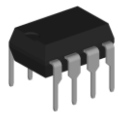
Precision Timers SA555

FEATURES

- Exact equivalent in most cases for NE/SA555
- Adjustable duty cycle
- TTL - Compatible Output Can Sink/Source Up to 200 mA
- Timing from microseconds through hours
- Operates in both astable and monostable modes
- Temperature Stability of 0.005%/°C

SOP-8



DIP-8

APPLICATIONS

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

ORDERING INFORMATION

Device	Package
SA555D	SOP-8
SA555N	DIP-8

DESCRIPTION

The SA555 is monolithic timing circuits capable of producing accurate time delays or oscillation.
In the time delay mode of operation, the timed interval is controlled by a single external resistor and capacitor 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.

ABSOLUTE MAXIMUM RATINGS

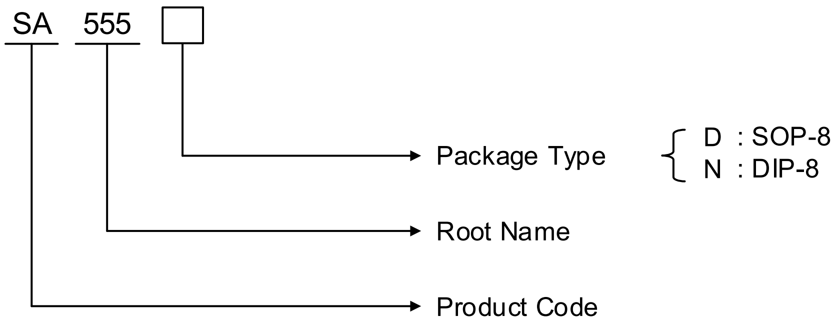
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	4.5	16	V
Output Current	I_O	-	±200	mA
Input Voltage	V_{IN}	-	V_{CC}	V
Storage Temperature Range	T_{STG}	-65	150	°C

RECOMMENDED OPERATING RATINGS

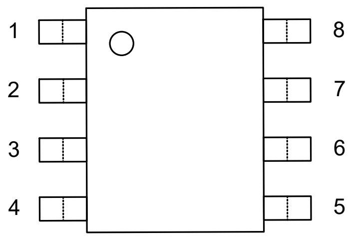
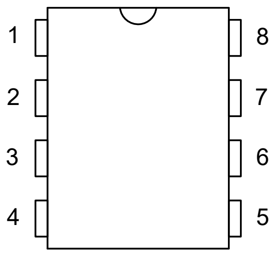
CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	4.5	16	V
Operating Free-Air Temperature Range	T_A	-40	85	°C

ORDERING INFORMATION

Order No.	Package	Description	Supplied As	Status
SA555D	SOP-8	General Purpose Timer	Reel	Active
SA555N	DIP-8	General Purpose Timer	Tube	Contact Us



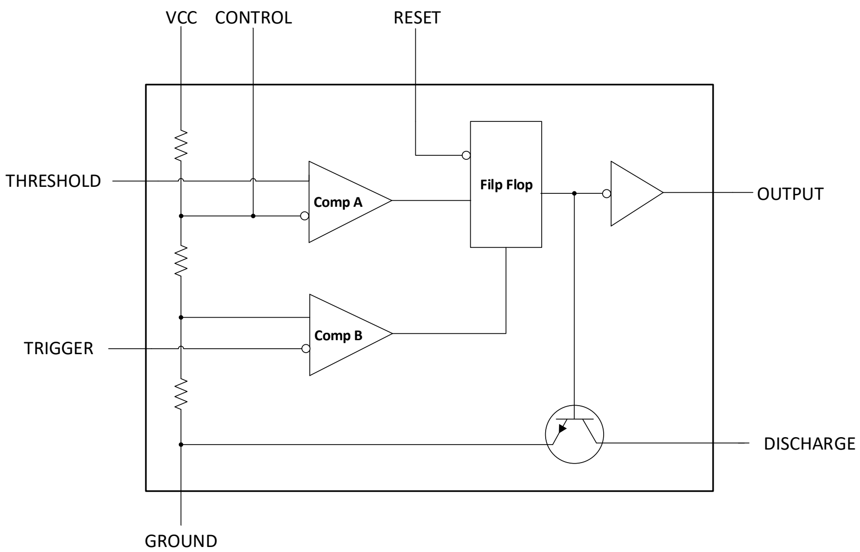
PIN CONFIGURATION

SOP-8	DIP-8
(Top View) 	(Top View) 

PIN DESCRIPTION

Pin No.	Name	Function
1	GND	Supply ground
2	$\overline{\text{TRIGGER}}$	Start timer input; (Active LOW)
3	OUTPUT	Timer logic level output
4	$\overline{\text{RESET}}$	Timer inhibit input; (Active LOW)
5	CONTROL VOLTAGE	Timing capacitor upper voltage sense input
6	THRESHOLD	Timing capacitor lower voltage sense input
7	DISCHARGE	Timing capacitor discharge output
8	VCC	Supply voltage

