555

Single line timer circuit

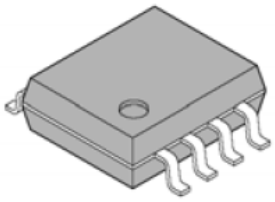
summary：

55 is a precise time pulse control circuit.

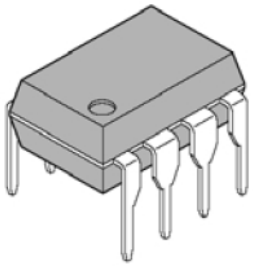
When the work is in single stable mode, the delay can be controlled by an external resistor and a capacitor; when the work is in multi-resonant mode, the frequency

The duty cycle can be controlled by two external resistors and a capacitor.

555 DIP8 and SOP8 packages are used.



SOP8



DIP8

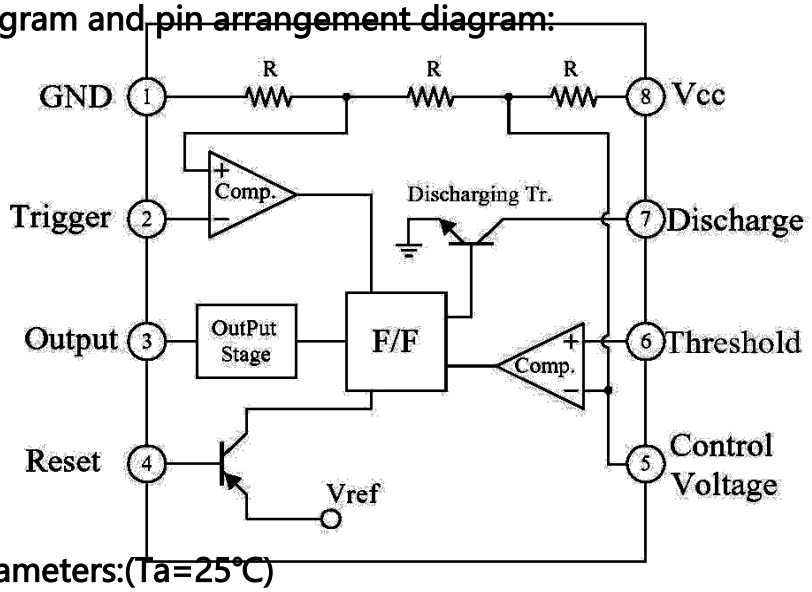
main features：

- High output current (200mA)
- The duty cycle ratio is adjustable
- High temperature stability: 0.005%/ C
- Timing can range from microsecond to hour
- The close time is less than 2 microseconds

apply：

- chromoneter
- pulser
- Delay generator
- Sequential timer

Function block diagram and pin arrangement diagram:



Extreme value parameters:(Ta=25℃)

Parameter name	symbol	numeric value	unit
maximum input volt-age	Vin	24	V
power dissipation	Pd	600	mW
working temperature	Top	-20~+120	℃
storage temperature	T_S	-65~ +150	℃

Welding temperature and time	T_{LEAD}	300°C,10S	

Electrical characteristics: (If there is no special explanation or other provisions: Vcc = 5 ~ 1 5 V, Ta=25C)

parameter	symbol	test condition	least value	representative value	crest value	unit
supply voltage	Vcc		4.5		18	
Static current (low output level) Note1	Icc	Vcc=5 V, R_L =∞		3	6	
		Vcc=15 V,R_L = ∞		7.5	15	
Timing error (single stability) Initial accuracy Note2 Temperature drift power supply voltage drift	ACCUR Δt/ΔT Δt/ΔVcc	R_A =1kΩ to 100kΩ, C=0.1μF		1.0 50 0.1	3.0 0.5	ppm / ° C % / V
Timing error (multivibrator) Initial accuracy Note2 Temperature drift power supply voltage drift	ACCUR Δt/ΔT Δt/ΔVcc	R_A =1kΩ to 100kΩ, C=0.1μF		2.25 150 0.3		ppm / ° C % / V
control voltage	Vc	Vcc=15V	9	10	11	
			2.6	3.33	4	
threshold voltage	V_{TH}	Vcc=15V		10		
				3.3		
Threshold current Note3	I_{TH}			0.1	0.25	
trigger voltage	V_{TR}		1.1	1.67	2.2	
		V	4.5	5	5.6	

