AX31002

Bipolar Tone Ringer IC

AX31002 Series	
DIP-8 Package	 DIP-8

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.

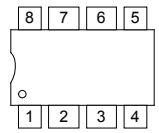
Features

- 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

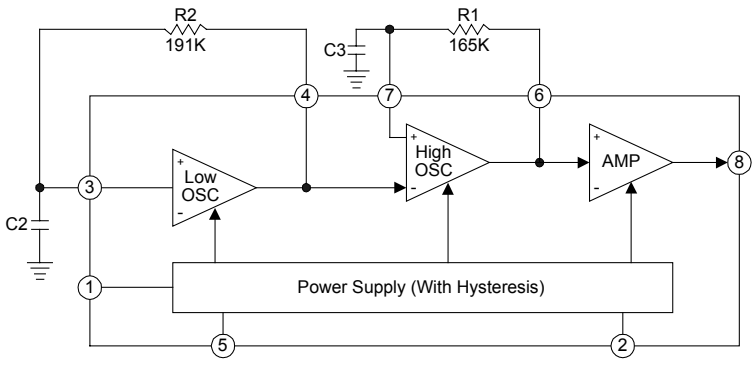


Pin1: VCC	Pin5: Gnd
Pin2: RSL Trigger In (RSL)	Pin6: High Freq. Time Constant. (HRC)
Pin3: Low Freq. Time Constant. (LRC)	Pin7: High Freq. Time Constant. (HRC)
Pin4: Low Freq. Time Constant. (LRC)	Pin8: Output

