

SENSOR SWITCH

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|--------|----------------|-------------|-------------|---------------|--------|
| Item.# | RBS3201 Series | Description | TILT SWITCH | Version | V100.0 |
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● FUNCTIONS

1. One way tilt detection
2. Upside down detection
3. Rotation detection in vertical position



● APPLICATIONS

1. Rotation Detection for LCD monitor
2. Position Detection for Iron
3. Wireless mouse
4. Anti-theft for motorbike

● FEATURES

- 1 Housing made of high insulation plastic material, free from electric conduction and rust problem.
- 2 Detecting with photo transistors, generating highly reliable and stable signals.
- 3 All plastic materials subject to industrial purpose, resist high temperature and meet fireproof function.
- 4 Simple ON and OFF signals, easy for design.
- 5 RoHS compliance, complete replacement of mercury switch.
- 6 A more economical tilt and vibration detection option than IC design solution.
- 7 Made in Taiwan and examined before shipment.



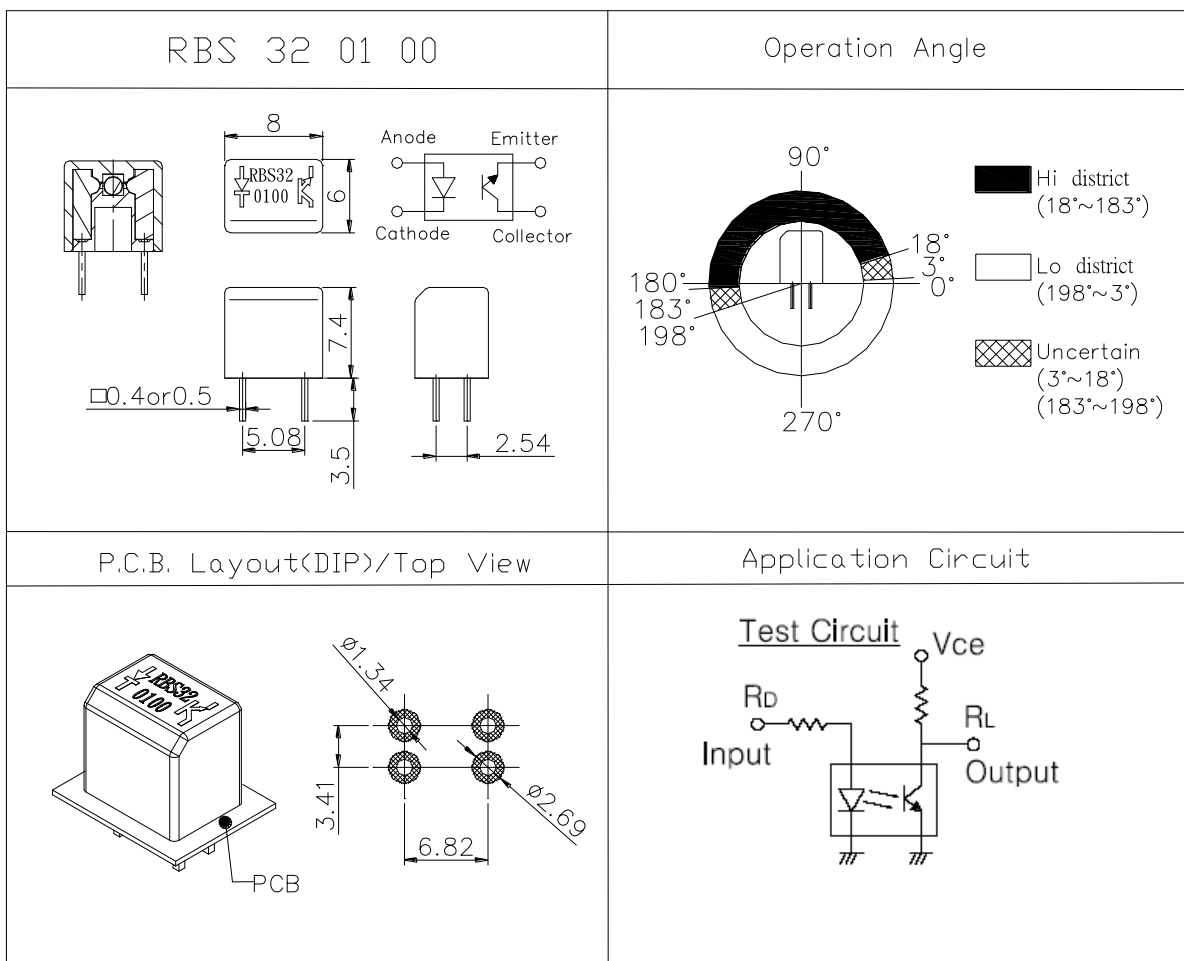
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● PATENTS

