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

Outline

This IC is a system reset IC builtin 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	1µA typ.
3.	Reset threshold range	1.6-4.6V
4.	Reset threshold accuracy	±1.5%
5.	Reset hysteresis	50mV typ.
6.	Reset active timeout period	20/50/100/200ms
7.	Output type	PST87 : CMOS output
		PST88 : Open drain output
8.	Manual RESET	PST87/88XA : NO
		PST87/88XR : YES

Packages

SSON-4B
SOT-25A
SC-82

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
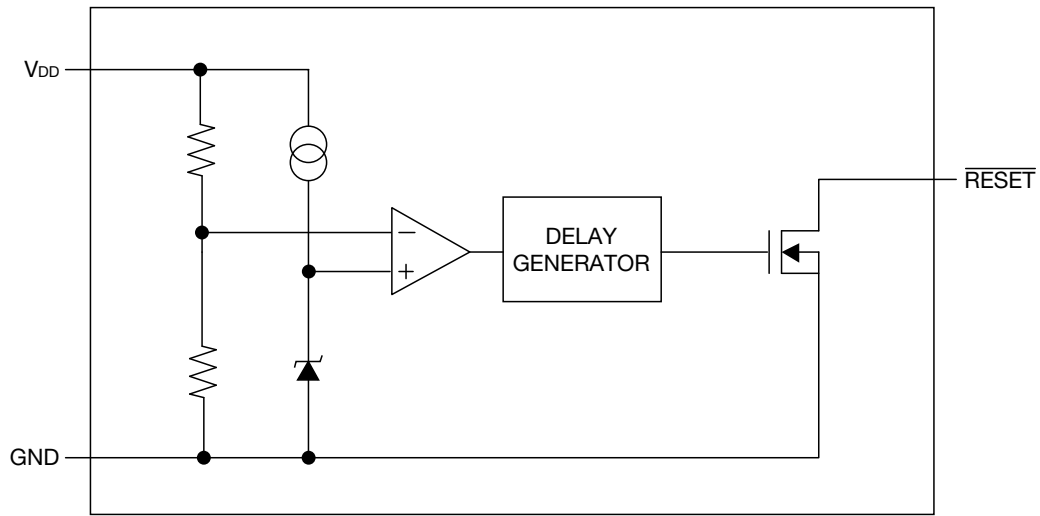6. Mechanical reset circuits

Block Diagram

■ **PST87XA** CMOS output / Manual RESET : NO
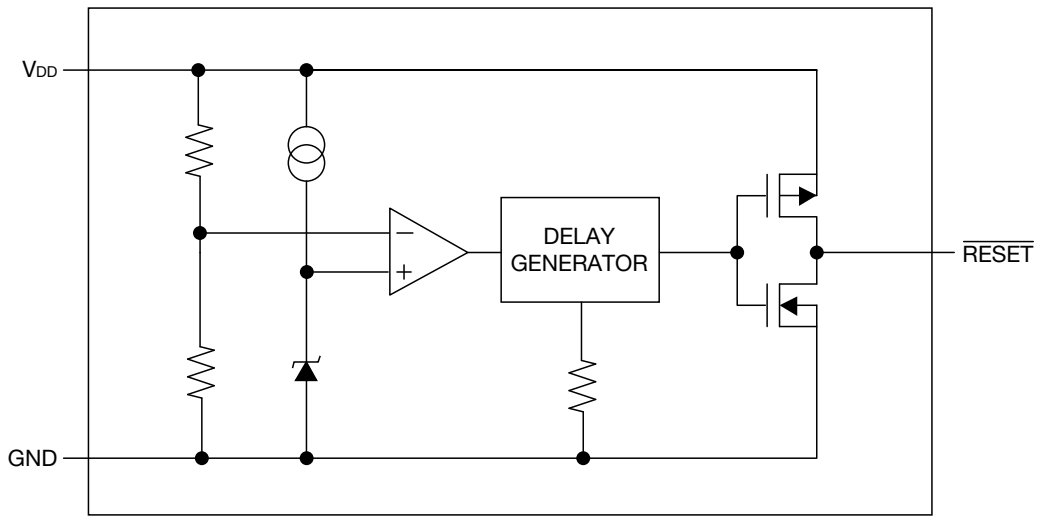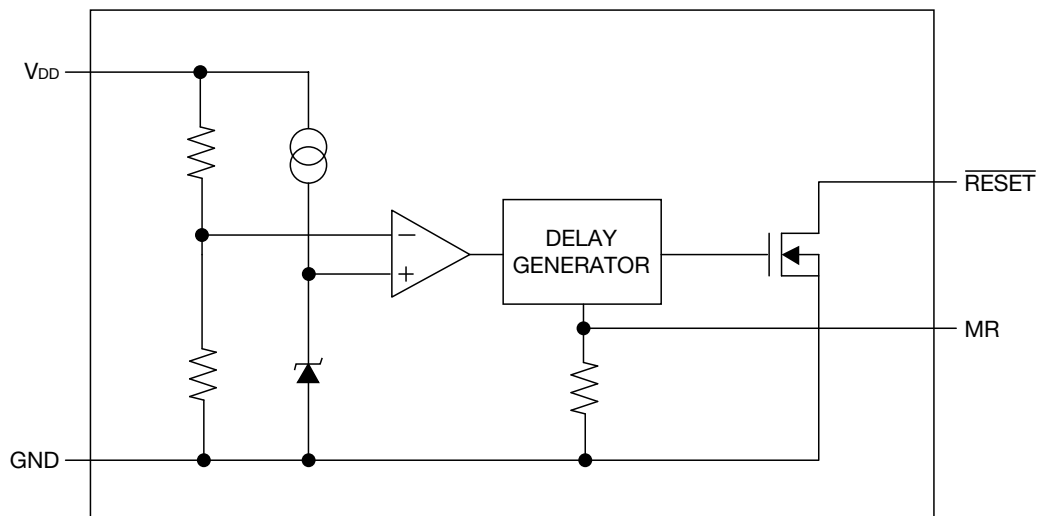

