

## Accelerometer



### FEATURES

- Available ranges  $\pm 1g$ ,  $\pm 1.5g$ ,  $\pm 1.7g$ ,  $\pm 3g$ ,
- 8-pin plastic surface mount DIP package mountable with pick and place machines
- Enhanced failure detection
- Digitally activated electrostatic self test
- 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

### 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 GND	20			kOhm
Capacitive load	Vout to Vdd or GND			20	nF
Output noise	DC...4kHz		1	5	mVrms

**VDD = 5.00V, UNLESS OTHERWISE SPECIFIED**

### PERFORMANCE CHARACTERISTICS

Parameter	Condition/ Comment	SCA600- C13H1G	SCA600- C21H1G	SCA600- C23H1G	SCA600- C28H1G	SCA600- C35H1G	SCA600- C35V1G	Units
Measuring range <sup>(1)</sup>	Nominal	$\pm 1.5$	$\pm 1$	$\pm 1.5$	$\pm 1.7$	$\pm 2.7$	$\pm 2.7$	g
Mounting plane <sup>(2)</sup>	Measuring direction	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Vertical	
Zero point (nom.) <sup>(3)</sup>	Vout in mounting position	Vdd/2	Vdd/2	Vdd/2	Vdd/2	Vdd/2	Vdd/2	V
Sensitivity <sup>(4)</sup>	@ room temperature	1.333	2	1.333	1.2	0.75	0.75	V/g
Zero point error	-40...125°C	$\pm 125^{(5a)}$	$\pm 125^{(5a)}$	$\pm 125^{(5a)}$	$\pm 125^{(5a)}$	$\pm 200^{(5a)}$	$\pm 300^{(5b)}$	mg
Zero point error <sup>(6)</sup>	-25...85°C	$\pm 80$	$\pm 80$	$\pm 80$	$\pm 80$	$\pm 130$	$\pm 200$	mg
Sensitivity error <sup>(7)</sup>	-40...125°C	$\pm 4$	$\pm 4$	$\pm 4$	$\pm 4$	$\pm 4$	$\pm 4$	%
Sensitivity error <sup>(6)</sup>	-25...85°C	$\pm 3$	$\pm 3$	$\pm 3$	$\pm 3$	$\pm 3$	$\pm 3$	%
Typical non-linearity <sup>(8)</sup>	Over measuring range	$\pm 30$	$\pm 20$	$\pm 30$	$\pm 40$	$\pm 60$	$\pm 80$	mg
Cross-axis sensitivity <sup>(9)</sup>		5	5	5	5	5	5	%
Frequency response	-3dB point <sup>(10)</sup>	400 $\pm$ 150	50 $\pm$ 30	50 $\pm$ 30	50 $\pm$ 30	400 $\pm$ 150	400 $\pm$ 150	Hz
Ratiometric error <sup>(11)</sup>	Vdd = 4.75...5.25V	2	2	2	2	2	2	%

**VDD = 5.00V, UNLESS OTHERWISE SPECIFIED**

Note 1 The measuring range is limited by sensitivity, offset and supply voltage rails of the device.

Note 2 Measuring direction parallel to the mounting plane.

Note 3 Vertical versions in +1g position, i.e. arrow up; horizontal versions pins down (+0g)

Note 4 Sensitivity specified as  $[(Vout(+1g) - Vout(-1g))] / 2 [V/g]$ .

Note 5a Zero point error specified as  $[(Vout(+0g) - Vdd/2) / Vsens [g]]$  (room temp. error included); Vsens = Nominal sensitivity.

Note 5b Sensitivity error specified as  $[(Vout(+1g) - Vdd/2) / Vsens [g]]$  (room temp. error included); Vsens = Nominal sensitivity.

Note 6 Typical tolerance, not 100 % tested.

Note 7 Sensitivity error specified as  $\{[(Vout(+1g) - Vout(-1g)) / 2] - Vsens\} / Vsens \times 100\%$  [%] (room temp. error included); Vsens = Nominal sensitivity.

Note 8 Relative to straight line between  $\pm 1g$ .

Note 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.

Note 10 The output has true DC (0Hz) response.

Note 11 Supply voltage noise also couples to the output, due to the ratiometric (output proportional to supply voltage) nature of the accelerometer.

The ratiometric error is specified as:  $RE = 100\% \times \left[ 1 - \frac{Vout(@Vx) \times \frac{5.00V}{Vx}}{Vout(@5V)} \right]$

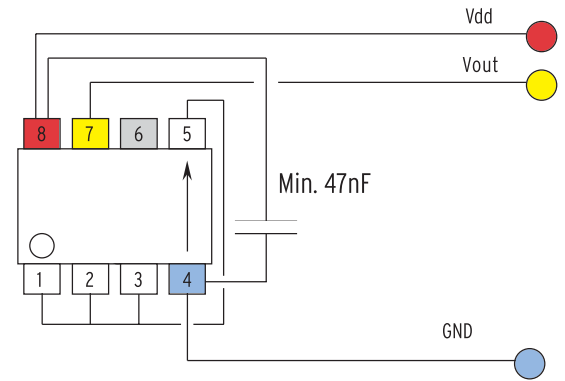
### ABSOLUTE MAXIMUM RATINGS

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	°C

### 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)

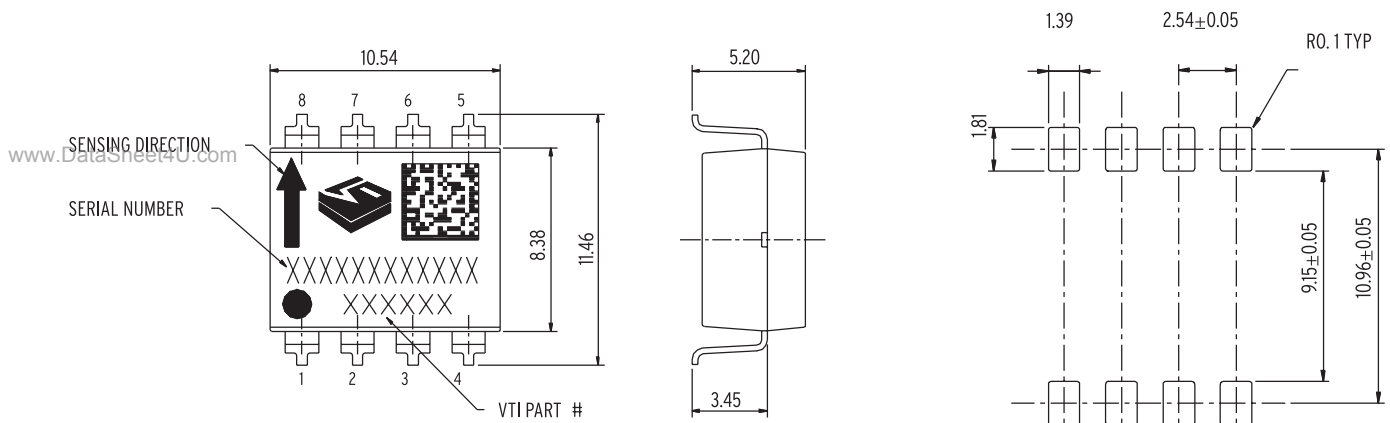
### RECOMMENDED CIRCUIT



### DIMENSIONS

### PCB PAD LAYOUTS

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.



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