

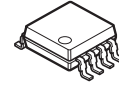
## Single-phase DC Brushless Motor Driver IC

### ■ GENERAL DESCRIPTION

The NJU7365 is a single-phase DC brushless motor driver IC designed for small and high power fan-motor applications. It provides a low operating current of 1.1mA (typ.) and low saturation output voltage at high output current operation, which offers a high efficiency motor driving. It also has a high output current capability of 1000mA (peak) and 350mA (continuous). The NJU7365 has useful functions such as a FG (frequency generator) output useful for various control systems, lock detect, auto-recovery (c-less type), thermal shutdown, linear driving which offers low noise motor driving and direct input of PWM signal for revolution speed control.

The NJU7365 is available in a small and thin package of MSOP8 (TVSP8), which provides downsizing and thinning in motor applications.

### ■ PACKAGE OUTLINE



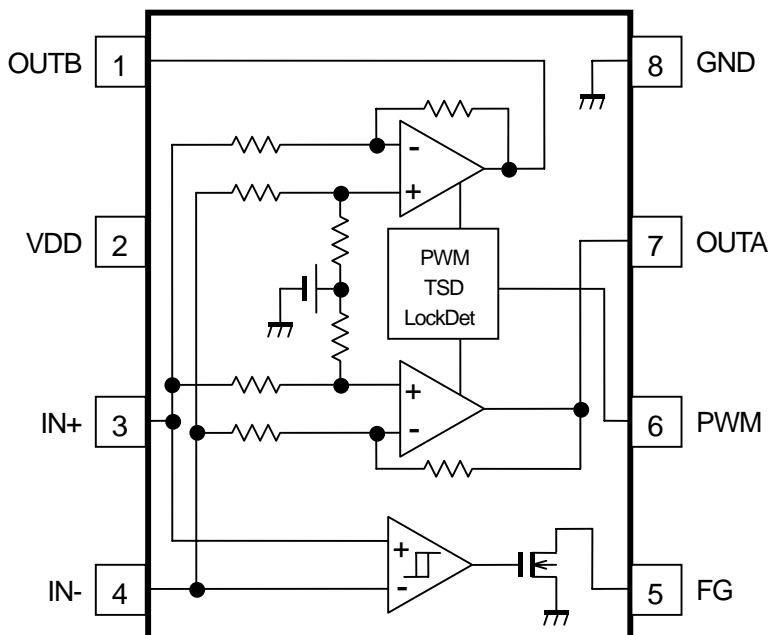
**NJU7365RB1**  
( MSOP8 (TVSP8) )

### ■ FEATURES

- Supply Voltage  $V_{DD}=2.0$  to  $5.5V$
- Low Quiescent Current  $I_{DD}=1mA$  typ.
- Maximum Output Voltage  $V_{OH}=4.7V$  typ. @  $I_o=+350mA$ ,  $V_{OL}=0.2V$  typ. @  $I_o=-350mA$
- 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

# NJU7365

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>DD</sub>	+7	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>	1000	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
		(*1)Mounted on 2Layer Board	510
Operating Temperature	T <sub>opr</sub>	-40 to +85	°C
Junction Temperature	T <sub>jmax</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-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<sub>DD</sub>=5V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<b>■ GENERAL</b>						
Quiescent Current	I <sub>DD</sub>	IN+=3.9V, IN-=0.4V	-	1.1	1.8	mA
Thermal Shutdown Operating Temperature	T <sub>TSD</sub>	-	-	170	-	°C
Thermal Shutdown Hysteresis	T <sub>HYS</sub>	-	-	20	-	°C
<b>■ HALL AMP BLOCK</b>						
Input Offset Voltage	V <sub>IO</sub>	-	-10	-	10	mV
Common Mode Input Voltage Range	V <sub>ICM</sub>	-	0.4	-	3.9	V
Close-loop Gain	A <sub>V</sub>	-	-	46.4	-	dB
<b>■ OUTPUT BLOCK</b>						
Output Voltage	V <sub>OH</sub>	I <sub>O</sub> =+350mA	4.6	4.7	-	V
	V <sub>OL</sub>	I <sub>O</sub> =-350mA	-	0.2	0.3	V
FGL Output Voltage	V <sub>FG</sub>	I <sub>FG</sub> =5mA	-	-	0.2	V
FGH Leak Current	I <sub>FG-LEAK</sub>	V <sub>FG</sub> =5V	-	-	1.0	uA
<b>■ PWM INPUT BLOCK</b>						
PWM Input Frequency	f <sub>PWM</sub>	-	2	-	50	kHz
Pullup resistance	R <sub>PWM</sub>	-	-	200	-	kΩ
Input H Level Voltage1	V <sub>IHP1</sub>	-	3.0	-	-	V
Input H Level Voltage2	V <sub>IHP2</sub>	V <sub>DD</sub> =2V	1.4	-	-	V
Input L Level Voltage1	V <sub>ILP1</sub>	-	0	-	1.5	V
Input L Level Voltage2	V <sub>ILP2</sub>	V <sub>DD</sub> =2V	0	-	0.5	V
<b>■ LOCK DETECT BLOCK</b>						
Lock Detect ON Time	t <sub>ON</sub>	-	-	0.66	-	s
Lock Detect OFF Time	t <sub>OFF</sub>	-	-	6.6	-	s
Lock Detect Ratio	t <sub>RATIO</sub>	-	-	1:10	-	-

