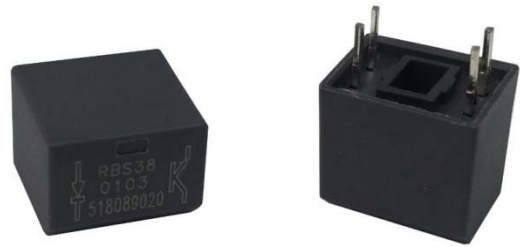


## Tilt Sensor Switch

|          |           |             |               |               |   |
|----------|-----------|-------------|---------------|---------------|---|
| Item No. | RBS380103 | Description | Photoelectric | Version       | 1 |
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### ● FUNCTIONS

1. Tilt Angles: 15° within a 360° radius
2. Suitable to vertical PCB
3. Vibration Detecting



### ● APPLICATIONS

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



## Tilt Sensor Switch

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### ● 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.

### ● PATENTS

1. Taiwan Patent No. M 450817
2. Taiwan Patent No. M 529259
3. Taiwan Patent No. I 553684
4. Taiwan Patent No. I 359430
5. Taiwan Patent No. I 584326
6. Taiwan Patent No. I 451463
7. Europe Patent No. EP 2157591
8. U.S.A Patent No.US 9,863,802 B2
9. China Patent No. ZL 200820126206.9
10. China Patent No. ZL 201620373881.6
11. China Patent No. ZL 201220539712.7
12. Japan Patent No. 3148127

