System Reset
Monolithic IC PST572

Outline

This IC functions in a variety of CPU systems and other logic systems, to detect power supply voltage and reset the system accurately when power is turned on or interrupted. This ultra-low current consumption low reset type system reset IC was developed using high resistance process and low current circuit design technology.

Features

1. Ultra-low current consumption	I_{CCH}=1μA typ. I_{CCL}=180μA typ.	
2. Low operating limit voltage	0.65V typ.	
3. Output current high for ON	30mA typ.	
4. Hysteresis voltage provided in detection voltage	50mV typ.	
5. 10 ranks of detection voltage	PST572 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.

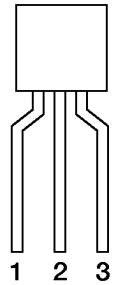
Package

MMP-3A (PST572□M)
TO-92A (PST572□)
*□contains detection voltage rank.

Applications

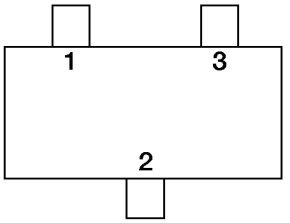
1. Reset circuits in microcomputers, CPUs and MPUs.
2. Logic circuit reset circuits.
3. Battery voltage check circuits.
4. Back-up power supply switching circuits.
5. Level detection circuits.

Pin Assignment



TO-92A

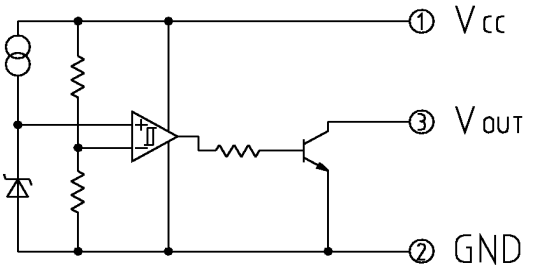
1	Vcc
2	GND
3	VOUT



MMP-3A

1	Vcc
2	GND
3	VOUT

Equivalent Circuit Diagram



Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Rating	Units
Storage temperature	T_{STG}	−40~+125	°C
Operating temperature	T_{OPR}	−20~+75	°C
Power supply voltage	V_{CC} max.	−0.3~10	V
Allowable loss	Pd	200(MMP-3A) 300(TO-92A)	mW

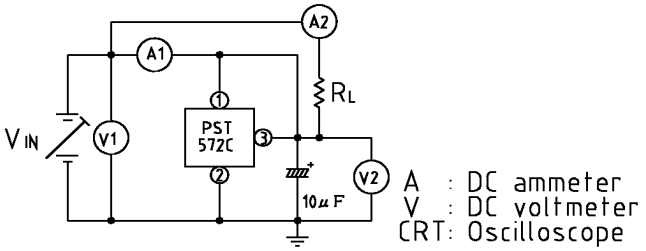
Electrical Characteristics (Ta=25°C)(Except where noted otherwise, resistance unit is Ω)

Item	Symbol	Measurement circuit	Measurement conditions		Min.	Typ.	Max.	Units
Detection voltage	V_S	1	R_L=470 V_{OL} ≦ 0.4V V_{CC}=H→L	PST572C	4.3	4.5	4.7	V
				PST572D	4.0	4.2	4.4	
				PST572E	3.7	3.9	4.1	
				PST572F	3.4	3.6	3.8	
				PST572G	3.1	3.3	3.5	
				PST572H	2.9	3.1	3.3	
				PST572I	2.75	2.90	3.05	
				PST572J	2.55	2.70	2.85	
				PST572K	2.35	2.50	2.65	
				PST572L	2.15	2.30	2.45	
Hysteresis voltage	⊿Vs	1	R_L=470, V_{CC}=L→H→L		25	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}=10.0V				±0.1	μA
Circuit current while on	V_{CCL}	1	V_{CC}=Vs min.−0.05V, R_L=∞			180	300	μA
Circuit current while off	I_{CCH}	1	V_{CC}=Vs typ./0.85V, R_L=∞			1.0	1.8	μA
"H"transport delay time	tpLH	2	R_L=4.7kΩ, C_L=100pF *1			30	60	μS
"L"transport delay time	tpHL	2	R_L=4.7kΩ, C_L=100pF *1			7	20	μS
Operation limit voltage	VopL	1	R_L=4.7kΩ, V_{OL} ≦ 0.4V			0.65	0.85	V
Output current while on I	I_{OL} I	1	V_{CC}=Vs min.−0.05V, R_L=0		8	30		mA
Output current while on II	I_{OL} II	1	Ta=−20°C~+75°C *2		5			mA

