

Dual full bridge driver

Overview

The L293 is a high-current, half-step four-phase motor driver with bi-directional drive current up to 600mA and operating voltage of 4.5V-36V, used as a relay to drive inductive loads, spiral coils, DC bipolar stepper motors, and high-current, high-voltage inductive loads in positive power applications.

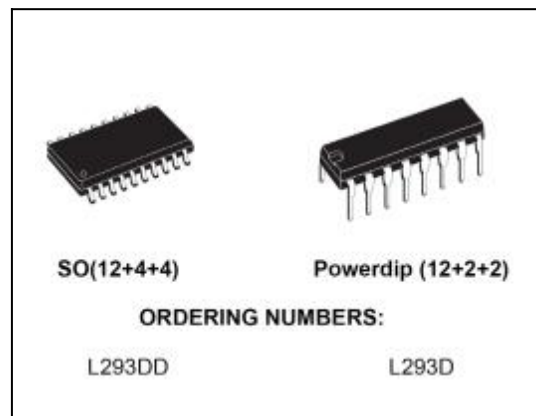
Each input is TTL compatible. Each output consists of a Darlington tube for pulling current and a pseudo-Darlington tube for filling current, which is a complementary output stage for eliminating crossover distortion. En1 controls two outputs Pin3 and Pin6, and En2 controls two outputs Pin11 and Pin14. An input controls a corresponding output. When the enable end is high, the corresponding channel works, and the output phase corresponds to the input; When the enabled end is low, the corresponding channel is turned off in a high resistance state. Along with signal input, each pair of channels can be used to drive a full-step and level direction reversible spiral coil or motor. Chip switch drive applications up to 5KHz.

The L293D comes in a DIP16 package with four GND pins in the middle for heat dissipation. The L293DD is packaged with SOP20.

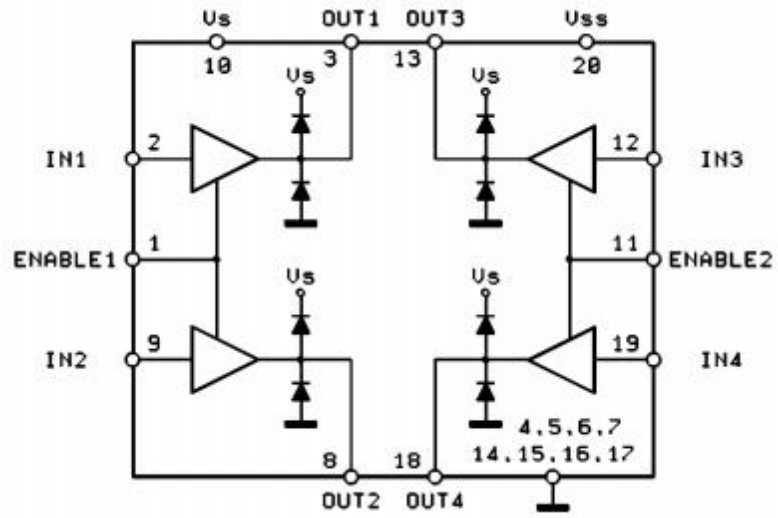
Internal block diagram

Main characters

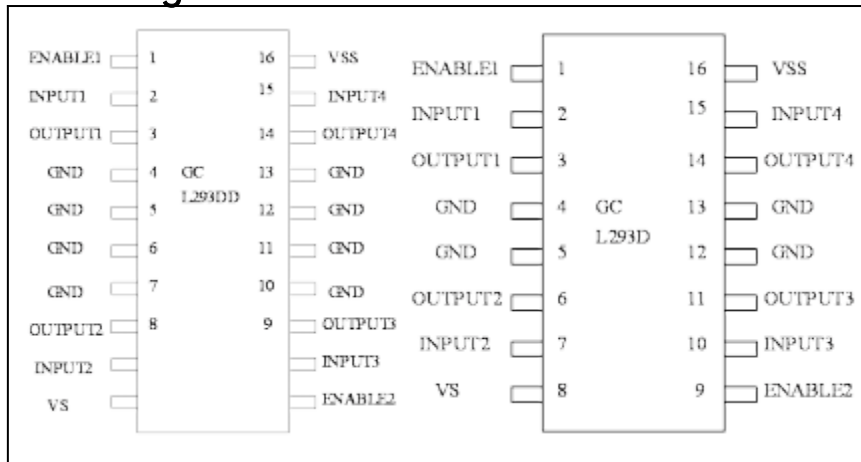
- Wide operating voltage range (4.5V-36V).
- 600mA output capacity per channel.
- Enable control with EN end.
- thermal protection
- Maximum output current per channel peak 1A (non-continuous)
- Low logic level up to 1.5V, with high anti-interference.
- Internal clamp diode.



