

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 _{CCH} =15μA typ. |
| 5. 3 models are available for different delay times. | PST596 50ms
PST597 100ms
PST598 200ms |
| 6. Each model has 10 detection voltage ranks. | 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. |

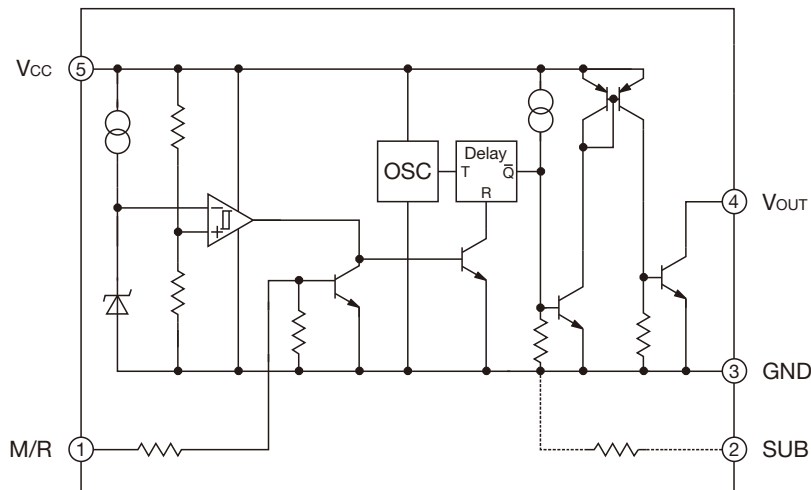
Package

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

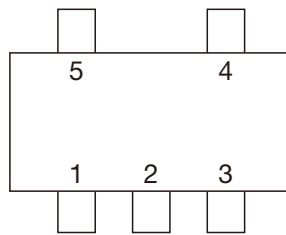
Applications

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



1	M/R
2	SUB
3	GND
4	V _{OUT}
5	V _{CC}

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	V _{OUT}	Reset signal output pin
5	V _{CC}	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 _{STG}	-40~+125	°C
Operating temperature	T _{OPR}	-20~+75	°C
Power supply voltage	V _{CC} max.	-0.3~+12	V
Manual reset input voltage	V _{RES} max.	-0.3~+12	V
Allowable loss	P _d	150	mW

Recommended Operating Conditions

Item	Symbol	Ratings	Units
Operating temperature	T _{OPR}	-20~+75	°C
Power supply voltage	V _{CC}	-0.3~+12	V

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

Item	Symbol	Measuring circuit	Measurement conditions	Min.	Typ.	Max.	Units	
Detection voltage	V _S	1	V _{CC} =H→L R _L =470 V _{OL} ≤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 _S	1	V _{CC} =L→H→L, R _L =470	30	50	100	mV	
Detection voltage temperature coefficient	V _S /ΔT	1	R _L =470, T _a =-20°C~+75°C		±0.01		%/°C	
Low-level output voltage	V _{OL}	1	V _{CC} =V _S min. -0.05V, R _L =470		0.1	0.4	V	
Output leakage current	I _{OH}	1	V _{CC} =10V			±0.1	μA	
Circuit current while on	I _{CCL}	1	V _{CC} =V _S min. -0.05V, R _L =∞		300	500	μA	
Circuit current while off	I _{CCH}	1	V _{CC} =V _S typ. / 0.85V, R _L =∞		15	25	μA	
"H" transport delay time	T _{PLH}	2	R _L =4.7k C _L =100pF * 1	PST596	30	50	75	ms
				PST597	60	100	150	
				PST598	120	200	300	
"L" transport delay time	T _{PHL}	2	R _L =4.7k, C _L =100pF, *2		20		μs	
Operating power supply voltage	V _{OPL}	1	R _L =4.7k, V _{OL} ≤0.4V		0.65	0.85	V	
Output current while on 1	I _{OL1}	1	V _{CC} =V _S min. -0.05V, R _L =0	8			mA	
Output current while on 2	I _{OL2}	1	V _{CC} =V _S min. -0.05V, R _L =0 T _a =-20~+75°C	6			mA	
M/R pin input H voltage	V _{RESH}			2.0			V	
M/R pin input H current	I _{RESH}		V _{RESH} =2.0V		10	60	μA	
M/R pin input low voltage	V _{RESL}			-0.3		0.8	V	

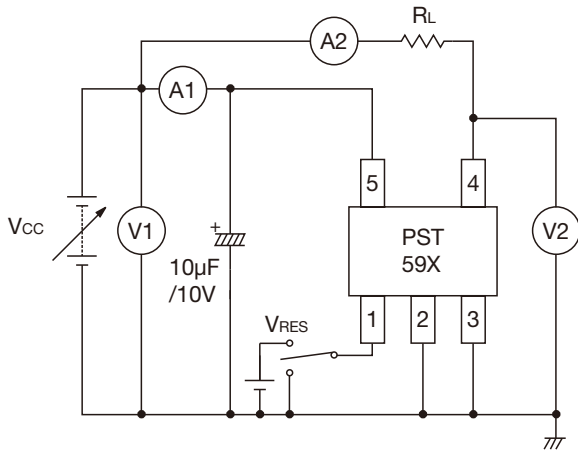
*1 : T_{PLH} ; V_{CC}= (V_S typ.-0.4V) → (V_S typ.+0.4V)

