

# 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 $\mu$ 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 output PST88 : Open drain output
8. Manual RESET	PST87/88XA : NO PST87/88XR : YES

## Packages

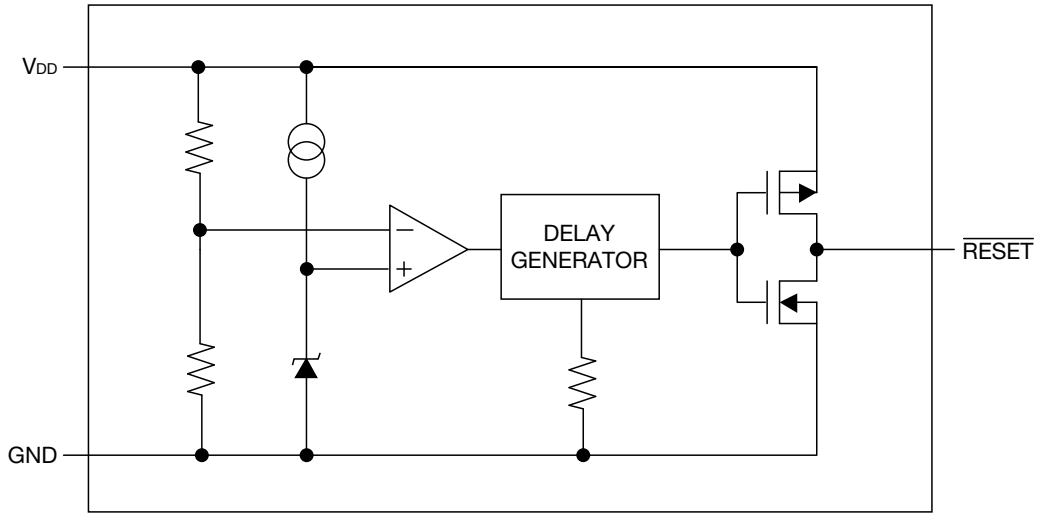
SSON-4B  
SOT-25A  
SC-82

## Applications

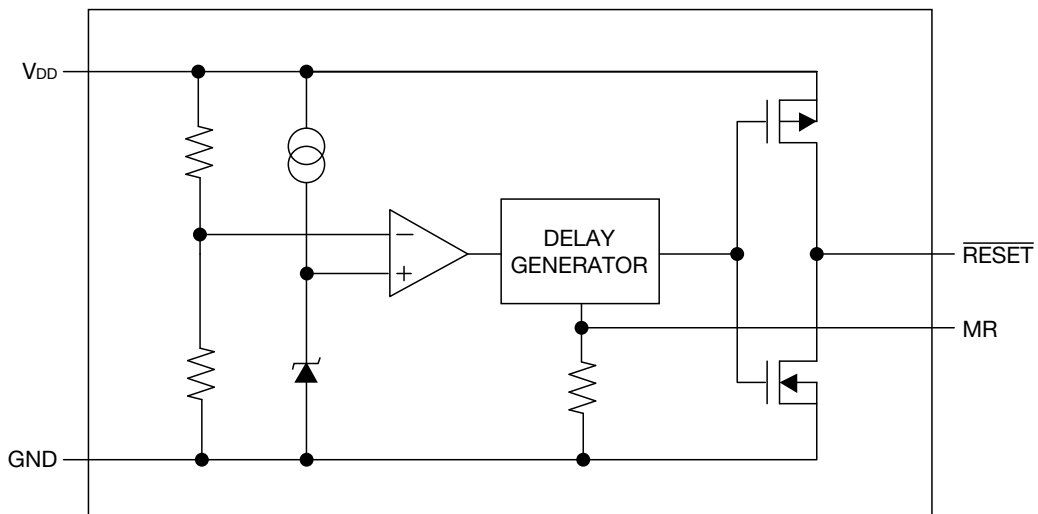
1. Reset circuits for microcomputers, CPUs and MPUs
2. Reset circuits for logic circuits
3. Battery voltage check circuits
4. Back-up power supply switching circuits
5. Level detection circuits
6. Mechanical reset circuits

