



KXSC7 Series

Accelerometers and Inclinometers

FEATURES

- Ultra-Small Package - 3x3x0.9mm LGA
- Analog Output
- Low Power Consumption
- Factory Programmable Internal Low Pass Filter
- Inertial Wake Up Interrupt
- Low Noise
- Lead-free Solderability
- Excellent Temperature Performance
- High Shock Survivability
- User Definable Bandwidth
- Factory Programmable Offset and Sensitivity
- Self-test Function

MARKETS

APPLICATIONS

- Cell Phones and Handheld PDAs*
 - Gesture Recognition
- Ultra-Mobile PCs/Laptops/Hard Disk Drives*
 - Free-fall Detection
- Game Controllers & Computer Peripherals*
 - Inclination and Tilt Sensing
- 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 3x3x0.9mm Land Grid Array Dual (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 **KXSC7** series is designed to provide a high signal-to-noise ratio with excellent performance over temperature. These sensors can accept supply voltages between 1.8V and 3.6V. Sensitivity is factory programmable allowing customization for applications requiring from $\pm 1.5g$ to $\pm 6g$ ranges. Several pre-set internal low pass filters can eliminate the need for external filter capacitors. If the pre-set values are not optimal for an application, the sensor bandwidth is user-definable with the use of external capacitors.

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 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 below are programmed and tested at 3.3 volts. However, the device can be factory programmed to accept supply voltages from 1.8V to 3.6V. Performance parameters will change with supply voltage variations.

PERFORMANCE SPECIFICATIONS				
PARAMETERS	UNITS	KXSC7-1050	KXSC7-2050	CONDITION
Range ¹	g	±2.0		Factory programmable
Sensitivity	mV/g	560 typical	660 typical	
0g Offset vs. Temp.	mg/°C	±0.5 (xy) ±3 (z) typical		
Sensitivity vs. Temp	%/°C	±0.01 (xy) ±0.04 (z) typical		
Noise Density (on filter pins)	$\mu\text{g} / \sqrt{\text{Hz}}$	100 typical		
Mechanical Resonance ²	Hz	4000 (xy) 2000 (z)		-3dB
LPF Bandwidth	Hz	50 default 100, 500, 1000, 2000, no filter		Factory programmable
Non-Linearity	% of FS	2.0 typical		% of full scale output
Ratiometric Error	%	±1.1 (xy) ±0.6 (z) typical		3.3V ± 5%
Cross-axis Sensitivity	%	2.0 typical		
Power Supply	V	2.8	3.3	Standard
Current Consumption	μA	230 typical		Operating (full power)
	μA	50 typical		Operating (low power)
	μA	5 max		Standby
ENVIRONMENTAL SPECIFICATIONS				
PARAMETERS	UNITS	KXSC7-1050	KXSC7-2050	CONDITION
Operating Temperature	°C	-40 to 85 (consumer)		Powered
Storage Temperature	°C	-55 to 150		Un-powered
Mechanical Shock	g	5000, 0.5 msec 10,000, 0.2 msec		Powered or un-powered, halversine
ESD	V	2000		Human body model

NOTES

¹ Custom ranges from 1.5g to 6g available.

² Resonance as defined by the dampened mechanical sensor.

ORDERING GUIDE

Product	Axis(es) of Sensitivity	Range (g)	Sensitivity	Offset	Operating Voltage (V)	Temperature (°C)	Package
KXSC7-1050	XYZ	2	560 (mV/g)	1.4 V	2.8	-40 to +85	3x3x0.9mm LGA
KXSC7-2050	XYZ	2	660 (mV/g)	1.65V	3.3	-40 to +85	3x3x0.9mm LGA