1. TAIWAN Patent NO. I 321332
2. U.S.A. Patent NO. US 7,485,818 B2
3. CHINA Patent NO. ZL 200610078607.7

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



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| | |
|-------------------------------------|----------------------------|
| <p>RBS 32 01 02</p> | <p>Operation Angle</p> |
| <p>P.C.B. Layout (DIP)/Top View</p> | <p>Application Circuit</p> |



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|-----------------------------|---------------------|
| RBS 32 01 03 | Operation Angle |
| | |
| P.C.B. Layout(DIP)/Top View | Application Circuit |
| | |



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| | |
|--|---|
| RBS 32 01 10 | Operation Angle |
| <p>Dimensions: 8, 6, 7.4, 0.5, 5.08, 3.5, 2.54</p> <p>Electrical symbols: Anode, Cathode, Collector</p> | <p>Stable Angle $\Theta \leq \pm 45^\circ$</p> <p>Operation Angle Θ</p> <p>Legend: I_{Hi} district (-55°~145°) I_{Lo} district (-35°~125°) Uncertain (125°~145°) (-35°~55°)</p> <p>$I = \text{Output Current}$</p> |
| P.C.B. Layout (DIP) / Top View | Application Circuit |
| <p>Dimensions: 45°, 6.6, 3.3, $\phi 2.6$, $\phi 1.3$</p> <p>Labels: PCB, Cu Foil</p> | <p>Test Circuit</p> <p>Labels: Input, R_D, Output, R_L, Vce</p> |



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● Current/Voltage Suggested

| | |
|--------------------|-----------------------|
| Input Current (mA) | Operating Voltage (V) |
| 10 | 5 |

● Absolute Maximum Rating (Ta=25°C)

| Item | | Symbol | Rating | Unit |
|----------------------------|-----------------------------|------------------|----------|------|
| Input | Power Dissipation | Pd | 75 | mW |
| | Reverse Voltage | Vr | 5 | V |
| | Forward Current | I _F | 50 | mA |
| | Peak Forward Current (*1) | I _{FP} | 1 | A |
| Output | Collector Power Dissipation | Pc | 100 | mW |
| | Collector Current | Ic | 20 | mA |
| | C-E Voltage | V _{CEO} | 30 | V |
| | E-C Voltage | V _{ECO} | 5 | V |
| Operating Temperature | | Topr | -25~+85 | °C |
| Storage Temperature | | Tstg | -40~+100 | °C |
| Soldering Temperature (*2) | | Tsol | 260 | °C |

(*1) tw=100 uSec. 、 T=10 mSec.

(*2) t=5 Sec

● MECHANICAL CHARACTERISTICS

| | | |
|----|------------------------|--|
| 1. | Temperature Range | Operating : -25°C to +85°C Storage : -40°C to +85°C |
| 2. | Pull Force of Terminal | 500 gf for 1 minute |
| 3. | Operation Life | 30,000 hrs |
| 4. | Humidity | 95% , RH 40°C · 96 hrs. |
| 5. | Solder Ability | After flux 260±5°C for 5±0.5 seconds 95% |



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| | |
|--|-----------|
| | coverage. |
|--|-----------|

● Electrical Optical Characteristics (Ta=25°C)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|------------------------|---------------|-----------------------------|------|------|------|-----------|
| Forward Voltage | V_F | $I_F=20mA$ | - | - | 1.5 | V |
| Reverse Current | I_R | $V_R=5V$ | - | - | 10 | μA |
| Peak Wavelength | λ_p | $I_F=10mA$ | | 940 | | nm |
| Dark Current | I_D | $V_{CE}=10V$ | - | - | 2 | μA |
| C-E Saturation Voltage | $V_{CE(sat)}$ | $I_C=0.25mA$ $I_F=20mA$ | - | - | 0.4 | V |
| Light Current | I_L | $V_{CE}=5V$ $I_F=20mA$ | 0.5 | 5 | - | mA |
| Rise Time | T_r | $I_C=0.8mA$ $V_{CC}=30V$ | - | 5 | - | μsec |
| Fall Time | T_f | $R_L=1K\Omega$ | - | 5 | - | μsec |



