

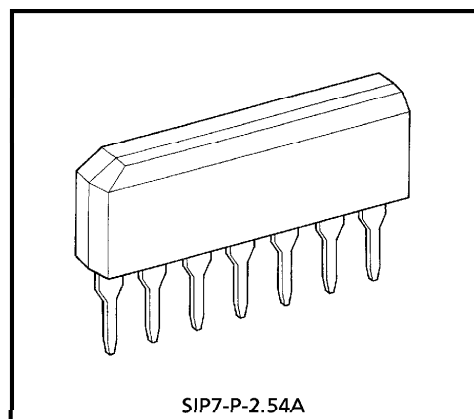
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

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.

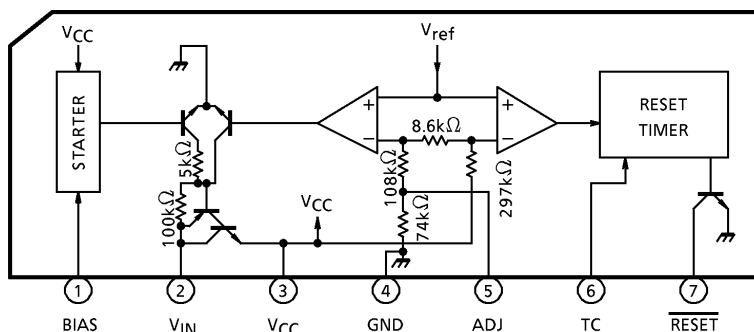


Weight : 0.7g (Typ.)

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



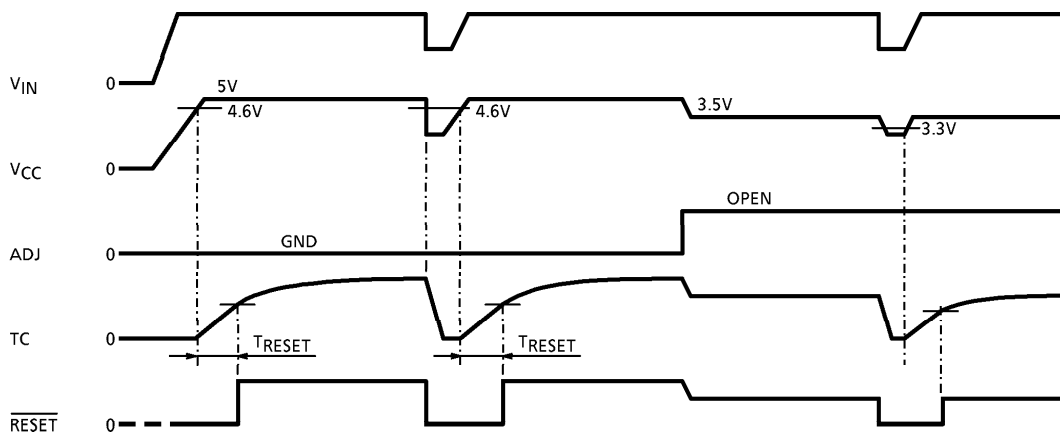
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PIN DESCRIPTION

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 Ω). 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 V_{REG}</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 _{IN}	30	V
Output Current	I _{OUT1}	20	mA
	I _{OUT2}	1	mA
Output Voltage	V _{OUT2}	16	V
Power Dissipation	P _D	500	mW
Operating Temperature	T _{opr}	-40~85	°C
Storage Temperature	T _{stg}	-55~150	°C
Lead Temperature-time	T _{sol}	260 (10s)	°C

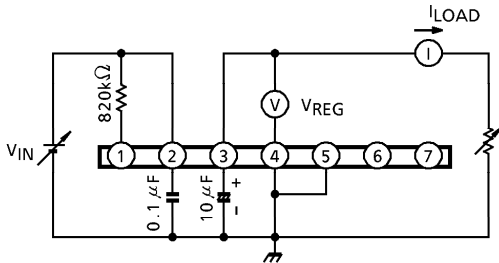
Note : V_{IN} : BIAS input
 I_{OUT1}, V_{OUT1} : OUT output
 I_{OUT2}, V_{OUT2} : $\overline{\text{RESET}}$ output

