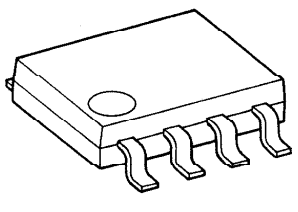
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8030F

WATCHDOG TIMER

The TA8030F is a system reset IC for 5V supply voltage system. 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.



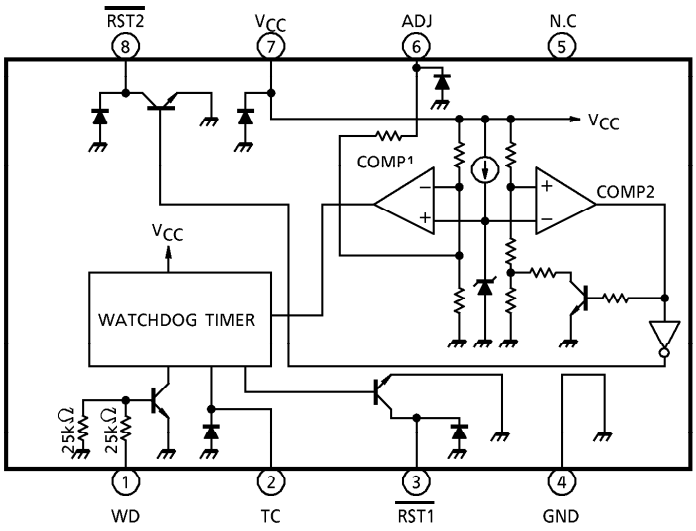
SOP8-P-225-1.27

Weight : 0.08g (Typ.)

FEATURES

- Watchdog timer
- Power-on reset timer
- Dual-reset output
- Small SOP-8 pin

BLOCK DIAGRAM AND PIN LAYOUT



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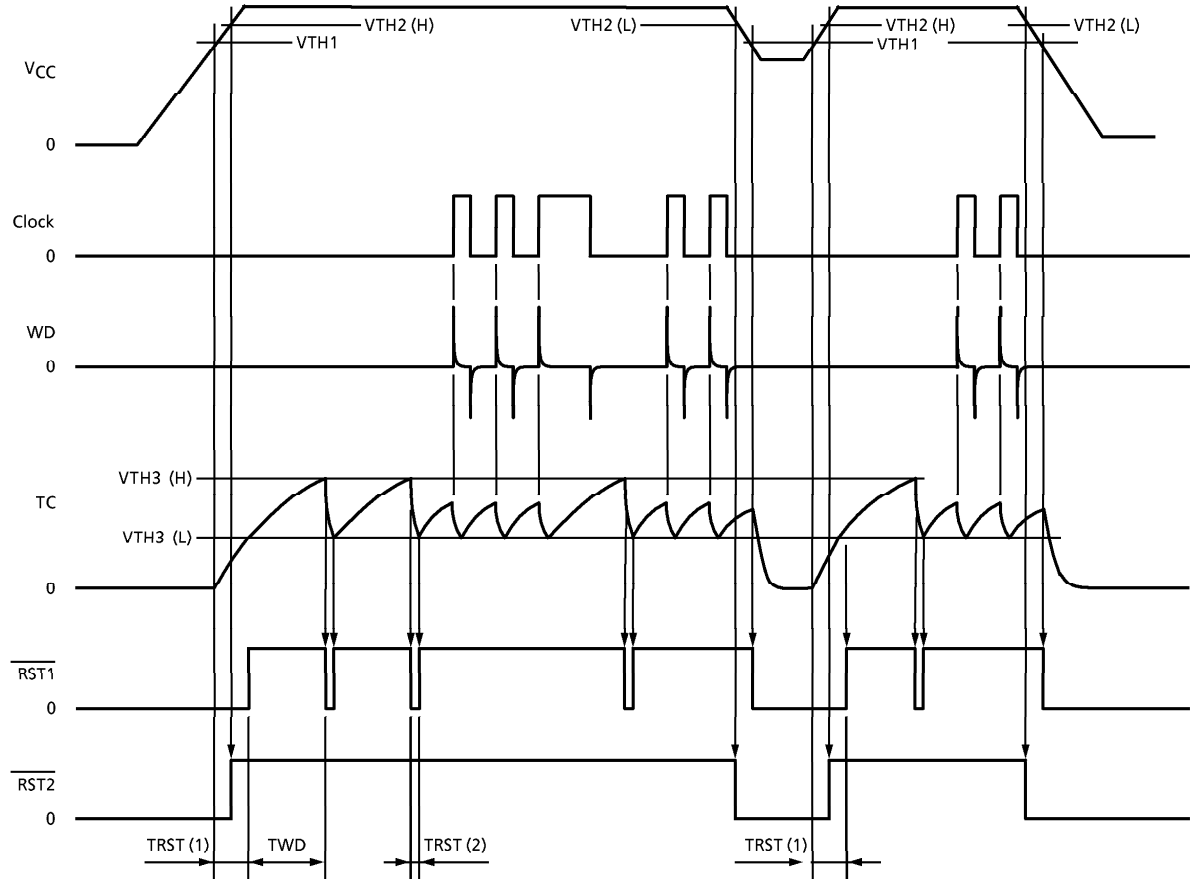
PIN DESCRIPTION

