

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

Packages

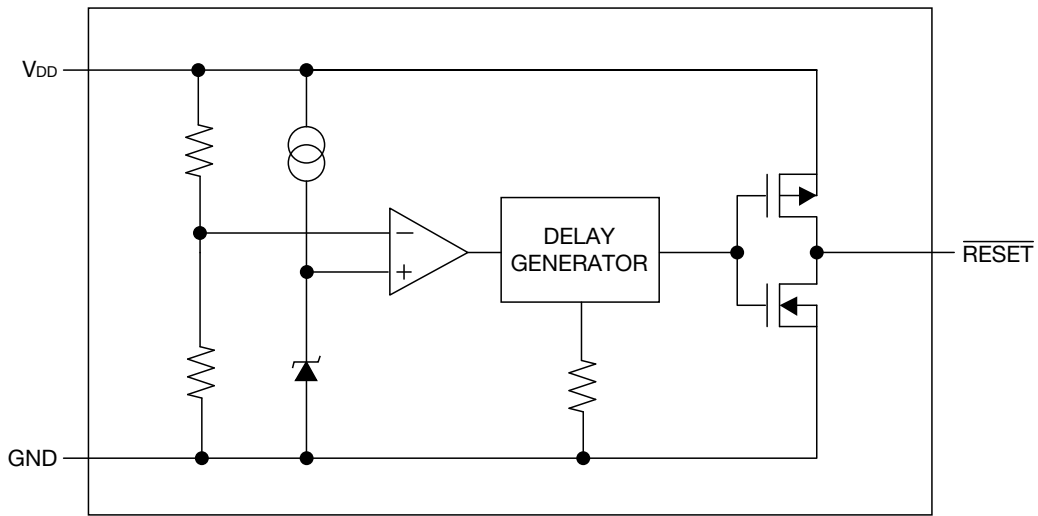
SSON-4B
SOT-25A
SC-82

Applications

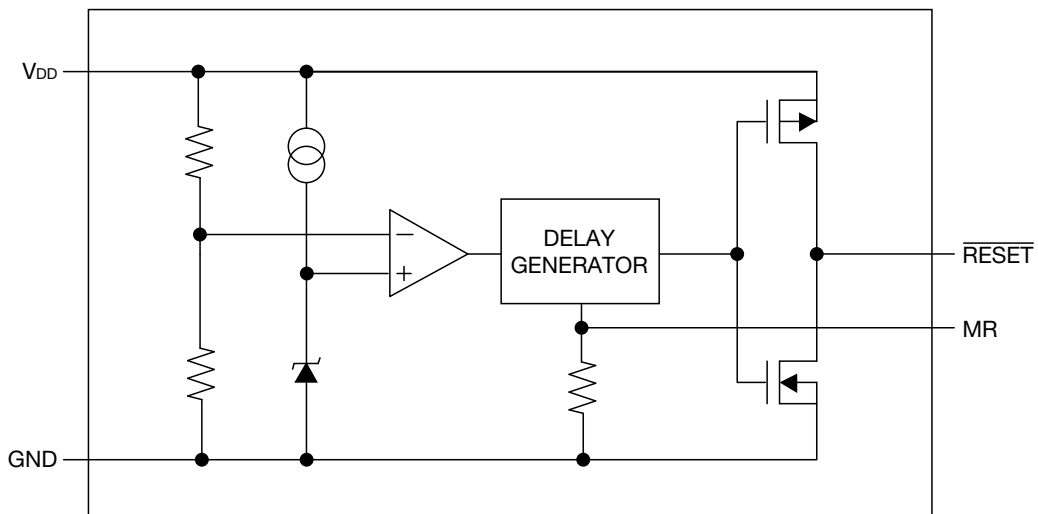
1. Reset circuits for microcomputers, CPUs and MPUs
2. Reset circuits for logic circuits
3. Battery voltage check circuits
4. Back-up power supply switching circuits
5. Level detection circuits
6. Mechanical reset circuits