ELECTRICAL CHARACTERISTICS (V_{IN} = 7 to 17V, Ta = -40 to 85°C, I_{LOAD} = 5mA)

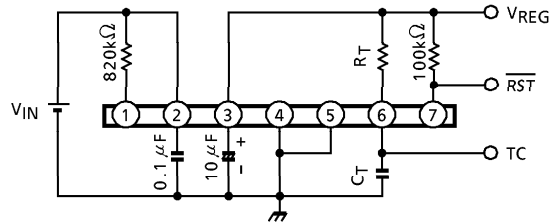
CHARACTERISTIC	SYMBOL	PIN	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V _{REG}	V _{CC}	1	—	4.5	5.0	5.5	V
Line Regulation	—	V _{CC}	—	V _{IN} = 7~30V	—	0.2	1.0	%
Load Regulation	—	V _{CC}	—	I _{LOAD} = 2~10mA	—	0.5	2.0	%
Temperature Coefficient	—	V _{CC}	—	—	—	0.01	—	% / °C
Output Voltage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

TEST CIRCUIT

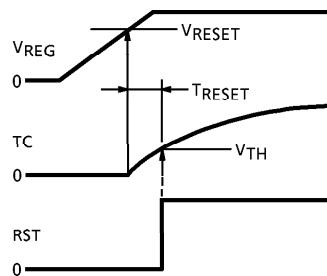
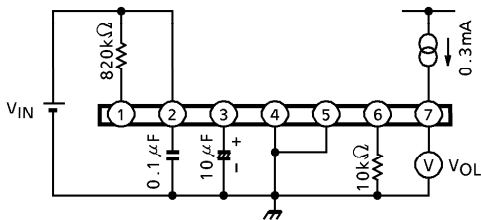
1. V_{REG}



