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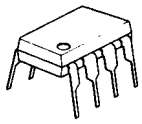
SYSTEM RESET IC

■ GENERAL DESCRIPTION

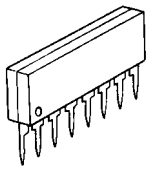
The **NJM2102** Possesses two functions. One is to detect a voltage which decays from the desired voltage and generate a warning signal. And also, the **NJM2102** holds the warning signal for a certain term after the specified voltage is obtained or recovered. The other one (Watch Dog Timer) is to identify missing clocks of microprocessors. Therefore, it should be said that the **NJM2102** is ideal to protect any microprocessors from the fales operations induced by undesired condition.

■ PACKAGE OUTLINE



NJM2102D
(DIP8)

NJM2102M
(DMP8)

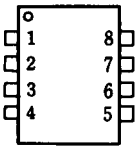


NJM2102L
(SIP8)

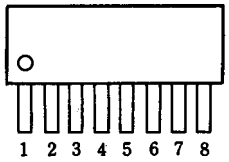
■ FEATURES

- Internal Watch Dog Timer
- Precise Detection of Supply Voltage Down (4.2V ±2.5%)
- Package Outline DIP8, DMP8, SIP8
- Bipolar Technology

■ PIN CONFIGURATION



NJM2102D
NJM2102M

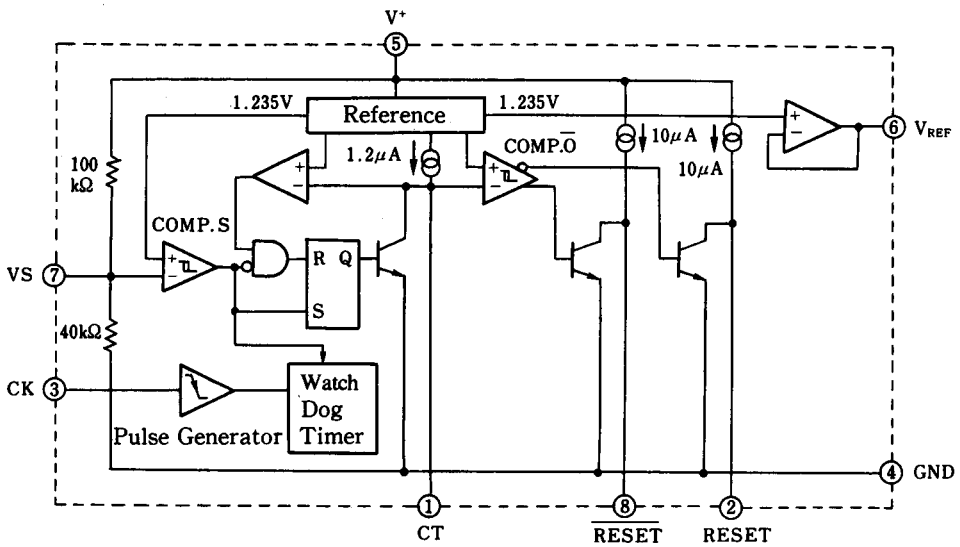


NJM2102L

PIN FUNCTION

1. C_T
2. RESET
3. CK
4. GND
5. V^+
6. V_{REF}
7. V_S
8. $\overline{RESET}$

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

(T_a=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	20.0	V
Input Voltage	V_S	V^++0.3 (<20.0)	V
Input Voltage	V_{CK}	20.0	V
Power Dissipation	P_D	(DIP8) 500 (DMP8) 300 (SIP8) 800	mW
Operating Temperature Range	T_{opr}	-40 to +85	°C
Storage Temperature Range	T_{stg}	-40 to +125	°C

■ ELECTRICAL CHARACTERISTICS

(V^+=5V, T_a=25°C)

