

# System Reset Monolithic IC PST611

## Outline

This IC functions in a variety of CPU systems and other logic systems, to constantly monitor power supply voltage, and to reset the system accurately when power is turned on or interrupted. System reset ICs have been represented by the PST series in the past, but this IC is able to set no-response time through an external capacitor, and controls reset output relative to temporary power supply voltage drop caused by motor load or the like in systems using batteries. Also, the detection voltage for this IC is set low so that it can respond to systems that operate on low voltage.

## Features

- |   |                    |  |  |
|---|--------------------|--|--|
| 1. Low current consumption                | $I_{CCH}=2.2\mu A$ | $I_{CCL}=3.2\mu A$   |  |
| 2. Low operating limit voltage            | 0.75V max.         |  |  |
| 3. High reset output                      |                    |  |  |
| 4. No-response time can be controlled     |                    |  |  |
| 5. 8 types of detection voltages provided | PST611             | R : 1.6V typ.<br>S : 1.5V typ.<br>T : 1.4V typ.<br>U : 1.3V typ. | V : 1.2V typ.<br>W : 1.1V typ.<br>X : 1.0V typ.<br>Y : 0.9V typ. |

## Package

MMP-4A (PST611□M)

\*□ contains detection voltage rank.

## Applications

1. Reset circuits in microcomputers, CPUs and MPUs
2. Set voltage drop detection
3. Battery voltage check circuits.
4. Voltage detection circuits in general

## Absolute Maximum Ratings (Ta=25°C)

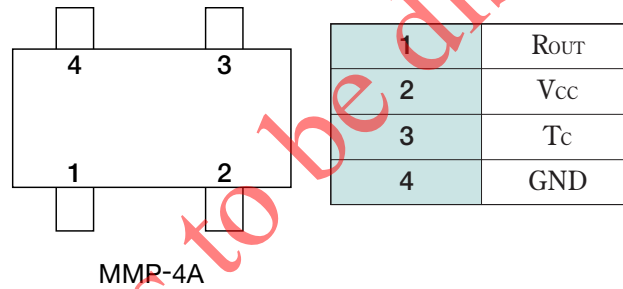
Item	Symbol	Rating	Units
Storage temperature	T <sub>STG</sub>	-40~+125	°C
Operating temperature	T <sub>OPR</sub>	-10~+70	°C
Power supply voltage	V <sub>CC max.</sub>	-0.3~+5	V
Allowable loss	P <sub>d</sub>	200	mW