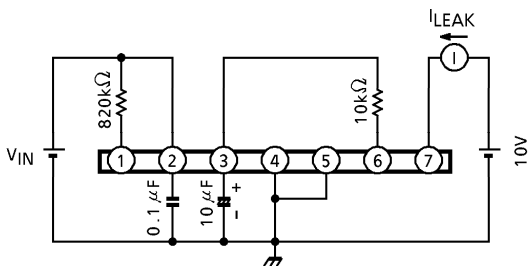
5. V_{RESET} , V_{TH} , T_{RESET}



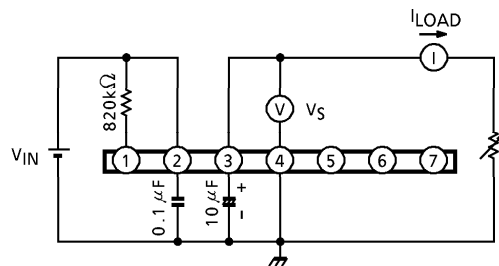
2. $V_{OL}(\overline{RESET})$



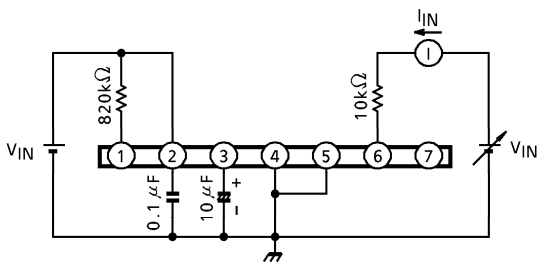
3. $I_{LEAK}(\overline{RESET})$



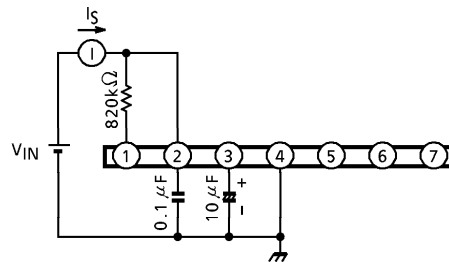
6. V_S



4. $I_{IN}(TC)$

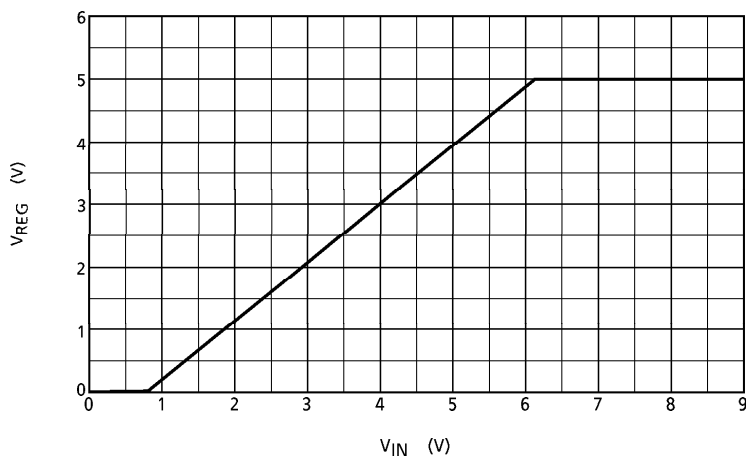


7. I_S

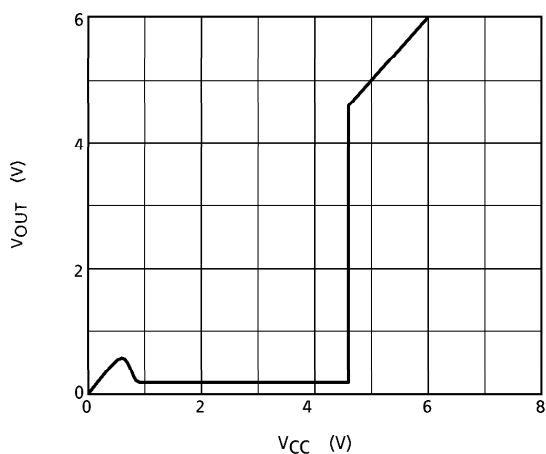


TYPICAL CHARACTERISTICS

