

1.2.4. SMAT TRANSDUCERS

Both the SMA buzzers and the SMAT (Sonitron Multi-Application) transducers are specially developed to meet a wide range of requirements in sound pressure, 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.

1.2.4.1. 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 reflow soldering,
- packed in a tray for automatic placing

APPLICATIONS:

- audible alarms
- gas detectors
- measuring and weighing equipment
- medical instrumentation
- timers
- instrumentation and control systems
- copiers
- automobiles
- games & toys
- cash registers, etc.

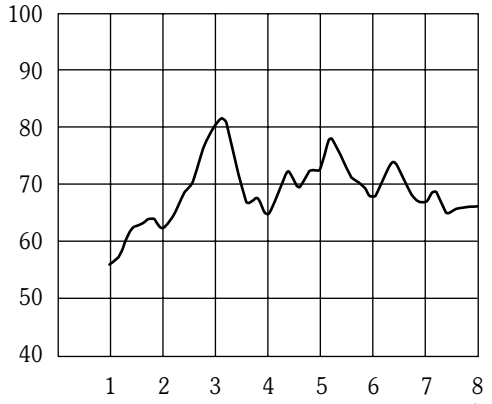
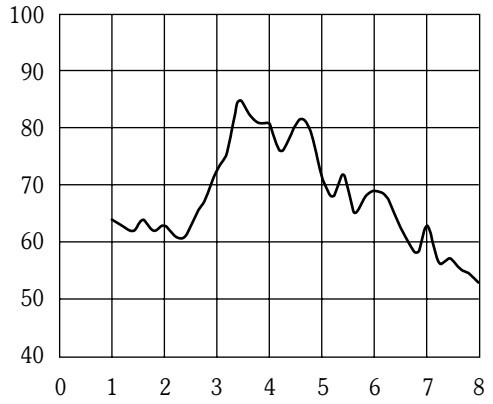
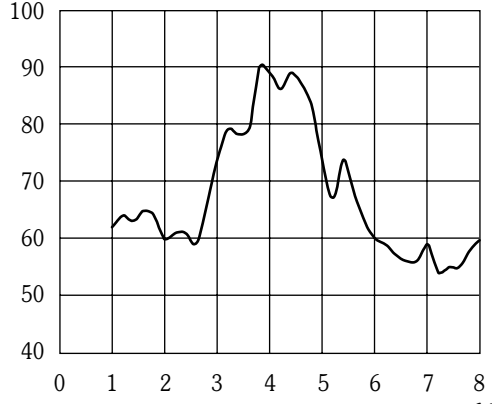
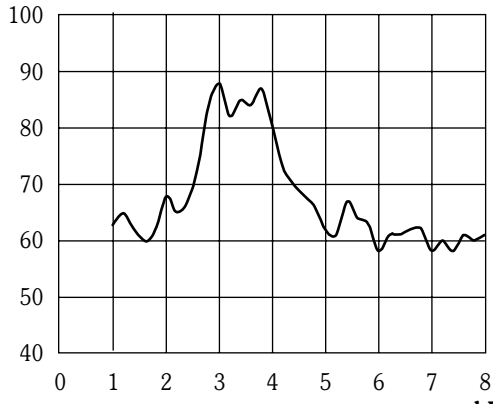
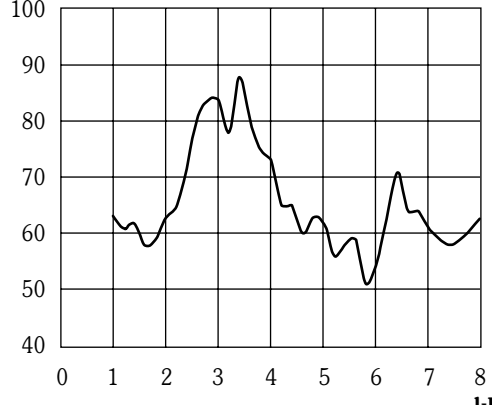
1.2.4.2. Specifications

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

* All measurements are made in free air at 21°C at 30 cm at 12V. The test buzzer is soldered on a pcb board with dimensions 24 cm x 11 cm.

Operating temperature	40°C to +85°C
Storage temperature	-40°C to +85°C
Life time (at 21°C)	See expected life time curve 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	Grey

1.2.4.3. Electrical parameters

Model	SMAT-13	SMAT-17
Sound pressure vs. frequency	<p>dB (A)</p>  <p>kHz</p>	<p>dB (A)</p>  <p>kHz</p>
Model	SMAT-21	SMAT-24
Sound pressure vs. frequency	<p>dB (A)</p>  <p>kHz</p>	<p>dB (A)</p>  <p>kHz</p>
Model	SMAT-30	
Sound pressure vs. frequency	<p>dB (A)</p>  <p>kHz</p>	

Precision of frequency: $\pm 15\%$
 Operating voltage: 10 V (pp)
 (square wave)