Block Diagram

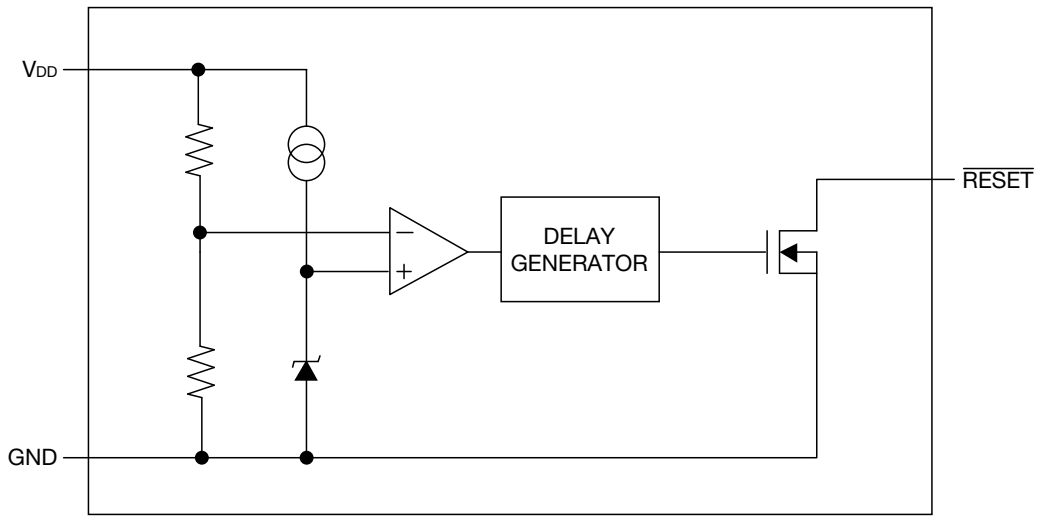
■ PST87XA CMOS output / Manual RESET : NO



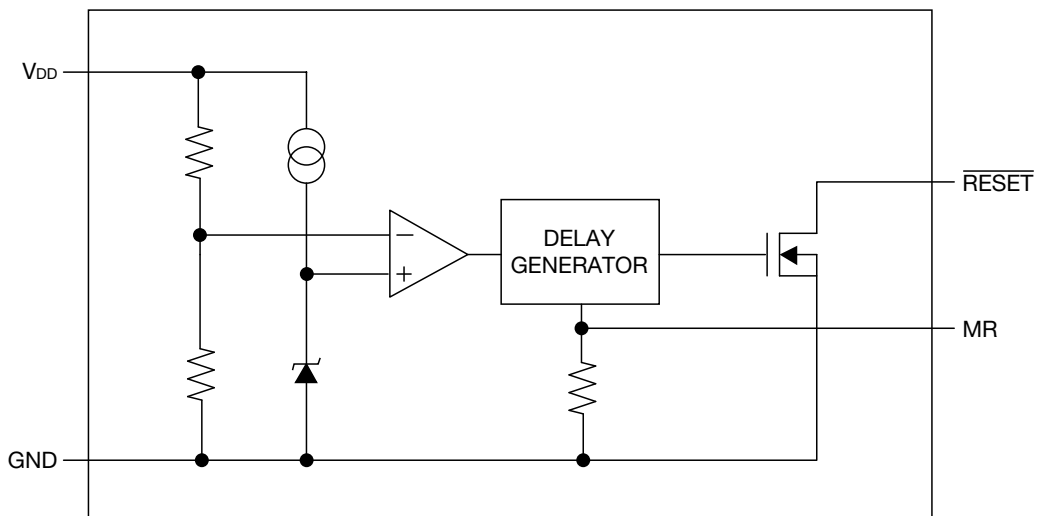
■ PST87XR CMOS output / Manual RESET : YES



■ PST88XA Open-Drain output / Manual RESET : NO

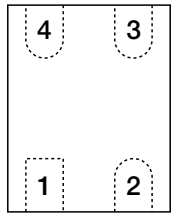


■ PST88XR Open-Drain output / Manual RESET : YES



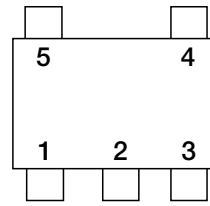
Pin Assignment

PST87XA, PST88XA



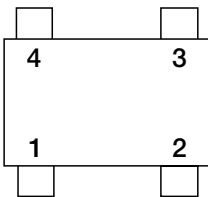
SSON-4B
(TOP VIEW)

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



SOT-25A
(TOP VIEW)

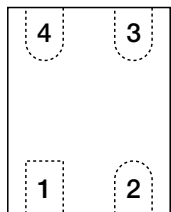
1	NC
2	GND
3	NC
4	RESET
5	V _{DD}



SC-82
(TOP VIEW)

