

# AUTOMOTIVE AND HOUSEHOLD SECURITY SIREN DRIVER

## ZSD100

ISSUE 6 – JANUARY 1998

### INTRODUCTION

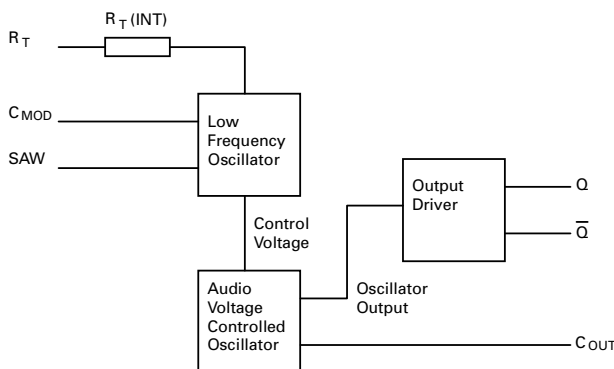
The ZSD100 is a frequency swept alarm signal generator designed specifically for static and automotive security alarm systems. One ZSD100, two timing capacitors, an in-expensive TO92 darlington, piezo transducer and coupling transformer is all that is necessary to produce an ear piercing 120 dB alarm 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  
- 1 $\mu$ A 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.

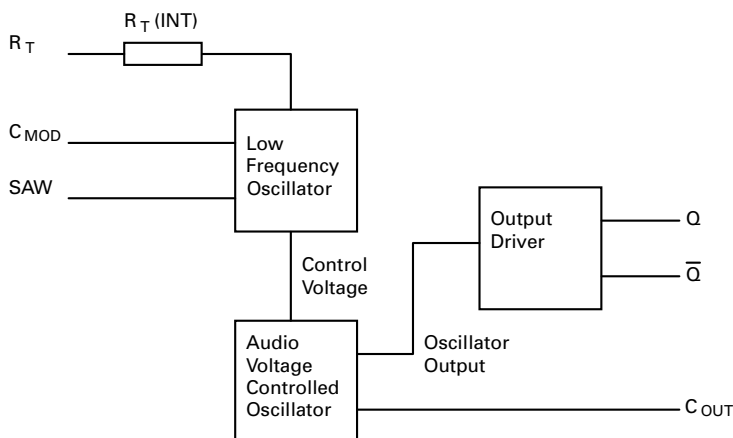
### SCHEMATIC DIAGRAM



# ZSD100

## 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  $R_T(\text{INT})$  and capacitors  $C_{\text{MOD}}$  and  $C_{\text{OUT}}$ .



## 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  $V_{\text{CC}}$  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  $C_{\text{MOD}}$  pin.
3.  $C_{\text{MOD}}$  An external capacitor is used to program the low frequency modulating oscillator. The value of  $C_{\text{MOD}}$  recommended is between  $0.1\mu\text{F}$  and  $100\mu\text{F}$ .
4.  $G_{\text{ND}}$
5.  $C_{\text{OUT}}$  An external capacitor is used to program the output oscillator. The value of  $C_{\text{OUT}}$  recommended is between  $1\text{nF}$  and  $100\text{nF}$ .
6.  $Q$  Non inverted output driver
7.  $\bar{Q}$  Inverted output driver
8.  $V_{\text{CC}}$

# ZSD100

## ABSOLUTE MAXIMUM RATING

|                       |               |
|-----------------------|---------------|
| V <sub>CC</sub>       | -0.5V to +20V |
| Operating Temperature | -40 to 125°C  |
| Storage Temperature   | -65 to 150°C  |

