

Exhibit 2152

FEATURES

- Low cost
- High resolution
- Dual-axis accelerometer on a single IC chip
- 5 mm × 5 mm × 2 mm CLCC package
- Low power < 400 μ A (typ)
- X-axis and Y-axis aligned to within 0.1° (typ)
- BW adjustment with a single capacitor
- Single-supply operation
- High shock survival

APPLICATIONS

- Tilt and motion sensing in cost-sensitive applications
- Smart handheld devices
- Computer security
- Input devices
- Pedometers and activity monitors
- Game controllers
- Toys and entertainment products

GENERAL DESCRIPTION

The ADXL311 is a low cost, low power, complete dual-axis accelerometer with signal conditioned voltage outputs, all on a single monolithic IC. The ADXL311 is built using the same proven iMEMS® process used in over 100 million Analog Devices accelerometers shipped to date, with demonstrated 1 FIT reliability (1 failure per 1 billion device operating hours).

The ADXL311 will measure acceleration with a full-scale range of $\pm 2 g$. The ADXL311 can measure both dynamic acceleration (e.g., vibration) and static acceleration (e.g., gravity). The outputs are analog voltages proportional to acceleration.

The typical noise floor is $300 \mu g/\sqrt{\text{Hz}}$ allowing signals below 2 mg (0.1° of inclination) to be resolved in tilt sensing applications using narrow bandwidths (10 Hz).

The user selects the bandwidth of the accelerometer using capacitors C_X and C_Y at the X_{FILT} and Y_{FILT} pins. Bandwidths of 1 Hz to 2 kHz may be selected to suit the application.

The ADXL311 is available in a 5 mm × 5 mm × 2 mm 8-terminal hermetic CLCC package

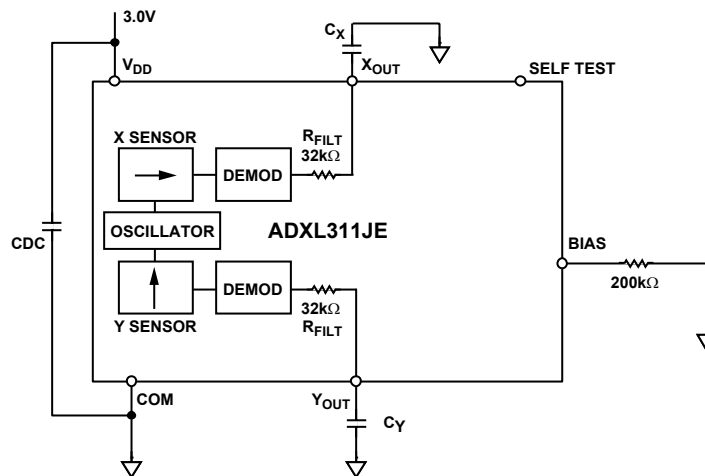


Figure 1. Functional Block Diagram

Rev. A

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ADXL311

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REVISION HISTORY

7/03—Data sheet changed from Rev. 0 to Rev. A. Change to OUTLINE DIMENSIONS.....	10
Revision 0: Initial Version	

SPECIFICATIONS

Table 1. $T_A = 25^\circ\text{C}$, $V_{DD} = 3\text{ V}$, $R_{BIAS} = 125\text{ k}\Omega$, Acceleration = 0 g , unless otherwise noted.)

Parameter	Conditions	Min	Typ	Max	Units
SENSOR INPUT	Each Axis				
Measurement Range			± 2		g
Nonlinearity	Best Fit Straight Line		0.2		% of FS
Alignment Error ¹			± 1		Degrees
Alignment Error	X Sensor to Y Sensor		0.01		Degrees
Cross Axis Sensitivity ²			± 2		%
SENSITIVITY	Each Axis				
Sensitivity at X_{FILT} , Y_{FILT}	$V_{DD} = 3\text{ V}$	140	167	195	mV/g
Sensitivity Change due to Temperature ³	Delta from 25°C		-0.025		%/ $^\circ\text{C}$
ZERO g BIAS LEVEL	Each Axis				
0 g Voltage X_{FILT} , Y_{FILT}	$V_{DD} = 3\text{ V}$	1.2	1.5	1.8	V
0 g Offset vs. Temperature	Delta from 25°C		2.0		mg/ $^\circ\text{C}$
NOISE PERFORMANCE					
Noise Density	@ 25°C		300		$\mu\text{g}/\sqrt{\text{Hz}}$ RMS
FREQUENCY RESPONSE					
3 dB Bandwidth	At Pins X_{FILT} , Y_{FILT}		6		kHz
Sensor Resonant Frequency			10		kHz
FILTER					
R_{FILT} Tolerance	32 k Ω Nominal		± 15		%
Minimum Capacitance	At Pins X_{FILT} , Y_{FILT}	1000			pF
SELF TEST					
X_{FILT} , Y_{FILT}	Self Test 0 to 1		45		mV
POWER SUPPLY					
Operating Voltage Range		2.7		5.25	V
Quiescent Supply Current			0.4	1.0	mA
Turn-On Time			$160 \times C_{FILT} + 0.3$		ms
TEMPERATURE RANGE					
Operating Range		0		70	$^\circ\text{C}$

¹ Alignment error is specified as the angle between the true and indicated axis of sensitivity (Figure 1).

² Cross axis sensitivity is the algebraic sum of the alignment and the inherent sensitivity errors.

³ Defined as the output change from ambient to maximum temperature or ambient to minimum temperature.

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ABSOLUTE MAXIMUM RATINGS

Table 2.

Parameter	Rating
Acceleration (Any Axis, Unpowered)	3,500 g, 0.5 ms
Acceleration (Any Axis, Powered, $V_{DD} = 3\text{ V}$)	3,500 g, 0.5 ms
V_{DD}	-0.3 V to +0.6 V
Output Short-Circuit Duration, (Any Pin to Commom)	Indefinite
Operating Temperature Range	-55°C to +125°C
Storage Temperature	-65°C to +150°C

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Table 3. Package Characteristics

Package Type	θ_{JA}	θ_{JC}	Device Weight
8-Lead CLCC	120°C/W	TBD°C/W	<1.0 gram

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