



Acoustic components

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## World's smallest MEMS microphones with a digital interface

TDK-EPC, a group company of TDK Corporation, presents the smallest commercially available MEMS microphone worldwide with an integrated digital interface. The dimensions of the EPCOS T4030 of only  $3.25 \times 2.25 \times 1.1 \text{ mm}^3$  make the microphone about 60 percent smaller than alternative

products. This allows significantly more compact designs of mobile phones and consumer electronics applications such as MP3 players and digital cameras.

The T4030 has a sensitivity of -26 dB FS (full scale), and a signal-to-noise ratio of 60 dBA. Even at a sound level of 100 dB, the distortion factor is under 1 percent. Its frequency response is characterized by high bandwidth and low amplitude fluctuations. The T4030 is largely insensitive to electromagnetic interference thanks to a digital PDM (pulse density modulation) output. The suppression of the power supply noise is -82 dB FS. Two channels can also be transmitted via one signal line, making stereo applications much simpler to implement than in analog technology. The supply voltage range is between 1.64 and 2.86 V. The power consumption is 650  $\mu\text{A}$  and is reduced to less than 10  $\mu\text{A}$  in standby operation.

Thanks to its compact dimensions and outstanding electrical properties, the microphone is also predestined for applications with high requirements on audio quality. This also includes high-quality video and VoIP (Voice over IP) systems, telephone conference installations, beam-forming and noise-suppression systems.

The T4030 is manufactured in the CSMP™ (chip-sized MEMS package) technology, which was developed for SAW filters and has already proved itself in billions of mobile phones. It thus benefits from matured EPCOS production processes as well as more than 15 years experience in the development of MEMS microphones. TDK-EPC also uses the proven technology of SAW production for the final electro-acoustic measurement. The MEMS microphones are RoHS-compatible and suitable for lead-free SMD reflow solder processes.

### Glossary

- MEMS: Micro-Electro-Mechanical System. This designates components and systems in which electronic and mechanical components are integrated in a miniature size. Apart from microphones, especially sensors and actuators are manufactured in this technology.
- Beam forming: A method for detecting sources in wave fields such as sound fields. Corresponding systems are also known as acoustic cameras or microphone arrays.
- RoHS: Restriction of Hazardous Substances. This directive has regulated the use of specific substances in electrical and electronic appliances since 2003.

### Main applications

- Mobile phones, hands-free phones, MP3 players and laptops.
- Video and VoIP systems, telephone conference systems and microphone arrays.

### Main features and benefits

- Compact dimensions:  $3.25 \times 2.25 \times 1.1 \text{ mm}^3$
- Low distortion: less than 1 percent at 100 dB
- Good signal-to-noise ratio: 60 dBA