

## 1.3. MULTI-FREQUENCY BUZZERS (SMB)

### 1.3.1. INTRODUCTION

Audible signals are part of our daily lives; for the industry, more sophisticated and distinctive functions are required. The choice of the frequencies is simply done by changing the capacitor value in a C-MOS driven circuit.

Our SMB-series offer the possibility to program several different frequencies. These audible signals with multi-frequency programmability will become an important component that must be considered in every design of equipment, machines, household equipment, computers, communication equipment, control panels, etc.

### 1.3.2. ADVANTAGES & APPLICATIONS

**ADVANTAGES:**

- Low cost
- Solid state reliability
- No EMC
- Very low current consumption
- Panel and PCB mountable
- Free programmable
- Easy integration in existing circuits
- Small dimensions, thin profile

**APPLICATIONS:**

- Cars, busses, trains
- Office equipment
- Telephone equipment
- Toys, games
- Clocks
- Alarms
- Instrumentation
- Control panels
- Medical equipment



### 1.3.3. SPECIFICATIONS

All three multi-frequency buzzers have several peak frequencies producing alerting tones at high frequencies as well as soft signals at low frequencies down to 100 Hz (see the typical application description). The diversity in use of the three models is only limited by your imagination. The current consumption is extremely low and starts at only 100  $\mu$ A with a maximum of only 4.8 mA at maximum 15 Vdc.

Model	Sound pressure level	Frequency ( $\pm 15\%$ ) Hz	Peak frequencies SPL **	Operating voltage	Operating current	Weight
SMB-17CC	see graph	see graph	2250 Hz - 79 dB(A) 1670 Hz - 71 dB(A) 785 Hz - 69 dB(A) 325 Hz - 64 dB(A)	1.5 to 15 Vdc	0.2 to 1.4 mA	2 g
SMB-32CC	see graph	see graph	2250 Hz - 76 dB(A) 1260 Hz - 89 dB(A) 785 Hz - 68 dB(A) 325 Hz - 66 dB(A)	1.5 to 15 Vdc	0.2 to 2.7 mA	8 g
SMB-57CC	see graph	see graph	2260 Hz - 80 dB(A) 1200 Hz - 89 dB(A) 890 Hz - 93 dB(A) 450 Hz - 81 dB(A) 100 Hz - 76 dB(A)	1.5 to 15 Vdc	0.4 to 4.8 mA	26 g

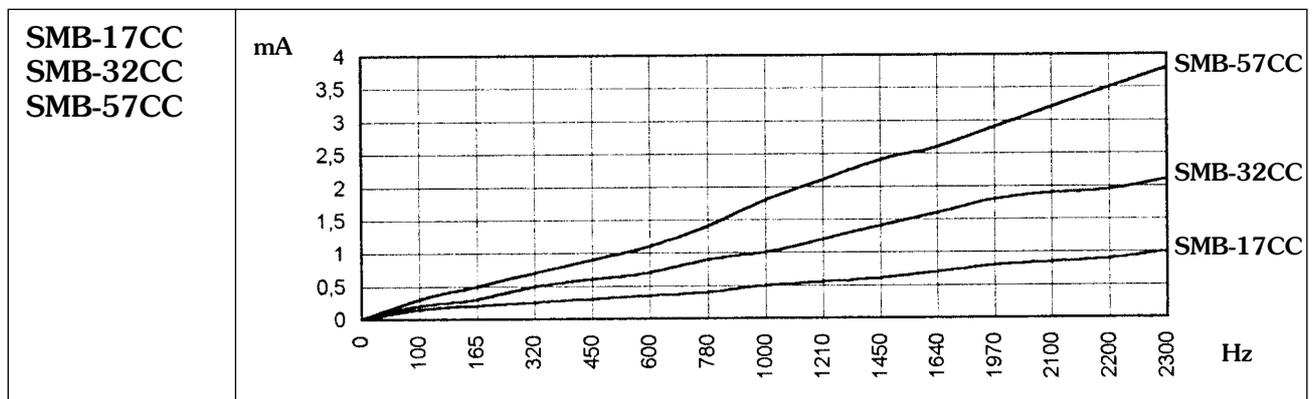
\* The current consumption decreases when the frequency is lowered. See graph 'Current consumption vs. Frequency'.

