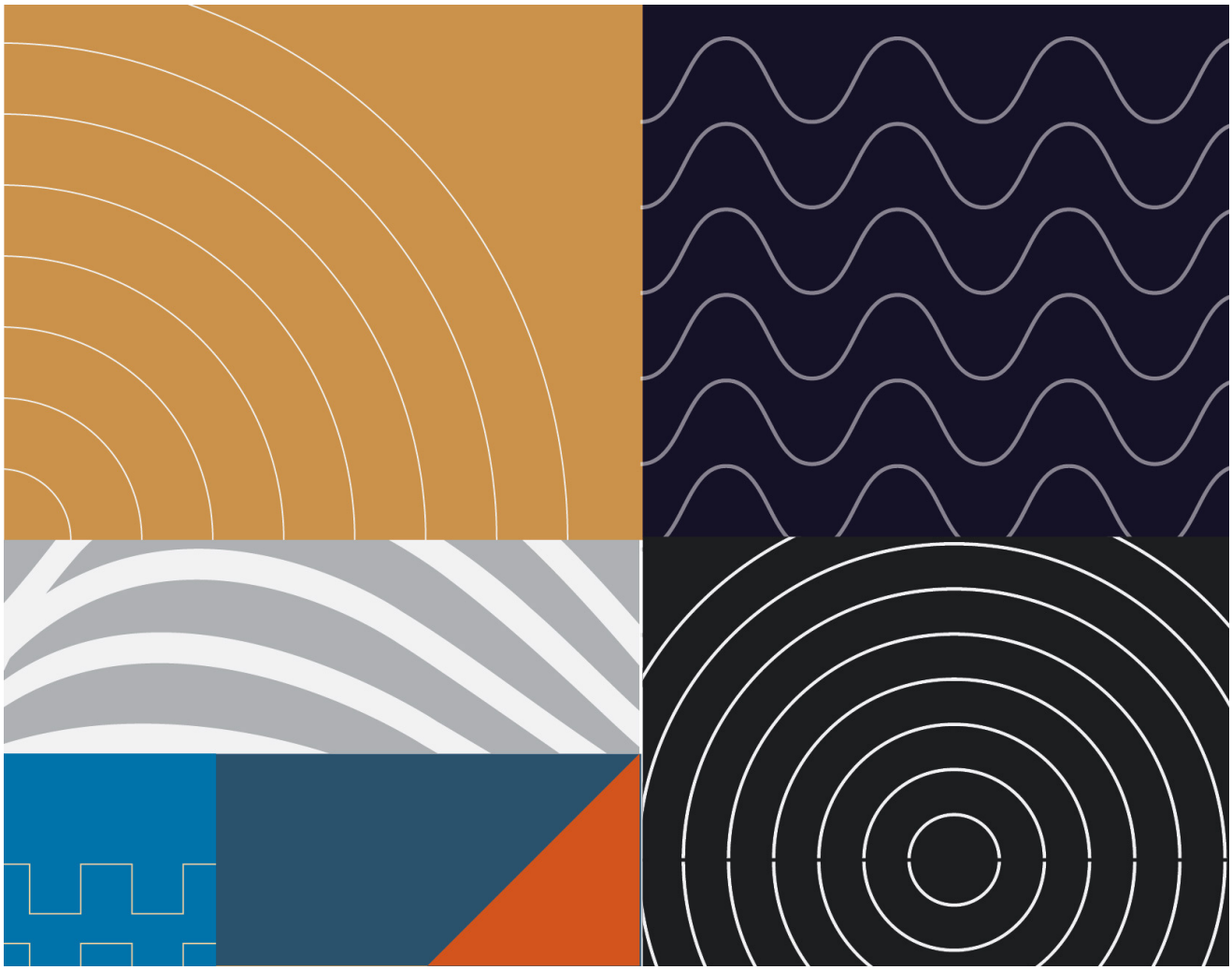
NEW PRODUCT INTRODUCTION
JANUARY 2024

Surface Mount Buzzers



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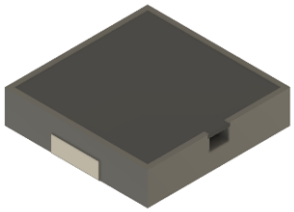
Announcement

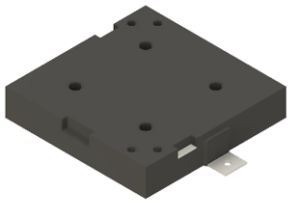
PUI Audio is thrilled to announce the expansion of our surface mount transducer offerings. Our new 8mm to 15mm range of surface mount buzzers can be utilized in numerous electronic devices and systems where highly reliable clear audible alerts, notifications, or alarms are needed. These low-profile and easy-to-integrate transducers are ideal for a wide range of applications and able to withstand temperatures from -40°C to 85°C. They can be found in medical devices, industrial equipment, security systems, appliances, communication devices, and more.

