

CMOS System Reset IC built-in delay time circuit Monolithic IC PST87XX, 88XX Series

Outline

This IC is a system reset IC built-in delay time circuit.

PST87/88 is not required with an external capacitor, and then can use a small package.

Therefore a space of PC board can be small.

Features

| | |
|--------------------------------|------------------------------------|
| 1. Operating supply voltage | 1.0-5.5V |
| 2. Supply current | 1 μ A typ. |
| 3. Reset threshold range | 1.6-4.6V |
| 4. Reset threshold accuracy | \pm 1.5% |
| 5. Reset hysteresis | 50mV typ. |
| 6. Reset active timeout period | 20/50/100/200ms |
| 7. Output type | PST87 : CMOS PST88 : Open drain |

Packages

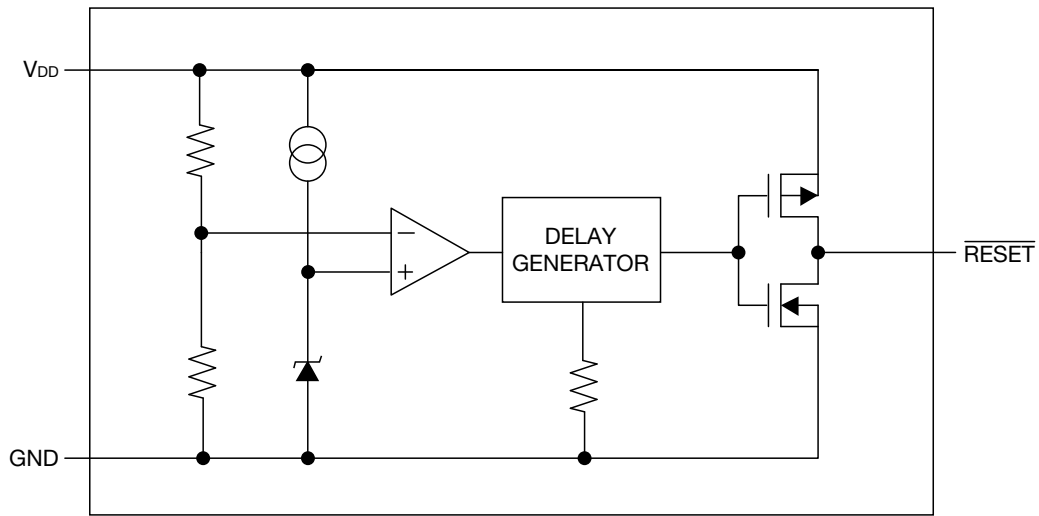
SSON-4
SOT-25A
SC-82ABB

Applications

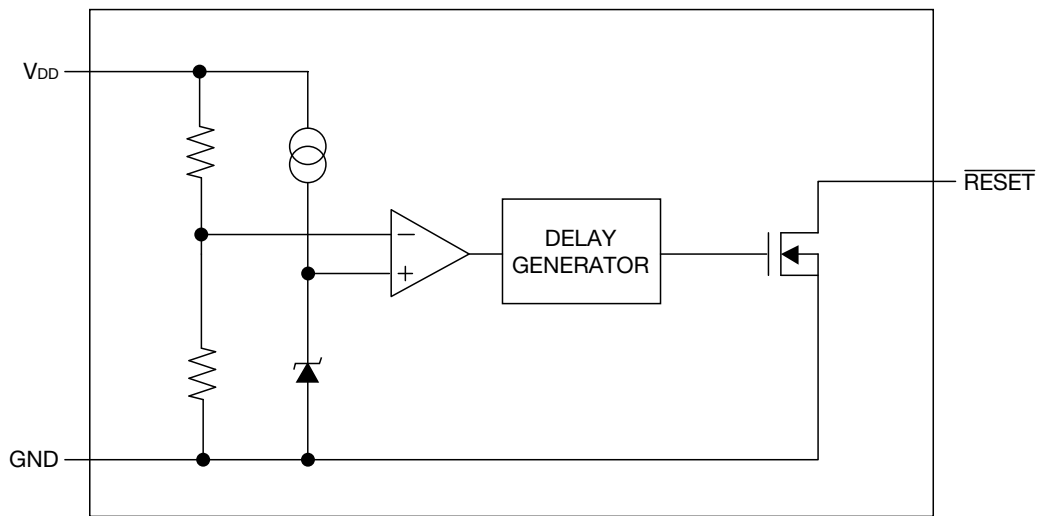
1. Reset circuits for microcomputers, CPUs and MPUs
2. Reset circuits for logic circuits
3. Battery voltage check circuits
4. Back-up power supply switching circuits
5. Level detection circuits
6. Mechanical reset circuits

Block Diagram

■ PST87XX Push-Pull / Active-Low Output Type.

