

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)

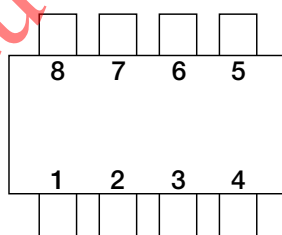
Applications

- 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	P _d max.	300	mW
Input pin voltage	V _{ID}	-0.3~V _{CC}	V

Recommended Operating Conditions

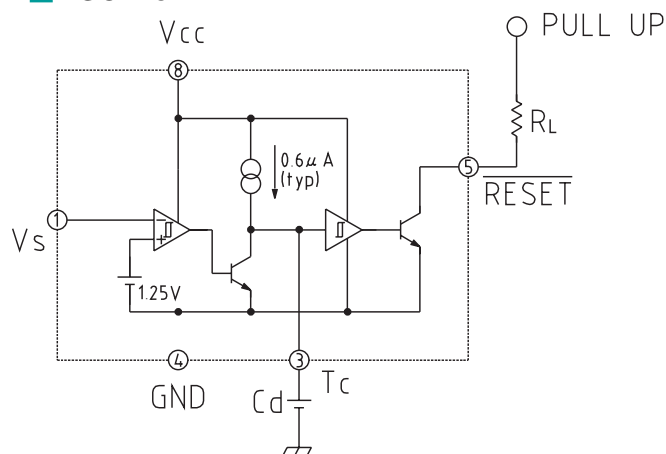
Item	Symbol	Rating	Units
Power supply voltage	V _{CCOP}	2.0~10.0	V
Operating temperature	T _{OPG}	-20~+75	°C

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	ΔV _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	tp _{LH}	R _L =4.7k, C _d =0.047μF		110		ms
"L" transport delay time	tp _{HL}	R _L =4.7k, C _d =0.047μF		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	V _{tsh}	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
V _S input current	I _{IN}	V _{IN} =1.35V		40		nA

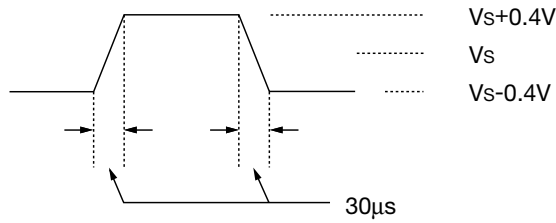
Equivalent Circuit Diagram

■ VSOP-8A



Notes on Using PST623

1. Input voltage rise and fall



Be sure to give an incline of more than $30\mu s$ 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 R_2 at $250k\Omega$ or less.

2. Delay time setting

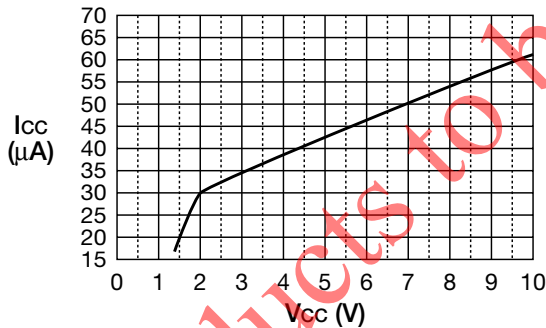
H transmission delay time can be set easily as follows from the TC pin, using the external capacitor.

$$T = Cd \times (2.33 \times 10^6) [s]$$

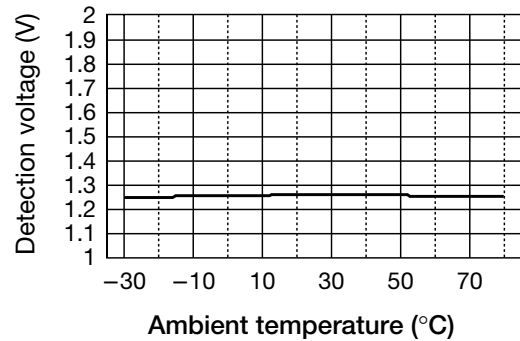
Use the external capacitor at $1\mu F$ (approx. 2.33s) or less.

