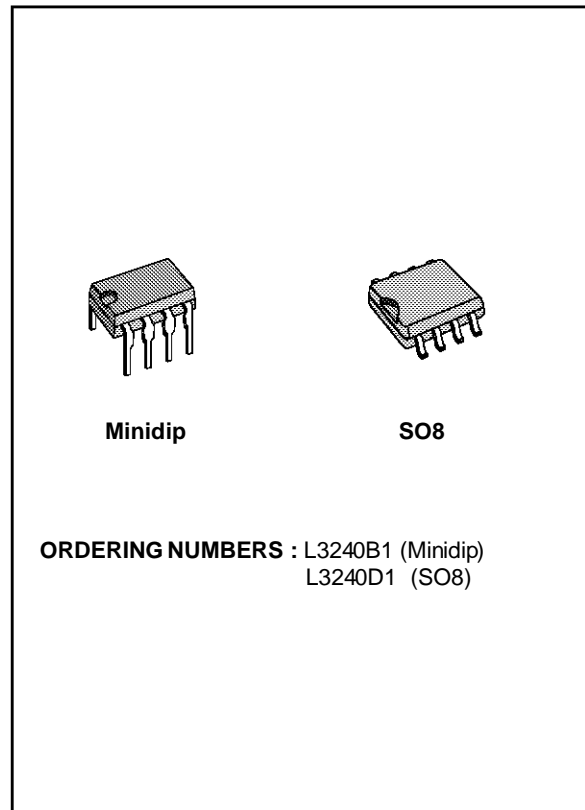


**ELECTRONIC TWO-TONE RINGER**

- 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
- COMPLEMENTARY OUTPUT CONFIGURATION



**DESCRIPTION**

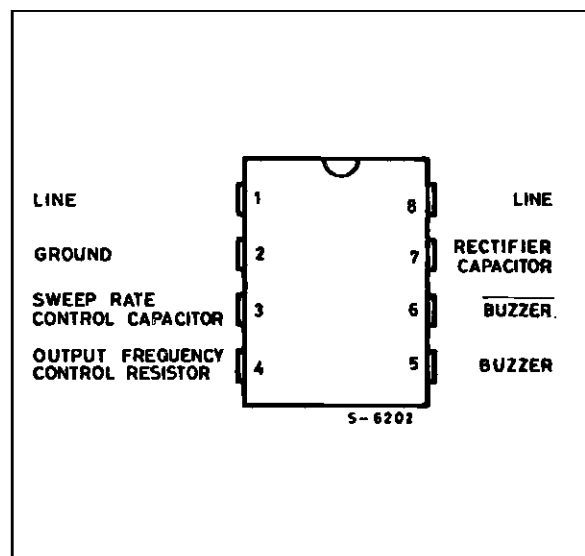
L3240 is a monolithic integrated circuit designed to replace the mechanical bell in telephone sets, in connection with an electro acoustical converter. The device can drive either directly a piezo ceramic converter (buzzer) or a small loudspeaker. In this case a transformer is needed. The two tone frequencies generated are switched by an internal oscillator in a fast sequence and made audible across output amplifiers in the transducer; both tone frequencies and the switching frequency can be externally adjusted.

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 the correct operation of the devices.

