

## 描述

HR9110是应用于直流电机方案的单通道H桥驱动器芯片。HR9110的H桥驱动部分采用低导通电阻的PMOS和NMOS功率管。低导通电阻保证芯片低的功率损耗，使得芯片安全工作更长时间。此外HR9110拥有低待机电流、低静态工作电流。这些性能使能HR9110易于玩具方案。

HR9110内部含有过温关断保护。当负载电机是低阻抗的，或者输出端短路，这样使能HR9110的输出电流急剧上升，同时内部温度也急剧上升。当芯片温度超过最大温度阈值（典型150℃），HR9110会关断所有的输出，防止潜在安全隐患。只有当确认了芯片回归到安全的工作温度，内置温度迟滞电流才重新控制驱动电路。

## 应用

锂电池直流电机驱动  
玩具机器人控制

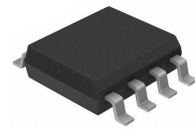
## 型号选择

Part Number	Package
HR9110S	SOP 8
HR9110D	DIP 8

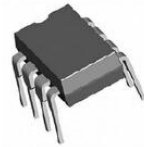
## 特点

- 内置PMOS、NMOS的单通道H桥驱动器
- 四种驱动功能：正传、反转、停转和刹车功能
- 低RDS(ON)电阻（0.3Ω），连续输出电流1.2A
- 低待机电流（0.01uA）和低静态工作电流（0.2mA）
- 低工作电压
- 宽电压供电，1.8V-6.8V
- 内置过温关断保护电路
- 符合RoHS标准

