SCA610 Series

Accelerometer/Inclinometer

FEATURES

- Available ranges ±0.5g (±30°), ±1g (±90°), ±1.5g, ±1.7g,
- 8-pin plastic surface mount DIP package mountable with pick and place machines
- Enhanced failure detection
- Digitally activated electrostatic self test (not for inclinometers)
- Calibration memory parity check
- Continuous connection failure detection
- Bi-directional acceleration measurement
- Controlled frequency response in the sensing element
- Re-flow solderable, process compatible
- Single +5V supply; ratiometric voltage output in the range 4.75 ... 5.25V

BENEFITS

- Exceptional reliability, unprecedented accuracy and excellent stability over temperature and time
- Outstanding overload and shock durability
- No additional components required

APPLICATIONS

- Acceleration measurement
- Inclination measurement
- Motion measurement
- Vibration measurement

For customised product please contact VTI Technologies

ELECTRICAL CHARACTERISTICS

Parameter	Condition	Min.	Typ.	Max.	Units
Supply voltage Vdd		4.75		5.25	V
Current consumption	Vdd = 5V; No load		2.0	4.0	mA
Operating temperature		- 40		+ 125	°C
Resistive output load	Vout to Vdd or Vss	20			kOhm
Capacitive load	Vout to Vdd or Vss			20	nF
Output noise (1	DC...80kHz		0.25		mg

VDD = 5.00V, UNLESS OTHERWISE SPECIFIED

PERFORMANCE CHARACTERISTICS

Parameter	Condition/ Comment	SCA610-CBHH1G (13	SCA610-CB1H1G (13	SCA610-C23H1A	SCA610-C28H1A	Units
Measuring range (2	Nominal	±0.5 (±30°)	±1 (±90°)	±1.5	±1.7	g
Mounting plane (3	Measuring Direction	Horizontal	Horizontal	Horizontal	Horizontal	
Zero point (nom.) (4	Mounting position	Vdd/2	Vdd/2	Vdd/2	Vdd/2	V
Sensitivity	@ room temperature	4(5b	2(5a	1.333(5a	1.2(5a	V/g
Zero point error (6	-40...125°C	±60	±60	±125	±125	mg
Zero point tempco (7	-25...85°C	0.15±0.35	0.15±0.35	0.3±0.6	0.3±0.6	mg/°C
Sensitivity error	-40...125°C	±4(8b	±4(8a	±4(8a	±4(8a	%
Sensitivity error (7	-25...85°C	±2.5(8b	±2.5(8b	±3(8b	±3(8b	%
Typical non-linearity (7	Over measuring range	±10(9b, c	±20(9a, c	±30(9a	±40(9a	mg
Cross-axis sensitivity (10		5	5	5	5	%
Frequency response	-3dB point (1	6±4	6±4	50±30	50±30	Hz
Ratiometric error (12	Vdd = 4.75...5.25V	2	2	2	2	%

VDD = 5.00V, UNLESS OTHERWISE SPECIFIED

Note 1 The noise density of CBHH1G and CB1H1G is 30 µg/√Hz, the noise density of C23H1G and C28H1G is 20 µg/√Hz.

Note 2 The measuring range is limited by sensitivity, offset and supply voltage rails of the device.

Note 3 Measuring direction parallel to the mounting plane.

Note 4 Vertical versions in +1g position, i.e. arrow up: horizontal versions pins down (+0g)

Note 5a Sensitivity specified as [Vout (+1g) - Vout(-1g)] / 2 [V/g] .

Note 5b Sensitivity specified as [Vout (+0.5g) - Vout(-0.5g)][V/g] .

Note 6 Zero point error specified as (Vout (+0g) - Vdd/2) / Vsens [g] (room temp. error included); Vsens = Nominal sensitivity.

Note 7 Typical tolerance, not 100 % tested.

Note 8a Sensitivity error specified as {{[Vout (+1g) -Vout (-1g)] / 2} -Vsens} / Vsens x 100% [%] (room temp. error included); Vsens = Nominal sensitivity.

