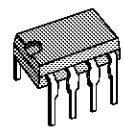
SGS-THOMSON MICROELECTRONICS

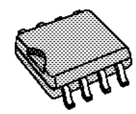
# L3240

## ELETRONIC 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



Minidip



SO8

**ORDERING NUMBERS :** L3240B1 (Minidip)
L3240D1 (SO8)

### DESCRIPTION

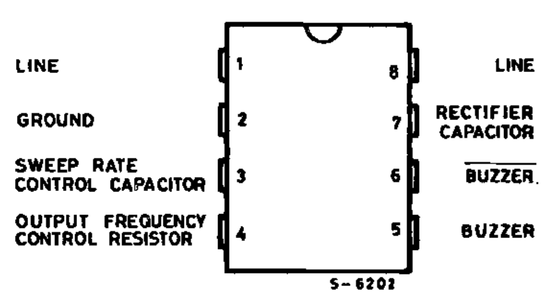
L3240 is a monolithic integrated circuit designed to replace the mechanical bell in telephone sets, in connection with an electro acoustical converter. The device can drive either directly a piezo ceramic converter (buzzer) or a small loudspeaker. In this case a transformer is needed. The two tone frequencies 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.

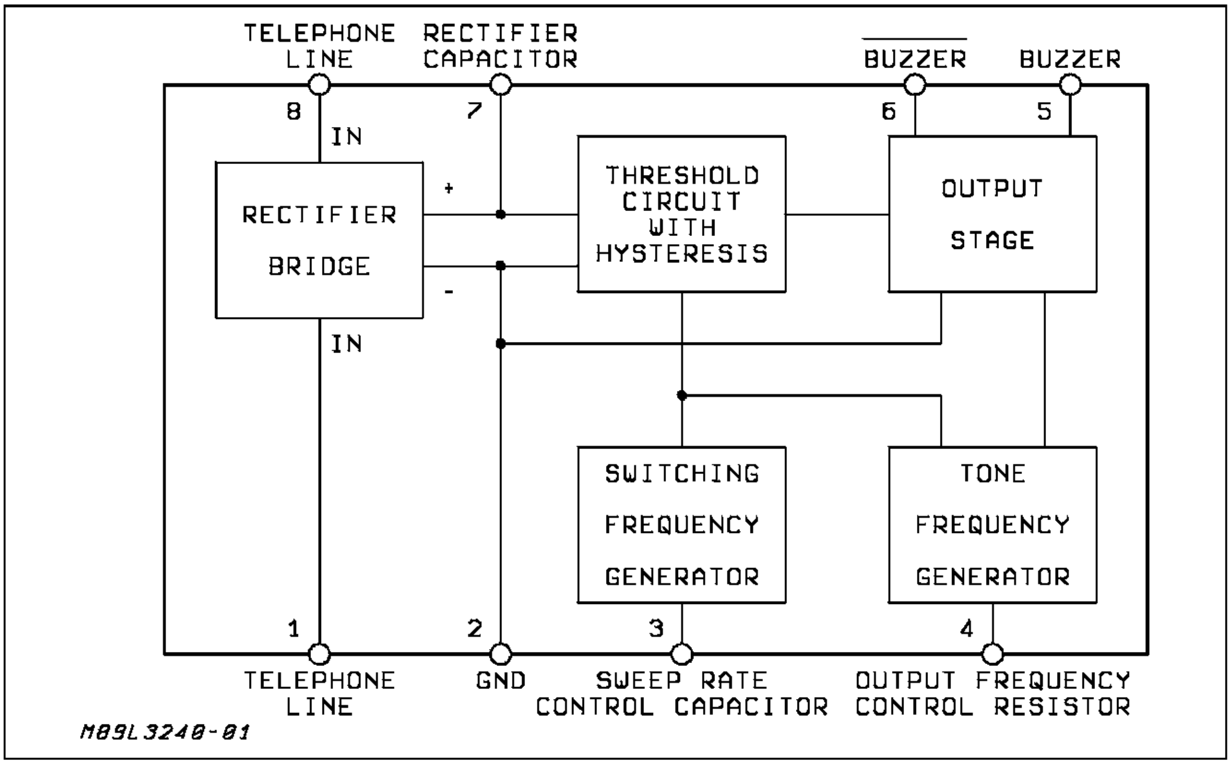
The output bridge configuration allows to use a high impedance transducer with acoustical results much better than in a single ended configuration.