Block Diagram

■ PST87XA CMOS output / Manual RESET : NO

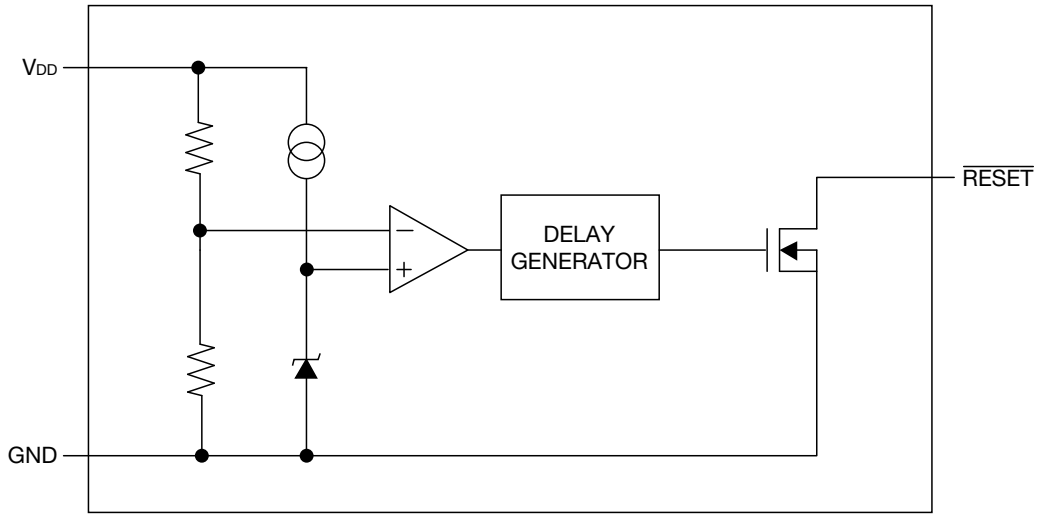


■ PST87XR CMOS output / Manual RESET : YES

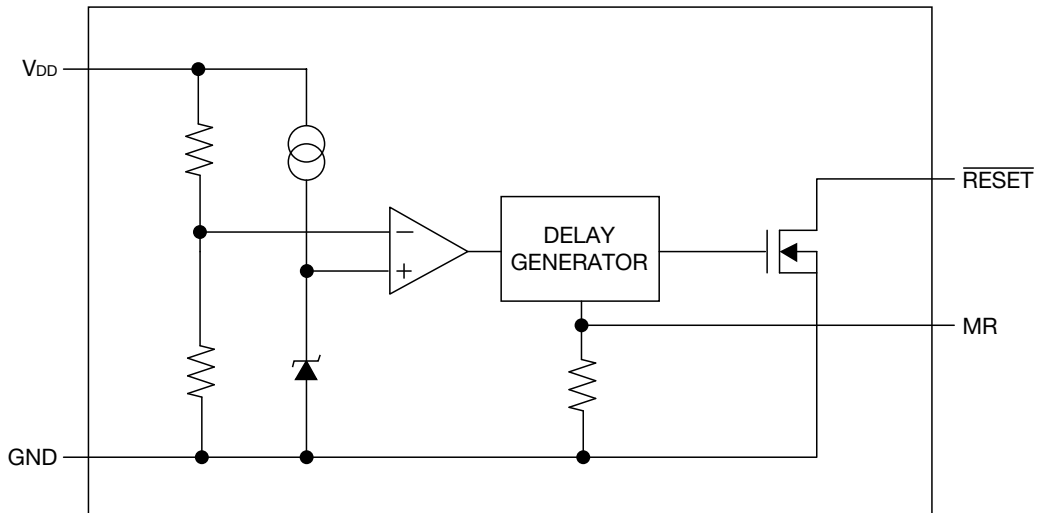


• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

■ PST88XA Open-Drain output / Manual RESET : NO



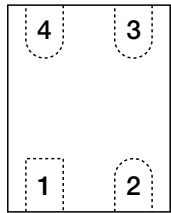
■ PST88XR Open-Drain output / Manual RESET : YES



• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
• The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

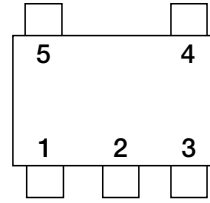
## Pin Assignment

### PST87XA, PST88XA



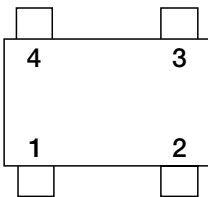
SSON-4B  
(TOP VIEW)

1	GND
2	NC
3	V <sub>DD</sub>
4	RESET



SOT-25A  
(TOP VIEW)

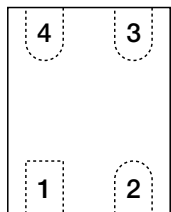
1	NC
2	GND
3	NC
4	RESET
5	V <sub>DD</sub>



SC-82  
(TOP VIEW)

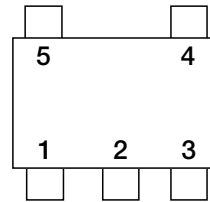
1	NC
2	GND
3	RESET
4	V <sub>DD</sub>

### PST87XR, PST88XR



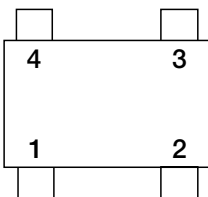
SSON-4B  
(TOP VIEW)

1	GND
2	MR
3	V <sub>DD</sub>
4	RESET



SOT-25A  
(TOP VIEW)

1	MR
2	GND
3	NC
4	RESET
5	V <sub>DD</sub>



SC-82  
(TOP VIEW)

