

# SENSOR SWITCH

Item.#	RBS02 Series	Description	ROLL BALL SWITCH	Version	V101.0
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## ● FUNCTIONS

1. Horizontal Tilt Detecting
2. Vertical Rotation Detecting
3. Shock Detecting



## ● APPLICATIONS

1. Screen Rotation
2. Web Camera
3. Alarm System
4. Iron Position Detecting
5. Bicycle lights flashing
6. Step Counter

## ● FEATURES

1. Tiny size, suitable for small space.
2. Wing-shaped terminals, a feature enables half body of the sensor switch to be buried into PCB.
3. No electricity consumption during detection status.
4. Gold-plated ball and terminals, low possibility of oxidization.
5. All plastic materials subject to industrial purpose, resist high temperature and meet fireproof function.
6. Simple ON and OFF signals, easy for design.
7. RoHS compliance, an ideal substitute for mercury switch.
8. A more economical tilt and rotation detection option than IC design solution.



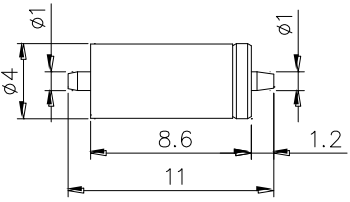
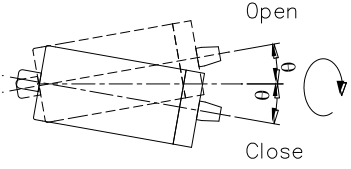
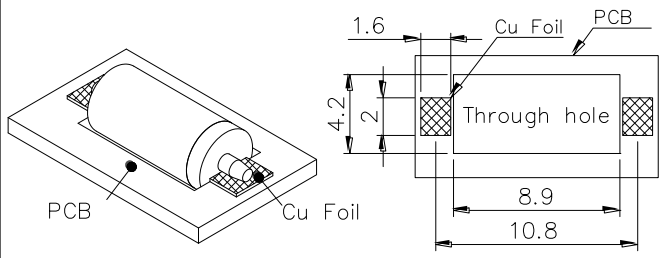
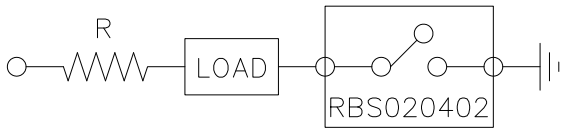
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● PATENTS

1. TAIWAN Patent NO. 168028
2. TAIWAN Patent NO. 195196

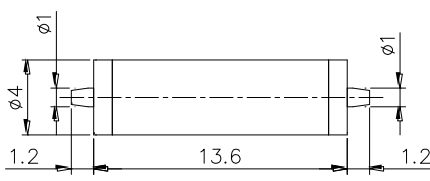
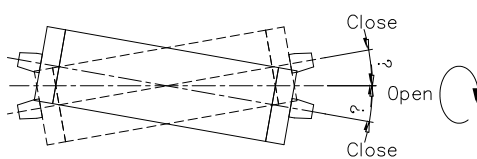
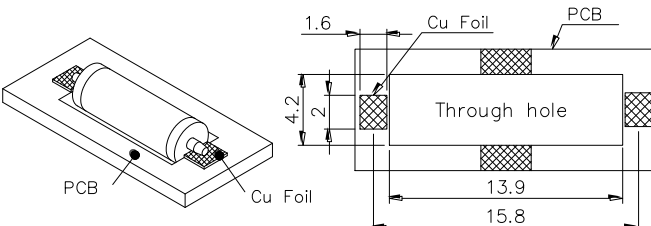
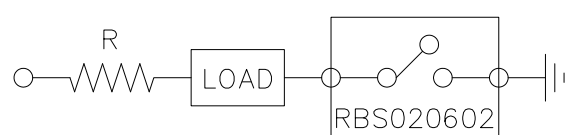
● DIMENSIONS / OPERATION / P.C.B. LAYOUT (Unit: mm, Tolerance:  $\pm 0.25\text{mm}$ )

