IC for System Reset
Monolithic IC PST623

October 4, 2001

Outline

This IC is a low-reset type system reset IC and 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.

Features

1. Detection voltage can be set easily. (2 external resistors)
2. High precision voltage detection; Internal reference voltage — 1.25±2%
3. Enables high voltage check (checks in front of Reg)
4. Low operating limit voltage — 0.65V typ.
5. Large output current during power-on — 10mA min.
6. Low current consumption — 40μA typ.
7. Built-in delay circuit (one external capacitor)

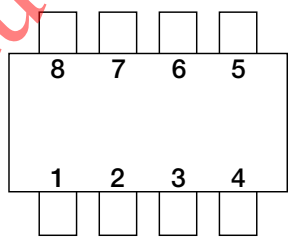
Applications

1. Reset circuits for microcomputers, CPUs and MPUs
2. Reset circuits for logic circuits
3. Level detection circuits

Packages

VSOP-8A (PST623XW)

Pin Assignment



VSOP-8A
(TOP VIEW)

1	V_S
2	NC
3	TC
4	GND
5	RESET
6	NC
7	NC
8	V_{CC}

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Units
Storage temperature	T_{STG}	−40~+125	°C
Maximum power supply voltage	V_{CC} max.	10	V
Allowable power consumption	Pd max.	300	mW
Input pin voltage	V_{ID}	−0.3~V_{CC}	V

Recommended Operating Conditions

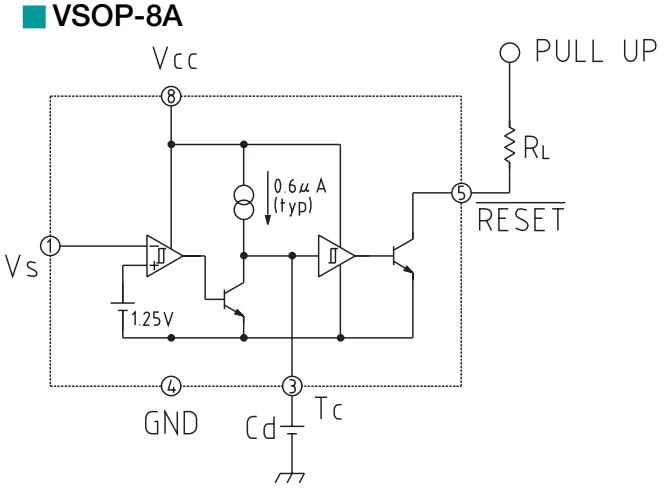
Item	Symbol	Rating	Units
Power supply voltage	V_{CCOP}	2.0~10.0	V
Operating temperature	T_{OPG}	−20~+75	°C

Electrical Characteristics (V_{CC}=5V, Ta=25°C) (Except where noted otherwise, resistance unit is Ω)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Detection reference voltage	V_S	R_L=470, V_{IN}=H→L	1.225	1.250	1.275	V
Hysteresis voltage	⊿V_S	R_L=470, V_{IN}=L→ H→L	12	25	50	mV
Detection reference voltage temperature coefficient	$\frac{V_S}{\Delta T}$	R_L=470, Ta=−20~+75°C		±0.01		%/°C
Low level output voltage	V_{OL}	V_{IN}=1.0V, R_L=470		0.3	0.45	V
Output leakage current	I_{OH}	V_{IN}=1.5V, V_{OUT}=10V			±0.1	μA
Circuit current while on	I_{CCL}	V_{IN}=1.0V, R_L=∞		50	90	μA
Circuit current while off	I_{CCH}	V_{IN}=1.5V, R_L=∞		42	70	μA
"H" transport delay time	tpLH	R_L=4.7k, Cd=0.047uF		110		ms
"L" transport delay time	tpHL	R_L=4.7k, Cd=0.047uF		15		μs
Operation limit voltage	V_{OPL}	R_L=4.7k, V_{OL} ≦ 0.4V Minimum power supply voltage for which output can maintain Lo.		0.65	0.85	V
Output current while on	I_{OL}	V_{IN}=1.0V, R_L=0	10			mA
Delay time setting comparator Threshold level	Vtsh	R_L=470, V_{TC}=L→ H	1.25	1.4	1.55	V
Capacitor charging current	I_{TC}	V_{IN}=1.5V, V_{TC}=0.2V	0.39	0.60	0.81	μA
Vs input current	I_{IN}	V_{IN}=1.35V		40		nA

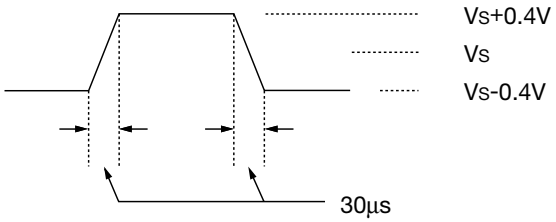
Equivalent Circuit Diagram

■ VSOP-8A



Notes on Using PST623

1. Input voltage rise and fall



Be sure to give an incline of more than 30µs to rise and fall for input with varied power supply voltage (V_{CC}) and bleeder resistance.
Also, when setting input bleeder resistance, V_S pin input current is affected and the detection voltage setting will differ from the set value if current on the bleeder resistor is too low.
Use input bleeder resistor R2 at 250kΩ or less.

