

System Reset

Monolithic IC PST596~598 Series

Outline

These ICs function in a variety of CPU systems and other logic systems, to detect power supply voltage and reset the system accurately when power is turned on or interrupted, and has a built-in fixed delay time generating circuit. This series has been represented in the past by PST591~595, and these new system reset ICs offer 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 in detection voltage | 50mV typ. |
| 4. Low current consumption | I _{CC} H=15μA typ. |
| 5. 3 delay time products available | |
| | PST596 50ms |
| | PST597 100ms |
| | PST598 200ms |
| 6. Each product 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. |

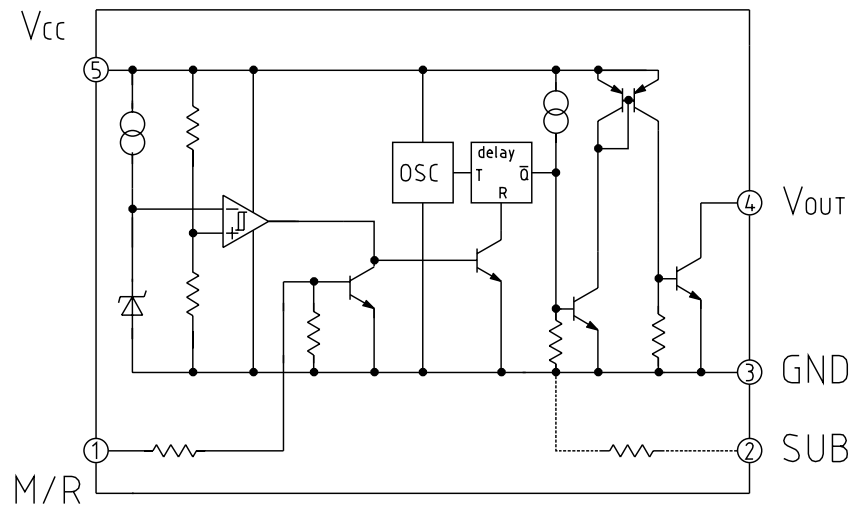
Package

SOT-25A (PST59×□N) (with manual reset pin)
 * □ contains detection voltage rank.

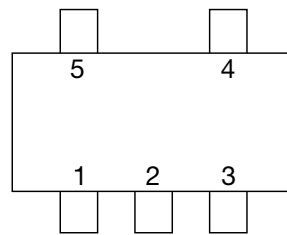
Applications

1. Reset circuits in microcomputers, CPUs and MPUs
2. Logic circuit reset 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 _{OUT} |
| 5 | V _{CC} |

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 (Ta=25°C)

| Item | Symbol | Rating | 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 | Rating | 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 | |

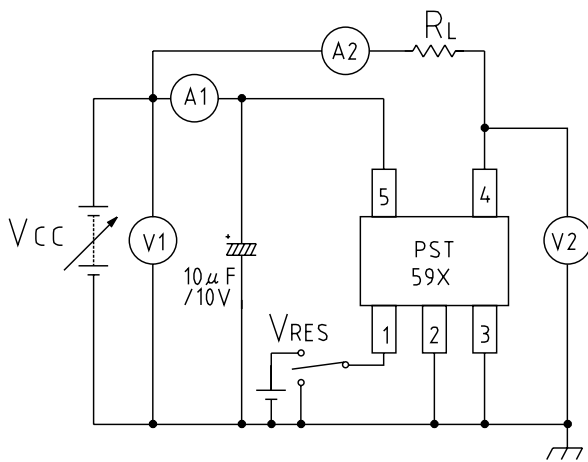
*1 : T_{PLH} ; V_{CC}= (V_s typ.-0.4V) → (V_s typ.+0.4V)

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

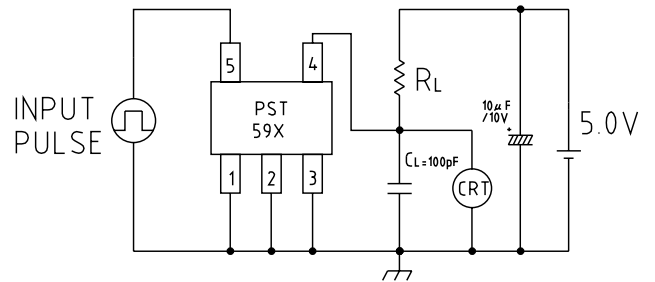
Note 3: Connect manual reset pin to GND when not using.

