

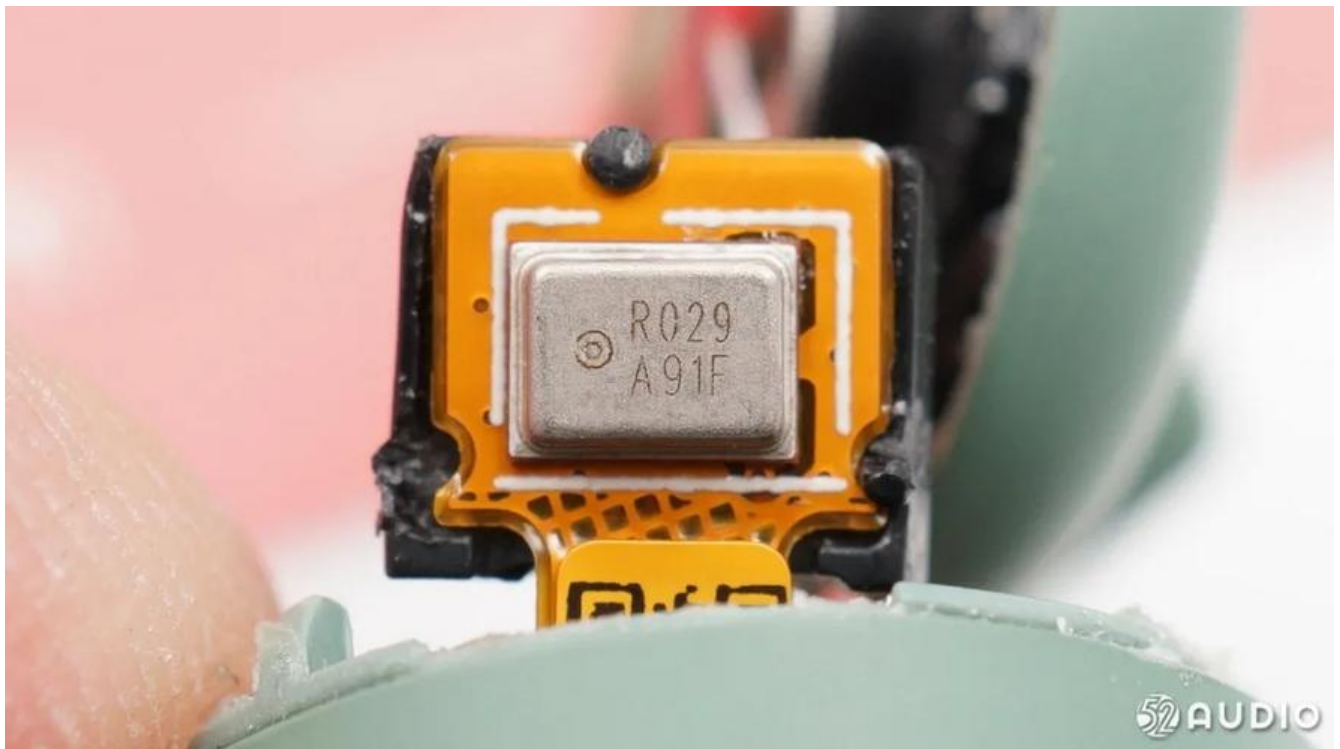
MEMS（微机电系统） 麦克风原理图

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原文链接: <https://ld246.com/article/1607055875891>

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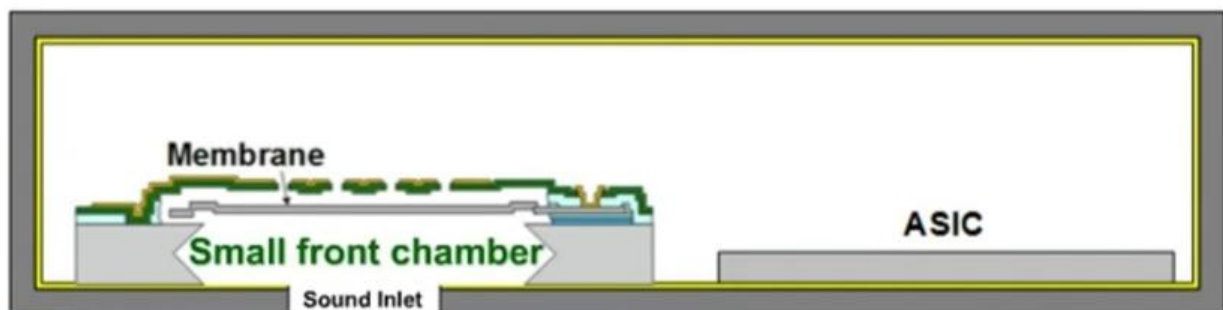
52 AUDIO

