

## MULTI-APPLICATION SERIES

## SMA & SMAT



### INTRODUCTION

The Sonitron Multi-Application (SMA) series are specifically developed to meet a wide range of requirements in sound pressure, dimensions and mounting methods. This series produce highly reliable audible signals, giving either an extremely clear penetrating tone or a soft sound output. Both, buzzers and transducers, are available in five sizes, 13 mm, 17 mm, 21 mm, 24 mm and 30 mm. All SMA products are manufactured to meet various mounting styles such as through-hole or surface mounting technologies (SMD). Therefore they are equipped with either pin or SMD terminals.

The Multi-Application series present the following advantages:

- The octagonal housing provides alignment with pick & place machines for SMD models, which are packed in trays and protected with a heat resistant label for automatic soldering.
- The miniature models SMA-13 and SMA-17 offer a high sound pressure level together with a clear audible tone.
- The LT-versions of the models SMA-13, SMA-17 and SMA-21 generate an increased sound output. The LC-versions of the same models operate at extremely low current consumption; ideal for battery operated applications.
- The LV versions of the model SMA-21 generate an extremely loud sound output at very low battery voltage starting at 2 Vdc up to 6 Vdc.
- Because of the same case style for buzzers and transducers with different pin pitches per model, the user is offered a great deal of flexibility and can switch over to a buzzer or transducer at any time.
- The piezo audio technology can be qualified as solid state, highly reliable, without EMI and is able to withstand temperatures from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ . The MTBF exceeds in reality several times the figure indicated in this catalogue. Lifetime depends on different factors and is described more in detail in the addendum.



## SELECTION GUIDE

The selection of an acoustic signal can be complex. The list below indicates the use of a certain buzzer model at a certain distance and frequency. It is important to take into account that every application is different and that the perception of a sound is very subjective.

| frequency        | Average distance from the source in free air                                |                                                                              |                                                                                                                                                |                                                                                                                                                |                                                                                                                                                |
|------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
|                  | 0 to 1m                                                                     | 1 to 2m                                                                      | 2 to 3m                                                                                                                                        | 3 to 4m                                                                                                                                        | 4 to 5m                                                                                                                                        |
| 2 kHz to 3 kHz   | SMAT-13<br>SMAT-17<br>SMA-13<br>SMA-17                                      | SMAT-13<br>SMAT-17<br>SMAT-21<br>SMA-13LC<br>SMA-17LC<br>SMA-17L<br>SMA-21LV | SMAT-13<br>SMAT-17<br>SMAT-21<br>SMA-13LC<br>SMA-17LC<br>SMA-17L<br>SMA-21LV                                                                   | SMAT-30<br>SMA-21LV<br>SMA-30<br>SMA-30L                                                                                                       | SMAT-30<br>SMA-21LV<br>SMA-30<br>SMA-30L                                                                                                       |
| 2.5 kHz to 3 kHz | SMAT-17<br>SMA-17LC<br>SMA-17L<br>SMA-21<br>SMA-21LC<br>SMA-21L<br>SMA-21LV | SMAT-17<br>SMA-17LC<br>SMA-17L<br>SMA-21<br>SMA-21LC<br>SMA-21L<br>SMA-21LV  | SMA-24<br>SMA-24L<br>SMA-17LC<br>SMA-17L<br>SMA-21LV                                                                                           | SMA-24<br>SMA-24L<br>SMA-17LC<br>SMA-17L<br>SMA-21LV                                                                                           | SMA-24<br>SMA-24L<br>SMA-17LC<br>SMA-17L<br>SMA-21LV                                                                                           |
| 3 kHz to 3.8 kHz | SMAT-17<br>SMAT-21<br>SMA-17<br>SMA-17LT<br>SMA-21<br>SMA-21LT              | SMAT-17<br>SMAT-21<br>SMA-17<br>SMA-17LT<br>SMA-21<br>SMA-21LT               | SMAT-17<br>SMAT-21<br>SMAT-24<br>SMAT-30<br>SMAC-25<br>SMA-17LT<br>SMA-17LC<br>SMA-17L<br>SMA-21LT<br>SMA-21LC<br>SMA-21L<br>SMA-30<br>SMA-30L | SMAT-17<br>SMAT-21<br>SMAT-24<br>SMAT-30<br>SMAC-25<br>SMA-17LT<br>SMA-17LC<br>SMA-17L<br>SMA-21LT<br>SMA-21LC<br>SMA-21L<br>SMA-30<br>SMA-30L | SMAT-17<br>SMAT-21<br>SMAT-24<br>SMAT-30<br>SMAC-25<br>SMA-17LT<br>SMA-17LC<br>SMA-17L<br>SMA-21LT<br>SMA-21LC<br>SMA-21L<br>SMA-30<br>SMA-30L |

## SMA SERIES



The Sonitron Multi-Application buzzers are low cost commercial grade components for large volume applications. The SMA series are designed to meet various requirements such as current consumption, voltage, sound pressure, mounting methods, connection, dimensions and packaging. They are available in five sizes: 13 mm, 17 mm, 21 mm, 24 mm and 30 mm. The buzzers have a built-in oscillator generating their working frequency. They produce a highly reliable audible tone signal, giving either an extremely clear and penetrating tone or a soft sound for non-aggressive signals.

