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}=2.2μA I_{CCL}=3.2μA
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.	V : 1.2V typ.
S : 1.5V typ.	W : 1.1V typ.
T : 1.4V typ.	X : 1.0V typ.
U : 1.3V typ.	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)

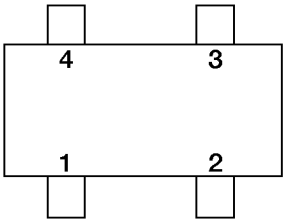
Item	Symbol	Rating	Units
Storage temperature	T_{STG}	−40~+125	°C
Operating temperature	T_{OPR}	−10~+70	°C
Power supply voltage	V_{CC} max.	−0.3~+5	V
Allowable loss	Pd	200	mW

Electrical Characteristics (Ta=25°C)

Item	Symbol	Measurement conditions		Min.	Typ.	Max.	Units
Consumption current	IccH	Vcc=0.95V, VR=OPEN			2.2		µA
	IccL	Vcc=1.2V, VR=OPEN			3.2		µA
Detection voltage	Vs	Vcc: 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	Itc1	Vcc=1.2V, Vtc=0.4V, VR=3V			0.1		µA
TC pin discharge current	Itc2	Vcc=0.95V, Vtc=0.1V, VR=3V			0.05		µA
TC pin discharge resistance	Rtc	Vcc=0V, Vtc=0.1V, VR=0V		16	33	66	MEGΩ
Detection voltage temperature coefficient	⊿Vs				±200		ppm
TC pin threshold	Vthtc	Vcc=1.0V, Vtc: variable=3V		0.06	0.08	0.10	V
TC pin hysteresis voltage	Vthtch	Vcc=1.0V, Vtc : variable=3V		0.06	0.09	0.12	V
R output leakage current	Ileak	Vcc=0.95V, VR=3V				0.1	µA
R output sync current	Iol	Vcc=1.0V, Vtc=0.4V, VR=0.4V		15	50		µA
Operation limit voltage	Vopl	Vcc : variable Vtc=0.4V, VR=3V			0.7	0.75	V

