

The WS2418 is a monolithic integrated circuit telephone tone ringer with bridge diode, when coupled with an appropriate transducer, it replaces the electromechanical bell. This device is designed for use with either a piezo transducer or an inexpensive transformer coupled speaker to produce a pleasing tone composed of a high frequency ( $f_R$ ) alternating with a low frequency ( $f_L$ ) resulting in a warble frequency. The supply voltage is obtained from the AC ring signal and the circuit is designed so that noise on the line or variation of the ringing signal cannot affect correct operating of the device.

**8 DIP**

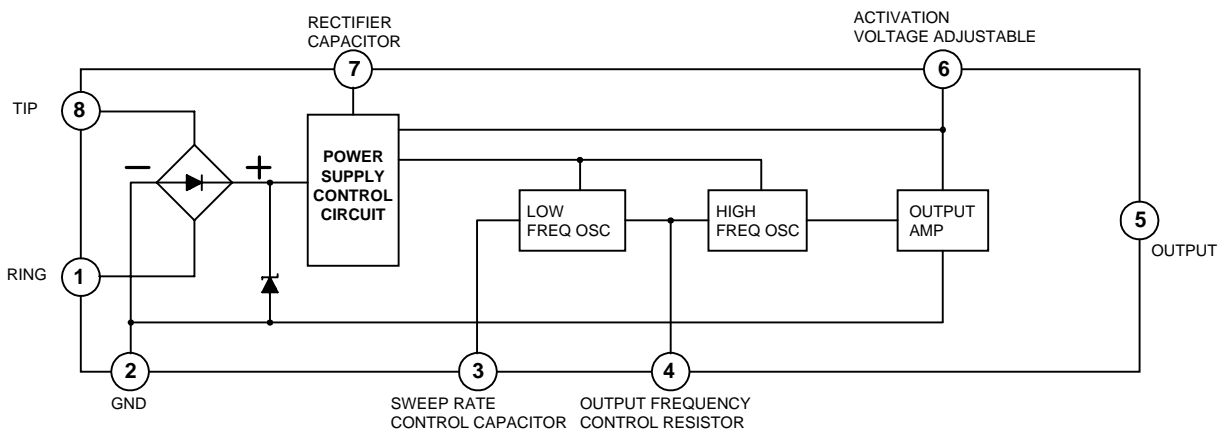


**WS2418**

**FEATURES**

- ♦ On chip high voltage full wave diode bridge rectifier
- ♦ Low current consumption, in order to allow the parallel operation of the 4device
- ♦ Low external component count
- ♦ Tone and switching frequencies adjustable by external components
- ♦ High noise immunity due to built-in voltage current hysteresis
- ♦ Activation voltage adjustable
- ♦ Internal zener diodes to protect against over voltages
- ♦ Ringer impedance adjustable with external components
- ♦ Electronic telephone ringers
- ♦ Extension ringers

**BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}C$ )**

| SYMBOL                 | CHARACTERISTIC                                       | VALUE    | UNIT        |
|------------------------|--|----------|-------------|
| $V_C$                  | Calling Voltage ( $f=50H_z$ ) Continuous             | 120      | $V_{RMS}$   |
| $V_{C(O\text{N-OFF})}$ | Calling Voltage ( $f=50H_z$ )<br>5 sec On/10 Sec Off | 200      | $V_{RMS}$   |
| $I_{CC}$               | Supply Current                                       | 22       | mA          |
| $T_{OPR}$              | Operating Temperature                                | -20~+70  | $^{\circ}C$ |
| $T_{STG}$              | Storage and Junction Temperature                     | -65~+150 | $^{\circ}C$ |

Absolute maximum rating are those values beyond which permanent damage to the device may occur. These are stress rating only and functional operation of the device at or beyond them is not implied. Long exposure to these conditions may affect device reliability.