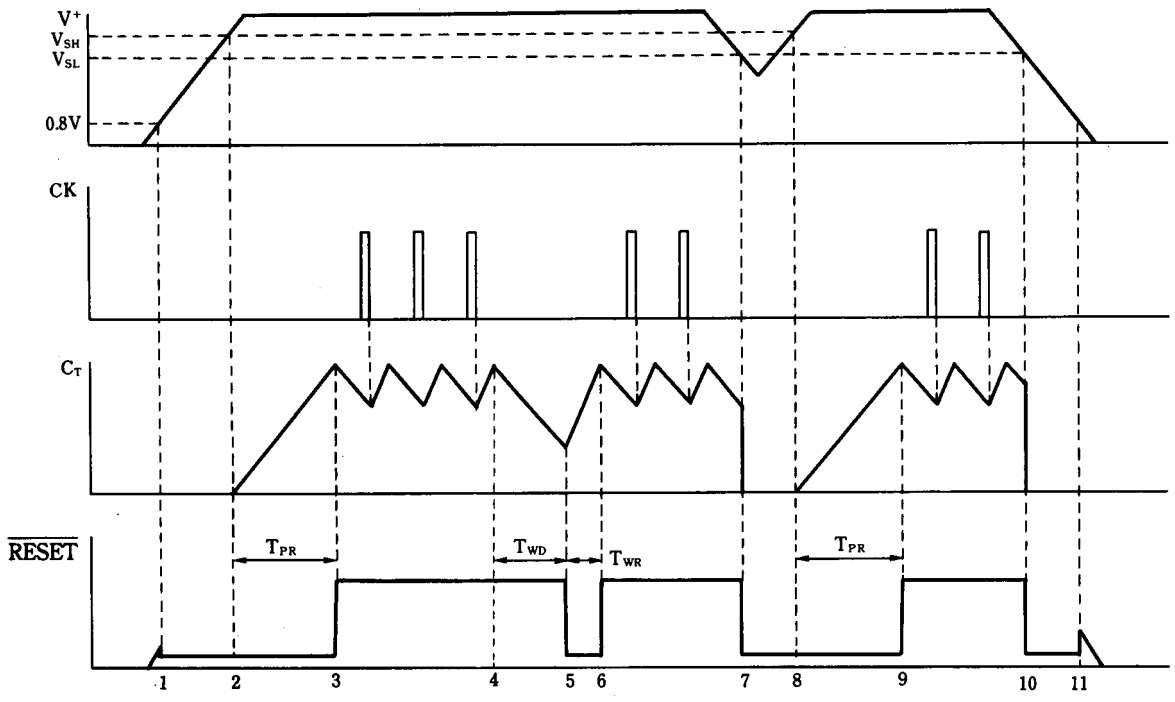
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	I_{CC}	Watch Dog Timer Operating	-	0.65	1.00	mA
Detection Voltage 1	V_{SL}	Falling Down Supply Voltage	4.10	4.20	4.30	V
Detection Voltage 2	V_{SH}	Rising Up Supply Voltage	4.20	4.30	4.40	V
Hysteresis Width	V_{HYS}	$V_{HYS} = V_{SL} - V_{SH}$	50	100	150	mV
Reference Voltage	V_{REF}		1.217	1.235	1.253	V
Supply Voltage Regulation	ΔV_{REF1}	V^+ = 3.5V to 18V	-10	+3	+10	mV
Reference Voltage Load Regulation	ΔV_{REF2}	I_{OUT} = -200µA to +5µA	-5	-	+5	mV
CK Input Threshold Voltage	V_{TH}		0.70	1.24	1.90	V
CK Input Current 1	I_{IH}	V_{CK} = 5.0V	-	0	1.0	µA
CK Input Current 2	I_{IL}	V_{CK} = 0.0V	-1.0	-0.1	-	µA
C_T Charge Current 1	I_{CTC1}	V_{CT} = 1.0V Watch Dog Timer Operating	20	50	110	µA
C_T Charge Current 2	I_{CTC2}	V_{CT} = 0.0V Power ON Reset Operating	0.6	1.4	3.0	µA
C_T Discharge Current 1	I_{CTD1}	V_{CT} = 1.0V Watch Dog Timer Operating	6	9	13	µA
C_T Discharge Current 2	I_{CTD2}	V_{CT} = 0.0V Power ON Reset Operating	100	600	-	µA
High Level Output Voltage 1	V_{OH1}	V_S=Open. $I_{\overline{RESET}}$ = -5µA	4.5	4.9	-	V
High Level Output Voltage 2	V_{OH2}	V_S=0V, I_{RESET} = -5mA	4.5	4.9	-	V
Output Saturation Voltage 1	V_{OL1}	V_S=0V, $I_{\overline{RESET}}$ =3mA	-	0.2	0.4	V
Output Saturation Voltage 2	V_{OL2}	V_S=0V, $I_{\overline{RESET}}$ =10mA	-	0.3	0.5	V
Output Saturation Voltage 3	V_{OL3}	V_S=Open. I_{RESET}=3mA	-	0.2	0.4	V
Output Saturation Voltage 4	V_{OL4}	V_S=Open. I_{RESET}=10mA	-	0.3	0.5	V
Output Sink Current 1	I_{OL1}	V_S=0V, $V_{\overline{RESET}}$ =1.0V	20	70	-	mA
Output Sink Current 2	I_{OL2}	V_S=Open. $V_{\overline{RESET}}$ =1.0V	20	70	-	mA
$\overline{RESET}$ Minimum Supply Voltage 1	V_{CCL1}	$V_{\overline{RESET}}$ =0.4V, $I_{\overline{RESET}}$ =0.2mA	-	0.8	1.2	V
RESET Minimum Supply Voltage 2	V_{CCL2}	V_{RESET}=V^+-0.1V, R_L(2Pin-GND)=1MΩ	-	0.8	1.2	V

