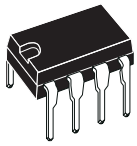
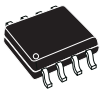
LS1240A

ELECTRONIC TWO - TONE RINGER

- LOW CURRENT CONSUMPTION, IN ORDER TO ALLOW THE PARALLEL OPERATION OF 4 DEVICES
- INTEGRATED RECTIFIER BRIDGE WITH ZENER DIODES TO PROTECT AGAINST OVERVOLTAGES
- LITTLE EXTERNAL CIRCUITRY
- TONE AND SWITCHING FREQUENCIES ADJUSTABLE BY EXTERNAL COMPONENTS
- INTEGRATED VOLTAGE AND CURRENT HYSTERESIS



Minidip



SO8

DESCRIPTION

LS1240A is a monolithic integrated circuit designed to replace the mechanical bell in telephone sets in connection with an electro-acoustical converter. It can drive directly a piezoceramic converter (buzzer)or a dynamic loudspeaker.

The output current capability of LS1240A is higher than standard ringer. For driving a dynamic loudspeaker LS1240A can simply use a decoupling capacitor, thus eliminating the usual transformer.

No current limitation is provided on the output stage of LS1240A, so a minimum load DC of 50 Ω is adviced, in series with a proper capacitor.

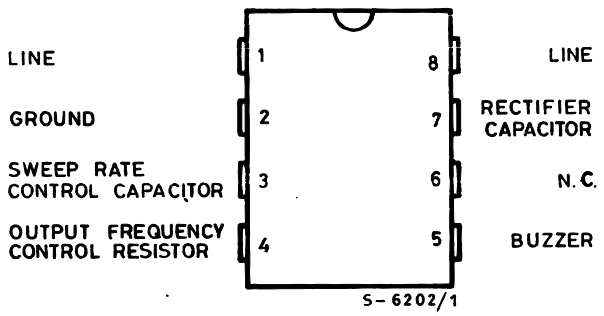
The two tone frequencies generated are switched by an internal oscillator in a fast sequence and made audible across an output amplifier in the loudspeaker, both tone frequencies and the switching frequency can be externally adjusted.

ORDERING NUMBERS

Minidip	SO8
LS1240A	LS1240AD1

The supply voltage is obtained from the AC ring signal and the circuit is designed so that noise on the line or variations of the ringing signal cannot affect correct operation of the device.

PIN CONNECTION (top view)



BLOCK DIAGRAM

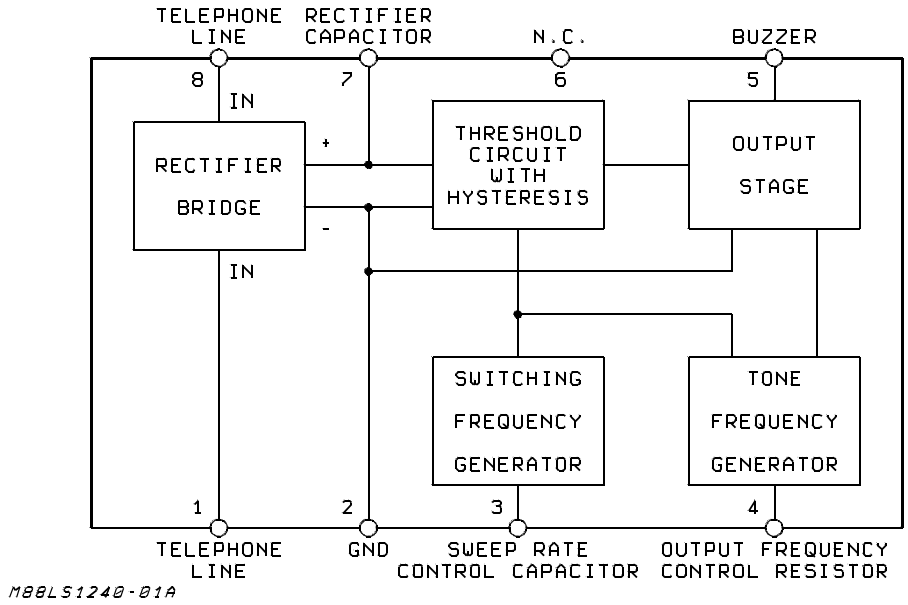
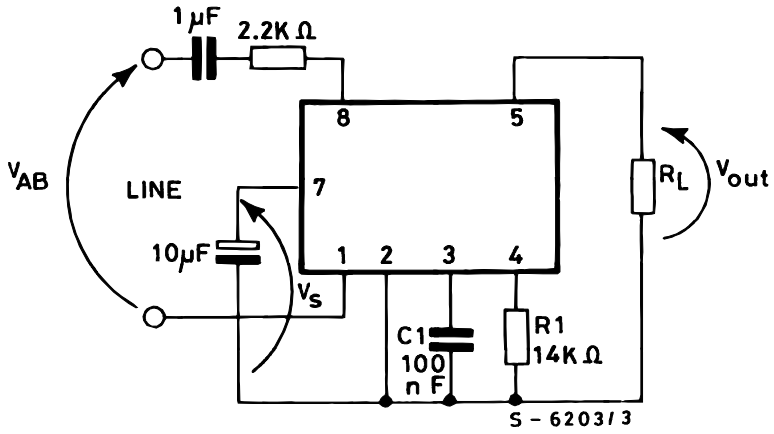


