

CMOS SINGLE TIMER

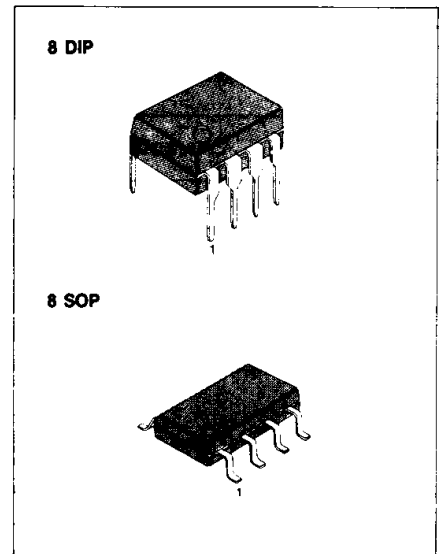
The KS555 is a CMOS timer with improved performance over a standard bipolar one. Due to its high-impedance inputs, it is capable of producing accurate time delays and oscillations with less expensive (smaller) timing capacitors than a standard bipolar timer.

Its dramatic advantages over bipolar ones are very low power consumption and wide operating voltage range especially during stable low voltage operations.

FEATURES

- Low power consumption
- Pin to pin operation with bipolar timer in most cases
- Extremely low trigger, threshold, and reset pin current
- High-speed operation (500KHz)
- Stable low voltage operation (possible 1.5V operation with most samples)
- Wide operating voltage range: 2 to 18V
- High output source/sink driver meet TTL/CMOS
- Immunized to static charge with inner protection devices

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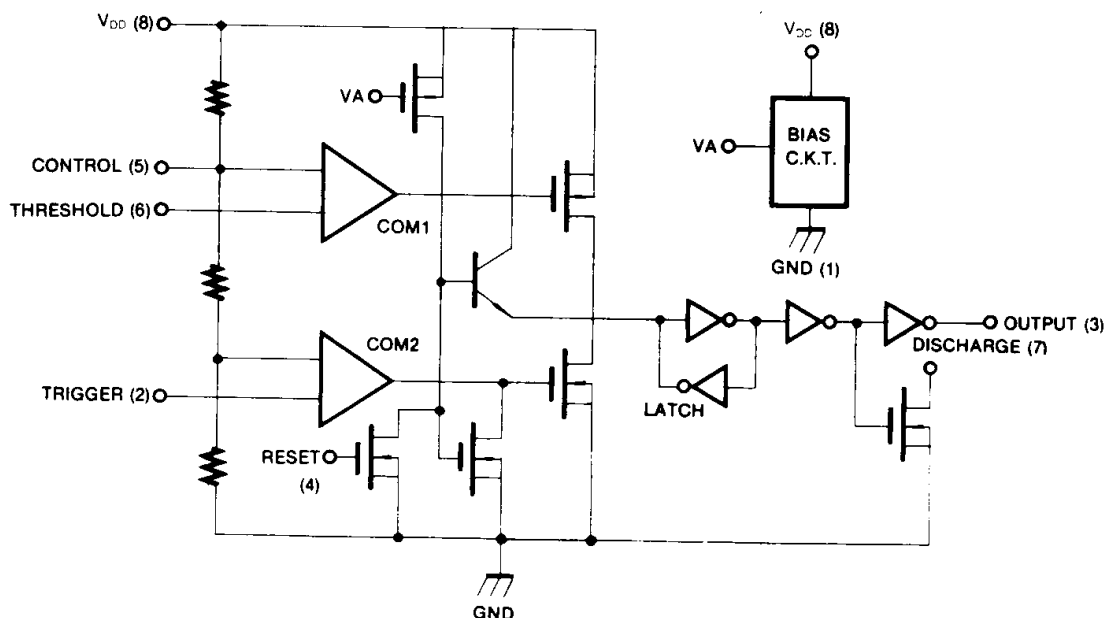
APPLICATIONS

- Precision Timing
- Pulse Generation
- Sequential Timing
- Time Delay Generation
- Pulse Width Modulation
- Pulse Position Modulation
- Missing Pulse Detector

