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

DATA SHEET

NY9M115A

Dual Channel 1.2A/0.9A Motor Driver

Version 1.1

May 15, 2015

Revision History

Version	*Date*	*Description*	*Modified Page*
1.0	201412/25	New release.	-
1.1	2015/05/15	1. Update DC characteristics. 2. Remove the error description of package.	7 9

1. 概述

NY9M115A 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1.2A，最大峰值輸出電流可到2.0A。通道2的持續輸出電流為0.9A，最大峰值輸出電流可到1.5A。

2. 功能

(1). 寬廣的工作電壓： CH1=1.8V ~ 9.0V，CH2=1.8V ~ 6.0V。

(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1.2A，通道2達到0.9A 以上電流輸出能力。

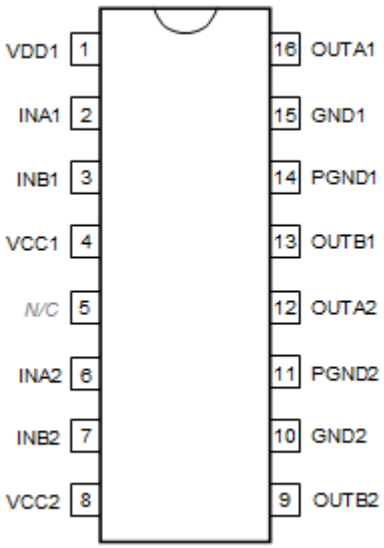
(6). 內建過溫保護功能 。(TSD, Thermal Shutdown)

(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。

16-pin SOP-16



1. GENERAL DESCRIPTION

NY9M115A 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 1.2A with peak current 2.0A output capability. Channel 2 has continuous current 0.9A with peak current 1.5A output capability.

2. FEATURES

(1). Wide operating voltage: CH1=1.8V ~ 9.0V, CH2=1.8V ~ 6.0V.

(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 1.2A output current capability. Channel 2 has over 0.9A output current capability.

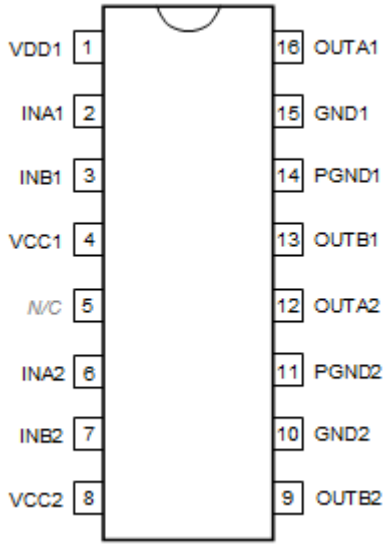
(6). Built-in Thermal Shutdown (TSD) circuit.

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

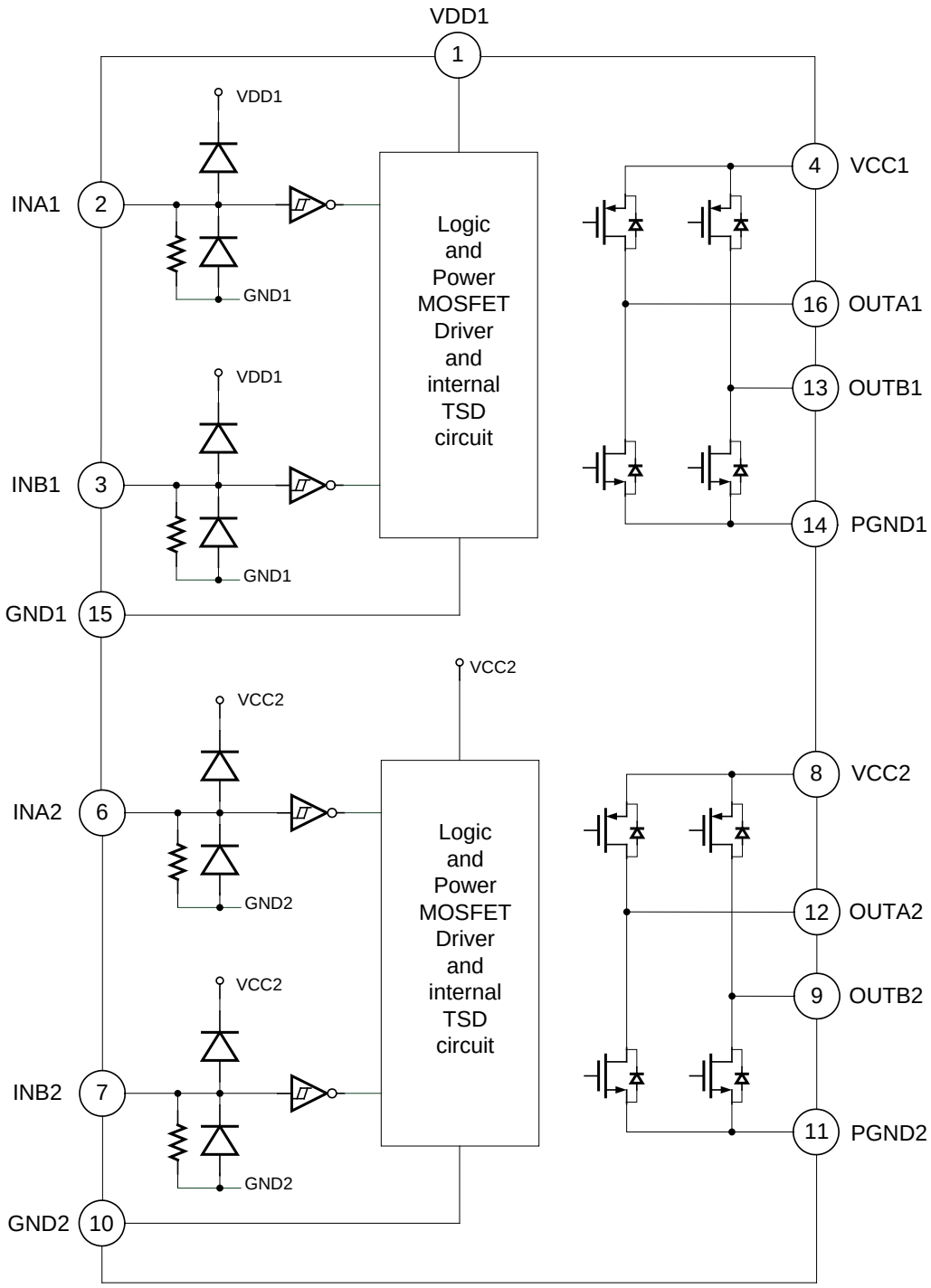
(8). High 5KV Human Body Mode (HBM) ESD protection.