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 | $^oC$ |
| $T_{stg}$ | Storage and Junction Temperature | – 65, + 150 | $^oC$ |

## THERMAL DATA

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

## ELECTRICAL CHARACTERISTICS
($T_{amb}$ = 25$^o$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 | | | kΩ |
| $V_{OUT}$ | 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°C ; $V_S$ = applied between pins 7-2 ;otherwise specified)
AC OPERATION

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| | Output Frequencies<br>Fout 1<br>Fout 2 | $V_s$ = 26 V, $R_1$ = 14 KΩ<br>$V_s$ = 0 V<br>$V_s$ = 6 V | <br>2,29<br>1.6 | | <br>2,8<br>2.1 | kHz |
| | $\frac{\text{Fout 1}}{\text{Fout 2}}$ | | 1.33 | | 1.43 | |
| | Programming Resistor Range | | 8 | | 56 | kΩ |
| | Sweep Frequency | $R_1$ = 14kΩ, C1 =100nF | 5.25 | 7,5 | 9.75 | Hz |

**Figure 1** : Test Circuit.

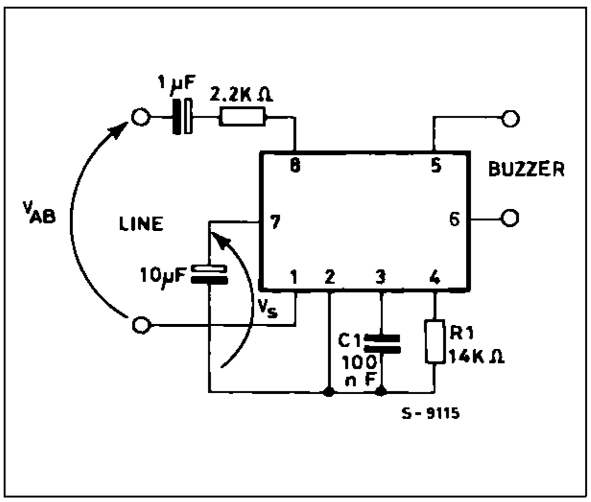