1	MR
2	GND
3	RESET
4	V <sub>DD</sub>

## Pin Description

### PST87XA, PST88XA

#### SSON-4B

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

#### SOT-25A

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

#### SC-82

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

### PST87XR, PST88XR

#### SSON-4B

Pin No.	Pin name	Functions
1	GND	GND Pin
2	MR	Manual RESET Pin
3	V <sub>DD</sub>	V <sub>DD</sub> Pin / Voltage Detect Pin
4	$\overline{\text{RESET}}$	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	$\overline{\text{RESET}}$	Reset Signal Output Pin
5	V <sub>DD</sub>	V <sub>DD</sub> Pin / Voltage Detect Pin

#### SC-82

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

## Absolute Maximum Ratings

Item	Symbol	Ratings	Units
Supply voltage	V <sub>DD</sub> max.	-0.3~+6	V
Output voltage	RESET	-0.3~+6	V
Input current (I <sub>DD</sub> )	I <sub>DD</sub>	20	mA
Output current	I <sub>OUT</sub>	20	mA
Power dissipation	P <sub>d</sub>	150 (Alone)	mW
		330 (Alone)	
Operating temperature	T <sub>OPR</sub>	-40~+85	°C
Storage temperature	T <sub>STG</sub>	-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 <sub>OPR</sub>	-40~+85	°C
Supply voltage	V <sub>DD</sub>	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 <sub>DET</sub> =1.60V	R	SSON-4B	R	R Housing
1	50ms	R	Yes	{	{	N	SOT-25A	L	L Housing
2	100ms			460	V <sub>DET</sub> =4.60V	U	SC-82		
3	200ms								

• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

**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	$\Delta V_{TH}/^{\circ}C$	Ta=-40~+85°C		±50		ppm/°C	1	
Reset Threshold Hysteresis	$\Delta V_{TH}$	$V_{DD}=0V \rightarrow V_{TH}+1V \rightarrow 0V$	30	50	100	mV	1	
Supply Current	$I_{DD}$	$V_{DD}=V_{TH(TYP)}/0.85$	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□ $V_{DD}=V_{TH}+0.1V$ $I_{OH}=150\mu A$	$V_{DD} \times 0.8$		0.4	V	4	
		PST87□□240N□ } PST87□□350N□ $V_{DD}=V_{TH}+0.1V$ $I_{OH}=500\mu A$						
		PST87□□360N□ } PST87□□460N□ $V_{DD}=V_{TH}+0.1V$ $I_{OH}=800\mu A$						
V <sub>DD</sub> to Reset Delay	$t_{RD}$	$V_{DD}=(V_{TH}+0.4V) \rightarrow (V_{TH}-0.4V)$ (note2)		4.0	20	μs	5	
Reset Active Timeout Period	$t_{RP}$	$V_{DD}=(V_{TH}-0.4V) \rightarrow (V_{TH}+0.4V)$		12	20	30	ms	5
				30	50	75		
				60	100	150		
				120	200	300		
M/R Terminal Input High Voltage	$V_{IH}$	(note3)	$V_{DD} \times 0.7$			V	6	
M/R Terminal Input Low Voltage	$V_{IL}$	(note3)			$V_{DD} \times 0.2$	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 : PST87XR applies to this item.

■ PST88XX

Item	Symbol	Test Condition	Min.	Typ.	Max.	Units	Circuit
Reset Threshold	$V_{TH}$	$T_a=+25^{\circ}C$	$V_{TH}-1.5\%$	$V_{TH}$	$V_{TH}+1.5\%$	V	1
Reset Threshold Temp. Coefficient	$\Delta V_{TH}/^{\circ}C$	$T_a=-40\sim+85^{\circ}C$		$\pm 50$		ppm/ $^{\circ}C$	1
Reset Threshold Hysteresis	$\Delta V_{TH}$		30	50	100	mV	1
Supply Current	$I_{DD}$	$V_{DD}=V_{TH(TYP)}/0.85$	0.5	1.0	2.0	$\mu A$	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	$\mu s$	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	$I_{LEAK}$	$V_{DD}=V_{OL}=5.5V$			$\pm 0.1$	$\mu A$	5
M/R Terminal Input High Voltage	$V_{IH}$	(note3)	$V_{DD}\times 0.7$			V	6
M/R Terminal Input Low Voltage	$V_{IL}$	(note3)			$V_{DD}\times 0.2$	V	6
M/R Minimum Input Pulse wide	$t_{MR}$	(note2) (note3)	1			$\mu s$	7

note1 : This device is tested at  $T_a=25^{\circ}C$ , over temperature limits guaranteed by design only.

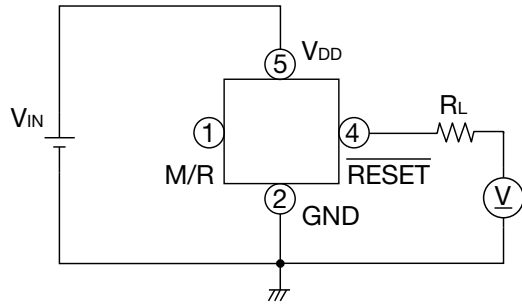
note2 : The parameter is guaranteed by design.

note3 : PST88XR applies to this item.

