

## SPECIFICATION FOR APPROVAL

### 1. SCOPE:

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

### 2. CHARACTERS:

NO	ITEM	SPECIFICATION
2-1	Rated Voltage	5.0 VDC
2-2	Starting Voltage	N/A
2-3	Operating Voltage Range	4.5V~5.5V
2-4	Rated Current	Max.0.30A <span style="float: right;">Duty cycle =100%</span>
2-5	Rated Power	Max.1.50W <span style="float: right;">Duty cycle =100%</span>
2-6	Start Peak Current	N/A
2-7	UL Current On Label	0.34 A
2-8	Rated Speed	0 R.P.M <span style="float: right;">Duty cycle =0%</span> 4200±10% R.P.M <span style="float: right;">Duty cycle =100%</span> (Testing Speed After Continuous 3Minutes Operation At Ambient Temperature Of 25°C)
2-9	Air Flow (At Zero Static Pressure)	5.24 CFM (Min. 4.36 CFM) 0.15 m³/min (Min. 0.12 m³/min) <span style="float: right;">Duty cycle =100%</span>
2-10	Static Pressure (At Zero Flow)	9.32 mmH2O (Min. 6.44 mmH2O) 0.37 Inh-H2O (Min. 0.25 Inh-H2O) <span style="float: right;">Duty cycle =100%</span>
2-11	Sound Level	32.0 dB(A) (Max. 36.0 dB(A))
2-12	Product Type	<input checked="" type="checkbox"/> RoHS <input type="checkbox"/> HF
2-13	Life Expectancy	40,000 Hours at 25°C.
2-14	Bearing Type	<input type="checkbox"/> Two Ball <input checked="" type="checkbox"/> EBR <input type="checkbox"/> Ball And Sleeve
2-15	Protection	<input type="checkbox"/> Impedance Protection <input checked="" type="checkbox"/> Auto-Restart <input type="checkbox"/> Current-Limit <input checked="" type="checkbox"/> Polarity Protection <input checked="" type="checkbox"/> Locked Protection
2-16	Pole	<input checked="" type="checkbox"/> 4 Pole <input type="checkbox"/> 8 Pole <input type="checkbox"/> Three Phase
2-17	Signal Output	Frequency Generator (FG)
2-18	Safety Approval	CE / TUV / UL / UKCA
2-19	IP Grade	N/A

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### 3. MECHANICAL:

NO	ITEM	SPECIFICATION
3-1	DIMENSIONS	SEE DIMENSIONS DRAWING
3-2	COVER	<div>■ UPPER COVER SPTE ELECTROPHORESIS BLACK</div> <div>■ LOWER COVER PBT (BLACK) PLASTIC (UL 94V-0)</div>
3-3	IMPELLER	<div>■ PBT (BLACK) PLASTIC (UL 94V-0)</div> <div>□ PC PLASTIC {UL 94V-2}</div>
3-4	WEIGHT	24 GRAMS (REF)

### 4. ENVIRONMENTAL:

4-1. OPERATING TEMPERATURE ----- -10℃~70℃

4-2. STORAGE TEMPERATURE----- -20℃~75℃

4-3. OPERATING HUMIDITY----- 5 TO 90% RH

4-4. STORAGE HUMIDITY ----- 5 TO 95% RH

4-5. DIRECTION OF ROTATION----- ☐CLOCKWISE  

■COUNTER-CLOCKWISE

(VIEWED FROM LABEL SIDE)

4-6. DIELECTRIC STRENGTH ----- 5mA MAX. AT 500 Vac 60Hz ONE MINUTE (BETWEEN FRAME AND (+)TERMINAL)

4-7. INSULATION STRENGTH----- MORE THAN 10 M OHM INTERNAL STATOR AND LEAD WIRE(+) MEASURED AT DC 500V

4-8. DROP TEST----- IN MINIMUM PACKAGING CONDITION, FAN WITHSTANDS ONE DROP FROM EACH OF ITS THREE FACES AT THE HEIGHT OF 60cm ON TO A SOLEPLATE WITH A THICKNESS OF 2cm.