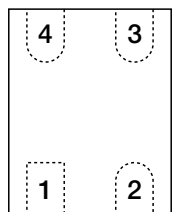


■ PST88XX Open-Drain / Active-Low Output Type.



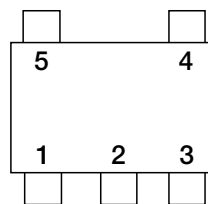
Pin Assignment

PST87XX, PST88XX



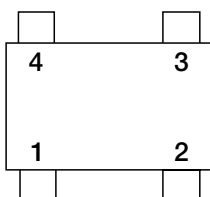
SSON-4B
(TOP VIEW)

| | |
|---|-----------------|
| 1 | GND |
| 2 | NC |
| 3 | V _{DD} |
| 4 | RESET |



SOT-25A
(TOP VIEW)

| | |
|---|-----------------|
| 1 | NC |
| 2 | GND |
| 3 | NC |
| 4 | RESET |
| 5 | V _{DD} |



SC-82ABB
(TOP VIEW)

| | |
|---|-----------------|
| 1 | NC |
| 2 | GND |
| 3 | RESET |
| 4 | V _{DD} |

Pin Description

SSON-4

| Pin No. | Pin name | Functions |
|---------|-----------------|--|
| 1 | GND | GND Pin |
| 2 | NC | No Connection |
| 3 | V _{DD} | V _{DD} Pin / Voltage Detect Pin |
| 4 | RESET | Reset Signal Output Pin |

SOT-25A

| Pin No. | Pin name | Functions |
|---------|-----------------|--|
| 1 | NC | No Connection |
| 2 | GND | GND Pin |
| 3 | NC | No Connection |
| 4 | RESET | Reset Signal Output Pin |
| 5 | V _{DD} | V _{DD} Pin / Voltage Detect Pin |

SC-82ABB

| Pin No. | Pin name | Functions |
|---------|-----------------|--|
| 1 | NC | No Connection |
| 2 | GND | GND Pin |
| 3 | RESET | Reset Signal Output Pin |
| 4 | V _{DD} | V _{DD} Pin / Voltage Detect Pin |

Absolute Maximum Ratings

| Item | Symbol | Ratings | Units |
|----------------------------|---------------------------|-------------|-------------------------------------|
| Supply voltage | $V_{DD \text{ max.}}$ | -0.3~+6 | V |
| Output voltage | $\overline{\text{RESET}}$ | -0.3~+6 | V |
| Input current (I_{DD}) | I_{DD} | 20 | mA |
| Output current | I_{OUT} | 20 | mA |
| Power dissipation | P_d | 150 (Alone) | SOT-25A, SC-82ABB SSON-4 (Alone) |
| | | 330 (Alone) | |
| Operating temperature | T_{OPR} | -40~+85 | °C |
| Storage temperature | T_{STG} | -65~+150 | °C |

note : With PC board of glass epoxy. (The tab pin is not connected with PC board.)
PC board size of 110×40×0.8mm

Recommended Operating Conditions

| Item | Symbol | Ratings | Units |
|-----------------------|-----------|--|-------|
| Operating temperature | T_{OPR} | -40~+85 | °C |
| Supply voltage | V_{DD} | 1.0~5.5 ($T_a=0\sim+70^\circ\text{C}$) | V |
| | | 1.2~5.5 ($T_a=-40\sim+85^\circ\text{C}$) | |

Pin Explanations

Model name

PST87 A U
a b c

PST88 A N
a b c

| a | | b | | c | |
|-----------|-------|-----------|------------------------|------------------------|-----------|
| TDEL Rank | | VDET Rank | | Packing Specifications | |
| 0 | 20ms | 160 | $V_{DET}=1.60\text{V}$ | R | R Housing |
| 1 | 50ms | } | } | L | L Housing |
| 2 | 100ms | 460 | $V_{DET}=4.60\text{V}$ | | |
| 3 | 200ms | | | | |

Electrical Characteristics (Except where noted otherwise Ta=25°C)

