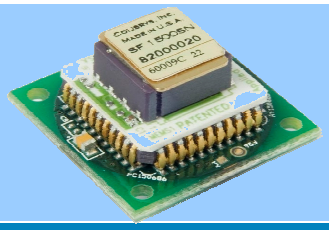
COLIBRYS



MEMS Capacitive Accelerometers

Data sheet

SF1500S / SF1500SN

30S.SF1500.C.08.07

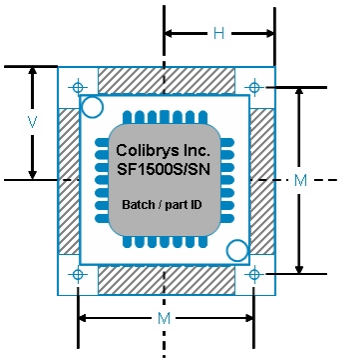
Features	Applications	
Best in class noise level of 300 $ng_{rms}/\sqrt{Hz}$	**Seismic sensing**	Earthquake detection
Wide dynamic range of 120 dB (100Hz BW)		Geophysics
DC to 1500 Hz frequency response		Homeland and border security
± 3g full scale		Strong motion
Analog servo accelerometer		Railway technology
Self test input		Structural monitoring

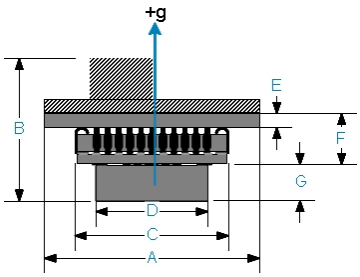
Description

The SiFlex™ accelerometer has been designed and developed by Colibrys Inc. for “strong motion” seismic sensing applications. This MEMS capacitive product is the world best in class “digital geophone”, largely used for seismic and vibration sensing when extreme low noise measurement is required. Features such as wide dynamic range, excellent bandwidth, low distortion, high shock tolerance, and thermal stability make it ideal for strong motion applications such as earthquake and seismology measurements, homeland and border security or structure monitoring. Used as a tilt sensor, it also provides a very high resolution for precise measurements.

The SF1500 operates from a bipolar power supply voltage that can range from ± 6V to ± 15V with a typical current consumption of 12mA at ± 6V. The linear full acceleration range is ± 3g with a corresponding sensitivity of 1.2V/g. The SF1500S.A and SF1500SN.A can operate over a wide temperature range from -40°C to +125°C and can withstand a shock of up to 1500g without performance degradation. The frequency response over the full scale range is DC to > 1500Hz for full signal as for a small signal, it can raise to 5000Hz.

Full scale range	± 3g (with oscillator)	± 3g (without oscillator)
Products	**SF1500S**	**SF1500SN**





	Inch	mm
A	0.96	24.4
B	0.65	16.6
C	0.70	17.8
D	0.50	12.7
E	0.14	3.5
F	0.31	7.9
G	0.19	4.8
H	0.48	12.2
M	0.78	19.8
V	0.48	12.2

