+44 20 8123 2220
info@marketpublishers.com

MEMS Microphones: A Global Technology, Industry and Market Analysis

https://marketpublishers.com/r/M8D608F340AEN.html
Date: February 2013
Pages: 113
Price: US$ 3,950.00 (Single User License)
ID: M8D608F340AEN

Abstracts

Silicon microphones are among a broad range of devices known as micro-electromechanical systems (MEMS), an emerging field in which various sensors and mechanical devices are constructed on a single wafer using processes developed for making integrated circuits (ICs). The chief advantage of micromachining silicon microphones is cost. Several sensors can be processed on a chip simultaneously and can be integrated with passive and active electronic devices.

One of the most notable differences between a MEMS microphone and an electret condenser microphone (ECM) is the difference in size. The back plate and diaphragm in a MEMS microphone are approximately 10x smaller than those in the smallest ECM. This inherent small size allows a packaged MEMS microphone to start at approximately the same size as the smallest ECM, with the potential to shrink much further as MEMS microphone technology matures. A smaller microphone consumes less printed circuit board (PCB) space and requires smaller height allowances, making it ideal for space-constrained designs

MEMS microphones are more compact than traditional microphone systems because they capture sound and convert it to a digital signal on the same chip. When sound waves hit the microphone's membrane – a thin metal mesh in the middle of the chip – it vibrates, producing a voltage that contains information about the analog sound signal. But since the analog signal is produced and converted to a digital signal on the same chip, it never has to experience the harsh electromagnetic environment outside the circuit. Further, because interference is less of an issue, insulation is not needed. This allows engineers to place the microphone anywhere that a chip can fit, for example, into a laptop in which multiple microphones can even fit in the bezel surrounding a laptop's monitor.

+44 20 8123 2220
info@marketpublishers.com

MEMS microphone solutions developed on the CMOS (complimentary metal oxide semiconductors) MEMS platform frees consumer electronic device designers and manufacturers from many of the problems associated with ECMs. CMOS MEMS microphones integrate an analogue-to-digital converter on the chip, creating a microphone with a robust digital output. Since the majority of portable applications will ultimately convert the analogue output of the microphone to a digital signal for processing, the system architecture can be made completely digital, removing noise-prone analogue signals from the circuit board and simplifying the overall design.

When electronic circuitry is fabricated within microns of the acoustic structure, the short trace lengths lead to an inherently improved ability to mitigate RF noise. The CMOS MEMS microphone has a very short diaphragm-to-preamp distance and better input-to output-isolation due to the on-chip amplification stage, as opposed to the FET in an ECM. Since there is better power supply and output signal isolation, as well as a shorter distance between the diaphragm and the preamplifier, there is less chance of coupling EM fields into the microphone.

Many of these new “miniature” silicon microphones for consumer and computer communication devices are approximately one-half the size and operate on just one-third the power of conventional microphones.

STUDY GOALS AND OBJECTIVES

CMOS MEMS microphones also solve many of the mechanical design and manufacturing challenges associated with using an ECM. First, the monolithic nature of the CMOS MEMS microphone enables a footprint and height that can be less than half that of a traditional ECM. Second, the small size and mass of the CMOS MEMS microphone diaphragm, which has a diameter of less than 0.5mm, leads to improved vibration immunity as compared with an ECM, which has a diaphragm diameter of 4mm-6mm. Third, since CMOS MEMS microphones are fabricated using standard CMOS materials and processes, they are inherently able to withstand the high temperatures required for surface mounting. Therefore, no mechanical interconnect is required, which leads to another significant reduction in overall height of the microphone system. Finally, the surface-mount and pick-and-place compatibility of the CMOS silicon microphone reduces cost by eliminating manual assembly, thereby improving reliability, manufacturing throughput and yield.

Therefore, this study focuses on MEMS microphones that can be used in mobile

+44 20 8123 2220
info@marketpublishers.com

phones, digital cameras, camcorders, laptops, automotive hands-free calling and hearing aids. Production will be low-cost and high-volume.

This study focuses on providing market data about the size and growth of the MEMS microphones application segments, new developments including a detailed patent analysis, company profiles and industry trends. This report also provides a detailed and comprehensive multi-client study of the market in North America, Europe, Japan, and the rest of the world (ROW) for MEMS microphones and potential business opportunities.

The objectives include thorough coverage of the underlying economic issues driving the MEMS microphones business, as well as assessments of new advanced MEMS microphones that are being developed. Another important objective is to provide realistic market data and forecasts for MEMS microphones.

REASONS FOR DOING THE STUDY

Most microphones in consumer electronics (CE) products today are based on technology that has remained fundamentally unchanged for 50 years. Problems with the ECMs include noise, size and manual assembly.

The main challenge for the audio system designer is to achieve the lowest overall noise in the system design. The noise of an ECM has several sources: electrical noise resulting from fluctuations in the bias voltage, noise of the field effect transistor (FET), board noise, acoustic self-noise of the diaphragm, and external electromagnetic (EM) and radio frequency (RF) fields that are coupled into the high impedance input of the FET.

The MEMS microphone exhibits many qualities that make it ideal for integrated microphone array applications in laptop and desktop computers. Most importantly, the robust digital output is immune to the EM or RF interference that can prohibit optimal acoustic placement of a standard analog-output microphone in a laptop computer. The small footprint and thinness also increase the flexibility of the microphone placement.

The widespread availability of well maintained CMOS models and simulation tools results in products that can go from design to prototype in a matter of weeks. Leveraging the economies of scale, high quality and maturity of the semiconductor industry, CMOS MEMS provides cost-effective solutions that can be incorporated into mobile phones, digital devices and automotive accessories. iRAP did a detailed market

+44 20 8123 2220
info@marketpublishers.com

study in 2007. Since then, numerous changes have happened, with several new applications emerging for MEMS microphones. The market has grown from over hundred million ranges in 2007 to almost half a billion dollar range now.

Therefore, iRAP conducted a detailed market research and industry analysis in this area and has produced this detailed technology and market update as well as industry analysis in this report.

CONTRIBUTIONS OF THE STUDY

This study segmented markets into six applications for MEMS microphone products. The first application consists of mobile phones; the second is laptops tablets; the third is camcorders and digicams; the forth is hearing aids; the fifth is headphones and the last is automotive hands-free calling. Manufacturers of MEMS microphones expect competition to persist and intensify in the future from a number of different sources.

The study is intended to benefit the existing manufacturers of mobile phones, digital cameras, camcorders, laptops, automobile hands-free calling devices and hearing aids, who seek to expand revenues and market opportunities through adding new technology such as MEMS microphones, which are positioned to become a preferred solution over conventional ECM applications. This study also will benefit existing manufacturers of microphones as well as manufacturers of microphones who deal with new types of MEMS technology for mobile phones, digital cameras, camcorders, laptops, automobile hands-free calling and hearing aids.

This report provides the most thorough and up-to-date assessment that can be found anywhere on the subject. The study also provides extensive quantification of the many important facets of market developments in MEMS microphones all over the world. This, in turn, contributes to the determination of what kinds of strategic responses companies may adopt in order to compete in this dynamic market.

The iRAP study focuses on MEMS microphones' market size and growth, new developments, including a detailed patent analysis, company profiles and industry trends. Another contribution of this report is to provide a detailed and comprehensive study of the market in North America, Europe, Japan and the rest of the world (ROW) for MEMS microphones and potential future business opportunities. These markets have also been estimated according to types of integration, i.e. single chip vs two-chip; and according to the application segments.

+44 20 8123 2220
info@marketpublishers.com

SCOPE AND FORMAT

The market data contained in this report quantifies opportunities for MEMS microphones. In addition to product types, it also covers the many issues concerning the merits and future prospects of the MEMS microphone business, including corporate strategies, information technologies, and the means for providing these highly advanced products and service offerings. It also covers in detail the economic and technological issues regarded by many as critical to the industry's current state of change. The report provides a review of the MEMS microphones industry and its structure, and the many companies involved in providing these products. The competitive position of the main players in the MEMS microphones market and the strategic options they face are also discussed, as well as such competitive factors as marketing, distribution and operations.

TO WHOM THE STUDY CATERS

The study will benefit existing manufacturers of hand-held electronic consumer products like mobile phones, laptops, etc., who seek to enhance revenues and market opportunities by expanding to new technologies such as MEMS microphones, which are positioned to become a preferred solution for many types of consumer and communication audio applications. This study also will benefit manufacturers of conventional microphones who deal with new types of technology for communication audio applications.

This study provides a technical overview of MEMS microphones, especially recent technology developments and existing barriers. Therefore, audiences for this study include marketing executives, business unit managers and other decision makers in companies that produce and market mobile phones, digital cameras, camcorders, laptops, automobile hands-free calling devices and hearing aids, as well as those in companies peripheral to this business.

REPORT SUMMARY

Six major applications are discussed in this report, which will create most of the market for MEMS microphones over the next five years. These are mobile phones, laptops and tablets, camcorders and digicams, hearing aids, head phones and automotive hands-free calling.

Manufacturers of MEMS microphones expect competition to persist and intensify in the future from a number of different sources. Microphones are facing competition in a new,

+44 20 8123 2220
info@marketpublishers.com

rapidly evolving and highly competitive sector of the audio communication market. Increased competition could result in reduced prices and gross margins for microphone products and could require increased spending by research and development, sales and marketing and customer support.

Micro-machined microphone chips can match and extend the performance of existing devices, for instance, by using sensor arrays. Silicon microphones also offer advantages to the OEM in the form of improved manufacturing methods (reliability, yield, assembly cost) combined with robustness. They also offer additional functionality, such as the ability to incorporate multiple microphones into portable electronic devices for noise suppression and beam forming.

The potential for smaller footprint components and resistance to electromagnetic interference also supports new cell phone designs. Moreover, MEMS microphones meet price points set by electret microphones by leveraging established high-volume silicon manufacturing processes. This combination of size, performance and functionality, and low cost are highly desirable for OEMs and consumers alike.

The range of possible applications of these microphones derives from their important advantages as compared to conventional ECM technologies. Based on silicon MEMS technology, the new microphone achieves the same acoustic and electrical properties as conventional microphones, but is more rugged and exhibits higher heat resistance. These properties offer designers of a wide range of products greater flexibility and new opportunities to integrate microphones.

Major findings of this report are:

The MEMS microphones market is an attractive, and still growing, multimillion-dollar market characterized by very high production volumes of MEMS microphones that are extremely reliable and low in cost.

In 2012, the global market for MEMS microphones has reached over $422 million and will increase to $865 million by 2017 with an annual average growth rate of 15.4%.

Mobile phones will have the largest share in 2012 followed by laptops/tablets and camcorders/digicams.

From 2012 to 2017, the largest growth rate will be for mobile phones – as much

+44 20 8123 2220
info@marketpublishers.com

as 53% AAGR from 2012 to 2017.

Regionally, North America has about 25.3% of the market in 2012, followed by Europe at 19.7%, Japan at 15.7%, and the rest of world (ROW) at 39.5%.

By 2017, MEMS microphones will achieve penetrations of 92% in the mobile phone market segment and 95% in PDAs, digicams and camcorders markets.

In terms of technology, the largest share will be for two-chip integration.

There are over a dozen players who are sharing the global market in 2012. They are fabless and depend upon a variety of fabrication processes to construct MEMS microphones. By 2017, the number of players is likely to double due to attractive growth potential for the products.

+44 20 8123 2220
info@marketpublishers.com

Contents

+44 20 8123 2220
info@marketpublishers.com

TECHNOLOGY OVERVIEW

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

MICRO-ELECTRO-MECHANICAL SYSTEMS (MEMS) PACKAGE
PACKAGING STRUCTURE AND METHOD OF A MEMS MICROPHONE
ELECTRICAL MODULE COMPRISING A MEMS MICROPHONE
MICRO-ELECTROMECHANICAL SYSTEMS (MEMS) MICROPHONE AND METHOD OF MANUFACTURING THE SAME
MEMS MICROPHONE WITH CAVITY AND METHOD THEREFOR
MEMS DEVICE WITH SURFACE HAVING A LOW ROUGHNESS EXPONENT
CONDENSER MICROPHONE AND PACKAGING METHOD FOR THE SAME
METHOD OF FABRICATING AN ULTRA-SMALL CONDENSER MICROPHONE
MICROPHONE WITH REDUCED PARASITIC CAPACITANCE
MEMS MICROPHONE PACKAGE WITH RF INSENSITIVE MEMS MICROPHONE CHIP
METHOD OF FABRICATING MICRO-ELECTROMECHANICAL SYSTEM MICROPHONE STRUCTURE
MEMS DEVICE AND METHOD FOR FABRICATING THE SAME
CARD TYPE MEMS MICROPHONE
CALIBRATED MICROELECTROMECHANICAL MICROPHONE
ALTERNATIVE SENSING CIRCUIT FOR MEMS MICROPHONE AND SENSING METHOD THEREOF
METHOD FOR PACKAGING MICRO ELECTROMECHANICAL SYSTEMS MICROPHONE
MICROPHONE APPARATUS
INTEGRATED AUDIO CODEC WITH SILICON AUDIO TRANSDUCER
PACKAGE AND PACKAGING ASSEMBLY OF MICROELECTROMECHANICAL SYSTEM MICROPHONE
SYSTEM AND METHOD TO PROVIDE RF SHIELDING FOR A MEMS MICROPHONE PACKAGE
SILICON BASED CONDENSER MICROPHONE AND PACKAGING METHOD FOR THE SAME
MEMS MICROPHONE PACKAGE AND METHOD THEREOF
OPTICAL SENSING IN A DIRECTIONAL MEMS MICROPHONE
CHIP-SCALED MEMS MICROPHONE PACKAGE
MEMS MICROPHONE MODULE AND METHOD THEREOF
LEADFRAME PACKAGE FOR MEMS MICROPHONE ASSEMBLY
PACKAGE STRUCTURE OF MEMS MICROPHONE
MEMS MICROPHONE WITH A STACKED PCB PACKAGE AND METHOD OF PRODUCING THE SAME
MICROELECTROMECHANICAL SYSTEM MICROPHONE FABRICATION INCLUDING SIGNAL PROCESSING CIRCUITRY ON COMMON SUBSTRATE

+44 20 8123 2220
info@marketpublishers.com

COMPANY PROFILES

+44 20 8123 2220
info@marketpublishers.com

List Of Tables

LIST OF TABLES

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

List Of Figures

LIST OF FIGURES

+44 20 8123 2220
info@marketpublishers.com

I would like to order

Product name: MEMS Microphones: A Global Technology, Industry and Market Analysis
Product link: https://marketpublishers.com/r/M8D608F340AEN.html
Price: US$ 3,950.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:
info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page https://marketpublishers.com/r/M8D608F340AEN.html

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:
Last name:
Email:
Company:
Address:
City:
Zip code:
Country:
Tel:
Fax:
Your message:

**All fields are required

Custumer signature _____

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at https://marketpublishers.com/docs/terms.html

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970