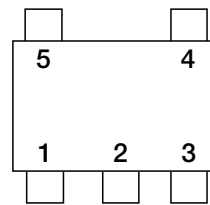
1	NC
2	GND
3	RESET
4	V _{DD}

PST87XR, PST88XR



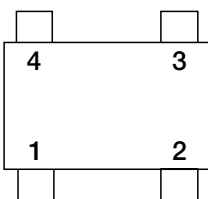
SSON-4B
(TOP VIEW)

1	GND
2	MR
3	V _{DD}
4	RESET



SOT-25A
(TOP VIEW)

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



SC-82
(TOP VIEW)

1	MR
2	GND
3	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	$\overline{\text{RESET}}$	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 _{DD}	V _{DD} 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 _{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	$\overline{\text{RESET}}$	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 _{DD}	V _{DD} Pin / Voltage Detect Pin

SC-82

Pin No.	Pin name	Functions
1	MR	Manual RESET Pin
2	GND	GND Pin
3	$\overline{\text{RESET}}$	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~+6	V
Output voltage	\overline{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-82	mW
		330 (Alone) SSON-4B (note)	
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

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	$V_{DET}=1.60\text{V}$	R	SSON-4B	R	R Housing
1	50ms	R	Yes	{	{	N	SOT-25A	L	L Housing
2	100ms			460	$V_{DET}=4.60\text{V}$	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	$\Delta V_{TH}/^{\circ}C$	Ta=-40~+85°C		±50		ppm/°C	1	
Reset Threshold Hysteresis	ΔV_{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 _{DD} 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	$\Delta V_{TH}/^{\circ}C$	$T_a=-40\sim+85^{\circ}C$		± 50		ppm/ $^{\circ}C$	1
Reset Threshold Hysteresis	ΔV_{TH}		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}	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)	$V_{DD}\times 0.7$			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 $T_a=25^{\circ}C$, over temperature limits guaranteed by design only.

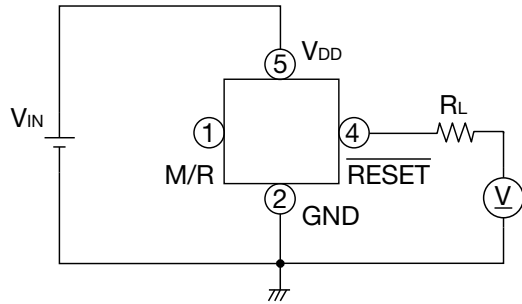
note2 : The parameter is guaranteed by design.

note3 : PST88XR applies to this item.