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● Typical Electrical / Optical Characteristics Curves (Ta=25°C) (Ta=25°C)

Fig.1 Power Dissipation vs. Ambient Temperature

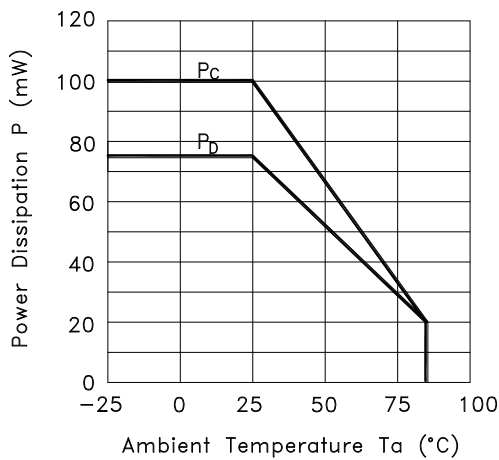


Fig.2 Forward Current vs. Forward Voltage

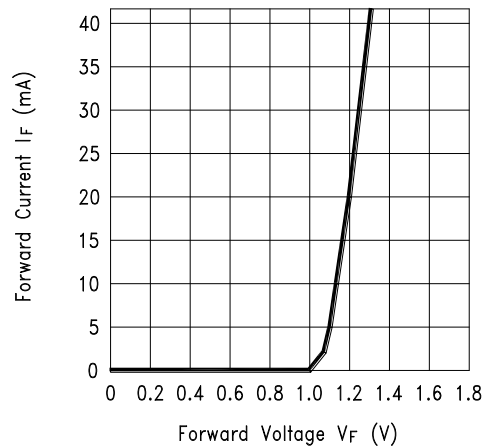


Fig.3 Collector Current vs. Collector-emitter Voltage

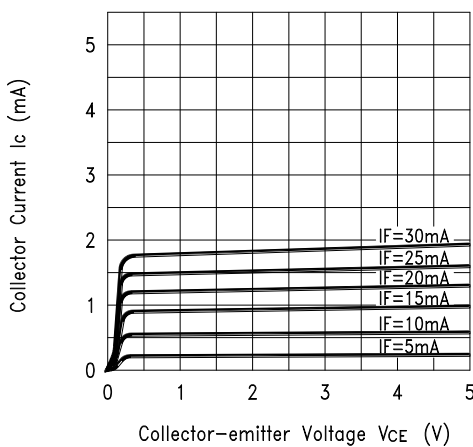
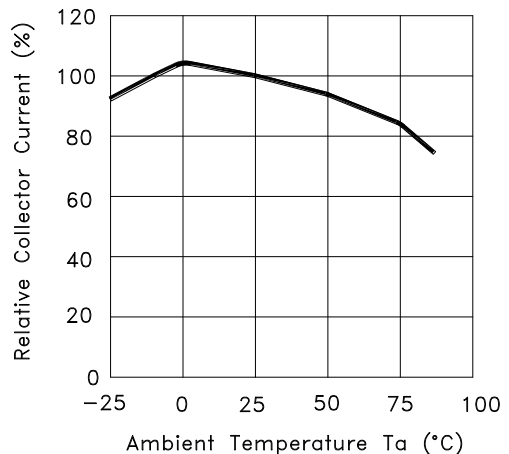


Fig.4 Collector Current vs. Ambient Temperature



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Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

