



## 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

### DESCRIPTION

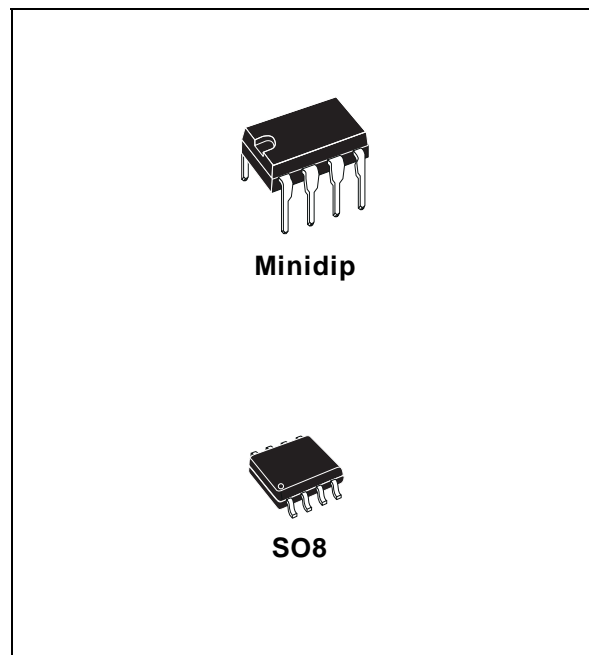
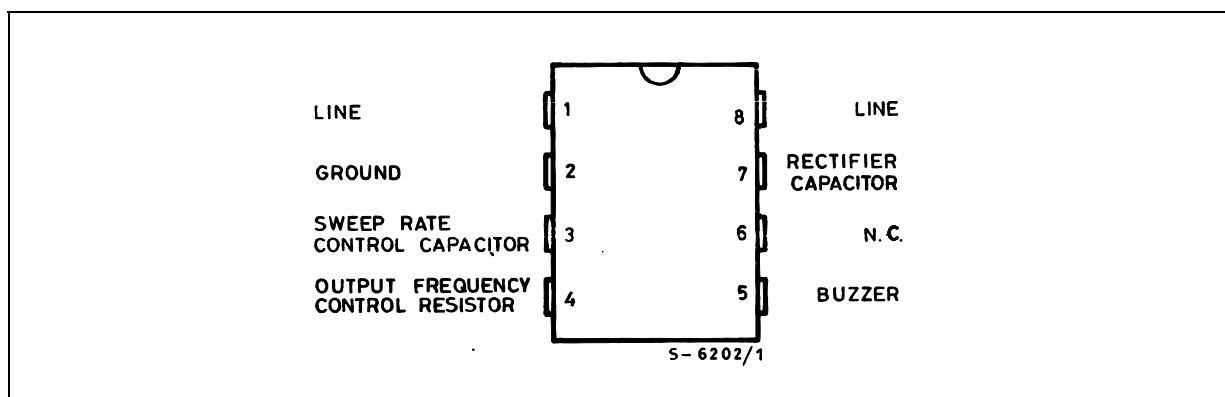
LS1240A is a monolithic integrated circuit designed to replace the mechanical bell in telephone sets in connection with an electro-acoustical converter. It can drive directly a piezoceramic converter (buzzer) or a dynamic loudspeaker.

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  $\Omega$  is advised, 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.

