

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

# TA8028S

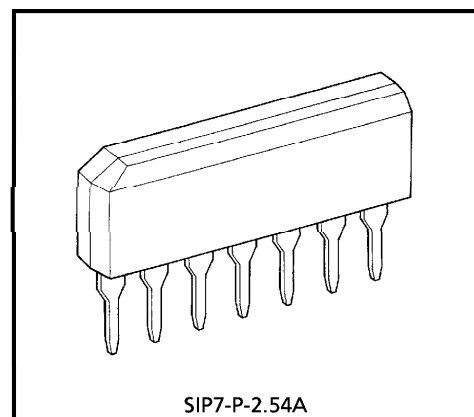
## DUTY CONTROLLER

The TA8028S is an IC designed to control automotive illumination systems. It produces an accurate output with small temperature drift.

Either Sink or Source type output can be selected.

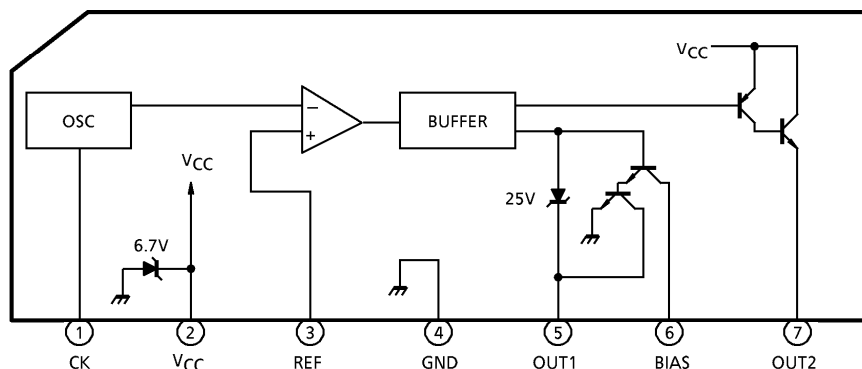
### FEATURES

- Output ON/OFF duty variable
- Large output current  
Sink type :  $I_{OUT} = 300\text{mA}$   
Source type :  $I_{OUT} = 100\text{mA}$
- Regulated voltage circuit incorporated  
: 6.7V shunt regulator
- Operating temperature range  
:  $T_a = -40$  to  $85^\circ\text{C}$
- Small SIP-7 pin



Weight : 0.7g (Typ.)

### BLOCK DIAGRAM AND PIN LAYOUT



961001EBA2

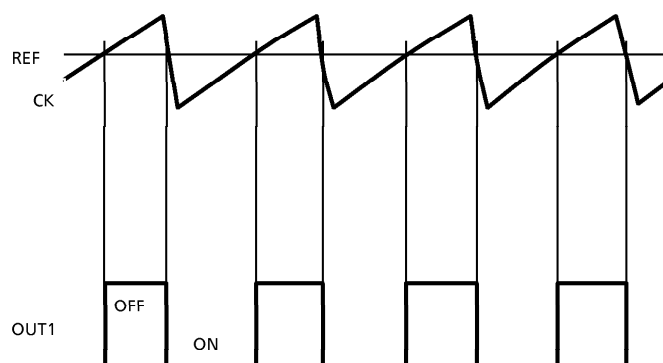
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## PIN DESCRIPTION

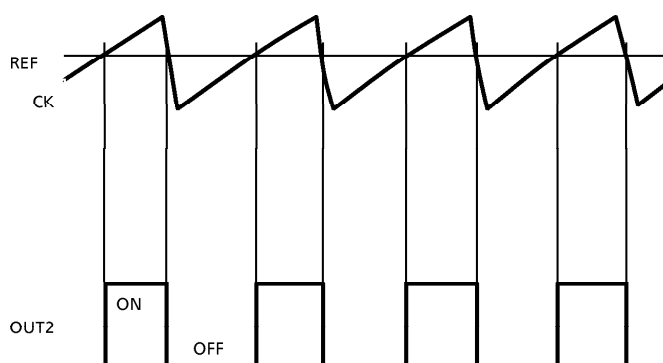
PIN No.	SYMBOL	DESCRIPTION
1	CK	Pin for determining the output frequency. A resistor is connected between $V_{CC}$ and CK ; a capacitor is connected between CK and GND.
2	$V_{CC}$	Power supply pin. This pin connects to the 6.7V regulated voltage circuit.
3	REF	Duty control pin. The voltage at this pin determines the output duty.
4	GND	Grounded
5	OUT1	Sink-type output pin which supplies the open-collector output of an NPN transistor.
6	BIAS	Connects to the collector of an NPN transistor preceding the NPN transistor which leads to the OUT1 pin. A resistor is connected between this pin and the power supply. When this pin is connected to OUT1, it supplies a Darlington transistor output.
7	OUT2	Source-type output pin which supplies the open-emitter output of an NPN transistor.

