PUSH-PULL FOUR CHANNEL DRIVER WITH DIODES

FEATURES

- 600mA Output Current Capability Per Channel
- 1.0 A Peak Output Current(Non Repeti- Tive) Per Channel
- Enable Facility Overtemperature Protection
- Logical ”0” Input Voltage Up To 1.5 V (High Noise Immunity)
- Internal Clamp Diodes

DIP-16

SOP-20W

ORDERING INFORMATION

DEVICE	Package Type	MARKING	Packing	Packing Qty
L293DN	DIP-16	L293D	TUBE	1000pcs/box
L293DDM/TR	SOP-20W	L293D	REEL	2000pcs/reel

DESCRIPTION

The Device is a monolithic integrated high volt- age, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads (such as relays solenoides, DC and stepping motors) and switching power tran- sistors.

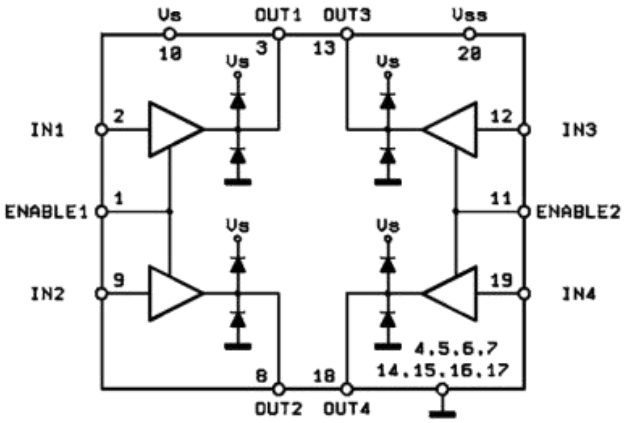
To simplify use as two bridges each pair of chan- nels is equipped with an enable input. A separate supply input is provided for the logic, allowing op- eration at a lower voltage and internal clamp di- odes are included.

This device is suitable for use in switching appli- cations at frequencies up to 5 kHz.

The L293D is assembled in a 16 lead plastic packaage which has 4 center pins connected to- gether and used for heatsinking

The L293DD is assembled in a 20 lead surface mount which has 8 center pins connected to- gether and used for heatsinking.

BLOCK DIAGRAM

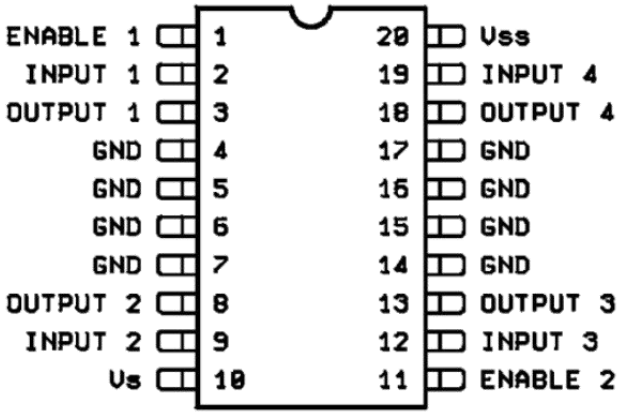


ABSOLUTE MAXIMUM RATINGS

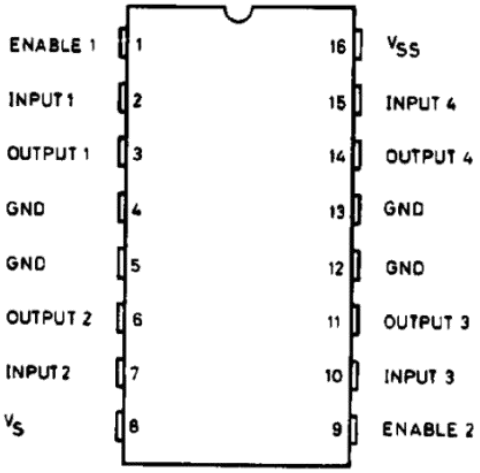
Symbol	Parameter	Value	Unit
V_S	Supply Voltage	36	V
V_{SS}	Logic Supply Voltage	36	V
V_i	Input Voltage	7	V
V_{en}	Enable Voltage	7	V
I_o	Peak Output Current (100μs non repetitive)	1.0	A
P_{tot}	Total Power Dissipation at T_{pins} = 90℃	4	W
T_L	Lead Temperature (Soldering, 10 seconds)	260	℃
T_{stg}, T_j	Storage and Junction Temperature	-40 ~ 150	℃
T_A	Operating Temperature Range	-20 ~ 85	℃

