VERSATILE, HIGH-PERFORMANCE, ULTRA-LOW-POWER, 3-AXIS, «FEMTO» ACCELEROMETER IN A 2 X 2 X 0.7 MM PACKAGE

The LIS2DW12 is the latest generation of our high-performance 3-axis MEMS accelerometer with an ultra-low-power “femto” design. The LIS2DW12 has 16-bit output and can be set to prioritize low power consumption less than 1 μA or low-noise performance down to 90 μg/√Hz with five settings in either mode. Thanks to its measurement accuracy and flexibility, the LIS2DW12 is particularly suitable for next-gen applications from healthcare, fitness and gaming to industrial sensing and environmental monitoring.

KEY FEATURES
- Acceleration range: ±2/±4/±8/±16 g
- Multiple operating modes with multiple bandwidths
- 32-level FIFO
- Noise density (accel.): 90 μg/√Hz
- Very low noise down to 1.3 mg RMS in low power mode
- 16-bit output resolution
- Ultra-low power consumption:
  - Power-down mode: 50 nA
  - Low-power mode: < 1 μA @ ODR = 12.5 Hz
- Supply voltage range: 1.62 to 3.6 V
- Temperature range: -40 to +85 °C
- PC/SPI digital interfaces
- LGA-12 package (2 x 2 x 0.7 mm)

KEY APPLICATIONS
- Motion detection for wearables
- Gesture recognition and gaming
- Motion-activated functions and user interfaces
- Display orientation
- Tap/double-tap recognition
- Free-fall detection
- Smart power saving for handheld devices
- Impact recognition and logging
- Hearing aids
- Portable healthcare devices
- Wireless sensor nodes
- Motion-enabled metering devices

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Advanced features

Enhanced flexibility with embedded FIFO
32-level first-in, first-out (FIFO) buffer allowing the user to store data in order to limit intervention by the host processor.

Higher thermal stability
• Over the entire operating temperature range from -40 to +85 °C

Ultra-low power consumption
• High-performance mode:
  • 90 µA @ ODR = 12.5 to 1600 Hz
• Low-power mode:
  • 5 µA @ ODR = 100 Hz
  • 3 µA @ ODR = 50 Hz
  • 1 µA @ ODR = 12.5 Hz
  • 0.38 µA @ ODR = 1.6 Hz
• Power-down mode: 50 nA

Advanced digital features
• Dedicated internal engine to process motion and acceleration detection:
  • Free-fall wakeup
  • 6D/4D orientation
  • Tap and double-tap recognition
  • Activity/inactivity recognition
  • Portrait/landscape detection

Operating modes

Low-noise mode «Disabled»

<table>
<thead>
<tr>
<th>Parameter</th>
<th>High-perf. mode</th>
<th>Low-power mode 4</th>
<th>Low-power mode 3</th>
<th>Low-power mode 2</th>
<th>Low-power mode 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>14-bit</td>
<td>14-bit</td>
<td>14-bit</td>
<td>14-bit</td>
<td>12-bit</td>
</tr>
<tr>
<td>Noise density (µg/√Hz)</td>
<td>110</td>
<td>160</td>
<td>210</td>
<td>300</td>
<td>550</td>
</tr>
</tbody>
</table>

Low-noise mode «Enabled»

<table>
<thead>
<tr>
<th>Parameter</th>
<th>High-perf. mode</th>
<th>Low-power mode 4</th>
<th>Low-power mode 3</th>
<th>Low-power mode 2</th>
<th>Low-power mode 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>14-bit</td>
<td>14-bit</td>
<td>14-bit</td>
<td>14-bit</td>
<td>12-bit</td>
</tr>
<tr>
<td>Noise density (µg/√Hz)</td>
<td>90</td>
<td>130</td>
<td>180</td>
<td>240</td>
<td>450</td>
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</tbody>
</table>

Evaluation tools

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>X-NUCLEO-IKS01A3</td>
<td>Motion MEMS and environmental sensor expansion board for STM32 Nucleo</td>
</tr>
<tr>
<td>STEVAL-MKI109V2</td>
<td>eMotion: ST MEMS adapters motherboard based on STM32F103, compatible with all ST MEMS adapter boards</td>
</tr>
<tr>
<td>STEVAL-MKI109V3</td>
<td>Professional MEMS tool: ST MEMS adapters motherboard based on the STM32F401VET6 compatible ST MEMS adapters</td>
</tr>
<tr>
<td>STEVAL-MKI179V1</td>
<td>LIS2DW12 adapter board for a standard DIL24 socket</td>
</tr>
</tbody>
</table>

For more information, visit www.st.com/accelerometers