RBS 02 04 02	Triggered Angle Range $\theta > 10^\circ; \theta < -10^\circ$
	
P.C.B. Layout (SMT) / Top View	Application Circuit
	



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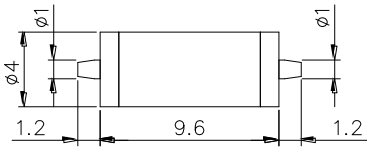
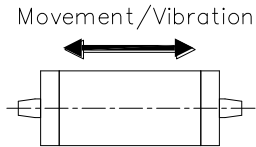
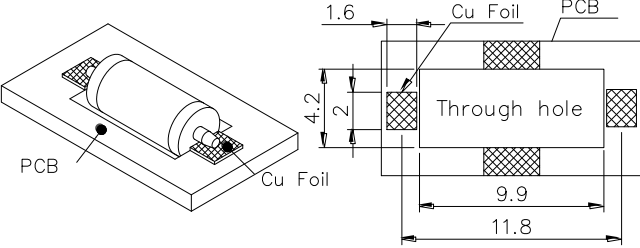
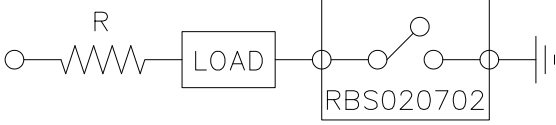
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<p>RBS 02 06 02</p> 	<p>Triggered Angle Range <math>\theta &gt; 10^\circ; \theta &lt; -10^\circ</math></p> 
<p>P.C.B. Layout (SMT) / Top View</p> 	<p>Application Circuit</p> 



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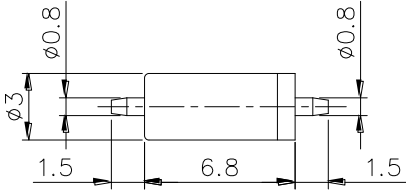
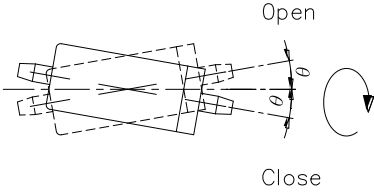
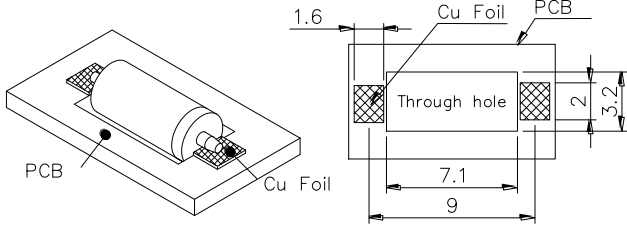
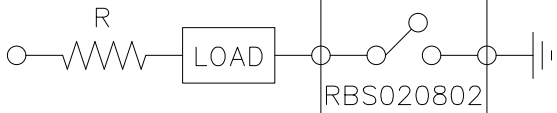
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<p>RBS 02 07 02</p> 	<p>Triggered By Vibration</p> 
<p>P.C.B. Layout (SMT) / Top View</p> 	<p>Application Circuit</p> 