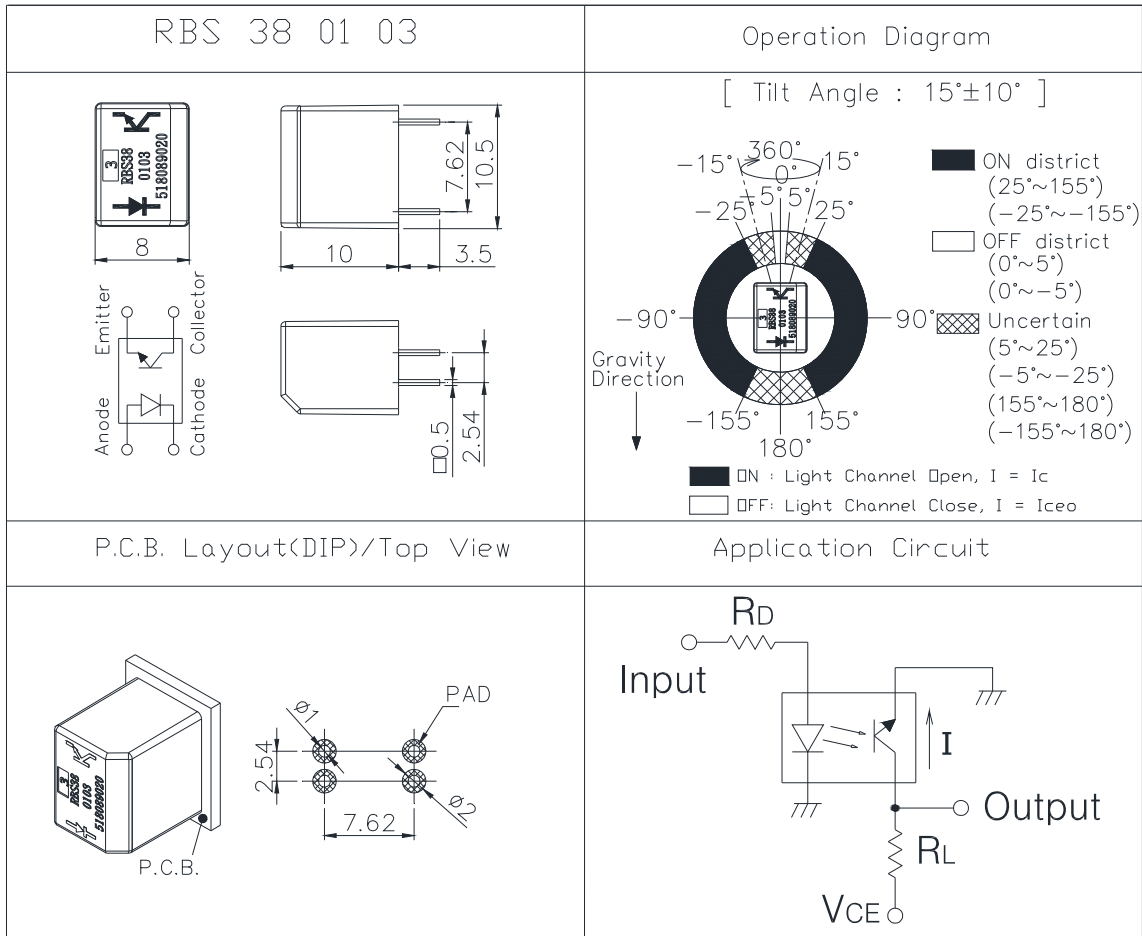


## Tilt Sensor Switch

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

Fig. 1



## Tilt Sensor Switch

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● Current/Voltage Suggested

| Input Current (mA) | Operating Voltage (V) | Conditions  |
|--------------------|-----------------------|---|
| 10                 | 3.3                   | $V_{CE}=3.3V$<br>$R_D=200\text{ ohm}$<br>$R_L=75K\text{ ohm}$ |
| 10                 | 5                     | $V_{CE}=5V$<br>$R_D=390\text{ ohm}$<br>$R_L=100K\text{ ohm}$  |

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

● Absolute Maximum Rating (  $T_a=25^{\circ}C$  )

| 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        | $I_{FP}$  | 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      |                             | $T_{opr}$ | -25~+85 | $^{\circ}C$ |
| Storage Temperature        |                             | $T_{stg}$ | -40~+85 | $^{\circ}C$ |
| Soldering Temperature (*1) |                             | $T_{sol}$ | 260     | $^{\circ}C$ |

(\*1) t=5 Sec



## Tilt Sensor Switch

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● Electrical Optical Characteristics (Ta=25°C)

| Parameter              | Symbol               | Condition                                 | Min. | Typ. | Max. | Unit            |
|------------------------|----------------------|---|------|------|------|-----------------|
| Forward Voltage        | $V_F$                | $I_F=20\text{mA}$                         | -    | 1.2  | 1.5  | V               |
| Reverse Current        | $I_R$                | $V_R=5\text{V}$                           | -    | -    | 10   | $\mu\text{A}$   |
| Peak Wavelength        | $\lambda_p$          | $I_F=10\text{mA}$                         |      | 940  |      | nm              |
| Dark Current           | $I_{ceo}$            | $V_{CE}=10\text{V}$                       | -    | -    | 2    | $\mu\text{A}$   |
| C-E Saturation Voltage | $V_{CE}(\text{sat})$ | $I_C=0.25\text{mA}$<br>$I_F=20\text{mA}$  | -    | -    | 0.4  | V               |
| Light Current          | $I_C$                | $V_{CE}=5\text{V}$<br>$I_F=20\text{mA}$   | 0.5  | 5    | -    | mA              |
| Rise Time              | $T_r$                | $I_C=0.8\text{mA}$<br>$V_{CC}=30\text{V}$ | -    | 5    | -    | $\mu\text{sec}$ |
| Fall Time              | $T_f$                | $R_L=1\text{K}\Omega$                     | -    | 5    | -    | $\mu\text{sec}$ |
| Operation Diagram      | $\theta$             | Fig.1                                     | 5    | 15   | 25   | $^\circ$        |



