

# Single-phase DC Brushless Motor Driver IC

## ■ GENERAL DESCRIPTION

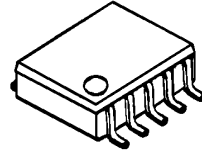
The NJU7346 is a single-phase DC brushless motor driver IC. It features MOS-FET driver circuit for better saturation characteristics.

It features Frequency Generator Output and Thermal Shutdown Circuit.

Maximum output current is 200mA(12V). Input offset voltage is  $\pm 7\text{mV}$ .

It is suitable for 12V high current small fan-motor applications.

## ■ PACKAGE OUTLINE

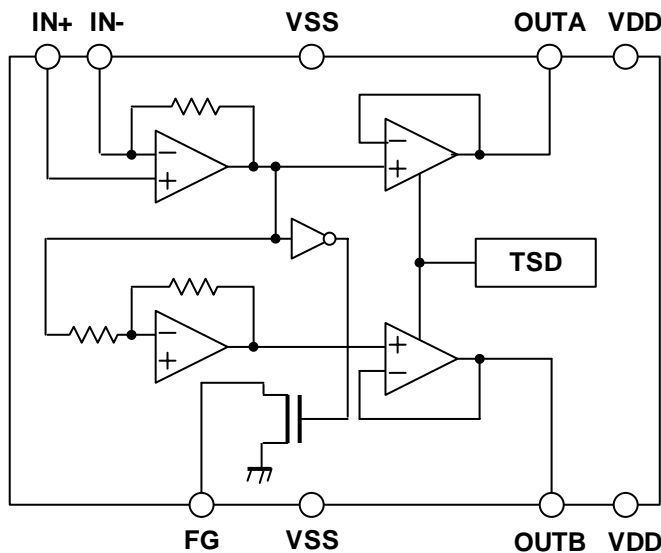


NJU7346R

## ■ FEATURES

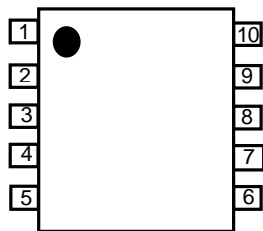
- Operating Voltage                    3.5 to 14V
- Frequency Generator Output
- Thermal Shutdown Circuit
- Low Operating Current
- Low Saturation Output Voltage
- $V_{\text{sat}} = \pm 0.3\text{V}$  @  $I_o = \pm 200\text{mA}$
- CMOS Technology
- Package Outline                      VSP10

## ■ BLOCK DIAGRAM



# NJM7346

## ■ PIN FUNCTION



VSP10

- 1:NC
- 2:FG
- 3:V<sub>SS</sub>
- 4:OUTB
- 5:V<sub>DD</sub>
- 6:V<sub>DD</sub>
- 7:OUTA
- 8:V<sub>SS</sub>
- 9:IN-
- 10:IN+

(Note)

All V<sub>DD</sub> and V<sub>SS</sub> pins should be connected the power supply and the ground respectively. Otherwise, the electrical characteristic may not satisfy specifications

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	RATINGS	SYMBOL (unit)	NOTE
Supply Voltage	+15.0	V <sub>DD</sub> (V)	
Input Voltage	-0.3 ~ V <sub>DD</sub>	V <sub>ID</sub> (V)	
Output Current (Peak)	600	I <sub>O PEAK</sub> (mA)	
Operating Temperature Range	-40 ~ +85	T <sub>opr</sub> (°C)	
Storage Temperature Range	-50 ~ +150	T <sub>stg</sub> (°C)	
Power Dissipation	400	P <sub>D</sub> (mW)	Device itself

## ■ RECOMMENDED OPERATING CONDITIONS

(V<sub>DD</sub>=12V, Ta=25°C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V <sub>DD</sub>	-	3.5	-	14	V
Output Current	I <sub>O</sub>	-	-	-	200	mA

## ■ ELECTRICAL CHARACTERISTICS

( $V_{DD}=12V, T_a=25^\circ C$ )

