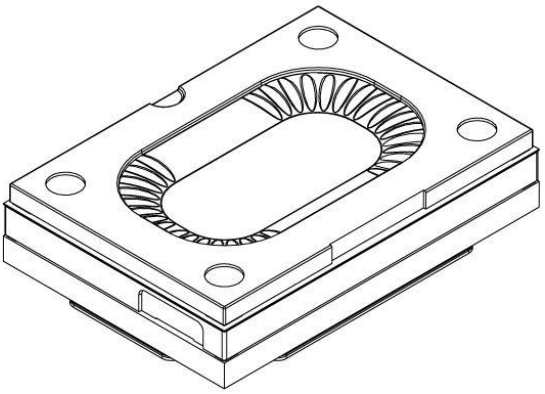
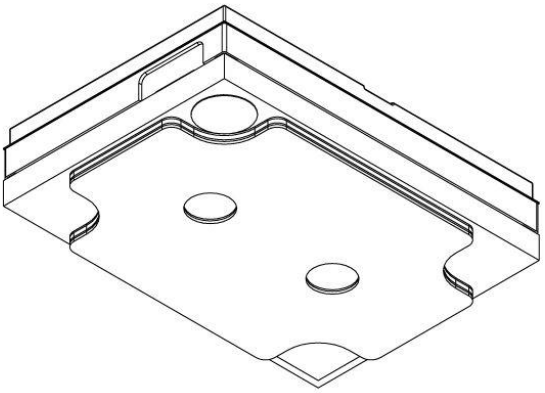




MEMS-based micro-speaker for headphones, wearables and array applications

Features

- Small form factor
- High flexibility for acoustic system integration
- Low heat generation
- No magnetic field
- High input impedance suitable for thin wires or PCB traces

Description

Adap is a MEMS-based micro-speaker for occluded-ear headphones, and can also be used as micro-tweeter for wearables and array applications

Test conditions

Measured with IEC 60318-4 coupler	
Coupler type	IEC 60318-4 (711)
Coupler Volume	1.4cm³
Connection tube length	1.6mm
Connection tube diameter	3.7mm

Microphone	GRAS 43AC
Microphone Amplifier	B&K Nexus
Loudspeaker Amplifier	G.R.A.S. 12AU
Measurement System	APx 526

Measurement Signal	Exp. Sweep
Frequency Range (Audio)	10Hz - 20kHz
Frequency Range (Ultrasound)	20kHz - 80kHz
Voltage levels (Audio)	
V_{dc}	15V
V_{ac}	15Vp
Voltage levels (Ultrasound)	
V_{dc}	15V
V_{ac}	5Vp

Measured with IEC 60268-5 baffle	
Baffle type	IEC 60268-5
Mic distance	3cm
Reference distance	10cm

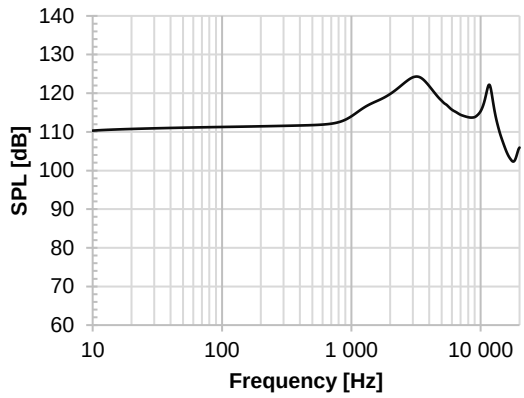
Microphone	GRAS 46AC
Microphone diameter	1/2"
Microphone Amplifier	B&K Nexus
Loudspeaker Amplifier	G.R.A.S. 12AU
Measurement System	APx 526

Measurement Signal	Exp. Sweep
Frequency Range (Audio)	1kHz - 20kHz
Frequency Range (Ultrasound)	20kHz - 80kHz
Voltage levels (Audio)	
V_{dc}	15V
V_{ac}	15Vp
Voltage levels (Ultrasound)	
V_{dc}	15V
V_{ac}	5Vp

