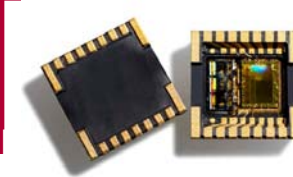


Data Sheet



SCA3000-D02 3-AXIS LOW POWER ACCELEROMETER WITH DIGITAL I²C INTERFACE

Features

- 2.35 V – 3.6 V supply voltage, 1.7 V – 3.6 V digital I/O voltage
- ±2 g measurement range
- I²C digital interface: V2.1 compliant, 10-bit addressing, supports standard mode and fast mode
- Selectable frequency response
- Very low current consumption (2.5 V, 650 μA typ)
- Temperature output
- 64 samples/axis buffer memory for output acceleration data and advanced features enable significant power and resource savings at system level
- Interrupt signal triggered by motion and free fall
- Size 7x7x1.8 mm
- Proven capacitive 3D-MEMS technology
- High shock durability
- RoHS compliant / lead free soldering

Applications

SCA3000-D02 is targeted to battery operated devices. Typical applications are but not limited

- Motion activated functions in mobile terminals and antitheft systems
- Inertial navigation
- Inclination sensing in digital inclinometers
- Tilt compensation in electronic compass

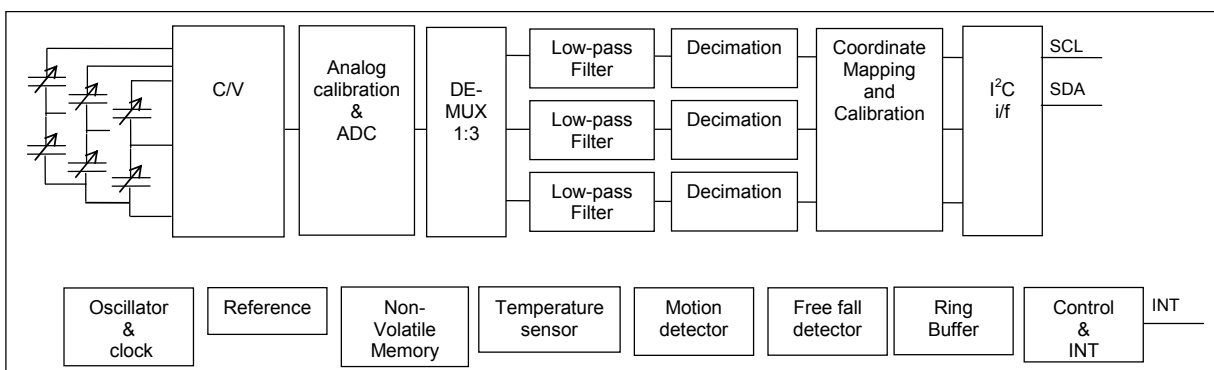


Figure 1 SCA3000-D02 Block Diagram

Performance Characteristics ¹⁾

Parameter	Condition	Typical supply range 2.35 – 2.7 V			Extended supply range 2.7 – 3.6 V			Units
		Min	Typ ²⁾	Max	Min	Typ ²⁾	Max	
Analog and digital Vdd		2.35	2.5	2.7	-	3.3	-	V
Digital I/O Vdd	Vdd ≥ Digital I/O Vdd	1.7	1.8 / 2.5	2.7	-	3.3	-	V
Operating temperature **		-40	-	85	-40	-	85	°C
Current consumption *	Reset ³⁾	-	<7		-	<9	-	μA
	Active	-	650		-	800	-	μA
	Motion Detection mode	-	450		-	550	-	μA
Acceleration range * ⁴⁾	Nominal	-2	-	2	-	± 2	-	g
Offset calibration error *	Z-axis +1g position	-20	-	20	-	± 50	-	mg
Offset temperature error ** ⁵⁾	-40 ... +85 °C	-	±0.5		-	±0.5	-	mg/°C
Sensitivity * ⁶⁾		-	1333	-	-	1333	-	Count/g
Sensitivity calibration error *		-1	-	+1	-	± 1	-	%
Sensitivity temperature error ** ⁷⁾	-40 ... +85 °C	-	±0.01		-	±0.0	-	%/°C
Non-Linearity ** ⁸⁾		-	±1		-	±1	-	% FS
Cross-Axis sensitivity ** ⁹⁾		-	±3	-	-	±3	-	%
Bandwidth ** ¹⁰⁾	Measurement mode	36	45	54	-	45	-	Hz
	Bypass measurement mode	56	70	84	-	70	-	Hz
Noise ** ¹¹⁾	Measurement mode	-	3		-	3	-	mg RMS
	Bypass measurement mode	-	5		-	5	-	mg RMS
Output data rate **		200	250	300	-	260	-	Hz
Temperature output	T=+23 °C		256		-	256	-	Count
	Sensitivity		1.8		-	1.8	-	Count/°C
Turn on time ** ¹²⁾	Measurement mode	-	35		-	35	-	ms
	Bypass measurement mode	-	35		-	35	-	ms
I ² C clock rate **		-	-	400	-	-	400	kHz