At PUI Audio, we strive to offer our customers the best possible solutions to meet their needs. We understand the importance of audible alerts and notifications in today's fast-paced world, and our surface mount transducers are designed to deliver reliable and efficient performance. Whether you require a buzzer for a medical device, security system, or communication device, we offer a broad selection to cater to your specific needs.

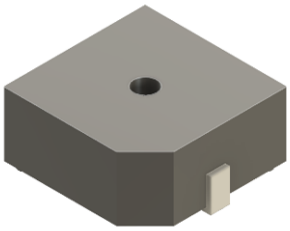
SMT-0823-S-HT
8mm



SMT-1240-S-HT
12mm



SMT-1341-T-HT-2
13mm



SMT-1550-T-HT
15mm

Our commitment to quality and customer satisfaction is what sets us apart from the competition. We work closely with our clients to understand their requirements and provide tailored solutions that meet their needs. With our new surface mount transducers, you can be assured of high performance, durability, and reliability.

New Product Key Features

SMT-0823-S-HT

- 7.5mm x 7.5mm electromagnetic transducer
- Surface mount and 2.5mm height for low profile easy installation
- Wide operating temperature range up to 85°C and as low as -40°C
- 80dB @ 3.6V (0 to peak)
- Resonant frequency of 2,500 Hz

SMT-1240-S-HT

- 12mm x 12mm Piezoelectric transducer
- Low power consumption & no added EMI/EMC concerns
- Surface mount and 2.8mm height for low profile, easy installation
- Wide operating temperature range up to 85°C and as low as -40°C
- 78dB @ 3.0V (peak to peak)
- Resonant frequency of 4,000 Hz

SMT-1341-T-HT-2

- 13mm x 13mm Piezoelectric transducer
- Low power consumption & no added EMI/EMC concerns
- Surface mount and 2.5mm height for low profile, easy installation
- Wide operating temperature range up to 105°C and as low as -40°C
- 85dB @ 5.0V (peak to peak)
- Resonant frequency of 4,100 Hz

SMT-1550-T-HT

- 14.8mm x 14.8mm footprint
- Low power consumption & no added EMI/EMC concerns
- Surface mount and 6.8mm height for low profile, easy installation
- Wide operating temperature range up to 85°C and as low as -30°C
- 85dB @ 12.0V (peak to peak)
- Resonant frequency of 5,000 Hz

Drive Circuit for Buzzers

A well-designed drive circuit ensures the buzzer operates at peak efficiency and produces the desired acoustic output. To achieve the highest sound pressure level (SPL) from the transducer, it is recommended to drive the transducer with a 50% duty cycle, 0V-VPK square wave, where VPK is equal to the rated voltage of the transducer. Half-rectified sine waves may also be used to create softer, less harsh tones, but the SPL will decrease. The drive circuit for an Audio Transducer depends on the driving signal's available current and voltage levels. Suppose the signal has sufficient current and voltage to drive the transducer. In that case, it can be connected directly to a DC voltage supply to control the sound output by modulating the positive voltage supply on/off rate. However, designing a separate drive circuit is recommended if the available current output is limited.

Drive circuit for Electromagnetic Transducers

(SMT-0823-S-HT)

A typical design includes a NPN transistor (Figure 1) in a low-side drive configuration. In this configuration, the transistor is connected between the ground and the transducer, and the signal is applied to the transistor's base. The transistor switches the current flow to the transducer, allowing the transducer to produce sound at the switching frequency. R1 is used to limit any current spikes, preventing damage to the microcontroller GPIO pin. When designing a drive circuit for an electromechanical audio transducer, it is important to consider the power dissipation of the drive transistor, particularly if it is a small-signal BJT in a TO-92 package.