BLOCK DIAGRAM



TYPICAL APPLICATION

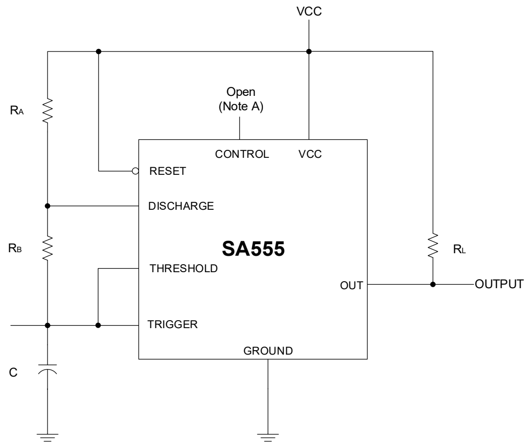


Fig. 1. Circuit for astable operation

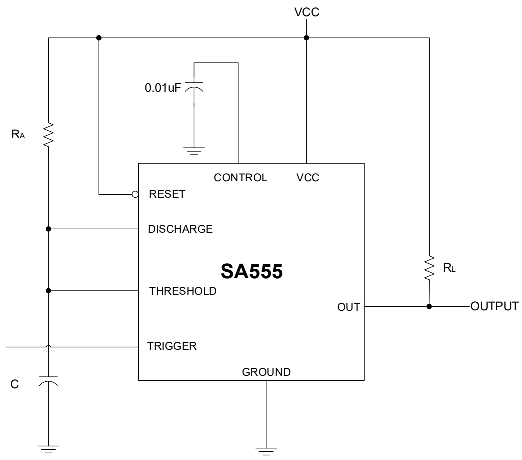


Fig. 2. Circuit for monostable operation

TRUTH TABLE

THRESHOLD	$\overline{\text{TRIGGER}}$	$\overline{\text{RESET}}$	OUTPUT	DISCHARGE
Irrelevant	Irrelevant	Low	Low	On
High	< 1/3V_{CC}	High	High	Off
> 2/3V_{CC}	> 1/3V_{CC}	High	Low	On
< 2/3V_{CC}	> 1/3V_{CC}	High	As previously established	

ELECTRICAL CHARACTERISTICS

Limits in standard typeface are for T_A = 25°C, and limits in **boldface type** apply over the **full operating temperature range.** V_{CC}=5V to 15V, unless otherwise specified.

PARAMETER	SYMBOL	TEST CONDITION (Note 2)		MIN.	TYP.	MAX.	UNIT
DC ELECTRICAL CHARACTERISTICS							
Threshold Voltage	V_{TH}	V_{CC} = 5V		2.4	3.3	4.2	V
		V_{CC} = 15V		8.8	10	11.2	
Threshold Current (Note 1)	I_{TH}	(Note 1)			30	250	nA
Trigger Voltage	V_{TRIG}	V_{CC} = 5V		1.1	1.67	2.2	V
		V_{CC} = 15V		4.5	5	5.6	
Trigger Current	I_{TRIG}	Trigger at 0V			0.5	2	uA
Reset Voltage	V_{RST}			0.3	0.7	1.0	V
Reset Current	I_{RST}	Reset at V_{CC}			0.1	0.4	mA
		Reset at 0V			-0.4	-1.5	
Discharge Leakage Current	I_{LKG}				20	100	nA
Control Voltage	V_{CV}	V_{CC} = 5V		2.6	3.3	4.0	V
		V_{CC} = 15V		9	10	11	
Output Voltage (Low)	V_{OL}	V_{CC} = 5V	I_{OL} = 5mA		0.25	0.35	V
			I_{OL} = 8mA		0.3	0.4	
		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		
Output Voltage (High)	V_{OH}	V_{CC} = 5V	I_{OH} = −100mA	2.75	3.3		V
		V_{CC} = 15V	I_{OH} = −100mA	12.75	13.3		
			I_{OH} = −200mA		12.5		
Supply Current	I_{CC}	Output Low, No Load	V_{CC} = 5V		3	6	mA
			V_{CC} = 15V		10	15	
		Output High, No Load	V_{CC} = 5V		2	5	
			V_{CC} = 15V		9	13	

SWITCHING CHARACTERISTICS						
Initial Error of Timing Interval (Note 3)	Accur	Monostable (Note 4)		1	3	%
		Astable (Note 5)		5	13	
Temperature Coefficient of Timing Interval	Δt/T	Monostable		**50**	**150**	ppm /°C
		Astable		**150**	**500**	
Supply Voltage Sensitivity of Timing Interval	Δt/ΔVcc	Monostable		0.1	0.5	%/V
		Astable		0.3	1	
Rise/ Fall Time of Output	t_r	C_L = 15pF		100	300	ns
	t_f			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 10MΩ.

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 100KΩ, 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 100KΩ, C = 0.1µF.

APPLICATION INFORMATION

Power-up Sequence Requirement

Vcc must be applied and stabilized before any other input (TRIGGER, RESET, THRESHOLD) receive a valid logic level, with Vcc leading all other signals by at least 100ms.

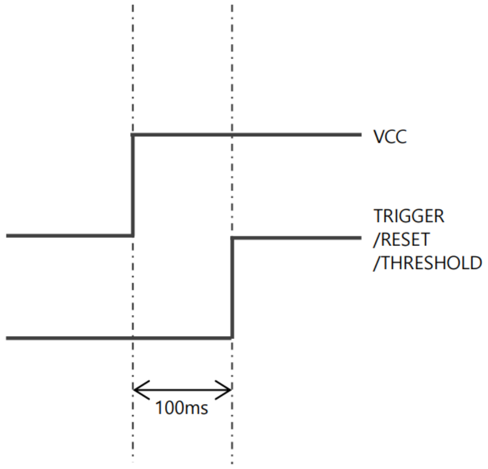


Fig. 3. Recommended power-up sequence showing Vcc-first requirement (100ms minimum).

REVISION NOTICE

The description in this datasheet is subject to change without notice to describe its electrical characteristics properly.