\*\* The given sound pressure values are measured at 12 Vdc at 30 cm distance in free air and have an accuracy of  $\pm 15\%$ . Default factory setting of the SMB models: continuous tone

Temperature range (stock & in function)	-40°C to +85°C
Life time (at 21°C)	See life time cycle in addendum
Case material	ABS (UL rating: 94 HB) for pin-versions PPS (UL rating: 94 V0/5V) for SMD-versions
Standard colour of case	Black

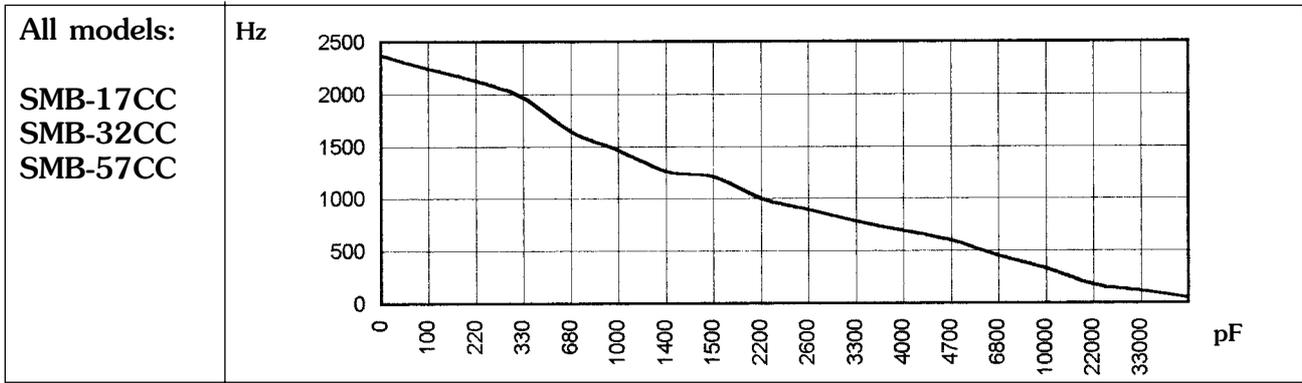
### 1.3.4. ELECTRICAL PARAMETERS

ELECTRICAL PARAMETERS: current consumption vs. frequency

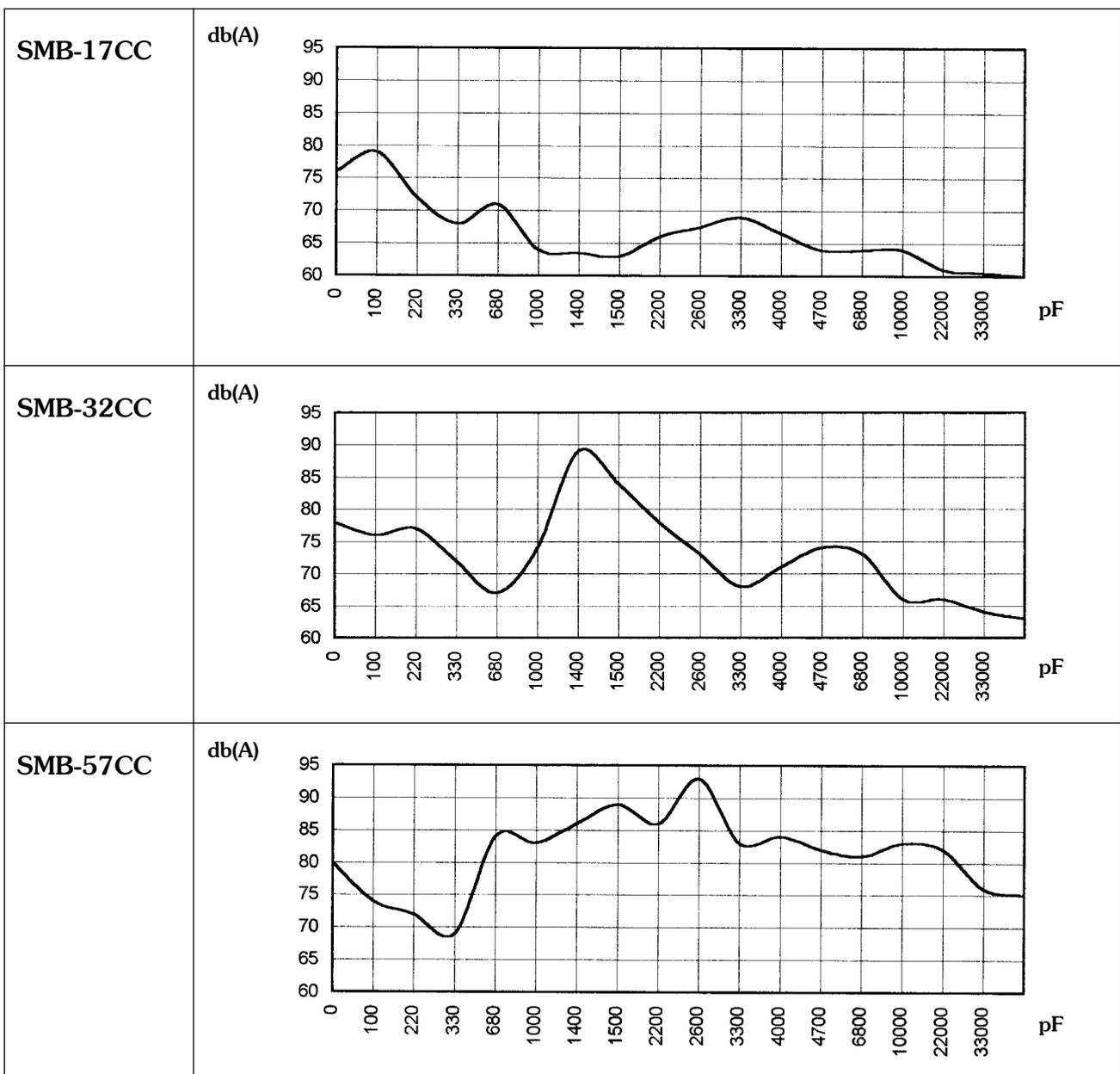


Measurement made at 12 Vdc.

