

1.5A, Low Voltage H-Bridge Motor Drive

FEATURES

- Support the input voltage range:
Motor power: 1.8V~12 V
Control power supply: 1.8V~7V
- LDMOS R_{dson} (HS+LS) 650mΩ (typical)
- Ultra-low power sleep mode
- 45nA (typ.) VM sleep mode current
- 17nA (typ.) VCC sleep mode current
- Maximum 1.5A current output capacity
- Built-in UVLO Protection
- Built-in Over Temperature Protection
- Built-in Short Circuit Protection
- Built-in Over Current Protection
- Built-in Charge Pump
- DFN2*2-8 package

GENERAL DESCRIPTION

TMI8837 is a low voltage DC motor driver IC. Internal integration 650mΩ (HS+LS) H bridge NMOS switch, which can support the 1.8V~12V input voltage range. The maximum current capacity is up to 1.5A, support for ultra-low power sleep mode; built-in UVLO, Thermal Shutdown, OCP protection circuit. TMI8837 can be used in camera, toys and consumer products.

APPLICATIONS

- Cameras
- Toys
- Consumer Products

TYPICAL APPLICATION

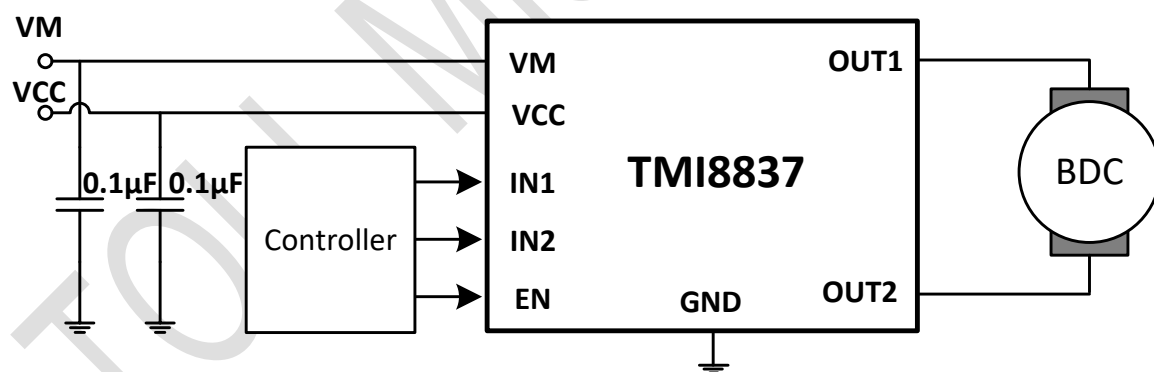
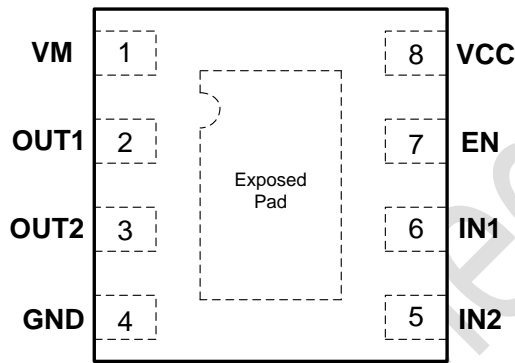


Figure 1. Basic Application Circuit

ABSOLUTE MAXIMUM RATINGS

Parameter	Value	Unit
VM Voltage Range	-0.3~12	V
VCC, IN1, IN2, EN Voltages Range	-0.3~7	V
OUT1, OUT2 Voltage Range	-0.3~Vin+0.3	V
Storage Temperature Range	-50~150	°C
Junction Temperature	-40~150	°C
Package Thermal Resistance θ_{JA}	70	°C/W

PACKAGE/ORDER INFORMATION



DFN2*2-8 (Top View)

Top Mark: TFCX/XX (TFC: Device Code, X/XX: Inside Code)

Part Number	Package	Top Mark	Quantity/ Reel
TMI8837	DFN2*2-8	TFCX/XX	3000

TMI8837 devices are Pb-free and RoHS compliant.