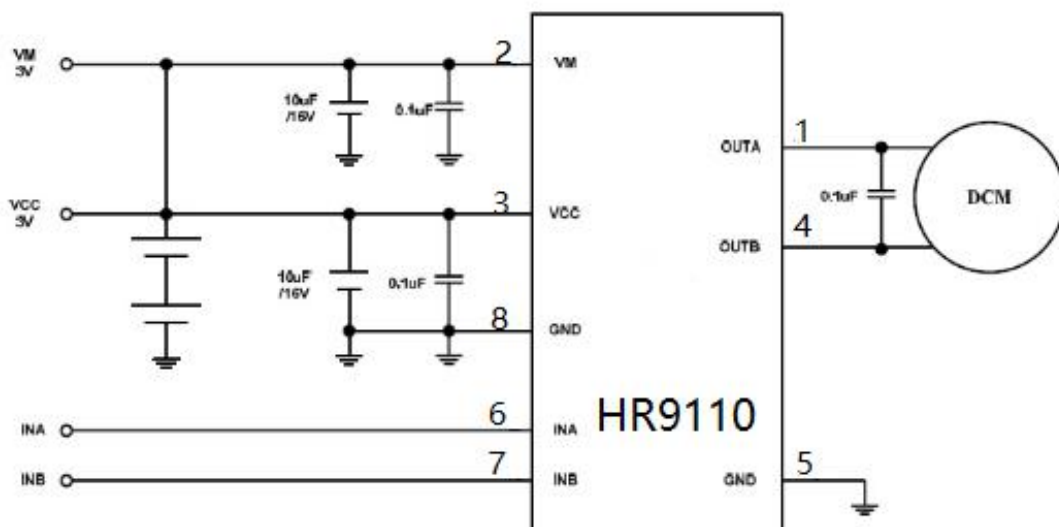
## 封装形式



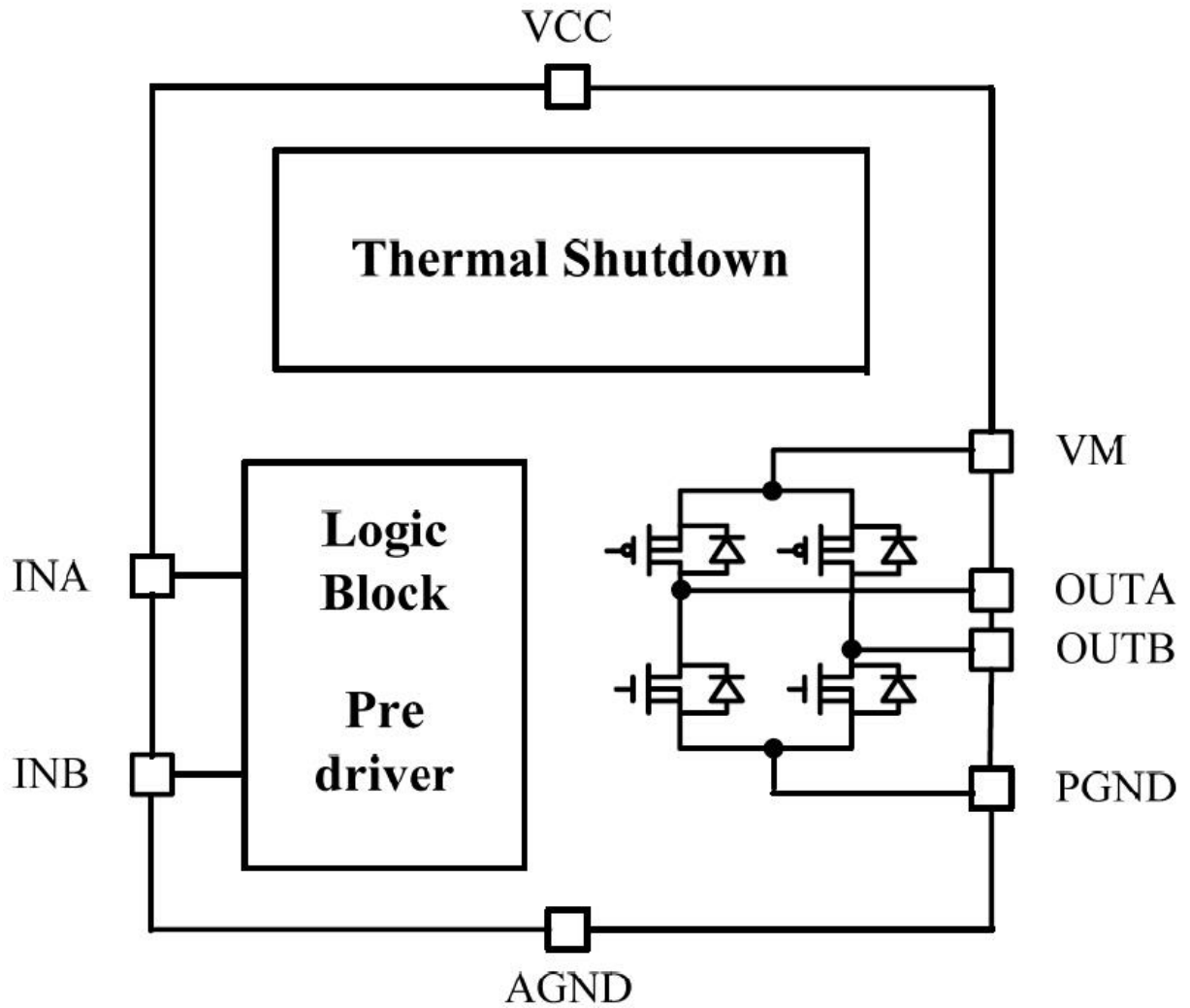
SOP 8



DIP 8



功能模块示意图



### 电路工作极限 at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Logic Supply Voltage	VCC		5.5	V
Load Supply Voltage	VM		6.8	V
Logic Input voltage	V <sub>IN</sub>		VCC	V
Output Current	I <sub>OUT</sub>		±1.2	A
Peak Out Current	I <sub>op</sub>		3	A
Operating Ambient Temperature	T <sub>A</sub>	Range S	-20 to 85	°C
Maximum Junction	T <sub>J(max)</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to 150	°C

### 推荐工作条件 at Ta = 25°C

		Min	NOM	Max	Unit
Logic Supply Voltage Range	VCC	1.8	-	5	V
Load Supply Voltage Range	VM	1.8	-	6	V
Logic Input Voltage Range	VIN	0	-	VCC	V
Continuous RMS or DC output current per bridge	IOUT	-1200		+1200	mA

电特性 at  $T_a = 25^{\circ}\text{C}$ ,  $V_{CC} = 3\text{V}$ ,  $V_M = 3\text{V}$ ,  $R_L = 15\ \Omega$ , unless otherwise noted.