**Electrical Characteristics** (Ta=25°C)

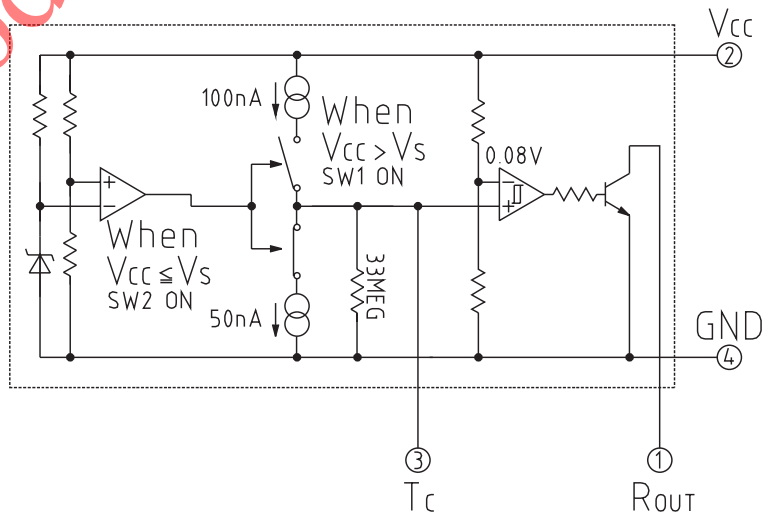
Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units	
Consumption current	I <sub>ccH</sub>	V <sub>CC</sub> =0.95V, V <sub>R</sub> =OPEN		2.2		μA	
	I <sub>ccL</sub>	V <sub>CC</sub> =1.2V, V <sub>R</sub> =OPEN		3.2		μA	
Detection voltage	V <sub>s</sub>	V <sub>CC</sub> : variable=3V	R	1.552	1.6	1.648	V
			S	1.455	1.5	1.545	V
			T	1.358	1.4	1.442	V
			U	1.261	1.3	1.339	V
			V	1.164	1.2	1.236	V
			W	1.067	1.1	1.133	V
			X	0.970	1.0	1.030	V
Y	0.873	0.9	0.927	V			
TC pin charge current	I <sub>TC1</sub>	V <sub>CC</sub> =1.2V, V <sub>TC</sub> =0.4V, V <sub>R</sub> =3V		0.1		μA	
TC pin discharge current	I <sub>TC2</sub>	V <sub>CC</sub> =0.95V, V <sub>TC</sub> =0.1V, V <sub>R</sub> =3V		0.05		μA	
TC pin discharge resistance	R <sub>TC</sub>	V <sub>CC</sub> =0V, V <sub>TC</sub> =0.1V, V <sub>R</sub> =0V	16	33	66	MEGΩ	
Detection voltage temperature coefficient	ΔV <sub>s</sub>			±200		ppm	
TC pin threshold	V <sub>THTC</sub>	V <sub>CC</sub> =1.0V, V <sub>TC</sub> : variable=3V	0.06	0.08	0.10	V	
TC pin hysteresis voltage	V <sub>THTCCH</sub>	V <sub>CC</sub> =1.0V, V <sub>TC</sub> : variable=3V	0.06	0.09	0.12	V	
R output leakage current	I <sub>LEAK</sub>	V <sub>CC</sub> =0.95V, V <sub>R</sub> =3V			0.1	μA	
R output sync current	I <sub>OL</sub>	V <sub>CC</sub> =1.0V, V <sub>TC</sub> =0.4V, V <sub>R</sub> =0.4V	15	50		μA	
Operation limit voltage	V <sub>OPL</sub>	V <sub>CC</sub> : variable V <sub>TC</sub> =0.4V, V <sub>R</sub> =3V		0.7	0.75	V	

Note: Characteristics other than for detection voltage use the 1.0V(X) type as a representative example.

