



AiP555

General Purpose Timers

Product Specification

Specification Revision History :

Version	Date	Description
2017-11-A1	2017-11	New
2026-01-B1	2026-01	Update the template; update soldering temperature; add moisture sensitivity level and electrostatic discharge; update ordering information and package information
2026-04-B2	2026-04	Modify Reset Voltage V_{RST}



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1、General Description

The AiP555 is a CMOS RC timer providing significantly improved performance over the standard SE/NE 555 timer, while at the same time being a direct replacement for those devices in most applications. Improved parameters include low supply current, wide operating supply voltage range, low Threshold, Trigger and Reset currents, no crowbarbing of the supply current during output transitions, higher frequency performance and no requirement to decouple Control Voltage for stable operation.

Specifically, the AiP555 is a stable controller capable of producing accurate time delays or frequencies. In the one shot mode, the pulse width of each circuit is precisely controlled by one external resistor and capacitor. For astable operation as an oscillator, the free running frequency and the duty cycle are both accurately controlled by two external resistors and one capacitor. Unlike the regular bipolar 555 device, the Control Voltage terminal need not be decoupled with a capacitor. The circuits are triggered and reset on falling (negative) waveforms, and the output inverter can source or sink currents large enough to drive TTL loads, or provide minimal offsets to drive CMOS loads.

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes	Moisture sensitivity level
AiP555DA8.TB	DIP8	AiP555	50 PCS/tube	40 tube/box	2000 PCS/box	Dimensions of plastic enclosure: 9.2mm×6.4mm Pin spacing: 2.54mm	-
AiP555SA8.TB	SOP8	AiP555	100 PCS/tube	100 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 1.27mm	MSL3

Reel packing specifications:

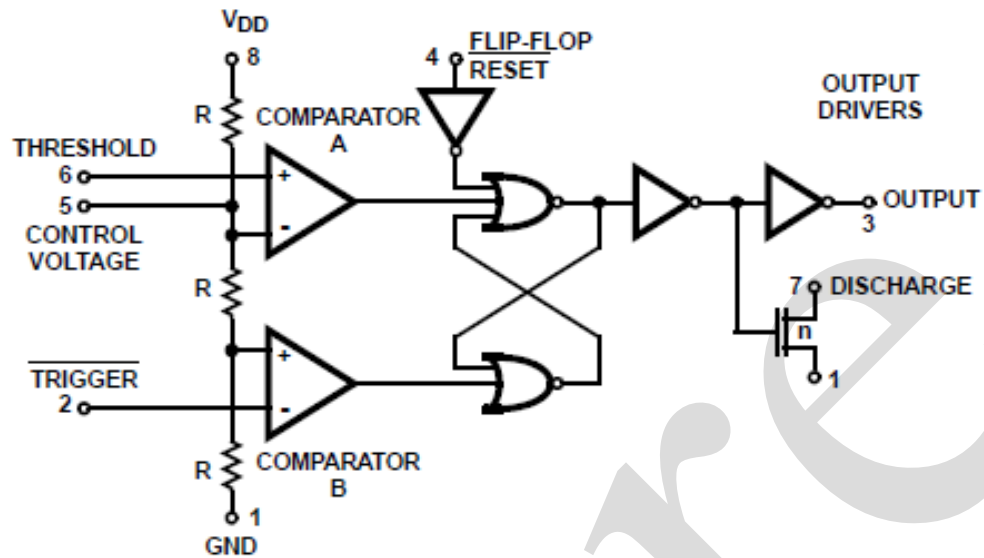
Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes	Moisture sensitivity level
AiP555SA8.TR	SOP8	AiP555	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing: 1.27mm	MSL3

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.



