DESCRIPTION

The AD8812 is a low-voltage DC motor driver IC specifically designed for low-voltage operating systems. It integrates 4 low-resistance MOS and forward, reverse, brake, and stop functions.

AD8812 protection function, when the output short circuit occurs, the output current increases instantaneously, the circuit power consumption rises sharply, and the chip temperature rises sharply, when the chip temperature exceeds the maximum temperature point set by the internal temperature protection circuit, the internal circuit shuts down the built-in power switch to cut off the load current.

The AD8812 is available in SOP8 package.

ORDERING INFORMATION

Package Type		Part Number
SOP8 SPQ:4,000pcs/Reel	M8	AD8812M8R
		AD8812M8VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

FEATURES

● Operating Voltage Range: 2.1V~6.8V.

● Low Operating Current: 6.5uA (TYP.)

● Low Standby Current: 0.1uA (TYP.)

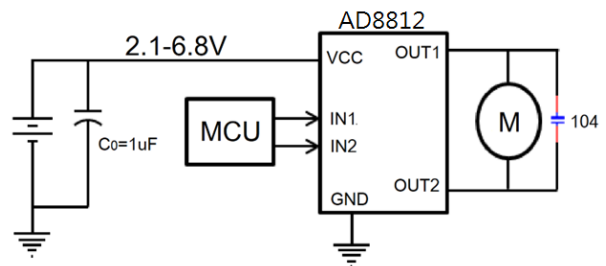● Continuous Working Current: 1.0A (TYP.)