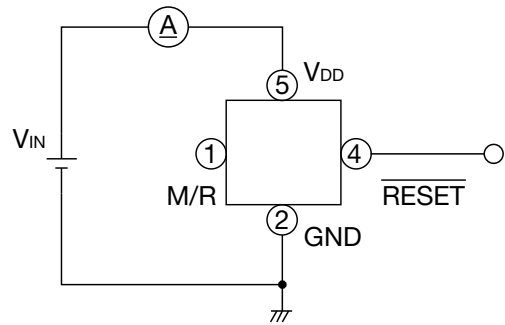
## Measuring Circuit

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

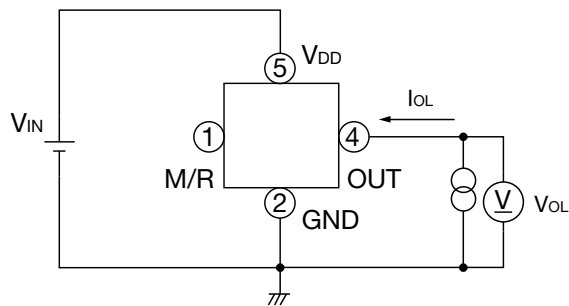
(1)



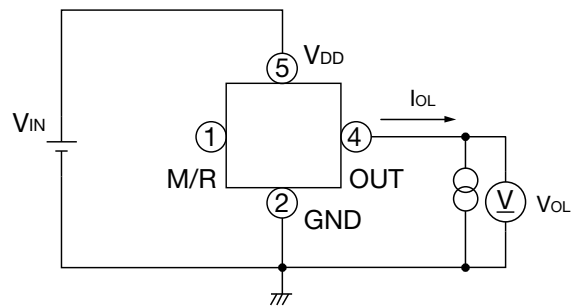
(2)



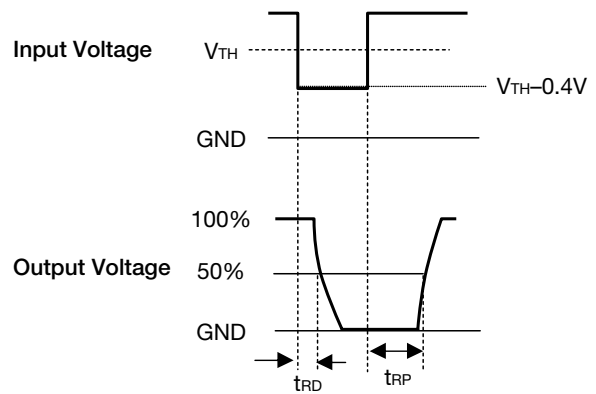
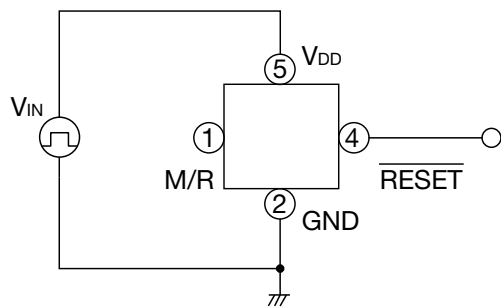
(3)



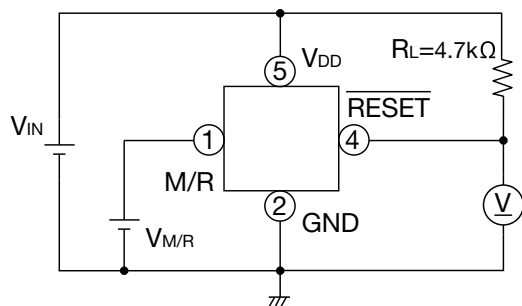
(4)



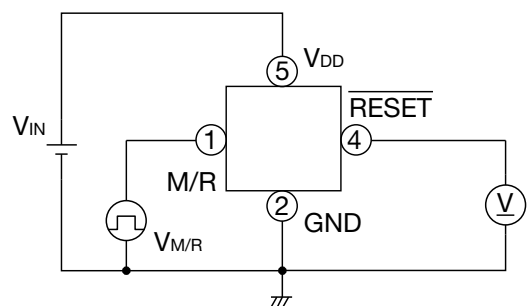
(5)



(6)



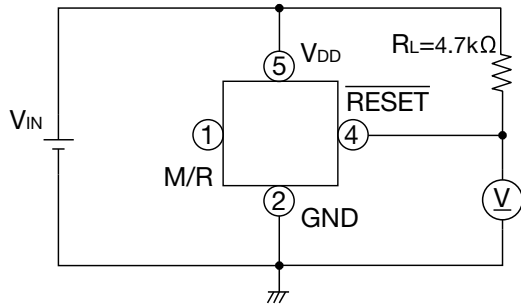
(7)