(9). SOP-16 package type is available.

16-pin SOP-16



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.
N/C*	5	-	No connection.
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.

** N/C pin is suggested connecting to VDD for pin-to-pin compatible with NY9M125AS16 at PCB layout.*

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_{DD1} - V_{GND1}	Ch-1 Supply voltage of logic control circuit		-0.5 ~ +7.5	V
V_{CC1}	Ch-1 Supply voltage of output power MOSFET		9.6	V
V_{CC2}	Ch-2 Supply voltage of output power MOSFET		6.8	V
$I_{OUT-PEAK}$	Output peak current	Channel 1	2.0	A
		Channel 2	1.5	
θ_{JA}	Thermal resistance (Junction to Ambient)	SOP-16	123	°C/W
P_D	Power dissipation	SOP-16	1.1	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_{DD1}=3.0V, V_{CC1}=6.0V, V_{CC2}=6.0V, T_A=25ºC, unless otherwise specified)*

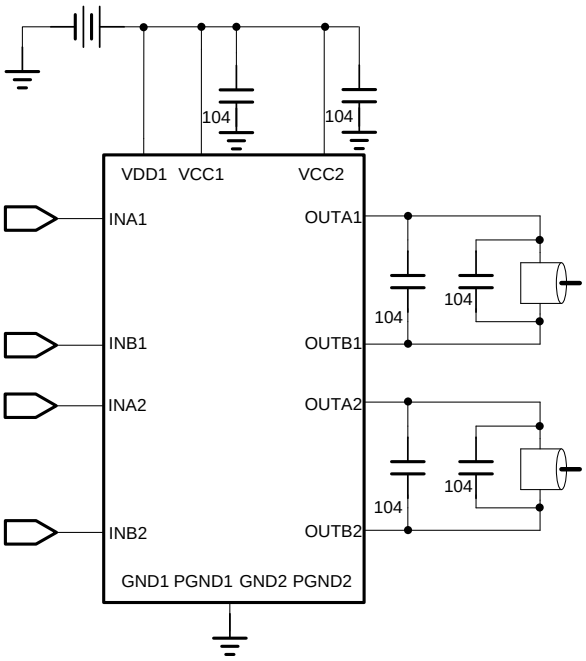
Symbol	Parameter		Min.	Typ.	Max.	Unit	Condition
V_{DD1}	Ch-1 Operating voltage (Logic)		1.8		6.8	V	
V_{CC1}	Ch-1 Operating voltage (MOSFET)		1.8		9.0	V	
V_{CC2}	Ch-2 Operating voltage (MOSFET)		1.8		6.0	V	
I_{SB}	Standby current			0.1	1	uA	INAx=INBx=0
I_{OPx}	Operating current	V_{DDX} = V_{CCX} = 3.0V		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 (12kΩ pull-low resistance)			260		uA	V_{IHX} = 3.0V
				510		uA	V_{IHX} = 6.0V
V_{IH1}	Ch-1 input high voltage		0.7V_{DD1}			V	
V_{IL1}	Ch-1 input low voltage				0.3V_{DD1}	V	
V_{IH2}	Ch-2 input high voltage		2.0			V	
V_{IL2}	Ch-2 input low voltage				0.8	V	
R_{ON1}	Ch-1 output resistance			0.61		Ω	I_{OUT1} = 500mA
				0.67		Ω	I_{OUT1} = 800mA
				0.81		Ω	I_{OUT} = 1200mA
R_{ON2}	Ch-2 output resistance			0.75		Ω	I_{OUT2} = 200mA
				0.80		Ω	I_{OUT2} = 500mA
				0.93		Ω	I_{OUT2} = 800mA
I_{OUT1}	Ch-1 output continuous current (* with PCB heat dissipation)			1200	1300*	mA	SOP-16
I_{OUT2}	Ch-2 output continuous current (* with PCB heat dissipation)			900	1100*	mA	

