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

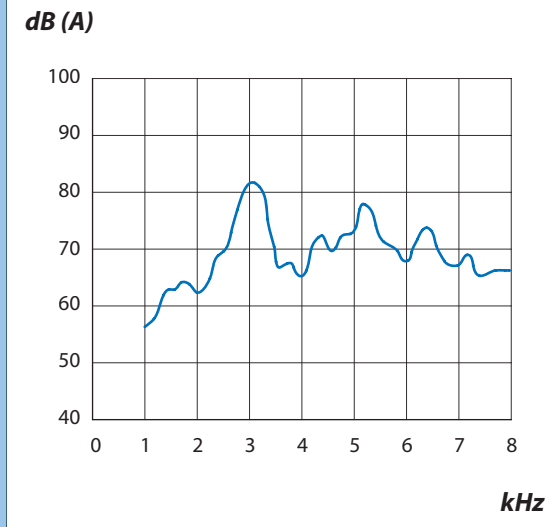
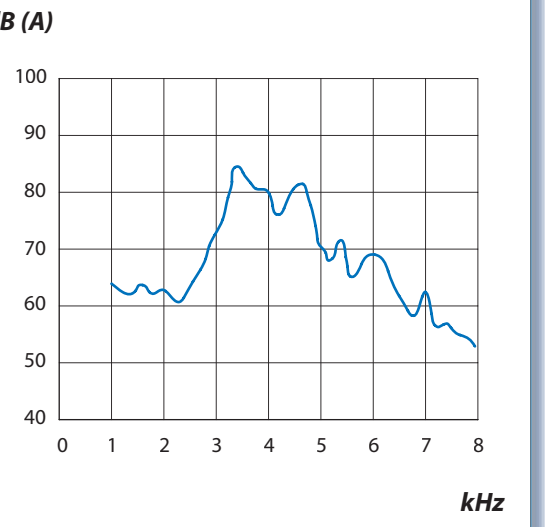
SPECIFICATIONS

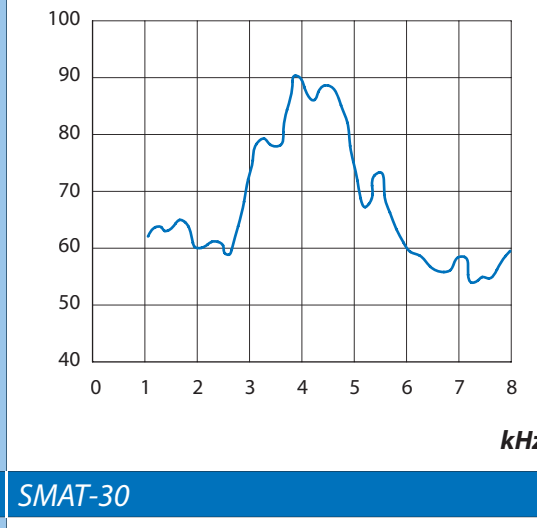
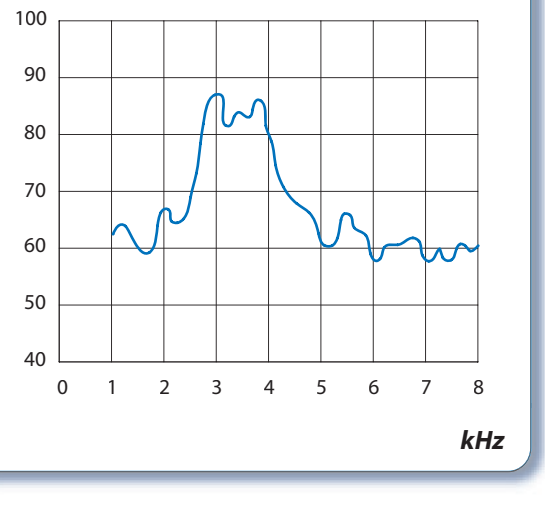
Model	SPL * (dB(A)	Frequency Range (Hz)	Capacitance (+/-30%) nF)	Operating voltage (VAC pp)	Weight (g)
SMAT-13	See graph	800-5000	7.8	0 to 30	1
SMAT-17	See graph	800-5000	17.5	0 to 30	2
SMAT-21	See graph	600-5000	12.4	0 to 30	2.5
SMAT-24	See graph	400-5000	18.6	0 to 30	4
SMAT-30	See graph	300-5000	25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

