Tilt Sensor Switch

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● FUNCTION

15° Tilt Detecting in one axis.

● APPLICATIONS

1. Water filtration module
2. Wake up systems for power saving, such like remote controllers.
3. Anti-theft / Anti-tamper devices
4. Alarm system
5. Earthquake detecting
6. Toys, Entertainment device

● FEATURES

1. Suitable for horizontal PCB.
2. Switch state: SMD Normally Closed.
3. Gold-plated ball and terminals, low possibility of oxidization.
4. Housing made of high insulation plastic material, free from electric conduction and rust problem.
5. All plastic materials subject to industrial purpose, resist high temperature.
6. Simple ON and OFF signals, easy for design.
7. RoHS compliance, an ideal substitute for mercury switch.
8. A more economical tilt detection option than IC design solution.
9. All made in Taiwan and examined before shipment.

● PATENT

1. Taiwan Patent No. 226086

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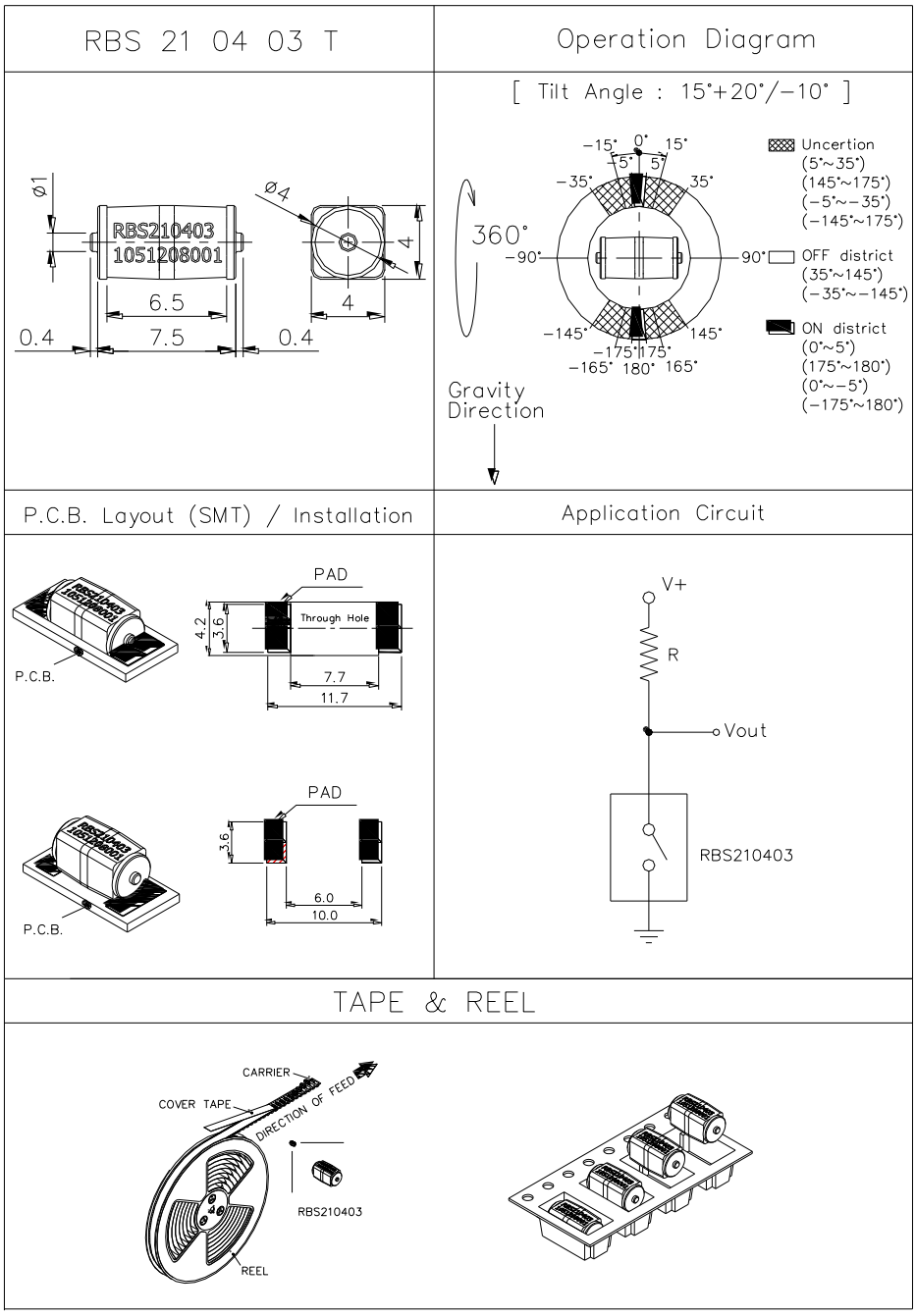
● DIMENSIONS / OPERATION / P.C.B. LAYOUT (Unit: mm, Tolerance: ±0.25mm)

Fig. 1



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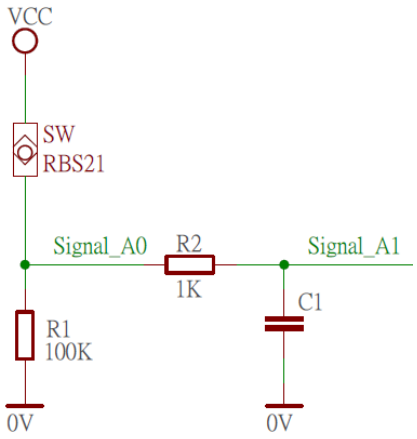
Application Circuit

(1) Type1 Circuit

Note：We suggest add RC filter circuit (see R2, C1) after Original detect signal (signal_A0). Application circuit as below.



