



KXP84 Series

Accelerometers and Inclinometers

FEATURES

- Small Package - 5x5x1.2mm DFN
- I²C/SPI Interface
- 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

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 $\pm 1.5g$ to $\pm 6.0g$ 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 (I²C) bus or serial peripheral interface (SPI).

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



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

KXP84 Series

Accelerometers and Inclinometers

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	$\mu\text{g} / \sqrt{\text{Hz}}$	175 (typical) 250 (max)	
Bandwidth ²	Hz	0 to 3500 max (x and y) 0 to 1750 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 ² C 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: C₂, C₃, and C₄ (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 (counts/g)	Offset (counts)	Operating Voltage (V)	Temperature (°C)	Package
KXP84-1050	XYZ	2	+/- 1638	819	2048	2.8	-40 to +85	5x5x1.2mm DFN
KXP84-2050	XYZ	2	+/- 1638	819	2048	3.3	-40 to +85	5x5x1.2mm DFN