2、Block Diagram And Pin Description

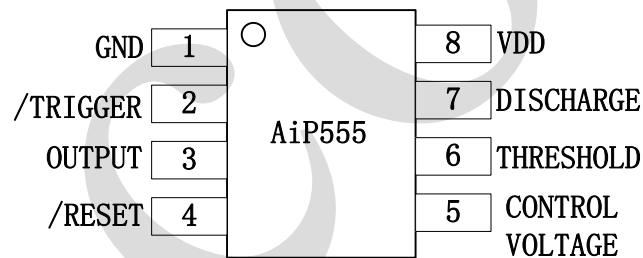
2.1、Block Diagram



Note:

Unused inputs should be connected to appropriate voltage from truth table.

2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	GND	Ground
2	/TRIGGER	Trigger Voltage Input
3	OUTPUT	Voltage Signal Output
4	/RESET	Reset Voltage Input
5	CONTROL VOLTAGE	Control Voltage Input
6	THRESHOLD	Threshold Voltage Input
7	DISCHARGE	Discharge Switch
8	VDD	Power



2.4、Truth Table

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

Note: Reset will dominate all other inputs: Trigger will dominate over Threshold.

3、Electrical Parameter

3.1、Absolute Maximum Ratings

($T_{amb}=25^{\circ}C$, All voltage referenced to GND, unless otherwise specified)

Characteristic	Symbol	Conditions	Value	Unit
Power Supply Voltage	VDD	-	+18	V
Input Voltage	V_{IN}	Trigger, Control Voltage, Threshold, Reset	-0.3 to VDD+0.3	V
Output Current	I_{OUT}	-	100	mA
Operating Temperature	T_{amb}	-	-40 to 105	$^{\circ}C$
Storage Temperature	T_{stg}	-	-55 to 125	$^{\circ}C$
Power Dissipation	P_D	-	500	mW
Soldering Temperature	T_L	10s DIP8	250	$^{\circ}C$
		SOP8	260	$^{\circ}C$
Electrostatic discharge	ESD	HBM	3000	V

3.2、Electrical Characteristics

($T_{amb}=25^{\circ}C$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static Supply Current	IDD	VDD=5V	-	40	200	μA
		VDD=15V	-	60	300	μA
Monostable Timing Accuracy	-	$R_A=10k$, $C=0.1\mu F$, VDD=5V	-	2	-	%
Drift with Supply	-	VDD=5V to 15V	-	0.5	-	%/V
Astable Timing Accuracy	-	$R_A=R_B=10k$, $C=0.1\mu F$, VDD=5V	-	2	-	%
Drift with Supply	-	VDD=5V to 15V	-	0.5	-	%/V
Threshold Voltage	V_{TH}	VDD=5V	62	67	71	%VDD
		VDD=15V	62	67	71	%VDD
Trigger Voltage	V_{TRIG}	VDD=5V	28	32	36	%VDD
		VDD=15V	28	32	36	%VDD
Threshold Current	I_{TH}	VDD=15V	-	-	10	nA
Trigger Current	I_{TRIG}	VDD=15V	-	-	10	nA
Control Voltage	V_{CV}	VDD=15V	62	67	71	%VDD
Reset Voltage	V_{RST}	VDD=2V to 15V	-	-	1.5	V
Reset Current	I_{RST}	VDD=15V	-	-	10	nA
Discharge Leakage	I_{DIS}	VDD=15V	-	-	10	nA



Output Voltage	V_{OL}	VDD=15V, $I_{SINK}=20mA$	-	0.4	1.0	V
		VDD=5V, $I_{SINK}=3.2mA$	-	0.2	0.4	V
	V_{OH}	VDD=15V, $I_{SOURCE}=0.8mA$	14.3	14.6	-	V
		VDD=5V, $I_{SOURCE}=0.8mA$	4.0	4.3	-	V
Discharge Output Voltage	V_{DIS}	VDD=5V, $I_{SINK}=15mA$	-	0.2	0.4	V
Supply Voltage	VDD	Functional Operation	2.0	-	18.0	V
Output Rise Time	t_R	$R_L=10M$, $C_L=10pF$, VDD=5V	-	75	-	ns
Output Fall Time	t_F	$R_L=10M$, $C_L=10pF$, VDD=5V	-	75	-	ns
Oscillator Frequency	f_{MAX}	VDD=5V, $R_A=470\Omega$, $R_B=270\Omega$, $C=200pF$	-	1	-	MHz

4、Function Description

4.1、General

The AiP555 device is, in most instances, a direct replacement for the NE/SE555 device. However, it is possible to effect economies in the external component count using the AiP555. Because the bipolar 555 device produces large crowbar currents in the output driver, it is necessary to decouple the power supply lines with a good capacitor close to the device. The AiP555 device produces no such transients. See Figure 1.

