



九齊科技股份有限公司
Nyquest Technology Co., Ltd.

DATA SHEET

NY9M125A

Dual Channel 1.5A/1.0A Motor Driver

Version 1.2

May 15, 2015

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Revision History

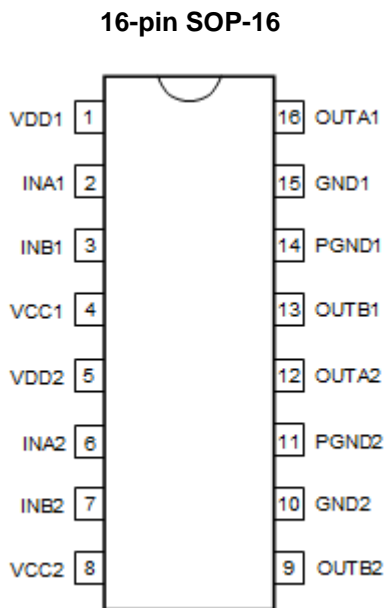
<i>Version</i>	<i>Date</i>	<i>Description</i>	<i>Modified Page</i>
1.0	2014/11/27	New release.	-
1.1	2014/12/25	1. CH1 is 1.5A motor driver, CH2 is 1.0A motor driver. 2. Update DC characteristics.	3, 4 7
1.2	2015/05/15	1. Update DC characteristics. 2. Remove the error description of package.	7 9

1. 概述

NY9M125A 為單晶片 CMOS 的兩通道雙向馬達驅動 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。通道 1 的持續輸出電流為 1.5A，最大峰值輸出電流可到 2.5A。通道 2 的持續輸出電流為 1.0A，最大峰值輸出電流可到 2.0A。

2. 功能

- (1). 寬廣的工作電壓：1.8V ~ 9.6V。
- (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). 通道 1 達到 1.5A，通道 2 達到 1.0A 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). 提供 SOP-16 封裝。