PST87XX

| Item | Symbol | Test Condition | Min. | Typ. | Max. | Units | Circuit |
|-----------------------------------|----------------------|---|-----------------------|-----------------|-----------------------|--------|---------|
| Supply Current | I _{DD} | V _{DD} =V _{TH} +1V | 0.5 | 1.0 | 2.0 | μA | 2 |
| Reset Threshold | V _{TH} | Ta=+25°C, R _L =470Ω, V _{OL} ≤0.4V | V _{TH} -1.5% | V _{TH} | V _{TH} +1.5% | V | 1 |
| | | Ta=-40~+85°C (note1) | V _{TH} -2.5% | V _{TH} | V _{TH} +2.5% | | |
| Reset Threshold Temp. Coefficient | ΔV _{TH} /°C | R _L =4.7kΩ (note2) | | 50 | | ppm/°C | 1 |
| V _{DD} to Reset Delay | t _{RD1} | V _{DD} =(V _{TH} +0.4V)→(V _{TH} -0.4V) R _L =4.7kΩ | | 4.0 | 20 | μs | 5 |
| Reset Active Timeout | t _{RP1} | V _{DD} =(V _{TH} -0.4V)→(V _{TH} +0.4V) R _L =4.7kΩ | 12 | 20 | 30 | ms | 5 |
| | | | 30 | 50 | 75 | | |
| | | | 60 | 100 | 150 | | |
| | | | 120 | 200 | 300 | | |
| RESET Output Voltage | V _{OL} | R _L =470Ω, Ta=25°C, V _{DD} =V _{THMIN.} -0.05V | | 0.1 | 0.4 | V | 4 |
| Reset Threshold Hysteresis | ΔV _{TH} | | 30 | 50 | 100 | mV | 1 |
| Threshold Operating Voltage | V _{OPL} | V _{DD} =V _{DS} , R _L =4.7kΩ, V _{OL} ≤0.4V | | 0.65 | 0.85 | V | 4 |
| Output Current at ON Time 1 | I _{OL1} | V _{DD} =V _{DS} =V _{THMIN.} -0.05V, R _L =0 | 8 | | | mA | 3 |
| Output Current at ON Time 2 | I _{OL2} | V _{DD} =V _{DS} =V _{THMIN.} -0.05V R _L =0, Ta=-40~+85°C (note2) | 6 | | | mA | 3 |

PST88XX

| Item | Symbol | Test Condition | Min. | Typ. | Max. | Units | Circuit |
|-----------------------------------|----------------------|---|-----------------------|-----------------|-----------------------|--------|---------|
| Supply Current | I _{DD} | V _{DD} =V _{TH} +1V | 0.5 | 1.0 | 2.0 | μA | 2 |
| Reset Threshold | V _{TH} | Ta=+25°C, R _L =470Ω, V _{OL} ≤0.4V | V _{TH} -1.5% | V _{TH} | V _{TH} +1.5% | V | 1 |
| | | Ta=-40~+85°C (note1) | V _{TH} -2.5% | V _{TH} | V _{TH} +2.5% | | |
| Reset Threshold Temp. Coefficient | ΔV _{TH} /°C | R _L =4.7kΩ (note2) | | 50 | | ppm/°C | 1 |
| V _{DD} to Reset Delay | t _{RD1} | V _{DD} =(V _{TH} +0.4V)→(V _{TH} -0.4V) R _L =4.7kΩ | | 4.0 | 20 | μs | 5 |
| Reset Active Timeout | t _{RP1} | V _{DD} =(V _{TH} -0.4V)→(V _{TH} +0.4V) R _L =4.7kΩ | 12 | 20 | 30 | ms | 5 |
| | | | 30 | 50 | 75 | | |
| | | | 60 | 100 | 150 | | |
| | | | 120 | 200 | 300 | | |
| RESET Output Voltage | V _{OL} | R _L =470Ω, Ta=25°C, V _{DD} =V _{THMIN.} -0.05V | | 0.1 | 0.4 | V | 4 |
| Reset Threshold Hysteresis | ΔV _{TH} | | 30 | 50 | 100 | mV | 1 |
| Output Leakage Current | I _{OH} | V _{DD} =V _{DS} =5V | | | ±0.1 | μA | 3 |
| Threshold Operating Voltage | V _{OPL} | V _{DD} =V _{DS} , R _L =4.7kΩ, V _{OL} ≤0.4V | | 0.65 | 0.85 | V | 4 |
| Output Current at ON Time 1 | I _{OL1} | V _{DD} =V _{DS} =V _{THMIN.} -0.05V, R _L =0 | 8 | | | mA | 3 |
| Output Current at ON Time 2 | I _{OL2} | V _{DD} =V _{DS} =V _{THMIN.} -0.05V R _L =0, Ta=-40~+85°C (note2) | 6 | | | mA | 3 |

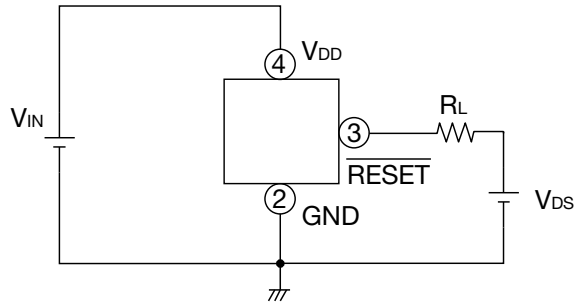
note1 : This device is tested at Ta=25°C, over temperature limits guaranteed by design only.

note2 : This parameter is guaranteed by design.

