



SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 1 of 10 | | Date | April 9, 2010 | |

● FUNCTIONS

1. Tilt Detecting within a 360° radius
2. Slight Vibration Detecting

● APPLICATIONS

1. LCD monitor rotation
2. Home appliance tilt-off function
3. Earthquake alarm
4. Automotive devices
5. Visual devices
6. Information devices
7. Communication devices



● 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. Suitable to vertical PCB.
6. Tilt Angles: 15°, 20°, 30°, and 45° within a 360 ° radius.
7. RoHS compliance, an ideal substitute for mercury switch.
8. A more economical tilt and vibration detection option than IC design solution.
9. All made in Taiwan and examined before shipment.

● PATENTS

1. TAIWAN Patent NO. 181431
2. CHINA Patent NO. ZL 01 2 60920.X
3. U.S.A. Patent NO. US 6,800,841 B1



SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 2 of 10 | | Date | April 9, 2010 | |

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

| | | |
|--|--|-------------------------------------|
| <p>RBS 31 10 10</p> <p>Anode Emitter Cathode Collector</p> | <p>Tilt Angle $45^{\circ} \pm 10^{\circ}$</p> <p>Uncertain ($30^{\circ} \sim 55^{\circ}$) ($-35^{\circ} \sim -55^{\circ}$)</p> <p>Lo district ($0^{\circ} \sim 35^{\circ}$) ($0^{\circ} \sim -35^{\circ}$)</p> <p>Hi district ($55^{\circ} \sim 180^{\circ}$) ($-55^{\circ} \sim -180^{\circ}$)</p> | <p>P.C.B. Layout (DIP)/Top View</p> |
| <p>Installation Position</p> | <p>Application Circuit</p> | |
| <p>P.C.B.</p> | <p>1. $V_{ce} = 5V$ 2. $R_D = 430\Omega$ 3. $R_L = 33K\Omega$</p> | |



SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 3 of 10 | | Date | April 9, 2010 | |

| | | |
|------------------------------|---|-------------------------------------|
| <p>RBS 31 10 11</p> | <p>Tilt Angle $30^{\circ} \pm 10^{\circ}$</p> | <p>P.C.B. Layout (DIP)/Top View</p> |
| <p>Installation Position</p> | <p>Application Circuit</p> | |
| | <ul style="list-style-type: none"> 1. Vce=5V 2. RD=430ohm 3. RL=33Kohm | |



SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 4 of 10 | | Date | April 9, 2010 | |

| | | |
|------------------------------|--|-------------------------------------|
| <p>RBS 31 10 12</p> | <p>Tilt Angle $20^\circ \pm 10^\circ$</p> | <p>P.C.B. Layout (DIP)/Top View</p> |
| <p>Installation Position</p> | <p>Application Circuit</p> | |
| | | |



SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 5 of 10 | | Date | April 9, 2010 | |

| | | |
|------------------------------|---|-------------------------------------|
| <p>RBS 31 10 13</p> | <p>Tilt Angle $15^\circ \pm 10^\circ$</p> <p> Uncertain (5°~25°) (-5°~-25°) </p> <p> Lo district (0°~5°) (0°~-5°) </p> <p> Hi district (25°~180°) (-25°~-180°) </p> | <p>P.C.B. Layout (DIP)/Top View</p> |
| <p>Installation Position</p> | <p>Application Circuit</p> | |
| <p>P.C.B.</p> | <p> 1. $V_{ce}=5V$ 2. $R_D=430\text{ohm}$ 3. $R_L=33K\text{ohm}$ </p> | |

● Device Selection Guide

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



SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 6 of 10 | | Date | April 9, 2010 | |

● 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) $t_w=100 \mu\text{Sec.}$ 、 $T=10 \text{ mSec.}$

(*2) $t=5 \text{ Sec}$

● 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 for 96 hrs. |
| 5. | Solder Ability | After flux 260±5°C for 5±0.5 seconds 95% coverage |



SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 7 of 10 | | Date | April 9, 2010 | |

● 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 |

● BILL OF MATERIAL

| | | |
|----|---------------------------|-----------------------------|
| 1. | Housing | Polyamide + Glass-Fiber |
| 2. | Base | Polyamide + Glass-Fiber |
| 3. | Ball | Stainless Steel |
| 4. | Infrared Emitting Diodes | |
| 5. | Silicon Photo Transistors | |
| 6. | Inside Part | Copper Alloy, Nickel Plated |



SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 8 of 10 | | Date | April 9, 2010 | |

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

Fig.1 Power Dissipation vs. Ambient Temperature

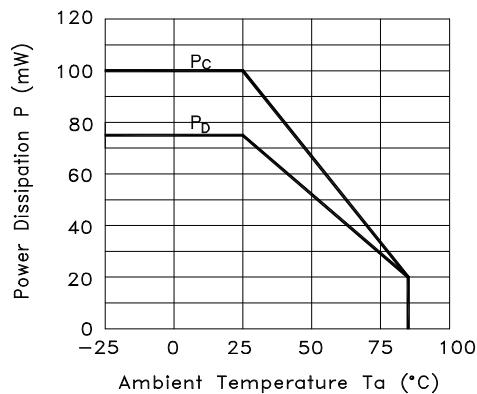


Fig.2 Forward Current vs. Forward Voltage

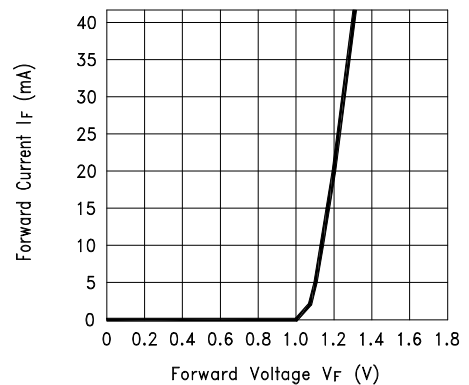


Fig.3 Collector Current vs. Collector-emitter Voltage

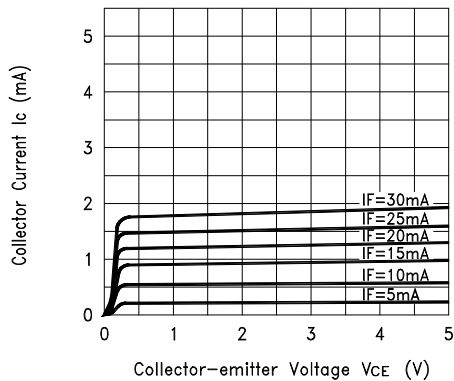
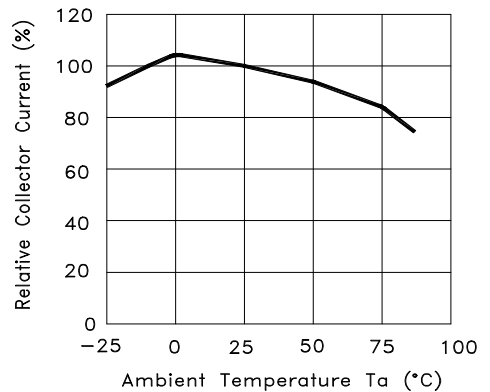


Fig.4 Collector Current vs. Ambient Temperature





SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 9 of 10 | | Date | April 9, 2010 | |