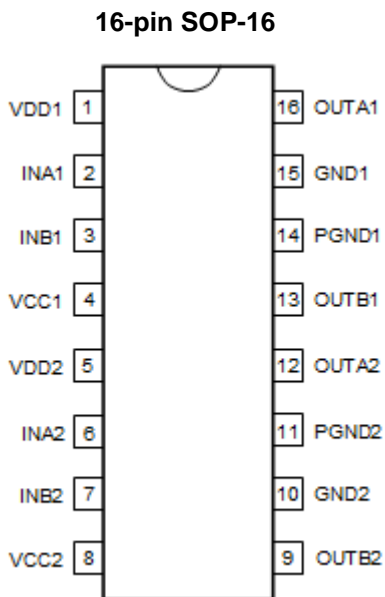


1. GENERAL DESCRIPTION

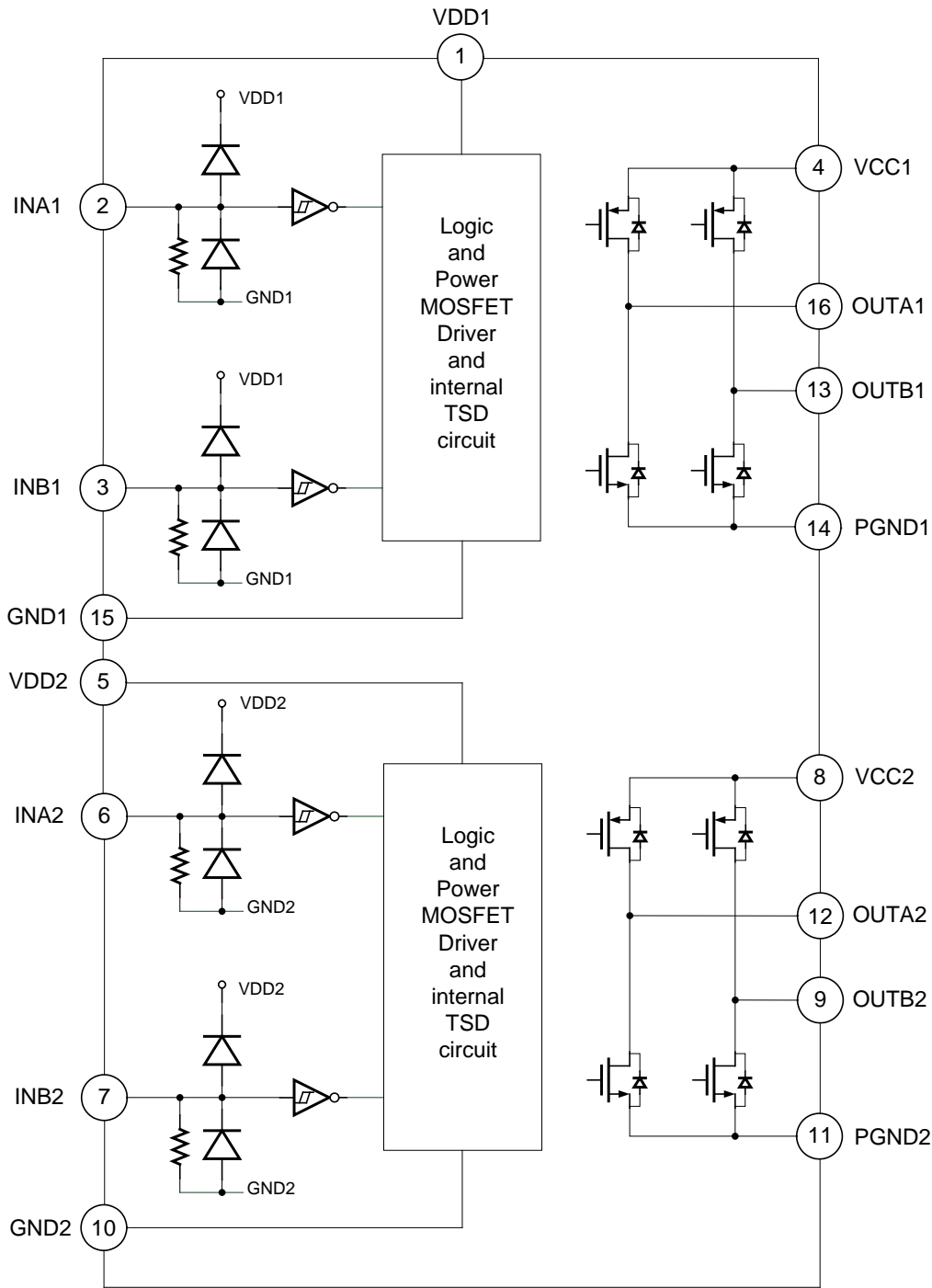
NY9M125A is a single-chip dual channel bi-directional motor driver CMOS IC for low-voltage applications. It is designed by LSI high technology with a low-power and low-cost process. It has H bridge driver of built-in MOSFET power switch to provide Forward / Reverse / Brake / Stop function for motor driver applications. Channel 1 has continuous current 1.5A with peak current 2.5A output capability. Channel 2 has continuous current 1.0A with peak current 2.0A output capability.

2. FEATURES

- (1). Wide operating voltage: 1.8V ~ 9.6V.
- (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). Channel 1 has over 1.5A output current capability. Channel 2 has over 1.0A 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). SOP-16 package type is available.



3. BLOCK DIAGRAM



4. PIN DESCRIPTION

Pin Name	Pin No.	ATTR.	Description
INA1	2	I	Channel 1 Forward rotation logic input.
INB1	3	I	Channel 1 Backward rotation logic input.
OUTA1	16	O	Channel 1 Forward rotation output.
OUTB1	13	O	Channel 1 Backward rotation output.
VDD1	1	Power	Channel 1 Positive power of logic control circuit.
VCC1	4	Power	Channel 1 Positive power of output power MOSFET.
GND1	15	Power	Channel 1 Negative power of logic control circuit.
PGND1	14	Power	Channel 1 Negative power of output power MOSFET.
INA2	6	I	Channel 2 Forward rotation logic input.
INB2	7	I	Channel 2 Backward rotation logic input.
OUTA2	12	O	Channel 2 Forward rotation output.
OUTB2	9	O	Channel 2 Backward rotation output.
VDD2	5	Power	Channel 2 Positive power of logic control circuit.
VCC2	8	Power	Channel 2 Positive power of output power MOSFET.
GND2	10	Power	Channel 2 Negative power of logic control circuit.
PGND2	11	Power	Channel 2 Negative power of output power MOSFET.

5. FUNCTION DESCRIPTION

INAx	INBx	OUTAx	OUTBx	Function
0	0	Z (Off)	Z (Off)	Stop (Standby)
1	0	1	0	Forward
0	1	0	1	Backward
1	1	0	0	Brake

'x' presents value 1 or 2.

