

INTEGRATED CIRCUITS FOR TELEPHONE APPLICATIONS

SBA5089, SBA5091 Tone Dialler Circuits

These CMOS circuits use an inexpensive crystal reference to provide eight different audio sinusoidal frequencies which are mixed together to provide tones suitable for Dual-Tone Multi-Frequency (DTMF) telephone dialling.

Features

- Minimum external parts count
- High-accuracy tones
- Digital divider logic, resistive ladder network and CMOS operational amplifier on single chip
- Uses inexpensive 3.579 545 MHz TV color burst crystal
- Invalid key entry can result either single tone or no tone
- Chip disable allows any key down output to function from keyboard input without generating tones.

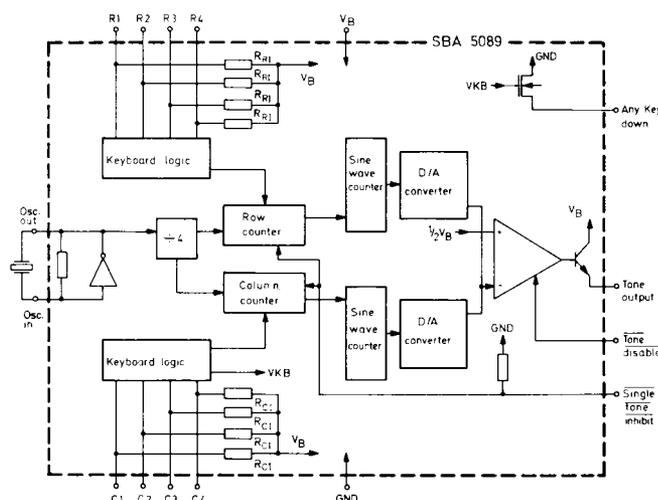
Description

The **SBA5089**, available in a 16-Pin Plastic Package, was designed specifically for integrated tone dialler applications that require the following: fixed supply operation, negative true keyboard input, Chip Disable input, stable output tone level, and Any Key Down output that is open circuit when no keyboard buttons are pushed and pulls to the V_B supply when a button is pushed. Keyboard entries to the SBA5089 cause the selection of the proper divider ratio to obtain the required two audio frequencies from the 3.579 545 MHz reference oscillator.

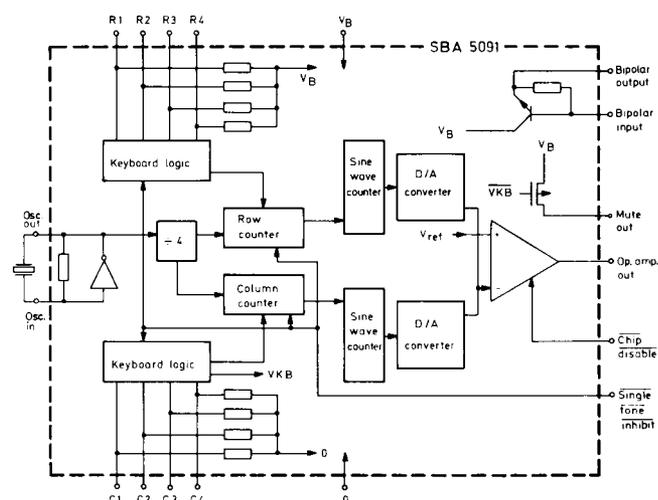
D to A conversion is accomplished on-chip by a conventional R-2R ladder network. The tone output is a stairstep approximation to a sine-wave and requires little filtering for low distortion applications. The same operational amplifier that accomplishes the current to voltage transformation necessary for the D to A converter also mixes the low and high group signals. Frequency stability of this type of tone generation is such that no frequency adjustment is needed to meet standard DTMF specifications.

The **SBA5091**, available in an 18-Pin Plastic Package, differs from the above described SBA5089 in the following:
 Compatibility with European CEPT specifications
 Besides of 2-of-8 keyboards, single-contact keyboards can be used.

The SBA5091 provides two pins which are connected to a bipolar transistor. This transistor is generally used to construct a multi-pole filter for tone filtering of the multiple stairstep output sine wave. Typically, only three resistors and two capacitors are needed to produce sine-waves of sufficient purity to meet the CEPT harmonic distortion specifications.



SBA5089 Block Diagram



SBA5091 Block Diagram

ZSY0,7 Silicon Click Suppressor ((DO-35 Package)

Monolithic integrated analog circuit with symmetric V/I-characteristic for use in voltage limiter circuits, e. g. as click suppressor in telephone sub-sets.

Type	Maximum Ratings			Characteristics at $T_A = 25^\circ\text{C}$					
	Operating Current at $T_A = 25^\circ\text{C}$	Surge Current at $t = 100 \mu\text{s}$	Power Dissipation at $T_A = 25^\circ\text{C}$	Junction Temperature	Forward Voltage Drop at $I_F = 100 \text{ mA}$	Dynamic Resistance at $I_F = 2 \text{ mA}$, $f = 1 \text{ kHz}$	Residual Attenuation at $R_G = R_L = 600 \Omega$, $f = 0.2 \dots 4 \text{ kHz}$ Voltage Level at the Generator		
	$\pm I_F \text{ mA}$	$\pm I_{FSM} \text{ A}$	$P_{tot} \text{ mW}$	$T_J \text{ }^\circ\text{C}$	$ V_F \text{ V}$	$r_F \text{ } \Omega$	D N	D N	D N
ZSY0,7	150	1	300	150	<135	20 (<29)	<0.05	0.05	1.8 (>0.5)