Measuring Circuit

[1]

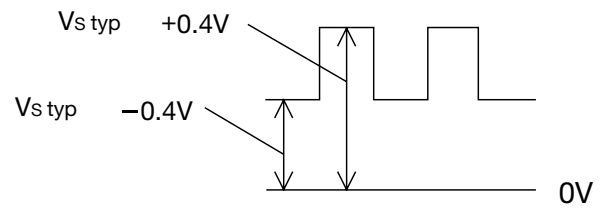


[2]

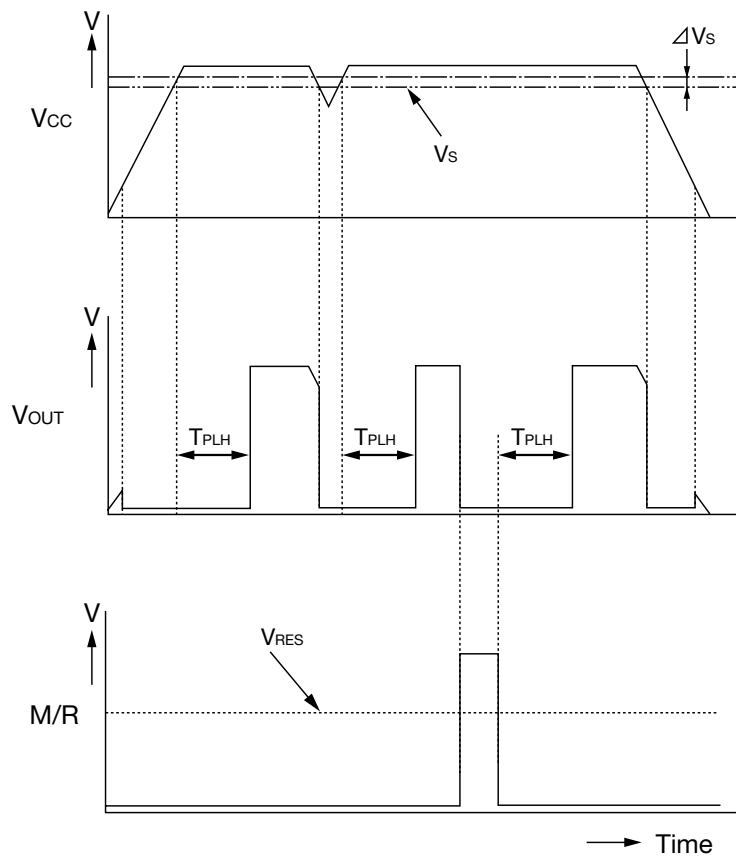


A : DC ammeter
 V : DC voltmeter
 CRT: Oscilloscope

INPUT PULSE



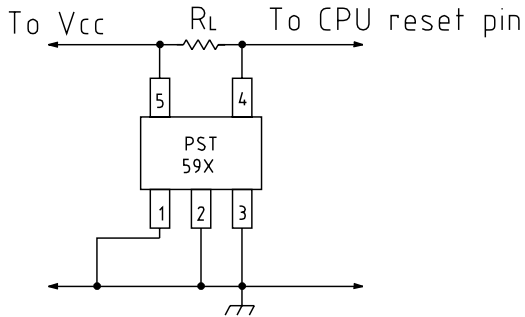
Timing Chart



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

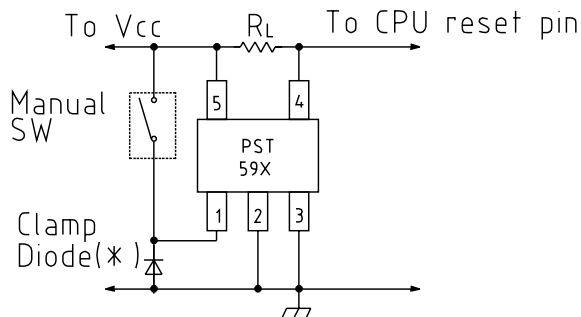
Application circuits

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 $15\mu s$.

Characteristics

V_{CC} vs V_{OUT}

