System Reset with Delay Time Circuit

Monolithic IC IC-PST596~598 Series

July 21, 2000

Outline

This IC functions in a variety of CPU systems and other logic systems, to detect supply voltage and reset the system accurately when the power is turned on or interrupted. It incorporates a fixed-delay time generation circuit. In particular, this IC is a system reset IC which realizes ultra-small size and low current consumption.

Features

1. Fixed delay time setting by counter timer

2. Low operating limit voltage

3. Hysteresis voltage provided for detection voltage

4. Low current consumption

5. 3 models are available for different delay times.

6. Each model has 10 detection voltage ranks.

0.65V typ.

50mV typ.

Іссн=15µA typ.

IC-PST596 50ms

IC-PST597 100ms

IC-PST598 200ms

C: 4.5V typ. H: 3.1V typ.

D: 4.2V typ. I:2.9V typ.

E:3.9V typ. J:2.7V typ.

F:3.6V typ. K: 2.5V typ.

G: 3.3V typ. L:2.3V typ.

Package

SOT-25A (IC-PST59×□N) (with manual reset pin)

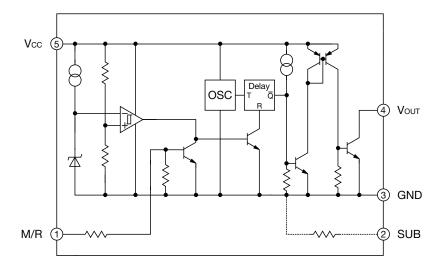
Applications

- 1. Reset circuits for microcomputers, CPUs and MPUs
- 2. Reset circuits for logic circuits
- 3. Battery voltage check circuits
- 4. Back-up power supply switching circuits
- 5. Level detection circuits
- 6. Mechanical reset circuits

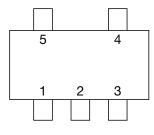
^{*}The box represents a rank of detection voltage.

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Equivalent Circuit Diagram



Pin Assignment



1	M/R
2	SUB
3	GND
4	Vout
5	Vcc

SOT-25 (TOP VIEW)

Pin Description

Pin No.	Pin name	Function		
1	M/R	Manual reset pin *1		
2	SUB	SUB pin * 2		
3	GND	GND pin		
4	$ m V_{OUT}$	Reset signal output pin		
5	Vcc	Power supply pin/Voltage detection pin		

★1: Note that the oscilloscope may mis-operate if the M/R pin falls below -0.3V.

*2 : Connect to GND.

Absolute Maximum Ratings (Except where noted otherwise Ta=25°C)

Item	Symbol	Ratings	Units	
Storage temperature	Tstg	-40~+125	°C	
Operating temperature	Topr	-20~+75	°C	
Power supply voltage	Vcc max.	-0.3~+12	V	
Manual reset input voltage	V _{RES} max.	-0.3~+12	V	
Allowable loss	Pd	150	mW	

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Recommended Operating Conditions

Item	Symbol	Ratings	Units	
Operating temperature	Topr	-20~+75	°C	
Power supply voltage	Vcc	-0.3~+12	V	

Electrical Characteristics (Ta=25°C) (Except where noted otherwise, resistance unit is Ω)