### PIN CONNECTION (top view)



### 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.

BLOCK DIAGRAM

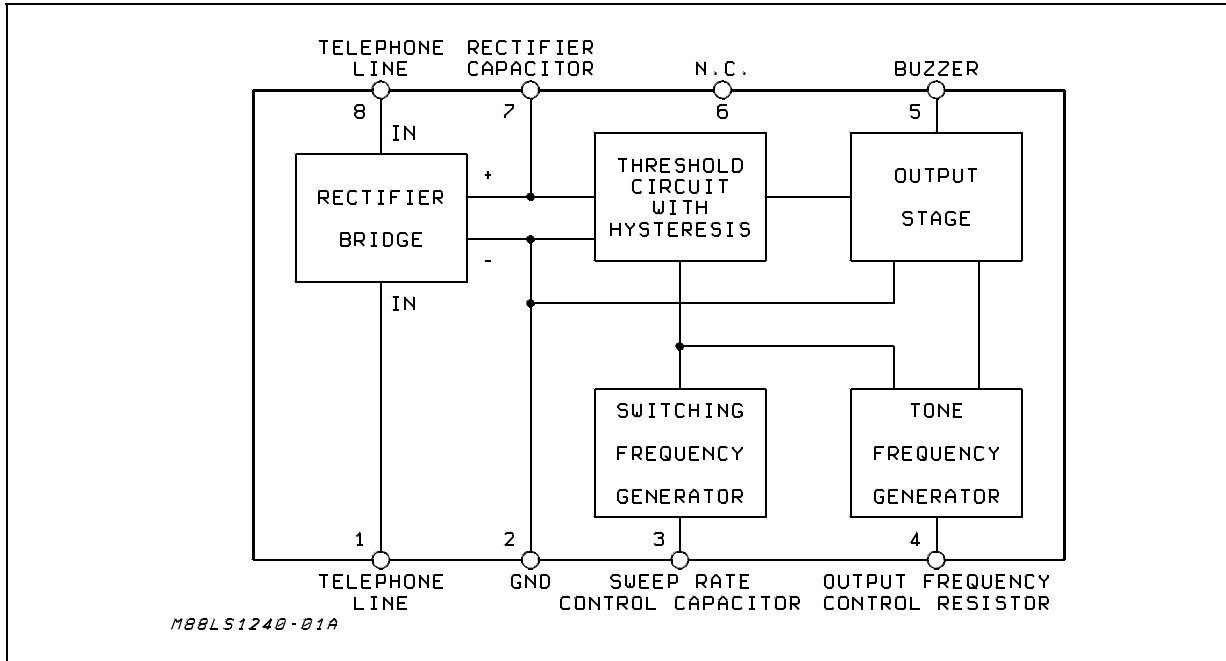
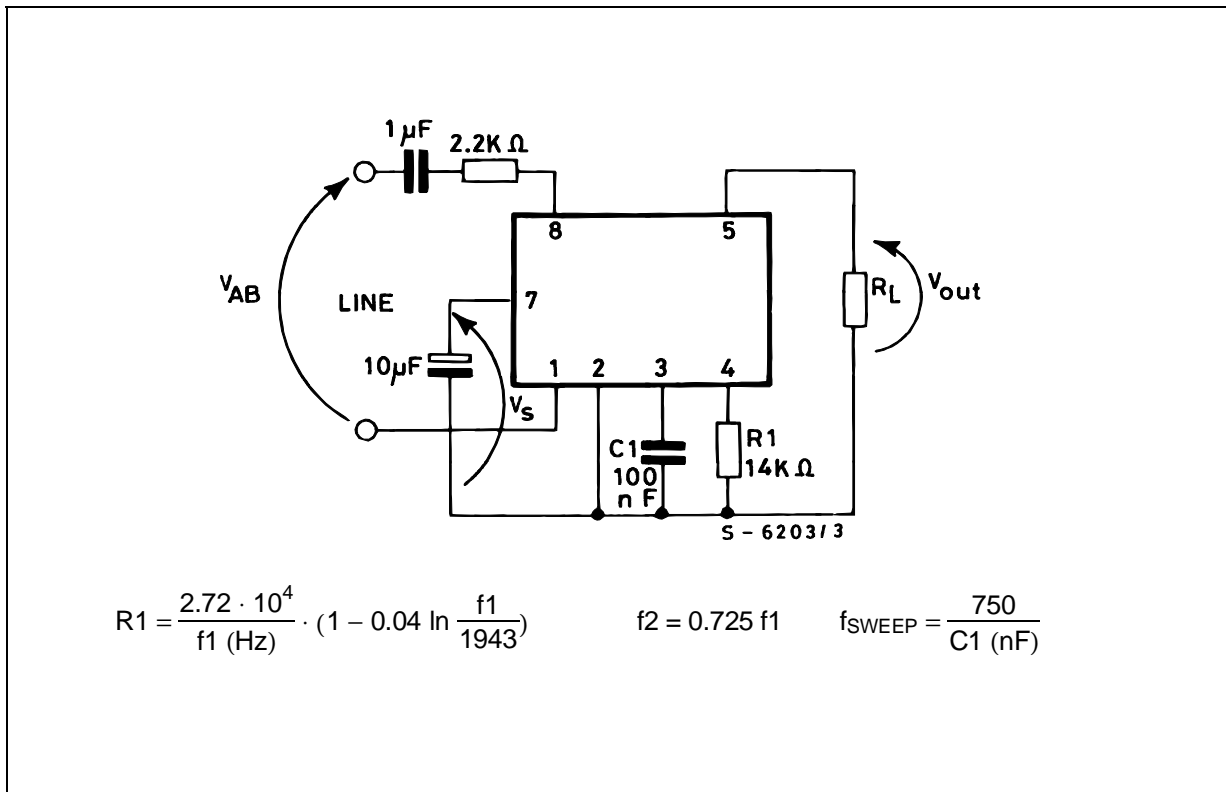