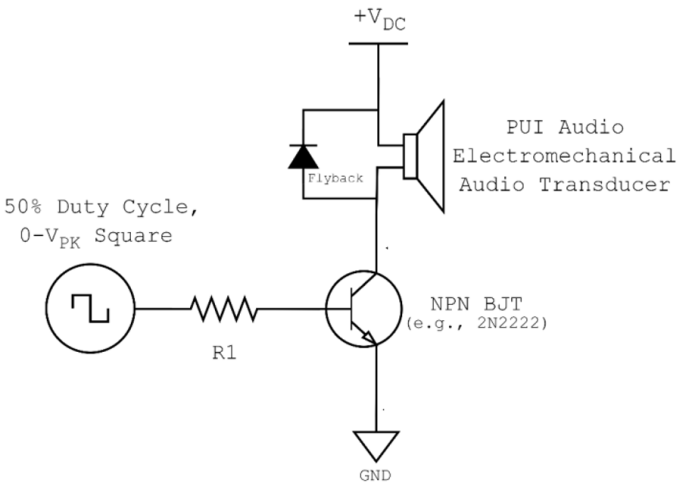


Figure1: Option 1 using a transistor.

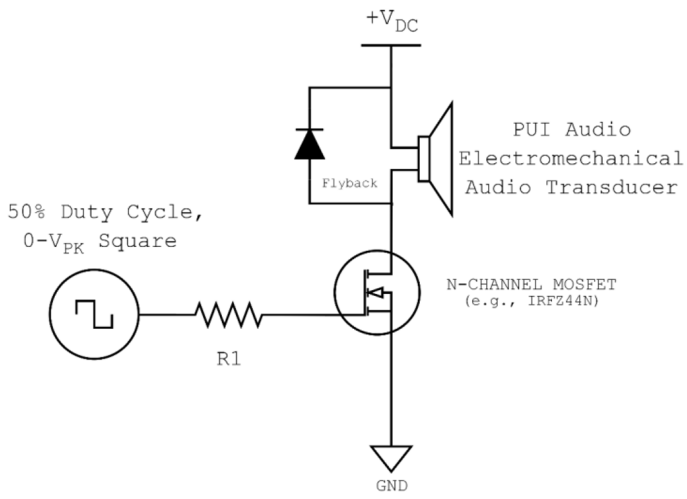


Figure 2: Option 2 using a MOSFET for efficiency improvement.

Using a MOSFET (shown in Figure 2 above) instead of a BJT in circuits prioritizing efficiency can provide positive results. MOSFETs have a significantly lower on-resistance than BJTs, resulting in lower power dissipation and higher efficiency. Additionally, MOSFETs typically have a higher input impedance than BJTs, making them easier to drive from current-restricted sources such as microcontrollers.

Drive circuit for Piezoelectric Transducers

(SMT-1240-S-HT, SMT-1341-T-HT-2, SMT-1550-T-HT)

If the transducer is driven below its resonant frequency, then the piezoelectric material may be considered a purely capacitive load; to begin the audio output, the drive circuit must supply a charge to the piezoelectric element in the transducer, then remove the charge to cause movement in the opposite direction. The resulting sound will be at the frequency at which charge is applied and removed from the transducer by the drive circuit.

When operating at or near the transducer's resonant frequency, the piezoelectric transducer has a small resistive element that appears electrically in parallel with the capacitance of the transducer (generally no more than 100 Ω). The drive circuit must have an adequate current supply to ensure the rated voltage of the transducer is dropped across its resistive element under regular operation.

