



概述：

NE555是一块精确时间脉冲控制电路。当工作在单稳态模式时，延迟可通过外接的一只电阻和一只电容来控制；当工作在多谐振荡模式时，频率和占空比可通过外接的两只电阻和一只电容来控制。

NE555采用DIP-8、SOP-8的封装形式封装。

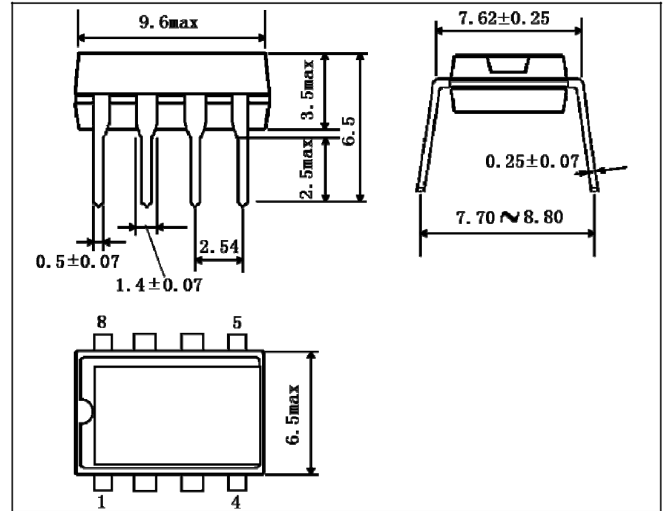
主要特点：

- 👉 输出电流大 (200mA)
- 👉 占空比可调
- 👉 温度稳定性高： 0.005%/°C
- 👉 定时可从微秒级至小时级
- 👉 关闭时间小于 2微秒

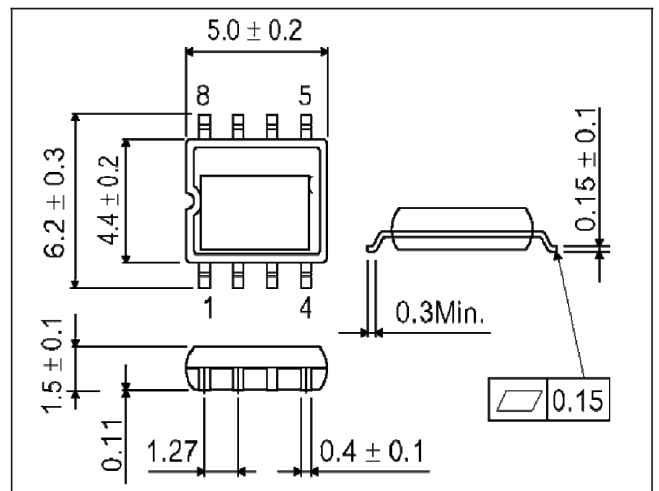
应用：

- 👉 精密计时器
- 👉 脉冲发生器
- 👉 延时发生器
- 👉 顺序计时器

封装外形图：



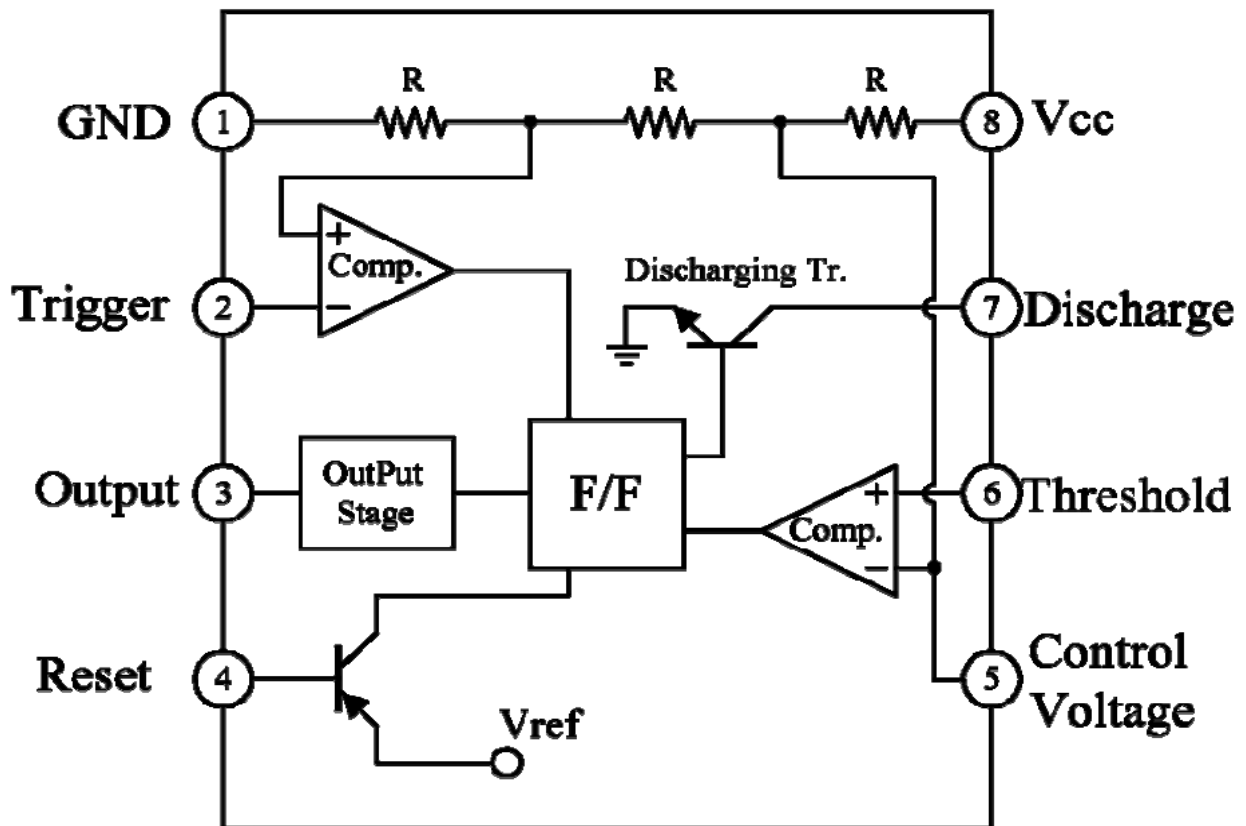
DIP 8



SOP8



功能框图与管脚排列图:



极限值: (Ta=25 °C)

参数名称	符号	数值	单位
电源电压	Vcc	16	V
功耗	Pd	600	mW
工作温度	Topr	- 0 ~+ 70	°C
贮存温度	Tstg	- 65 ~+ 150	°C
焊接温度 (10 秒焊接)	T _{LEAD}	300	°C



电特性:

(若无其它规定: $V_{CC}=5\sim 15V$, $T_a=25^\circ C$)

参数名称	符号	测试条件	最小	典型	最大	单位
电源电压	V_{CC}		4.5		16	V
静态电流(输出低电平)*	I_{CC}	$V_{CC}=5V, R_L = \infty$		3	6	mA
		$V_{CC}=15V, R_L = \infty$		7.5	15	
计时误差(单稳态)初始精度** 温度漂移 电源电压漂移	ACCUR $\Delta t / \Delta T$ $\Delta t / \Delta V_{CC}$	$R_A=1k\Omega$ to $100k\Omega$ $C=0.1\mu F$		1.0 50 0.1	3.0 0.5	% ppm/ $^\circ C$ %/V