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

1.2.4.4. Dimensions (All dimensions are in mm)

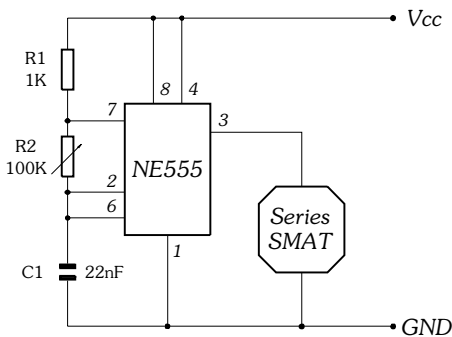
	SMAT-13	SMAT-17	SMAT-21
Pin-version			
SMD-version			
	<p>Recommended PCB lay-out</p>	<p>Recommended PCB lay-out</p>	<p>Recommended PCB lay-out</p>

(All dimensions are in mm)

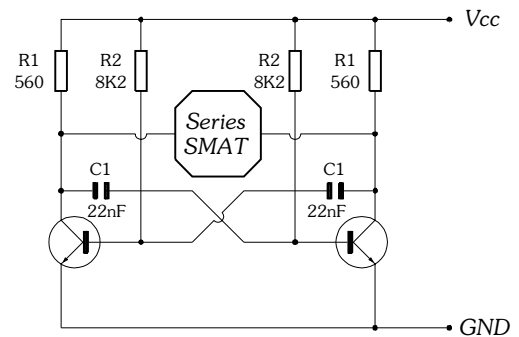
	SMAT-24	SMAT-30
Pin-version		
SMD-version		

1.2.4.5. Drive circuits

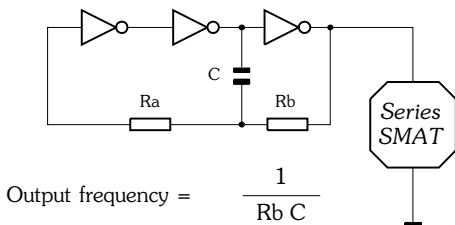
IC Oscillation Circuit



Multivibrator Circuit



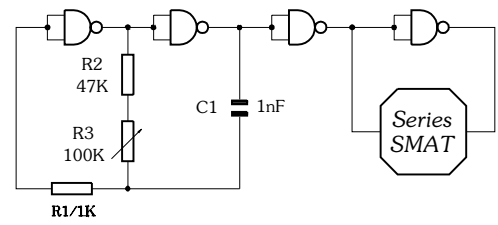
Inverter Oscillator



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

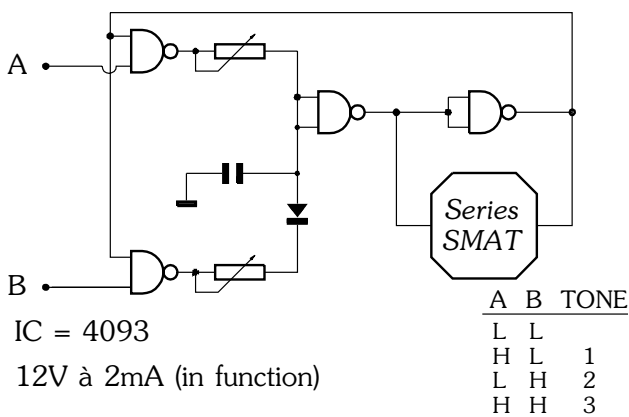
Inverters are CMOS 4049 or 4069.

Nandgate Oscillator

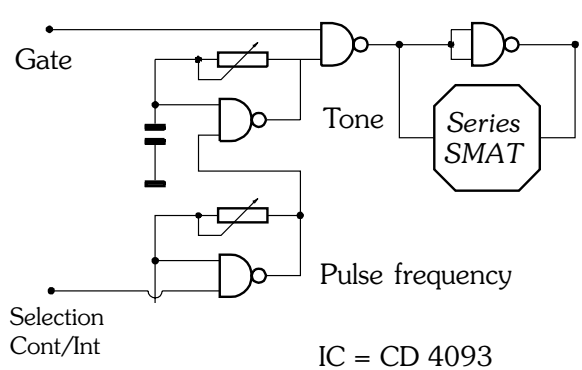


Nandgates are CMOS 4011A

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 $\pm 15\%$. We therefore recommend to testing the sound pressure level with the transducer connected to the final drive circuit.

1.2.4.6. Product codification

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

1.2.4.7. List of available product types

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

A heat protection label in capton material is glued on the SMD model of the SMA buzzer. This enables the user to pick up the buzzer by vacuum. During the reflow 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.

1.2.5. MODELS ON REQUEST

The SMA series can be delivered, upon special request, with the following protection:

- Wash tabs**
 A wash tab is glued on the sound emitting hole of the buzzer to protect it from water penetrating into the hole of the cavity. The PCB at the back is also sealed with a silicon film. To order this part, please add WASH TAB to the model number of the SMA series.
- Acrylcoating**
 For applications in aggressive humid conditions, models containing a membrane with a protective coating are available. The protective coating gives a complementary assurance against smog. Add MC to the model number of the SMA series.

1.2.6. 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	SMA-13 series	SMA-17 series	SMA-21 series	SMA-24 series	SMA-30 series
per board	250	150	100	100	50
per box	(6 x 250) 1500	(6 x 150) 900	(5 x 100) 500	(5 x 100) 500	(3 x 50) 150

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-13 S	SMA-17 S	SMA-21 S	SMA-24 S	SMA-30 S
per tray	100	81	49	42	25
per box	(9 x 100) 900	(8 x 81) 648	(7 x 49) 343	(5 x 42) 210	(6 x 25) 150

Dimensions of the tray and position of the SMD components:

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