■ **PST87XR** CMOS output / Manual RESET : YES
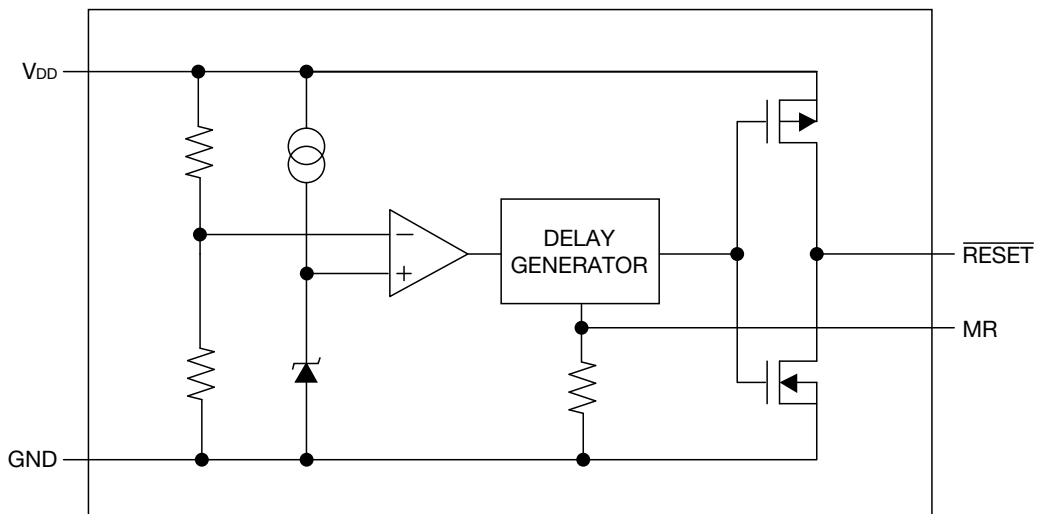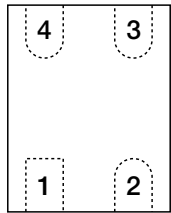
PST88XA Open-Drain output / Manual RESET : NO

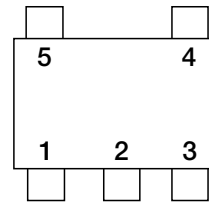## PST88XR Open-Drain output / Manual RESET : YES
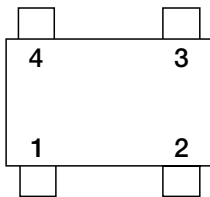
Pin Assignment

PST87XA, PST88XA

SSON-4B (TOP VIEW)

1	GND
2	NC
3	V_{DD}
4	$\overline{RESET}$

SOT-25A (TOP VIEW)

1	NC
2	GND
3	NC
4	$\overline{RESET}$
5	V_{DD}

SC-82 (TOP VIEW)

1	NC
2	GND
3	$\overline{RESET}$
4	V_{DD}

PST87XR, PST88XR
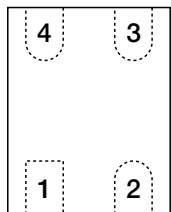
SSON-4B (TOP VIEW)

1	GND
2	MR
3	V_{DD}
4	$\overline{RESET}$
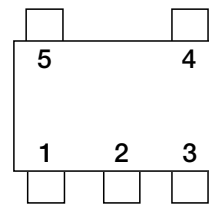
SOT-25A (TOP VIEW)

1	MR
2	GND
3	NC
4	$\overline{RESET}$
5	V_{DD}
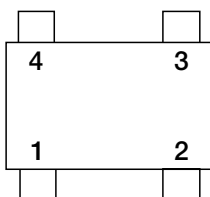
SC-82 (TOP VIEW)

1	MR
2	GND
3	$\overline{RESET}$
4	V_{DD}

Pin Description

PST87XA, PST88XA

■ SSON-4B

Pin No.	Pin name	Functions
1	GND	GND Pin
2	NC	No Connection
3	V_{DD}	V_{DD} Pin / Voltage Detect Pin
4	$\overline{RESET}$	Reset Signal Output Pin

■ SOT-25A

Pin No.	Pin name	Functions
1	NC	No Connection
2	GND	GND Pin
3	NC	No Connection
4	$\overline{RESET}$	Reset Signal Output Pin
5	V_{DD}	V_{DD} Pin / Voltage Detect Pin

