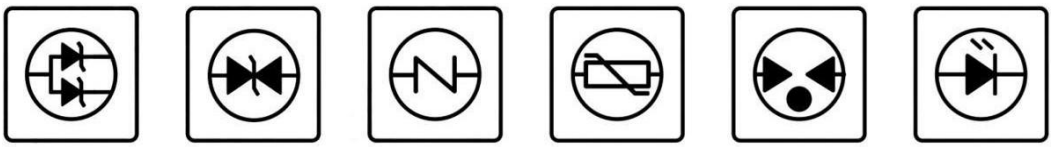
MSKSEMI 美森科
SEMICONDUCTOR



NE555

产品手册

产品简介

NE555 是一款能产生高精度定时脉冲的双极性集成电路。内部包括阈值比较器、触发比较器、 RS 触发 器、输出电路等四部分电路构成。它可通过外接少量的阻容器件， 组成定时触发电路、脉宽调制电路、音 频振荡器等等电路。广泛应用于玩具、信号交通、自动化控制等等领域。

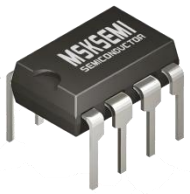
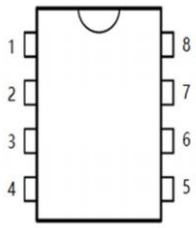
产品特点

- 定时精度好
- 输出驱动能力强
- 温度稳定性好
- 最大工作频率可达 500KHZ 以上
- 可与 TTL 电路兼容
- 定时时间可从微秒级到小时级(可通过外接电阻电容精确控制)
- 封装形式:SOP-8、DIP-8

产品用途

- 音频脉冲发生器、分频器
- 设备定时， 交通灯控制、门禁控制
- 脉宽调制，脉冲相位调制
- 工业控制

参考信息

封装图		DIP-8/SOP-8
		
SOP-8	DIP-8	管脚功能定义

管脚序号	管脚定义	管脚功能描述
1	GND	电源地
2	Trig	触发
3	Output	输出
4	Reset	复位
5	Cont	控制电压
6	Thres	阈值
7	Disch	放电
8	VCC	电源正

订单信息

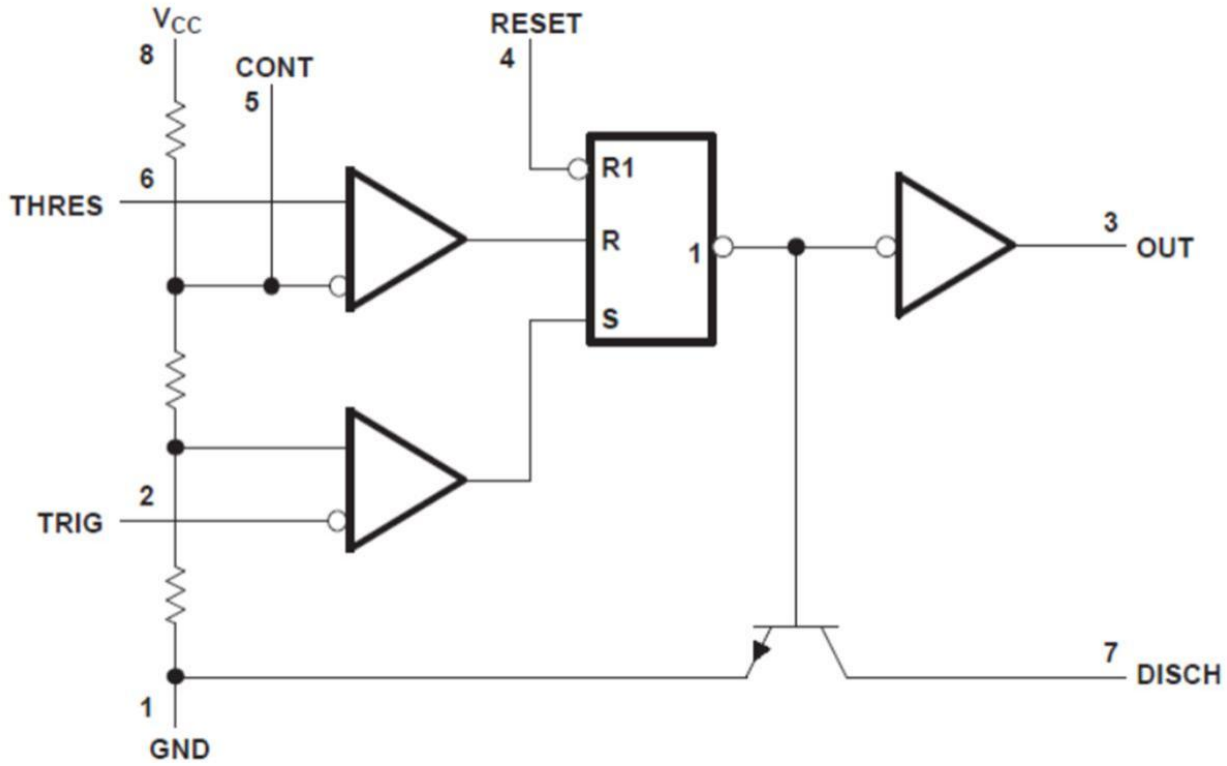
P/N	PKG	QTY
NE555P-MS	DIP-8	1000PCS
NE555DR-MS	SOP-8	2500PCS

