

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

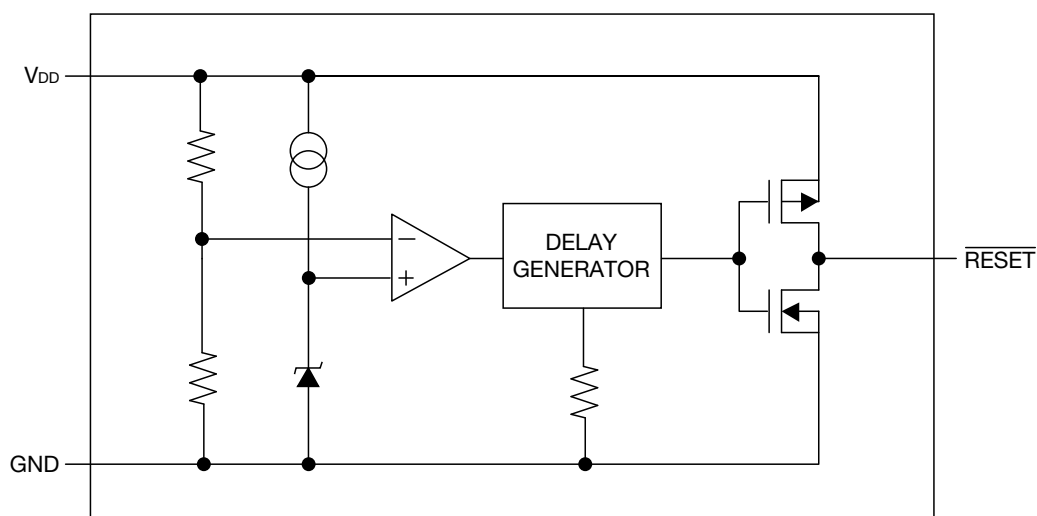
SSON-4B
SOT-25A
SC-82

Applications

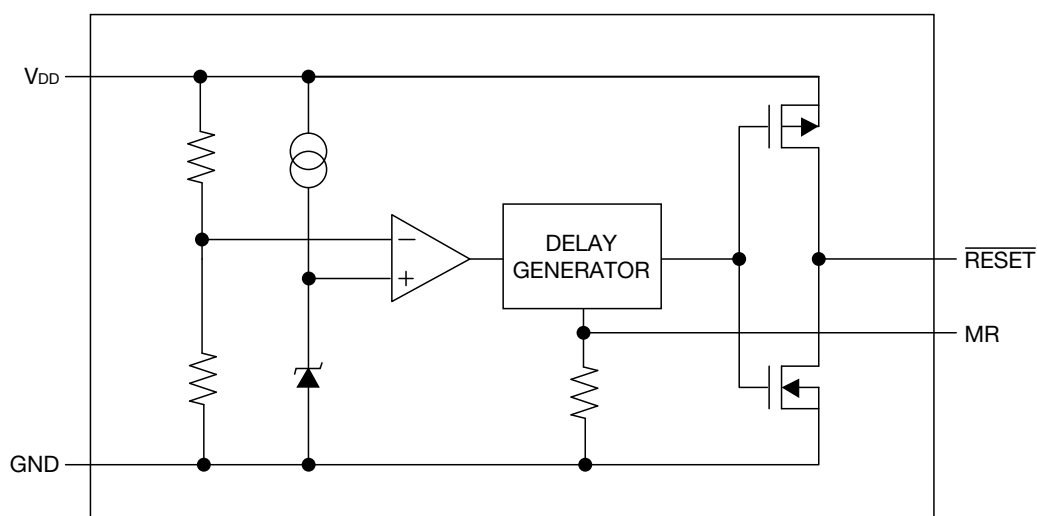
1. Reset circuits for microcomputers, CPUs and MPUs
2. Reset circuits for logic circuits
3. Battery voltage check circuits
4. Back-up power supply switching circuits
5. Level detection circuits
6. Mechanical reset circuits

