

Tilt Sensor Switch

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|----------|------------|-------------|---------------|---------------|----|
| Item No. | RBS330210T | Description | Photoelectric | Version | 13 |
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● **FUNCTIONS**

1. Tilt Angles: 45° within a 360° radius
2. Suitable for horizontal PCB
3. Vibration Detecting



● **APPLICATIONS**

1. Automatically shut off for home appliances
2. Automatically shut off for Sporting equipment
3. Alarm system
4. Anti-theft / Anti-tamper devices
5. Being motion detection (personal locator)
6. Wake up systems for power saving, such like remote controllers
7. Automatically shut off for motorcycle when tilt
8. Earthquake Detecting

● **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, an ideal substitute for mercury switch.
6. A more economical tilt and vibration detection option than IC design solution.
7. All made in Taiwan and examined before shipment.



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● PATENTS

1. Taiwan Patent No. I 310952
2. Taiwan Patent No. M 450817
3. Japan Patent No. 4384217
4. Japan Patent No. 3148127
5. U.S.A. Patent No. US 6,800,841 B1
6. U.S.A. Patent No. US 7,402,791 B2
7. China Patent No. ZL 200610083013.5
8. China Patent No. ZL 200820126206.9
9. China Patent No. ZL 201220539712.7

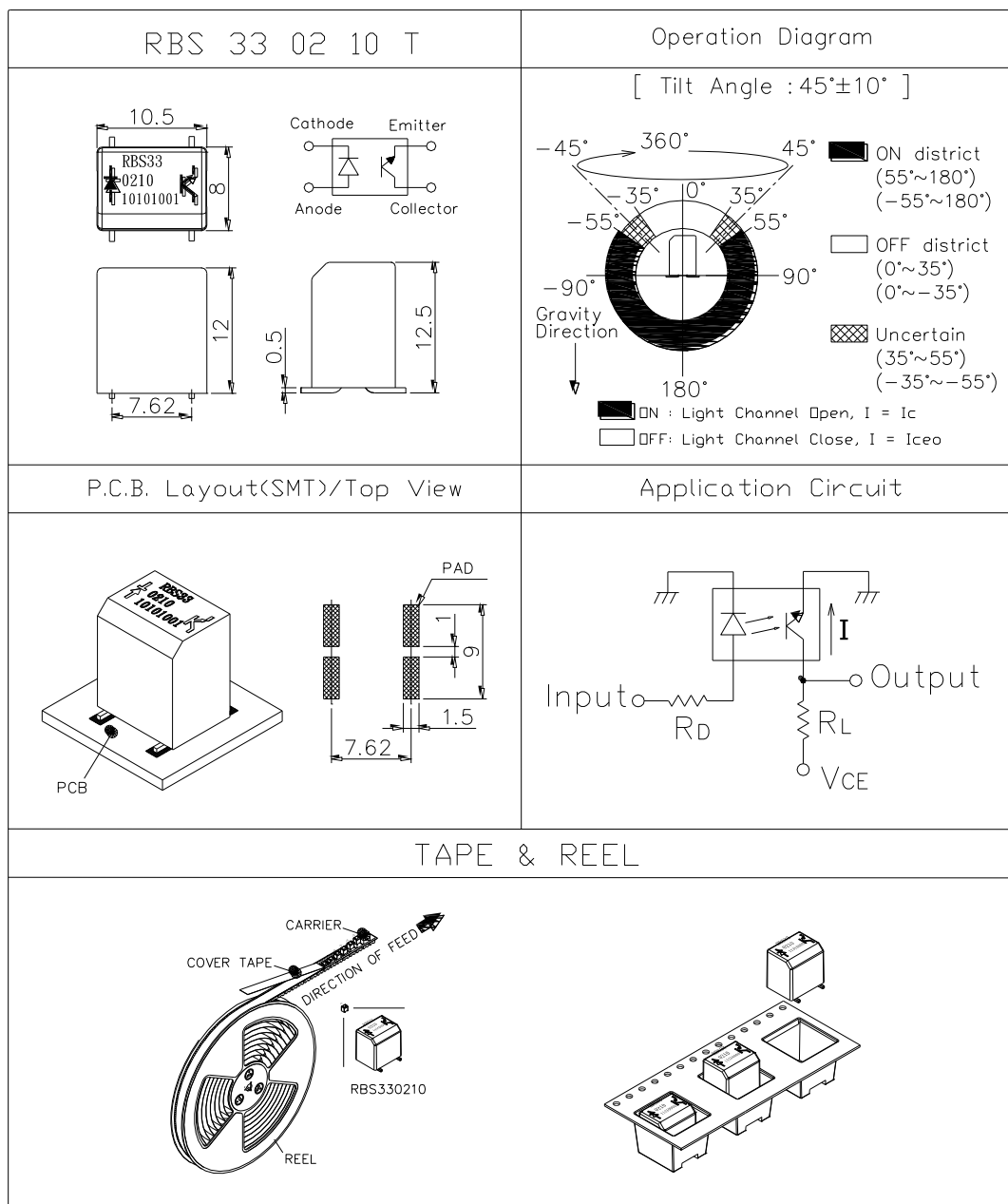


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● DIMENSIONS / OPERATION / P.C.B. LAYOUT (Unit: mm, Tolerance: ±0.25mm)

Fig. 1



Tilt Sensor Switch

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● Current/Voltage Suggested

