



H31002P

BIPOLAR TONE RINGER IC

Description

The H31002P is a bipolar integrated circuit. It is designed for telephone bell replacement. It can also be used as alarms or other alerting devices.

Features

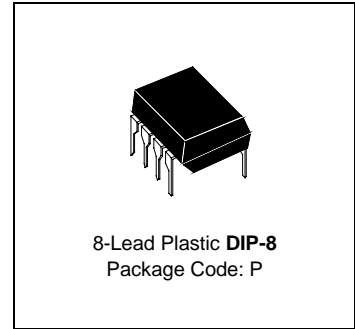
- Current consumption is small
- Oscillation frequency is variable
- Adjustable start-up current
- Higher driving capability
- Built-in threshold circuits prevent false triggering due to power noise as well as 'chirps' due to rotary dial
- Few external components
- Easy connection to telephone system

Applications

- Telecom Tone Ringer Set

Pin Connections

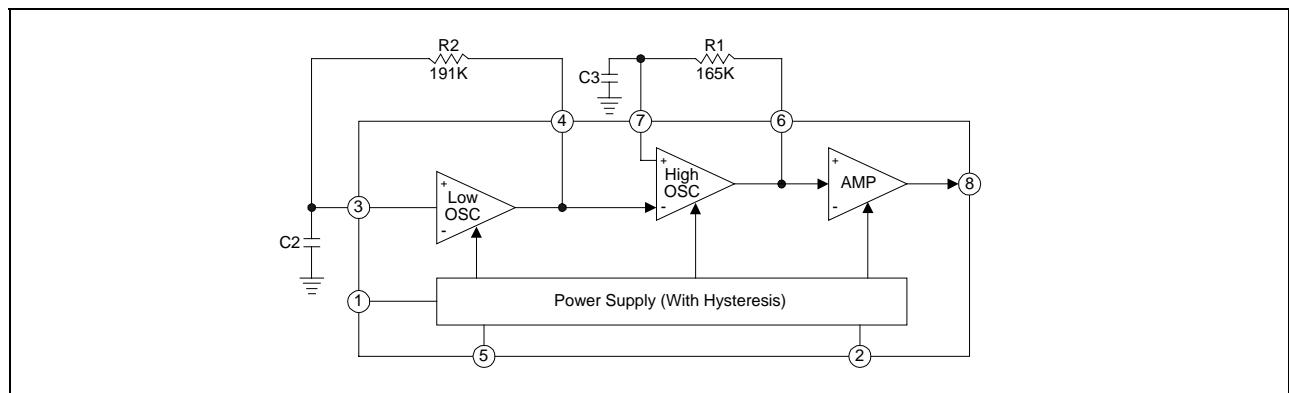
| | | |
|--|--------------------------------------|---------------------------------------|
| | Pin1: VCC | Pin5: Gnd |
| | Pin2: RSL Trigger In (RSL) | Pin6: High Freq. Time Constant. (HRC) |
| | Pin3: Low Freq. Time Constant. (LRC) | Pin7: High Freq. Time Constant. (HRC) |
| | Pin4: Low Freq. Time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