L293D/L293DD



Pin diagram



Function table

输入	EN	输出
H	H	H
L	H	L
H	L	Z
L	L	Z
Z = Output off		

Limit Parameter

Symbol	Description	Parameter value	Unit
Vs	Power supply Voltage	36	V
Vss	Logic supply voltage	7	V
Vi	Input Voltage	6	V
Ven	Enable the terminal voltage	6	V
Io (MAX)	Maximum output current (unsustainable, duration<5ms)	1	A
Io	Maximum sustained output current	600	mA
P	Maximum Power	4	W
TJ	Maximum junction temperature	150	°C
T	Storage temperature range	65 to 150	°C

Recommended conditions of use:

		Min value	Max	Unit
Power supply Voltage	Vs	Vss	36	V
	Vss	4.5	7	
High level	Vss ≤ 6 V	2.3	Vss	V
	Ven ≥ 6 V	2.3	6	
Low level		0	1.5	V
Running temperature		0	70	°C

Electrical parameters: (unless otherwise stated $V_s=24V$; $V_{ss}=5V$, $T_j=25^\circ C$)

Symbol	Parameter	Testing conditions	Min	Typical	Max	Unit
V_s	Power supply Voltage(Pin 8)	Working situation	V_{ss}	-	36	V
V_{ss}	Logic supply voltage(Pin16)		4.5	5	7	V
I_s	Static working current(Pin8)	$V_{en}=H$; $I_L=0$, $V_i=L$	--		6	m A
		$V_{en}=H$; $I_L=0$, $V_i=H$	--		24	m A
		$V_{en}=L$, $V_i=X$	--		4	m A
I_{ss}	Static working current of the V_{ss} (Pin16)	$V_{en}=H$; $I_L=0$, $V_i=L$	--		60	m A
		$V_{en}=H$; $I_L=0$, $V_i=H$	--		22	m A
		$V_{en}=L$ $V_i=X$	--		24	m A
V_{iL}	Input low voltage(pin2,7,10,15)		-0.3	--	1.5	V
V_{iH}	Input High voltage(pin2,7,10,15)		2.3	--	V_{ss}	V
I_{iL}	Low voltage input current (pin2,7,10,15)	$V_{iL} = 1.5V$	--	--	-10	μA
I_{iH}	High voltage input current (pin2,7,10,15)	$2.3V \leq V_{enH} \leq V_{SS} - 0.6V$	--	30	100	μA
V_{enL}	Enable the low voltage at the end(pins 1,9)		-0.3	--	1.5	V
V_{enH}	Enable the end high voltage(pins 1,9)		2.3	--	V_{ss}	V
$I_{en=L}$	The low voltage enables the current(pins 1,9)	$V_{enL} = 1.5V$	--	-30	-100	μA
$I_{en=H}$	The high voltage enables the current(pins 1,9)	$2.3V \leq V_{enH} \leq V_{SS} - 0.6V$	--	--	± 10	μA
$V_{CEsat}(H)$	Saturation voltage drop when pulling current	$I_O = -0.6A$	--	1.35	1.8	V
$V_{CEsat}(L)$	Saturation pressure drop when filling current	$I_O = +0.6A$	--	1.1	1.8	V

Application message:

