



KXG10-□□□

**±2g, ±5g, ±10g Accelerometers/
Inclinometers
Dual (X,Y) Axis
ISO 9001 Certified**

36 Thornwood Dr. - Ithaca, NY 14850 - tel: 607-257-1080 - fax: 607-257-1146 - www.kionix.com - info@kionix.com

Features

- Robust Silicon MEMS Technology
- Factory Programmable Ranges from 1-10g
- Low Noise
- Excellent Temperature Performance
- Factory Programmable Offset
- User Definable Bandwidth
- High Shock Survivability
- Low Power Consumption
- Self-test Function

Applications

- Static or Dynamic Acceleration
- Inclination/Tilt Sensing
- Motion and Vibration Detection
- Automotive Electronics
- Inertial Navigation and Ded(uctive) Reckoning
- Industrial Sensing
- Consumer Electronics

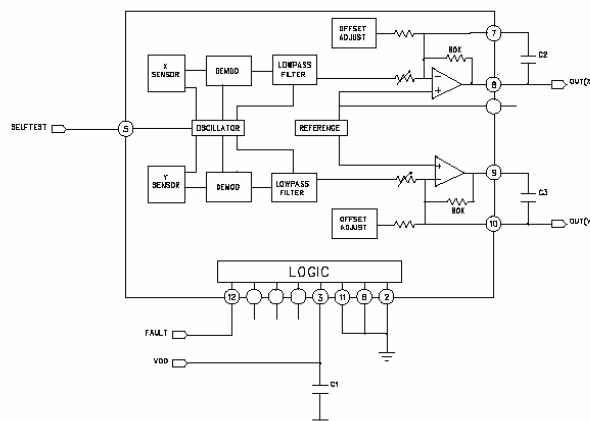
General Description

Kionix high performance silicon micromachined linear accelerometers consist of a sensor element and an ASIC packaged in a standard 16-pin SOIC wide body package. The sensor element is fabricated from single crystal silicon with proprietary DRIE processes and is protected from the environment by a hermetically sealed silicon cap wafer at the wafer level.

The KXG10-L series is designed to provide a high signal to noise ratio with excellent performance over temperature. Sensitivity is factory programmable allowing customization for applications requiring ±1.0g to ±10.0g 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. A standard CMOS technology ASIC 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.

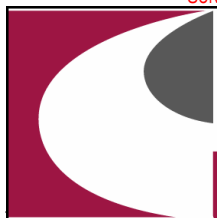
Functional Block Diagram



Rev 1
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CAUTION:
ELECTROSTATIC-SENSITIVE
COMPONENT




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PERFORMANCE SPECIFICATIONS

Performance Specifications					
Parameters	Units	KXG10-L20	KXG10-L50	KXG10-010	Condition
Range	g	±2.0	±5.0	±10.0	
Sensitivity ¹	mV/g	1000	400	200	Factory set
Offset vs. Temp.	mV	±250	±250	±150	Over temp range
	°C	0 to 70 ²	-40 to 125 ²	-40 to 125 ²	
Sensitivity Error	%	±2.0 typical (±3.0 max)			Over chosen temp range
Resolution	mg	0.1 to 0.3			DC..30Hz
Span	mV	±2000			
Noise Density	µg/Hz ^{1/2}	60 typical (100 max)			DC..100Hz
Bandwidth ³	Hz	250 Standard			Hz @ 3dB
		1000, 500 (preset) or lower			
Non-Linearity	% of FS	±0.4 typical (±1.0 max)			
Ratiometric Error	%	±0.4 typical (±1.5 max)			
Cross-Axis Sensitivity	%	±2.0 typical (±3.0 max)			
Power Supply	V	5.0 ± 0.25			Voltage
	V	-0.3 (min) 7.0 (max)			Absolute min/max
	mA	6.5 typical (7.0 max)			Current draw
Package ⁴		16-pin SOIC Overmolded Plastic			

ENVIRONMENTAL SPECIFICATIONS

PARAMETERS	UNITS	KXG10-L20	KXG10-L50	KXG10-010	CONDITION
Storage Temp.	°C	-55 to 125			Without power
Mechanical Shock	g	2000			Powered or unpowered, 0.5msec haversine
ESD	V	3000			Human body model

¹ Custom sensitivities from 2000mV/g through 200mV/g available.

