DATASHEET

SQ-SEN-6XX

ON/OFF TILT SENSOR

6xx Series 6xxB Series

FUNCTION

- On / off tilt sensing
- Normally open when vertical
- Normally closed when below or between the switch angles
- Non-sensitive to vibration or lateral movement when open

APPLICATIONS

- Motion triggered wake-up
- GPS tracking, RFID, vehicle electronics
- Security, anti-tamper, anti-theft, alarms

DESCRIPTION

The SQ-SEN-6xx series acts like a position sensitive switch that is normally open when vertical and normally closed below or between the switch angles. The 6xx series is designed to be non-sensitive to vibration or lateral movement when vertical. When at rest in a vertical position, the sensor will settle in an open state. When tipped down from vertical to the "switch angle" it will produce continuous on/off contact closures while in motion. When at rest below or between the switch angles, it will settle normally closed.

The sensor can be used to produce CMOS or TTL pulses to interrupt (wake up) a microcontroller. Alternatively, these pulses can be counted to estimate the amount and duration of activity. The sensor is fully passive, requires no signal conditioning, and operates with currents as low as 50 nA.

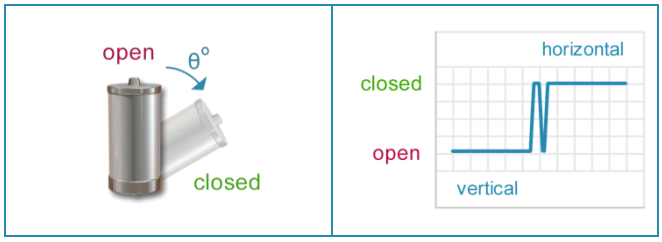
PATENTS

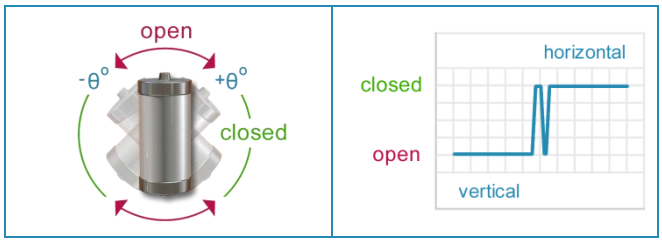
US 7326866, 7067748, 7326867, 7421793. Patents pending.

FEATURES

- **Simple Interface -** No signal conditioning required
- **Surface Mount** - RoHS & REACH compliant, lead-free, Halogen free
- **Made in USA -** fully automated production, 100% testing, worldwide quality and price leader
- **Zero-power Normally -** < 50 nA when activated
- **Activation Angle** - Available in 60°, 75°, 45°, or 45° bi-directional
- **Miniature Size** - 3.3 mm x 6.9 mm
- **Industrial Rated** - 10 year life, -40º to 85º C

FUNCTIONAL DIAGRAM





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THEORY OF OPERATION

The SQ-SEN-6xx series sensor acts like a position sensitive switch which is open or closed depending on orientation. When resting in a normally open orientation contacts are virtually guaranteed to be open. When resting in the normally closed orientation contacts are not guaranteed to be closed. A good rule of thumb is that they will be closed 95% - 99% of the time when at rest.

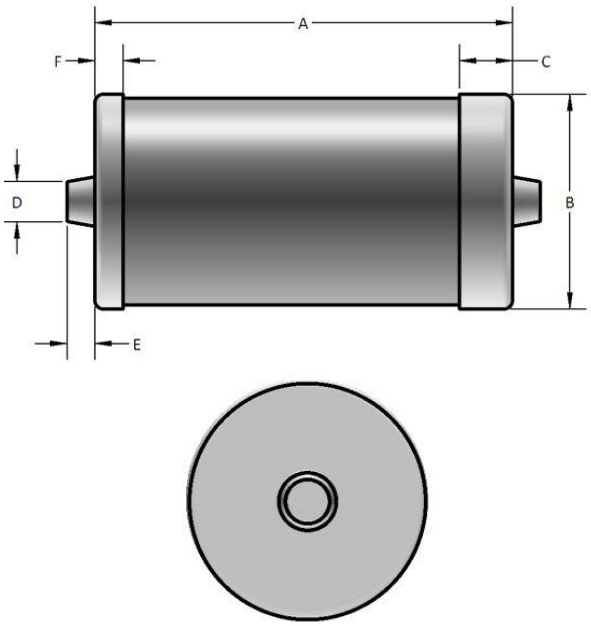
When in a normally closed orientation vibration will cause the sensor to chatter open and closed. The engineer should design his or her software to look for high-to-low and low-to-high edge transitions rather than an open or closed switch state.

