

# System Reset with Delay Time Circuit Monolithic 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                       | 0.65V typ.  |
| 3. Hysteresis voltage provided for detection voltage | 50mV typ.   |
| 4. Low current consumption                           | I <sub>CCH</sub> =15μA typ.   |
| 5. 3 models are available for different delay times. | PST596 50ms<br>PST597 100ms<br>PST598 200ms   |
| 6. Each model has 10 detection voltage ranks.        | C: 4.5V typ.      H: 3.1V typ.<br>D: 4.2V typ.      I : 2.9V typ.<br>E: 3.9V typ.      J : 2.7V typ.<br>F: 3.6V typ.      K: 2.5V typ.<br>G: 3.3V typ.      L : 2.3V typ. |

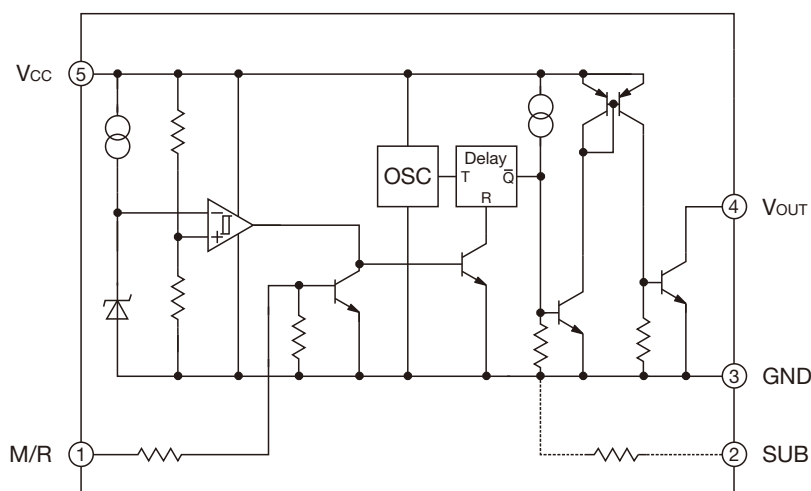
## Package

SOT-25A (PST59×□N) (with manual reset pin)  
\*The box represents a rank of detection voltage.

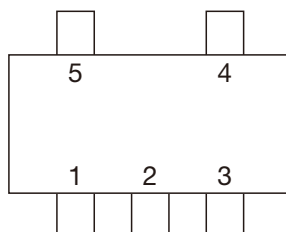
## Applications

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

### Equivalent Circuit Diagram



### Pin Assignment



SOT-25  
(TOP VIEW)

1	M/R
2	SUB
3	GND
4	V <sub>OUT</sub>
5	V <sub>CC</sub>

### Pin Description

Pin No.	Pin name	Function
1	M/R	Manual reset pin *1
2	SUB	SUB pin *2
3	GND	GND pin
4	V <sub>OUT</sub>	Reset signal output pin
5	V <sub>CC</sub>	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	T <sub>STG</sub>	-40~+125	°C
Operating temperature	T <sub>OPR</sub>	-20~+75	°C
Power supply voltage	V <sub>CC</sub> max.	-0.3~+12	V
Manual reset input voltage	V <sub>RES</sub> max.	-0.3~+12	V
Allowable loss	P <sub>d</sub>	150	mW

## Recommended Operating Conditions

Item	Symbol	Ratings	Units
Operating temperature	T <sub>OPR</sub>	-20~+75	°C
Power supply voltage	V <sub>CC</sub>	-0.3~+12	V