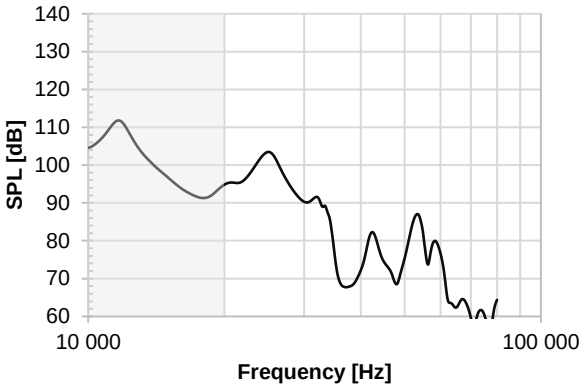
Impedance		
Z @ 100Hz	[Ω]	46611
Z @ 1kHz	[Ω]	4891
Z @ 10kHz	[Ω]	648
Z @ 40kHz	[Ω]	161
Capacity		
C @ 100Hz	[nF]	34
C @ 1kHz	[nF]	33
C @ 10kHz	[nF]	25
C @ 40kHz	[nF]	25

Acoustic parameters IEC 60318-4 coupler

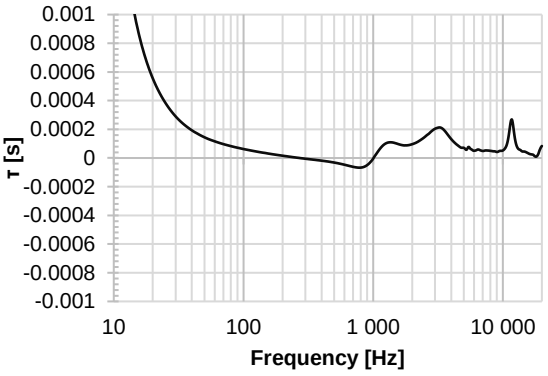
SPL (@15Vp drive)
Audio Range (10Hz-20kHz)



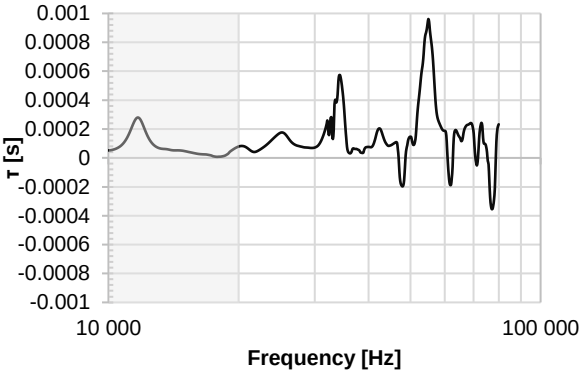
SPL (@5Vp drive)
Ultrasound Range (20kHz-80kHz)



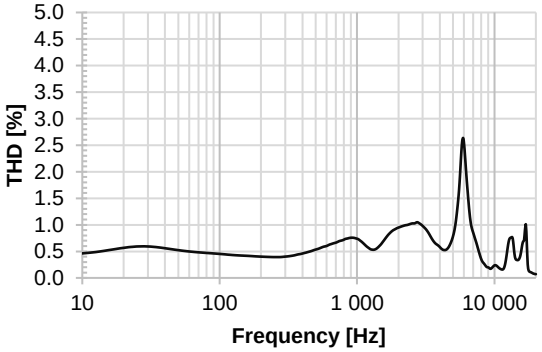
Group Delay
Audio Range (10Hz-20kHz)



Group Delay
Ultrasound Range (20kHz-80kHz)

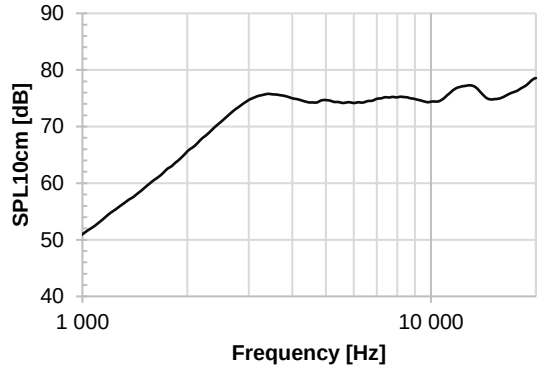


THD (94dB SPL @1kHz)
Audio Range (10Hz-20kHz)