## ADVANTAGES &amp; APPLICATIONS

## ADVANTAGES :

- Octagonal form
- Models with different pin pitches
- Light but solid state construction
- Little power consumption, especially the Extra loud LC-versions
- Wide voltage range (1,5V to 24V)
- Easy mountable
- SMA-13 and SMA-17 for applications with limited space
- SMD models with heat resistant label for protection during automatic soldering
- Automatic pick & place

## APPLICATIONS :

- Automatic doors
- Alarms
- Gas & metal detectors
- Weighing & measuring equipment
- Medical instrumentation
- Timers & clocks
- Control instrumentation & systems
- Copiers
- Automobiles & trucks
- Games & toys
- Computer peripherals
- Cash registers

## SPECIFICATIONS

| Model    | SPL *<br>(dB(A)) | Frequency<br>(+/-15%) Hz) | Operating<br>Voltage (min.-max.) | Operating<br>current (mA) | Weight<br>(g) |
|----------|------------------|---------------------------|----------------------------------|---------------------------|---------------|
| SMA-13   | 75               | 3000                      | 1.5 to 24                        | 1.8                       | 1             |
| SMA-13LT | 82               | 3000                      | 1.5 to 15                        | 11.6                      | 1             |
| SMA-13LC | 81               | 3000                      | 1.5 to 15                        | 0.7                       | 1             |
| SMA-17   | 82               | 3000                      | 1.5 to 24                        | 3.3                       | 2             |
| SMA-17L  | 88               | 3000                      | 1.5 to 24                        | 5                         | 2             |
| SMA-17LT | 86               | 3000                      | 1.5 to 15                        | 15                        | 2             |
| SMA-17LC | 89               | 3500                      | 1.5 to 15                        | 0.8                       | 2             |
| SMA-21   | 85               | 3300                      | 1.5 to 24                        | 3.8                       | 2.5           |
| SMA-21L  | 91               | 3300                      | 1.5 to 24                        | 5                         | 2.5           |
| SMA-21LT | 90               | 3300                      | 1.5 to 15                        | 12.5                      | 2.5           |
| SMA-21LC | 91               | 3800                      | 1.5 to 15                        | 1.1                       | 2.5           |
| SMA-21LV | 87 @ 3V          | 3000                      | 2 to 6                           | 13 @ 3V                   | 2.5           |
| SMA-24   | 92               | 3000                      | 1.5 to 24                        | 4.2                       | 4             |
| SMA-24L  | 98               | 3000                      | 1.5 to 15                        | 6.7                       | 4             |
| SMAI-24  | 92               | **3500                    | 5 to 24                          | 6.2                       | 4             |
| SMA-30   | 87               | 2500                      | 1.5 to 24                        | 4.1                       | 5             |
| SMA-30L  | 97 @ 9V          | 2500                      | 3 to 9                           | 5 @ 9V                    | 5             |

\* All measurements are made in free air @ 21°C @ 30cm @ 12Vdc (Except for the SMA-21LV & SMA-30 L). Buzzers soldered on a PCB board with dimensions of 24cmx11cm.

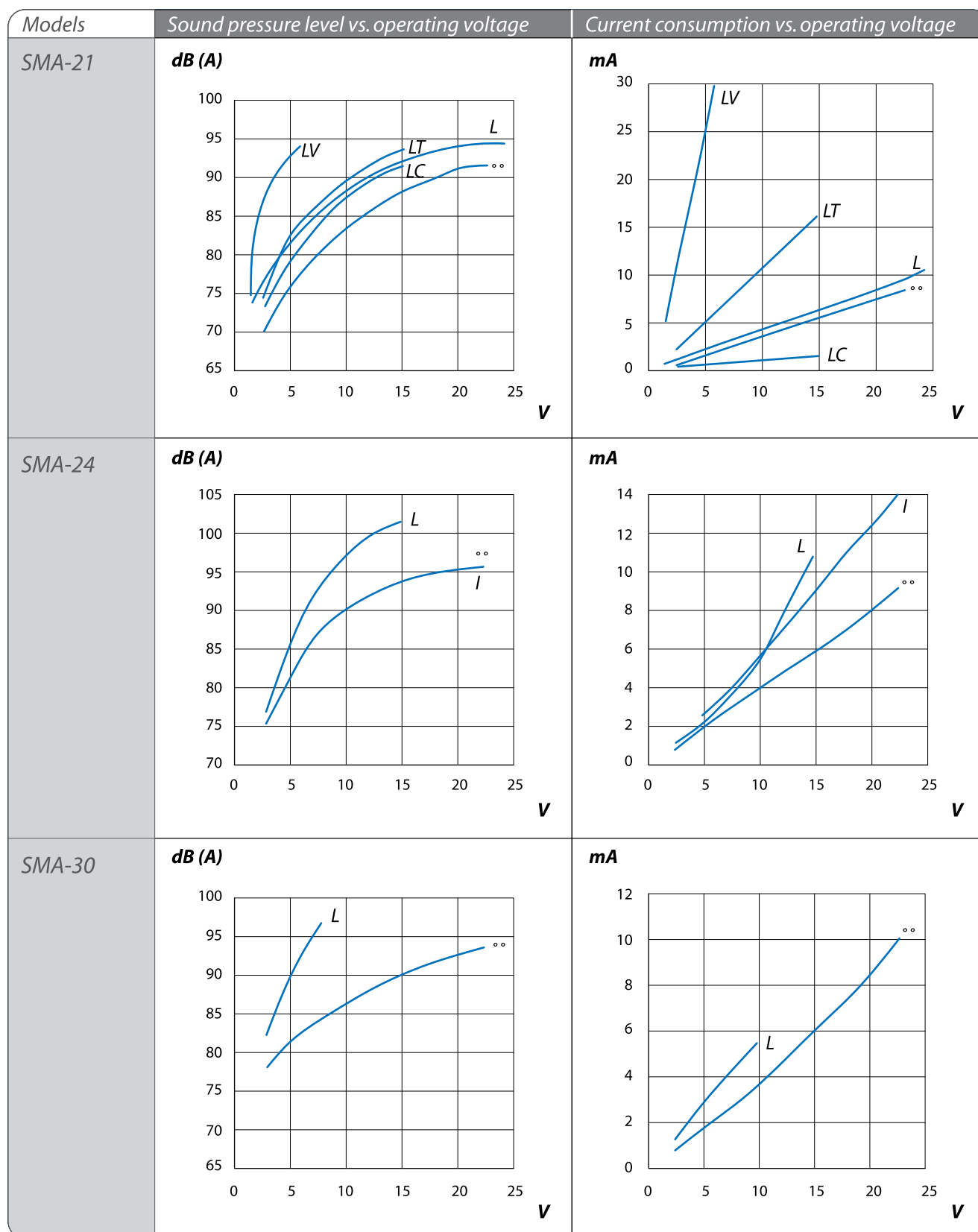
\*\* SMAI 24: intermittent pulse rate of 5Hz (@ 15Vdc). All the other models have a continuous tone.

