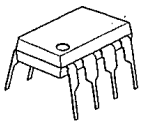
SYSTEM RESET IC

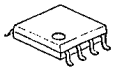
■ GENERAL DESCRIPTION

NJM2103 is supply voltage supervisory IC to detect the abnormal conditions, such as shut down of all supply voltages at once, or sudden voltage down and then generate the reset signal. It supervises both 5V supply voltage and the voltage optionally set up.

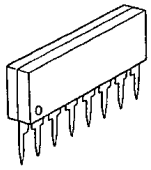
■ PACKAGE OUTLINE



NJM2103D



NJM2103M

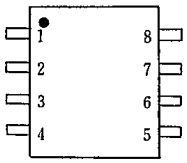


NJM2103L

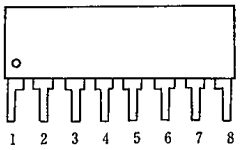
■ FEATURES

- Precise Detection of Supply Voltage Down (V_{SA}=4.2V±2.5%)
- Possible Detection of Optional Voltage Down (V_{SB}=1.22V±1.5%)
- Possible Detection of Optional Over-loading
- Low Operating Current (I_{CC}≦560μA @V_{SB}=5V)
- Reference Voltage can be taken out.
- Low Reset Validated Voltage (V^+=0.8V Typ.)
- Voltage Detection with Hystersis Feature
- Package Outline DIP8, DMP8, SIP8
- Bipolar Technology

■ PIN CONFIGURATION



NJM2103D
NJM2103M

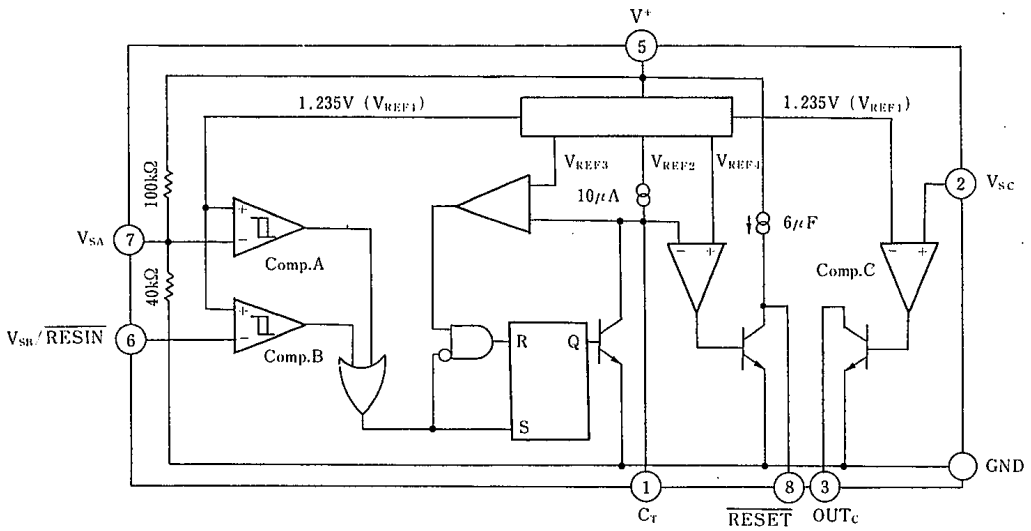


NJM2103L

PIN FUNCTION

1. C_T
2. V_{SC}
3. OUT_C
4. GND
5. V^+
6. $V_{SB}/\overline{RESIN}$
7. V_{SA}
8. $\overline{RESET}$

■ BLOCK DIAGRAM



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■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	20	V
Power Dissipation	P_D	(DIP8) 500	mW
		(DM8) 300	mW
		(SIP8) 800	mW
Input Voltage A	V_{SA}	V^++0.3(<20)	V
Input Voltage B	V_{SB}	20	V
Input Voltage C	V_{SC}	20	V
Operating Temperature Range	T_{opr}	−40～+85	℃
Storage Temperature Range	T_{stg}	−40～+125	℃