Figure 1 : Test Circuit.



$$R1 = \frac{2.72 \cdot 10^4}{f1\ (Hz)} \cdot (1 - 0.04 \ln \frac{f1}{1943}) \qquad f2 = 0.725\ f1 \qquad f_{SWEEP} = \frac{750}{C1\ (nF)}$$

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{AB}	Calling Voltage (f = 50 Hz) Continuous	120	V_{rms}
V_{AB}	Calling Voltage (f = 50 Hz) 5s ON/10s OFF	200	V_{rms}
DC	Supply Current	30	mA
T_{op}	Operating Temperature	– 40 to + 70	°C
T_{stg}	Storage and Junction Temperature	– 65 to + 150	°C

THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	100	°C/W

ELECTRICAL CHARACTERISTICS

(T_{amb} = 25 °C; V_S = applied between pins 7-2 unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_S	Supply Voltage				26	V
I_B	Current Consumption without Load (pins 8-1)	$V_{8\text{-}1}$ = 9.3 to 25 V		1.5	1.8	mA
V_{ON}	Activation Voltage		12.2		13.2	V
V_{OFF}	Sustaining Voltage		8		9	V
R_D	Differential Resistance in OFF Condition (pins 8-1)		6.4			kΩ
V_{OUT}	Output Voltage Swing			V_S – 5		V
I_{OUT}	Short Circuit Current (pins 5-2)	V_S = 20V R_L = 250Ω		70		mA

AC OPERATION

f_1 f_2	Output Frequencies f_{out1} f_{out2}	V_S = 26V, R_1 = 14kΩ V_S = 0 V V_S = 6V	 1.74 1.22		 2.14 1.6	kHz
	$\frac{f_{OUT1}}{f_{OUT2}}$		1.33		1.43	
	Programming Resistor Range		8		56	kΩ
f_{SWEEP}	Sweep Frequency	R_1 = 14kΩ, C_1 = 100nF	5.25	7.5	9.75	Hz

Figure 2 : Typical Application with BUZZER

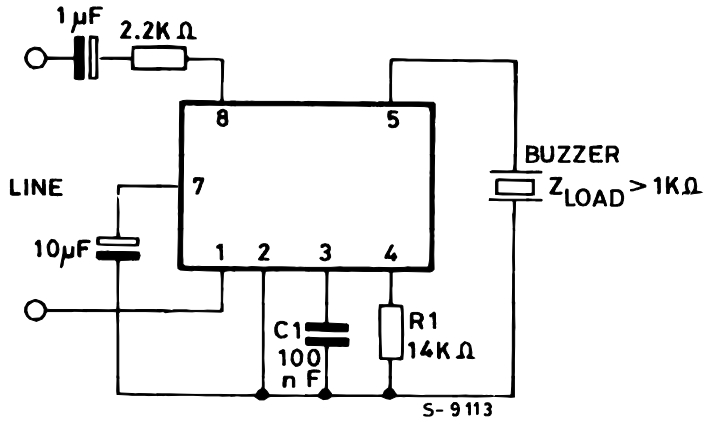
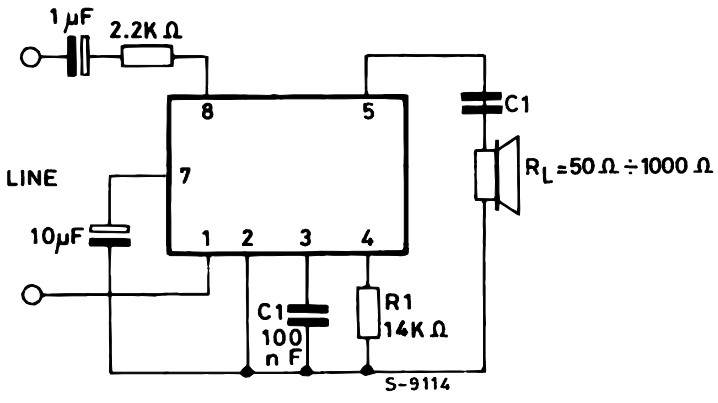


