

Single-phase DC Brushless Motor Driver IC

■ GENERAL DESCRIPTION

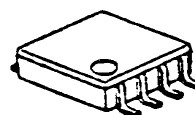
The NJU7360 is a single-phase DC brushless motor driver IC for small fan-motor and high power applications.

It features MOS-FET driver circuit for better output saturation characteristics.

The NJU7360 is equipped with Hall Bias output, Hall Amplifier, and Frequency Generator(FG) output, which are optimized to achieve Low Noise motor operation.

It is suitable for variable speed FAN required Low Noise & Good Efficiency characteristics.

■ PACKAGE OUTLINE

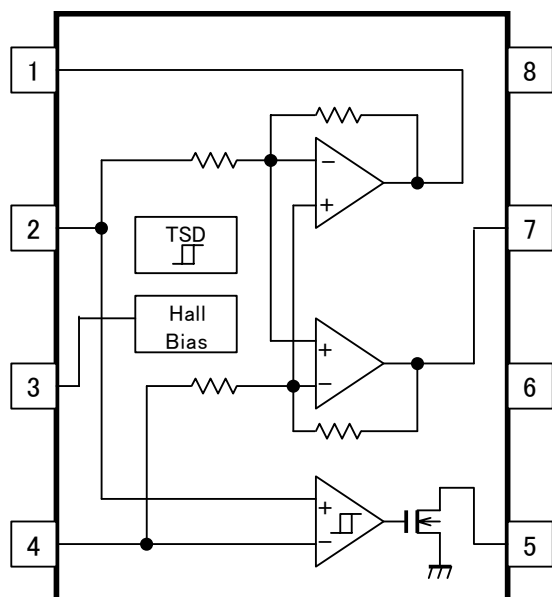


NJU7360RB1

■ FEATURES

- Operating Voltage $V_{DD} = 2.2 \sim 5.5V$
- Low Operating Current $I_{DD} = 2mA(Typ.)$
- Low Saturation Output Voltage
 $V_{OM} = \pm 0.30V @ I_o = \pm 250mA$
- Thermal Shutdown Circuit
- Frequency Generator Output
- Hall Bias Terminal
- C-MOS Technology
- Package outline TVSP8

■ BLOCK DIAGRAM



■ PIN FUNCTION

PIN no.	PIN NAME
1	OUT B
2	IN+
3	HB
4	IN-
5	FG
6	VDD
7	OUT A
8	GND

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	RATINGS	SYMBOL (unit)	NOTE
Supply Voltage	+7.0	V _{DD} (V)	
Input Voltage	-0.3 ~ V _{DD}	V _{ID} (V)	1)
Output Current (Peak)	600	I _{OPEAK} (mA)	
FG Output Current	5	I _{FG} (mA)	
Operating Temperature Range	-40 ~ +85	T _{opr} (°C)	
Storage Temperature Range	-50 ~ +150	T _{stg} (°C)	
Power Dissipation	400	P _D (mW)	Device itself
Junction Temperature	150	T _{jmax} (°C)	

1): The Input Voltage (V_{ID}) never exceeds the Supply Voltage (V_{DD}).

■ RECOMMENDED OPERATING CONDITIONS

(Ta=25°C, V_{DD}=5V)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V _{DD}	-	2.2	5.0	5.5	V
Input Common Mode Voltage Range	V _{ICM}	-	0.4	-	4.0	V