极限参数

参数	符号	极限值	单位
电源电压	VCC	18	V
输入电压	VI (thre, trig, cont, reset)	VCC	V
输出电流	Io	±220	mA
耗散功率	PD	400	mW
工作温度	TA	-20~70	℃
储存温度	TS	-65~150	℃
焊接温度	TW	260,10s	℃

注：极限参数是指无论在任何条件下都不能超过的极限值。如果超过此极限值，将有可能造成产品劣化等物理性损伤； 同时在接近极限参数下，不能保证芯片可以正常工作。

原理框图



推荐电学参数

项目	符号	参数值	单位
电源电压	VCC	4.5~15	V
最大输入电压	Vth, Vtrig, Vcont, Vreset	VCC	V
输出电流	Io	±200	mA

电学特性(T_A=25℃，除非特别指定)

项目	符号	条件	最小值	典型值	最大值	单位
工作电压	V_{CC}		4.5	–	15	V
工作电流	I_{CC}	V_{CC} =5V, R_L =∝, VO=VOL	–	3	6	mA
		V_{CC} =5V, R_L =∝, VO=VOH	–	1.5	5	mA
		V_{CC} =15V, R_L =∝, VO=VOL	–	8	15	mA
		V_{CC} =15V, R_L =∝, VO=VOH	–	6	13	mA
控制端电压	V_{CL}	V_{CC} =15V	–	10.0	11	V
		V_{CC} =5V	–	3.3	4	V
阈值电压端电压	V_{TH}	V_{CC} =15V	–	10.0	11.2	V
		V_{CC} =5V	–	3.3	4.2	V
阈值电压电流	I_{TH} *note1	V_{CC} =15V, V_{TH} =0V	–	–	250	nA
触发端电压	V_{TRIG}	V_{CC} =15V	–	5.0	5.6	V
		V_{CC} =5V	–	1.6	2.2	V
触发端电流	I_{TRIG}	V_{CC} =15V, V_{TRIG} =0V,	–	–	2	uA
复位端高电压	V_{RESETH}	V_{CC} =5V	1.5	–	VCC	V
复位端低电压	V_{RESETL}	V_{CC} =5V	GND	–	0.5	V
复位端电流	I_{RESET}	V_{RESET} =0.4V, V_{CC} =15V	–	0.13	0.4	mA
		V_{RESET} =0V, V_{CC} =15V	–	0.3	1.5	mA
输出低电压	V_{OL}	V_{CC} =15V, I_L =-5mA	–	0.02	0.25	V
		V_{CC} =15V, I_L =-50mA	–	0.04	0.75	
		V_{CC} =15V, I_L =-100mA	–	2.0	2.5	
		V_{CC} =15V, I_L =-200mA	–	2.8	–	
		V_{CC} =5V, I_L =-5mA	–	0.08	0.35	
		V_{CC} =5V, I_L =-8mA		0.15	0.4	
输出高电压	V_{OH}	V_{CC} =15V, I_L =-100mA	12.75	13.3	–	V
		V_{CC} =15V, I_L =-200mA	–	12.2	–	
		V_{CC} =5V, I_L =-100mA	2.75	3.3	–	
放电管关闭漏电流	Idis (off)	VO=VOH, Vdis = 10V	–	–	100	nA

