

AUTOMOTIVE AND HOUSEHOLD SECURITY SIREN DRIVER

ZSD100

ISSUE 5 – AUGUST 1995

INTRODUCTION

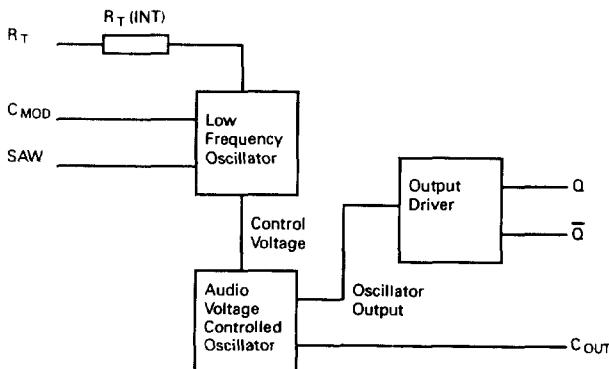
The ZSD100 is a frequency swept alarm signal generator designed specifically for static and automotive security alarm systems. One ZSD100, two timing capacitors, an in-expensive TO92 darlington, piezo transducer and coupling transformer is all that is necessary to produce an ear piercing 120 dB alarm siren.

Including an audio frequency signal generator, low frequency sweep generator, disable circuitry and output driver stages, the ZSD100 provides every function necessary to produce a standard alarm signal. Available in either an 8 pin DIL or SO package the IC gives a low cost compact solution to siren signal generation. The device operates from supplies of 4V up to 18V and is ideal for security alarms in battery powered applications, burglar alarms and automotive anti theft systems.

FEATURES

- 4-18V Operating voltage range.
- Small external component count.
- Direct drive of darlington, mosfet and IGBT output stages.
- Single ended or push-pull output stages.
- Suitable for automotive and static alarm systems.
- Low supply current - 10mA operating - 1µA sleep mode
- Low cost 8 pin DIL & SO packages.
- User selected audio and sweep frequencies.
- -40°C to 125°C operating temperature range.
- Choice of modulation waveform.

SCHEMATIC DIAGRAM



CONNECTION TABLE

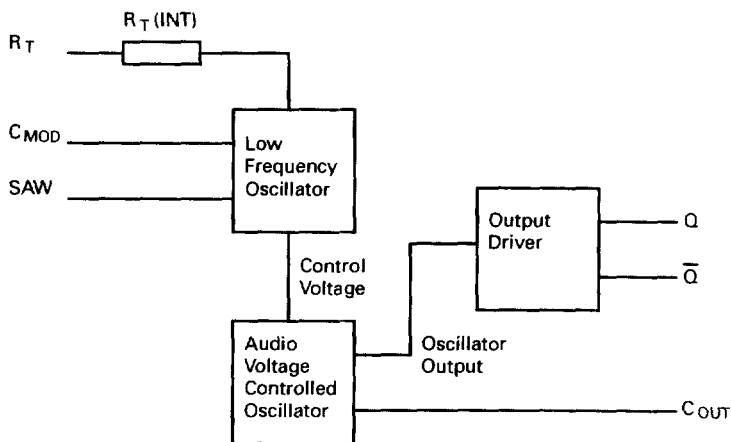
Pin	SO8	DIL8
1	R _T	R _T
2	SAW	SAW
3	C _{MOD}	C _{MOD}
4	GND	GND
5	C _{OUT}	C _{OUT}
6	Q	Q
7	\bar{Q}	\bar{Q}
8	V _{CC}	V _{CC}
Pack	N8	D8

see Diagrams Page 5 - 3

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FUNCTIONAL DESCRIPTION

The audio signal of the ZSD100 is generated using a squarewave oscillator whose output is capable of directly driving a wide range of output circuits. To produce a characteristic alarm siren sound, the frequency of the audio oscillator is swept over a fixed 2:1 range by a second, low frequency oscillator. The frequencies of both oscillators are controlled by $R_T(INT)$ and capacitors C_{MOD} and C_{OUT} .