Block Diagram

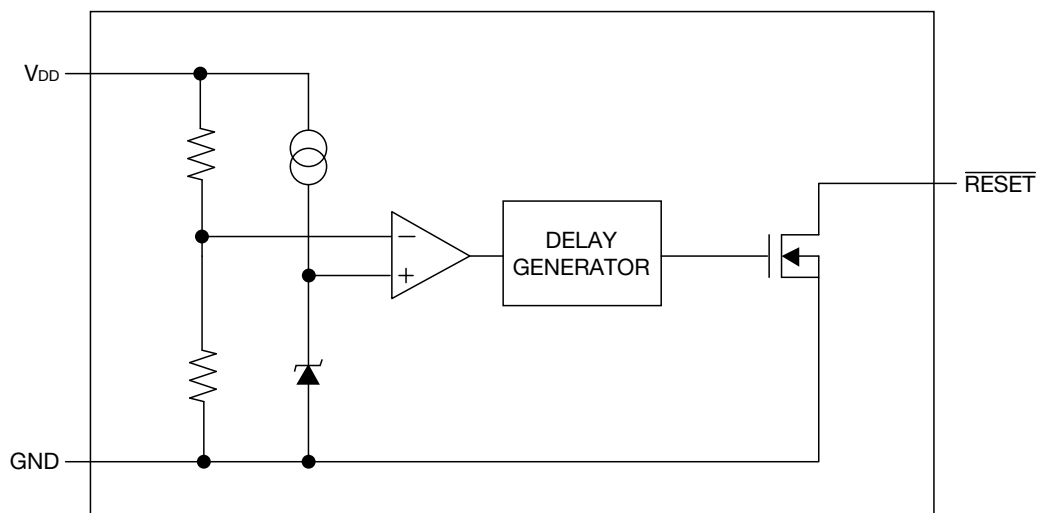
■ PST87XA CMOS output / Manual RESET : NO



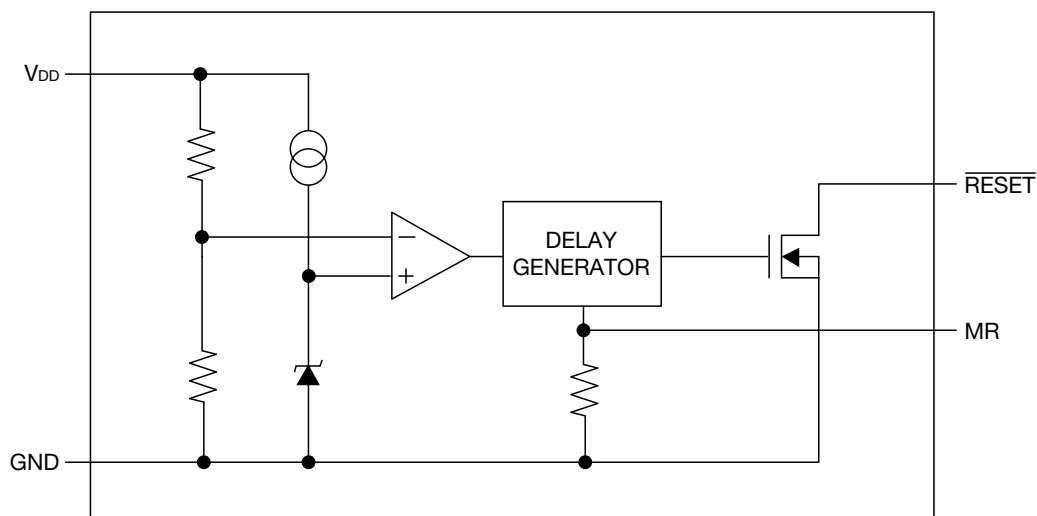
■ PST87XR CMOS output / Manual RESET : YES



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

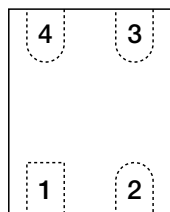


■ **PST88XR** Open-Drain output / Manual RESET : YES



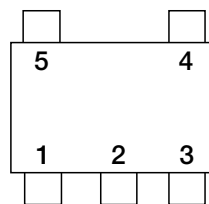
Pin Assignment

PST87XA, PST88XA



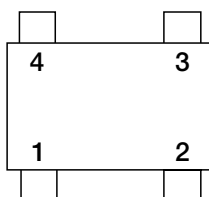
SSON-4B
(TOP VIEW)

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



SOT-25A
(TOP VIEW)

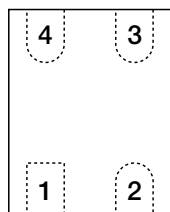
1	NC
2	GND
3	NC
4	RESET
5	V _{DD}



SC-82
(TOP VIEW)