**Pin Assignment**

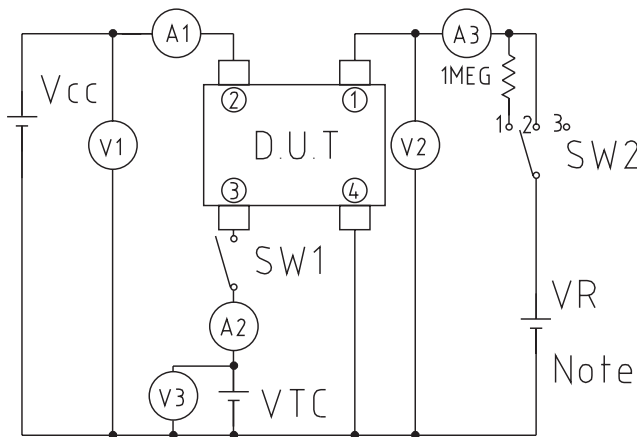


**Equivalent Circuit Diagram**



V<sub>s</sub>: Detection voltage

Measuring Circuit

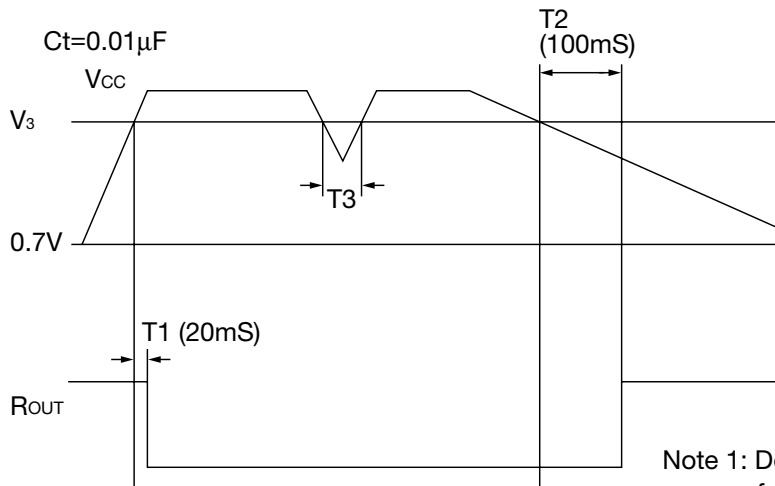


Note: VTC is used for Force/Sink both.

Measurement Method

Item	Measurement conditions						Reference
	V <sub>CC</sub>	V <sub>TC</sub>	VR	SW1	SW2	Measured value	
Consumption current	1.2V	—	—	OFF	3	A1	Measure A1 value.
Detection voltage	Variable	—	3V	OFF	1	V1	Gradually lower V <sub>CC</sub> from 1.2V and measure the value of V1 when V2 value switches from low to high.
TC pin charge current	1.2V	0.4V	3V	ON	1	A2	Measure A2 value.
TC pin discharge current	0.95V	0.2V	3V	ON	1	A2	Measure A2 value.
TC pin discharge resistance	0V	0.1V	0V	ON	1	A2	0.1V/A2 value
TC pin threshold	1.0V	Variable	3V	ON	1	V3	Gradually lower V <sub>TC</sub> from 0.3V and measure the value of V3 when V2 value switches from low to high. (V <sub>THTC</sub> )
TC pin hysteresis voltage	1.0V	Variable	3V	ON	1	V3	The value of V3 when V2 switches from high to low while raising V <sub>TC</sub> from 0.0V, minus "V <sub>THTC</sub> ."
R output leakage current	0.95V	—	3V	OFF	2	A3	Measure A3K value.
R output sync current	1.0V	0.4V	0.4V	ON	2	A3	Measure A3 value.
Operation limit voltage	Variable	0.4V	3V	OFF	1	V1	The limit voltage within which V2 value stays low while lowering V <sub>CC</sub> from 1.0V.

Delay Characteristics



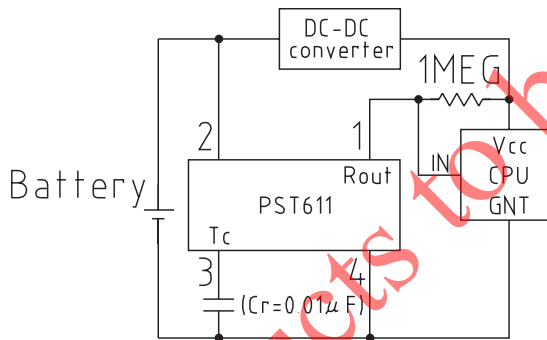
Note 1: Delay times T1 and T2 are found from the formulae below.

$$T_1 (S) = C_T \times (2.0 \times 10^6)$$

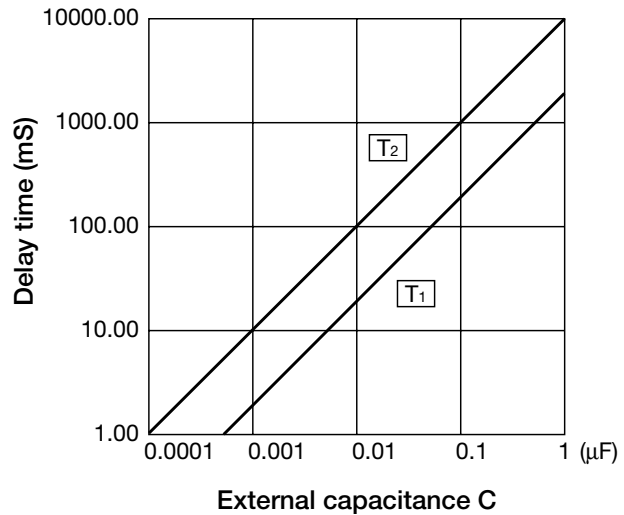
$$T_2 (S) = C_T \times 10^7$$

Note 2: Rout is not output if Vcc is temporarily lower than VS.