## Electrical Characteristics (T<sub>a</sub>=25°C) (Except where noted otherwise, resistance unit is Ω)

Item	Symbol	Measuring circuit	Measurement conditions	Min.	Typ.	Max.	Units	
Detection voltage	V <sub>S</sub>	1	V <sub>CC</sub> =H→L R <sub>L</sub> =470 V <sub>OL</sub> ≤0.4V	C	4.3	4.5	4.7	V
				D	4.0	4.2	4.4	
				E	3.7	3.9	4.1	
				F	3.4	3.6	3.8	
				G	3.1	3.3	3.5	
				H	2.9	3.1	3.3	
				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	ΔV <sub>S</sub>	1	V <sub>CC</sub> =L→H→L, R <sub>L</sub> =470	30	50	100	mV	
Detection voltage temperature coefficient	V <sub>S</sub> /ΔT	1	R <sub>L</sub> =470, T <sub>a</sub> =-20°C~+75°C		±0.01		%/°C	
Low-level output voltage	V <sub>OL</sub>	1	V <sub>CC</sub> =V <sub>S</sub> min. -0.05V, R <sub>L</sub> =470		0.1	0.4	V	
Output leakage current	I <sub>OH</sub>	1	V <sub>CC</sub> =10V			±0.1	μA	
Circuit current while on	I <sub>CCL</sub>	1	V <sub>CC</sub> =V <sub>S</sub> min. -0.05V, R <sub>L</sub> =∞		300	500	μA	
Circuit current while off	I <sub>CCH</sub>	1	V <sub>CC</sub> =V <sub>S</sub> typ. / 0.85V, R <sub>L</sub> =∞		15	25	μA	
"H" transport delay time	T <sub>PLH</sub>	2	R <sub>L</sub> =4.7k C <sub>L</sub> =100pF * 1	PST596	30	50	75	ms
				PST597	60	100	150	
				PST598	120	200	300	
"L" transport delay time	T <sub>PHL</sub>	2	R <sub>L</sub> =4.7k, C <sub>L</sub> =100pF, *2		20		μs	
Operating power supply voltage	V <sub>OPL</sub>	1	R <sub>L</sub> =4.7k, V <sub>OL</sub> ≤0.4V		0.65	0.85	V	
Output current while on 1	I <sub>OL1</sub>	1	V <sub>CC</sub> =V <sub>S</sub> min. -0.05V, R <sub>L</sub> =0	8			mA	
Output current while on 2	I <sub>OL2</sub>	1	V <sub>CC</sub> =V <sub>S</sub> min. -0.05V, R <sub>L</sub> =0 T <sub>a</sub> =-20~+75°C	6			mA	
M/R pin input H voltage	V <sub>RESH</sub>			2.0			V	
M/R pin input H current	I <sub>RESH</sub>		V <sub>RESH</sub> =2.0V		10	60	μA	
M/R pin input low voltage	V <sub>RESL</sub>			-0.3		0.8	V	

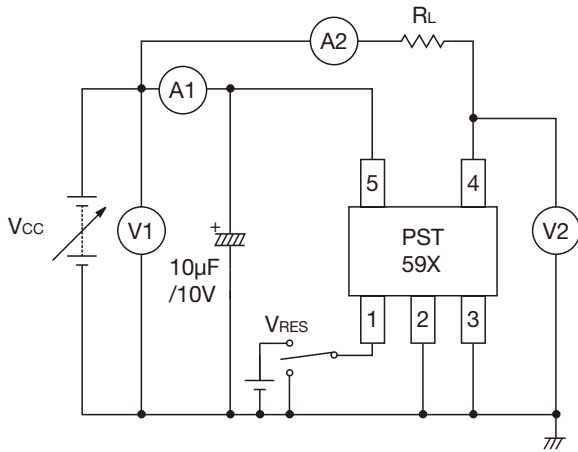
\*1 : T<sub>PLH</sub> ; V<sub>CC</sub>= (V<sub>S</sub> typ.-0.4V) → (V<sub>S</sub> typ.+0.4V)

\*2 : T<sub>PHL</sub> ; V<sub>CC</sub>= (V<sub>S</sub> typ.+0.4V) → (V<sub>S</sub> typ.-0.4V)

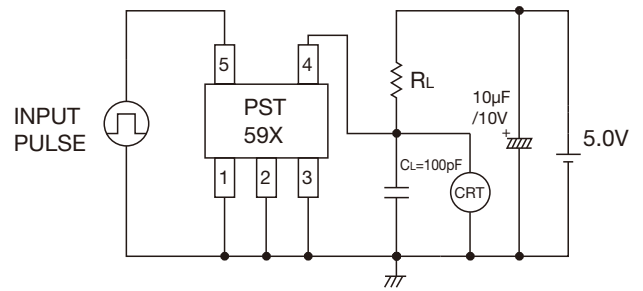
Note 3: Connect manual reset pin to GND when not using.