AC CHARACTERISTICS

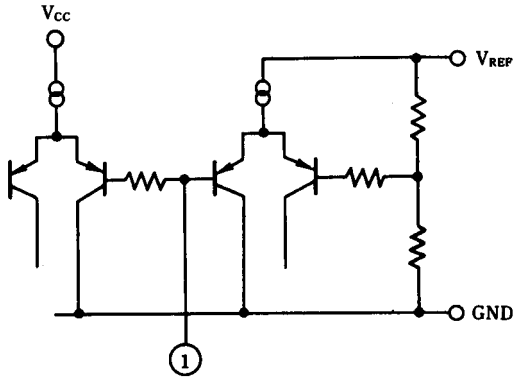
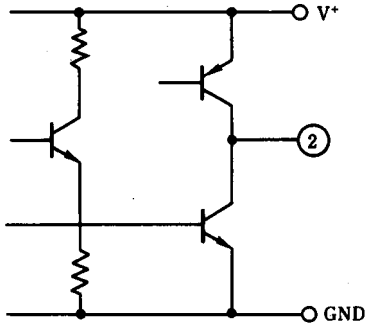
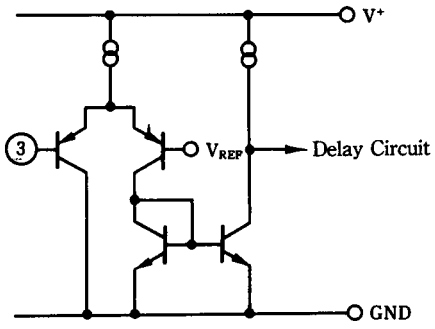
(V^+=5V, T_a=25°C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
V^+ Input Pulse Width	T_{PI}	V_{CC} 5V / 4V	-	10	-	µS
CK Input Pulse Width	T_{CKW}	CK	-	1.8	-	µS
CK Input Frequency	T_{CK}		-	12	-	µS
Watch Dog Timer Watching Time	T_{WD}	C_T=0.1µF	-	10	-	mS
Watch Dog Timer Reset Time	T_{WR}	C_T=0.1µF	-	2	-	mS
Reset Signal Hold Time	T_{PR}	C_T=0.1µF, V^+	-	100	-	mS
Propagation Delay from V^+	T_{PD1}	$\overline{RESET}$ Pin, R_L=2.2kΩ, C_L=100pF	-	2	-	µS
Propagation Delay from V^+	T_{PD2}	RESET Pin R_L=2.2kΩ, C_L=100pF	-	3	-	µS
Output Rise Time	t_R	R_L=2.2kΩ, C_L=100pF	-	1.0	-	µS
Output Fall Time	t_F	R_L=2.2kΩ, C_L=100pF	-	0.1	-	µS

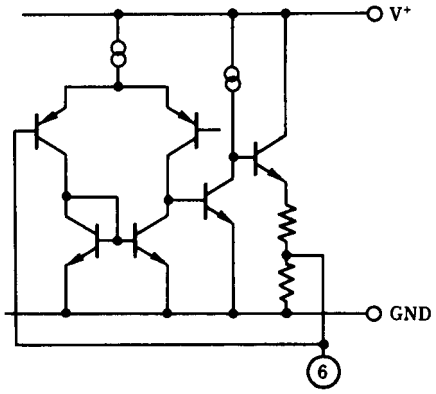
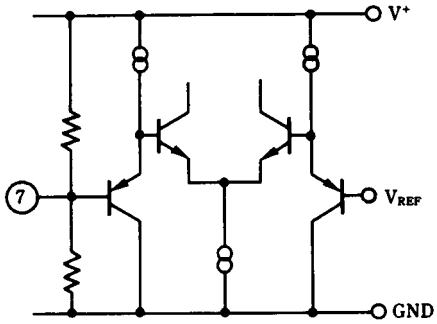
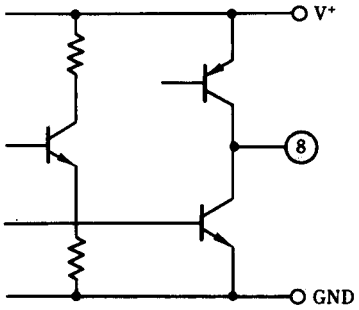
■ TIMING CHART