Figure 1 : Test Circuit.



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>AB</sub>	Calling Voltage (f = 50 Hz) Continuous	120	V <sub>rms</sub>
V <sub>AB</sub>	Calling Voltage (f = 50 Hz) 5s ON/10s OFF	200	V <sub>rms</sub>
DC	Supply Current	30	mA
T <sub>op</sub>	Operating Temperature	- 40 to + 70	°C
T <sub>stg</sub>	Storage and Junction Temperature	- 65 to + 150	°C

**THERMAL DATA**

Symbol	Parameter	Value	Unit
R <sub>th j-amb</sub>	Thermal Resistance Junction-ambient Max	100	°C/W

**ELECTRICAL CHARACTERISTICS**(T<sub>amb</sub> = 25 °C; V<sub>s</sub> = applied between pins 7-2 unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>s</sub>	Supply Voltage				26	V
I <sub>B</sub>	Current Consumption without Load (pins 8-1)	V <sub>8-1</sub> = 9.3 to 25 V		1.5	1.8	mA
V <sub>ON</sub>	Activation Voltage		12.2		13.2	V
V <sub>OFF</sub>	Sustaining Voltage		8		9	V
R <sub>D</sub>	Differential Resistance in OFF Condition (pins 8-1)		6.4			kΩ
V <sub>OUT</sub>	Output Voltage Swing			V <sub>s</sub> - 5		V
I <sub>OUT</sub>	Short Circuit Current (pins 5-2)	V <sub>s</sub> = 20V R <sub>L</sub> = 250Ω		70		mA

**AC OPERATION**

f <sub>1</sub> f <sub>2</sub>	Output Frequencies f <sub>out1</sub> f <sub>out2</sub>	V <sub>s</sub> = 26V, R <sub>1</sub> = 14kΩ V <sub>s</sub> = 0 V V <sub>s</sub> = 6V	1.74 1.22		2.14 1.6	kHz
	f <sub>OUT1</sub> f <sub>OUT2</sub>		1.33		1.43	
	Programming Resistor Range		8		56	kΩ
f <sub>SWEEP</sub>	Sweep Frequency	R <sub>1</sub> = 14kΩ, C <sub>1</sub> = 100nF	5.25	7.5	9.75	Hz

