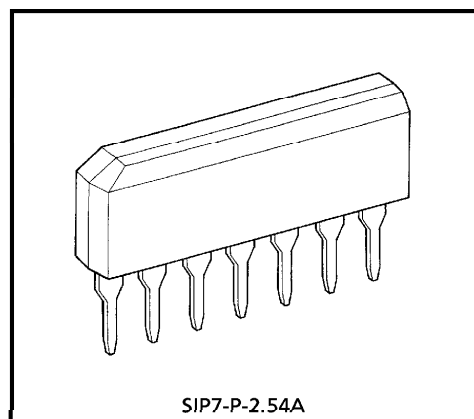


# TA8001S

## 5V VOLTAGE REGULATOR WITH RESET TIMER

The TA8001S is an IC specially designed for automotive microcomputer systems. It produces an output voltage of  $5 \pm 0.5V$  without need for adjustment from its accurate reference voltage and amplifier circuit.

At power-on, it outputs a reset signal to reset the system. It will also output a reset signal when the 5V output voltage drops below 92% because of external disturbance or other problem. Since it is also designed to have a small bias current, power consumption on the system can be reduced.

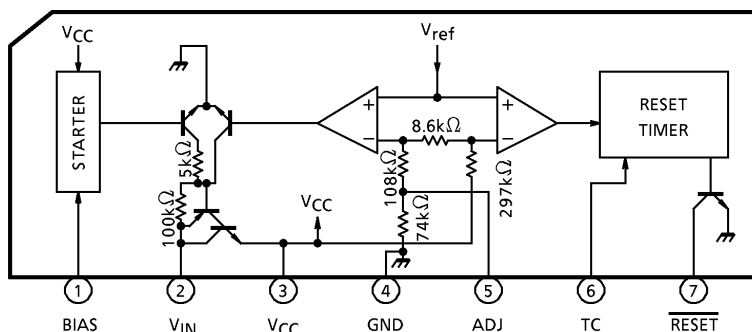


Weight : 0.7g (Typ.)

### FEATURES

- Accurate output :  $5 \pm 0.5V$
- Standby output : 3.5V
- Low bias current :  $150 \mu A$  (Typ.)
- Power-on reset timer
- Operating temperature range : from  $-40$  to  $85^\circ C$
- Wide operating voltage range : 30V (max.)
- Small SIP-7 pin