■ TERMINAL FUNCTION

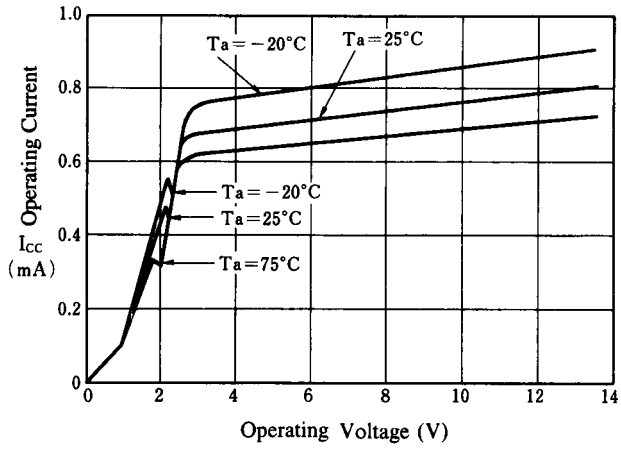
PIN. NO	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
1	C_T	Pin Connection to Capacitor, Set the reset holding time	
2	RESET	Reset Output	
3	CK	Clock Input	

■ TERMINAL FUNCTION

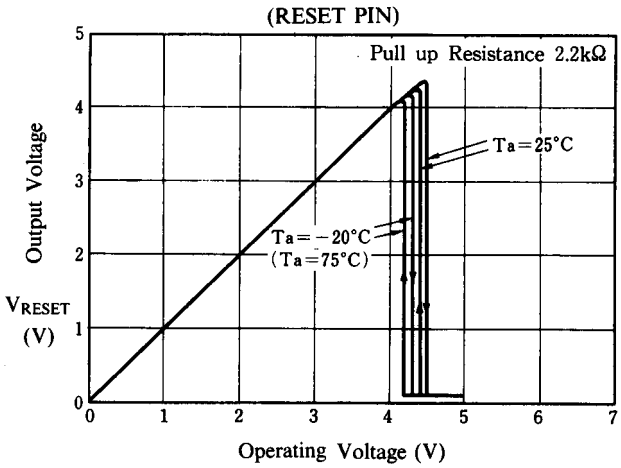
PIN. NO	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
4	GND	Ground	
5	V^+	Operating Voltage	
6	V_{REF}	Ref Amp Output	
7	V_S	Comparator S Input	
8	$\overline{RESET}$	Reset Output Internal pull up resistor	

