MEMS Need Comprehensive, Market-Ready Solutions

by Shashi Gupta
Henkel Electronic Materials LLC

Microelectromechanical systems -- commonly known as MEMS -- applications are on the rise. In fact, the MEMS market is currently outpacing overall IC market growth at a rate that is twice as fast and is expected to be a $20B US market as early as 2017. Why the uptick in MEMS use? The consumer (primarily handheld) and automotive markets hold the answer for now, but other market sectors such as medical, for example, are also beginning to incorporate MEMS devices.

Consider that today the average smartphone contains approximately eight to ten MEMS – a number which is projected to grow in the coming years – and one gets a sense for the breadth of MEMS applications. Scroll speed on the smartphone touchscreen, screen orientation when the device is turned, noise-cancelling microphones, anti-shaking feature in cameras and much more – all are MEMS. And, when it comes to automotive MEMS applications, the list is equally as long and includes tire pressure sensors, air bag deployment sensors, GPS systems, headlights that can detect the curve in the road, side mirror proximity sensors and more.

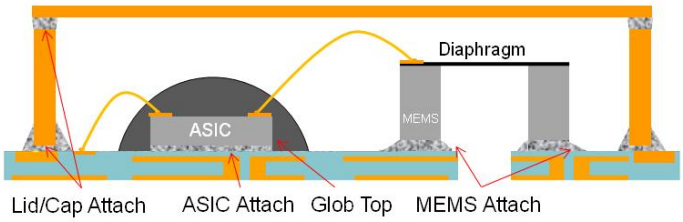
Certainly one of the primary drivers of MEMS growth is the functionality these system-in-package powerhouses deliver. But other important factors include the ability to reduce form factors and the speed with which new MEMS can be brought to market for a viable, technology-enhancing solution. MEMs can be classified into several categories, the most common of which are accelerometers, gyroscopes, magnetometers, microphones and pressure sensors. While all have different functions and applications, they share two common requirements: (1) time-to-market-speed dictates success and, (2) stress reduction and reliability of the MEMS assembly is critical.

The ability to design, test and commercialize new MEMS devices quickly is critical to a MEMS manufacturer's market competitiveness. And, in order to meet the three to six month average cycle time, MEMS firms need to leverage proven materials solutions that are market-ready, market-tested and supported globally to facilitate multi-site design and manufacturing.

This is the Henkel advantage. With a full portfolio of materials for varying processes from die attach to underfill to lid attach and glob top, Henkel's breadth of commercialized, proven materials in combination with a comprehensive global support structure, enable Henkel to quickly deliver materials off the shelf and around the globe for just about any MEMS application. Henkel's ability to provide multiple materials for quick evaluation and testing, along with the company's unmatched global infrastructure, ensures expert worldwide technical support. What's more, the broad portfolio of multiple MEMS materials (reference the below charts) helps simplify the supply chain, enabling a more streamlined approach.

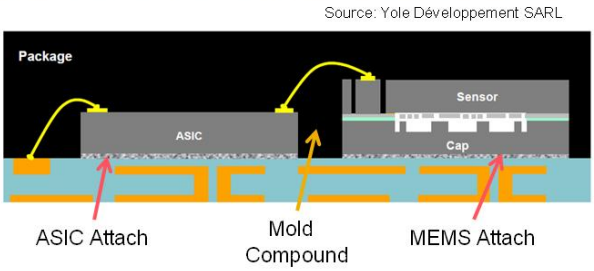
MEMS Application Overview

Microphone, Pressure Sensors



Accelerometers, Gyroscope, Magnetometers

Source: Yole Développement SARL



SOLUTIONS PORTFOLIO	ASIC Attach or MEMS Attach	Lid/Cap Attach
Non-Conductive Paste/Liquid Dispensed	LOCTITE ABLESTIK QMI 536NB LOCTITE ABLESTIK QMI 538NB LOCTITE ABLESTIK 2025D	LOCTITE ABLESTIK 3220 LOCTITE ABLESTIK 3128 LOCTITE ABLESTIK MC723
Non-Conductive-Print Film	LOCTITE ABLESTIK 8006NS LOCTITE ABLESTIK 6202CX LOCTITE ABLESTIK ATB-120US LOCTITE ABLESTIK ATBF-125E	NA
Conductive Paste	LOCTITE ABLESTIK 8290 LOCTITE ABLESTIK 2100A	LOCTITE ABLESTIK CE3920/ ICP3920 LOCTITE ABLESTIK SR4 LOCTITE ABLESTIK 2030SC

SOLUTIONS PORTFOLIO	Glob Top	Underfill/ NCP	Mold Compound
Non-Conductive Paste/Liquid Dispensed	LOCTITE ECCOBOND EO1058 LOCTITE ECCOBOND UF 8828	LOCTITE ECCOBOND FP4549 (CUF) LOCTITE ECCOBOND FP4530 (CUF) LOCTITE ECCOBOND FP5201 (NCP) LOCTITE ECCOBOND NCP5208 (NCP)	LOCTITE HYSOL GR9810-1P (75um filler) & LOCTITE HYSOL GR9810-1PF (45um filler)

Of course, quick time-to-market has to be coupled with excellent performance and, for MEMS that means low stress and high reliability. The calibration of a MEMS device determines the balance required for proper long-term function. But subtle changes in materials – delamination, shrinkage and warping – can impact the device configuration and change its the performance. For example, a manufacturer may design a pressure sensor that has a certain sensitivity. If the material properties change over time and experience shrinkage, for instance, the calibration changes and the pressure output may be far from satisfactory. If the package

planarity is slightly off, performance of the MEMS device may suffer. For critical applications such as air bag deployment or braking systems, inferior calibration could be catastrophic. Ensuring high performance materials that are in balance is essential and where Henkel's tested and market-ready materials deliver an advantage.

For trusted, proven MEMS materials, a full solutions approach, quick materials delivery for fast production ramp-up, supply chain simplification, global support and capability, along with an expert, knowledgeable team, Henkel is the obvious – and only – choice.

To find out more about Henkel's comprehensive MEMS materials, log onto www.henkel.com/electronics or call +1-888-943-6535 in the Americas, +32 1457 5611 in Europe or +86 21 3898 4800 in Asia.