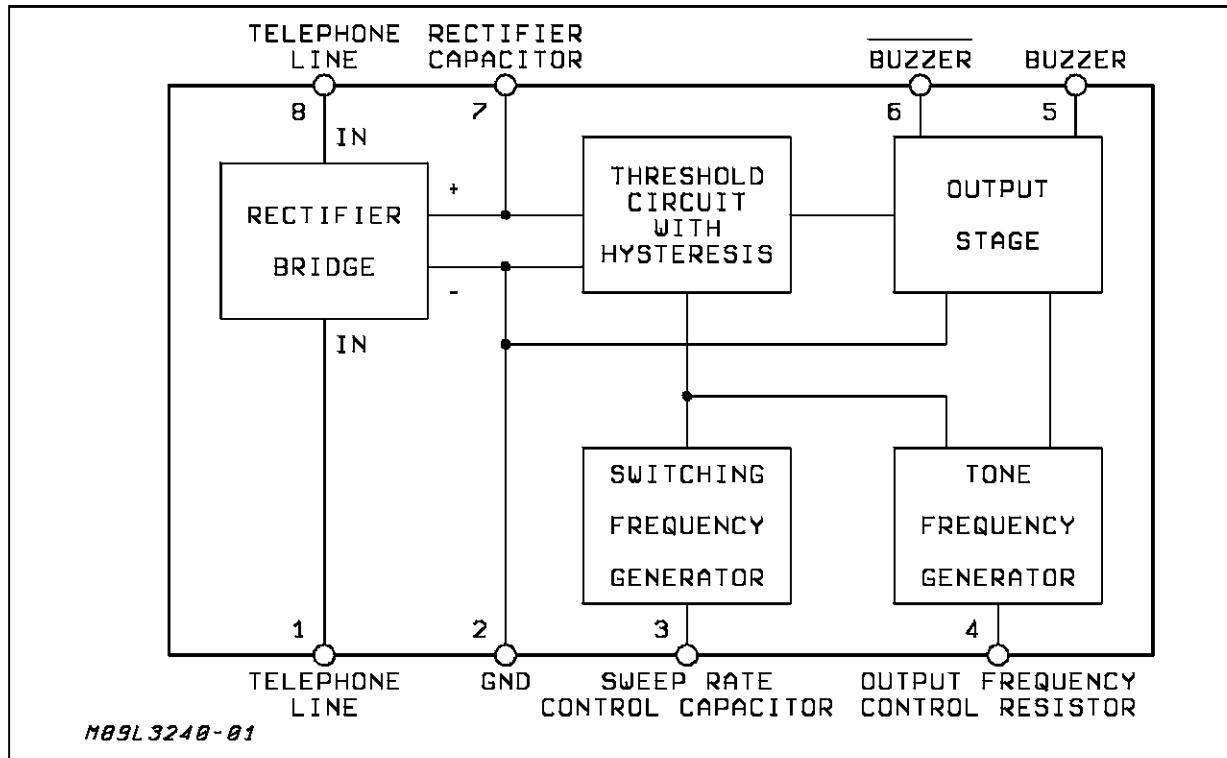
The output bridge configuration allows to use a high impedance transducer with acoustical results much better than in a single ended configuration.

The two outputs can also be connected independently to different converters or actuators (acoustical, opto, logic).

**PIN CONNECTION ( top view )**



**BLOCK DIAGRAM**



**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 N/10s OFF	200	$V_{RMS}$
DC	Supply Current	30	mA
$T_{op}$	Operating Temperature	- 20, + 70	$^{\circ}C$
$T_{stg}$	Storage and Junction Temperature	- 65, + 150	$^{\circ}C$

**THERMAL DATA**

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

**ELECTRICAL CHARACTERISTICS**

( $T_{amb} = 25^{\circ}C$  ;  $V_S =$  applied between pins 7-2 ; 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)	$V_{8-1} = 16.5$ to $29.5$ V		1.5	1.8	mA
$V_{ON}$	Activation Voltage		12		13.5	V
$V_{OFF}$	Sustaining Voltage		7.8		9.3	V
$R_D$	Differential Resistance in OFF Condition (Pins 8-1)		6.4			k $\Omega$
$V_{OUT}$	Output Voltage Swing			$V_S - 5$		V
$I_{OUT}$	Short Circuit Current (pins 5-6)	$V_S = 20$ V		35		mA
$V_S$	Voltage Drop between Pins 8-1 and Pins 7-2			3		V

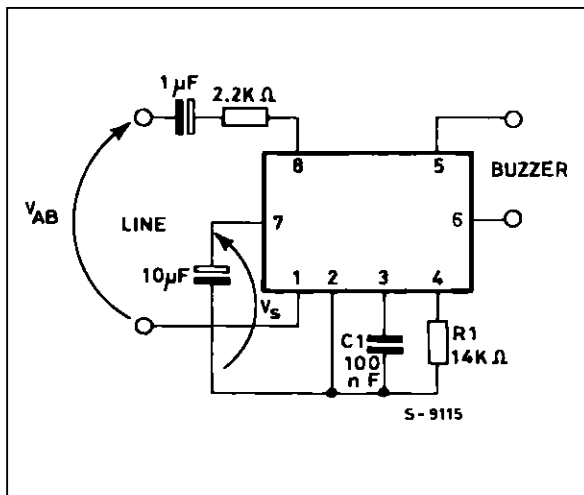
**ELECTRICAL CHARACTERISTICS**

( $T_{amb} = 25^{\circ}C$  ;  $V_s$  = applied between pins 7-2 ; otherwise specified)