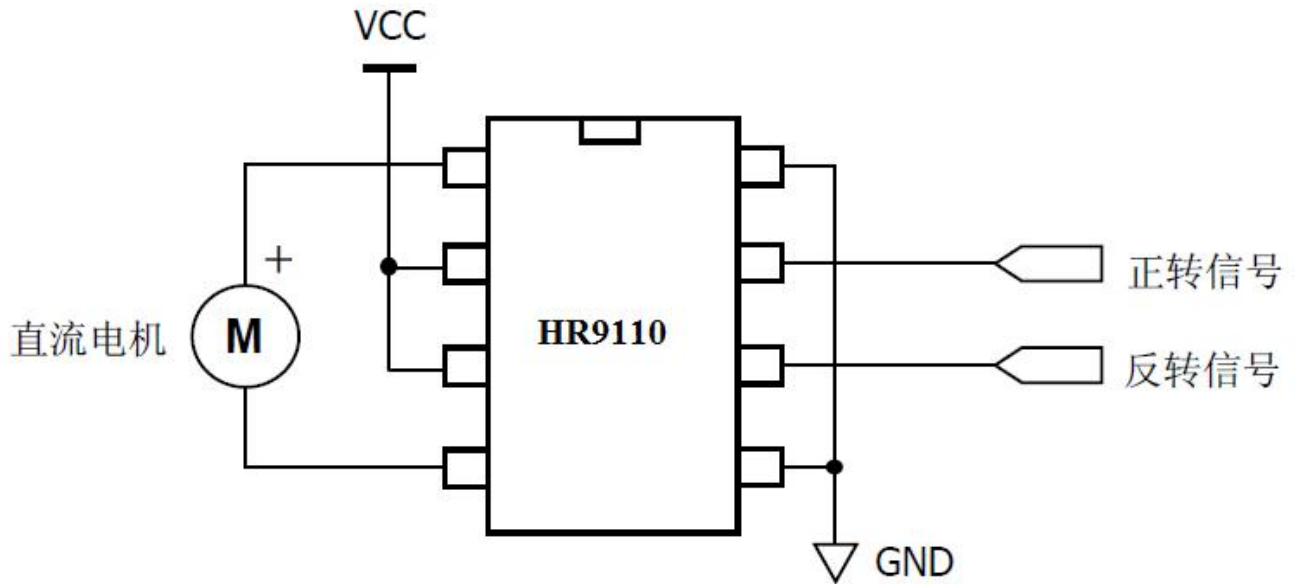
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>POWER SUPPLY</b>						
ICCST	Circuit current at standby	INA=INB = L		0	10	uA
IVMST	VM current at standby	INA=INB = L		0	10	uA
ICC	Circuit current	INA=L ,INB = H or INA=H ,INB = L or INA=H ,INB = H		0.3	1	mA
IVM	VM current	INA=L ,INB = H or INA=H ,INB = L or INA=H ,INB = H		0.1	1	mA
<b>LOGIC-LEVEL INPUTS</b>						
VINL	Input low voltage				0.3VCC	V
VINH	Input High voltage		0.7VCC			V
RPD	Input pull-down resistance			1.5		M $\Omega$
IINL	Input low current	VIN = 0V	-1	0		uA
IINH	Input high current	VIN = 3V		5	20	uA
<b>H-BRIDGE FETS</b>						
RDS(ON)	Output on resistance	IO= $\pm 200\text{ mA}$		0.3	0.6	$\Omega$
<b>PROTECTION CIRCUITS</b>						
tTSD	Thermal shutdown temperature	Die temperature		150		$^{\circ}\text{C}$