### BLOCK DIAGRAM AND PIN LAYOUT



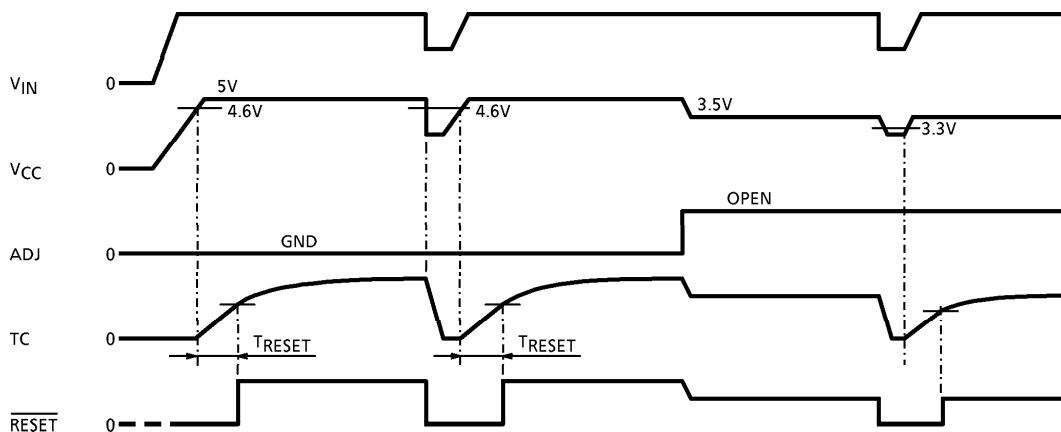
961001EBA2

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

**PIN DESCRIPTION**

PIN No.	SYMBOL	DESCRIPTION									
1	BIAS	Power supply starting pin. The starting current is supplied through a resistor to which the input voltage is applied. The output current from this starting current is as follows : $I_{OUT}(\text{pin } 1) \cong 3000 \times (V_{IN} - 0.6) / (200 + R_1) \text{ (mA)}$ where $R_1$ is the external resistance attached to pin 1 (k $\Omega$ ). When the output voltage rises above 2.7V, its control is transferred from the starting circuit to the internal control circuit.									
2	$V_{IN}$	Power supply input pin.									
3	$V_{CC}$	Power supply pin for internal circuit. The output voltage can also be detected at this pin.									
4	GND	Grounded									
5	ADJ	The output voltage can be adjusted by inserting a resistor between ADJ and GND or between ADJ and $V_{CC}$ . <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Mode</th> <th>ADJ Pin</th> <th>Output Voltage <math>V_{REG}</math></th> </tr> </thead> <tbody> <tr> <td>Standby</td> <td>OPEN</td> <td>3.5V</td> </tr> <tr> <td>Normal</td> <td>GND</td> <td>5.0V</td> </tr> </tbody> </table>	Mode	ADJ Pin	Output Voltage $V_{REG}$	Standby	OPEN	3.5V	Normal	GND	5.0V
Mode	ADJ Pin	Output Voltage $V_{REG}$									
Standby	OPEN	3.5V									
Normal	GND	5.0V									
6	TC	Time setting pin for reset timer									
7	$\overline{\text{RESET}}$	NPN transistor open-collector output. This pin supplies a reset signal when the output drops below 92% of the specified level. After the output voltage increases above 92% of the specified level, the reset signal will be output for a period of time set at the TC pin.									

**TIMING CHART**



## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Input Voltage	V <sub>IN</sub>	30	V
Output Current	I <sub>OUT1</sub>	20	mA
	I <sub>OUT2</sub>	1	mA
Output Voltage	V <sub>OUT2</sub>	16	V
Power Dissipation	P <sub>D</sub>	500	mW
Operating Temperature	T <sub>opr</sub>	-40~85	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C
Lead Temperature-time	T <sub>sol</sub>	260 (10s)	°C

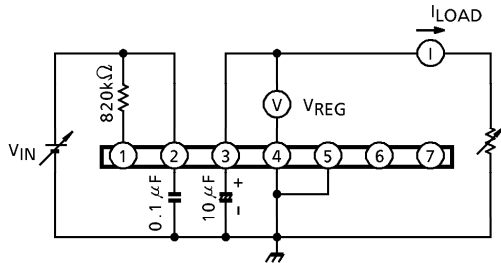
Note : V<sub>IN</sub> : BIAS input  
 I<sub>OUT1</sub>, V<sub>OUT1</sub> : OUT output  
 I<sub>OUT2</sub>, V<sub>OUT2</sub> :  $\overline{\text{RESET}}$  output

ELECTRICAL CHARACTERISTICS (V<sub>IN</sub> = 7 to 17V, Ta = -40 to 85°C, I<sub>LOAD</sub> = 5mA)