# WS2418

# TELEPHONE TONE RINGER WITH BRIDGE DIODE

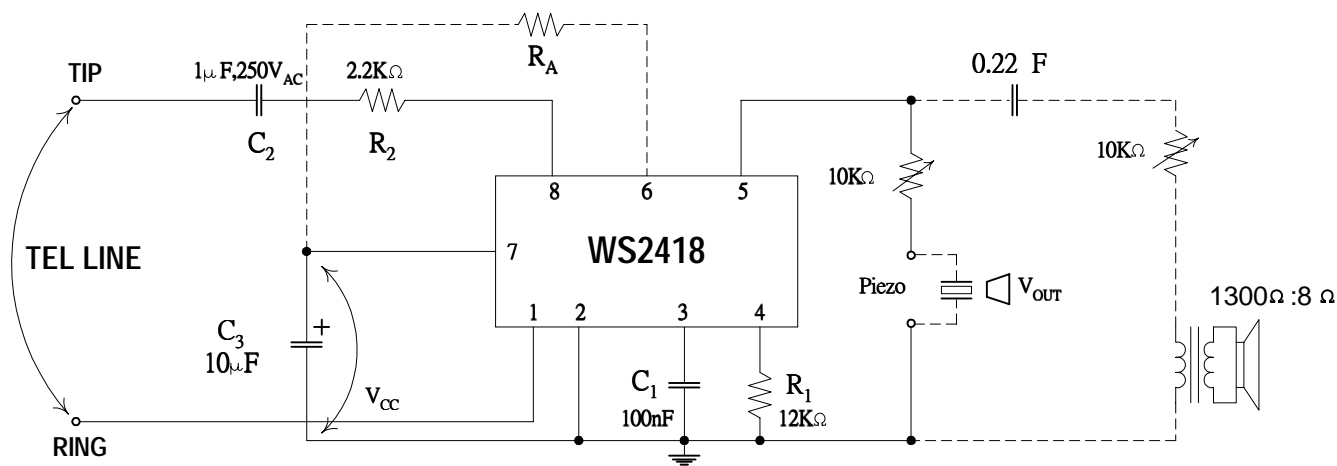
## DC ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

| Symbol              | Characteristics                       | Min. | Typ.               | Max. | Units | Test Conditions             |
|---------------------|---------------------------------------|------|--------------------|------|-------|-----------------------------|
| V <sub>CC</sub>     | Supply Voltage                        |      |                    | 26   | V     |                             |
| I <sub>CC</sub>     | Current Consumption Without load      |      | 1.5                | 1.8  | mA    | V <sub>CC</sub> =8.8 to 26V |
| V <sub>ON</sub>     | Activation Voltage                    | 12.2 |                    | 13   | V     |                             |
| V <sub>ONR</sub>    | Activation Voltage Range              | 8    |                    | 10   | V     | R <sub>A</sub> =1KΩ         |
| V <sub>SUS</sub>    | Sustaining Voltage                    | 8    |                    | 8.8  | V     |                             |
| R <sub>D(OFF)</sub> | Different Resistance in OFF Condition | 6.4  |                    |      | KΩ    |                             |
| V <sub>O(P-P)</sub> | Output Voltage Swing                  |      | V <sub>CC</sub> -3 |      | V     |                             |
| I <sub>SC</sub>     | Short Circuit Current                 |      | 35                 |      | mA    | V <sub>CC</sub> =26V        |

## AC ELECTRICAL CHARACTERISTICS

| Symbol           | Characteristic        | Min. | Typ.     | Max. | Units | Test Conditions  |
|------------------|-----------------------|------|----------|------|-------|--|
| F <sub>H1</sub>  | Output Frequency      |      | 2300+300 |      | Hz    | V <sub>CC</sub> =26V, R <sub>1</sub> =14KΩ<br>V <sub>C</sub> =0V(PIN3)<br>V <sub>C</sub> =6V(PIN3) |
| F <sub>H2</sub>  |                       |      | 1700+300 |      |       |  |
| f <sub>H1R</sub> | f <sub>H1</sub> Range | 0.1  |          | 15   | KHz   | R <sub>1</sub> =27KΩ To 1.7KΩ  |
| f <sub>S</sub>   | Sweep Frequency       |      | 8        |      | Hz    | R <sub>1</sub> =14KΩ, C <sub>1</sub> =100nF  |