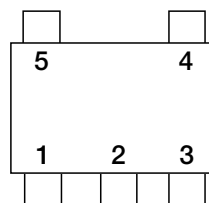
1	NC
2	GND
3	RESET
4	V _{DD}

PST87XR, PST88XR



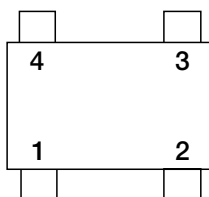
SSON-4B
(TOP VIEW)

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	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-82

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

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	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	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	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 (Ta=0~+70°C)	V
		1.2~5.5 (Ta=−40~+85°C)	

Pin Explanations

Model name

CMOS output

PST87

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a b c d e

Open-Drain output

PST88

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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→V _{TH} +1V→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 PST87□□360N□ } PST87□□460N□ V_{DD}=V_{TH}-0.1V I_{OL}=3.2mA			0.4	V	3
RESET Output Voltage H	V _{OH}	PST87□□160N□ } PST87□□230N□ V_{DD}=V_{TH}+0.1V I_{OH}=150μA 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} =×0.8		0.4	V	4
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 30 60 120	20 50 100 200	30 75 150 300	ms	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 : PST87XR applies to this item.

PST88XX

Item	Symbol	Test Condition	Min.	Typ.	Max.	Units	Circuit
Reset Threshold	V_{TH}	$T_a = +25^{\circ}\text{C}$	$V_{TH}-1.5\%$	V_{TH}	$V_{TH}+1.5\%$	V	1
Reset Threshold Temp. Coefficient	$\Delta V_{TH}/^{\circ}\text{C}$	$T_a = -40 \sim +85^{\circ}\text{C}$		± 50		ppm/ $^{\circ}\text{C}$	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□			0.4	V	3
		$V_{DD} = V_{TH} - 0.1\text{V}$ $I_{OL} = 1.2\text{mA}$					
		PST88□□360N□ └ PST88□□460N□					
		$V_{DD} = V_{TH} - 0.1\text{V}$ $I_{OL} = 3.2\text{mA}$					
V_{DD} to Reset Delay	t_{RD}	$V_{DD} = (V_{TH} + 0.4\text{V}) \rightarrow (V_{TH} - 0.4\text{V})$		4.0	20	μs	4
Reset Active Timeout Period	t_{RP}	$V_{DD} = (V_{TH} - 0.4\text{V}) \rightarrow (V_{TH} + 0.4\text{V})$	12	20	30	ms	4
			30	50	75		
			60	100	150		
			120	200	300		
Output Leakage Current	I_{LEAK}	$V_{DD} = V_{OL} = 5.5\text{V}$			± 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 $T_a = 25^{\circ}\text{C}$, over temperature limits guaranteed by design only.

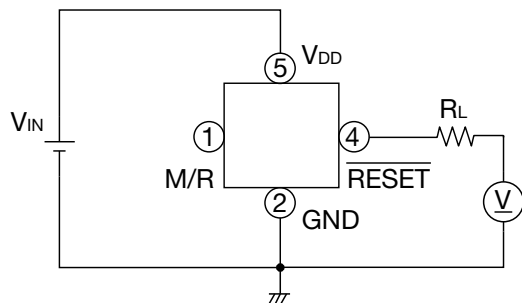
note2 : The parameter is guaranteed by design.

note3 : PST88XR applies to this item.