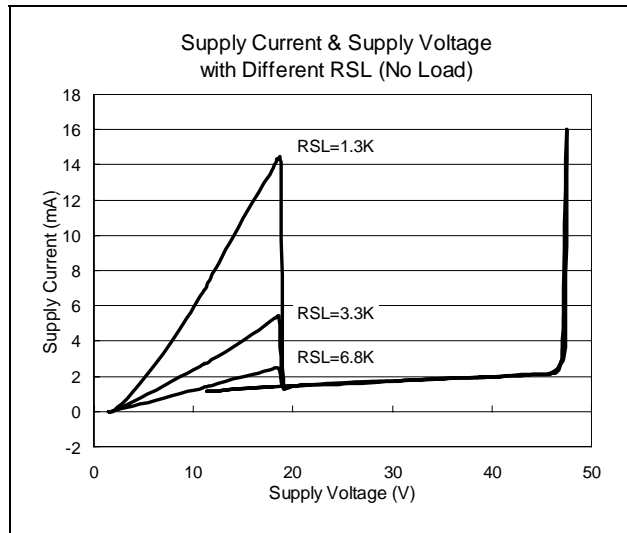
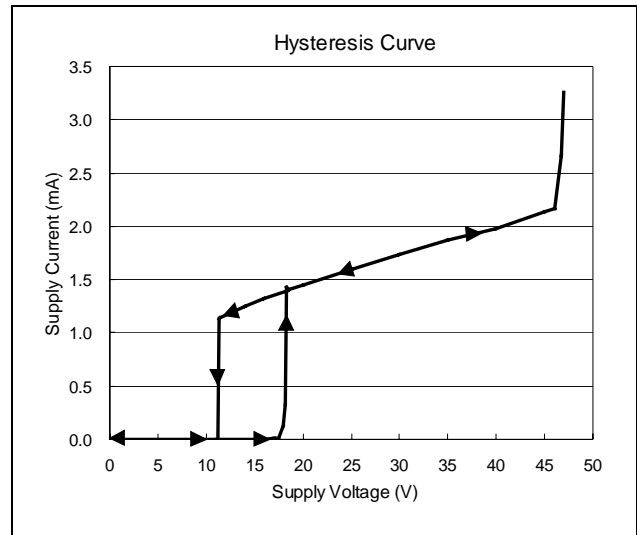
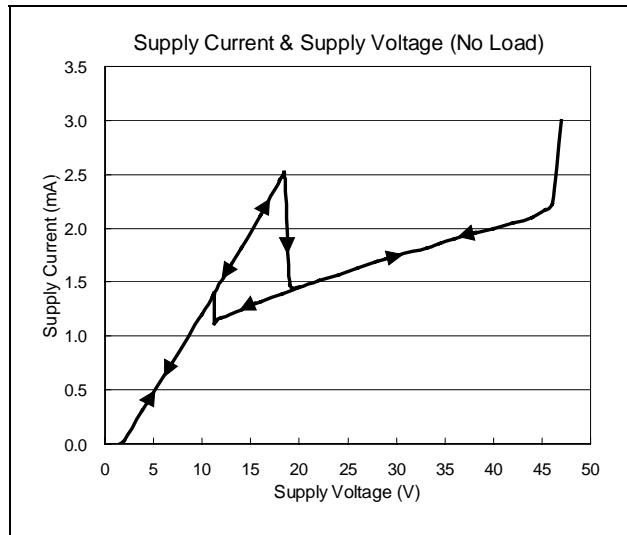
| Characteristics | | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|--------------------------------|-----------|-----------|--|------|------|------|------|
| Operating Voltage | | V_{opr} | | - | - | 29 | V |
| Initiation Supply Voltage | | V_{si} | (Note 1) | 17 | 19 | 21 | V |
| Sustaining 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 ring.

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

Note 3: Oscillation frequency is determined by the following equations: (1) $f_L=1/1.234 \times R_1 \times C_1$ (Hz) (2) $f_{H1}=1/1.515 \times R_2 \times C_2$ (Hz) (3) $f_{H2}=1.24f_{H1}$ (Hz)

