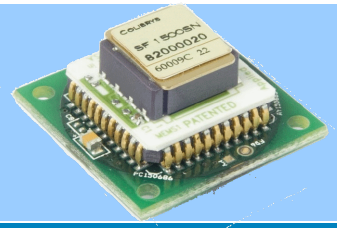


MEMS Capacitive Accelerometers

Data sheet

SF1500S.A / SF1500SN.A

30S.SF1500A.E.09.10

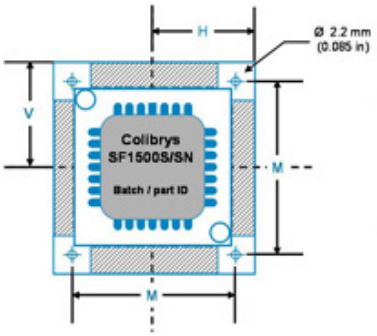
Features	Applications	
Best in class noise level of 300 $ng_{rms}/\sqrt{Hz}$	**Seismic sensing**	Earthquake detection
Wide dynamic range of 117 dB (100Hz BW)		Geophysics
DC to 1500 Hz frequency response		Homeland and border security
± 3g full scale		Strong motion
Analog servo accelerometer		Railway technology
Self test input		Structural monitoring

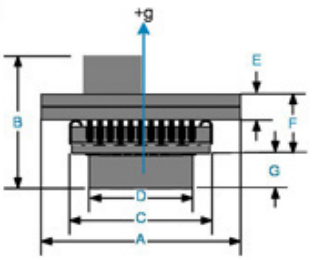
Description

The SiFlex™ accelerometer has been designed and developed by Colibrys for “strong motion” seismic sensing applications. This MEMS capacitive product is the best in class “digital geophone”, largely used for seismic and vibration sensing when extremely 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.

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 +85°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.

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





Typ. values	Inch	mm
A	0.98	25.0
B	0.65	16.5
C	0.67	17.4
D	0.46	11.7
E	0.07	1.78
F	0.22	5.6
G	0.19	4.8
H	0.49	12.5
M	0.78	19.8
V	0.49	12.5

Specifications

All values are specified at +20°C (+68°F) and ±6 to ±15VDC supply voltage, unless otherwise stated

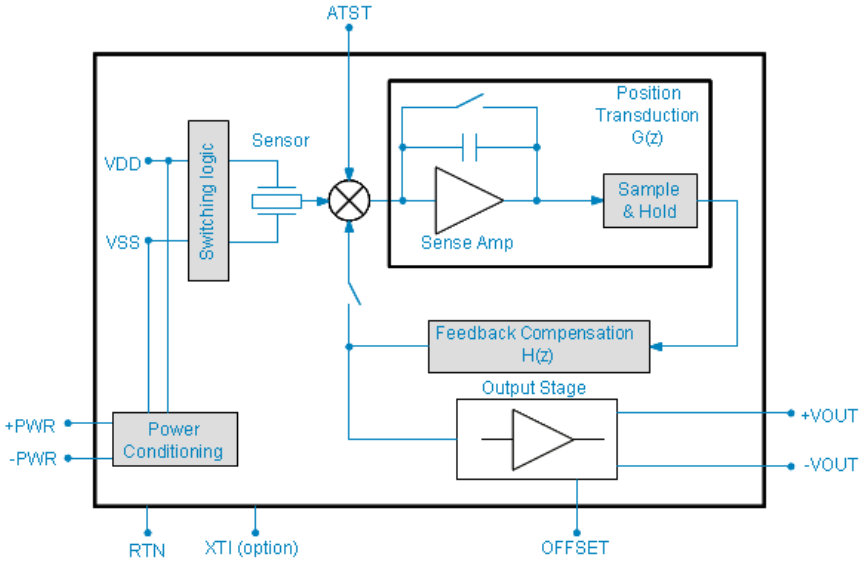
	Units	**SF1500S.A / SF1500SN.A**
Linear output range	g peak typ.	± 3
Sensitivity	V/g (differential)	1.2 ± 0.1 (2.4 ± 0.2)
Frequency response [1]	Hz	DC to 1500
Dynamic range (100 Hz BW)	dB typ. (min.)	117 (113)
Noise (10 to 1000 Hz)	$ng_{rms}/\sqrt{Hz}$ typ. (max.)	300 (500)
Cross-axis rejection	dB	> 46
Shock limit (0.5 ms ½ sine)	g peak	1500
Operating temperature range	°C	-40 to +85
Sensitivity temperature coefficient	ppm/°C (re: ±1g) typ.	250
DC offset	mg max.	±200
Input Resistance of Offset adjustment pin	KΩ	10
Offset thermal coefficient	mg/°C (re: ±1g) typ.	-0.2
Linearity error	% (over ± 1g range)	< 1
Input voltage	Volts DC	±6 to ±15
Quiescent current @ 6 VDC	mA typ.	11.7

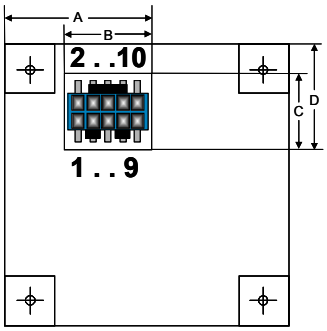
[1]: The bandwidth is defined as the frequency band for which the sensitivity has decreased by less than 3dB.

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. The connector reference for the SF1500 is a Samtec part no. FTSH-105-01-L-DV-K-P-TR (Header, 2X5, 1.27mm (0.05 in), SMD). **Electrostatic discharge (ESD) damage** can occur when Si-Flex accelerometers are improperly handled,





Typ. values	Inch	mm
A	0.49	12.2
B	0.24	6.2
C	0.20	5.1
D	0.36	9.2

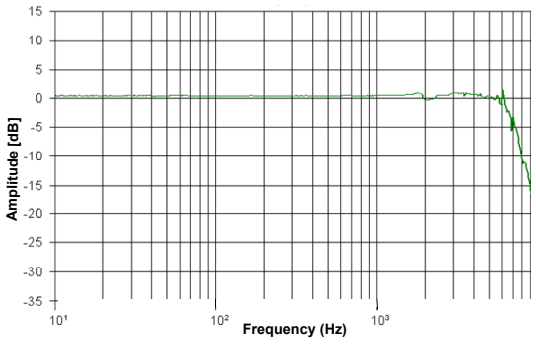
Electrical connections

PJ1-1	-Vout	Inverted output signal
PJ1-2	+Vout	Output signal
PJ1-3	ATST *	Sensor self test input
PJ1-4, PJ1-8	RTN *	Signal return (common)
PJ1-5	OFFSET *	Used to remove DC offset
PJ1-6	XTI *	Oscillator input. N/C for SF1500S
PJ1-7	RTN	Return
PJ1-9	-PWR	Negative power supply
PJ1-10	+PWR	Positive power supply

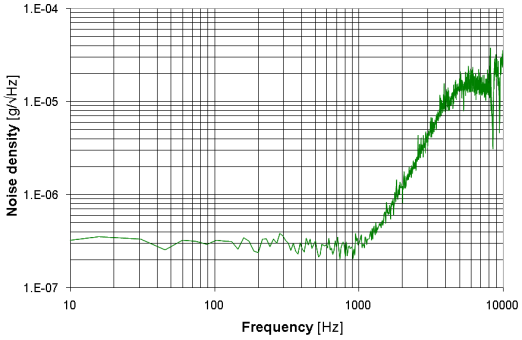
* : see SiFlex™ product description for more details

Frequency response and noise

SF1500S/SN 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.

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