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

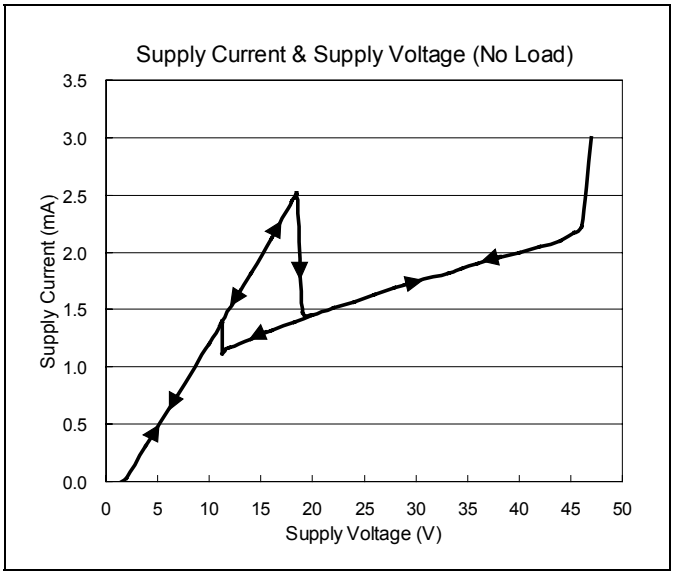


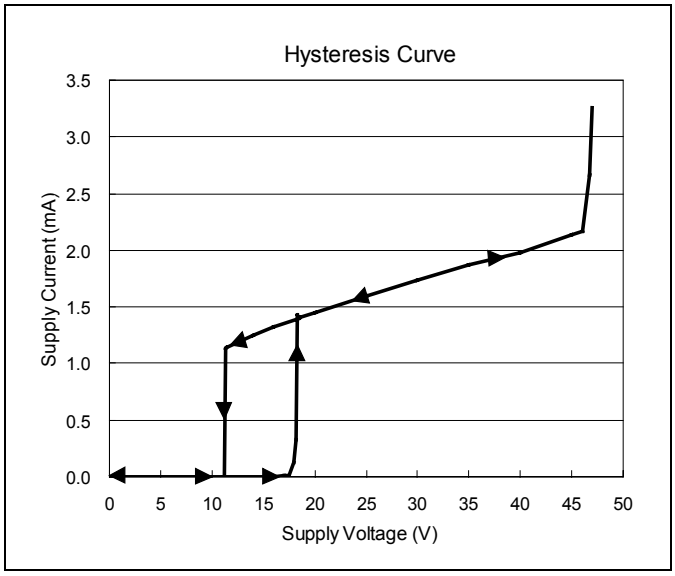
Electrical Characteristics

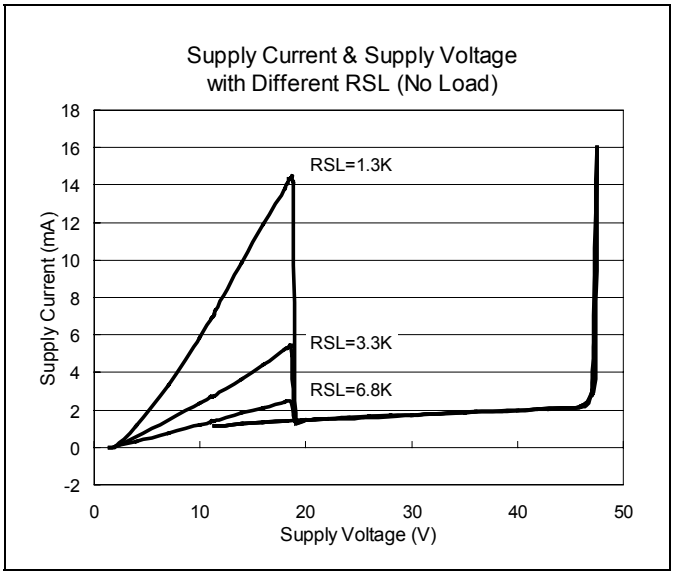
Characteristics		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Operating Voltage		V_{opr}		-	-	29	V
Initiation Supply Voltage		V_{si}	(Note 1)	17	19	21	V
Sustaining Supply Voltage		V_{sus}	(Note 2)	10.5	12	13.5	V
Initiation Current Consumption		I_{si}	No Load	1.4	3.3	4.2	mA
Sustaining Current Consumption		I_{sus}	No Load	0.34	1.4	2.5	mA
Oscillator Frequency		f_L	C_1=0.47uF, R_1=165kΩ	9	10	11	Hz
		f_{H1}	C_2=6800pF, R_2=191kΩ	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 (Vsi) is a supply voltage required to start oscillation of the tone ringer.
Note 2: Sustaining Supply Voltage (Vsus) 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