■ ELECTRICAL CHARACTERISTICS

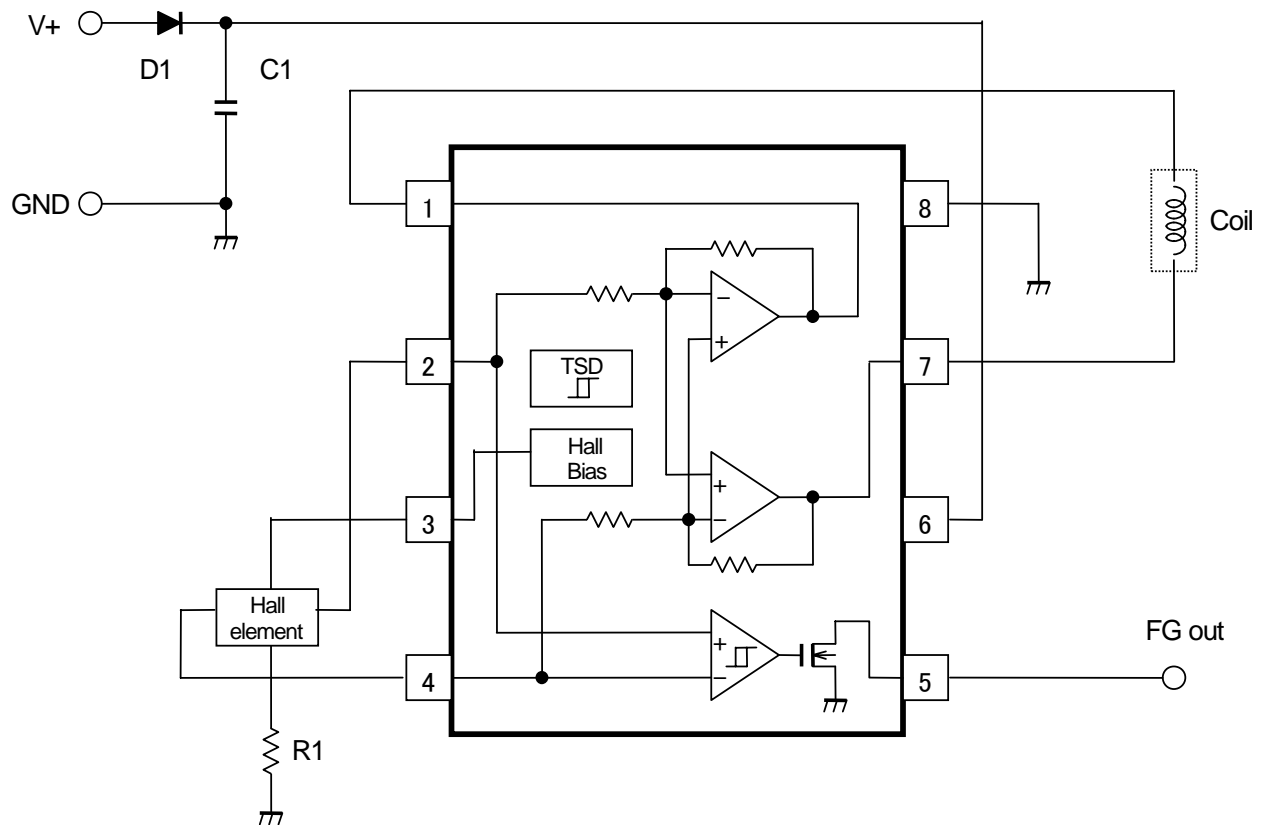
(Ta=25°C, V_{DD}=5V)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
■ General						
Operating Current	I _{DD}	-	-	2.0	5.0	mA
Thermal Shutdown Temperature	T _{TSD}	-	-	180	-	°C
Thermal Shutdown Hysteresis	T _{HYS}	-	-	50	-	°C
■ Hall Amplifier						
Close Loop Gain	A _V	-	43	46	49	dB
Input Offset Voltage	V _{IO}	-	-12	-	12	mV
■ Output						
Maximum Output Voltage Range	V _{OH}	I _o =250mA	4.55	4.70	-	V
	V _{OL}	I _o = -250mA	-	0.30	0.45	
FGL Output Voltage	V _{FG}	R _{FG} =10kΩ	-	-	0.3	V
FGH Leak Current	I _{FG-LEAK}	-	-	-	5.0	μA
■ Hall Bias						
Hall Bias Voltage	V _{HB}	-	1.1	1.3	1.5	V