■ ELECTRICAL CHARACTERISTICS

• DC CHARACTERISTICS

(V^+=5.0V, V_{SB}=0V, V_{SC}=0V, Ta=25°C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current (1)	I_{CC1}	V_{SB}=5V	—	380	560	μA
Operating Current (2)	I_{CC2}		—	460	700	μA
V_{SA} Detecting Voltage (1)	V_{SAL}	V^+ fall time V_{SB}=V^+	4.10	4.20	4.30	V
V_{SA} Detecting Voltage (2)	V_{SAH}	V^+ rise time V_{SB}=V^+	4.20	4.30	4.40	V
V_{SA} Hysterisis Width	V_{HRSA}		50	100	150	mV
V_{SB} Detecting Voltage	V_{SBL}	V_{SB} fall time	1.202	1.220	1.238	V
V_{SB} Detecting Supply Voltage Fluctuation	ΔV_{SBL}	V^+=3.5～18V	—	3	10	mV
V_{SB} Hysterisis Width	V_{HRSB}		14	28	42	mV
V_{SB} Input Current (1)	I_{IHB}	V_{SB}=5V	—	0	250	nA
V_{SB} Input Current (2)	I_{ILB}		—	20	250	nA
High Level $\overline{\text{RESET}}$ Output Voltage	V_{OHR}	I_{RESET}=−5μA, V_{SB}=5V	4.5	4.9	—	μV
$\overline{\text{RESET}}$ Output Saturating Voltage(1)	V_{OLR1}	I_{RESET}=2mA	—	0.20	0.40	V
$\overline{\text{RESET}}$ Output Saturating Voltage(2)	V_{OLR2}	I_{RESET}=10mA	—	0.30	0.50	V
$\overline{\text{RESET}}$ Output Sink Current	I_{RESET}	V_{OLR}=1.0V	20	80	—	mA
C_T Charge Current	I_{CT}	V_{SB}=5V, VCT=0.5V	6.0	9.5	13.0	μA
V_{SC} Input Current (1)	I_{IHC}	V_{SC}=5V	—	0	500	nA
V_{SC} Input Current (2)	I_{ILC}		—	50	500	nA
V_{SC} Detecting Voltage	V_{SC}		1.215	1.235	1.255	V
V_{SC} Detecting Supply Voltage Fluctuation	ΔV_{SC}	V^+=3.5～13.5V	—	3	10	mV
OUT_C Output Leak Current	I_{OHC}	V_{OHC}=13.5V	—	0	1	μA
OUT_C Output Saturation Voltage	V_{OLC}	I_{OUT}=4mA, V_{SC}=5V	—	0.10	0.40	V
OUT_C Output Sink Current	I_{OUTC}	V_{OLC}=1.0V, V_{SC}=5V	6	20	—	mA
RESET Guarantee Minimum Supply Voltage	V^+_L	V_{OLR}=0.4V, I_{RESET}=200μA	—	0.8	1.2	V

• AC CHARACTERISTICS

(V^+=5.0V V_{SB}=5.0V, V_{SC}=0V, CT=0.01 μF, Ta=25℃)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
V_{SA} Input Pulse Width	t_{PIA}		—	3.0	—	μs
V_{SB} Input Pulse Width	t_{PIB}		—	1.5	—	μs
$\overline{\text{RESET}}$ Output Pulse Width	t_{PO}	V_{SB}=V^+	—	1.5	—	ms
$\overline{\text{RESET}}$ Rise Time	t_r	V_{SB}=V^+, R_L=2.2kΩ, C_1=100pF	—	1.0	—	μs
$\overline{\text{RESET}}$ Fall Time	t_f	V_{SB}=V^+, R_L=2.2kΩ, C_L=100pF	—	0.1	—	μs
Output Delay Time	t_{PD}	V_{SB} fall time	—	2	—	μs
Output, Delay Time	t_{PHL}	V_{SC} rise time, R_L=2.2kΩ, C_L=100pF	—	0.5	—	μs
Output Delay Time	t_{PLH}	V_{SC} fall time, R_L=2.2kΩ, C_L=100pF	—	1.0	—	μs