Bottom-port MEMS microphones

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Most bottom-port MEMS microphones have similar designs

- sound inlet on bottom
- acoustic sensor mounted directly over the sound inlet
 - small front chamber helps high frequency response



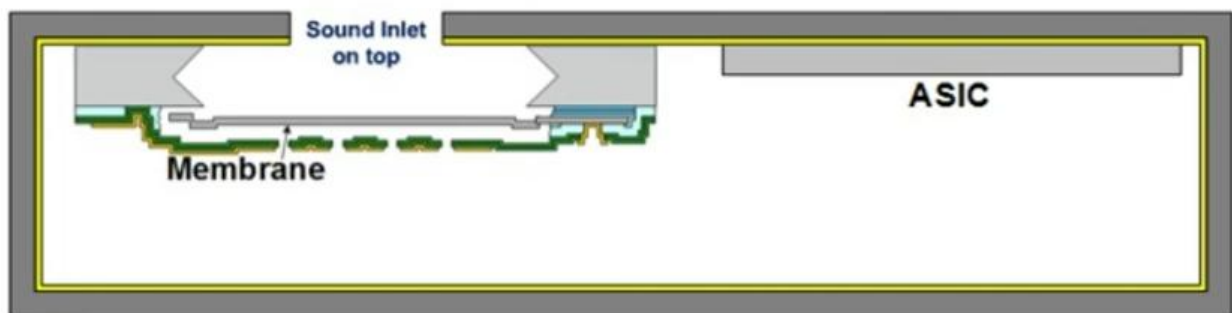
MP34DT01 top-port MEMS microphone

15

ST has taken a different approach to top-port microphones

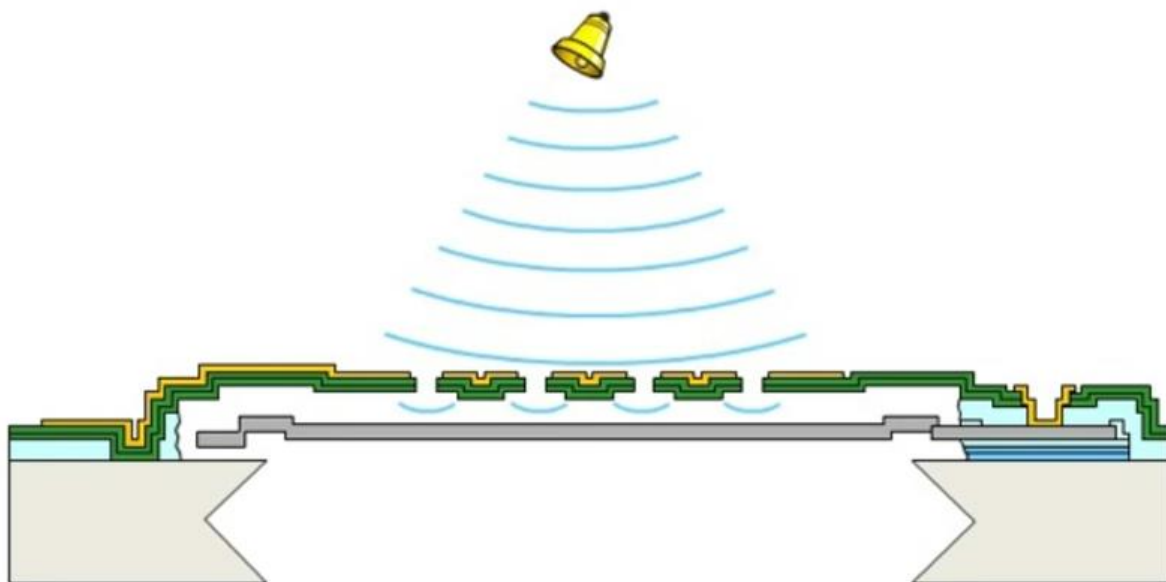
- the sound inlet on the top of the package
- the acoustic sensor is mounted directly below the sound inlet on the bottom side of the microphone lid
- the small front chamber helps the high frequency response

