATOR (FG) SIGNAL:

10-1. OUTPUT CIRCUIT - OPEN DRAIN MODE:




CAUTION:

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

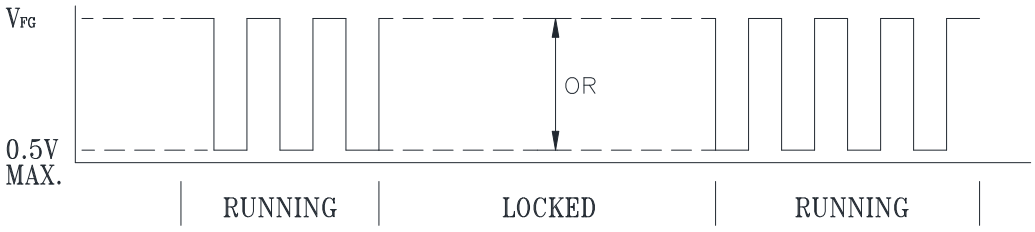
10-2. SPECIFICATION:

$V_{FG}$= 5.0V TYP. (Vcc MAX.)

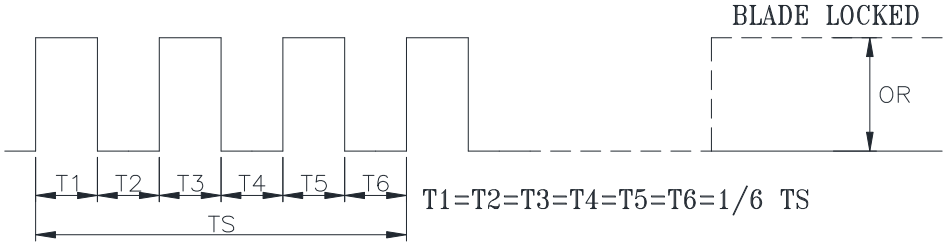
$I_D$ = 5mA MAX. $R \geqq V_{FG} / I_D$

THE RESISTOR R IS NOT INCLUDED IN FAN CIRCUIT AND NEEDS TO BE PROVIDED BY FAN USER

10-3. FREQUENCY GENERATOR WAVEFORM:



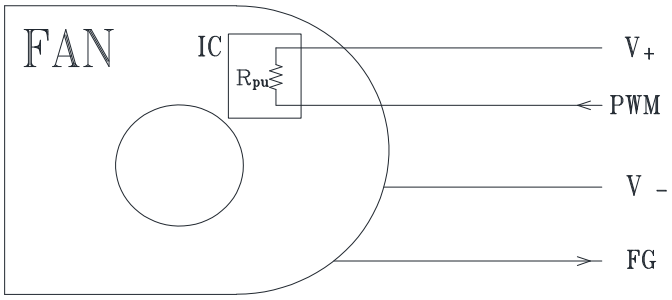

FAN RUNNING FOR 6 POLES



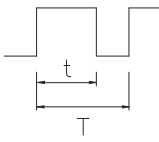

N=R.P.M

## 11. PWM CONTROL FUNCTION

### 11-1. PWM CONTROL INTERFACE




SIGNAL VOLTAGE RANGE: 0 ~ ($V_+$ - 0.5) VDC




DUTY CYCLE= $\frac{t}{T}$ *100(%)

Frequency = $\frac{1}{T}$

- HIGH LEVEL : ($V_+$ - 0.5) VDC max.
  2.8 VDC min.
- LOW LEVEL : 0.6 VDC max.
  0 VDC min.
- $R_{pu}$: 200Kohm ~ 500Kohm.

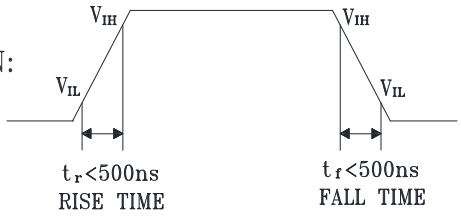
- THE $R_{pu}$ IS A SEMICONDUCTING RESISTOR BUILD IN THE IC WAFER OF THE FAN DRIVER FOR THE DEFAULT SETTING.
- THE FREQUENCY FOR CONTROL SINGAL OF THE FAN SHALL BE ABLE TO ACCEPT A 20KHZ~50KHZ.
- THE PREFERRED OPERATING FREQUENCY OF PWM SIGNAL IS 25KHz.
- AT 100% DUTY CYCLE, THE ROTOR WILL SPIN AT MAXIMUM SPEED.
- AT 0% DUTY CYCLE, THE ROTOR WILL STOP TO SPIN.
- DUE TO PULL UP RESISTER($R_{pu}$), WHEN THE PWM CONTROL LEAD WIRE IS DISCONNECTED, THE ROTOR WILL SPIN AT MAXIMUM SPEED.