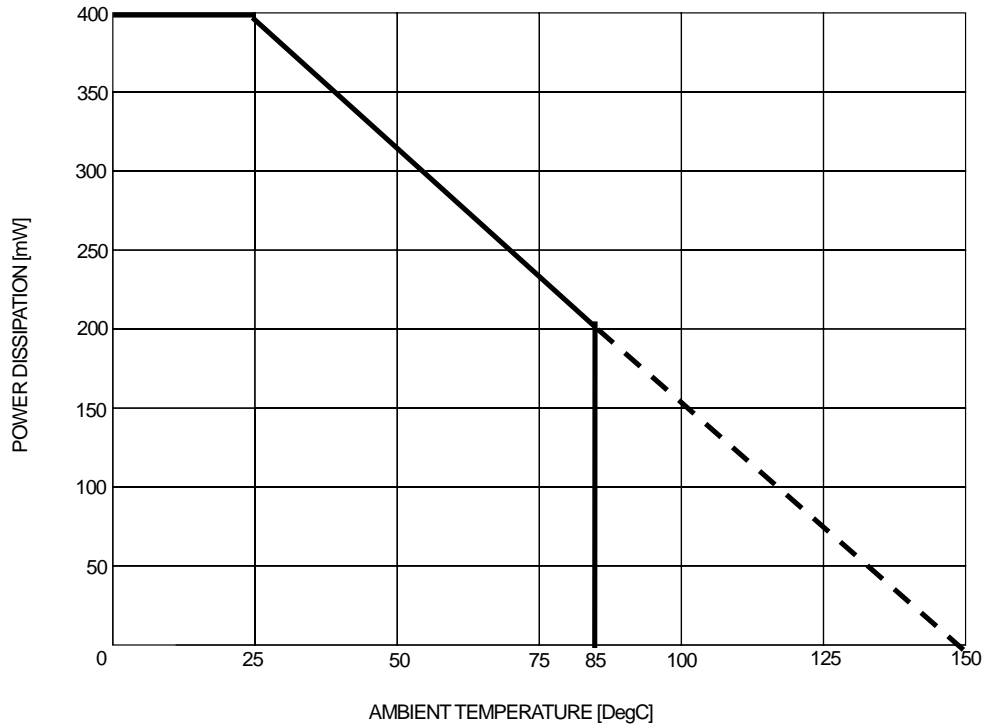
INPUT-OUTPUT TRUTH TABLE

IN+	IN-	OUTA	OUTB	FG
H	L	H	L	L (Output TR : ON)
L	H	L	H	Z (Output TR : OFF)

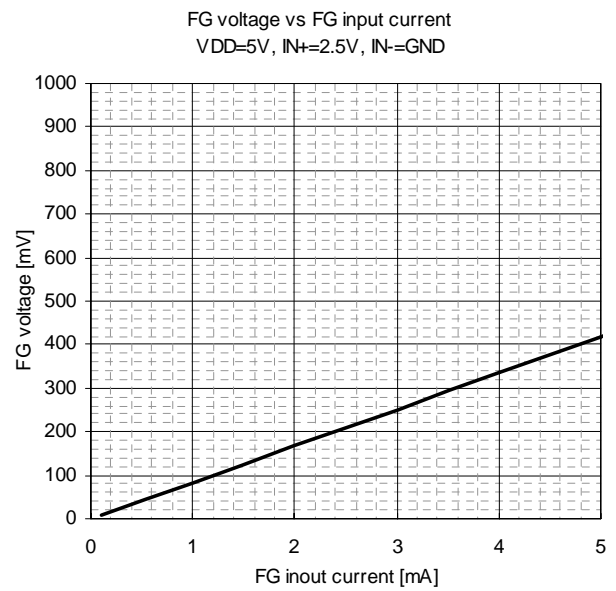
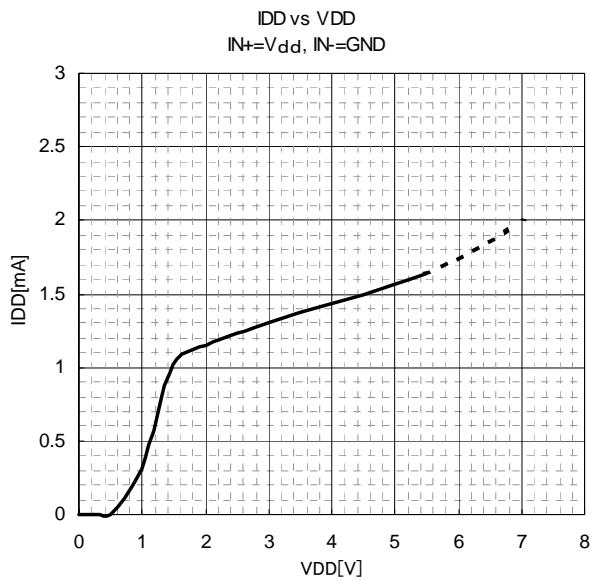
APPLICATION CIRCUIT EXAMPLE