| Input Current (mA) | Operating Voltage (V) | Condition |
|--------------------|-----------------------|---|
| 10 | 3.3 | V _{CE} =3.3V R _D =200 ohm R _L =33K ohm |
| 10 | 5 | V _{CE} =5V R _D =390 ohm R _L =33K ohm |

* Please refer to above Application Circuit for designing electrical circuit.

● Absolute Maximum Rating (Ta=25°C)

| Item | | Symbol | Rating | Unit |
|----------------------------|-----------------------------|------------------|---------|------|
| Input | Power Dissipation | P _d | 75 | mW |
| | Reverse Voltage | V _R | 5 | V |
| | Forward Current | I _F | 50 | mA |
| | Peak Forward Current (*1) | I _{FP} | 1 | A |
| Output | Collector Power Dissipation | P _C | 100 | mW |
| | Collector Current | I _c | 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~+85 | °C |
| Soldering Temperature (*2) | | Tsol | 260 | °C |

(*1) tw=100 uSec., T=10 mSec.

(*2) t=5 Sec



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● Electrical Optical Characteristics (Ta=25°C)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|------------------------|---------------|-----------------------------|------|------|------|-----------|
| Forward Voltage | V_F | $I_F=20mA$ | - | 1.2 | 1.5 | V |
| Reverse Current | I_R | $V_R=5V$ | - | - | 10 | μA |
| Peak Wavelength | λ_p | $I_F=10mA$ | | 940 | | nm |
| Dark Current | I_{ceo} | $V_{CE}=10V$ | - | - | 2 | μA |
| C-E Saturation Voltage | $V_{CE(sat)}$ | $I_C=0.25mA$ $I_F=20mA$ | - | - | 0.4 | V |
| Light Current | I_c | $V_{CE}=5V$ $I_F=20mA$ | 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 |
| Operation Diagram | θ | Fig. 1 | 35 | 45 | 55 | ° |