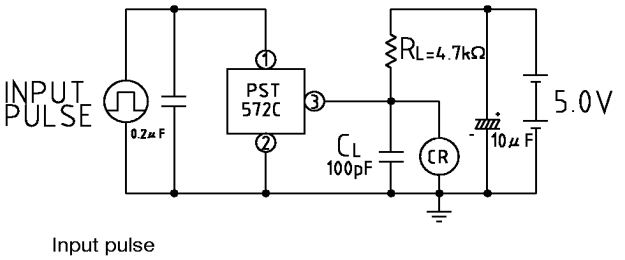
*1 : tpLH : V_{CC}=(Vs typ.−0.4V)→(Vs typ.+0.4V), tpHL : V_{CC}=(Vs typ.+0.4V)→(Vs typ.−0.4V)
*2 : V_{CC}=Vs min.−0.15V

Measuring Circuit

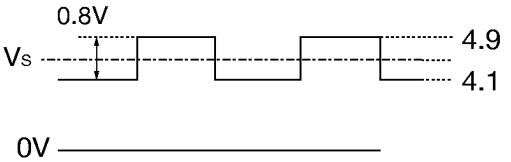
[1]



[2]



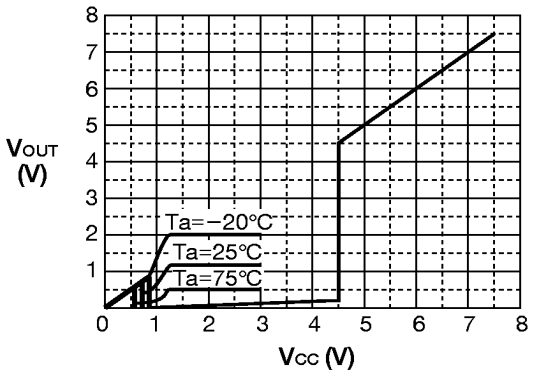
Input pulse



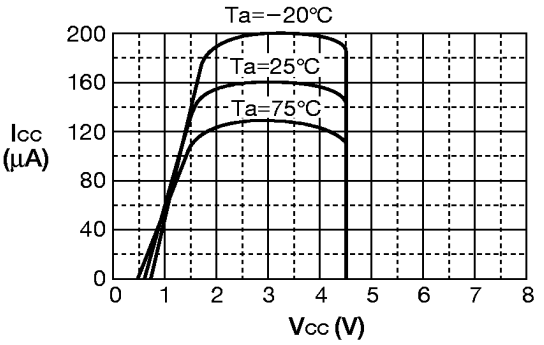
Note: Input model is an example for PST572C.