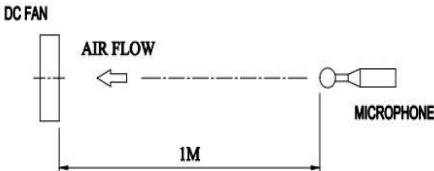
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4-9. LIFE EXPECTANCY----- THE "LIFE EXPECTANCY" OF EVERFLOW FANS IS DETERMINED IN EVERFLOW'S RELIABILITY TEST LABORATORY BY USING TEMPERATURE CHAMBERS. THE "LIFE EXPECTANCY" OF THIS FAN HAS NOT BEEN EVALUATED FOR USE IN COMBINATION WITH ANY END APPLICATION . THEREFORE .THE LIFE EXPECTANCY THAT RELATE TO THIS FAN ARE ONLY FOR REFERENCE.

4-10. VIBRATION TEST----- ORIENTATION: X , Y, Z .  
FREQUENCY(Hz) PSD (g<sup>2</sup>/Hz)  
5 0.02  
500 0.0001  
TEST TIME: 2 HRS FOR EACH DIRECTION.

4-11. SHOCK TEST----- TEMPERATURE : +25°C.  
ORIENTATION : X, Y, Z.  
POWER : NON-OPERATING.  
ACCELERATION : 50g MAX.  
PULSE: 11ms HALF-SINE WAVE.  
NUMBER OF SHOCKS:  
5 SHOCKS FOR EACH DIRECTION.

4-12. NOISE TEST ----- MEASURED IN A SEMI-ANECHOIC CHAMBER WITH BACKGROUND NOISE LEVEL BELOW 19 dB(A). THE FAN IS RUNNING IN FREE AIR WITH THE MICROPHONE AT A DISTANCE OF ONE METER FROM THE FAN INTAKE NOISE TESTER MODEL: CEL-63X/CASELLA.



4-13. AIR PERFORMANCE ----- MEASURED BY A DOUBLE CHAMBER.THE VALUES ARE RECORDED WHEN THE FAN SPEED HAS STABILIZED AT RATED VOLTAGE.

## 5. NOTES:

- 5-1. EVERFLOW WILL NOT GUARANTEE THE PERFORMANCE OF THE PRODUCTS IF THE APPLICATION CONDITION FALLS OUTSIDE THE PARAMETERS SET FOR THE SPECIFICATION . A WRITTEN REQUEST SHOULD BE SUBMITTED TO EVERFLOW PRIOR TO APPEROVAL IF DEVIATON FROM THIS SPECIFICATION IS REQUIRED.
- 5-2.THE ABOVE STANDARD SHOULD BE THE SPECIFIED VALUE AT NORMAL TEMPERATURE (25°C) AND NORMAL HUMIDITY (60~65%) UNLESS OTHERWISE NOTED.

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### 5-3. SPECIFICATION CHANGE:

ANY CHANGES TO THE PARAMETERS SPECIFIED IN THIS DOCUMENT WILL BE DETERMINED BY MUTUAL AGREEMENT ON BOTH PARTIES.

5-4. IT IS VERY IMPORTANT TO ESTABLISH THE CORRECT POLARITY, POSTIVE (+) AND NEGATIVE (-), BEFORE CONNECTING THE FAN TO THE POWER SOURCE. DAMAGE MAY BE CAUSED TO THE FANS IF CONNECTION IS WITH REVERSE POLARITY. THERE IS NO FOOLPROOF METHOD TO PROTECT AGAINST SUCH ERROR SPECIFICALLY MENTIONED IN THIS SPEC.

5-5. PLEASE BE CAUTIOUS WHEN MOUNTING THE FAN. INCORRECT MOUNTING OF FANS MAY CAUSE EXCESS RESONANCE, VIBRATION, SUBSEQUENT NOISE, AND EVEN BROKEN SCREW HOLES.

5-6. PLEASE EXERCISE CAUTION WHEN HANDLING FANS. DAMAGE MAY BE CAUSED IF PRESSURE IS APPLIED TO THE INPELLER, IF THE FANS ARE HANDLED BY THE LEAD WIRES, OR IF THE FAN WAS HARD-DROPPED TO THE PRODUCTION FLOOR.

5-7. EVERFLOW FANS WITHOUT SPECIAL PROTECTION ARE NOT SUITABLE WHERE ANY CORROSIVE FLUIDS ARE INTRODUCED TO THEIR ENVIRONMENT.

5-8. PLEASE ENSURE ALL FANS ARE STORED ACCORDING TO THE SPECIFIED STORAGE TEMPERATURE LIMITS. DO NOT STORE FANS IN A HIGH HUMIDITY ENVIRONMENT. WE HIGHLY RECOMMEND CONDUCTING PERFORMANCE TESTING BEFORE SHIPPING IF THE FANS HAVE BEEN STORED OVER 6 MONTHS.