The AiP555 produces supply current spikes of only 2-3mA instead of 300-400mA and supply decoupling is normally not necessary. Secondly, in most instances, the Control Voltage decoupling capacitors are not required since the input impedance of the CMOS comparators on chip are very high. Thus, for many applications, 2 capacitors can be saved using an AiP555.

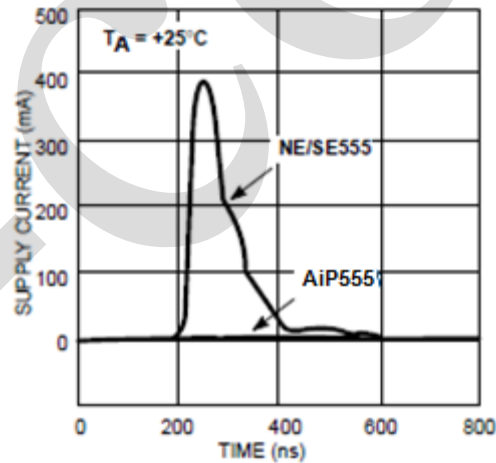


Figure 1. Supply Current Transient Compared With a Standard Bipolar 555 During an Output Transition

4.2、Power Supply Considerations

Although the supply current consumed by the AiP555 device is very low, the total system supply can be high unless the timing components are high impedance. Therefore, high values for R and low values for C in Figures 2 and 3 are recommended

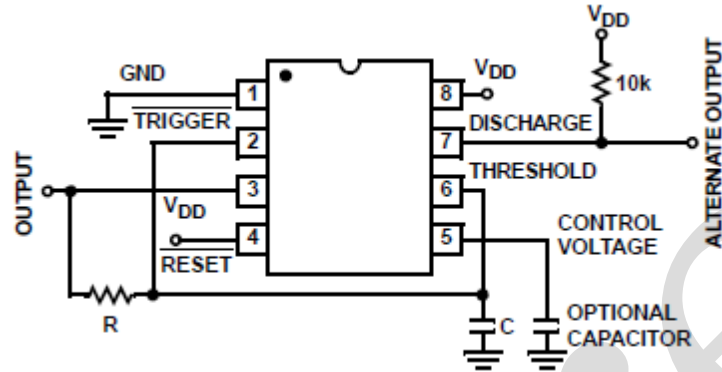


Figure 2. Astable Operation

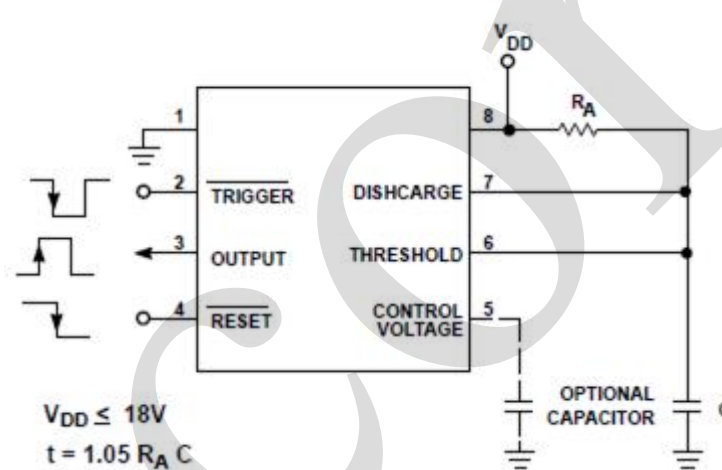


Figure 3. Monostable Operation

4.3、Output Drive Capability

The output driver consists of a CMOS inverter capable of driving most logic families including CMOS and TTL. As such, if driving CMOS, the output swing at all supply voltages will equal the supply voltage. At a supply voltage of 4.5V or more, the AiP555 will drive at least 2 standard TTL loads.