* 100% tested in production

** Qualified during product validation

1) The product is factory calibrated at 2.5 V in room temperature.

2) Typical values are not guaranteed.

3) Includes the current through the internal 400 kΩ pull-up resistor connected to digital I/O Vdd.

4) Range defined as $\sqrt{x^2+y^2+z^2} \leq 2g$. The measuring range is tested on sensing element level.
FS = 2g.

5) Offset temperature error = {Count(0g)-Offset} / Sensitivity [g]. Sensitivity = Calibrated sensitivity.
Offset= Calibrated offset.

6) Sensitivity = {Count(+1g) - Count(-1g)}/2 [Count/g].

7) Sensitivity temperature error = {[Count(+1g)-Count(-1g)]/2 - Sensitivity} / Sensitivity x 100% [%].
Sensitivity = Calibrated sensitivity.

8) From straight line through sensitivity calibration (+1g, -1g) points.

9) The cross-axis sensitivity determines how much acceleration, perpendicular to the measuring axis, couples to the output. The total cross-axis sensitivity is the geometric sum of the sensitivities of the two axes which are perpendicular to the measuring axis. The angular alignment error between X, Y and Z axis is included into the cross axis sensitivity.

10) Frequency responses according to Figure 3 and Figure 4.

11) Average noise/axis over the measurement bandwidth defined as $\sqrt{\frac{1}{3}(n_x^2+n_y^2+n_z^2)}$, where n_x , n_y and n_z are

the measured signal's standard deviation due to noise in x, y and z directions.

12) Settling error less than 1% of FS.

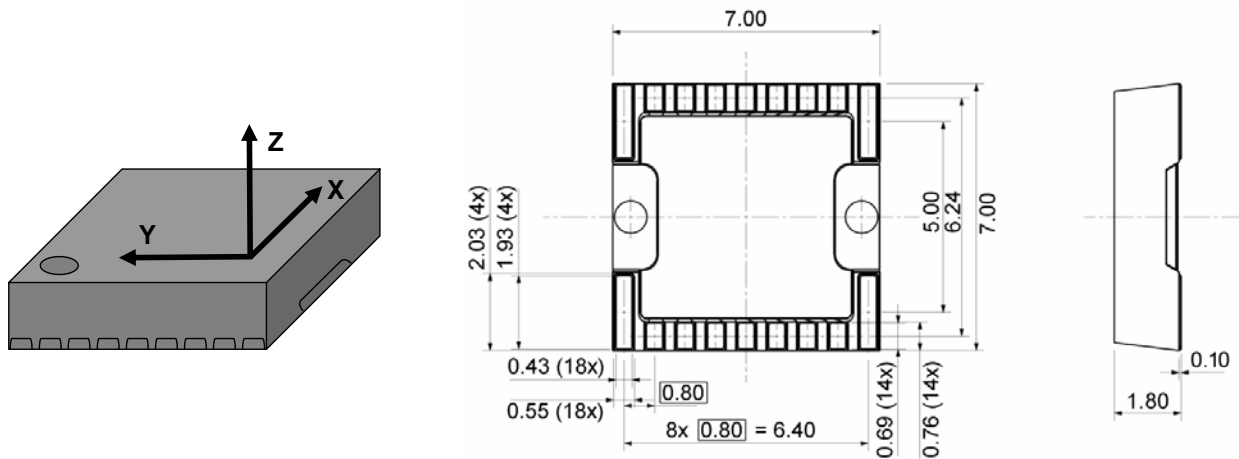


Figure 2 Sensing directions and package dimensions in mm with $\pm 50 \mu\text{m}$ tolerance.