# SENSOR SWITCH

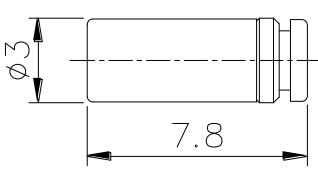
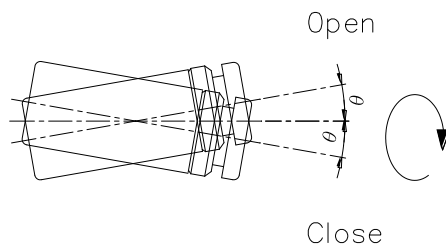
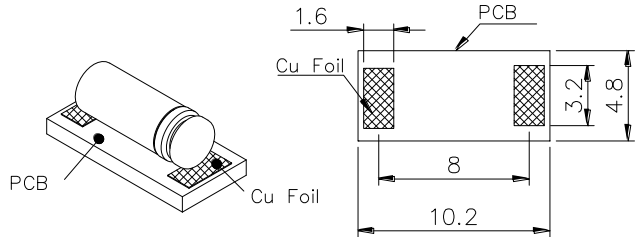
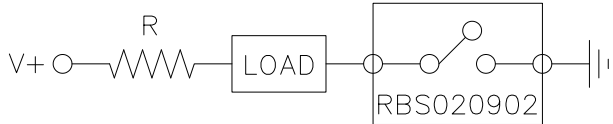
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RBS 02 08 02	Triggered Angle Range $\theta > 20^\circ; \theta < -20^\circ$
	
P.C.B. Layout (SMT) / Top View	Application Circuit
	



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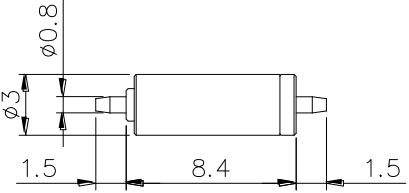
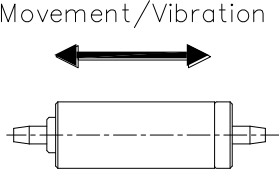
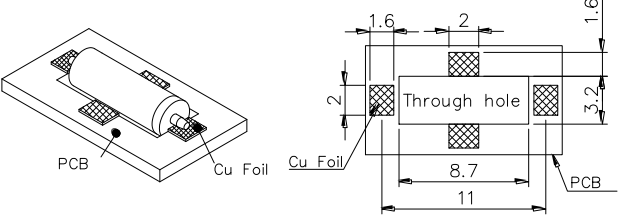
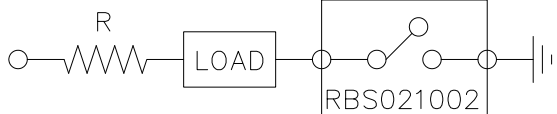
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<p>RBS 02 09 02</p> 	<p>uncertain degree <math>\theta &lt; 20^\circ</math></p> 
<p>P.C.B. Layout (SMT) / Top View</p> 	<p>Application Circuit</p> 



# SENSOR SWITCH

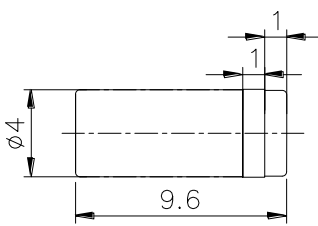
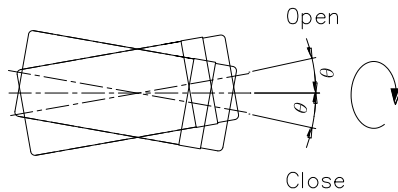
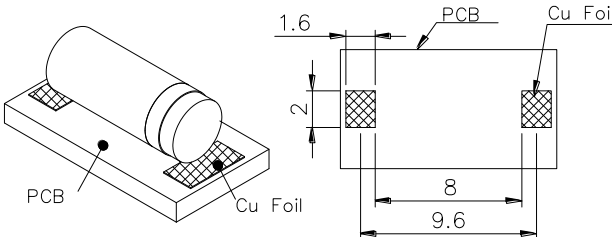
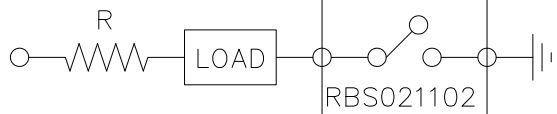
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<p>RBS 02 10 02</p> 	<p>Triggered By Vibration</p> 
<p>P.C.B. Layout (SMT) / Top View</p> 	<p>Application Circuit</p> 