## 电路应用参考

### 过温关断 (TSD)

当结温达到 150°C，HR9110 关断所有的输出，这是为了防止因为过高的温度而烧毁芯片。TSD 含有 25°C 的迟滞。

### 典型应用



注：1.请做好电源滤波。

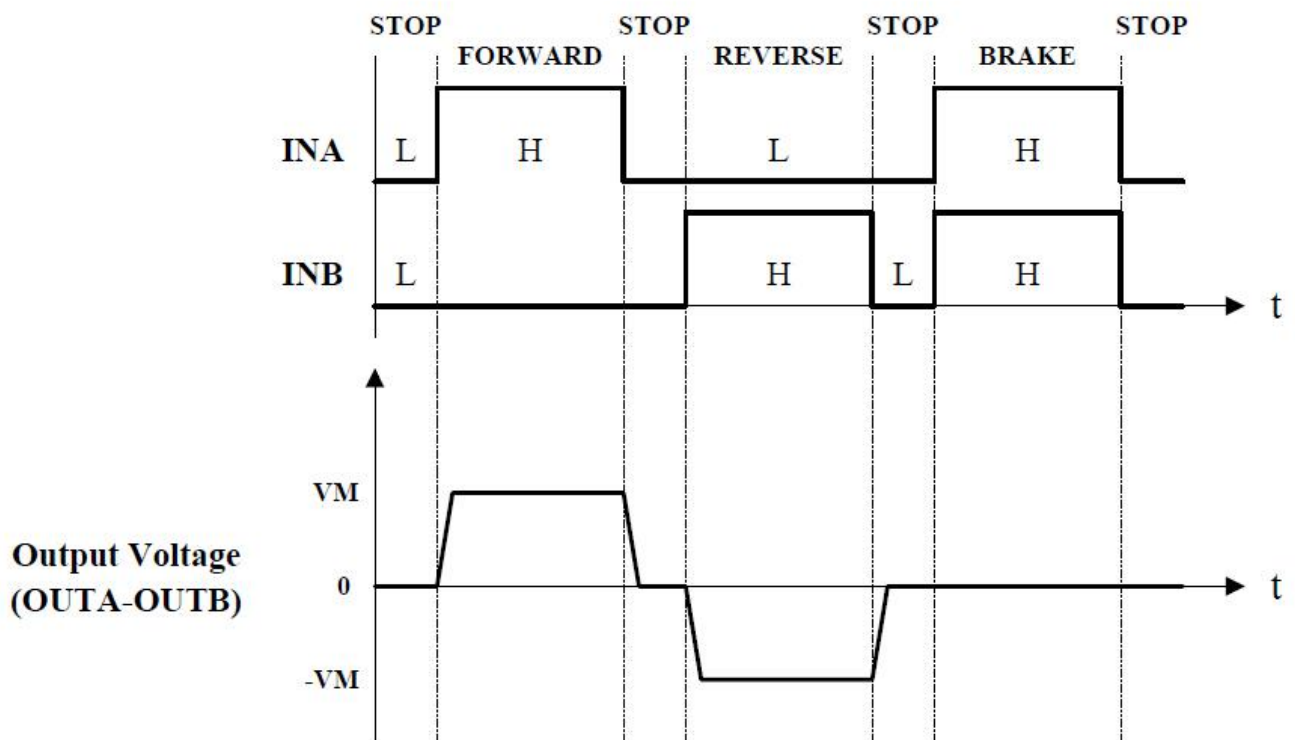
2.若接近极限工作电压工作，请在电机上加 100nF 电容做保护，防止芯片因电机启动、换向时产生的高压导致损坏。