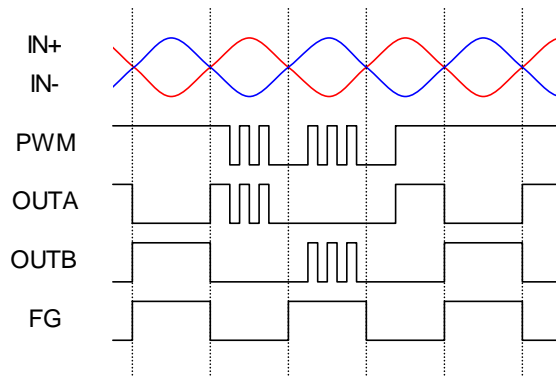
## TRUTH TABLE

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	Z
10	L	H	H	OFF	ON	L	L	Z
11	H	L	L	OFF	ON	L	L	Z
12	L	H	L	OFF	ON	L	L	Z
13	H	L	H	ON	ON	L	L	Z
14	L	H	H	ON	ON	L	L	Z
15	H	L	L	ON	ON	L	L	Z
16	L	H	L	ON	ON	L	L	Z

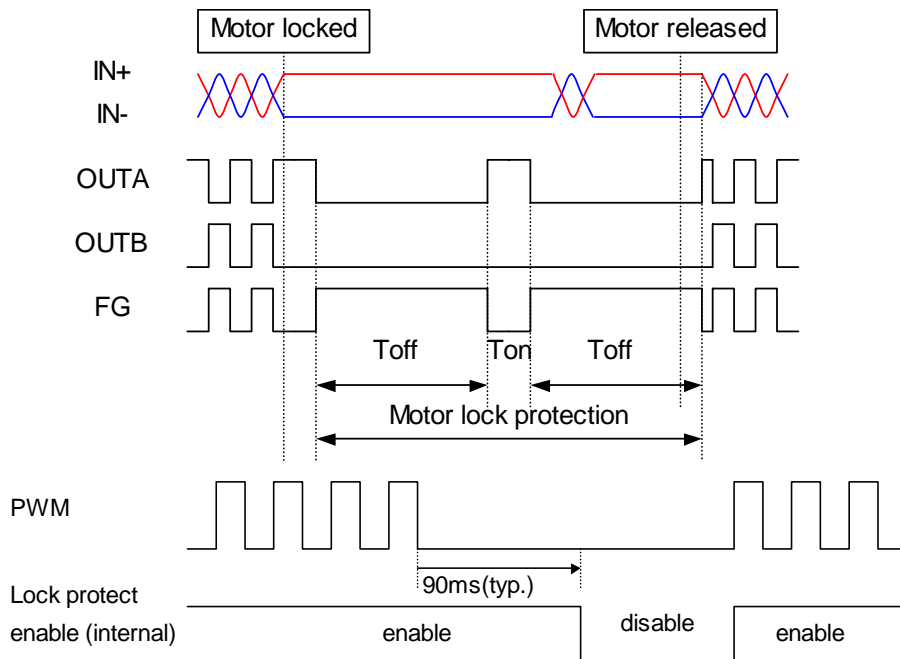
Z : High Impedance

\*FG output turns to "L" when PWM "L" state is within fixed time(90ms typ.).

