

TOSHIBA

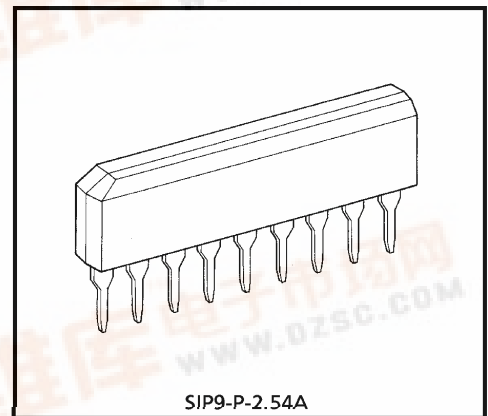
TA8007AS

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA8007AS

5V VOLTAGE REGULATOR WITH WATCHDOG TIMER

The TA8007AS is an IC specially designed for microcomputer systems. It incorporates a highly accurate constant-voltage power supply ($5 \pm 0.25V$) and various system reset functions. For system reset, it monitors the output voltage of $V_{REG} \times 88\%$ and has a watchdog timer which can self-diagnose the microcomputer system so that program runaway can be prevented. It also has other monitor functions for checking the operation of the microcomputer system. Since its standby current is as small as 1.2mA (Max.), it can be connected directly to an automotive battery.



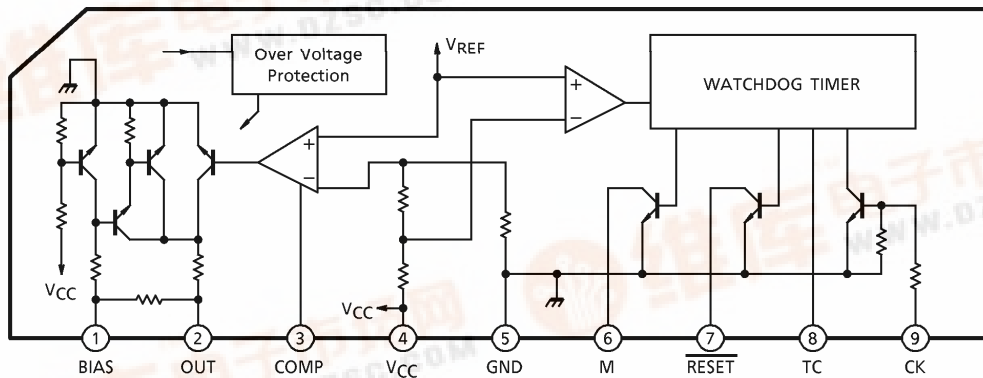
SIP9-P-2.54A

Weight : 0.92g (Typ.)

FEATURES

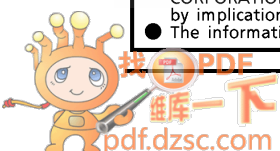
- Accurate output : $5 \pm 0.25V$
- Low standby current : 1.2mA (Max.)
- Power-on reset timer and watchdog timer incorporated, as well as reset and monitor outputs
- Wide operating voltage range : 40V (Max.)
- Wide operating temperature range : from -40 to $105^{\circ}C$
- Small SIP-9pin

BLOCK DIAGRAM AND PIN LAYOUT



961001EBA2

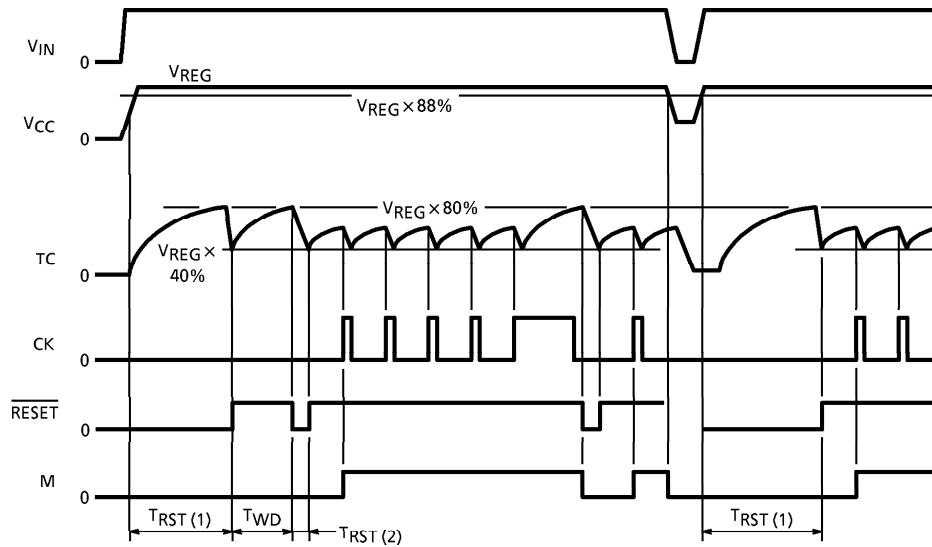
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PIN DESCRIPTION

