

# AX31002

Bipolar Tone Ringer IC

## Description

The AX31002 is a bipolar integrated circuit. It is designed for telephone bell replacement. It can also be used as alarms or other alerting devices.

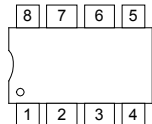
## Features

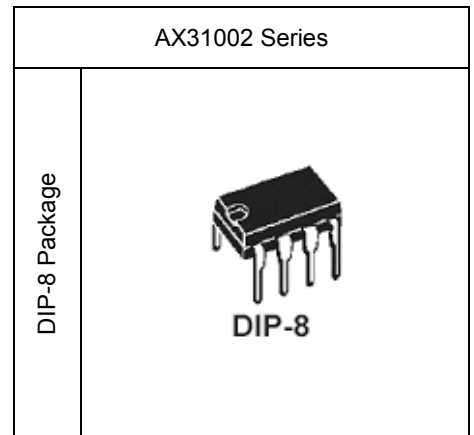
- Current consumption is small
- Oscillation frequency is variable
- Adjustable start-up current
- Higher driving capability
- Built-in threshold circuits prevent false triggering due to power noise as well as 'chirps' due to rotary dial
- Few external components
- Easy connection to telephone system

## Applications

- Telecom Tone Ringer Set

## Pin Connections

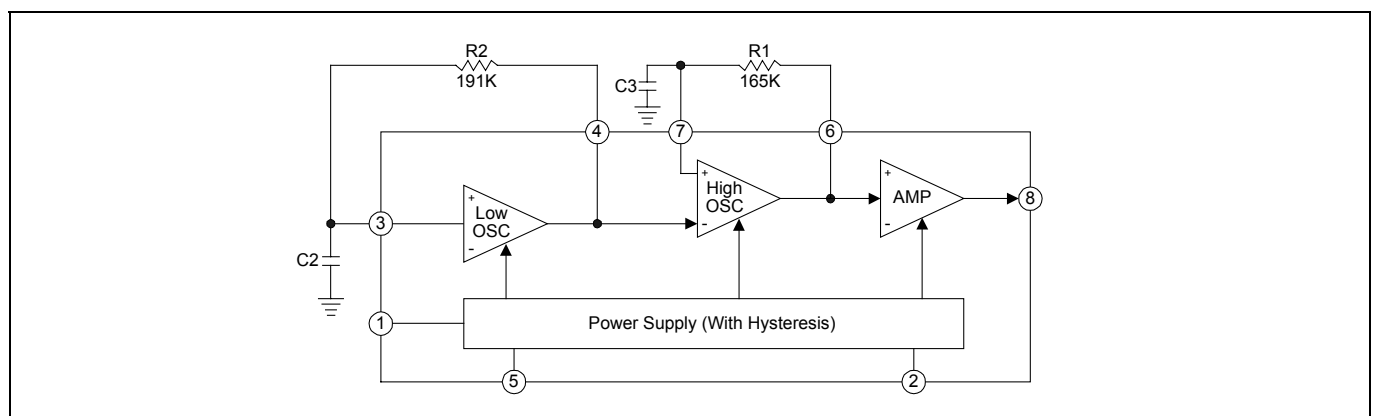
	Pin1: VCC	Pin5: Gnd
	Pin2: RSL Trigger In (RSL)	Pin6: High Freq. Time Constant. (HRC)
	Pin3: Low Freq. Time Constant. (LRC)	Pin7: High Freq. Time Constant. (HRC)
	Pin4: Low Freq. Time Constant. (LRC)	Pin8: Output



## Absolute Maximum Rating (unless otherwise specified)

Characteristics	Symbol	Rating	Unit
Supply Voltage	$V_{CC}$	30	V
Power Dissipation	$P_D$	500	mW
Operating Temperature	$T_{opr}$	-25 ~ +85	°C
Storage Temperature	$T_{stg}$	-55 ~ +150	°C

