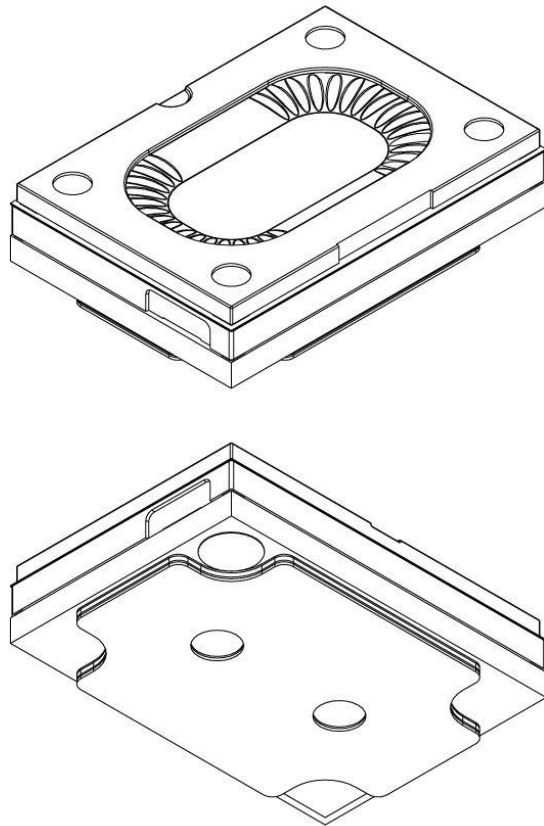


## **MEMS-based micro-speaker for headphones, wearables and array applications**



### **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**

Achelous 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	1.4cm <sup>3</sup>
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

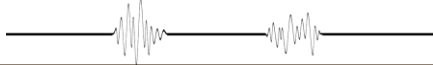
Measurement Signal	Exp. Sweep
Frequency Range (Audio)	10Hz - 20kHz
Frequency Range (Ultrasound)	20kHz - 80kHz
Voltage levels (Audio)	
V <sub>dc</sub>	15V
V <sub>ac</sub>	15Vp
Voltage levels (Ultrasound)	
V <sub>dc</sub>	15V
V <sub>ac</sub>	5Vp

Impedance		
Z @ 100Hz	[Ω]	36542
Z @ 1kHz	[Ω]	3946
Z @ 10kHz	[Ω]	605
Z @ 40kHz	[Ω]	137
Capacity		
C @ 100Hz	[nF]	44
C @ 1kHz	[nF]	40
C @ 10kHz	[nF]	26
C @ 40kHz	[nF]	29