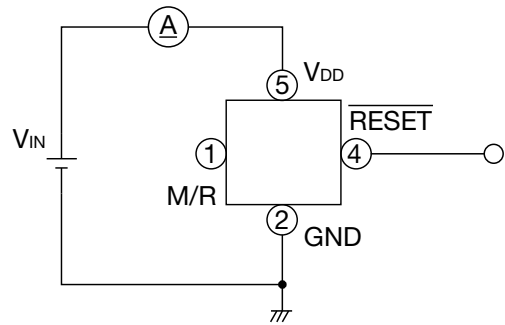
• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

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

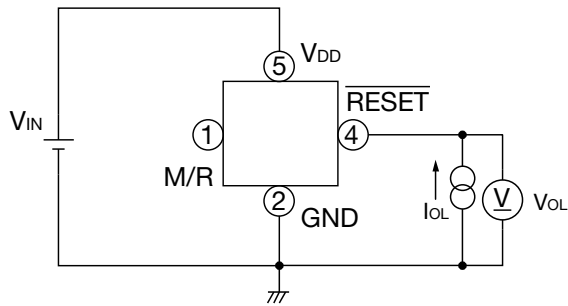
(1)



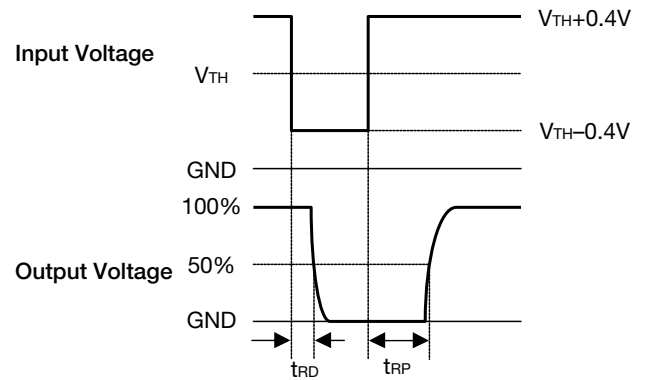
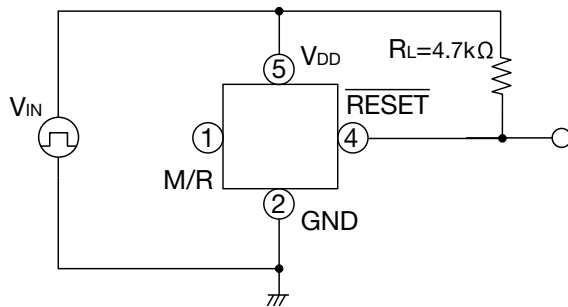
(2)



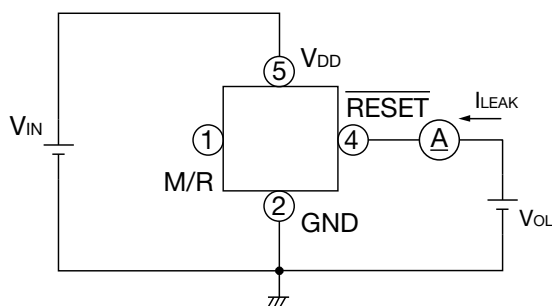
(3)



(4)

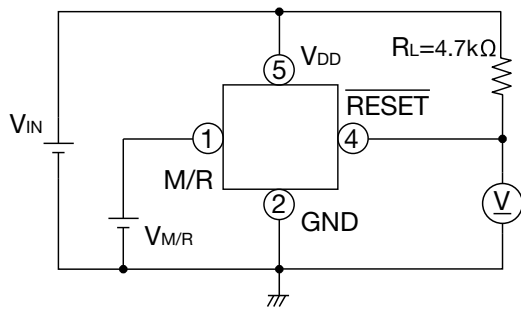


(5)

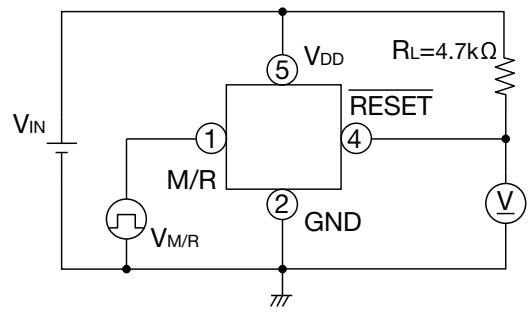


• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

(6)



(7)