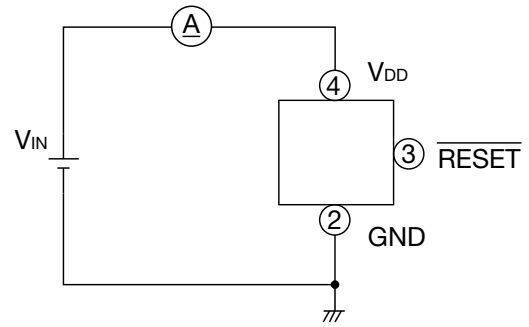
Measuring Circuit

■ PST87XX *②-④ in the circuit diagram is pin number for the SC-82ABB package.

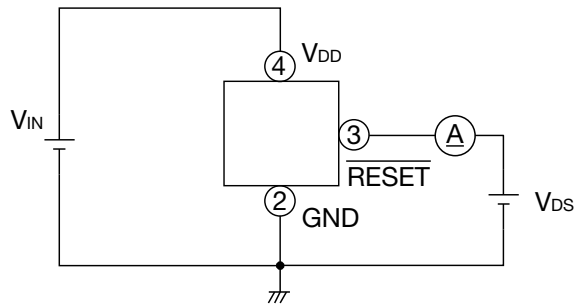
(1)



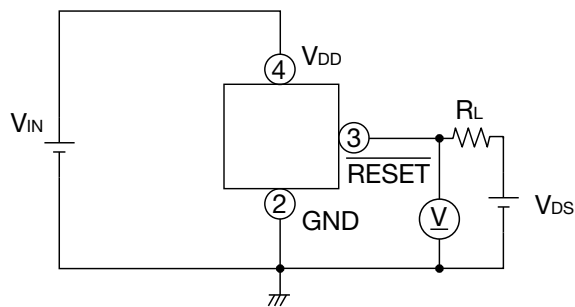
(2)



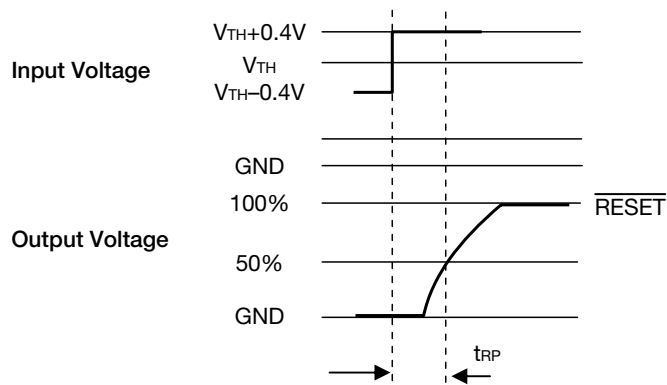
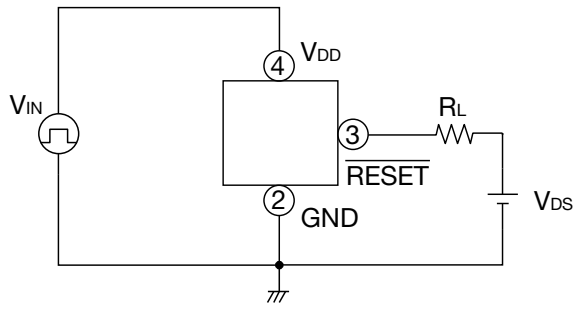
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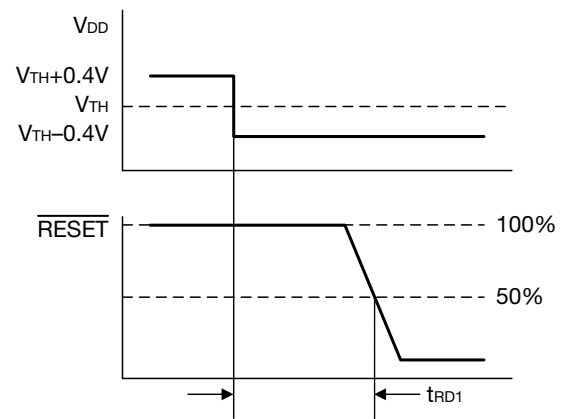
(4)



(5)



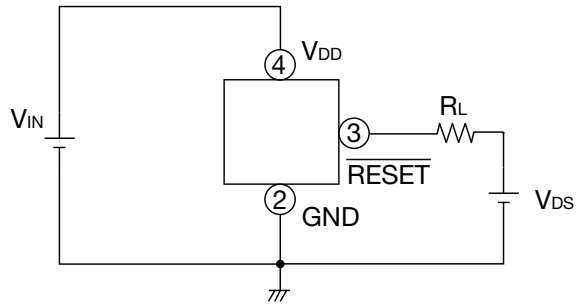
Reset Active Timeout period



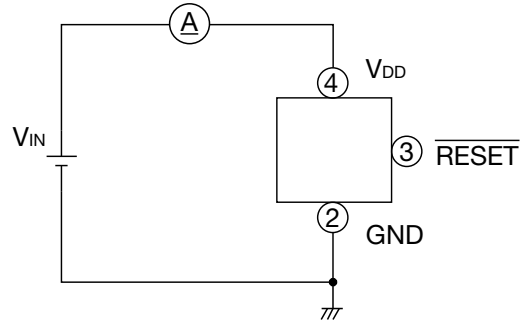
V_{DD} to Reset Delay

■ PST88XX *②-④ in the circuit diagram is pin number for the SC-82ABB package.