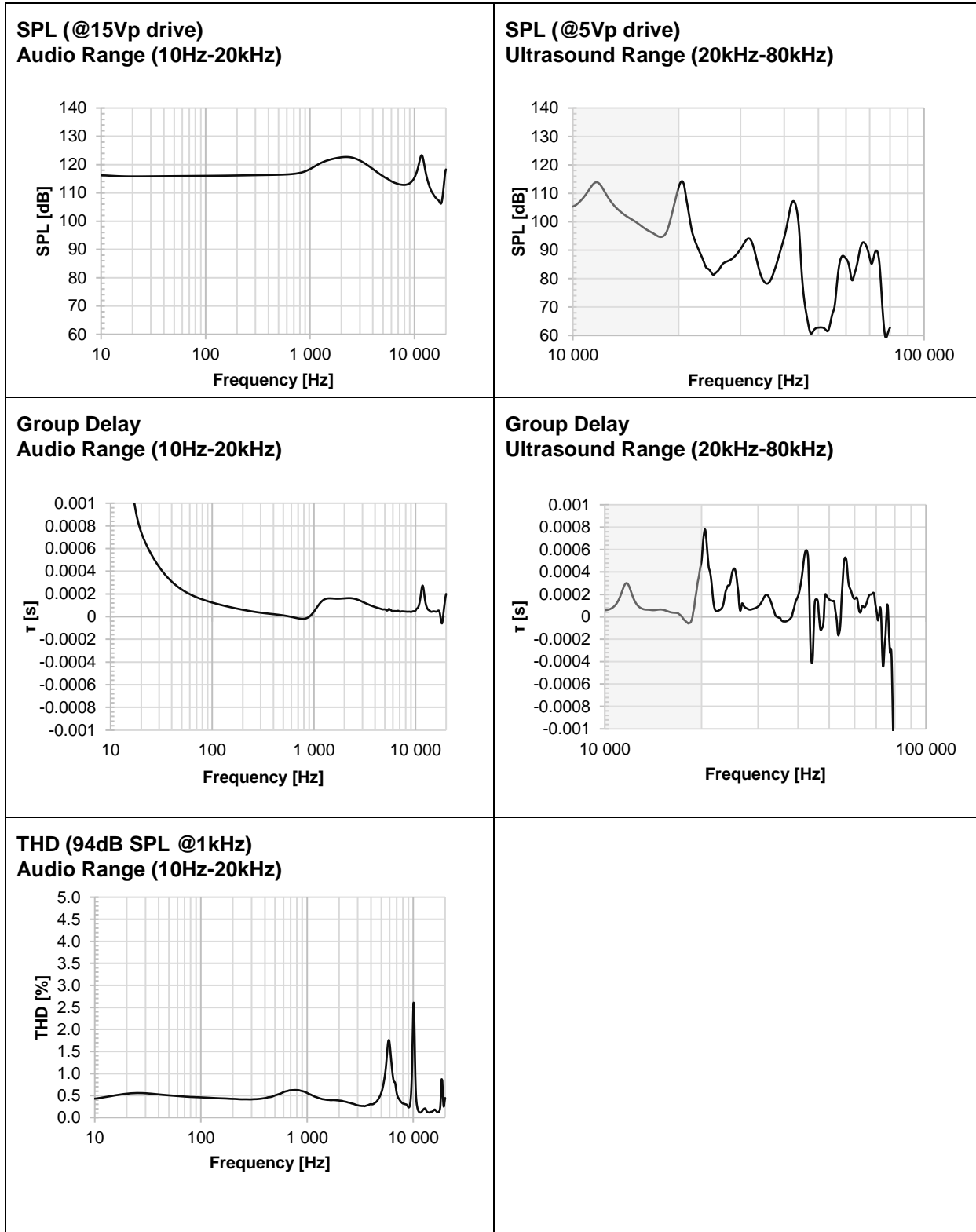
Measured with IEC 60268-5 baffle	
Baffle type	IEC 60268-5
Mic distance	3cm
Reference distance	10cm

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 <sub>dc</sub>	15V
V <sub>ac</sub>	15Vp
Voltage levels (Ultrasound)	
V <sub>dc</sub>	15V
V <sub>ac</sub>	5Vp