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

Fig.1 Power Dissipation vs. Ambient Temperature

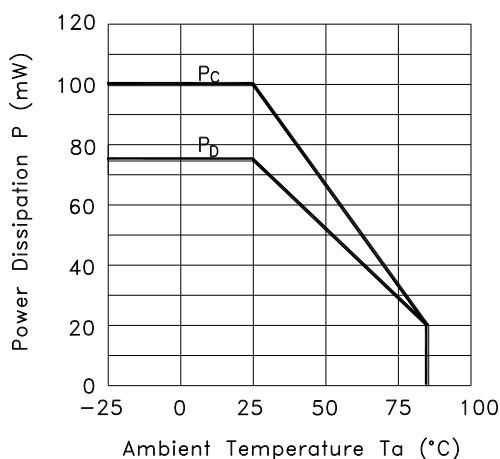


Fig.2 Forward Current vs. Forward Voltage

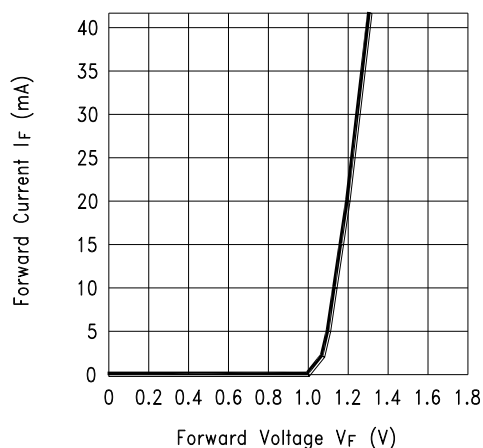


Fig.3 Collector Current vs. Collector-emitter Voltage

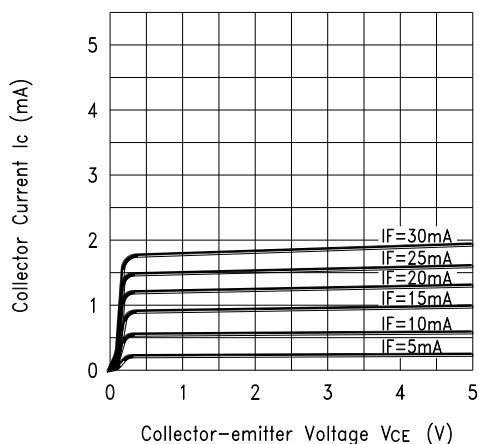
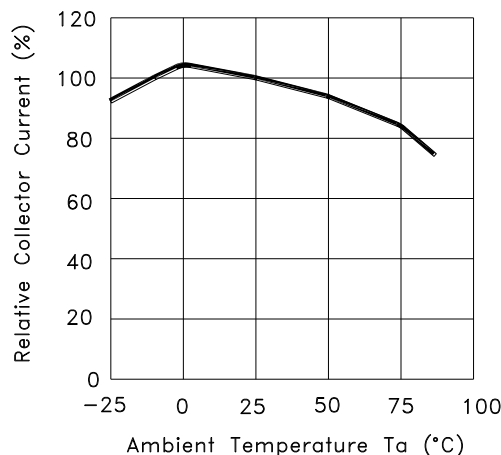


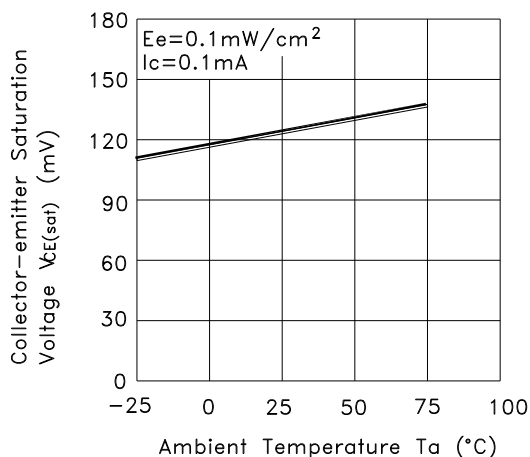
Fig.4 Collector Current vs. Ambient Temperature



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



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● **RELIABLE TEST ITEMS**

Reliable Test for RBS330210T

| | Test Item | Contents |
|---|-----------------------|---|
| 1 | IR Reflow | Peak temp.=255~260°C |
| 2 | Operating Temperature | -25°C ~ 85°C |
| 3 | Storage Temperature | -40°C ~ 85°C |
| 4 | Humidity | 40 °C / 95 %RH |
| 5 | Mechanical Life | 2Hz, horizontal 1,000,000 times |
| 6 | Electrical Life | I _F =20 mA, V _{CE} =5 V TIME: 30,000 hrs |

● **SOLDERING CONDITION**

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

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



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< Table of classification Reflow profile >

