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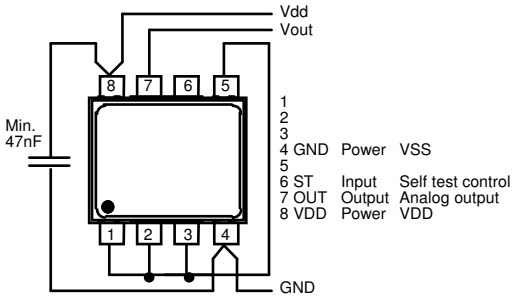
Inclination and Acceleration Sensors

SCA610 series

The sensors are based one an advanced “bulk micro machined” MEMS technology. The three dimensional structure (3D MEMS) of these sensors comprise a pendulum made of mono crystalline silicon. The pendulum is hermetically enclosed between two silicon discs. From this construction results a long term stable, high resolution und shock resistant sensor. A gas damping prevents overshooting and interfering resonance oscillation. The movement of the pendulum is measured capacitive by an ASIC.

- **senses in positive and negative direction**
- **static and dynamic acceleration measured**
- **high repeatability up to 0,05% over range**
- **high resolution: up to 0,005% over range**
- **shock resistance of the pendulum min. 50’000g**
- **passive temperature compensation**
- **temperature range -40… +125°C**
- **small, solid brass housing with fixing holes**
- **rugged PVC cable**
- **large output span: 0.5 .. 4.5V output over measuring range**
- **11x12x5 mm DIL 8- pin housing for SMD mounting**



Other versions

- **single and dual axis inclination and acceleration sensor chips in DIL-housing for SMD mounting**
- **single and dual axis sensors in IP67 housing with fixing holes, cable or connector and standardized signal output (4... 20mA, 2… 10V, digital output)**

*) G and A are marks for technically identical device from different production series

Parameter	Remarks / Conditions	SCA610-CAHH1G	SCA610-CA1H1G	SCA610-C21H1A	SCA610-C13H1A	**SCA610*) C28H1A(G)**	SCA610-CC5H1A	Einheit
Measuring range (g) (angle)[4]		+/- 1,5 +/- 30	+/- 1 +/- 90	+/- 1 +/- 90	+/- 1,5 (+/- 90)	+/- 1,7 (+/- 90)	+/- 3	g °[4]
Repeatability [1]	0 .. 40°C on 0° angle	2 0,1	2 0,1	4 0,2	ca. 4 ca. 0,2	4 0,2	ca. 8	mg ° (angle)
Resolution (analogue output) [6]	0....50 Hz	0,2	0,2	0,2	0,2	0,2	0,4	mg
Longterm stability[5]	10 Jahren[5]	ca. 0,5	ca. 0,5	ca. 0,5	ca. 0,5	ca. 0,5	ca. 0,5	%
Measuring direction		horizontal	horizontal	horizontal	horizontal	horizontal	horizontal	
Cross axis sensitivity [2]	Max.	5	5	5	5	5	5	%
Damping / **frequency response**	-3dB, typ.	18	18	50	400	50	115	Hz
Operating temperature range		-40... +125	-40... +125	-40... +125	-40... +125	-40... +125	-40... +125	°C
Shock resistance		20’000	20’000	20’000	20’000	20’000	20’000	G
Output signal V_{out} Offset = V_{out} in 0° / rest position Sensitivity		0,5 .. 4,5 2,5 1,333	0,5 .. 4,5 2,5 1,333	0,5 .. 4,5 2,5 2	0,5 .. 4,5 2,5 1,333	0,5 .. 4,5 2,5 1,2	0,5 .. 4,5 2,5 0,75	V V V/g
Power supply [3]	max	4.75 … 5.25	4.75 … 5.25	4.75 … 5.25	4.75 … 5.25	4.75 … 5.25	4.75 … 5.25	V
Power consumption max.	on 5V on 3V [3]	2.0 approx. 0,3	2.0 approx. 0,3	2.0 approx. 0,3	2.0 approx. 0,3	2.0 approx. 0,3	2.0 approx. 0,3	mA mA

1) **Repeatability:** maximum offset occurring with position change after return to initial position (Corresponds to achievable precision including temperature hysteresis after temperature compensation and linearization).
2) **Cross axis sensitivity:** maximum error occurring with (additional) inclination or acceleration from another direction than the measuring plane
3) **Supply:** 5V DC stabilized; variations affect the measurement; (alternatively 3V, precision and resolution will be affected: 1g <> 1.5V, output ≈ 0.3 … 2.7V)
4) **Measuring range:** Trigonometric function: angle = $\arcsin\left(\frac{\text{Vout} - 2{,}5\,(\text{Offset})}{\text{Sensitivity}}\right)$ (paste values without units)
5) **Long term stability**: calculated values from HTB tests. Test results available at request.
6) **Auflösung/Rauschen:** Averaging can improve very well the Resolution due to the noise of the sensing element (20..30 µg√/Hz) which is 5…10x smaller the noise of the ASIC.: Test results available on request.