

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

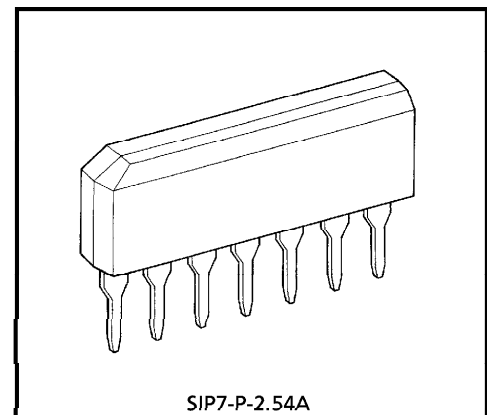
TA8030S

WATCHDOG TIMER

The TA8030S is a system reset IC supplied with 5V power. It is specially designed for microcomputer systems. It incorporates a watchdog timer for monitoring microcomputer operation and has many reset functions, including a reset timer output which will be given at power-on and another reset output which will be given when the supply voltage drops. With these functions, it helps build up a reliable system.

FEATURES

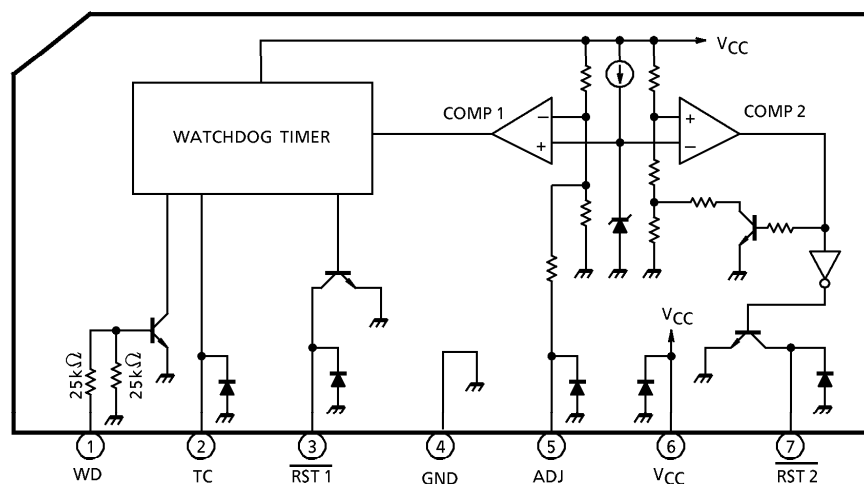
- Watchdog timer
- Power-on reset timer
- Dual-reset output
- Small SIP-7 pin



SIP7-P-2.54A

Weight : 0.7g (Typ.)