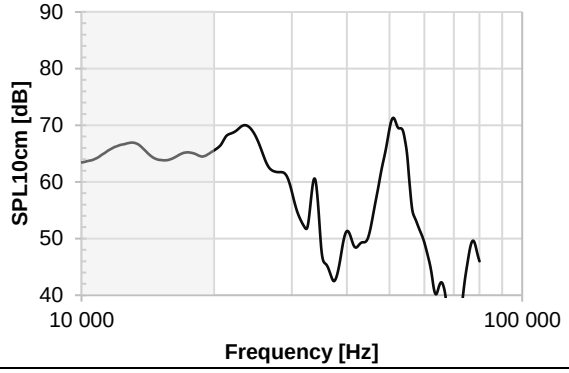


Acoustic parameters IEC 60268-5 baffle

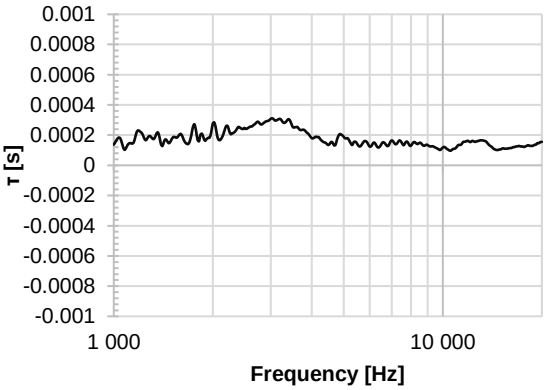
SPL (@15Vp drive)
Audio Range (1kHz-20kHz)



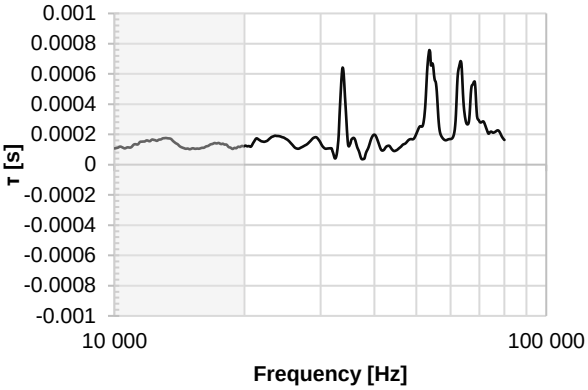
SPL (@5Vp drive)
Ultrasound Range (20kHz-80kHz)



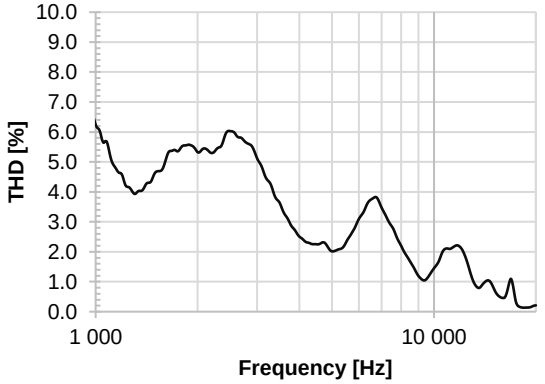
Group Delay
Audio Range (1kHz-20kHz)



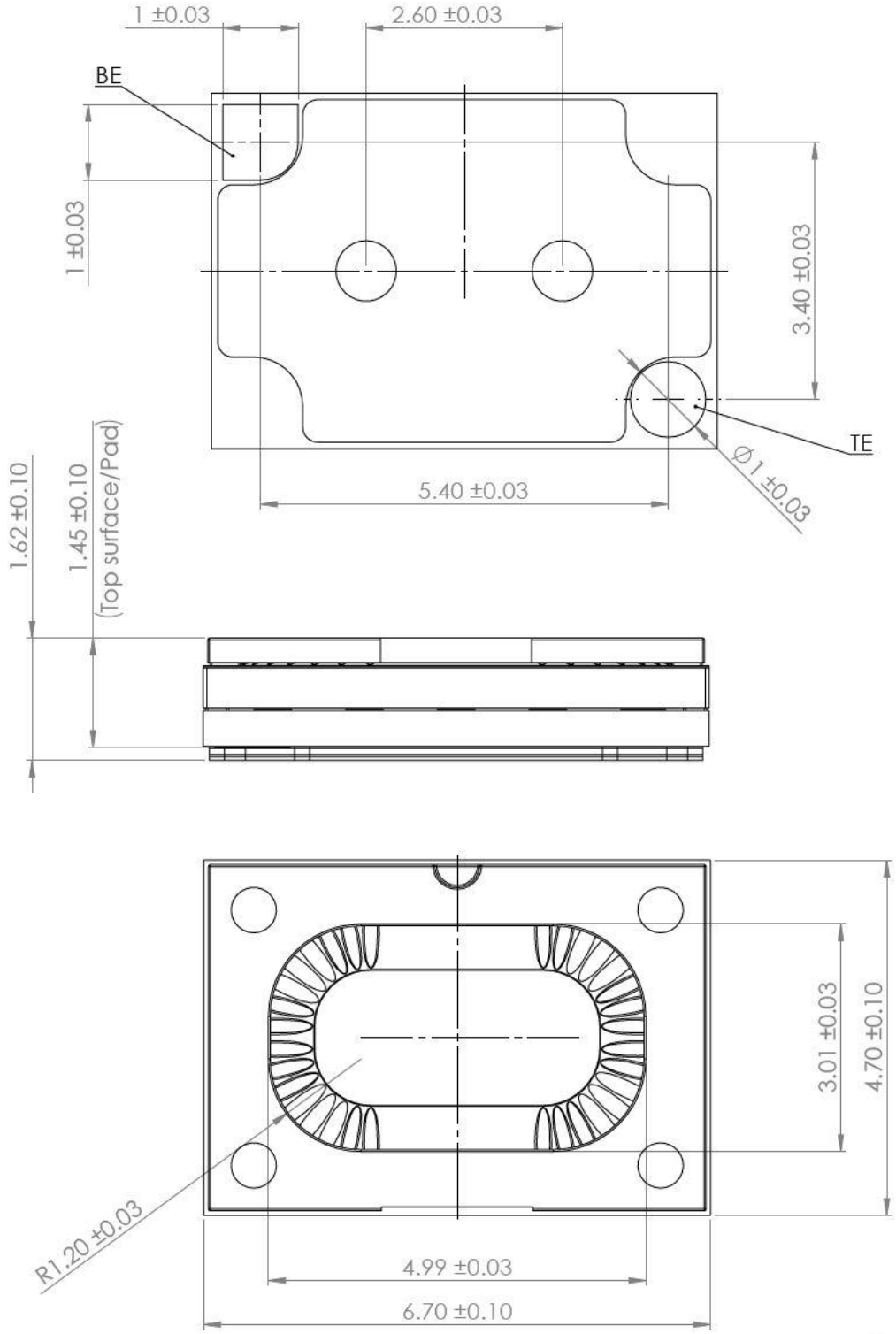
Group Delay
Ultrasound Range (20kHz-80kHz)



