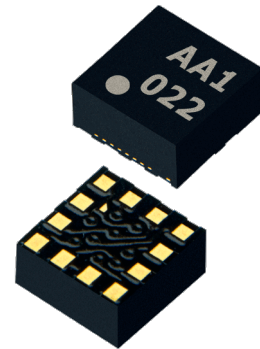




# MOTION MATTERS

## New 2x2x0.9mm KX022 Accelerometer with FIFO/FILO Buffer offers low current consumption and a full range of high-performance embedded algorithms optimized for mobile applications

The KX022 is a robust, low-power, I2C/SPI, 3-axis accelerometer with integrated FIFO/FILO buffer that features a wide range of embedded functionality, including tap detection, orientation, activity, and wake-up algorithms. Kionix's XAC sensor also provides outstanding stability with a market-leading combination of improved shock, reflow, and thermal performance. The KX022 offers low current consumption in all modes and accelerometer outputs with 16-bit resolution for greater precision. User-selectable parameters include  $\pm 2g$ , 4g or 8g ranges and Output Data Rates (ODR) with programmable high-pass and low-pass filters. It is packaged in an ultra-small, 12-pin, 2x2x0.9mm LGA plastic package.



### **KX022 Features and Functions**

The KX022 accelerometer has several key features that make this an extremely valuable product for a wide variety of consumer electronics applications:

- Ultra low power in all modes,
- Low noise,
- An embedded FIFO/FILO buffer, and
- Numerous embedded features, including Tap/Double-Tap.



**Low Power:** The KX022 offers customers superior power performance at only 2  $\mu\text{A}$  in standby, 10  $\mu\text{A}$  at normal resolution, and 130  $\mu\text{A}$  at high resolution. In addition, the KX022 includes a motion wake-up function that allows users to conserve battery life in their products by powering down other systems until needed. This motion wake-up function generates an interrupt when the part transitions from an inactive to an active state, and can be configured in a variety of ways depending on the needs of each particular application. The KX022's low power makes this part an ideal choice for mobile devices with stringent power and battery-life requirements.

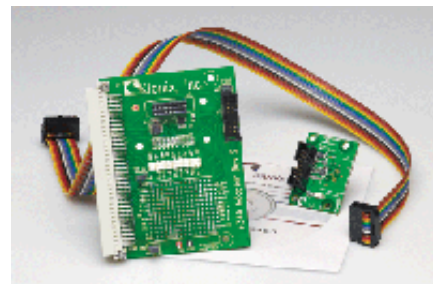
**Low Noise:** The KX022 offers customers excellent noise performance, as low as 150  $\mu\text{g}/\sqrt{\text{Hz}}$  at lower resolutions. Low noise is made possible with Kionix's ASIC, which includes a low-noise capacitance to voltage amplifier to convert the differential capacitance of the MEMS sensor into an analog voltage that is sent through an analog-to-digital converter. Low noise allows designers to achieve higher-precision measurements, enabling this device to accurately measure low-frequency events.

**FIFO/FILO Buffer:** By simplifying timing requirements and enabling burst reads, the KX022's FIFO/FILO buffer allows this part to process sensor data smoothly while maintaining low power consumption. The FIFO/FILO buffer functions are designed to accumulate sensor data until the programmed sample threshold is reached, at which point a watermark interrupt is triggered until the buffer sample level is brought below the sample threshold. In 8-bit mode, each 3-axis sample is 3 bytes, so the buffer can hold a maximum of 84 samples. In 12-bit mode, each 3-axis sample is 6 bytes, so the buffer can hold a maximum of 41 samples.



**Tap/Double-Tap:** The KX022 is an extremely high-performance part equipped with numerous embedded features. One of these embedded features, Tap/Double-Tap (TDT), offers customers the ability to incorporate tap detection applications on their device. This feature was not available on the KX022's processor, the KXTJ2. The output data rate (ODR) for the TDT engine is variable between 12.5Hz and 1600Hz and all tap timers are based on this ODR, which defaults to 400Hz. The TDT function also includes a timer to establish the minimum time separation between the first tap and the second tap in a double-tap event, which defaults to 0.3 seconds, and two thresholds (upper and lower) to determine if an event can or cannot be classified as a tap event.

**Developer Support:** For developers looking to quickly begin the development of applications and firmware that incorporate the KX022, Kionix offers an Accelerometer USB Development Kit. This Development Kit provides a common interface to Kionix evaluation boards. The applications and utilities supported by the development kit include SensorScope (to monitor real-time data coming from the attached sensor), SensorCalc (to test and calculate the zero-g offset and sensitivity parameters of the accelerometer), and SensorMap (to read and write to specific registers of the accelerometer).

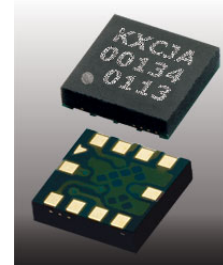


With its ultra-small package, high-performance embedded functionality, and current consumption as low as 2 $\mu\text{A}$ , the KX022 provides customers with substantial reductions in

power, noise, and cost, making this part ideally suited for smartphones, tablets, and health and fitness applications.

[Visit our website to learn more about the KX022.](#)

## Also, be sure to check out our ultra-thin accelerometer - The 3x3x0.7mm KXCJA with embedded motion wake-up



The new Kionix KXCJA accelerometer is the thinnest package available on the market today and has power as low as 1uA. The 0.7mm thin package is perfectly suited for high-volume handset and tablet applications, offering manufacturers an unmatched combination of quality, performance and size.

In addition, the KXCJA provides up to 14-bit resolution and incorporates Kionix's XAC sensor for outstanding stability over temperature, shock and post-reflow performance.

[Visit our website to learn more.](#)

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