**ELECTRICAL PARAMETERS: frequency vs. external capacitor (c)**

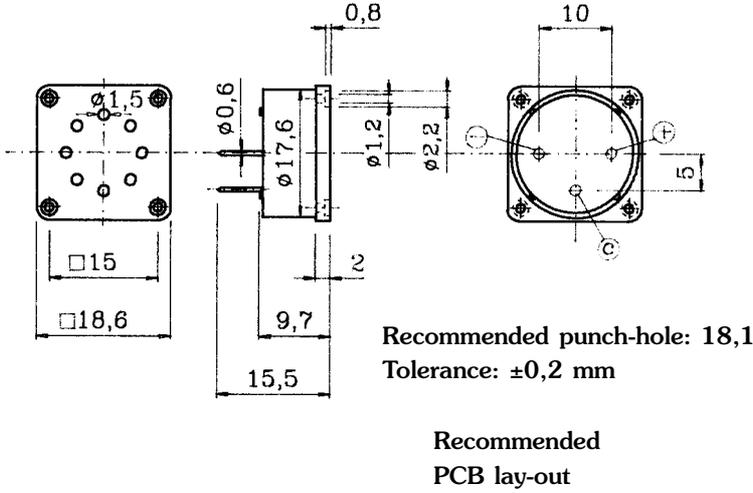
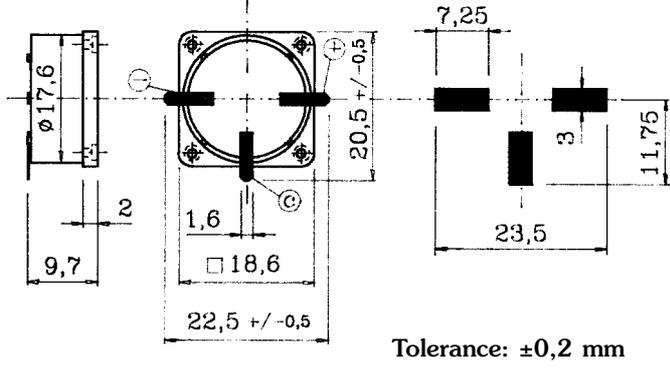
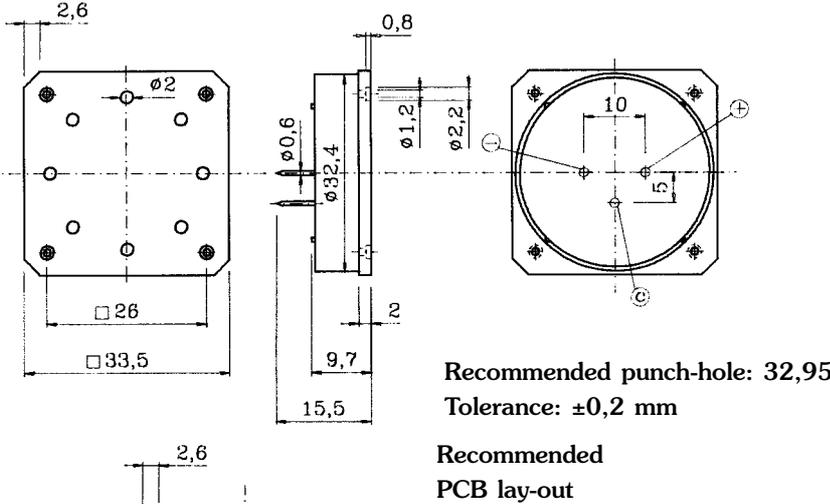
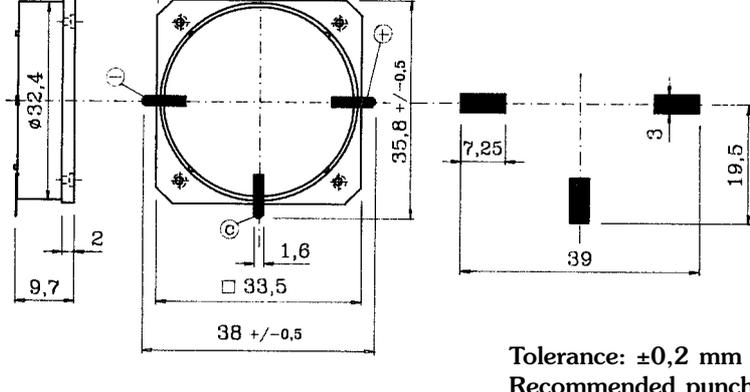