## Power Dissipation (T<sub>amb</sub>=25°C)

|      |       |
|------|-------|
| SO8  | 625mW |
| DIL8 | 625mW |

## ELECTRICAL CHARACTERISTICS

TEST CONDITIONS (Unless otherwise stated): T<sub>amb</sub>=25°C, V<sub>CC</sub>=12V

| PARAMETER  | SYMBOL  | MIN.                                  | TYP.                   | MAX.           | CONDITIONS.   |
|--|---|---------------------------------------|------------------------|----------------|---|
| Supply Voltage Operating Range                                   | V <sub>CC</sub>   | 4V                                    |                        | 18V            |   |
| Supply Current<br>Disabled<br>Enabled                            | I <sub>CC</sub>   |                                       |                        | 1μA<br>25mA    | R <sub>T</sub> O/C, V <sub>CC</sub> =18V<br>R <sub>T</sub> , Q, Q̄ at Gnd, V <sub>CC</sub> =18V         |
| Modulating Oscillator<br>Frequency Range                         | F <sub>MOD</sub>  | 0.1Hz                                 |                        | 10Hz           | V <sub>CC</sub> =4 to 18V   |
| Frequency Value  | F <sub>MOD</sub>  | 3.3Hz<br>5.1Hz                        | 4.3Hz<br>5.5Hz         | 5.4Hz<br>5.9Hz | R <sub>T</sub> =0, C <sub>MOD</sub> =10μF<br>R <sub>T</sub> =470kΩ, C <sub>MOD</sub> =1μF               |
| See Note 1   |   |                                       |                        |                |   |
| Output Oscillator<br>Frequency Range                             | F <sub>OUT</sub>  | 100Hz                                 |                        | 10kHz          | V <sub>CC</sub> =4 to 18V   |
| Centre Frequency (Note 2)<br>Deviation<br>Duty Cycle             | F <sub>OUT</sub><br>ΔF <sub>OUT</sub>   | 1.01kHz                               | 1.26kHz<br>±33%<br>49% | 1.58kHz<br>55% | R <sub>T</sub> =0, C <sub>OUT</sub> =22nF   |
| Output<br>Source Current<br>Sink Current<br>Open Circuit Voltage | I <sub>SOURCE</sub><br>I <sub>SINK</sub><br>V <sub>OUT(HIGH)</sub><br>V <sub>OUT(LOW)</sub> | 5mA<br>0.5mA<br>V <sub>CC</sub> -1.5V |                        | 0.5V           | V <sub>OUT</sub> =1.4V<br>V <sub>OUT</sub> =1.4V<br>I <sub>OUT</sub> =100μA<br>I <sub>SINK</sub> =0.1μA |
| Frequency Control<br>Components                                  |   |                                       |                        |                |   |
| Internal Resistor  | R <sub>T</sub> (INT)  |                                       | 61.5kΩ                 |                |   |
| External Resistor  | R <sub>T</sub> (EXT)  | 0                                     |                        | 1MΩ            |   |
| Modulation Capacitor   | C <sub>MOD</sub>  | 0.1μF                                 |                        | 100μF          |   |
| Output Capacitor   | C <sub>OUT</sub>  | 1nF                                   |                        | 100nF          |   |