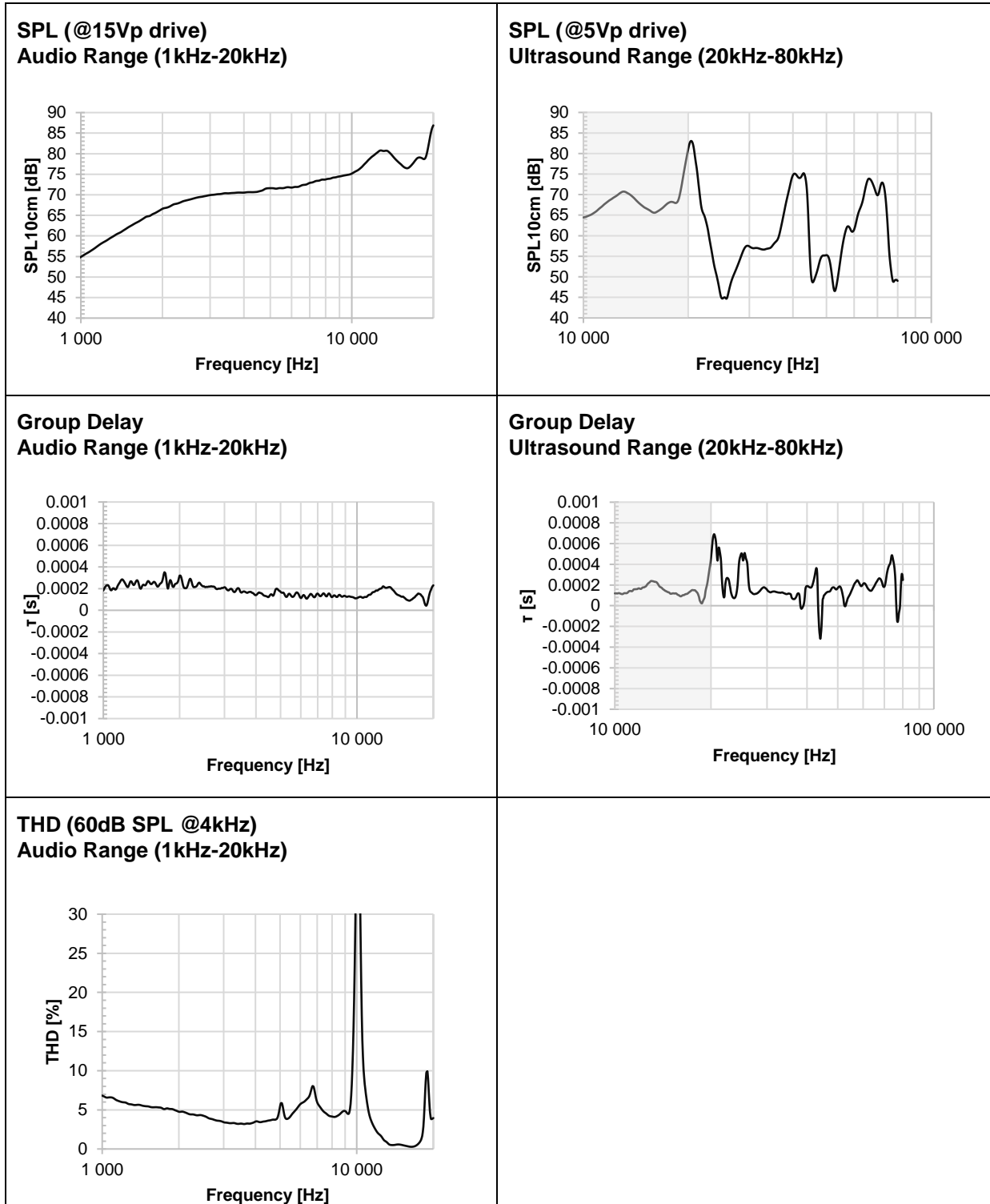


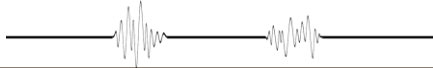
Acoustic parameters IEC 60318-4 coupler



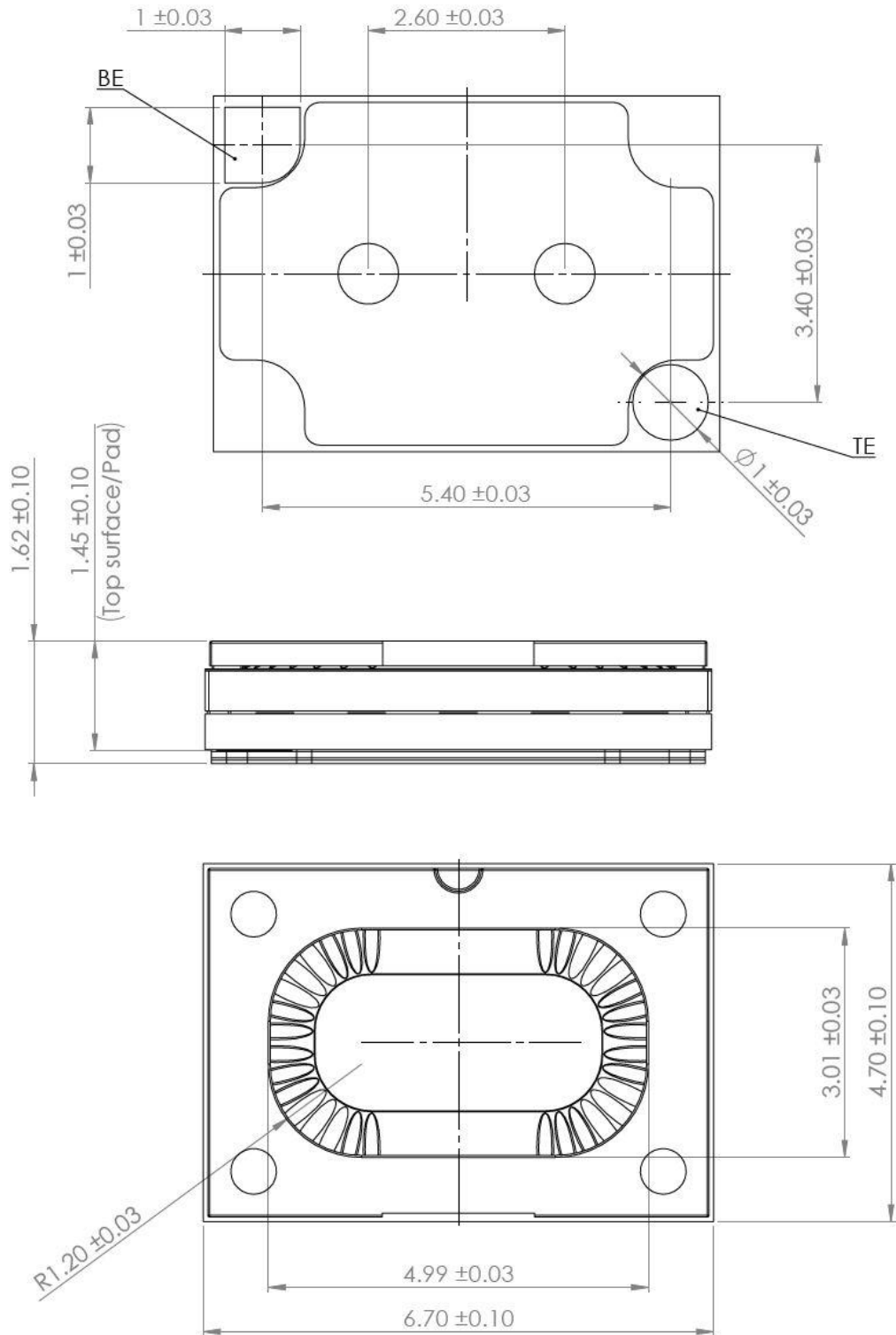


### Acoustic parameters IEC 60268-5 baffle





### Mechanical Dimensions

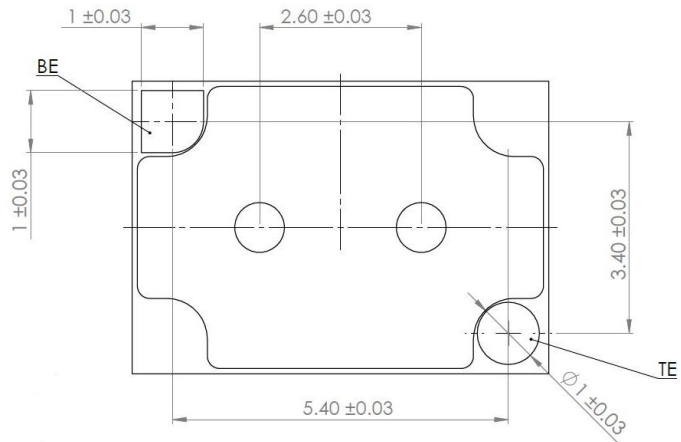


## Connectivity

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 <sub>P</sub> ]	15
Maximum AC Voltage (Peak) – up to 40kHz	[V <sub>P</sub> ]	5
Maximum DC Voltage	[V]	15
Maximum Current (AC <sub>Peak</sub> )	[mA]	200

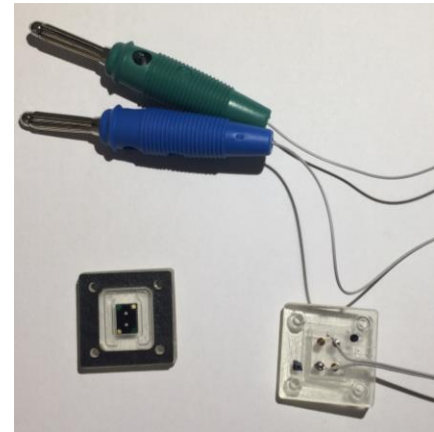
## Test-Box

Achelous can be delivered with a default test-box with a back volume of 100mm<sup>3</sup>.

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

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

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



USound GmbH ("USound") makes no warranties for the use of USound products, other than those expressly contained in USound's applicable General Terms of Sale, located at [www.usound.com](http://www.usound.com). USound assumes no responsibility for any errors which may have crept into this document, reserves the right to change devices or specifications detailed herein at any time without notice, and does not make any commitment to update the information contained herein.

No license to patents or other intellectual property rights of USound are granted in connection with the sale of USound products, neither expressly nor implicitly.

In respect of the intended use of USound products by customer, customer is solely responsible for observing existing patents and other intellectual property rights of third parties and for obtaining, as the case may be, the necessary licenses.

**Important note: The use of USound products as components in medical devices and/or medical applications, including but not limited to, safety and life supporting systems, where malfunctions of such USound products might result in damage to and/or injury or death of persons is expressly prohibited, as USound products are neither destined nor qualified for use as components in such medical devices and/or medical applications. The prohibited use of USound products in such medical devices and/or medical applications is exclusively at the risk of the customer.**