## Block Diagram



## Electrical Characteristics

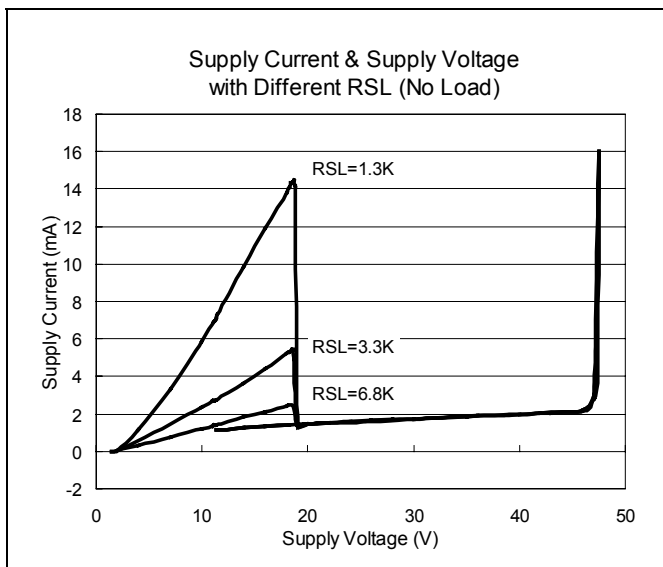
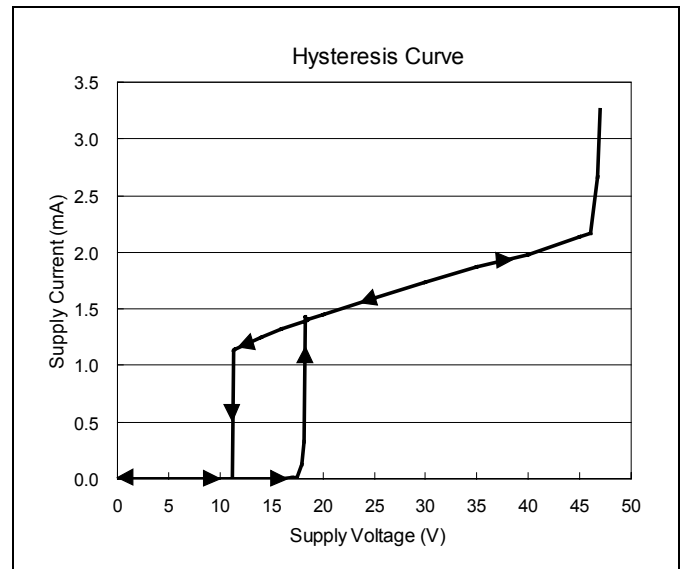
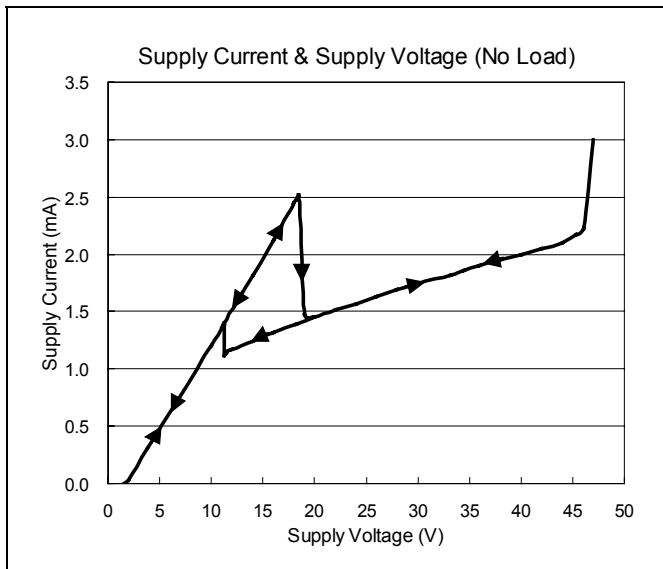
Characteristics		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Operating Voltage		$V_{opr}$		-	-	29	V
Initiation Supply Voltage		$V_{si}$	(Note 1)	17	19	21	V
Sustaining Supply Voltage		$V_{sus}$	(Note 2)	10.5	12	13.5	V
Initiation Current Consumption		$I_{si}$	No Load	1.4	3.3	4.2	mA
Sustaining Current Consumption		$I_{sus}$	No Load	0.34	1.4	2.5	mA
Oscillator Frequency		$f_L$	$C_1=0.47\mu F, R_1=165k\Omega$	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	21.5	22.5	V
	"L" Level	$V_{OL}$	$V_{CC}=24V, I_{OH}=10mA, Pin\ 7=7V$	0.7	1	2	V