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

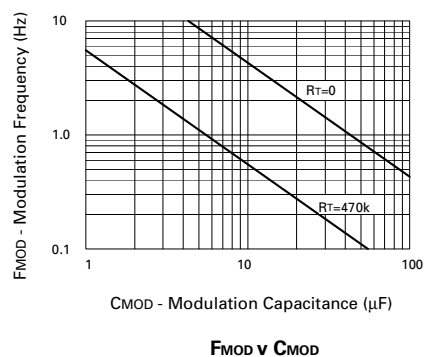
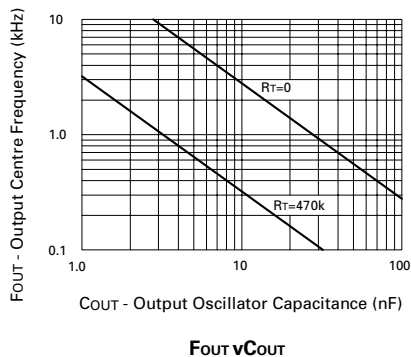
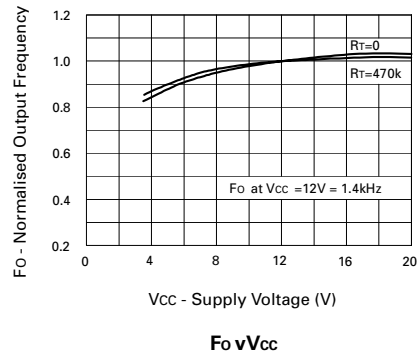
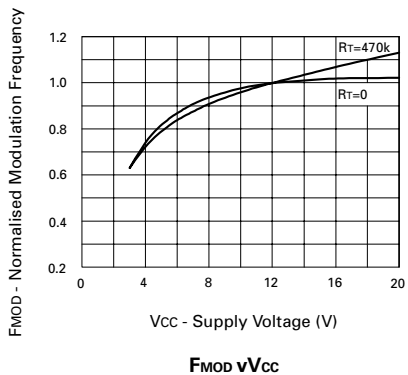
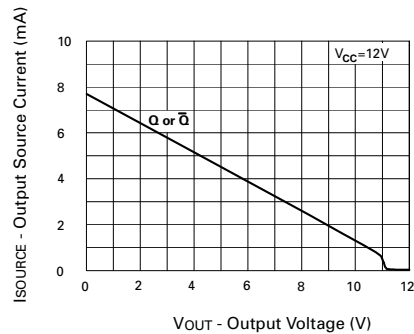
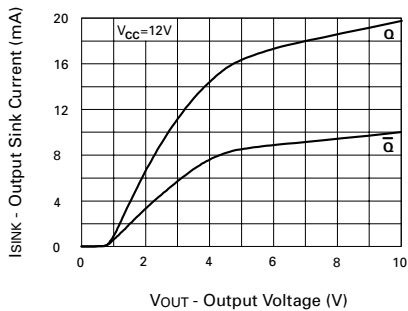
C<sub>MOD</sub> in μF, R<sub>T</sub> (EXT) in kΩ

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

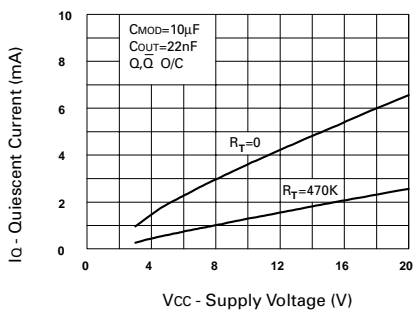
C<sub>OUT</sub> in μF, R<sub>T</sub> (EXT) in kΩ