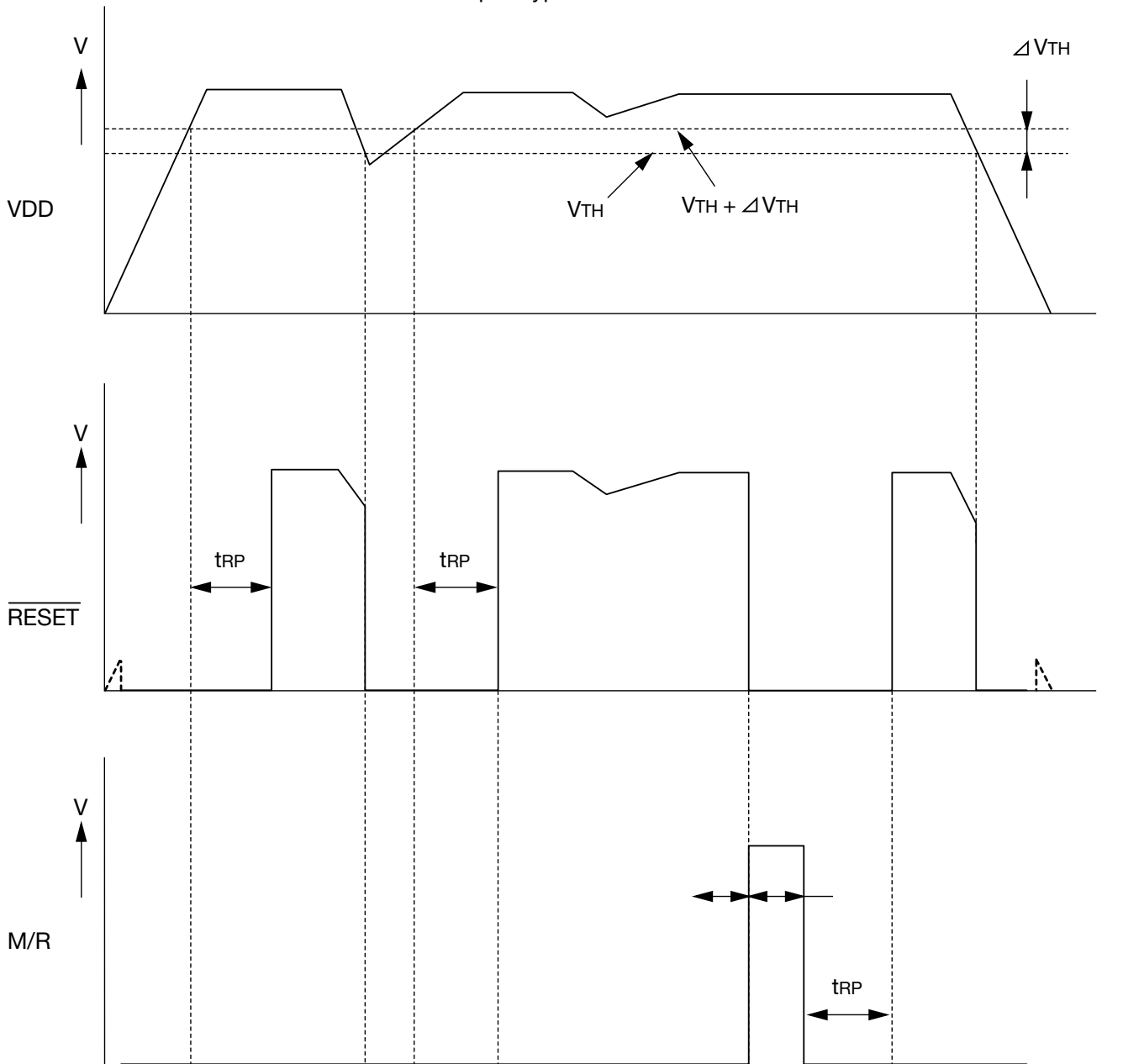


• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

Timing Chart

PST87XX, 88XX

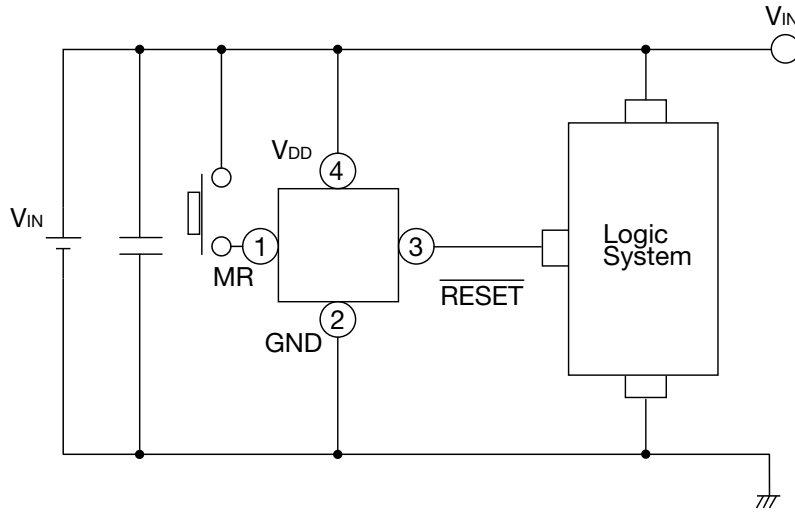
Active-Low Output Type



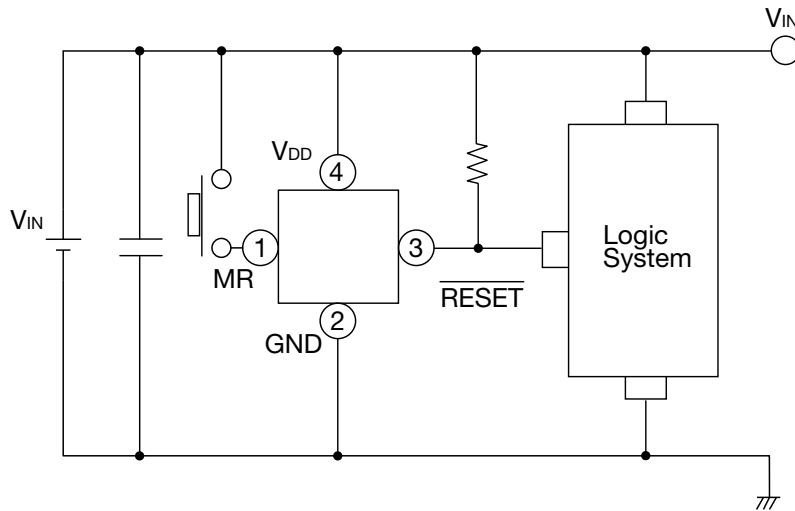
• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

Application Circuits

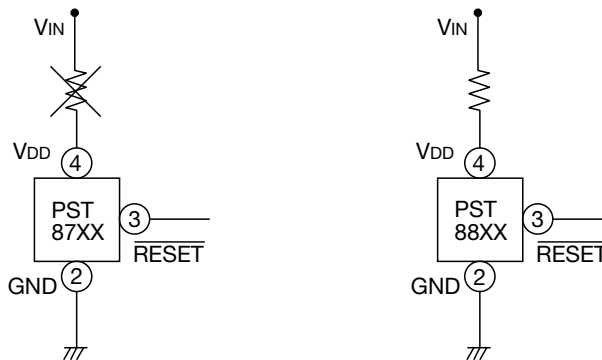
■ PST87XX \*②-④ in the circuit diagram is pin number for the SC-82AB package.



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