Figure 2 : Typical Application with BUZZER

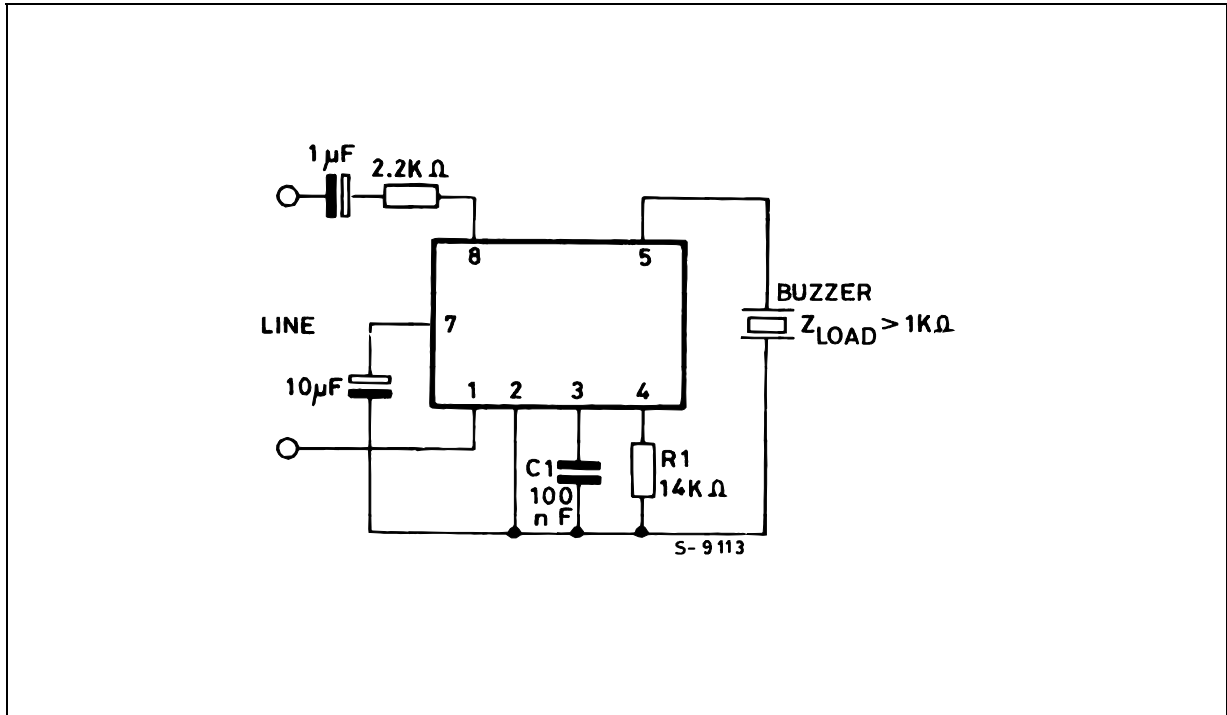