BLOCK DIAGRAM AND PIN LAYOUT



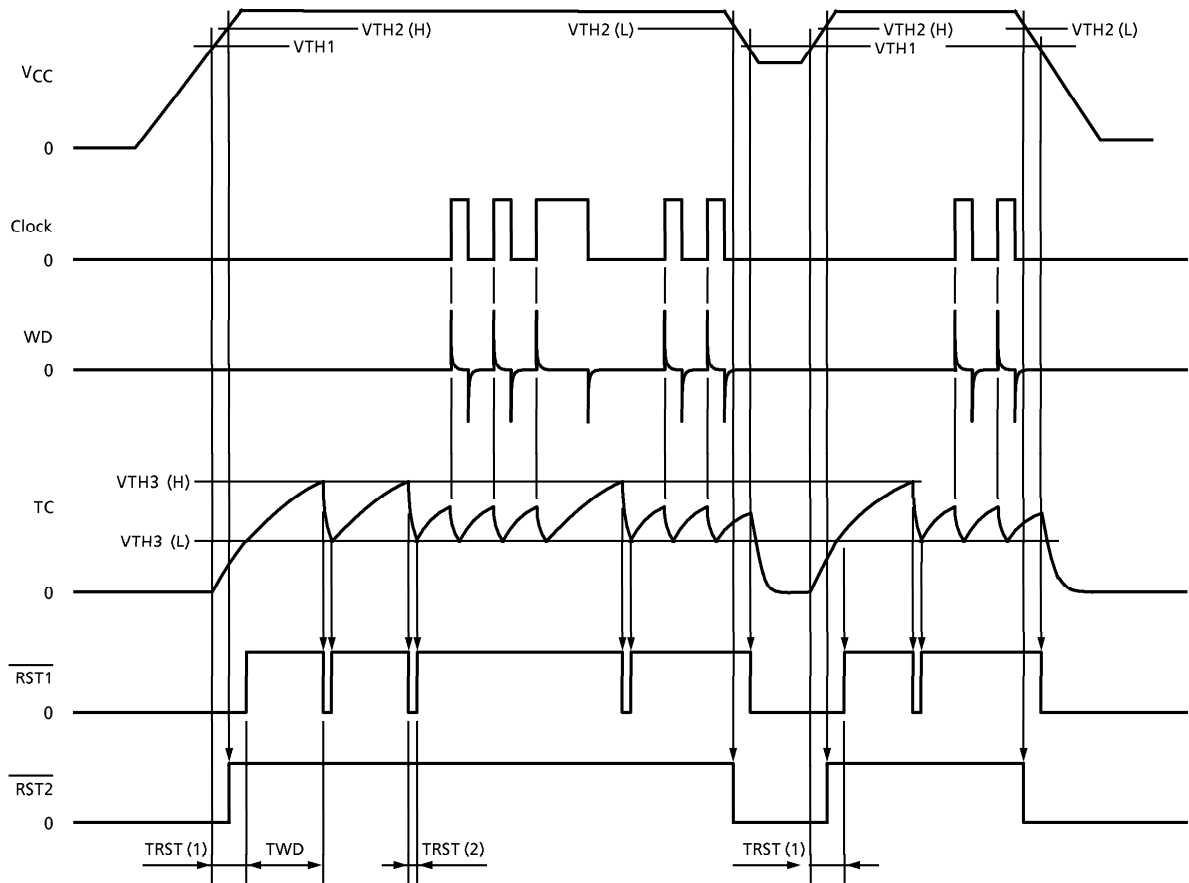
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PIN DESCRIPTION

PIN No.	SYMBOL	DESCRIPTION
1	WD	Clock input pin for watchdog timer. If this IC is only used as a power-on reset timer, this pin is connected to $\overline{\text{RST1}}$.
2	TC	Time setting pin for the reset and watchdog timers. R ₁ leads to V _{CC} , and C ₁ leads to GND.
3	$\overline{\text{RST1}}$	Supplies an NPN transistor open-collector output. <ul style="list-style-type: none">● Generates a reset signal determined by the CR combination connected to the TC pin.● Supplies reset pulses intermittently if no clock is given to the WD pin.
4	GND	Grounded
5	ADJ	V _{CC} detect voltage (1) adjusting pin. The detection voltage is 4.6V when this pin is grounded ; it is 3.5V when this pin is directly connected to V _{CC} .
6	V _{CC}	Power supply pin for internal circuit. The output voltage can also be detected at this pin.
7	$\overline{\text{RST2}}$	Supplies an NPN transistor open-collector output. It is the output pin for V _{CC} detect voltage (2) . The detect voltage has a hysteresis of 0.17V.

TIMING CHART



MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	17	V
Input Voltage	V _{IN}	-7 to 7	V
Output Voltage	V _{OUT}	7	V
Output Current	I _{OUT}	10	mA
Power Dissipation	P _D	300	mW
Operating Temperature	T _{opr}	-40 to 85	°C
Storage Temperature	T _{stg}	-55 to 150	°C
Lead Temperature-time	T _{sol}	260 (10s)	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = 5V, Ta = -40 to 85°C)