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

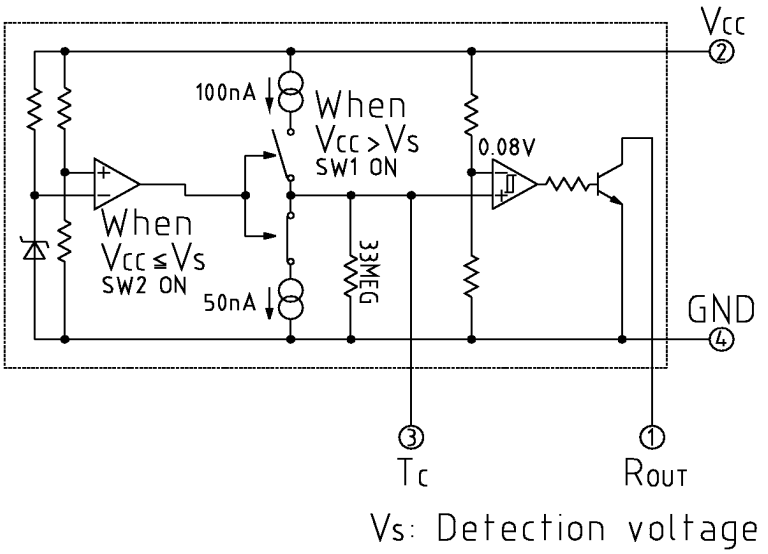
Pin Assignment



MMP-4A

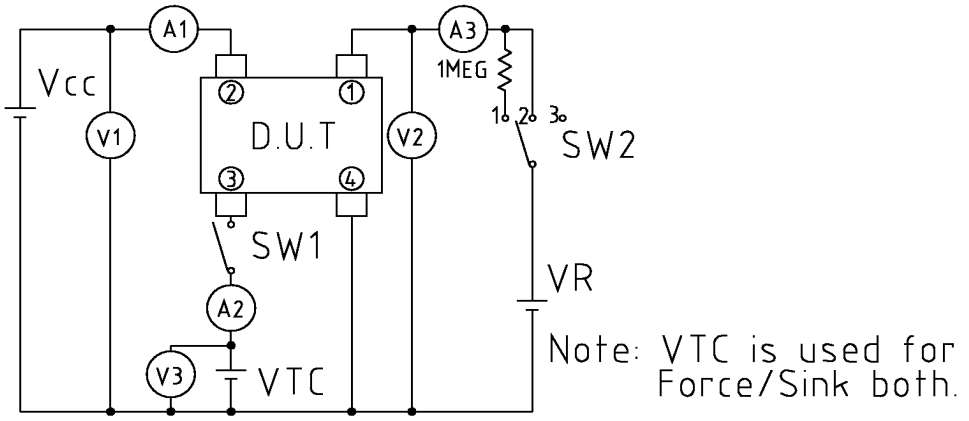
1	Rout
2	Vcc
3	Tc
4	GND

Equivalent Circuit Diagram



Vs: Detection voltage

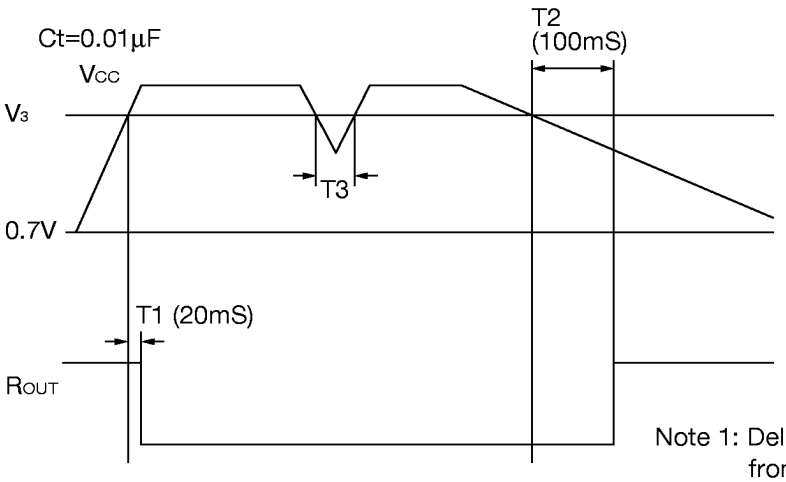
Measuring Circuit



Measurement Method

Item	Measurement conditions						Reference
	V_{CC}	V_{TC}	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_{CC} 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_{TC} from 0.3V and measure the value of V3 when V2 value switches from low to high. (V_{THTC})
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_{TC} from 0.0V, minus "V_{THTC}."
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_{CC} from 1.0V.

Delay Characteristics



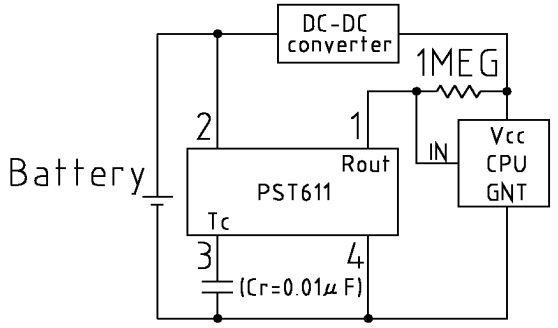
Note 1: Delay times T1 and T2 are found from the formulae below.

T_1 (S)=C_Tx (2.0x10^6)