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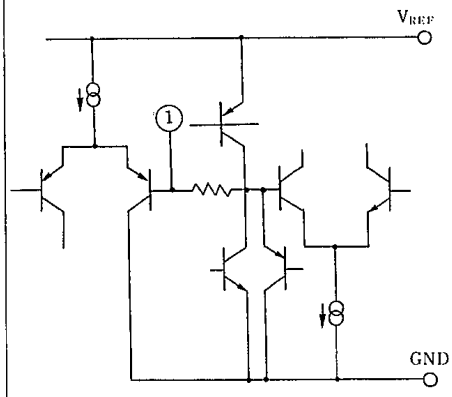
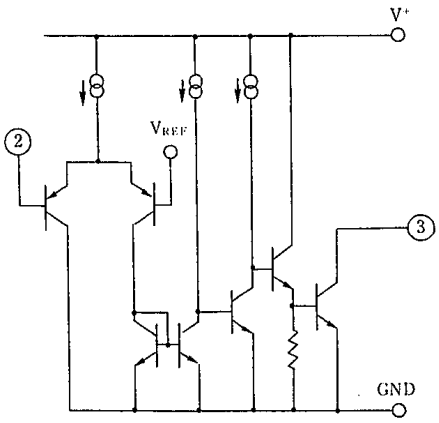
■ TERMINAL FUNCTION

PIN NO.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
1	C_T	Pin Connection to Capacitor, Set the reset holding time.	
2	V_{SC}	Comparator Input	
3	OUT_C	Open Collector Output of Comparator C.	

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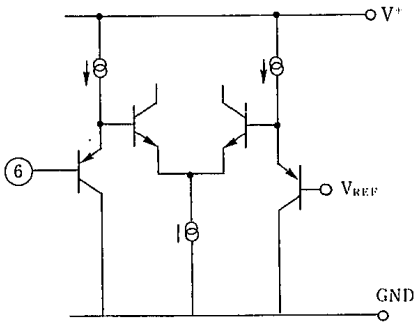
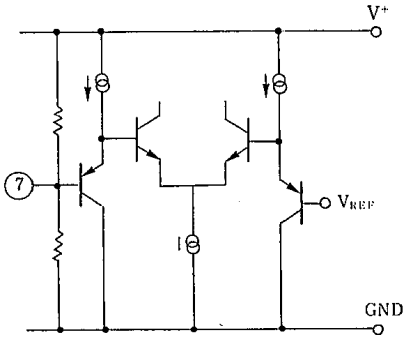
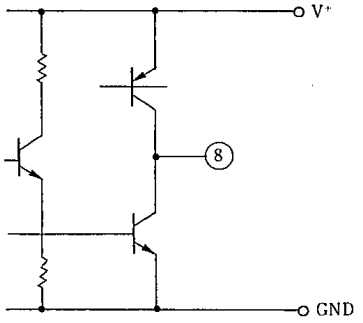
■ TERMINAL FUNCTION

PIN NO.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
4	GND	Ground	
5	V^+	Operating Voltage	
6	$V_{SB}/\overline{RESIN}$	Comparator B Input	
7	V_{SA}	Comparator A Input	
8	$\overline{RESET}$	Reset Output Internalizing pull up resistor	

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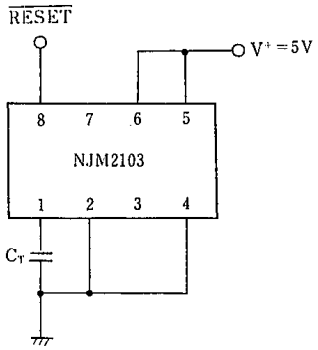
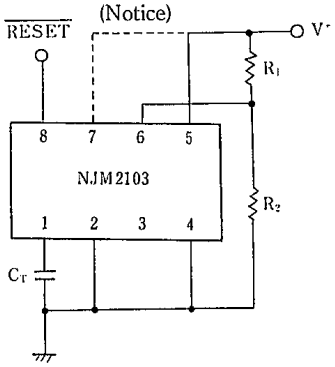
■ APPLICATION CIRCUIT

1) 5V Supply Voltage Monitor



2) Monitoring of Optional Supply Voltage ($V^+ \leqq 13.5V$)