|                         |                                                                                                                                                                                                                                  |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature   | -20°C to +70°C                                                                                                                                                                                                                   |
| Storage temperature     | -40°C to +85°C                                                                                                                                                                                                                   |
| Life time (@ 21°C)      | @12Vdc (L-version working @ 6Vdc) continuous use min. 100 hours<br>The SMA-21 LV (PIN/SMD) working @ 3Vdc in continuous use:<br>min.24 hours. All tests are made @ 20°C mounted on PCB<br>(expected life time curve in addendum) |
| Case material           | ABS (UL rating: 94 HB) for pin-versions, SMA-13/21/30<br>PBT (UL rating: 94 HB) for pin versions, SMA-17/24<br>PPS (UL rating: 94 V0/5V) for SMD-versions, SMA-13/17/21/24/30                                                    |
| Standard colour of case | Grey                                                                                                                                                                                                                             |

## ELECTRICAL PARAMETERS

| Models | Sound pressure level vs. operating voltage | Current consumption vs. operating voltage |
|--------|--------------------------------------------|-------------------------------------------|
| SMA-13 | <p><b>dB (A)</b></p>                       | <p><b>mA</b></p>                          |
| SMA-17 | <p><b>dB (A)</b></p>                       | <p><b>mA</b></p>                          |

All measurements are made @ 30 cm in free air @ 21°C.  
°°: standard versions, respectively SMA-13, SMA-17.



All measurements are made @ 30 cm in free air @ 21°C.  
 °°: standard versions, respectively SMA-21, SMA-24, SMA-30.

## PRODUCT CODIFICATION

|                                                                                                                                      |                                                                                                                      |                                                                                                                                                     |                                                                                                                                                        |                                                                                                                                                      |                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SMA</b><br><br><b>Sonitron Multi-Application</b> | <b>I</b><br><br><b>Intermittent</b> | <b>-</b><br>13<br>17<br>21<br>24<br>30<br><br>Square diameter (mm) | <b>L</b><br><b>LV</b><br><br><b>L:</b> Loud<br><b>LV:</b> Low voltage | <b>C</b><br><b>T</b><br><br><b>C:</b> C-MOS<br><b>T:</b> Transistor | P7.5<br>P10<br>P15<br>P17.5<br>P20.32<br><b>S</b><br><br><b>P:</b> Pin distance (in mm)<br><b>S:</b> SMD terminals |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## LIST OF AVAILABLE PRODUCT TYPES

| Version       | Standard (°°)                                                         | Loud (L)                                                                   | Transistor (LT)                                              | Low Current (LC)                                             | Intermittent (I) (*)                                                       | Low Voltage (LV)                           |
|---------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------|
| SMA-13 series | SMA-13 P7.5<br>SMA-13 P10<br>SMA-13 S                                 |                                                                            | SMA-13LT P7.5<br>SMA-13LT P10<br>SMA-13LT S                  | SMA-13LC P7.5<br>SMA-13LC P10<br>SMA-13LC S                  |                                                                            |                                            |
| SMA-17 series | SMA-17 P7.5<br>SMA-17 P10<br>SMA-17 S                                 | SMA-17L P7.5<br>SMA-17L P10<br>SMA-17L S                                   | SMA-17LT P7.5<br>SMA-17LT P10<br>SMA-17LT S                  | SMA-17LC P7.5<br>SMA-17LC P10<br>SMA-17LC S                  |                                                                            |                                            |
| SMA-21 series | SMA-21 P10<br>SMA-21 P15<br>SMA-21 P17.5<br>SMA-21 S                  | SMA-21L P10<br>SMA-21L P15<br>SMA-21L P17.5<br>SMA-21L S                   | SMA-21LT P10<br>SMA-21LT P15<br>SMA-21LT P17.5<br>SMA-21LT S | SMA-21LC P10<br>SMA-21LC P15<br>SMA-21LC P17.5<br>SMA-21LC S |                                                                            | SMA-21LV P10<br>SMA-21LV P15<br>SMA-21LV S |
| SMA-24 series | SMA-24 P10<br>SMA-24 P15<br>SMA-24 P17.5<br>SMA-24 P20.32<br>SMA-24 S | SMA-24L P10<br>SMA-24L P15<br>SMA-24L P17.5<br>SMA-24L P20.32<br>SMA-24L S |                                                              |                                                              | SMAI-24 P10<br>SMAI-24 P15<br>SMAI-24 P17.5<br>SMAI-24 P20.32<br>SMAI-24 S |                                            |
| SMA-30 series | SMA-30 P15<br>SMA-30 P17.5<br>SMA-30 P20.32<br>SMA-30 S               | SMA-30L P15<br>SMA-30L P17.5<br>SMA-30L P20.32<br>SMA-30L S                |                                                              |                                                              |                                                                            |                                            |

\* When the third pin of SMAI-24 is left open, the audible signal is intermittent. When the third pin is connected to the (-), the audible signal is continuous. When the third pin is connected to the (+), there is no sound (=stop).

**Order options and packaging information see page 52, 53.**



## SMAT SERIES

The SMAT transducers are specifically developed to meet various requirements, such as loud sound pressure level, mounting methods, connection possibilities and dimensions. The transducers do not have a built-in oscillator. The drive frequency must be generated with electronics outside the transducer. Recommended drive circuits are described in this catalogue. Our transducers produce a highly reliable audible tone signal, giving either an extremely clear and penetrating tone or a soft sound for non-aggressive signals. They are available in five sizes: 13mm, 17mm, 21mm, 24mm and 30mm.