Note:Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

PIN CONNECTIONS (Top view)



SOP(12+4+4)
L293DD



Powerdip(12+2+2)
L293D

THERMAL DATA

Symbol	Decription		DIP	SOP	Unit
$R_{th\ j\text{-}pins}$	Thermal Resistance Junction-pins	max.	–	14	℃/W
$R_{th\ j\text{-}amb}$	Thermal Resistance junction-ambient	max.	80	50 (*)	℃/W
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	max.	14	–	

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

ELECTRICAL CHARACTERISTICS

(for each channel, V_S=24V, V_{SS}=5V,T_{amb}=25 °C, unlessotherwise 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	V_i = L ; I_O = 0 ; V_{en} = H		2	6	mA
	(pin 10)	V_i = H ; I_O = 0 ; V_{en} = H		16	24	mA
		V_{en} = L			4	mA
I_{SS}	Total Quiescent Logic Supply	V_i = L ; I_O =0 ; V_{en} = H		44	60	mA
	Current (pin 20)	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,	V_{SS} 7 V	2.3		V_{SS}	V
	12, 19)	V_{SS} > 7 V	2.3		7	V
I_{IL}	Low Voltage Input Current (pin2, 9, 12, 19)	V_{IL} = 1.5 V			– 10	μA
I_{IH}	High Voltage Input Current (pin2, 9, 12, 19)	2.3 V V_{IH} V_{SS} – 0.6 V		30	100	μA
$V_{en\,L}$	Enable Low Voltage(pin 1, 11)		– 0.3		1.5	V
$V_{en\,H}$	Enable High Voltage	V_{SS} 7 V	2.3		V_{SS}	V
	(pin 1, 11)	V_{SS} > 7 V	2.3		7	V
$I_{en\,L}$	Low Voltage Enable Current(pin 1, 11)	$V_{en\,L}$ = 1.5 V		– 30	– 100	μA
$I_{en\,H}$	High Voltage Enable Current(pin 1, 11)	2.3 V $V_{en\,H}$ V_{SS} – 0.6 V			±10	μA
$V_{CE(sat)H}$	Source Output Saturation Voltage (pins 3, 8, 13, 18)	I_O = – 0.6 A		1.4	1.8	V
$V_{CE(sat)L}$	Sink Output Saturation Voltage(pins 3, 8, 13, 18)	I_O = + 0.6 A		1.2	1.8	V
V_F	Clamp Diode Forward Voltage	I_O = 600nA		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 channe

Figure 1: Switching Times

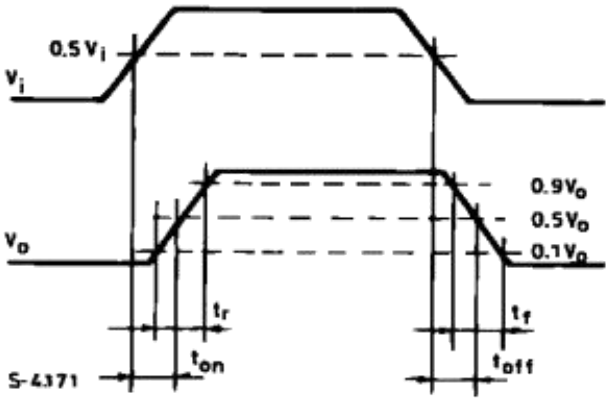
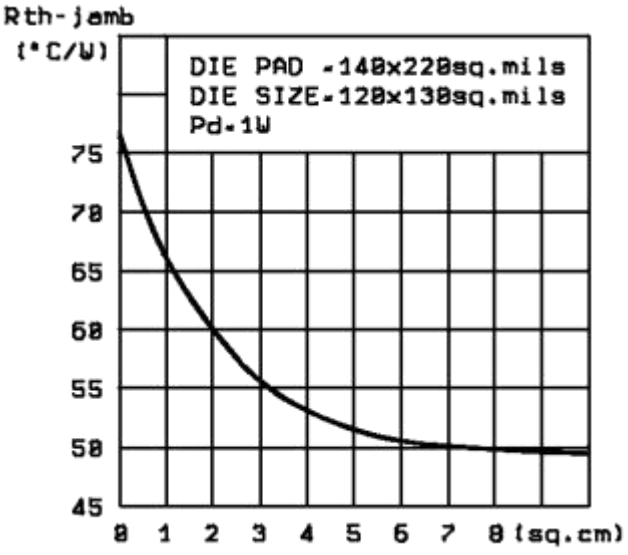
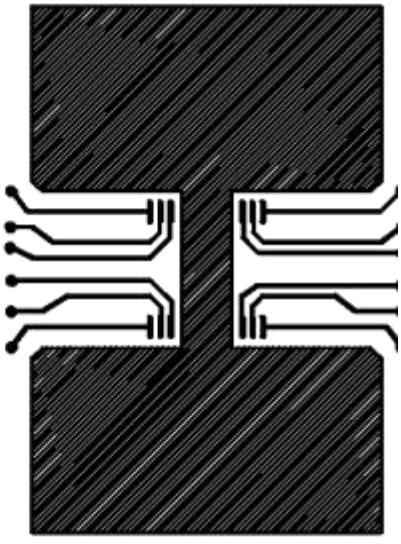


