KXP84 Series

Accelerometers and Inclinometers

FEATURES

Small Package - 5x5x1.2mm DFN
I^2C/SPI Interface and Analog Outputs
Free-fall Interrupt Output
High-g Motion Interrupt Output
Low Noise
Lead-free Solderability
Excellent Temperature Performance
High Shock Survivability
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

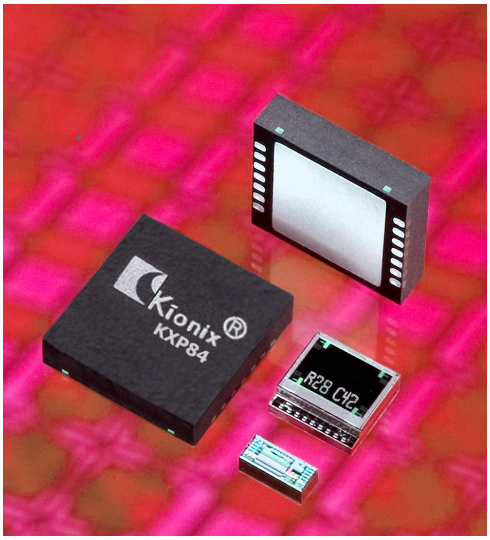
Static or Dynamic Acceleration

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 KXP84 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. Interrupts can be generated for acceleration on any axis above a threshold value (Motion Interrupt) or for acceleration on all three axes below a threshold value (Free-fall Interrupt).

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. This voltage is digitized by an on-board A/D converter and is accessed via an inter-integrated circuit (I^2C) bus or serial peripheral interface (SPI).

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 below are programmed and tested at 3.3 volts. However, the device can be factory programmed to accept supply voltages from 2.7 V to 5.25 V. Performance parameters will change with supply voltage variations.

PERFORMANCE SPECIFICATIONS			
PARAMETERS	**UNITS**	**KXP84-2050**	**CONDITION**
Range [1]	g	±2.0	Factory programmable
Sensitivity	counts/g	819 (typical) ±25	12 bit operation
0g Offset vs. Temp.	mg	±150 max	
Sensitivity vs. Temp	%/°C	±2.0 typical (±3.0 max)	
Noise	$\mu g / \sqrt{Hz}$	175 (typical) 250 (max)	
Bandwidth [2]	Hz	0 to 3300 max (x and y) 0 to 1700 max (z)	-3dB
Non-Linearity	%	0.1 typical (0.5 max)	% of full scale output
Ratiometric Error	%	0.4 typical (1.5 max)	
Cross-axis Sensitivity	%	2.0 typical (3.0 max)	
Resolution	mg	1.22 typical	
A/D Conversion Time	µS	200 typical	
SPI Communication Rate [3]	MHz	1 typical	
I^2C Communication Rate	KHz	400 typical	
Power Supply	V	3.3	Standard
I/O Pads Supply Voltage	V	1.7 to Vdd	
Current Consumption	mA	1.0 typical [4]	Operating
	µA	10 max	Standby—over temperature
ENVIRONMENTAL SPECIFICATIONS			
PARAMETERS	**UNITS**	**KXP84 Series**	**CONDITION**
Operating Temperature	°C	-40 to 85	Powered
Storage Temperature	°C	-55 to 150	Un-powered
Mechanical Shock	g	5000	Powered or un-powered, 0.5 msec halversine
ESD	V	3000	Human body model

NOTES

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

[2] The bandwidth is determined by the external capacitors: C_2 , C_3 , and C_4 (see Product Specs).

[3] SPI communication rate can be optimized for faster communication.

[4] Actual current consumption during operation depends on user selected sampling and interrupt speeds.

ORDERING GUIDE

Product	Axis(es) of Sensitivity	Range (g)	Span (counts)	Sensitivity (mg/count)	Offset (counts)	Operating Voltage (V)	Temperature (°C)	Package
KXP84-1050	XYZ	2	+/- 1638	1.22	2048	2.8	-40 to +85	5x5x1.2mm DFN
KXP84-2050	XYZ	2	+/- 1638	1.22	2048	3.3	-40 to +85	5x5x1.2mm DFN