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



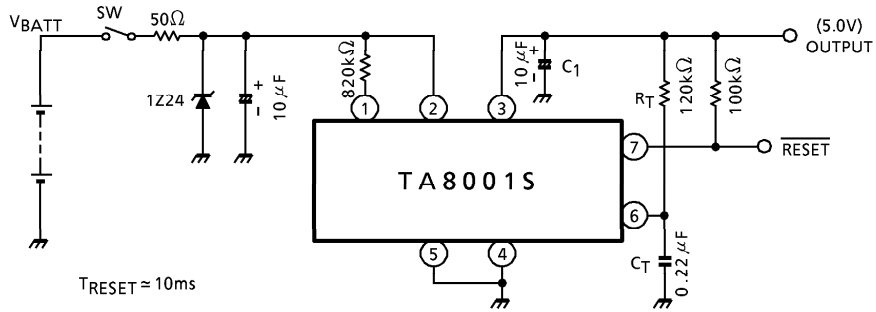
2. Reset Characteristic



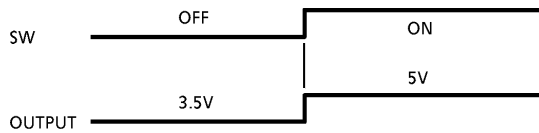
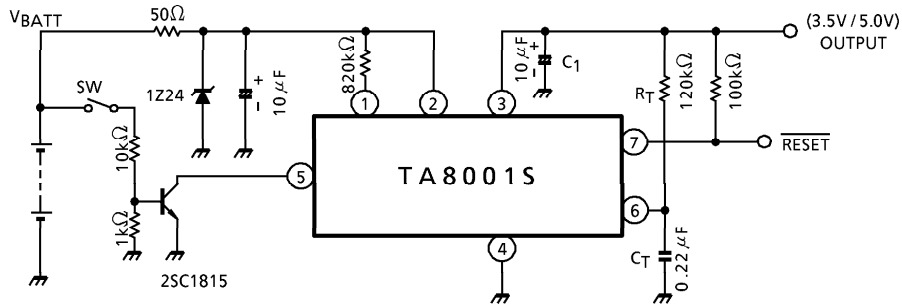
EXAMPLE OF APPLICATION CIRCUIT

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

1. 5V Standard Circuit



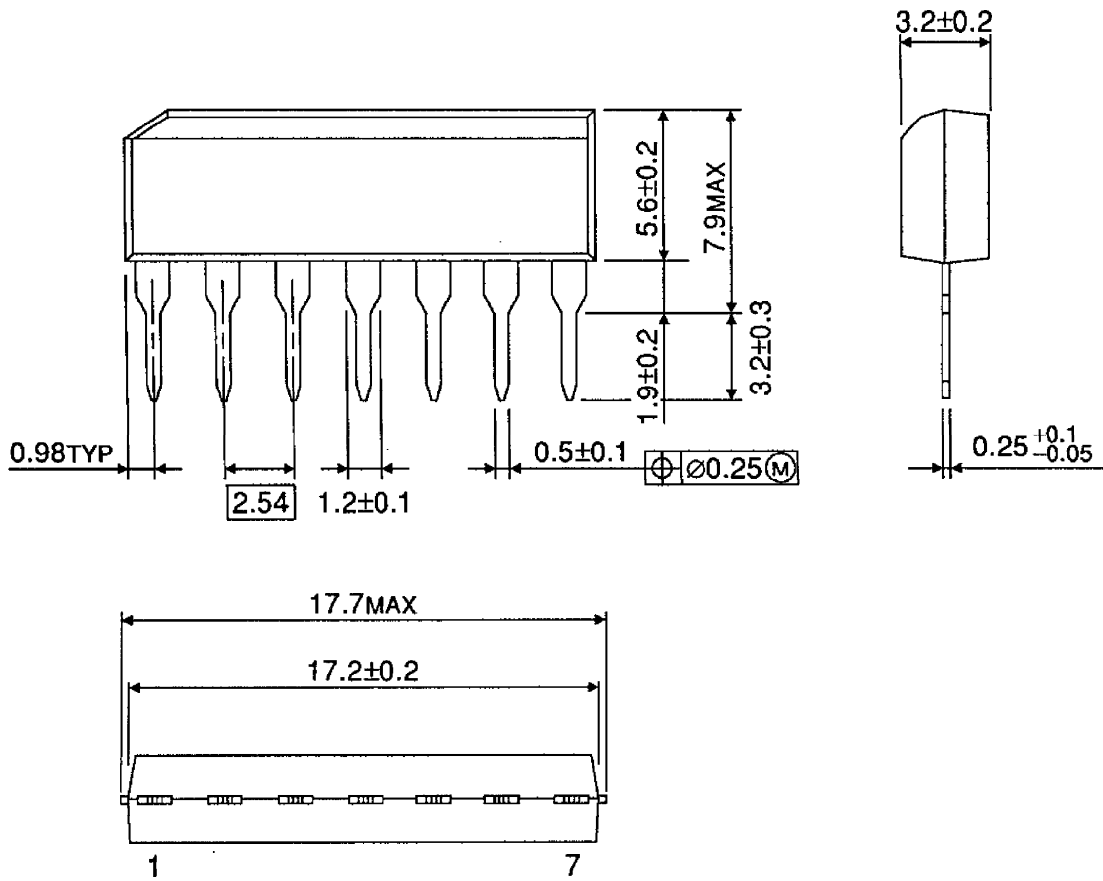
2. Backup Circuit



* 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.)