Note 8b Sensitivity error specified as {{[Vout (+0.5g) -Vout (-0.5g)] / 2} -Vsens} / Vsens x 100% [%] (room temp. error included); Vsens = Nominal sensitivity.

Note 9a Relative to straight line between ±1g.

Note 9b Relative to straight line between ±0.5g.

Note 9b In inclinometer applications a correction based on the angular error resulting from cross-axis sensitivity around the inclination angle reduces non-linearity.

Note 10 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.

Note 11 The output has true DC (0Hz) response.

Note 12 Supply voltage noise also couples to the output, due to the ratiometric (output proportional to supply voltage) nature of the accelerometer.

Note 13 Self test not recommended.

The ratiometric error is specified as:

$$RE = 100\% \times \left(1 - \frac{Vout(@Vx) \times \frac{5.00V}{Vx}}{Vout(@5V)}\right)$$

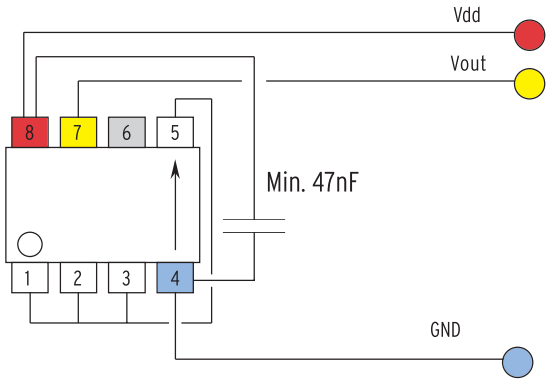
ABSOLUTE MAXIMUM RATINGS

Parameter	Value	Units
Acceleration (powered or non-powered)	20000	g
Supply voltage	-0.3 to +7.0	V
Voltage at input / output pins	-0.3 to Vdd + 0.3	V
Temperature range	-55 to +125	ºC

ELECTRICAL CONNECTION

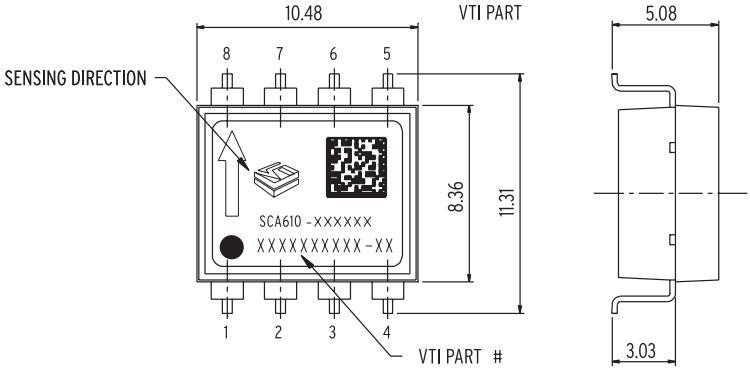
Pin#	Pin Name	Connection
1		Open or capacitively connected to GND for EMC
2		Open or capacitively connected to GND for EMC
3		Open or capacitively connected to GND for EMC
4		Negative supply voltage (VSS)
5		Open or capacitively connected to GND for EMC
6	ST	Self-test control
7	VOUT	Sensor analog output
8	VDD	Positive supply voltage (VDD)

RECOMMENDED CIRCUIT

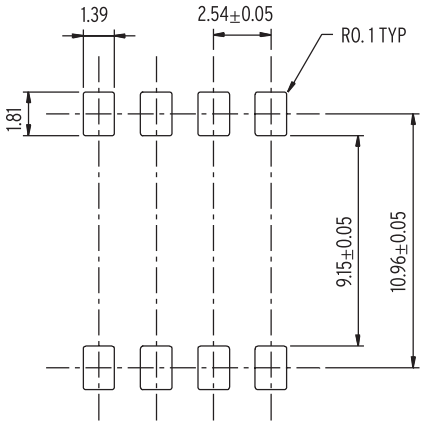


DIMENSIONS

The accelerometer weighs under 1g. The size of the part is approximately (w x h x l) 9 x 5 x 11 mm. Pin pitch is standard 100 mils.



PCB PAD LAYOUTS



Acceleration in the direction of the arrow will increase the output voltage.

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