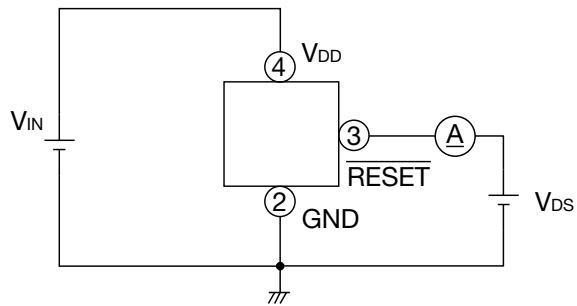
(1)



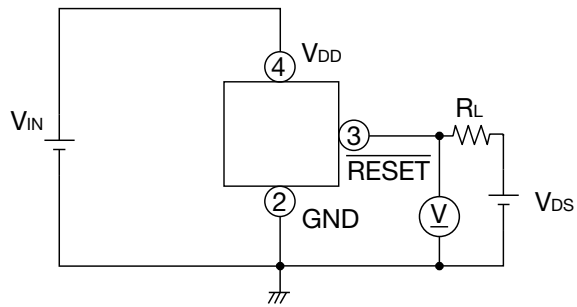
(2)



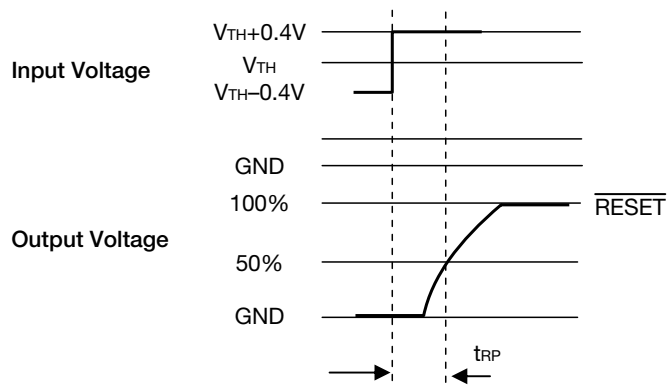
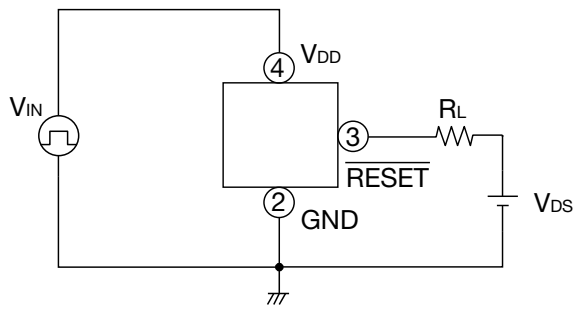
(3)



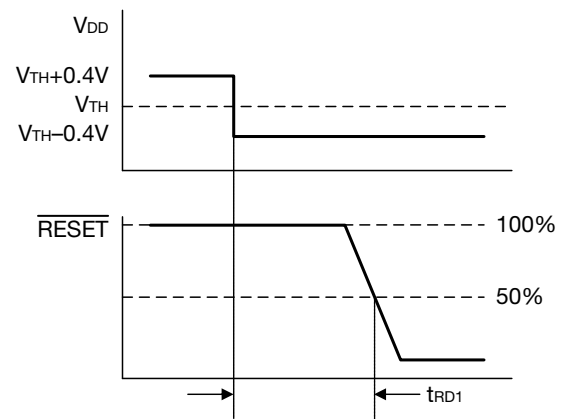
(4)



(5)



