

# KXCNL Accelerometer

3x3x0.9mm Accelerometer with Dual State Machines



## FEATURES

- Small Package - 3x3x0.9mm, 16-pin LGA
- User-selectable g Range and Output Data Rate
- 8-bit and 12-bit Resolution
- Low Power Consumption at 50  $\mu$ A operating
- User-configurable wake-up function
- Digital I<sup>2</sup>C
- Lead-free Solderability
- Excellent Temperature Performance
- High Shock Survivability
- Factory Programmable Offset and Sensitivity
- Self-test Function

## APPLICATIONS

- Freefall Detection
- Active/Inactive Monitoring
- Device Orientation
- Tap/Double-Tap recognition
- Gesture Recognition
- Pedometer/Activity Monitoring
- Motion-controlled User interface

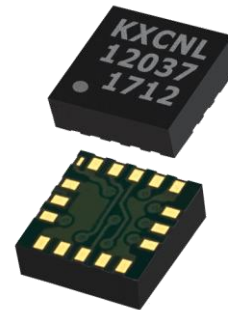
## FOR

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

## PRODUCT OVERVIEW

The KXCNL is a dual user-programmable state machine device that provides users with unmatched flexibility and user-programmability. Designed for mobile applications, it contains two programmable interrupt pins that enable the device to run multiple applications at the same time, at the chip level, taking significant processing load off the system's main applications processor and conserving power.

The KXCNL is delivered in a 3x3x0.9mm, 16-pin LGA package with an operating temperature range of -40°C to +85°C. The KXCNL sensor offers improved shock, reflow, and temperature performance, and the ASIC has an internal voltage regulator that allows operation from 1.7 V to 3.6 V within the specified product performance. In addition, Kionix is providing a library of pre-written state programs, while still allowing customers to write their own state programs if they choose.





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The performance parameters below are programmed and tested at 2.5 volts and T = 25°C. The device can accept supply voltages from 1.7V to 3.6V. Due to internal voltage regulators, there should be minimal change with supply voltage variations.

PERFORMANCE SPECIFICATIONS			
PARAMETERS	UNITS	KXCNL-1010	CONDITION
Range	g	±2.0, ±4.0, ±6.0, ±8.0	User-selectable full-scale output range
Sensitivity <sup>1</sup>	counts/g	1024	SC_1=0, SC_0=0 (± 2g)
		512	SC_1=0, SC_0=1 (± 4g)
		341	SC_1=1, SC_0=0 (± 6g)
		256	SC_1=1, SC_0=1 (± 8g)
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 <sup>2</sup>	Hz	3500 (xy) 1800 (z) typical	-3dB
Output Data Rate (ODR) <sup>3</sup>	Hz	3.125 min; 100 typical; 1600 max	
Bandwidth (-3dB) <sup>4</sup>	Hz	ODR/2	
Non-Linearity	% of FS	0.5 typical	% of full scale output
Cross-axis Sensitivity	%	2.0 typical	
Noise <sup>5</sup>	mg	-40 min; 40 max	
I <sup>2</sup> C Communication Rate	MHz	3.4 max	
Power Supply	V	2.5 typical	1.7V - 3.6V
Current Consumption <sup>6</sup>	µA	250 max	Active-mode ODR7
		50 max	Active-mode ODR0
		8 max	Standby
		2 max	Off-mode Leakage
ENVIRONMENTAL SPECIFICATIONS			
PARAMETERS	UNITS	KXCNL-1010	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

<sup>1</sup> Resolution and acceleration ranges are user selectable via I2C.

<sup>2</sup> Resonance as defined by the dampened mechanical sensor.

<sup>3</sup> User selectable through I2C.

<sup>4</sup> User selectable; dependent on ODR.

<sup>5</sup> Measured in ±2g range and including variation over operating temperature range at ODR5 (100Hz).

<sup>6</sup> Current varies with Output Data Rate (ODR).