

## Single-phase DC Brushless Motor Driver IC

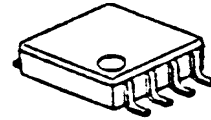
### ■ GENERAL DESCRIPTION

The NJU7367 is a single-phase motor driver IC. It features lock detect, FG output and thermal shutdown circuit functions.

The motor rotational speed is controlled by PWM input pulse.

The NJU7367 is available in a small and thin 8-lead MSOP(TVSP) package.

### ■ PACKAGE OUTLINE



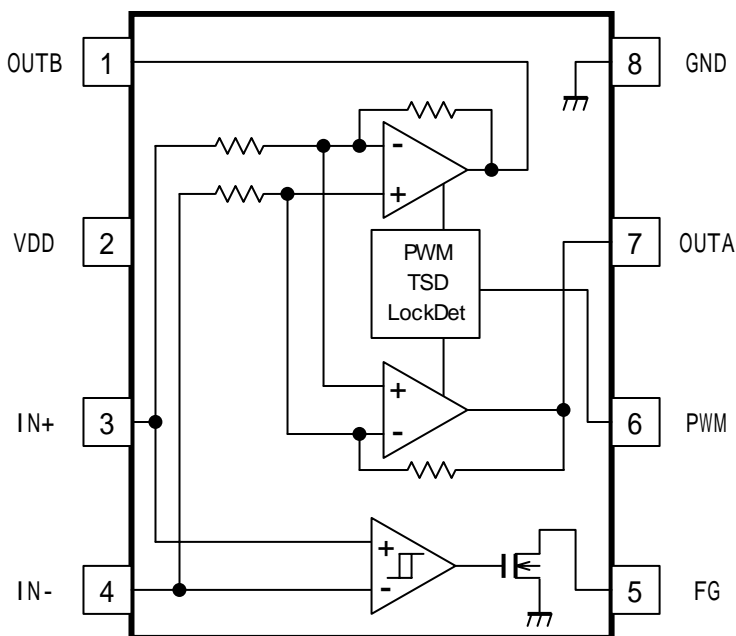
NJU7367RB1  
(MSOP8 (TVSP8))

### ■ FEATURES

- Supply Voltage  $V_{DD}=2.0$  to  $5.5V$
- Low Quiescent Current  $I_{DD}=1.0mA$  typ.
- Maximum Output Voltage  $V_{OH}=4.8V$  typ. @  $I_o=+350mA$ ,  $V_{OL}=0.2V$  typ. @  $I_o=-350mA$
- Input Offset Voltage  $V_{IO}=\pm 10mV$
- Direct PWM Input
- Lock Detect
- FG Output
- Thermal Shutdown Circuit
- CMOS Technology
- Package Outline MSOP8 (TVSP8)\*

\*MEET JEDEC MO-187-DA/THIN TYPE

### ■ BLOCK DIAGRAM



### ■ PIN FUNCTION

PIN No.	PIN NAME
1	OUTB
2	VDD
3	IN+
4	IN-
5	FG
6	PWM
7	OUTA
8	GND

# NJU7367

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS		UNIT
Supply Voltage	V <sub>DD</sub>	+7.0		V
Input Voltage	V <sub>ID</sub>	-0.3 to V <sub>DD</sub>		V
PWM Input Voltage	V <sub>PWM</sub>	-0.3 to V <sub>DD</sub>		V
Output Current (Peak)	I <sub>OPEAK</sub>	700		mA
FG Output Current	I <sub>FG</sub>	10		mA
FG Output Voltage	V <sub>FG</sub>	+7.0		V
Power Dissipation	P <sub>D</sub>	Device itself	400	mW
		Mounted on 2Layer Board (*1)	510	
Operating Temperature	Topr	-40 to +85		°C
Junction Temperature	Tjmax	150		°C
Storage Temperature	Tstg	-50 to +150		°C

(\*1): Mounted on glass epoxy board based on EIA/JEDEC. (76.2 × 114.3 × 1.6mm: 2-Layers FR-4)

## ■ RECOMMENDED OPERATING CONDITIONS

(Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V <sub>DD</sub>	-	2.0	5.0	5.5	V