Reset Active Timeout period

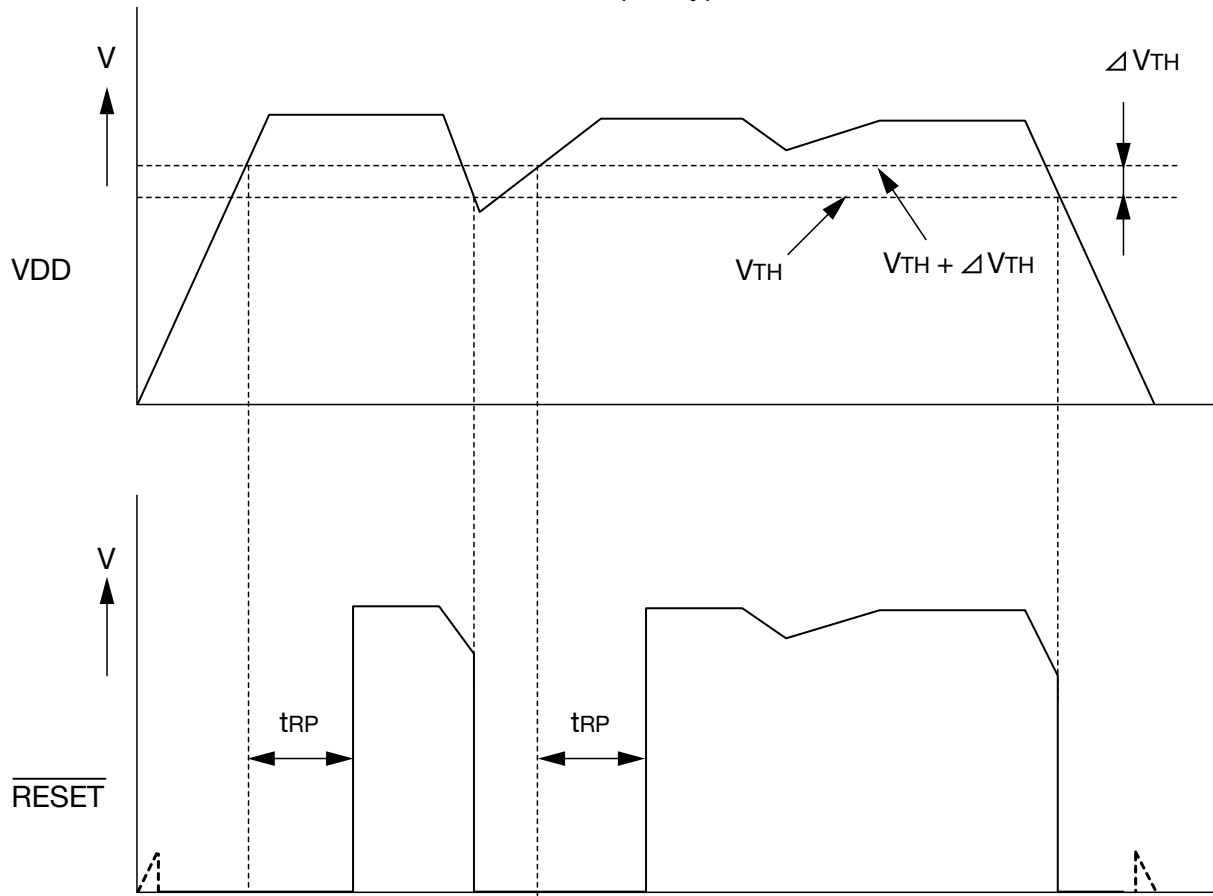


V_{DD} to Reset Delay

Timing Chart

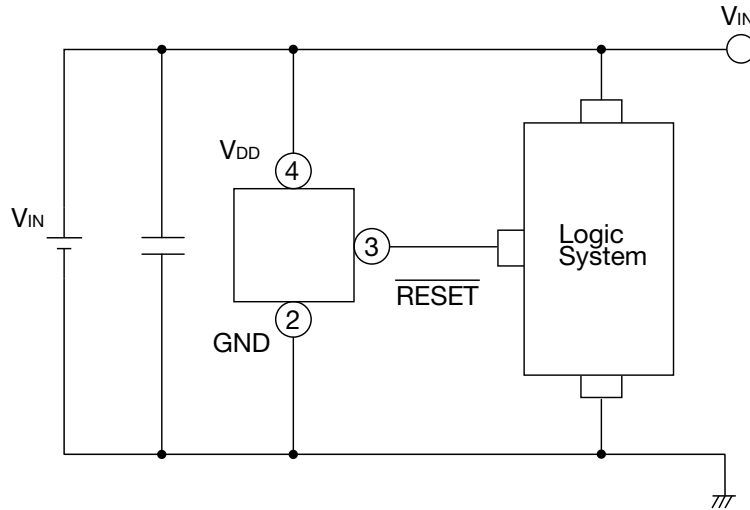
PST87XX, 88XX

Active-Low Output Type

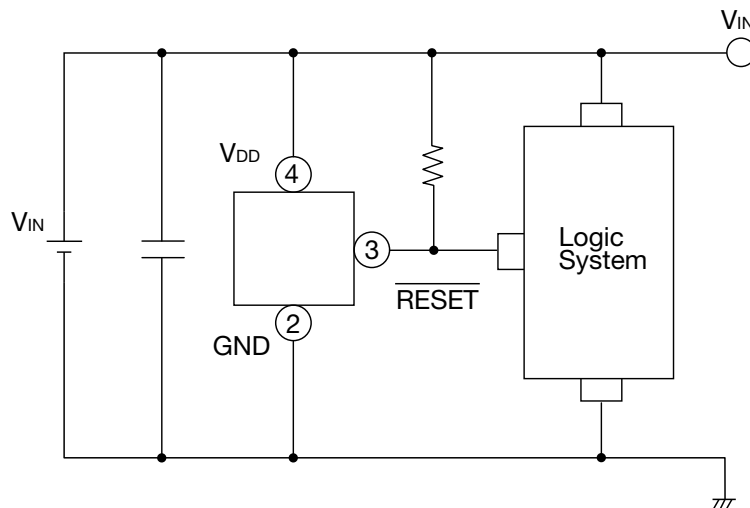


Application Circuits

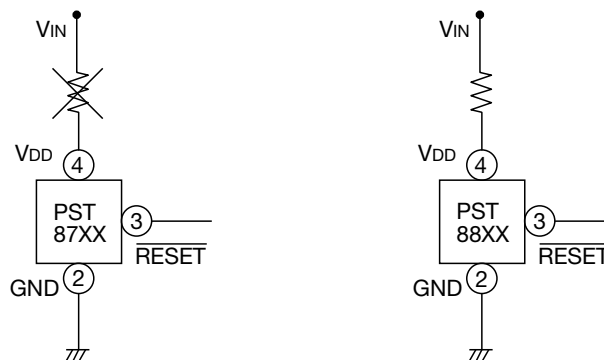
■ PST87XX *②-④ in the circuit diagram is pin number for the SC-82ABB package.



■ PST88XX *②-④ in the circuit diagram is pin number for the SC-82ABB package.



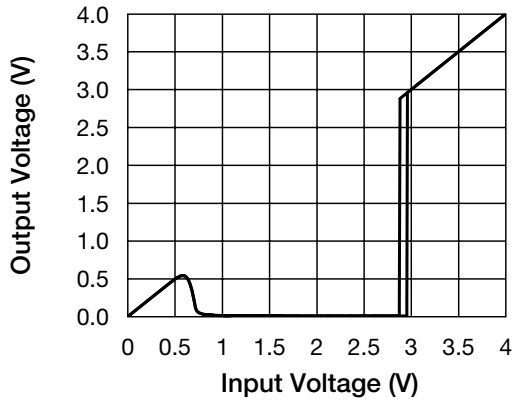
- If the impedance of V_{DD} line is high enough, connect a capacitor between V_{DD} and GND terminal of the IC.
- We shall not be liable for any trouble or damage caused by using this circuit.