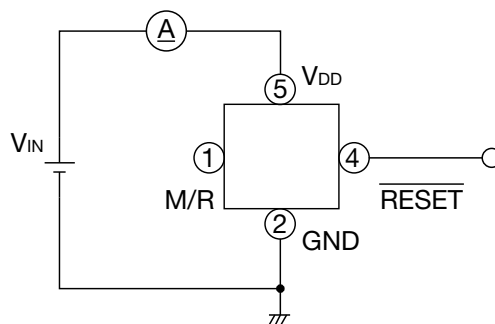
Measuring Circuit

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

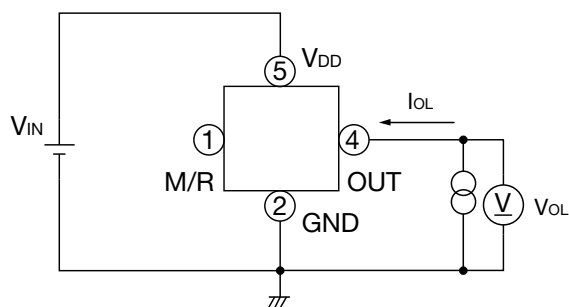
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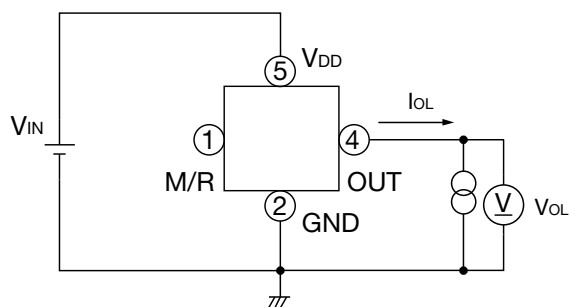
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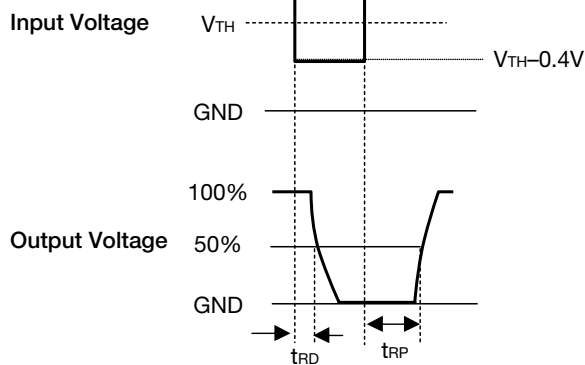
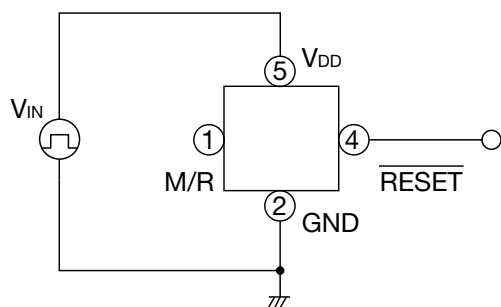
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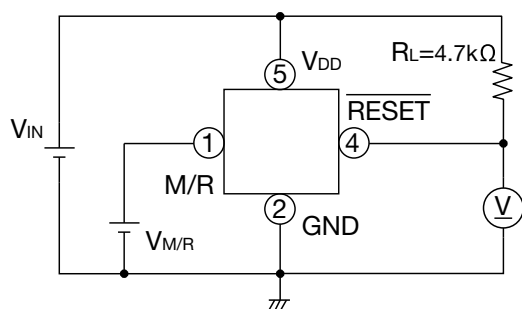
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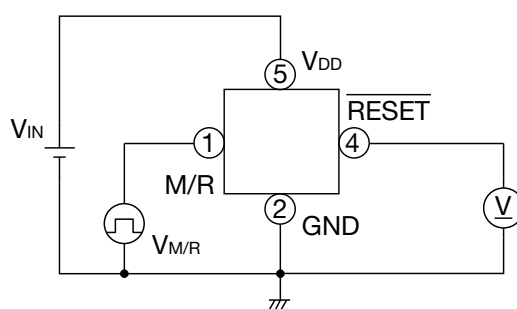
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(6)

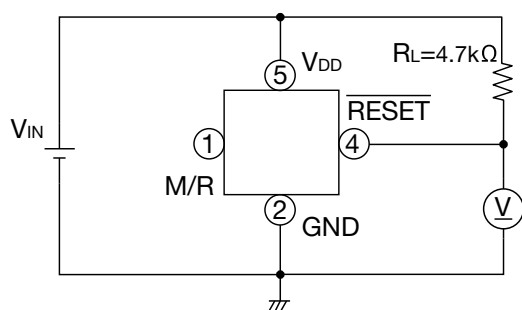


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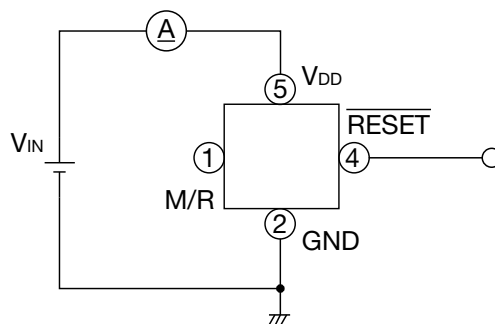



PST88XX *①-⑤ in the circuit diagram is pin number for the SOT-25A package.

