One Channel H-Bridge Motor Driver AM2837

Features and Benefits

- Wide supply voltage range up to 13.5V
- Maximum continuous current output up to 3.5A
- Low $R_{DS\ (ON)}$ for high efficient H-bridge output.
- SOP-8 package for small size PCB layout
- Over temperature protection
- Over current protection
- Low standby current
- Low quiescent current

Application

- Small Appliances
- Toy (R/C car)
- DC Brushed Motor Drive

Description

The AM2837 is a channel H-Bridge driver IC, It provides integrated motor-driver solution for robotics, consumer products and battery-powered motion control applications. The output driver block consists of N-channel and P-channel power MOSFETs configured as an H-bridge to drive DC motor.

AM2837 maximum operational voltage is 13.5V. It can supply up to 3.5A of continuous output current. There are internal shutdown functions for over-temperature protection and over-current protection (IOCP = 6.0 A).

Package material is Pb-Free Product & RoHS compliant for the purpose of environmental protection and for sustainable development of the Earth.

Ordering Information

Orderable Part Number	Package	Marking
AM2837	SOP-8	AM2837

Absolute Maximum Ratings (T_A=25℃)

Parameter	Symbol	Limits	Unit
Power Supply Voltage	VCC	15	V
Output Continuous Current	I_{cont}	3.5 (NOTE*)	A
Output peak current	Iomax	6	A
Operate Temperature Range	T_{opr}	-20～+85	℃
Storage Temperature Range	T_{stg}	-40～+150	℃

Note *: Based on 20 x 20 mm^2 FR4 PCB (1 oz.) at single side PCB

Recommended Operating Conditions (T_A =25℃)

(Set the power supply voltage taking allowable dissipation into considering)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	VCC	2.7		13.5	V
Signal Input IN_A and IN_B Voltage	V_{IN_X}	-0.3		6*	V
H-Bridge Output Continuous Current	I_{OUT}	0		3.5(Note**)	A
Externally Applied PWM Frequency	F_{IN_x}			50	KHz

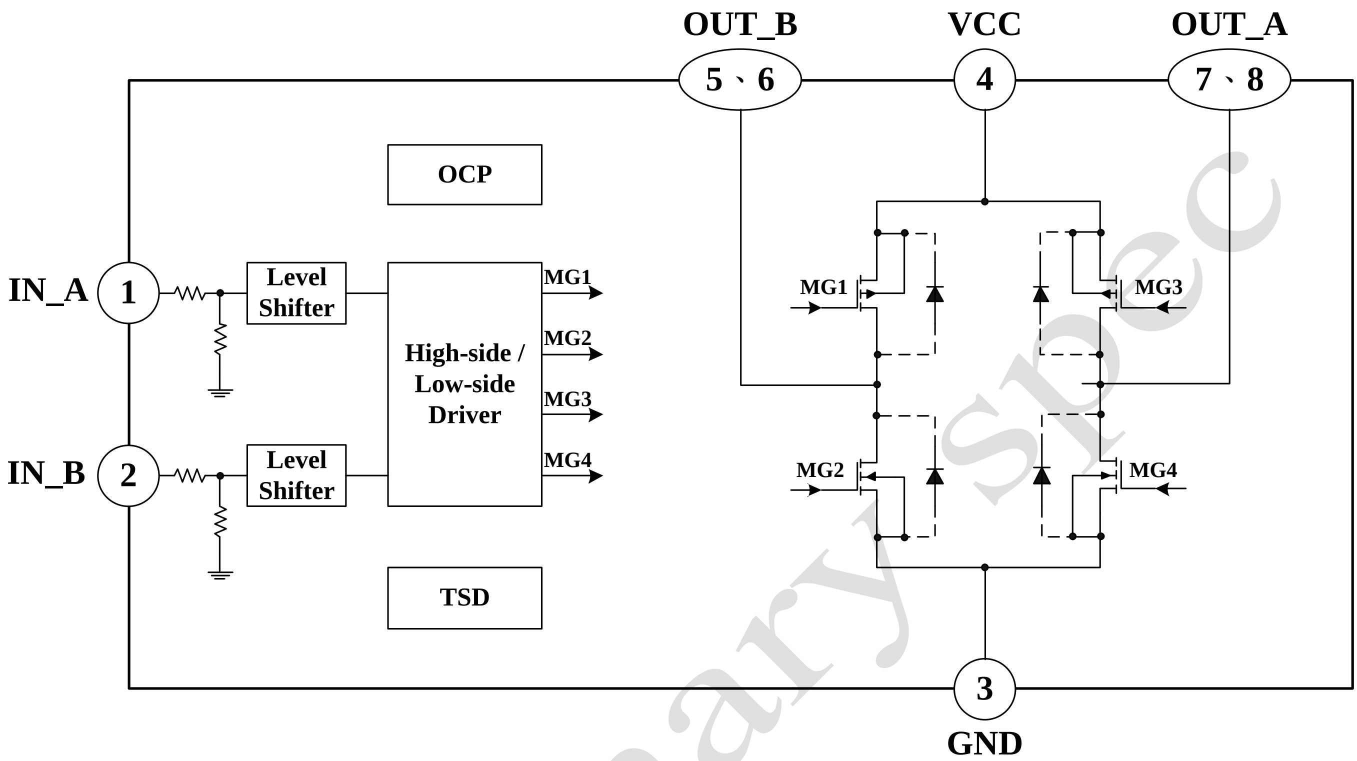
Note*: Input signal voltage is not higher VCC voltage.

