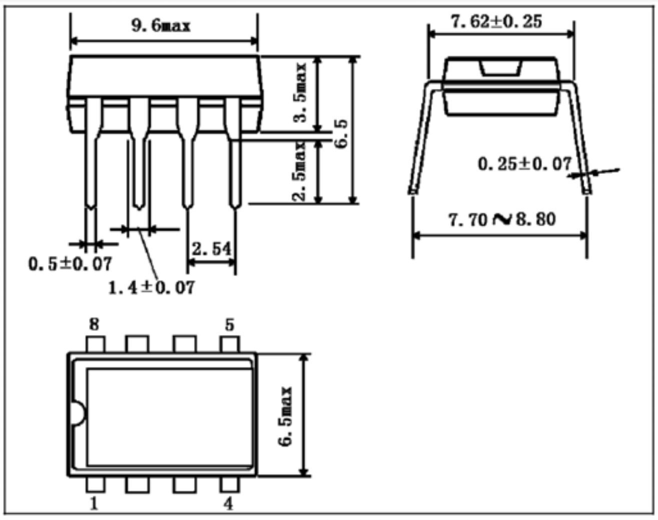
概 述：

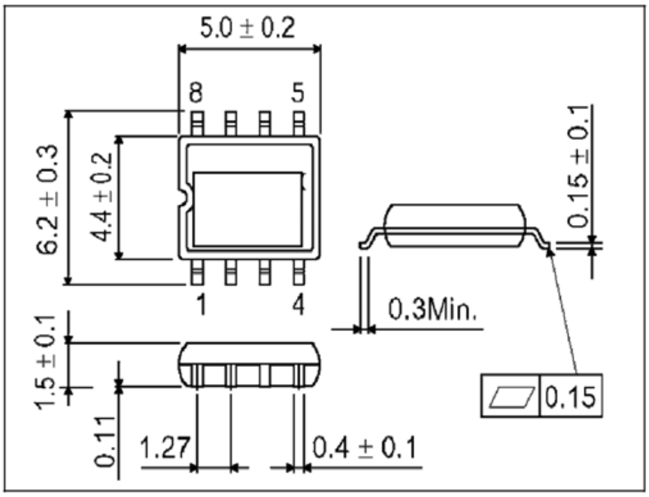
NE555是一块精确时间脉冲控制电路。当工作在单稳态模式时，延迟可通过外接的一只电阻和一只电容来控制；当工作在多谐振荡模式时，频率和占空比可通过外接的两只电阻和一只电容来控制。

NE555采用 DIP-8、SOP-8 的封装形式封装。

封装外形图：



DIP 8



SOP8(SOIC-8)