# ZSD100

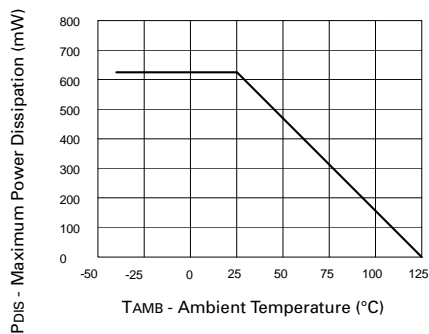
## TYPICAL CHARACTERISTICS



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**IQ v VCC**

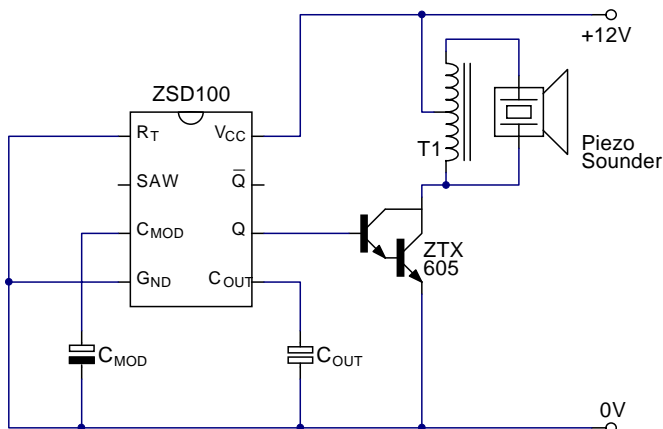


**Derating Curve**

# ZSD100

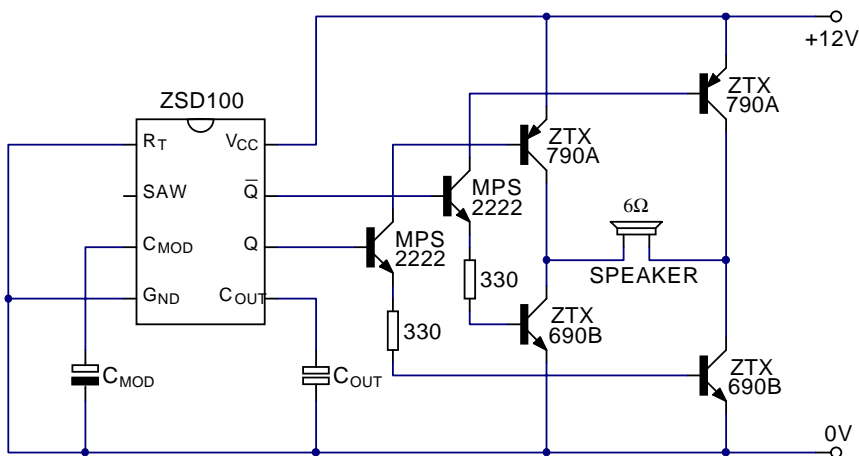
## APPLICATIONS CIRCUITS

### Piezo Sounder



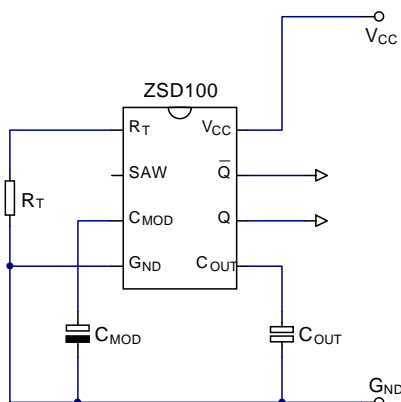
Utilizing a standard autotransformer driven piezo sounder, this circuit indicates a minimum component count alarm solution. In this configuration a ZTX605 darlington transistor can be connected directly to the output of the IC without the need for base resistors.

### 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.

## Improved Frequency Control

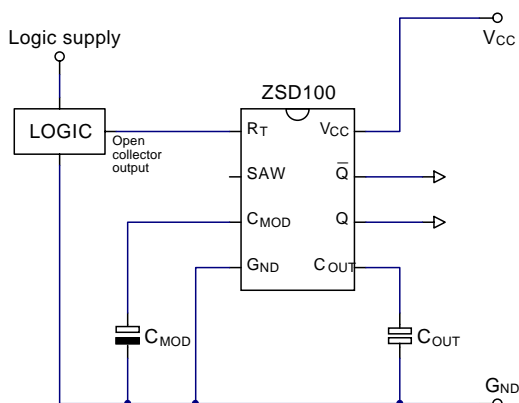


Improved frequency control can be achieved with an external resistor between the  $R_T$  pin and  $GND$ . An external resistor reduces the value of the timing capacitors required for the selected operating frequency and also reduces the ZSD100's power consumption.

**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

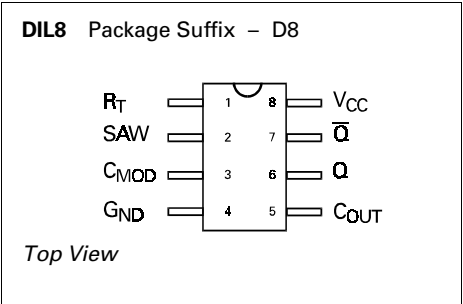
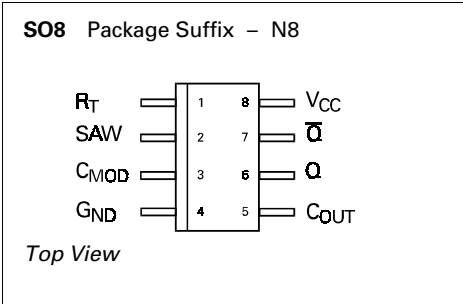
If the  $R_T$  pin is switched open-circuit, all internal functions of the IC are shut down.



**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.

# ZSD100

## CONNECTION DIAGRAMS



## ORDERING INFORMATION

| Part Number | Package | Part Mark |
|-------------|---------|-----------|
| ZSD100D8    | DIL8    | ZSD100    |
| ZSD100N8    | SO8     | ZSD100    |