KXTE9 Series

Accelerometers and Inclinometers

FEATURES

Ultra-Small Package - 3x3x0.9mm LGA
Activity-monitoring Algorithm (Active/Inactive)
Device Orientation Detection Algorithm
Digital I^2C Communication Interface
Very Low Power Consumption (30µA full operation)
Lead-free Solderability
Excellent Temperature Performance
High Shock Survivability
User-selectable Output Data Rate
Factory Programmable Offset and Sensitivity
Self-test Function

MARKETS

APPLICATIONS

Mobile Phones and Mobile Internet Devices

Screen Rotation
Gesture Recognition
User Interface
Power Management
Activity Monitoring

Game Controllers and Computer Peripherals

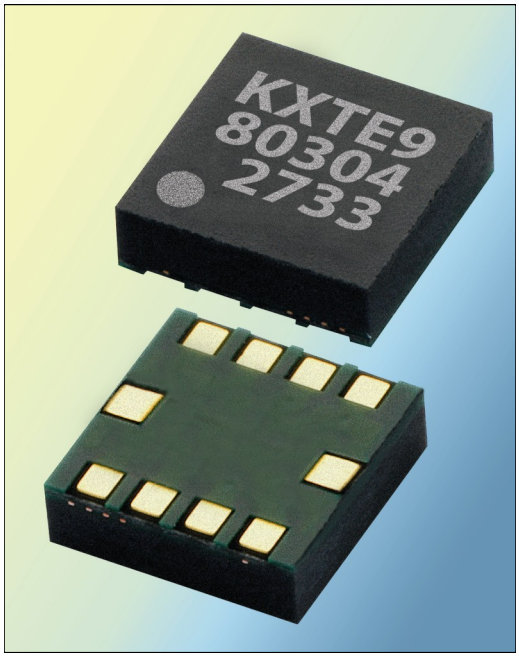
Inclination and Tilt Sensing
User Interface
Power Management
Activity Monitoring

Sports Diagnostic Equipment

Static and Dynamic Acceleration
Activity Monitoring

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 (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 KXTE9's advanced, orientation-detection feature reports changes in landscape, portrait, face-up, and face-down conditions. This sophisticated, embedded algorithm eliminates the need for continuous data collection and complex calculations by a microprocessor. With a few adjustable parameters, the screen-rotation algorithm can be optimized for an intuitive user experience. In addition to orientation detection, the KXTE9 features an activity-monitoring function. This function reports changes in a device's motion state, either moving (active) or not moving (inactive). A highly-manufacturable product with consistent product performance across use conditions, the KXTE9 operates across a supply voltage of 1.8V to 3.6V DC.

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. The voltage is digitized by an on-board A/D converter and is accessed via an inter-interated circuit (I^2C).

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PERFORMANCE SPECIFICATIONS

The performance parameters below are programmed and tested for ±2.0g, 6-bit operation at 3.3 volts and 25°C. 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**	**KXTE9-2050**	**CONDITION**
Range	g	±2.0	Factory programmable
Sensitivity	counts/g	16 typical	
Sensitivity vs. Temp	%/°C	±0.01 (X, Y) ±0.03 (Z) typical	
0g Offset	counts	32 typical	
0g Offset vs. Temp.	mg/°C	±0.6 typical	
Non-Linearity	% of FS	0.1 typical	% of full scale output
Cross-axis Sensitivity	%	2.0 typical	
I^2C Communication Rate	KHz	400 max	
Power Supply	V	3.3 typical	Factory programmable
Current Consumption	µA	30 typical	Operating
	µA	0.1 typical	Standby
ENVIRONMENTAL SPECIFICATIONS			
PARAMETERS	**UNITS**	**KXTE9-2050**	**CONDITION**
Operating Temperature	°C	-40 to 85	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

ORDERING GUIDE

Product	Axis(es) of Sensitivity	Range (g)	Sensitivity (counts/g)	Offset (counts)	Operating Voltage (V)	Temperature (°C)	Package
KXTE9-1026	XYZ	2	16	32	2.6	-40 to +85	3x3x0.9mm LGA
KXTE9-1050	XYZ	2	16	32	2.8	-40 to +85	3x3x0.9mm LGA
KXTE9-2050	XYZ	2	16	32	3.3	-40 to +85	3x3x0.9mm LGA
KXTE9-4100	XYZ	2	16	32	1.8	-40 to +85	3x3x0.9mm LGA