TONE RINGER FOR TELEPHONE SET

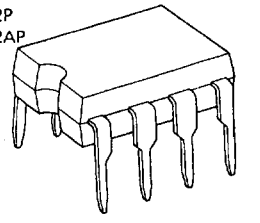
FEATURES

- Current consumption is small. (at no-load)
- Package is compact. (DIP-8 pin)
- Oscillation frequency is variable.
- Built-in threshold circuits prevent false triggering due to power noise as well as "chirps" due to rotary dial.
- Few external components.

DIFFERENCE BETWEEN TA31002P/F AND TA31002AP/AF

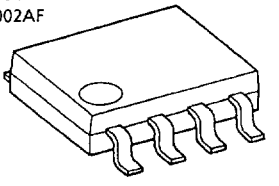
NAME OF PRODUCT	INITIATION SUPPLY VOLTAGE	SUSTAINING SUPPLY VOLTAGE
TA31002P/F	19V (TYP.)	12V (TYP.)
TA31002AP/AF	16V (TYP.)	9V (TYP.)

TA31001P
TA31002P
TA31002AP



DIP8-P-300A

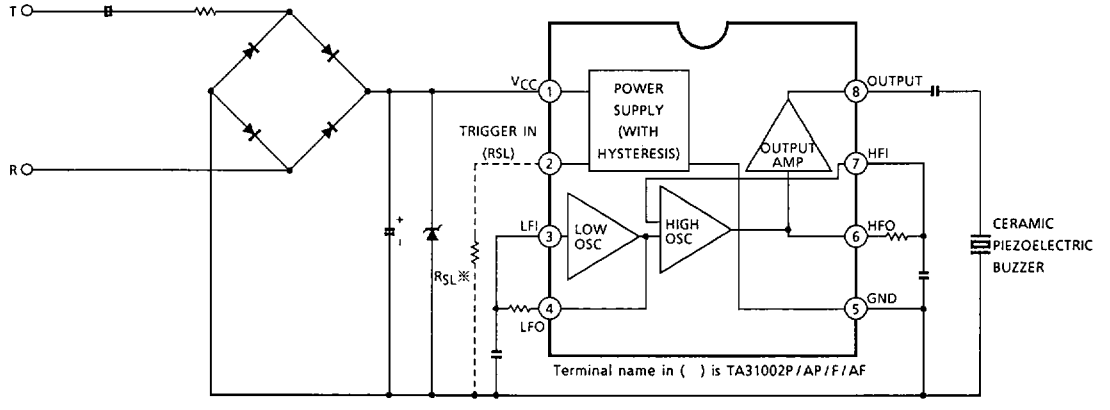
TA31001F
TA31002F
TA31002AF



SOP8-P-225

Weight DIP8-P-300A : 0.52g (Typ.)
SOP8-P-225 : 0.08g (Typ.)

BLOCK DIAGRAM



※ Use for TA31002P/F, TA31002AP/AF

DESCRIPTION

1. TA31001P, TA31001F method of using TRIGGER IN

Usually PIN 2 is used at an open state, but in the TA31001P, TA31001F the TRIGGER IN terminal can prohibit oscillation and also can change the initiation supply voltage (V_{Si}).
In case of $V_{sus} < V_S \leqq V_{Si}$, the oscillation of the TA31001P, TA31001F can be started by forcing a current I_E ($4\mu A < I_E < 1mA$) into PIN 2.
If PIN 2 is connected to V_S as shown in Fig.1, oscillation can be started under a lower supply voltage than the initiation supply voltage at the time when PIN 2 is used at an open state.
Further, the initiation supply voltage (V_{Si}) can be changed by using a zener diode as shown Fig.2.
V_{Si} is determined by the following formulas :