The combination of a small front chamber and a large back chamber provides good sensitivity and good frequency response



MEMS microphone operation ■

- The MP34DT01 operates by measuring the capacitance change between a fixed plate and a movable diaphragm

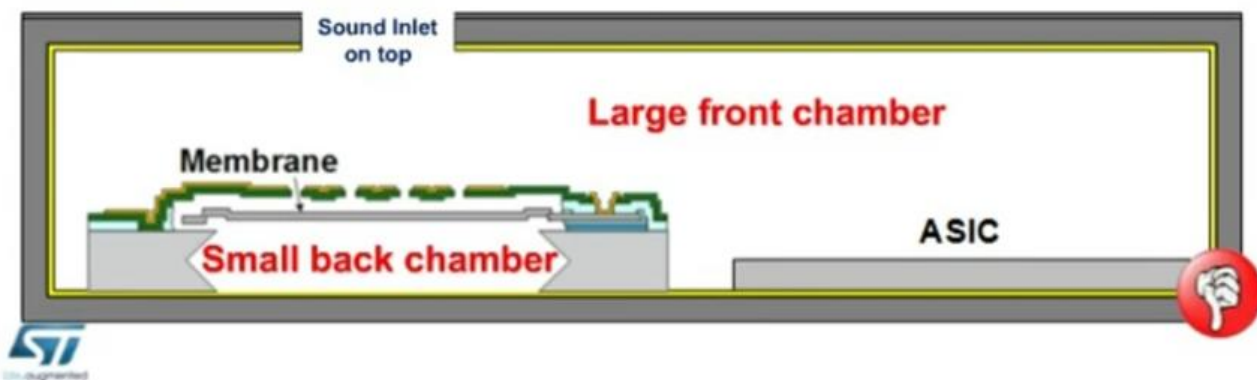


microphones

ST's competitors use the same basic structure used for bottom-port microphones to make their top-port mics

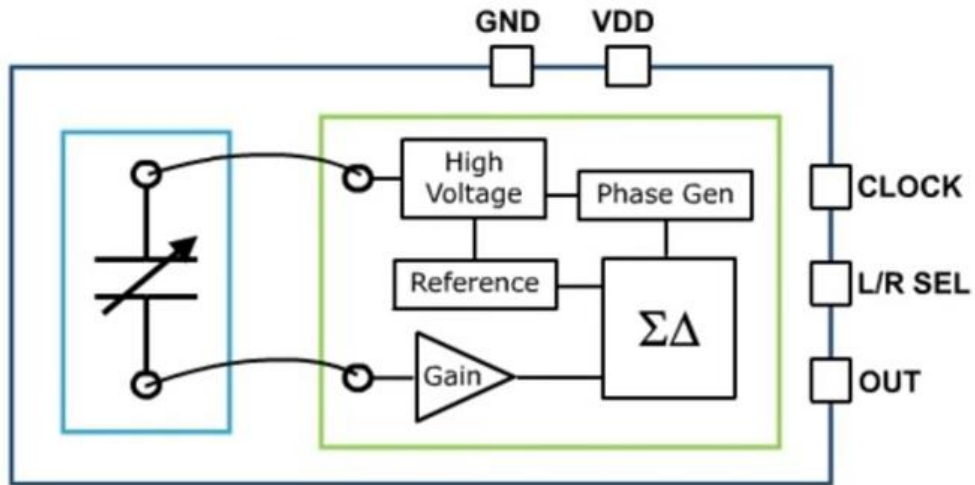
- sound inlet moved from bottom to top
- acoustic sensor still mounted on the bottom of the microphone
 - large front chamber hurts high frequency response
 - small back chamber hurts sensitivity and low frequency response

This is why bottom-port microphones have traditionally had better performance than top-port microphones



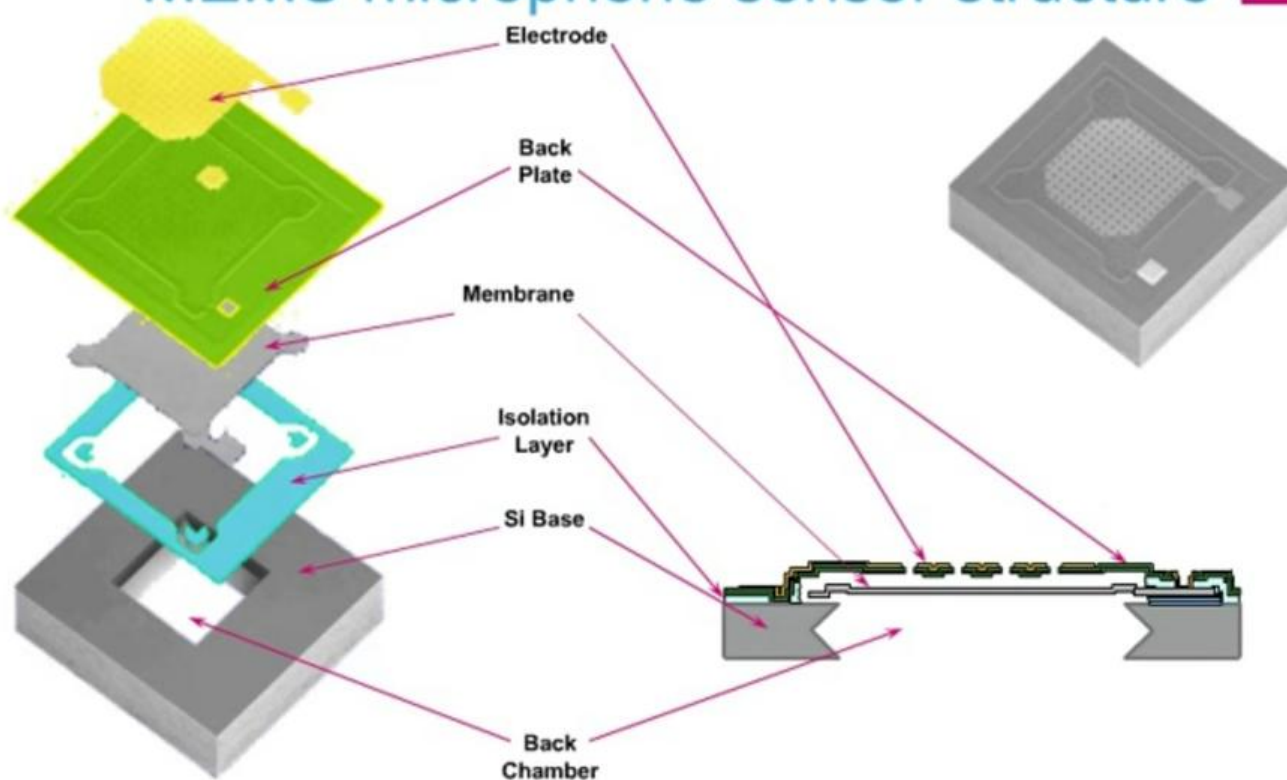
Electrical block diagram

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MEMS microphone sensor structure

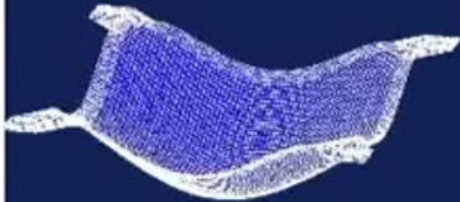

6



Membrane design and sensitivity

11

- The sensitivity of the sensor is a critical factor in determining the signal-to-noise ratio of a microphone. The 4-point membrane anchor design used by ST provides high sensitivity while minimizing the sensor size

Simulating Vibrating membrane	<div>ST Membrane</div>  <div>4 point support</div>	
	Sensitivity Good	Fair

