L293D Motor Driver

Tested By
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11/06/19

High Level

Motor A Truth Table

Inputs			Outputs	
Pin 1 (EN)	Pin 2 (Controls pin 3 state)	Pin 7 (Controls pin 6 state)	Pin 3 (MotorA+ Pin)	Pin 6 (MotorA- Pin)
OFF	OFF	OFF	HIGH Z	HIGH Z
OFF	OFF	ON	HIGH Z	HIGH Z
OFF	ON	OFF	HIGH Z	HIGH Z
OFF	ON	ON	HIGH Z	HIGH Z
ON	OFF	OFF	OFF	OFF
ON	OFF	ON	OFF	ON
ON	ON	OFF	ON	OFF
ON	ON	ON	ON	ON

```
/* Motor A logic */
if(pin1 == ON){
      pin3 = pin2;
      pin6 = pin7;
}
if(pin1 == OFF){
      pin3 = HIGHZ;
      pin6 = HIGHZ;
}



/* Motor B logic */
if(pin9 == ON){
      pin14 = pin10;
      pin11 = pin15;
}
if(pin9 == OFF){
      pin14 = HIGHZ;
      pin11 = HIGHZ;
}
```

Motor B Truth Table

Inputs			Outputs	
Pin 9 (EN)	Pin 10 (Controls pin 11 state)	Pin 15 (Controls pin 14 state)	Pin 14 (MotorB+ Pin)	Pin 11 (MotorB- Pin)
OFF	OFF	OFF	HIGH Z	HIGH Z
OFF	OFF	ON	HIGH Z	HIGH Z
OFF	ON	OFF	HIGH Z	HIGH Z
OFF	ON	ON	HIGH Z	HIGH Z
ON	OFF	OFF	OFF	OFF
ON	OFF	ON	OFF	ON
ON	ON	OFF	ON	OFF
ON	ON	ON	ON	ON

Confirm direction of motor spin after wiring.

Low Level

Back emf is handled in driver.
Motor A and motor B can work at the same time if needed.
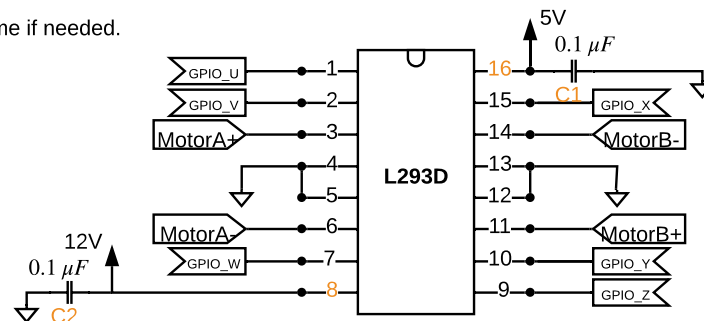
The voltages at pins 3,6,11,14 will be the voltage at pin 8 when these pins are HIGH/ON. Otherwise, voltage at ground (zero) if LOW/OFF.

C1 and C2 AC bypass caps should be placed as close as possible to IC pins 8 and 16 respectively.
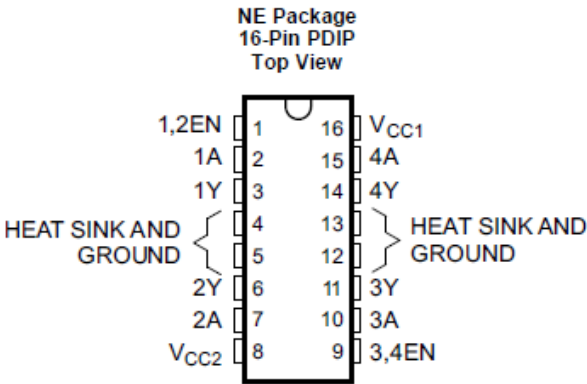**Pin 16 must be at 5V** (Internal logic voltage).
Pin 8 should be the voltage needed to drive motors A and B. **Voltage must not exceed 36V.**
600 mA current MAX per motor (both motors can be on at 600mA for a max of 1.2 A).