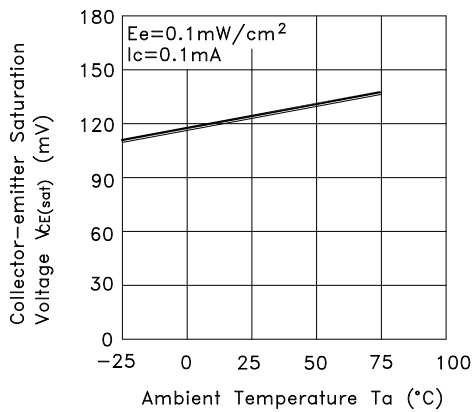


Fig.6 Response Time vs. Load Resistance

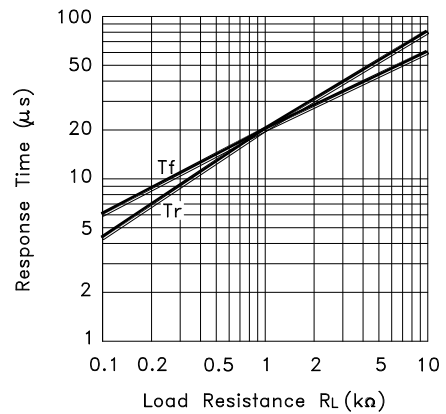
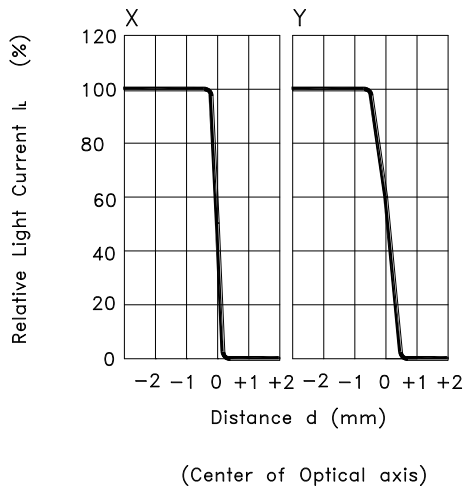


Fig.7 Sensing Position Characteristics (Typical)



Test Circuit for Response Time



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● Reliable Test Items

Reliable test item-1

| Test Items | Test Content | Duration | Qualified Standard |
|---------------------|---------------------------------|----------|---------------------------------|
| Storage Temperature | -40°C~85°C | 5 cycles | < 10Ω Cm > 100% Ca > 100% |
| IR Reflow Oven | Peak temp.=255~260°C *3times | 3 times | |

Reliable test items -2

| Test Items | Test Content | Duration | Qualified Standard |
|-----------------------|---------------------------|-----------------|---------------------------------|
| Humidity | 40°C/95%RH, 5VDC, I=1.6mA | 120 hours | < 10Ω Cm > 100% Ca > 100% |
| 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 | 30,000 hrs | |

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.



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3. *Ca : Represents Average conductive rate.
4. Regarding definition of conductive rate, please refer to "NOTE" stated below.

● Soldering Temperature and Times

| Condition Soldering Method | Soldering Temperature | Times for Soldering |
|-------------------------------|-----------------------|---------------------|
| Soldering-iron | 260 ± 5°C | < 5 Sec. Max |
| Wave | 255 ± 5°C | < 3 Sec. Max |

● PACKAGE

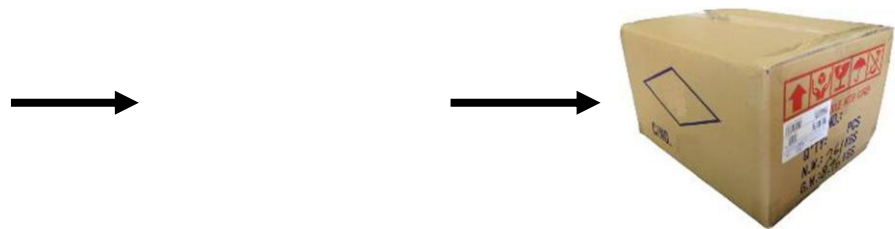
| | Part Number | Package | Quantity | Total | Dimension |
|----|-------------|--------------|--------------------|------------|----------------|
| 1. | RBS320100 | IC tube | 62 pcs | 62 pcs | 525L*10W*17.5H |
| | RBS320102 | Inner box | 120 pcs of IC tube | 7,440 pcs | 539L*130W*130H |
| | RBS320103 | | | | |
| | RBS320110 | Outer carton | 4 Inner boxes | 29,760 pcs | 551L*285W*288H |

※ Package shown as below for reference.



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● NOTES

1. Suggestion for usage : For vibration usage or application · we suggest to add "on delay" for IC.
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. When the soldering temperature exceeds specifications, the switch may fall 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.).

