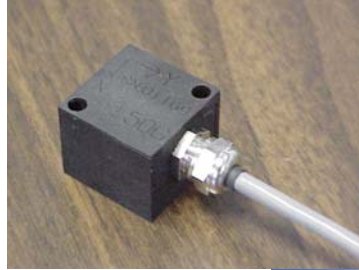


Three Axis Capacitive Accelerometer and Tilt Sensor Model 7022



Features

- Miniature Size
- Rugged Environmentally Sealed Package
- Low Power Consumption
- Responds to Vibration and Orientation
- From 1 to 3 Axis Sensing
- -55C to +85°C Operation
- $\pm 5V$ Single Ended Output
- Available Full Scale Accelerations of $\pm 5G$, $\pm 10G$, $\pm 25G$, $\pm 50G$, $\pm 100G$, & $\pm 200G$
- Available with cable lengths from 1' to 25'



Description

The 7022 accelerometer module has one, two, or three orthogonal analog capacitive accelerometers with high drive, low impedance, buffering for measuring in harsh environments. It is tailored for zero to medium frequency instrumentation applications for the measurements of vibration or orientation (tilt). Each of the internal accelerometers contains a miniature, hermetically sealed micromachined capacitive sense element and a custom integrated circuit sense amplifier. On-board voltage regulation and an internal voltage reference eliminate the need for precision power supplies. In addition, the M9C includes an amplifier on each axis to produce high-level outputs. The 7022 is insensitive to temperature changes and its frequency response includes DC.

Operation

The 7022 accelerometer module produces three analog voltage outputs that vary with acceleration and orientation. The "Z" axis is perpendicular to the bottom of the package, with positive acceleration defined as a vibration on the bottom of the package. The "X" and "Y" axis directions are marked on the cover with positive acceleration defined as acceleration in the direction of the axis arrow. The outputs are single ended and vary with respect to the voltage at the OUTPUT REF input which should be approximately centered between the $+V_s$ and $-V_s$ supply voltages. The output scale factor is independent of the supply voltages from ± 12 to ± 18 volts. At zero acceleration the output differential voltage is nominally zero volts; at \pm full-scale acceleration the output voltage is ± 5 volts respectively.

Applications

- Missile Guidance • Vibration Monitoring • Tilt Sensor • Modal Analysis • Robotics •
- Crash Testing • Instrumentation •

Signal Descriptions

+V_s (Power): Red wire. Apply +12 to +18 Volts DC with respect to OUTPUT REF.

-V_s (Power): Black wire. Apply -12 to -18Volts DC with respect to OUTPUT REF.

OUTPUT REF (Input): White wire. The X, Y, & Z outputs are referenced to this potential. This input is tied to a potential halfway between the + V_s and – V_s voltages.

X, Y & Z (Outputs): Green, orange, and blue wires respectively. These analog output voltages are proportional to acceleration: they increase with positive acceleration and decrease with negative acceleration. At zero acceleration the output is nominally equal to zero volts with respect to OUTPUT REF.

Performance by Acceleration level: V_s=±12 to ±18 VDC; T_C=25° C.

Acceleration Level	5G	10G	25G	50G	100G	200G	Units
Input Range	±5	±10	±25	±50	±100	±200	g
Frequency Response (Nominal, -3 dB)	0-250	0-400	0-500	0-500	0-500	0-500	Hz
Sensitivity	1000	500	200	100	50	25	mV/g
Max. Mechanical Shock	500						g

Performance: V_s=±12 to ±18VDC; T_C=25° C unless otherwise specified.

Parameter	Min.	Typ	Max	Units
Cross Axis Sensitivity		2	3	%
Offset at 0g (T _C = 25°C)	-0.250	0.000	0.250	Volts
Offset Temperature Shift (T _C = -20 to +60°C)			250	(ppm of span)/°C
Sensitivity Temperature Shift (T _C = -20 to +60°C)			625	ppm/°C
Output Noise (0 – 1.0 kHz)		1.2		mV (RMS)
Non-Linearity (0 to + 90% of Full Scale)		0.5	1.0	% of span
Damping Ratio	0.4	0.7	0.9	NA
Power Supply Rejection Ratio	50	65		dB
Output Impedance		0.1	1.0	Ohm
Operating Voltage (V _s)	±12		±18	Volts
Operating Current Positive Supply ¹		35	40	mA
Operating Current Negative Supply ¹		10	15	mA
Weight (not including cable)		35		Grams
Operating Temperature	-55		85	°C
Storage Temperature	-55		85	°C

Note 1: The power source must be capable of providing at least 3 times the operating current at turn-on.

Specifications are subject to change without notice. Rev A.1

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2001 Fulling Mill Rd, Middletown, PA 17057

Phone: (717) 939-2300 Fax: (717) 939-7170

Website: www.actpower.com E-mail: mail@actpower.com