## ADVANTAGES & APPLICATIONS

### ADVANTAGES :

- Octagonal form
- Models with different pin pitches
- Light but solid construction
- Not fixed working frequency
- Easily mountable
- SMAT-13 and SMAT-17 for limited space applications
- SMD models with heat resistant labels for protection during re-flow soldering
- Automatic pick & place

### APPLICATIONS :

- Alarms
- Gas & metal detectors
- Measuring & weighing equipment
- Medical instrumentation
- Timers & clocks
- Instrumentation & control systems
- Copiers
- Automobiles & trucks
- Games & toys
- Cash registers

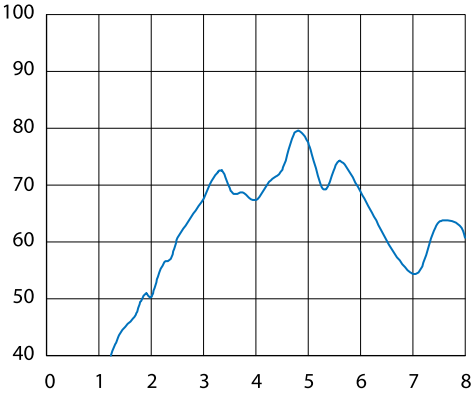
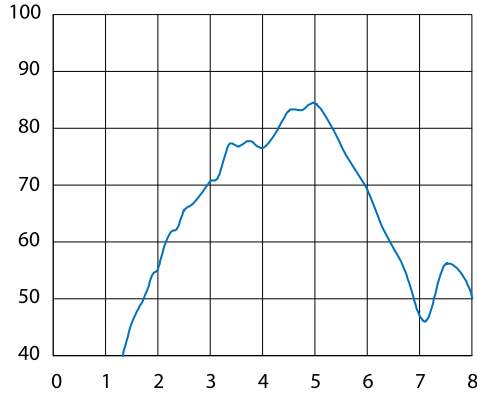
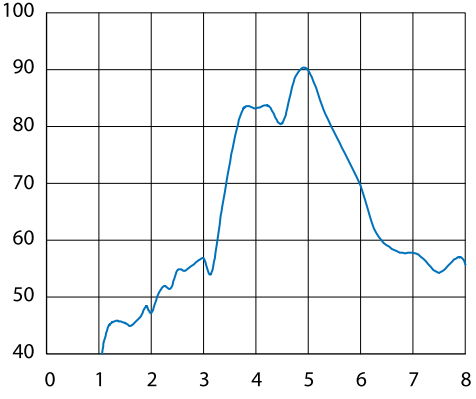
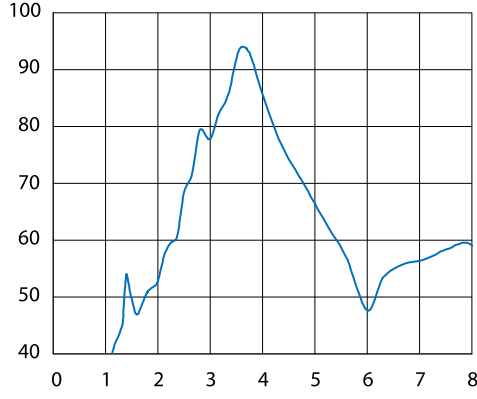
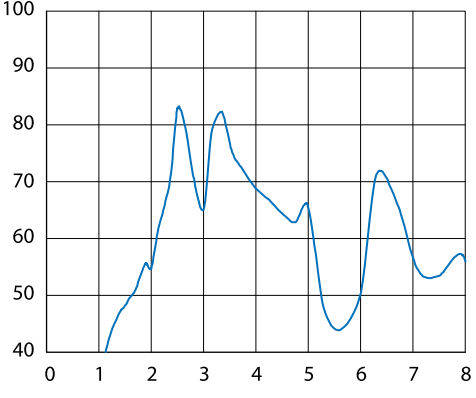
## SPECIFICATIONS

| Model   | SPL *<br>(dB(A)) | Frequency<br>Range (Hz) | Capacitance<br>(+/-30%) nF) | Operating<br>voltage (VAC pp) | Weight<br>(g) |
|---------|------------------|-------------------------|-----------------------------|-------------------------------|---------------|
| SMAT-13 | See graph        | 800-5000                | 7.8                         | 0 to 30                       | 1             |
| SMAT-17 | See graph        | 800-5000                | 17.5                        | 0 to 30                       | 2             |
| SMAT-21 | See graph        | 600-5000                | 12.4                        | 0 to 30                       | 2.5           |
| SMAT-24 | See graph        | 400-5000                | 18.6                        | 0 to 30                       | 4             |
| SMAT-30 | See graph        | 300-5000                | 25                          | 0 to 30                       | 5             |

|                         |                                                                                                                                                                                                                              |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature   | -20°C to +70°C                                                                                                                                                                                                               |
| Storage temperature     | -40°C to +85°C                                                                                                                                                                                                               |
| Life time (@ 21°C)      | @12Vpp continuous use at resonance frequency, tested on maximum sound pressure (eg. SMAT-21 @ 3.75 kHz). Life expectations: min.1000 hours. All tests are made @ 20°C mounted on PCB (expected life time curve in addendum). |
| Case material           | ABS (UL rating: 94 HB) for pin-versions, SMAT-13/21/30<br>PBT (UL rating: 94 HB) for pin versions, SMAT-17/24<br>PPS (UL rating: 94 V0/5V) for SMD-versions, SMAT-13/17/21/24/30                                             |
| Standard colour of case | Grey                                                                                                                                                                                                                         |

\* All measurements are made in free air @ 21°C @ 30 cm @10 Vpp (square wave). The test buzzer is soldered on a pcb board with dimensions of 24 cm x 11 cm.

