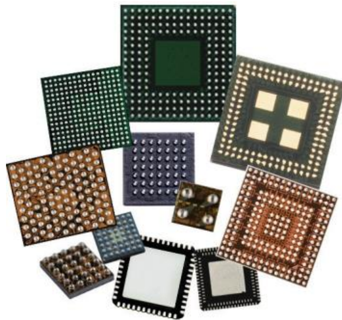
MEMS and Sensors

Micro-Electrical-Mechanical Systems and Sensors



Features

- Very small size
- Very low power consumption
- Low cost
- Easy to integrate into systems

Applications

- Voice / sound (Silicon microphones)
- Motion / positioning sensors (Accelerometers, Gyroscopes, Magnetometers and Intertial Combos)
- Pressure monitoring (Pressure sensors)
- Optical / image (Proximity sensors, HRMs, light sensors, etc.)
- Fingerprint sensors
- Bio sensors (Wearables)
- RF-related functions (Oscillators, Resonators, Switches and Tuners)

Description

Sensors

A sensor is a device or system that detects/measures a physical property and then records, reports and/or responds to the stimulation. Sensors are typically assembled in a module that responds based on the stimulation or feed to the sensor. Typically a sensor module is comprised a detector and an Application-Specific Integrated Circuit (ASIC) for signal processing and on-chip computation.

There are many different types of sensors and applications such as:

- Inertial sensors - Accelerometer, Gyroscopes
- Environmental sensors - Pressure (TPMS, microphones), temperature sensors, RH
- Optical sensors - Biometric sensors, proximity, depth sensing

MEMS

Micro-Electro-Mechanical-Systems (MEMS) are specialized sensors that combine mechanical and electrical components in a discrete format or a module. MEMS are typically multi-die solutions such as a sensing die paired with an application-specific integrated circuit (ASIC). A MEMS can consist of mechanical elements, sensors, actuators, and electrical and electronics devices on a common silicon substrate.

MEMS can replace larger conventional mechanical sensors and actuators with advantages including:

- Smaller size, low power and low cost vs. conventional solutions
- Enables multi sensors and sensor fusion in applications
- Enables smaller, lighter system designs
- Highly accurate and real time data acquisition

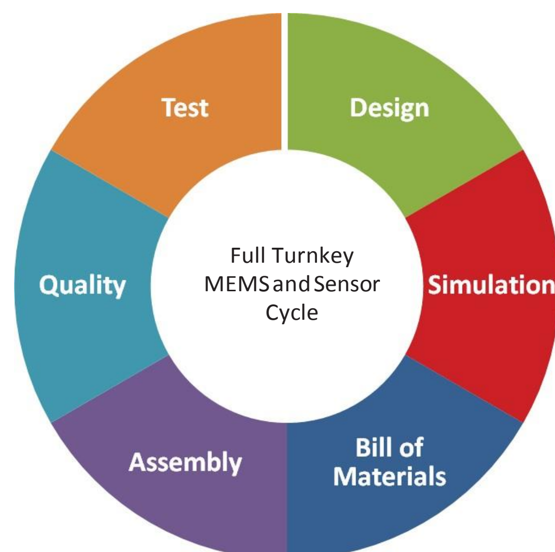
MOEMS

Combination of MEMS merged with Micro-optics. Involves sensing or manipulating optical signals on a very small size scale using integrated mechanical, optical, and electrical systems.

Turnkey MEMS and Sensor Cycle

As demand increases for compact, highly integrated and high performance components with the most efficient costs, companies are turning to Outsourced Semiconductor Assembly and Test (OSAT) providers for solutions that satisfy their sub-system and product level requirements.

Our dedicated MEMS team can provide a comprehensive turnkey solution to support your production ramp, including package co-design, simulation, Bill of Material (BOM) qualification, assembly, quality assurance and in-house test solutions.



MEMS And Sensors Process Highlights

Assembly Line

- Class 1k line (Measuring)
- Waterproof process
- 2D bar code / strip mapping
- Die traceability (partial in HVM and full in development)
- Test supported per request
- AOI through assembly process

Die Attach / Wire Bonding

- Small die (<1mm^2), small LED die (<0.25mm^2)
- Sensitive features
  - Thin die <100μm
  - MEMS with released membrane

Package Singulation

- Waterproof
- Tape saw (UV tape)
- Small package pick & place
- Jig saw
- Glass wafer saw

Molding Method

- Transfer Mold
- Compression Mold
- Film Assisted Mold (FAM)
- Film Assisted Cavity Mold (Cavity FAM)
- Transparent clear Embedded Capicitative Material (ECM)

Test Services

- Turnkey test solution: test, System Level Test, laser marking, LIS, packing, and drop shipment
- Engineering support and services to improve test performance during high volume production
- Test production capabilities with multiple sites (4x, 8x, 12x, and 16x)
- Experienced in thin core substrates (300 um), higher ball counts
- Supports sound test production with higher quality by experienced test engineering, stable manufacturing resources, automation and advanced tools
- Supports various inspection (LIS) requirements with advanced equipment

Package Types

eWLB - Single die, multi die, stacked PoP configurations

WLCSP - Very small single die

fcCSP - Single or multi die flip chip configurations

FBGA - Single die, multi die configurations

LGA - Single die or multi die configurations

QFN - Single die or multi die configurations

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