PIN DESCRIPTIONS

1. R_T Optional external resistor for improved frequency control. An external resistor improves the control of both the modulating and output oscillators. The R_T pin is also used to power the device down. Either connecting R_T to V_{CC} or an open circuit will result in the device being disabled.
2. SAW Selection of modulation waveform is made using the SAW pin. An open circuit produces a triangle wave, sawtooth is achieved by connecting SAW to the C_{MOD} pin.
3. C_{MOD} An external capacitor is used to program the low frequency modulating oscillator. The value of C_{MOD} recommended is between $0.1\mu F$ and $100\mu F$.
4. GND
5. C_{OUT} An external capacitor is used to program the output oscillator. The value of C_{OUT} recommended is between $1nF$ and $100nF$.
6. Q Non inverted output driver
7. \bar{Q} Inverted output driver
8. V_{CC}

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ABSOLUTE MAXIMUM RATING

V_{CC}	-0.5V to +20V
Operating Temperature	-40 to 125°C
Storage Temperature	-65 to 150°C

Power Dissipation ($T_{amb}=25^{\circ}\text{C}$)

SO8	625mW
DIL8	625mW

ELECTRICAL CHARACTERISTICS

TEST CONDITIONS (Unless otherwise stated): $T_{amb}=25^{\circ}\text{C}$, $V_{CC}=12\text{V}$

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	CONDITIONS.
Supply Voltage Operating Range	V_{CC}	4V		18V	
Supply Current Disabled	I_{CC}			1 μA	R_T O/C, $V_{CC}=18\text{V}$ R_T , Q, \bar{Q} at Gnd, $V_{CC}=18\text{V}$
Supply Current Enabled				25mA	
Modulating Oscillator Frequency Range	F_{MOD}	0.1Hz		10Hz	$V_{CC}=4$ to 18V
Modulating Oscillator Frequency Value	F_{MOD}	3.3Hz 5.1Hz	4.3Hz 5.5Hz	5.4Hz 5.9Hz	$R_T=0$, $C_{MOD}=10\mu\text{F}$ $R_T=470\text{k}\Omega$, $C_{MOD}=1\mu\text{F}$
See Note 1					
Output Oscillator Frequency Range	F_{OUT}	100Hz		10kHz	$V_{CC}=4$ to 18V
Output Oscillator Centre Frequency (Note 2)	F_{OUT}	1.01kHz	1.26kHz	1.58kHz	$R_T=0$, $C_{OUT}=22\text{nF}$
Output Oscillator Deviation	ΔF_{OUT}		$\pm 33\%$ 49%	55%	
Output Source Current	I_{SOURCE}	5mA			$V_{OUT}=1.4\text{V}$ $V_{OUT}=1.4\text{V}$ $I_{OUT}=100\mu\text{A}$ $I_{SINK}=0.1\mu\text{A}$
Output Sink Current	I_{SINK}	0.5mA			
Output Open Circuit Voltage	$V_{OUT(HIGH)}$ $V_{OUT(LOW)}$	$V_{CC}-1.5\text{V}$		0.5V	
Frequency Control Components					
Internal Resistor	R_T (INT)		61.5k Ω		
External Resistor	R_T (EXT)	0		1M Ω	
Modulation Capacitor	C_{MOD}	0.1 μF		100 μF	
Output Capacitor	C_{OUT}	1nF		100nF	