PIN No.	SYMBOL	DESCRIPTION
1	BIAS	Power supply pin for the start-up circuit which activates the overvoltage detection circuit and the 5V power supply.
2	OUT	Connected to the base of an external PNP transistor so that the output voltage is stabilized. Power supply design suitable for particular load capacities is thus possible. Since the recommended maximum I_{OUT} is 5mA, an output current of 300mA is assured if the external transistor has an h_{FE} of 60 or more.
3	COMP	Phase compensation pin for output stabilization.
4	V_{CC}	Power supply pin for the power supply section and reset timers. The output voltage V_{REG} can also be detected at this pin.
5	GND	Grounded
6	M	NPN transistor open-collector output This signal is low while pulses come from pin 7 (\overline{RESET} output) ; it becomes high when pulses no longer come from pin 7. This function can be used for monitoring the operation of the microcomputer system.
7	\overline{RESET}	NPN transistor open-collector output. (1) The signal goes low when the output voltage drops below 88%. (2) The pin supplies a reset signal determined by the CR combination connected to the TC pin. (3) The pin supplies reset pulses intermittently if no clock is given to the CK pin.
8	TC	Time setting pin for the reset and watchdog timers. The resistor R_T leads to V_{CC} , and the capacitor C_T leads to GND.
9	CK	Input pin for watchdog timer. The pin is pulled up to V_{CC} if the IC is used only as a power-on reset timer.

TIMING CHART



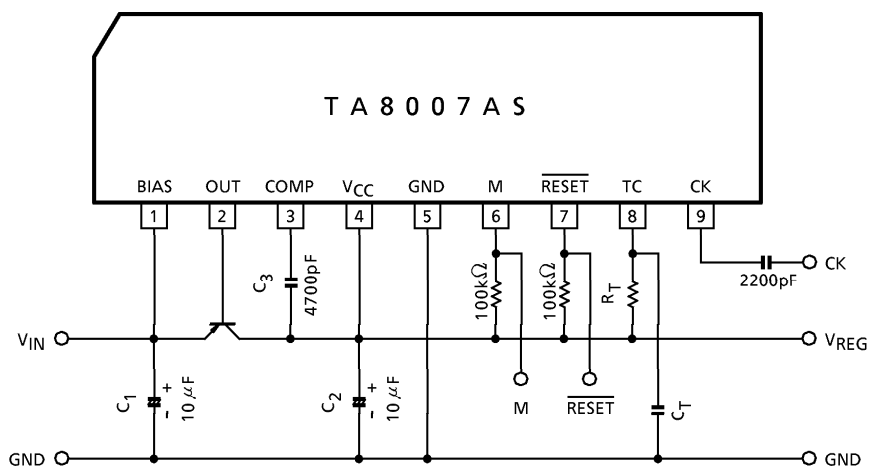
MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	PIN	RATING	UNIT
Input Voltage	V_{IN1}	BIAS	60 (1s)	V
	V_{IN2}	CK	-5~ V_{CC}	
Output Current	I_{OUT1}	OUT	10	mA
	I_{OUT2}	$\overline{\text{RESET}}$, M	2	
Output Voltage	V_{OUT1}	OUT	60 (1s)	V
	V_{OUT2}	$\overline{\text{RESET}}$	16	
Power Dissipation	P_D	—	500	mW
Operating Temperature	T_{opr}	—	-40~105	$^\circ\text{C}$
Storage Temperature	T_{stg}	—	-55~150	$^\circ\text{C}$
Lead Temperature-time	T_{sol}	—	260 (10s)	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($V_{IN} = 6 \sim 18V$, $I_{LOAD} = 10mA$, $T_a = -40 \sim 105^\circ C$)

