



## Descriptions

The L293DD is a monolithic integrated high voltage, highcurrent four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads (such as relayssolenoides, DC and stepping motors) and switching power tran-sistors.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 L293DD is assembled in a 16 lead plastic package which has 4 center pins connected together and used for heat sinking The L293DD is assembled in a 20 lead surface mount which has 8 center pins connected together and used for heat sinking.

## Feature

- Enable Facility
- Internal Clamp Diodes
- Overtemperature Protection
- logical "0" Input Voltage Up to 1.5V (high noise immunity)
- 600ma Output Current Capability Per Channel
- 1.2A Peak Output Current (Non-Repetitive) Per Channel

## Applications

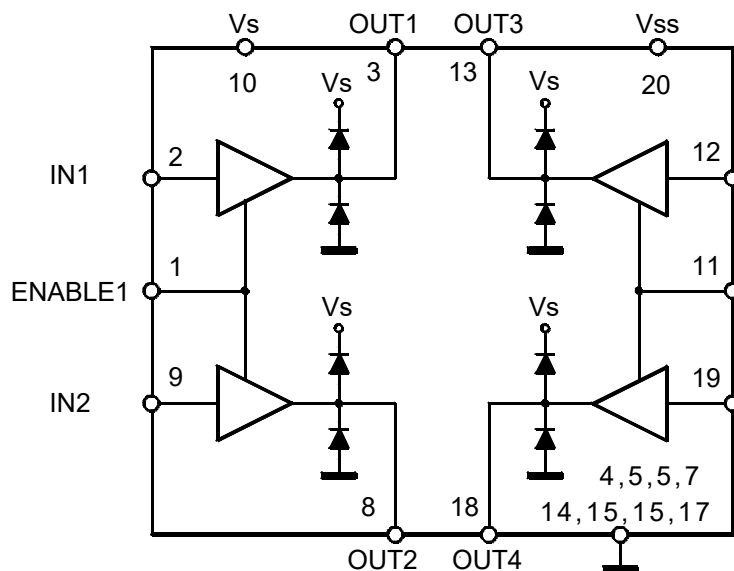
- Stepper Motor Drivers
- DC Motor Drivers
- Latching Relay Drivers

## Ordering Information

Product Model	Package Type	Packing	Packing Qty
L293DD	SOP-20(SOIC-20)	Tape	1000Pcs/Reel



## Block Diagram



## Thermal Data

Symbol	Decription	SOP-20(SOIC-20)	Unit
$R_{thj-pins}$	Thermal Resistance Junction-pins <b>max.</b>	14	°C/W
$R_{thj-amb}$	Thermal Resistance junction-ambient <b>max.</b>	50(*)	°C/W
$R_{thj-case}$	Thermal Resistance Junction-case <b>max.</b>	-	

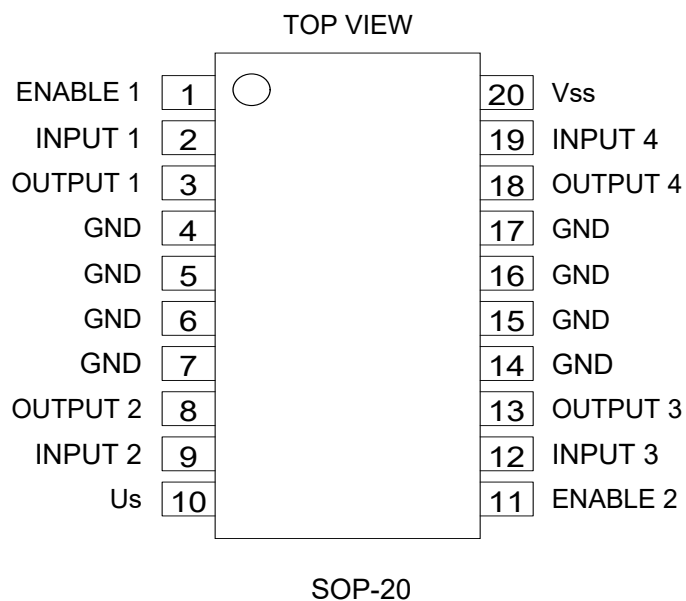
(\*) With 6sq. cm on board heat sink.

