KXPA4 Series

Accelerometers and Inclinometers

FEATURES

Small Package - 5x5x1.2mm DFN

Lead-free Solderability

Multiplexed Analog Output

High Shock Survivability

Excellent Temperature Performance

Low Noise Density

Low Power Consumption

Selectable Power Reduction Modes

User Definable Bandwidth

Factory Programmable Offset and Sensitivity

Self-test Function

MARKETS

APPLICATIONS

Hard Disk Drives/Laptops

Free-fall Detection

Cell Phones and Handheld PDAs

Gesture Recognition

Game Controllers & Computer Peripherals

Inclination and Tilt Sensing

Cameras and Video Equipment

Image Stabilization

Sports Diagnostic Equipment/Pedometers

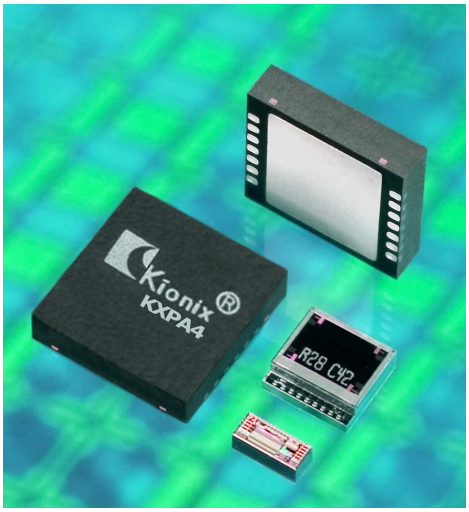
Static or Dynamic Acceleration

Personal Navigation Devices

Inertial Navigation and Dead Reckoning

PROPRIETARY TECHNOLOGY

These high-performance silicon micromachined linear accelerometers and inclinometers consists of a sensor element and an ASIC packaged in a 5x5x1.2mm Dual Flat No-lead (DFN). The sensor element is fabricated from single-crystal silicon with proprietary Deep Reactive Ion Etching (DRIE) processes, and is protected from the environment by a hermetically-sealed silicon cap at the wafer level.



The KXPA4 series is designed to provide a high signal-to-noise ratio with excellent performance over temperature. These sensors can accept supply voltages between 2.7V and 5.25V. Sensitivity is factory programmable allowing customization for applications requiring from ±1.5g to ±6.0g ranges. Sensor bandwidth is user-definable.

The sensor element functions on the principle of differential capacitance. Acceleration causes displacement of a silicon structure resulting in a change in capacitance. An ASIC, using a standard CMOS manufacturing process, detects and transforms changes in capacitance into an analog output voltage, which is proportional to acceleration. The analog output is also accessed through an on-board 3 channel multiplexer. The sense element design utilizes common mode cancellation to decrease errors from process variation and environmental stress.

36 Thornwood Dr. - Ithaca, NY 14850 USA tel: 607-257-1080 - fax: 607-257-1146 - www.kionix.com - info@kionix.com

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PERFORMANCE SPECIFICATIONS

The performance parameters are programmed and tested at 2.8 volts (KXPA4-1050) and 3.3V (KXPA4-2050). However, the device can be factory programmed to accept supply voltages from 2.7 V to 5.25 V. Operation at reduced supply voltages, down to 2.6 V, can be achieved by narrowing the operating temperature range. Performance parameters will change with supply voltage variations.

PERFORMANCE SPECIFICATIONS				
PARAMETERS	**UNITS**	**KXPA4–1050**	**KXPA4–2050**	**CONDITION**
Range [1]	g	±2.0		Factory programmable
Sensitivity	mV/g	560	660	
0g Offset vs. Temp.	mg/°C	±1 typical		
Sensitivity vs. Temp	%/°C	±0.015 typical		
Span	mV	±1120	±1320	
Noise	$mg/\sqrt{Hz}$	175 typical		
Bandwidth [2]	Hz	0 to 3300 max (x and y) 0 to 1700 max (z)		-3dB
Output Resistance [3]	Ω	32K typical		
Non-Linearity	% of FS	0.1 typical		
Ratiometric Error	%	0.3 typical (1.5 max)		
Cross-axis Sensitivity	%	2.0 typical		
Power Supply	V	2.8	3.3	
	V	-0.3 (min) 7.0 (max)		Absolute min/max
	mA	1.1 typical		
	µA	<10		Shutdown pin connected to GND
	ms	1.6		Power-up time @ 500 Hz [4]
ENVIRONMENTAL SPECIFICATIONS				
PARAMETERS	**UNITS**	**KXPA4 Series**		**CONDITION**
Operating Temperature	°C	-40 to 85		Powered
Storage Temperature	°C	-55 to 150		Unpowered
Mechanical Shock	g	5000		Powered or unpowered, 0.5 msec halversine
ESD	V	3000		Human body model

NOTES

[1] Custom ranges from 1.5g to 6g available.

[2] Lower bandwidth can be achieved by using the external C_2 , C_3 , and C_4 (see Product Spec).

[3] 32K Ω resistor connects the output amplifier to the output pin. Resistive loading may reduce sensitivity or cause a shift in offset. Maintaining a load resistance at 3.2M Ω will prevent appreciable changes.

[4] The power-up time will increase or decrease according to bandwidth ($5*R_{out}*C$).

ORDERING GUIDE

Product	Axis(es) of Sensitivity	Range	Sensitivity (mV/g)	Offset (V)	Operating Voltage (V)	Temperature (°C)	Package
KXPA4-1050	XYZ	2g	560	1.40	2.8	-40 to +85	5x5x1.2mm DFN
KXPA4-2050	XYZ	2g	660	1.65	3.3	-40 to +85	5x5x1.2mm DFN