		Vcc=15V				
Trigger current	ITR			0.01	2.0	
Reset voltage	VRST		0.4	0.7	1.0	
Reset current	IRST			0.1	0.4	
output low level	VOL	Vcc=15V ISINK=10mA		0.06	0.25	
				0.3	0.75	
		ISINK=50mA				
		Vcc=5V ,ISOURCE=5mA		0.05	0.35	
Output high level	VOH	Vcc=15V ISOURCE=200mA		12.5		
			12.75	13.3		
		ISOURCE=100mA				
		Vcc=5V ,ISOURCE=100mA	2.75	3 . 3		
Output rise time	tR			100		
Output down time	tF			100		
Unloading end leakage current	ILKG			20	100	

Note1: When the output is high, the current is about 1mA less than the low level current when Vcc= 5V.

Note2: The test conditions are Vcc = 5.0V and Vcc = 15V.

Note3: This value will determine the maximum value of RA+ RB under the working condition of 15V, and the maximum total resistance R = 20MΩ, and the maximum total resistance

R = 6.7MΩ under the working condition of 5V.

Application summary:

555 Basic timer worksheet:

threshold voltage (Vth)(PIN6)	trigger voltage (Vtr)(PIN2)	Reset (PIN 4)	output （PIN3)	Unplug the terminal transistor (PIN7)
—	—	low	low	open
Vth>2Vcc/3	Vth>2Vcc/3	tall	low	open
Vcc/3<Vth<2Vcc/3	Vcc/3<Vth<2Vcc/3	tall		
Vth<Vcc/3	Vth<Vcc/3	tall	tall	close

When a low level signal is applied to the reset terminal, the output of the circuit is low and is not controlled by the threshold voltage and trigger voltage. Only when a high level signal is applied to the reset terminal, the output of the circuit is controlled by the threshold voltage and trigger voltage.

When the circuit outputs a high level, if a voltage exceeding 2/3 of the power supply voltage is applied to the threshold voltage terminal, the internal discharge transistor turns on, reducing the threshold voltage to 1/3 of the power supply voltage. During this period, the circuit maintains a low output level. Later, if a voltage below 1/3 of the power supply voltage is applied to the trigger voltage terminal, the internal discharge transistor turns off, raising the threshold voltage and causing the circuit to output a high level again.

application drawing：

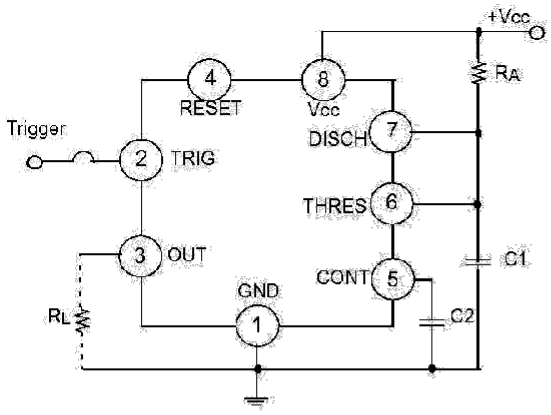


图1：单稳态电路

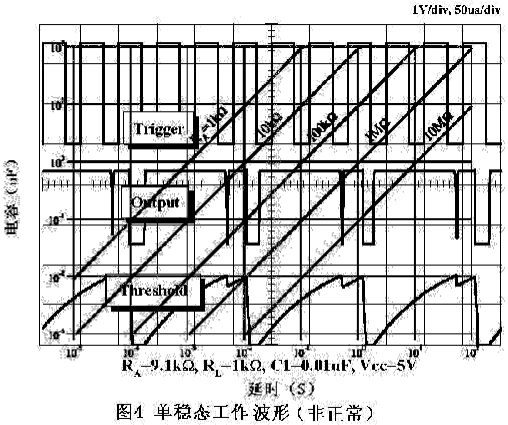
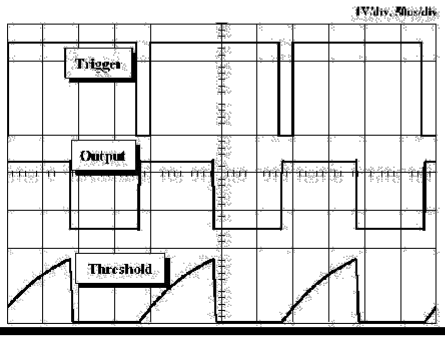


