Description

These devices are monolithic timing circuits capable of producing accurate time delays or oscillation. Inthe time delay mode of operation, the timed interval is controlled by a single external resistor and capacit or network. In the astable mode of operation, the frequency and duty cycle may be independently controlled with two external resistors and a single external capacitor.

Features

- Timing from Microseconds to Hours
- Astable or Monostable Operation
- Adjustable Duty Cycle
- TTL - Compatible Output Can Sink or Source Up to 200 mA
- Temperature Stability of 0.005% per °C
- Direct Replacement for Signetics NE555 Timer

DIP-8

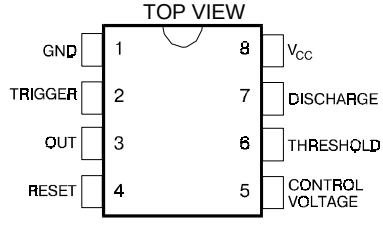
SOP-8

Package

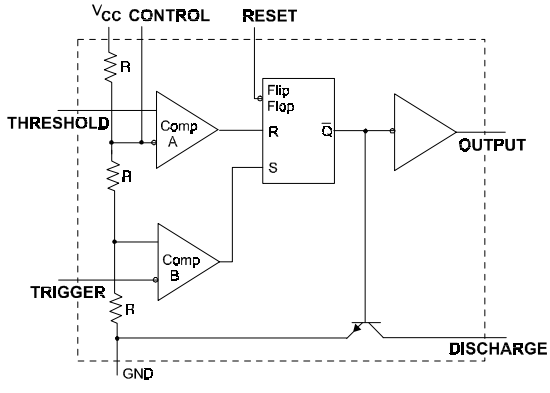
Applications

- Precision timing
- Pulse generation
- Sequential timing
- Time delay generation
- Pulse width modulation
- Pulse position modulation
- Missing pulse detector

Pin Configuration



Internal Block Digram



RESET can override TRIGGER, which can override THRESHOLD

Absolute Maximum Ratings

(T_A=25°C, unless otherwise specified)

Parameter	Min	Max	Units
Supply Voltage, V_{CC}	4.5	16	V
Input Voltage (control, reset, threshold and trigger)		V_{CC}	
Output Current, I_0		±200	mA
Operating Free-Air Temperature, T_A		70	°C
Storage Temperature Range, T_{STG}	-65	+150	

Electrical characteristics

(T_A=25°C, V_{CC}=+5V to +15V, unless otherwise specified)

Parameter		Test conditions (Note 2)		Min	Typ	Max	Units
Operating Supply Voltage Range				4.5		16	V
Threshold Voltage Level		V_{CC}=15V		8.8	10	11.2	V
		V_{CC}=5V		2.4	3.3	4.2	
Threshold Current (Note 1)		(see Note 1)			30	250	nA
Trigger Voltage Level		V_{CC}=15V		4.5	5	5.6	V
		V_{CC}=5V		1.1	1.67	2.2	
Trigger Current		Trigger at 0V			0.5	2	µA
Reset Voltage Level				0.3	0.7	1	V
Reset Current		Reset at V_{CC}			0.1	0.4	mA
		Reset at 0V			-0.4	-1.5	
Discharge Leakage Current					20	100	nA
Control Voltage Level		V_{CC}=15V		9	10	11	V
		V_{CC}=5V		2.6	3.3	4	
Low-level Output Voltage		V_{CC}=15V	I_{OL}=10mA		0.1	0.25	
			I_{OL}=50mA		0.4	0.75	
			I_{OL}=100mA		2	2.5	
			I_{OL}=200mA		2.5		
		V_{CC}=5V	I_{OL}=5mA		0.25	0.35	
			I_{OL}=8mA		0.3	0.4	
High-level Output Voltage		V_{CC}=15V	I_{OL}=-100mA	12.75	13.3		
			I_{OL}=-200mA		12.5		
		V_{CC}=5V	I_{OL}=-100mA	2.75	3.3		
Supply Current		Output Low, No Load	V_{CC}=15V		10	15	mA
			V_{CC}=5V		3	6	
		Output High, No Load	V_{CC}=15V		9	13	
			V_{CC}=5V		2	5	
Initial Error of Timing Interval (Note 3)	monostable (Note 4)	T_A=25°C			1	3	%
	astable (Note 5)				5	13	
Temperature Coefficient of Timing Interval	monostable	T_A=MIN to MAX			50	150	ppm /°C
	astable				150	500	
Supply Voltage Sensitivity of Timing Interval	monostable	T_A=25°C			0.1	0.5	%/V
	astable				0.3	1	
Output Pulse Rise Time		C_L=15pF, T_A=25°C			100	300	ns
Output Pulse Fall Time					100	300	

Note 1: This parameter influences the maximum value of the timing resistors R_A and R_B in the circuit on Fig 1. For example, when V_{CC}=5V, the maximum value is $R=R_A+R_B$=3.4 MΩ, and V_{CC}=15V, the maximum value is 10 MΩ.

Note 2: For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

Note 3: Timing interval error is defined as the difference between the measured value and the average value of a random sample from each process run.

Note 4: Values specified are for a device in a monostable circuit similar to Fig. 2, with component values as follow: R_A=2KΩ to 100 KΩ, C=0.1µF.

Note 5: Values specified are for a device in an astable circuit similar to Fig. 1, with component values as follow: R_A, R_B=1KΩ to 100 KΩ, C=0.1µF.

Function Table

Reset	Trigger Voltage *	Threshold Voltage *	Output	Discharge Switch
Low	Irrelevant	Irrelevant	Low	On
High	< 1/3 V_{CC}	High	High	Off
High	> 1/3 V_{CC}	> 2/3 V_{CC}	Low	On
High	> 1/3 V_{CC}	< 2/3 V_{CC}	As previously established	

* Voltage levels shown are nominal

Typical Applications Circuit

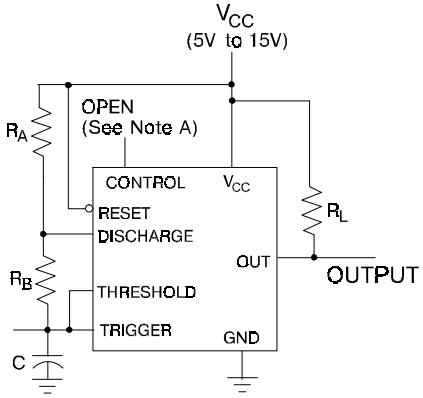


Figure 1 Circuit for astable operation

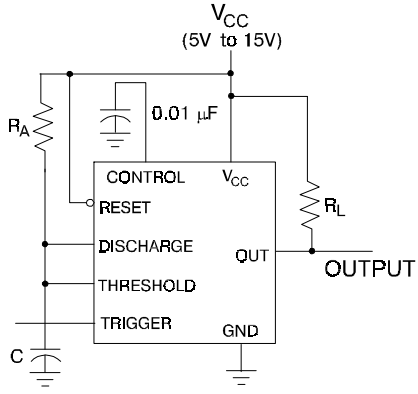


Figure 2. Circuit for monostable operation

NOTE A: Bypassing the control voltage input to ground with a capacitor may improve operation. This should be evaluated for individual

Ordering Information

ORDERING NUMBER	PACKAGE	MARKING
NE555	DIP - 8 / SOP - 8	NE555

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