PIN FUNCTIONS

Pin	Name	Function
1	VM	Power Supply for Driver Connect a 0.1μF bypass ceramic capacitor to GND
2	OUT1	Motor Driver output 1
3	OUT2	Motor Driver output 2
4	GND	Ground pin
5	IN2	PWM input2
6	IN1	PWM input1
7	EN	Chip Enable Input Pin When this pin is in logic low, the device enters low-power sleep mode. The device operates normally when this pin is logic high. The pin has an internal pull down resistor to GND.
8	VCC	Power Supply for Logic Input Connect a 0.1μF bypass ceramic capacitor to GND

ESD RATING

Items	Description	Value	Unit
V _{ESD}	Human Body Model for all pins	±2000	V

JEDEC specification JS-001

RECOMMENDED OPERATING CONDITIONS

Items	Description	Min	Max	Unit
Voltage Range	VM	1.8	12	V
T _J	Operating Junction Temperature Range	-40	125	°C

ELECTRICAL CHARACTERISTICS

($V_M=12V$, $T_A = 25^\circ C$, unless otherwise noted.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
VM Voltage Range	V_{VM}		1.8		12	V
VM Supply Current	I_{VM}	VM=5V, VCC=3V No PWM		124		μA
		VM=5V, VCC=3V 50kHz PWM		0.53		mA
VM sleep mode supply current	I_{VMQ}	VM=5V, VCC=3V Sleep Mode (EN=0)		45	95	nA
VCC Voltage Range	V_{VCC}		1.8		7	V
VCC Supply Current	I_{VCC}	VM=5V, VCC=3V No PWM		180		μA
		VM=5V, VCC=3V 50kHz PWM		0.32		mA
VCC sleep mode supply current	I_{VCCQ}	VM=5V, VCC=3V Sleep Mode (EN=0)		17	35	nA
Input Logic Low Voltage	V_{IL}		0.25x VCC	0.4x VCC		V
Input Logic High Voltage	V_{IH}			0.5x VCC	0.6x VCC	V
Input logic Hysteresis	V_{HYS}			0.1x VCC		V
Input Logic Low Current	I_{IL}		-5		5	μA
Input Logic High Current	I_{IH}				40	μA
Input Pull Down Resistor	R_{IN}			100		k Ω
Output Switch On-Resistance (HS+LS)	R_{ON}	VM=5V, VCC=3V $I_{load}=800mA$		0.65		Ω
Output Switch Leakage Current	I_{LEAK}		-200		200	nA
VCC UVLO Voltage	V_{UVLO}			1.7		V
UVLO Hysteresis	V_{UVLO_HY}			100		mV
Over Current Protection	I_{OCP}		1.6	1.75		A
Over Current Retry Time	T_{OCP_RT}			1		ms
Thermal Shutdown Threshold	T_{SDN}			160		$^\circ C$
Thermal Shutdown Hysteresis	T_{SDN_HY}			20		$^\circ C$
Output Enable time	T_1			180		ns
Output Disable time	T_2			70		ns

ELECTRICAL CHARACTERISTICS (continued)

($V_{IN}=12V$, $T_A = 25^{\circ}C$, unless otherwise noted.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Delay Time IN1 low to OUT2 high IN2 low to OUT1 high	T_3			140		ns
Delay Time IN2 high to OUT1 low IN1 high to OUT2 low	T_4			160		ns
Output rise time	T_5			60		ns
Output fall time	T_6			38		ns