计时误差(多谐振荡)初始精度** 温度漂移**** 电源电压漂移****	ACCUR $\Delta t / \Delta T$ $\Delta t / \Delta V_{CC}$	$R_A=1k\Omega$ to $100k\Omega$ $C=0.1\mu F$		2.25 150 0.3		% ppm/ $^\circ C$ %/V
控制电压	V_C	$V_{CC}=15V$	9.0	10.0	11.0	V
		$V_{CC}=5V$	2.6	3.33	4.0	
阈值电压	V_{TH}	$V_{CC}=15V$		10.0		V
		$V_{CC}=5V$		3.33		
阈值电流***	I_{TH}			0.1	0.25	μA
触发电压	V_{TR}	$V_{CC}=5V$	1.1	1.67	2.2	V
		$V_{CC}=15V$	4.5	5	5.6	
触发电流	I_{TR}	$V_{TR}=0V$		0.01	2.0	μA
复位电压	V_{RST}		0.4	0.7	1.0	V
复位电流	I_{RST}			0.1	0.4	mA
输出低电平	V_{OL}	$V_{CC}=15V$ $I_{SINK}=10mA$ $I_{SINK}=50mA$		0.06 0.3	0.25 0.75	V
		$V_{CC}=5V$ $I_{SINK}=5mA$		0.05	0.35	
输出高电平	V_{OH}	$V_{CC}=15V$ $I_{SOURCE}=200mA$ $I_{SOURCE}=100mA$	12.75	12.5 13.3		V
		$V_{CC}=5V$ $I_{SOURCE}=100mA$	2.75	3.3		
输出上升时间	tR			100		ns
输出下降时间	tF			100		ns
卸放端漏电流	I_{LKG}			20	100	nA