3.注意电机电流路径 PCB 布线。大电流路径为 VM、OA、OB、PGND，管脚分别为 2、1、4、5。

输入输出逻辑表

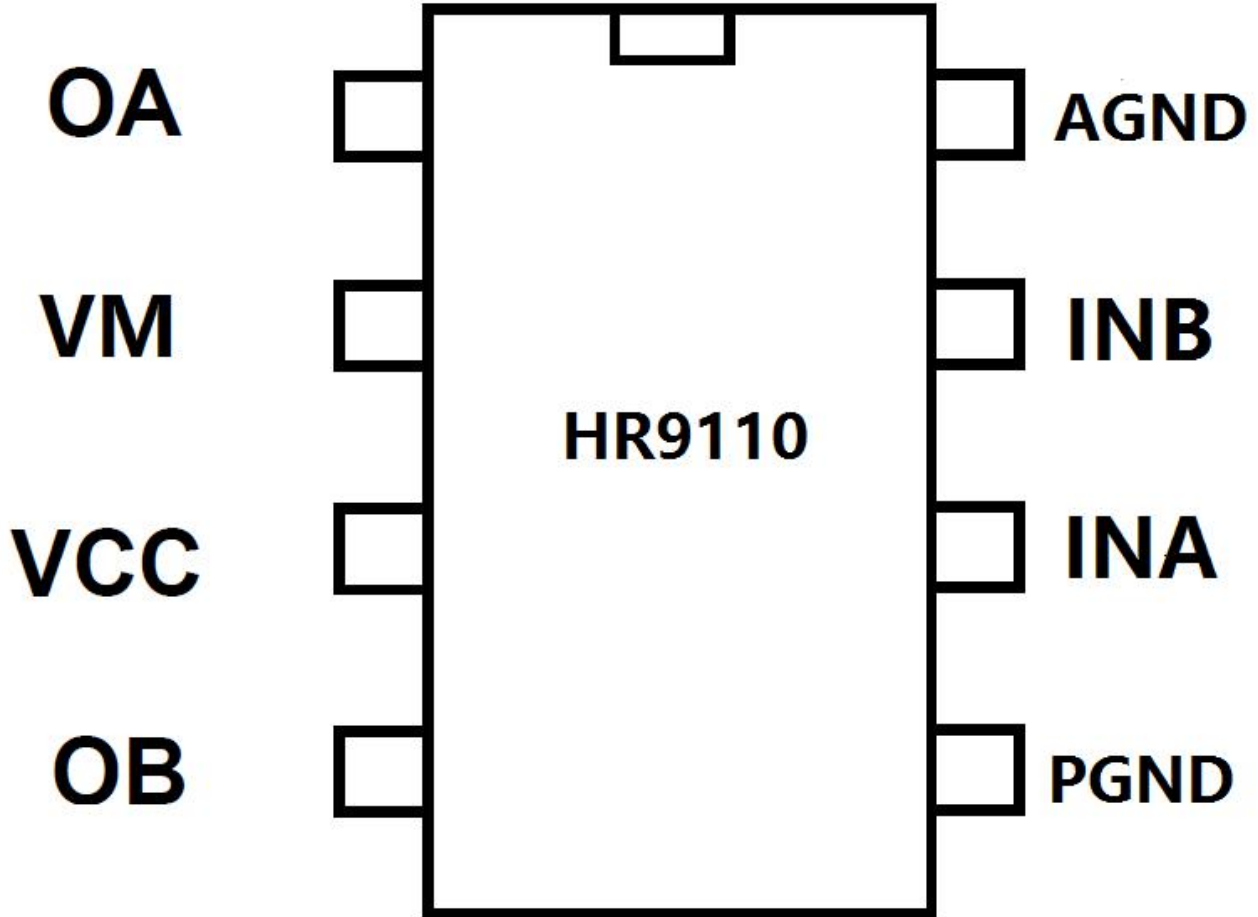
INPUT		OUTPUT		MODE
INA	INB	OUTA	OUTB	
L	L	Hi-Z	Hi-Z	Standby (STOP)
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Brake

