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January 24, 2011

SMD Sound Transducers Reliability

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As with many high-tech trends, miniaturization spawns great innovation. However, it often involves great challenge. This is particularly evident in the area of audible alarms where design challenges magnify as open real estate on products shrinks.

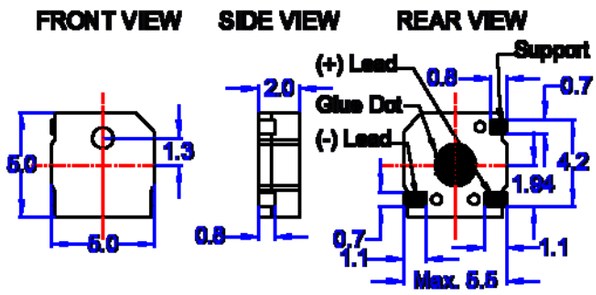
Often, the barriers are physical. To output significant volume, an alarm needs to move air across a desired distance. Smaller devices move less air and do not generate the desired effect or signal strength. Human hearing is another consideration. Sonic reception deteriorates with age, particularly within higher octaves. Since smaller piezoelectric transducers or alarms produce higher signal frequencies, their sound may go unheeded, which can have dire consequences in a healthcare, smoke, or fire applications. Sound vibration also increases kinetic stress on SMD solder connections, which can prevent the device from sounding properly—an equally serious issue in many healthcare settings.

We, at Challenge Electronics have resolved these issues by enhancing the sound pressure level at the manufacturing stage. This requires careful tuning of the sound chamber, followed by higher-fidelity adjustment and testing. Output Sound Pressure Level is also optimized by the design of the driving circuit for the transducer, or, in the case of piezoelectric alarms, by raising the output voltage of the diaphragm with coils or transformers. In such instances, coils or transformers need to match the impedance of the piezoelectric element at resonant frequency which can be ten times lower than any other frequency.

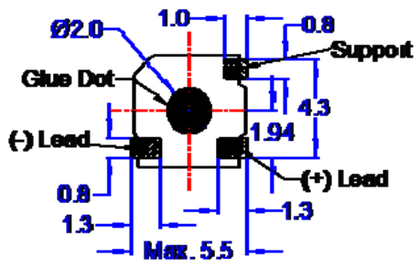
To reduce the Resonant Frequency of Piezoelectric Sound Devices, our engineers in some products mount the Sound Diaphragm on its edges instead of the traditional Nodal mount. This conserves premium space and reduces resonant frequency anywhere from 100 to 800 Hz. and spreads the frequency response of the Alarm or Transducer. Other options include the use of larger, thinner diaphragms made with softer metals such as nickel alloy vs. the traditional brass or stainless steel variations.

To ensure long-term reliability, certain manufacturers, including Challenge Electronics, recommend gluing SMD audible devices to the printed circuit board. The SMD landings are very small and in some cases, only a few solder balls are attaching the Sound Transducer to the PCB. Since the membrane is moving in the Sound Transducer, it creates vibrations in the plastic housing. The addition of a glue dot will alleviate vibration-related stress on the SMT solder pad.

For example, **Challenge Electronics PN CEET050M020-12-204-40MR, SMD Electro-Magnetic Transducer**, 5.0mm X 5.0mm X 2.0mm high, with an output Sound Pressure Level of 82 dB at 10cm, Challenge Electronics recommends to add the glue dot for long-term reliability.



CEET050M020-12-204-40MR
Dimensions in mm



CEET050M020-12-204-40MR

For applications where loudness is a factor, end-product engineers should consult with a specialist who is fully equipped with the knowledge necessary to ensure quality and reliability. Sounding devices may be easily categorized as commodity products, yet not all parts are equal in terms of performance and compliance.

ONLINE

For additional information on the technologies and products discussed in this article, visit Challenge Electronics at www.challengeelectronics.com or email to sales@challelec.com

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