FUNCTIONAL BLOCK DIAGRAM

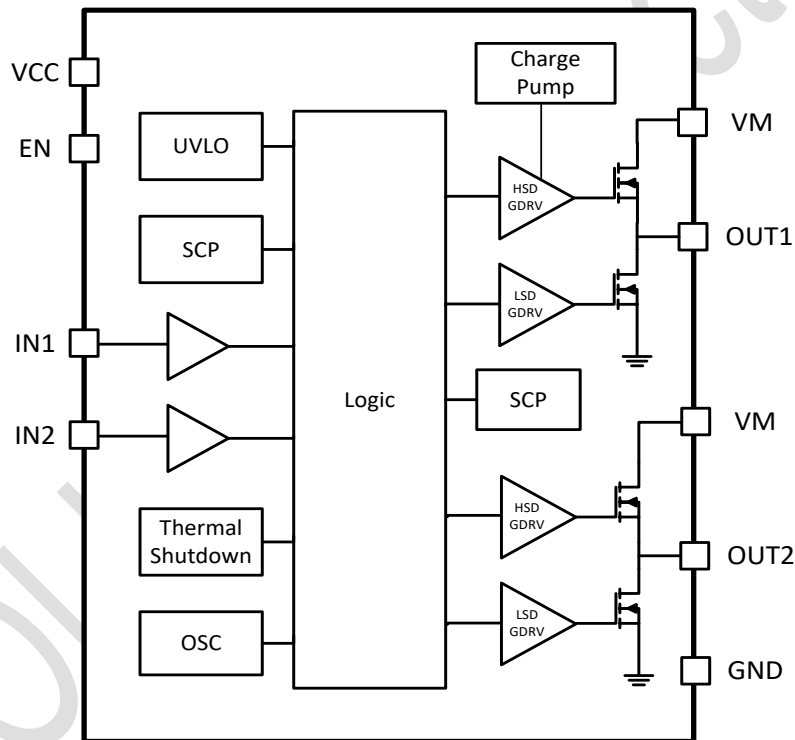
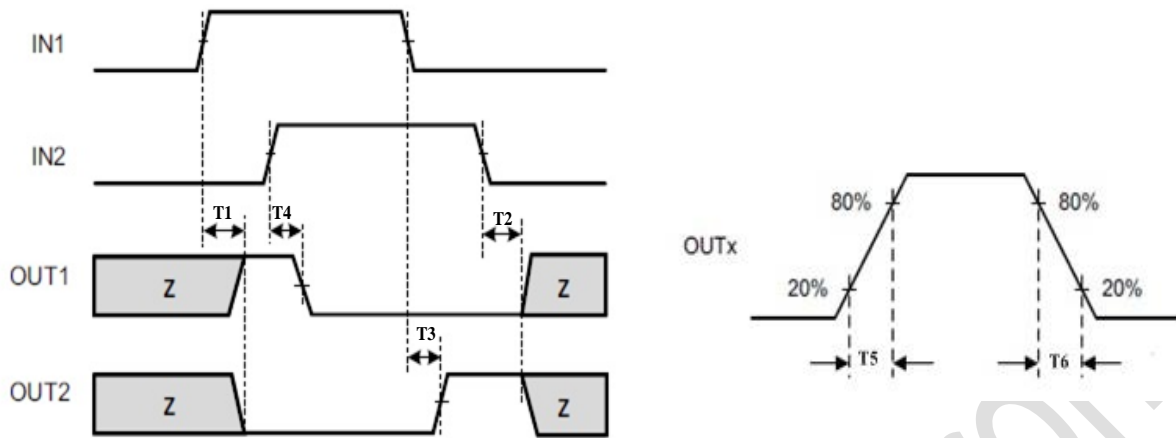