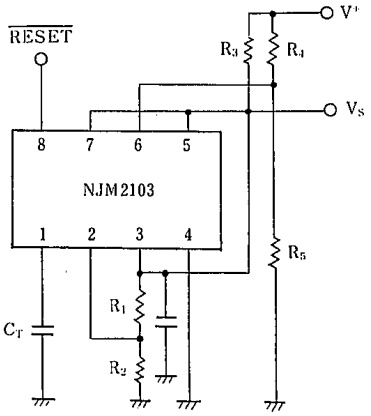


Detecting Voltage $\fallingdotseq (1+\frac{R_1}{R_2}) \times V_{SB}$

(Notice)

If it were that V^+ indicates under 4.50V, Connect 7 pin to V^+

3) Monitoring of Optional Supply Voltage ($V^+ > 13.5V$)

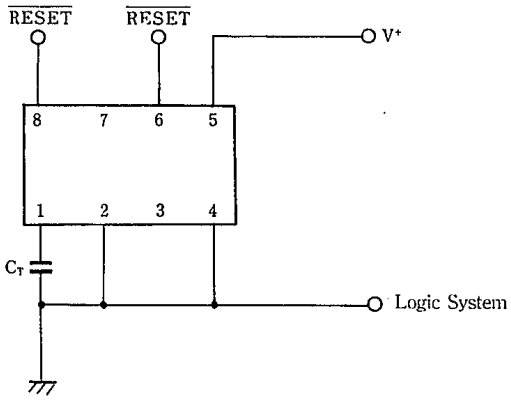


Detecting Voltage $\fallingdotseq (1+\frac{R_3}{R_5}) \times V_{SB}$

Constant Voltage Output $V_S \fallingdotseq (1+\frac{R_1}{R_2}) \times V_{SC}$

$\overline{\text{RESET}}$ Output $\fallingdotseq \begin{cases} V_S & \text{(High Level)} \\ 0V & \text{(Low Level)} \end{cases}$

4) Compulsry Reset



Input Reset signal TTL level to V_{SB}-terminal

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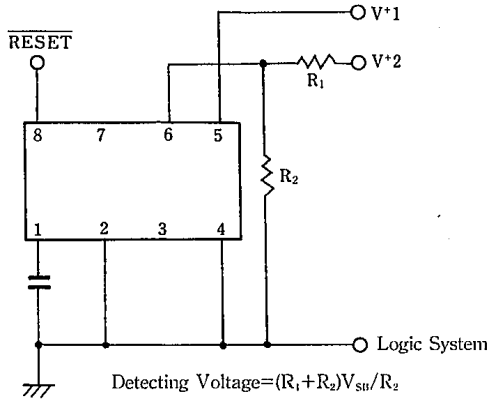
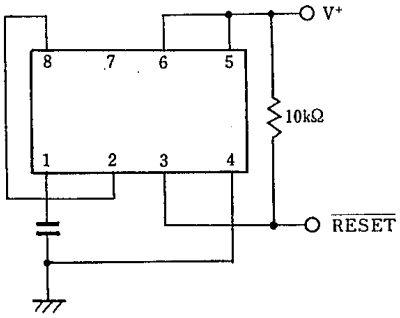
5) 5V,Vcc<12V Supply Voltage Monttor



Detecting Voltage=$(R_1+R_2)V_{SH}/R_2$

6) Non-Inverting Reset



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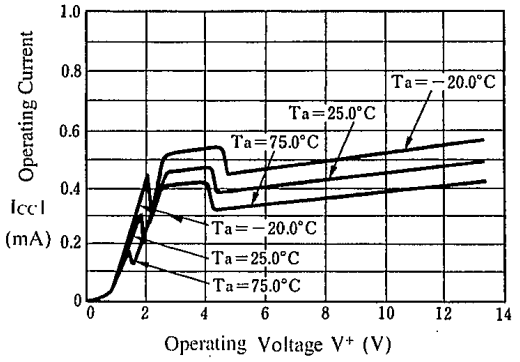
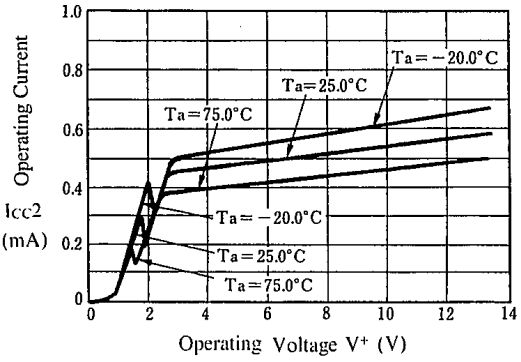
■ TYPICAL CHARACTERISTICS