$$V_{Si} = V_{Trig} + V_Z + 4R_E$$
$$R_E = (M\Omega)$$

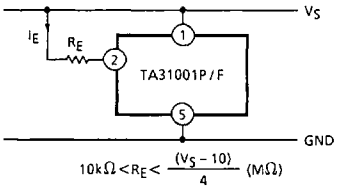


Fig.1

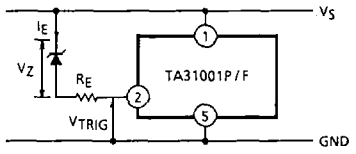


Fig.2

2. TA31002P, TA31002F, TA31002AP, TA31002AF method of using R_{SL}

In the TA31002P, TA31002F, TA31002AP, TA31002AF the initiation current consumption (I_{Si}) can be changed by using the R_{SL} terminal. The resistor R_{SL} is connected to GND from PIN 2 as shown in Fig.3. Further, the initiation current consumption (I_{Si}) can be changed by changing the value of R_{SL}.
Fig.4 and Fig.5 show the graph of $V_S - I_S$ characteristic at the time when R_{SL} has been changed to three values. The $V_S - I_S$ characteristic in TA31002P, TA31002F at the time when $R_{SL} = 6.8k\Omega$ coincides with that at the time when PIN 2 of the TA31001P, TA31001F has been used at an open state.

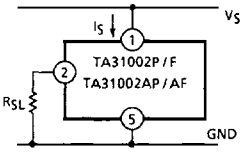


Fig.3

SUPPLY VOLTAGE – CURRENT CONSUMPTION

TA31002P, TA31002F

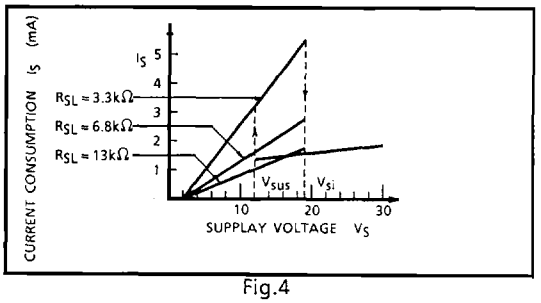


Fig.4

TA31002AP, TA31002AF

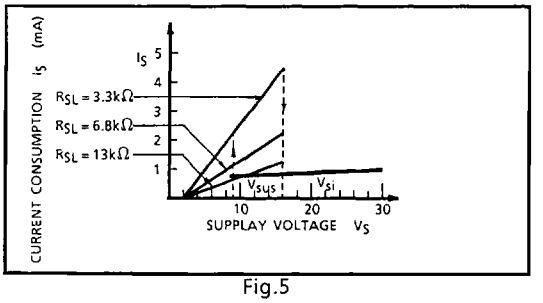


Fig.5

3. Method of stop oscillating

If PIN 7 is connected to GND as shown in Fig.6 the IC can stop oscillation.
(The "L" level voltage is under 2V.)

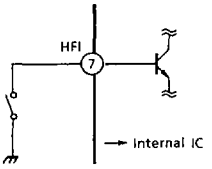


Fig.6

4. Oscillation frequency

Oscillation Frequency is determined by the following equations (1), (2), and (3).

(1) $f_L = 1 / 1.234 \cdot R_1 \cdot C_1$ (Hz)

(2) $f_{H1} \approx 1 / 1.515 \cdot R_2 \cdot C_2$ (Hz)

(3) $f_{H2} \approx 1.24 f_{H1}$ (Hz)

Example $R_1 = 165k\Omega$, $R_2 = 191k\Omega$, $C_1 = 0.47\mu F$, $C_2 = 6800pF$
$f_L \fallingdotseq 10Hz$, $f_{H1} \fallingdotseq 500Hz$, $f_{H2} \fallingdotseq 630Hz$

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Power Supply Voltage		V_{CC}	30	V
Power Dissipation	P / AP Type	P_D	800	mW
	F / AF Type		350	
Operating Temperature		T_{opr}	−40~85	°C
Storage Temperature		T_{stg}	−55~150	°C

ELECTRICAL CHARACTERISTICS (Ta = 25°C)
TA31001P, TA31001F, TA31002P, TA31002F

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage		V_{opr}	—	—	—	—	29	V
Initiation Supply Voltage		V_{si}	—	(Note 1)	17	19	21	V
Sustaining Supply Voltage		V_{sus}	—	(Note 2)	10.5	12	—	V
Initiation Current Consumption		I_{si}	—	No-Load	1.4	3.3	4.2	mA
Sustaining Current Consumption		I_{sus}	—		0.7	1.4	2.5	mA
Oscillation Frequency (Note 3)		f_L	—	$C_1 = 0.47\mu F$, $R_1 = 165k\Omega$	9	10	11	Hz
		f_{H1}	—	$C_2 = 6800pF$, $R_2 = 191k\Omega$	461	512	563	
		f_{H2}	—		576	640	703	
Output Volage	"H" Level	V_{OH}	—	$V_{CC} = 24V$, $I_{OH} = -10mA$ PIN 7 = GND	20.0	21.5	22.5	V
	"L" Level	V_{OL}	—	$V_{CC} = 24V$, $I_{OH} = 10mA$ PIN 7 = 7V	0.7	1.0	2.0	