■ SC-82

Pin No.	Pin name	Functions
1	NC	No Connection
2	GND	GND Pin
3	$\overline{RESET}$	Reset Signal Output Pin
4	V_{DD}	V_{DD} Pin / Voltage Detect Pin

PST87XR, PST88XR

■ SSON-4B

Pin No.	Pin name	Functions
1	GND	GND Pin
2	MR	Manual RESET Pin
3	V_{DD}	V_{DD} Pin / Voltage Detect Pin
4	$\overline{RESET}$	Reset Signal Output Pin

■ SOT-25A

Pin No.	Pin name	Functions
1	MR	Manual RESET Pin
2	GND	GND Pin
3	NC	No Connection
4	$\overline{RESET}$	Reset Signal Output Pin
5	V_{DD}	V_{DD} Pin / Voltage Detect Pin

■ SC-82

Pin No.	Pin name	Functions
1	MR	Manual RESET Pin
2	GND	GND Pin
3	$\overline{RESET}$	Reset Signal Output Pin
4	V_{DD}	V_{DD} Pin / Voltage Detect Pin

Absolute Maximum Ratings

Item	Symbol	Ratings		Units
Supply voltage	V_{DD} max.	$-0.3\sim+6$		V
Output voltage	$\overline{RESET}$	$-0.3\sim+6$		V
Input current (I_{DD})	I_{DD}	20		mA
Output current	I_{OUT}	20		mA
Power dissipation	P_D	150 (Alone)	SOT-25A, SC-82	mW
		330 (Alone)	SSON-4B (note)	
Operating temperature	T_{OPR}	$-40\sim+85$		°C
Storage temperature	T_{STG}	$-65\sim+150$		°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}	$-40\sim+85$	°C
Supply voltage	V_{DD}	1.0~5.5 (Ta=0~+70°C)	V
		1.2~5.5 (Ta=−40~+85°C)	

Pin Explanations

■ Model name

CMOS output

PST87 ☐ ☐ ☐☐☐ ☐ ☐
　　　 a　b　　c　　 d　e

Open-Drain output

PST88 ☐ ☐ ☐☐☐ ☐ ☐
　　　 a　b　　c　　 d　e

a		b		c		d		e	
TDEL Rank		Manual RESET		VDET Rank		Package Code		Packing Specifications	
0	20ms	A	No	160	$V_{DET}=1.60V$	R	SSON-4B	R	R Housing
1	50ms	R	Yes	≀	≀	N	SOT-25A	L	L Housing
2	100ms			460	$V_{DET}=4.60V$	U	SC-82		
3	200ms								

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

■ PST87XX

Item	Symbol	Test Condition		Min.	Typ.	Max.	Units	Circuit
Reset Threshold	V_{TH}	Ta=+25°C		V_{TH}–1.5%	V_{TH}	V_{TH}+1.5%	V	1
Reset Threshold Temp. Coefficient	$\triangle V_{TH}/°C$	Ta=−40~+85°C			±50		ppm/°C	1
Reset Threshold Hysteresis	$\triangle V_{TH}$	V_{DD}=0V→V_{TH}+1V→0V		30	50	100	mV	1
Supply Current	I_{DD}	V_{DD}=V_{THTYP}/0.85		0.5	1.0	2.0	µA	2
RESET Output Voltage L	V_{OL}	PST87☐☐160N☐ ≀ PST87☐☐350N☐	V_{DD}=V_{TH}–0.1V I_{OL}=1.2mA			0.4	V	3
		PST87☐☐360N☐ ≀ PST87☐☐460N☐	V_{DD}=V_{TH}–0.1V I_{OL}=3.2mA					
RESET Output Voltage H	V_{OH}	PST87☐☐160N☐ ≀ PST87☐☐230N☐	V_{DD}=V_{TH}+0.1V I_{OH}=150µA	V_{DD}=×0.8		0.4	V	4
		PST87☐☐240N☐ ≀ PST87☐☐350N☐	V_{DD}=V_{TH}+0.1V I_{OH}=500µA					
		PST87☐☐360N☐ ≀ PST87☐☐460N☐	V_{DD}=V_{TH}+0.1V I_{OH}=800µA					
V_{DD} to Reset Delay	t_{RD}	V_{DD}=(V_{TH}+0.4V)→(V_{TH}–0.4V) (note2)			4.0	20	µs	5
Reset Active Timeout Period	t_{RP}	V_{DD}=(V_{TH}–0.4V)→(V_{TH}+0.4V)		12	20	30	ms	5
				30	50	75		
				60	100	150		
				120	200	300		
M/R Terminal Input High Voltage	V_{IH}	(note3)		V_{DD}=×0.7			V	6
M/R Terminal Input Low Voltage	V_{IL}	(note3)				V_{DD}=×0.2	V	6
M/R Minimum Input Pulse wide	t_{MR}	(note2) (note3)		1			µs	7

note1 : This device is tested at Ta=25℃, over temperature limits guaranteed by desigh only.

note2 : The parameter is guaranteed by design.

note3 : PST87XR applies to this item.

