# PUSH-PULL FOUR CHANNEL DRIVER WITH DIODES

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

SOP(12+4+4)   **Powerdip (12+2+2)**

ORDERING NUMBERS:

L293DD   L293D

DESCRIPTION

The Device is a monolithic integrated high voltage, 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 transistors.

To simplify use as two bridges each pair of channels is equipped with an enable input. A separate supply input is provided for the logic, allowing operation at a lower voltage and internal clamp diodes are included.

This device is suitable for use in switching applications at frequencies up to 5 kHz.
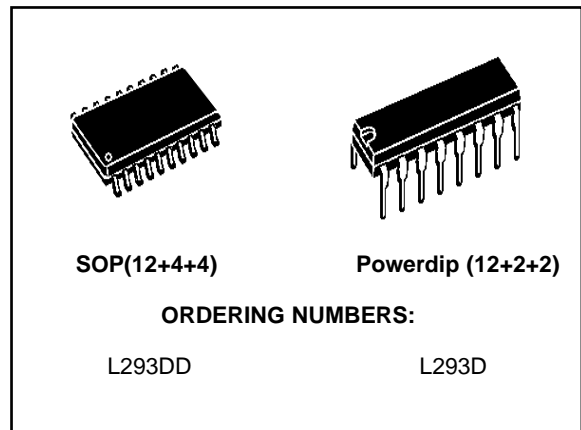
The L293D is assembled in a 16 lead plastic packaage which has 4 center pins connected together and used for heatsinking

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

ORDERING INFORMATION

DEVICE	Package Type	MARKING	Packing	Packing Qty
L293DN	DIP16	L293D	TUBE	1000/box
L293DDM/TR	SOP20	L293DD	REEL	2000/reel

BLOCK DIAGRAM
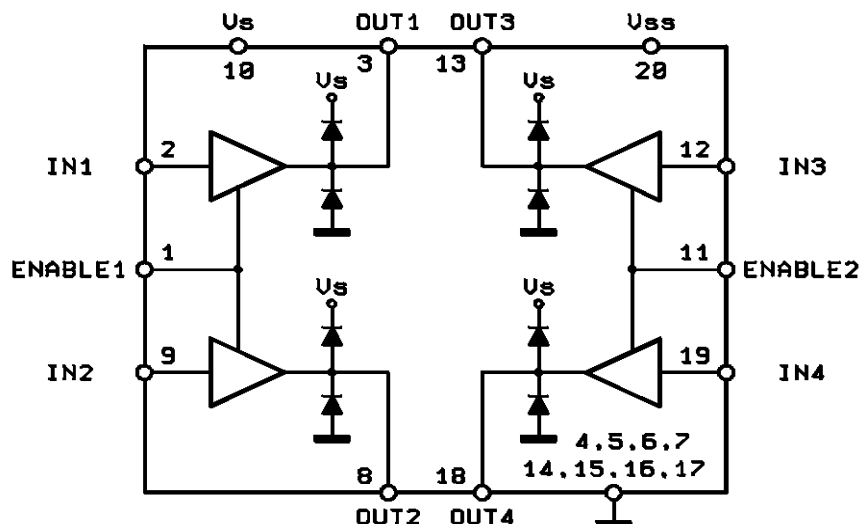
ABSOLUTE MAXIMUM RATINGS

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)

SOP(12+4+4)   Powerdip(12+2+2)
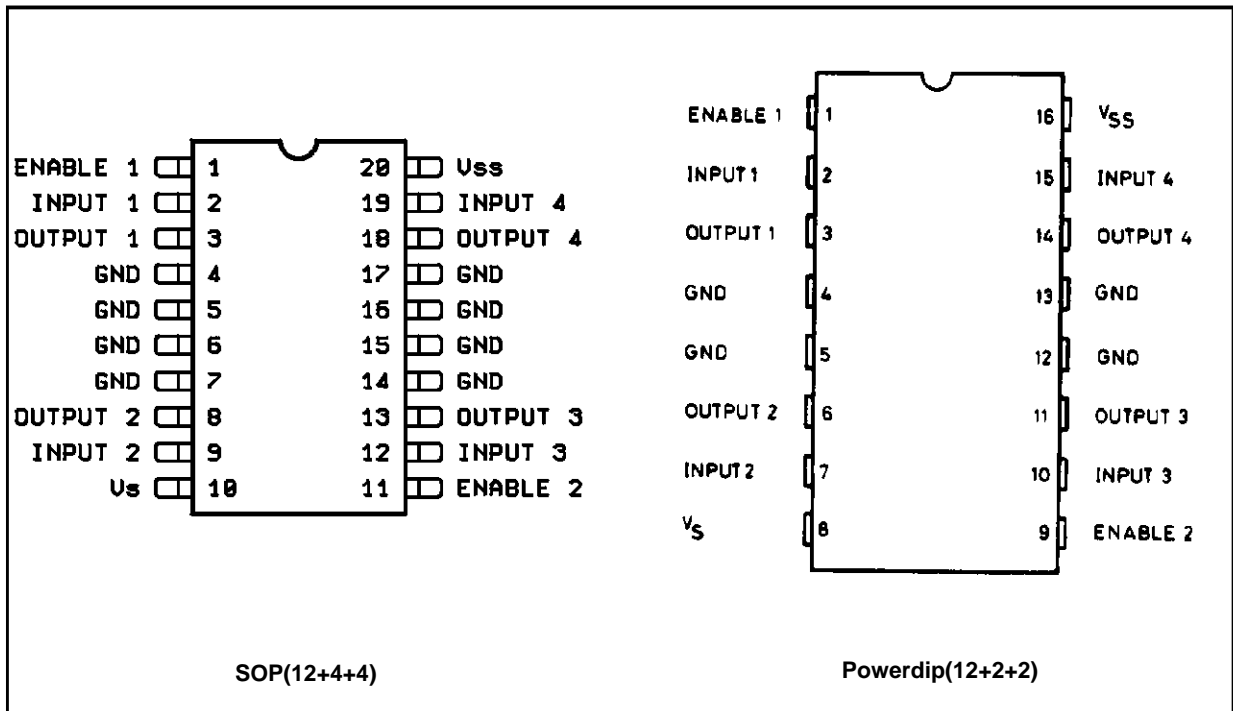
THERMAL DATA