## Truth Table (one channel)

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



## Pin Connections



## 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
V <sub>CC1</sub>	16	—	5-V supply for internal logic translation
V <sub>CC2</sub>	8	—	Power VCC for drivers 4.5 V to 36 V



## Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V <sub>s</sub>	Supply Voltage	36	V
V <sub>ss</sub>	Logic Supply Voltage	36	V
V <sub>i</sub>	Input Voltage	7	V
V <sub>en</sub>	Enable Voltage	7	V
I <sub>o</sub>	Peak Output Current ( 100 μs non repetitive)	1.2	A
P <sub>tot</sub>	Total Power Dissipation at T <sub>pins</sub> = 90 °C	4	W
T <sub>stg</sub> , T <sub>j</sub>	Storage and Junction Temperature	-40 to 150	°C

## Electrical Characteristics

(For each channel, V<sub>s</sub>=24V, V<sub>ss</sub>=5V, T<sub>amb</sub>=25°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>s</sub>	Supply Voltage (pin 10)		V <sub>ss</sub>		36	V
V <sub>ss</sub>	Logic Supply Voltage (pin 20)		4.5		36	V
I <sub>s</sub>	Total Quiescent Supply Current (pin 10)	V <sub>i</sub> =L; I <sub>o</sub> =0; V <sub>en</sub> =H		2	6	mA
		V <sub>i</sub> =H; I <sub>o</sub> =0; V <sub>en</sub> =H		16	24	mA
		V <sub>en</sub> = L			4	mA
I <sub>ss</sub>	Total Quiescent Logic Supply Current (pin 20)	V <sub>i</sub> =L; I <sub>o</sub> =0; V <sub>en</sub> =H		44	60	mA
		V <sub>i</sub> =H; I <sub>o</sub> =0; V <sub>en</sub> =H		16	22	mA
		V <sub>en</sub> = L		16	24	mA
V <sub>IL</sub>	Input Low Voltage (pin 2, 9, 12, 19)		-0.3		1.5	V
V <sub>IH</sub>	Input High Voltage (pin 2, 9, 12, 19)	V <sub>ss</sub> ≤7 V	2.3		V <sub>ss</sub>	V
		V <sub>ss</sub> >7V	2.3		7	V
I <sub>IL</sub>	Low Voltage Input Current (pin 2, 9, 12, 19)	V <sub>IL</sub> = 1.5V			-10	μA
I <sub>IH</sub>	High Voltage Input Current (pin 2, 9, 12, 19)	2.3V≤V <sub>IH</sub> ≤V <sub>ss</sub> -0.6V		30	100	μA
V <sub>enL</sub>	Enable Low Voltage (pin 1, 11)		-0.3		1.5	V
V <sub>enH</sub>	Enable High Voltage (pin 1, 11)	V <sub>ss</sub> ≤7 V	2.3		V <sub>ss</sub>	V
		V <sub>ss</sub> >7V	2.3		7	V
I <sub>enL</sub>	Low Voltage Enable Current (pin 1, 11)	V <sub>enL</sub> = 1.5V		-30	-100	μA
I <sub>enH</sub>	High Voltage Enable Current (pin 1, 11)	2.3V≤V <sub>enH</sub> ≤V <sub>ss</sub> -0.6 V			±10	μA
V <sub>CE(sat)H</sub>	Source Output Saturation Voltage (pins 3, 8, 13, 18)	I <sub>o</sub> =-0.6 A		1.4	1.8	V
V <sub>CE(sat)L</sub>	Sink Output Saturation Voltage (pins 3, 8, 13, 18)	I <sub>o</sub> =+0.6 A		1.2	1.8	V
V <sub>F</sub>	Clamp Diode Forward Voltage	I <sub>o</sub> = 600nA		1.3		V
t <sub>r</sub>	Rise Time(*)	0.1 to 0.9 V <sub>o</sub>		250		ns
t <sub>f</sub>	Fall Time(*)	0.9 to 0.1 V <sub>o</sub>		250		ns
t <sub>on</sub>	Turn-on Delay(*)	0.5 V <sub>i</sub> to 0.5 V <sub>o</sub>		750		ns
t <sub>off</sub>	Turn-off Delay(*)	0.5 V <sub>i</sub> to 0.5 V <sub>o</sub>		200		ns

