1. 概述

HM2505 為單晶片CMOS的雙向馬達驅動IC，利用大型積體電路(LSI)製造技術，具有低電源及低成本的特性，可應用於低電壓工作模式。電路採用H橋架構，內置功率 MOSFET 開關，可實現對直流電機做 正轉、反轉、煞車、停止 四個功能的控制。

2. 功能

(1). 寬廣的工作電壓： 1.8V ~ 5.5V。

(2). 內置 PMOS/NMOS 功率開關的 H 橋驅動器。

(3). 支援4種操作模式：正轉 / 反轉 / 剎車 / 停止。

(4). 低待機電流 (Typ.=0.1uA)。

(5). 650mA 以上電流輸出能力。

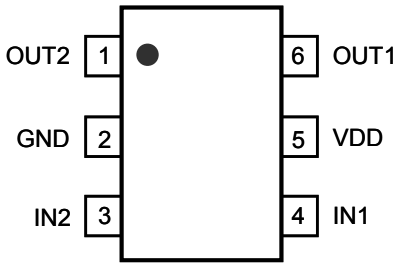
(6). 內建過溫保護功能 。(TSD, Thermal Shutdown)

(7). CMOS 輸入，輸入腳無需外加限流電阻，且輸入腳內建下拉電阻。

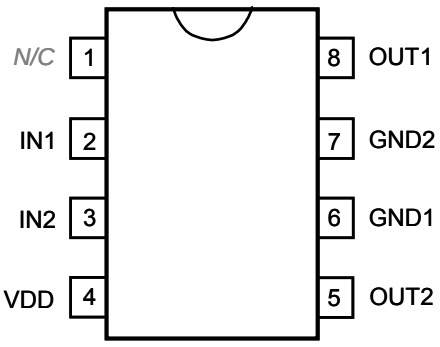
(8). 高達 5KV 的人體靜電模式 (HBM) 的 ESD 保護。

(9). 提供 SOT23-6 和 SOP-8 封裝。

6-pin SOT23-6



8-pin SOP-8



1. GENERAL DESCRIPTION

HM2505 is a single-chip bi-directional motor driver CMOS IC for low-voltage applications. It is designed with LSI high technology with a low-power and low-cost process. It has H bridge driver of built-in MOSFET power switch to provide Forward / Reverse / Brake / Stop function for motor driver applications.

2. FEATURES

(1). Wide operating voltage: 1.8V ~ 5.5V.

(2). H bridge driver of internal PMOS/NMOS power switches.

(3). Support 4 operating mode: Forward / Backward / Brake / Stop.

(4). Low standby current. (Typ.=0.1uA)

(5). Over 650mA output current capability.

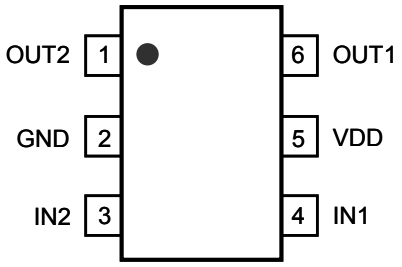
(6). Built-in Thermal Shutdown (TSD) circuit.

(7). CMOS input. No current-limit resistance required and built-in input pull-low resistance.

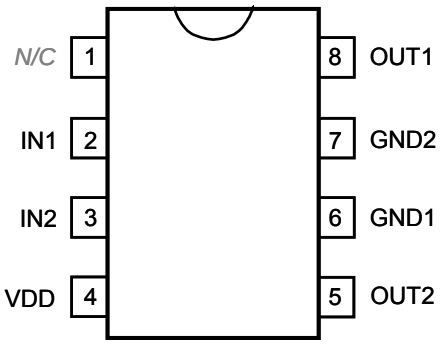
(8). High 5KV Human Body Mode (HBM) ESD protection.

(9). SOT23-6 and SOP-8 package type are available.