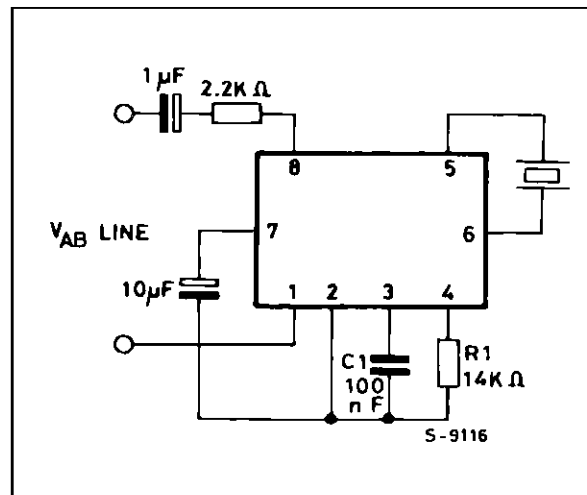
**AC OPERATION**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
	Output Frequencies	$V_s = 26 V, R_1 = 14 K\Omega$				kHz
	Fout 1	$V_s = 0 V$	2,29		2,8	
	Fout 2	$V_s = 6 V$	1.6		2.1	
	Fout 1		1.33		1.43	
	Fout 2					
	Programming Resistor Range		8		56	k $\Omega$
	Sweep Frequency	$R_1 = 14k\Omega, C_1 = 100nF$	5.25	7,5	9.75	Hz

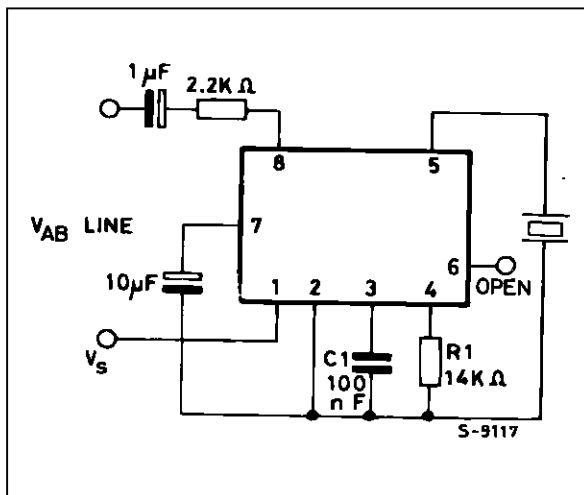
**Figure 1 :** Test Circuit.



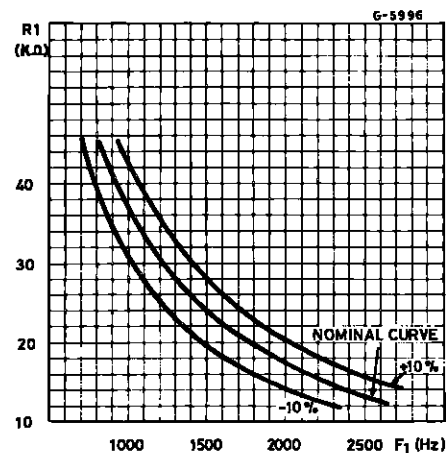
**Figure 2 :** Typical Application with Balanced Output.



**Figure 3 :** Application Compatible with LS1240 (single ended output).



**Figure 4 :**  $F_1$  Out vs.  $R_1$ .



$$R_1 \approx \frac{3.56 \times 10^4}{F_1 \text{ (HZ)}} \times \left( 1 - 0.12 \times \ln \frac{F_1}{2543} \right)$$