(\*) See fig. 1.



## Application Information

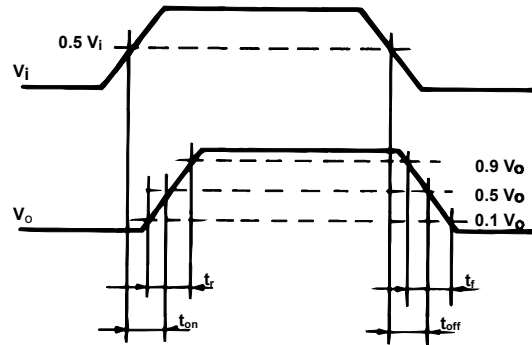


Figure 1: Switching Times

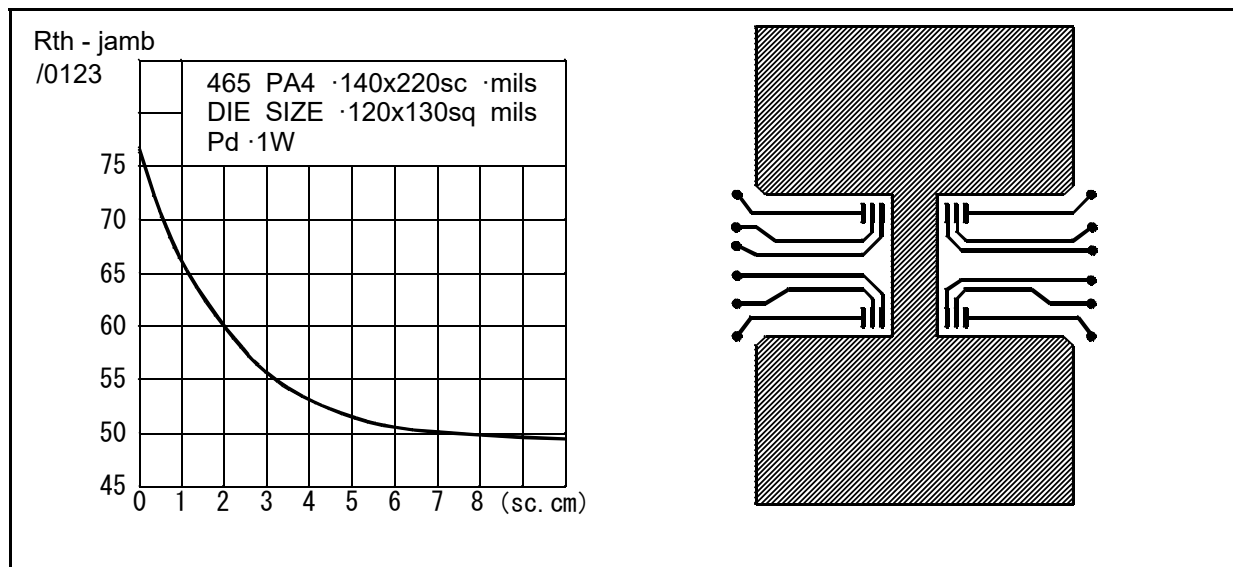
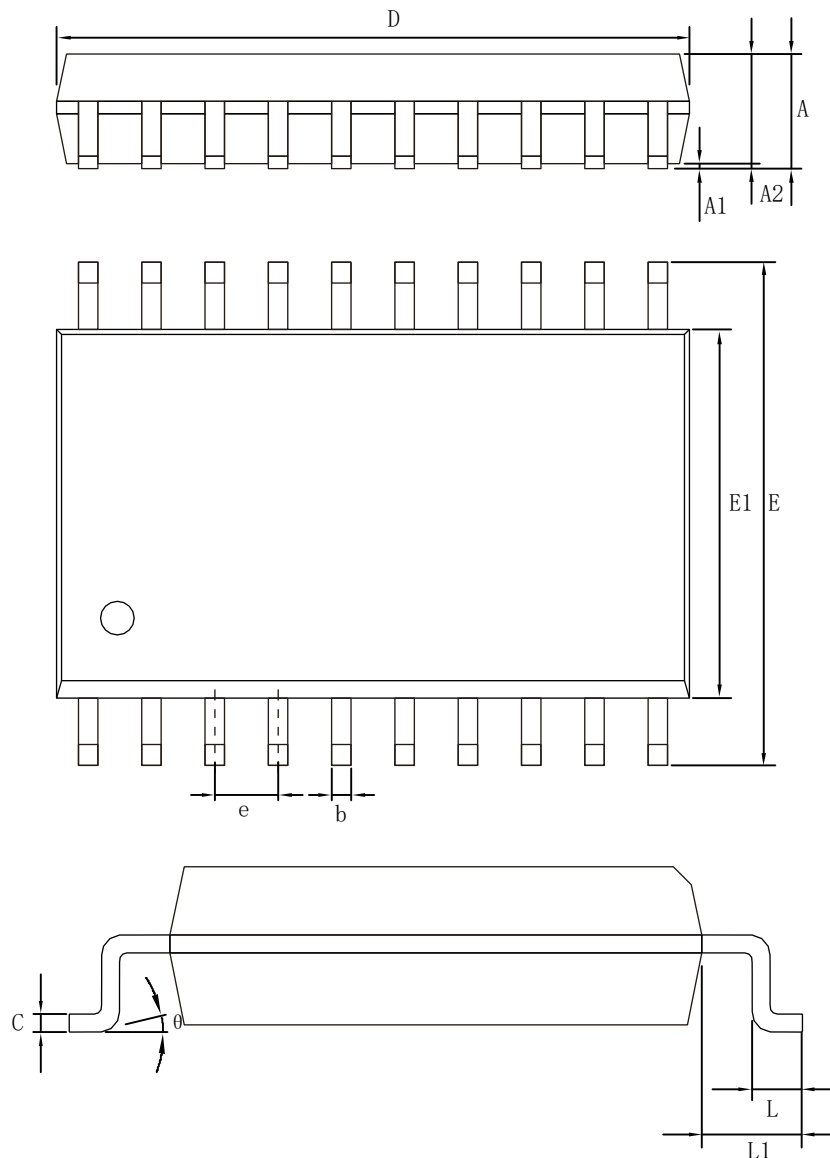


Figure 2: Junction to ambient thermal resistance vs. area on board heatsink (SOP-20 package)



## Package Information

### SOP-20(SOIC-20)



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	2.470	2.650	A	0.097	0.104
A1	0.050	0.300	A1	0.002	0.012
A2	2.200	2.440	A2	0.087	0.096
b	0.350	0.500	b	0.014	0.020
c	0.150	0.300	c	0.006	0.012
D	12.54	12.94	D	0.494	0.509
E	10.00	10.60	E	0.394	0.417
E1	7.300	7.700	E1	0.287	0.303
e	1.270(BSC)		e	0.050(BSC)	
L	0.400	1.050	L	0.016	0.041
L1	1.300	1.500	L1	0.051	0.059
θ	0°	8°	θ	0°	8°



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