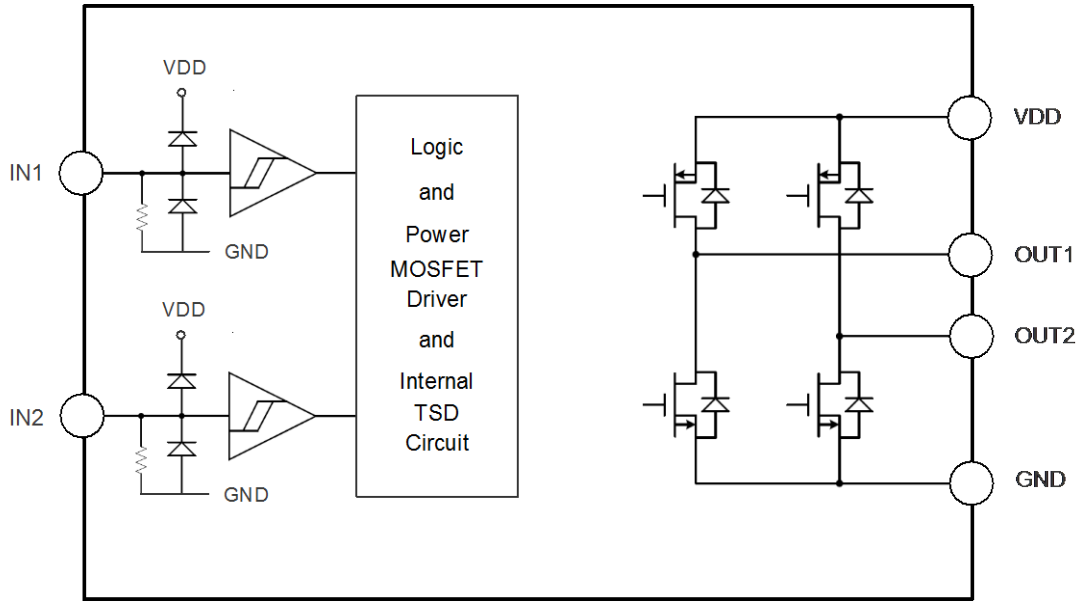
6-pin SOT23-6



8-pin SOP-8



3. BLOCK DIAGRAM



4. PIN DESCRIPTION

Pin Name	*Pin No.* *(SOT23-6 / SOP8)*	*ATTR.*	*Description*
IN1	4 / 2	I	Forward rotation logic input.
IN2	3 / 3	I	Backward rotation logic input.
OUT1	6 / 8	O	Forward rotation output.
OUT2	1 / 5	O	Backward rotation output.
VDD	5 / 4	Power	Positive power.
GND	2 / 6, 7	Power	Negative power.
N/C*	- / 1	-	No connection.

** N/C pin is suggested connecting to VDD for pin-to-pin compatible with NY9M008AS8 at PCB layout.*

5. FUNCTION DESCRIPTION

IN1	*IN2*	*OUT1*	*OUT2*	*Function*
0	0	Z (Off)	Z (Off)	Stop (Standby)
1	0	1	0	Forward
0	1	0	1	Backward
1	1	0	0	Brake

6. ELECTRICAL CHARACTERISTICS

6.1 Absolute Maximum Rating

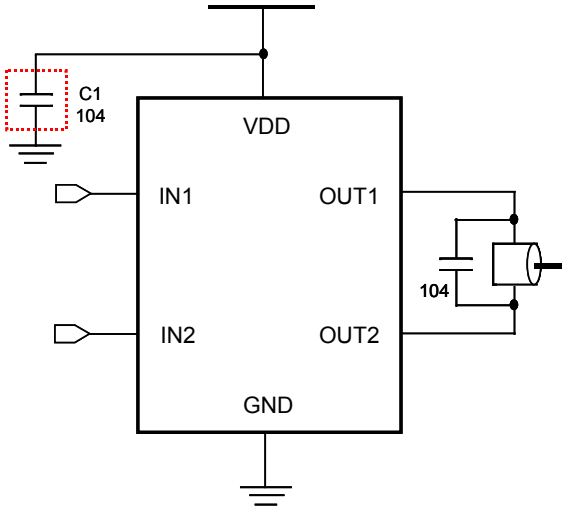
Symbol	Parameter		Rating	Unit
V_{DD} - V_{SS}	Supply voltage		-0.5 ~ +6.0	V
$I_{OUT-PEAK}$	Output peak current		1.0	A
θ_{JA}	Thermal resistance (Junction to Ambient)	SOT23-6	180	°C/W
		SOP-8	150	
P_D	Power dissipation	SOT23-6	0.7	W
		SOP-8	0.8	
T_A	Operating ambient temperature		-40 ~ +85	°C
T_J	Operating junction temperature		+150	°C
T_{ST}	Storage temperature		-55 ~ +150	°C