- In the event a problem which may affect industrial property or any other rights of us or a third party is encountered during the use of information described in these circuit, Mitsumi Electric Co., Ltd. shall not be liable for any such problem, nor grant a license therefore.



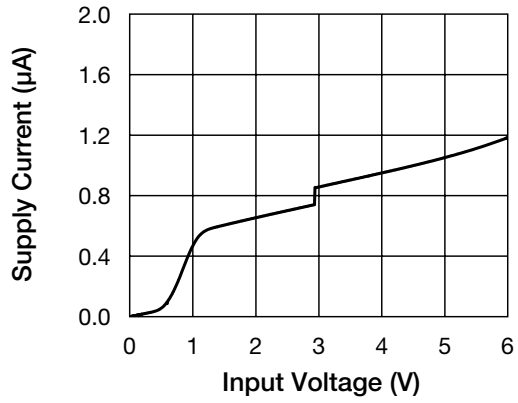
- Please do not put resistance on the PST87XX with circuits where resistance is put in the line V_{IN} as in the above illustration.
- Please be careful as there is a possibility of circuit oscillation with PST88XX.

Characteristics (Except where noted otherwise $V_{CC}=5.0V$, $R_{ICHG}=2.32k\Omega$, $R_{OSC}=100k\Omega$, $T_a=25^\circ C$)