### 11-2. THE REQUIREMENT OF WAVEFORM QUALITY OF PWM SIGNAL

- THE RECOMMENDED PWM SIGNAL FROM SYSTEM IS TTL ($t_r$=50ns, $t_f$=50ns), EVEN IF THE PWM LEAD OF FAN IS DISCONNECTED.
- THE MAXIMUM PERMISSIBLE OF WAVEFORM DISTORTION:

  $V_{IH}$ : ($V_+$ - 0.5) × 90%  RISE TIME : $t_r$<500ns

  $V_{IL}$ : ($V_+$ - 0.5) × 10%  FALL TIME : $t_f$<500ns




### 11-3. FAN CHARACTERISTICS

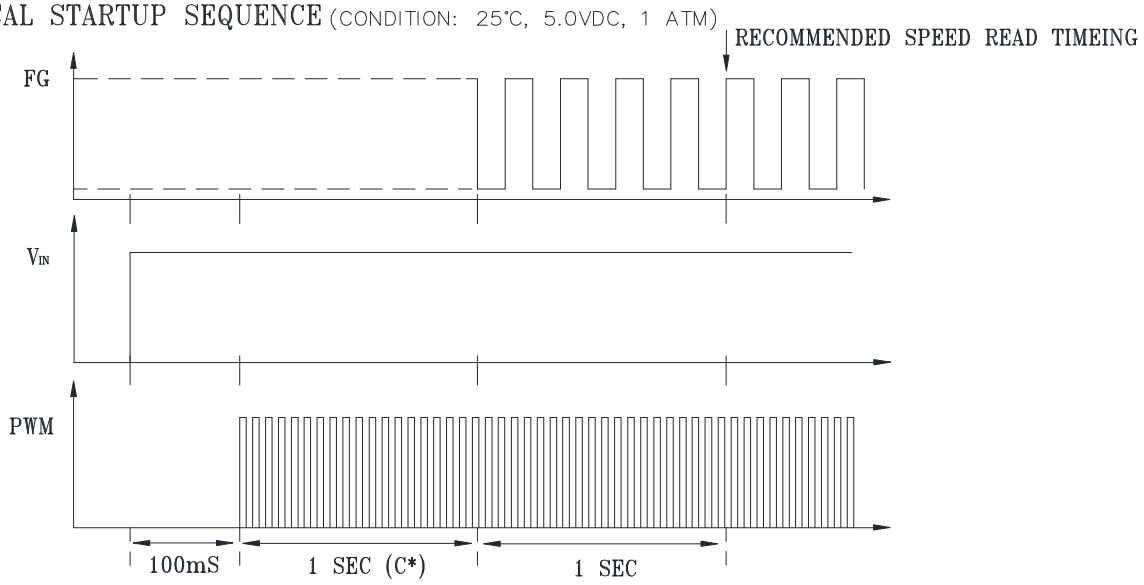
TEST CONDITION : AT 25°C, $V_+$= 5.0VDC & PWM SIGNAL AS FOLLOW

| DUTY CYCLE (%) | SPEED R.P.M. | CURRENT (A) TYP. |
|---|---|---|
| 100 | 12000±25% | 0.08(A) |
| 0 | 0 | 0.2(mA) |

* PWM SIGNAL
PWM FREQUENCY = 25 KHz

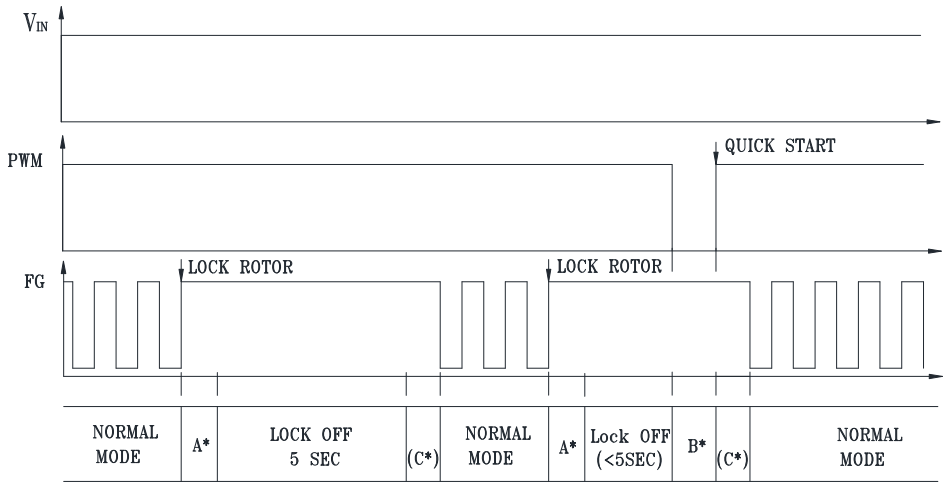

- MIN. STARTED DUTY CYCLE : 30%
  WHEN DUTY CYCLE IS SET FOR MORE THAN 30% , THE FAN WILL BE ABLE TO START FROM A DEAD STOP.

12. TYPICAL STARTUP SEQUENCE (CONDITION: 25°C, 5.0VDC, 1 ATM)




- THE FIRST 100mS IS USED TO WAIT FOR VCC SETTLING.
- THE PWM SIGNAL CAN NOT INPUT BEFORE VCC.

13. DEFINITION OF LOCK DETECTION, LOCK-OFF TIME, AND QUICK START FUNCTION




A* : TYPICALLY 0.5 SEC FOR LOCK DETECTION.

B* : COMMONLY 100mS DETECTION TIME FOR LOCK-OFF RELEASE.

C* : FG OUTPUT DELAY TIME.

- THE 5SEC LOCK-OFF TIME IS ALSO A TYPICAL VALUE AND THE MAXIMUM TOLERANCE IS 10 SECONDS.