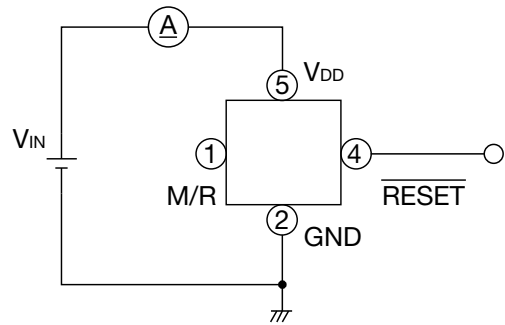
Measuring Circuit

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

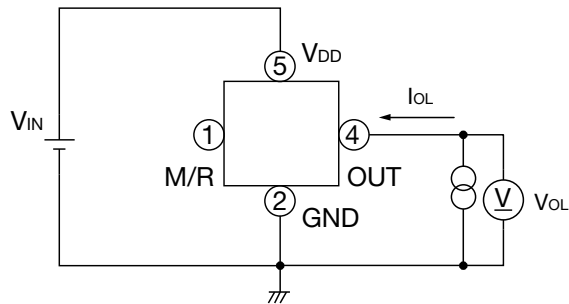
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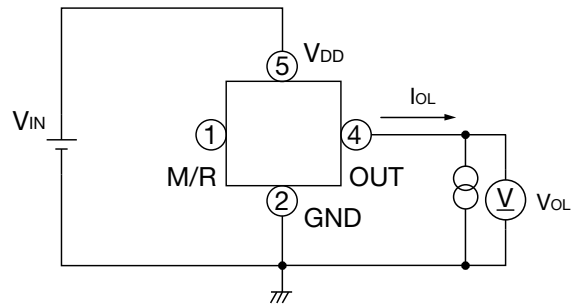
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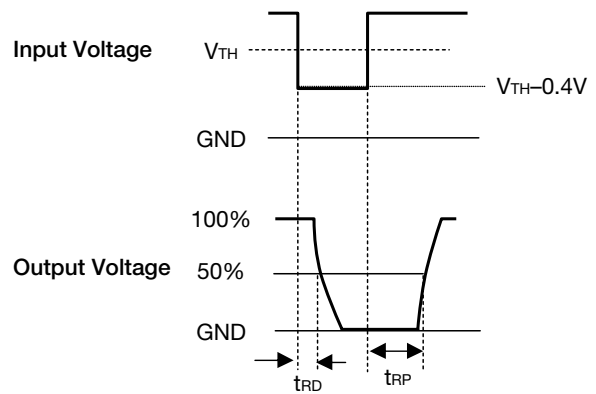
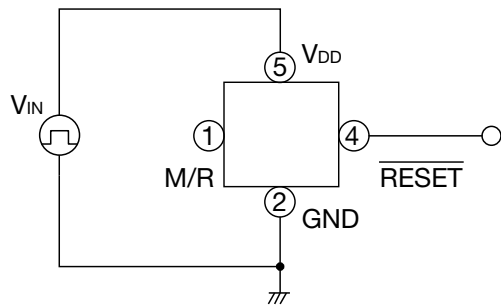
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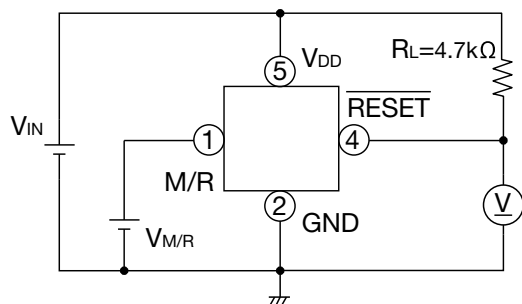
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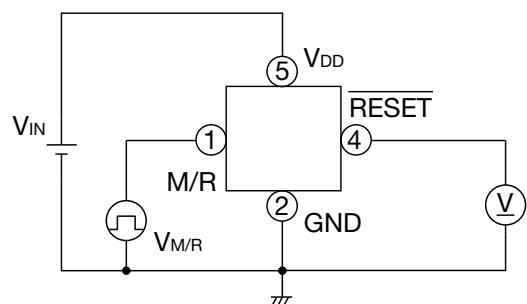
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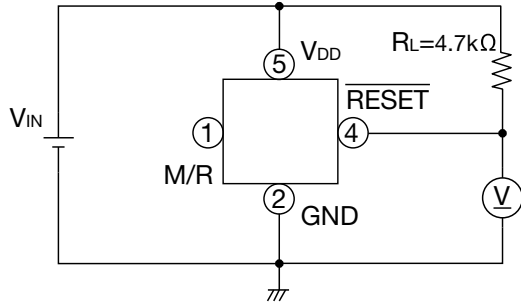


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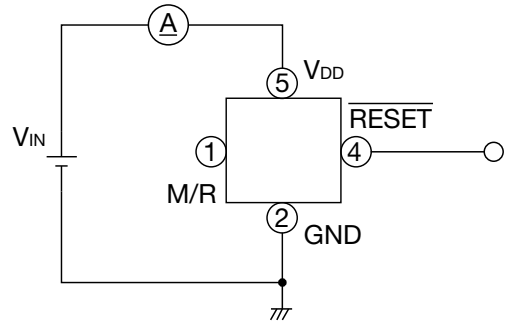


■ PST88XX *①-⑤ in the circuit diagram is pin number for the SOT-25A package.

