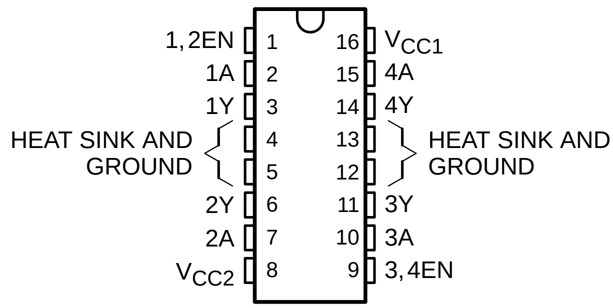
- **1-A Output Current Capability Per Driver**
- **Pulsed Current 2-A Driver**
- **Wide Supply Voltage Range: 4.5 V to 36 V**
- **Separate Input-Logic Supply**
- **NE Package Designed for Heat Sinking**
- **Thermal Shutdown**
- **Internal ESD Protection**
- **High-Noise-Immunity Inputs**
- **Functional Replacement for SGS L293**

NE PACKAGE
(TOP VIEW)



description

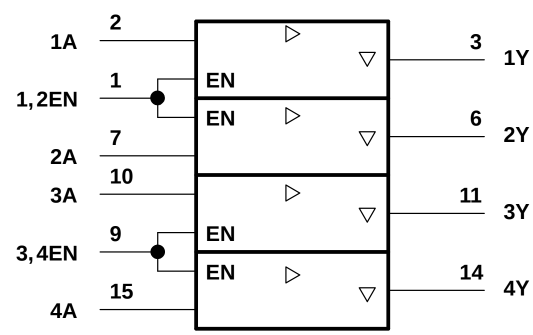
The L293 is a quadruple high-current half-H driver designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. It is designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors, as well as other high-current/high-voltage loads in positive-supply applications.

All inputs are TTL compatible. Each output is a complete totem-pole drive circuit with a Darlington transistor sink and a pseudo-Darlington source. Drivers are enabled in pairs with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN. When an enable input is high, the associated drivers are enabled and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled and their outputs are off and in a high-impedance state. With the proper data inputs, each pair of drivers form a full-H (or bridge) reversible drive suitable for solenoid or motor applications.

External high-speed output clamp diodes should be used for inductive transient suppression. A V_{CC1} terminal, separate from V_{CC2}, is provided for the logic inputs to minimize device power dissipation.

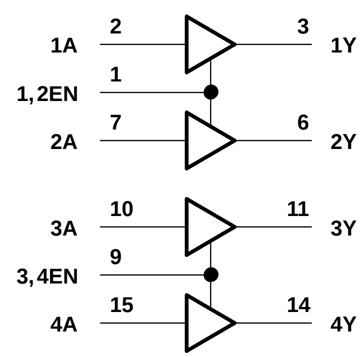
The L293 is designed for operation from 0°C to 70°C.

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC publication 617-12.

logic diagram

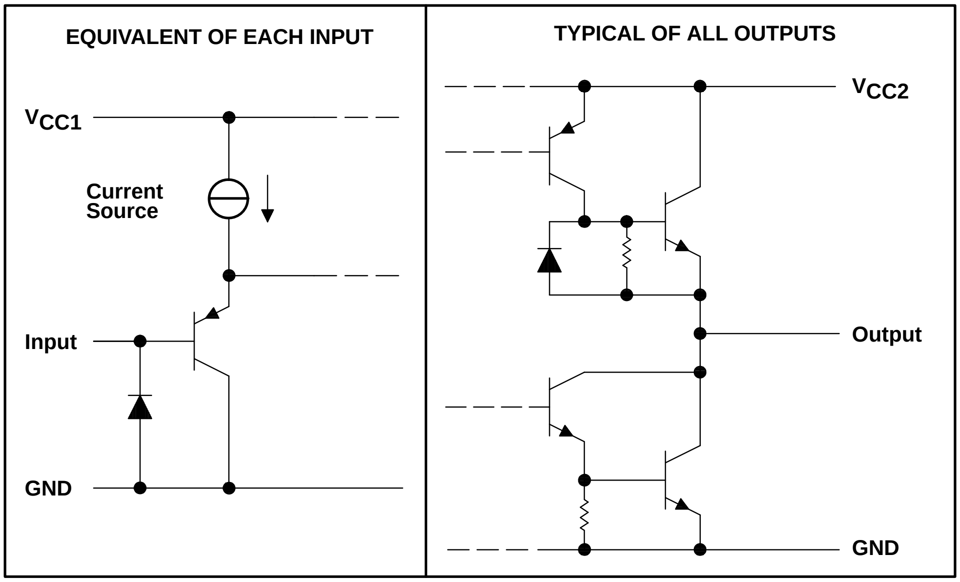


FUNCTION TABLE
(each driver)

