

HX293D-S/HX293D-P Push-pull four-channel driver with diode

Description

The device is a monolithic integrated high-voltage, high-current four-channel driver designed to accept standard DTL or TTL logic levels. It is capable of driving inductive loads such as relays, solenoids, DC motors, and stepping motors, as well as switching power transistors.

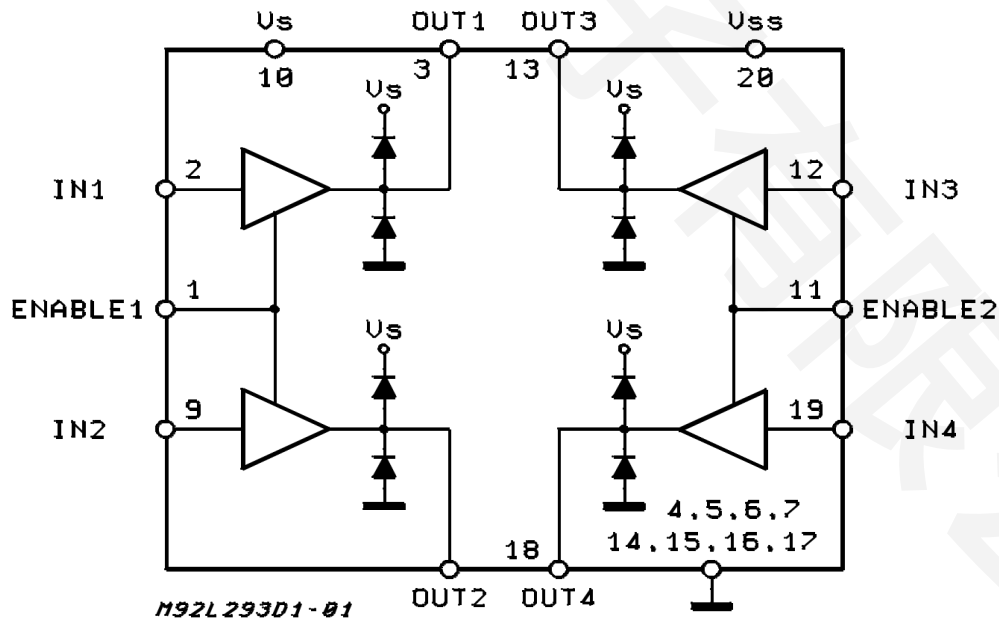
To facilitate its use in two bridge configurations, each pair of channels is equipped with an enable input. Additionally, a separate supply input for the logic circuitry allows for operation at a lower voltage. Internal clamp diodes are also included to enhance performance.

This device is suitable for application in switching operations at frequencies of up to 5 kHz.

Features

- ★ 600mA OUTPUT CURRENT CAPABILITY PER CHANNEL
- ★ 1.2A PEAK OUTPUT CURRENT (non repetitive) PER CHANNEL
- ★ ENABLE FACILITY
- ★ OVERTEMPERATURE PROTECTION
- ★ LOGICAL "0" INPUT VOLTAGE UP TO 1.5 V (HIGH NOISE IMMUNITY)
- ★ INTERNAL CLAMP DIODES