2. Delay time setting

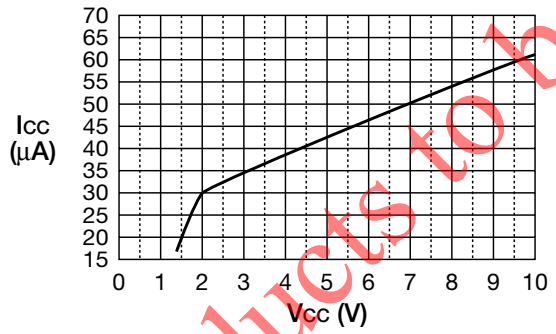
H transmission delay time can be set easily as follows from the TC pin, using the external capacitor.

$T = Cd \times (2.33 \times 106)$ [s]

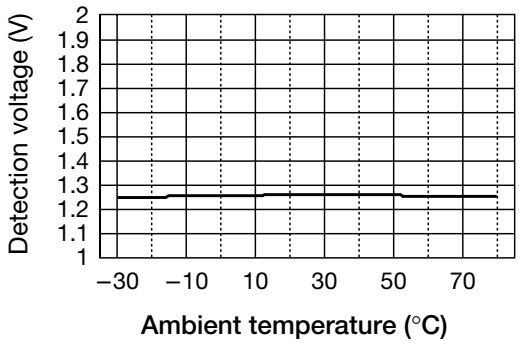
Use the external capacitor at 1µF (approx. 2.33s) or less.

Characteristics

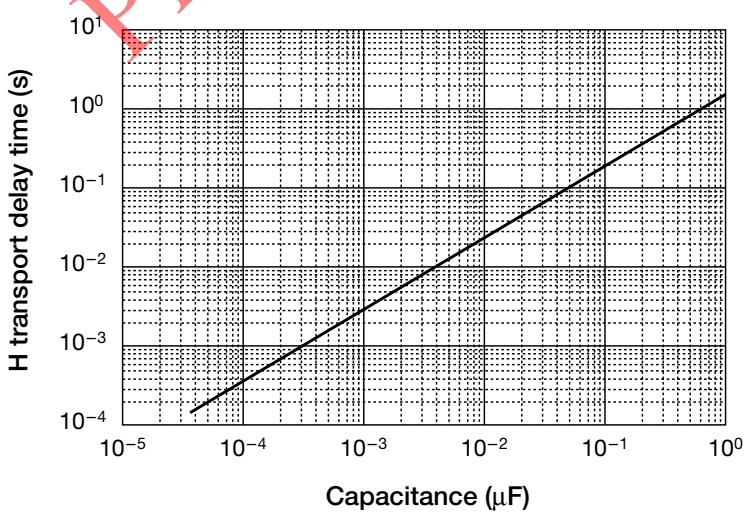
Current consumption for OFF



Detection voltage

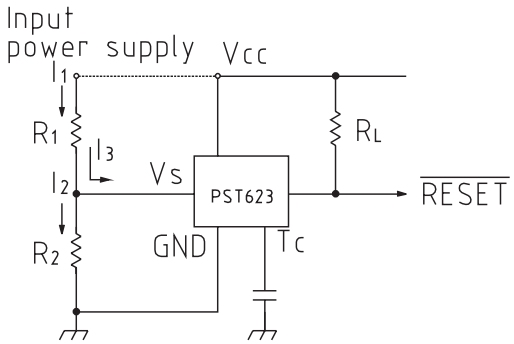


H transport delay time



Application Circuits

1. Circuit Diagram

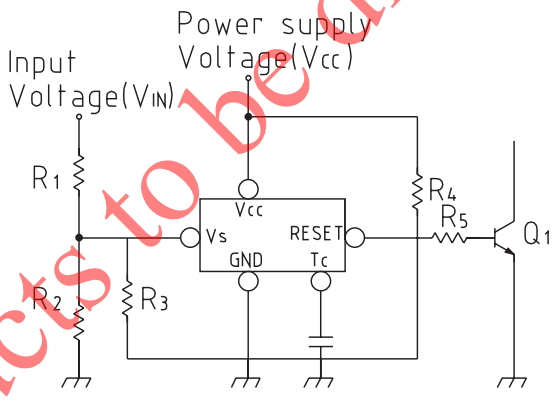


2. Detection Voltage Setting

$$V_S \fallingdotseq 1.25 \cdot \frac{R1+R2}{R2}$$

Note
The value of I2 should be sufficient to ignore I3.
Make I2 > 5μA.
R2 < 250kΩ

3. How to widen hysteresis



Voltage $V_{IN}1$ so that Q1 ON goes OFF.

$$V_{IN}1=\frac{(R1+R2)}{R2 \cdot (R3+R4//R5)}[1.25\ (V) \cdot (R3+R1//R2+R4//R5) - \frac{R1//R2}{R4+R5}(R4 \cdot V_{BE}+R5 \cdot V_{CC})]$$

Voltage $V_{IN}2$ so that Q1 OFF goes ON.

$$V_{IN}2=\frac{(R1+R2)}{R2 \cdot R3}[1.275\ (V) \cdot (R1//R2+R3) - V_{OL} \cdot (R1//R2)]$$

VOL: Low level output voltage
VBE: Base-emitter voltage of transistor Q1

$$R1//R2 \equiv \frac{R1 \cdot R2}{R1+R2} \qquad R4//R5 \equiv \frac{R4 \cdot R5}{R4+R5}$$