Characteristics (Example: PST572C)

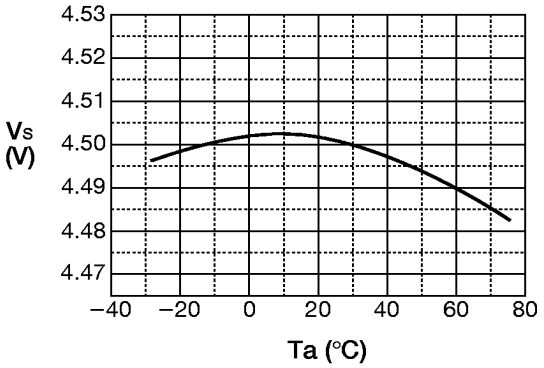
VCC vs. VOUT



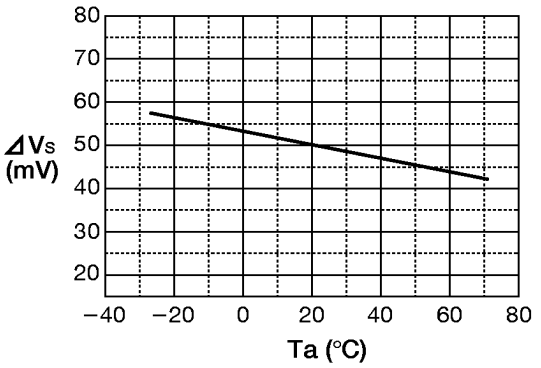
VCC vs. ICC



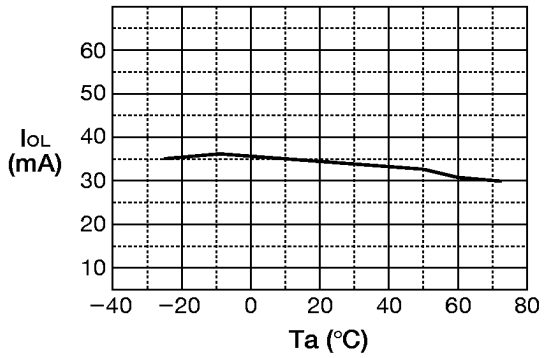
VS vs. Ta



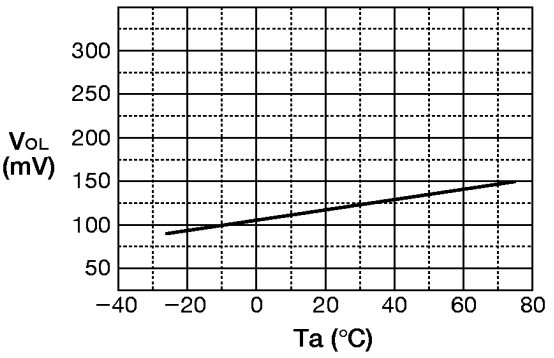
⊿VS vs. Ta



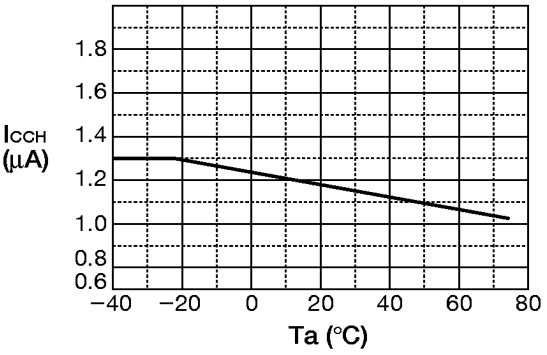
I_{OL} vs. Ta



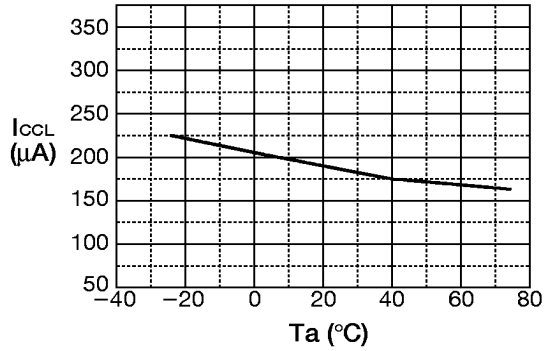
V_{OL} vs. Ta



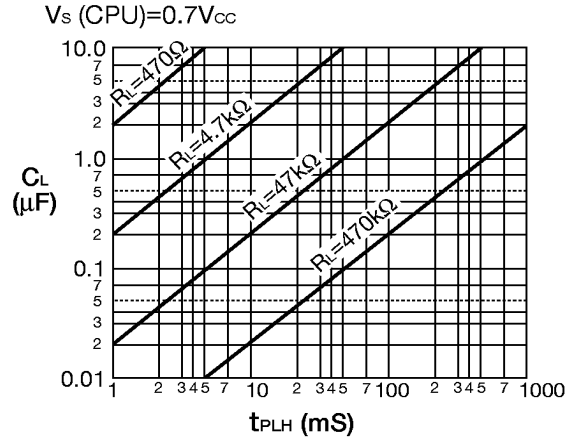
