

Microphones MEMS Development towards high SNR

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Abstract

The fast progressing consumer market for smart phones challenges the development of silicon MEMS microphones with ever higher key performance parameters. While in 2006 the signal to noise ratio was at 60dB(A) it doubled until 2014 (fig. 1) and is about to double again in half the time (fig. 2). This talk will show the state of the art standard condenser microphone performance and describe a way towards lowest noise MEMS microphones utilizing interdigitated comb sensors. Design constraints and fabrication results will be discussed. Finally, the first measurements of MEMS microphones with SNR larger than 72dB(A) will be presented.

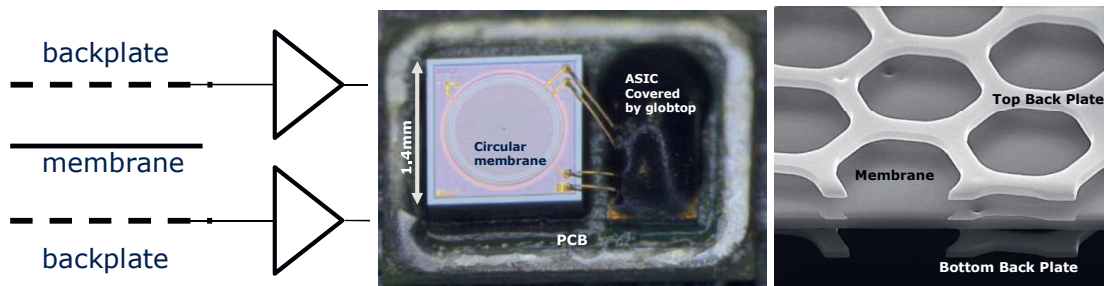


Fig. 1: Concept of dual backplate microphone (left) allowing fully differential sensing. Open package with MEMS die and ASIC (center) and cross-section of dual backplate surface and backside micro machined condenser configuration. The device offers 66dB(A) and a total harmonic distortion below 1% above 130dB sound pressure level [1].

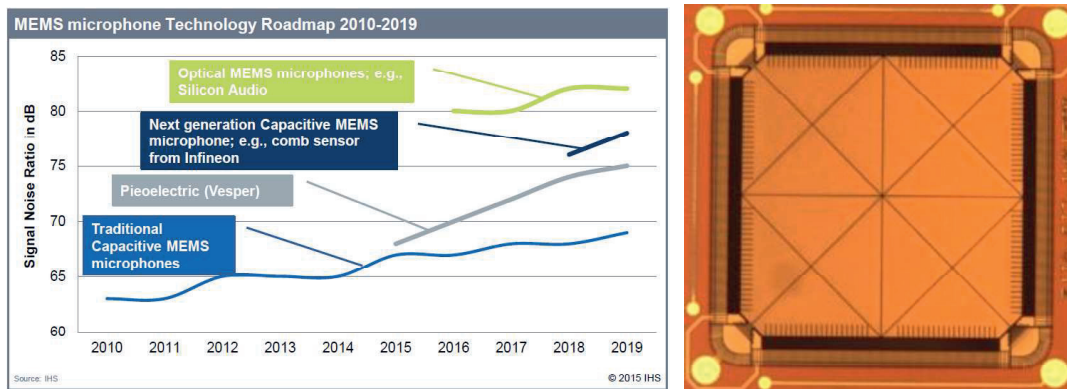


Fig. 2: Race for high SNR as of IHS [1] with different competing technologies (left). And Infineon first comb sensor microphone with a 1mm² diaphragm on the right.

- [1] Marc Földner and Alfons Dehé, Dual Back Plate Silicon MEMS Microphone: Balancing High Performance!, DAGA, Nürnberg, March 2015
- [2] IHS MEMS Microphone Report, November, 2015