Note 1.
$$F_{MOD} = \frac{2850}{C_{MOD}(61.5 + R_T(EXT))} \text{ Hz}$$

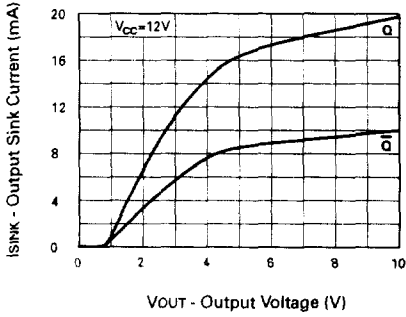
C_{MOD} in μF , R_T (EXT) in k Ω

Note 2.
$$F_{OUT} = \frac{1710}{C_{OUT}(61.5 + R_T(EXT))} \text{ kHz}$$

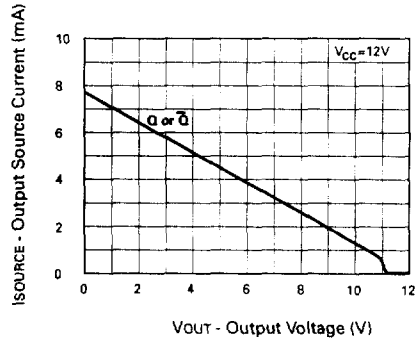
C_{OUT} in μF , R_T (EXT) in k Ω

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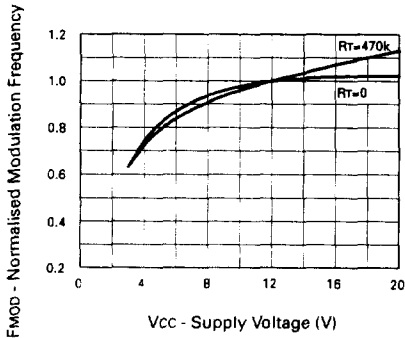
TYPICAL CHARACTERISTICS