4.4、Astable Operation

The circuit can be connected to trigger itself and free run as a multivibrator, see Figure 2. The output swings from rail-to-rail, and is a true 50% duty cycle square wave. Trip points and output swings are symmetrical. Less than a 1% frequency variation is observed over a voltage range of +5V to +15V.

$$F=1/1.4RC \quad (EQ.1)$$

The timer can also be connected as shown in Figure 4. In this circuit, the frequency is as shown by Equation 2:

$$F=1.44/(R_A+2R_B)C \quad (EQ.2)$$

The duty cycle is controlled by the values of R_A and R_B , by Equation 3:

$$D=(R_A+R_B)/(R_A+2R_B) \quad (EQ.3)$$

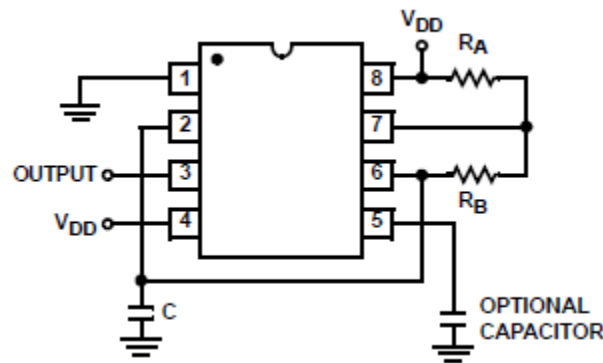


Figure 4. Alternate Astable Configuration

4.5、 Monostable Operation

In this mode of operation, the timer functions as a one-shot. Initially, the external capacitor (C) is held discharged by a transistor inside the timer. Upon application of a negative pulse to Pin 2, Trigger, the internal flip-flop is set which releases the low impedance on Discharge; the external capacitor charges and drives the Output High. The voltage across the capacitor increases exponentially with a time constant $t = R_A C$. When the voltage across the capacitor equals $2/3 V_{DD}$, the comparator resets the flip-flop, which in turn discharges the capacitor rapidly and also drives the OUTPUT to its low state. /Trigger must return to a high state before the OUTPUT can return to a low state.

4.6、 Control Voltage

The Control Voltage terminal permits the two trip voltages for the Threshold and /Trigger internal comparators to be controlled. This provides the possibility of oscillation frequency modulation in the astable mode, or even inhibition of oscillation, depending on the applied voltage. In the monostable mode, delay times can be changed by varying the applied voltage to the Control Voltage pin.