## TIMING CHART at PWM

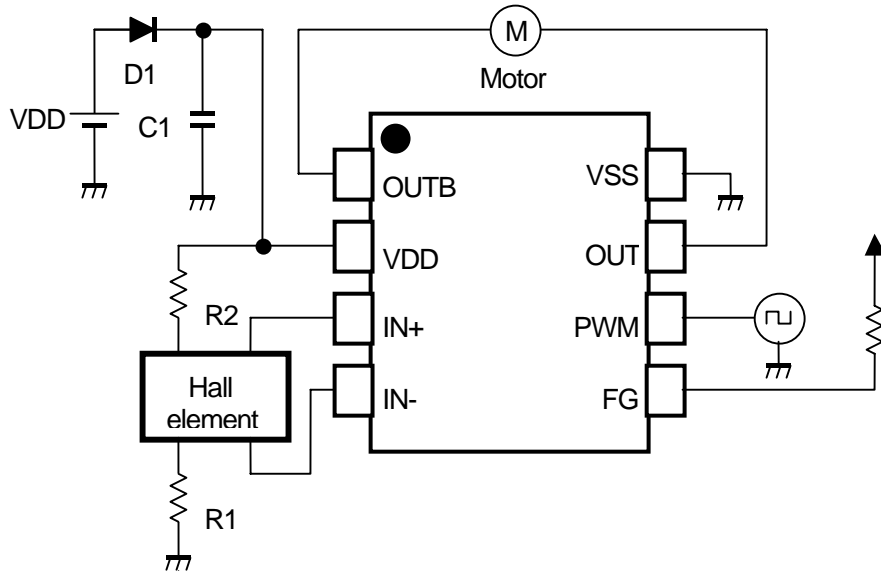


## TIMING CHART at LOCK DETECT

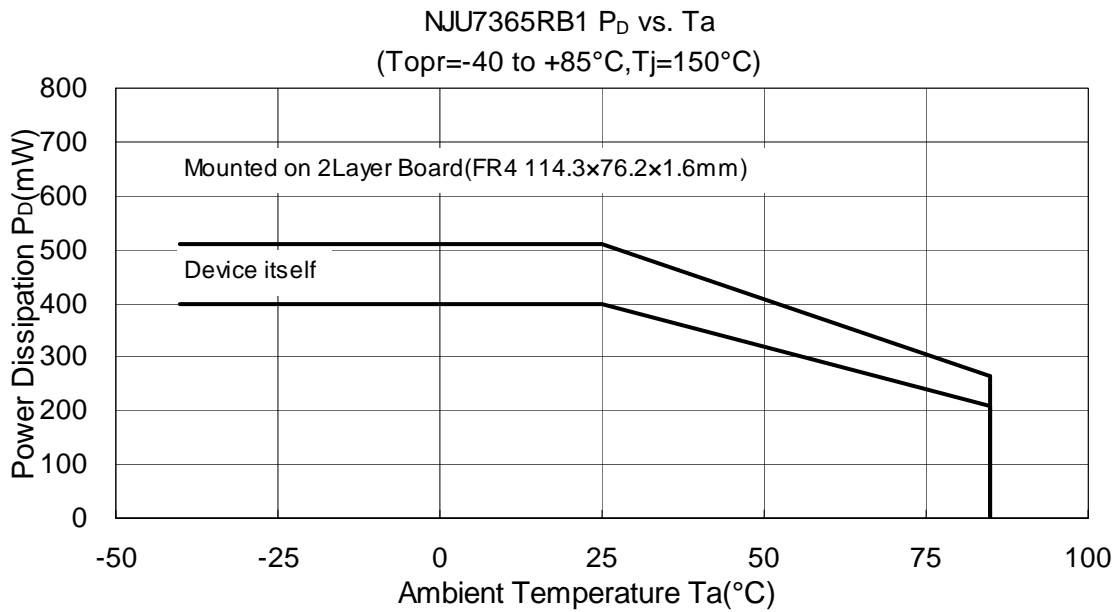


# NJU7365

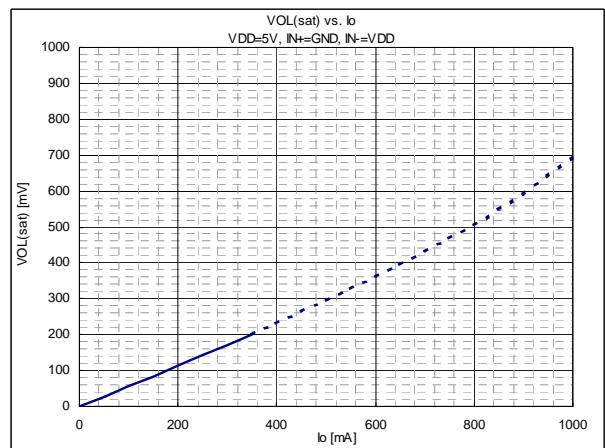
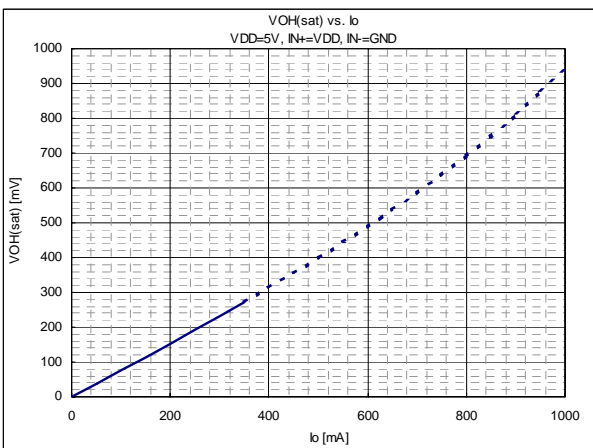
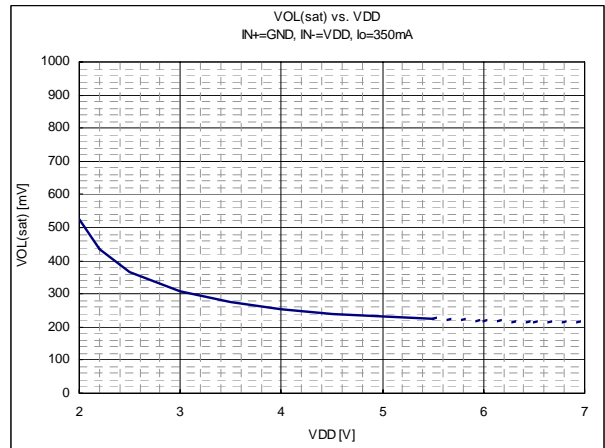
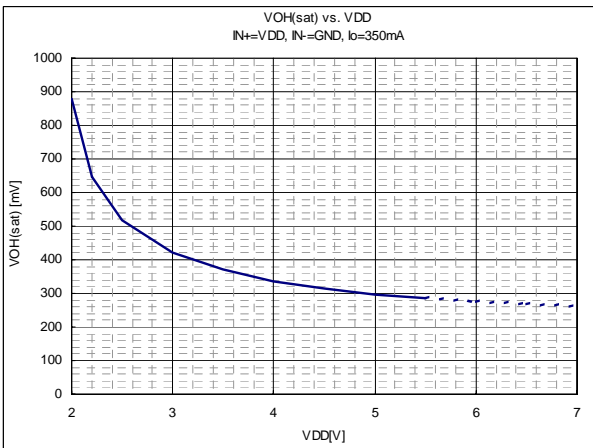
