九齊科技股份有限公司

Nyquest Technology Co., Ltd.

DATA SHEET

NY9M012B

Single Channel 1.5A Motor Driver

Version 1.0

Jul. 24, 2017

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Revision History

Version	Date	Description	Modified Page
1.0	2017/07/24	Formal release.	-

1. 概述

NY9M012B 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 ~ 6.8V。

(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). 1.5A 以上電流輸出能力。

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

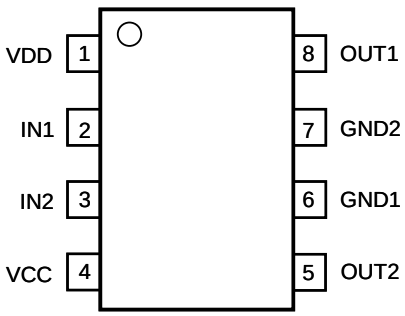
(7). CMOS 輸入，輸入腳內建下拉電阻，無需外加限流電阻。

(8). 高達 5KV 的人體靜電模式 (HBM) 的 ESD 保護。

(9). 當邏輯電源VDD掉電或電壓過低時，輸出會進入停止 (Standby) 模式。

(10). 僅提供 SOP-8 封裝。

8-pin SOP-8



1. GENERAL DESCRIPTION

NY9M012B is a single-chip bi-directional motor driver CMOS IC for low-voltage applications. It is designed by 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 ~ 6.8V.

(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 1.5A output current capability.

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

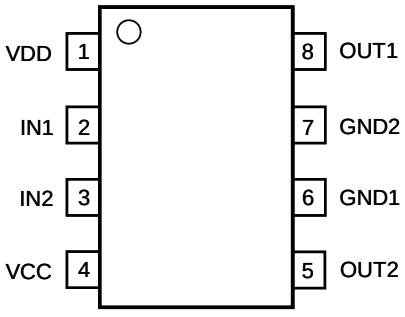
(7). CMOS input. Built-in input pull-low resistance and no current-limit resistance required.

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

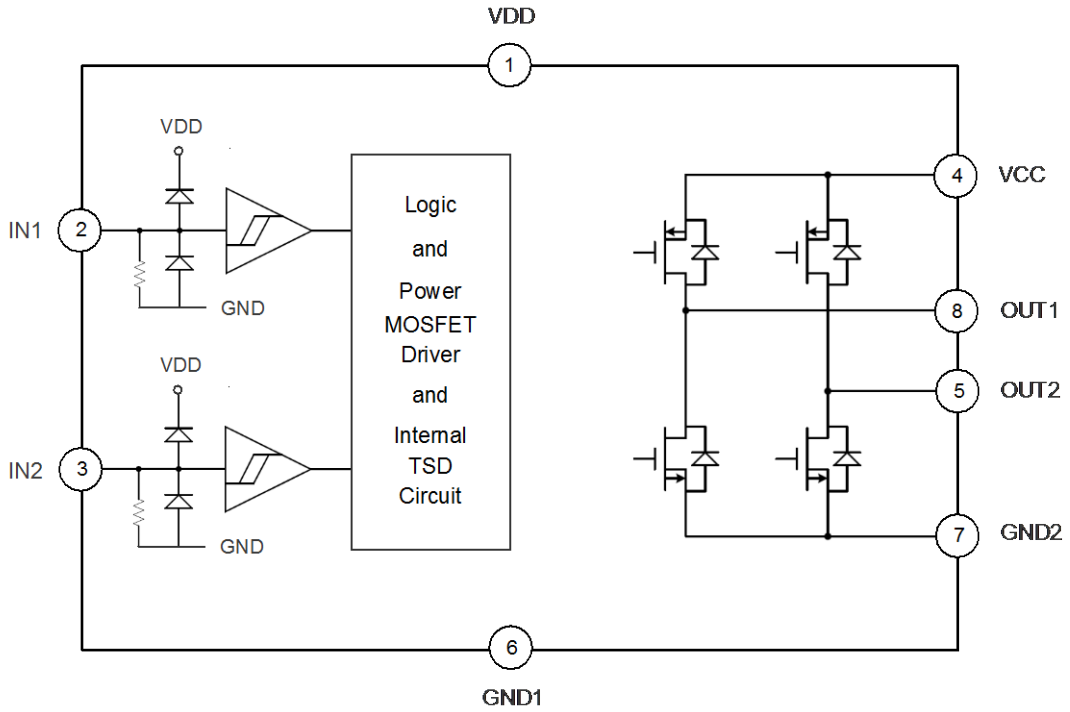
(9). Stop (Standby) mode will take place when logic power VDD is switched off or voltage is too low.