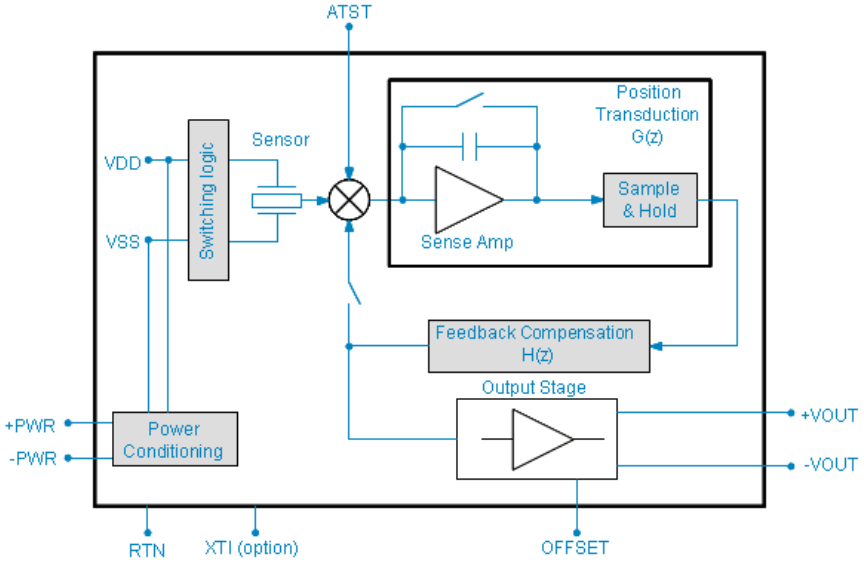
Specifications

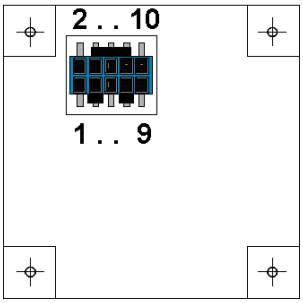
	Units	SF1500S / SF1500SN
Linear output range	g peak	± 3
Sensitivity (differential)	V/g	1.2 (2.4)
Frequency response (full signal)	Hz	DC to 1500
Frequency response (small signal)	Hz	DC to 5000
Dynamic range (100 Hz BW)	dB	120
Noise (10 to 1000 Hz)	$ng_{rms}/\sqrt{Hz}$	300 to 500
Cross-axis rejection	dB	> 40
Shock limit (0.5 ms ½ sine)	g peak	1500
Vibration (20Hz – 2000Hz)	g pk-pk	60
Operating temperature range	°C	-40 to +125
Sensitivity temperature coefficient	ppm/°C	75
Offset thermal coefficient	µg/°C	± 100
Linearity error	% Full scale	± 0.1
Input voltage	Volts DC	± 6 to ± 15
Quiescent current	mA	11.6

Block diagram and electrical connections

Both the (+) and (-) power supplies must be applied simultaneously to the input pins (within 50 ms). The power supply should have less than 100 µV/√Hz noise in order to avoid the possibility of adding noise to the output of the sensor. The ASIC and on-board electronics operate on ± 5V DC provided by internal power conditioning circuitry, reducing the effects of power supply variations on sensor operation. The input power supply connections are reverse polarity protected by a diode bridge. Should reverse polarity power be applied, the unit will self-correct and start normally.

The output of the Si-Flex accelerometer is fully buffered and ready to connect to common inputs found on many analog to digital converters, oscilloscopes and digital multi-meters. The nominal output impedance for the Si-Flex accelerometers is typically 10 Ohms. A 10cm un-terminated mini-ribbon cable is provided with a single mating connector for the SF1500 (connector Samtec part no. FTSH-105-01-L-DV-K-P-TR). The on-board amplifiers are capable of driving typical twisted pair cable of 1000 meters or more in length.





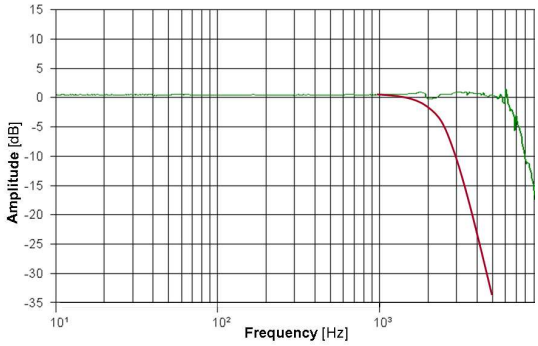
Electrical connections

P1	-Vout	Inverted output signal
P2	+Vout	Output signal
P3	ATST *	Sensor self test input
P4, P8	RTN *	Signal return (common)
P5	OFFSET *	Used to remove DC offset
P6	XTI *	Oscillator input. N/C for SF1500S and SF2005S
P7	N/C	Not connected
P9	-PWR	Negative power supply
P10	+PWR	Positive power supply

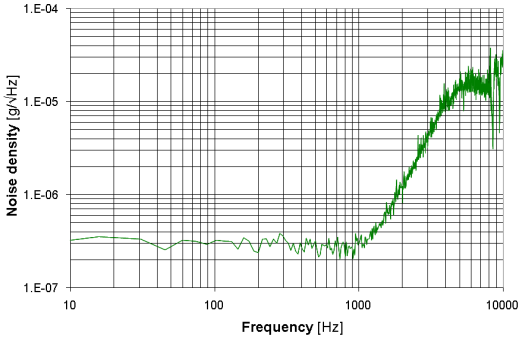
* : see SiFlex™ product description for more details

Frequency response and noise

SF1500S/SN Typical Frequency Response



SF1500S/SN Typical Wideband Noise



A detailed SiFlex™ Product Description (30D.SFX.x.xx.xx) and further Application Notes are available on demand or on our web site. In order to provide an ideal support to our customers, our standard SF1500S.A and SF1500SN.A products are available worldwide through a wide network of distributors and agents or directly at Colibrys. Do not hesitate to access our web site for precise contacts or directly Colibrys in Europe or in US for more details.

Colibrys (Switzerland) Ltd
accelero.europe@colibrys.com

Colibrys, Inc.
accelero.us@colibrys.com

www.colibrys.com