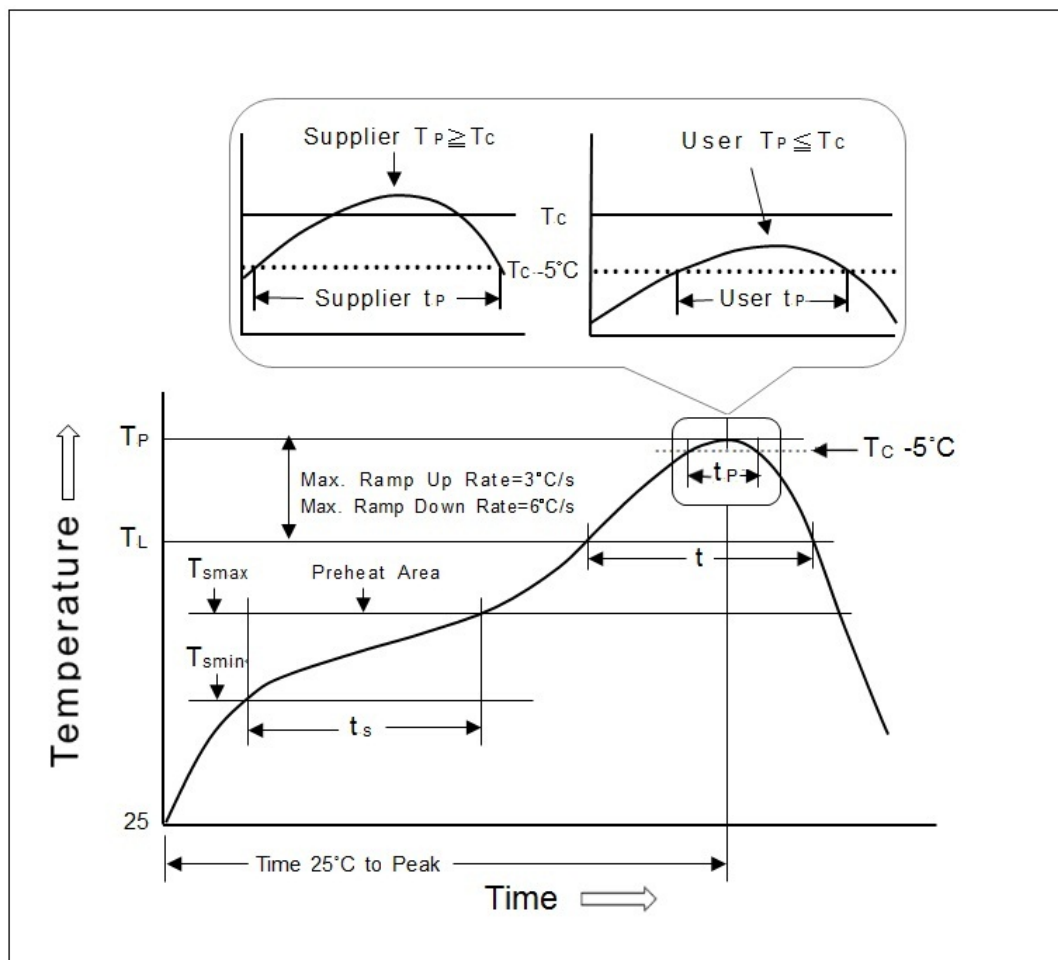
| Item | Pb process | Pb free process |
|---|----------------------------------|----------------------------------|
| Pre-heat and Soak Temperature min.(T _{min}) Temperature max.(T _{max}) Time (T _{min} to T _{max})(ts) | 100°C 150°C 60-120 seconds | 150°C 200°C 60-120 seconds |
| Average ram-up Rate (T _{max} to T _p) | 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 _p)* | 230°C ~235°C * | 255°C ~260°C * |
| Classification temperature(T _c) | 235°C | 260°C |
| Time(tp)** within 5 °C of the specified classification temperature (T _c) | 20** seconds | 30** seconds |
| Average ram-down Rate (T _p to T _{max}) | 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_p) 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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Fig. 2



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● PACKAGE

| | Part Number | Package | Quantity | Total | Dimension (mm) |
|----|-------------|-------------|----------|-----------|----------------|
| 1. | RBS330210T | Tape & Reel | 250 pcs | 250 pcs | φ330*25H |
| | | Inner Box | 2 Reels | 500 pcs | 355L*340W*68H |
| | | Carton | 10 Boxes | 5,000 pcs | 703L*364W*380H |

※ Package is shown as below for reference.