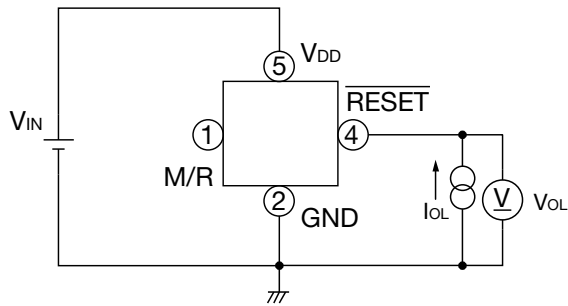
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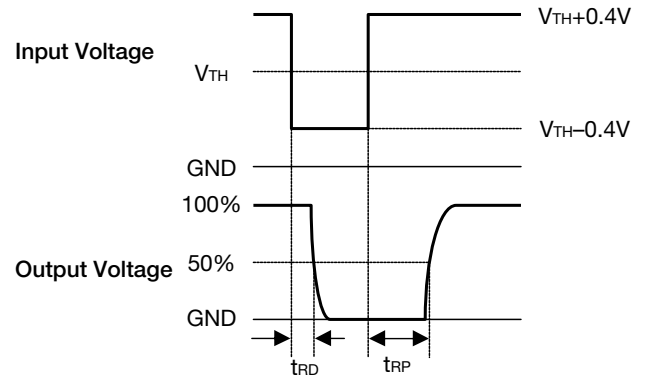
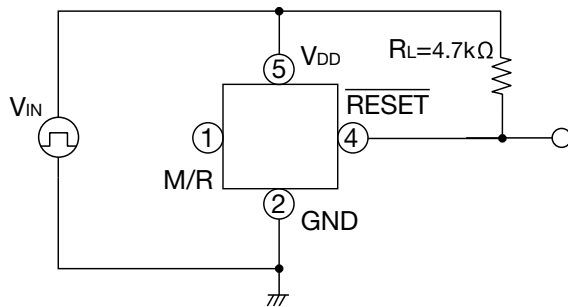
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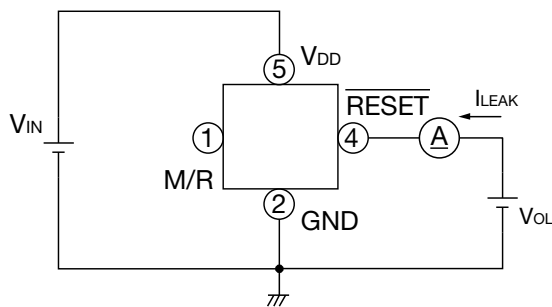
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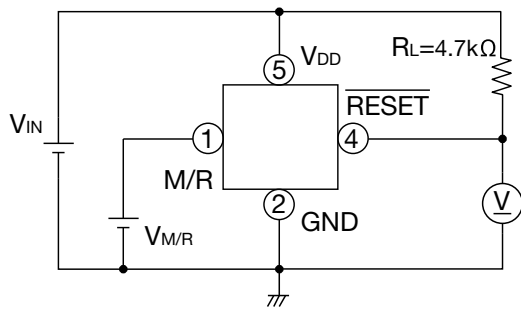
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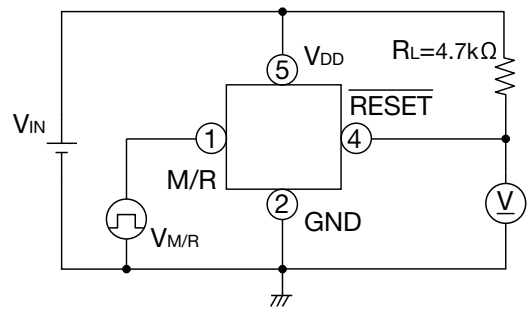
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(6)