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

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

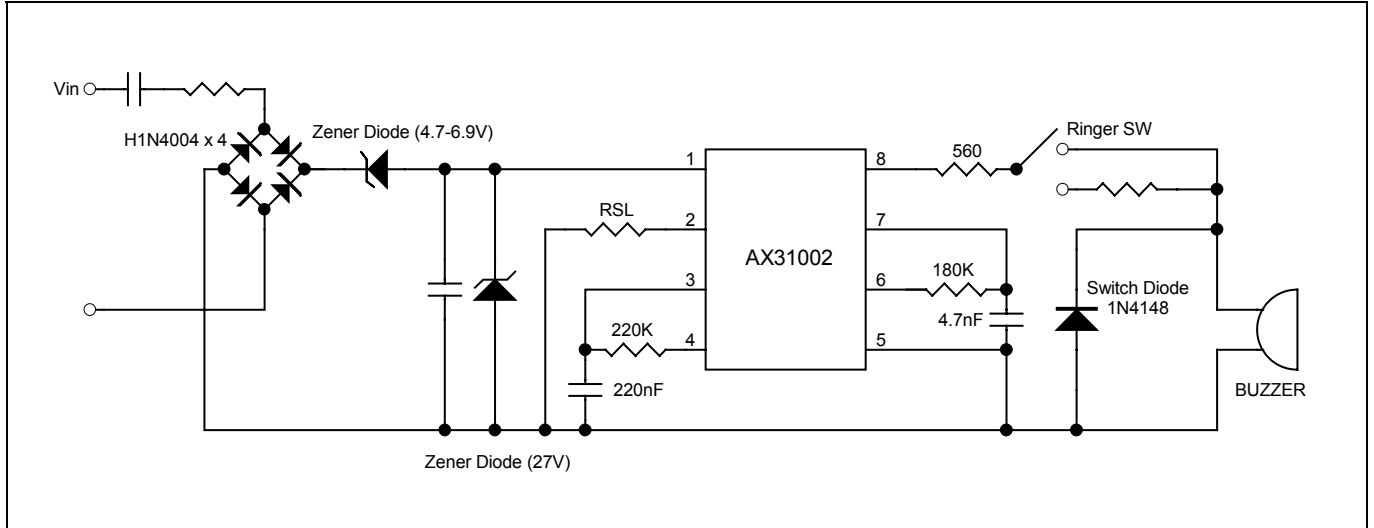
Note 3: Oscillation frequency is determined by the following equations: (1)  $f_L=1/1.234xR_1xC_1$  (Hz) (2)  $f_{H1}=1/1.515xR_2xC_2$  (Hz) (3)  $f_{H2}=1.24f_{H1}$  (Hz)