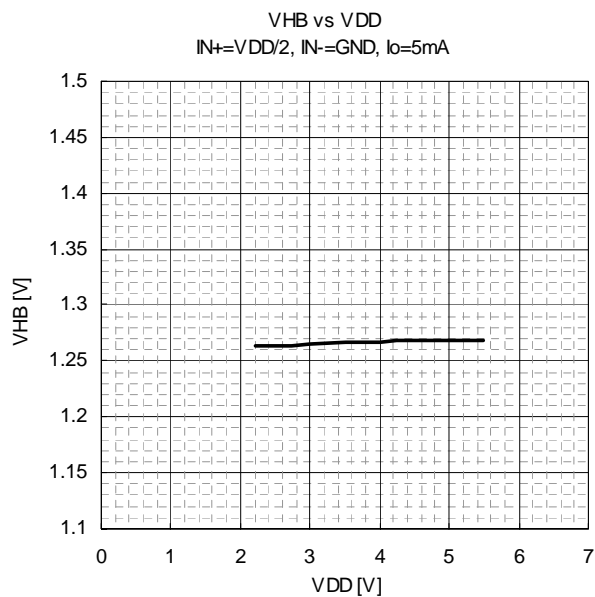
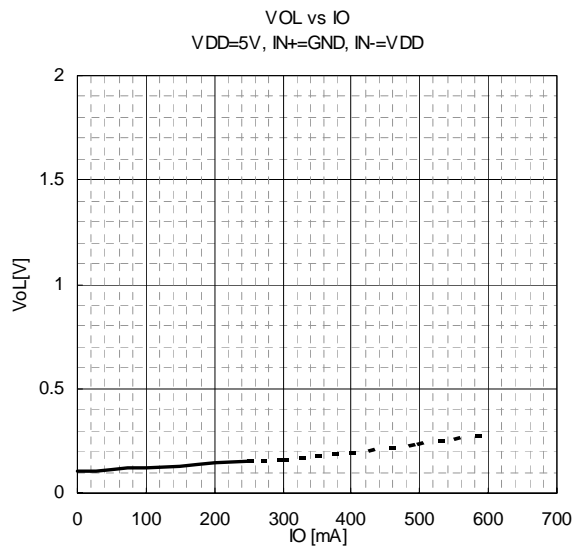
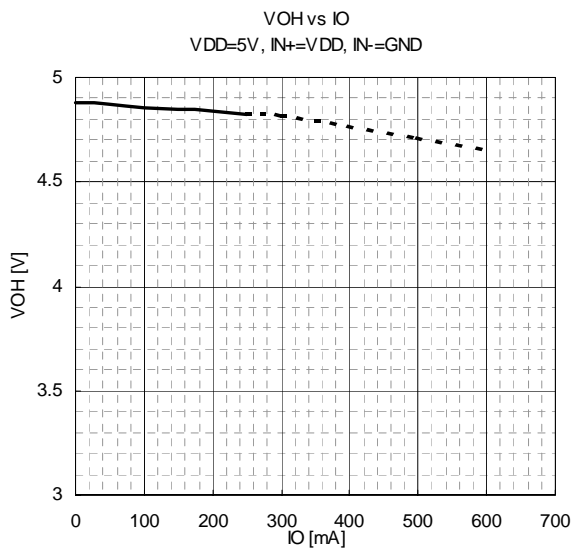
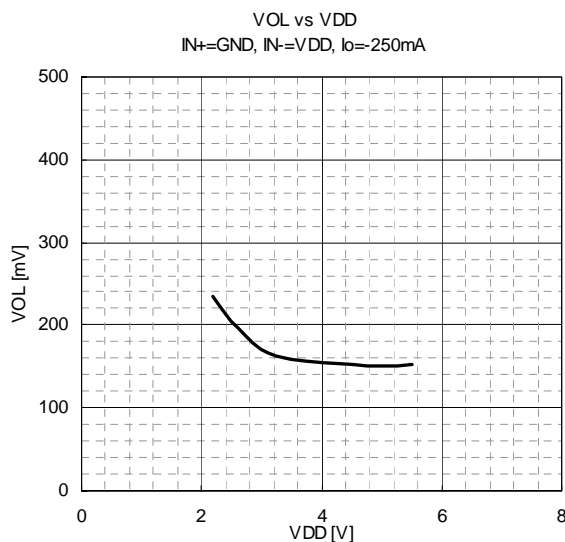
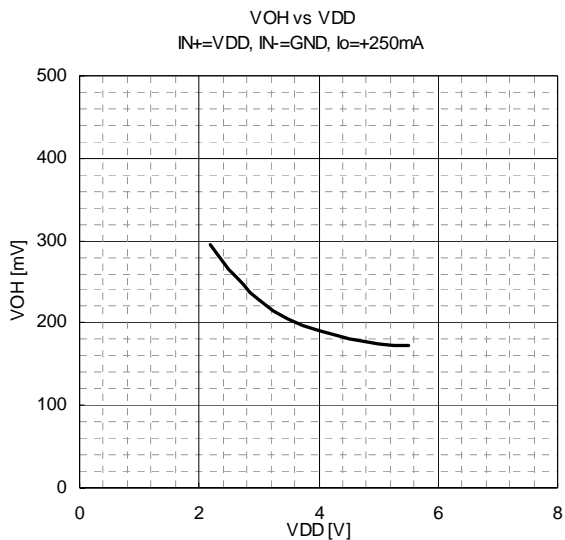
POWER DISSIPATION



TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS

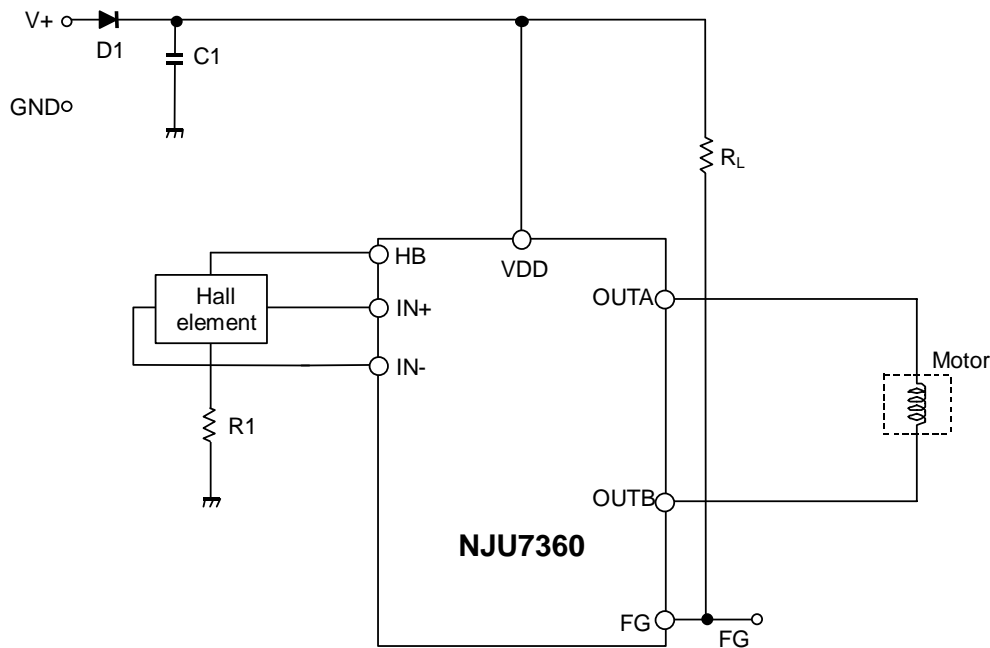


APPLICATION NOTE

The NJU7360 are single-phase DC brushless motor driver IC in small TVSP8 package. With minimal external components, that can drive up to 250mA of motor current for small fan application.

[Application Circuit Example]

1) Hall Bias unused application circuit



[Design Notes]

Above application example is designed for 5V operation with motor current of 250mA. 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.

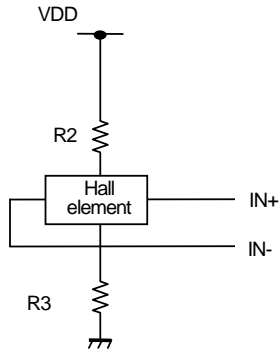
2. Position Detection Circuit Hall Device

2-1. When using HB (R1 design)

By connecting a Hall device to the Hall bias terminal (HB), a constant Hall output amplitude that has good temperature characteristics is obtained, resulting in stable linear drive. If it is necessary to adjust the Hall output amplitude, perform adjustment with R1.

2-2. When using V_{DD} (R2 and R3 design)

When it is necessary to increase the Hall bias current to increase the Hall output amplitude, obtain Hall bias from V_{DD}. The input bias voltage for the amplifier must be used within the Hall input common mode voltage (0.4 - V_{DD}-1 V) including the amplitude of the signal. It is recommended that the Hall bias voltage be one half of the power supply voltage, that is, V_{DD}/2.

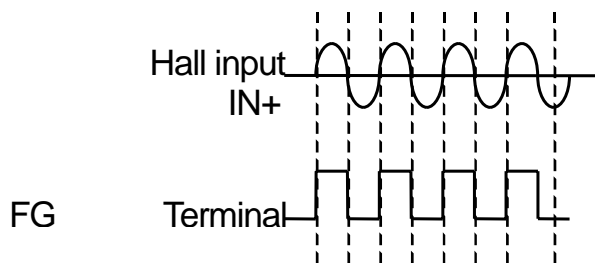


3. Design of FG output resistance (R_L)

FG Out (FG: Pin5) is an open drain output and R_L is a pull up register. A typical value of R_L is 10k Ω .

The timing chart of FG Out is as follows.

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



[CAUTION]
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