



Application Note

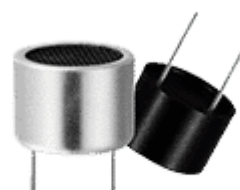
AN 05 – Buzzers: design guidelines for sound ports

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2023/10/15

The information contained herein is for reference purposes only. It is intended as a guide for use by persons having technical skill at their own discretion and risk. We do not assume any liability in connection with its use.

Based on their geometry, the acoustic ports of audio buzzers can significantly affect sound quality. This document aims to summarize some fundamental aspects to consider when designing these acoustic ports.



Figures 1, 2, and 3 illustrate three different possible ways of integrating a conventional buzzer into a device. The labels in these figures correspond to the following components:

A: A gasket that ensures complete sealing between the buzzer and the device casing (**B**). This element is often made of rubber and surrounds the buzzer port. This gasket must be compressed either from the front or rear side.

B: The device casing, for which three different edge shapes are proposed:

- Fig. 1: Flared edges that help prevent any acoustic tubing effect,
- Fig. 2: A straight opening with a diameter larger than that of the buzzer port,
- Fig. 3: A straight opening with the same diameter as the buzzer port.

In this last configuration, it is important to note that a tube of the same diameter will act as an additional acoustic load on the buzzer port, creating a risk of lowering its resonance frequency if the tube is significantly long.

Additionally, this tube is expected to resonate at a frequency approximately equal to $f = 343 / (4 * \text{Casing thickness})$. Considering typical casing thicknesses, this phenomenon could help increase the radiated sound pressure level in ultrasonic applications.

C: A mesh that helps protect the buzzer sound port from solid particles and water droplets. Depending on the required IP rating for the application, the sound pressure level radiated from the buzzer may need to be reconsidered.

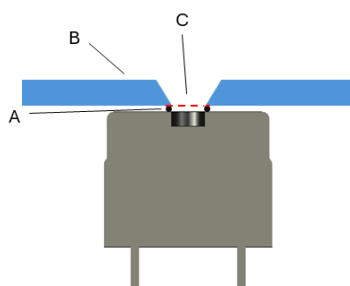


Figure 1

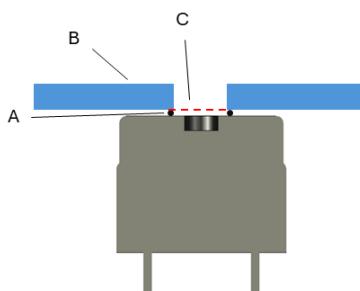


Figure 2

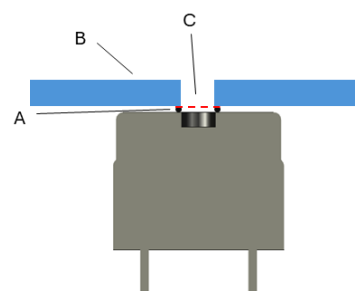


Figure 3