(1) DC CHARACTERISTICS

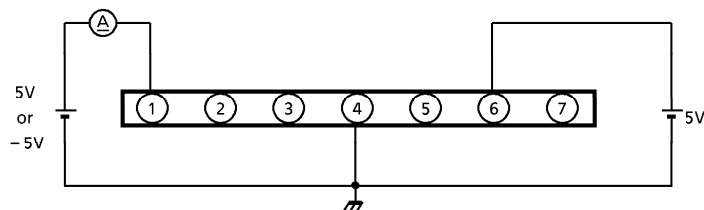
CHARACTERISTIC	SYMBOL	PIN	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Current	I _{IH}	WD	1	V _{IN} = 5V	0.1	0.17	0.35	mA
	I _{IL}		1	V _{IN} = -5V	-0.06	-0.1	-0.2	
Input Voltage	V _{IH}	WD	2	—	2.2	—	—	V
	V _{IL}		2	—	—	—	0.6	
Input Current	I _{IN}	TC	4	V _{IN} = 1.5V	-2	—	2	μA
Output Current	I _{OUT}	TC	4	V _{OUT} = 4.2V	2.4	4	7.7	mA
Watchdog Timer Threshold Voltage	V _{TH3} (H)	TC	3	—	3.5	4	4.5	V
	V _{TH3} (L)		3	—	1.75	2	2.25	
Output Voltage	V _{OL}	RST1	5	I _{OUT} = 2mA	—	—	0.5	V
Output Leakage Current	I _{LEAK}	RST2	6	V _{OUT} = 7V	—	—	5	μA
V _{CC} Detect Voltage (1)	V _{TH1}	V _{CC}	—	—	4.0	4.25	4.5	V
	V _{TH1} (H)		3	ADJ = GND	4.3	4.6	4.9	
	V _{TH1} (L)		3	ADJ = V _{CC}	3.25	3.5	3.75	
V _{CC} Detect Voltage (2)	V _{TH2} (H)	V _{CC}	3	—	4.4	4.65	4.9	V
	ΔV _{TH2}		3	—	—	0.17	0.3	
Current Consumption	I _{CC}	V _{CC}	7	—	—	2.5	4.5	mA

(2) AC CHARACTERISTICS

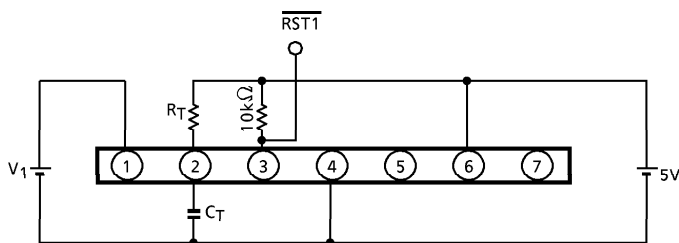
CHARACTERISTIC	SYMBOL	PIN	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Watchdog Timer	T _{WD}	RST1	3	—	0.9 × C ₁ R ₁	1.1 × C ₁ R ₁	1.3 × C ₁ R ₁	s
Reset Timer (1)	T _{RST} (1)	RST1	3	—	0.4 × C ₁ R ₁	0.5 × C ₁ R ₁	0.6 × C ₁ R ₁	s
Reset Timer (2)	T _{RST} (2)	RST1	3	—	350 × C ₁	750 × C ₁	1500 × C ₁	s
Input Pulse Width	T _W	WD	3	—	3	—	—	μs
Transfer Delay Time	t _{d1}	RST1	3	t _{dHL} (C ₁ = 0μF)	—	3	10	μs
	t _{d2}	RST2	3	t _{dHL} , t _{dLH}	—	3	10	μs

TEST CIRCUIT

1. I_{IH} , I_{IL} (WD)

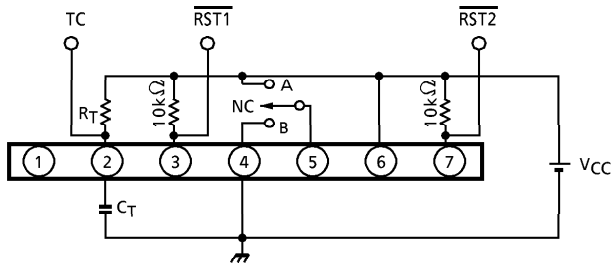


2. V_{IH} , V_{IL} (WD)



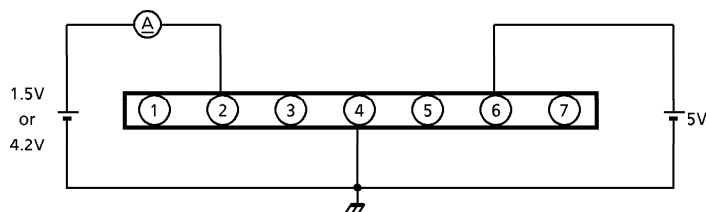
$\overline{RST1}$ should be 5V when $V_1 = 2.2V$.
 $\overline{RST1}$ should be a pulse signal when $V_1 = 0.6V$.