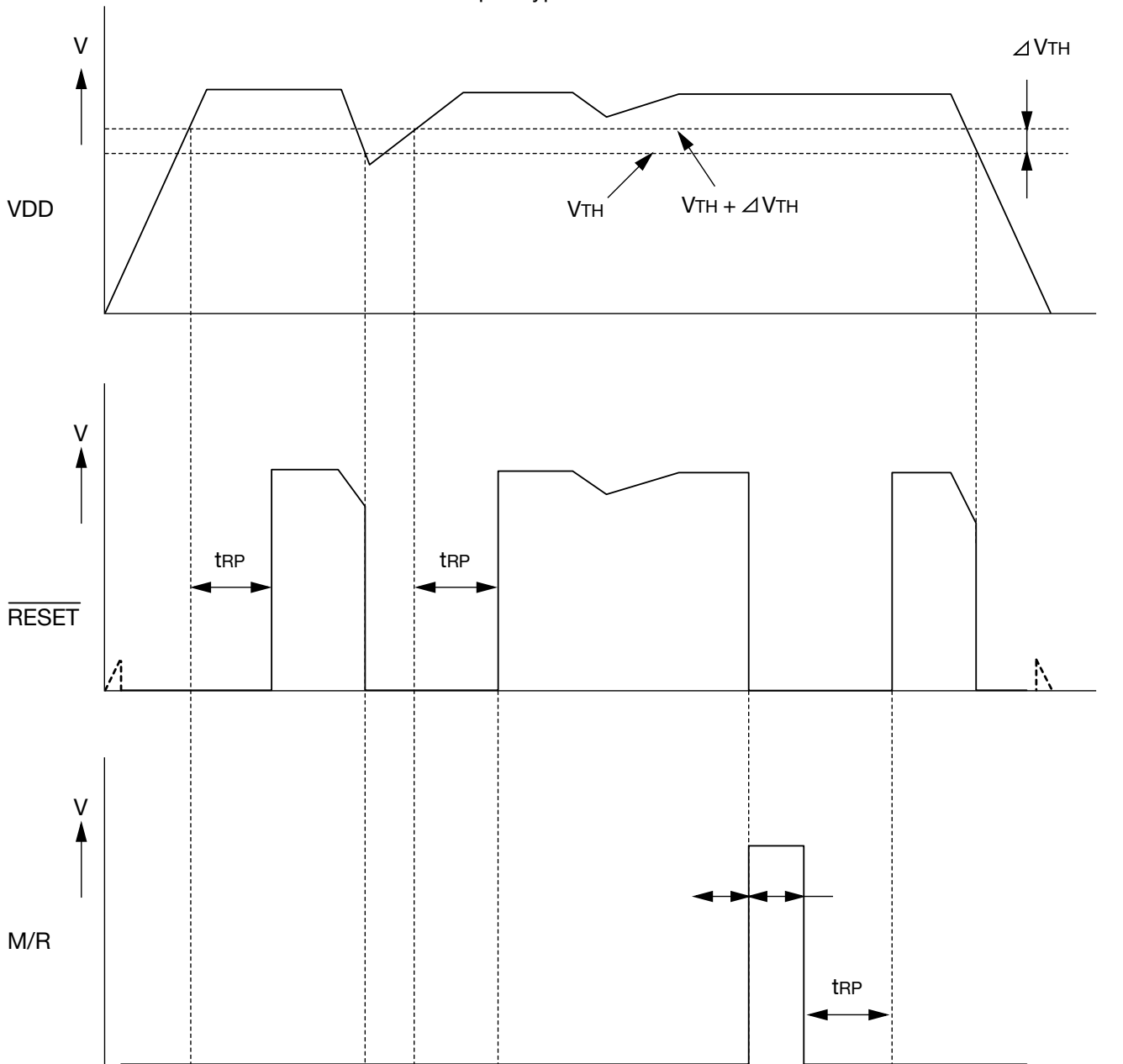
(7)