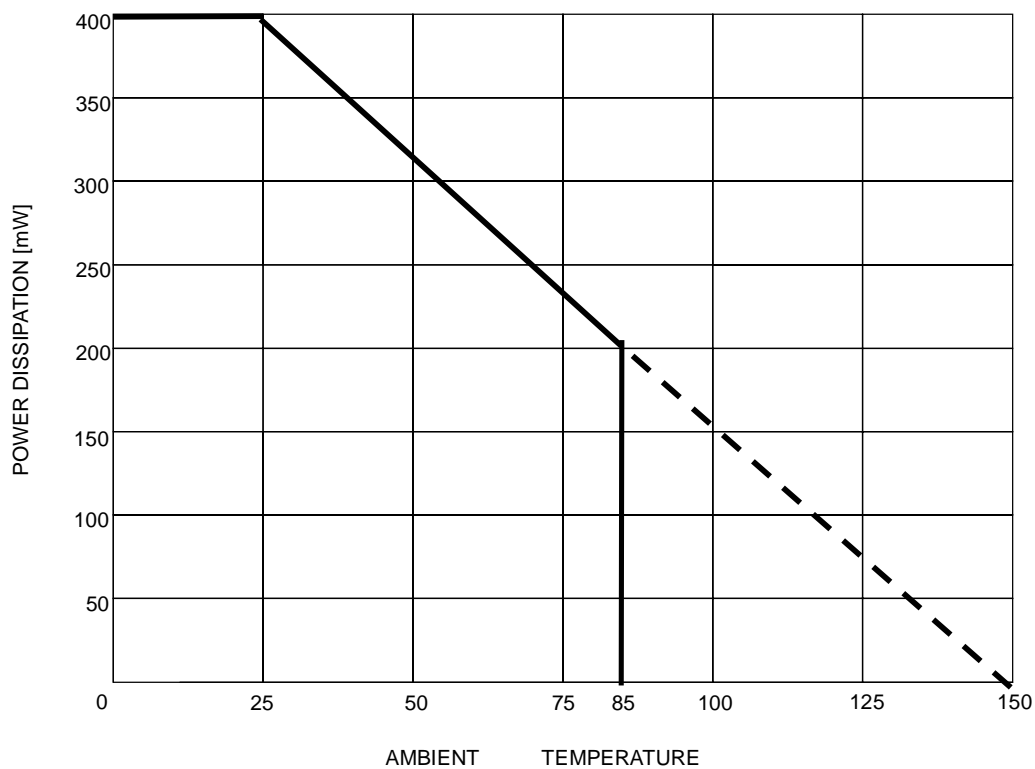
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
<b>General</b>						
Operating Current	$I_{DD}$	-	-	3.0	4.0	mA
Thermal Shutdown Temperature	$T_{TSD}$	-	-	180	-	$^\circ C$
Thermal Shutdown Hysteresis	$T_{HYS}$	-	-	60	-	$^\circ C$
<b>Hall Amplifier</b>						
Input Offset Voltage	$V_{IO}$	-	-18	-	18	mV
Feedback Resistance	$R_F$	-	-	37.5	-	k $\Omega$
Input Common Mode Voltage Range	$V_{ICM}$	-	0.2~10.5	-	-	V
<b>Output</b>						
Maximum Output Voltage Range	$V_{OH}$	$I_o=+200mA$	11.55	11.70	-	V
	$V_{OL}$	$I_o=-200mA$	-	0.30	0.45	
Output Resistance	$R_{ONH}$	$I_o=+200mA$	-	1.5	-	$\Omega$
	$R_{ONL}$	$I_o=-200mA$	-	1.5	-	
FG L Output Voltage	$V_{FG}$	$I_{FGL}=5mA$	-	-	0.6	V
FG H Leak Current	$I_{FG-LEAK}$	$V_{FGL}=12V$	-	-	1.0	$\mu A$