## ■ ELECTRICAL CHARACTERISTICS

( $V_{DD}=5V$ ,  $T_a=25^{\circ}C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<b>■ GENERAL</b>						
Quiescent Current	$I_{DD}$	$I_{N+}=3.9V$ , $I_{N-}=0.4V$	-	1.0	1.5	mA
Thermal Shutdown Operating Temperature	$T_{TSD}$	-	-	170	-	$^{\circ}C$
Thermal Shutdown Hysteresis	$T_{HYS}$	-	-	20	-	$^{\circ}C$
<b>■ HALL AMP BLOCK</b>						
Input Offset Voltage	$V_{IO}$	-	-10	-	10	mV
Common Mode Input Voltage Range	$V_{ICM}$	-	0.4	-	3.9	V
Close-loop Gain	$A_V$	-	-	44.5	-	dB
<b>■ OUTPUT BLOCK</b>						
Output Voltage	$V_{OH}$	$I_{O+}=+350mA$	4.7	4.8	-	V
	$V_{OL}$	$I_{O-}=-350mA$	-	0.2	0.3	V
FG L Output Voltage	$V_{FG}$	$I_{FG}=5mA$	-	-	0.2	V
FG H Leak Current	$I_{FG-LEAK}$	$V_{FG}=5V$	-	-	1.0	$\mu A$
<b>■ PWM INPUT BLOCK</b>						
PWM Input Frequency	$f_{PWM}$	-	2	-	50	kHz
Pullup resistance	$R_{PWM}$	-	-	200	-	$k\Omega$
Input H Level Voltage1	$V_{IHP}$	-	2.4	-	5	V
Input L Level Voltage1	$V_{ILP}$	-	0	-	1.4	V
Input H Level Voltage2	$V_{IHP}$	$V_{DD}=2V$	1.1	-	2	V
Input L Level Voltage2	$V_{ILP}$	$V_{DD}=2V$	0	-	0.5	V
<b>■ LOCK DETECT BLOCK</b>						
Lock Detect ON Time	$t_{ON}$	-	-	0.5	-	s
Lock Detect OFF Time	$t_{OFF}$	-	-	5.0	-	s
Lock Detect Ratio	$t_{RATIO}$	-	-	1:10	-	-

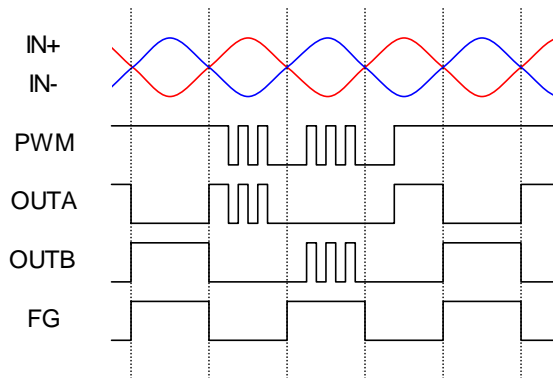
# NJU7367

## TRUTH TABLE

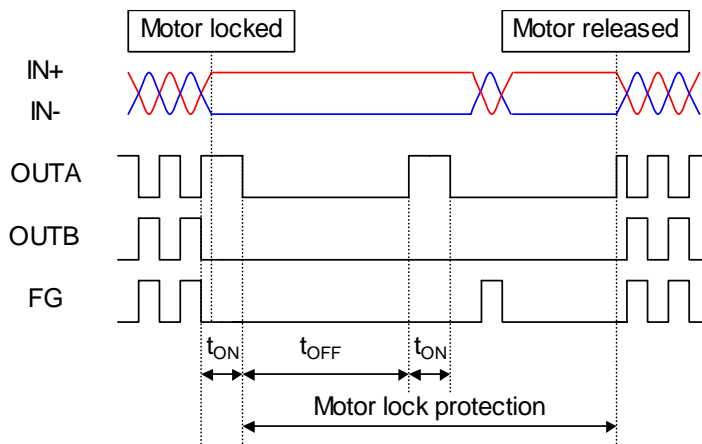
No.	IN+	IN -	PWM	TSD	LD	OUTA	OUTB	FG
1	H	L	H	OFF	OFF	H	L	L
2	L	H	H	OFF	OFF	L	H	Z
3	H	L	L	OFF	OFF	L	L	L
4	L	H	L	OFF	OFF	L	L	Z
5	H	L	H	ON	OFF	L	L	L
6	L	H	H	ON	OFF	L	L	Z
7	H	L	L	ON	OFF	L	L	L
8	L	H	L	ON	OFF	L	L	Z
9	H	L	H	OFF	ON	L	L	L
10	L	H	H	OFF	ON	L	L	Z
11	H	L	L	OFF	ON	L	L	L
12	L	H	L	OFF	ON	L	L	Z
13	H	L	H	ON	ON	L	L	L
14	L	H	H	ON	ON	L	L	Z
15	H	L	L	ON	ON	L	L	L
16	L	H	L	ON	ON	L	L	Z