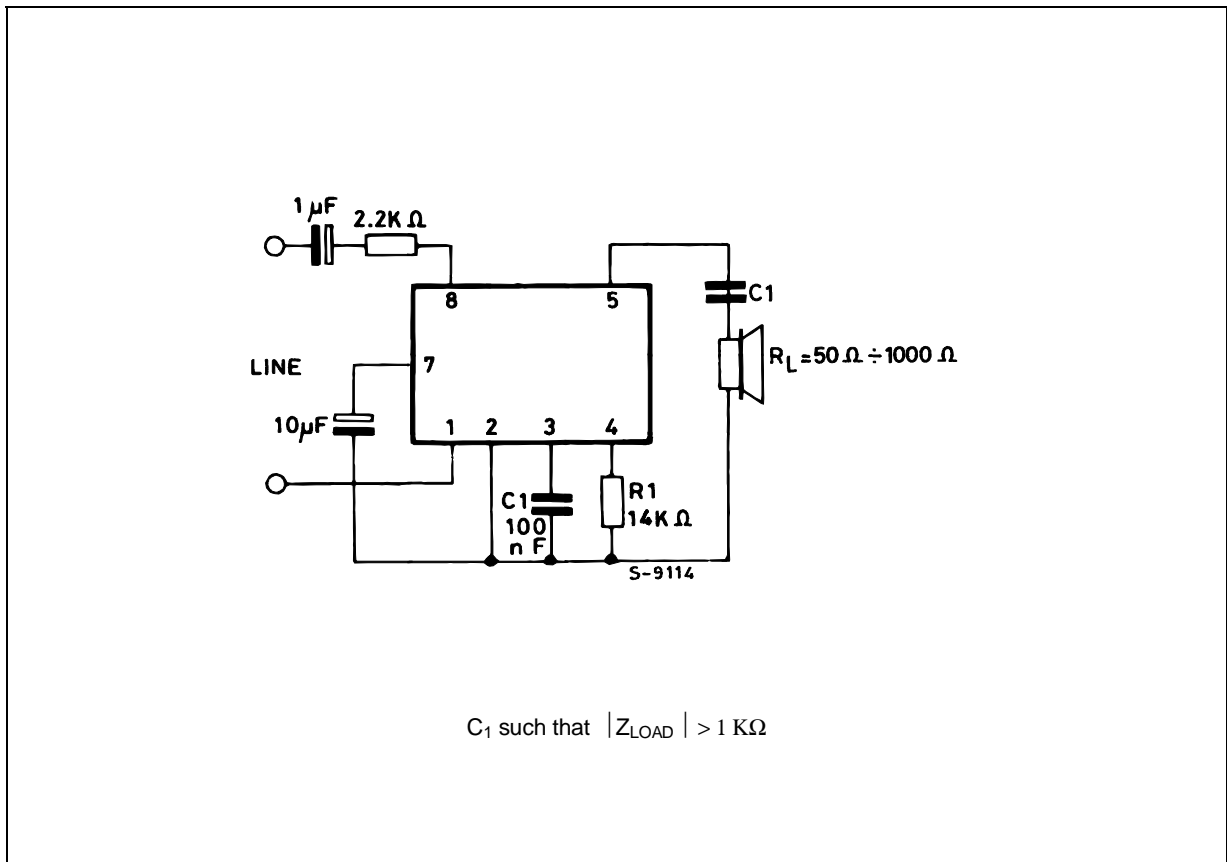
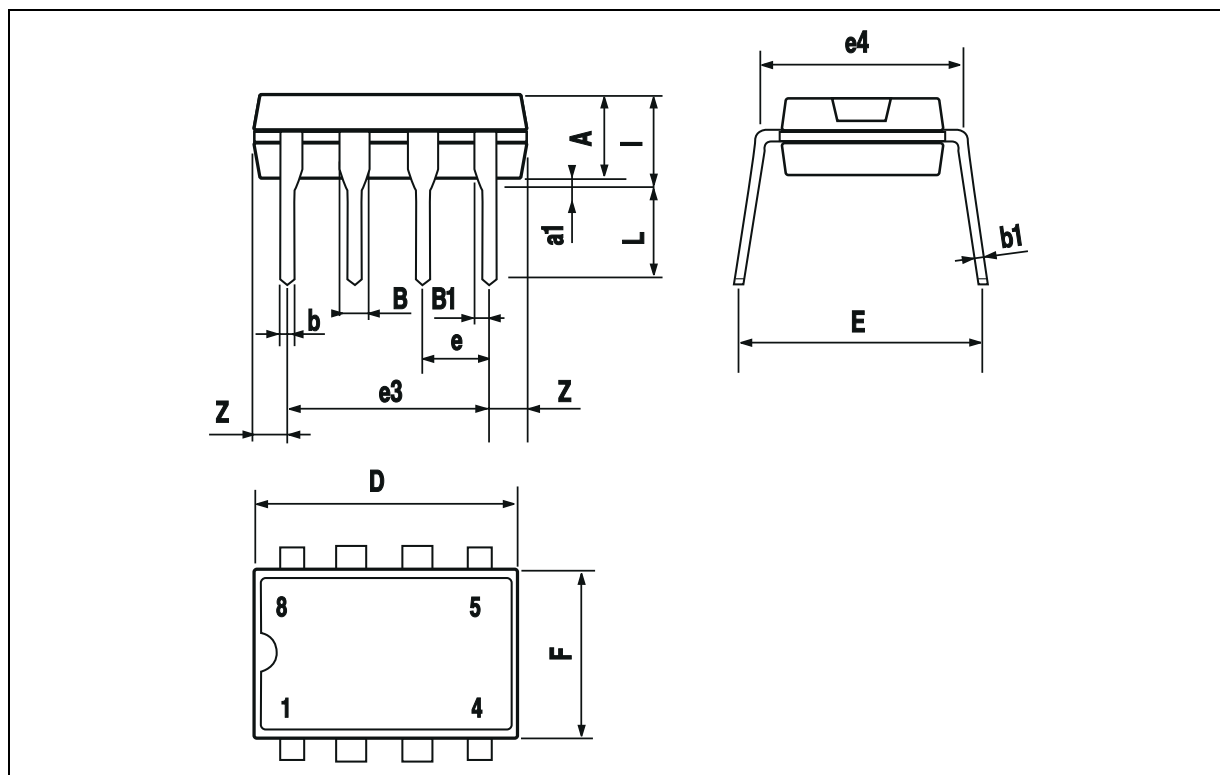