CHARACTERISTIC	SYMBOL	PIN	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{REG}	V_{CC}	—	—	4.75	5.0	5.25	V
Line Regulation	V_{LINE}	V_{CC}	—	$V_{IN} = 5.5 \sim 40V$	—	0.1	0.5	%
Load Regulation	V_{LOAD}	V_{CC}	—	$I_{LOAD} = 1 \sim 50mA$	—	0.1	0.5	%
Temperature Coefficient	—	V_{CC}	—	—	—	0.01	—	% / °C
Output Voltage	V_{OL}	\overline{RESET} , M	—	$I_{OL} = 1mA$	—	—	0.5	V
Output Leakage Current	I_{LEAK}	\overline{RESET} , M	—	$V_{OUT} = 10V$	—	—	5	μA
Input Current	I_{IN}	TC	—	$V_{IN} = 0 \sim 3.5V$	-3	—	3	μA
Threshold Voltage	V_{IH}	TC	—	—	—	$V_{REG} \times 80\%$	—	V
	V_{IL}		—	—	—	$V_{REG} \times 40\%$	—	
Input Current	I_{IN}	CK	—	$V_{IN} = 5V$	—	0.14	0.3	mA
Input Voltage	V_{IH}	CK	—	—	2	—	—	V
	V_{IL}		—	—	—	—	0.5	
Reset Detect Voltage	—	V_{CC}	—	—	$V_{REG} \times 85\%$	$V_{REG} \times 88\%$	$V_{REG} \times 91\%$	V
Standby Current	I_{ST}	V_{CC}	—	$V_{IN} = 14V$	—	0.6	1.2	mA
Overvoltage Detection	V_{SD}	BIAS	—	—	—	44	—	V
Watchdog Timer	T_{WD}	\overline{RESET}	—	—	$0.9 \times C_{TRT}$	$1.1 \times C_{TRT}$	$1.3 \times C_{TRT}$	—
Reset Timer (1)	$T_{RST} (1)$	\overline{RESET}	—	—	$1.3 \times C_{TRT}$	$1.6 \times C_{TRT}$	$1.9 \times C_{TRT}$	—
Reset Timer (2)	$T_{RST} (2)$	\overline{RESET}	—	—	$300 \times C_T$	$700 \times C_T$	$1500 \times C_T$	—
Clock Pulse Width	T_W	CK	—	—	3	—	—	μS

EXAMPLE OF APPLICATION CIRCUIT

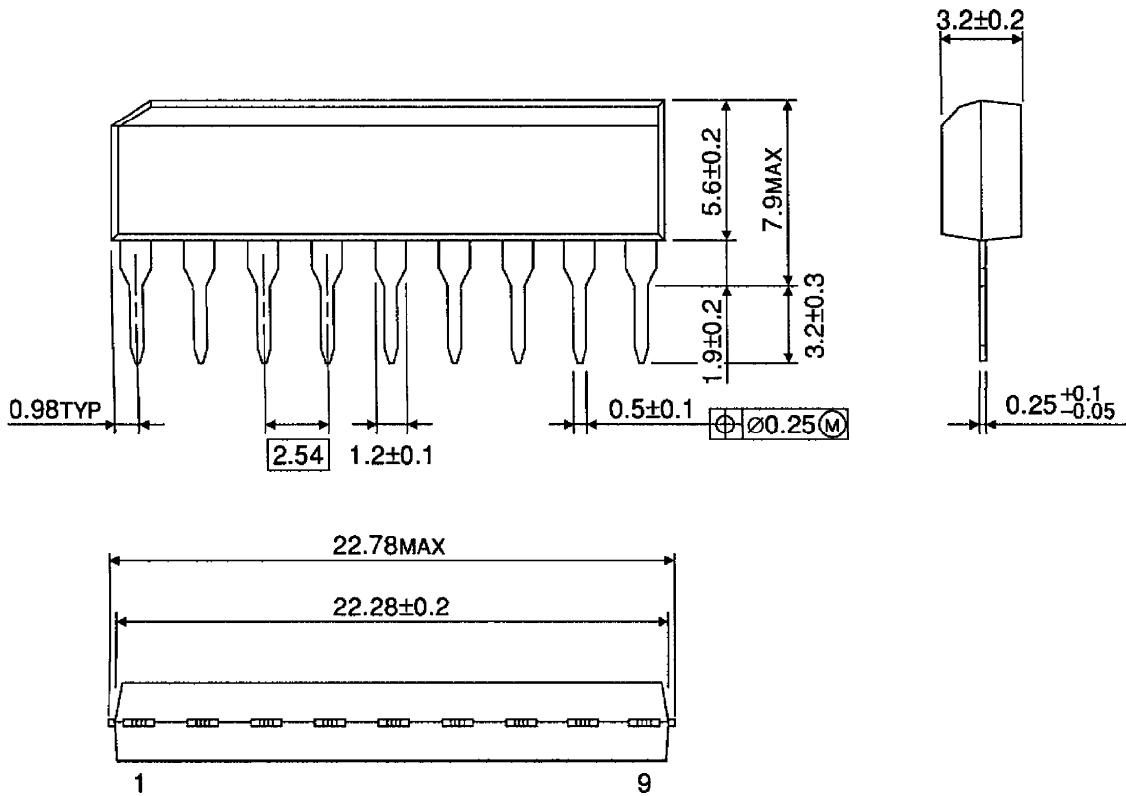


(*) Cautions for Wiring

1. C_1 and C_2 are for absorbing disturbance, noise, etc. Connect them as close to the IC as possible.
2. C_3 is for phase compensation. Also, connect C_3 close to the IC.

OUTLINE DRAWING
SIP9-P-2.54A

Unit : mm



Weight : 0.92g (Typ.)