Z : High Impedance

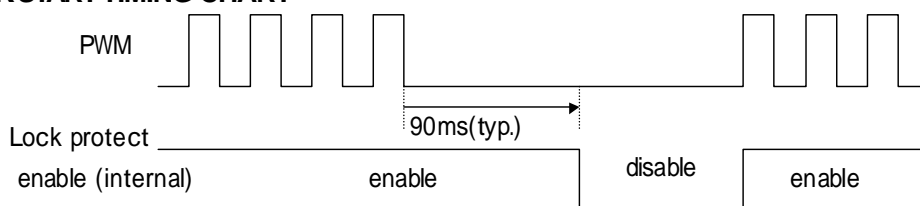
## TIMING CHART at PWM



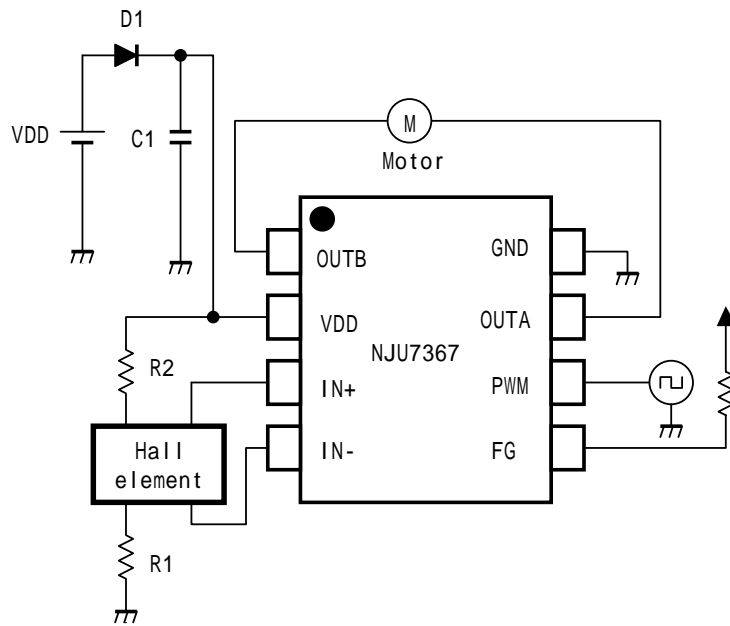
## TIMING CHART at LOCK DETECT