## ■ INPUT-OUTPUT TRUTH TABLE

Input		Output		
IN+	IN-	OUTA	OUTB	FG
H	L	H	L	H
L	H	L	H	L

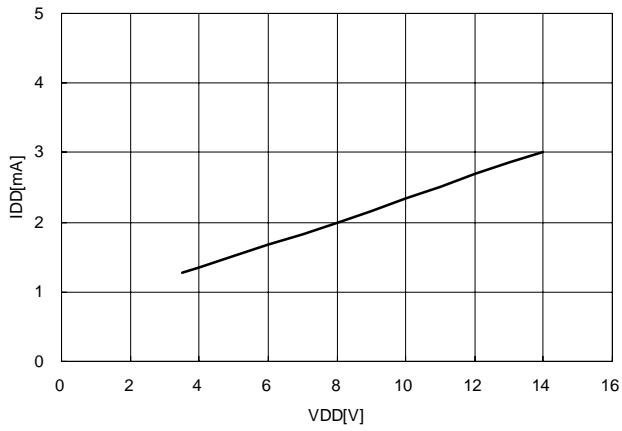
# NJM7346

## POWER DISSIPATION

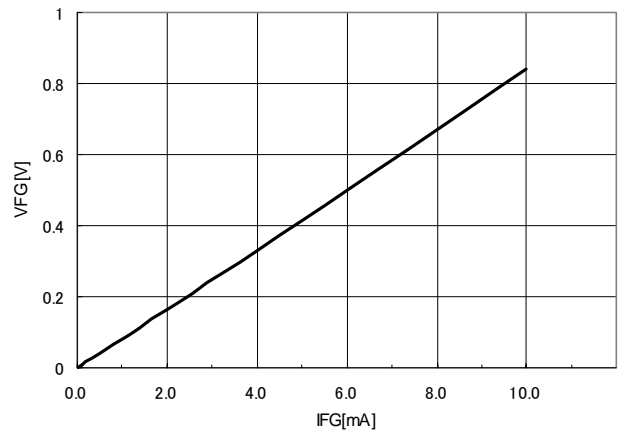


## TYPICAL CHARACTERISTICS

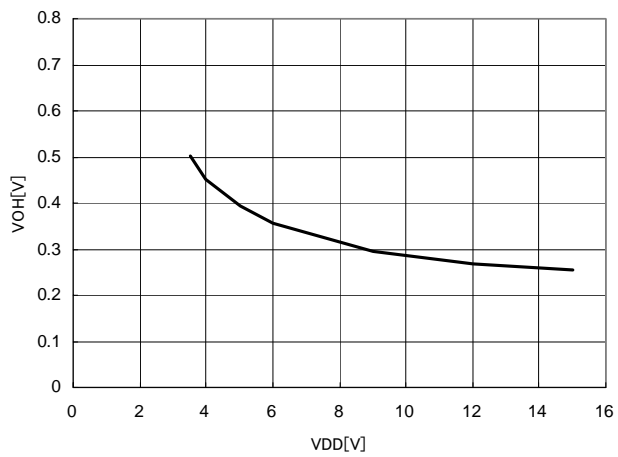
VDD-IDD  
IN+=VDD, IN-=VDD



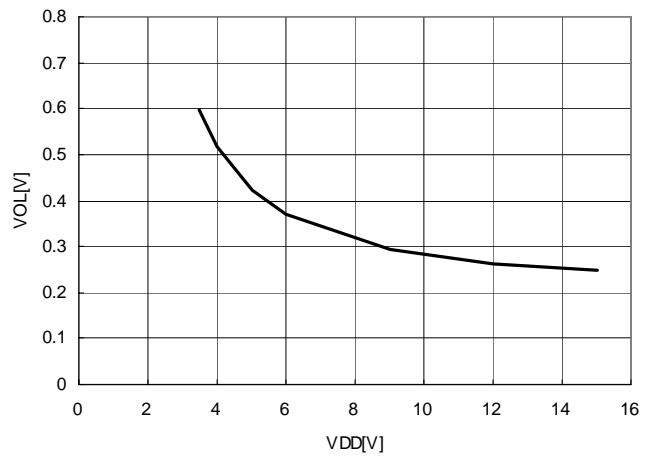
VFG-IFG  
VDD=12V



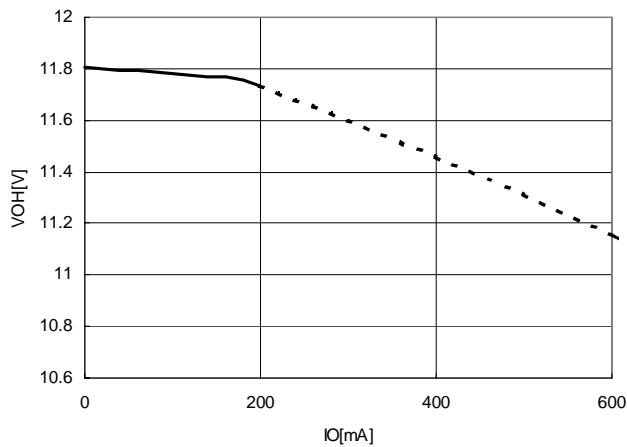
VDD - VOH  
Io=+200mA



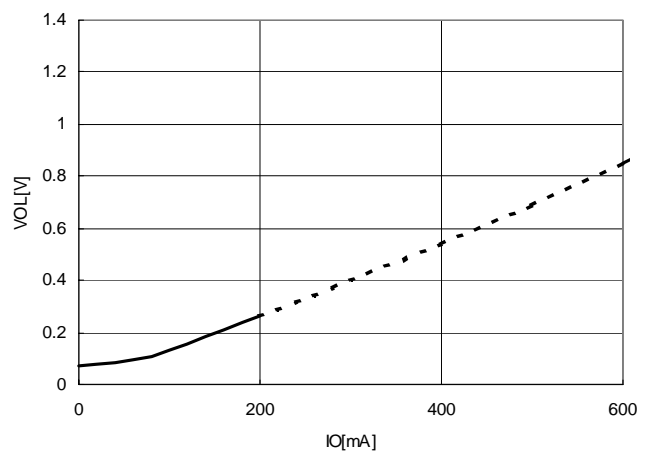
VDD - VOL  
Io=-200mA



IO-VOH  
VDD=12V



IO-VOL  
VDD=12V

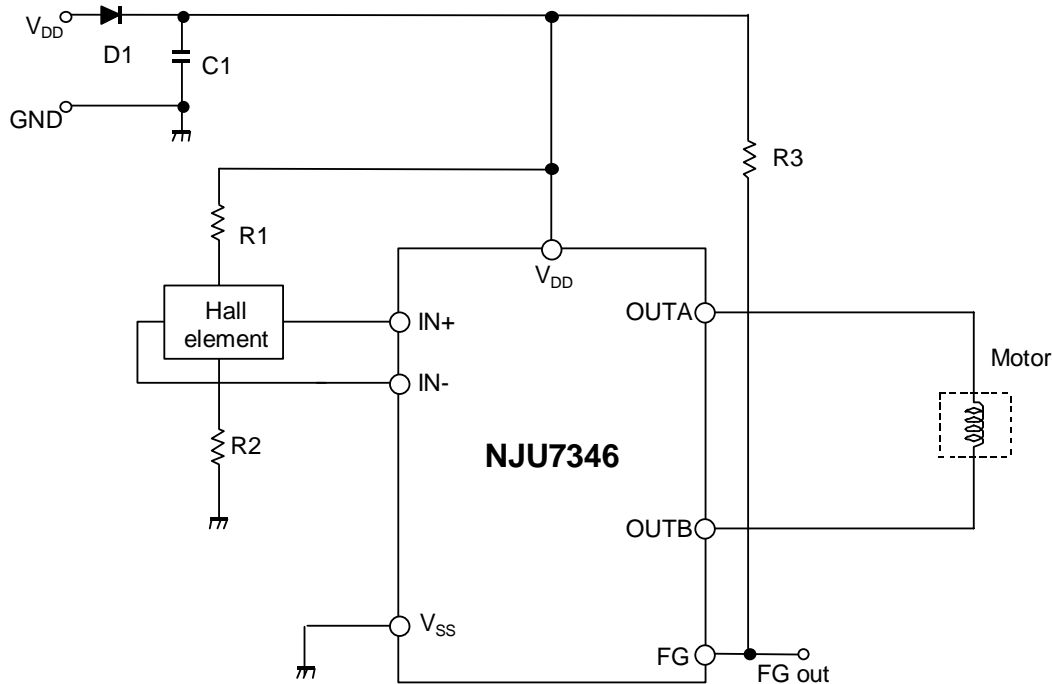


# NJM7346

## APPLICATION NOTE

The NJU7346 is a single-phase DC brushless motor driver IC in small VSP10 package.  
With minimal external components, It can drive up to 200mA of motor current for small fan application.

[Application Circuit Example]



[Design Notes]

Above application example is designed for 12V operation with motor current of 200mA. It uses the following components:

Hall elements: HW101A (AKE)

### 1. Selection of **C1** and **D1**:

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

Optimize the value in actual operating conditions 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 amplifier.