## TIMING CHART

## (1) SINK TYPE



## (2) SOURCE TYPE



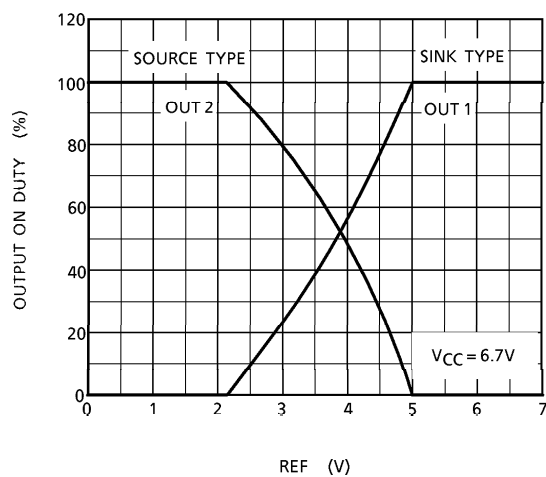
**MAXIMUM RATINGS** ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	$I_{CC}$	50 (1s)	mA
Output Current	$I_{OUT1}$	300	mA
	$I_{OUT2}$	100	
Output Voltage	$V_{OUT1, 2}$	24	V
Input Voltage	$V_{IN}$	$-0.3 \sim V_{CC}$	V
Power Dissipation	$P_D$	300	mW
Operation Temperature	$T_{opr}$	$-40 \sim 85$	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	$-55 \sim 150$	$^\circ\text{C}$

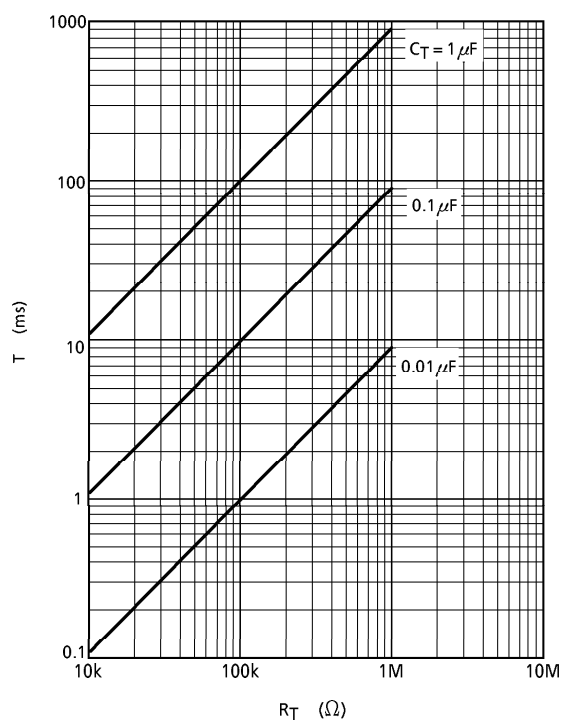
**ELECTRICAL CHARACTERISTICS** ( $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 6\text{V}$ )

