IP68 Protected DC Fan with PWM and Tach Output

09238DE-24Q (Potting II)

General Specification

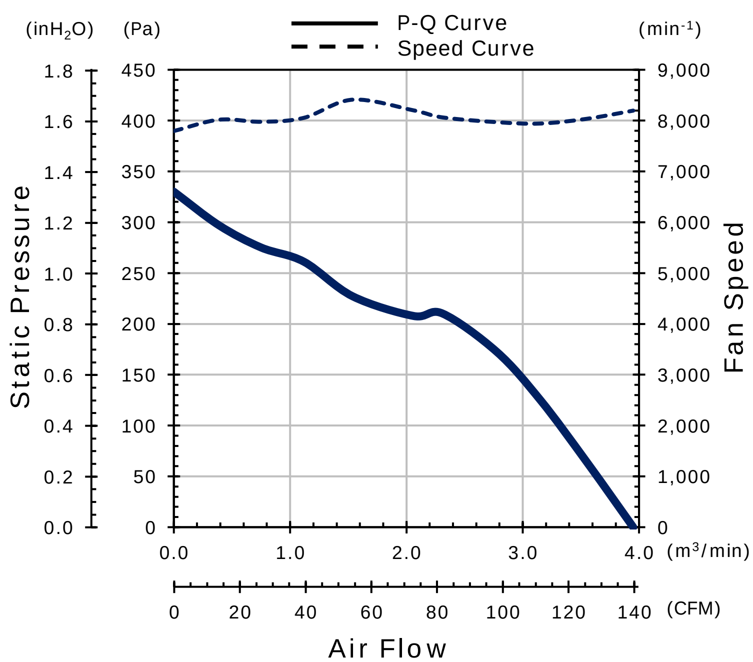
Motor Type:
DC Brushless Motor
Motor Protection:
Auto Restart
Polarity Protection (Motor withstands reverse connection for positive and negative leads.)
Insulation Resistance:
10MΩ or over with a DC 500V Megger
Dielectric Withstand Voltage:
AC 700V 1sec or 500V 1min
Allowable Ambient Temperature Range:
-10°C ~ + 60°C (Operating)
-40°C ~ + 70°C (Storage)
non-condensing environment
Mass:
Approx. 300g
Installation:
Fans to be installed with lead wire pointing downward to avoid water ingress to the motor.

This image is for reference only. Please refer to outline.

Features

- DC axial fan with outstanding P-Q performance, IP68 protection, PWM speed control, and tach output
- Vertically integrated manufacturing, with key components made in-house
- IP68 with highest level of protection from water/dust ingress
- Outfitted with NMB precision machined stainless steel ball bearings for long life
- Ideal for applications such as EV chargers, PV inverters, telecom cabinets, small cell 5G network and many other outdoor applications
- Made in Cambodia Upon Customer Request

Characteristics Curves



Life Expectancy L10

100,000 Hours at 25°C

*Fan life expectation is based on free air operation at 25°C, rated voltage, and indoor benign lab environment

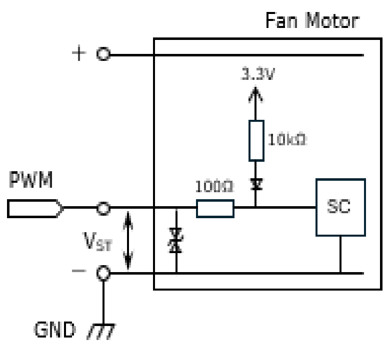
Specification

Model	Rated Voltage (V)	Operating Voltage (V)	Current *1 Ave. (A)	Current *1 Max. (A)	Input Power *1 Ave. (W)	Input Power *1 Max. (W)	Speed *1 (min^{-1})	Max. Air Flow *1 (m^3/min)	Max. Air Flow *1 (CFM)	Max. Static Pressure (Pa)	Max. Static Pressure (inH_2O)	Noise *1 (dB)
09238DE-24Q-GUG-9	24	18.0~26.0	1.20	1.50	28.80	36.00	8,200	3.9	138	330	1.32	62.0

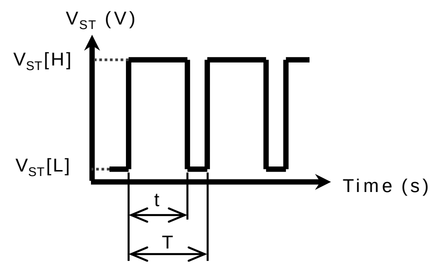
*1 Values in Free Air

PWM Specification

Connection



PWM Input Pulse



1. PWM Voltage
   Vst[L] = 0V ~ 0.4V : Stop (On Duty 0%)
   Vst[H] = 4.5V ~ 5.0V : Full Speed (On Duty 100%)
   Vst = Open : Default to Full Speed