INPUTS‡		OUTPUT
A	EN	Y
H	H	H
L	H	L
X	L	Z

H = high-level, L = low-level,
X = irrelevant, Z = high-impedance (off)
‡ In the thermal shutdown mode, the output is in the high-impedance state regardless of the input levels.

schematics of inputs and outputs



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

Supply voltage, V_{CC1} (see Note 1)	36 V
Output supply voltage, V_{CC2}	36 V
Input voltage, V_I	7 V
Output voltage range	−3 V to V_{CC2} + 3 V
Peak output current (nonrepetitive, t ≤ 5 ms)	±2 A
Continuous output current, I_O	±1 A
Continuous total dissipation at (or below) 25°C free-air temperature (see Notes 2 and 3)	2075 mW
Continuous total dissipation at 80°C case temperature (see Note 3)	5000 mW
Operating case or virtual junction temperature range	−40°C to 150°C
Storage temperature range	−65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

NOTES: 1. All voltage values are with respect to the network ground terminal.
2. For operation above 25°C free-air temperature, derate linearly at the rate of 16.6 mW/°C.
3. For operation above 25°C case temperature, derate linearly at the rate of 71.4 mW/°C. Due to variations in individual device electrical characteristics and thermal resistance, the built-in thermal overload protection may be activated at power levels slightly above or below the rated dissipation.

recommended operating conditions

		MIN	MAX	UNIT
Logic supply voltage, V_{CC1}		4.5	7	V
Output supply voltage, V_{CC2}			36	V
High-level input voltage, V_{IH}	V_{CC1} ≤ 7 V	2.3		V
	V_{CC1} ≥ 7 V	2.3	7	
Low-level output voltage, V_{IL}		−0.3†	1.5	V
Operating free-air temperature, T_A		0	70	°C

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

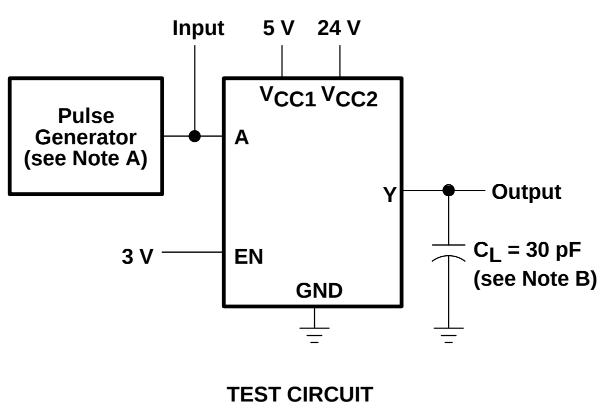
electrical characteristics, V_{CC1} = 5 V, V_{CC2} = 24 V, T_A = 25°C

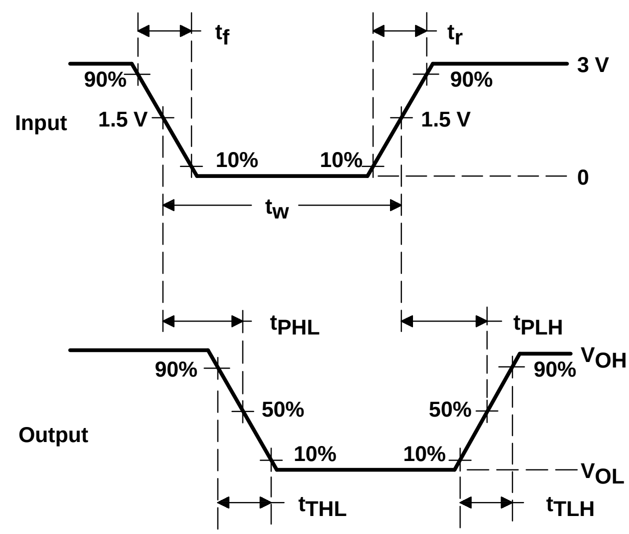
PARAMETER			TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_{OH}	High-level output voltage		I_{OH} = –1 A		V_{CC2}–1.8	V_{CC2}–1.4		V
V_{OL}	Low-level output voltage		I_{OL} = 1 A			1.2	1.8	V
I_{IH}	High-level input current	A	V_I = 7 V			0.2	100	μA
		EN				0.2	±10	
I_{IL}	Low-level input current	A	V_I = 0			–3	–10	μA
		EN				–2	–100	
I_{CC1}	Logic supply current		I_O = 0	All outputs at high level		13	22	mA
				All outputs at low level		35	60	
				All outputs at high impedance		8	24	
I_{CC2}	Output supply current		I_O = 0	All outputs at high level		14	24	mA
				All outputs at low level		2	6	
				All outputs at high impedance		2	4	

switching characteristics, V_{CC1} = 5 V, V_{CC2} = 24 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output from A input	C_L = 30 pF, See Figure 1		800		ns
t_{PHL}	Propagation delay time, high-to-low-level output from A input			400		ns
t_{TLH}	Transition time, low-to-high-level output			300		ns
t_{THL}	Transition time, high-to-low-level output			300		ns

PARAMETER MEASUREMENT INFORMATION





NOTES: A. The pulse generator has the following characteristics: $t_r \le 10$ ns, $t_f \le 10$ ns, t_w = 10 μs, PRR = 5 kHz, Z_O = 50 Ω.
B. C_L includes probe and jig capacitance.