CHARACTERISTIC	SYMBOL	PIN	TEST CIR- CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Consumption	$I_{CC}$	$V_{CC}$	—	—	—	3.0	4.5	mA
Regulated Voltage	$V_S$	$V_{CC}$	—	$I_{CC} = 10\text{mA}$	6.2	6.7	7.2	V
Input Current	$I_{IN}$	CK	—	$V_{IN} = 0$	-5	—	5	$\mu\text{A}$
		REF	—	$V_{IN} = 0 \sim V_{CC}$	-5	—	5	
Output Voltage	$V_{OUT}$	$V_{OUT1}$	—	$I_{OUT} = 200\text{mA}$ (BIAS : $I_{OUT} = 15\text{mA}$ )	—	—	0.7	V
		$V_{OUT2}$	—	$I_{OUT} = 80\text{mA}$	$V_{CC} - 1.3$	—	—	
		BIAS	—	$I_{OUT} = 15\text{mA}$	—	—	1.5	
Output Leakage Current	$I_{LEAK}$	$V_{OUT1}$	—	$V_{OUT} = 16\text{V}$	—	—	10	$\mu\text{A}$
		$V_{OUT2}$	—	$V_{OUT} = 0\text{V}$	-10	—	—	
		BIAS	—	$V_{OUT} = 16\text{V}$	—	—	10	
Detection Voltage	$V_{IH}$	CK	—	—	$0.71 \times V_{CC}$	$0.75 \times V_{CC}$	$0.79 \times V_{CC}$	V
	$V_{IL}$				$0.29 \times V_{CC}$	$0.31 \times V_{CC}$	$0.33 \times V_{CC}$	
Duty variation with temperature	—	—	—	$R_T = 100\text{k}\Omega$ $C_T = 0.01\mu\text{F}$	—	50	—	ppm/ $^\circ\text{C}$