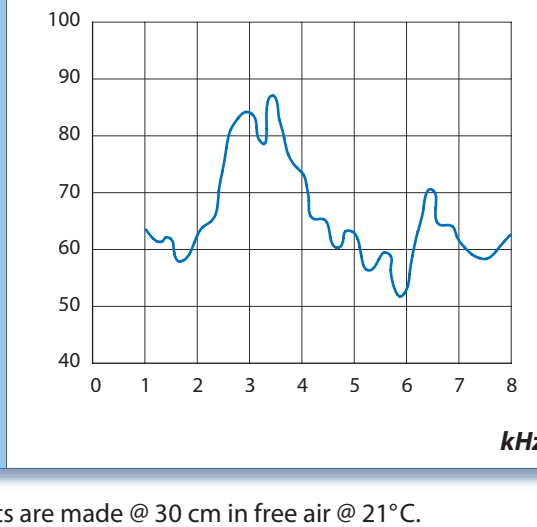
Operating temperature	-20°C to +70°C
Storage temperature	-40°C to +85°C
Life time (@ 21°C)	See expected life time curve in addendum
Case material	ABS (UL rating: 94 HB) for pin-versions, SMAT-13/21/30 PBT (UL rating: 94 HB) for pin versions, SMAT-17/24 PPS (UL rating: 94 V0/5V) for SMD-versions, SMAT-13/17/21/24/30
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		

Model	SMAT-21	SMAT-24
Sound pressure vs. frequency		

Model	SMAT-30
Sound pressure vs. frequency	

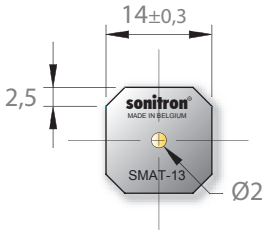
Precision of frequency: +/- 15%
Operating voltage: 10 Vpp
(square wave)

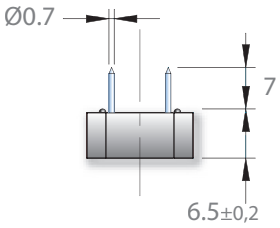
All measurements are made @ 30 cm in free air @ 21°C.

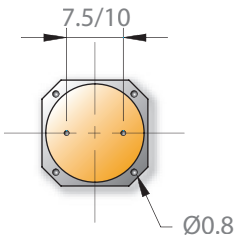
DIMENSIONS (All dimensions are in mm)