图2：电阻、电容与延时（td）

图4 单稳态工作波形（非正常）



R_x=9.1kΩ, R_L=1kΩ, C1=0.01uF, Vcc=5V

图3 单稳态工作时波形

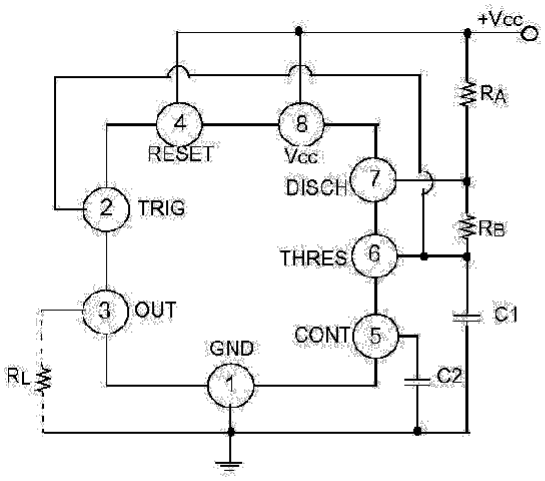


图5 多谐振荡电路

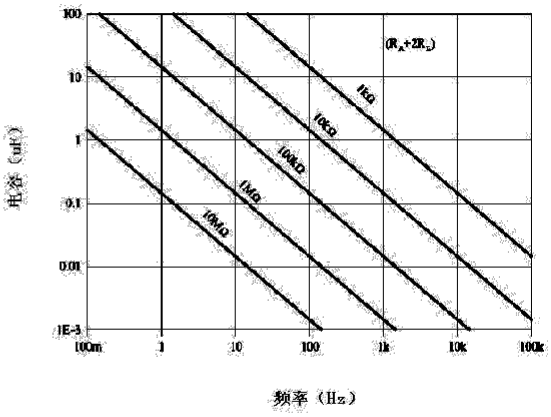
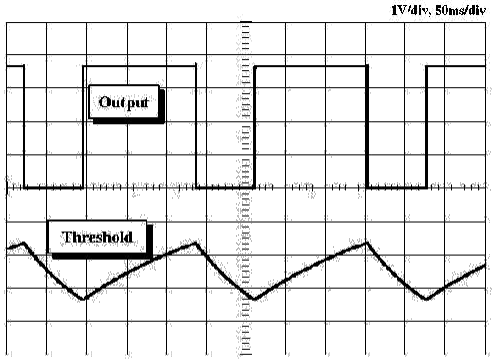
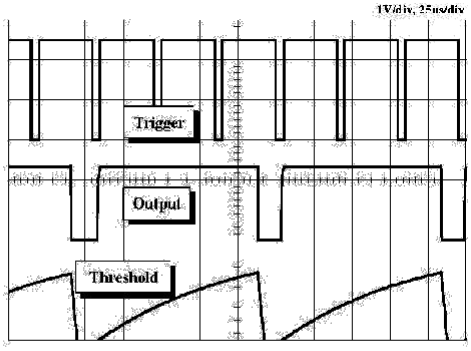


图6 电容、电阻与频率



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

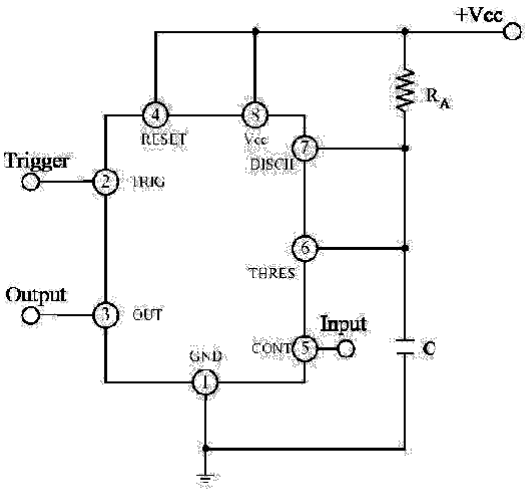
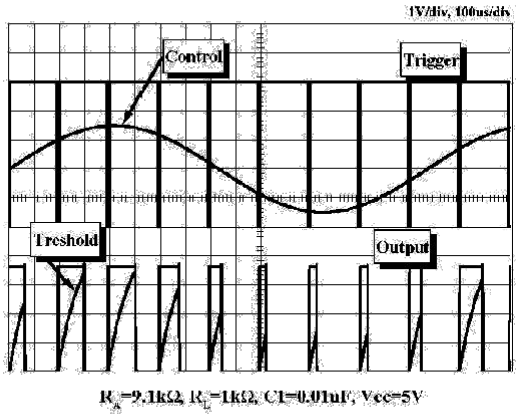