● Peak Current:1.5A

● SOP8 Package

APPLICATION
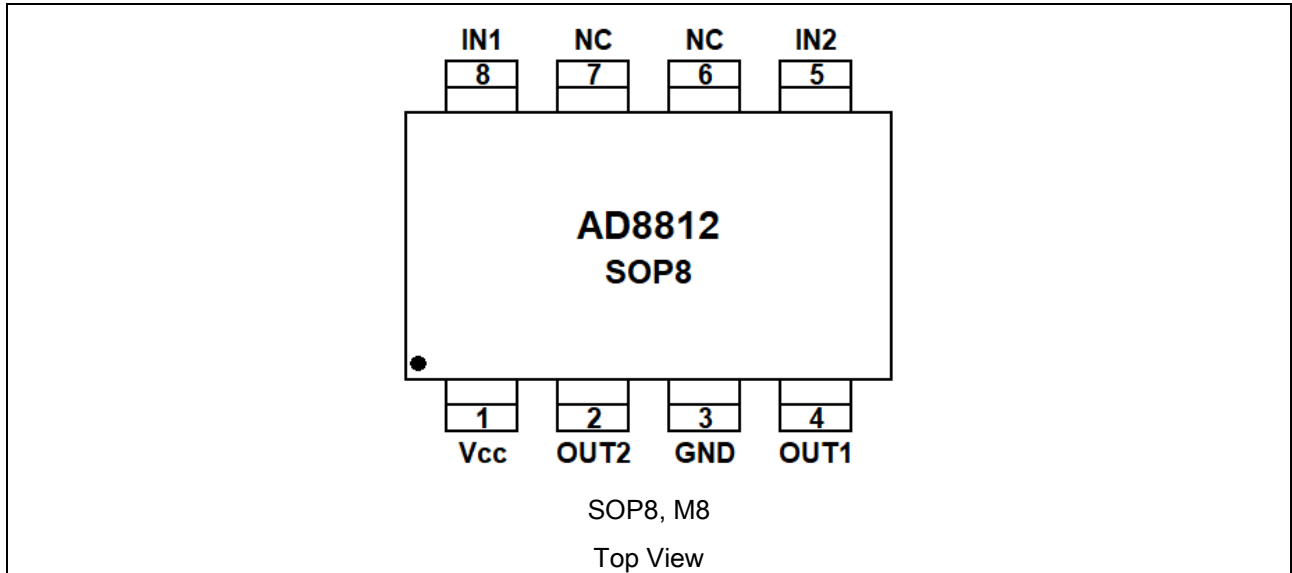
● IR-CUT Drive

● Tooth Blush

● Handheld Devices

TYPICAL APPLICATION

PIN DESCRIPTION

```
        IN1    NC     NC    IN2
        [8]   [7]    [6]    [5]

            AD8812
             SOP8

   ●
        [1]   [2]    [3]    [4]
        Vcc   OUT2   GND   OUT1
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SOP8, M8

Top View

PIN#	Symbol	Function
1	Vcc	Power Input Pin, Connect a Capacitor of 1uf or Greater between Vcc and GND
2	OUT2	OUTPUT Pin: OUT2
3	GND	Grand Pin
4	OUT1	OUTPUT Pin: OUT1
5	IN2	Logical Input IN2
6	NC	No Connect
7	NC	No Connect
8	IN1	Logical Input IN1

ABSOLUTE MAXIMUM RATINGS

VDD, Supply Voltage	-0.3 ~ +7.0V
IN1, IN2, Input Voltage	-0.3 ~ +7.0V
VDD, IN1, IN2, OUT1, OUT2, ESD	2KV
T_J, Operating Temperature	-40℃ ~ +150℃
T_{stg}, Storage Temperature	-65℃ ~ +150℃
$θ_{JA}$, Thermal Resistance	260°C/W

Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.

RECOMMENDED WORKING RANGE

| Parameter	Symbol	Min	Typ.	Max	Unit
Supply Voltage	V_{CC}	2.1	-	6.8	V
Input Voltage	IN1, IN2	2.1	-	6.8	
Export Current	IOUT1, IOUT2	0	-	1	A

ELECTRICAL CHARACTERISTICS

V_{CC}=6.0V, T_a=25℃, R_{LOAD}=20, Unless otherwise specified

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
MOTOR DRIVER OUTPUT						
Output Impedance	RDSON	I_{OUT}=400mA	-	0.6	1.3	Ω
CONTROL INPUTS (IN1/IN2)						
High Input Voltage	V_{INH}		20	-	VDD	V
Low Level Input Voltage	V_{INL}		0	-	0.7	V
High Input Current	I_{INH}		-	2.5	5.0	uA
Low Input Current	I_{INL}		-	0	1	uA
Pull-Down Resistors	R_{PD}		-	1.3	2.0	KΩ
OPERATING CURRENT						
Chip Shutdown Current	I_{DD_OFF}	IN1=IN2=0	-	0	1	uA
