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.

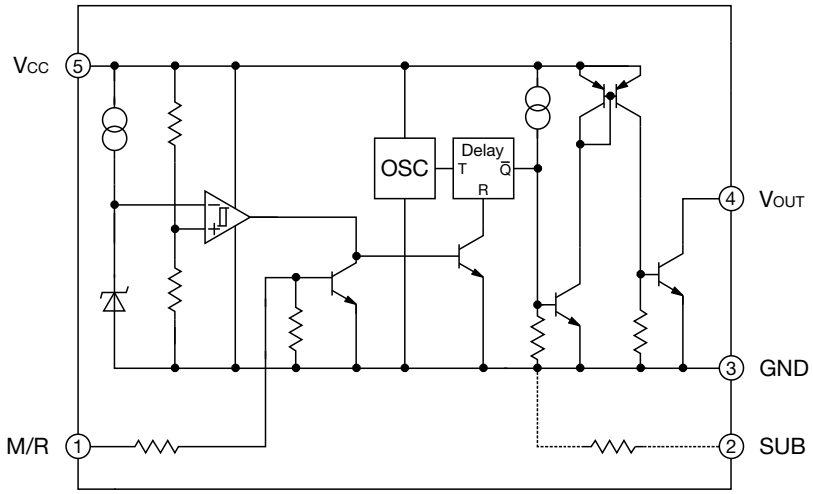
Package

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

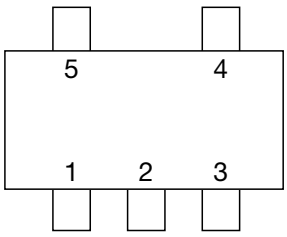
Applications

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



SOT-25
(TOP VIEW)

1	M/R
2	SUB
3	GND
4	VOUT
5	VCC

Pin Description

Pin No.	Pin name	Function
1	M/R	Manual reset pin ∗1
2	SUB	SUB pin ∗2
3	GND	GND pin
4	VOUT	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	VRES max.	−0.3~+12	V
Allowable loss	Pd	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

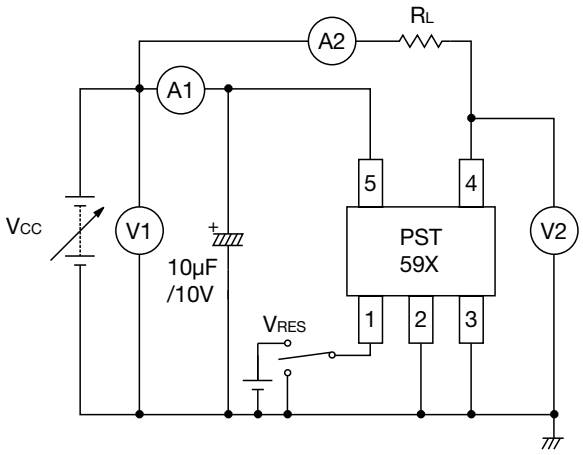
(Ta=25°C) (Except where noted otherwise, resistance unit is Ω)

Item	Symbol	Measuring circuit	Measurement conditions		Min.	Typ.	Max.	Units
Detection voltage	Vs	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	⊿Vs	1	V_{CC}=L→H→L, R_L=470		30	50	100	mV
Detection voltage temperature coefficient	Vs/⊿T	1	R_L=470, Ta=−20°C~+75°C			±0.01		%/°C
Low-level output voltage	V_{OL}	1	V_{CC}=Vs 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}=Vs min. −0.05V, R_L=∞			300	500	μA
Circuit current while off	I_{CCH}	1	V_{CC}=Vs 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	$I_{OL}1$	1	V_{CC}=Vs min. −0.05V, R_L=0		8			mA
Output current while on 2	$I_{OL}2$	1	V_{CC}=Vs min. −0.05V, R_L=0, Ta=−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

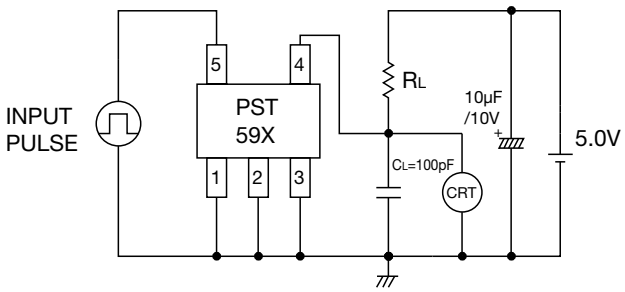
＊1 : T_{PLH} ; V_{CC}= (Vs typ.−0.4V) → (Vs typ.+0.4V)
＊2 : T_{PLH} ; V_{CC}= (Vs typ.+0.4V) → (Vs typ.−0.4V)
Note 3: Connect manual reset pin to GND when not using.