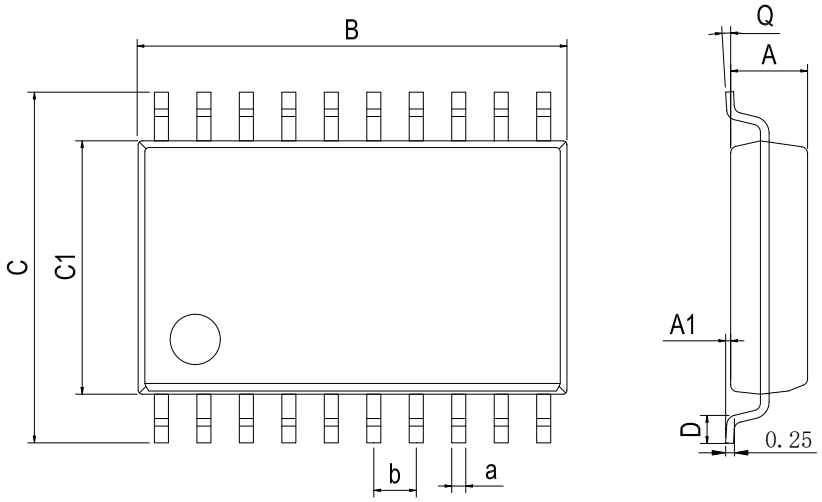
Figure 2: Junction to ambient thermal resistance vs. area on board heatsink (SOP 12+4+4 package)





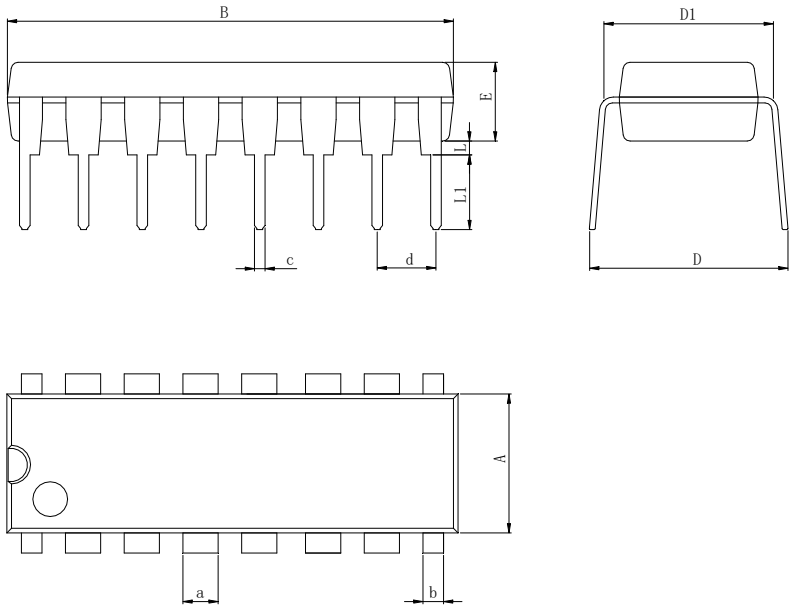
PHYSICAL DIMENSIONS

SOP-20W



Dimensions In Millimeters(SOP-20W)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	2.10	0.05	12.50	10.21	7.40	0.45	0°	0.35	1.27 BSC
Max:	2.50	0.25	13.00	10.61	7.60	1.25	8°	0.45	

DIP-16



Dimensions In Millimeters(DIP-16)											
Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	18.94	8.10	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	19.56	10.9	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

Revision History

DATE	REVISION	PAGE
2018-8-3	New	1-8
2023-9-13	Update encapsulation type、Updated DIP-16 dimension、Add annotation for Maximum Ratings.	1、6
2024-10-31	Updated max Peak Output Current、Update packages model SOP-20W、Update Lead Temperature	1、3

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