(10). Only SOP-8 package type is available.

8-pin SOP-8



3. BLOCK DIAGRAM



4. PIN DESCRIPTION

Pin Name	*Pin No.*	*ATTR.*	*Description*
IN1	2	I	Forward rotation logic input.
IN2	3	I	Backward rotation logic input.
OUT1	8	O	Forward rotation output.
OUT2	5	O	Backward rotation output.
VDD	1	Power	Positive power of logic control circuit.
VCC	4	Power	Positive power of output power MOSFET.
GND1	6	Power	Negative power of logic control circuit.
GND2	7	Power	Negative power of output power MOSFET.

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

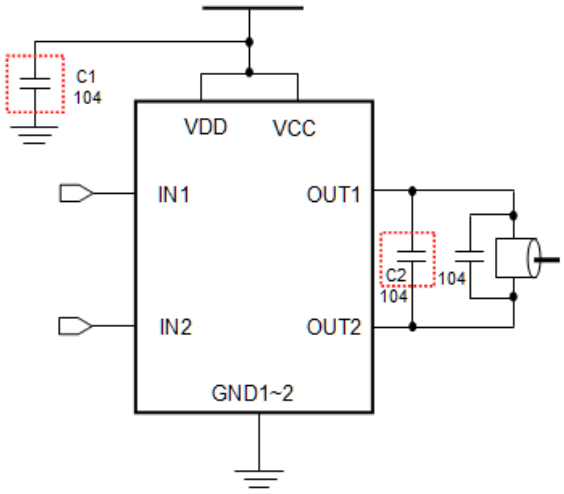
Symbol	Parameter		Rating	Unit
V_{DD} - V_{SS}	Supply voltage of logic control circuit		-0.5 ~ +7.5	V
V_{CC}	Supply voltage of output power MOSFET		7.5	V
$I_{OUT-PEAK}$	Output peak current		2.5	A
θ_{JA}	Thermal resistance (Junction to Ambient)	SOP-8	150	°C/W
P_D	Power dissipation	SOP-8	0.9	W
T_A	Operating ambient temperature		-40 ~ +85	°C
T_J	Operating junction temperature		+160	°C
T_{ST}	Storage temperature		-55 ~ +160	°C

6.2 DC Characteristics *(V_{DD}=3.0V, V_{CC}=6.0V, T_A=25ºC, unless otherwise specified)*

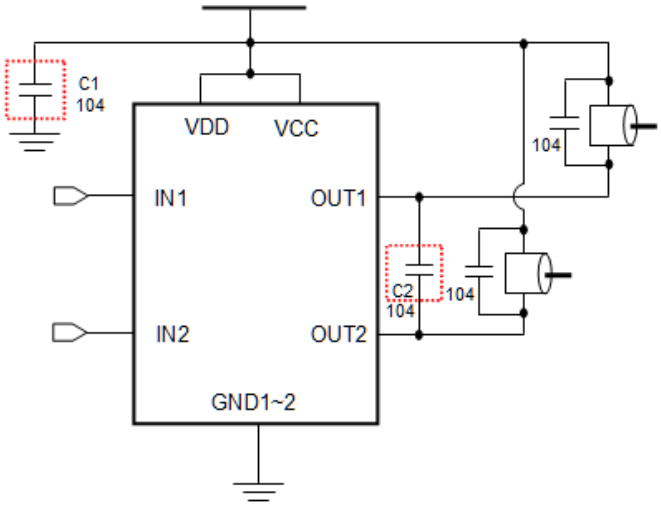
Symbol	Parameter		Min.	Typ.	Max.	Unit	Condition
V_{DD}	Operating voltage (Logic)		1.8		6.8	V	
V_{CC}	Operating voltage (MOSFET)		1.8		6.8	V	
I_{SB}	Standby current			0.1	1	uA	IN1=IN2=0
I_{OP}	Operating current	$V_{DD}=V_{CC}=3.0V$		370		uA	IN1=1, IN2=0 or IN1=0, IN2=1 or IN1=1, IN2=1
		$V_{DD}=V_{CC}=6.0V$		650		uA	
I_{IH}	Input high current (12kΩ pull-low resistance)			260		uA	$V_{IH}=3.0V$
				510		uA	$V_{IH}=6.0V$
V_{IH}	Input high voltage		2			V	
V_{IL}	Input low voltage				0.8	V	
R_{ON}	Output resistance (SOP-8 Package)			0.33		Ω	$I_{OUT}=800mA$
				0.38		Ω	$I_{OUT}=1200mA$
				0.43		Ω	$I_{OUT}=1500mA$
I_{OUT}	Output continuous current (* with PCB heat dissipation)			1500	1700*	mA	SOP-8
I_{PULSE}	Pulsed drain current				6.0	A	Pulse width < 20ms
T_{RISE}	Output rise time			370		ns	PWM=20kHz, Duty=50%
T_{FALL}	Output fall time			180		ns	
T_{RP}	Input-to-Output response time			570		ns	
T_{TSD}	Thermal shutdown (TSD)			160		°C	Junction temperature
T_{TSDH}	Thermal shutdown hysteresis			40		°C	