3. V_{TH3} (H), (L) (TC), V_{TH1} , V_{TH1} (H), (L), V_{TH2} (H), ΔV_{TH2} , AC CHARACTERISTICS

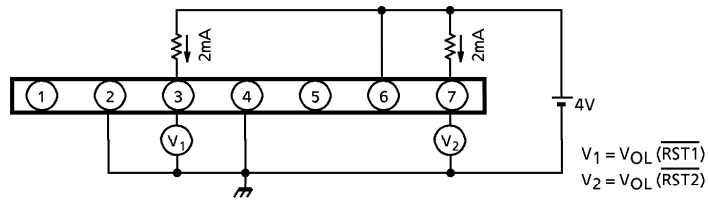


\therefore See TIMING CHART.
 $\Delta V_{TH2} = V_{TH2} (H) - V_{TH2} (L)$

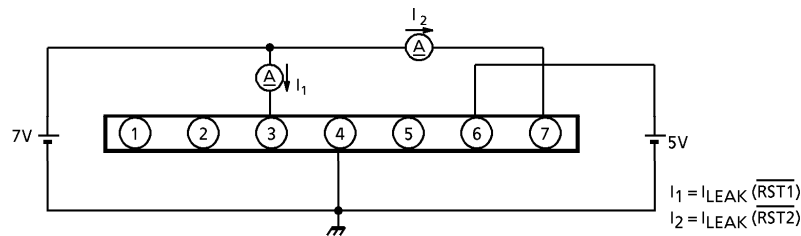
4. I_{IN} , I_{OUT} (TC)



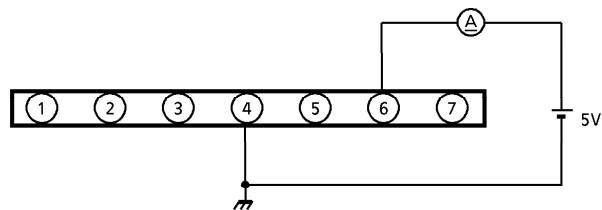
5. $V_{OL}(\overline{RST1}) (\overline{RST2})$



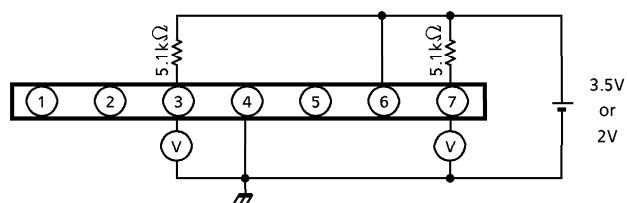
6. $V_{LEAK}(\overline{RST1}) (\overline{RST2})$



