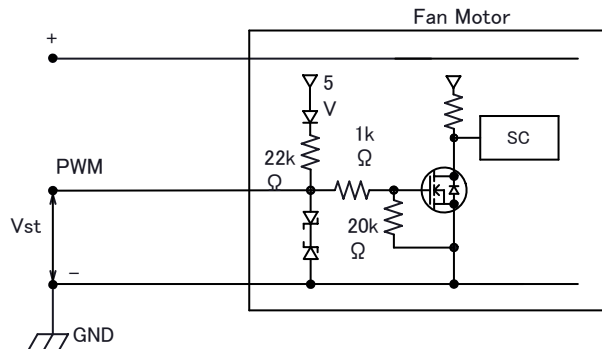


PWM and Tach Output Brushless DC Fan 04028DA-12V (K-Type)

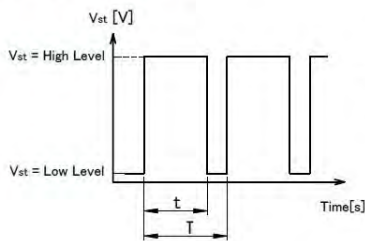
NMB

PWM Specifications

Connection



1. PWM Control
 $V_{st} = \text{Low Level (0V} \sim \text{0.4V)} \rightarrow \text{Stop (On Duty 0\%)}$
 $V_{st} = \text{High Level (4.0V} \sim \text{5.0V)} \rightarrow \text{Full Speed (On Duty 100\%)}$
 $V_{st} = \text{Open} \rightarrow \text{Full Speed}$
2. PWM Duty & PWM Input Pulse



PWM Duty means that a ratio of high level time (t)/PWM Input Pulse(T).

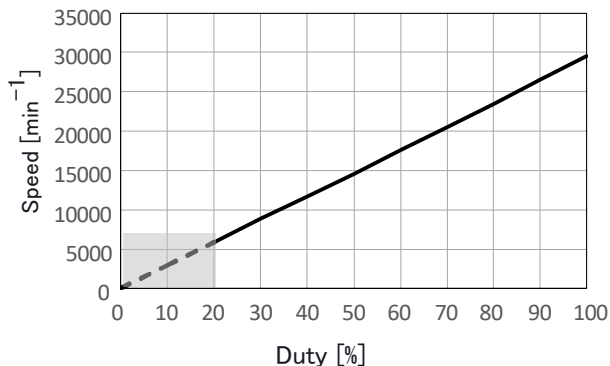
$$(t/T) \times 100 : \text{On Duty 0\%} \sim \text{100\%}$$

$$\text{PWM Frequency } f = 25[\text{kHz}]$$

3. The condition for PWM control are as follows
 - When you use this under PWM control, always be sure the motor's operation under practical mounting state. Fan motor may not start up caused by PWM control at very low speed condition.)
 - To run at Rating Voltage
 - Please use the start with Duty 20% or more at 25kHz.[At rated voltage input, Ambient temperature 25°C]

PWM Characteristic Curve

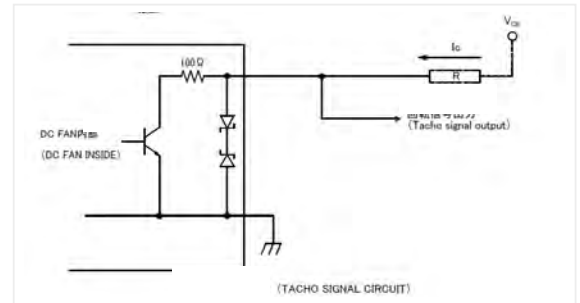
Reference PWM Duty VS Speed
 Conditions: at Rating Voltage, $V_{st}=5.0\text{V}$, $f=25\text{kHz}$, $T_a=25^\circ\text{C}$



TACHO Specifications

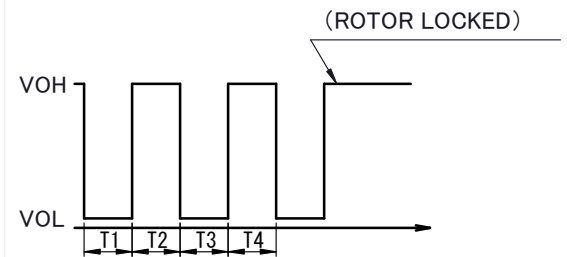
Tachometer Signal

1. Output Circuit: Open Drain
2. Specification
Absolute Maximum Ratings at $T_a=25^\circ\text{C}$
 $V_{D5max}: +15\text{V}$
 $I_{Dmax}: 5\text{mA}[V_{CE(sat)max}=1.5\text{V}]$