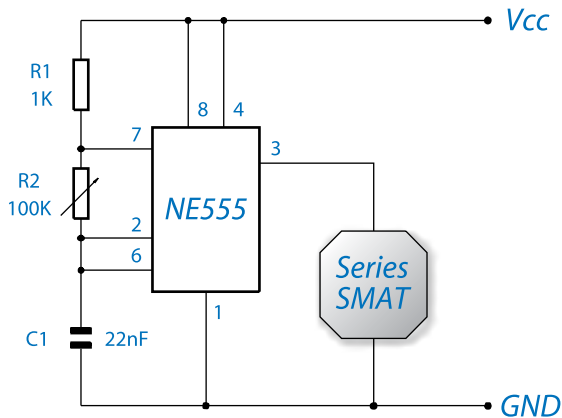
## ELECTRICAL PARAMETERS

| Model                        | SMAT-13                                                                                                     | SMAT-17                                                                                                               |
|------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Sound pressure vs. frequency | <b>dB (A)</b><br><br>kHz   | <b>dB (A)</b><br><br>kHz            |
| Model                        | SMAT-21                                                                                                     | SMAT-24                                                                                                               |
| Sound pressure vs. frequency | <b>dB (A)</b><br><br>kHz  | <b>dB (A)</b><br><br>kHz           |
| Model                        | SMAT-30                                                                                                     | <b>Peak hold frequency sweep from 1 to 8kHz with a square wave signal of 10Vpp. (precision of frequency: +/- 15%)</b> |
| Sound pressure vs. frequency | <b>dB (A)</b><br><br>kHz |                                                                                                                       |

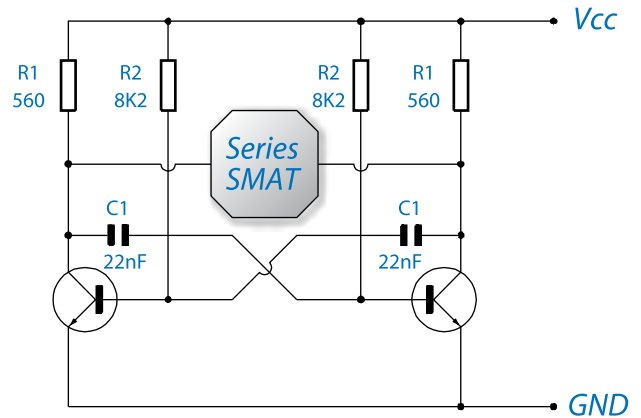
All measurements are made @ 30 cm in free air @ 21°C.

## DRIVE CIRCUITS (typical circuits)

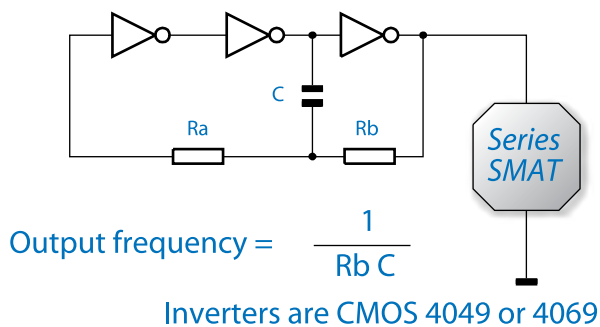
### IC Oscillation Circuit



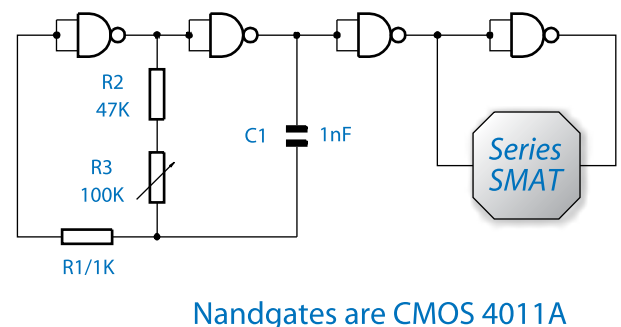
### Multivibrator Circuit



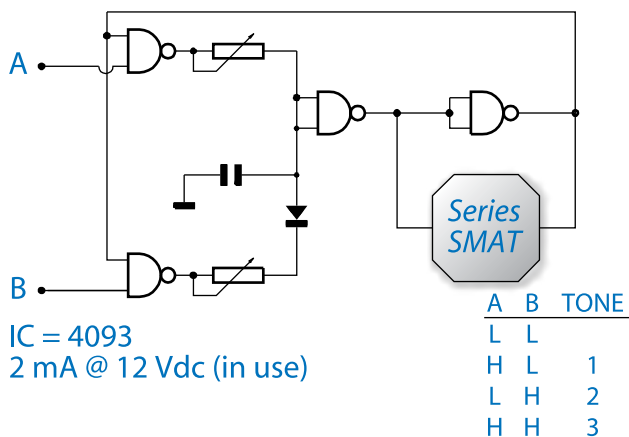
### Inverter Oscillator



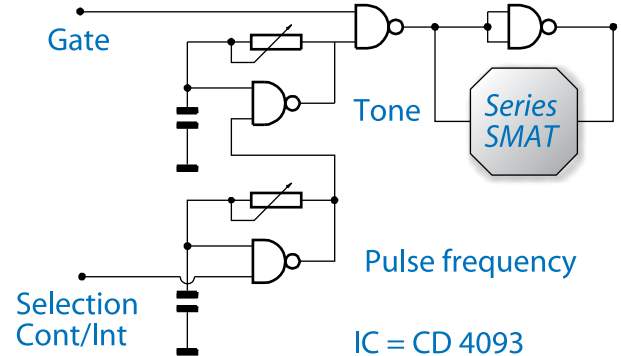
### Nandgate Oscillator



### 5 Nandgate Oscillator - 3 tones



### Tone Generator - CMOS - Gate Multifunction



When the transducers are used in a drive circuit at one single frequency, the designer should bear in mind that the precision of the frequency, as mentioned on the graph "sound pressure vs. Frequency" is +/- 15%. We therefore recommend to test the sound pressure level with the transducer connected to the final drive circuit.

