



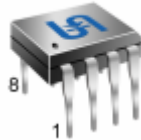
# TS2418

Telephone tone ringer with bridge diode

SOP-8



DIP-8



**Supply Voltage 26V (max.)**  
**Calling Voltage (f=50Hz) Continuous**

## General Description

The TS2418 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 ( $f_H$ ) 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 can not affect correct operation of the device.

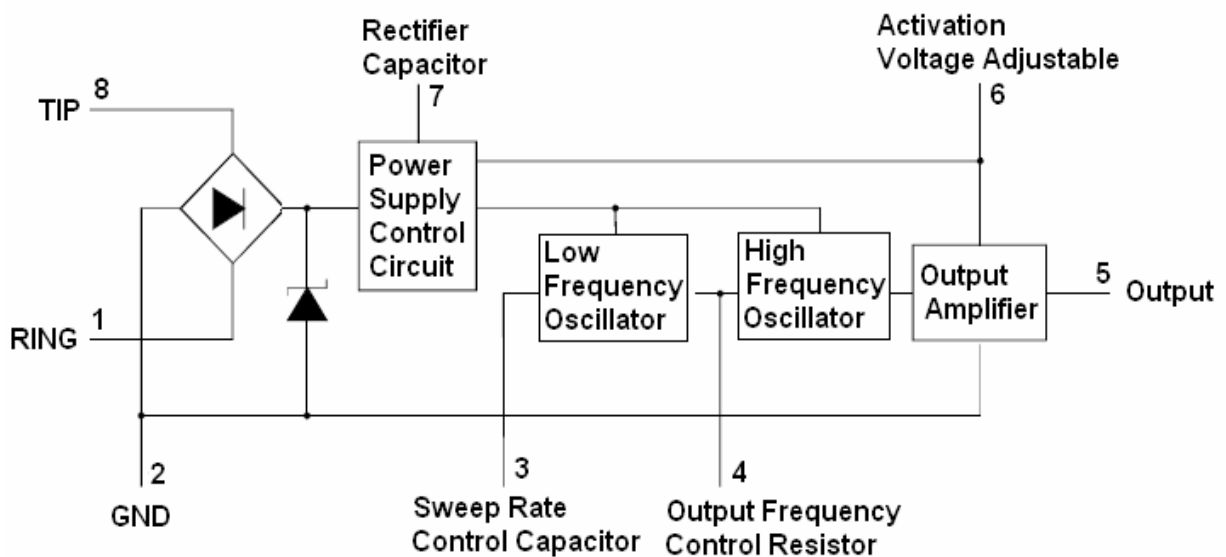
## Features

- ✧ On chip high voltage full wave diode bridge rectifier.
- ✧ Low current consumption, in order to allow the parallel operation of the 4 devices.
- ✧ 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.

## Ordering Information

Part No.	Operating Temp.	Package
TS2418CD	-20 ~ +70 °C	DIP-8
TS2418CS		SOP-8

## Block Diagram





## Absolute Maximum Rating

Description	Symbol	Value	Unit
Calling Voltage (f=50Hz) Continuous	$V_{TP}$	120	Vrms
Calling Voltage (f=50Hz) 5 Sec ON/10 Sec OFF	$V_{TP}$	200	Vrms
Supply Current	$I_{CC}$	22	mA
Operating Temperature	$T_{OP}$	-20~+70	$^{\circ}C$
Storage and Junction Temperature	$T_{stg}$	-65~+150	$^{\circ}C$

**Note:** \*Maximum Rating are those values beyond which damage to the device may occur.  
Functional operation should be restricted to the Recommended Operating Conditions.

## Recommended Operating Conditions

Description	Symbol	Min	Max	Unit
Supply Voltage	$V_{CC}$	--	26	V
Operating Temperature	$T_A$	-20	+70	$^{\circ}C$

**Note:** This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation,  $V_{IN}$  and  $V_{OUT}$  should be constrained to the range  $GND \leq (V_{IN} \text{ or } V_{OUT}) \leq V_{CC}$ . Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or  $V_{CC}$ ). Unused output must be left open.

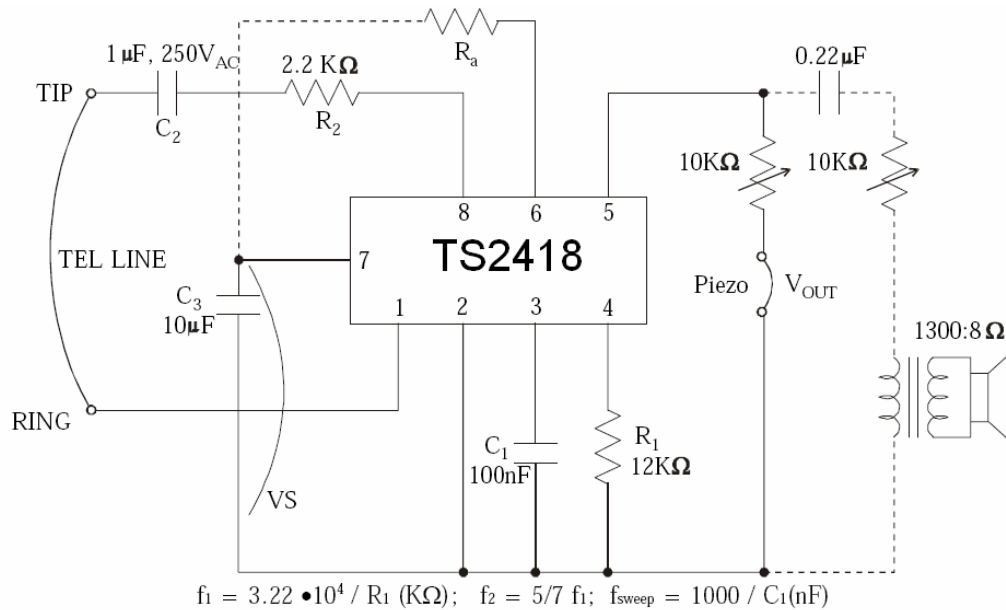
## Electrical Characteristics ( $T_a=25^{\circ}C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	$V_{CC}$		--	--	26	V
Current Consumption without Load	$I_{CC}$	$V_s = 8.8 \text{ to } 26V$	--	1.5	1.8	mA
Activation Voltage	$V_{ON}$		12.2	--	13	V
Activation Voltage Range	$V_{ONR}$	$R_A=1K\Omega$	8.0	--	10	V
Sustaining Voltage	$V_{SUS}$		8.0	--	8.8	V
Differential Resistance in Off Condition	$R_D$		6.4	--	--	$K\Omega$
Output Voltage Swing	$V_{OUT}$		--	$V_{CC}-3$	--	V
Short Circuit Current	$I_{OUT}$	$V_s=26V$	--	35	--	mA