图9 脉宽调制电路



R_A=9.1kΩ, R_L=1kΩ, C1=0.01uF, Vcc=5V

图10 脉宽调制工作波形

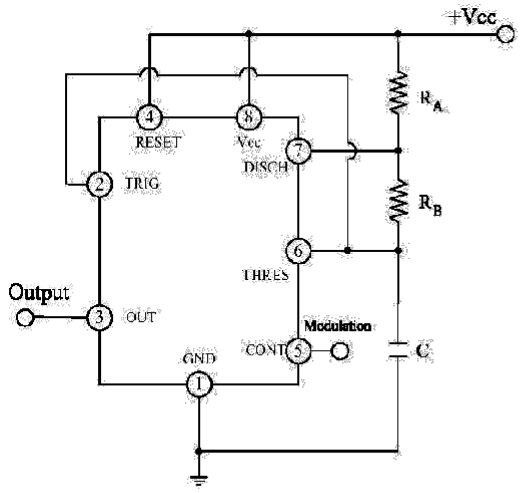
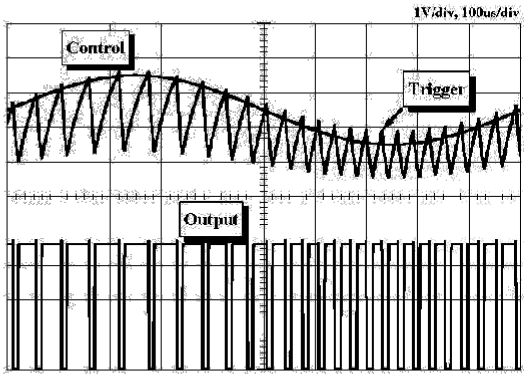


图11 脉位调制电路



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

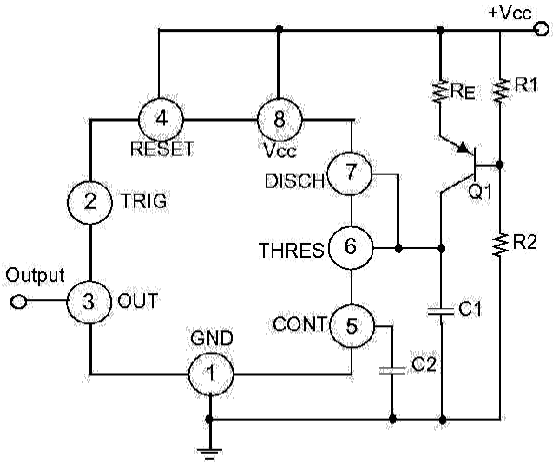
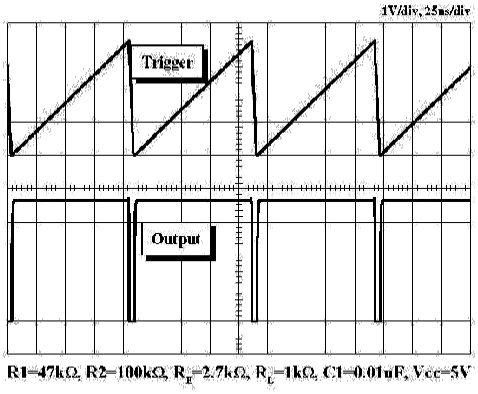


图13 线性斜波电路



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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- There is no end to the improvement of product performance, our company will be committed to providing customers with better performance and better quality of integrated circuit products.