² Temperature range for specified offset. Operating temperature range is -40 to 125 °C

³ Bandwidth is factory programmed to 250. Bandwidths of 500 and 1000 can also be factory programmed, or the internal LPF can be bypassed.

⁴ Custom packaging is available. The packaged device weighs less than 1 gram.




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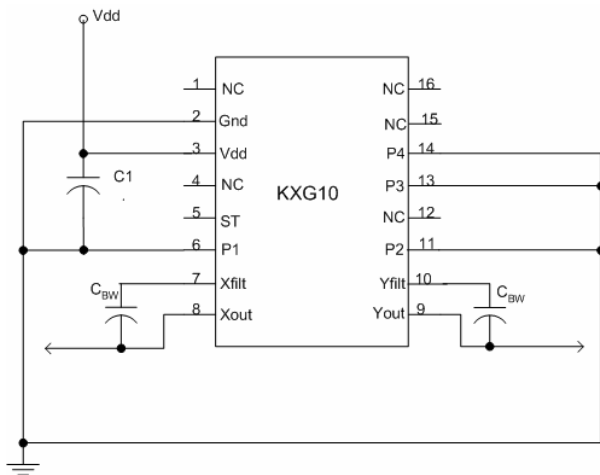
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Performance Notes

- Recommend using 0.1 μF for the decoupling capacitor (C1).
- A 1000 pF capacitor from the output to ground will reduce high frequency noise.
- The output of a properly functioning part will increase by at least 1.8V when 5V is applied to the self test pin (#5).
- The bandwidth can be adjusted with a capacitor (C2) across pins 7 and 8 and a capacitor (C3) across pins 9 and 10. The response is single pole. Given a desired bandwidth, f_{BW} , the filter capacitor, C_{BW} , is determined by:

$$C_2 = C_3 = C_{BW} = \frac{1.99 \times 10^{-6}}{f_{BW}}$$

Application Circuit

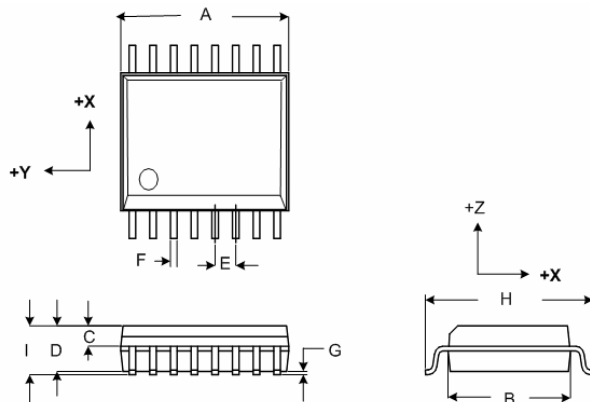


Pin Function Table

Pin	Function	Pin	Function
1	NC	9	Output (Y)
2	GND	10	LPF (Y)
3	Vdd (+5 V)	11	GND
4	NC	12	NC
5	Self Test	13	GND
6	GND	14	GND
7	LPF (X)	15	NC
8	Output (X)	16	NC

GND — Ground LPF — Low Pass Filter NC — Not Connected

Package Data: 16-pin SOIC Wide Body



Dimension	Inches	Millimeters
A	0.406	10.31
B	0.296	7.52
C	0.043	1.09
D	0.096	2.44
E	0.050	1.27
F	0.016	0.41
G	0.007	0.18
H	0.406	10.31
I	0.103	2.62

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Note: When the device is accelerated in the +X or +Y direction, the corresponding output will increase.

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