■ PST88XX

Item	Symbol	Test Condition		Min.	Typ.	Max.	Units	Circuit
Reset Threshold	V_{TH}	Ta=+25°C		V_{TH}−1.5%	V_{TH}	V_{TH}+1.5%	V	1
Reset Threshold Temp. Coefficient	$\triangle V_{TH}$/°C	Ta=−40~+85°C			±50		ppm/°C	1
Reset Threshold Hysteresis	$\triangle V_{TH}$			30	50	100	mV	1
Supply Current	I_{DD}	$V_{DD}=V_{THTYP}/0.85$		0.5	1.0	2.0	µA	2
RESET Output Voltage L	V_{OL}	PST88□□160N□ ⟨ PST88□□350N□	$V_{DD}=V_{TH}$−0.1V I_{OL}=1.2mA			0.4	V	3
		PST88□□360N□ ⟨ PST88□□460N□	$V_{DD}=V_{TH}$−0.1V I_{OL}=3.2mA					
V_{DD} to Reset Delay	t_{RD}	$V_{DD}=(V_{TH}+0.4V) \rightarrow (V_{TH}−0.4V)$			4.0	20	µs	4
Reset Active Timeout Period	t_{RP}	$V_{DD}=(V_{TH}−0.4V) \rightarrow (V_{TH}+0.4V)$		12	20	30	ms	4
				30	50	75		
				60	100	150		
				120	200	300		
Output Leakage Current	I_{LEAK}	$V_{DD}=V_{OL}$=5.5V				±0.1	µA	5
M/R Terminal Input High Voltage	V_{IH}	(note3)		V_{DD}=×0.7			V	6
M/R Terminal Input Low Voltage	V_{IL}	(note3)				V_{DD}=×0.2	V	6
M/R Minimum Input Pulse wide	t_{MR}	(note2) (note3)		1			µs	7

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

note2 : The parameter is guaranteed by design.

note3 : PST88XR applies to this item.

Measuring Circuit

■ **PST87XX** *①-⑤ in the circuit diagram is pin number for the SOT-25A package.

(1)
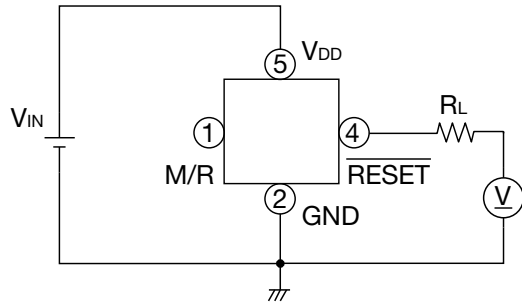
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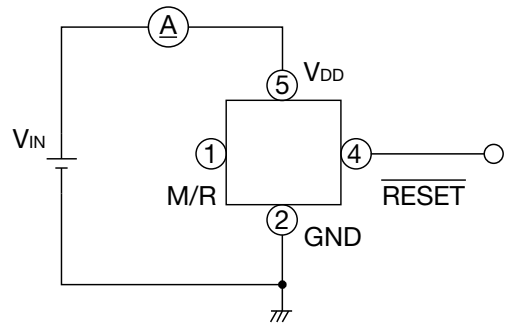
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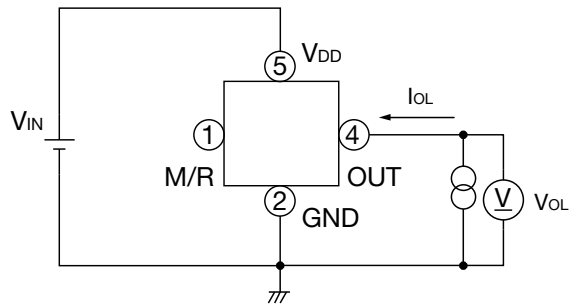
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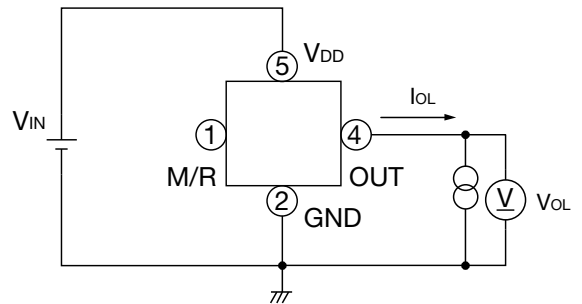
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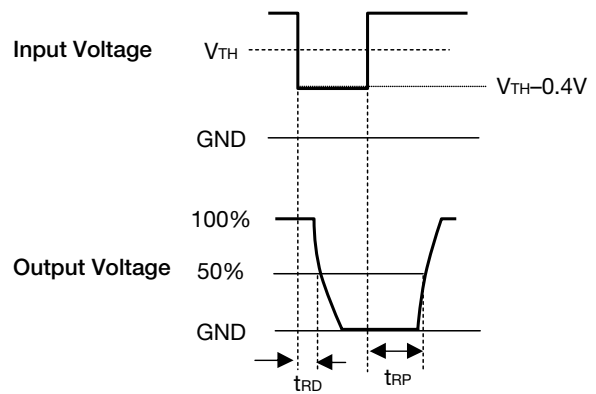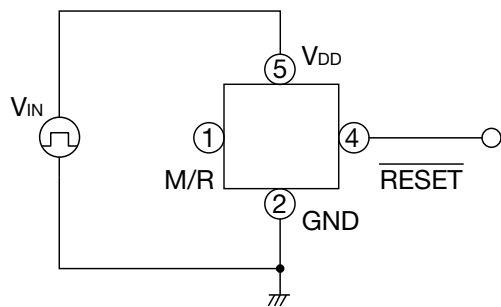
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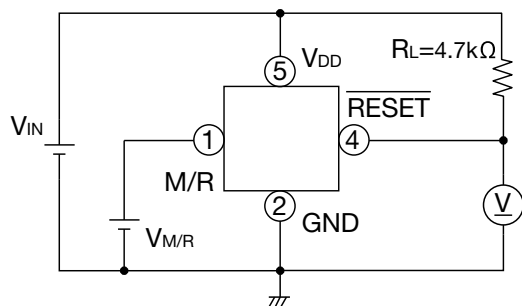
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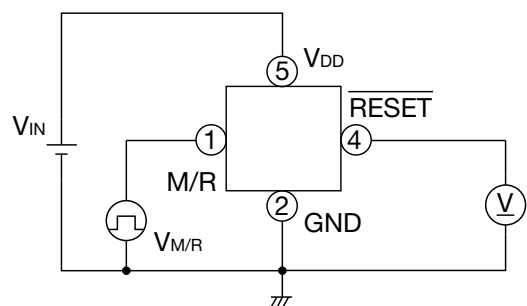
■ **PST88XX** *①-⑤ in the circuit diagram is pin number for the SOT-25A package.