The common-mode input voltage is between 0.2V and  $V_{DD}-1.5V$  and the input signal must be within the range. Non-excitation hall bias voltage is to be set at a half of  $V_{DD}$  for effective use of common-mode input voltage range. Therefore the same value of hall bias resistors is selected for R1 and R2.

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

$$R1 + R2 + R_{in} = \frac{V_{DD}}{I_{bias}} = \frac{12}{5 \times 10^{-3}} = 2.4k\Omega$$

$$R1 = R2 = 1k\Omega$$

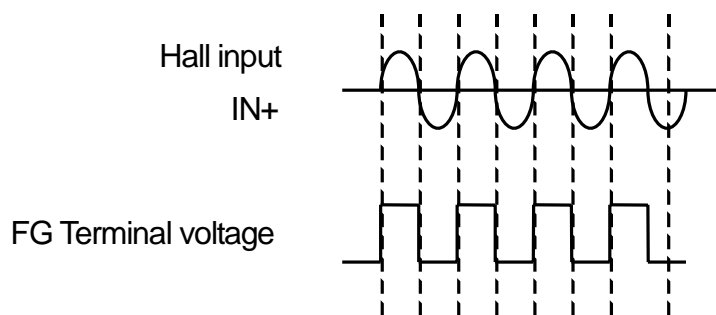
The output voltage of hall elements is influenced by the bias current and magnetic flux density of hall elements.

The optimum input voltage of NJU7346 is 100mVp-p and higher. With such input voltage, the highest efficiency can be obtained.

### 3. Design of FG output resistance (R3)

FG Out(FG:Pin2) is a open drain output and R3 is a pull up register. A typical value of R3 is 10kΩ. The timing chart of FG Out is as follows.

Note that the pull up resistance shall be connected to below supply voltage.



**[CAUTION]**

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[NJR:](#)

[NJU7346R-TE1](#)



Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)