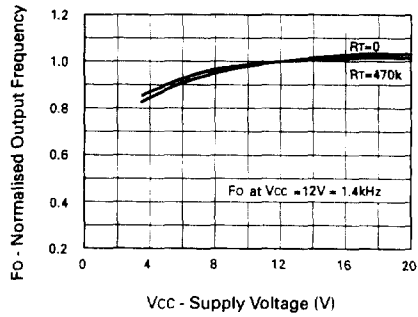
$I_{SINK} \text{ v } V_{OUT}$



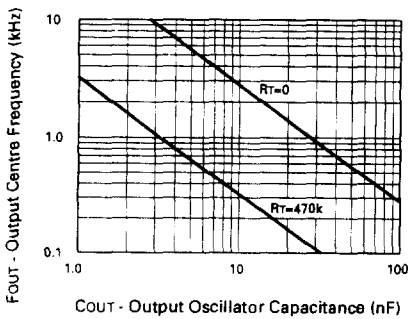
$I_{SOURCE} \text{ v } V_{OUT}$



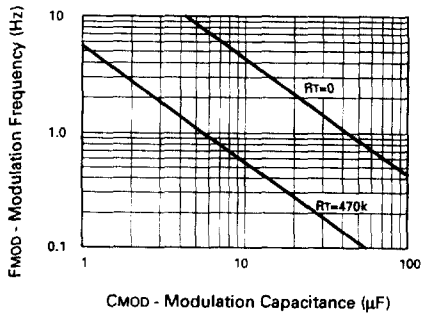
$F_{MOD} \text{ v } V_{CC}$



$F_0 \text{ v } V_{CC}$

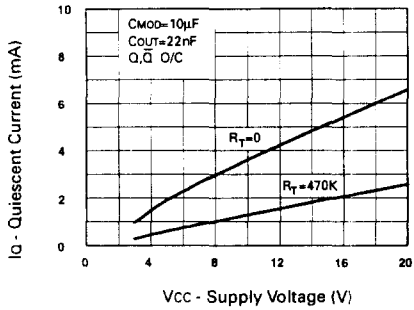


$F_{OUT} \text{ v } C_{OUT}$

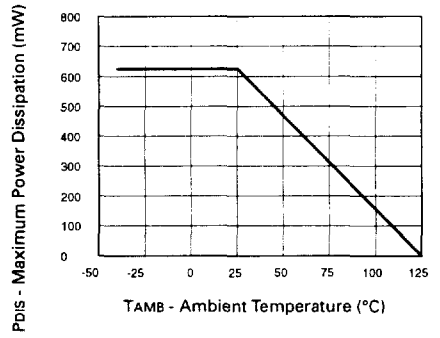


$F_{MOD} \text{ v } C_{MOD}$

TYPICAL CHARACTERISTICS



IQ v VCC

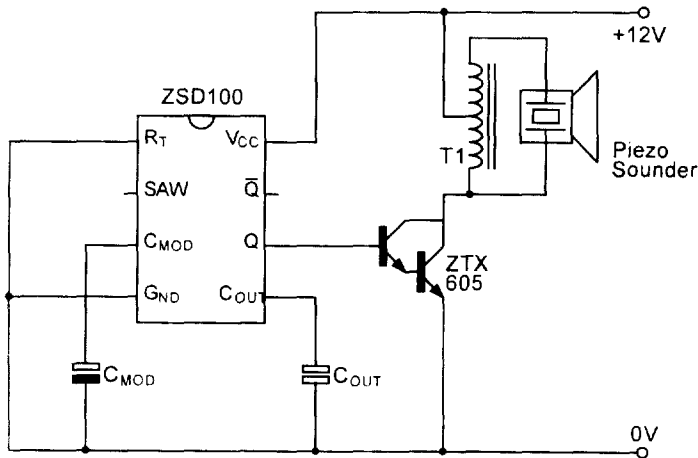


Derating Curve

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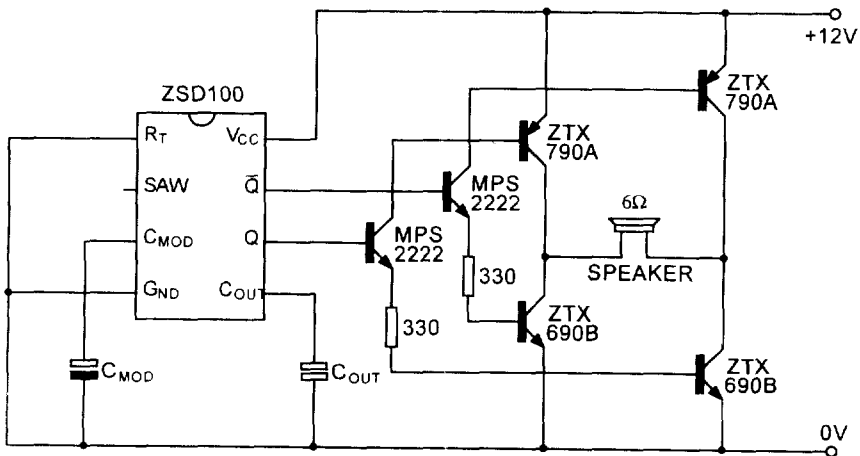
APPLICATIONS CIRCUITS

Piezo Sounder



Utilizing a standard autotransformer driven piezo sounder, this circuit indicates a minimum component count alarm solution. In this configuration a ZTX605 darlington transistor can be connected directly to the output of the IC without the need for base resistors.

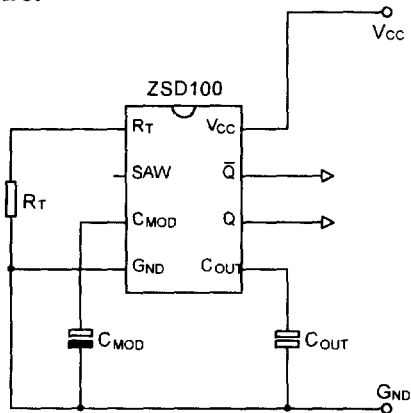
Moving Coil Loudspeaker Sounder



Moving coil loudspeakers are often used for the very highest output automotive alarm sounders. The ZSD100 complementary outputs, with the selection of ZTX790A and ZTX690B transistors, can drive this H bridge output circuit without any additional interface components.

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Improved Frequency Control

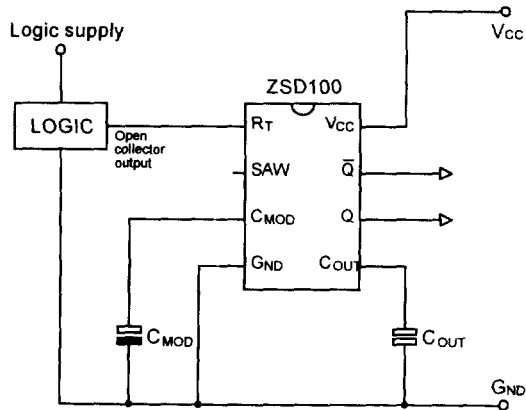


Improved frequency control can be achieved with an external resistor between the R_T pin and GND . An external resistor reduces the value of the timing capacitors required for the selected operating frequency and also reduces the ZSD100's power consumption.

Note: The outputs of the ZSD100 have been designed to avoid cross-conduction in full bridge output circuits. Large value external timing resistors can lead to a small level of cross-conduction. It is recommended that external timing resistors are not used with bridge output circuits.

Remote Switching

If the R_T pin is switched open-circuit, all internal functions of the IC are shut down.



Note: A small leakage current in the open collector logic controller will enable the IC. If such leakage cannot be eliminated, its effect can be easily negated by adding a high value resistor (eg. 100k) between pin R_T and V_{cc} . This resistor will have no effect on frequency control.