**ELECTRICAL PARAMETERS: sound pressure level vs. external capacitor (c)**



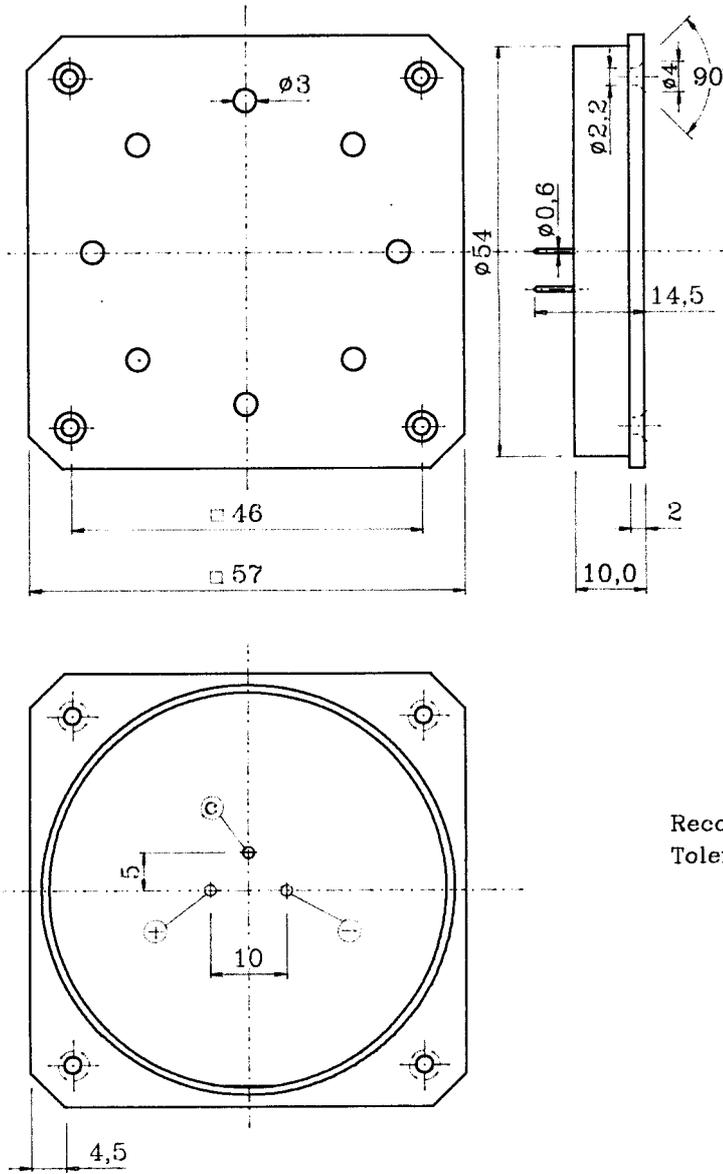
Measurements are made at 12 Vdc at 30 cm in free air at 21°C.

**1.3.5. DIMENSIONS (All dimensions are in mm)**

<p><b>SMB-17CC P10</b></p>	 <p>Recommended punch-hole: 18,1 Tolerance: <math>\pm 0,2</math> mm</p> <p>Recommended PCB lay-out</p>
<p><b>SMB-17CC S</b></p>	 <p>Tolerance: <math>\pm 0,2</math> mm</p>
<p><b>SMB-32CC P10</b></p>	 <p>Recommended punch-hole: 32,95 Tolerance: <math>\pm 0,2</math> mm</p> <p>Recommended PCB lay-out</p>
<p><b>SMB-32CC S</b></p>	 <p>Tolerance: <math>\pm 0,2</math> mm Recommended punch-hole: 32,95</p>

(All dimensions are in mm)