Measuring Circuit

[1]

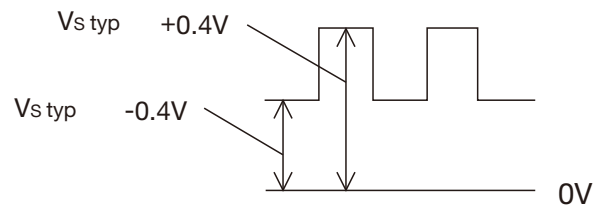


[2]

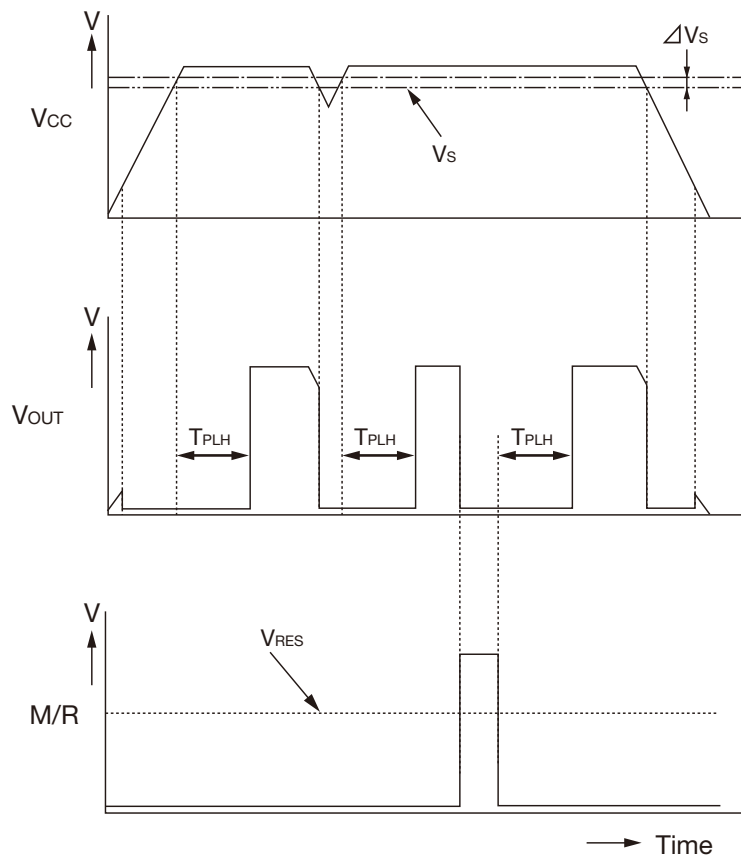


A : DC ammeter  
 V : DC voltmeter  
 CRT : Oscilloscope

INPUT PULSE



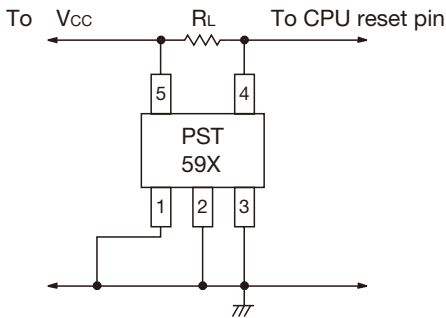
Timing Chart



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

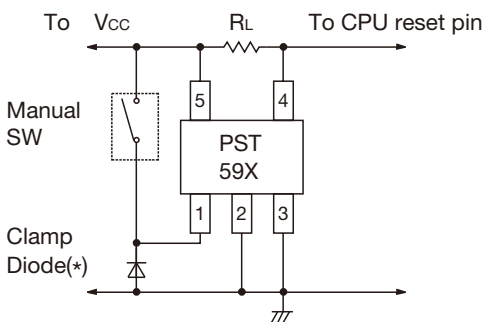
## Application Circuits

### 1. Normal hard reset



Note : Connect a capacitor between IC V<sub>CC</sub> and GND pins if V<sub>CC</sub> line impedance is high.

### 2. Manual reset



V<sub>OUT</sub> pin low for manual switch ON.

V<sub>OUT</sub> 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

V<sub>CC</sub> vs V<sub>OUT</sub>