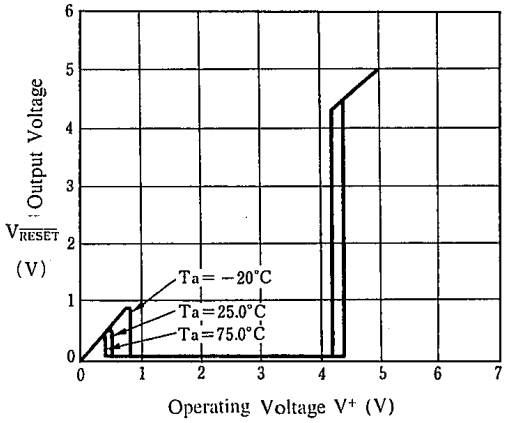
Operating Current 1 vs. Operating Voltage



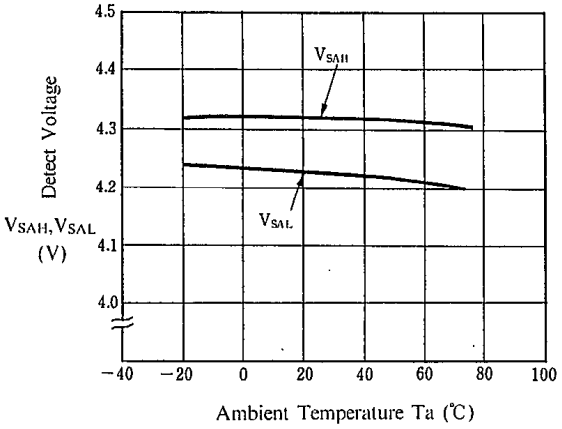
Operating Current 2 vs. Operating Voltage



Output Voltage vs. Operating Voltage



Detect Voltage (V_{SA}) vs. Temperature



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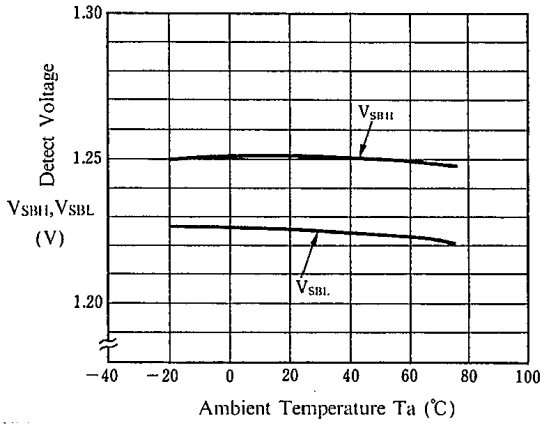
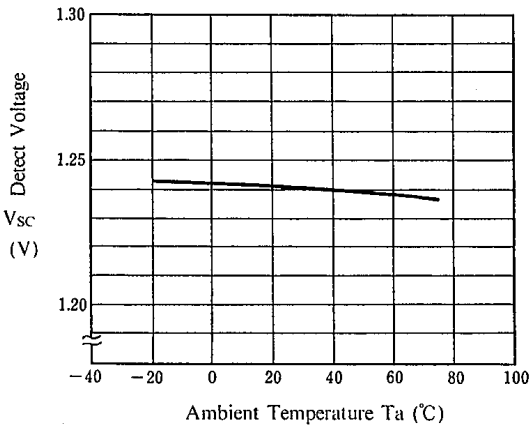
Detect Voltage (V_{SA}) vs. Temperature