电学特性(TA=25℃，除非特别指定)

项目	符号	条件		最小值	典型值	最大值	单位
放电管饱和电压	Vdis(sat)	VO=VOL	VCC=15V,Idis=15mA	-	140	48	mV
			VCC=5V,Idis=4.5mA	-	100	200	mV
输出上升沿时间	tR	CL=15pF，		-	80	300	ns
输出下降沿时间	tF	CL=15pF		-	50	300	ns
定时误差(单稳态)	Ts*note2	RA=2kΩ至100kΩ C=0.1uF	VCC=15V,初始误差	-	1	-	%
	Tv		随电源电压漂移 (4.5V~15V)	-	0.1	-	%/V
	Tt		VCC=15V,随温度漂移(0~60℃)	-	150	-	ppm℃
定时误差(非稳态)	Ts*note2	RA 、 RB=1KΩ 至 100kΩ C=0.1uF	VCC=15V,初始误差	-	1	-	%
	Tv		随电源电压漂移(4.5V~15V)	-	0.1	-	%/V
	Tt		VCC=15V,随温度漂移(0~60℃)	-	150	-	ppm℃

典型应用线路

1、单稳态：

在单稳态模式下，当输入电平达到 1/3 Vcc 时，电路触发输出高电平， 并保持 t=1.1*RA*C 时间后， 输出变为低电平。在 t 时间内， 无论输入电平是什么状态，输出状态不受影响。电路及波形见图 3 和图 4。

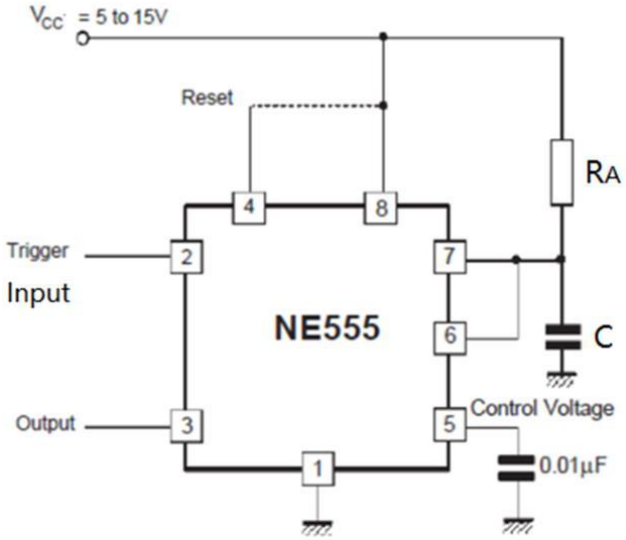


图 3 单稳态电路

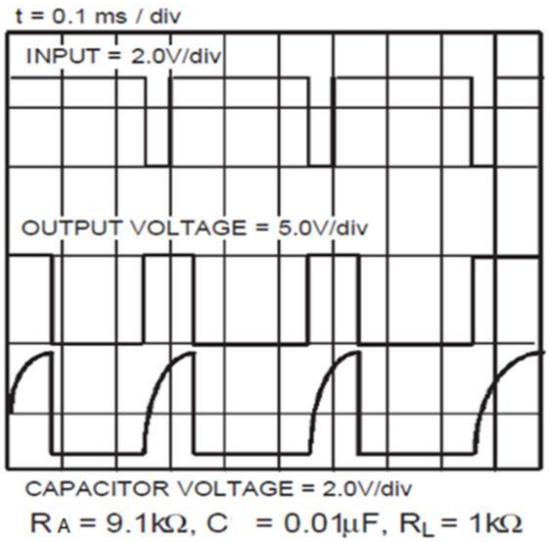


图4 单稳态波形图

2、非稳态：

在非稳态模式下，电路会自动触发，输出为方波的多谐振荡器。其输出方波频率和占空比，可通过 RA、RB、C 大小进行调节。 其触发模式、充电和放电时间以及频率与电源电压无关。电路及波形见图 5 和图 6。 输出高电平脉宽 th=0.693*(RA+RB)*C；低电平脉宽 tl=0.693*RB*C； T=th+tl=0.693(RA+2RB)C；