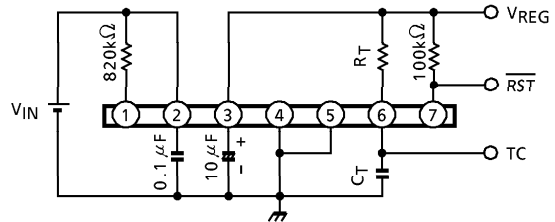
CHARACTERISTIC	SYMBOL	PIN	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>REG</sub>	V <sub>CC</sub>	1	—	4.5	5.0	5.5	V
Line Regulation	—	V <sub>CC</sub>	—	V <sub>IN</sub> = 7~30V	—	0.2	1.0	%
Load Regulation	—	V <sub>CC</sub>	—	I <sub>LOAD</sub> = 2~10mA	—	0.5	2.0	%
Temperature Coefficient	—	V <sub>CC</sub>	—	—	—	0.01	—	% / °C
Output Voltage	V <sub>OL</sub>	$\overline{\text{RESET}}$	2	I <sub>OL</sub> = 300μA	—	—	0.4	V
Output Leakage Current	I <sub>LEAK</sub>	$\overline{\text{RESET}}$	3	V <sub>OUT</sub> = 10V	—	—	5	μA
Input Current	I <sub>IN</sub>	TC	4	V <sub>IN</sub> = 0~V <sub>REG</sub>	-2	—	2	μA
Threshold Voltage	V <sub>TH</sub>	TC	5	TC : Low to High	—	1.7	—	V
Reset Detect Voltage	—	V <sub>CC</sub>	—	V <sub>REG</sub> = 5V	—	4.6	—	V
Standby Voltage	V <sub>S</sub>	V <sub>CC</sub>	6	—	3.1	3.5	3.9	V
Standby Current	I <sub>S</sub>	V <sub>CC</sub>	7	V <sub>IN</sub> = 14V	—	150	300	μA
Reset Timer	T <sub>RESET</sub>	$\overline{\text{RESET}}$	5	—	—	0.4 × C <sub>TRT</sub>	—	—

TEST CIRCUIT

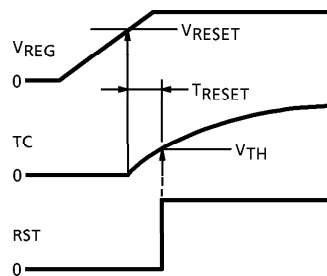
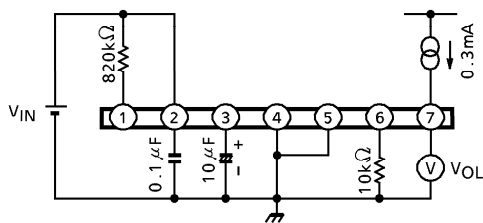
1.  $V_{REG}$



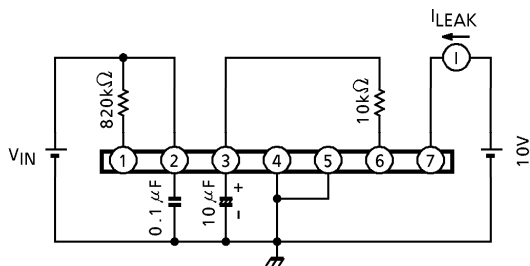
5.  $V_{RESET}$ ,  $V_{TH}$ ,  $T_{RESET}$



