2-Axis Gyroscopes for Optical Image Stabilization: STMicroelectronics L2G2IS and InvenSense IDG-2030

Complete reports and comparison of the latest generation products for smartphones from the leading optical image stabilization gyro players.

The 2-axis gyroscopes are located inside the camera module of high-end smartphones. The main constraints are a small footprint and, more importantly, thinness.

Previously, thickness was the same as standard land grid array (LGA) or quad flat no-leads (QFN) package, close to 1mm. Now the standard is 0.65mm, which products from both InvenSense and STMicroelectronics attain.

InvenSense was first, with the IDG-2030, a 2.3x2.3x0.65mm gyroscope, which is still the smallest on the market. Since its introduction we found it in several smartphones from various manufacturers. The IDG-2030 uses the same Nasiri platform as other InvenSense inertial devices, with wafer-level integration of the MEMS sensor on top of the application specific integrated circuit (ASIC), thus providing only one die in the final LGA package.

Months later, STMicroelectronics released the L2G2IS, which shares the same dimensions. The device is manufactured using the same THELMA process as all STMicroelectronics inertial devices. The THELMA platform involves a two-die approach that is challenging for very thin package integration. However, both players now offer very low-cost gyros thanks to die size reduction and process optimization.

Both gyroscopes analyzed are 2-axis X, Y (Pitch, Roll). The two reports can be purchased separately or together in order to compare the technology and pricing of the main smartphone OIS gyro players, including previous generation products.
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**Manufacturing Process Flow**

- ASIC front-end process
- ASIC wafer fabrication unit

**Estimated Selling Price**

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Romain is in charge of costing analyses for Advanced Packaging, MEMS and IC. He has published numerous reports on advanced packaging devices including fan-in and fan-out WLP, embedded die packaging and 3D TSV packaging.

**Véronique Le Troade (Lab)**  
Véronique is in charge of structure analysis of semiconductors. She has a deep knowledge in chemical & physical technical analyses. She previously worked for 20 years in Atmel Nantes Laboratory.

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BOSCH Sensortec has unveiled a programmable all-in-on emotion sensor for robotics, gaming, and house hold IoT devices, touted as the industry’s first custom-programmable 9-axis motion sensor.

With the emergence of connected objects and wearable devices like the personal fitness coach, InvenSense offers in the ICM-30630 a competitive, complete motion-tracking solution.

mCube has released the industry’s smallest ultra-low power accelerometer for wearables, enabling significantly extended battery life and very small form factors.
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