*2 : T_{PHL} ; V_{CC}= (V_S typ.+0.4V) → (V_S typ.-0.4V)

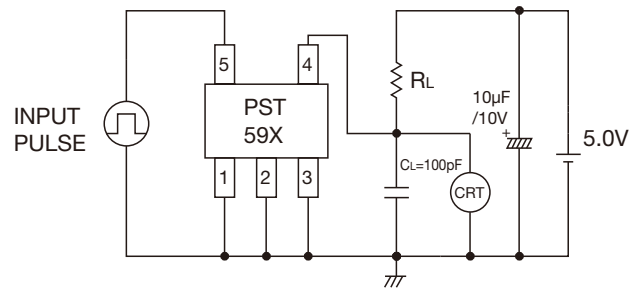
Note 3: Connect manual reset pin to GND when not using.

Measuring Circuit

[1]

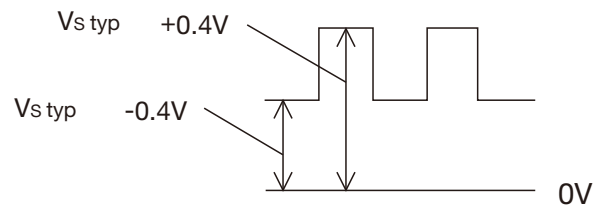


[2]

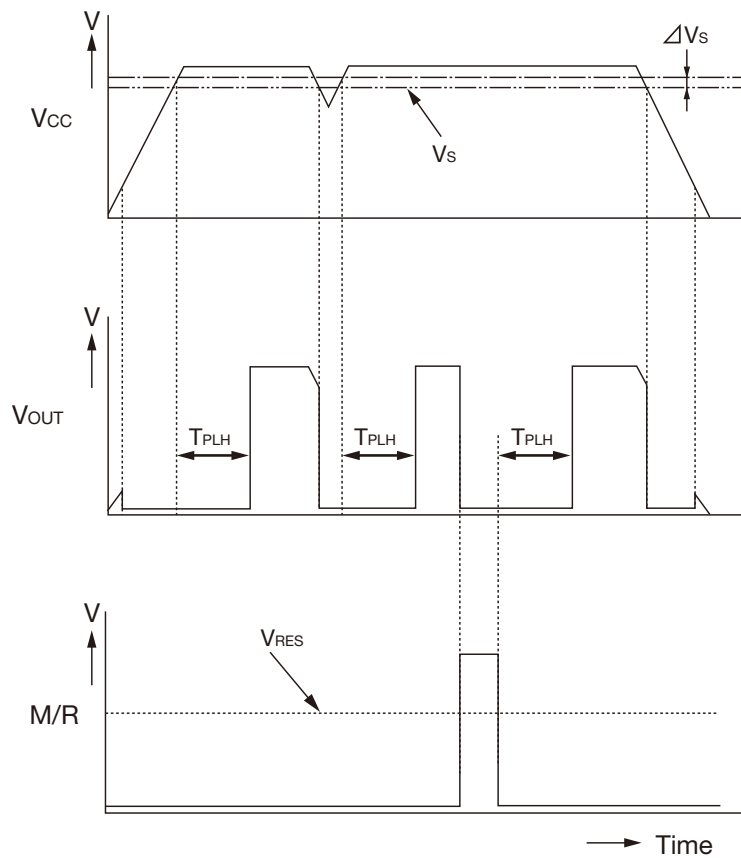


A : DC ammeter
 V : DC voltmeter
 CRT : Oscilloscope

INPUT PULSE



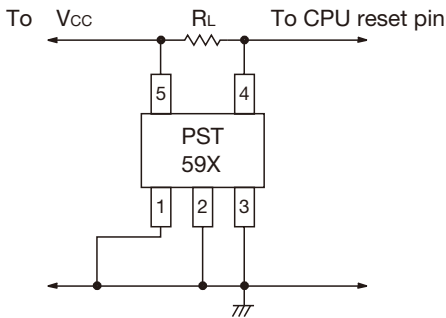
Timing Chart



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

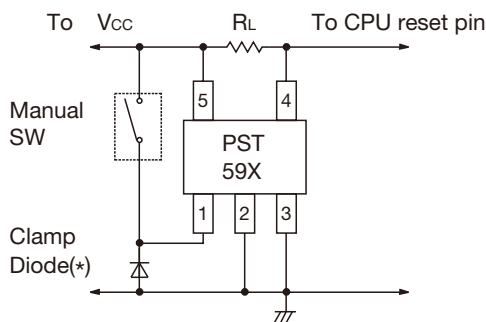
Application Circuits

1. Normal hard reset



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

2. Manual reset



V_{OUT} pin low for manual switch ON.

V_{OUT} 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_{CC} vs V_{OUT}