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 $\overline{RST1}$.
2	TC	Time setting pin for the reset and watchdog timers. R_1 leads to V_{CC}, and C_1 leads to GND.
3	$\overline{RST1}$	Supplies an NPN transistor open-collector output. ● 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
6	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}.
7	V_{CC}	Power supply pin for internal circuit. The output voltage can also be detected at this pin.
8	$\overline{RST2}$	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.
5	NC	Not connected pin

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	280	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

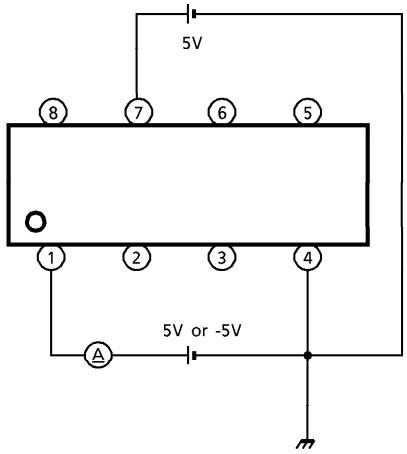
CHARACTERISTIC	SYMBOL	PIN	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input Current	I_{IH}	WD	1	V_{IN} = 5V	0.1	0.17	0.35	mA
	I_{IL}		1	V_{IN} = −5V	−0.06	−0.1	−0.2	
Input Voltage	V_{IH}	WD	2	—	2.2	—	—	V
	V_{IL}		2	—	—	—	0.6	
Input Current	I_{IN}	TC	4	V_{IN} = 1.5V	−2	—	2	μA
Output Current	I_{OUT}	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}	$\overline{RST1}$	5	I_{OUT} = 2mA	—	—	0.5	V
Output Leakage Current	I_{LEAK}	$\overline{RST2}$	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

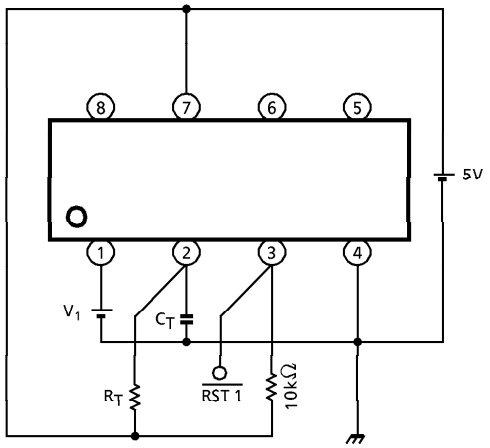
CHARACTERISTIC	SYMBOL	PIN	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Watchdog Timer	T_{WD}	$\overline{RST1}$	3	—	$0.9 \times C_1R_1$	$1.1 \times C_1R_1$	$1.3 \times C_1R_1$	s
Reset Timer (1)	$T_{RST\ (1)}$	$\overline{RST1}$	3	—	$0.4 \times C_1R_1$	$0.5 \times C_1R_1$	$0.6 \times C_1R_1$	s
Reset Timer (2)	$T_{RST\ (2)}$	$\overline{RST1}$	3	—	$350 \times C_1$	$750 \times C_1$	$1500 \times C_1$	s
Input Pulse Width	T_W	W_D	3	—	3	—	—	μs
Transfer Delay Time	t_{d1}	$\overline{RST1}$	3	t_{dHL} (C_1 = 0μF)	—	3	10	μs
	t_{d2}	$\overline{RST2}$	3	t_{dHL}, t_{dLH}	—	3	10	μs