Figure 2. TMI8837 Block Diagram

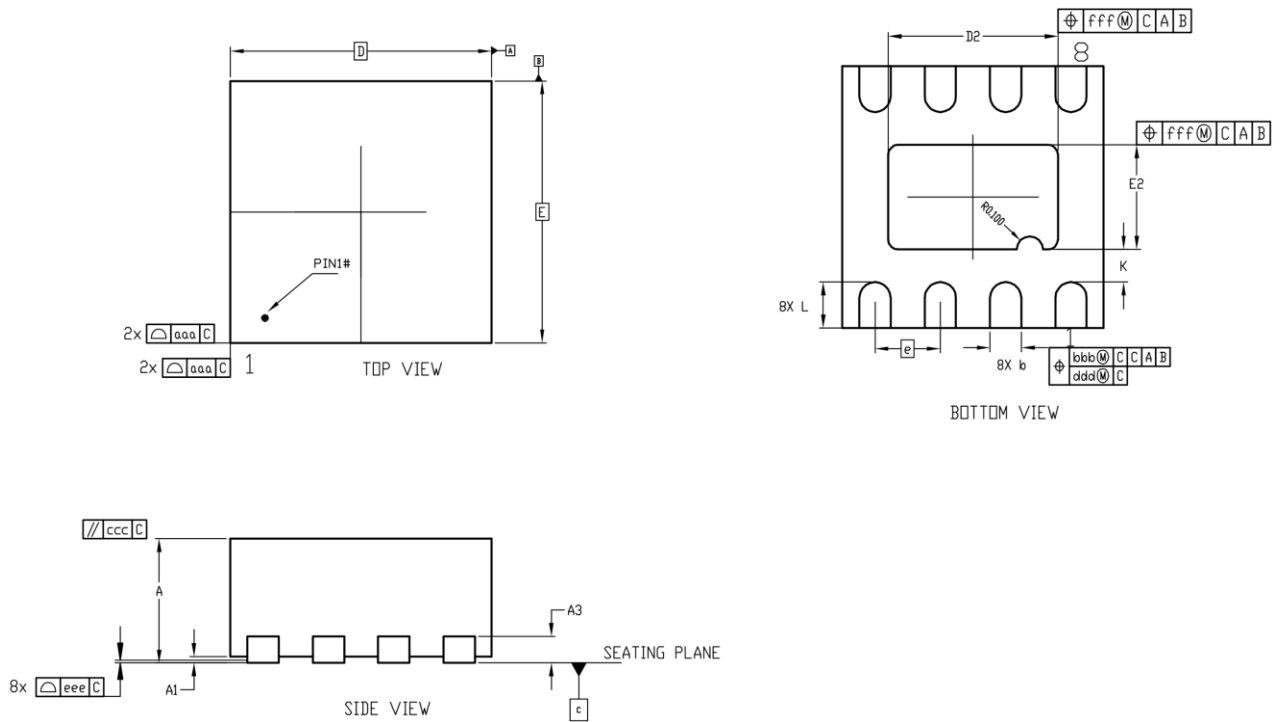
INPUT OUTPUT LOGIC



EN	IN1	IN2	OUT1	OUT2	Function
0	X	X	Z	Z	Coast
1	0	0	Z	Z	Coast
1	1	0	H	L	Forward
1	0	1	L	H	Reverse
1	1	1	L	L	Break