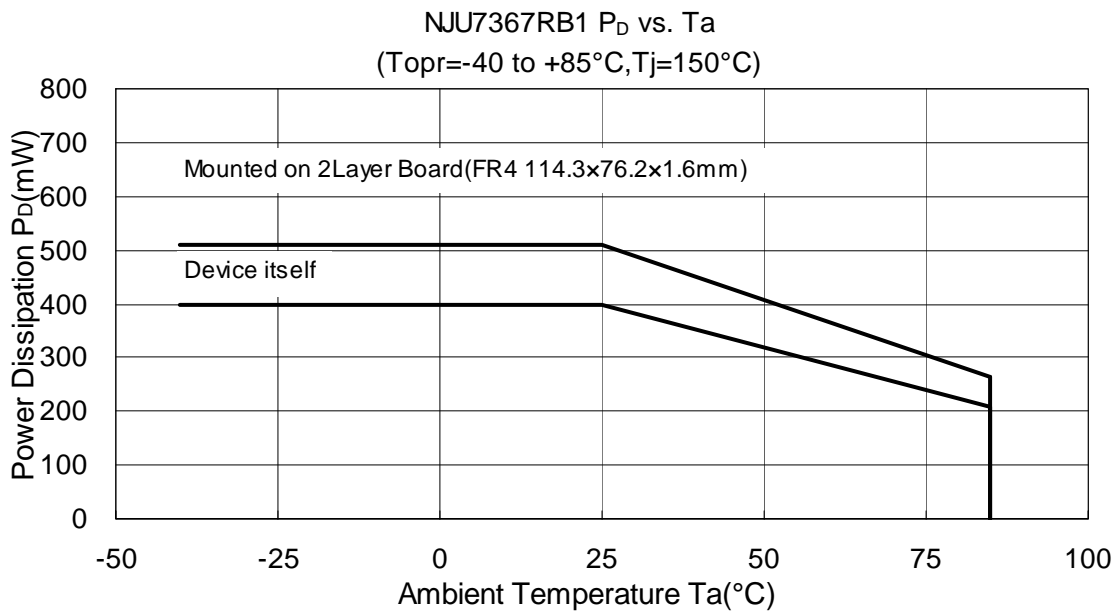
## QUICK START TIMING CHART



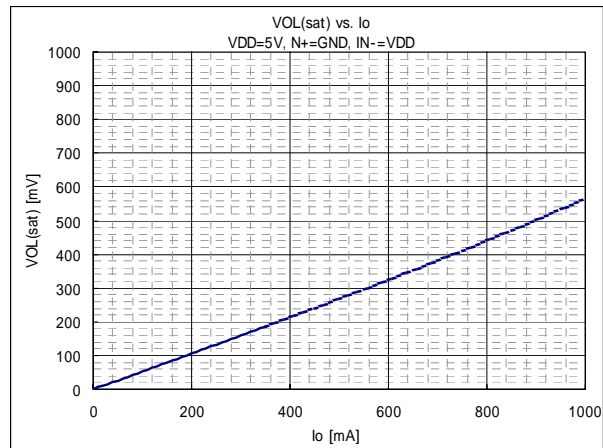
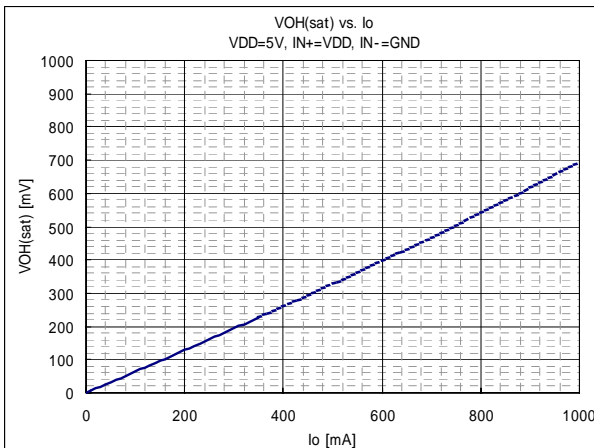
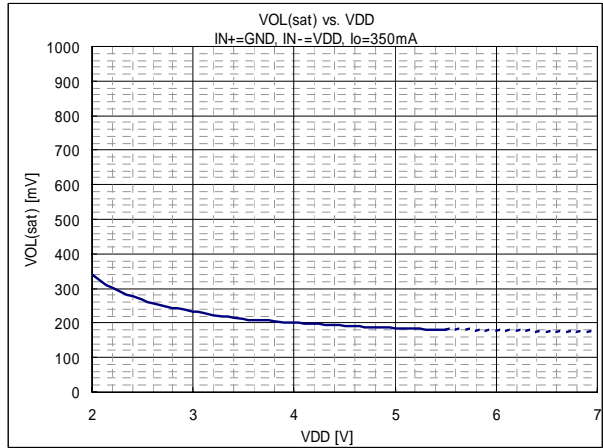