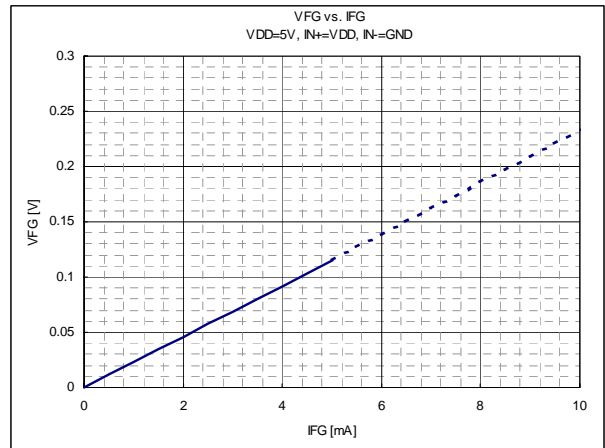
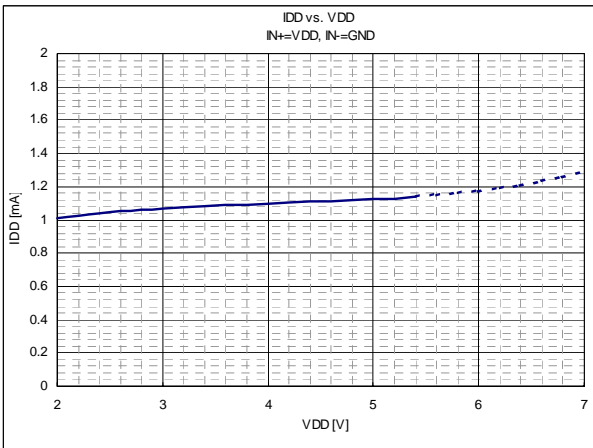
## ■ TYPICAL APPLICATION CIRCUIT



## ■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



## TYPICAL CHARACTERISTICS



**[CAUTION]**  
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