Figure 3 : Typical Application with Loudspeaker (no transformer needed)



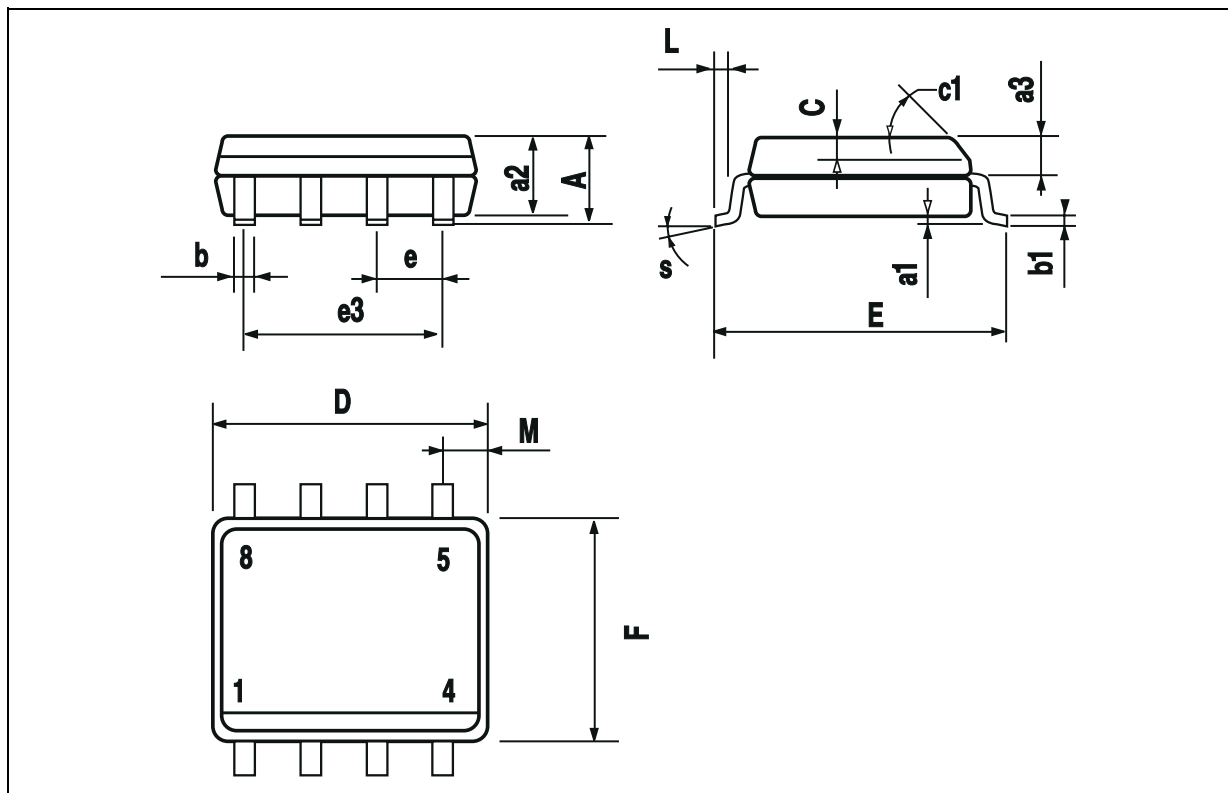
## MINIDIP PACKAGE MECHANICAL DATA

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
l			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.)					



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