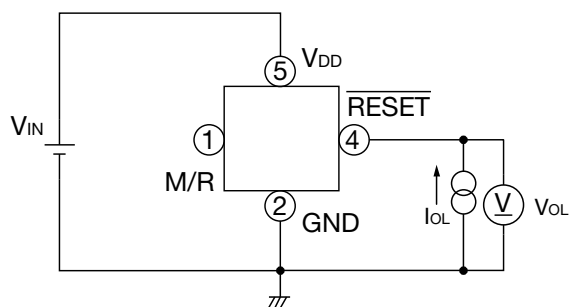
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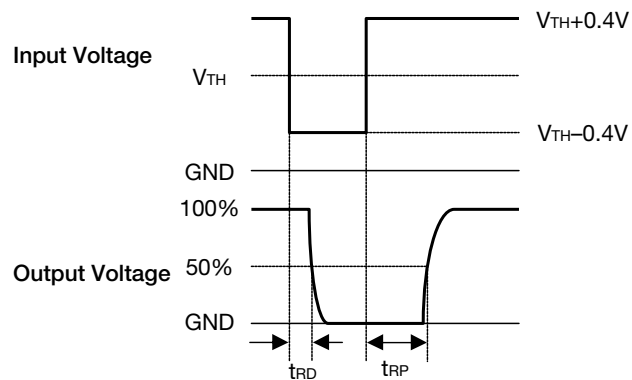
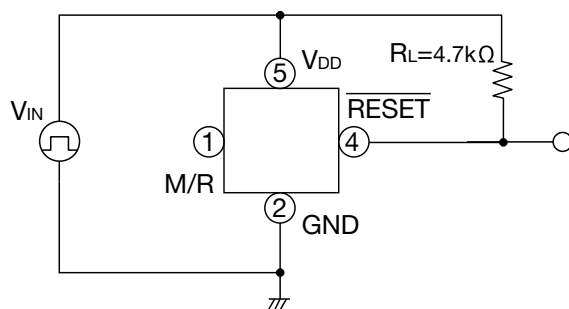
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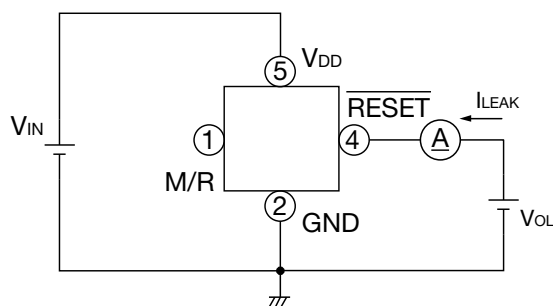
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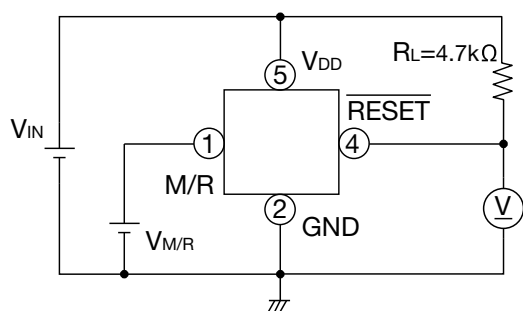
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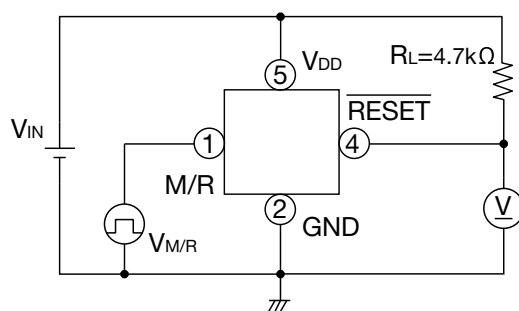
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(6)