■ TYPICAL CHARACTERISTICS

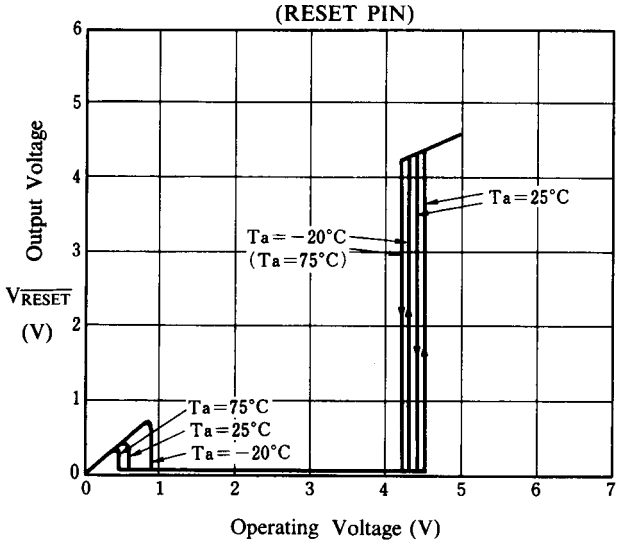
Operating Current vs. Operating Voltage



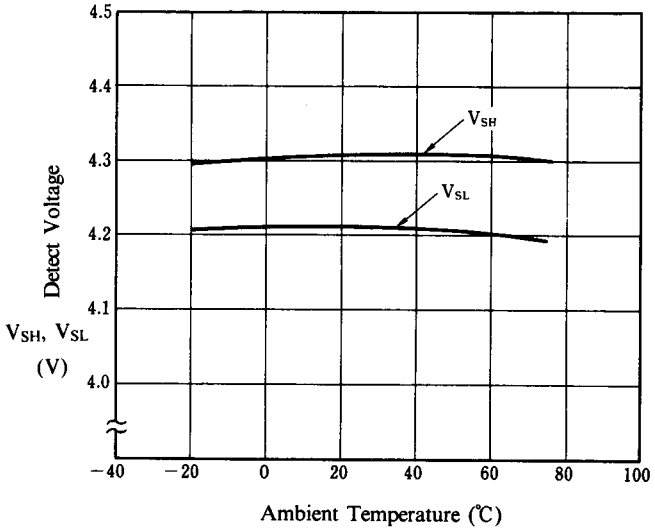
Output Voltage vs. Operating Voltage



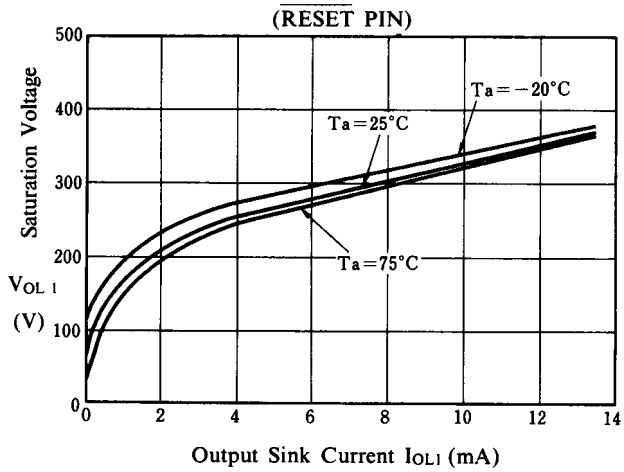
Output Voltage vs. Operating Voltage



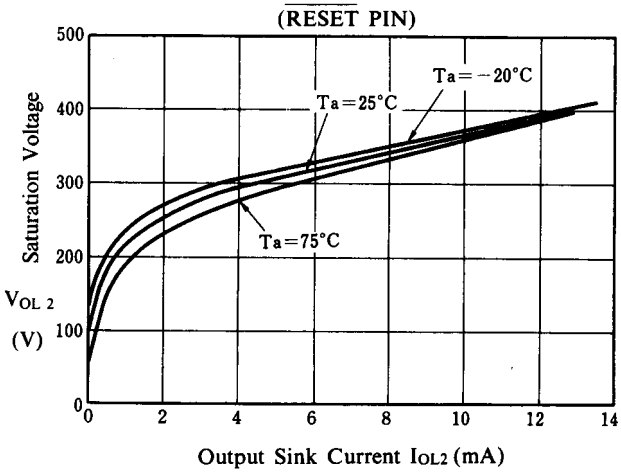
Detect Voltage vs. Ambient Temperature



Satulation Voltage vs. Output Sink Current

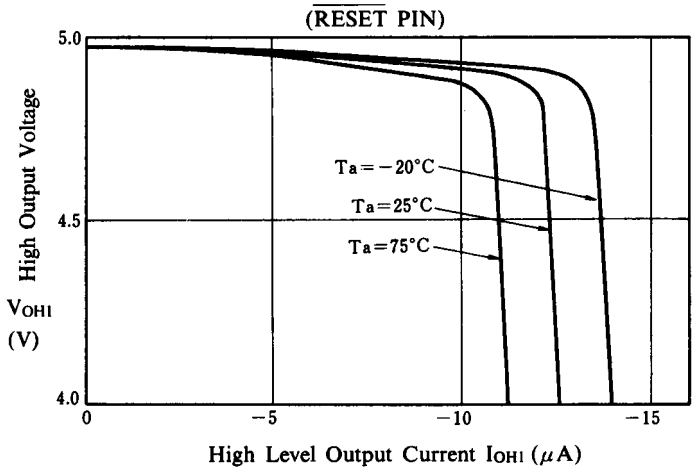


Satulation Voltage vs. Output Sink Current

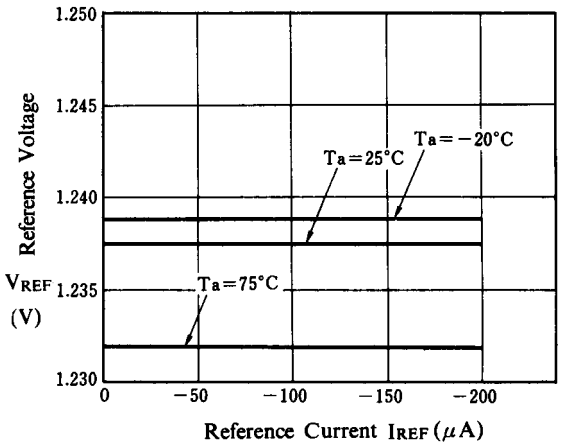


■ TYPICAL CHARACTERISTICS

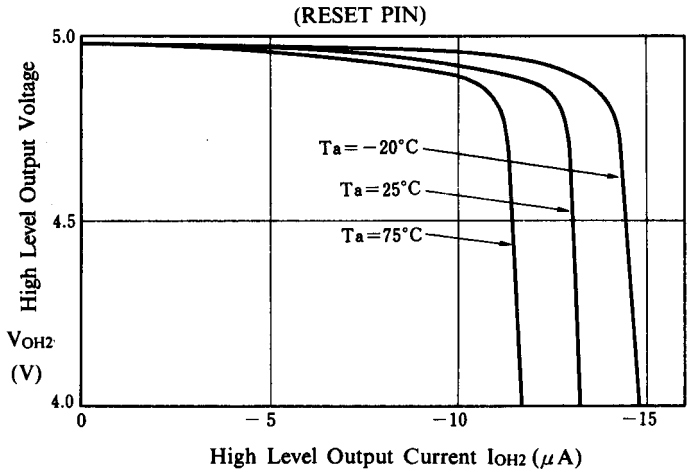
High Level Output Voltage vs. High Level Output Current



