San Ace 60T 9GT type
Wide Temperature Range Fan

Features

Wide Operating Temperature Range
These products operate in a wide temperature range of -40°C to +85°C.
They can be safely used in both low-temperature and high-temperature applications ranging from refrigerators and freezers to heat-generating lighting devices. With these new products, the San Ace lineup can now serve in conventional applications such as communications devices, PV inverters, and rapid EV charging stations in even more demanding environments.

60 x 60 x 25 mm

Specifications

The following nos. have PWM controls, pulse sensors.

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<td>12</td>
<td>10.2 to 13.6</td>
<td>100</td>
<td>0.56</td>
<td>6.72</td>
<td>10,000</td>
<td>1.26</td>
<td>44.5</td>
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Note1: PWM frequency: 25 kHz
Note2: Fans do not rotate when PWM duty cycle is 0%.
Available options: Without sensor
Please inquire as the availability of these functions depends on the model: Lock Sensor

Common Specifications

- Material: Frame: Aluminum, Impeller: Plastics (Flammability: UL94V-1)
- Expected life: Refer to specifications (L10: Survival rate: 90% at 85°C, rated voltage, and continuously run in a free air state)
- Motor protection system: Current blocking function and reverse polarity protection
- Dielectric strength: 50 / 60 Hz, 500 VAC, 1 minute (between lead conductor and frame)
- Sound pressure level (SPL): Expressed as the value at 1 m from air inlet side
- Operating temperature: Refer to specifications (Non-condensing)
- Storage temperature: -40°C to +85°C (Non-condensing)
- Lead wire: Red, Black, Sensor: Yellow, Control: Brown
- Mass: Approx. 100 g
Airflow - Static Pressure Characteristics

- PWM duty cycle

![PWM Duty Cycle Graph](image)

Operating voltage range

![Operating Voltage Range Graph](image)

PWM Duty - Speed Characteristics Example

![Speed Characteristics Graph](image)
**PWM Input Signal Example**

Input signal waveform

\[ V_{IL} \]

\[ V_{IH} \]

- \( V_{IH} = 4.75 \text{ V to } 5.25 \text{ V} \)
- \( V_{IL} = 0 \text{ V to } 0.4 \text{ V} \)

PWM duty cycle (%): \( \frac{T_1}{T} \times 100 \)

PWM frequency \( 25 \text{ kHz} \)

- Source current (Isource): \( 1 \text{ mA Max. at control voltage } 0 \text{ V} \)
- Sink current (Isink): \( 1 \text{ mA Max. at control voltage } 5.25 \text{ V} \)

Control terminal voltage: \( 5.25 \text{ V Max. (Open circuit)} \)

When the control lead wire is open, the fan speed is the same as the one at a PWM duty cycle of 100%.

Either TTL input, open collector or open drain can be used for PWM control input signal.

**Example of Connection Schematic**

DC fan input voltage

Inside of DC fan

PWM input signal

- 10k \( \Omega \)
- 47k \( \Omega \)

**Specifications for Pulse Sensors**

Output circuit: Open collector

- Rated voltage 12 V fan
  - \( V_{CE} = +13.8 \text{ V MAX.} \)
  - \( I_c = 5 \text{ mA MAX. } [V_{OL} = V_{CE \text{ (SAT)}} = 0.6 \text{ V MAX.}] \)
- Rated voltage 24 V fan
  - \( V_{CE} = +30 \text{ V MAX.} \)
  - \( I_c = 10 \text{ mA MAX. } [V_{OL} = V_{CE \text{ (SAT)}} = 0.6 \text{ V MAX.}] \)

Output waveform (Need pull-up resistor)

In case of steady running

- \( T_1 \approx \frac{1}{4} T_0 \)
- \( T_1 \approx \frac{1}{4} T_0 = 60/4N \text{ (sec)} \)
- \( N = \text{Fan speed (min}^{-1}) \)

\( T_0 \) (One revolution)

- \( V_{OH} \)
- \( V_{OL} \)
- \( 0 \text{ V} \)
Notice

- Please read the “Safety Instructions” on our website once you have decided on a product for use.
- The products shown in this catalog are subject to Japanese Export Control Law. Diversion contrary to the law of exporting country is prohibited.
- To protect against electrolytic corrosion that may occur in locations with strong electromagnetic noise, we provide fans that are unaffected by electrolytic corrosion.

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