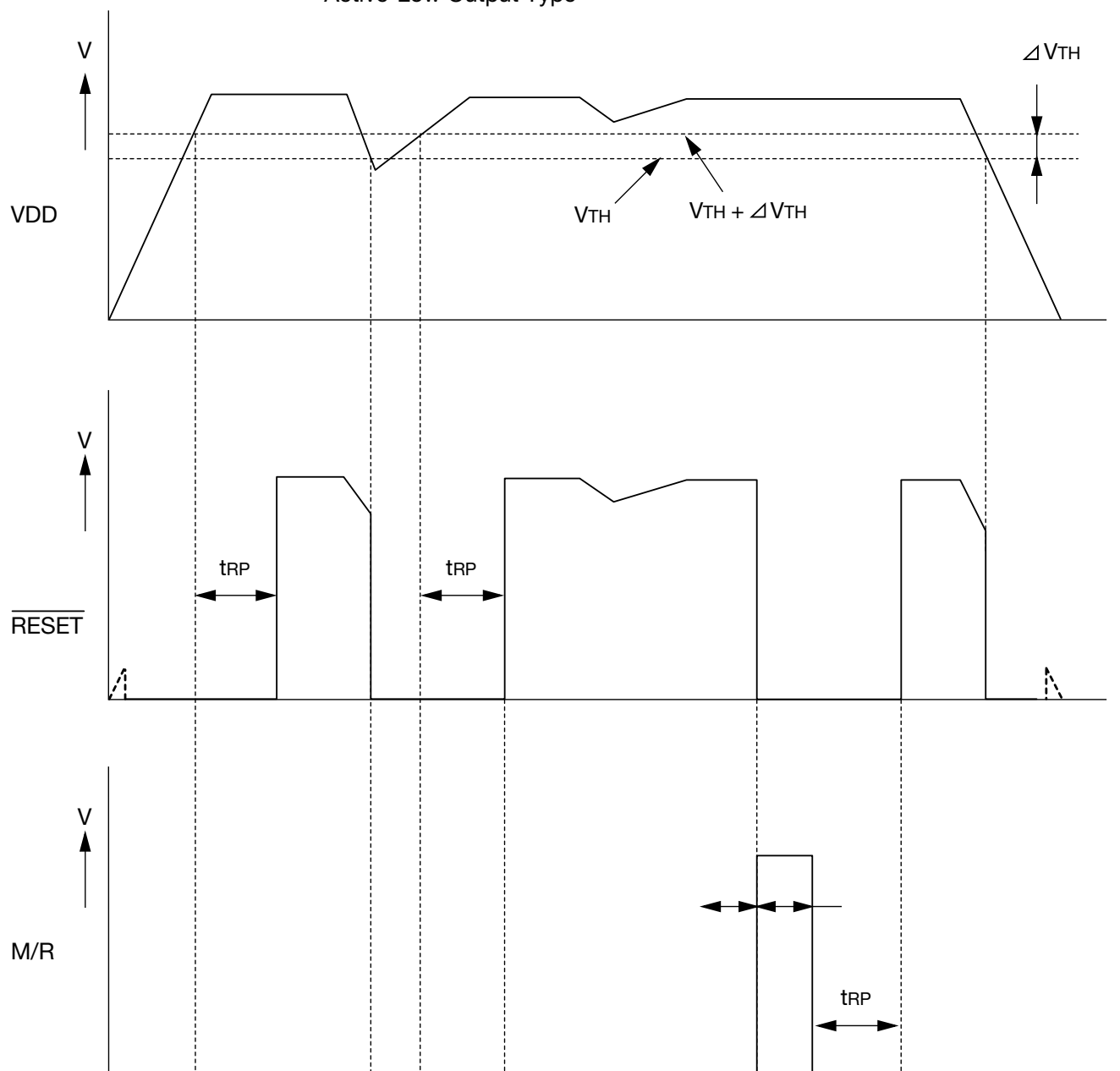
(7)