Chip Operating Current	I_{DD_ON}		-	65	100	uA
PROTECTION CIRCUITS						
Thermal Shutdown Temperature	T_{OTSD}		-	150	-	°C
Thermal Shutdown Hysteresis	T_{HYS}		-	30	-	°C

BLOCK DIAGRAM
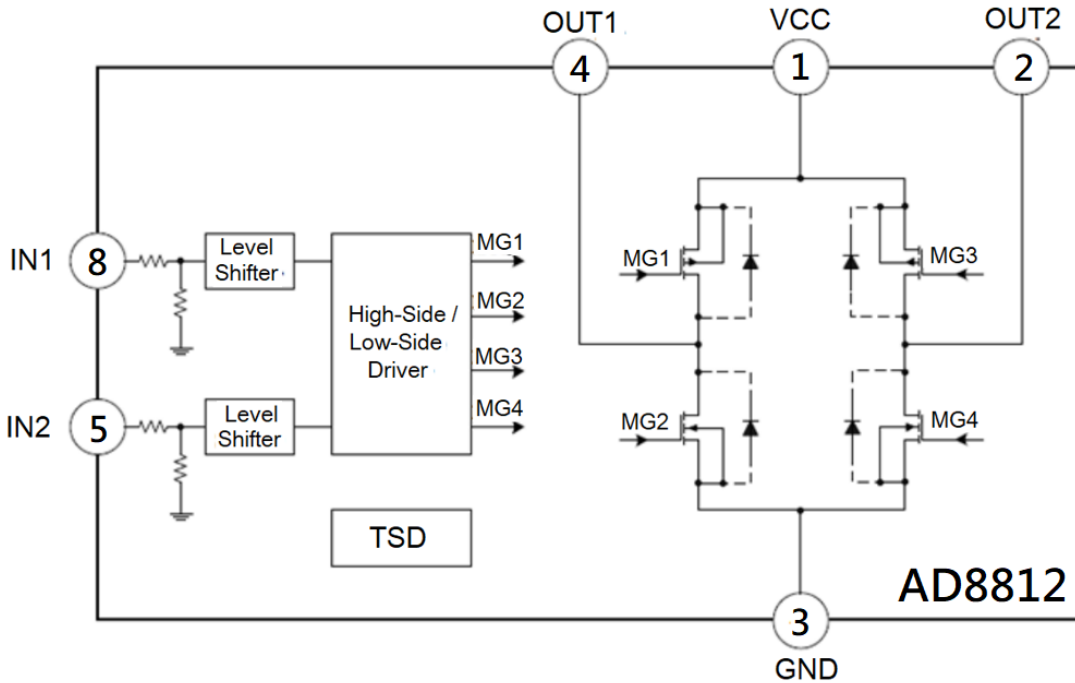
INPUT-OUTPUT LOGICAL TABLE

IN1	IN2	OUT1	OUT2	Working Status	Operating Current
L	L	Hi-Z	Hi-Z	Stop	I_{CC_OFF}
H	L	H	L	Forward	I_{CC_ON}
L	H	L	H	Back Off	I_{CC_ON}
H	H	L	L	Brake	I_{CC_ON}

INPUT-OUTPUT WAVEFORMS
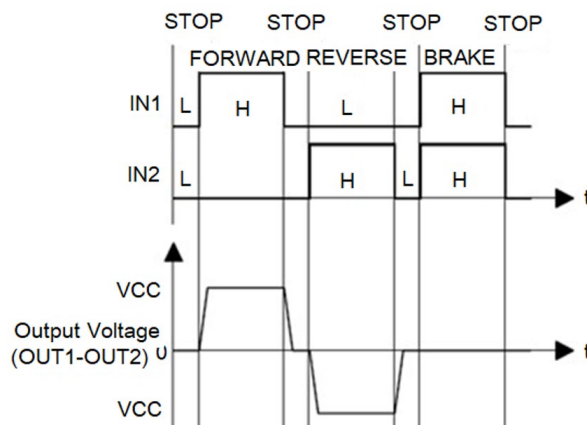
DETAILED INFORMATION

Operating Mode

H-Bridge basic operating mode：

A) Stop mode

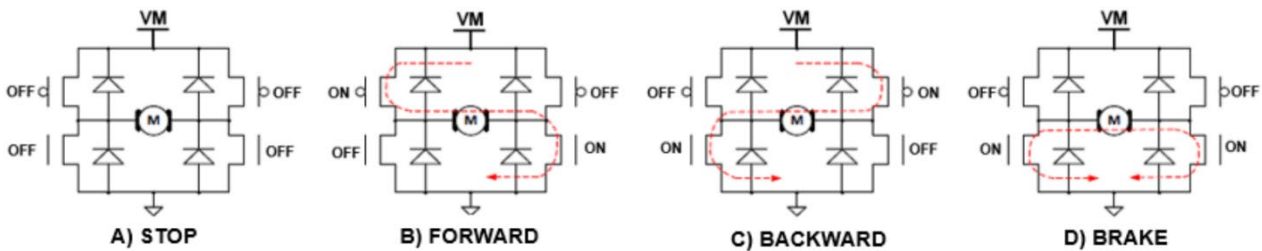Definition：When IN1= IN2= L, then OUT1=OUT2=Hi-Z

B) Forward mode

Definition：When IN1=H, IN2=L, then OUT1=H, OUT2=L

C) Reverse mode

Definition：When IN1=L, IN2=H, then OUT1=H, OUT2=L

D) Brake mode

Definition：When IN1=IN2= H，then OUT1=OUT2=L

e) PWM mode A

When the input signal IN1 is a PWM signal, IN2=0 or IN1=0, and IN2 is a PWM signal, the rotational speed of the motor will be affected by PWM signal duty cycle control. In this mode, the motor drive circuit switches between On-and-Stop mode, where all power transistors are turned off and the energy stored inside the motor can only be slowly released through the power MOSFET's body diode.

Note: Due to the presence of a high impedance state in the operating state, the rotational speed of the motor cannot be precisely controlled by the duty cycle of the PWM signal. If the frequency of the PWM signal is too high, the motor will not start.
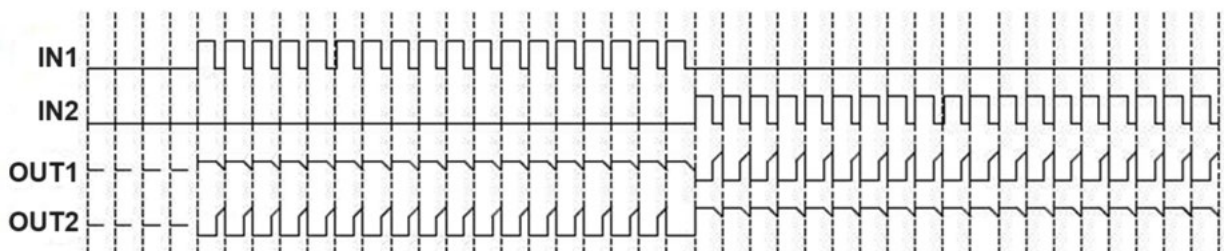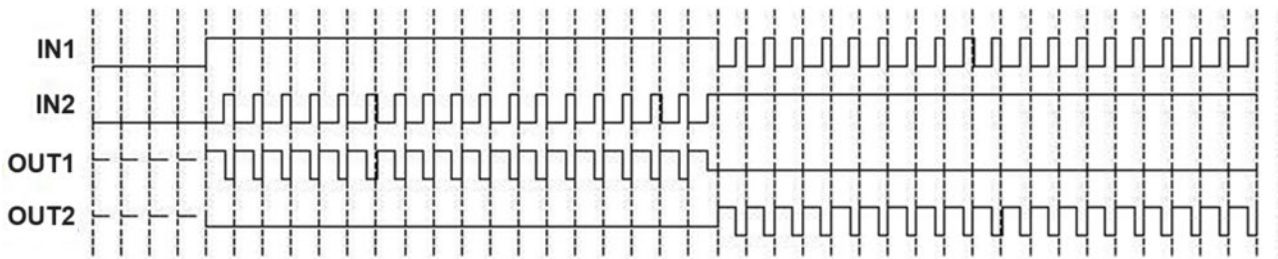

PWM mode A signal waveform

f) PWM mode B