Figure 1. Test Circuit and Voltage Waveforms

APPLICATION INFORMATION

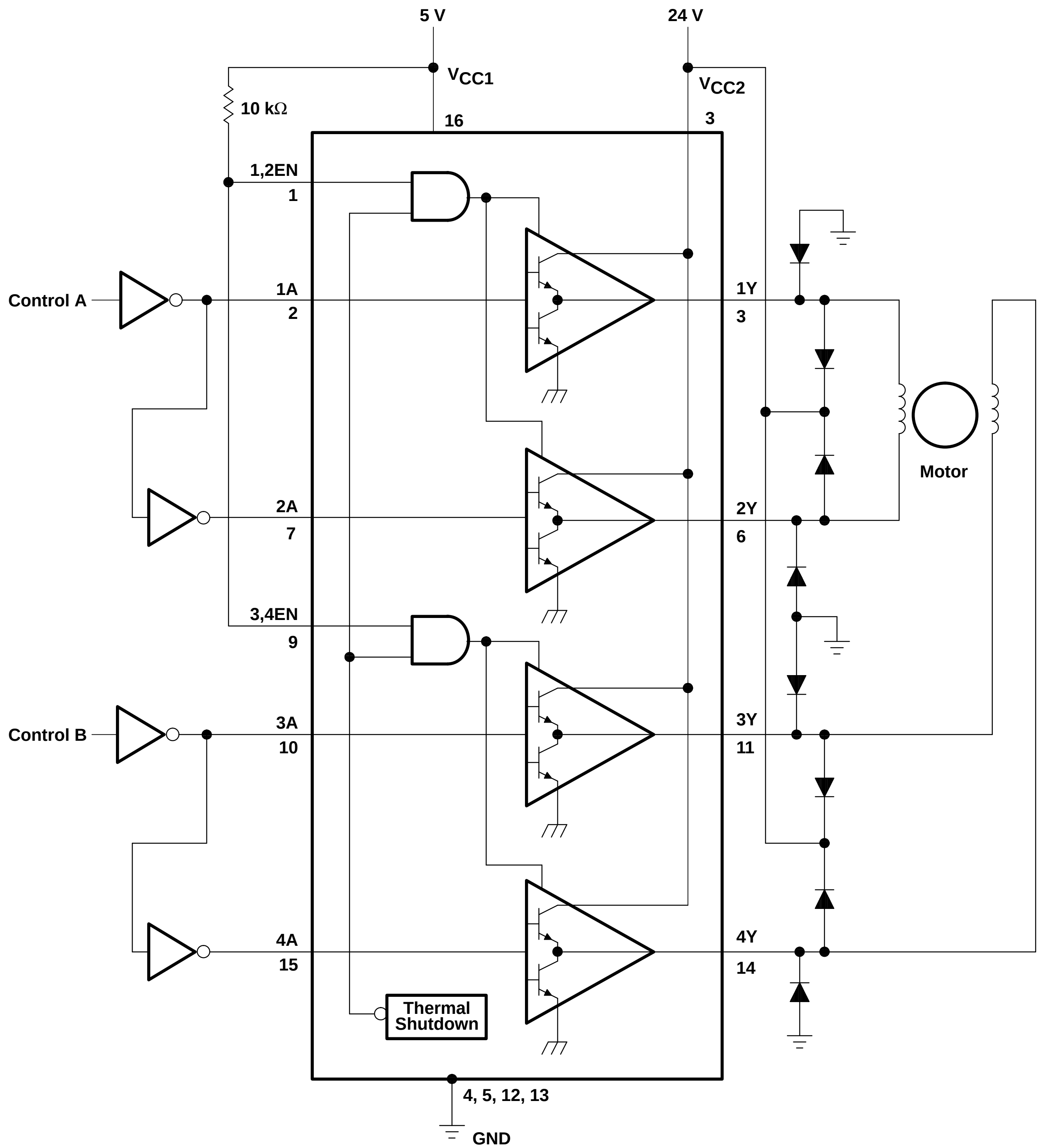


Figure 2. Two-Phase Motor Driver