(1)

(2)

(3)

(4)

Input Voltage

$V_{TH}+0.4V$

V_{TH}

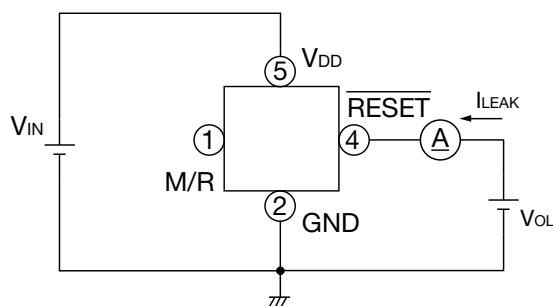$V_{TH}-0.4V$

GND

100%
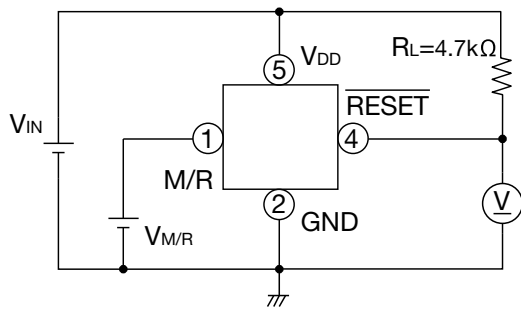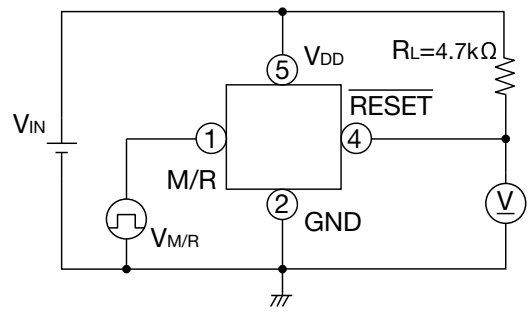
Output Voltage 50%

