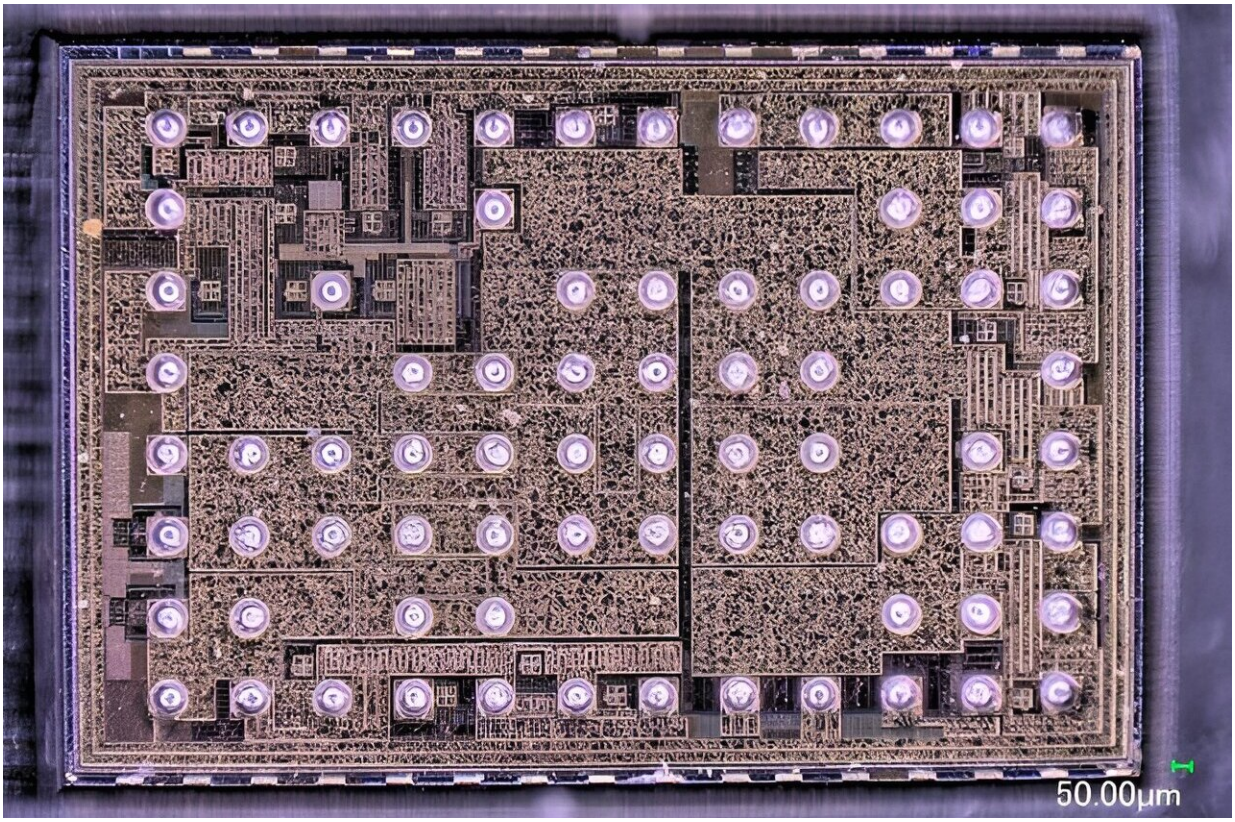
Tiny power converters that run on vibrational energy

February 21 2024, by Ioana Patringenaru



Die photograph of the proposed piezoelectric converter. Credit: University of California San Diego

University of California San Diego and CEA-Leti scientists have developed a ground-breaking piezoelectric-based DC-DC converter that

unifies all power switches onto a single chip to increase power density. This new power topology, which extends beyond existing topologies, blends the advantages of piezoelectric converters with capacitive-based DC-DC converters.

The power converters the team developed are much smaller than the huge, bulky inductors currently used for this role. The devices could eventually be used for any type of DC-DC conversation, in everything from smart phones, to computers, to server farms and AR/VR headsets.

The results were presented in the paper, "An Integrated Dual-side Series/Parallel Piezoelectric Resonator-based 20-to-2.2V DC-DC Converter Achieving a 310% Loss Reduction," Feb. 20 at ISSCC 2024 in San Francisco.

"The Dual-side Series/Parallel Piezoelectric Resonator (DSPPR) is the first IC used for PR-based power conversion, and achieves up to 310% loss reduction over prior-art published and co-designed discrete designs for VCRs