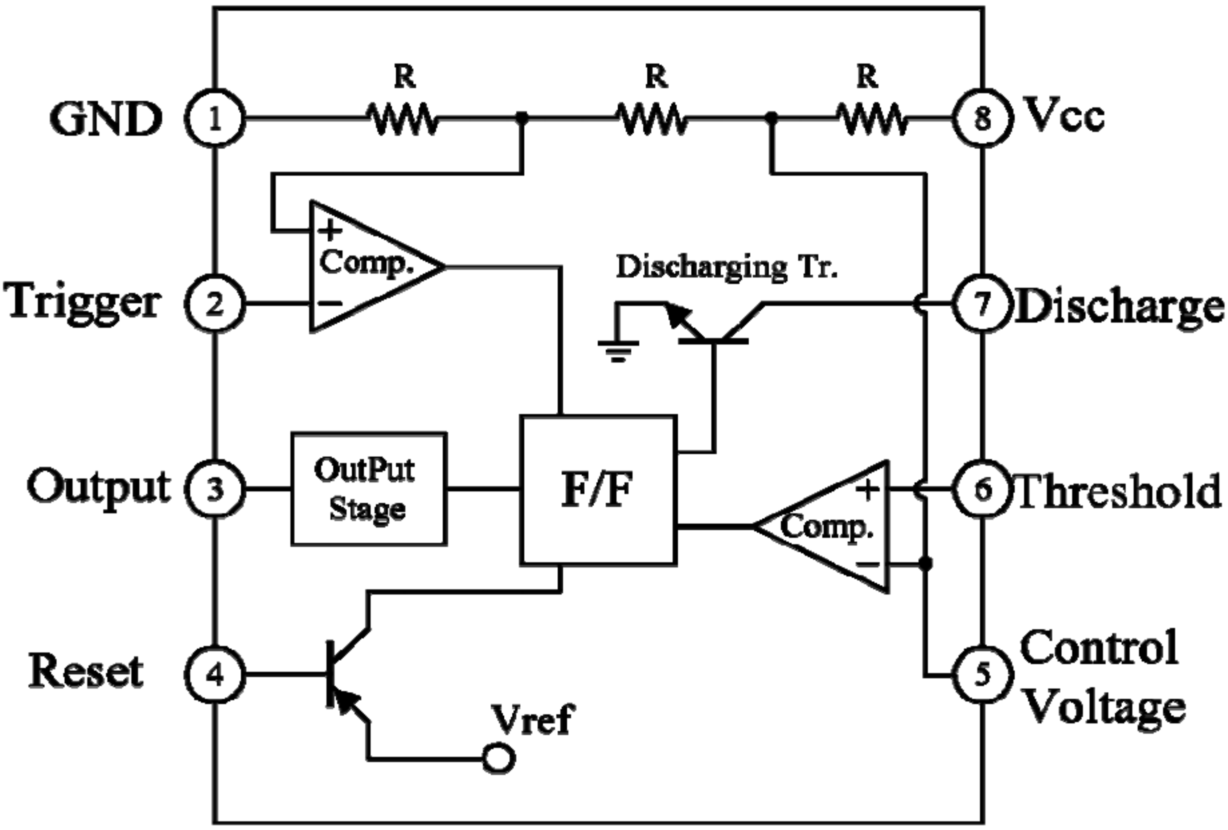
主要特点：

- 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

功能框图与管脚排列图:



极限值:　(Ta=25 ℃)

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	℃
贮存温度	Tstg	- 65 ~+ 150	℃
焊接温度 (10 秒焊接)	T_{LEAD}	300	℃

电特性:

(若无其它规定: Vcc=5~15V , Ta= 25 °C)

参数名称	符号	测试条件	最小	典型	最大	单位
电源电压	Vcc		4.5		16	V
静态电流(输出低电平)*	Icc	Vcc=5 V, $R_L = \infty$		3	6	mA
		Vcc=15 V, $R_L = \infty$		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 Δt/ΔT Δt/ΔVcc	R_A=1k Ω to 100k Ω C=0.1μF		1.0 50 0.1	3.0 0.5	% ppm/ °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 Δt/ΔT Δt/ΔVcc	R_A=1k Ω to 100k Ω C=0.1μF		2.25 150 0.3		% ppm/ °C %/V
控制电压	Vc	Vcc=15V	9.0	10.0	11.0	V
		Vcc=5V	2.6	3.33	4.0	
阈值电压	V_{TH}	Vcc=15V		10.0		V
		Vcc=5V		3.33		
阈值电流***	I_{TH}			0.1	0.25	μA
触发电压	V_{TR}	Vcc=5V	1.1	1.67	2.2	V
		Vcc=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}	Vcc=15V I_{SINK}=10mA I_{SINK}=50mA		0.06 0.3	0.25 0.75	V
		Vcc=5V I_{SINK}=5mA		0.05	0.35	
输出高电平	V_{OH}	Vcc=15V I_{SOURCE}=200mA I_{SOURCE}=100mA	12.75	12.5 13.3		V
		Vcc=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 Vcc = 5V时的输出低电平电流小 1mA左右。

** 测试条件为 Vcc = 5.0V及Vcc = 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 = 20MΩ ，在5V工作条件下， 最大总电阻 R = 6.7MΩ .

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
Vth> 2 Vcc/ 3	Vth> 2 Vcc/ 3	高	低	开
Vcc/3<Vth<2Vcc/ 3	Vcc/ 3 < Vth< 2 Vcc/ 3	高		
Vth< Vcc/ 3	Vth< Vcc/ 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:

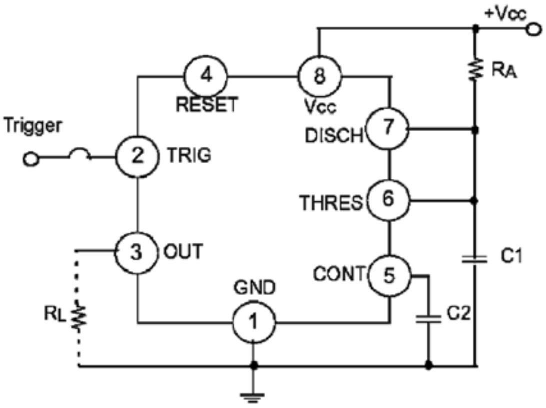


图1：单稳态电路

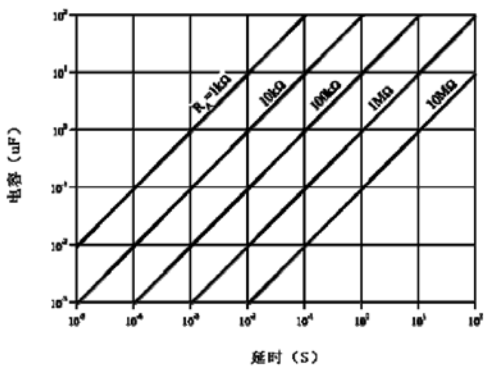
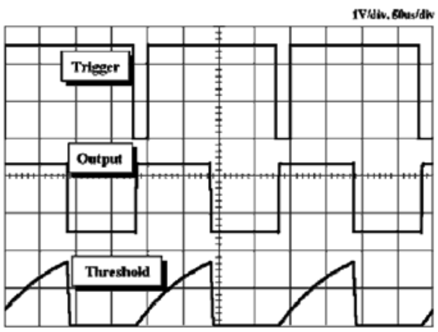
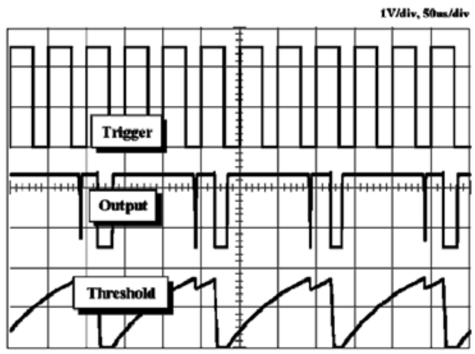


图2：电阻、电容与延时（td）



R_A=9.1kΩ, R_L=1kΩ, C1=0.01uF, Vcc=5V

图3 单稳态工作时波形



R_A=9.1kΩ, R_L=1kΩ, C1=0.01uF, Vcc=5V

图4 单稳态工作波形（非正常）

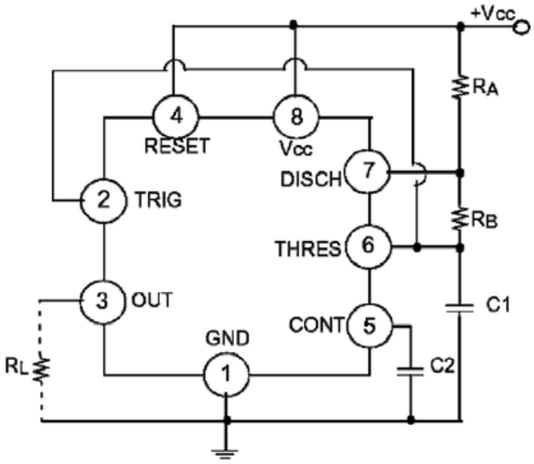


图5 多谐振荡电路

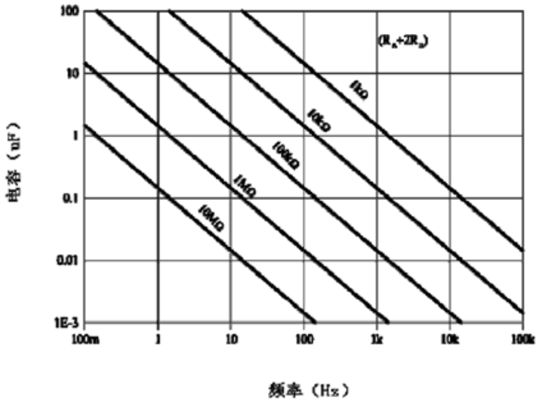
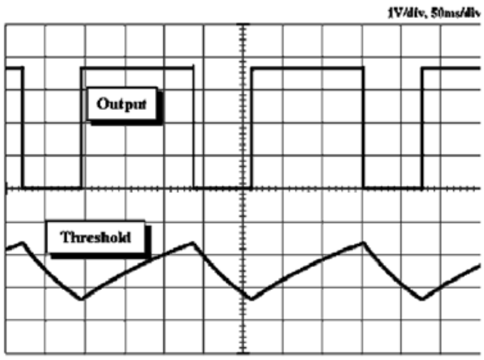
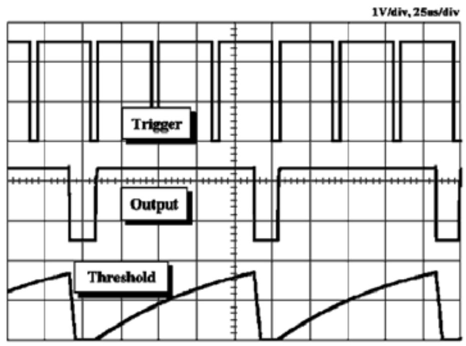