TEST CIRCUIT

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

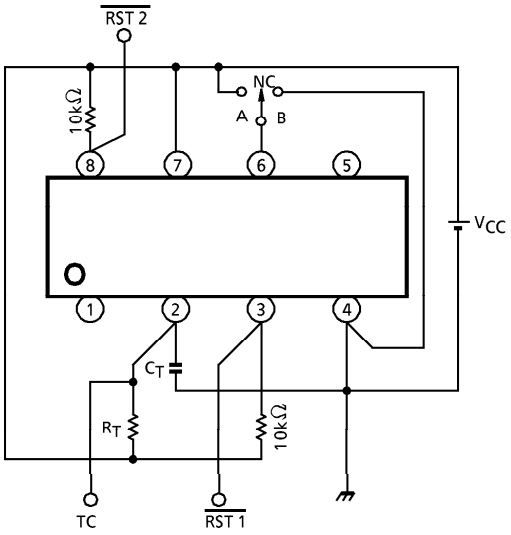


2. V_{IH}, V_{IL} (WD)



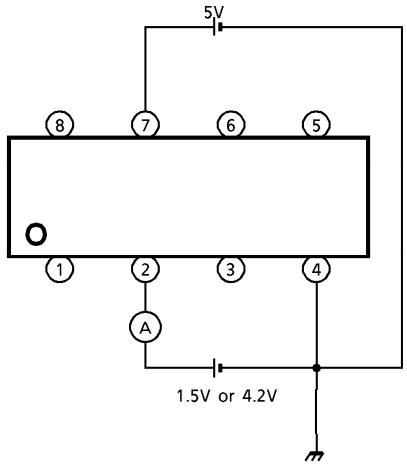
$\overline{RST1}$ should be 5V when $V_1 = 2.2V$.
$\overline{RST1}$ should be a pulse signal when $V_1 = 0.6V$.

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

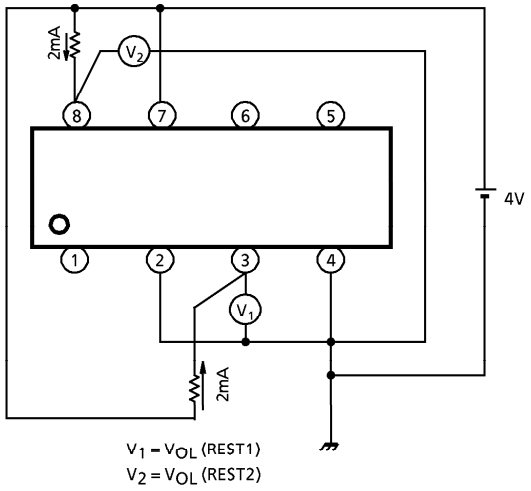


∴ See TIMING CHART.
$\Delta V_{TH2} = V_{TH2}$ (H) − V_{TH2} (L)

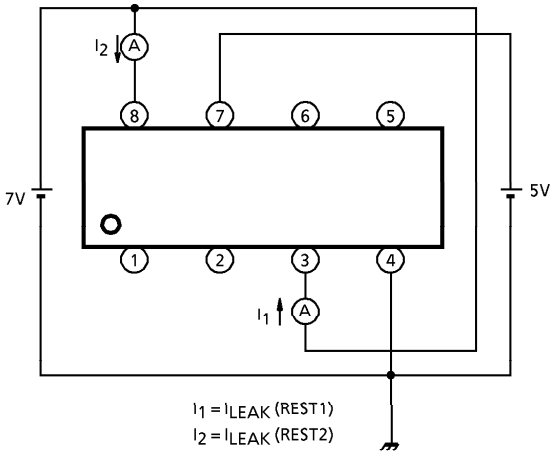
4. I_{IN}, I_{OUT} (TC)



