

muRata's Piezoelectric Sound Components

Piezoelectric Sound Components for Cost-Effective Audible Feedback

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From communications to automotive to home electronics, piezoelectric sound components are an integral part of today's electronic world. Recent advancements in electronics technology have placed these components in a "high demand" status.

To grasp the impact of piezoelectric sound components in today's world, it is first necessary to understand the concept of piezoelectricity.

Piezoelectricity (derived from the greek term *piezin* meaning to press tight or squeeze) is a property of certain classes of crystalline materials such as Quartz, Rochelle Salt, Tourmaline and Lead (Pb) Zirconate Titanate (PZT) ceramics. Simply put, piezoelectric products are able to convert electrical energy into mechanical energy and vice versa. When a piezoelectric material is struck, bent or compressed a voltage will be produced across the crystalline material. This is how a BBQ lighter works. The "popping" noise heard is the result of a tiny spring loaded hammer striking the crystalline material. This generates thousands of volts across the face of the crystal, resulting in a spark that lights the grill. In this example mechanical energy is converted to electrical energy. Conversely, when voltage is applied to a piezoelectric material, the material experiences a slight change in shape. Piezoelectric speakers operate on this principle. The speakers convert electrical energy into physical vibrations to create sound.

MuRata's piezoelectric sound components function based on the latter principle – electrical energy is converted into physical vibrations (mechanical energy) thus producing an audible tone (microwave oven beeping when food is ready) or acoustic alarm (warning sound for smoke alarms, car alarms, etc.). Murata's piezoelectric sound components are divided into four sub-categories:

- Piezoelectric Diaphragm (7BB/NB/SB Series) – the sound element of the piezoelectric sound component (consisting of a ceramic plate with electrodes on both sides and a metal plate) – AC Voltage driven*
- Piezoelectric Sounder (PKM Series) – self or externally driven, plastic encased piezoelectric diaphragm (no internal drive circuit) – AC Voltage driven
- Piezoelectric Buzzer (PKB Series) – plastic encased piezoelectric diaphragm which contains a built-in drive circuit (DC voltage can be used to drive circuit)
- Piezoelectric Speaker (VSB Series) – speaker element (piezoelectric diaphragm consisting of a plastic ring) which is capable of reproducing speech – AC Voltage driven



FIGURE 1.0: muRata's Piezoelectric Sound Components

Various applications, such as smoke alarms, burglar alarms, automobiles, household appliances, games, telephones and medical equipment employ Murata's piezoelectric sound components. Their high reliability (due to very few moving parts), clear – penetrating sound, low current consumption (for battery powered applications) and variety of models for various tones and functions make these components a favorite amongst the design community.

In summary, piezoelectric sound components are a staple in today's electronics world. Competitive pricing and variety of models, make muRata's piezoelectric sound components ideal for a variety of applications. Design engineers whose applications require a highly reliable acoustic alarm / audible tone, need look no further than the muRata piezoelectric sound components product line.

For more information on muRata Piezoelectric Sound Components, please contact your local muRata sales office or consult our website at www.murata.com.

* AC Voltage driven – AC Voltage is required to make sound element move back and forth to create sound