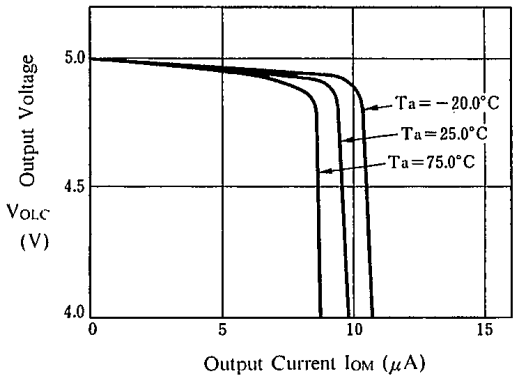


Detect Voltage (V_{SC}) vs. Temperature

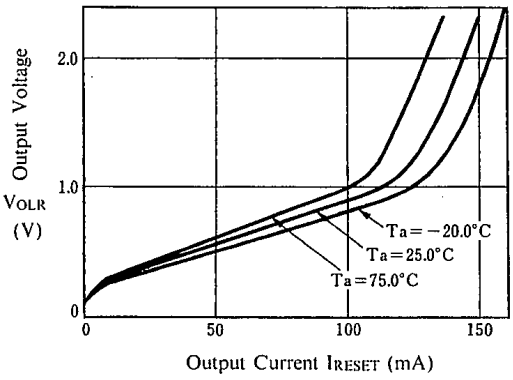


■ TYPICAL CHARACTERISTICS

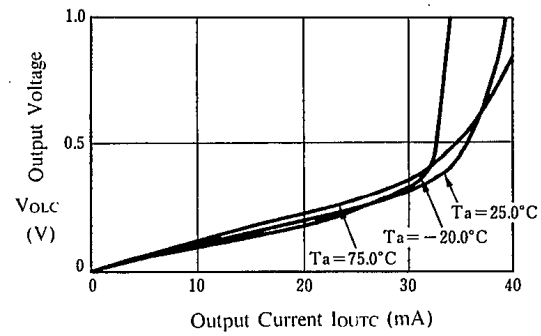
Output Voltage vs. Output Current



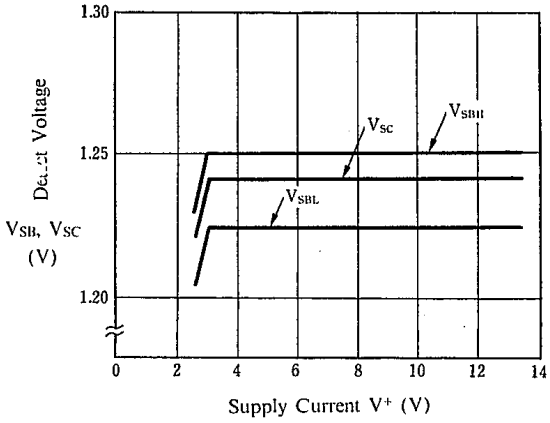
Output Voltage vs. Output Current



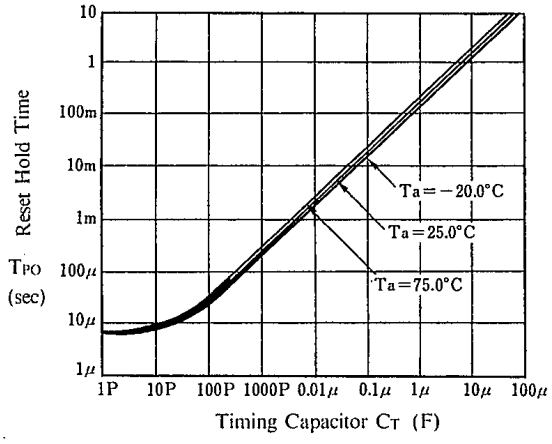
Output Voltage (OUTC) vs. Output Current (IOUTC)



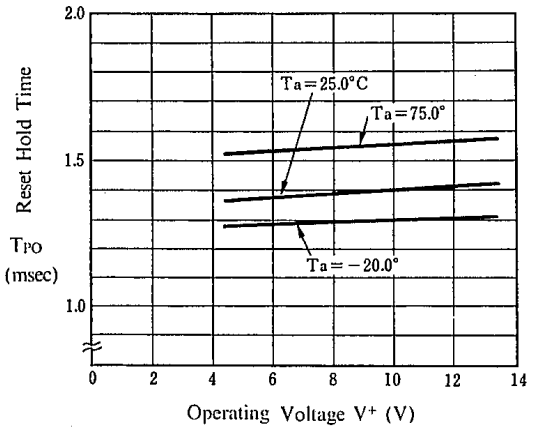
Detect Voltage (VSB, VSC) vs. Supply Voltage



Reset Hold Time vs. G



Reset Hold Time vs. Operating Voltage



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MEMO