### Input-Output Characteristic

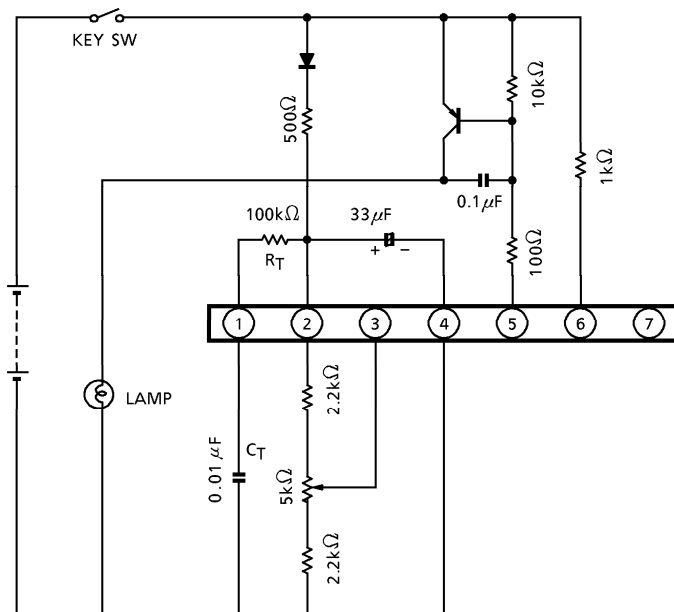


### Relationship between Frequency and $C_T$ , $R_T$

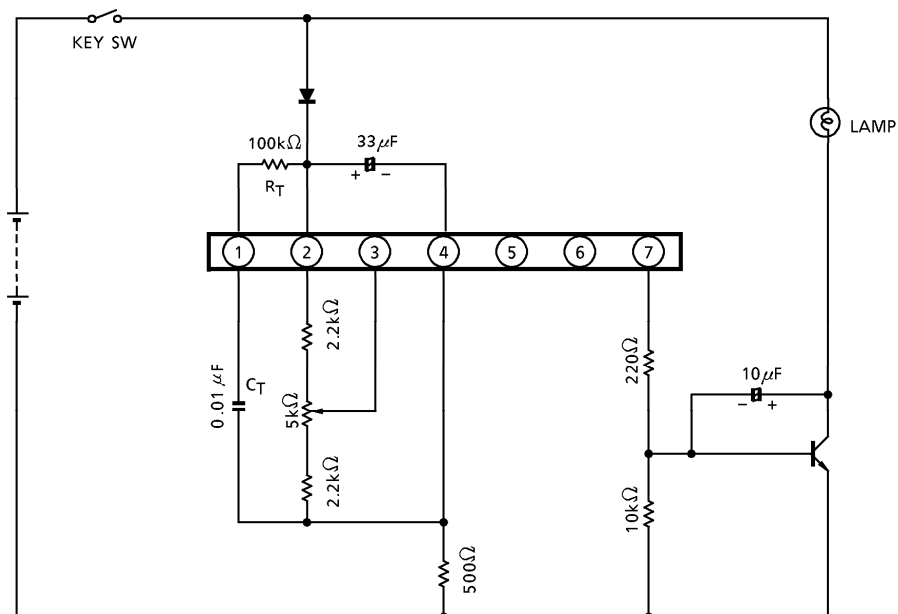


## EXAMPLE OF APPLICATION CIRCUIT

### (1) SINK TYPE (OUT1)

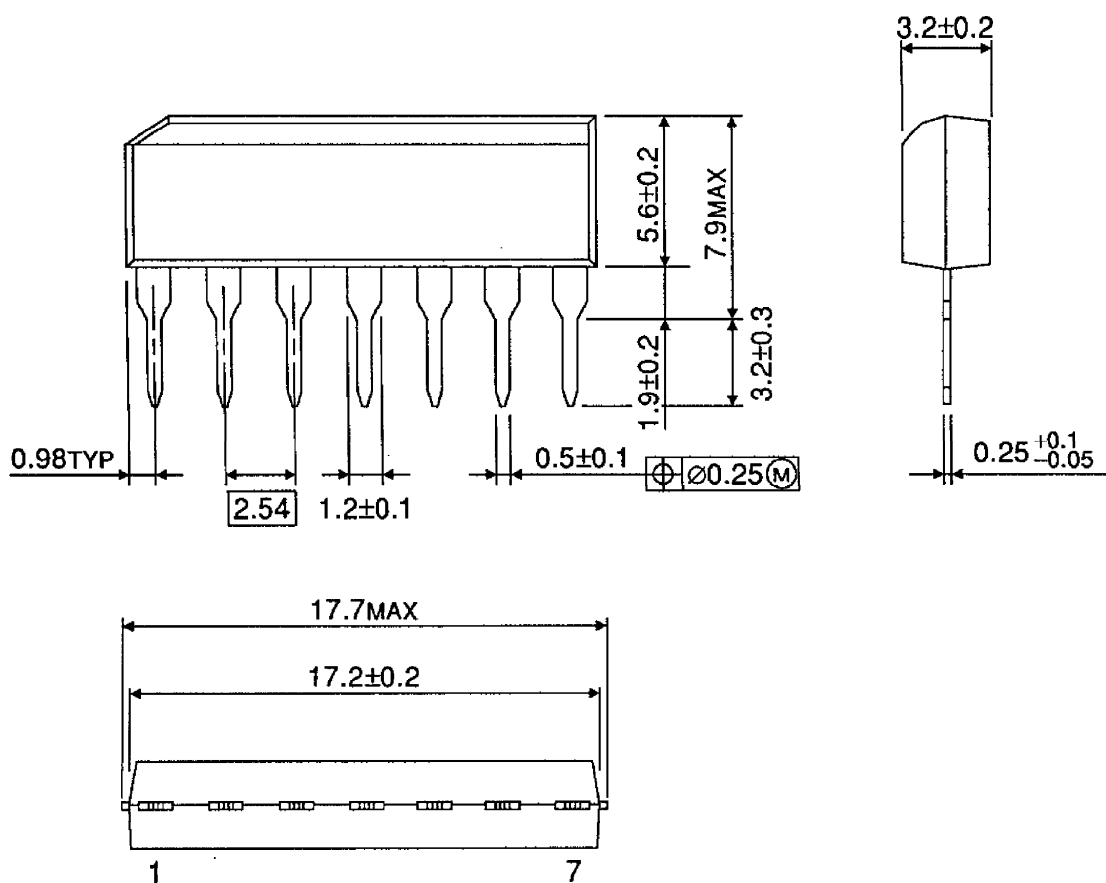


### (2) SOURCE TYPE (OUT2)



OUTLINE DRAWING  
SIP7-P-2.54A

Unit : mm



Weight : 0.7g (Typ.)