### TEST AND APPLICATION CIRCUIT



$$f_1 = \frac{3.22 \times 10^4}{R_1 (K\Omega)}, f_2 = \frac{5}{7} f_1, f_s = \frac{1000}{C_1 (nF)}$$

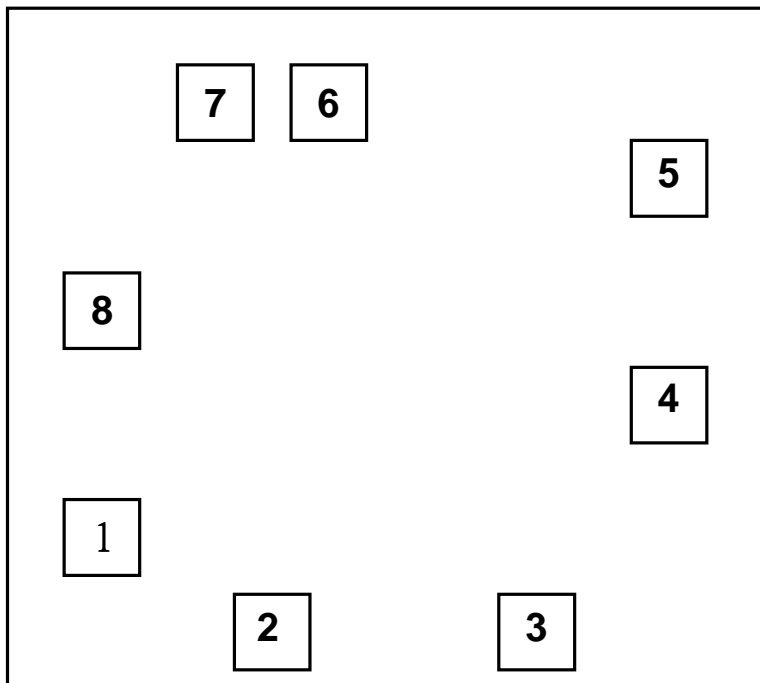
## DESCRIPTION

The WS2418 tone ringer device its power supply by rectifying the AS ringing signal. It uses this power to activate two tone generators. The two tone frequencies generators are switched by an internal oscillator in a fast sequence and made audible across an output amplifier in the loudspeaker, both tone frequencies and the switch frequency can be externally adjusted

The devices can driver either directly a piezo ceramic converter (buzzer) or small loudspeaker. In case of using a loudspeaker, a transformer is need.4

An internal shunt voltage regulator provides DC voltage to the output stage, low frequency oscillator, and high frequency oscillator. To protect the IC telephone line transients, a zener diode is include.

**PAD LOCATION**



**Chip size 2.4mm X 2.2mm**

| <b>Pad N</b> | <b>X (<math>\mu</math>m)</b> | <b>Y (<math>\mu</math>m)</b> |
|--------------|------------------------------|------------------------------|
| <b>1</b>     | <b>315</b>                   | <b>630</b>                   |
| <b>2</b>     | <b>660</b>                   | <b>195</b>                   |
| <b>3</b>     | <b>1550</b>                  | <b>205</b>                   |
| <b>4</b>     | <b>2065</b>                  | <b>825</b>                   |
| <b>5</b>     | <b>2100</b>                  | <b>1710</b>                  |
| <b>6</b>     | <b>790</b>                   | <b>1875</b>                  |
| <b>7</b>     | <b>595</b>                   | <b>1875</b>                  |
| <b>8</b>     | <b>285</b>                   | <b>1265</b>                  |