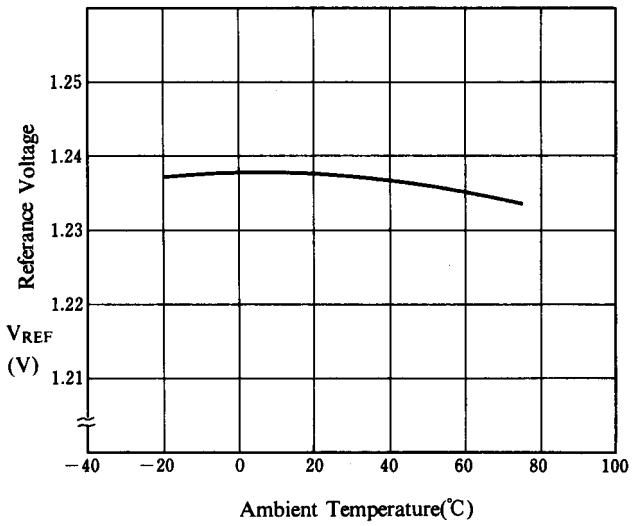
Reference Voltage vs. Reference Current



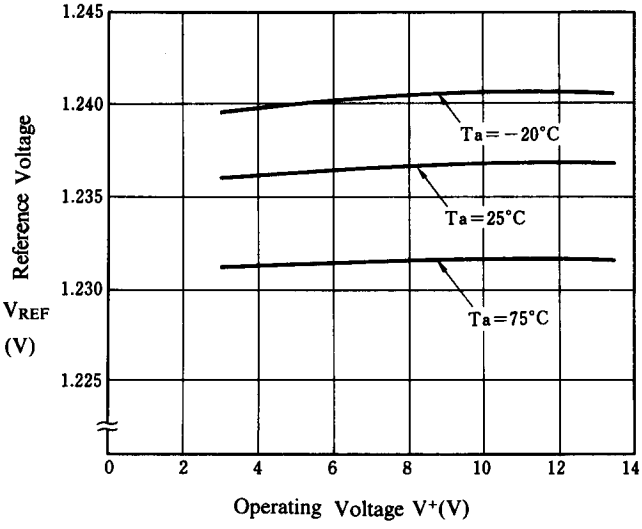
High Output Voltage vs. High Level Output Current



