



RoHS compliant,
lead-free SMD
package

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

FEATURES

- **Ultra low power** - As little as 0.25 μ A
- **Surface mount device (SMD)** - RoHS compliant, lead-free, tape and reel
- **High sensitivity & long life** - 99.9% pure gold plating
- **Miniature size** - 3.3 mm x 6.9 mm
- **Simple interface** - No signal conditioning required
- **Quiet** - Undetectable sounds level

APPLICATIONS

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

SWITCH ANGLES

- 75°, 60°, 45°
- 89° to 1° by special order

PATENTS

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

DESCRIPTION

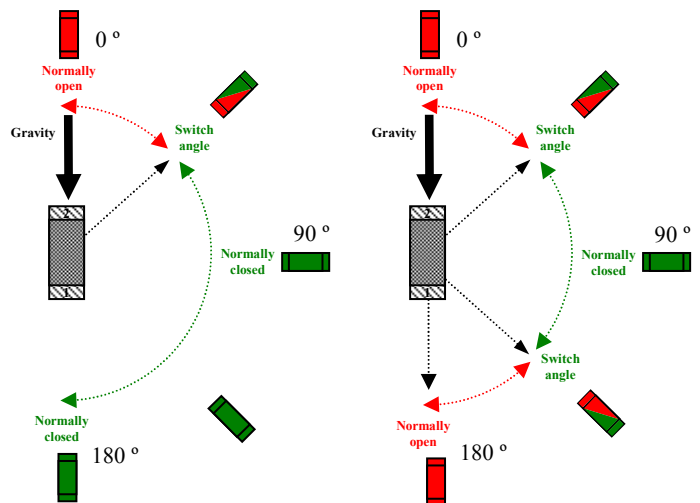
The SQ-SEN-6xx series acts like a position sensitive switch that is normally open when vertical and normally closed below or between the switch angles. It is designed to be non-sensitive to vibration in the vertical position. When at rest in a vertical position, the sensor will settle in an open state. 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 0.25 μ A.

6XX SERIES

The 6xx series is designed to be non-sensitive to vibration or lateral movement when **vertical**.

FUNCTIONAL DIAGRAM



660, 675 Versions

Normally open when vertical

Normally closed when past
"switch angle"

645B (bidirectional) Version



DATASHEET

SQ-SEN-6XX

ON/OFF TILT SENSOR

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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 75% - 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.

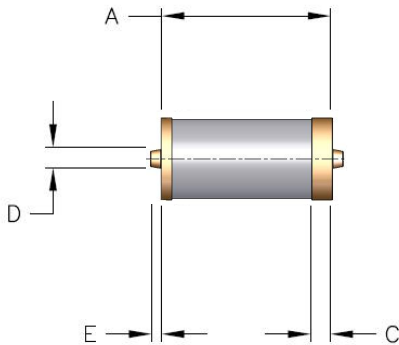
ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	MAX	UNITS
Supply Voltage Range	0.5	12	V
Current Sink*	0.00025	5	mA

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

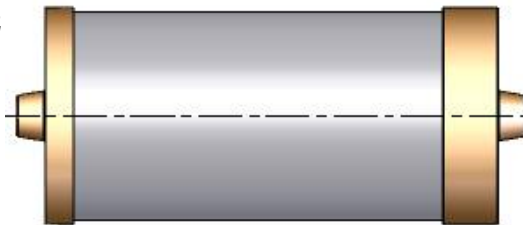
DIMENSIONS

PHYSICAL SIZE



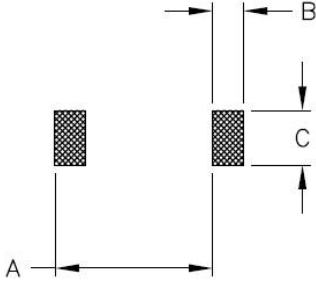
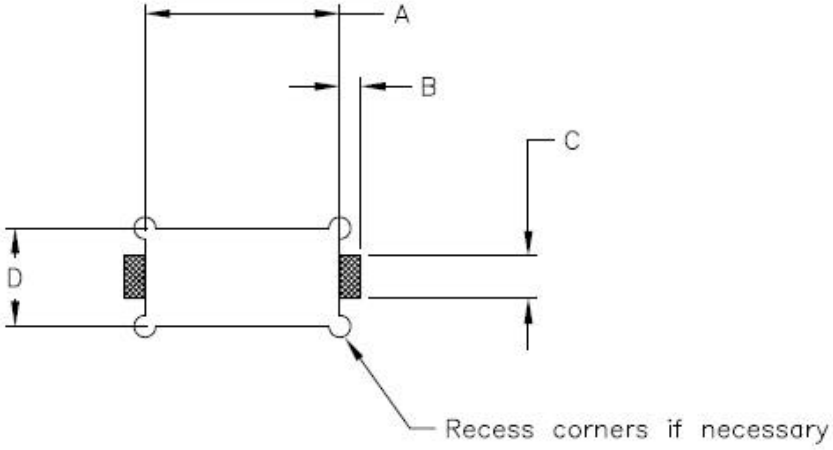
SYMBOL	DESCRIPTION	MM	TOLERANCE
A	Length	6.8	±0.25
B	Diameter	3.3	±0.1
C	Terminal Width	0.8	±0.25
D	Solder Nub Diameter	0.9	±0.25
E	Solder Nub Length	0.4	±0.1

Terminal 2



Terminal 1

EXAMPLE PCB LANDING

RECOMMENDED PCB LANDING			ALTERNATE, PCB CUTOUT LANDING (USE FOR LOWEST PROFILE)		
SYMBOL	DESCRIPTION	MM	SYMBOL	DESCRIPTION	MM
A	Pitch	6.0	A	Recess Length	7.25
B	Pad Length	1.2	B	Pad Length	0.8
C	Pad Width	2.1	C	Pad Width	1.5
					

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



DATASHEET

SQ-SEN-6XX

ON/OFF TILT SENSOR

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

PRODUCTION GRADES

GRADE	ASSEMBLY METHOD	SEALING	WASH TOLERANCE	PB-FREE, ROHS	OPERATING TEMPERATURE
C	Reflow Solder: 260° C peak Hand Assembly: 315° C peak, 2 -3 seconds on end terminal	Yes	Washable	Yes	0C to + 70C
I	Reflow Solder: 260° C peak Hand Assembly: 315° C peak, 2 -3 seconds on end terminal	Yes	Washable	Yes	-40C to + 85C

PACKAGING OPTIONS

PACKAGE CODE	DESCRIPTION
CT	Cut tape, 10 to 1999 pieces
TR	Tape on reel, 2000 pieces

EXAMPLE COMPLETE PART NUMBERS

SQ-SEN-660-ITR



DATASHEET

SQ-SEN-6XX

ON/OFF TILT SENSOR

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 OMISSIONS. 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.

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