THD (60dB SPL @4kHz)
Audio Range (1kHz-20kHz)



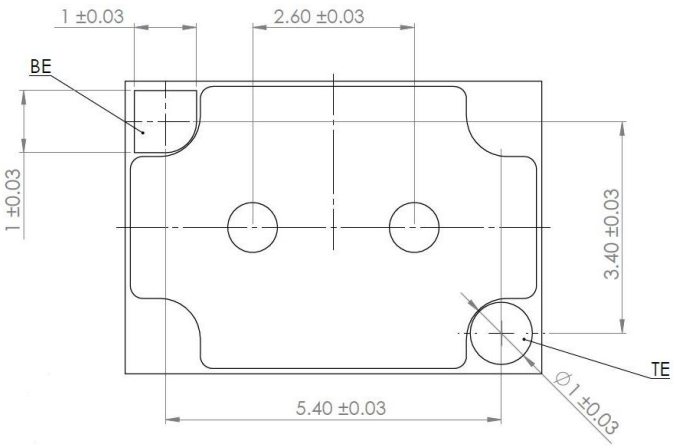
Mechanical Dimensions



Connectivity

The speaker is driven by applying a voltage between the connections for top electrode (TE) and bottom electrode (BE). The potential of BE has to be always equal or higher than the TE. To ensure that, a DC voltage together with the AC signal have to be applied on BE.

Attention:
The AC peak voltage must be always smaller or equal the DC voltage.



Operating conditions

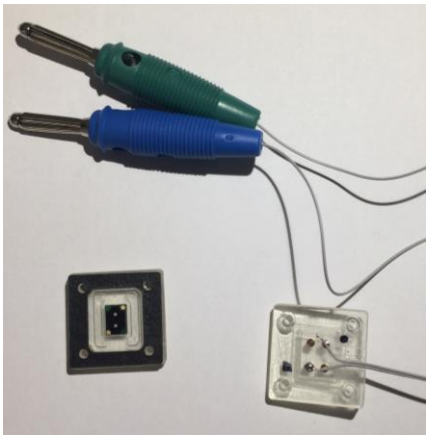
Maximum AC Voltage (Peak) – up to 20kHz	[V_P]	15
Maximum AC Voltage (Peak) – up to 40kHz	[V_P]	5
Maximum DC Voltage	[V]	15
Maximum Current (AC_{Peak})	[mA]	200

Test-Box

Adap can be delivered with a default test-box with a back volume of 100mm³.

This box provides, besides the necessary sealing to avoid an acoustic short circuit, a convenient way to connect Adap to the AC and DC Signal.

Adap must be placed in the bottom shell, make sure that the pins on the box connect to the correct contact-pads on the speaker. Tighten the screws after closing the box to ensure proper sealing.



Top electrode (TE)	Green
Bottom electrode (BE)	Blue