**Figure 2** : Typical Application with Balanced Output.

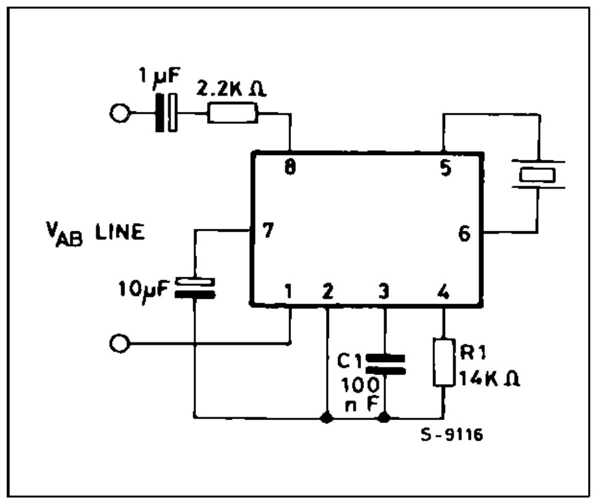



**Figure 3** : Application Compatible with LS1240 (single ended output).

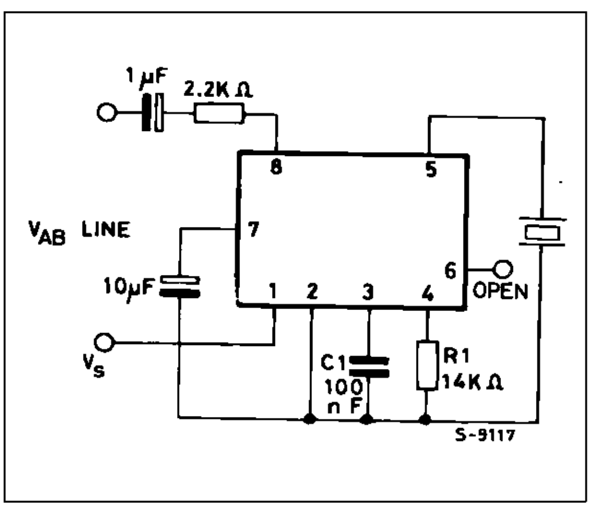
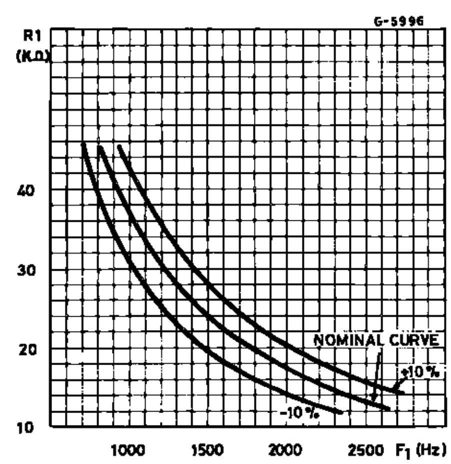



**Figure 4** : $F_1$ Out vs. $R_1$.




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

$$f_2 = 0.725\, f_1$$

$$f_{SWEEP} = \frac{750}{C1\,(nF)}$$

## 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 | | | 0260 |
| i | | | 5.08 | | | 0.200 |
| L | 3.18 | | 3.81 | 0.125 | | 0.150 |
| Z | | | 1.52 | | | 0.060 |

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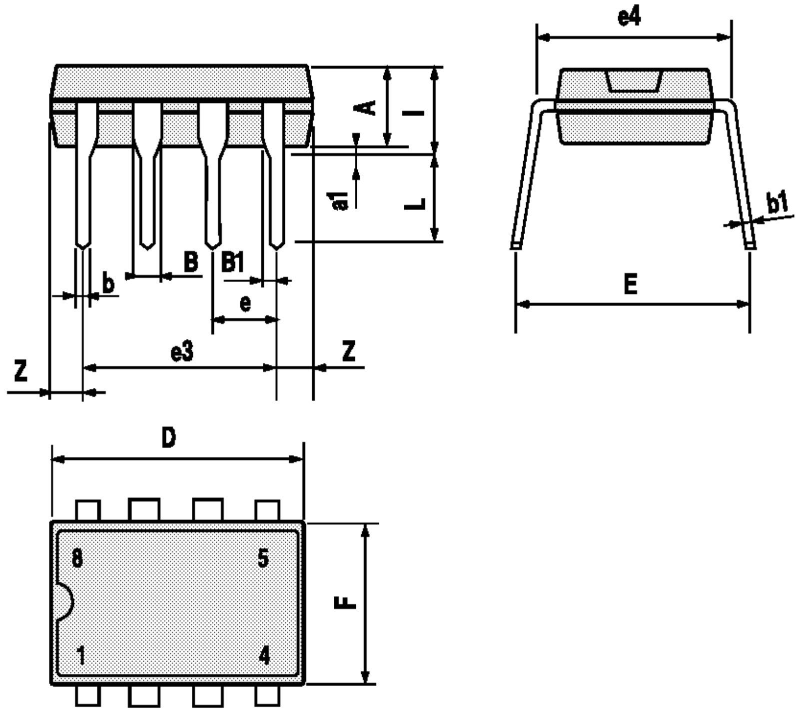

## SO8 PACKAGE MECHANICAL DATA

| 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 | $45^{o}$ (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 | $8^{o}$ (max.) | | | | | |

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