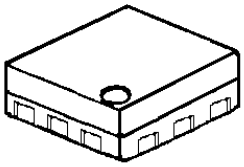
# Single-phase DC Brushless Motor Driver IC

## ■ GENERAL DESCRIPTION

The NJU7332 is a single-phase DC brushless motor driver
IC for very small fan-motor application. It features MOS-FET driver circuit for better saturation characteristics. Slew late of amplifers and feedback resistors are optimized to achieve low-noise motor operation.

The NJU7332 adopt a very small FFP package, therefore it is suitable for micro motor applications.

## ■ PACKAGE OUTLINE

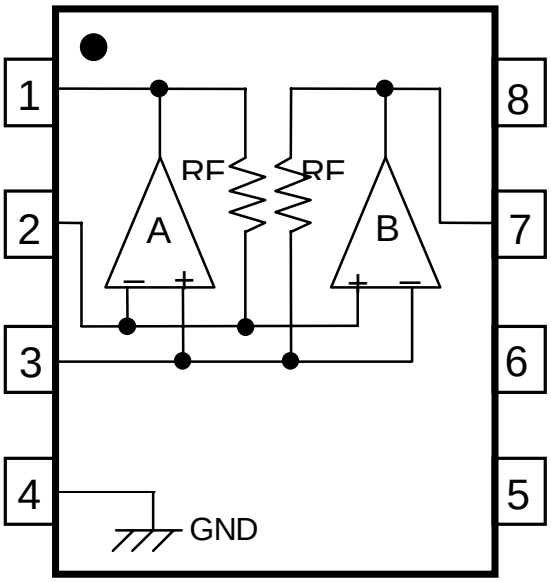


NJU7332PB1

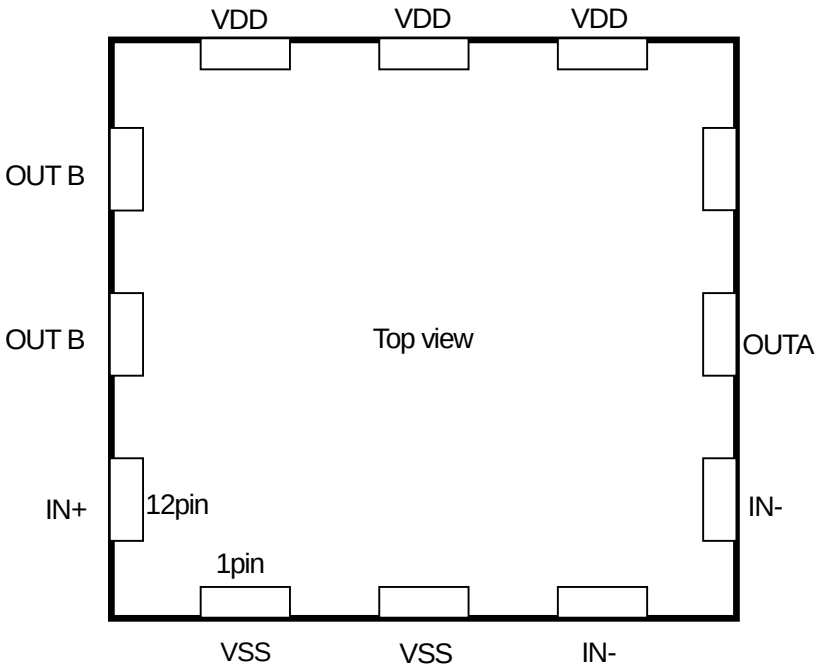
## ■ FEATURES

- Single supply
- Operating Voltage $V_{DD}$=2.4～5.5V
- Low Operating Current
- Low Saturation Output Voltage
- Vsat=±0.2V @Io=±100mA
- C-MOS Technology
- Package Outline
- TVSP8/FFP12 (2mm×2mm×0.85mm)