GND

t_{RD} t_{RP}
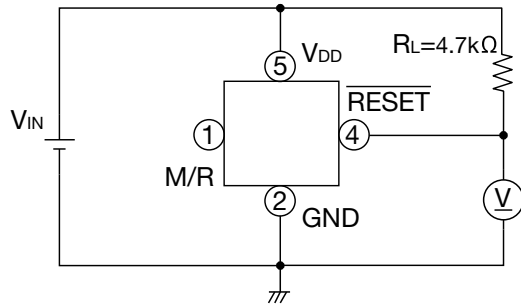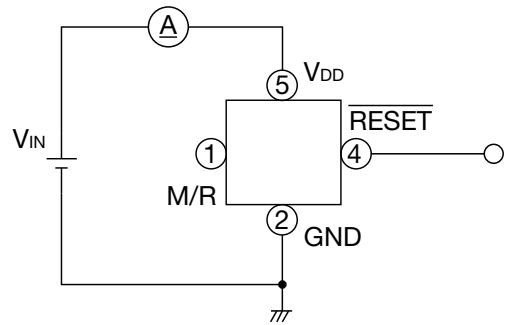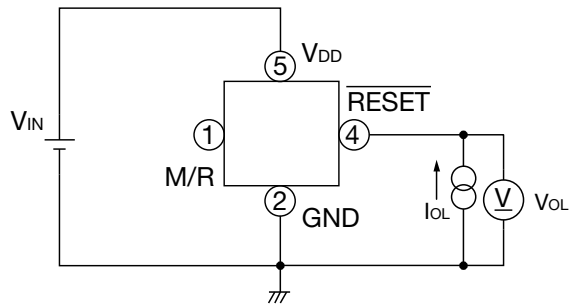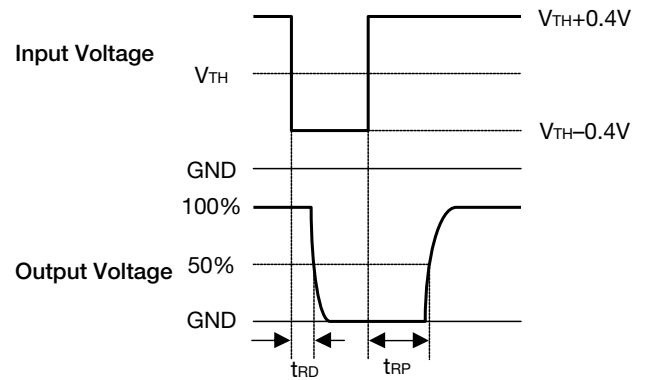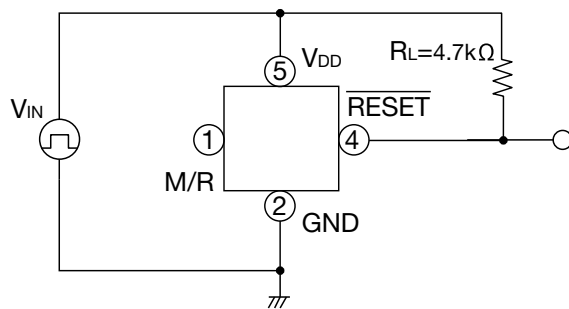
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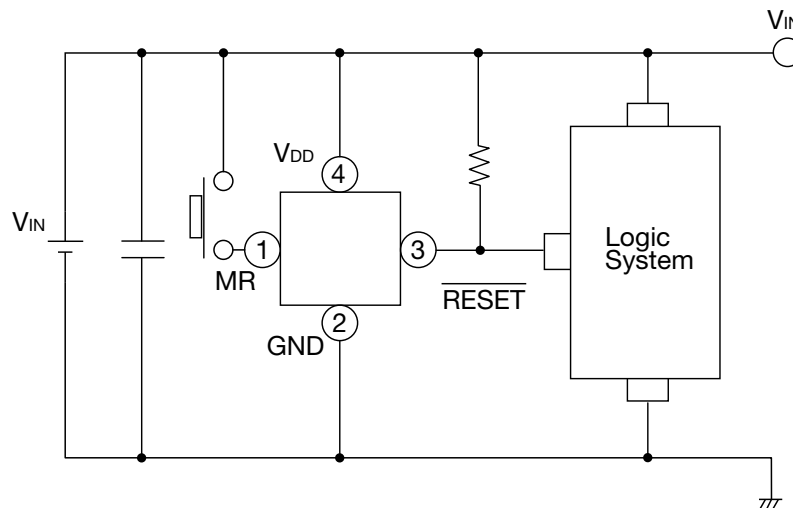(6)

(7)

Timing Chart

PST87XX, 88XX

Active-Low Output Type
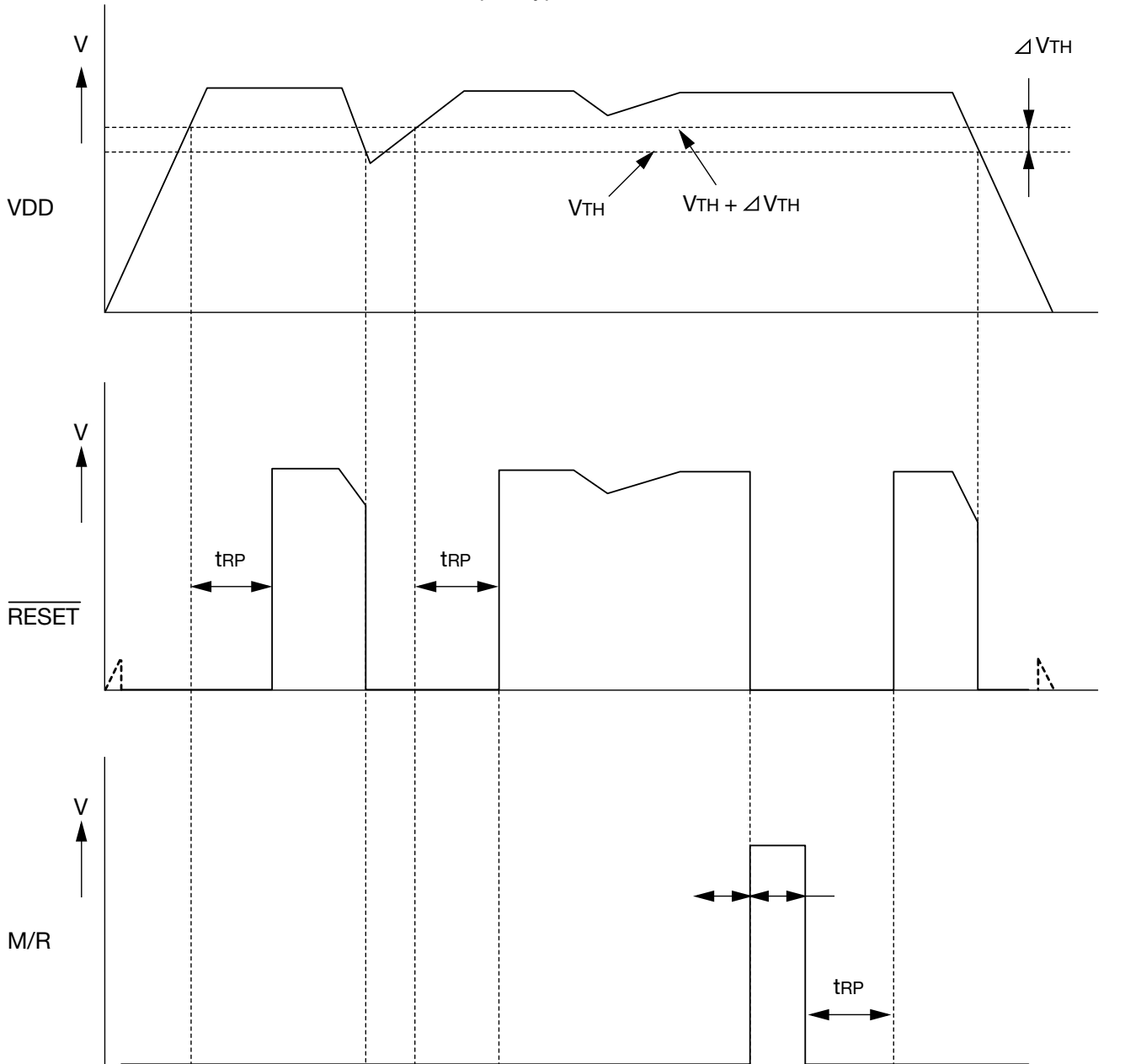
Application Circuits