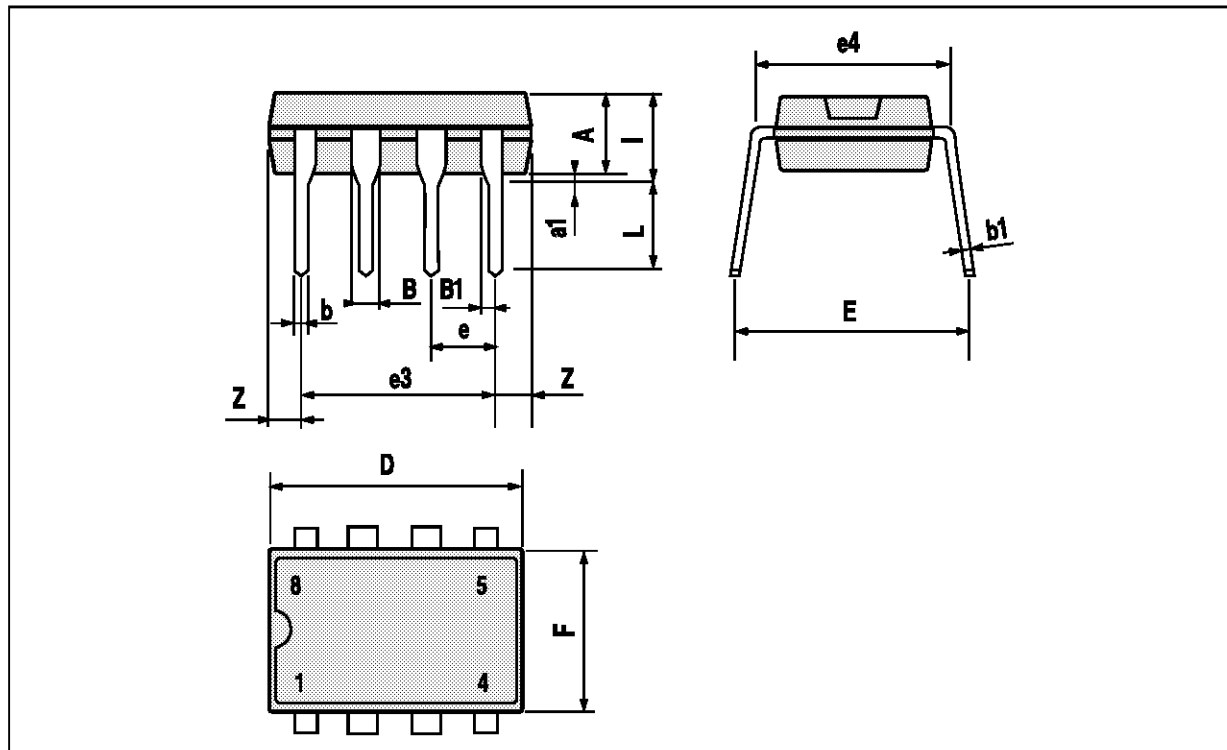
$$f_2 = 0.725 f_1$$

$$f_{SWEEP} = \frac{750}{C_1 \text{ (nF)}}$$

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

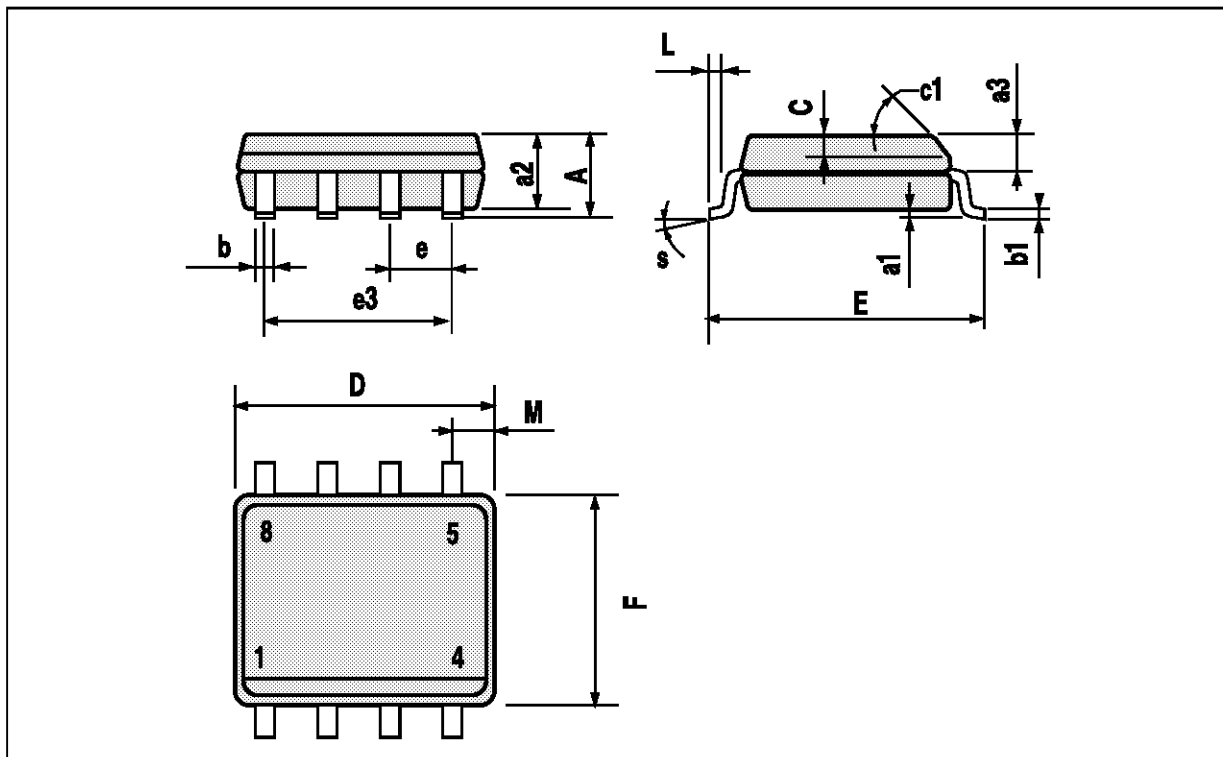
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## SO8 PACKAGE MECHANICAL DATA

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	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	3.8		4.0	0.150		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max.)					

SO8-TBL



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