KX022 Accelerometer
2x2x0.9mm Accelerometer with FIFO/FILO Buffer

FEATURES

- 2x2x0.9mm LGA package
- Full-featured algorithm engine including:
  - Tap detection, orientation detection, activity monitoring, and embedded motion wake-up algorithms
- Low current consumption in all modes:
  - 0.9 µA in standby,
  - 10 µA at normal resolution, and
  - 145 µA at high resolution
- Two interrupt registers
- User-configurable, embedded wake-up function to conserve battery power
- Internal voltage regulator to maintain constant internal operating voltages throughout the 1.8 - 3.6V input supply range

APPLICATIONS

- User Interface
- Power Management
- Active/Inactive Monitoring
- Device Orientation
- Inclination and Tilt Sensing
- Gesture Recognition
- Pedometer/Activity Monitoring
- Motion-controlled user interface

FOR

- Smartphones and Mobile Devices
- Laptops
- Gaming and Virtual Reality
- Health and Fitness

PRODUCT OVERVIEW

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 provides outstanding stability with a market-leading combination of improved shock, reflow, and thermal performance. The KX022 also offers accelerometer outputs with 16-bit resolution for greater precision. User-selectable parameters include ± 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.
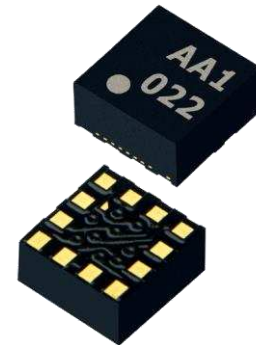
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The performance parameters below are programmed and tested at 2.6 volts and T = 25°C. The device can accept supply voltages from 1.8V to 3.6V. Due to internal voltage regulators, there should be minimal change with supply voltage variations.

PERFORMANCE SPECIFICATIONS

PARAMETERS	UNITS	KX022-1020	CONDITION
Range	g	±2.0, ±4.0, ±8.0	User-selectable full-scale output range
Sensitivity[1]	counts/g	16384, 8192, 4096	16-bit
		64, 32, 16	8-bit
0g Offset vs. Temp	mg/°C	0.2	-40°C to +85°C
Sensitivity vs. Temp	%/°C	0.01	-40°C to +85°C
Mechanical Resonance[2]	Hz	3500 (xy) 1800 (z) typical	-3dB
Output Data Rate (ODR)[3]	Hz	0.781 min; 50 typical; 1600 max	
Non-Linearity	% of FS	0.6 typical	% of full scale output
Cross-axis Sensitivity	%	2.0 typical	
Noise[4]	mg	0.75 typical	
I^{2}C Communication Rate	MHz	3.4 max	
SPI Communication Rate	MHz	10 max	
Power Supply	V	1.8V – 3.6V typical	
Current Consumption[5]	µA	145 typical	High resolution (RES = 1)
		10 typical	Low resolution (RES = 0)
		0.9 typical	Standby

ENVIRONMENTAL SPECIFICATIONS

PARAMETERS	UNITS	KX022-1020	CONDITION
Operating Temperature	°C	-40 to 85	Powered
Storage Temperature	°C	-55 to 150	Un-powered
Mechanical Shock	g	5,000, 0.5 ms 10,000, 0.2 ms	Powered or un-powered, halversine
ESD	V	2,000	Human body model

NOTES

[1] Resolution and acceleration ranges are user selectable via I^{2}C or SPI.
[2] Resonance as defined by the dampened mechanical sensor.
[3] User selectable through I^{2}C or SPI.
[4] RMS at 50Hz with low-pass filter = ODR/9.
[5] Current varies with Output Data Rate (ODR).