5-9. 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.

5-10. 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.

5-11. ALL THE FANS SHALL MEET THE QUALITY INSPECTION UNDER SAMPLING PLAN MIL-STD-105E AS FOLLOWS WITH EXCEPTIONS PERTAINING TO CERTAIN SPECIAL DESIGNS. THERE IS NO GUARANTEE THAT THE PRODUCTS WILL BE FREE FROM SAFETY PROBLEMS OR FAILURES CAUSED BY DISRUPTION DUE TO DUST, SUBMERSION INTO WATER OR ENCROACHMENT BY INSECTS INTO THE HUB.

CRITICAL 0.25%

MAJOR 1.00%

MINOR 2.50%

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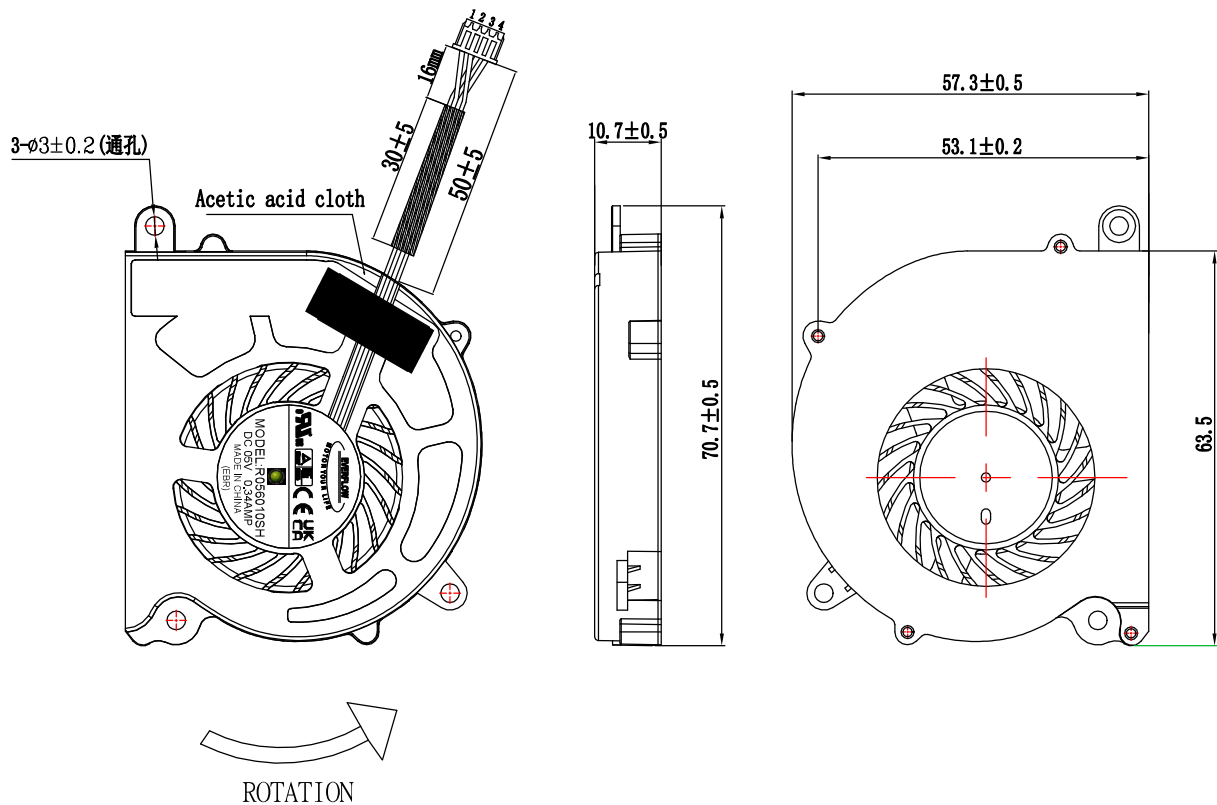
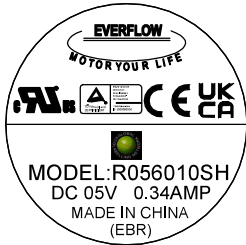
- 5-12. CUSTOMER SHALL CONFIRM THE COMPATIBILITY AND RELIABILITY OF THE FAN IN THE ACTUAL SETUP OR UNIT APPLICATION. THIS INCLUDES CONFIRMATION ON SET OR UNIT LIFE, ELECTRICAL NOISE, MECHANICAL NOISE, VIBRATION, STATIC ELECTRICITY, ELECTRIC POWER NOISE, DRIFT, ELECTRIC RESONANCE BETWEEN MOTOR AND CONTROL CIRCUIT, MECHANICAL RESONANCE BETWEEN MOTOR AND CHASSIS, IRREGULAR MOVEMENT OF SET DUE TO MOTOR NOISE, IRREGULAR MOVEMENT OF SET IN STRONG ELECTROMAGNETIC FIELD, POTENTIAL DAMAGE CAUSED BY LIGHTNING SURGE AND EARTHING METHOD ETC.
