Safran Colibrys VS1000 Series: Comparison Analysis

Description: Safran Colibrys is the leading European supplier of high-performance silicon-based MEMS providing long-term bias stability under harsh environments. In a global market worth around $100M in 2016, high-performance silicon-based MEMS accelerometers address a wide range of applications, from commercial aerospace applications to the defense market. Amongst these, the industrial market remains attractive and the most dynamic. Thanks to performance improvements and reduced size and cost, more opportunities are appearing.

The VS1000 series consists of vibration sensors based on Colibrys’ MEMS accelerometer. They offer the best match for low- to medium-frequency sensing, as well as the best performance stability, with shock resistance and the lowest non-linearity and noise available on the market. The VS1000 is available in various acceleration ranges, from ±2g to ±200g.

The VS1000 features an innovative low-noise application specific integrated circuit (ASIC) developed by HMT microelectronic AG and manufactured in a European foundry with a bipolar CMOS-DMOS process using Deep Trench Isolation (DTI). The ASIC is highly integrated in order to use only one die compared to four dies in the previous versions.

The MEMS die uses a capacitive detection principle and is manufactured by Colibrys using its mature 3-stack bulk micromachining process, providing a very stable MEMS device. The ASIC and MEMS dies are hermetically sealed in a ceramic package to ensure robustness and durability.

Typical applications for the VS1000 accelerometer include railway technology, testing and process control. Key features offered by the components are: large and flat frequency response, exceptional bias and scale factor temperature stabilities, repetitive high-shock resistance enhanced by a smart overload system and lowest noise of 7 µg/√Hz in band for the ±2g range.

The VS1002 (±2g) and the VS1200 (±200g) are analyzed and compared in the report in order to highlight the differences at the process level. Also, a comparison with the Colibrys MS9000 accelerometer is provided.
VS1002 vs VS1200 comparison
VS1000 vs MS9000 comparison

Manufacturing Process Flow

ASIC front-end process
- ASIC wafer fabrication unit
- MEMS process flow
- MEMS wafer fabrication unit
- Packaging process flow
- Package assembly unit

Cost Analysis

Yield hypotheses
- ASIC front-end cost
- ASIC back-end 0: probe test and dicing
- ASIC wafer and die cost
- MEMS front-end cost
- MEMS back-end 0: probe test and dicing
- MEMS front-end cost per process step
- MEMS wafer and die cost
- Back-end: packaging cost
- Back-end: packaging cost per process step
- Back-end: final test cost
- VS1000 component cost

Estimated Price Analysis

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