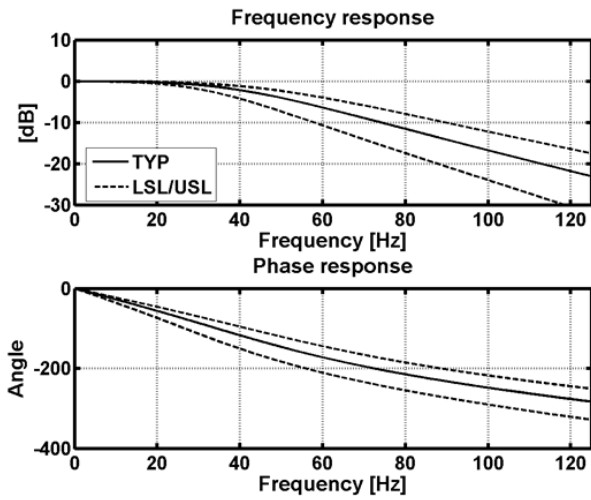


Figure 3 Frequency response of SCA3000-D02 in measurement mode

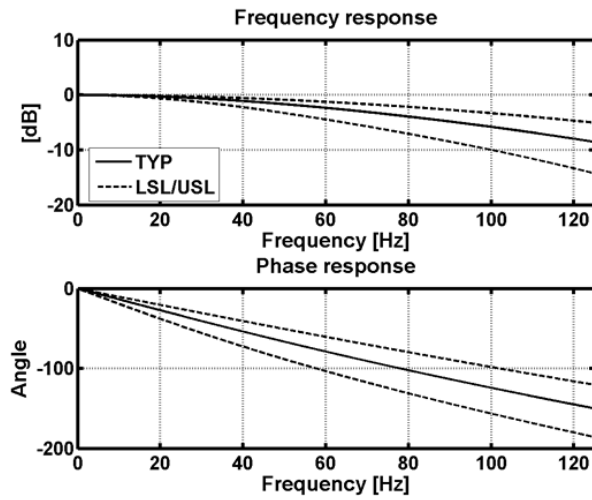


Figure 4 Frequency response of SCA3000-D02 in bypass measurement mode

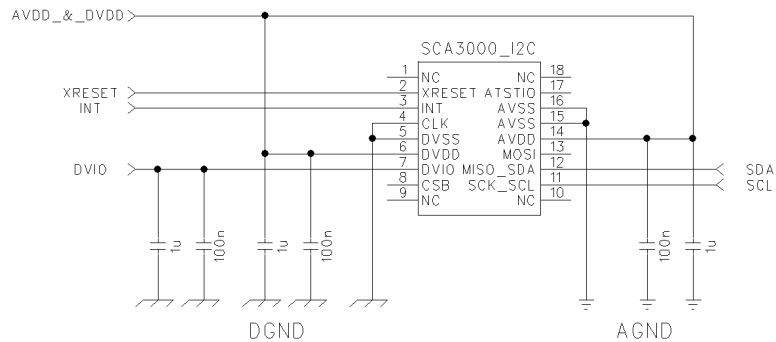


Figure 5 Application schematic

Pin #	Name	Function
1	NC	Not connected
2	XRESET	External reset, active low
3	INT	Interrupt output
4	CLK	Digital ground
5	DVSS	Digital ground
6	DVDD	Digital supply
7	DVIO	Digital I/O supply
8	CSB	Not connected
9	NC	Not connected
10	NC	Not connected
11	SCK_SCL	I ² C clock (SCL)
12	MISO_SDA	I ² C data (SDA)
13	MOSI	Not connected
14	AVDD	Analog supply
15	AVSS	Analog ground
16	AVSS	Analog ground
17	ATSTIO	Not connected
18	NC	Not connected

Table 1 Pin descriptions

Document Change Control

Rev.	Date	Change Description
A	21-Apr-06	1 st official release
A.01	13-Jun-06	Dimensions updated