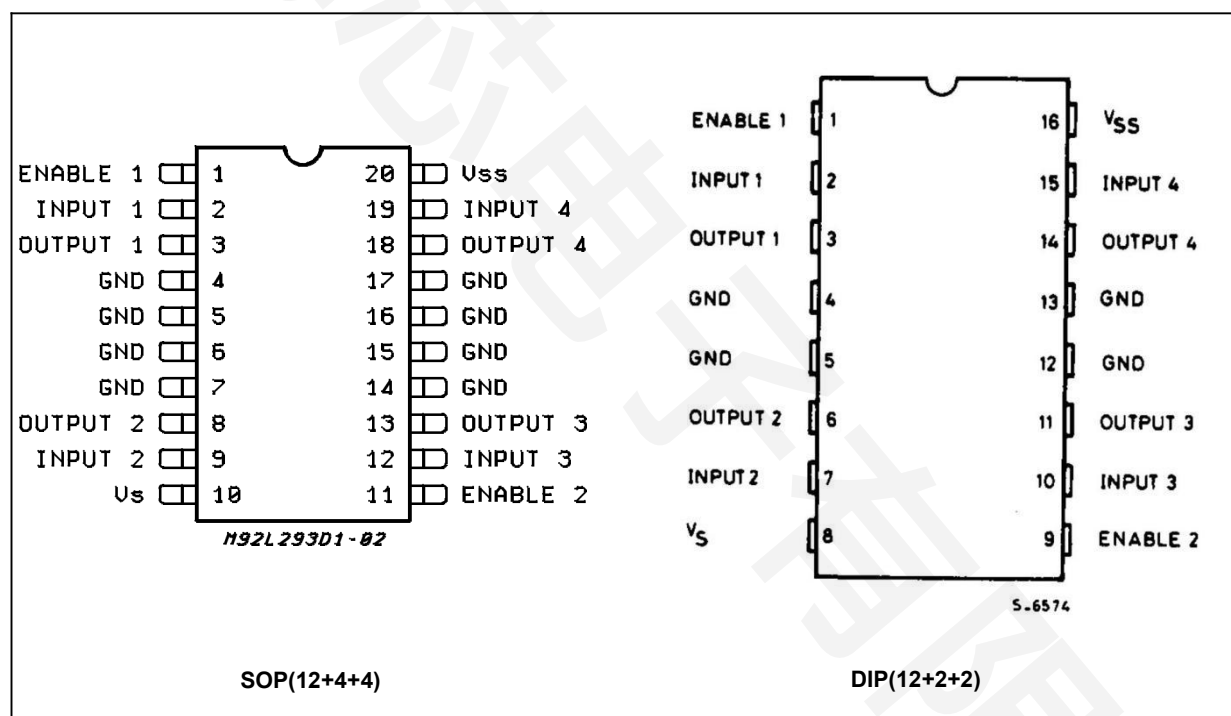
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _s	Supply Voltage	36	V
V _{ss}	Logic Supply Voltage	36	V
V _i	Input Voltage	7	V
V _{en}	Enable Voltage	7	V
I _o	Peak Output Current (100 μs non repetitive)	1.2	A
P _{tot}	Total Power Dissipation at T _{pins} = 90 °C	4	W
T _{stg} , T _j	Storage and Junction Temperature	- 40 to 150	°C

PIN CONNECTIONS (Top view)



THERMAL DATA

Symbol	Decription	DIP	SO	Unit
R _{th j-pins}	Thermal Resistance Junction-pins	max.	14	°C/W
R _{th j-amb}	Thermal Resistance junction-ambient	max.	50 (*)	°C/W
R _{th j-case}	Thermal Resistance Junction-case	max.	—	°C/W

(*) With 6sq. cm on board heatsink.

ELECTRICAL CHARACTERISTICS (for each channel, $V_S = 24\text{ V}$, $V_{SS} = 5\text{ V}$, $T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_S	Supply Voltage (pin 10)		V_{SS}		36	V
V_{SS}	Logic Supply Voltage (pin 20)		4.5		36	V
I_S	Total Quiescent Supply Current (pin 10)	$V_i = L$; $I_o = 0$; $V_{en} = H$		2	6	mA
		$V_i = H$; $I_o = 0$; $V_{en} = H$		16	24	mA
		$V_{en} = L$			4	mA
I_{SS}	Total Quiescent Logic Supply Current (pin 20)	$V_i = L$; $I_o = 0$; $V_{en} = H$		44	60	mA
		$V_i = H$; $I_o = 0$; $V_{en} = H$		16	22	mA
		$V_{en} = L$		16	24	mA
V_{IL}	Input Low Voltage (pin 2, 9, 12, 19)		-0.3		1.5	V
V_{IH}	Input High Voltage (pin 2, 9, 12, 19)	$V_{SS} \leq 7\text{ V}$	2.3		V_{SS}	V
		$V_{SS} > 7\text{ V}$	2.3		7	V
I_{IL}	Low Voltage Input Current (pin 2, 9, 12, 19)	$V_{IL} = 1.5\text{ V}$			-10	μA
I_{IH}	High Voltage Input Current (pin 2, 9, 12, 19)	$2.3\text{ V} \leq V_{IH} \leq V_{SS} - 0.6\text{ V}$		30	100	μA
$V_{en L}$	Enable Low Voltage (pin 1, 11)		-0.3		1.5	V
$V_{en H}$	Enable High Voltage (pin 1, 11)	$V_{SS} \leq 7\text{ V}$	2.3		V_{SS}	V
		$V_{SS} > 7\text{ V}$	2.3		7	V
$I_{en L}$	Low Voltage Enable Current (pin 1, 11)	$V_{en L} = 1.5\text{ V}$		-30	-100	μA
$I_{en H}$	High Voltage Enable Current (pin 1, 11)	$2.3\text{ V} \leq V_{en H} \leq V_{SS} - 0.6\text{ V}$			± 10	μA
$V_{CE(sat)H}$	Source Output Saturation Voltage (pins 3, 8, 13, 18)	$I_o = -0.6\text{ A}$		1.4	1.8	V
$V_{CE(sat)L}$	Sink Output Saturation Voltage (pins 3, 8, 13, 18)	$I_o = +0.6\text{ A}$		1.2	1.8	V
V_F	Clamp Diode Forward Voltage	$I_o = 600\text{ nA}$		1.3		V
t_r	Rise Time (*)	0.1 to 0.9 V_o		250		ns
t_f	Fall Time (*)	0.9 to 0.1 V_o		250		ns
t_{on}	Turn-on Delay (*)	0.5 V_i to 0.5 V_o		750		ns
t_{off}	Turn-off Delay (*)	0.5 V_i to 0.5 V_o		200		ns