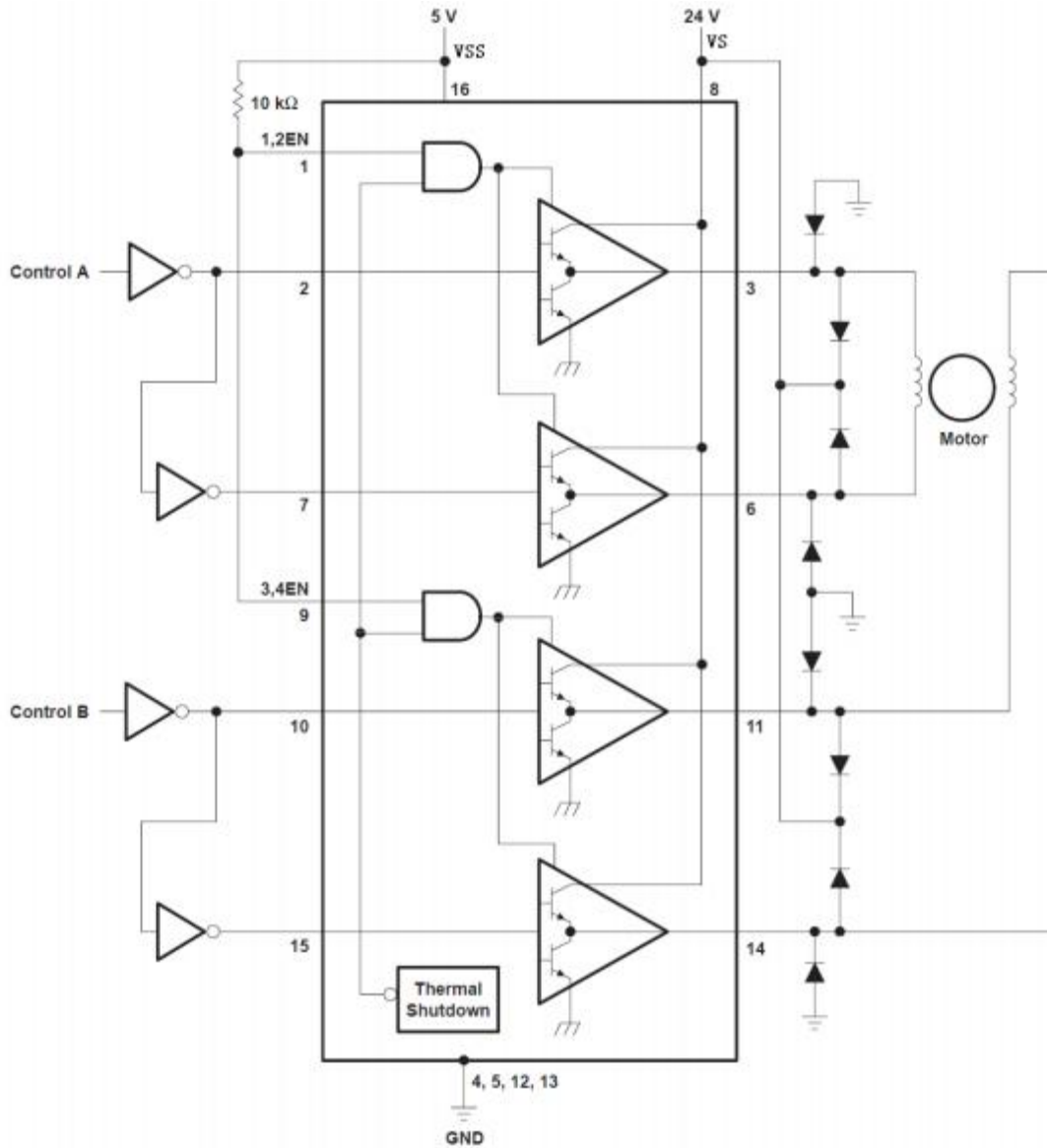
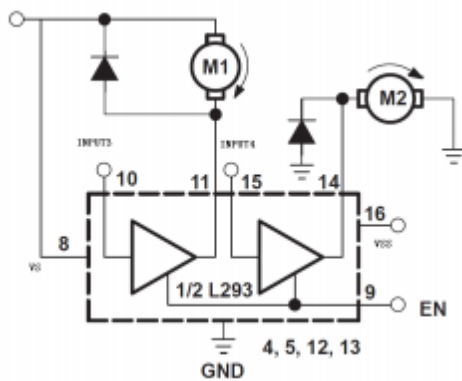


Figure 1 two-phase motor driver



EN	INPUT3	M1	INPUT4	M2
H	H	FAST STOP	H	RUN
H	L	RUN	L	FAST STOP
L	X	FREE RUNNING	X	FREE RUNNING
		STOP		STOP

Figure 2 DC motor control (grounding and connecting supply voltage)

