

KXR94 Series Accelerometers and Inclinometers

FEATURES

Small Package - 5x5x1.2mm DFN

Multiplexed Analog or Digital SPI Interface

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

Stability Control
Telematics/GPS
Theft and Accident Alarms

Personal Navigation Devices

Inertial Navigation and Dead Reckoning

Cell Phones and Handheld PDAs

Gesture Recognition

Cameras and Video Equipment

Image Stabilization

Industrial

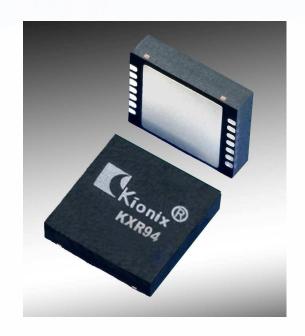
Platform Stabilization Drill Orientation

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 KXR94 series is designed to provide a high signal-to-noise ratio with integrated temperature compensation that provides 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 $\pm 1.0g$ to $\pm 5.0g$ 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 and environmental stress. Available in analog and multiplexed analog outputs and serial peripheral interface (SPI).



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KXR94 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 2.5 V to 5.25 V. Performance parameters will change with supply voltage variations.

| | PERI | FORMANCE SPECIF | ICATIONS | | |
|-------------------------------------|---------------------|-------------------------------------|---|------------------|--|
| PARAMETERS | UNITS | KXR94-2050 | CONDITION | | |
| Range ¹ | g | ±2 | Factory programmable | | |
| Concitivity | mV/g | 660 typical (673 max) | Not applicable | 12-bit operation | |
| Sensitivity | counts/g | Not applicable 819 target (835 max) | | 12-bit operation | |
| 0g Offset vs. Temp. | mg/°C | ±0.2 t | | | |
| Sensitivity vs. Temp | %/°C | ±0.01 (xy) ±0 | | | |
| Noise Density | $\mu g / \sqrt{Hz}$ | 45 ty | | | |
| Bandwidth ² | Hz | 80 | -3dB | | |
| Non-Linearity | % of FS | 0.1 ty | % of full scale output | | |
| Ratiometric Error | % | ±1.25 (xy) ± | 3.3V ± 5% | | |
| Cross-axis Sensitivity | % | 2.0 ty | | | |
| A/D Conversion Time | μS | Not applicable 40 typical | | | |
| SPI Communication Rate ³ | MHz | Not Applicable | 5 typical | | |
| Power Supply | V | 3. | Standard | | |
| | mA | 0.95 t | Operating | | |
| Current Consumption | μΑ | 5 m | Standby | | |
| | ENVI | RONMENTAL SPECI | FICATIONS | | |
| PARAMETERS | UNITS | KXR94-2050 | KXR94-2353 | CONDITION | |
| Operating Temperature | °C | -40 to 85 (Cons | Powered | | |
| | | -40 to 125 (A | | | |
| Storage Temperature | °C | -55 to | Un-powered | | |
| Mechanical Shock | g | 50 | Powered or un-powered, 0.5 msec halversine | | |
| ESD | V | 30 | Human body model | | |

NOTES

ORDERING GUIDE

| Product | Axis(es) of Sensitivity | Range (g) | Sensitivity | Offset | Operating Voltage (V) | Ouput | Temperature (\mathfrak{C}) | Package |
|------------|----------------------------|--------------|----------------|-------------|--------------------------|-------------|------------------------------|-------------|
| KXR94-1050 | XYZ | 2 | 560 (mV/g) | 1.4 V | 2.8 | Mux Analog | -40 to +85 | 5x5x1.2 DFN |
| KXR94-2050 | XYZ | 2 | 660 (mV/g) | 1.65V | 3.3 | Mux Analog | -40 to +85 | 5x5x1.2 DFN |
| KXR94-2283 | XYZ | 2 | 1000 (mV/g) | 2.5V | 5.0 | Mux Analog | -40 to +85 | 5x5x1.2 DFN |
| KXR94-2353 | XYZ | 2 | 819 (counts/g) | 2048 counts | 3.3 | Digital SPI | -40 to +85 | 5x5x1.2 DFN |
| KXR94-7050 | XYZ | 2 | 660 (mV/g) | 1.65V | 3.3 | Mux Analog | -40 to 125 | 5x5x1.2 DFN |

¹ Custom ranges from 1.0g to 5.0g available.

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

³ SPI communication rate can be optimized for faster communication.