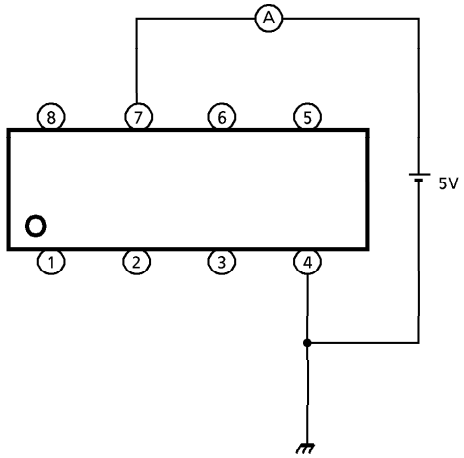
5. V_{OL} ($\overline{RST1}$) ($\overline{RST2}$)



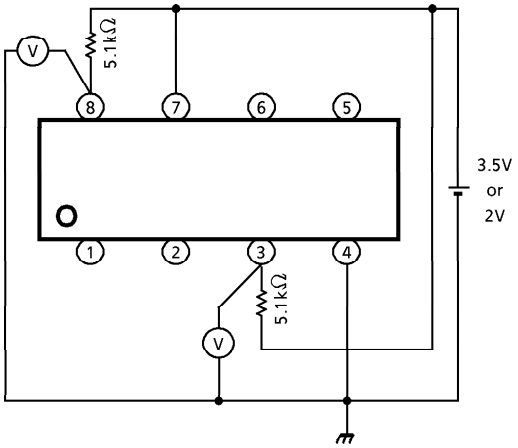
6. I_{LEAK} ($\overline{RST1}$) ($\overline{RST2}$)