2. PWM Frequency
   f = 1/T = 25±5 kHz

3. PWM Duty
   PWM duty means the proportion of “HIGH state time (t)” to the period of time (T) in PWM input pulse
   (t / T) × 100% : On Duty 0%～100%

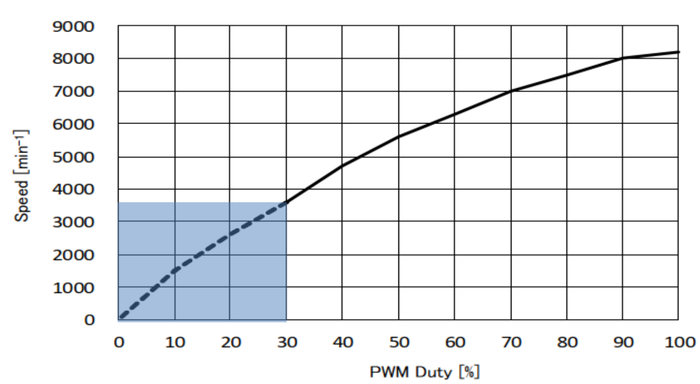
4. Start-up PWM Duty
   30% or more at f=25kHz
   (At rated voltage, Ta=25℃, Free Air)

5. Notice for PWM
   - Run the fan at “Rated Voltage”
   - In the case of running with very-low speed by PWM control, validate the fan operation under the condition with the fan installed in the target systems/devices, not only free air
   - PWM Profile may change significantly depending on fan input voltage, operating temperature and the target system/device conditions

PWM Characteristic Curve

Reference Curve

Fan Conditions : At Rated Voltage, Free Air and Ta=25℃
PWM input Conditions : Vst [H]=5.0V, Vst [L]=0V. f=25kHz



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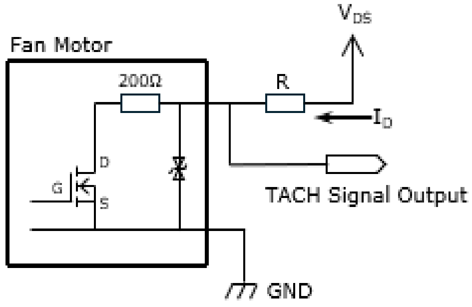
Tach Specification

※ Tachometer (Tach/Tacho) Signal, also called Frequency Generator (FG) Signal, Speed Signal, Pulse Signal, Rotational Singal, Revolution Signal

Connection



Note : Improper connection of Tach lead may cause damage to the motor circuit

1. Output Circuit : Open Drain
2. Specification

   Absolute Maximum Ratings at Ta=25℃

   V_{DS}max : +30V

   $I_D$max : 5mA [V_{DS}(ON)max=1.5V]

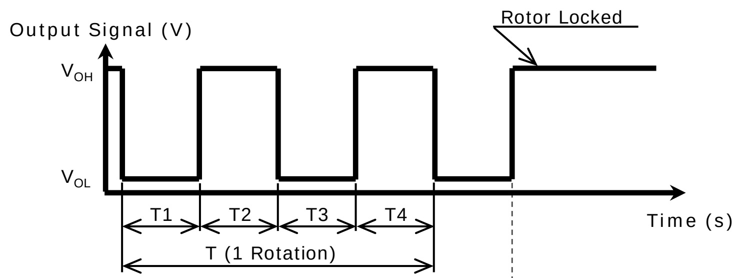
   ※ Reference Guide Design

   $$I_D \leq \frac{V_{DS}}{R} < 5\text{mA}$$

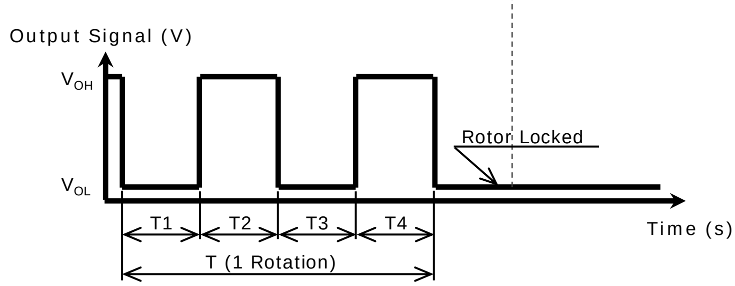
3. Output Waveform : Square Wave
   - Under the conditions of the locked rotor at the V_{OH} position of tach output, it keeps V_{OH} until the locked rotor is lifted. [Case-1]
   - Under the conditions of the locked rotor at the V_{OL} position of tach output, it keeps V_{OL} until the locked rotor is lifted. [Case-2]
   - T = T1 + T2 + T3 + T4 = 60 / n = 1 rotation