频率 f=1/T=1.44/(RA*C+2RB*C)；

占空比 D=tl/T=RB/(RA+2RB)。

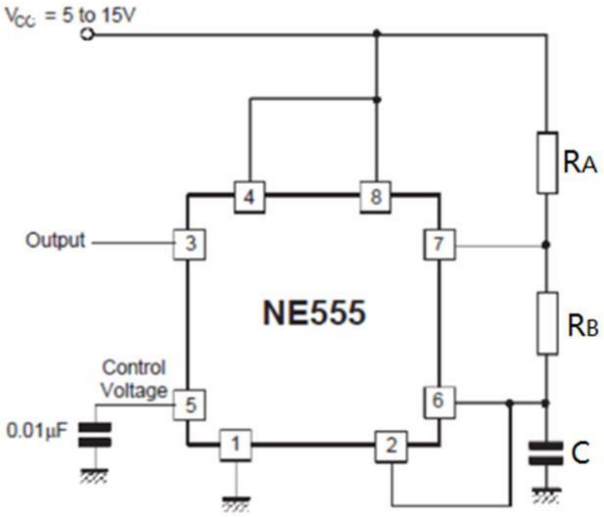


图 5 非稳态电路

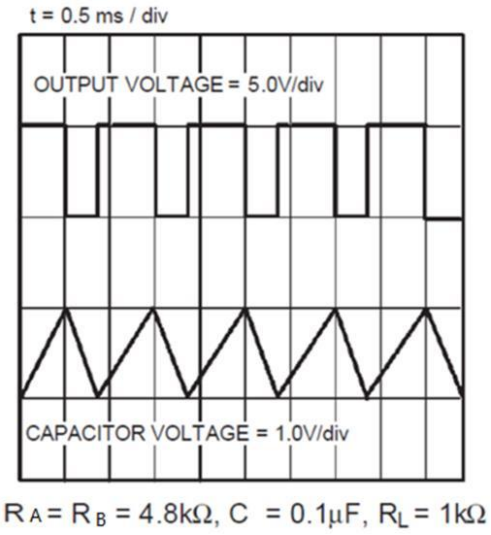


图 6 非稳态波形图

3、脉宽调制：

当定时器以单稳态模式连接，并由连续脉冲串施加到引脚 2 触发时，输出脉冲宽度可由施加到引脚 5 的信号进行调制。见图 7、图 8。

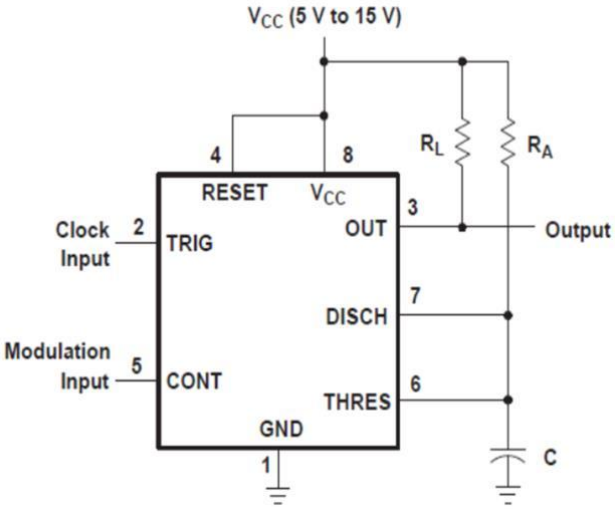