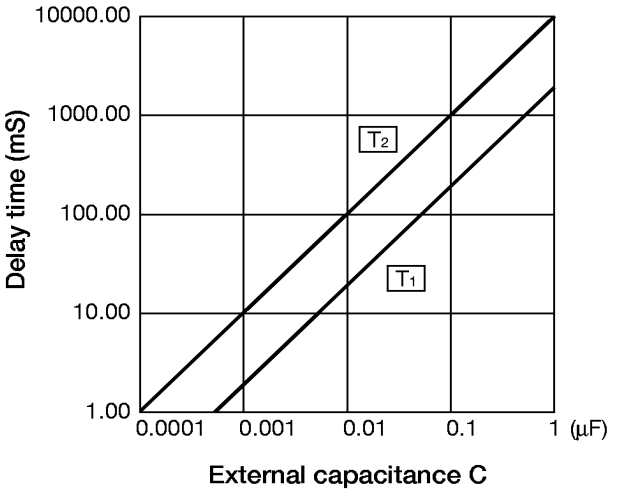
T_2 (S)=C_Tx10^7

Note 2: R_{OUT} is not output if V_{CC} is temporarily lower than VS.

Application circuits

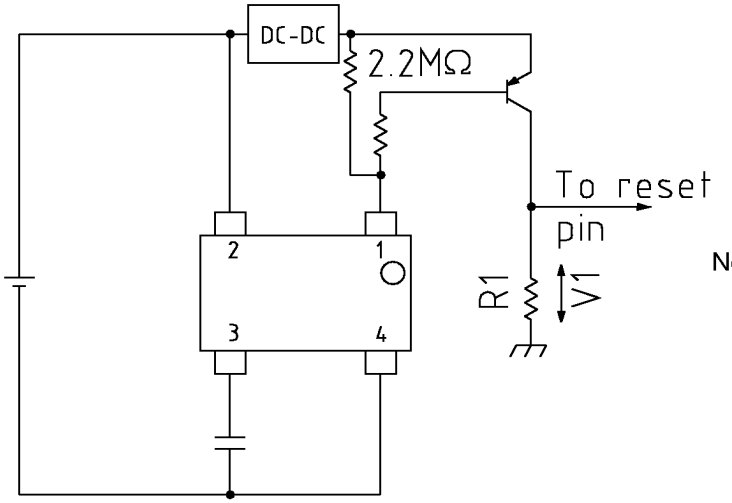


Rise delay time (T1) and
No-response time (T2)
using external capacitor



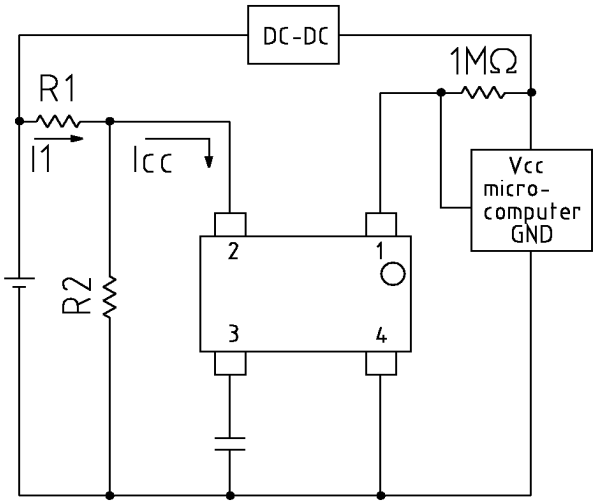
Application circuits

1. How to change reset output logic



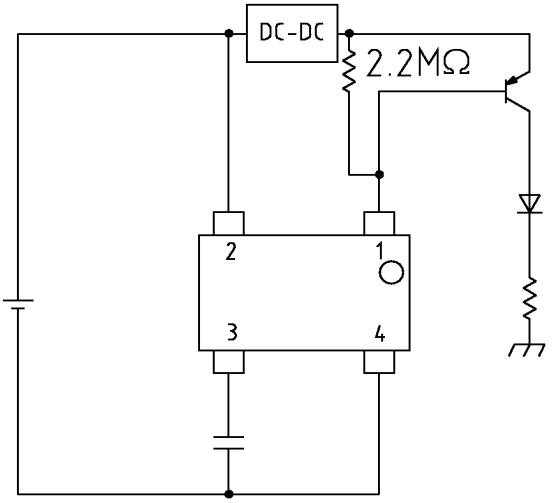
Note: Set R1 so that V1 > threshold voltage.

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 VF, take LED lamp power from DC-DC converter or other output.