## ■ BLOCK DIAGRAM／PIN CONFIGURATIONS




**FFP12**




**TVSP8**

## ■ ABUSOLYTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER | RATINGS | SYMBOL (unit) | NOTE |
|---|---|---|---|
| Supply Voltage | +7.0 | $V_{DD}$ (V) | |
| Input Voltage | -0.3～$V_{DD}$+0.3 | $V_{ID}$(V) | |
| Operating Tempereture Range | -40～+85 | Topr (°C) | |
| Storage Temperature Range | -50～+150 | Tstg (°C) | |
| Power Dissipation | 300 | $P_D$(mW) | (*1) |

(*1) When mounted on a glass epoxy board.

## ■ RECOMMENDED OPARATING CONDITIONS

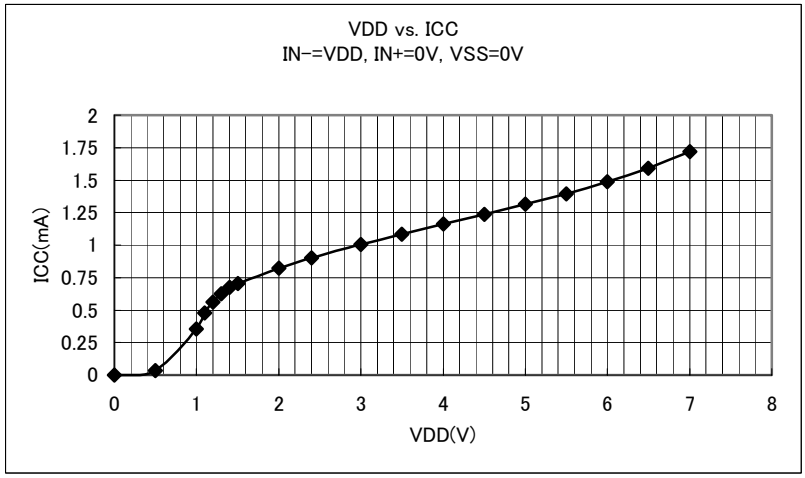
$V_{DD}$=2.4V～5.5V

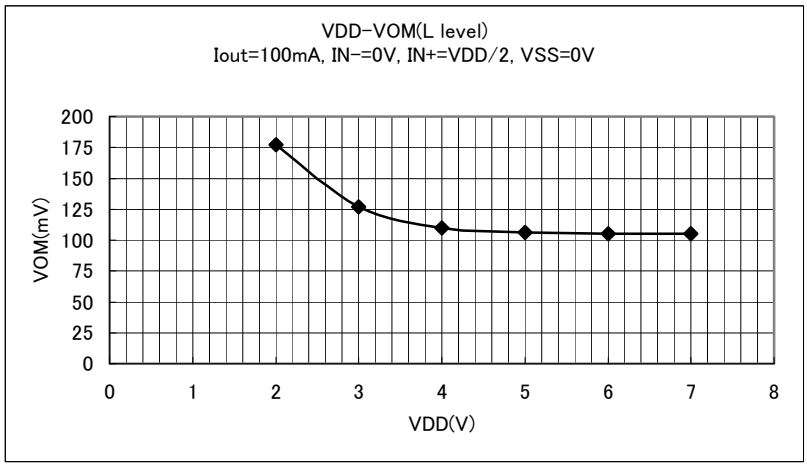
## ■ ERECTRICAL CHARACTERISTICS

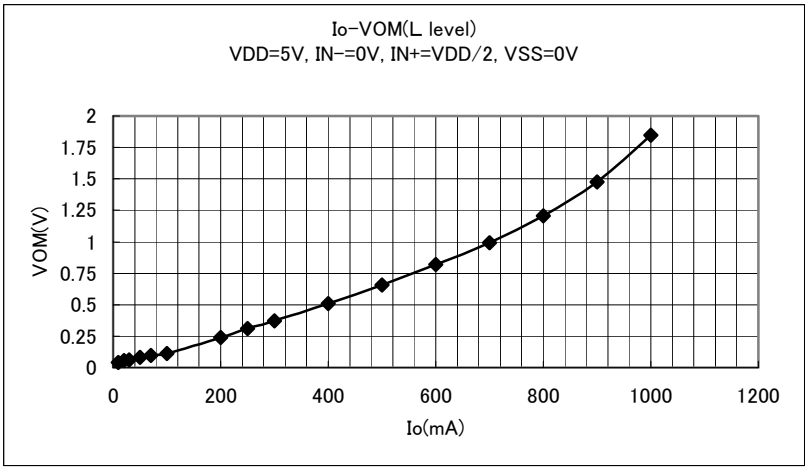
(Ta=25°C, $V_{DD}$= 5 V)

| PARAMETER | SYMBOL | CONDITION | MIN. | TYP. | MAX. | UNIT. |
|---|---|---|---|---|---|---|
| Operating Current | $I_{DD}$ | - | - | 3.0 | 4.0 | mA |
| Input Offset Voltage | $V_{IO}$ | - | -15.0 | - | 15.0 | mV |
| Input Common Mode Voltage Range | $V_{ICM}$ | - | 0.4～4.0 | - | - | V |
| Maximum Output Voltage Range | $V_{OM}$ | Io=+100mA | 4.70 | 4.80 | - | V |
| | | Io=-100mA | - | 0.20 | 0.30 | |
| Feedback Resistance | $R_F$ | - | 22.0 | 27.5 | 33.0 | kΩ |
| Open Loop Gain | Av | - | - | 80 | - | dB |