7. I_{CC}

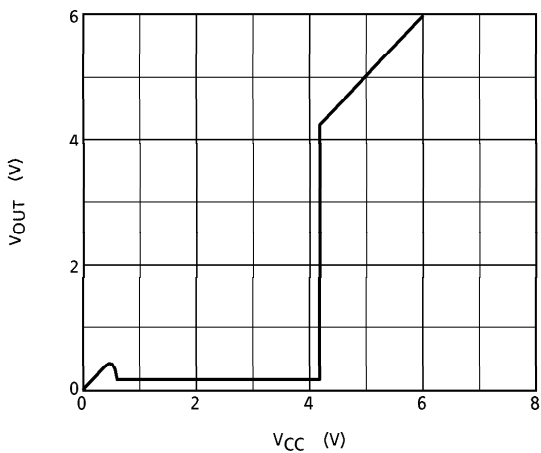


8. $V_{OL}(1), (2) (\overline{RST1}) (\overline{RST2})$

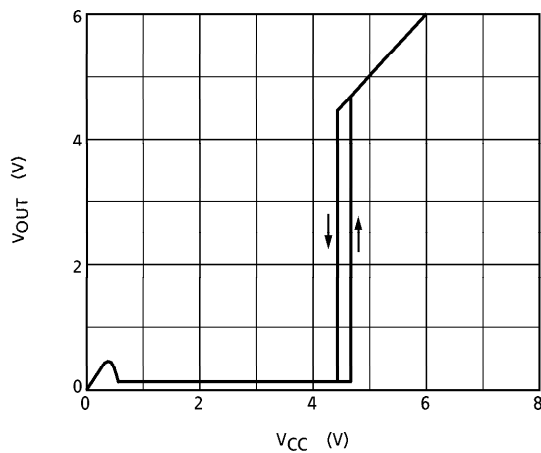


RESET OUTPUT STANDARD CHARACTERISTICS

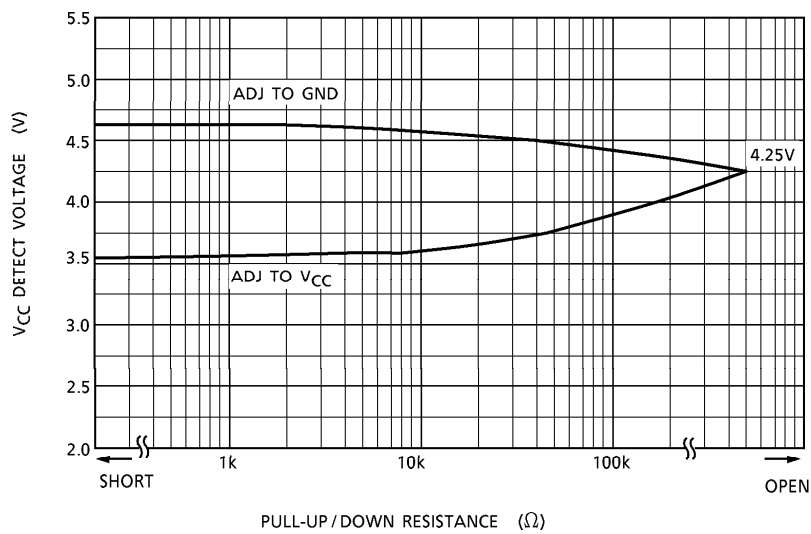
1. $\overline{RST1}$



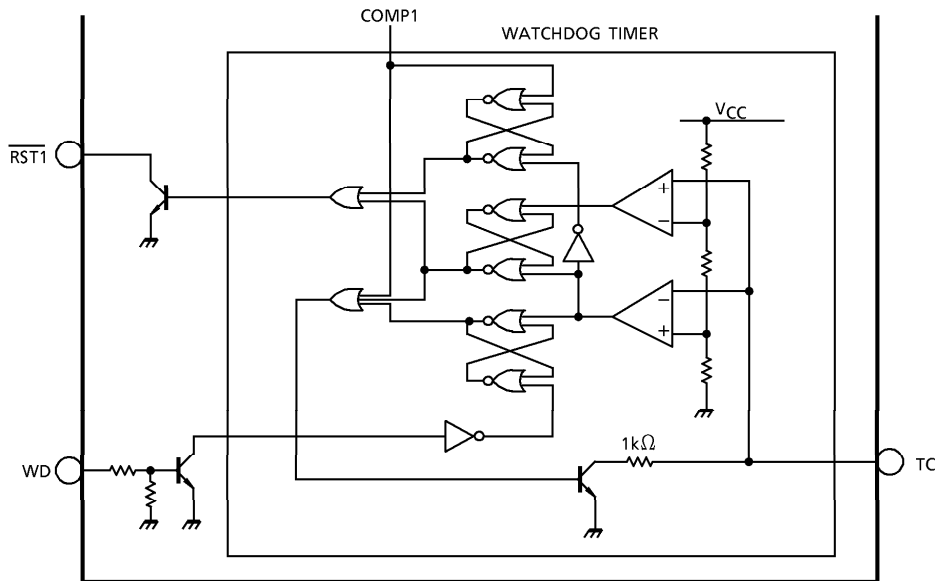
2. $\overline{RST2}$



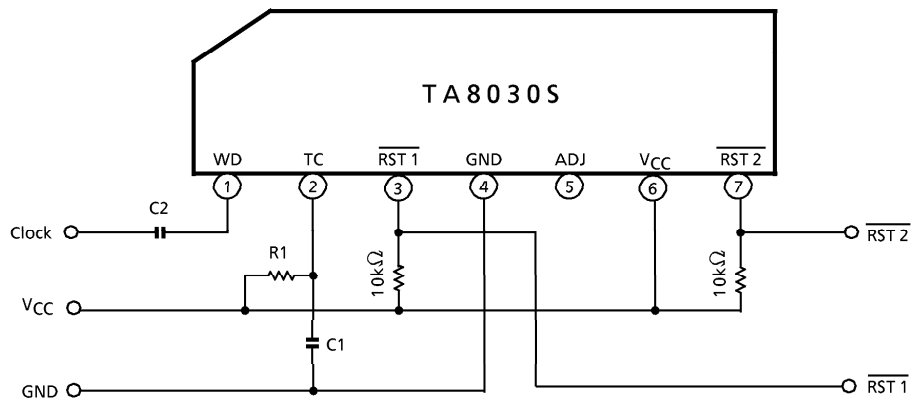
ADJ PIN PULL-UP / DOWN RESISTANCE VS V_{CC} DETECT VOLTAGE