6. ELECTRICAL CHARACTERISTICS

6.1 Absolute Maximum Rating

Symbol	Parameter	Rating	Unit
$V_{DDX} - V_{GNDX}$	Supply voltage of logic control circuit	-0.5 ~ +7.5	V
V_{CCX}	Supply voltage of output power MOSFET	10.0	V
$I_{OUT-PEAK}$	Output peak current	Channel 1	2.5
		Channel 2	2.0
θ_{JA}	Thermal resistance (Junction to Ambient)	SOP-16	123
P_D	Power dissipation	SOP-16	1.1
T_A	Operating ambient temperature	-40 ~ +85	°C
T_J	Operating junction temperature	+160	°C
T_{ST}	Storage temperature	-55 ~ +160	°C

'x' presents value 1 or 2.

6.2 DC Characteristics ($V_{DD}=3.0V$, $V_{CC}=6.0V$, $T_A=25^\circ C$, unless otherwise specified)

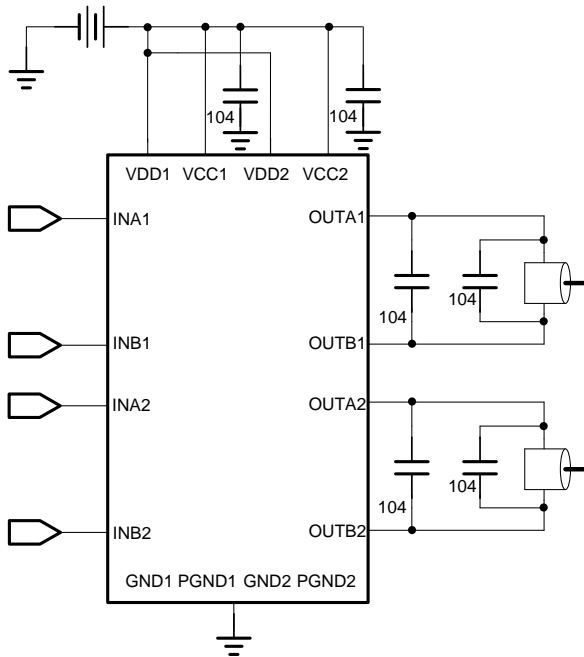
Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
V_{DDX}	Operating voltage (Logic)	1.8		6.8	V	
V_{CCX}	Operating voltage (MOSFET)	1.8		9.6	V	
I_{SB}	Standby current		0.1	1	uA	$INAx=INBx=0$
I_{OPx}	Operating current	$V_{DDX}=V_{CCX}=3.0V$		180	uA	$INAx=1, INBx=0$ or $INAx=0, INBx=1$ or $INAx=1, INBx=1$
		$V_{DDX}=V_{CCX}=6.0V$		260	uA	
I_{IHx}	Input high current (12k Ω pull-low resistance)		260		uA	$V_{IHx}=3.0V$
			510		uA	$V_{IHx}=6.0V$
V_{IH1}	Ch-1 input high voltage	2.0			V	
V_{IL1}	Ch-1 input low voltage			0.8	V	
V_{IH2}	Ch-2 input high voltage	$0.7V_{DD2}$			V	
V_{IL2}	Ch-2 input low voltage			$0.3V_{DD2}$	V	
R_{ON1}	Ch-1 output resistance		0.39		Ω	$I_{OUT}=800mA$
			0.44		Ω	$I_{OUT}=1200mA$
			0.50		Ω	$I_{OUT}=1500mA$
R_{ON2}	Ch-2 output resistance		0.69		Ω	$I_{OUT2}=500mA$
			0.79		Ω	$I_{OUT2}=800mA$
			0.94		Ω	$I_{OUT}=1200mA$
I_{OUT1}	Ch-1 output continuous current (* with PCB heat dissipation)		1500	1800*	mA	SOP-16
I_{OUT2}	Ch-2 output continuous current (* with PCB heat dissipation)		1000	1200*	mA	

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
I_{PULSE1}	Ch-1 pulsed drain current			6.0	A	Pulse width < 20ms
I_{PULSE2}	Ch-2 pulsed drain current			5.0	A	Pulse width < 20ms
T_{RISE1}	Ch-1 output rise time		310		ns	PWM=20kHz, Duty=50%
T_{FALL1}	Ch-1 output fall time		125		ns	
T_{RP1}	Ch-1 Input-to-Output response time		420		ns	
T_{RISE2}	Ch-2 output rise time		300		ns	PWM=20kHz, Duty=50%
T_{FALL2}	Ch-2 output fall time		120		ns	
T_{RP2}	Ch-2 Input-to-Output response time		250		ns	
T_{TSD}	Thermal shutdown (TSD)		160		°C	Junction temperature
T_{TSDH}	Thermal shutdown hysteresis		40		°C	