The higher the RC value is, the better the effect of filter is. RC filter circuit could filter out more vibrate noise. But the delay time of signal (Signal_A1) will be longer than before (Signal_A0).

The delay time of signal happens during C1 discharge. It will take t=5RC for C1 discharge through R2 and R1 to ground (0V).

As above circuit, when C1=1uF that delay about 0.5s
t = 5 *(R1+R2)*C1 = 5 * (100K+1K) *1uF = 0.505 sec

We suggest t > 0.5s,
User could adjust C1 to appropriate parameter to fit your product

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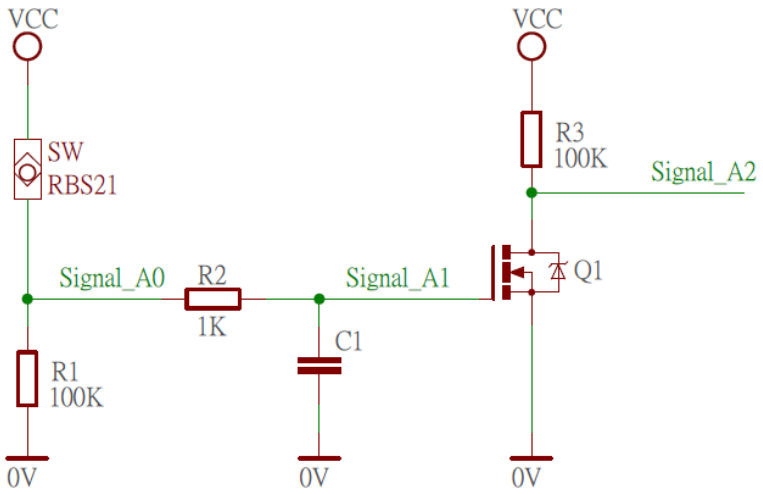
(2) Type2 Circuit

Note：If MosFET is added to Type1 circuit, the effect of filter will be better

Especially, for the circuit with load effect after Signal_A1, you better add MosFET circuit. Then you get Signal_A2 phase is inverse to Signal_A0

Operate voltage Vcc=5V, we suggest MosFET could use model 2N7000 or the same specification model.



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● Current/Voltage Suggested

Input Current (mA)	Operating Voltage (V)	Condition
1.0	5	--

● ELECTRICAL CHARACTERISTICS

1	Contact Rating	10 mA, 5 VDC
2	Contact Resistance	50 Ω max.
3	Operation Diagram	Refer to Fig. 1
4	Insulation Resistance	1000 MΩ min., 100 VDC
5	Dielectric Strength	50 VDC min., 1 minute
6	Capacitance	5 pF max.
7	Conductive Rate	90% min.

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● RELIABLILITY TEST ITEMS

Reliability Test for RBS210403T

	Test Item	Contents
1	IR Reflow	Peak temp.=255~260°C
2	Operating Temperature	-25°C ~ 85°C
3	Storage Temperature	-40°C ~ 85℃
4	Humidity	40 °C / 95 %RH
5	Mechanical Life	2 Hz horizontal 1,000,000 times
6	Electrical Life	100,000 times

● SOLDERING CONDITION

Following soldering conditions are for reference only, please use soldering information that solder paste manufacturer recommends.

Condition / Suitable Production Process	Soldering Temperature	Soldering Time	Wattage of Manual Soldering	Type
IR Reflow	Please refer to following < Table of classification Reflow profile > and Fig. 2		-	SMD
Manual Soldering	300±5℃	< 3 seconds max.	30W or Temperature-controlled manual soldering	SMD

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< Table of classification Reflow profile >

Item	Pb process	Pb free process
Pre-heat and Soak Temperature min.(Tsmin) Temperature max.(Tsmax) Time (Tsmin to Tsmax)(ts)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-120 seconds
Average Rate of temperature rising up (Tsmax to Tp)	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 (Tp)*	230°C ~235°C *	255°C ~260°C *
Classification temperature(Tc)	235°C	260°C
Time(tp)** within 5 °C of the specified classification temperature (Tc)	20** seconds	30** seconds
Average ram-down Rate (Tp to Tsmax)	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.
* Tolerance for peak profile temperature (Tp) 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.		