Timing Chart

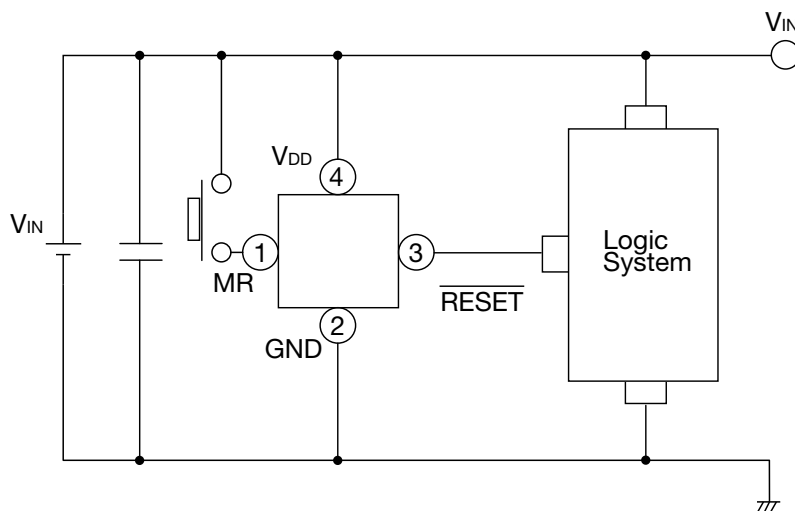
PST87XX, 88XX

Active-Low Output Type

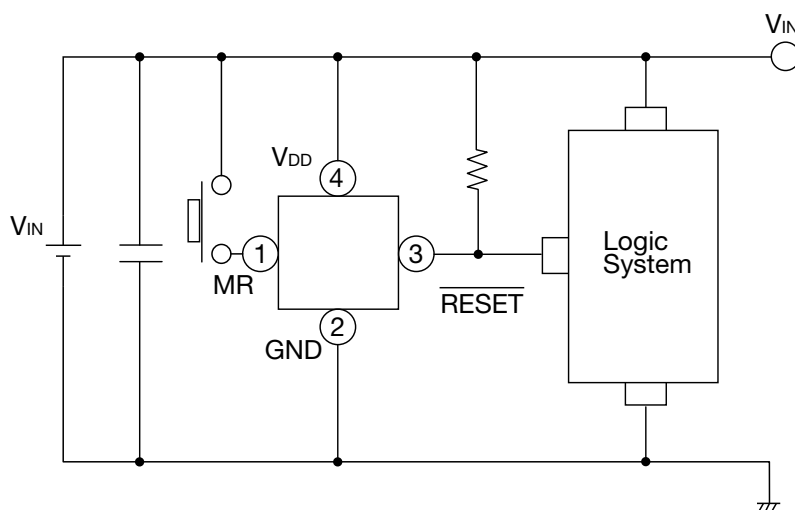


Application Circuits

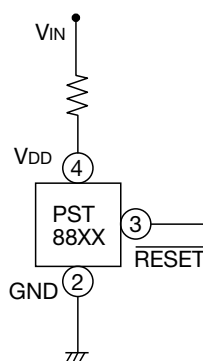
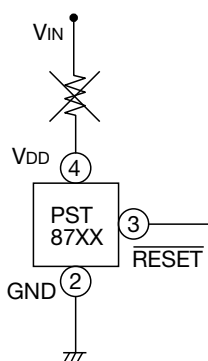
PST87XX *②-④ in the circuit diagram is pin number for the SC-82AB package.



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



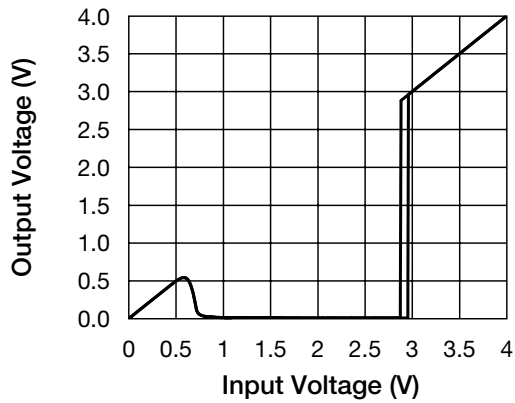
- If the impedance of V_{DD} line is high enough, connect a capacitor between V_{DD} and GND terminal of the IC.
- We shall not be liable for any trouble or damage caused by using this circuit.
- In the event a problem which may affect industrial property or any other rights of us or a third party is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



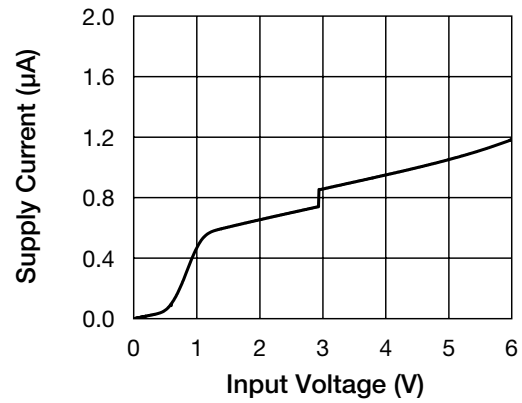
- Please do not put resistance on the PST87XX with circuits where resistance is put in the line V_{IN} as in the above illustration.
- Please be careful as there is a possibility of circuit oscillation with PST88XX.