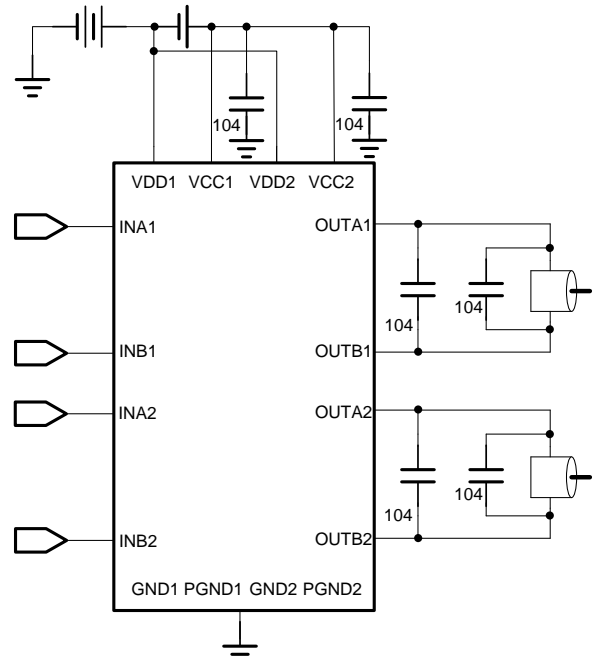
'x' presents value 1 or 2.

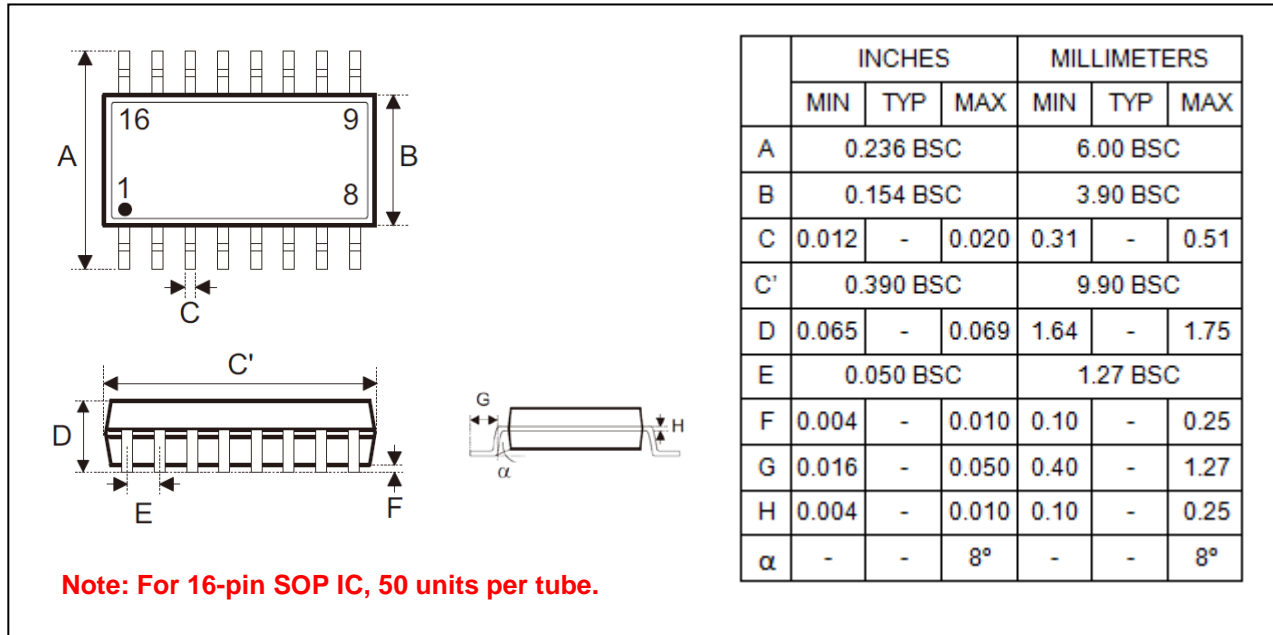
7. APPLICATION CIRCUIT

(1) Two Motors Bi-Directional Control (Single Power)



(2) Two Motors Bi-Directional Control (Dual Power)



8. PACKAGE DIMENSION
16-Pin Plastic SOP (150 mil)

9. ORDERING INFORMATION

<i>P/N</i>	<i>Package Type</i>	<i>Package Width</i>	<i>Shipping</i>
NY9M125AS16	SOP-16	150 mil.	<u>Tape & Reel</u> : 2.5K pcs per Reel <u>Tube</u> : 50 pcs per Tube