7. I_{CC}

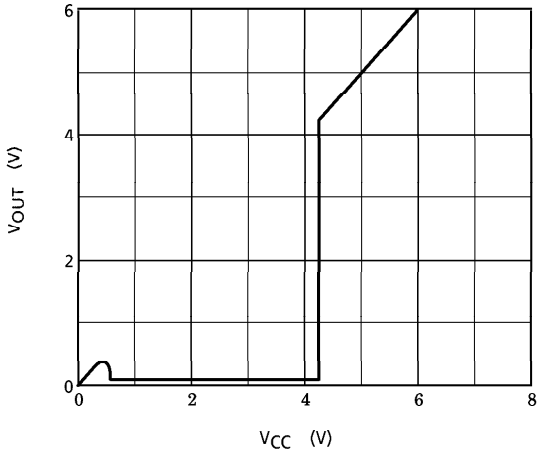


8. V_{OL} (1), (2) ($\overline{RST1}$) ($\overline{RST2}$)

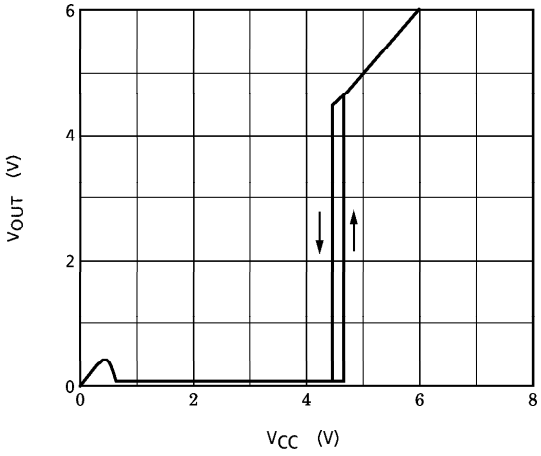


RESET OUTPUT STANDARD CHARACTERISTICS

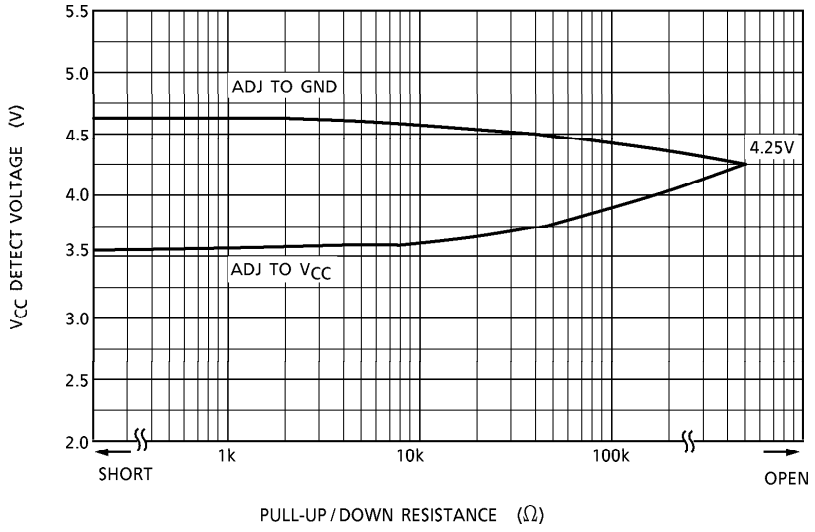
1. $\overline{RST1}$



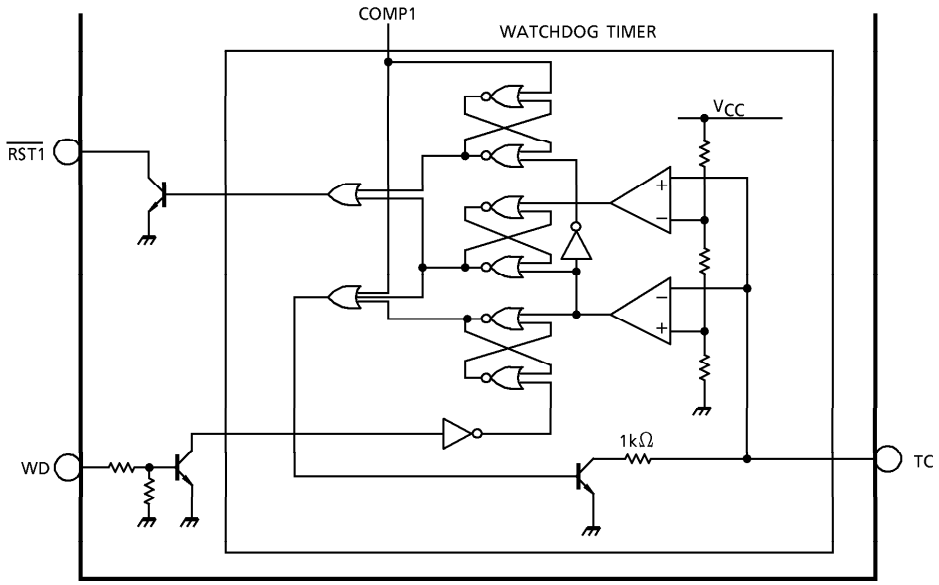
2. $\overline{RST2}$



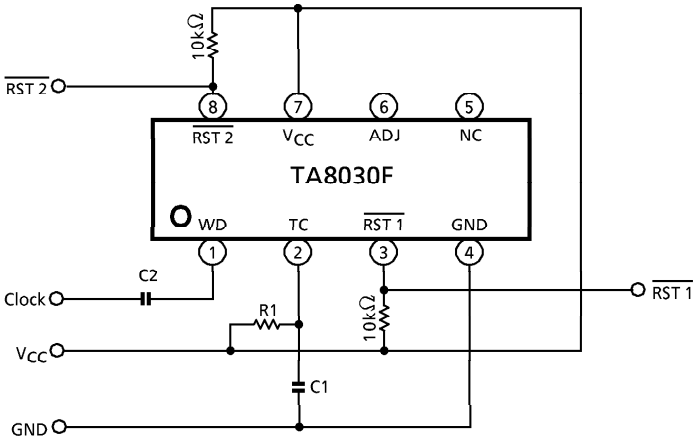
ADJ PIN PULL-UP / DOWN RESISTANCE VS V_{CC} DETECT VOLTAGE