Note**: Based on 20 x 20mm^2 FR4 PCB (1 oz.) at single side PCB

Electrical Characteristics (Unless otherwise specified, TA = 25℃, VCC=6V)

Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
Power Supplies						
Supply Current	I_{CC}		4		mA	Input signal IN_A/B= L/H or H/L or H/H No load on OUT_A/B,
Standby Current	I_{STB}			1	uA	Input signal IN_A/B= L/L
IN_X Inputs						
Input H level Voltage	V_{IN_XH}	2.0		6	V	
Input L level Voltage	V_{IN_XL}	-0.3		0.7	V	
Input H level Current	I_{IN_X}		100		μA	V_{CC} = 6V, V_{IN} = 3V
Input Frequency	F_{IN_X}			50	KHz	
Input Pull Down Resistance	R_{IN_X}		30		KΩ	
H-bridge FETs						
On-Resistance	$R_{ds(on)}$		85		mΩ	I_O = 1A Upper and Lower total
On-Resistance	$R_{ds(on)}$		95		mΩ	I_O = 3A Upper and Lower total
TSD Protections						
Thermal Shutdown Protection	TSD_p		160		℃	
Thermal Shutdown Release	TSD_r		110		℃	

Block Diagram

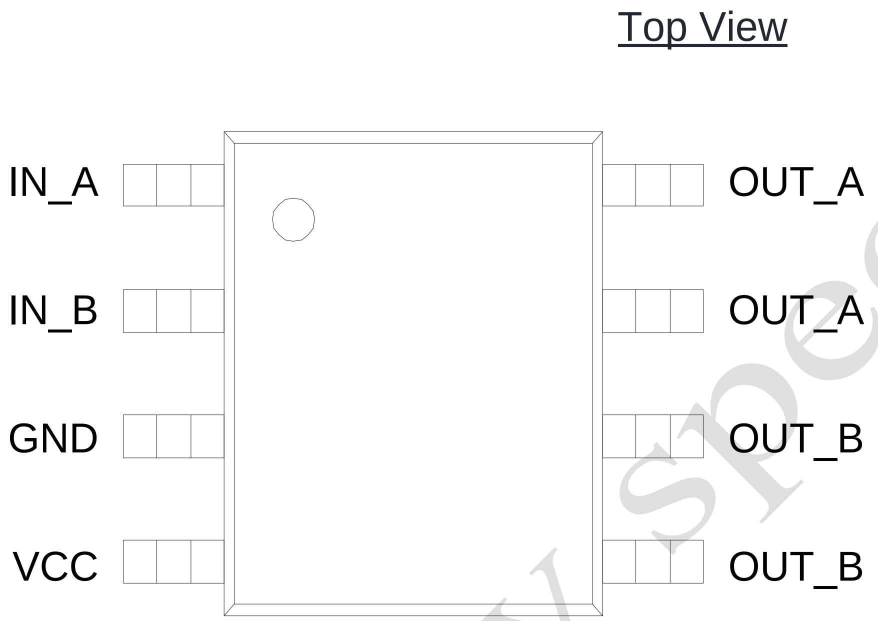


Input Logic Descriptions

Function Truth Table

IN_A	IN_B	OUT_A	OUT_B	Mode
L	L	Hi-Z	Hi-Z	Stop
L	H	L	H	Reverse
H	L	H	L	Forward
H	H	L	L	Brake