PST87XX *②-④ in the circuit diagram is pin number for the SC-82AB package.
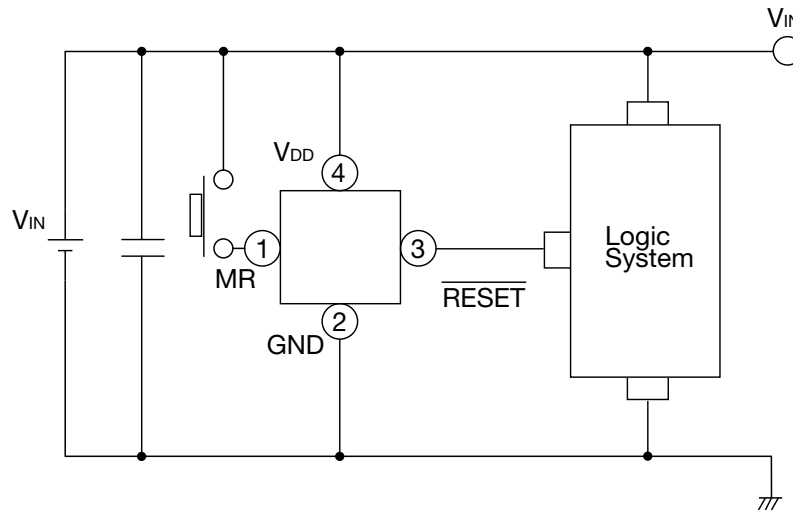
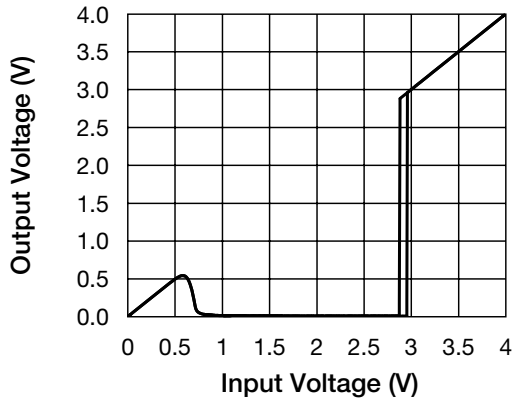**PST88XX** *②-④ in the circuit diagram is pin number for the SC-82AB package.

· 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.
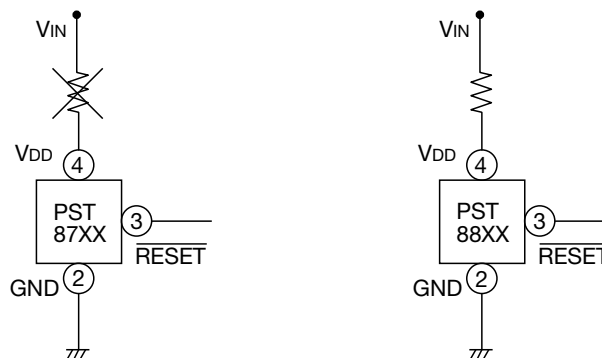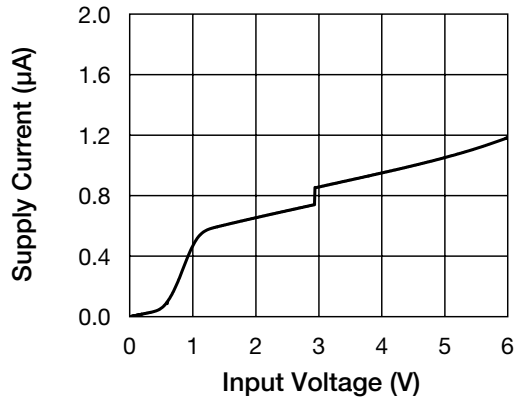

· Please do not put resistance on the PST87XX with circuits where resistance is put in the line V_{IN} as in the above illustration.
· Please be careful as there is a possibility of circuit oscillation with PST88XX.