TA31002AP, TA31002AF

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage		V_{opr}	—	—	—	—	29	V
Initiation Supply Voltage		V_{si}	—	(Note 1)	14	16	18	V
Sustaining Supply Voltage		V_{sus}	—	(Note 2)	8.4	9.0	—	V
Initiation Current Consumption		I_{si}	—	No-Load	1.1	2.7	3.6	mA
Sustaining Current Consumption		I_{sus}	—		0.3	0.8	1.8	mA
Oscillation Frequency (Note 3)		f_L	—	$C_1 = 0.47\mu F$, $R_1 = 165k\Omega$	9	10	11	Hz
		f_{H1}	—	$C_2 = 6800pF$, $R_2 = 191k\Omega$	461	512	563	
		f_{H2}	—		576	640	703	
Output Voltage	"H" Level	V_{OH}	—	$V_{CC} = 24V$, $I_{OH} = -10mA$ PIN 7 = GND	20.0	21.5	22.5	V
	"L" Level	V_{OL}	—	$V_{CC} = 24V$, $I_{OH} = 10mA$ PIN 7 = 5V	0.7	1.0	2.0	

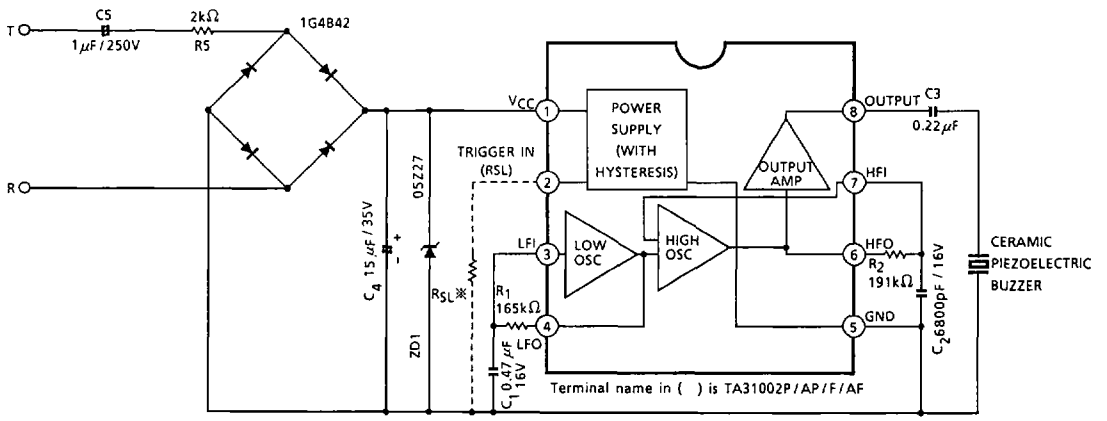
Note 1. Initiation Supply Voltage (V_{si}) is a supply voltage required to start oscillation of the tone ringer.

2. Sustaining Supply Voltage (V_{sus}) is a supply voltage required to maintain oscillation of the tone ringer.

3. Oscillation frequency is determined by the above-mentioned equations (1), (2), and (3).

TONE RINGER ICs

APPLICATION CIRCUIT



※ Use for TA31002P, TA31002F, TA31002AP, TA31002AF

EXAMPLE OF OUTPUT CIRCUIT

For Ceramic Piezoelectric Buzzer

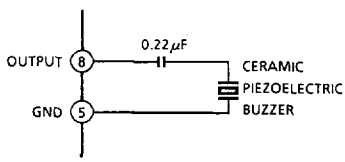


Fig.7

For Speaker

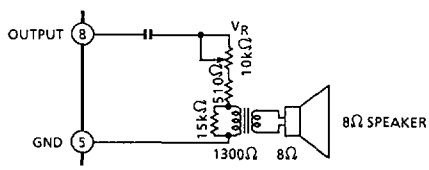


Fig.8