Pin version

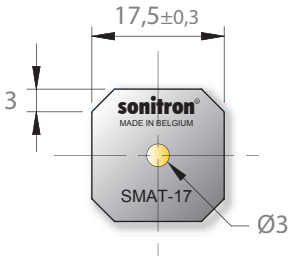
SMAT-13

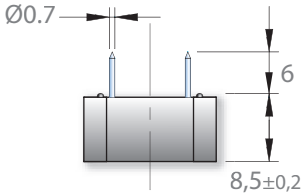


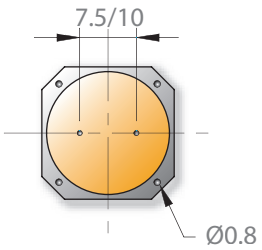




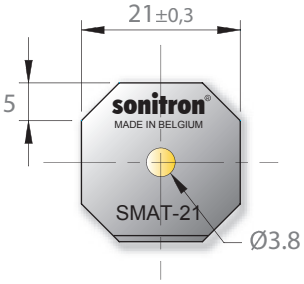
SMAT-17

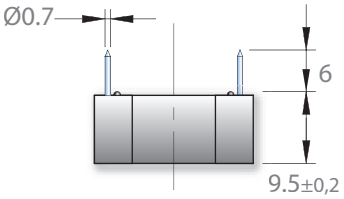


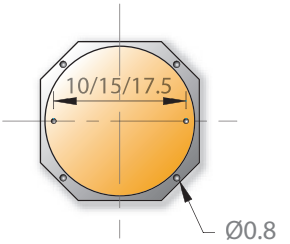




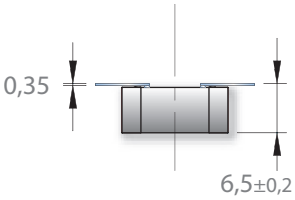
SMAT-21

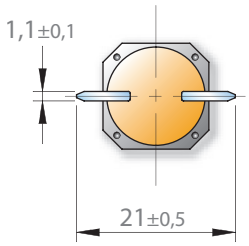




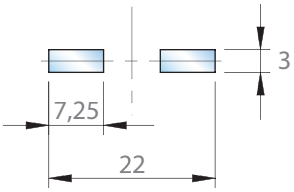


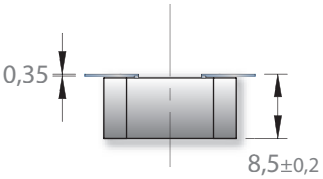
SMD version

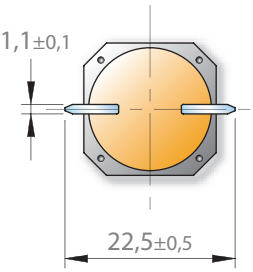




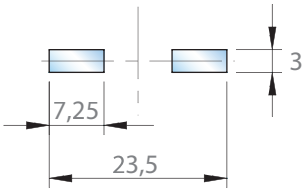
Recommended PCB lay-out

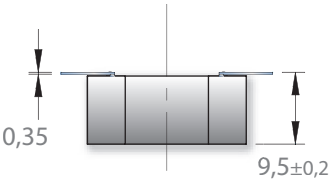


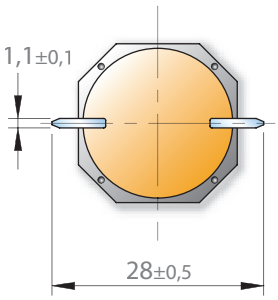




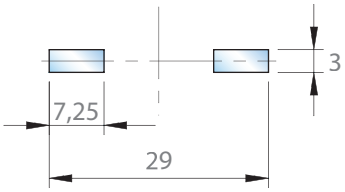
Recommended PCB lay-out







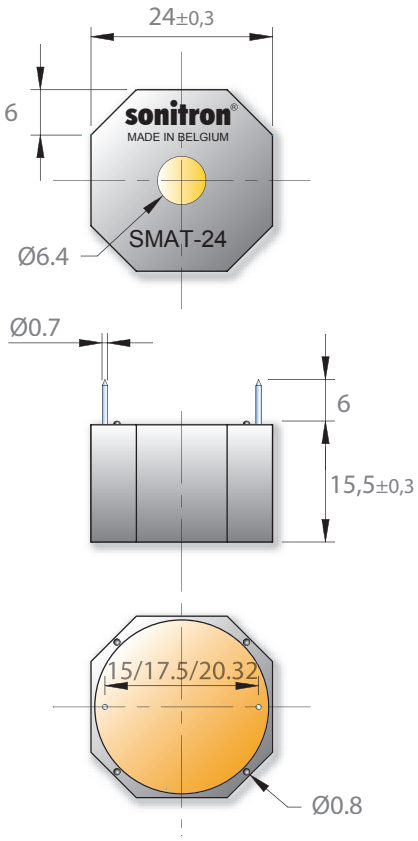
Recommended PCB lay-out



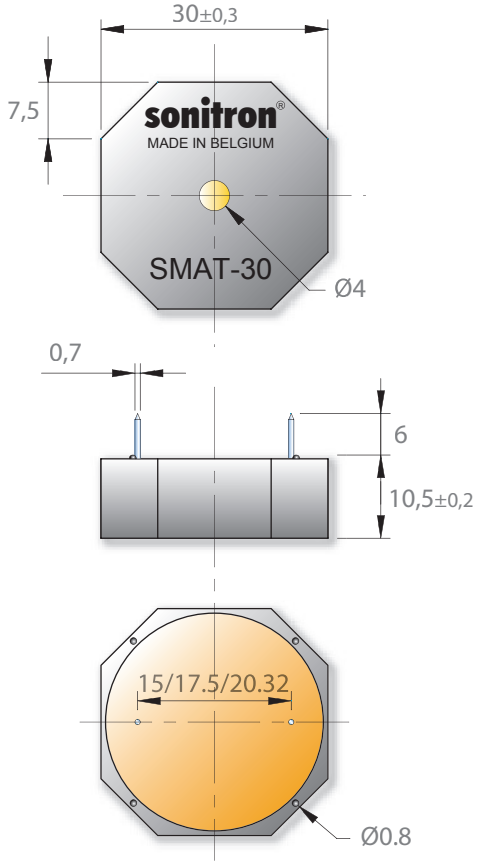
(All dimensions are in mm)