Reference Voltage vs. Ambient Temperature

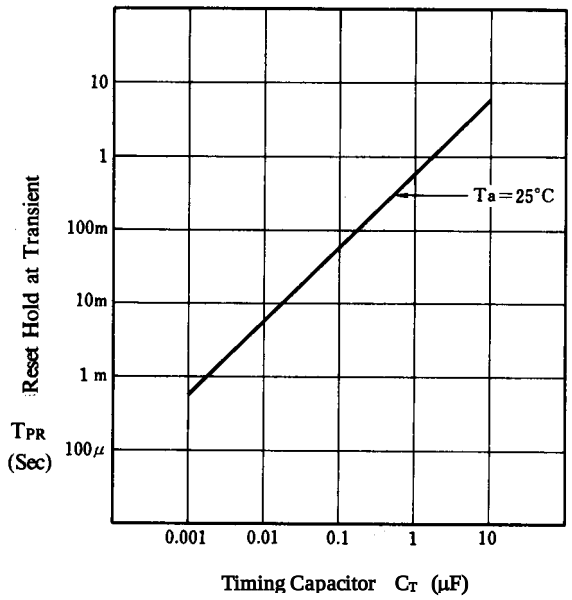


Reference Voltage vs. Operating Voltage

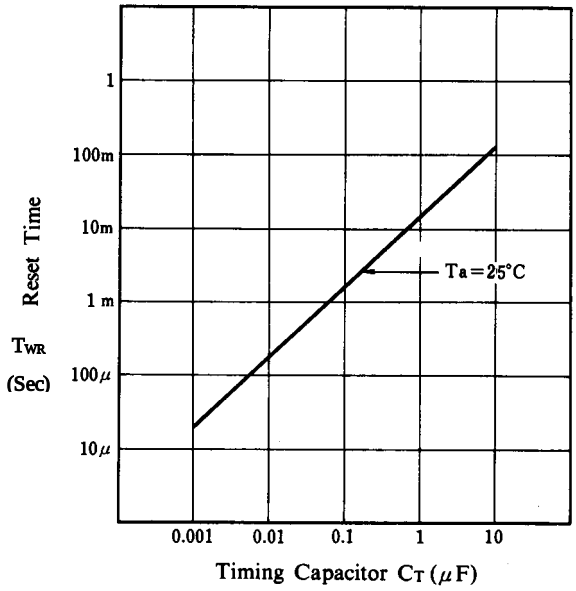


■ TYPICAL CHARACTERISTICS

Reset Hold Time at Transient

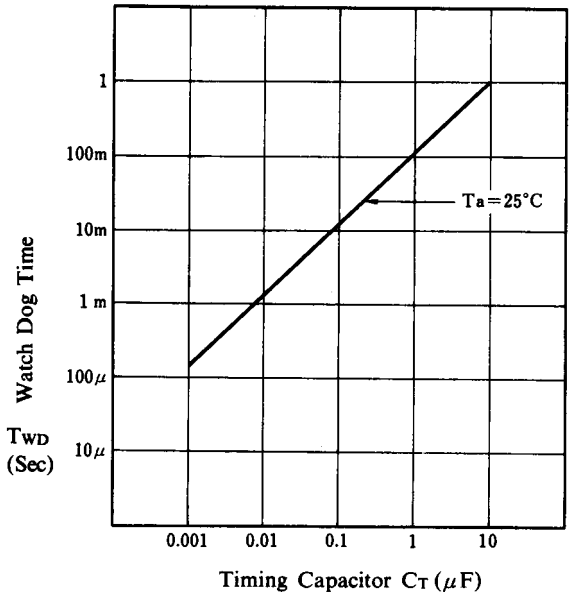


Reset Time

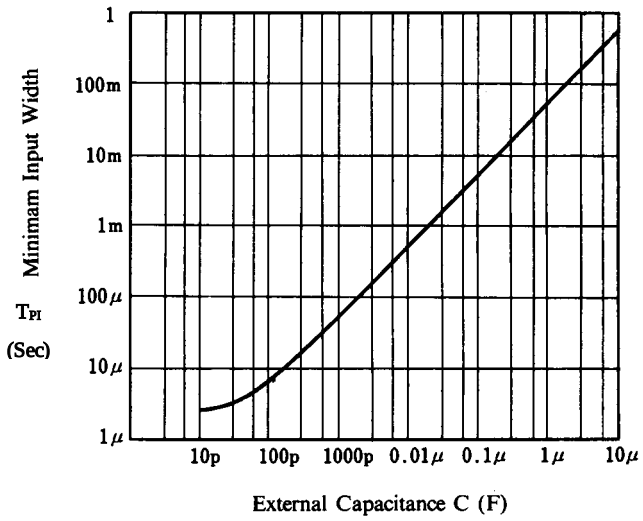


1

Watch Dog Timer observation time

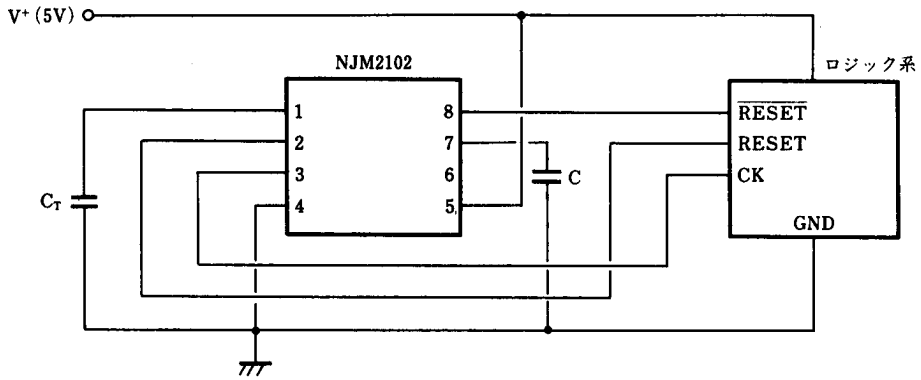


Minimum Input Pulse Width vs. C



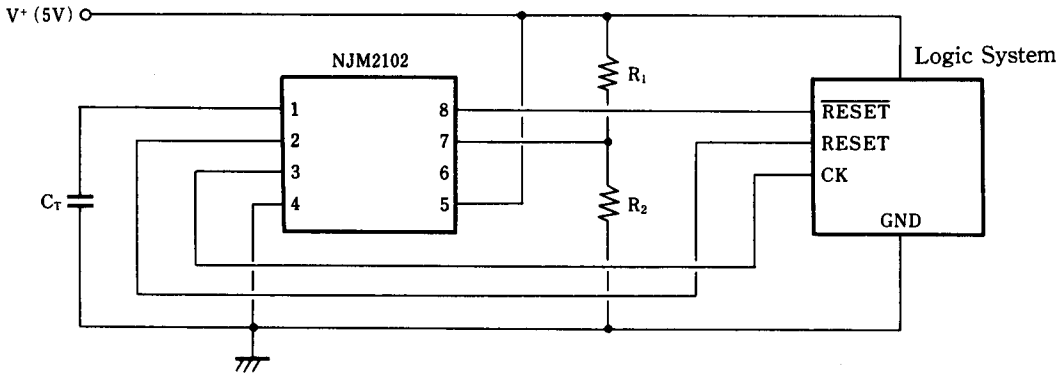
■ APPLICATION CIRCUIT

1. 5V Supply Voltage Supervisory and Watch-dog timer



- Voltage Supply is detected through V_S. Detected Voltage is V_{SH}, V_{SL}.
- If minimum input pulse width T_{PI} needs extend, add external capacitor C between V_S terminal and GND. (Please refer to TYPICAL CHARACTERISTICS : Minimum Input Pulse Width vs C)