Item	Symbol	Measuring circuit	Measurement co	Min.	Тур.	Max.	Units	
				С	4.3	4.5	4.7	V
				D	4.0	4.2	4.4	
				E	3.7	3.9	4.1	
			V _{CC} =H→L	F	3.4	3.6	3.8	
Detection voltage	Vs	1		G	3.1	3.3	3.5	
Detection voltage	vs	1	RL=470	Н	2.9	3.1	3.3	
			Vol≤0.4V	I	2.75	2.90	3.05	
				J	2.55	2.70	2.85	
				K	2.35	2.50	2.65	
				L	2.15	2.30	2.45	
Hysteresis voltage	⊿Vs	1	Vcc=L→H→L, RL=470		30	50	100	mV
Detection voltage	Vs/⊿T	1	$R_{L}=470, Ta=-20^{\circ}$	C +75°C		±0.01		%/°C
temperature coefficient	VS/∠II	1	KL=470, 1a=-20	C~+13 C		±0.01		76/ C
Low-level output voltage	V_{OL}	1	V _{CC} =Vs min0.05V, R _L =470			0.1	0.4	V
Output leakage current	Іон	1	Vcc=10V				±0.1	μA
Circuit current while on	Iccl	1	Vcc=Vs min0.05V, R _L =∞			300	500	μA
Circuit current while off	Іссн	1	V_{CC} =Vs typ. / 0.85V, R_{L} = ∞			15	25	μA
"H" transport delay time	Трін	2	C _L =100pF	PST596	30	50	75	
				PST597	Γ597 60		150	ms
				PST598	120	200	300	
"L" transport delay time	Трнг	2	R _L =4.7k, C _L =100pF, ★2			20		μs
Operating power supply voltage	V_{OPL}	1	$R_L=4.7k$, $V_{OL}\leq0.4V$			0.65	0.85	V
Output current while on 1	Iol1	1	Vcc=Vs min0.05V, RL=0		8			mA
Output current while on 2	Iol2	1	Vcc=Vs min0.05V, R _L =0 Ta=-20~+75° C		6			mA
M/R pin input H voltage	Vresh				2.0			V
M/R pin input H current	Iresh		Vresh=2.0V			10	60	μA
M/R pin input low voltage	V _{RESL}				-0.3		0.8	V

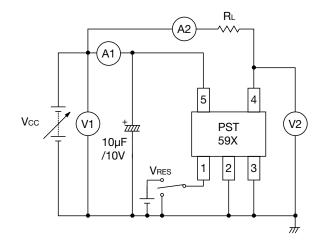
 \star 1 : TPLH ; VCC= (Vs typ.-0.4V) → (Vs typ.+0.4V) *2: TPLH; Vcc= (Vs typ.+0.4V) → (Vs typ.-0.4V)

Note 3: Connect manual reset pin to GND when not using.

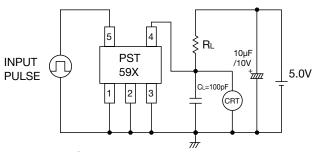
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Measuring Circuit

[1]

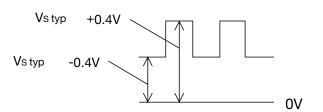


[2]

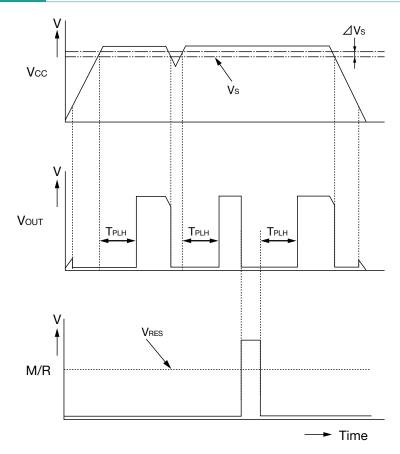


: DC ammeter : DC voltmeter **CRT**: Osciloscope

INPUT PULSE



Timing Chart

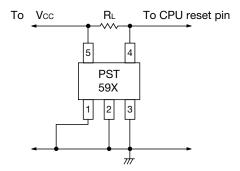


Note: Thoroughly check the actual operation of the circuit, then set the manual reset when pressing the manual switch ON to about 15µs.

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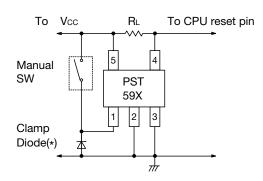
Application Circuits

1. Normal hard reset



Note: Connect a capacitor between IC Vcc and GND pins if V_{CC} line impedance is high.

2. Manual reset



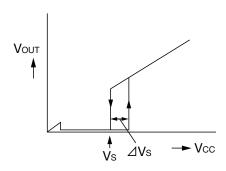
Vout pin low for manual switch ON. Vout pin high for manual switch OFF.

Note1: *Mount a clamp diode if it is possible that the M/R pin might go below -0.3V.

Note2: Thoroughly check the actual operation of the circuit, then set the manual reset when pressing the manual switch ON to about 15µs.

Characteristics





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