Characteristics (Except where noted otherwise Vcc=5.0V, RICHG=2.32kΩ, Rosc=100kΩ, Ta=25°C)

■ Detecting Voltage

Output Voltage (V) vs Input Voltage (V)

■ Supply Current

Supply Current (μA) vs Input Voltage (V)

■ Detecting Voltage – Temperature

Detecting Voltage (V) vs Temperature (ºC)
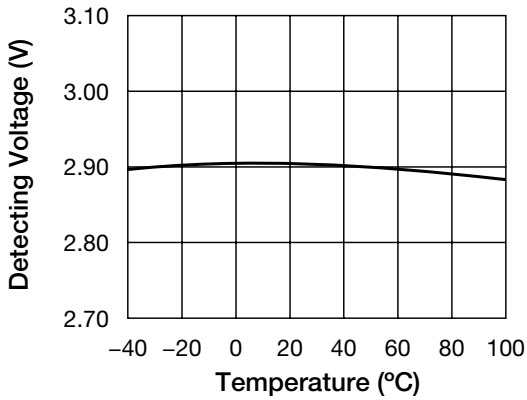
■ Hysteresis Voltage – Temperature

Hysteresis Voltage (mV) vs Temperature (ºC)
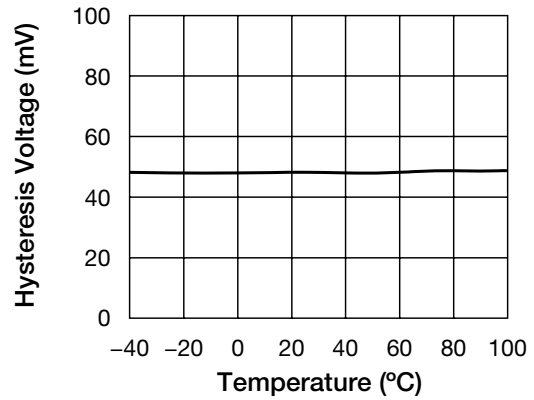
■ Supply Current – Temperature
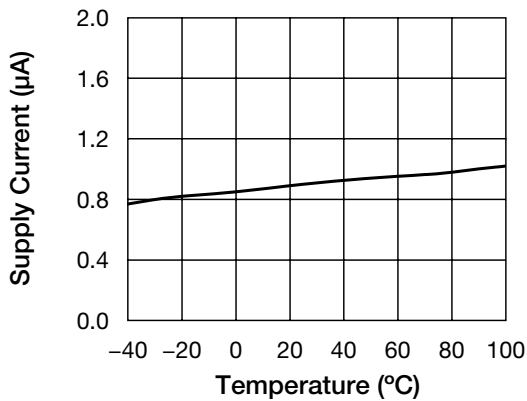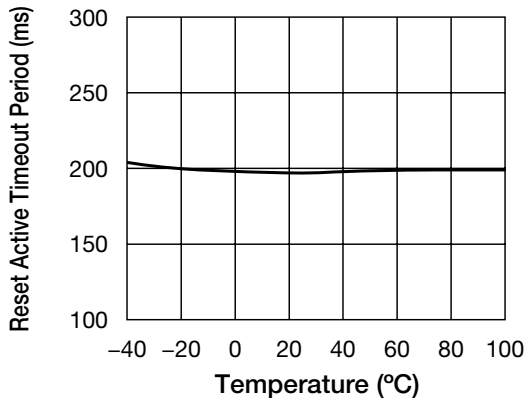
Supply Current (μA) vs Temperature (ºC)

◼ RESET Output Voltage – Temperature
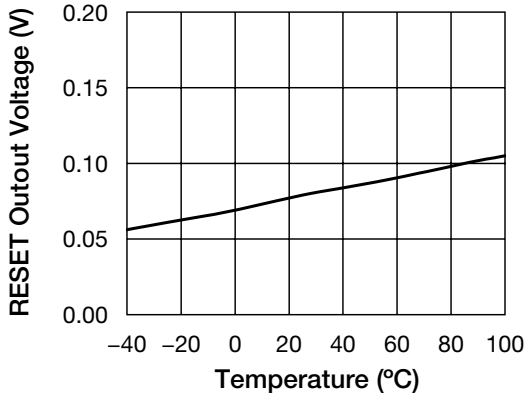
◼ Output Leakage Current – Temperature
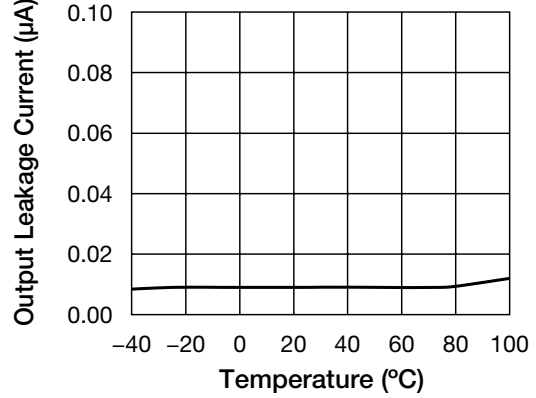
◼ Reset Active Timeout Period – Temperature

◼ V_{DD} to Reset Deray – Temperature