I_{CCH} vs. Ta



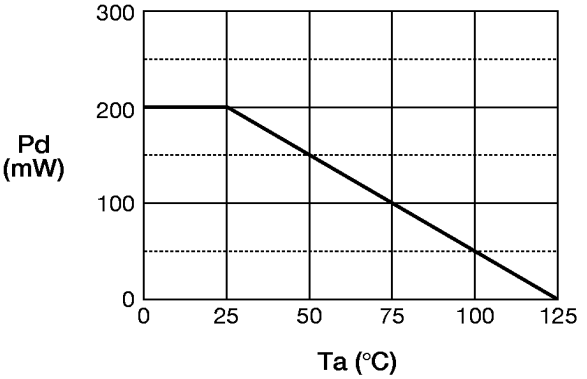
I_{CCL} vs. Ta



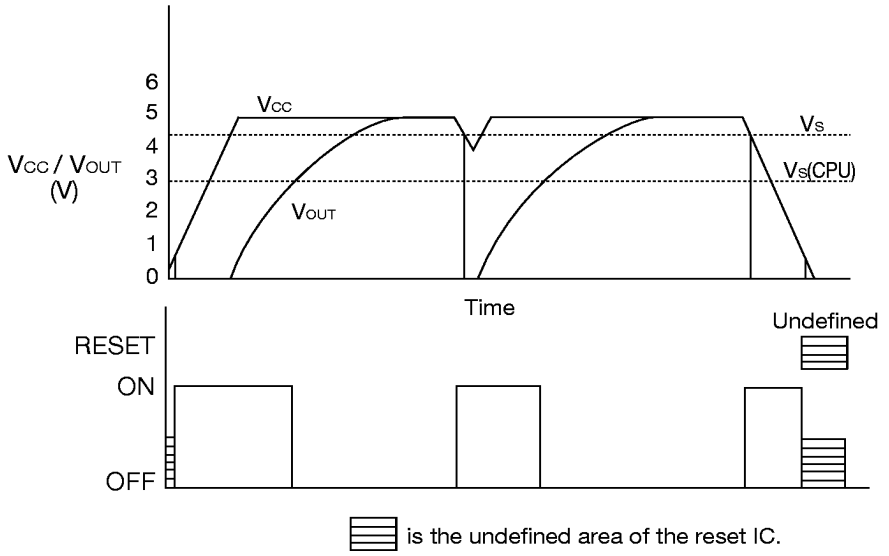
$C_L(R_L)$ vs. tpLH



Pd vs. Ta

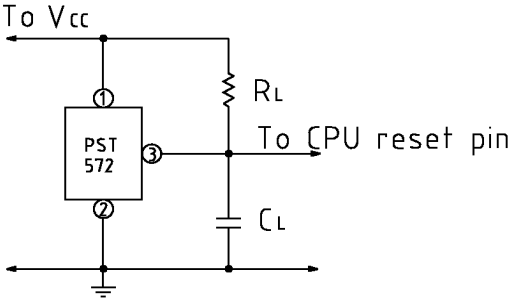


Timing Chart



Application Circuits

1. Normal hard reset



Delay time (tpLH)

$$\fallingdotseq C_L \times R_L \times \left[\ln \frac{V_{CC}}{V_{CC}-(V_{S\,cpu}+0.2)} \right]$$