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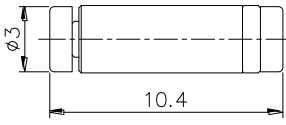
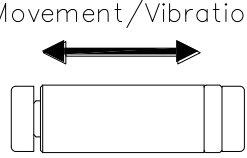
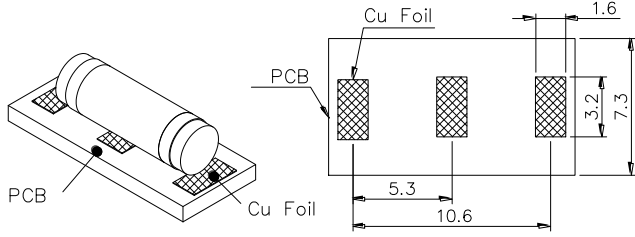
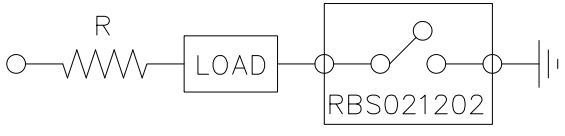
RBS 02 11 02	Triggered Angle Range $\theta > 10^\circ; \theta < -10^\circ$
	
P.C.B. Layout (SMT) / Top View	Application Circuit
	





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<p>RBS 02 12 02</p> 	<p>Triggered By Vibration</p> <p>Movement/Vibration</p> 
<p>P.C.B. Layout (SMT) / Top View</p> 	<p>Application Circuit</p> 



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● ELECTRICAL CHARACTERISTICS

1.	Contact Rating	10mA, 5VDC
2.	Contact Resistance	10Ω max.
3.	Insulation Resistance	50MΩ min. at 100VDC
4.	Dielectric Strength	50VDC min. for 1 minute
5.	Capacitance	5pF max.

● RELIABLE TEST ITEMS

Reliable Test - 1

Test Items	Test Content	Duration	Qualified Standard
Storage Temperature	-40°C~85°C	5 cycles	< 10Ω Cm > 90% Ca > 95%
IR Reflow Oven	Peak temp.=255~260°C *3times	3 times	

Reliable Test -2

Test Items	Test Content	Duration	Qualified Standard
Humidity	40°C/95%RH, 5VDC, I=1.6mA	120 hours	< 10Ω Cm > 90% Ca > 95%
Operating Temperature	-25°C~85°C, 5VDC, I=1.6mA	5 cycles	
Mechanical Life	2Hz	1,000,000 times	
Electrical Life	2Hz, 5VDC, I=1.6mA	100,000 times	



# SENSOR SWITCH

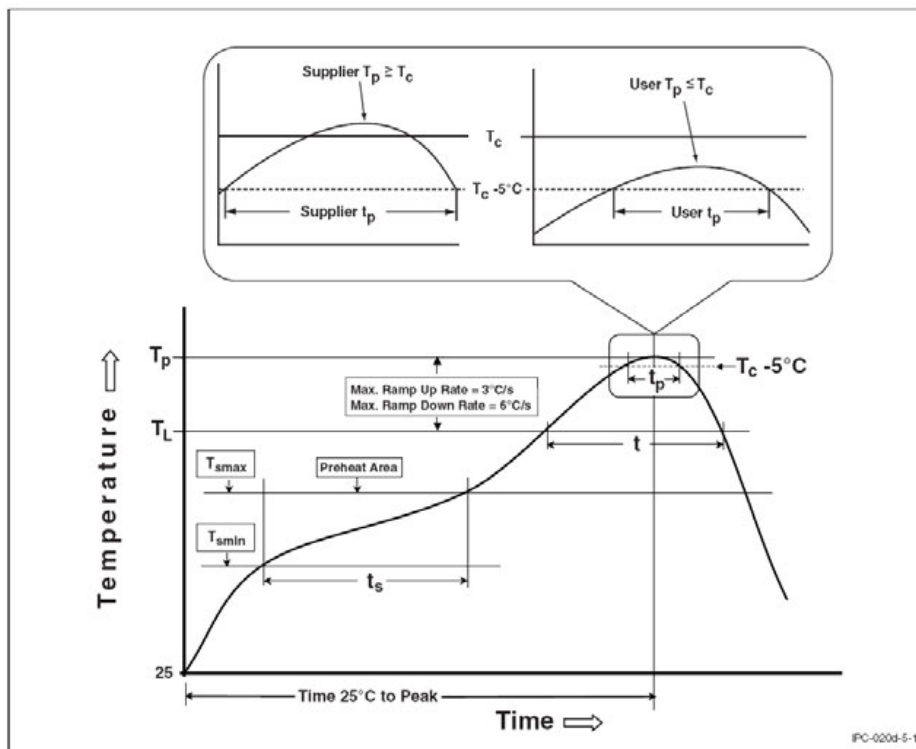
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Note:

1. Reliable test items-2 will be processing only after Reliable test items-1 were tested and qualified.
2. \*Cm : Represents Minimum conductive rate.
3. \*Ca : Represents Average conductive rate.
4. Regarding definition of conductive rate, please refer to "NOTE" stated below.

## ● SOLDERING TEMPERATURE AND DURATION

Following profile is for reference only. Please use solder paste that solder paste manufacturer recommends.



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< Table of classification Reflow profile >

Item	Pb process	Pb free process
Pre-heat and Soak Temperature min.(T <sub>smin</sub> ) Temperature max.(T <sub>smax</sub> ) Time (T <sub>smin</sub> to T <sub>smax</sub> )(t <sub>s</sub> )	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-120 seconds
Average ram-up Rate (T <sub>smax</sub> to T <sub>p</sub> )	3 °C/second max.	3 °C/second max.
Liquidous Temperature (TL) Time at Liquidous (tL)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body Temperature (T <sub>p</sub> )*	230 °C ~235 °C *	255 °C ~260 °C *
Classification temperature(T <sub>c</sub> )	235 °C	260 °C
Time(tp)** within 5 °C of the specified classification temperature (T <sub>c</sub> )	20** seconds	30** seconds
Average ram-down Rate (T <sub>p</sub> to T <sub>smax</sub> )	6 °C/second max.	6 °C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.
<p>* Tolerance for peak profile temperature (T<sub>p</sub>) is defined as a supplier minimum and a user maximum.  ** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum.</p>		



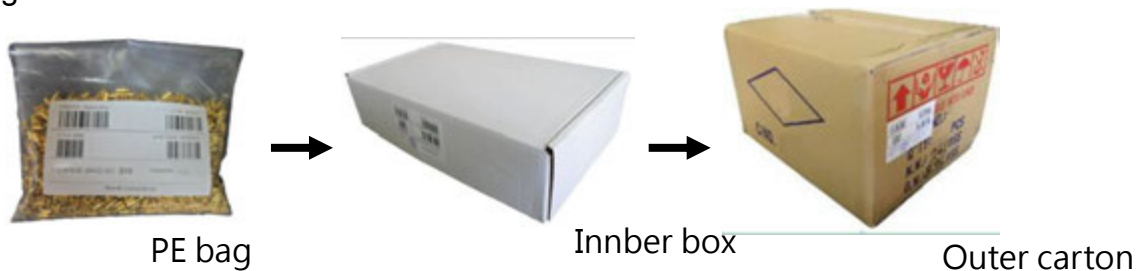
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● PACKAGE

	Part Number	Package	Quantity	Total Q'ty	Packing Dimension(mm)
1.	RBS020402	PE bag	1,000 pcs	1,000 pcs	205L*145W
	RBS020602	Inner box	10 PE bags	10,000 pcs	348L*191W*85H
	RBS020702 RBS021102	Outer carton	3 Inner boxes	30,000 pcs	364L*278W*213H
2.	RBS020802	PE bag	2,000 pcs	2,000 pcs	205L*145W
	RBS020902	Inner box	10 PE bags	20,000 pcs	348L*191W*85H
	RBS021002 RBS021202	Outer carton	3 Inner boxes	60,000 pcs	364L*278W*213H

※ Package shown as below for reference.