## AC Operation

Output Frequency		$V_{CC}=26V, R_1=14K\Omega$				
$f_{H1}$	$f_{H1}$	$V_{CC}=0V$		2300		Hz
$f_{H2}$	$f_{H2}$	$V_{CC}=6V$		1700		Hz
$f_{H1}$ Range		$R_1=27K\Omega \text{ to } 1.7 K\Omega$	0.1	--	15	KHz
Sweep Frequency	$f_L$	$R_1=14K\Omega, C_1=100nF$	--	10	--	Hz

## Test and Application Circuit



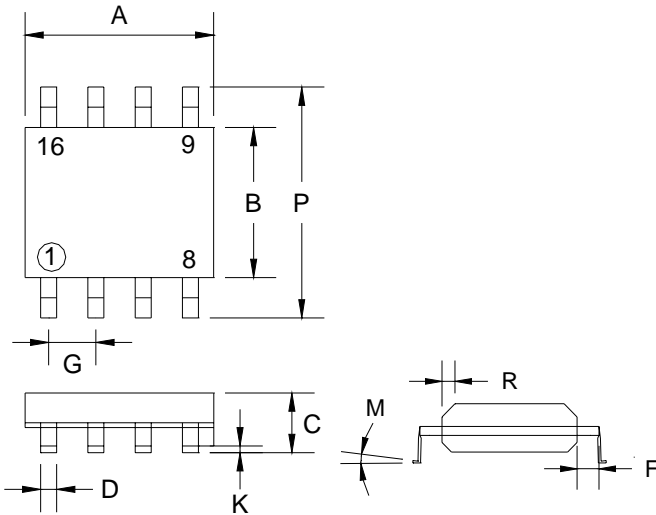
### Description:

The TS2418 tone ringer derives its power supply by rectifying the AC ringing signal. It uses this power to activate two tone generators. The two tone frequencies generated are switched by internal oscillator in a fast sequence and made audible across an output amplifier in the loudspeaker; both tone frequencies and the switching frequency can be externally adjusted.

The device can drive either directly a piezo ceramic converter (buzzer) or small loudspeaker. In case of using a loud-speaker, a transformer is needed.

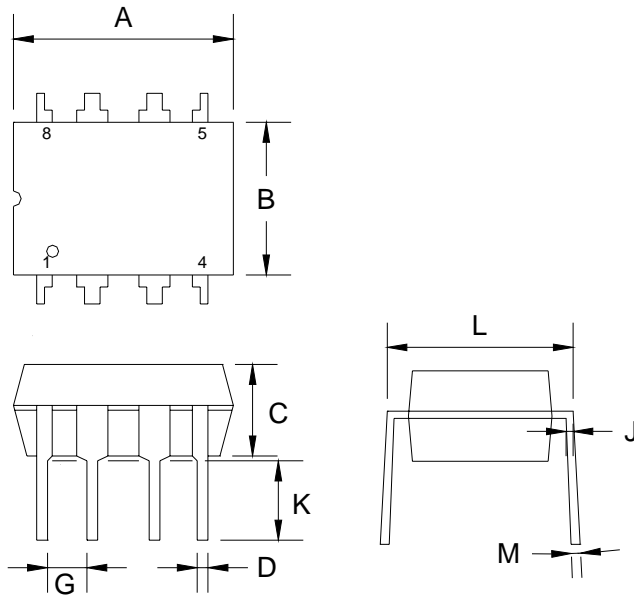
An internal shunt voltage regulator provides DC voltage to the output stage, low frequency oscillator, and high f frequency oscillator. To protect the IC from telephone line transients, a zener Diode is included.

## SOP-8 Mechanical Drawing



SOP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 (typ)		0.05 (typ)	
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

## DIP-8 Mechanical Drawing



DIP-8 DIMENSION				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.07	9.32	0.357	0.367
B	6.22	6.48	0.245	0.255
C	3.18	4.45	0.125	0.135
D	0.35	0.55	0.019	0.020
G	2.54 (typ)		0.10 (typ)	
J	0.29	0.31	0.011	0.012
K	3.25	3.35	0.128	0.132
L	7.75	8.00	0.305	0.315
M	-	10°	-	10°