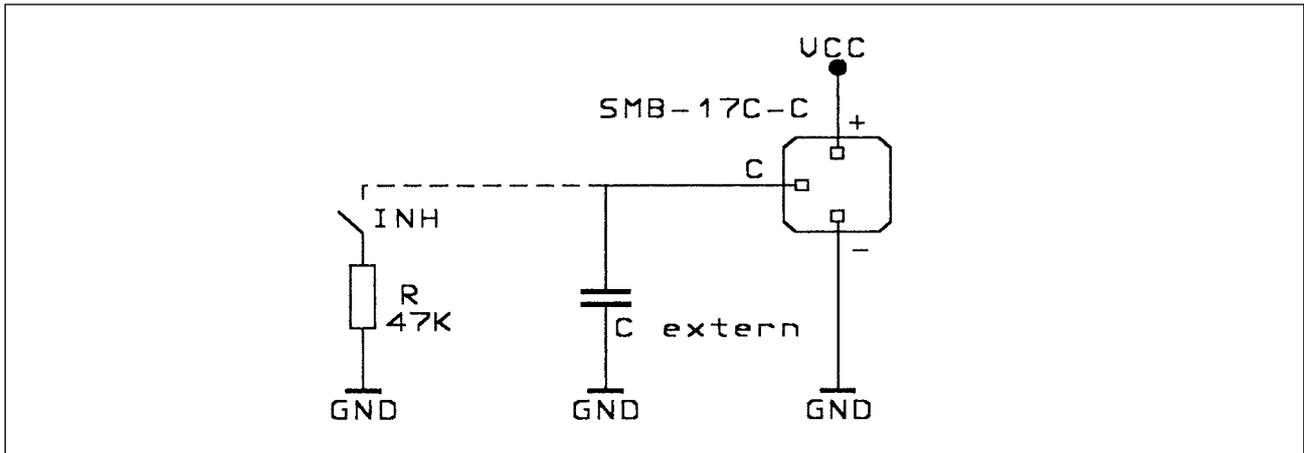
SMB-57CC P10



Recommended punch-hole:  $\phi 55,5$   
Tolerance:  $\pm 0,2$  mm

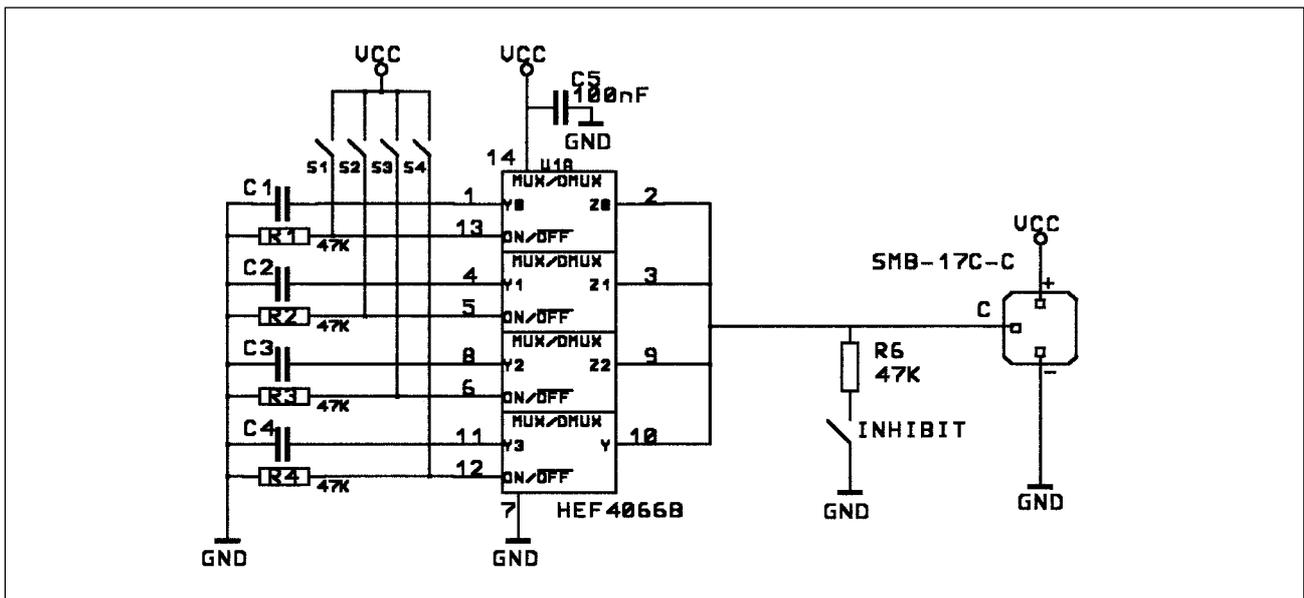
### 1.3.6. WORKING PRINCIPLE

In order to realise different frequencies with the SMB multi-frequency buzzers, the customer simply has to connect a capacitor between the control pin and the ground. It is also possible to disable the SMB, by putting a resistor (47K) to the ground (INHIBIT).



### 1.3.7. TYPICAL APPLICATION DESCRIPTION

With the circuit shown below, 16 possible frequencies can be generated. The values of C1, C2, C3, ... with their respective frequencies are given in the above shown graph 'Frequency vs. external capacitor' (see page 29).



*This typical application description is not limited to the typical components we have illustrated. Many other possibilities exist to select and switch the capacitors and/or the resistor.*

