



# KXD94 Series

## Accelerometers and Inclinometers

### FEATURES

- Small Package - 5x5x1.2mm DFN
- Multiplexed Analog Output
- Internal 1KHz Low Pass Filter
- Low Noise
- Lead-free Solderability
- Excellent Temperature Performance
- High Shock Survivability
- Low Power Consumption
- User Definable Bandwidth
- Factory Programmable Offset and Sensitivity
- Self-test Function

### MARKETS

#### APPLICATIONS

##### *Automotive*

- Active Suspension
- Stability Control
- Telematics/GPS

##### *Industrial*

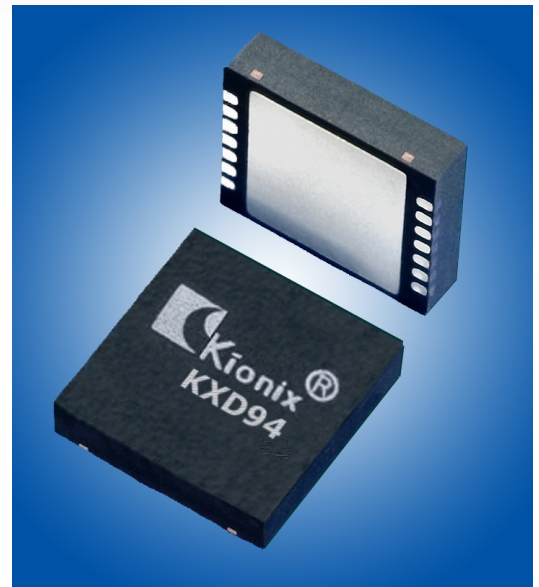
- Platform Stabilization
- Drill Orientation
- Event Detection
- Vibration Analysis
- Appliance Monitoring

### PROPRIETARY TECHNOLOGY

These high-performance silicon micromachined linear accelerometers and inclinometers consist 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 **KXD94** series is designed to provide a high signal-to-noise ratio with excellent performance over temperature. These sensors can accept supply voltages between 2.5 – 5.25V. Sensitivity is factory programmable for applications requiring from  $\pm 5.0g$  to  $\pm 15.0g$  ranges. Sensor bandwidth is user-definable.

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, temperature, and environmental stress.



36 Thornwood Dr. - Ithaca, NY 14850 USA tel: 607-257-1080 - fax: 607-257-1146 - [www.kionix.com](http://www.kionix.com) - [info@kionix.com](mailto:info@kionix.com)

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### PERFORMANCE SPECIFICATIONS

The performance parameters below are programmed and tested at 5.0 volts.

PERFORMANCE SPECIFICATIONS				
PARAMETERS	UNITS	KXD94-2802	KXD94-7228	CONDITION
Range	g	±10	±13	Factory programmable
0g Offset vs. Temp.	mg/°C	±1.0 typical		
Sensitivity vs. Temp	%/°C	±0.01		
Noise Density	$\mu\text{g} / \sqrt{\text{Hz}}$	100 typical		On filter pins
Bandwidth <sup>1</sup>	Hz	800 typical		-3dB
Non-Linearity	% of FS	0.1 typical		% of full scale output
Ratiometric Error	%	±0.2 (XY) ±0.1 (Z)	±0.5 typical	5.0V ± 5%
Cross-axis Sensitivity	%	2.0 typical		
Power Supply	V	5.0 typical		Standard
Current Consumption	mA	1.20 typical	1.10 typical	Operating
	$\mu\text{A}$	5 max		Standby
ENVIRONMENTAL SPECIFICATIONS				
PARAMETERS	UNITS	KXD94-2802	KXD94-7228	CONDITION
Operating Temperature	°C	-40 to +85 (Consumer/ Industrial)	-40 to +125 (Automotive)	Powered
Storage Temperature	°C	-55 to 150		Unpowered
Mechanical Shock	g	5000		Powered and unpowered, 0.5 msec halversine
ESD	V	3000		Human body model

### NOTE

<sup>1</sup> Internal 1 KHz low pass filter. Lower frequencies are user definable with external capacitors.

### ORDERING GUIDE

Product	Axis(es) of Sensitivity	Range (g)	Sensitivity (mV/g)	Offset (V)	Operating Voltage (V)	Temperature (°C)	Package
<b>KXD94-2802</b>	XYZ	10	200	2.5	5.0	-40 to +85	5x5x1.2 DFN
<b>KXD94-7044</b>	X	13	150	2.5	5.0	-40 to +125	5x5x1.2 DFN
<b>KXD94-7138</b>	X	5	400	2.5	5.0	-40 to +125	5x5x1.2 DFN
<b>KXD94-7228</b>	XYZ	13	150	2.35 (X) 2.5 (Y, Z)	5.0	-40 to +125	5x5x1.2 DFN