- 5-13. ANY REVISIONS ON THE SPECIFICATION SHALL BE DONE BASED ON MUTUAL DISCUSSION AND AGREEMENT.
- 5-14. IN ORDER TO IMPROVE THE PERFORMANCE WITHIN THE SCOPE OF SPECIFICATION, PARTS OR MATERIAL CHANGES ARE SUBJECT TO PRIOR NOTICE TO CUSTOMER.
- 5-15. ANY ITEM THAT NEEDS TO BE ADDED INTO SPECIFICATION SHALL BE DETERMINED ON CUSTOMER'S PRIOR WRITTEN REQUEST. IF NO INFORMATION GIVEN, FAN WILL BE DELIVERED BASED ON OUR STANDARD JUDGMENT.
- 5-16. WHEN ANY TROUBLE OCCURS, BOTH PARTIES SHALL DISCUSS ON THIS SPECIFICATION TO SOLVE THE MATTER. IN THIS CASE, OUR GUARANTEE IS ONLY LIMITED TO FANS.
- 5-17. BE SURE TO CONNECT AN "4.7 $\mu$ F OR GREATER" CAPACITOR TO THE FAN EXTERNALLY WHEN THE APPLICATION CALLS FOR USING MULTIPLE FANS IN PARALLEL. THIS IS TO AVOID ANY UNSTABLE POWER.
- 5-18. PLEASE EXERCISE CAUTION WHEN HANDLING FANS. DAMAGE MAY BE CAUSED BY OUTSIDE ABNORMAL PRESSURE OR ENVIRONMENT STRESS DURING MOVING.
- 5-19. LOCKED ROTOR PROTECTION:  
IMPEDANCE OF MOTOR WINDING PROTECTS MOTOR FROM DAMAGE IN 72 HOURS OF LOCKED ROTOR CONDITION AT THE RATED VOLTAGE.
- 5-20. POLARITY PROTECTION:  
BE CAPABLE OF WITHSTANDING IF REVERSE CONNECTION FOR POSITIVE AND NEGATIVE LEADS.