Timing Chart

PST87XX, 88XX

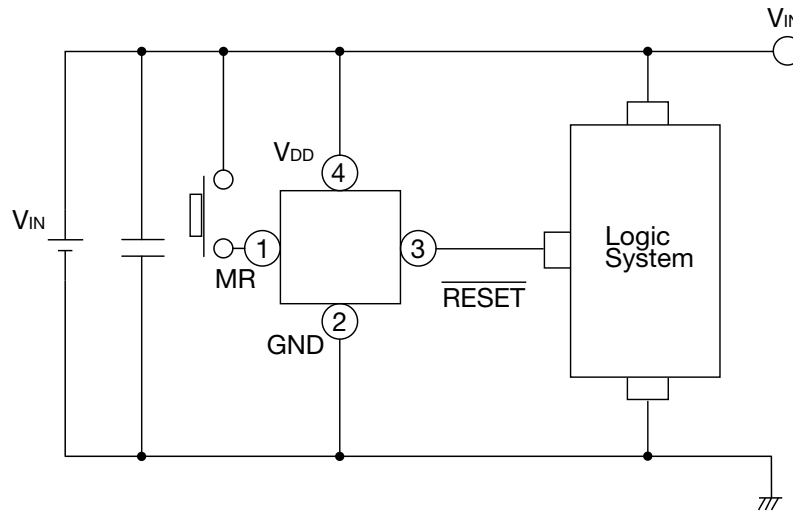
Active-Low Output Type



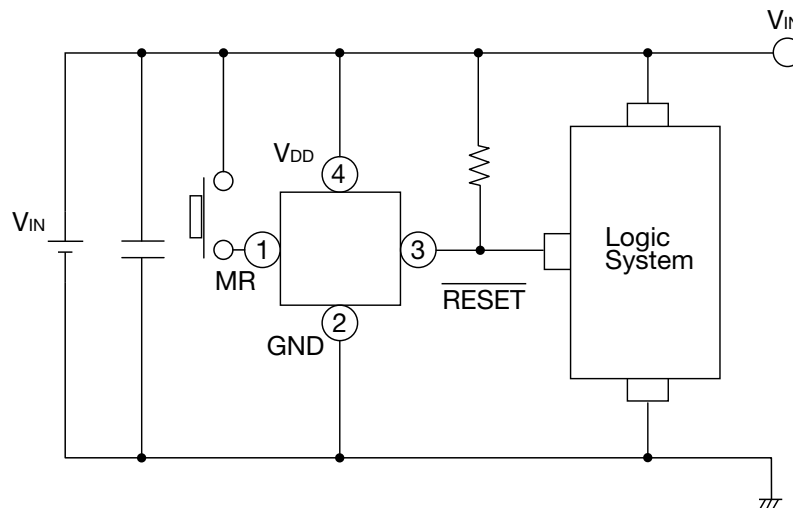
• Any products mentioned in this catalog are subject to any modification in their appearance and others for improvements without prior notification.
 • The details listed here are not a guarantee of the individual products at the time of ordering. When using the products, you will be asked to check their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

Application Circuits

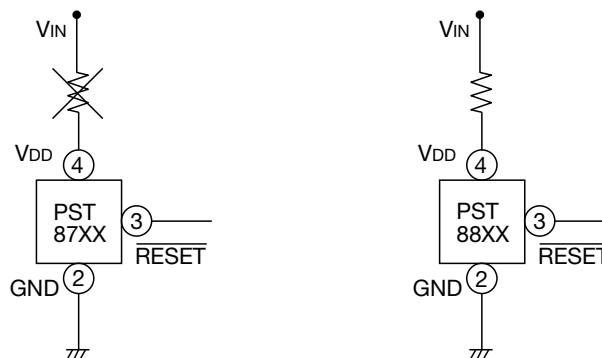
■ PST87XX *②-④ in the circuit diagram is pin number for the SC-82AB package.



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



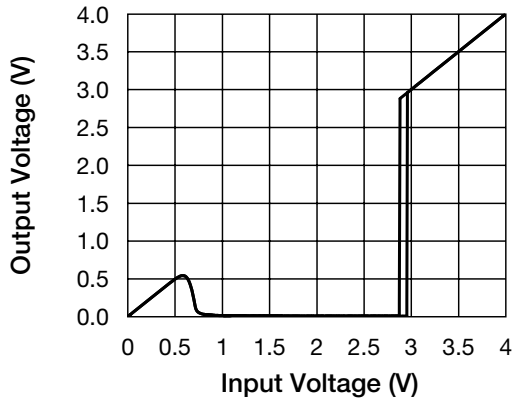
- If the impedance of V_{DD} line is high enough, connect a capacitor between V_{DD} and GND terminal of the IC.
- We shall not be liable for any trouble or damage caused by using this circuit.
- In the event a problem which may affect industrial property or any other rights of us or a third party is 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.



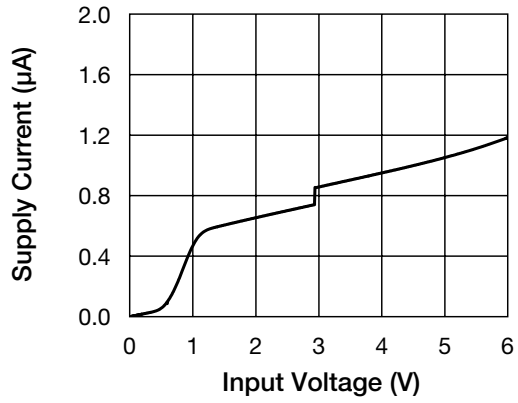
- Please do not put resistance on the PST87XX with circuits where resistance is put in the line V_{IN} as in the above illustration.
- Please be careful as there is a possibility of circuit oscillation with PST88XX.