图 7 脉宽调制电路

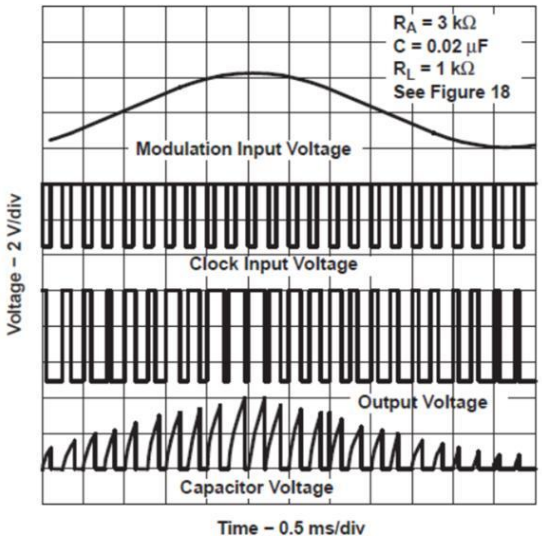


图 8 脉宽调制电路波形图

4、脉冲位置调制：

当定时器以图 9 方式连接，输出脉冲位置可由施加到引脚 5 的信号进行调制。见图 9、图 10。

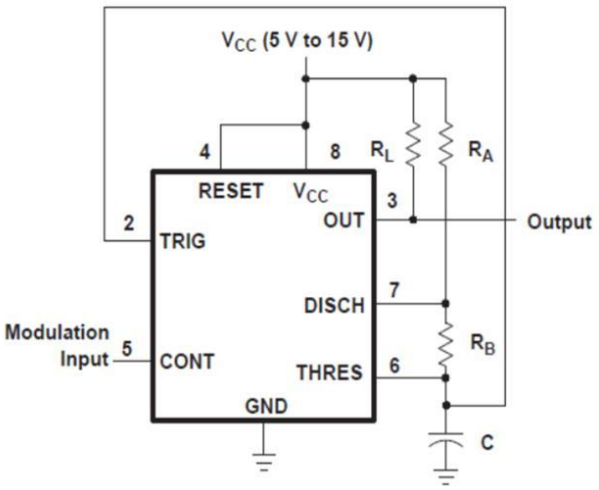


图 9 脉冲位置调制电路

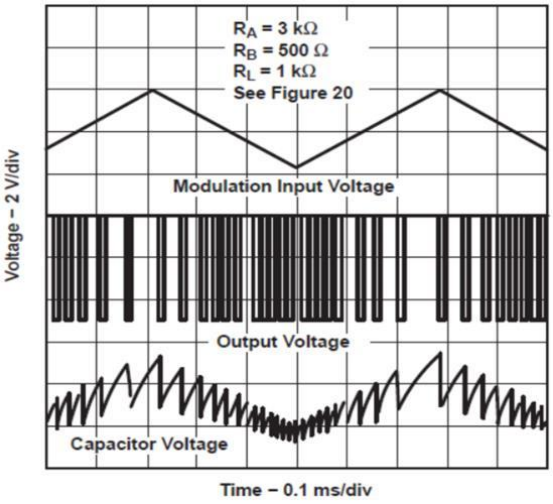
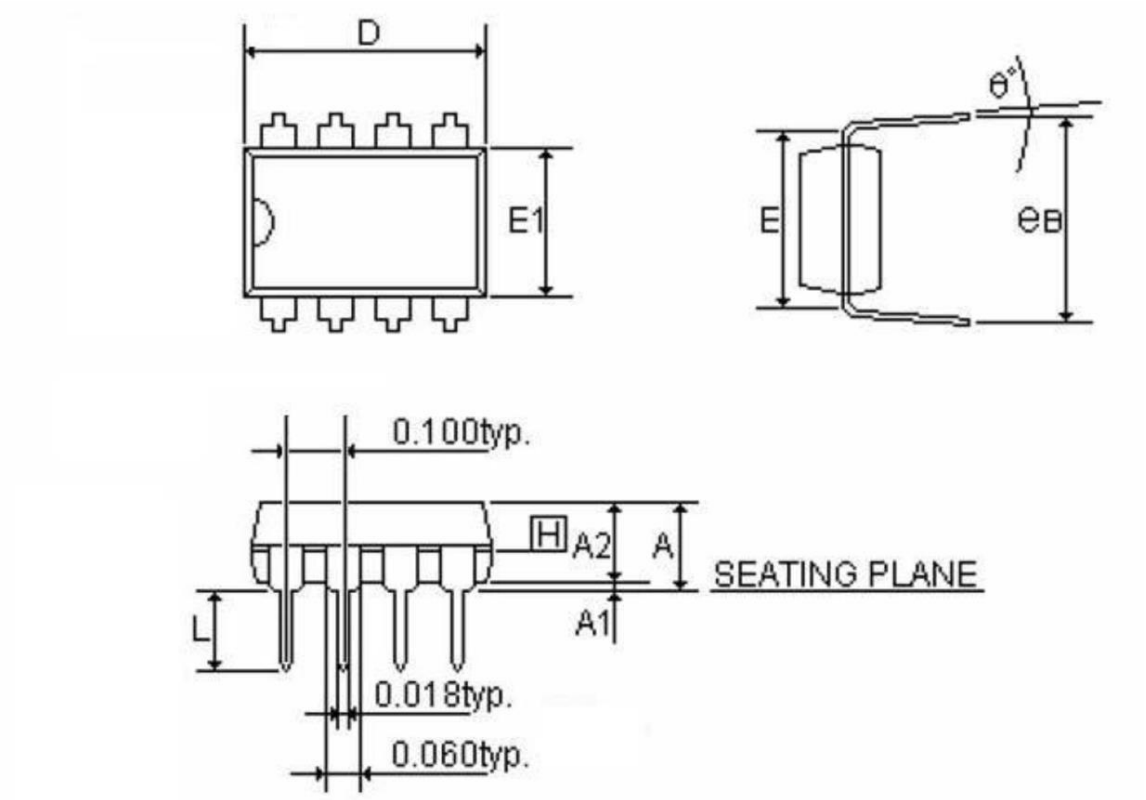