ORDERING INFORMATION

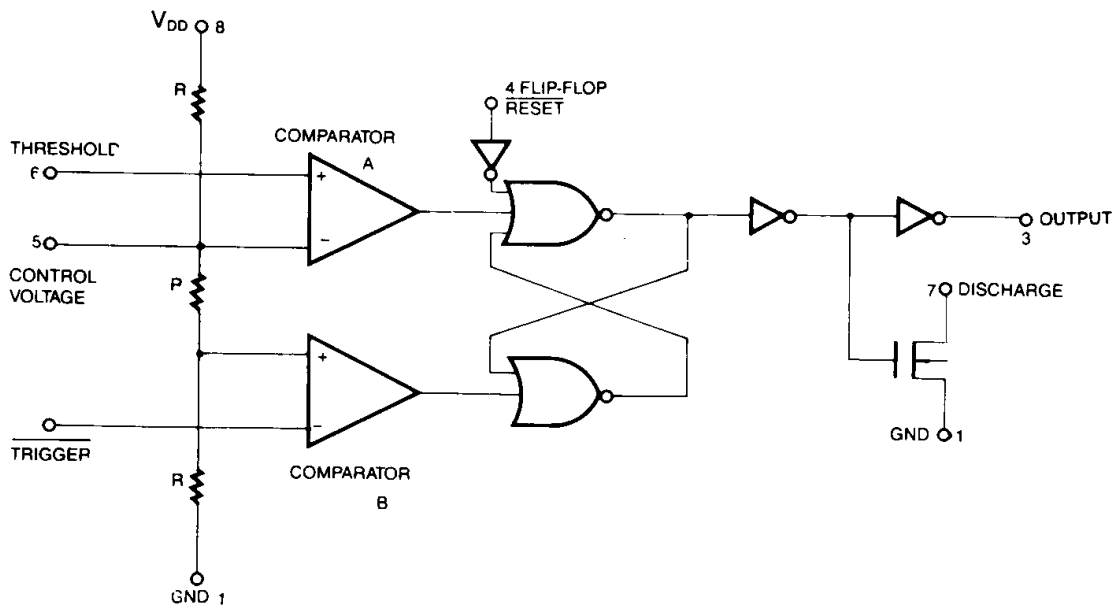
Device	Package	Operating Temperature
KS555	8 DIP	- 20 ~ + 85°C
KS555D	8 SOP	

SCHEMATIC DIAGRAM



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BLOCK DIAGRAM



This block diagram reduces the circuitry down to its simplest equivalent components. Tie down unused inputs. R = 100KΩ ± 20% Typ.

TRUTH TABLE

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Threshold Voltage	Trigger Voltage	Reset	Output	Discharge Switch
Don't Care	Don't Care	Low	Low	On
$> 2/3 (V_{CC})$	$> 1/3 (V_{CC})$	High	Low	On
$< 1/3(V_{CC}) \sim 2/3(V_{CC})$	$> 1/3(V_{CC}) \sim 2/3(V_{CC})$	High	Stable	Stable
Don't Care	$< 1/3 (V_{CC})$	High	High	Off

Note: \overline{RESET} will dominate all other input. $\overline{TRIGGER}$ will dominate over THRESHOLD.

ABSOLUTE MAXIMUM RATINGS (Note 1)

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{DD}	18	V
Power Dissipation	P_D	200	mW
Operating Temperature Range	T_{OPR}	- 20 ~ + 85	°C
Storage Temperature Range	T_{STG}	- 65 ~ + 150	°C

Note 1: Stresses above those listed under absolute maximum rating may cause permanent damage to the device.