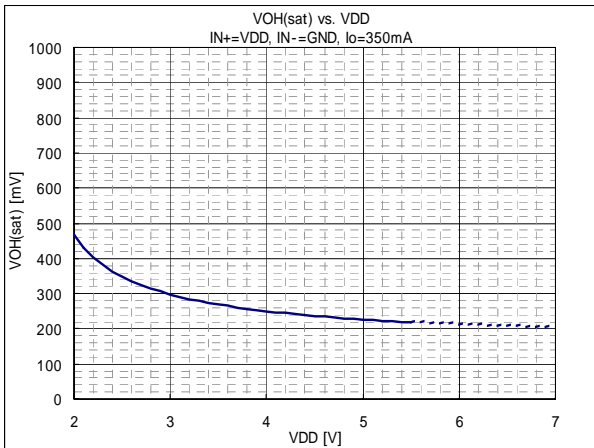
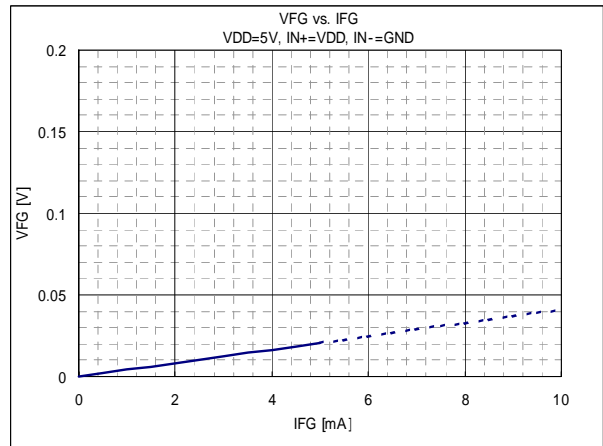
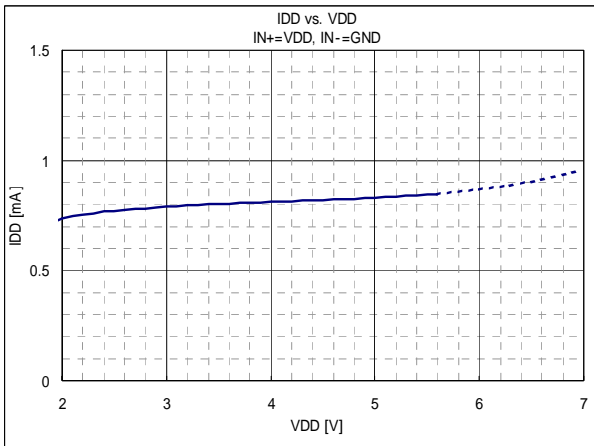
## ■ TYPICAL APPLICATION CIRCUIT