+0.025(mS)

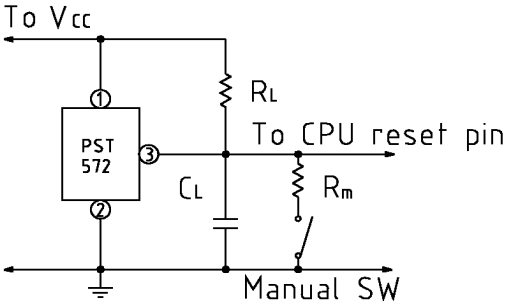
C_L : µF • Vs cpu : Reset threshold voltage of CPU, MPU, etc.

RL : kΩ

Voltage: V

Note: Connect a capacitor between IC pins 1 and 2 if V_{CC} line impedance is high.

2. Manual reset added

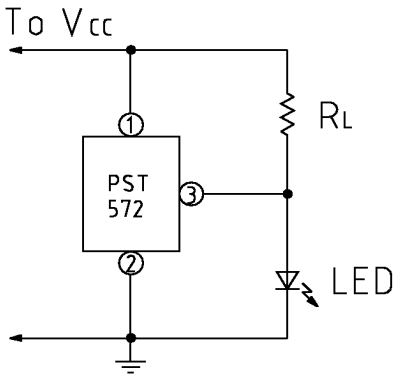


Note 1: Use R_L, C_L and Rm to prevent manual switch chattering. Note that Rm should be set to the following conditions.

$Rm \leq 1/20R_L$

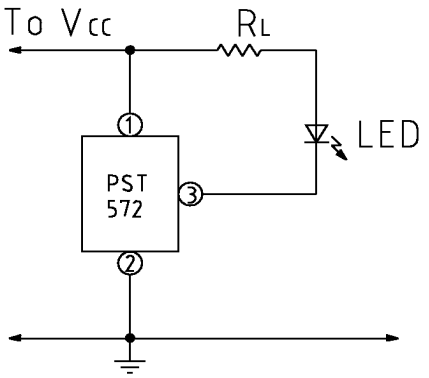
Note 2: Connect a capacitor between IC pins 1 and 2 if V_{CC} line impedance is high.

3. Battery checker (LED ON for high voltage)



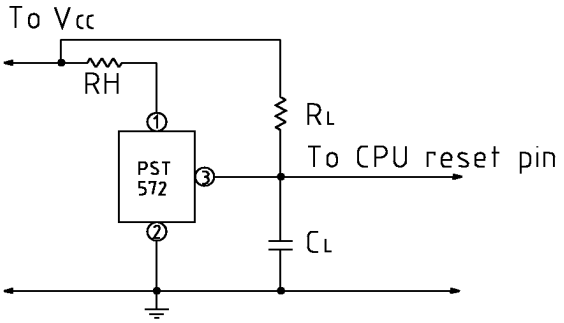
Note: Connect a capacitor between IC pins 1 and 2 if V_{CC} line impedance is high.

4. Battery checker (LED ON for low voltage)



Note: Connect a capacitor between IC pins 1 and 2 if V_{CC} line impedance is high.

5. Hysteresis voltage UP method



When increasing hysteresis voltage for stable system operation, determine RH as follows and connect externally.
However, $I_{CC}H$ is −5000PPM/°C so perform temperature compensation at RH when using over a wide temperature range.
Hysteresis voltage UP amount (ΔV_{sup}) is
$\Delta V_{sup} \fallingdotseq RH \quad I_{CCL}$
Total hysteresis voltage (ΔV_{stotal}) is
$\Delta V_{stotal} \fallingdotseq Vs+\Delta V_{sup}$

Note: Connect a capacitor between IC pins 1 and 2 if V_{CC} line impedance is high.