6.2 DC Characteristics *(V_{DD}=4.5V, T_A=25ºC, unless otherwise specified)*

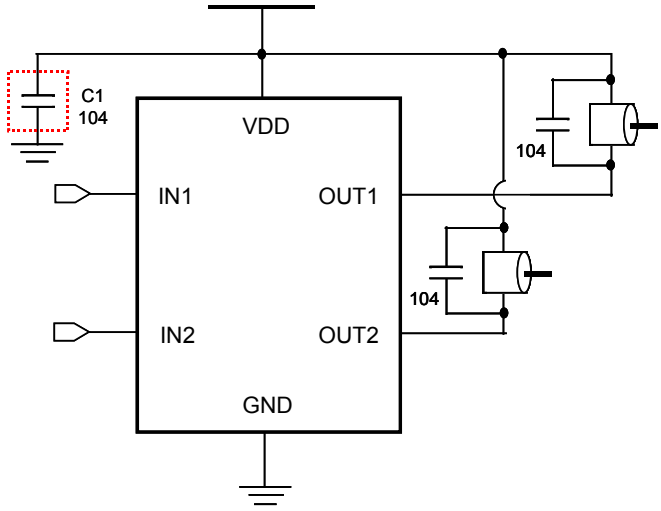
Symbol	Parameter		Min.	Typ.	Max.	Unit	Condition
V_{DD}	Operating voltage		1.8		5.5	V	
I_{SB}	Standby current			0.1	1	uA	IN1=IN2=0
I_{OP}	Operating current	V_{DD} = 3.0V		35		uA	IN1=1, IN2=0 or IN1=0, IN2=1 or IN1=1, IN2=1
		V_{DD} = 4.5V		50		uA	
I_{IH}	Input high current (12kΩ pull-low resistance)			250		uA	V_{IH} = 3.0V
				370		uA	V_{IH} = 4.5V
V_{IH}	Input high voltage		0.7V_{DD}			V	
V_{IL}	Input low voltage				0.3V_{DD}	V	
R_{ON}	Output resistance (SOT23-6 Package)			1.20		Ω	I_{OUT} = 200mA
				1.38		Ω	I_{OUT} = 500mA
				1.73		Ω	I_{OUT} = 800mA
	Output resistance (SOP-8 Package)			1.25		Ω	I_{OUT} = 200mA
				1.43		Ω	I_{OUT} = 500mA
				1.80		Ω	I_{OUT} = 800mA
I_{OUT}	Output continuous current (* with PCB heat dissipation)			650	800*	mA	SOT23-6
				700	900*	mA	SOP-8
I_{PULSE}	Pulsed drain current				2.0	A	Pulse width < 20ms
T_{RISE}	Output rise time			300		ns	PWM=20kHz, Duty=50%
T_{FALL}	Output fall time			120		ns	
T_{RP}	Input-to-Output response time			150		ns	
T_{TSD}	Thermal shutdown (TSD)			150		°C	Junction temperature
T_{TSDH}	Thermal shutdown hysteresis			35		°C	