When the input IN1 is a PWM signal, IN2=1 or IN1=1, and IN2 is a PWM signal, the motor's rotational speed is affected by PWM signal duty cycle control. In this mode, the motor drive circuit outputs between the Conduction and Brake modes, where the energy the motor stores is quickly released through the NMOS on the lower side.

Note: Due to the braking state in the working state, the motor energy can be released quickly, and the speed of the motor can be accurately controlled by the duty cycle of the PWM signal, but it must be noted that if the PWM signal frequency is too low, the motor will not be able to rotate smoothly continuously due to entering the Brake mode.

To reduce motor noise, it is recommended the PWM signal frequency is greater than 10KHz and less than 50KHz.

PWM mode B signal waveform

Protection Mechanisms

1) Over-current protection (OCP)

While the IC conducts a large current, 4.5A (Typ.), the internal over-current protection function will be triggered. The device enters protection mode of auto-recover to avoid damaging IC and system.

2) Over-temperature protection

If the IC junction temperature exceeds 180 °C (Typ.), the internal over-temperature protection function will be triggered, partial FETs in the H-bridge are disabled, that will ensure the safety of customers' products. If the IC junction temperature falls to 120 °C(Typ.), the IC resumes automatically.

PACKAGE INFORMATION

Dimension in SOP8 (Unit: mm)
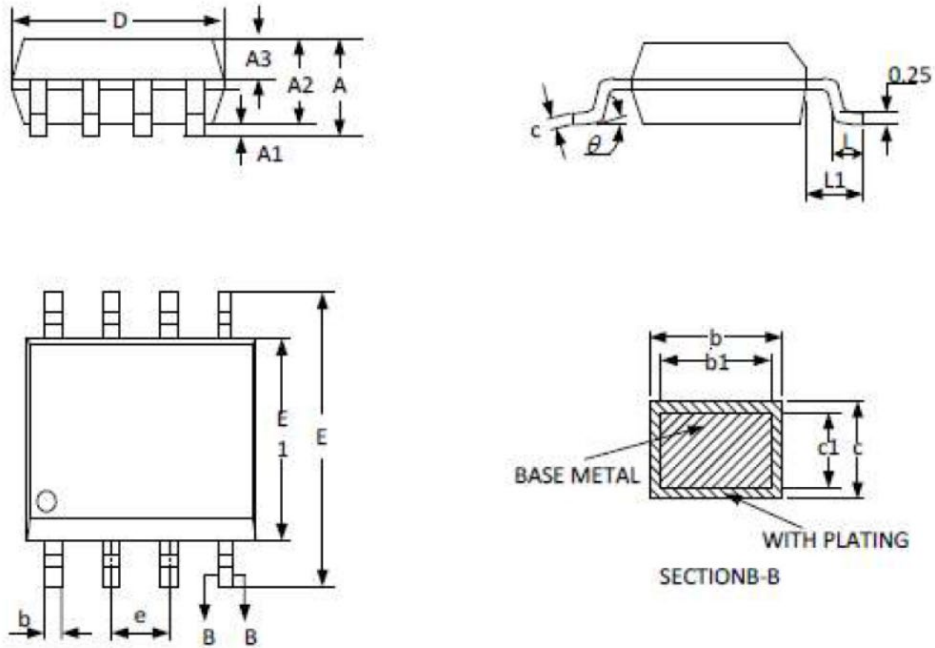
Symbol	Min	Max
A	-	1.77
A1	0.08	0.28
A2	1.20	1.60
A3	0.55	0.75
b	0.39	0.48
b1	0.38	0.43
c	0.21	0.26
c1	0.19	0.21
D	4.70	5.10
E	5.80	6.20
E1	3.70	4.10
e	1.27BSC	
L	0.50	0.80
L1	1.05BSC	
θ	0°	8°

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