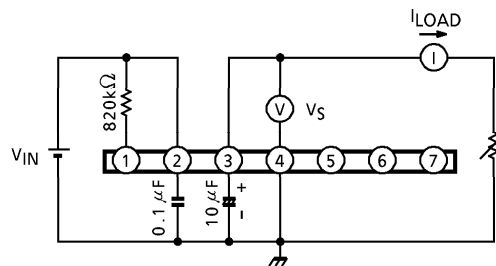
2.  $V_{OL}(\overline{RESET})$



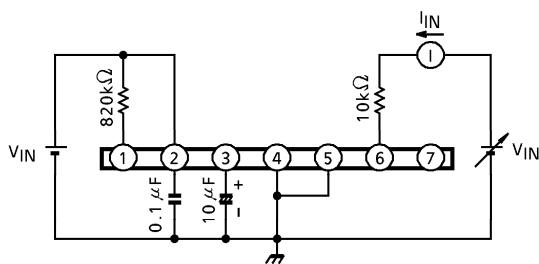
3.  $I_{LEAK}(\overline{RESET})$



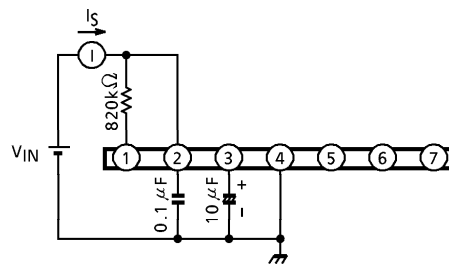
6.  $V_S$



4.  $I_{IN}(TC)$

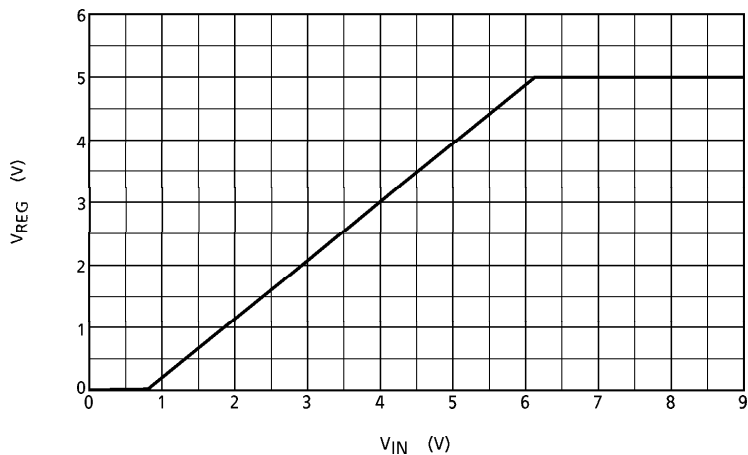


7.  $I_S$

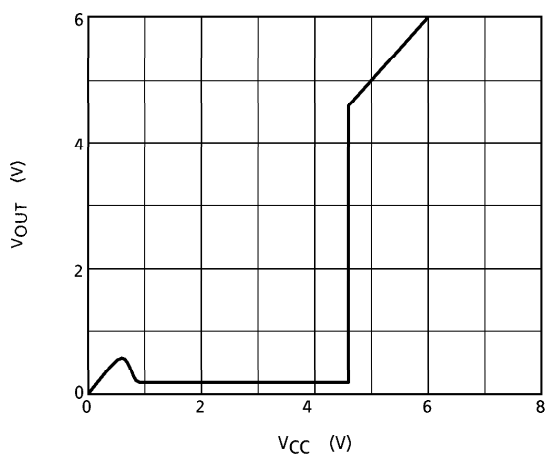


**TYPICAL CHARACTERISTICS**

1. Input-Output Characteristic ( $R_L = 500\Omega$ )



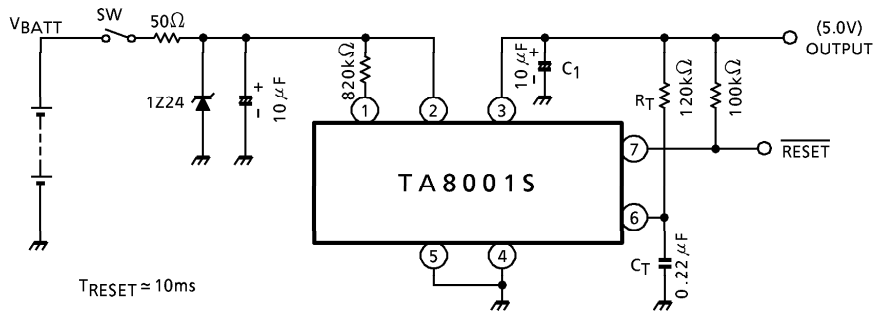
2. Reset Characteristic



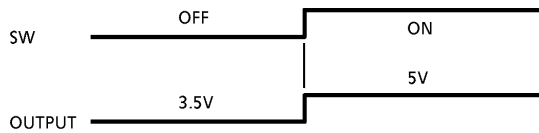
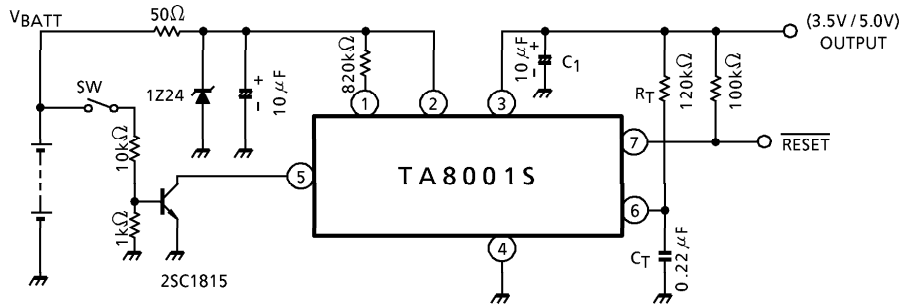
EXAMPLE OF APPLICATION CIRCUIT