     n : Fan Speed (min^{-1})
   - Tach Duty Cycle = 50% ± 10%

Case-1



Case-2



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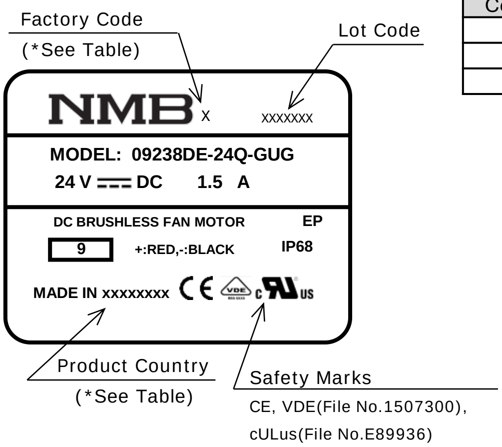
Name Plate

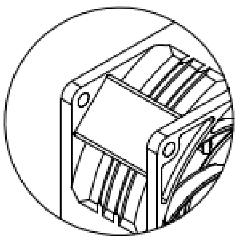


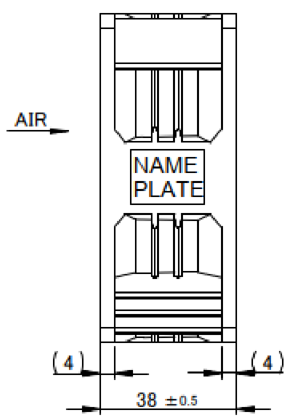
Factory Code	Product Country
7	CHINA
C	JAPAN
U	CAMBODIA

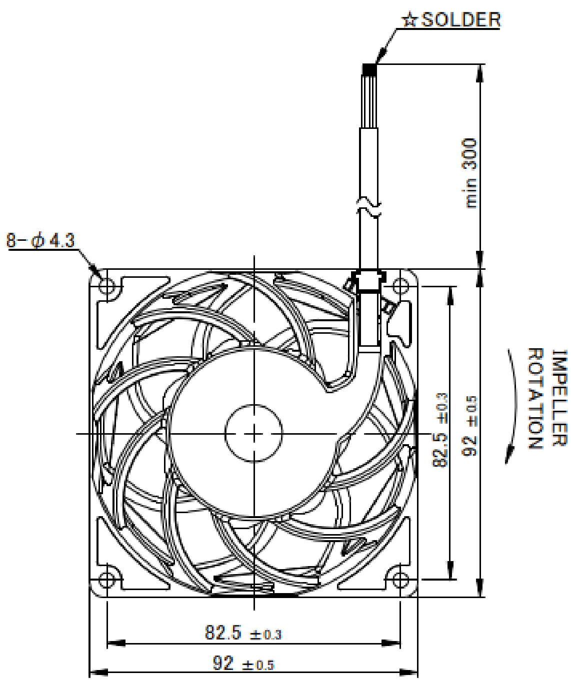
Materials

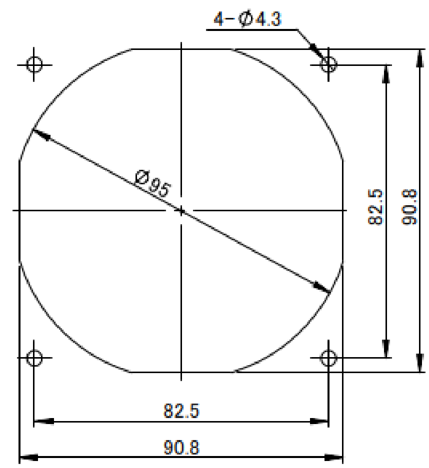
- Casing : Plastic (Black UL 94V-0)
- Impeller : Plastic (Black UL 94V-0)
- Bearing : Stainless Steel Ball Bearing
- Lead Wire :
  UL2517 AWG22 or equivalent
  - Red (+)
  - Black (-)
  - White (Tach)
  - Brown (PWM)

Outlines

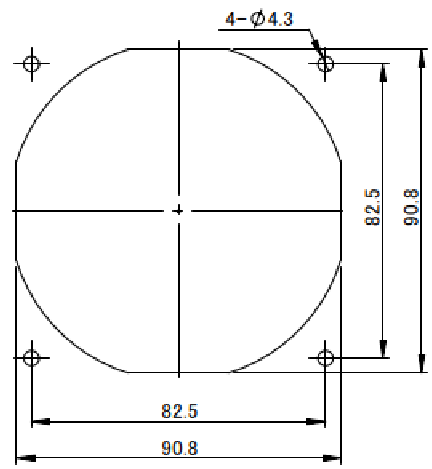








Inlet Side



Outlet Side