EQUIVALENT CIRCUIT DIAGRAM (WATCHDOG TIMER)



EXAMPLE OF APPLICATION CIRCUIT



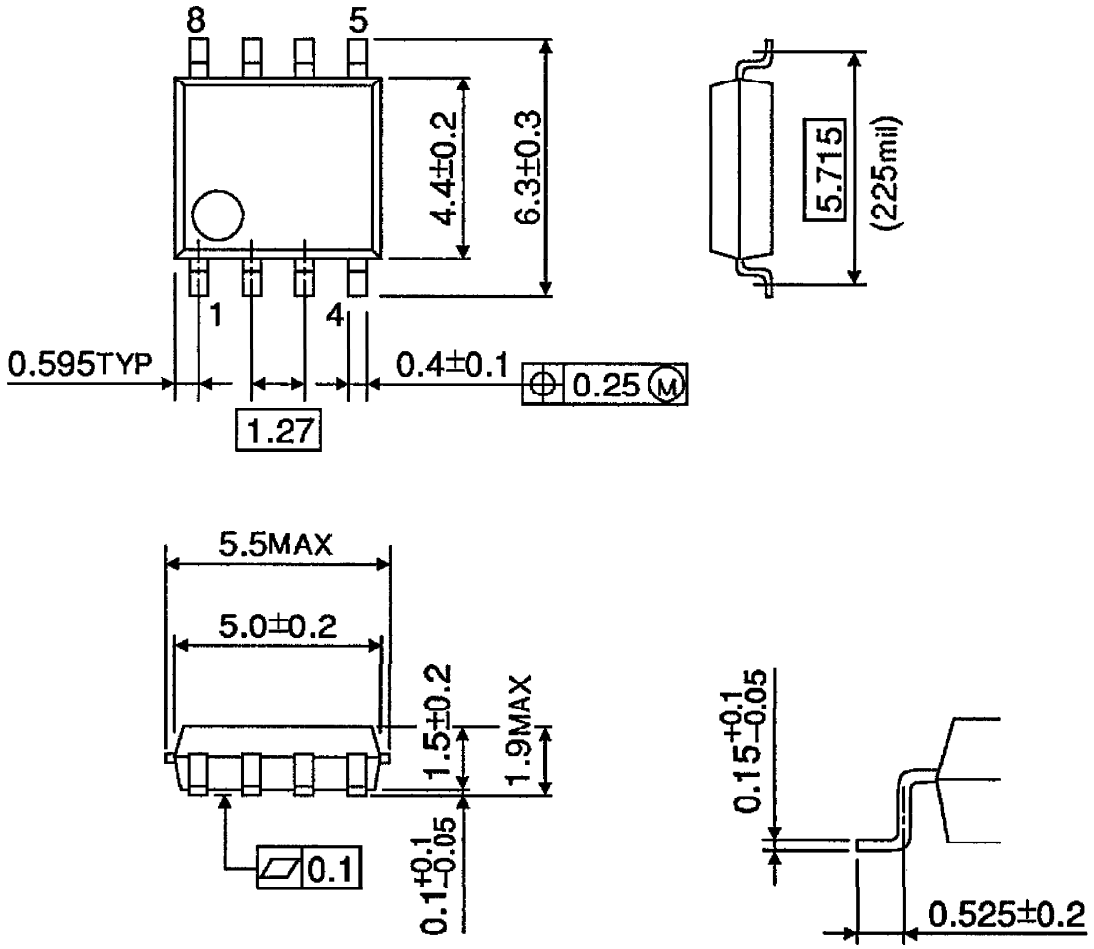
RECOMMENDED CONDITIONS

PART NAME	MIN.	TYP.	MAX.	UNIT
C_1	0.01	—	100	μF
R_1	10	—	100	kΩ
C_2	—	2200	—	pF

OUTLINE DRAWING

SOP8-P-225-1.27

Unit : mm



Weight : 0.08g (Typ.)