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

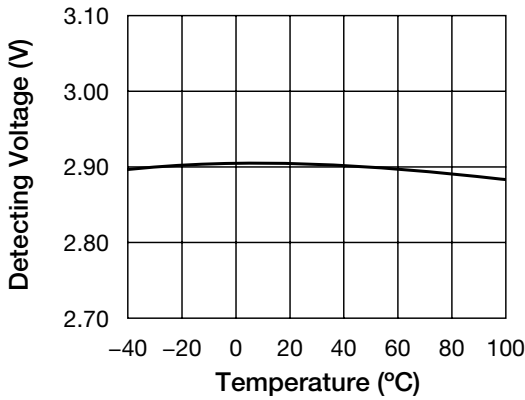
Detecting Voltage



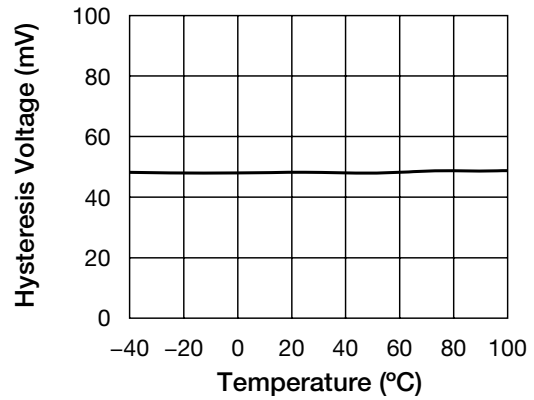
Supply Current



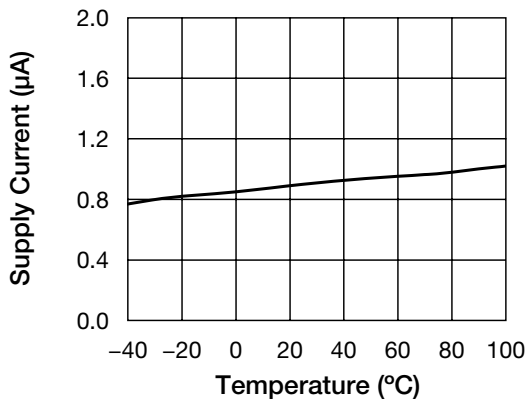
Detecting Voltage - Temperature



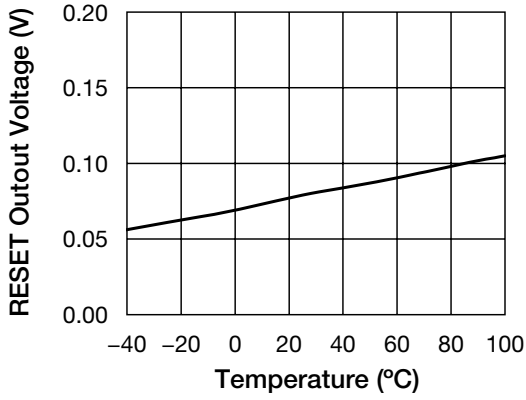
Hysteresis Voltage - Temperature



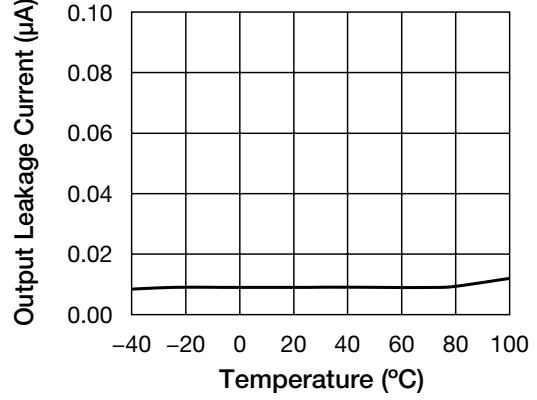
Supply Current - Temperature



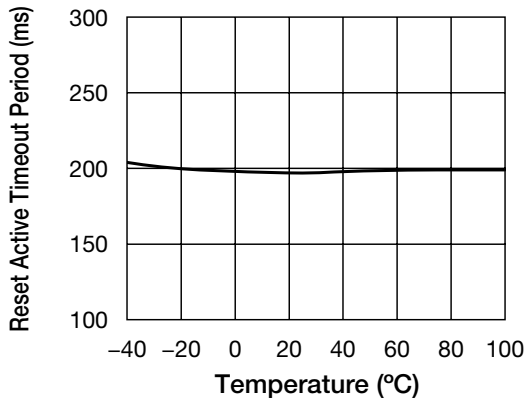
■ RESET Output Voltage - Temperature



■ Output Leakage Current - Temperature



■ Reset Active Timeout Period - Temperature



■ V_{DD} to Reset Delay - Temperature

