SignalQuest™
Precision Microsensors

DATASHEET

SQ-MIN-200

NANO-POWER TILT AND VIBRATION SENSOR

Nano-power, omnidirectional, ultra miniature, SMT

FUNCTION

- Omnidirectional movement sensing
- Chatters open / closed when tilted or vibrated in any direction regardless of orientation
- Normally closed when at rest

FEATURES

- **Nano-power:** As little as 50 nA continuous
- **Surface mount:** RoHS & REACH compliant, lead-free, Halogen free
- **Industrial rated:** 10 year life, -40 ºC to 85 ºC
- **Miniature size:** 1.95 mm x 3.6 mm
- **Simple interface:** No signal conditioning required

APPLICATIONS

- Motion triggered wake-up
- GPS tracking, RFID, alarms, automotive
- Security, anti-tamper, anti-theft
- Vibration sensing, tilt detection

MANUFACTURING

Made in USA, fully automated production, 100% testing, worldwide quality and price leader

PATENTED

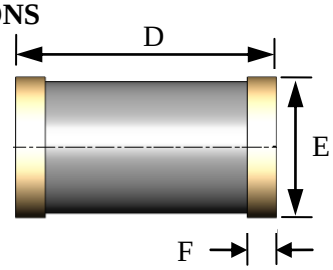
US 7326866, 7067748, 7326867, 7421793, Taiwan 200732625, 200732626, Korea 10-0946453, Mexico 275272. Patents pending.

DESCRIPTION

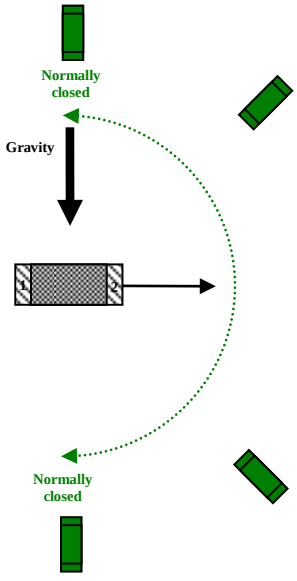
The SQ-MIN-200 series sensor acts like a normally closed switch which chatters open and closed as it is tilted or vibrated. Unlike other rolling-ball sensors, the 200 is truly an omnidirectional movement sensor. It will function regardless of how it is mounted or aligned.

When at rest, it normally settles in a closed state. When in motion, it will produce continuous on/off contact closures. It is sensitive to both tilt (static acceleration) and vibration (dynamic acceleration). The sensor operates at CMOS or TTL voltage logic to produce a pulse train when moving. It requires only a single resistor to limit current. The signal level can be read directly by a digital input. This can be used to interrupt (wake up) a microcontroller or can be counted to estimate the amount and duration of activity. The sensor is fully passive, requires no signal conditioning, and draws as little as 50 nA of continuous current.

FUNCTION & DIMENSIONS



DIM	MM
D	3.60
E	1.95
F	0.40



Normally closed in all orientations

Chatters open on movement

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THEORY OF OPERATION

The SQ-MIN-200 series sensor acts like a normally closed switch which chatters open and closed as it is tilted or vibrated. Note that the SQ-MIN-200 is not guaranteed to be closed—even when the sensing mechanism is at rest. However, a good rule of thumb is that 75% - 95% of the time (depending on orientation) when the sensor is at rest it will be closed. The engineer should design his or her software to look for high-to-low and low-to-high edge transitions rather than an open of closed state of the switch.

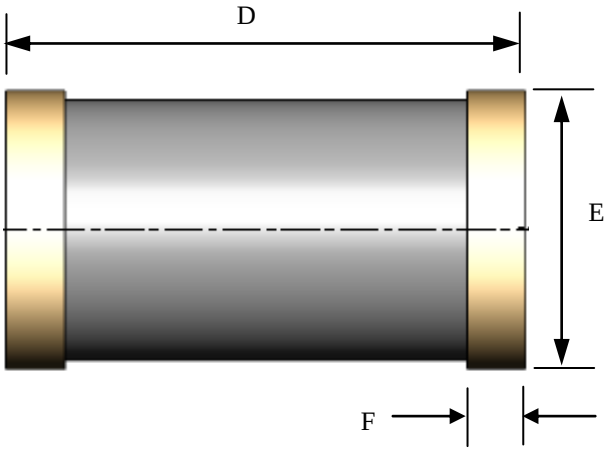
ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	MAX
Supply Voltage Range	0.9 V	12 V
Current Sink*	50 nA	10 mA

* Current consumption is determined by the resistance of the application circuit and the supply voltage.

DIMENSIONS

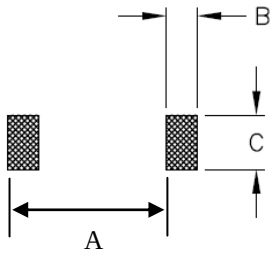
PHYSICAL SIZE



SYMBOL	DESCRIPTION	MM	TOLERANCE
D	Length	3.60	±0.1
E	Diameter	1.95	±0.1
F	Terminal Width	0.40	±0.1

PCB LANDING

SYMBOL	DESCRIPTION	MM
A	Pitch	3.6
B	Pad Length	1.0
C	Pad Width	1.5



***Note:** Alternative layouts may be used to optimize size or manufacturability

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PRODUCT COMPARISON

GRADE	ASSEMBLY METHOD	SEALING	WASHABLE	ROHS & REACH COMPLAINT, HALOGEN FREE	OPERATING TEMPERATURE
C	Reflow Solder: 260° C peak Hand Assembly: 315° C peak, 2 -3 seconds on end terminal	Yes	Yes	Yes	0C to + 70C
I	Reflow Solder: 260° C peak Hand Assembly: 315° C peak, 2 -3 seconds on end terminal	Yes	Yes	Yes	-40C to + 85C

ORDERING GUIDE

PART NUMBER	PACKAGING CODE	COMPLETE ORDER NUMBER
SQ-MIN-200-C	CT - Cut Tape TR - Tape on Reel	SQ-MIN-200-CCT SQ-MI -200-CTR
SQ-MIN-200-I	CT - Cut Tape TR - Tape on Reel	SQ-MIN-200-ICT SQ-MIN-200-ITR

LIMITATIONS AND WARNINGS

This product is not designed for use in life support and/or safety equipment where malfunction of the product can reasonably be expected to result in personal injury or death. Buyer uses this product in such applications at Buyer's own risk and agrees to defend, indemnify, and hold harmless SignalQuest, Inc. from any and all damages, claims, suits, or expenses resulting from such misuse.

TESTING

The performance of each sensor is verified through build-time testing.

SYSTEM INTEGRATION TESTING

Thorough testing should be carried out prior to product release to ensure system integration has not introduced unforeseen problems. The system integrator assumes the ultimate responsibility for the safety of the target application.

NOTICE

Information furnished by SignalQuest, Inc is believed to be accurate and reliable. However, this document may contain ERRORS and OMMISIONS. Accordingly, the design engineer should use this document as a reference rather than a strict design guideline and should perform thorough testing of any product that incorporates this or any other SignalQuest product. No responsibility is assumed by SignalQuest, Inc. for this use of this information, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications are subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of SignalQuest, Inc. Trademarks and registered trademarks are the property of their respective companies.

FURTHER INFORMATION

For pricing, delivery, and ordering information, please contact SignalQuest at (603) 448-6266
For updates on this and other documents, visit our website at www.signalquest.com.

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