## PRODUCT CODIFICATION

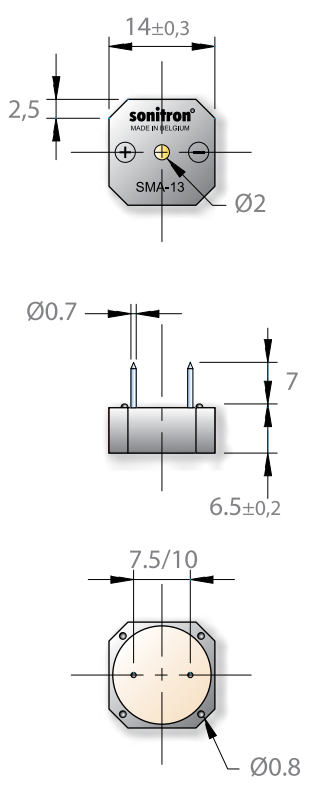
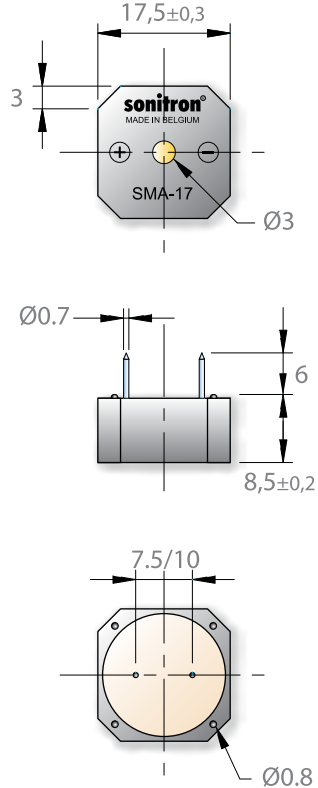
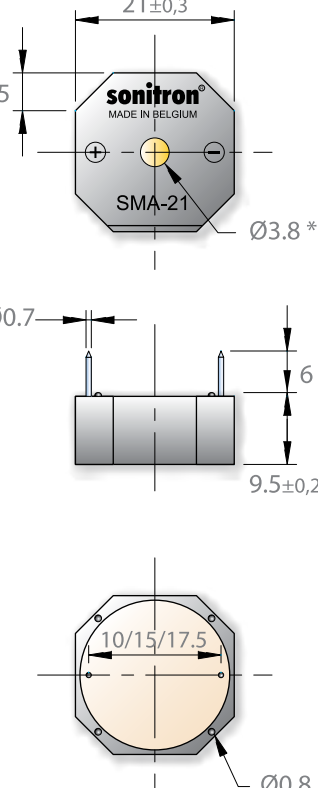
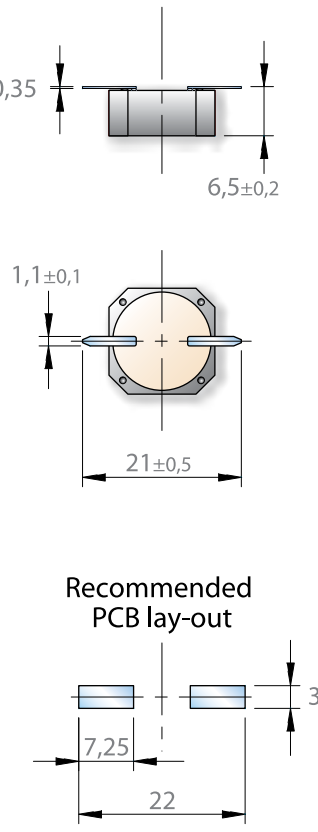
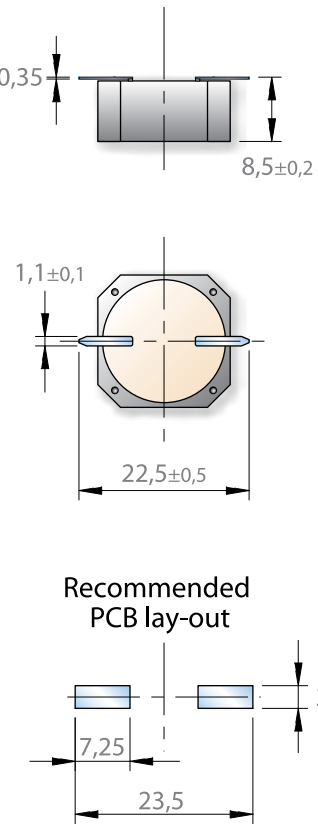
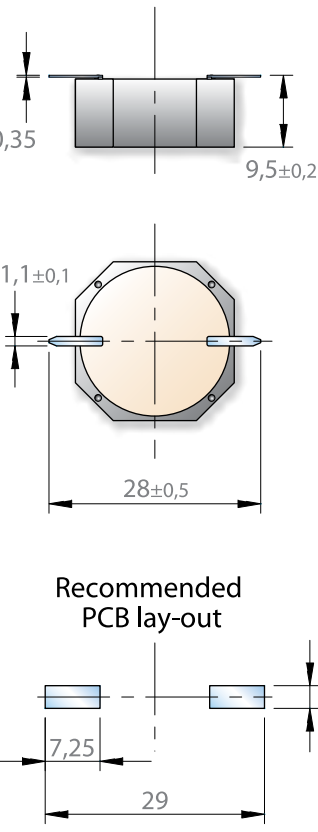
|                                               |                      |                                                         |                                                                                                |
|-----------------------------------------------|----------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------|
| SMA<br>↓<br>Sonitron<br>Multi-<br>Application | T<br>↓<br>Transducer | 13<br>17<br>21<br>24<br>30<br>↓<br>Square diameter (mm) | P7.5<br>P10<br>P15<br>P17.5<br>P20.32<br>S<br>↓<br>P: Pin distance (in mm)<br>S: SMD terminals |
|-----------------------------------------------|----------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------|