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## 6. DIMENSION DRAWING. UNIT: mm

EF Part no

R056010SHAFT09AR



### NOTES:

1. LEAD WIRE UL 1571 AWG#32  
 PIN 1: RED WIRE--- (+)  
 PIN 2: BLUE WIRE---(PWM INPUT)  
 PIN 3: BLACK WIRE---(-)  
 PIN 4: YELLOW WIRE---(SIGNAL)
- 2.HOUSING: 51021-4P (WHITE) OR EQUIVAIENT

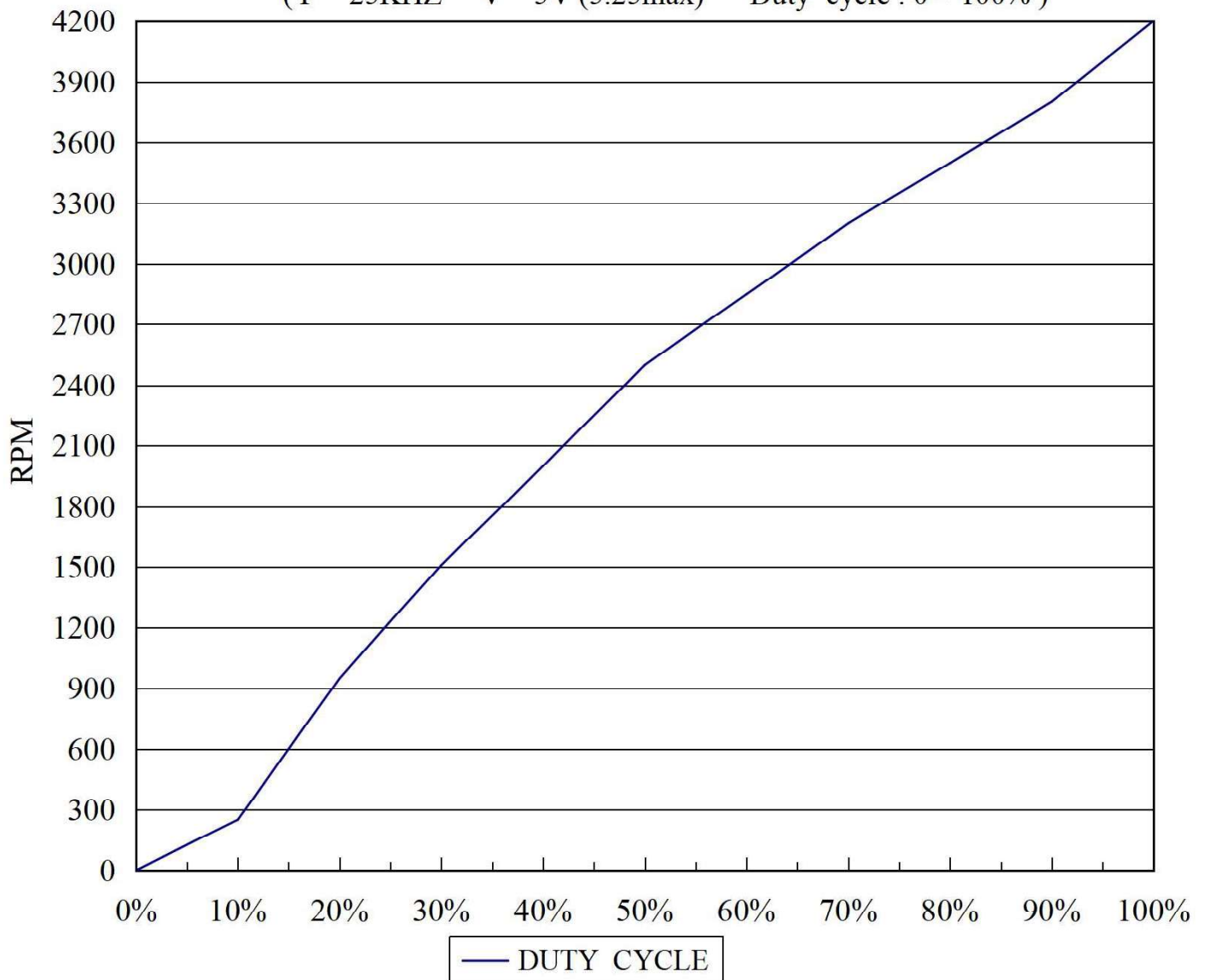
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### 7. DUTY CYCLE CURVE CHART

DUTY CYCLE	SPEED (RPM)	RANGE	CURRENT
0%	0	0	<0.02A
100%	4200	±10%	<0.30A

**DUTY CYCLE CURVE CHART**

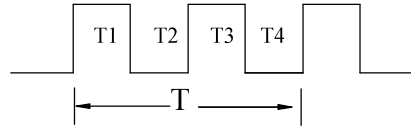
( F = 25KHZ    V = 5V (5.25max)    Duty cycle : 0 ~ 100% )



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### 8. CHARACTERISTICS & DEFINITION

- 4 Pole Motor: Fan with 4 pole motor.



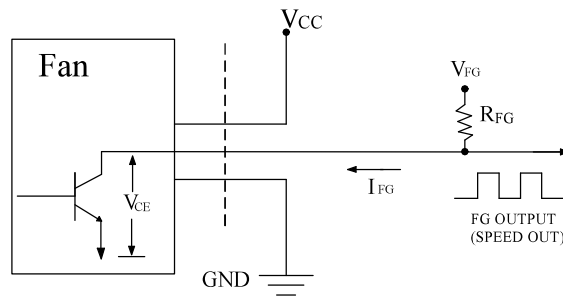
$$1 \text{ Rotation} = T$$

$$T = T_1 + T_2 + T_3 + T_4 = 1 \text{ Rotation}$$

$$T_1 = T_2 = T_3 = T_4 = \frac{60}{4 \times \text{r.p.m}} \text{ Sec}$$

- FG(Frequency Generator)Signal External Circuit:

Open-collector output for rotation frequency detection

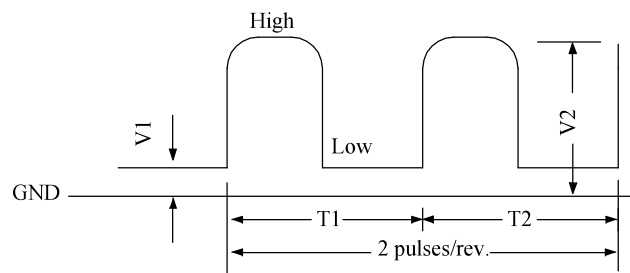


Note: Max.  $V_{FG} = 5.5 \text{ VDC}$ , Max.  $I_{FG} = 5 \text{ mA}$ ,  $\Rightarrow R_{FG} \geq V_{FG} / I_{FG}$

When  $V_{FG} = 3.3 \text{ V}$  We Recommend  $R_{FG} = 4.7 \text{ K}\Omega$

- FG(Frequency Generator)Type Output Waveform:

1. Motor Rotating Condition (at  $25^\circ\text{C}$ ,  $V_{cc} = 5 \text{ VDC}$ )



$V_1$ : within  $0.5 \text{ V}$  when  $I_{FG}$  Less Than  $3 \text{ mA}$

$V_2$ :  $V_{FG}$ , FG signal output voltage, maximum rating:  $5.5 \text{ VDC}$

Duty =  $T_1 / (T_1 + T_2) \times 100\% = (50 \pm 20)\%$  (measured between  $0.3 \times V_2 \sim 0.7 \times V_2$ )

$V_1 \sim V_2$  rise time: less than  $1.0 \text{ ms}$

$V_2 \sim V_1$  fall time: less than  $1.0 \text{ ms}$

Rotation Speed (RPM) =  $(60/2) \times f_{FG} = 30 \times f_{FG}$

$f_{FG}$ : frequency of FG output waveform (Hz)

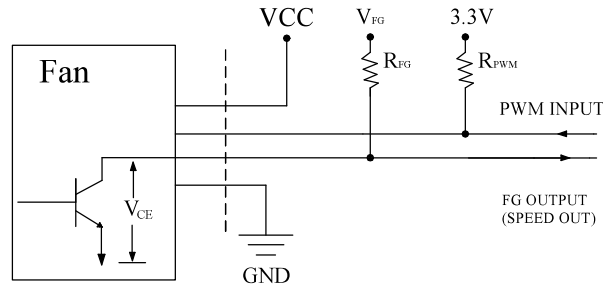
2. Motor locked condition (at  $V_{cc} = 5.0 \text{ VDC}$ )

Output is fixed at low or high when motor is locked.

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### 9. CHARACTERISTICS & DEFINITION

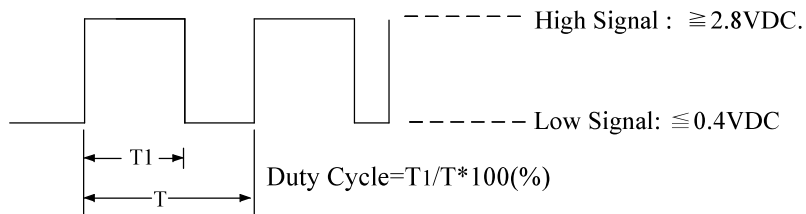
- PWM Circuit:(for reference)



When  $V_{RPM} = 3.3V$  We Recommend  $R_{PWM} = 1-10K\Omega$

- PWM Control Signal Input:

Signal Voltage Range :DC 0V ~5.5V ( $V = 5V$ )



- 1.The 25KHz operating frequency(customer preferred)has been tested and checked.
- 2.At 100% duty cycle, The fan will operate at maximum speed.
- 3.The fan will default to operate at maximum speed when the speed control input(PWM input)is left unconnected.

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### 10. PQ CURVE

### 6010 P-Q CURVE CHART

#### AIR PRESSURE & AIR FLOW VALUE

VALE \ SPEC.		H			
SPEED(RPM)		4200			
AIR FLOW	(CFM)	5.24			
	(M <sup>3</sup> /MIN)	0.15			
AIRPRESSURE	(mmH <sub>2</sub> O)	9.32			
NOISE	dB(A)	32.0			

#### AIR PRESURE-AIR FLOW (PERFORMANCE CURVES)

AIR PRESSURE(mmH<sub>2</sub>O)