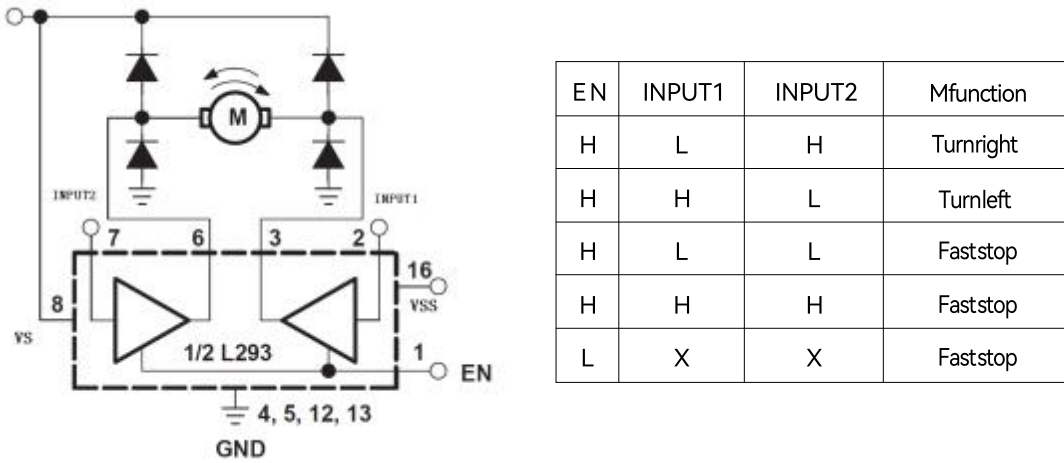


FIG. 3 Two-phase DC motor control

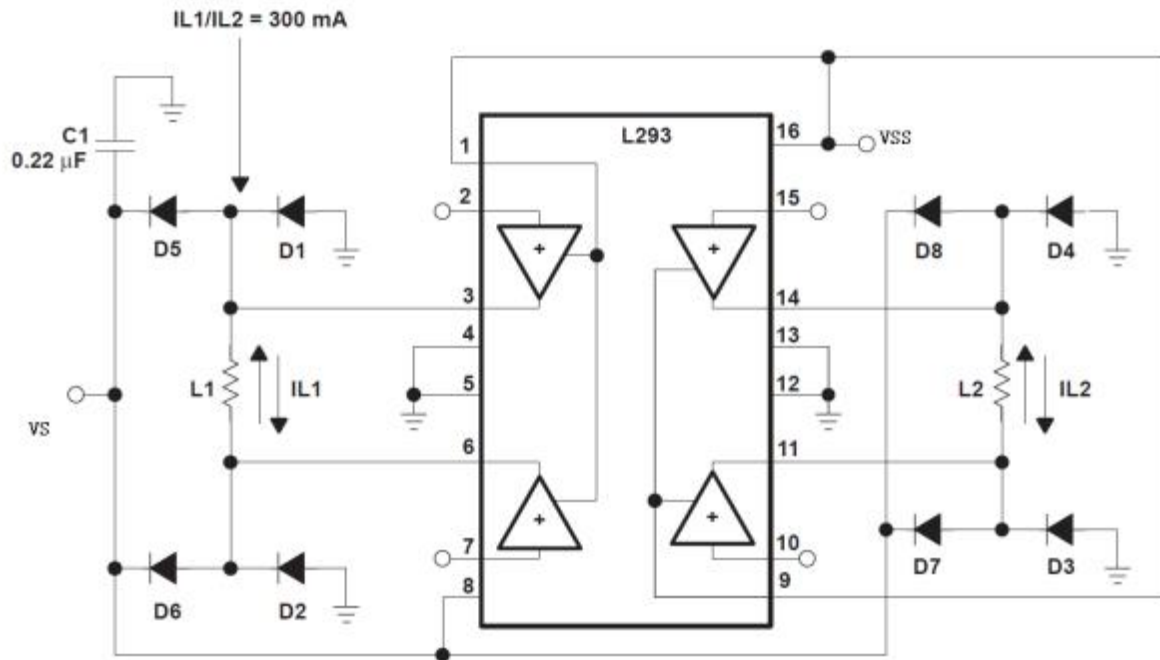