Application circuits

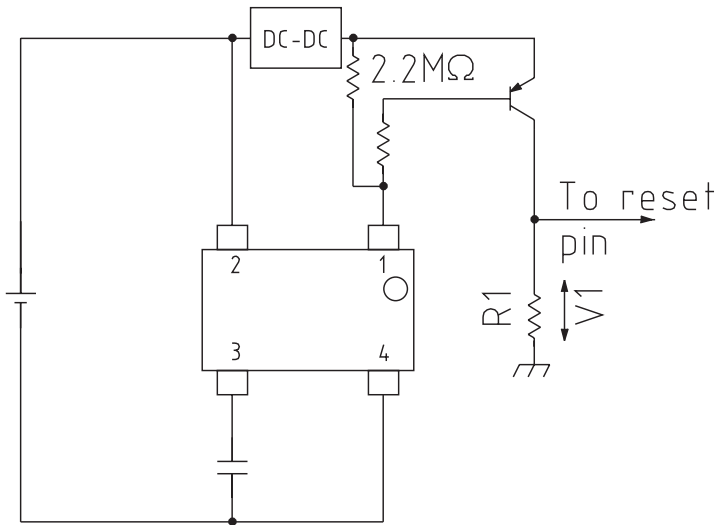


Rise delay time (T1) and No-response time (T2) using external capacitor



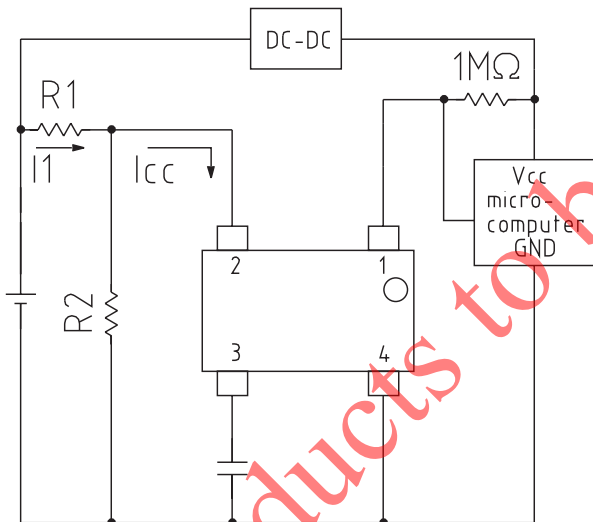
Application circuits

1. How to change reset output logic



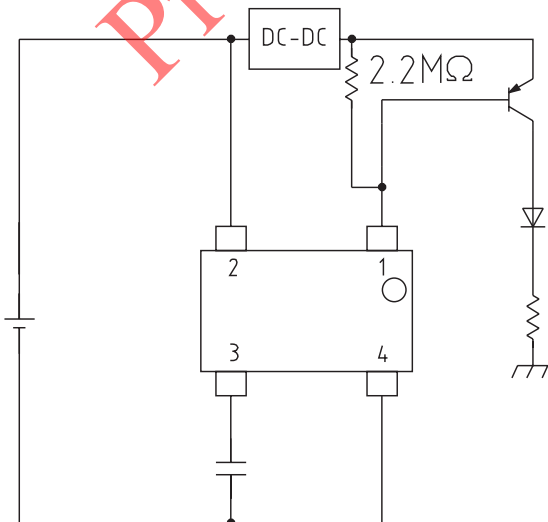
Note: Set R1 so that  $V1 >$  threshold voltage.

2. How to change detection voltage (detection voltage UP)



Note: Set R1 so that the value of  $I_1$  is sufficient to ignore  $I_{cc}$ .

3 Battery checker (LED ON for high voltage)



Note: When  $V_{cc}$  is less than LED  $V_F$ , take LED lamp power from DC-DC converter or other output.