## LIST OF AVAILABLE PRODUCT TYPES

|                                          |                                          |                                                          |                                                                            |                                                             |
|------------------------------------------|------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------|
| SMAT-13 P7.5<br>SMAT-13 P10<br>SMAT-13 S | SMAT-17 P7.5<br>SMAT-17 P10<br>SMAT-17 S | SMAT-21 P10<br>SMAT-21 P15<br>SMAT-21 P17.5<br>SMAT-21 S | SMAT-24 P10<br>SMAT-24 P15<br>SMAT-24 P17.5<br>SMAT-24 P20.32<br>SMAT-24 S | SMAT-30 P15<br>SMAT-30 P17.5<br>SMAT-30 P20.32<br>SMAT-30 S |
|------------------------------------------|------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------|

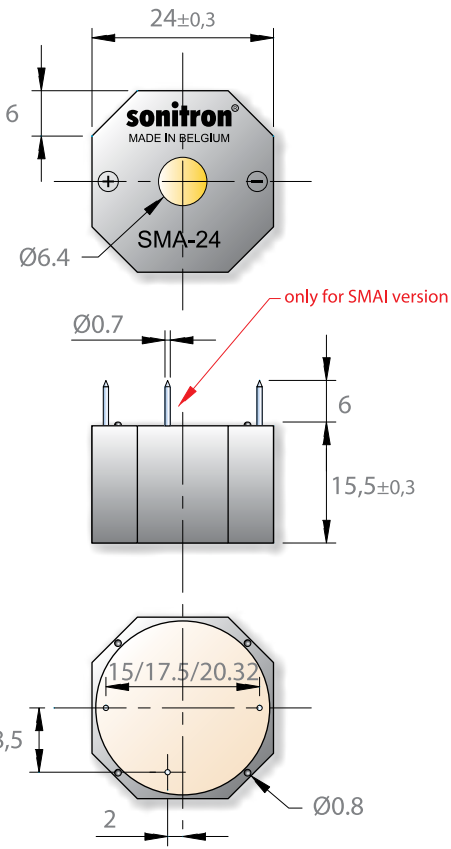
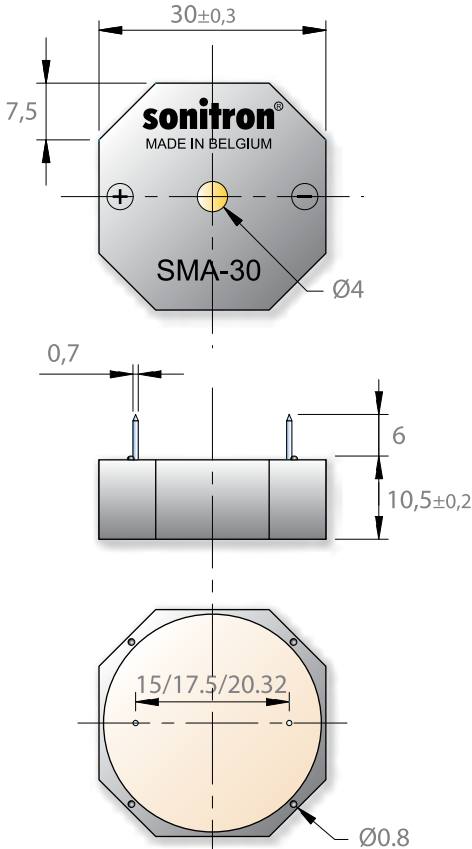
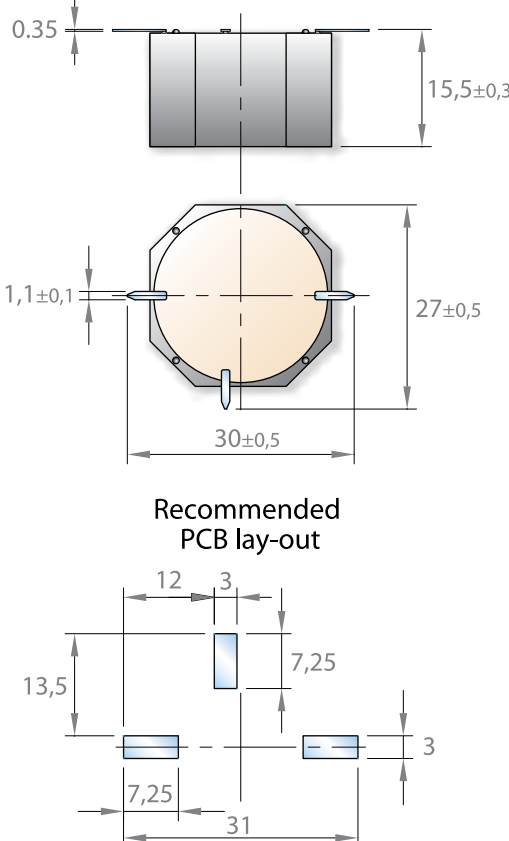
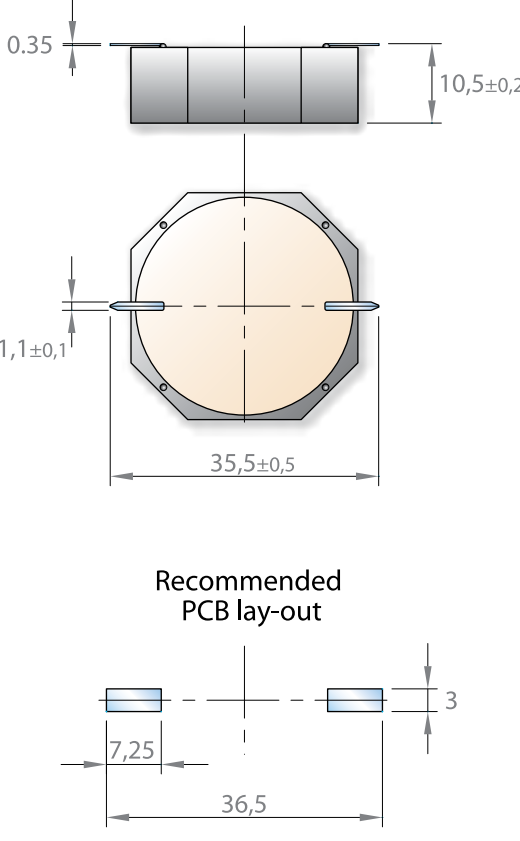