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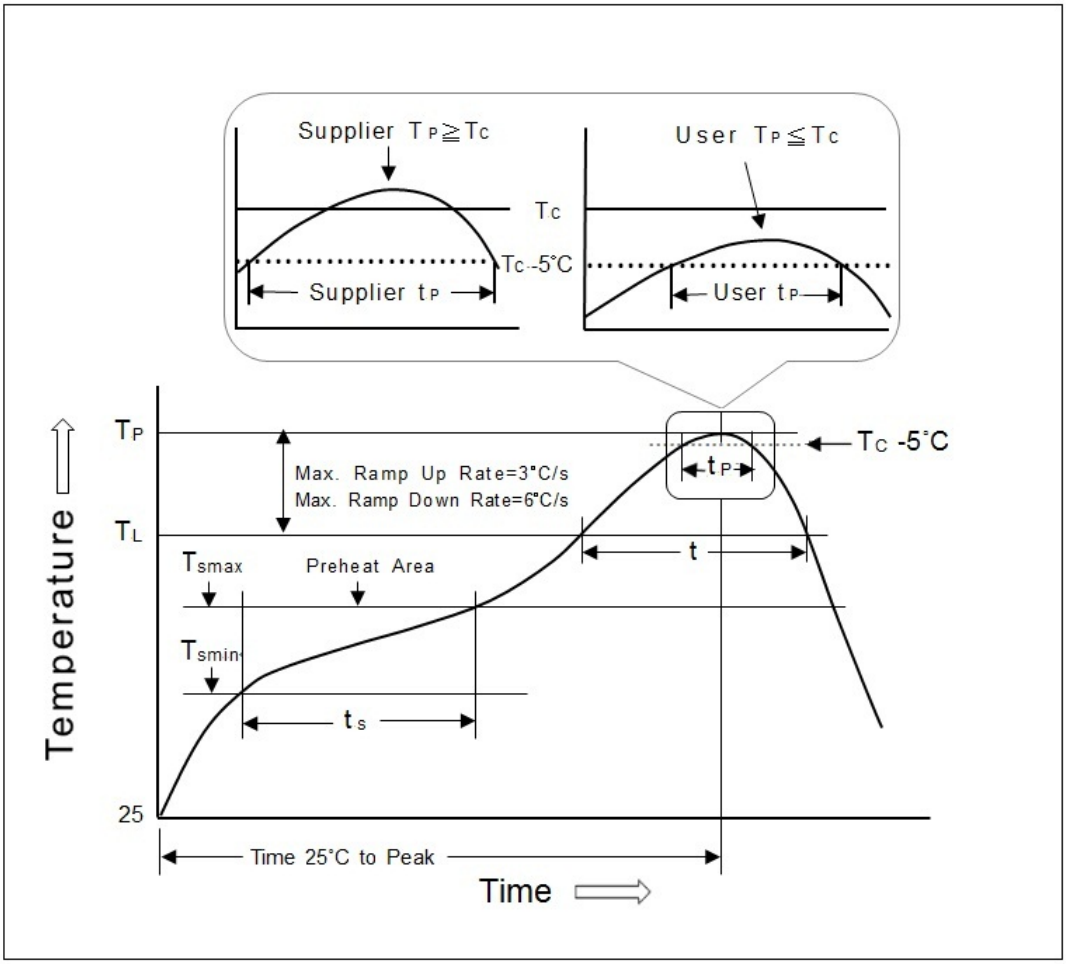
Fig. 2



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● PACKAGE

	Part Number	Package	Quantity	Total	Dimension (mm)
1.	RBS210403	PE bag	1,000 pcs	1,000 pcs	205L*145W
		Inner box	10PE bag	10,000 pcs	348L*191W*85H
		Carton	3 boxes	30,000 pcs	364L*278W*213H

※ Package shown as below for reference.

PE bag　　Inner box　　Carton

	Part Number	Package	Quantity	Total	Dimension (mm)
2.	RBS210043T	Tape & reel	2,000 pcs	2,000 pcs	φ330*17H
		Inner box	2 reels	4,000 pcs	355L*340W*68H
		Carton	10 boxes	40,000 pcs	703L*364W*380H

※ Package shown as below for reference.

Tape & reel　　Inner box　　Carton

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● NOTE

1. Suggestion for usage: For vibration usage or application, we suggest to add hysteresis for IC; if vibration is strong, optical type of sensor switch is recommended.
2. The continuous improvement on product as one of the company policy, specifications may be changed or updated without notice. The latest information can be obtained through our sales offices. Normally, all products are produced based on this datasheet.

● PRECAUTIONS FOR USE

1. If the product is applied for the device such as life support system, space and aviation devices, disaster and safety system, which safety and reliability are critical, it's necessary to make verification or contact us for the details before using.
2. Do not clean the switch with solvent-like substance after the soldering process.
3. Using water soluble flux may damage the switch.
4. Please follow the soldering instruction accordingly, otherwise might lead to defective.
5. Do not use switch in the highly humid environment which may cause the current leakage between the terminals.
6. Please do not exceed the rated load as there will be a risk of disabling the product function.
7. In the circuit, the switch should not be near or directly connected with the magnetic component solder joints (for example: relays, transformers, etc.).

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