EQUIVALENT CIRCUIT DIAGRAM (WATCHDOG TIMER)



EXAMPLE OF APPLICATION CIRCUIT

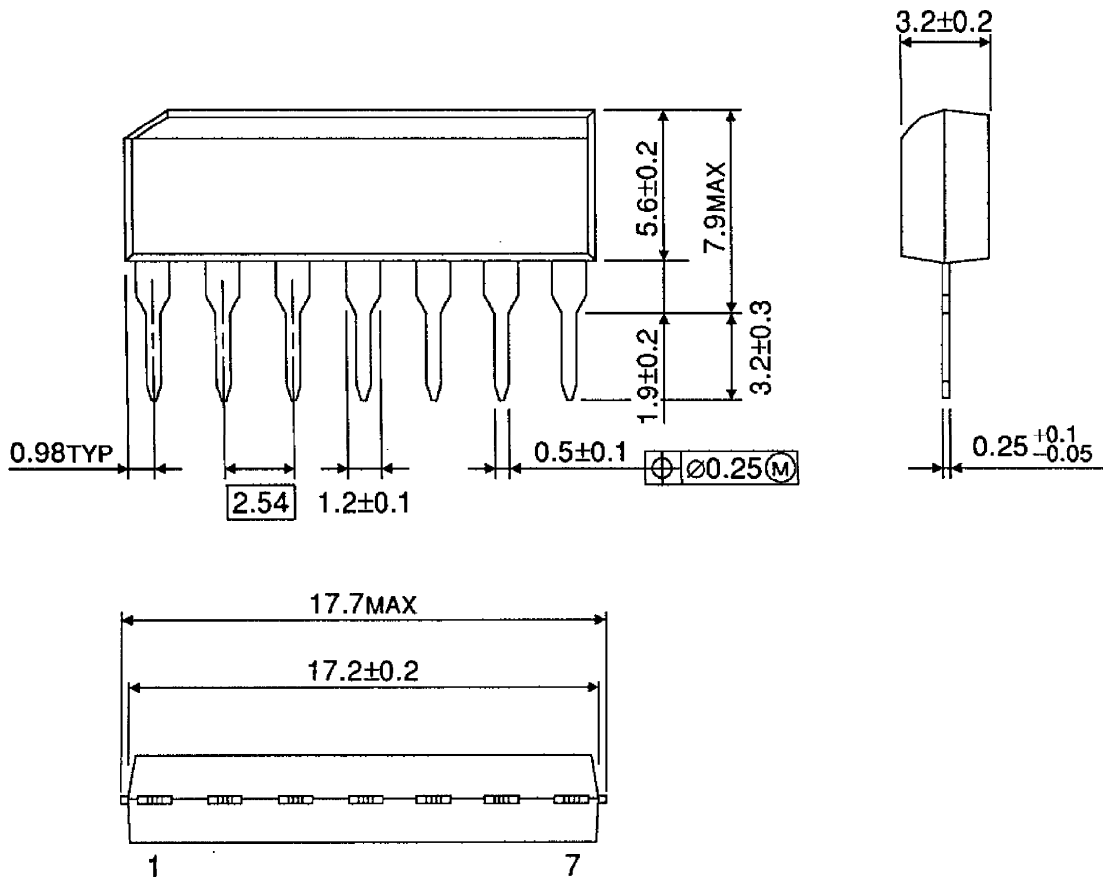


RECOMMENDED CONDITIONS

PART NAME	MIN.	TYP.	MAX.	UNIT
C ₁	0.01	—	100	μF
R ₁	10	—	100	kΩ
C ₂	—	2200	—	pF

OUTLINE DRAWING
SIP7-P-2.54A

Unit : mm



Weight : 0.7g (Typ.)