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

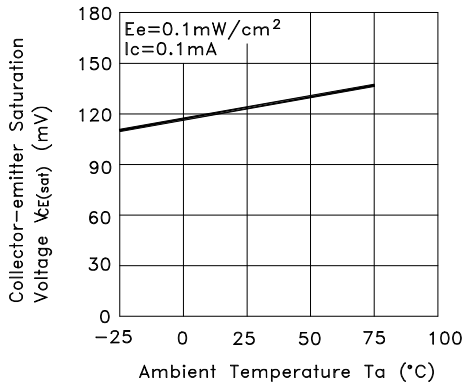


Fig.6 Response Time vs. Load Resistance

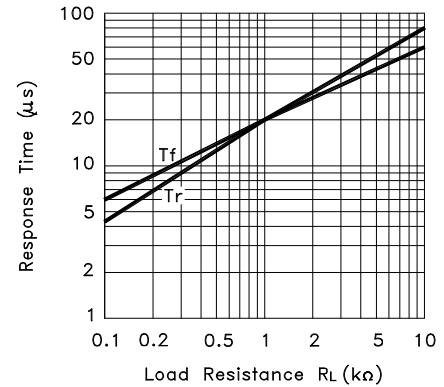
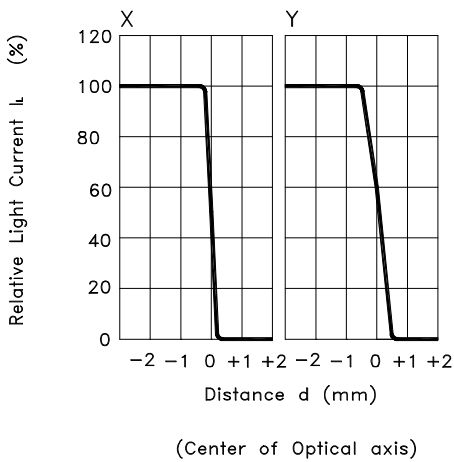
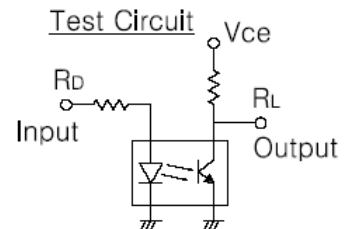
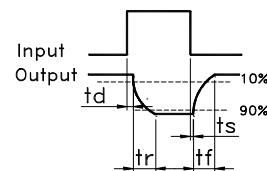
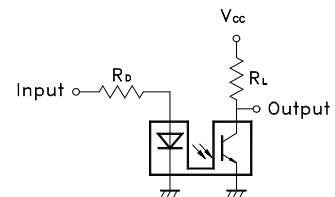


Fig.7 Sensing Position Characteristics (Typical)



Test Circuit for Response Time





SENSOR SWITCH

| | | | | | |
|--------|----------------|-------------|-------------|---------------|-------|
| Item # | RBS3110 Series | Description | TILT SWITCH | Version | V99.0 |
| Page | 10 of 10 | | Date | April 9, 2010 | |

● PACKAGE

| | Part Number | Package | Quantity | Total | Size |
|----|-------------------------------------|-----------|----------|------------|----------------------|
| 1. | RBS311110 | PE Bag | 250 pcs | 250 pcs | 12.7 x 17.8 (cm) |
| | RBS311111 RBS311112 RBS311113 | Inner Box | 8 PE Bag | 2,000 pcs | 36 x 20 x 9 (cm) |
| | | Carton | 3 Boxes | 6,000 pcs | 36 x 28 x 23 (cm) |
| 2. | RBS311110 | IC tube | 48 pcs | 48 pcs | 52.5 x 1 x 1.75 (cm) |
| | RBS311111 RBS311112 RBS311113 | Inner Box | 84 tubes | 4,032 pcs | 54 x 13 x 13 (cm) |
| | | Carton | 4 Boxes | 16,128 pcs | 55 x 29 x 29 (cm) |

* Minimum Order Quantity: One Bag / One Box (84 tubes)

● NOTE

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.

● PRECAUTIONS FOR USE

1. If the products is intended to be used for other endurance equipments requiring higher safety and reliability such as life support system, space and aviations devices, disaster and safety system, it's necessary to make verification of conformity or contact us for the details before using.
2. Don't try to clean the switch with a solvent or similar substance after the soldering process.
3. The switch might be damaged if using the water-soluble flux.