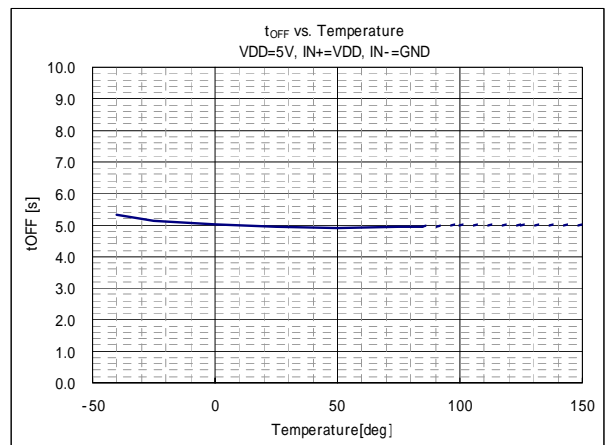
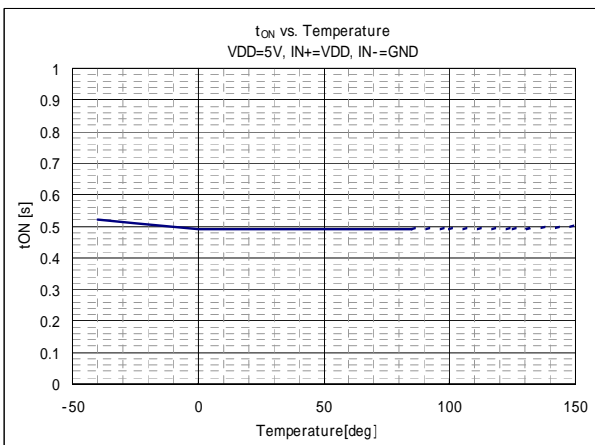
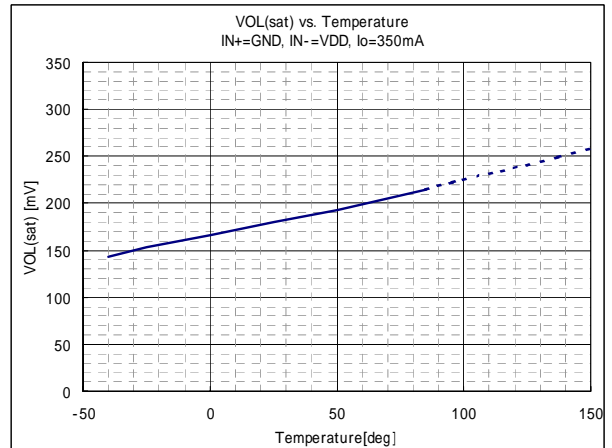
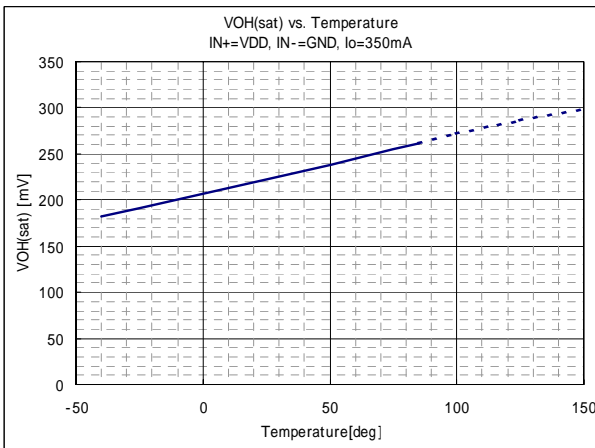
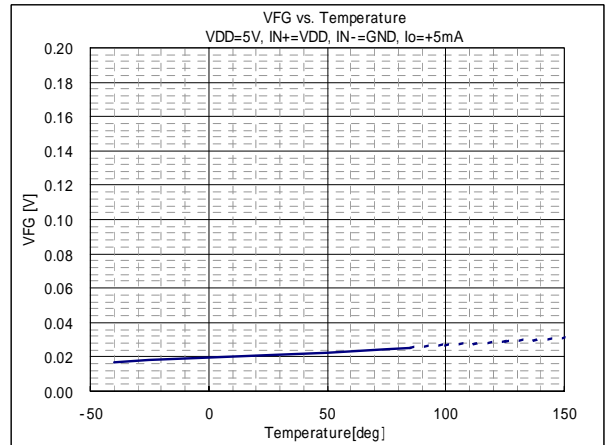
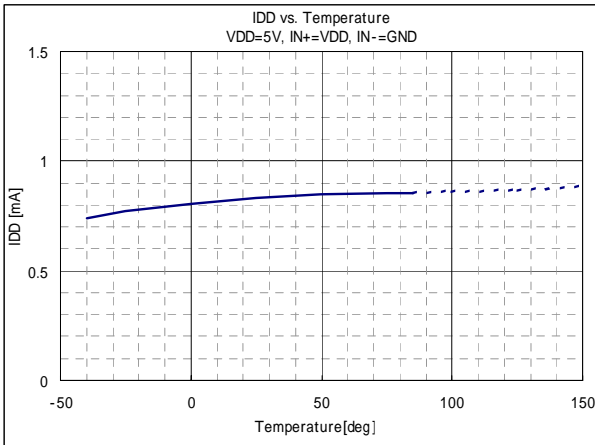
## ■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS



**[CAUTION]**  
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