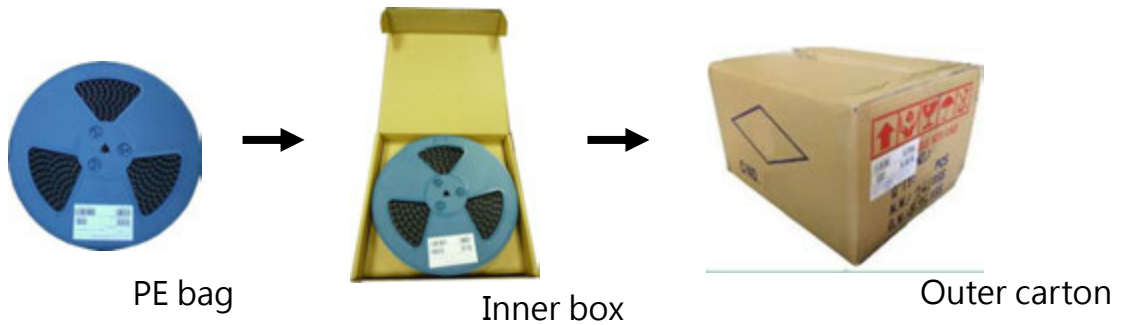
	Part Number	Package	Quantity	Total Q'ty	Packing Dimension(mm)
1.	RBS020402T	Tape & reel	2,000 pcs	2,000 pcs	φ330*25H
	RBS021002T	Inner box	2 Reels	4,000 pcs	355L*340W*68H
	RBS021102T	Outer carton	4 Inner boxes	16,000 pcs	373L*358W*309H
2.	RBS020802T	Tape & reel	2,500 pcs	2,500 pcs	φ330*25H
	RBS021202T	Inner box	2 Reels	5,000 pcs	355L*340W*68H
		Outer carton	4 Inner boxes	20,000 pcs	373L*358W*309H
3.	RBS020902T	Tape & reel	2,500 pcs	2,500 pcs	φ330*17H
		Inner box	2 Reels	5,000 pcs	355L*340W*68H
		Outer carton	4 Inner boxes	20,000 pcs	373L*358W*309H



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※ Package shown as below for reference.



## ● NOTES

1. Suggestion for usage : For vibration usage or application · we suggest to add “on delay” for IC; if vibration is heavy · optical type of sensor switch is recommended.
2. Recommend using 5mA as input current.
3. For the continued product improvement as one of the company policy, specifications may change or update without notice. The latest information can be obtained through our sales offices. Normally, all products are supplied under our standard conditions.
4. Conductive rate (Switch-on Rate): To test the conductivity of one switch individually for 100 times · if the switch got 95 times of “ON” · we call the its “conductive rate” is 95%.



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## ● PRECAUTIONS FOR USE

1. If the products is intended to be used for other endurance equipment requiring higher safety and reliability such as life support system, space and aviation devices, disaster and safety system, it's necessary to make verification of conformity or contact us for the details before using.
2. Do not try to clean the switch with a solvent or similar substance after the soldering process.
3. Use water-soluble flux may damage the switch.
4. If soldering temperature exceeds our specification, sensor switch could get apart.
5. Do not use switch in the environment of high humidity · because such an environment may cause the leakage current between the terminals.
6. More than the rated load may cause fire, so do not use more than the load.
7. In the circuit · switch should not be near or directly connected with the magnetic component solder joints (for example: relays, transformers, etc.).