$I_{LOAD} = 10\text{mA Max.}$   $V_{BATT} = 7\sim 17\text{V}$  (LOAD DUMP 120Vpeak, 200ms)

1. 5V Standard Circuit



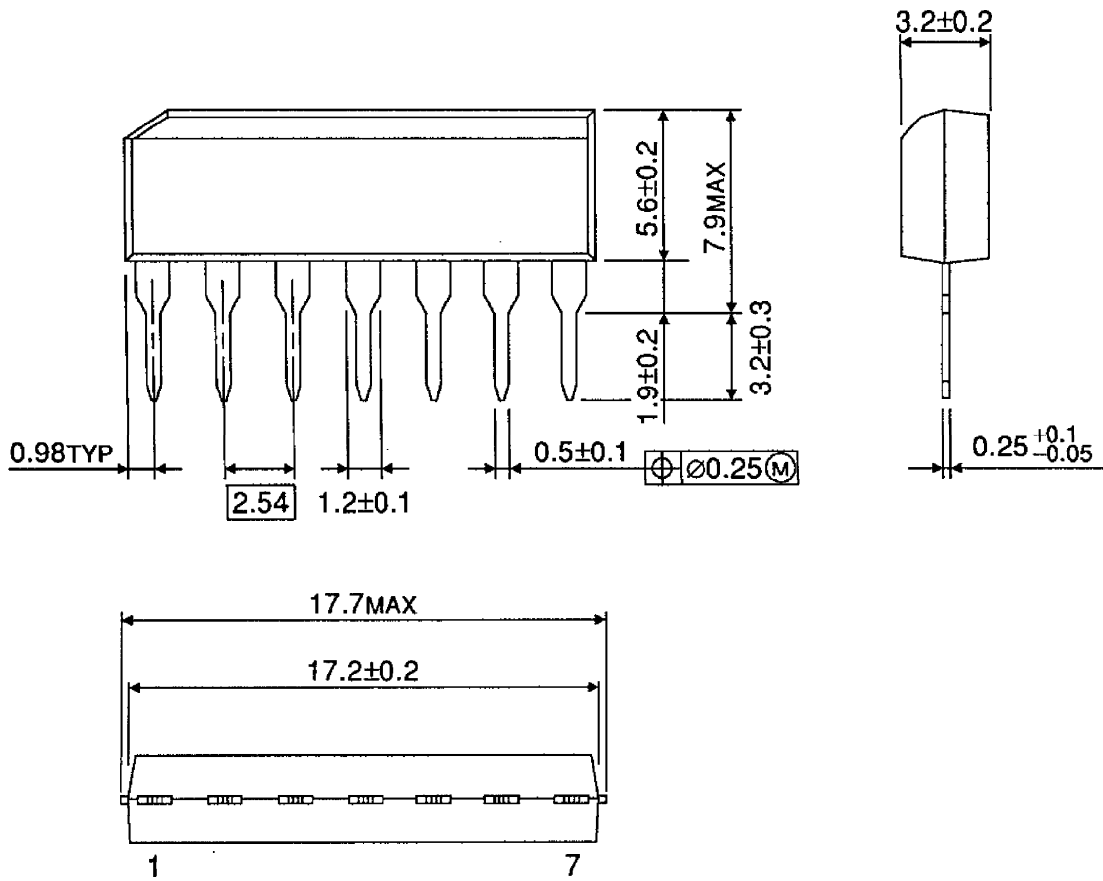
2. Backup Circuit



\* Use an output capacitor  $C_1$  which has a low temperature dependence (such as a tantalum capacitor). Connect it as close to the IC as possible.

**OUTLINE DRAWING**  
SIP7-P-2.54A

Unit : mm



Weight : 0.7g (Typ.)