Pin version

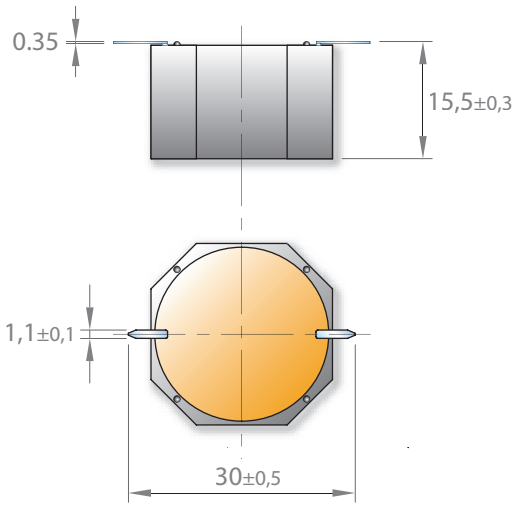
SMAT-24



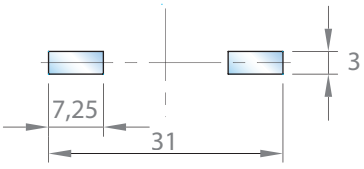
SMAT-30

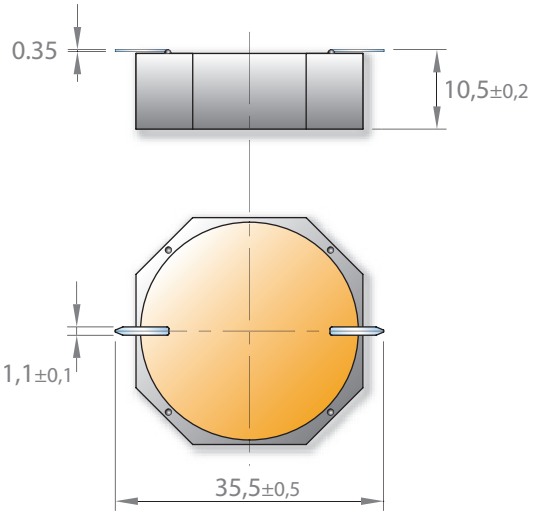


SMD version

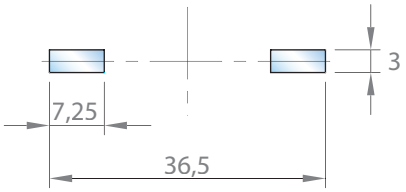


Recommended PCB lay-out



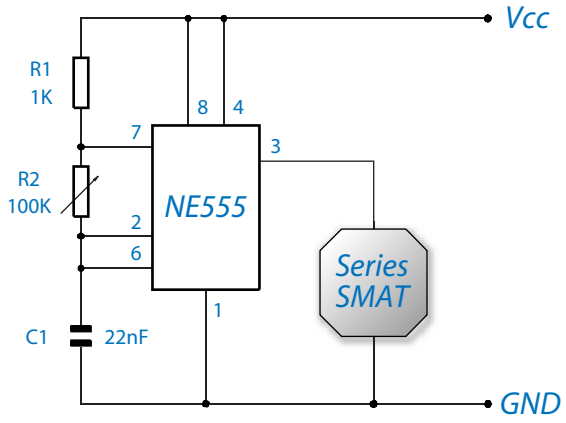


Recommended PCB lay-out

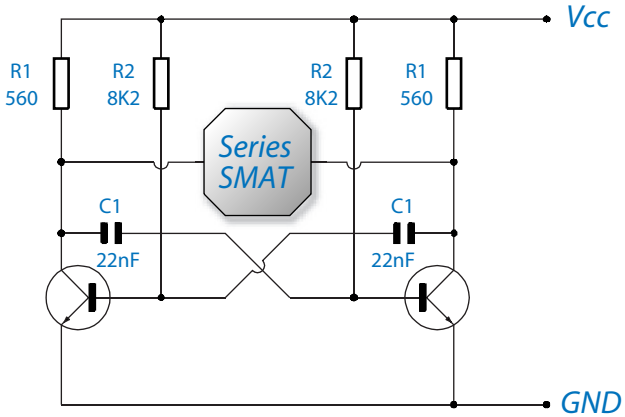


DRIVE CIRCUITS

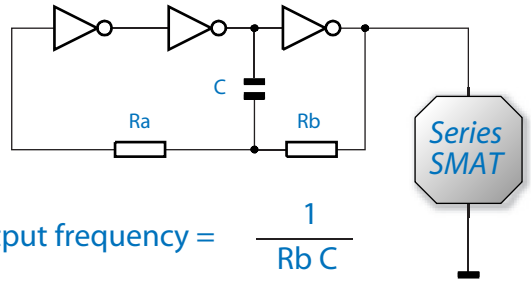
IC Oscillation Circuit



Multivibrator Circuit



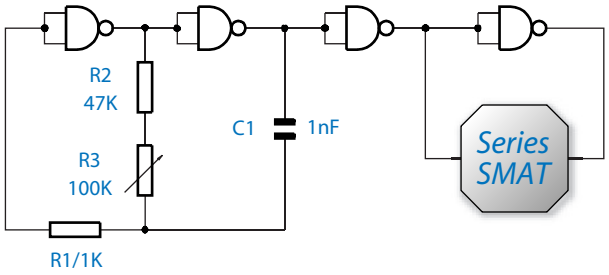
Inverter Oscillator



$$\text{Output frequency} = \frac{1}{Rb\ C}$$

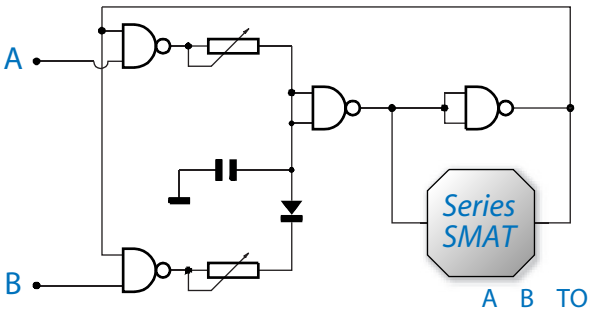
Inverters are CMOS 4049 or 4069

Nandgate Oscillator



Nandgates are CMOS 4011A

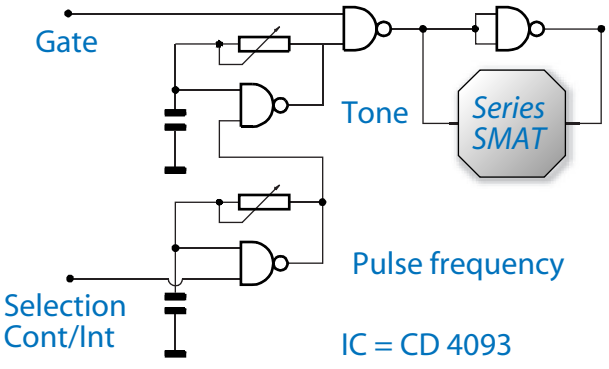
5 Nandgate Oscillator - 3 tones



IC = 4093
2 mA @ 12 Vdc (in use)

A	B	TONE
L	L	
H	L	1
L	H	2
H	H	3

Tone Generator - CMOS - Gate Multifunction



IC = CD 4093

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	T	13 17 21 24 30	P7.5 P10 P15 P17.5 P20.32 S
Sonitron **M**ulti- **A**pplication	**T**ransducer	Square diameter (mm)	**P**: Pin distance (in mm) **S**: SMD terminals

LIST OF AVAILABLE PRODUCT TYPES

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

HEAT PROTECTION & MODELS ON REQUEST

- **A heat protection label** in capton material is glued on the SMD model of the SMAT buzzer.