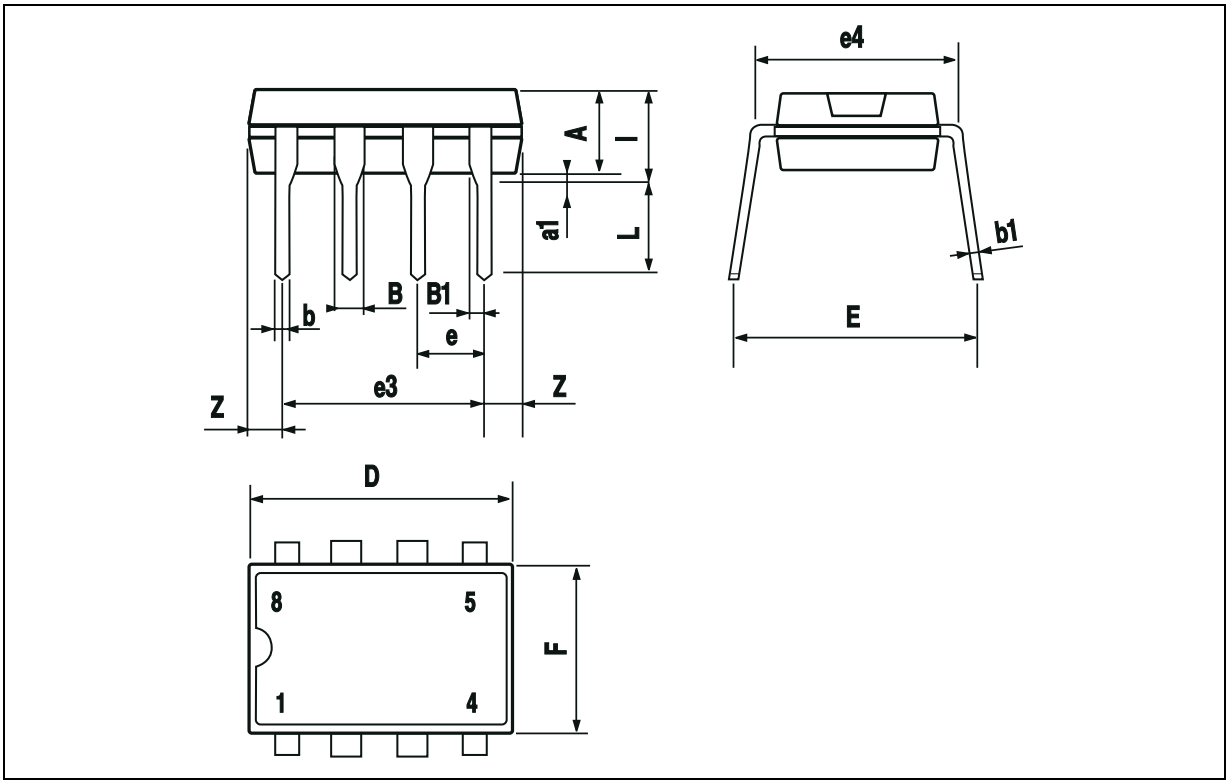
Figure 3 : Typical Application with Loudspeaker (no transformer needed)



C_1 such that $|Z_{LOAD}| > 1\ K\Omega$

MINIDIP PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
I			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060



SO8 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D (1)	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F (1)	3.8		4.0	0.15		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max.)