ELECTRICAL CHARACTERISTICS(T_A = 25°C, V_{DD} = 2 to 15V, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V _{DD}	-20°C < T _A < +70°C	2		18	V
Supply Current	I _{DD}	V _{DD} = 2V		30		μA
		V _{DD} = 18V		60		μA
Timing Error	ACCUR	R _A = R _B = 1KΩ to 100KΩ C = 0.1μF, 5V ≥ V _{DD} ≤ 15V				
Initial Accuracy				2.0	10.0	%
Drift With Temperature	Δt/ΔT	V _{DD} = 5V		50		ppm/°C
		V _{DD} = 10V		75		ppm/°C
		V _{DD} = 15V		100		ppm/°C
Drift With Supply Voltage	Δt/ΔV _{DD}	V _{DD} = 5V		1.0	3.0	%/V
Threshold Voltage	V _{TH}	V _{DD} = 5V		0.66		V _{CC}
Trigger Voltage	V _{TR}	V _{DD} = 5V		0.33		V _{CC}
Trigger Current	I _{TR}	V _{DD} = 18V		50		pA
		V _{DD} = 5V		10		pA
		V _{DD} = 2V		1		pA
Threshold Current	I _{TH}	V _{DD} = 18V		50		pA
		V _{DD} = 5V		10		pA
		V _{DD} = 2V		1		pA
Reset Current	I _{RST}	V _{RST} = GND V _{DD} = 18V		100		pA
		V _{RST} = GND V _{DD} = 5V		20		pA
Reset Voltage	V _{RST}	V _{DD} = 18V	0.4	0.7	1.0	V
		V _{DD} = 2V	0.4	0.7	1.0	V
Control Voltage	V _C	V _{DD} = 5V		0.66		V _{CC}
Low Output Voltage	V _{OL}	V _{DD} = 18V, I _{SINK} = 3.2mA		0.1	0.4	V
		V _{DD} = 5V, I _{SINK} = 3.2mA		0.15	0.4	V
High Output Voltage	V _{OH}	V _{DD} = 18V, I _{SOURCE} = 1.0mA	17.25	17.8		V
		V _{DD} = 5V, I _{SOURCE} = 1.0mA	4.0	4.5		V
Rise Time of Output	t _R	R _L = 10MΩ, C _L = 10pF, V _{DD} = 5V	35	40	75	ns
Fall Time of Output	t _F		35	40	75	ns
Guaranteed Max Osc. Freq.	f _(MAX)	Astable Operation	500			KHz

APPLICATION NOTES

Astable Operation

The KS555 can free run as a multivibrator by triggering itself; refer to Fig. 2. The output can swing from V_{DD} to GND and have 50% duty cycle square wave. Less than 1% frequency deviation can be observed, over a voltage range of 2 to 5 V. $f = 1/1.4RC$

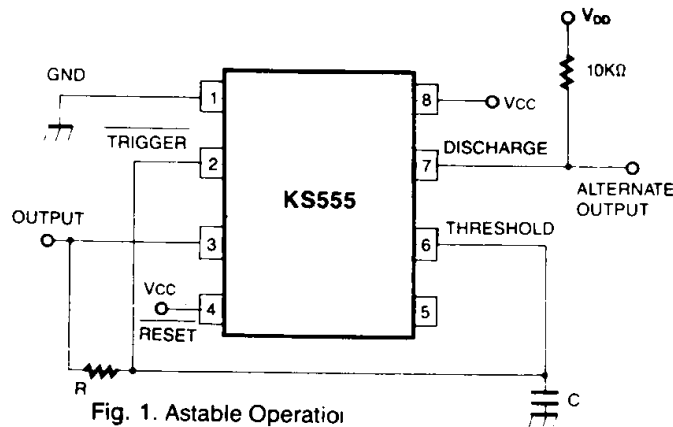


Fig. 1. Astable Operation

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Monostable Operation

The KS555 can be used as a one-shot, i.e. monostable multivibrator. Initially, because the inside discharge transistor is on state, external timing capacitor is held to GND potential. Upon application of a negative TRIGGER pulse to pin 2, the internal discharge transistor is off state and the voltage across the capacitor increases with time constant $= R_A C$ and OUTPUT goes to high state. When the voltage across the capacitor equals $2/3 V_{DD}$ the inner comparator is reset by THRESHOLD input and the discharge transistor goes to on state, which in turn discharges the capacitor rapidly and also drives the OUTPUT to its low state.

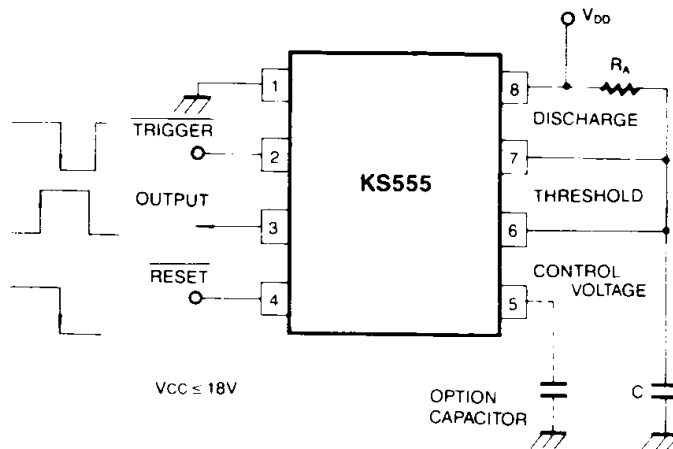


Fig. 2. monostable Operation

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