***DIMENSIONS SMA & SMAT-SERIES (All dimensions are in mm)***

| <b>Pin version</b><br>   | <b>SMA(T)-13</b>                                                                    | <b>SMA(T)-17</b>                                                                     | <b>SMA(T)-21</b>                                                                      |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                                           |   |   |   |
| <b>SMD version</b><br> |  |  |  |

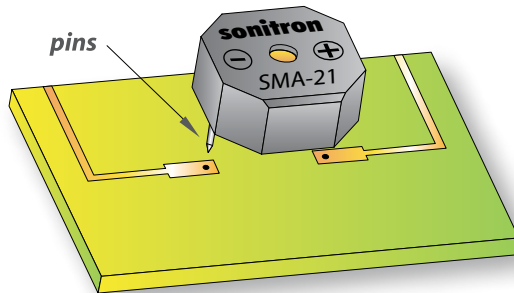
\* The sound hole of SMA-21 LV has a diameter of 3 mm, whereas the other SMA-21 types have a 3,8 mm sound hole.

*(All dimensions are in mm)*

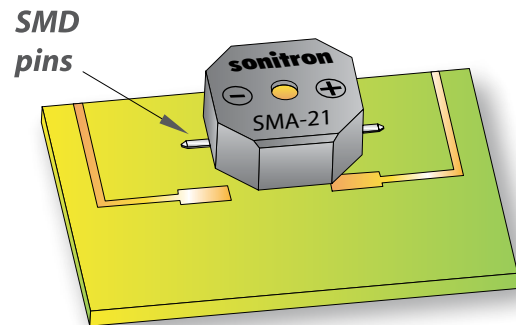
|                                                                                                               |                                                                                                                                            |                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Pin version</b></p>    | <p><b>SMA(T)-24</b></p>                                  | <p><b>SMA(T)-30</b></p>                                  |
| <p><b>SMD version</b></p>  | <p><b>SMA(T)-24</b></p>  <p>Recommended PCB lay-out</p> | <p><b>SMA(T)-30</b></p>  <p>Recommended PCB lay-out</p> |

## MOUNTING POSSIBILITIES FOR THE SMA & SMAT SERIES

Soldered with pins on the PCB



SMD soldered on the PCB



## PRODUCT OPTIONS SMA & SMAT SERIES

| Option Code                                                                 | example                   | Description                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SP01</b>                                                                 | SMAT-21-P10/SP01          | Contains heavy duty wires (plastic insulation)                                                                                                                                                                                                               |
| <b>SP02</b>                                                                 | SMAT-21-P17.5/SP02        | Contains heavy duty wires (plastic insulation), connection sealed with silicone (only for SMA(T)-21, SMA(T)-24)                                                                                                                                              |
| <b>SP04</b>                                                                 | SMA-13LC-S/SP04           | The PCB of the buzzer/transducer is secured with epoxy-adhesive                                                                                                                                                                                              |
| <b>SP05</b>                                                                 | SMA-24L-P17.5/SP05        | Extended frequency control (only SMA series)                                                                                                                                                                                                                 |
| <b>Wash Tab</b>                                                             | SMAT-13-P7.5<br>+Wash Tab | Recommended for automatic washing production process. The PCB is secured with epoxy-adhesive+ wash tab upon the sound-emitting hole, avoiding liquid penetration into the cavity.<br><b>TO BE REMOVED AFTER the washing process for good sound output!!!</b> |
| <b>MC</b>                                                                   | SMAT-13-P10-MC            | Acryl coating (Membrane Coating). Recommended for aggressive, humid or smoggy environment.                                                                                                                                                                   |
| <b>FP13 FP13SR</b><br><b>FP17 FP17SR</b><br><b>FP21 FP24</b><br><b>FP30</b> |                           | 7 different Foam Patches are available to cover the SMA(T) series for extra acoustic and mechanical stabilization.<br>See page 38, 39                                                                                                                        |



**To order an option add the suffix to the model number of the SMA(T)-series.**

|        |                                                                                                                                                                                                                                                                                                                  |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Capton | <p>A heat protection label standard for all SMD buzzers, in capton material glued on the SMD model of the SMA(T) buzzer. This enables the user to pick up the buzzer by vacuum.</p> <p>During the re-flow soldering process the heat shield label remains on the buzzer and must be removed after soldering.</p> |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## PACKAGING SMA & SMAT-SERIES

All models with pin terminals are put on a polystyrene board (245 L x 245 W) and sold in boxes with dimensions 250 L x 250 W x 125 H.

| Number    | SMA(T)-13 series | SMA(T)-17 series | SMA(T)-21 series | SMA(T)-24 series | SMA(T)-30 series |
|-----------|------------------|------------------|------------------|------------------|------------------|
| per board | 250              | 150              | 100              | 100              | 64               |
| per box   | (8x250)<br>2000  | (6x150)<br>900   | (5x100)<br>500   | (5x100)<br>500   | (6x64)<br>384    |

All SMD models are packed in trays (245 L x 245 W) and sold in boxes with dimensions 250 L x 250 W x 125 H.

| Number    | SMA(T)-13 S    | SMA(T)-17 S   | SMA(T)-21 S   | SMA(T)-24 S   | SMA(T)-30 S   |
|-----------|----------------|---------------|---------------|---------------|---------------|
| per board | 100            | 81            | 49            | 42            | 25            |
| per box   | (9x100)<br>900 | (8x81)<br>648 | (7x49)<br>343 | (5x42)<br>210 | (6x25)<br>150 |

Dimensions of the tray and position of the SMD components:

| Model            | A     | B       |
|------------------|-------|---------|
| SMA(T)-13-series | 22 mm | 16 mm   |
| SMA(T)-17-series | 24 mm | 18 mm   |
| SMA(T)-21-series | 30 mm | 16.7 mm |
| SMA(T)-24-series | 35 mm | 22.6 mm |
| SMA(T)-30-series | 36 mm | 19 mm   |