输入输出波形



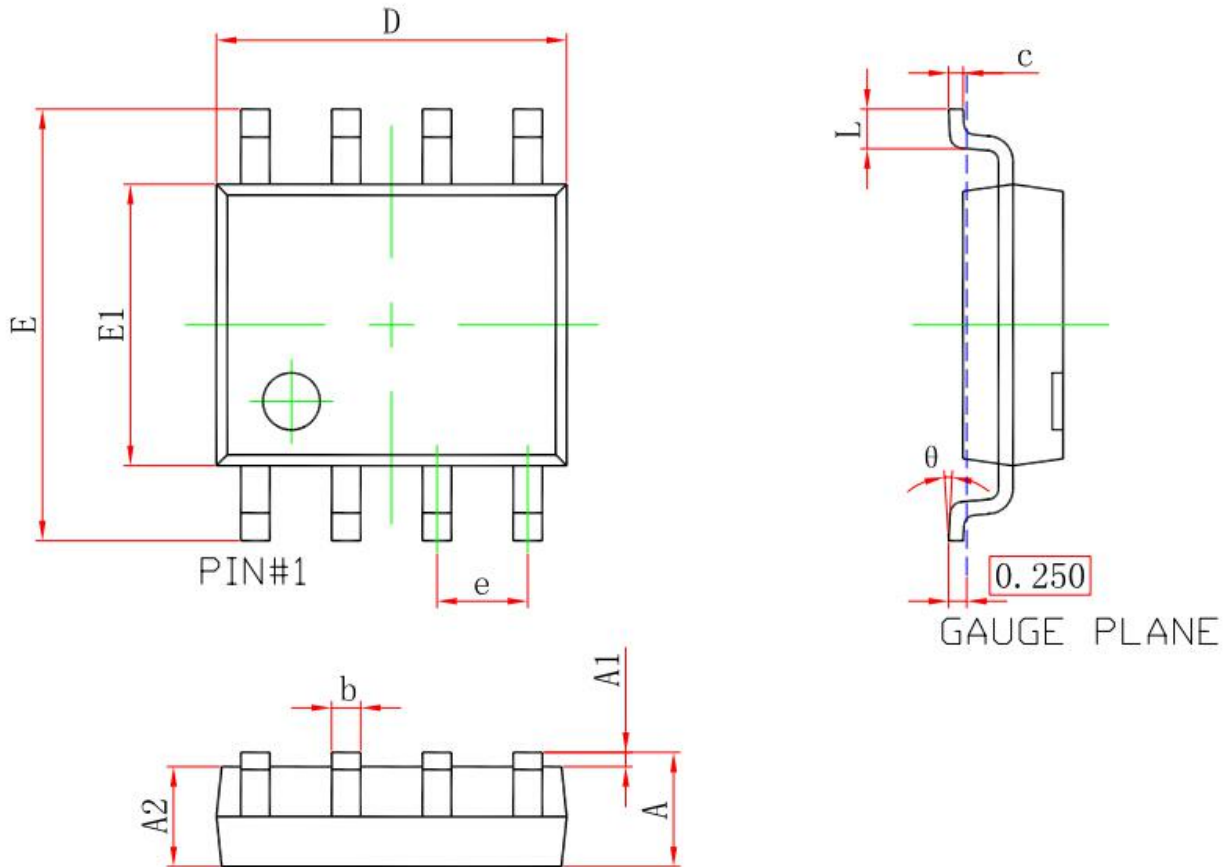
管脚图

TOP VIEW



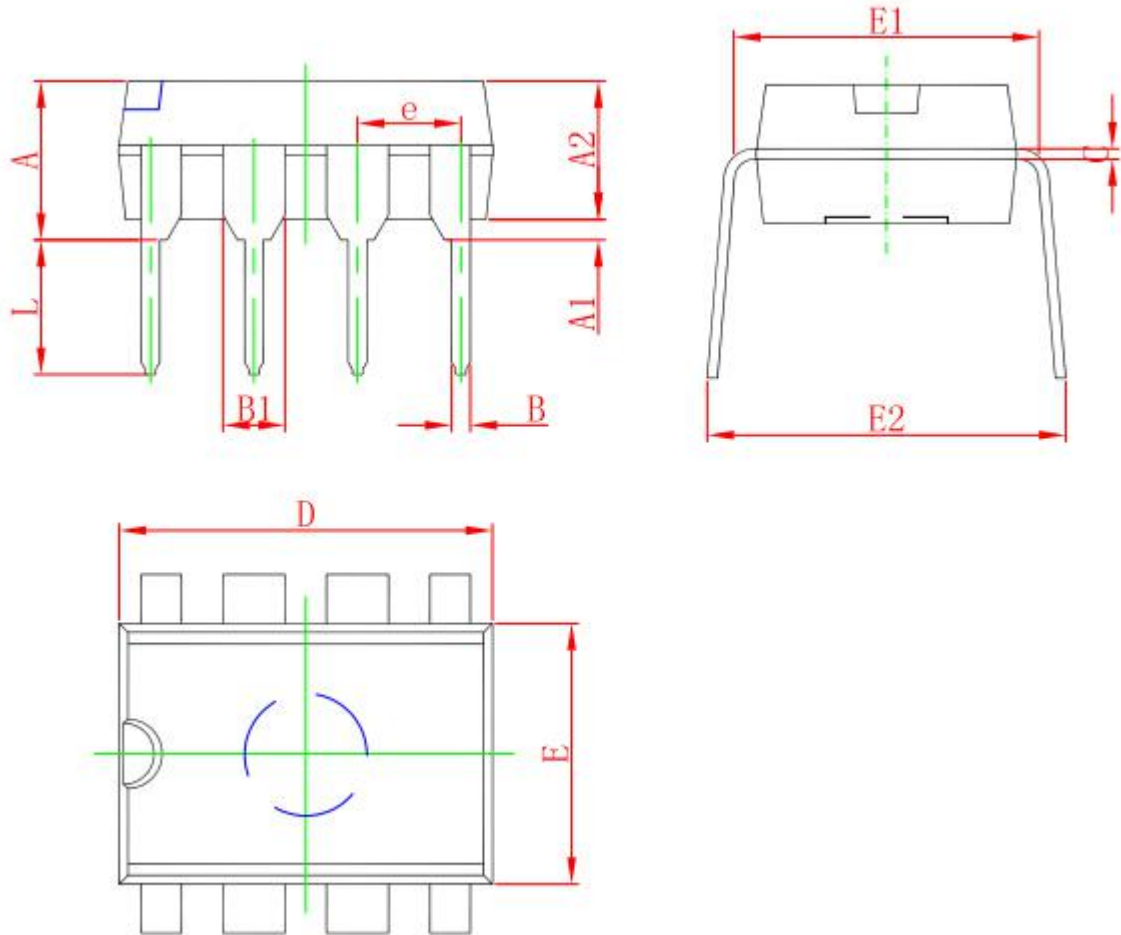
管脚列表

NAME	PIN	IO	Pin Description
OA	1	O	H-bridge output terminal A of the driver
VM	2	P	Power supply for driver
VCC	3	P	Power supply for logic
OB	4	O	H-bridge output terminal B of the driver
PGND	7	G	GND for driver
INA	6	I	It combines INB to decide the state of the driver
INB	7	I	It combines INA to decide the state of the driver
AGND	8	G	GND for logic

封装信息  
 SOP 8


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.031
$\theta$	0°	8°	0°	8°



**DIP 8**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524 (BSC)		0.060 (BSC)	
C	0.204	0.360	0.008	0.014
D	9.000	9.400	0.354	0.370
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540 (BSC)		0.100 (BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354

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