## Tilt Sensor Switch

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

Fig.1 Power Dissipation vs. Ambient Temperature

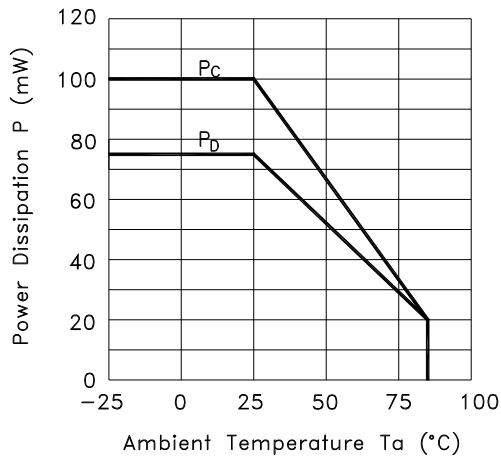


Fig.2 Forward Current vs. Forward Voltage

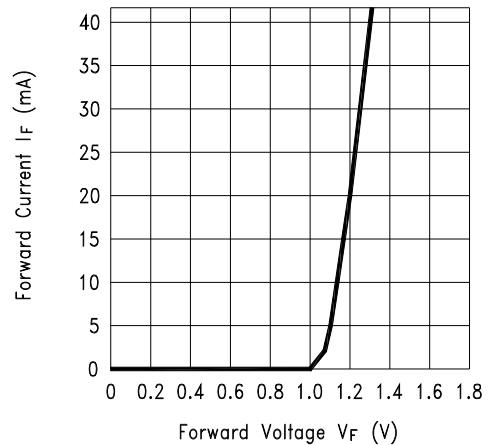


Fig.3 Collector Current vs. Collector-emitter Voltage

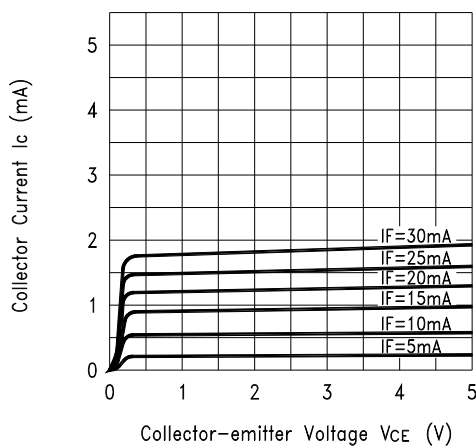
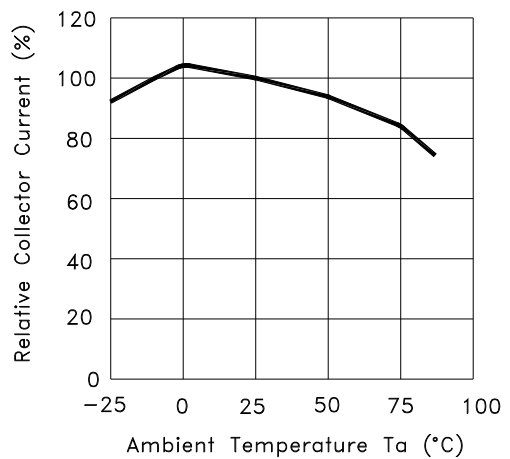


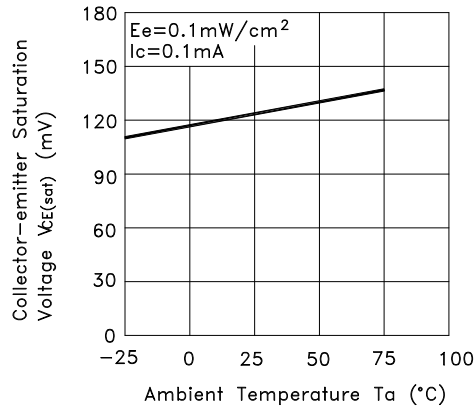
Fig.4 Collector Current vs. Ambient Temperature



## Tilt Sensor Switch

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



### ● RELIABLE TEST ITEMS

Reliable Test for RBS380103

|   | Test Item             | Test Content   |
|---|-----------------------|--|
| 1 | Operation Temperature | -25°C ~ 85°C   |
| 2 | Storage Temperature   | -40°C ~ 85°C   |
| 3 | Humidity              | 40 °C / 95 %RH   |
| 4 | Mechanical Life       | 2Hz, horizontal<br>1,000,000 times                           |
| 5 | Electrical Life       | $I_F=20\text{ mA}$ , $V_{CE}=5\text{ V}$<br>TIME: 30,000 hrs |



## Tilt Sensor Switch

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### ● SOLDERING CONDITION

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

| Condition<br>Suitable<br>Production<br>Process | Soldering<br>Temperature | Soldering Time   | Wattage of<br>Manual Soldering                           | Type |
|--|--------------------------|------------------|--|------|
| Wave Soldering                                 | 260±5°C                  | < 5 seconds max. | -  | DIP  |
| Manual Soldering                               | 300±5°C                  | < 3 seconds max. | 30W or<br>Temperature-<br>controlled manual<br>soldering | DIP  |

### ● PACKAGE

|    | Part Number | Package      | Quantity | Total      | Dimension(mm)  |
|----|-------------|--------------|----------|------------|----------------|
| 1. | RBS380103   | IC tube      | 48 pcs   | 48 pcs     | 525L*10W*17.5H |
|    |             | Inner box    | 84 tubes | 4,032 pcs  | 539L*130W*130H |
|    |             | Outer carton | 4 boxes  | 16,128 pcs | 551L*285W*288H |

※ Package shown as below for reference.