## Characteristics Curve

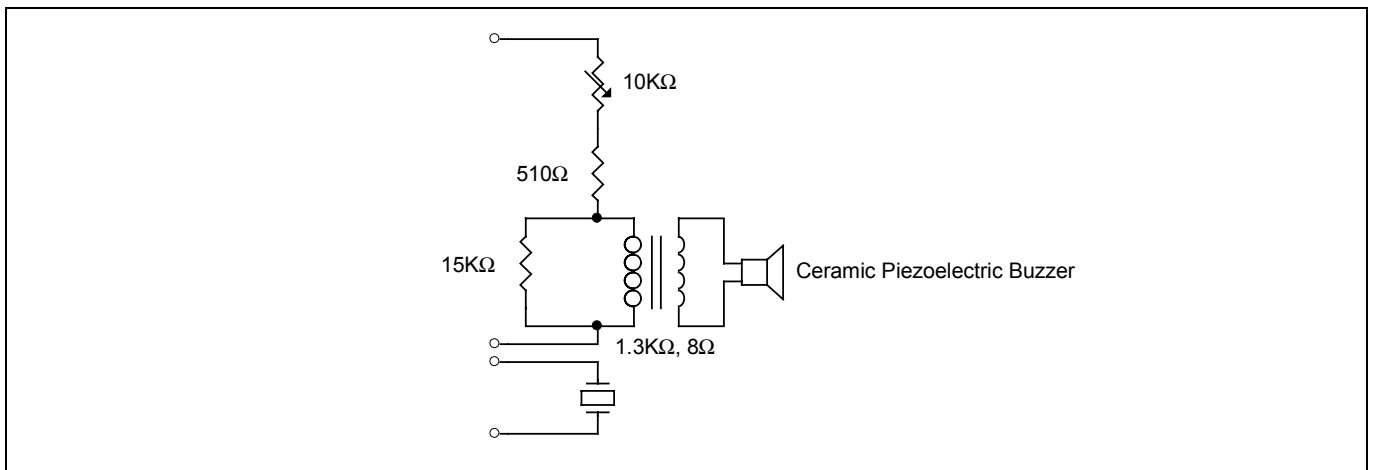


## Application Information

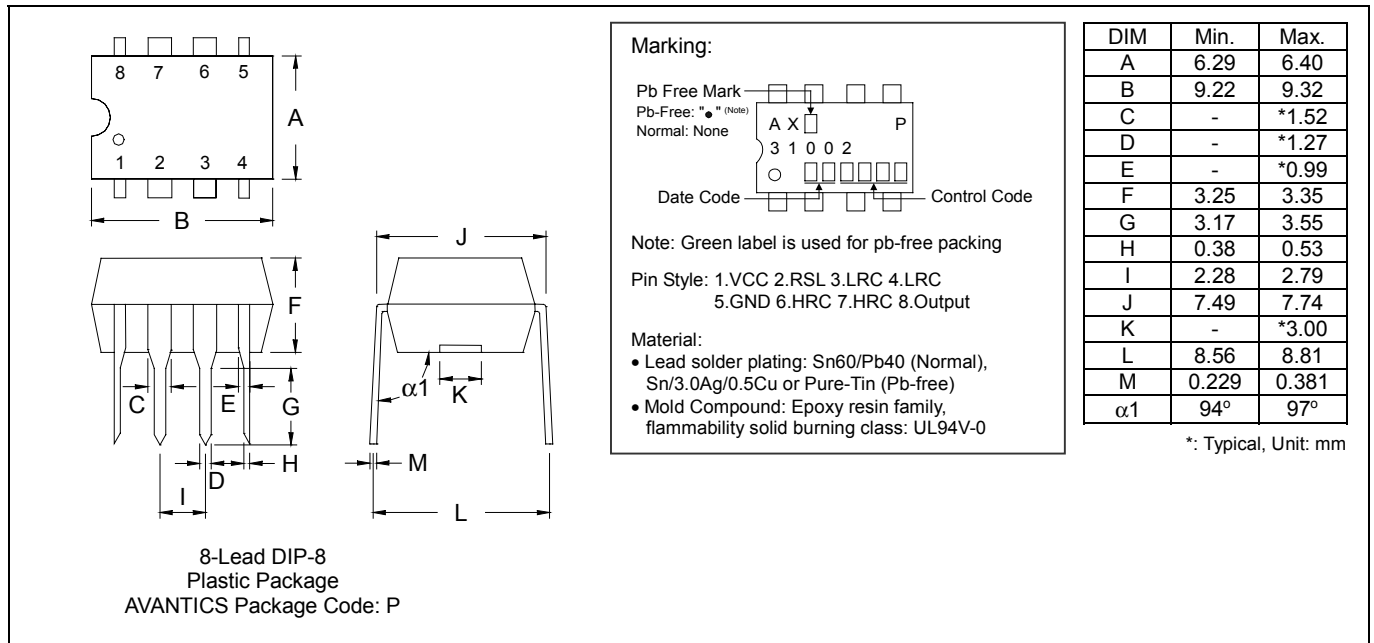
- Application circuits of Telecom Tone Ringer Set