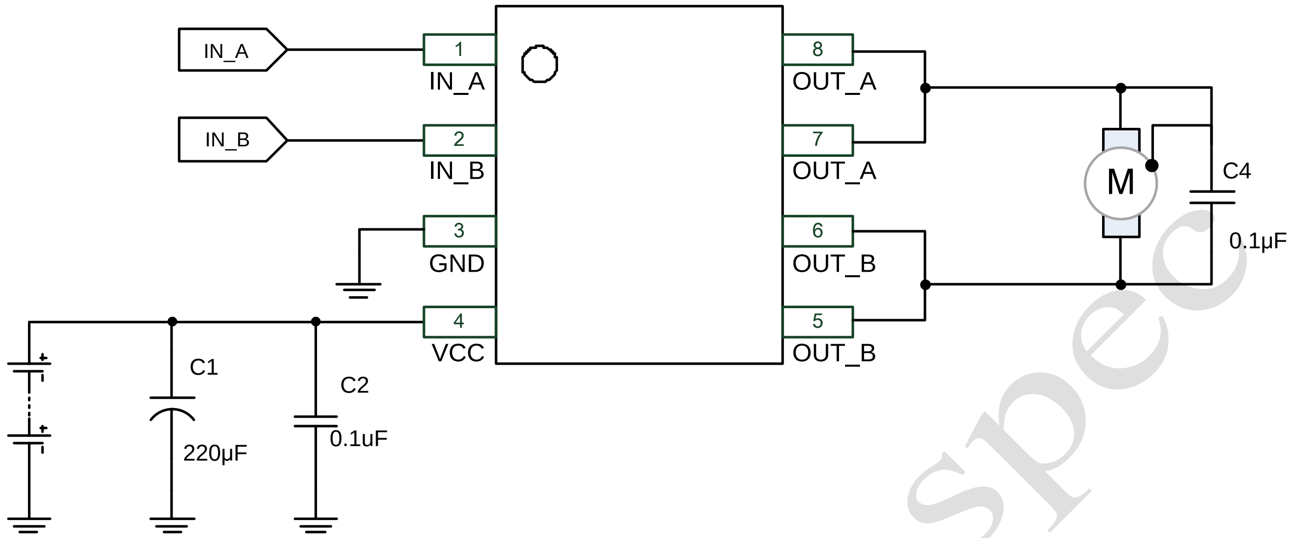
- **Pin configuration SOP-8**



- **Pin Descriptions**

PIN No.	Pin Name	I/O	Description
1	IN_A	I	Input Half Bridge A
2	IN_B	I	Input Half Bridge B
3	GND	I	Ground Pin
4	VCC	I	Power Supply
5	OUT_B	O	Output Half Bridge B
6	OUT_B	O	Output Half Bridge B
7	OUT_A	O	Output Half Bridge A
8	OUT_A	O	Output Half Bridge A

Application:



Circuit Descriptions

The function descriptions of capacitors on the application circuit:

1. C1、C2: Power supply VCC pin capacitor:
   1) The capacitor can reduce the power spike when the motor is in motion. To avoid the IC directly damaged by the VCC peak voltage. It also can stabilize the power supply voltage and reduce its ripples.
   2) The C1 capacitor can compensate power when motor starts running.
   3) The capacitor value (μF) determines the stability of the VCC during motor in motion. If the large voltage power or a heavy loading motor is used, then a larger capacitor would be needed.
   4) On the PCB configuration, the C1、C2 must be mounted as close as possible to VCC pin .
2. C4: The across-motor capacitor
   1) The C4 capacitors can reduce the power spike when motor is running. 0.1μF capacitor is recommended.
   2) The C4 capacitor must be added to the general application.
3. It's not allowed INA, INB input remain floating status, because there is a minor leakage current between P-N junction when temperature rising, the leakage current will go through internal pull- low resistor which causes INA or INB floating level abnormal pull high and output abnormal working.