(*) See fig. 1.

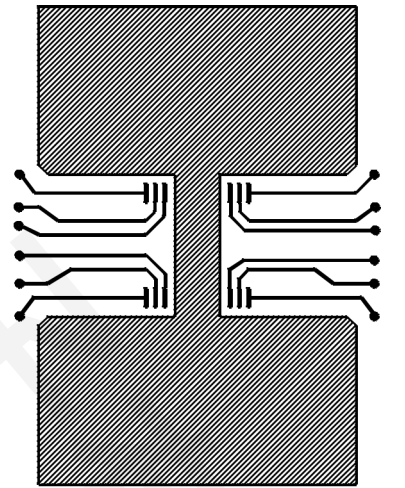
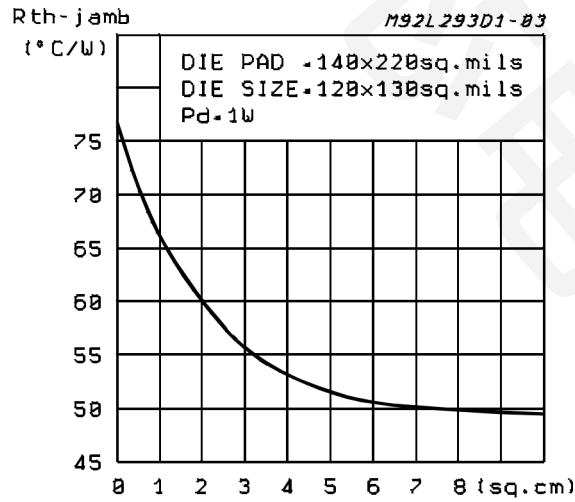
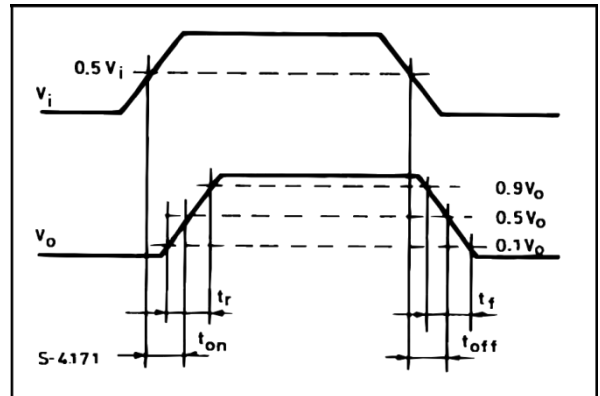
TRUTH TABLE (one channel)