Symbol	Decription		DIP	SOP	Unit
$R_{th\ j\text{-}pins}$	Thermal Resistance Junction-pins	max.	–	14	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance junction-ambient	max.	80	50 (*)	°C/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 = 24 V, V_{SS} = 5 V, T_{amb} = 25 °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)	$V_{SS} \leq 7$ V	2.3		V_{SS}	V
		$V_{SS} > 7$ V	2.3		7	V
I_{IL}	Low Voltage Input Current (pin 2, 9, 12, 19)	$V_{IL} = 1.5$ V			− 10	μA
I_{IH}	High Voltage Input Current (pin 2, 9, 12, 19)	$2.3 V \leq V_{IH} \leq V_{SS} − 0.6$ V		30	100	μA
$V_{en\ L}$	Enable Low Voltage (pin 1, 11)		− 0.3		1.5	V
$V_{en\ H}$	Enable High Voltage (pin 1, 11)	$V_{SS} \leq 7$ V	2.3		V_{SS}	V
		$V_{SS} > 7$ 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)	$2.3 V \leq V_{en\ H} \leq V_{SS} − 0.6$ 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	$I_O = 600$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)

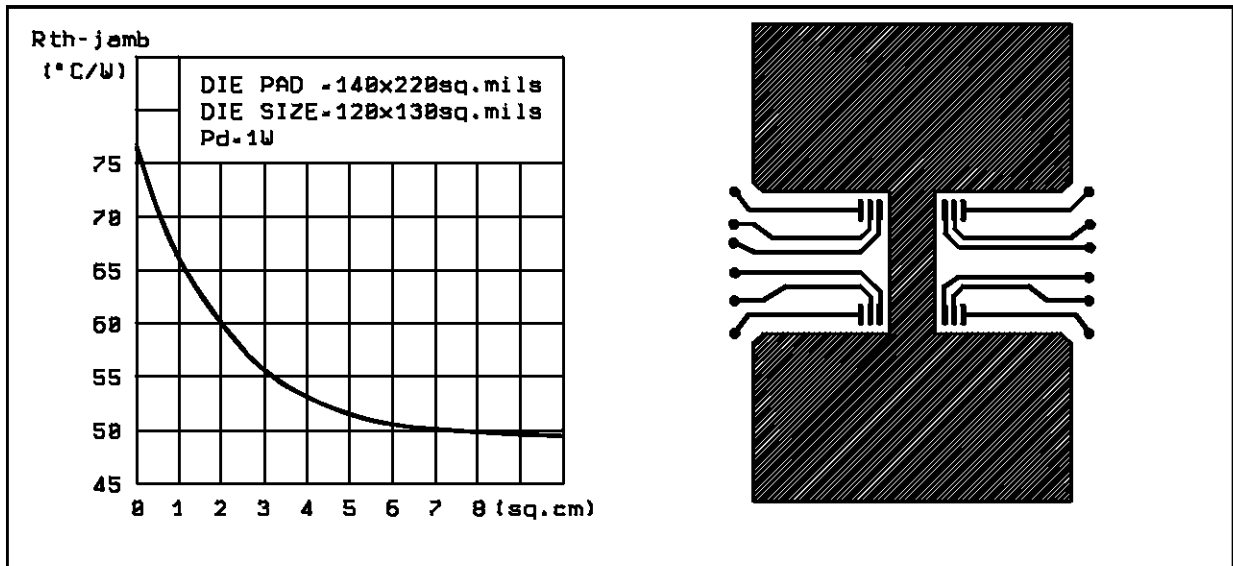| Input	Enable (*)	Output
H	H	H
L	H	L
H	L	Z
L	L	Z

Z = High output impedance
(*) Relative to the considered channel

Figure 1: Switching Times
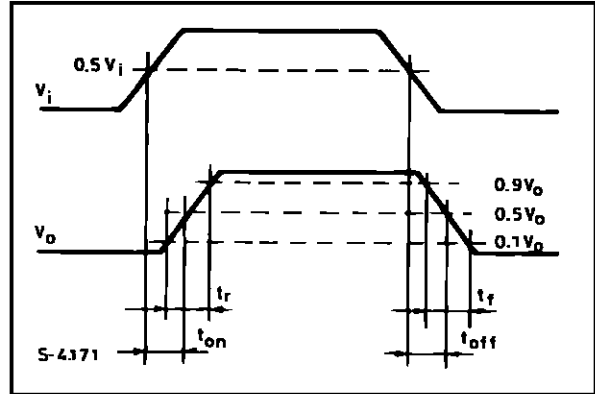
Figure 2: Junction to ambient thermal resistance vs. area on board heatsink (SOP12+4+4 package)

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