Operating Mode Descriptions

H-Bridge basic operating mode：

a) Forward mode

Definition：When IN_A=H，IN_B=L，then OUT_A=H，OUT_B=L

b) Reverse mode

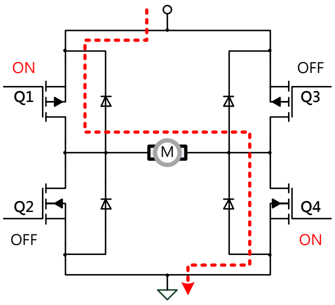
Definition：When IN_A=L，IN_B=H，then OUT_A=L，OUT_B=H

c) Brake mode

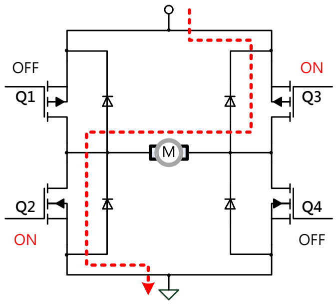
Definition：When IN_A=IN_B= H，then OUT_A=OUT_B=L

d) Stop mode

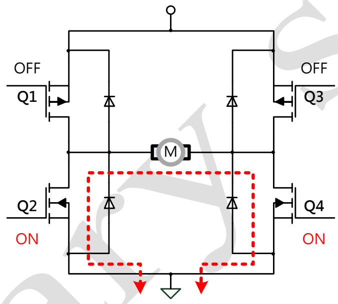
Definition：When IN_A=IN_B= L，then OUT_A=OUT_B=Hi-Z



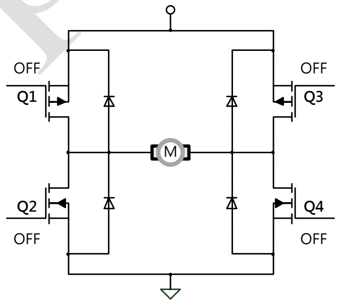
a) Forward mode



b) Reverse mode



c) Brake mode



d) Stop mode

Protection Mechanisms Descriptions

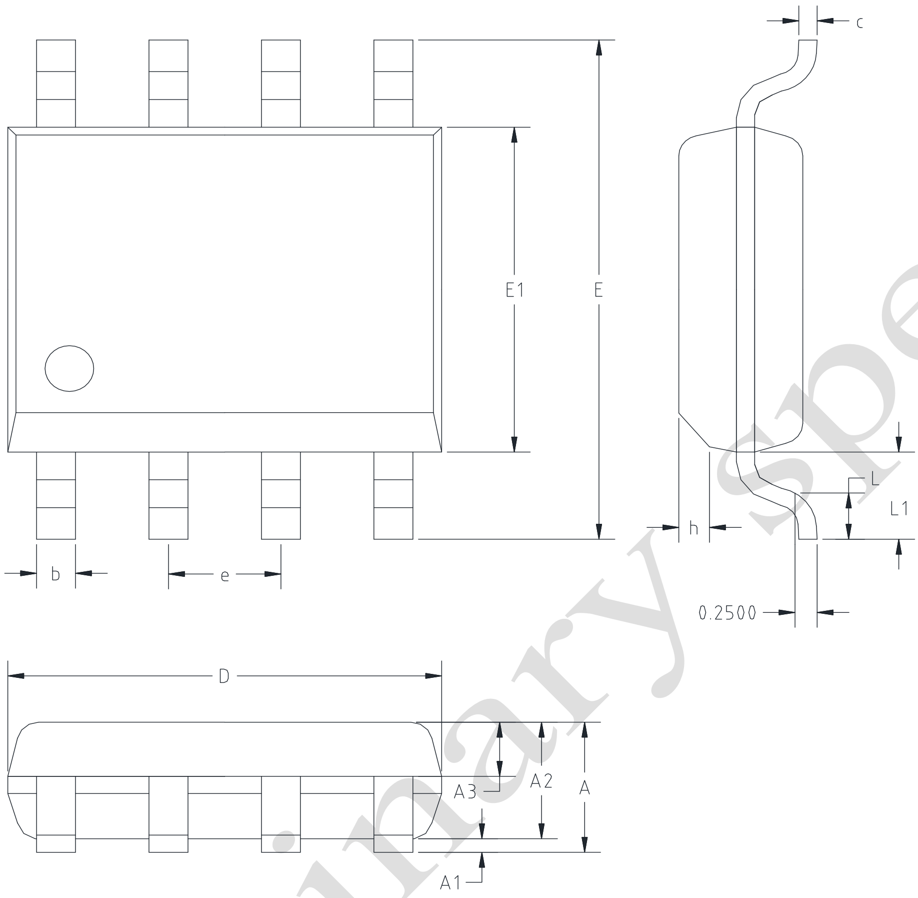
1) Over-current protection (OCP)

When the IC conducts a large current, 6A (Typ), the internal over-current protection function will be triggered. The device enter protection mode of auto-recover to avoid damaging IC and system.