图6 电容、电阻与频率



R_A=1kΩ, R_B=1kΩ, R_L=1kW, C1=1uF, Vcc=5V

图7 多谐振荡工作波形



R_A=9.1kΩ, R_L=1kΩ, C1=0.01uF, Vcc=5V

图8 分频器工作波形

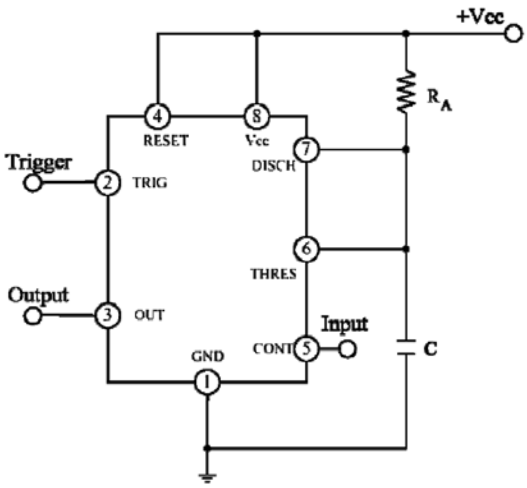
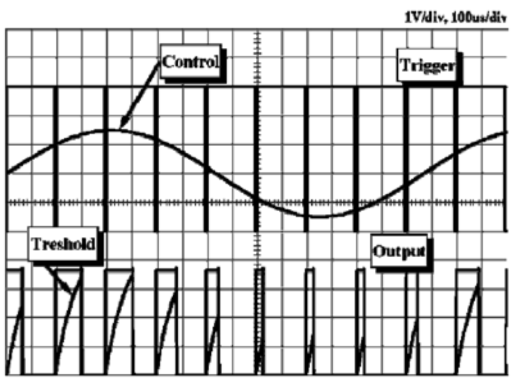


图9 脉宽调制电路



R_A=9.1kΩ, R_L=1kΩ, C1=0.01uF, Vcc=5V

图10 脉宽调制工作波形

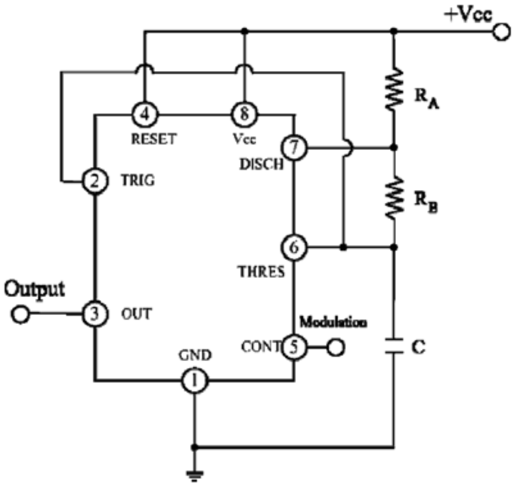
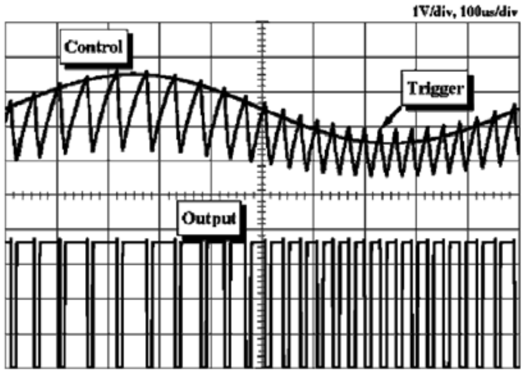


图11 脉位调制电路



R_A=3.9kΩ, R_B=1kΩ, R_L=1kΩ, C1=0.01uF, Vcc=5V

图12 脉位调制工作波形

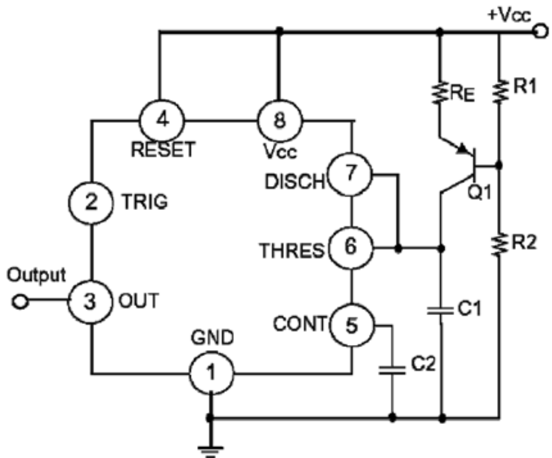
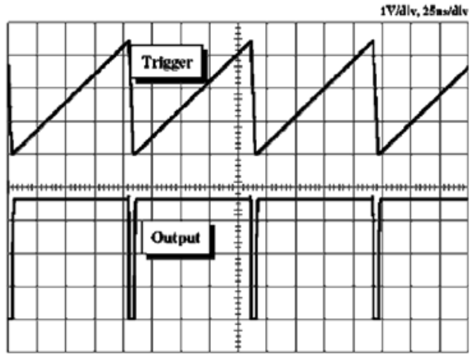


图13 线性斜波电路



R1=47kΩ, R2=100kΩ, R_E=2.7kΩ, R_L=1kΩ, C1=0.01uF, Vcc=5V

图14 线性斜波工作波形

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