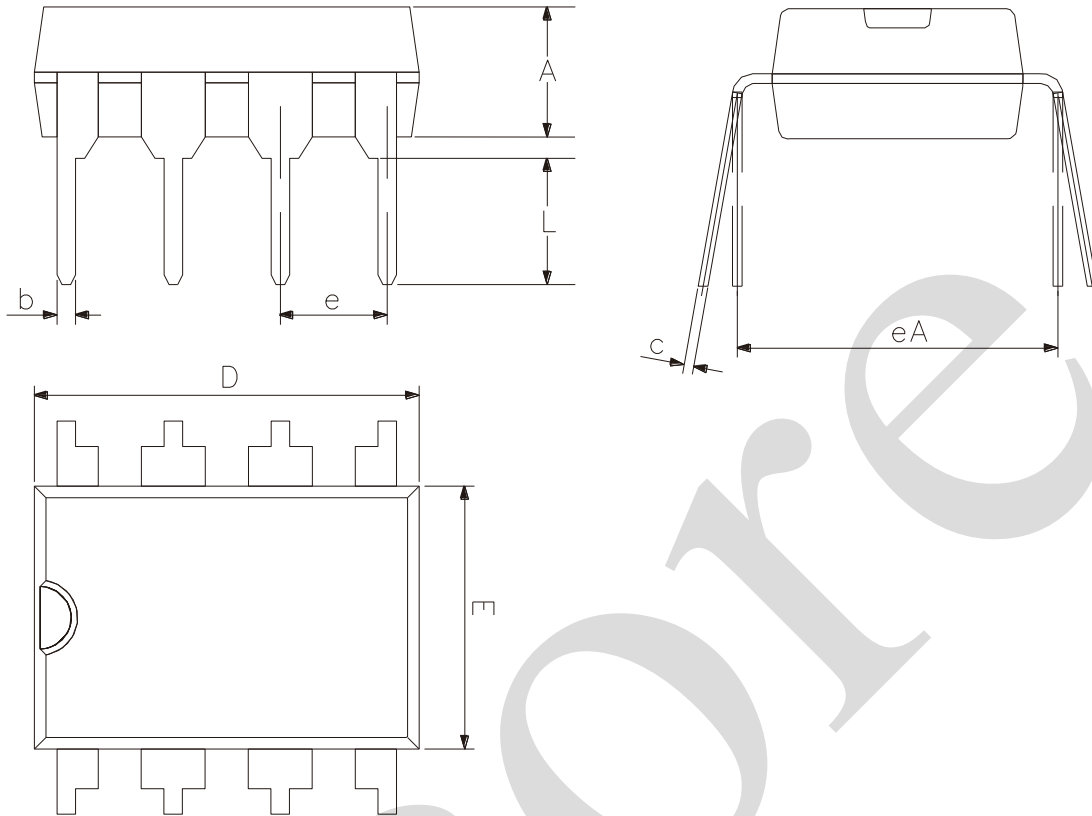
4.7、 /RESET

The /Reset terminal is designed to have essentially the same trip voltage as the standard bipolar 555, i.e., 0.6 to 0.7V. At all supply voltages it represents an extremely high input impedance. The mode of operation of the /Reset function is, however, much improved over the standard bipolar 555 in that it controls only the internal flip-flop, which in turn controls simultaneously the state of the Output and Discharge pins. This avoids the multiple threshold problems sometimes encountered with slow falling edges in the bipolar devices.



5、Package Information

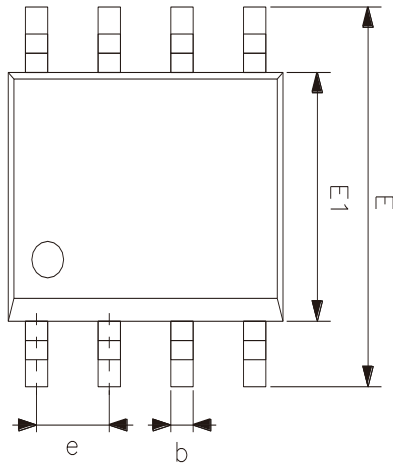
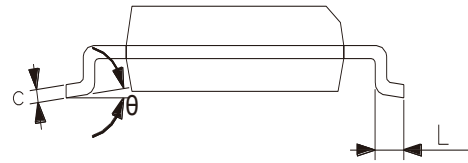
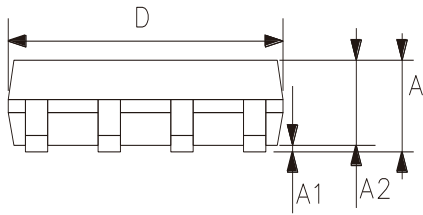
5.1、DIP8



2023/12/A	Dimensions In Millimeters	
Symbol	Min	Max
A	3.00	3.60
b	0.36	0.56
c	0.20	0.36
D	9.00	9.45
E	6.15	6.60
e	2.54	
eA	7.62	9.30
L	3.00	—



5.2、SOP8



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	1.35	1.80
A1	0.05	0.25
A2	1.25	1.55
D	4.70	5.10
E	5.80	6.30
E1	3.70	4.10
b	0.306	0.51
c	0.19	0.25
e	1.27	
L	0.40	0.89
θ	0°	8°



6、Statements And Notes

6.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

6.2、Notes

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