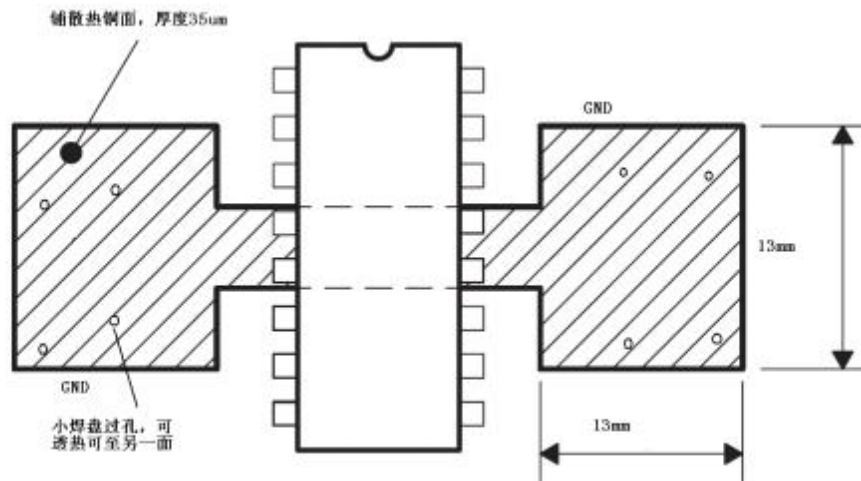
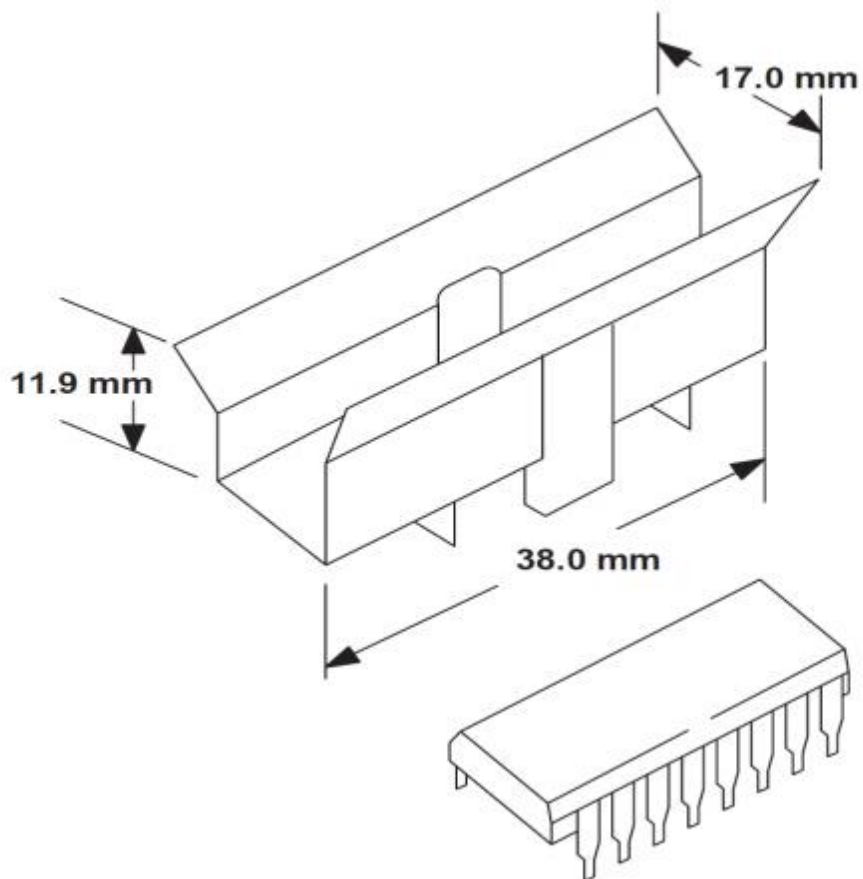