Measuring Circuit

[1]

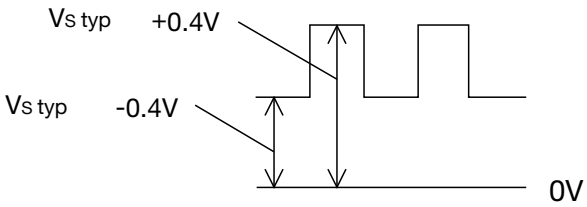


[2]

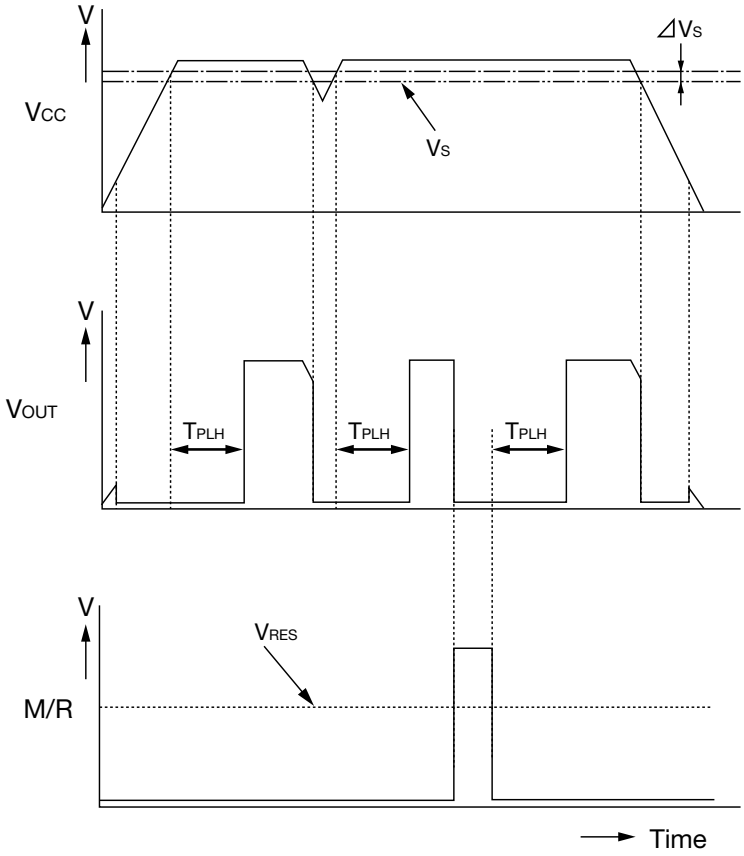


A : DC ammeter
V : DC voltmeter
CRT : Osciloscope

INPUT PULSE



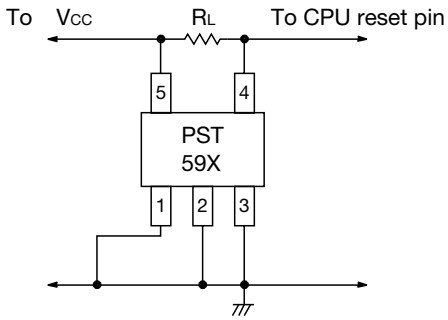
Timing Chart



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

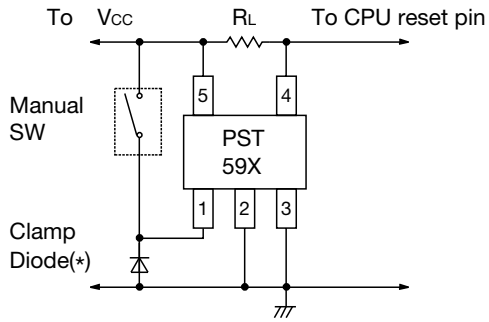
Application Circuits

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}