## ■ TYPICAL CHARACTERISTICS



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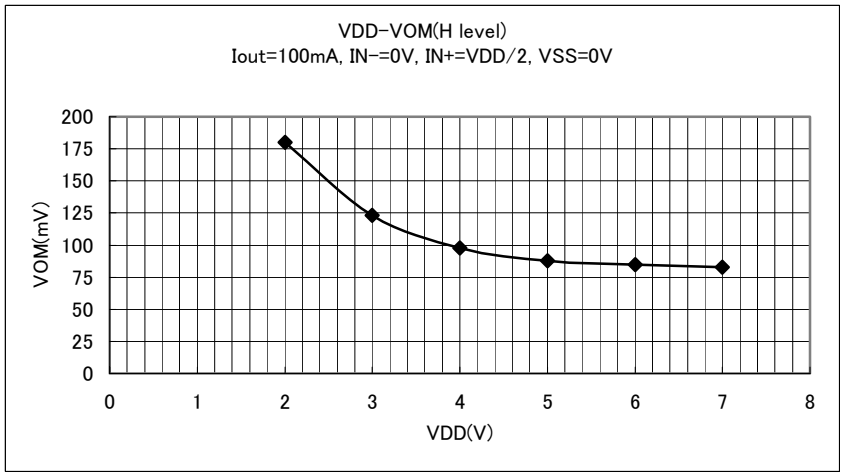
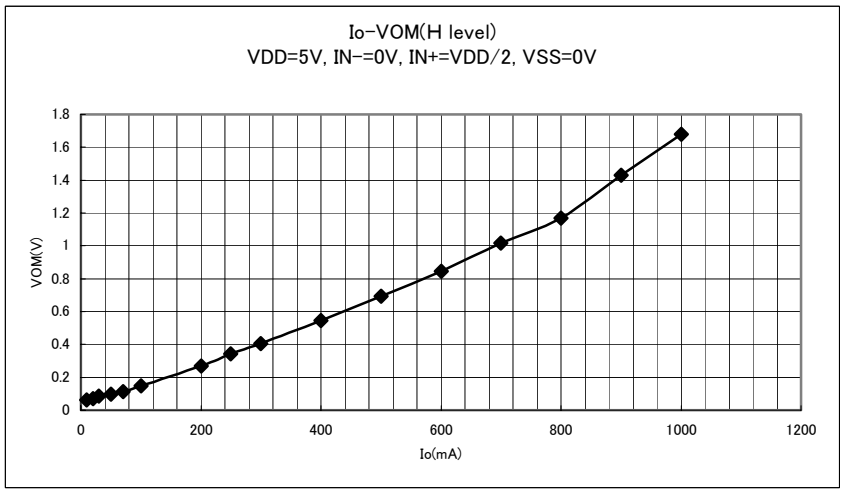
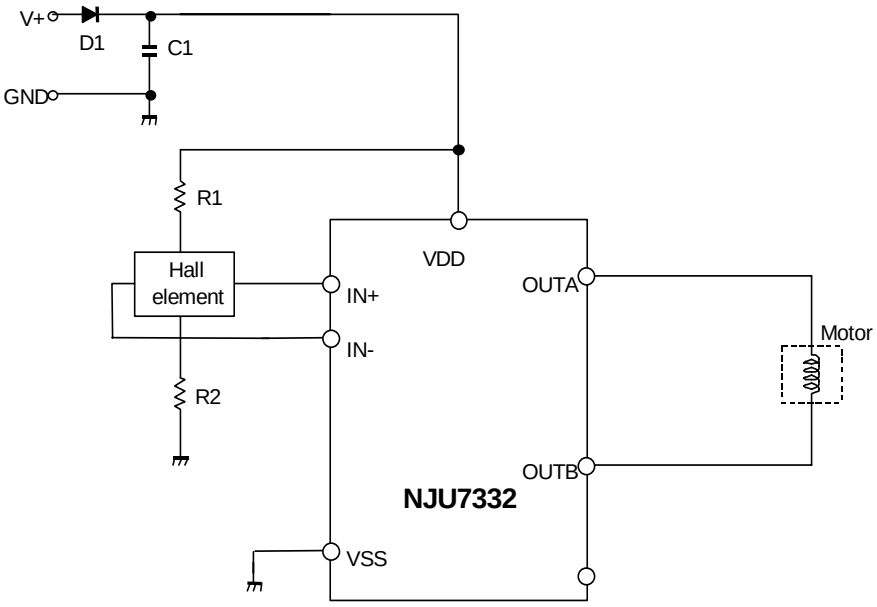


## ■ APPLICATION NOTE

The NJU7332 is a signal-phase DC brushless motor driver IC featuring CMOS process.
It is suitable for fan drivers for a small equipment such as the note personal computers.

[Application Circuit Example]




[Design Notes]

Above application example is designed for 5V operation with motor current of 100mA, it uses the following components:

Hall Elements: HW101A(AKE)

**1.** SECTION of C1 and D1:

C1 used for a noise reduction purpose. A typical value is 0.1µF.

Optimize the value in actual operating condition if necessary. D1 is a diode for protection against reverse voltage supply. Silicon rectifier diode(WO3C, 10D1, and equivalent) is appropriate.

**2.** Design of hall element bias resistance **(R1 and R2)**

Hall amplifier is a differential with hysteresis characterics(24mV typical).

The common-mode input voltage is between 0.4V and VDD-1V and the input signal must be within the range. Non-excitation hall bias is to be set at a half of VDD for effective use of common-mode input voltage range. Therefore the same value of hall bias resistors is seletcted for R1 and R2.

Given that the bias current is set to be 5mA by HW101A datasheet, R1 and R2 can be determined as

$$R1 + R2 + Rin = \frac{VDD}{Ihbias} = \frac{5}{5\times10^{-3}} = 1k\Omega$$

$$R1 = R2 = 300\Omega$$

follows:

The output voltage of hall elements is influenced by the bias current and magnetic flux density of hall elements.

The optimum input voltage of the NJU7332 is 100mVp-p and higher. With such input voltage, the highest efficiency can be obtained.