# Texas Instruments Datasheet Information Snippets for L293D Motor Drivers

5 Pin Configuration and Functions

NE Package
16-Pin PDIP
Top View

```
1,2EN [ 1        16 ] VCC1
  1A  [ 2        15 ] 4A
  1Y  [ 3        14 ] 4Y
         [ 4        13 ]
         [ 5        12 ]
  2Y  [ 6        11 ] 3Y
  2A  [ 7        10 ] 3A
 VCC2 [ 8         9 ] 3,4EN
```

HEAT SINK AND GROUND (pins 4, 5)   HEAT SINK AND GROUND (pins 13, 12)

Pin Functions

PIN		TYPE	DESCRIPTION
NAME	NO.		
1,2EN	1	I	Enable driver channels 1 and 2 (active high input)
<1:4>A	2, 7, 10, 15	I	Driver inputs, noninverting
<1:4>Y	3, 6, 11, 14	O	Driver outputs
3,4EN	9	I	Enable driver channels 3 and 4 (active high input)
GROUND	4, 5, 12, 13	—	Device ground and heat sink pin. Connect to printed-circuit-board ground plane with multiple solid vias
VCC1	16	—	5-V supply for internal logic translation
VCC2	8	—	Power VCC for drivers 4.5 V to 36 V

8.2 Functional Block Diagram

Output diodes are internal in L293D.
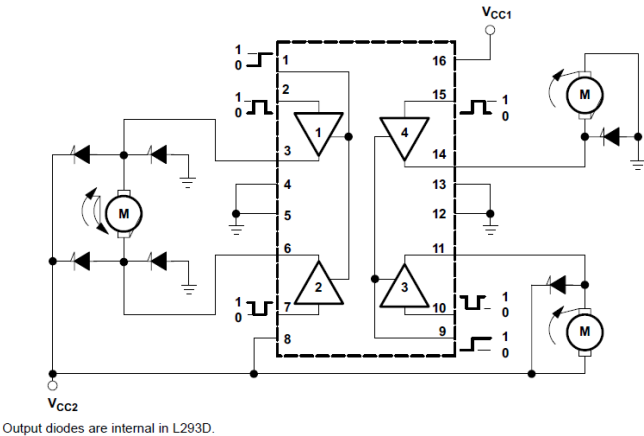
Logic Diagram
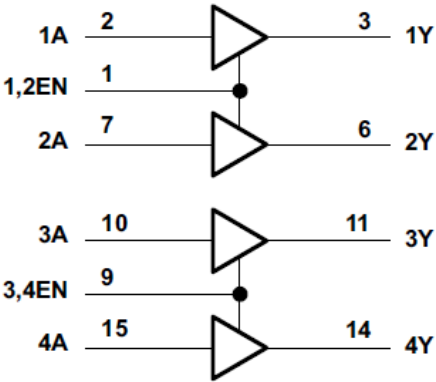
6.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)[1]

		MIN	MAX	UNIT
Supply voltage, V_{CC1}[2]			36	V
Output supply voltage, V_{CC2}			36	V
Input voltage, V_I			7	V
Output voltage, V_O		−3	V_{CC2} + 3	V
Peak output current, I_O (nonrepetitive, t ≤ 5 ms): L293		−2	2	A
Peak output current, I_O (nonrepetitive, t ≤ 100 µs): L293D		−1.2	1.2	A
Continuous output current, I_O: L293		−1	1	A
Continuous output current, I_O: L293D		−600	600	mA
Maximum junction temperature, T_J			150	°C
Storage temperature, T_{stg}		−65	150	°C

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
(2) All voltage values are with respect to the network ground terminal.

6.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)

			MIN	NOM	MAX	UNIT
	Supply voltage	V_{CC1}	4.5		7	V
		V_{CC2}	V_{CC1}		36	
V_{IH}	High-level input voltage	V_{CC1} ≤ 7 V	2.3		V_{CC1}	V
		V_{CC1} ≥ 7 V	2.3		7	V
V_{IL}	Low-level output voltage		−0.3[1]		1.5	V
T_A	Operating free-air temperature		0		70	°C

(1) The algebraic convention, in which the least positive (most negative) designated minimum, is used in this data sheet for logic voltage levels.