7. APPLICATION CIRCUIT

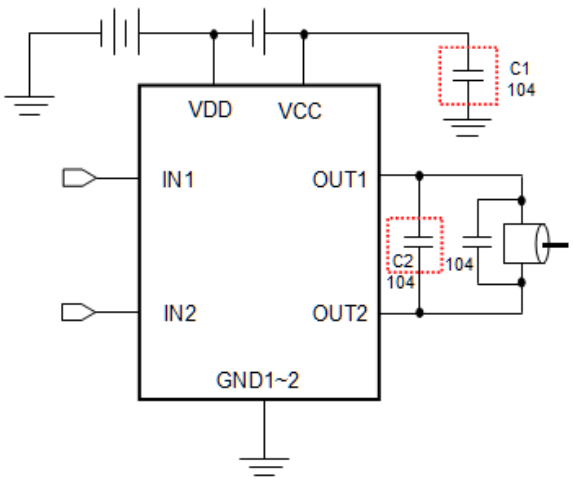
(1) One Motor Bi-Directional Control (Single Power)



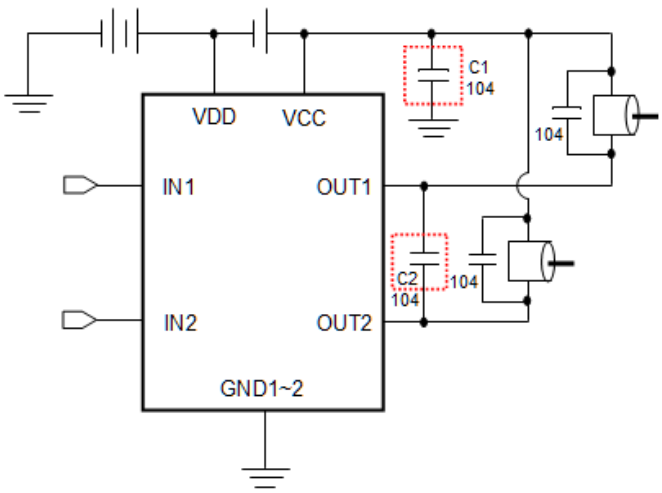
(2) Two Motors Directional Control (Single Power)



(3) One Motor Bi-Directional Control (Dual Power)



(4) Two Motors Directional Control (Dual Power)

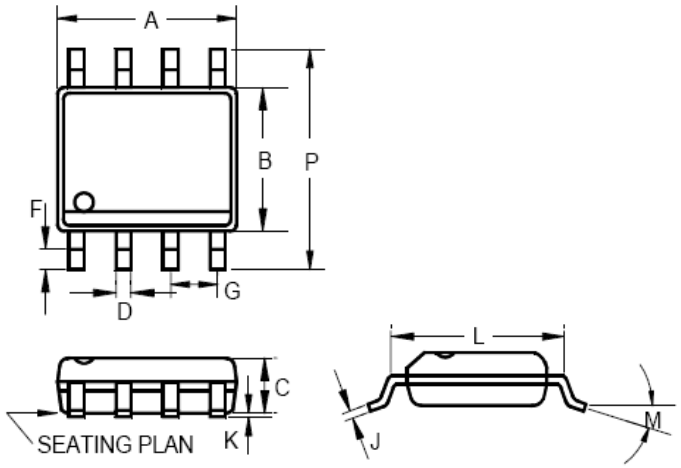


** In normal application, C1 (0.1uF) can be saved, but please reserve C1 space at PCB layout.*

** If voltage is higher than 6.0V, C2 (0.1uF) is necessary to endure high voltage.*

8. PACKAGE DIMENSION

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.

9. ORDERING INFORMATION

P/N	*Package Type*	*Package Width*	*Shipping*
NY9M012BS8	SOP-8	150 mil.	Tape & Reel: 2.5K pcs per Reel Tube: 100 pcs per Tube