* 当输出高电平时, 电流比 $V_{CC}=5V$ 时的输出低电平电流小 1mA 左右。

** 测试条件为 $V_{CC}=5.0V$ 及 $V_{CC}=15V$ 。

*** 该值将决定 $R_A + R_B$ 在 15V 工作条件下的最大值, 最大总电阻 $R=20M\Omega$, 在 5V 工作条件下, 最大总电阻 $R=6.7M\Omega$ 。



应用概要:

下表为 NE555 计时器基本工作表:

阈值电压 (Vth)(PIN6)	触发电压 (Vtr)(PIN2)	复位(PIN4)	输出(PIN3)	卸放端三极管 (PIN7)
—	—	低	低	开
$V_{th} > 2 V_{cc} / 3$	$V_{tr} > 2 V_{cc} / 3$	高	低	开
$V_{cc} / 3 < V_{th} < 2 V_{cc} / 3$	$V_{cc} / 3 < V_{tr} < 2 V_{cc} / 3$	高		
$V_{th} < V_{cc} / 3$	$V_{tr} < V_{cc} / 3$	高	高	关

当复位端加低电平信号时，电路输出为低，且不受阈值电压和触发电压的控制。仅当复位端加高电平信号时，电路输出才受阈值电压和触发电压的控制。

当电路输出高电平时，在阈值电压端加上超过电源电压 $2/3$ 的电压值时，电路内部卸放端三极管开启，阈值电压被拉低到电源电压的 $1/3$ 。在此期间，电路保持输出低电平，稍后，若触发电压端加上低于电源电压 $1/3$ 的电压值时，电路内部卸放端三极管关闭，从而升高阈值电压，并使电路再一次输出高电平。

应用图:

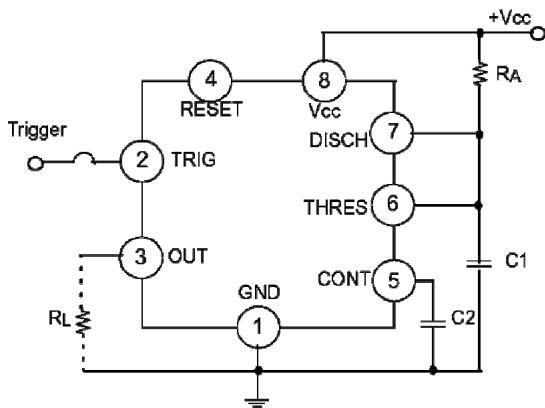


图1: 单稳态电路

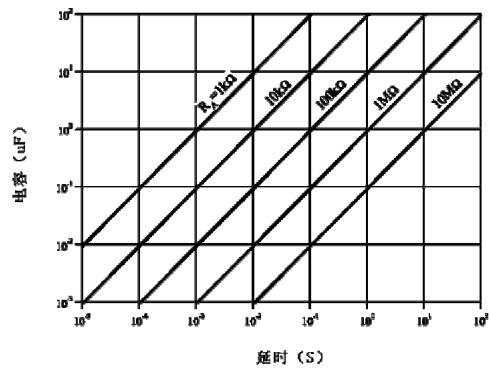


图2: 电阻、电容与延时 (td)

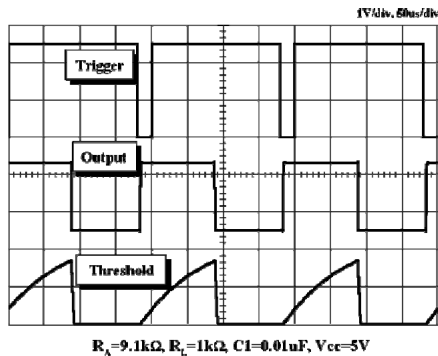


图3 单稳态工作时波形

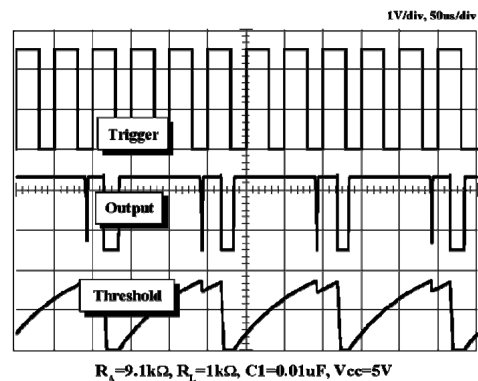


图4 单稳态工作波形 (非正常)