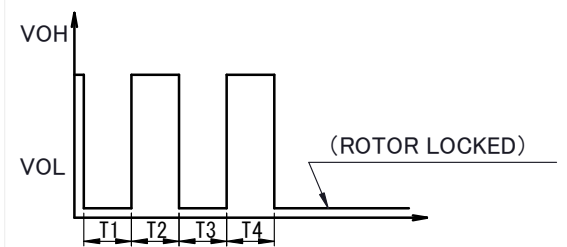


3. Output Waveform: At Rated Voltage
 Output Signal Voltage

Case-1



Case-2



- 1) When the rotor is locked at VOH position of signal, signal keeps VOH position.
- 2) When the rotor is locked at VOL position of signal, signal keeps VOL position.
- 3) $T=T_1+T_2+T_3+T_4=60/m=1 \text{ rotation}$

m : Fan Speed (min^{-1})

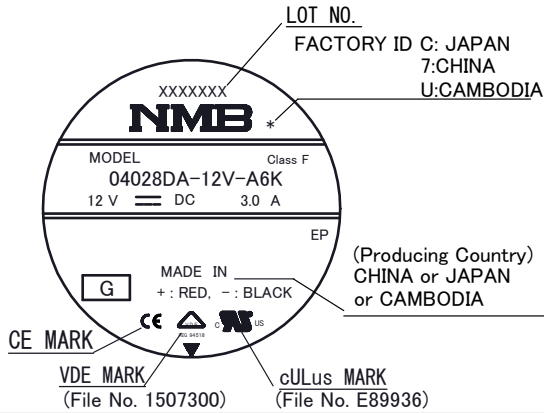
Tacho Duty Cycle=50%±10%

PWM and Tach Output Brushless DC Fan 04028DA-12V (K-Type)

NMB

Outlines

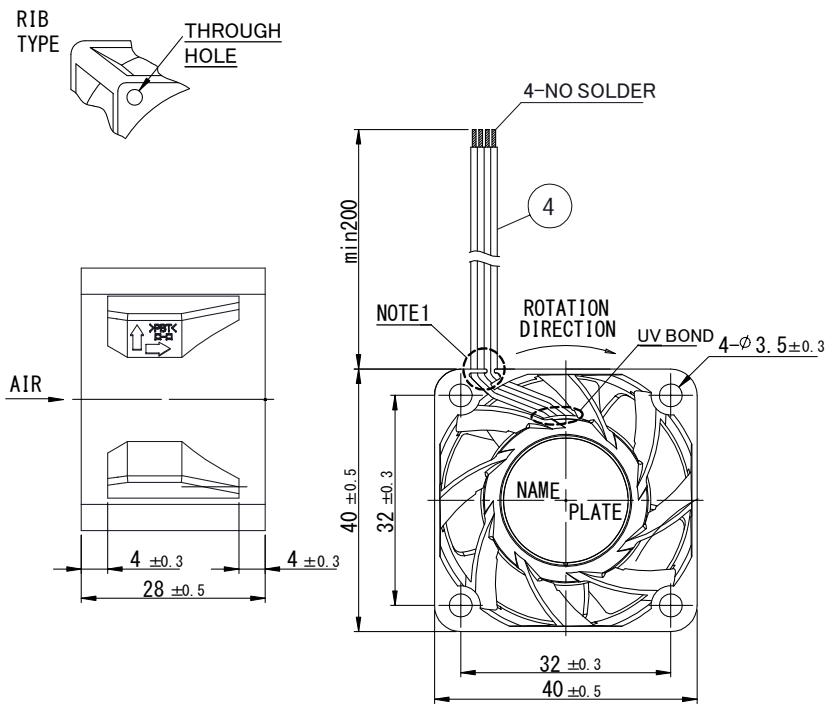
(Name Plate)



Materials

Casing: Plastic (Black UL94V-0)
Impeller: Plastic (Black UL94V-0)
Bearing: Ball Bearing
Lead Wire: (+): Red (-) Black
Tacho: White
PWM: Brown
 UL10368 AWG26

(Outline)



(Panel Out-line)