Figure 4 bipolar stepper motor control

Several ways to help dissipate heat



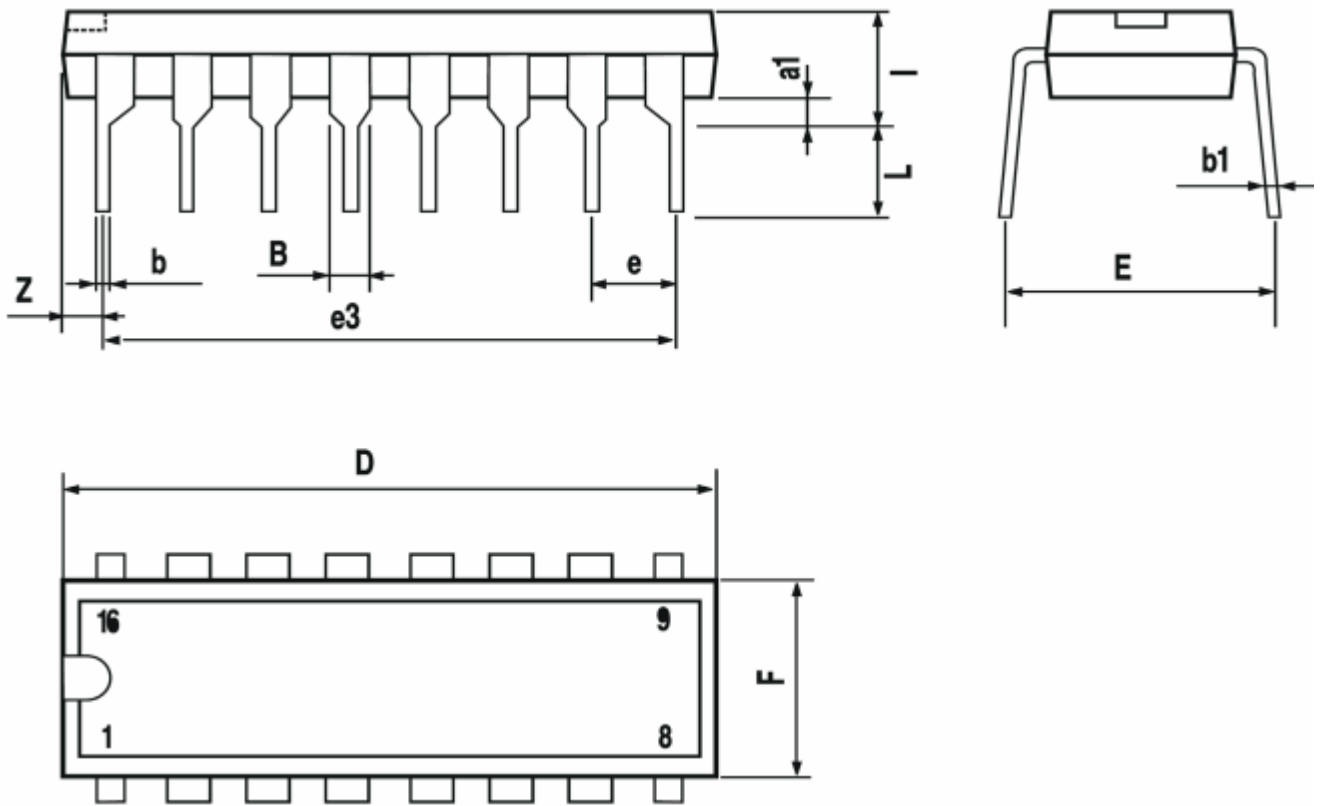
The PCB is covered with cooling copper surface



External heat sink

Encapsulate form and data:

DIP16

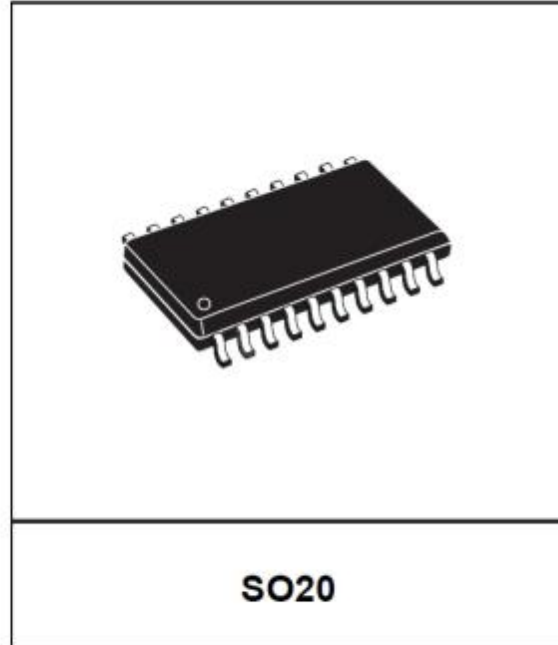


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No.	mm			Inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.02		
B	0.85	1.4	1.4	0.033		0.055
b	0.5	0.5			0.02	
b1	0.38	0.5	0.5	0.015		0.02
D			20			0.787
E	8.8	8.8			0.346	
e	2.54	2.54			0.1	
e3	17.78	17.78			0.7	
F	7.1	0.28	7.1			0.28
l	5.1	0.201	5.1			0.201
L	3.3	3.3			0.13	
Z			1.27			0.05

SOP20

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.)					



SO20