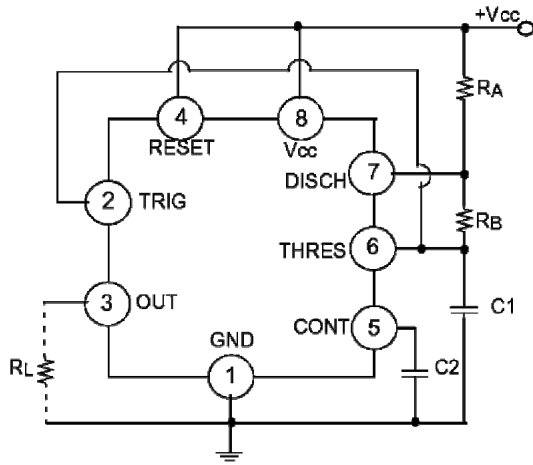


图5 多谐振荡电路

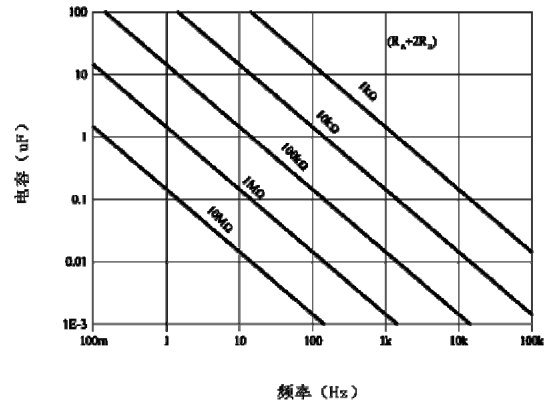
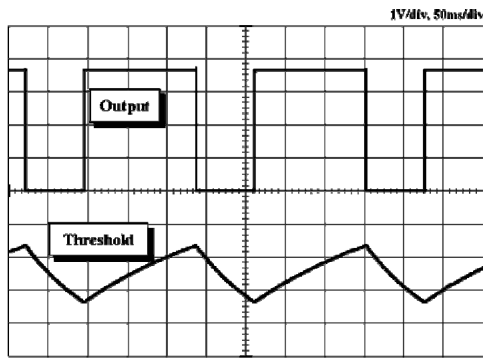
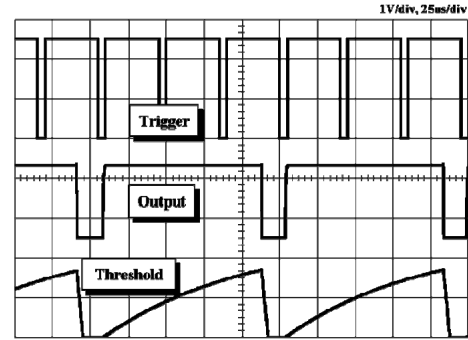