CHARACTERISTICS

PARAMETER	MIN	MAX	CONDITIONS
Shock Survival		5,000 *g*	5x, 0.1 ms half-sin, any axis
Storage Temperature	-40º C	85º C	
Supply Voltage Range	0.5 V	12 V	
Current Sink*	50 nA	10 mA	

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

PHYSICAL SIZE



SYMBOL	DESCRIPTION	MM	TOLERANCE
A	Length	6.8	±0.25
B	Diameter	3.3	±0.1
C	Terminal Width 1	0.8	±0.25
D	Solder Nub Diameter	0.9	±0.25
E	Solder Nub Length	0.4	±0.1
F	Terminal Width 2	0.4	±0.25

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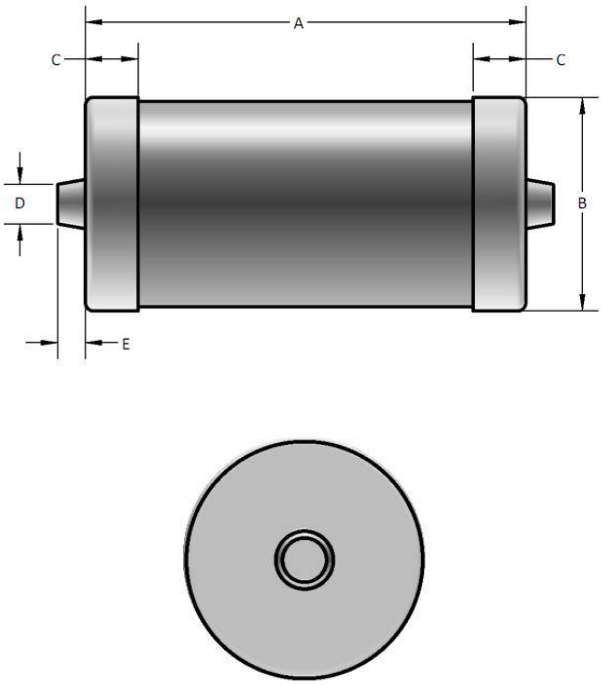
DIMENSIONS 6XXB

PHYSICAL SIZE



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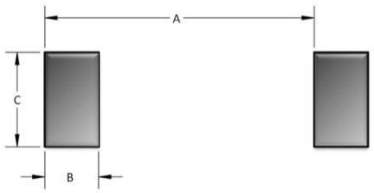
EXAMPLE PCB LANDING

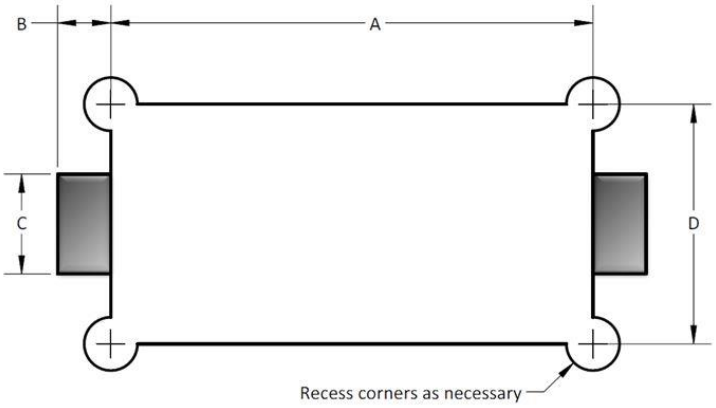
RECOMMENDED PCB LANDING

SYMBOL	DESCRIPTION	MM
A	Pitch	6.0
B	Pad Length	1.2
C	Pad Width	2.1



ALTERNATE, PCB CUTOUT LANDING (USE FOR LOWEST PROFILE)

SYMBOL	DESCRIPTION	MM
A	Recess Length	7.25
B	Pad Length	0.8
C	Pad Width	1.5
D	Recess Width	3.6



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

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PART COMPARISON

PART NUMBER	SWITCH ANGLE	SENSITIVE TO LATERAL MOVEMENT WHEN VERTICAL
SQ-SEN-675	75 degrees down from vertical	No
SQ-SEN-660	60 degrees down from vertical	No
SQ-SEN-645B	45 degrees down from vertical, bidirectional	No

PRODUCT COMPARISON

GRADE	ASSEMBLY METHOD	SEALED	WASHABLE	ROHS	OPERATING TEMPERATURE	CYCLES *	SERVICE LIFE (YRS)
I	Reflow Solder: 260° C peak Hand Assembly: 315° C peak, 2 -3 seconds on end terminal	Yes	Yes	Yes	-40º to +85º C	1 Billion	10
C	Reflow Solder: 260° C peak Hand Assembly: 315° C peak, 2 -3 seconds on end terminal	Yes	Yes	Yes	-25º to +70º C	1 Billion	5

*Test conditions: 0.5 *g*RMS, 5 to 200 Hz flat spectrum

ORDERING GUIDE

PART NUMBER	PACKAGING CODE	COMPLETE ORDER NUMBER
SQ-SEN-645B-C	TR - Tape on Reel	SQ-SEN-645B-CTR
SQ-SEN-675-I SQ-SEN-660-I	CT - Cut Tape TR - Tape on Reel	SQ-SEN-675-ICT SQ-SEN-660-ITR

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

NOTES

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