KXRB5 Series

Accelerometers and Inclinometers

FEATURES

Very Small Package - 3x5x0.9mm LGA

Low Power Consumption

Multiplexed Analog or Digital SPI Interface

Internal 1KHz Low Pass Filter

Ultra Low Noise Density

Lead-free Solderability

Excellent Temperature Performance

High Shock Survivability

User Definable Bandwidth

Factory Programmable Offset and Sensitivity

A/D Converter and Auxiliary Input to Multiplexer

Self-test Function

MARKETS

APPLICATIONS

Personal Navigation Devices

Inertial Navigation and Dead Reckoning

Cell Phones and Handheld PDAs

Gesture Recognition

Game Controllers & Computer Peripherals

Inclination and Tilt Sensing

Ultra-Mobile PCs/Laptops/Hard Disk

Free-fall Detection

Cameras and Video Equipment

Image Stabilization

Sports Diagnostic Equipment/Pedometers

Static or Dynamic Acceleration

PROPRIETARY TECHNOLOGY

These high-performance silicon micromachined linear accelerometers and inclinometers consist of a sensor element and an ASIC packaged in a 3x5x0.9 mm Land Grid Array (LGA). 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 KXRB5 series is designed to provide a high signal-to-noise ratio with excellent performance over temperature. These sensors can accept supply voltages between 2.5V 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 auxiliary input to the A/D converter and multiplexer minimizes the need for external A/D converters.

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.

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PERFORMANCE SPECIFICATIONS

The performance parameters below are programmed and tested at 3.0 and 3.3 volts respectively. However, the device can be factory programmed to accept supply voltages from 2.5 V to 5.25 V. Performance parameters will change with supply voltage variations.

PERFORMANCE SPECIFICATIONS				
PARAMETERS	**UNITS**	**KXRB5-2042**	**KXRB5-2050**	**CONDITION**
Range [1]	g	±2.0		Factory programmable
Sensitivity	mV/g	600 typical (618 max)	660 typical (680 max)	
0g Offset vs. Temp.	mg/°C	±0.2 typical		
Sensitivity vs. Temp	%/°C	±0.01 (xy) typical ±0.02 (z) typical		
Noise		45 typical		
Bandwidth [2]	$\mu g/\sqrt{Hz}$	1000 typical		-3dB
Non-Linearity	% of FS	0.1 typical		% of full scale output
Ratiometric Error	%	0.2 typical		Vdd ± 5%
Cross-axis Sensitivity	%	2.0 typical		
Power Supply	V	3.0	3.3	Standard
Current Consumption	µA	500 typical (700 max)		Operating
	µA	1 typical		Standby
ENVIRONMENTAL SPECIFICATIONS				
PARAMETERS	**UNITS**	**KXRB5-2042**	**KXRB5-2050**	**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 6.0g available.

[2] Internal low pass filter. Lower frequencies are user definable with external capacitors.

ORDERING GUIDE

Product	Output	Axis(es) of Sensitivity	Range (g)	Sensitivity mV/g	Offset (V)	Operating Voltage (V)	Temperature (℃)	Package
KXRB5-2042	Multiplexed Analog	XYZ	2	600	1.5	3.0	-40 to +85	3x5x0.9 LGA
KXRB5-2050	Multiplexed Analog	XYZ	2	660	1.65	3.3	-40 to +85	3x5x0.9 LGA

Contact Kionix for part number assignments with SPI output.