图6 电容、电阻与频率



$R_A=1k\Omega, R_B=1k\Omega, R_L=1k\Omega, C_1=1\mu F, V_{CC}=5V$

图7 多谐振荡工作波形



$R_A=9.1k\Omega, R_L=1k\Omega, C_1=0.01\mu F, V_{CC}=5V$

图8 分频器工作波形

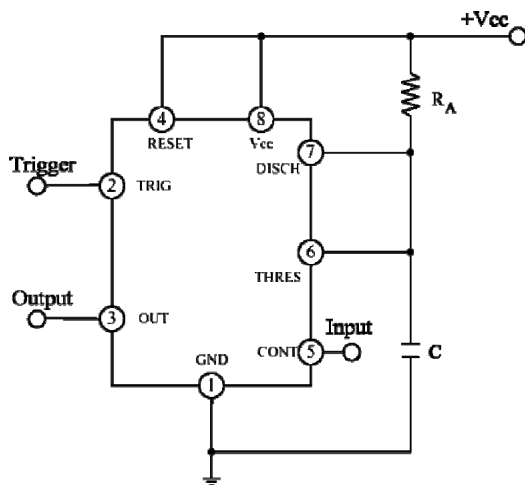
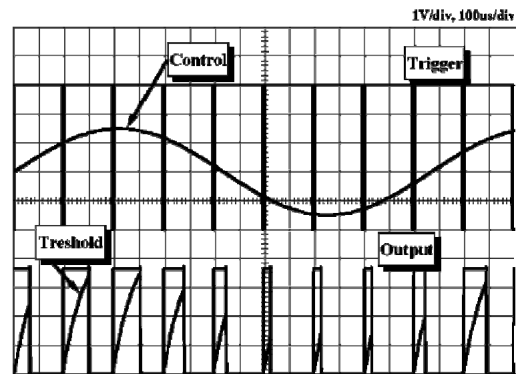


图9 脉宽调制电路



$R_A=9.1k\Omega, R_L=1k\Omega, C_1=0.01\mu F, V_{CC}=5V$

图10 脉宽调制工作波形

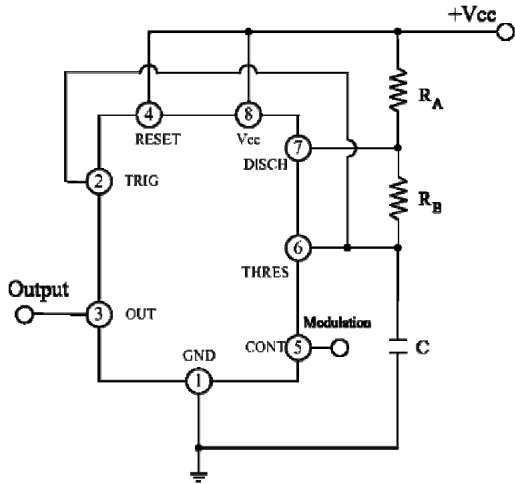


图11 脉位调制电路

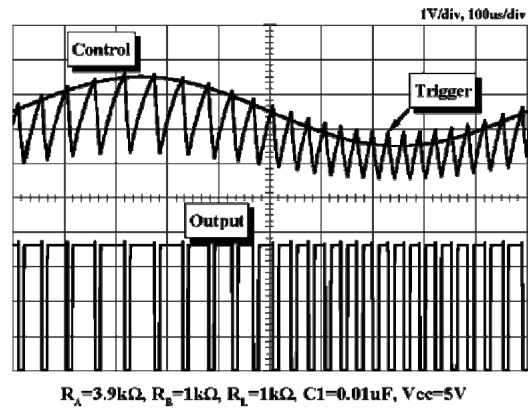


图12 脉位调制工作波形

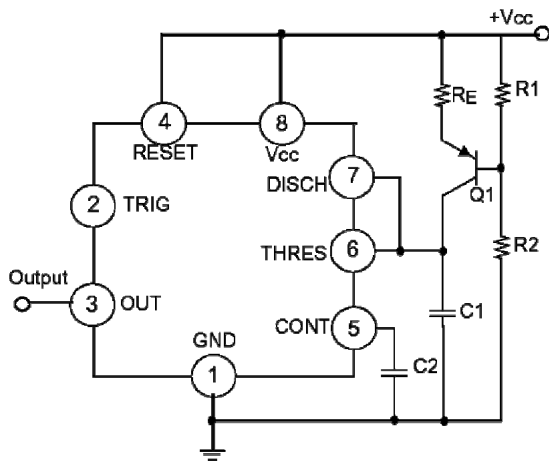


图13 线性斜坡电路

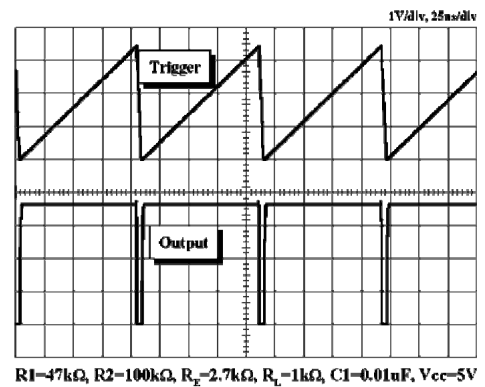


图14 线性斜坡工作波形



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