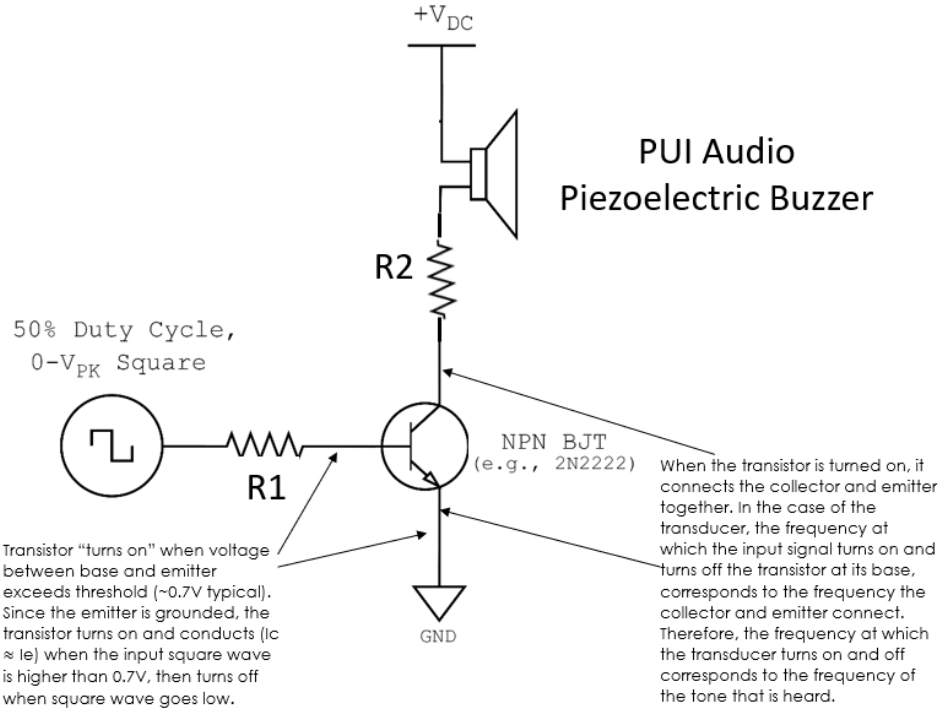


Figure3: Drive Circuit for Piezoelectric transducer using a transistor

R2 provides an additional resistive element in series with the transducer to ensure sufficient current dissipation for the transducer when operating outside of resonance and not appearing as having a resistive element. An additional resistance may be placed in parallel across the piezoelectric buzzer to allow for any stored charges to dissipate when the transistor switch is open. This may improve performance and reliability in designs.

Specific values for resistors will depend on the application and circuit design, though a typical value is between 100-1k ohms.

A diode is typically used in place of the parallel resistor for magnetic circuits; since the buzzer has an internal resistive element, any stored energy will dissipate immediately when the switch is open, and the diode protects the voltage rail from any feedback.

Due to its high impedance and piezoelectric property, a piezoelectric buzzer can also be directly driven from an integrated circuit (IC) (shown in Figure 4). However, for stable sound production and IC protection, it is advisable to insert a resistor in series between the IC output and the piezoelectric buzzer. Resistor value should be such that it does not exceed the maximum current rating of IC.

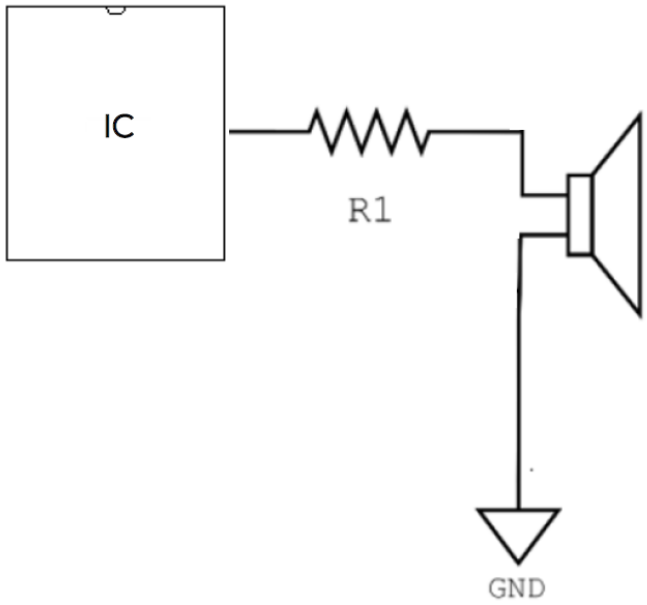


Figure4: Drive Circuit for Piezoelectric transducer using an IC

CONCLUSION

We are thrilled to announce the expansion of our surface mount transducers offering and look forward to serving our customers with the best possible solutions. PUI Audio offers comprehensive documentation and support to assist engineers in designing optimal drive circuits tailored to their specific requirements. Contact us today to learn more about our products and how we can help you with your audible alert needs.

Additional products and resources at:

https://puiaudio.com/products/category/transducers
https://puiaudio.com/wp-content/uploads/2023/10/Buzzers-Expansion-1.pdf
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WHEN IT NEEDS TO BE HEARD