



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

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.

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



KXRB5 Series

Accelerometers and Inclinometers

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	$\mu\text{g} / \sqrt{\text{Hz}}$	75 typical		
Bandwidth ²	Hz	800		-3dB
Non-Linearity	%	0.1 typical		% of full scale output
Ratiometric Error	%	0.2 typical (1.5 max)		3.0V ± 5%
Cross-axis Sensitivity	%	2.0 typical		
Power Supply	V	3.0	3.3	Standard
Current Consumption	mA	0.5 typical (0.7 max)		Operating
	nA	1.2 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 (°C)	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.