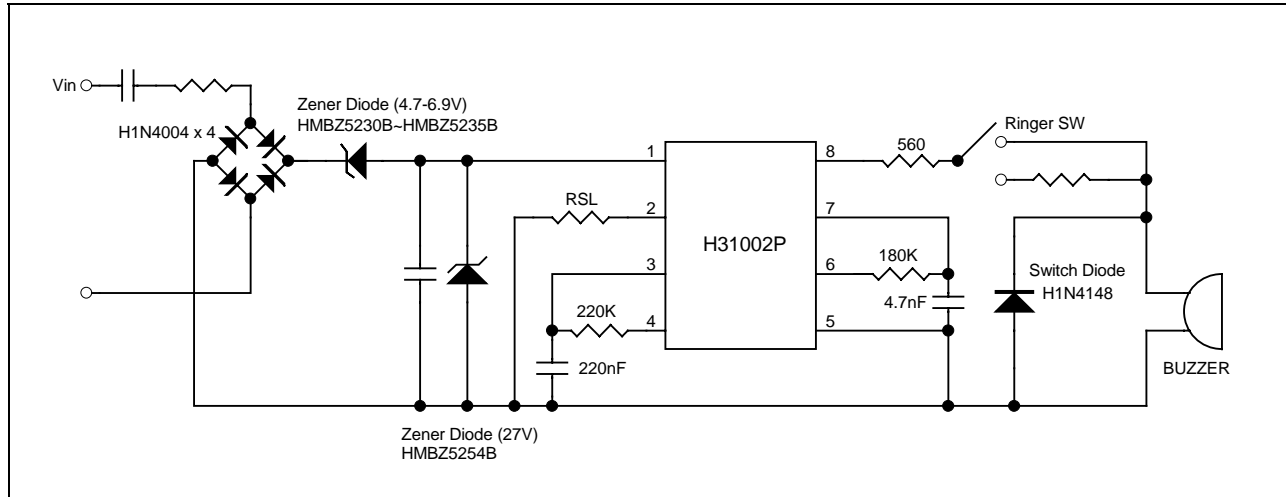
Characteristics Curve



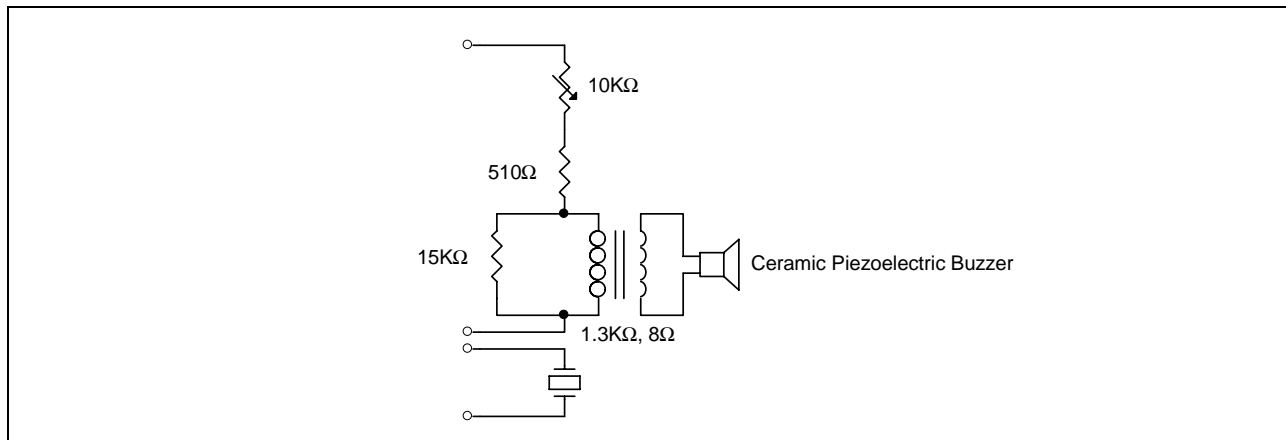


Application Information

- Application circuits of Telecom Tone Ringer Set



- Example of Output Circuit





DIP-8 Dimension

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

Marking:

Pb Free Mark
 Pb-Free: "●" (Note)
 Normal: None

Date Code Control Code

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 |
| $\alpha 1$ | 94° | 97° |

*: Typical, Unit: mm

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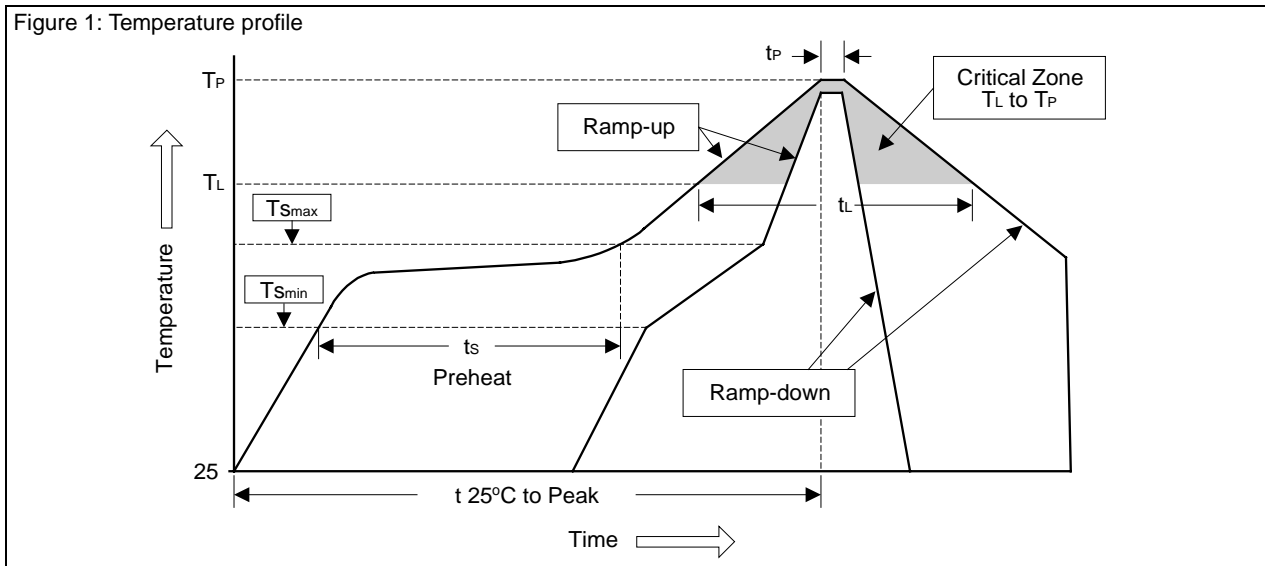
- **Head Office** (Hi-Sincerity Microelectronics Corp.): 10F., No. 61, Sec. 2, Chung-Shan N. Rd. Taipei Taiwan R.O.C.
 Tel: 886-2-25212056 Fax: 886-2-25632712, 25368454
- **Factory 1:** No. 38, Kuang Fu S. Rd., Fu-Kou Hsin-Chu Industrial Park Hsin-Chu Taiwan. R.O.C
 Tel: 886-3-5983621~5 Fax: 886-3-5982931



Soldering Methods for HSMC's Products

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

2. Reflow soldering of surface-mount devices



| 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 |