7. APPLICATION CIRCUIT

(1) One Motor Bi-Directional Control



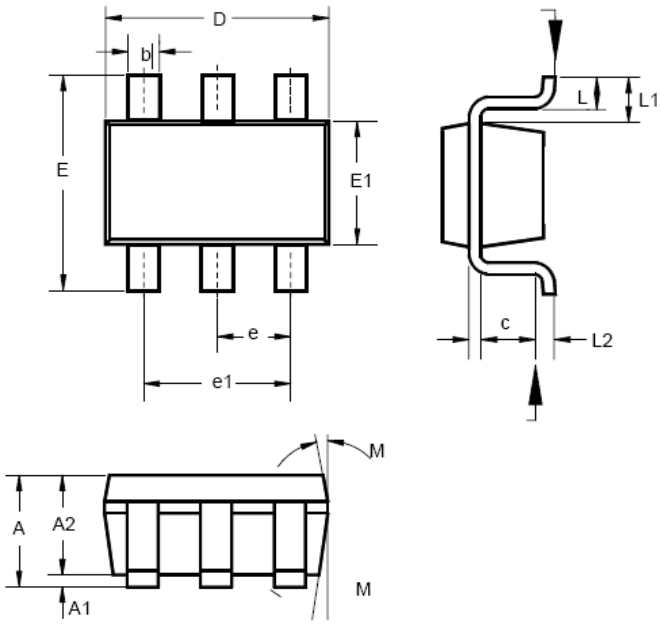
(2) Two Motors Directional Control



** In normal application, C1 (0.1uF) can be saved, but please reserve C1 space at PCB layout.*

8. PACKAGE DIMENSION

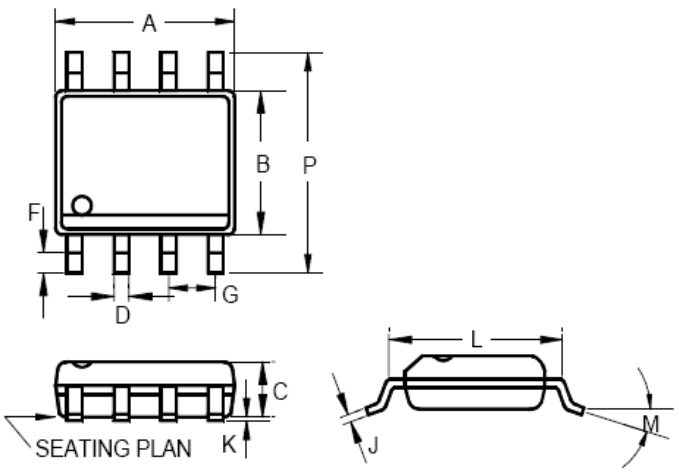
8.1 6-Pin Plastic SOT23-6 (63 mil)



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	-	-	0.057	-	-	1.45
A1	-	-	0.006	-	-	0.15
A2	0.035	0.045	0.051	0.90	1.15	1.30
b	0.012	-	0.020	0.30	-	0.50
c	0.003	-	0.009	0.08	-	0.22
D	0.114 BSC			2.90 BSC		
E	0.110 BSC			2.80 BSC		
E1	0.063`BSC			1.60 BSC		
e	0.037 BSC			0.95 BSC		
e1	0.075BSC			1.90 BSC		
L	0.012	0.018	0.024	0.30	0.45	0.60
L1	0.024 REF			0.60 REF		
L2	0.010 BSC			0.25 BSC		
°M	5°	10°	15°	5°	10°	15°

Note: For SOT23-6 IC, 3000 units per reel.

8.2 8-Pin Plastic SOP (150 mil)



	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.183	-	0.202	4.65	-	5.13
B	0.144	0.150	0.163	3.66	3.81	4.14
C	0.068	-	0.074	1.35	-	1.88
D	0.010	-	0.020	0.25	-	0.51
F	0.015	-	0.035	0.38	-	0.89
G	0.050 BSC			1.27 BSC		
J	0.007	-	0.010	0.19	-	0.25
K	0.005	-	0.010	0.13	-	0.25
L	0.189	-	0.205	4.80	-	5.21
M	-	-	8°	-	-	8°
P	0.228	-	0.244	5.79	-	6.20

Note: For 8-pin SOP IC, 100 units per tube.