

Single-phase DC Brushless Motor Driver IC

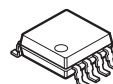
■ GENERAL DESCRIPTION

The NJU7357 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 2mA (typ.) and low saturation output voltage at high output current operation, which offers high efficiency motor driving. It also has a high output current capability of 1000mA (peak) and 400mA (continuous).

The NJU7357 has useful functions such as a FG (frequency generator) output useful for various control systems, lock detect, auto-release (c-less type), thermal shutdown, linear driving which offers low noise motor driving and direct input of PWM signal for revolution speed control. The NJU7357 is available in a small and thin package of MSOP8 (TVSP8), which provides downsizing and thinning in motor applications.

■ PACKAGE OUTLINE



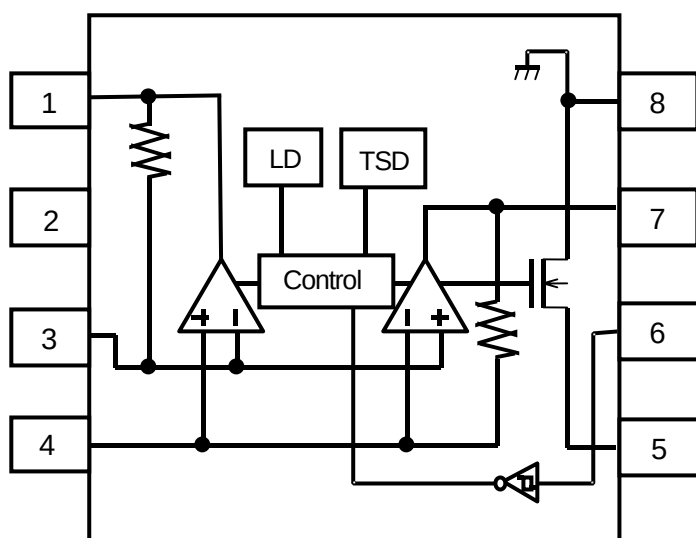
NJU7357RB1
(MSOP8 (TVSP8))

■ FEATURES

- Operating Voltage 2.2 to 5.5V
- Low Operating Current $I_{DD}=2\text{mA}$
- Low Saturation Output Voltage
 $V_{sat} = \pm 0.2\text{V} @ I_o = \pm 400\text{mA}$
- Lock Detect / Auto Release Circuit (Condenser less type)
- Thermal Shutdown Circuit
- Frequency Generator Output
- CMOS Technology
- Package Outline MSOP8 (TVSP8)*

*MEET JEDEC MO-187-DA/ THIN TYPE

■ BLOCK DIAGRAM



■ PIN FUNCTION

- 1: OUT B
- 2: V_{DD}
- 3: IN +
- 4: IN -
- 5: FG
- 6: PWM_IN
- 7: OUT A
- 8: V_{SS}

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	RATINGS	SYMBOL (unit)	NOTE
Supply Voltage	+7.0	V_{DD} (V)	
Input Voltage	-0.3 to V_{DD}	V_{ID} (V)	(*1)
Output Current (Peak)	1000	$I_{O\ PEAK}$ (mA)	(*2)
Operating Temperature Range	-40 to +85	T_{opr} (°C)	
Storage Temperature Range	-50 to +150	T_{stg} (°C)	
Power Dissipation	400	P_D (mW)	Device itself
Junction Temperature	150	T_{jmax} (°C)	

(*1). Input voltage is not to be over supply voltage to really use.

(*2). This value is not to be over P_D .

■ RECOMMENDED OPERATING CONDITIONS

(Ta=25°C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{DD}	-	2.2	5.0	5.5	V

■ ELECTRICAL CHARACTERISTICS

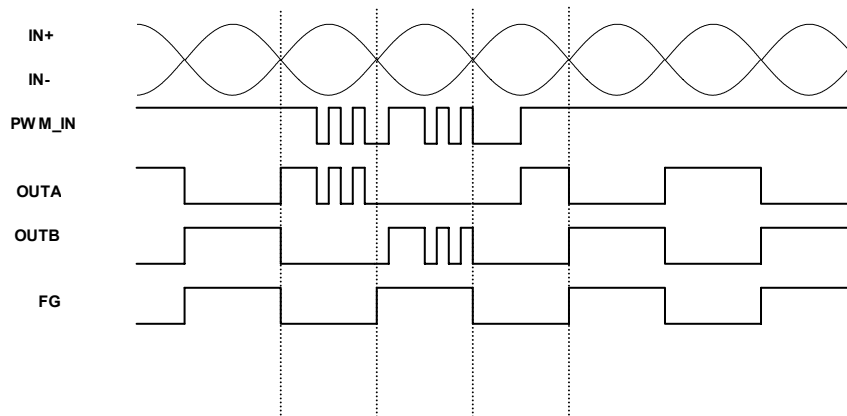
($V_{DD}=5V$, $T_a=25^{\circ}C$)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
General						
Operating Current	I_{DD}	-	-	2.0	5.0	mA
Thermal Shutdown Temperature	T_{TSD}	-	-	180	-	$^{\circ}C$
Thermal Shutdown Hysteresis	T_{HYS}	-	-	50	-	$^{\circ}C$
Hall Amplifier						
Input Offset Voltage	V_{IO}	-	-10	-	10	mV
Feedback Resistance	R_F	-	-	27.5	-	$k\Omega$
Open Loop Gain	A_V	-	-	70	-	dB
Input Common Mode Voltage Range	V_{ICM}	-	0.4	-	4.0	V
Output						
Maximum Output Voltage Range	V_{OH}	$I_O=+400mA$	4.65	4.80	-	V
	V_{OL}	$I_O=-400mA$	-	0.20	0.35	
Output Resistance	R_{ONH}	$I_O=+400mA$	-	0.5	-	Ω
	R_{ONL}	$I_O=-400mA$	-	0.5	-	
FG L Output Voltage	V_{FG}	$IN+=5V, IN-=0V, RL=10\Omega$	-	-	0.3	V
FG H Leak Current	$I_{FG-LEAK}$	$IN+=0V, IN-=5V, FG=5V$	-	-	1.0	μA
Lock Detect Circuit*						
Lock Protect ON Time	T_{ON}	-	-	0.4	-	sec
Lock Protect OFF Time	T_{OFF}	-	-	2.8	-	sec
Detect Protection ON/OFF Ratio	TV_{RATIO}	-	-	1:7	-	-
PWM Input						
PWM Input Frequency Ratio	F_{PWM}	-	16	-	50	kHz
PWM pull-up Resistance	R_{PWM}	-	-	50	-	$k\Omega$
Input H Level Voltage	V_{IHP}	-	$0.7V_{DD}$	-	V_{DD}	V
Input L Level Voltage	V_{ILP}	-	-	-	$0.3V_{DD}$	V

■ INPUT-OUTPUT TRUTH TABLE

IN+	IN -	PWM	OUTA	OUTB	FG
H	L	H	H	L	L (Output Transistor ON)
L	H	H	L	H	Z (Output Transistor OFF)
H	L	L	L	L	L (Output Transistor ON)
L	H	L	L	L	Z (Output Transistor OFF)

■ PWM TIMING CHART



■ FG TIMING CHART