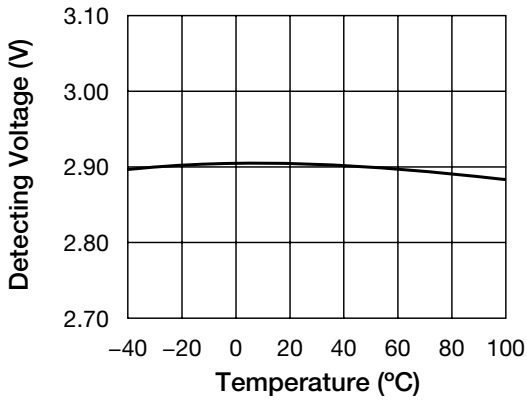
Detecting Voltage



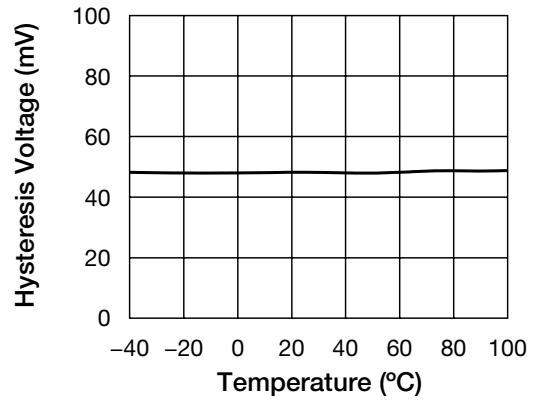
Supply Current



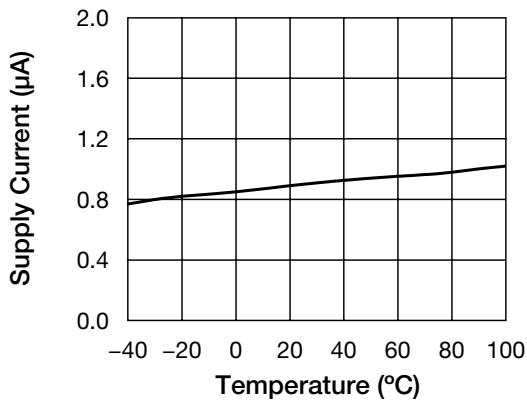
Detecting Voltage - Temperature



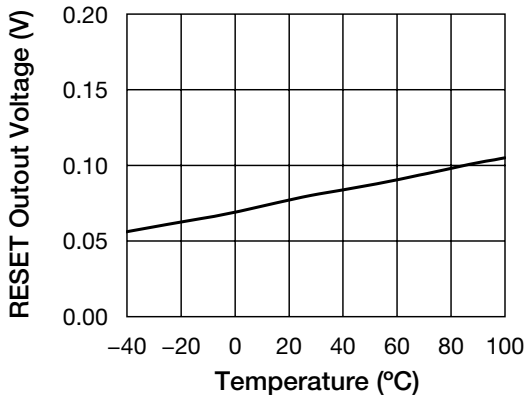
Hysteresis Voltage - Temperature



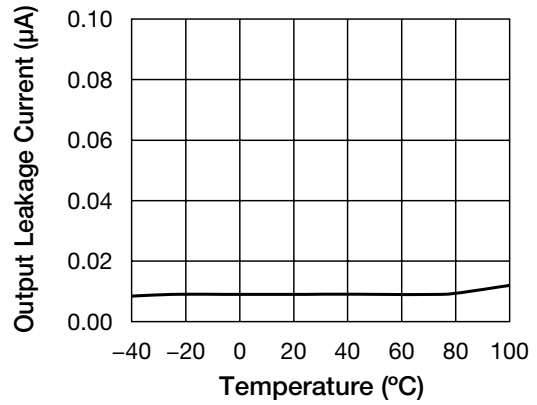
Supply Current - Temperature



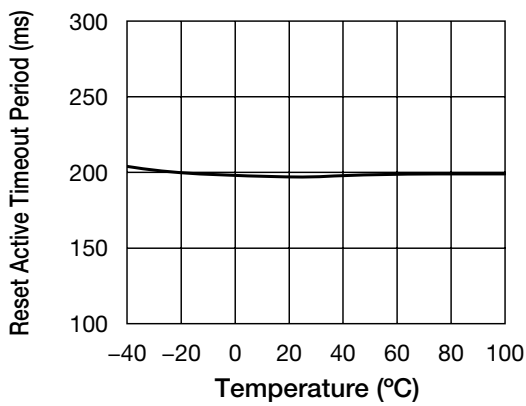
■ RESET Output Voltage - Temperature



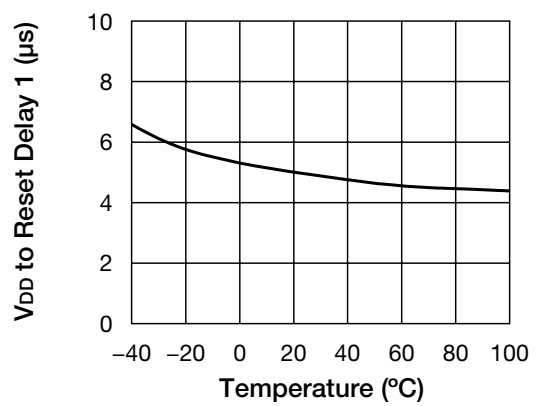
■ Output Leakage Current - Temperature



■ Reset Active Timeout Period - Temperature



■ V_{DD} to Reset Delay - Temperature



■ Output Current at ON Time 2 - Temperature