- If the impedance of V<sub>DD</sub> line is high enough, connect a capacitor between V<sub>DD</sub> 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.

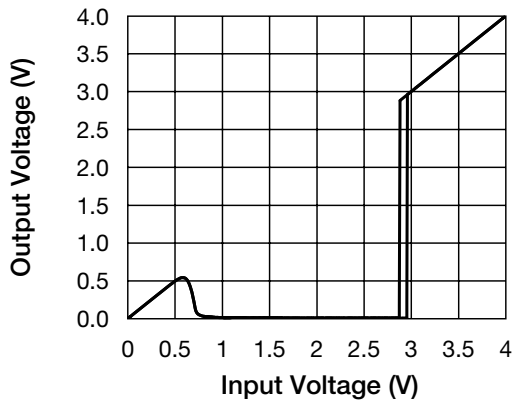


- Please do not put resistance on the PST87XX with circuits where resistance is put in the line V<sub>IN</sub> as in the above illustration.
- Please be careful as there is a possibility of circuit oscillation with PST88XX.

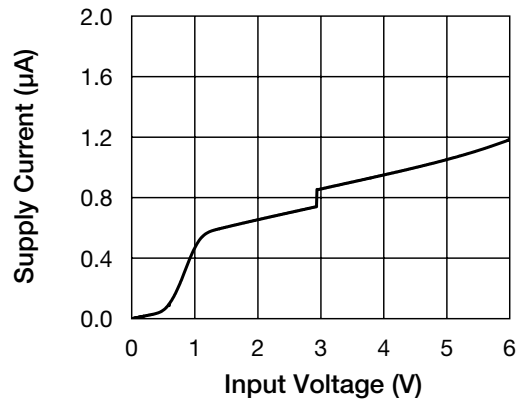
• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