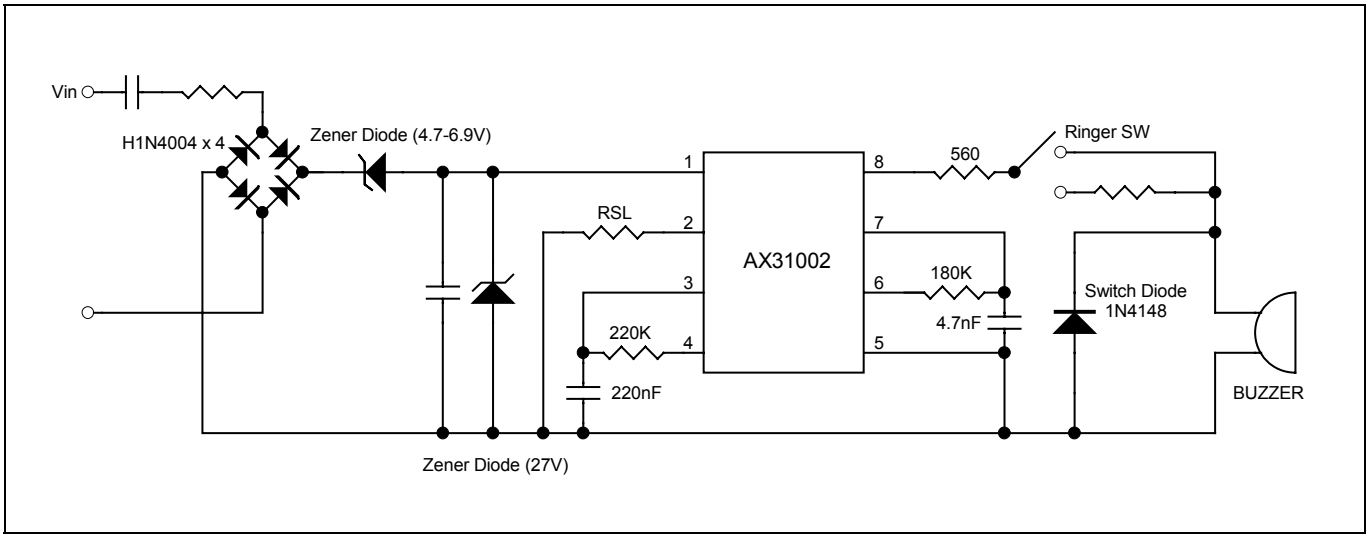




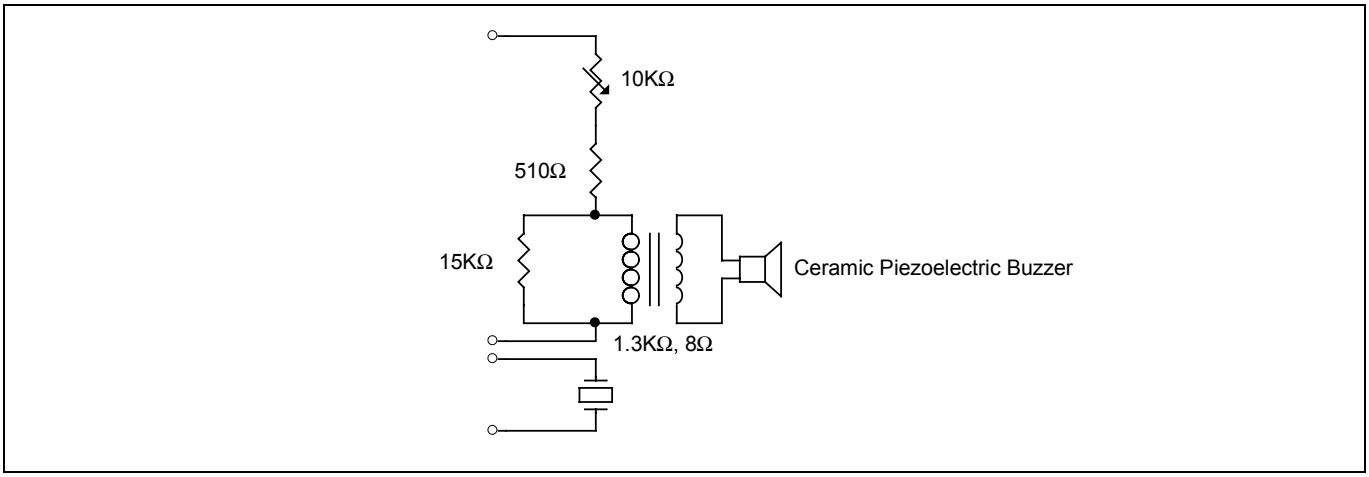


Application Information

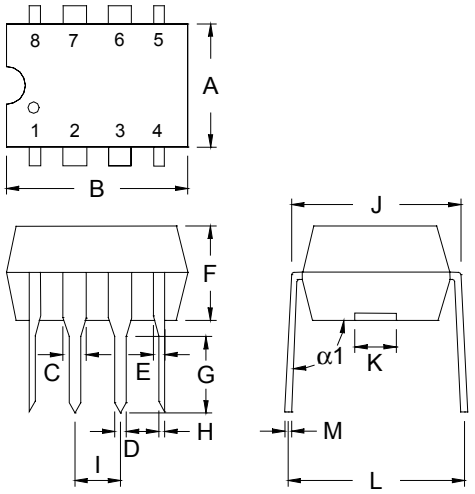
• Application circuits of Telecom Tone Ringer Set



• Example of Output Circuit

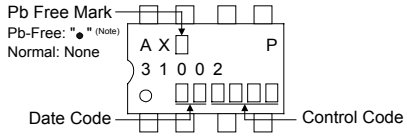


DIP-8 Dimension



8-Lead DIP-8
Plastic Package
AVANTICS Package Code: P

Marking:



Note: Green label is used for pb-free packing

Pin Style: 1.VCC 2.RSL 3.LRC 4.LRC
5.GND 6.HRC 7.HRC 8.Output

Material:
- Lead solder plating: Sn60/Pb40 (Normal), Sn/3.0Ag/0.5Cu or Pure-Tin (Pb-free)
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

DIM	Min.	Max.
A	6.29	6.40
B	9.22	9.32
C	-	*1.52
D	-	*1.27
E	-	*0.99
F	3.25	3.35
G	3.17	3.55
H	0.38	0.53
I	2.28	2.79
J	7.49	7.74
K	-	*3.00
L	8.56	8.81
M	0.229	0.381
α1	94°	97°

*: Typical, Unit: mm

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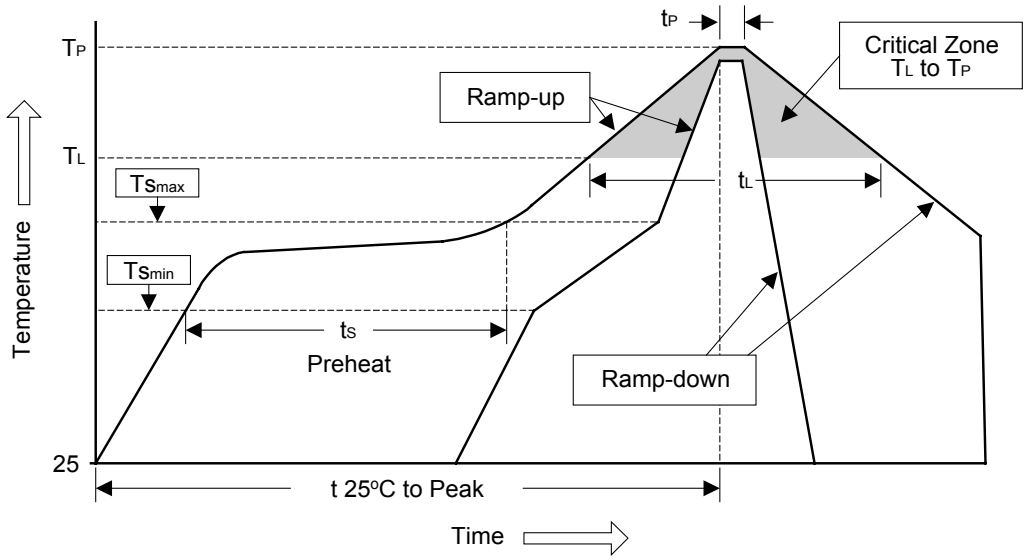
Soldering Methods for AVANTICS's Products

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 (Ts_{min}) - Temperature Max (Ts_{max}) - Time (min to max) (ts)	 100°C 150°C 60~120 sec	 150°C 200°C 60~180 sec
Tsmax to T_L - Ramp-up Rate	 <3°C/sec	 <3°C/sec
Time maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60~150 sec	 217°C 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