图 10 脉冲位置调制电路波形图

PACKAGE MECHANICAL DATA

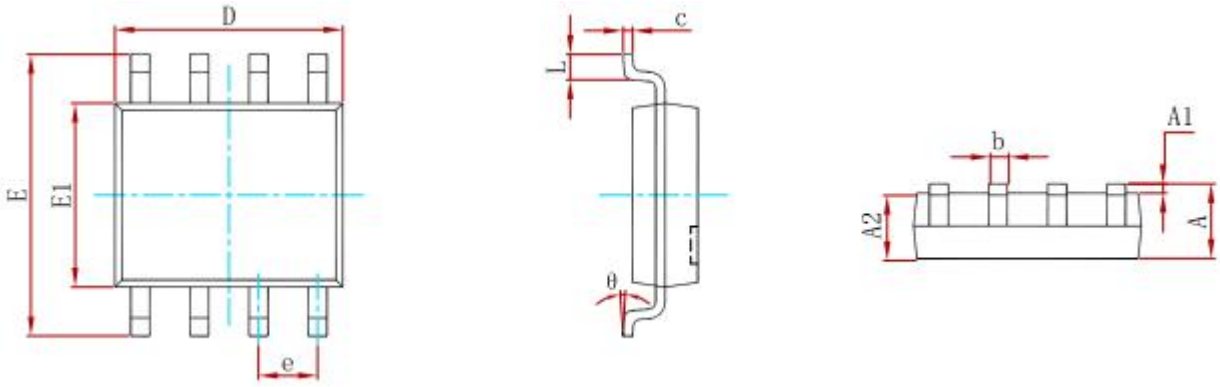
DIP-8



SYMBOLS	MIN	NOR	MAX	MIN	NOR	MAX
	(inch)			(mm)		
A	-	-	0.210	-	-	5.334
A1	0.015	-	-	0.381	-	-
A2	0.125	0.130	0.135	3.175	3.302	3.429
D	0.435	0.455	0.475	15.669	16.050	16.685
E		0.300			7.62	
E1	0.245	0.250	0.255	6.223	6.35	6.477
L	0.115	0.130	0.150	2.921	3.302	3.810
e B	0.335	0.355	0.375	8.509	9.017	9.525
θ°	0°	7°	15°	0°	7°	15°

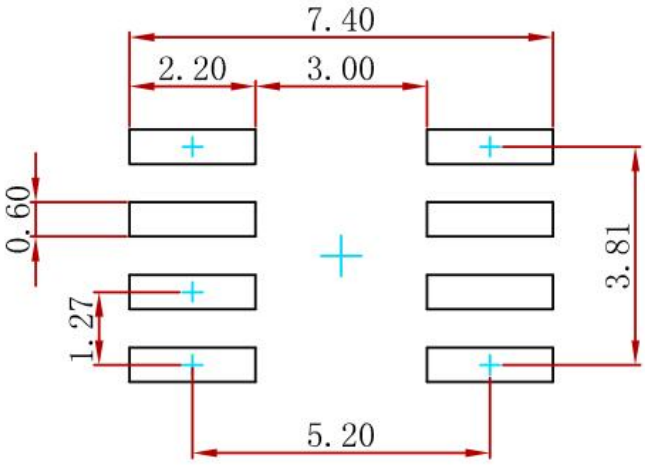
PACKAGE MECHANICAL DATA

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	0.050
θ	0°	8°	0°	8°

Suggested Pad Layout



Note:

1.Controlling dimension:in millimeters.

2.General tolerance:±0.05mm.

3.The pad layout is for reference purposes only.

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