2) Over-temperature protection

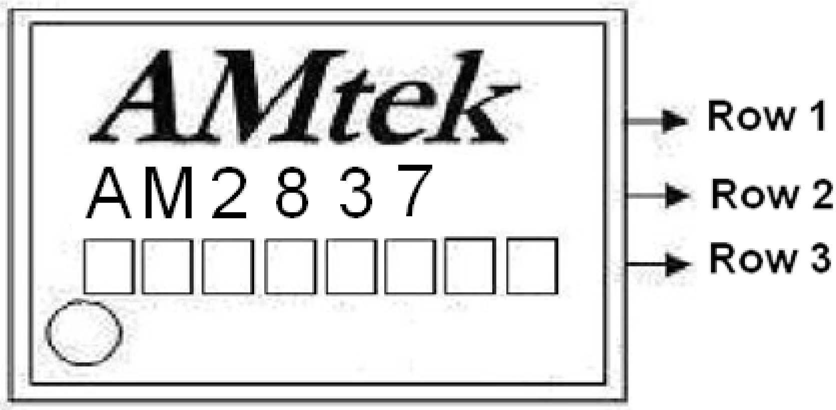
If the IC junction temperature exceeds 160° C (Typ.), the internal over-temperature protection function will be triggered, partial FETs in the H-bridge are disabled, that will ensure the safety of customers' products. If the IC junction temperature falls to 110° C(Typ.), the IC resumes automatically.

● Packaging outline --- SOP-8 Unit : mm



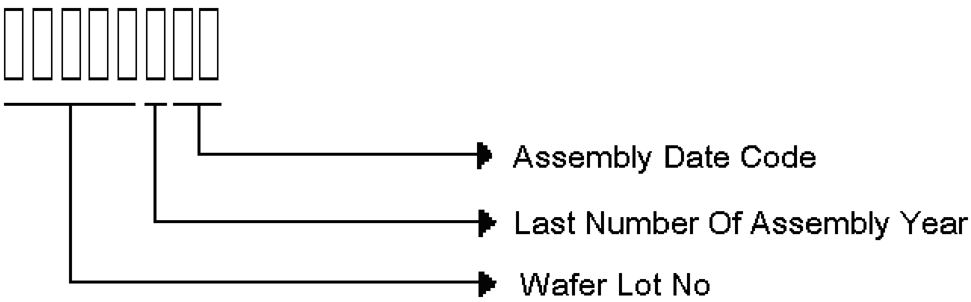
SYMBOL	MILLIMETERS		INCHES	
	Min.	Max.	Min.	Max.
A	--	1.75	--	0.069
A1	0.10	0.225	0.004	0.009
A2	1.30	1.50	0.051	0.059
A3	0.60	0.70	0.024	0.028
b	0.39	0.48	0.015	0.019
c	0.21	0.26	0.008	0.010
D	4.70	5.10	0.185	0.201
E	5.80	6.20	0.228	0.244
E1	3.70	4.10	0.146	0.161
e	1.27 TYP.		0.05 TYP.	
h	0.25	0.50	0.010	0.020
L	0.50	0.80	0.020	0.031
L1	1.05 TYP		0.041 TYP.	

Marking Identification



NOTE:

Row1 ： Logo
Row2 ： Device Name
Row3 ： Wafer Lot No use five codes + Assembly Year use one code + Assembly Week use two codes



Example: Wafer Lot No is <u>EB168</u> + Year 2017 is <u>H</u> + Week 08 is <u>08</u>，then mark 〝EB168H08〞
The last code of assembly year, explanation as below: ：
(Year： A=0,B=1,C=2,D=3,E=4,F=5,G=6,H=7,I=8,J=9. For example: year 2017=H)