Piezoelectric Micromachined Ultrasonic Transducer Device and Methods

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Technology description

Ultrasound transducers have been widely used in applications such as imaging, diagnostics, and treatments or therapy. Piezoelectric micromachined ultrasonic transducers (pMUTs) for medical devices configured to direct sound waves to body tissue have attracted industry attention for their high pressure-to-size-output ratios, small geometry, low manufacturing cost, low driving voltages, low power consumption, and favorable compatibilities with CMOS and consumer electronics. Traditional ultrasound-based methods involve complex, bulky and expensive hardware. single-electrode unimorph pMUTs have less favorable performance characteristics for medical diagnostics and treatment. Researchers at the University of California, Berkeley, have developed next generation of pMUTs arrays with desirable electromechanical coupling and output efficiencies for medical applications.

Application area

Medical diagnostics and vital signs monitoring
Medical treatment

Advantages

Mode flexibility including pulse-echo and continuous wave
Positioned for wide range of beamwidths (directionality) over wide range of frequencies
Lower manufacturing cost (at least an order of magnitude) comparing to state-of-the-art medical ultrasound technologies
Portability of the system in form of patches or handheld devices
High sensitivity even at low voltages (1-10V) compatible with battery-powered consumer electronics
Smaller size comparing to other non-MEMS technology targeting the same applications

Institution

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