This enables the user to pick up the buzzer by vacuum.
During the re-flow soldering process the heat shield label remains on the buzzer and must be removed after soldering. These heat protection labels are standard for all SMD buzzers.

- **Wash tabs**

A wash tab can be glued on the sound-emitting hole of the buzzer avoiding water penetration into the cavity.
To order this option: add WASH TAB to the model number of the SMAT series.

- **Acryl coating**

Models containing a protective acryl coated membrane are recommended for aggressive, humid or smoggy environment.
To order this option: add MC to the model number of the SMAT series.

PACKAGING

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	SMAT-13 series	SMAT-17 series	SMAT-21 series	SMAT-24 series	SMAT-30 series
per board	250	150	100	100	64
per box	(8x250) 2000	(6x150) 900	(5x100) 500	(5x100) 500	(6x64) 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	SMAT-13 S	SMAT-17 S	SMAT-21 S	SMAT-24 S	SMAT-30 S
per board	100	81	49	42	25
per box	(9x100) 900	(8x81) 648	(7x49) 343	(5x42) 210	(6x25) 150

Dimensions of the tray and position of the SMD components:

Model	A	B
SMAT-13 series	22 mm	16 mm
SMAT-17 series	24 mm	18 mm
SMAT-21 series	30 mm	16.7 mm
SMAT-24 series	35 mm	22.6 mm
SMAT-30 series	36 mm	19 mm