- Example of Output Circuit



## DIP-8 Dimension



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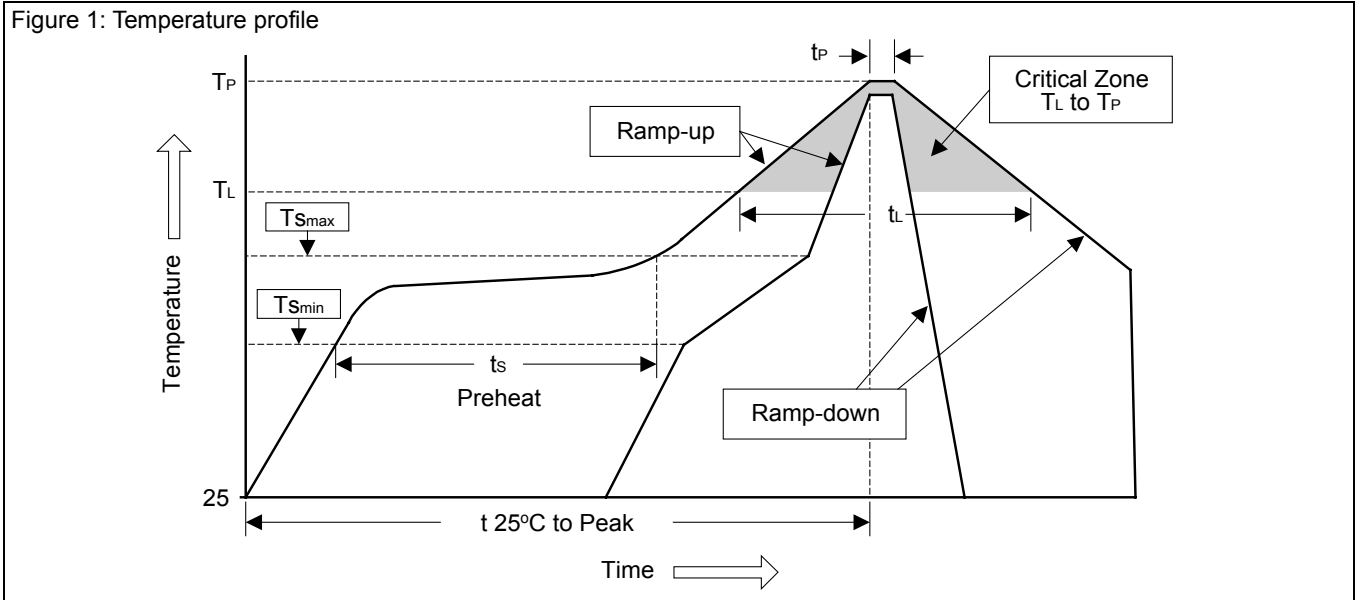
- AVANTICS Microelectronics Corp: No. 255, Cai Lun Rd. Zhangjiang Technology Industrial Park Pudong, Shanghai, China  
Tel: 86-021-58955599 Fax: 86-021-58558038

## Soldering Methods for AVANTICS's Products

1. Storage environment: Temperature=10°C~35°C Humidity=65%±15%

2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min ( $T_{smin}$ )	100°C	150°C
- Temperature Max ( $T_{smax}$ )	150°C	200°C
- Time (min to max) ( $t_s$ )	60~120 sec	60~180 sec
$T_{smax}$ to $T_L$		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature ( $T_L$ )	183°C	217°C
- Time ( $t_L$ )	60~150 sec	60~150 sec
Peak Temperature ( $T_P$ )	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	10~30 sec	20~40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

3. Flow (wave) soldering (solder dipping)

Products	Peak temperature	Dipping time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec