6-Axis OIS IMU: Technology Analysis

Description:
IMU for OIS is a new trend taken by the main suppliers in high-end smartphones. Two players share the pie: InvenSense and STMicroelectronics who have developed a new generation of IMU dedicated for OIS on smartphone mainboard. For InvenSense as usual, the latest customized version can be found in the iPhone 7 Plus and for STMicroelectronics it is the LSM6DSM.

The 6-axis IMU are located on the motherboard of high-end smartphones (and other consumer product) and the main constraint consists on providing a small footprint and more importantly a very low power consumption.

The thickness was the same than standard LGA or QFN packages some years ago, close to 1mm. Now the standard is 0.75mm, and both InvenSense and STMicroelectronics released a device with this thickness.

InvenSense has been the first to integrate in an actual device, with a custom version for Apple, a 3.0x3.0x0.75mm IMU. This version uses the same Nasiri platform as other InvenSense IMU devices, making the wafer-level integration of the MEMS sensor on top of the ASIC, thus providing only one die in the final LGA package. InvenSense new 6-Axis IMU presented new design which are specific to this Apple's Version.

STMicroelectronics on its side released the LSM6DSM and provides a smaller device. The device is manufactured using the same THELMA process than all STMicroelectronics IMU devices. This THELMA platform requires a two dies approach which becomes challenging for very thin package integration. At the end both players have been able to propose very low cost OIS IMU due to die size reduction and process optimization.

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