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

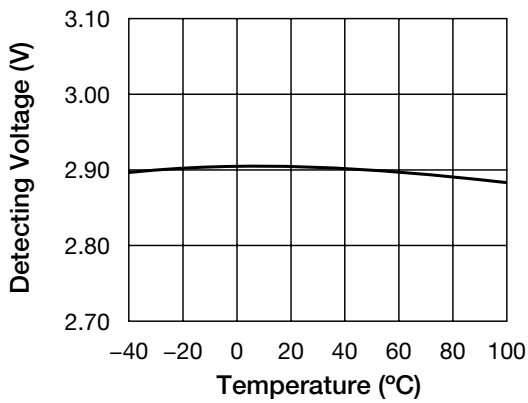
**Detecting Voltage**



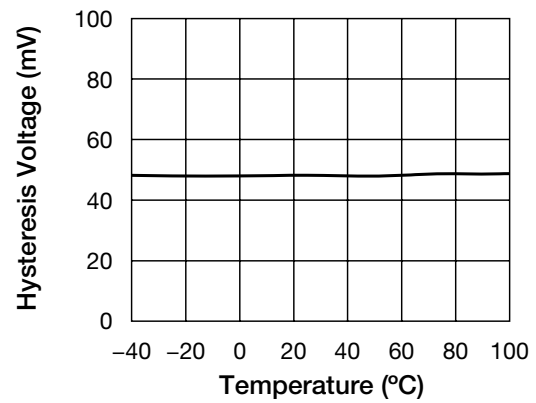
**Supply Current**



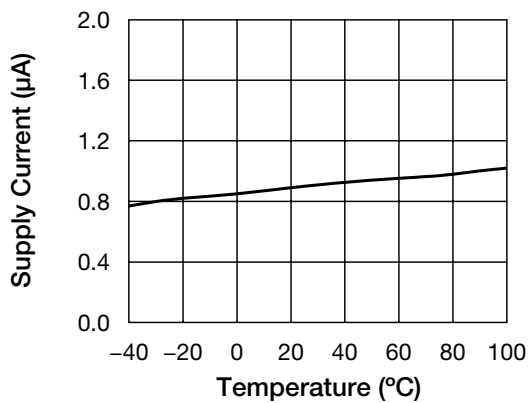
**Detecting Voltage - Temperature**



**Hysteresis Voltage - Temperature**

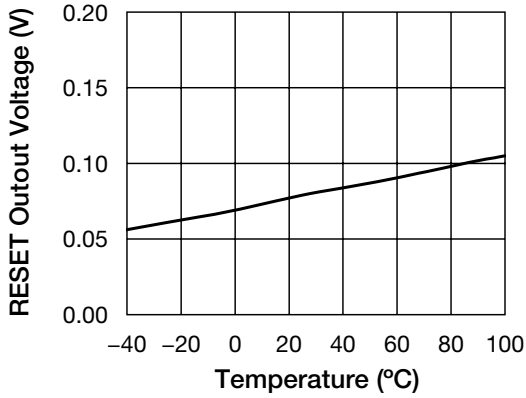


**Supply Current - Temperature**

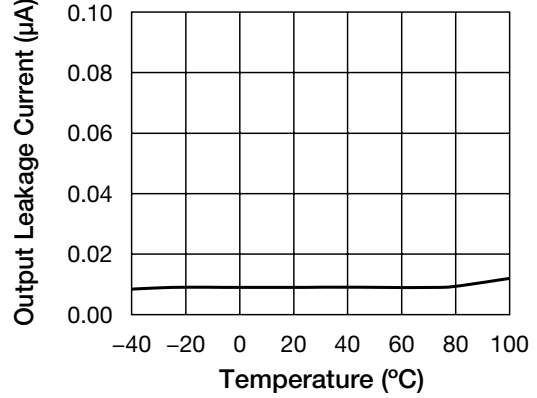


• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.

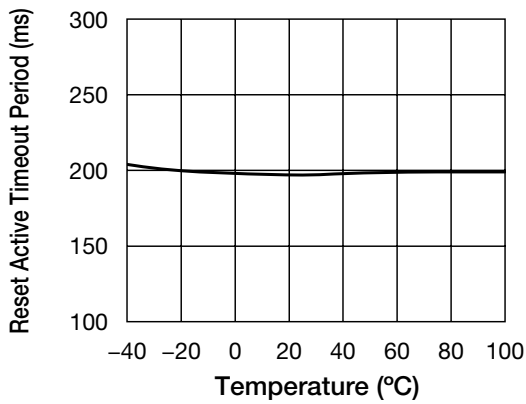
**RESET Output Voltage - Temperature**



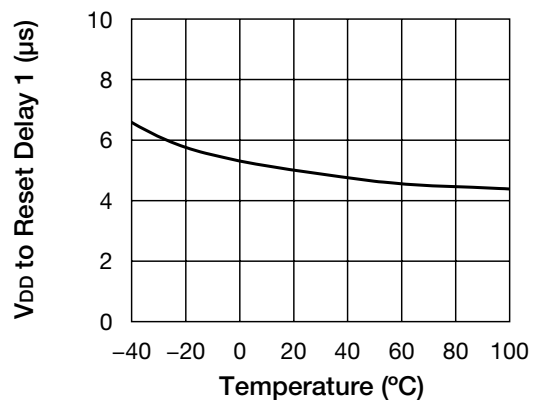
**Output Leakage Current - Temperature**



**Reset Active Timeout Period - Temperature**



**V<sub>DD</sub> to Reset Delay - Temperature**



• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.  
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their specifications.