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
I_{PULSE1}	Ch-1 pulsed drain current			5.0	A	Pulse width < 20ms
I_{PULSE2}	Ch-2 pulsed drain current			2.5	A	Pulse width < 20ms
T_{RISE1}	Ch-1 output rise time		300		ns	PWM=20kHz, Duty=50%
T_{FALL1}	Ch-1 output fall time		120		ns	
T_{RP1}	Ch-1 Input-to-Output response time		250		ns	
T_{RISE2}	Ch-2 output rise time		400		ns	PWM=20kHz, Duty=50%
T_{FALL2}	Ch-2 output fall time		150		ns	
T_{RP2}	Ch-2 Input-to-Output response time		460		ns	
T_{TSD}	Thermal shutdown (TSD)		160		°C	Junction temperature
T_{TSDH}	Thermal shutdown hysteresis		30		°C	

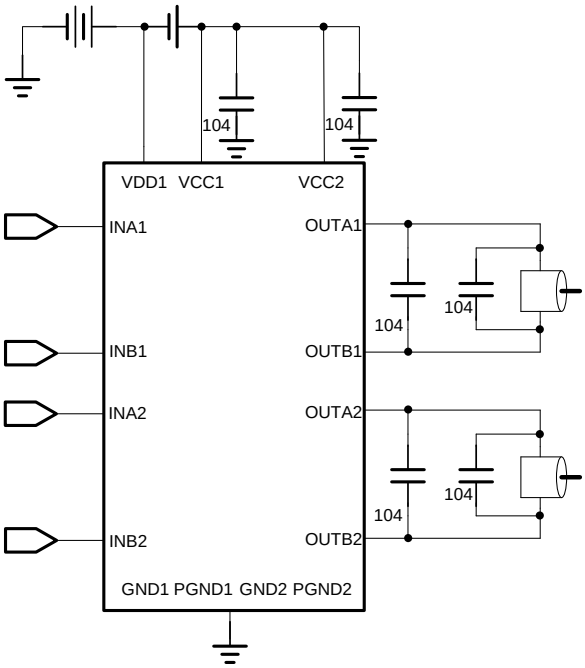
'x' presents value 1 or 2.

7. APPLICATION CIRCUIT

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

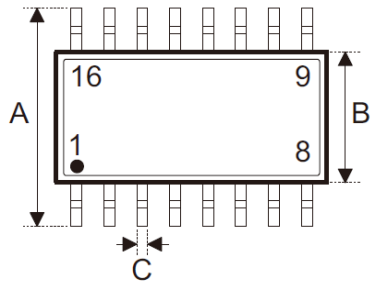


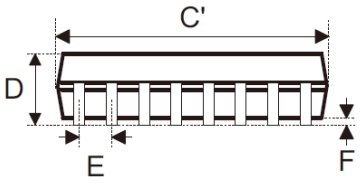
(2) Two Motors Bi-Directional Control (Dual Power)



8. PACKAGE DIMENSION

16-Pin Plastic SOP (150 mil)





	INCHES			MILLIMETERS		
	MIN	TYP	MAX	MIN	TYP	MAX
A		0.236 BSC			6.00 BSC	
B		0.154 BSC			3.90 BSC	
C	0.012	-	0.020	0.31	-	0.51
C'		0.390 BSC			9.90 BSC	
D	0.065	-	0.069	1.64	-	1.75
E		0.050 BSC			1.27 BSC	
F	0.004	-	0.010	0.10	-	0.25
G	0.016	-	0.050	0.40	-	1.27
H	0.004	-	0.010	0.10	-	0.25
α	-	-	8°	-	-	8°

Note: For 16-pin SOP IC, 50 units per tube.

9. ORDERING INFORMATION

P/N	*Package Type*	*Package Width*	*Shipping*
NY9M115AS16	SOP-16	150 mil.	Tape & Reel: 2.5K pcs per Reel Tube: 50 pcs per Tube