Characteristics

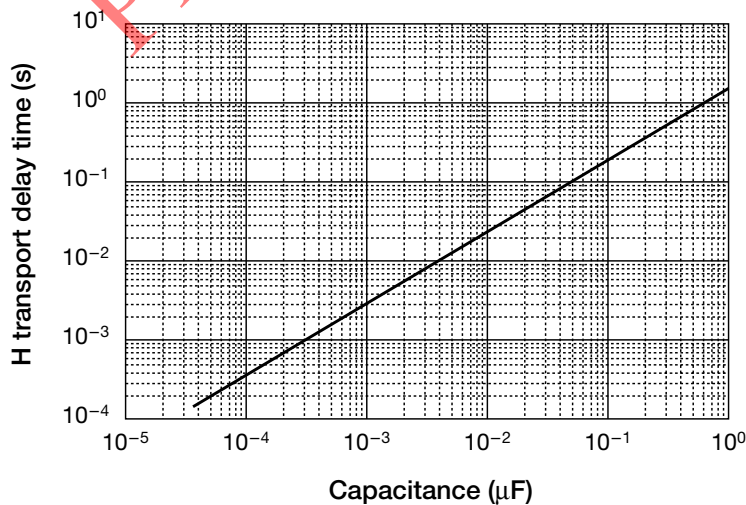
■ Current consumption for OFF



■ Detection voltage

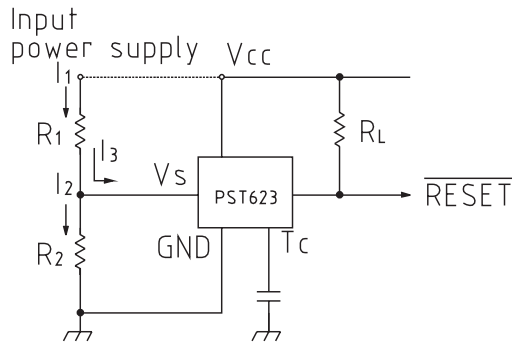


■ H transport delay time



Application Circuits

1. Circuit Diagram



2. Detection Voltage Setting

$$V_s \cong 1.25 \cdot \frac{R1+R2}{R2}$$

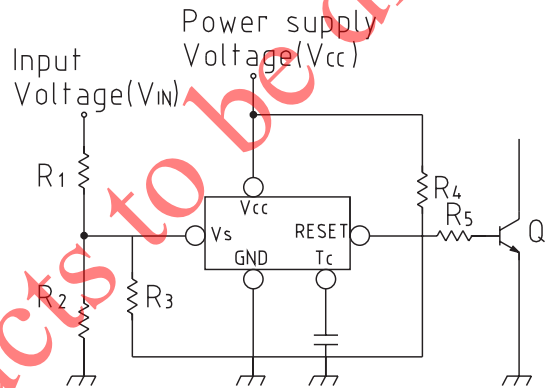
Note

The value of I2 should be sufficient to ignore I3.

Make I2 > 5μA.

R2 < 250kΩ

3. How to widen hysteresis



Voltage Vin1 so that Q1 ON goes OFF.

$$V_{IN1} = \frac{(R1+R2)}{R2 \cdot (R3+R4//R5)} [1.25 (V) \cdot (R3+R1//R2+R4//R5) - \frac{R1//R2}{R4+R5} (R4 \cdot V_{BE}+R5 \cdot V_{CC})]$$

Voltage Vin2 so that Q1 OFF goes ON.

$$V_{IN2} = \frac{(R1+R2)}{R2 \cdot R3} [1.275 (V) \cdot (R1//R2+R3) - V_{OL} \cdot (R1//R2)]$$

VOL: Low level output voltage

VBE: Base-emitter voltage of transistor Q1

$$R1//R2 \cong \frac{R1 \cdot R2}{R1+R2}$$

$$R4//R5 \cong \frac{R4 \cdot R5}{R4+R5}$$