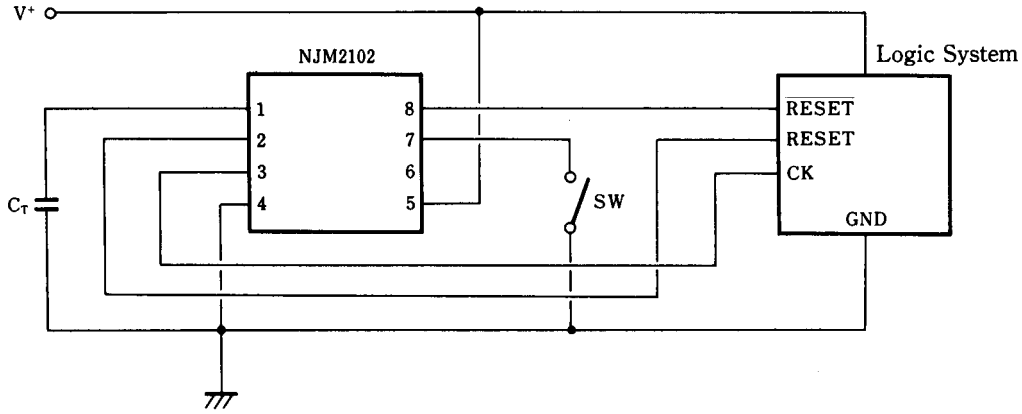
2. 5V Supply Voltage Supervisiory (Externally fine tunning type)



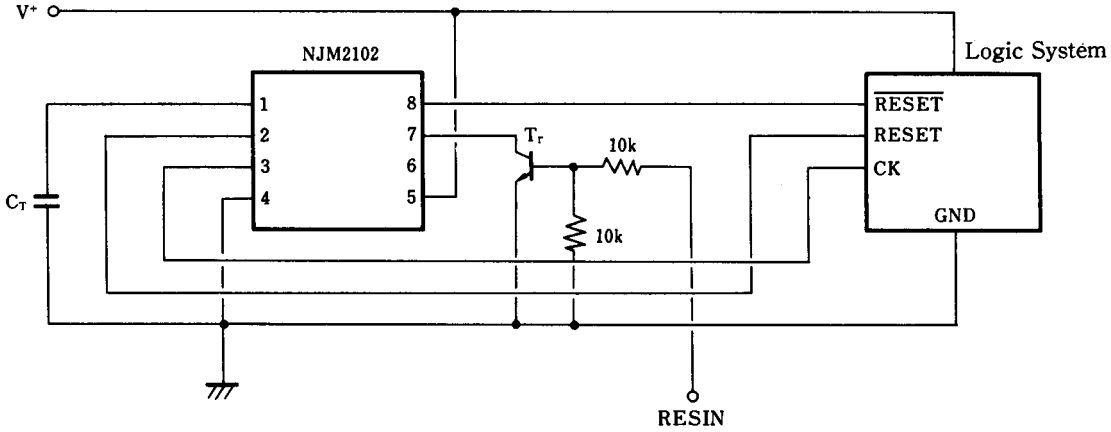
- V_S detecting Voltage can be externally adjusted.
- Detecting Voltage can be decided by divider resistor of IC inside.
  Detecting Voltage can be set by external R1, R2.
  The external resistor R1, R2 are required to be set in value less than 1 / 10 in comparing to divideing resistor of IC inside. Please refere to following Table.

R_1(kΩ)	R_2(kΩ)	Detecting Voltage : V_{SL}(V)	Detecting Voltage : V_{SH}(V)
10	3.9	4.34	4.44
9.1	3.9	4.08	4.18

3. Compulsory Resetting attached (Reset Hold attached)



● *Pin 7 to be grounded when SW. ON. RESET (8pin) become Low : RESET (pin2) become HIGH.



● By putting signal in the RESET pin, and Tr swich ON $\overline{\text{RESET}}$ pin become LOW and RESET pin HIGH.