PACKAGE INFORMATION

DFN2*2-8



Unit: mm

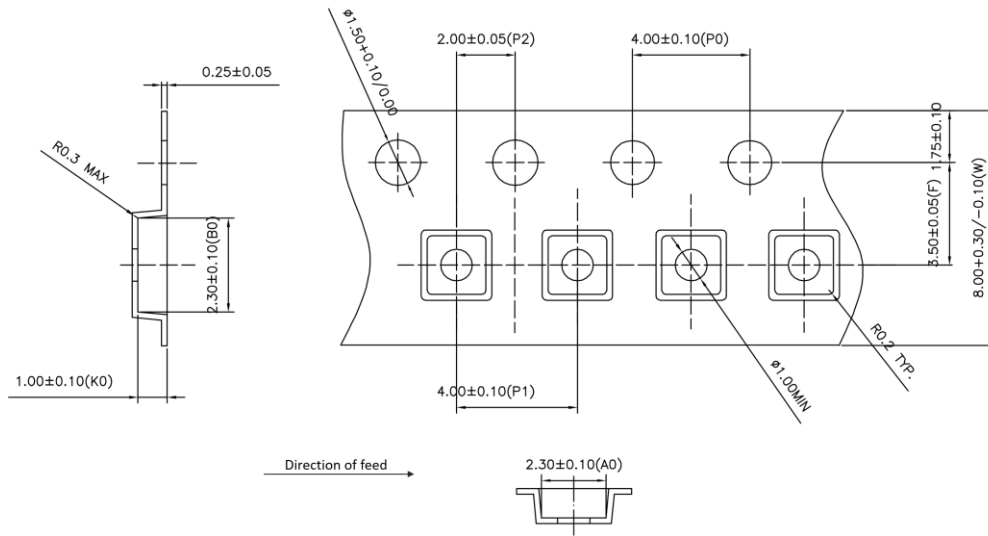
Symbol	Dimensions In Millimeters			Symbol	Dimensions In Millimeters		
	Min	Typ	Max		Min	Typ	Max
A	0.70	0.75	0.80	L	0.30	0.35	0.40
A1	0	0.02	0.05	K	0.20	-	-
A3	-	0.20 REF	-	aaa	-	0.15	-
b	0.19	0.24	0.29	bbb	-	0.10	-
D	2.00 BSC			ccc	-	0.10	-
E	2.00 BSC			ddd	-	0.05	-
D2	1.25	1.30	1.35	eee	-	0.08	-
E2	0.75	0.80	0.85	fff	-	0.10	-
e	0.50 BSC						

Note:

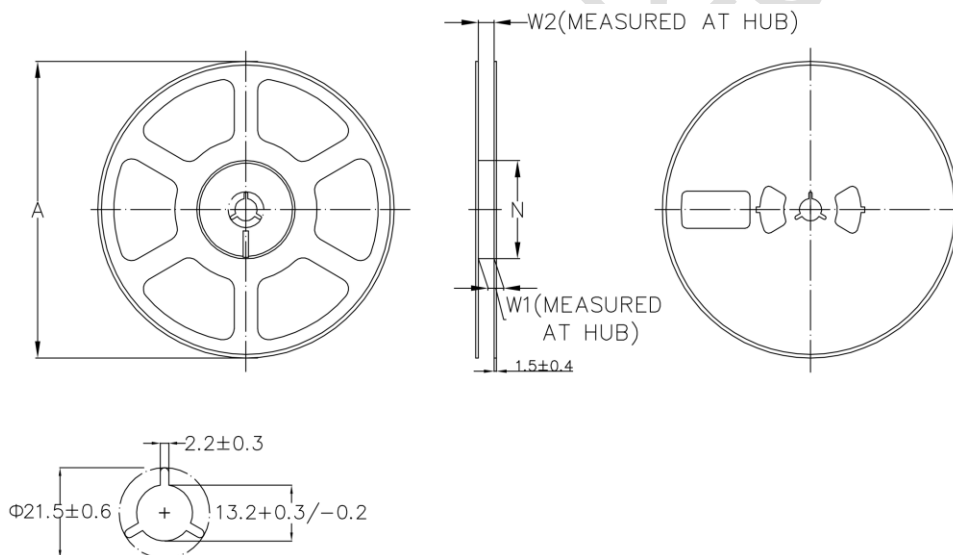
- 1) All dimensions are in millimeters.

TAPE AND REEL INFORMATION

TAPE DIMENSIONS: DFN2*2-8



REEL DIMENSIONS: DFN2*2-8



Unit: mm

TAPE WIDTH	Ø A (±1.0)	Ø N (±2.0)	W1 (+1.5/-0)	W2 (Max)
8MM	178	54	8.4	14.4

Note:

- 1) All Dimensions are in Millimeter
- 2) Quantity of Units per Reel is 3000
- 3) MSL level is level 3.