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

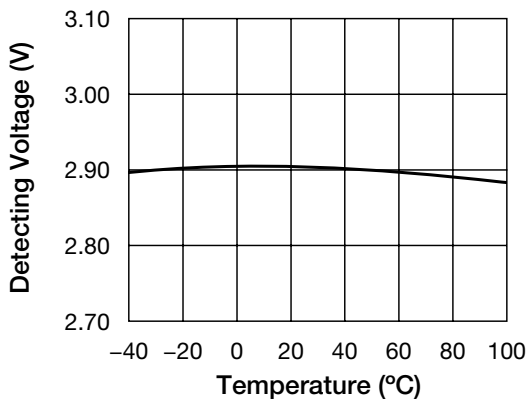
Detecting Voltage



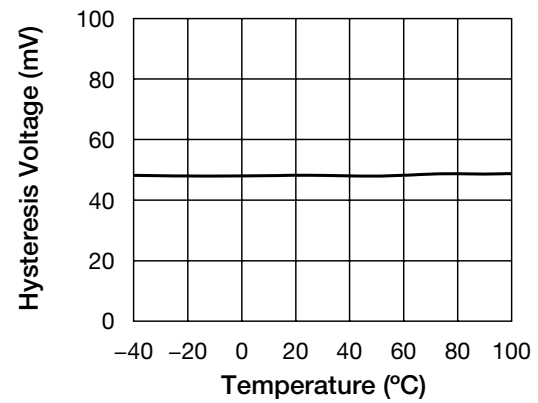
Supply Current



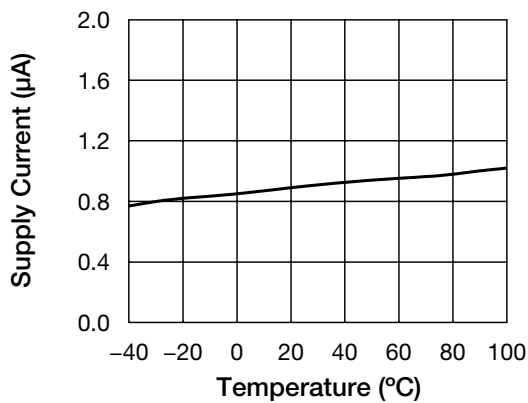
Detecting Voltage - Temperature



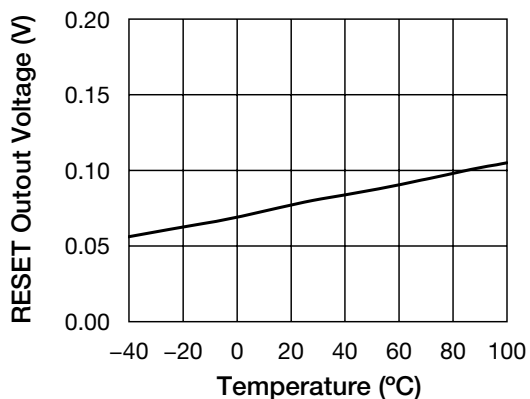
Hysteresis Voltage - Temperature



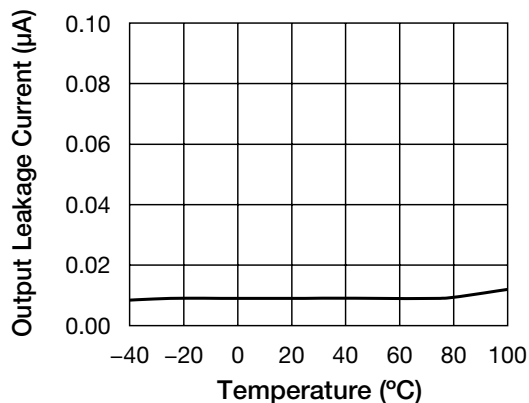
Supply Current - Temperature



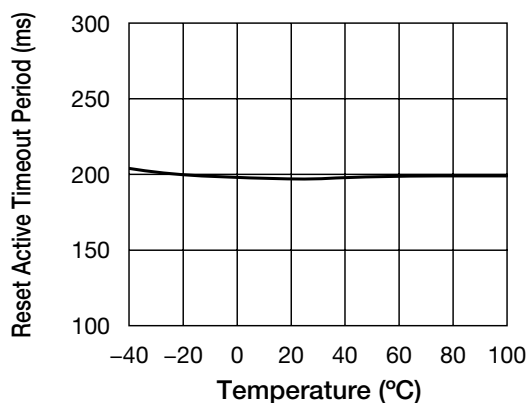
■ RESET Output Voltage - Temperature



■ Output Leakage Current - Temperature



■ Reset Active Timeout Period - Temperature



■ V_{DD} to Reset Delay - Temperature