Input	Enable (*)	Output
H	H	H
L	H	L
H	L	Z
L	L	Z

Z = High output impedance

(*) Relative to the considered channel

Figure 1: Switching Times

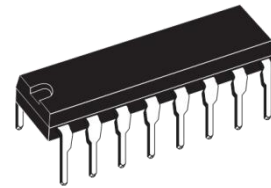


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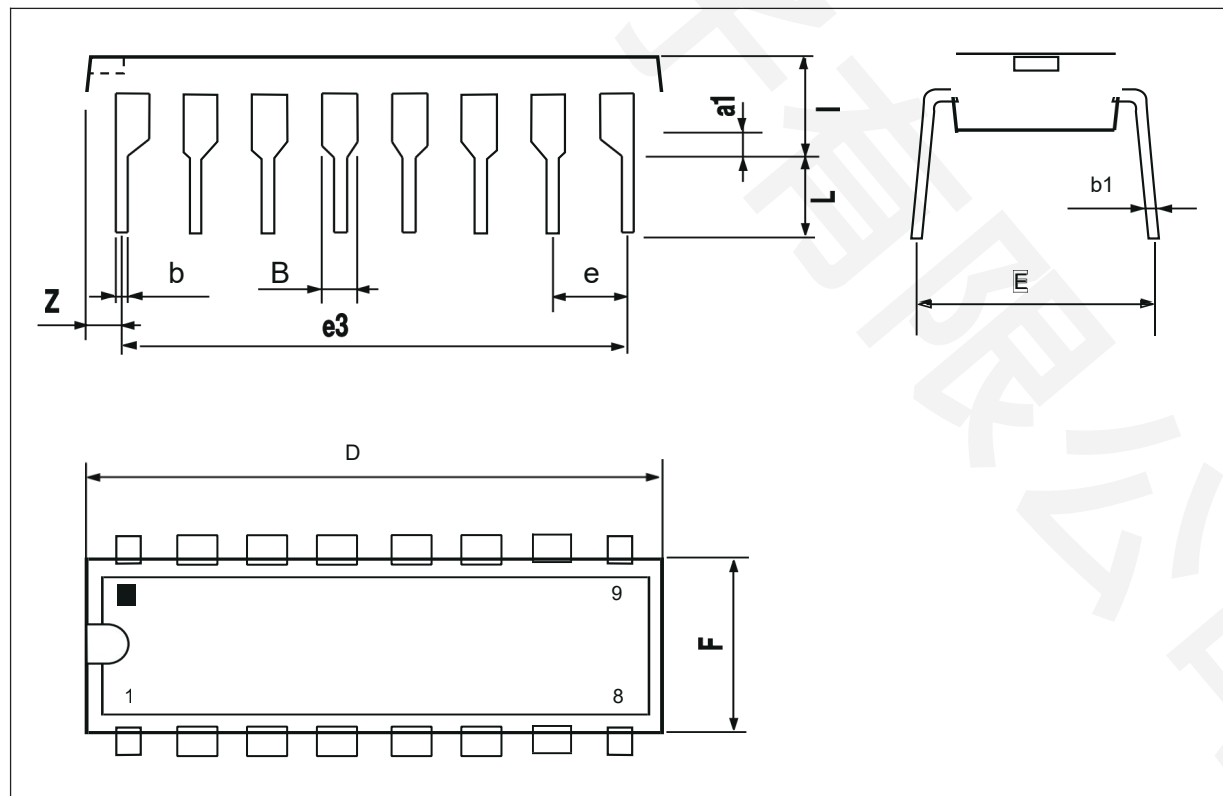
Figure 2: Junction to ambient thermal resistance vs. area on board heatsink (SO12+4+4 package)

DIM	mm			inch		
	MIN	TYP	MAX	MIN	TYP	MAX
a1	0.51			0.020		
B	0.85		1.40	0.033		0.055
b		0.50			0.020	
b1	0.38		0.50	0.015		0.020
D			20.0			0.787
E		8.80			0.346	
e		2.54			0.100	
e3		17.78			0.700	
F			7.10			0.280
I			5.10			0.201
L		3.30			0.130	
Z			1.27			0.050

OUTLINE AND MECHANICAL DATA

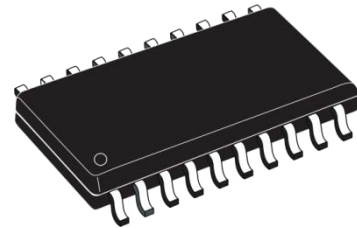


DIP-16



DIM	mm			inch		
	MIN	TYP	MAX	MIN	TYP	MAX
A	2.35		2.65	0.093		0.104
A1	0.1		0.3	0.004		0.012
B	0.33		0.51	0.013		0.020
C	0.23		0.32	0.009		0.013
D	12.6		13	0.496		0.512
E	7.4		7.6	0.291		0.299
e		1.27			0.050	
H	10		10.65	0.394		0.419
h	0.25		0.75	0.010		0.030
L	0.4		1.27	0.016		0.050
K	0° (min.)8° (max.)					

OUTLINE AND MECHANICAL DATA



SOP-20

