

Detector Switch

2mm-thick Two-way Operation Type

SPVG Series



2mm thick two-way detection type suitable for Surface Mount Device.

Detector

Push

Slide

Rotary

Encoders

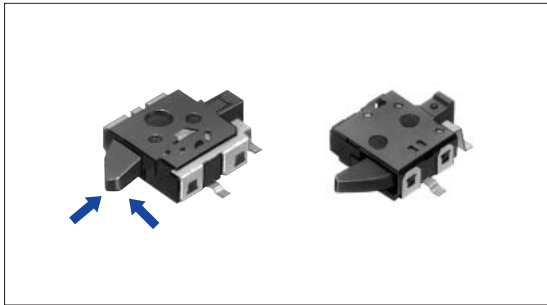
Power

Dual-in-line
Package Type

Multi Control
Devices

TACT Switch™

Custom-
Products



Features

- This is a compact detection switch that can be pressed vertically, horizontally or at an angle.
- Reflow solderable.
- This is a low-profile unit with a 2mm height from the mounting surface of a PC board.

Applications

- For preventing inadvertent overwriting of DVD recorders
- For detection mechanisms in car navigation systems, car audio systems, CD changers, CD-RW drives, and CD-ROM drives
- For detecting the position of lids of laptop PCs and personal digital assistants

Typical Specifications

| Items | | Specifications |
|---|--------------|------------------------------|
| Rating (max.) / (min.) (Resistive load) | | 50mA 20V DC/100μA 3V DC |
| Contact resistance (Initial performance/After lifetime) | | 500mΩ max./1Ω max. |
| Operating force | | 0.4N max. |
| Operating life | Without load | 100,000 cycles |
| | With load | 100,000 cycles (50mA 20V DC) |

Products Line

| Poles | Positions | Terminal style | Lever length | Control direction | Location lug | Side terminal | Products No. | Drawing No. |
|---------|------------------|-----------------------|--------------------|-------------------|--------------|--------------------|--------------|-------------|
| 1 | 1 | For PC board (Reflow) | Standard | Right | With | With both sides. | SPVG110301 | 1 |
| | | | | | | With a right side. | SPVG111500 | 2 |
| | | | | | | With a left side. | SPVG111400 | 3 |
| | | | | Without | SPVG120302 | 4 | | |
| | | | | Left | With | Without | SPVG130200 | 1 |
| | | | | | | With both sides. | SPVG210302 | 5 |
| | | | With a right side. | | | SPVG211200 | 6 | |
| | | | Short | Right | With | With a left side. | SPVG211300 | 7 |
| | | | | | | Without | SPVG220300 | 8 |
| | | | | | | Without | SPVG230200 | 5 |
| | | | | Left | With | With both sides. | SPVG310300 | 9 |
| | | | | | | Without | SPVG320200 | 10 |
| Without | SPVG330200 | 9 | | | | | | |
| Without | With both sides. | SPVG410300 | 11 | | | | | |
| | Without | SPVG420200 | 12 | | | | | |
| | Without | SPVG430200 | 11 | | | | | |

For other specifications, see P.60
For specifications for the taping package, see P.73

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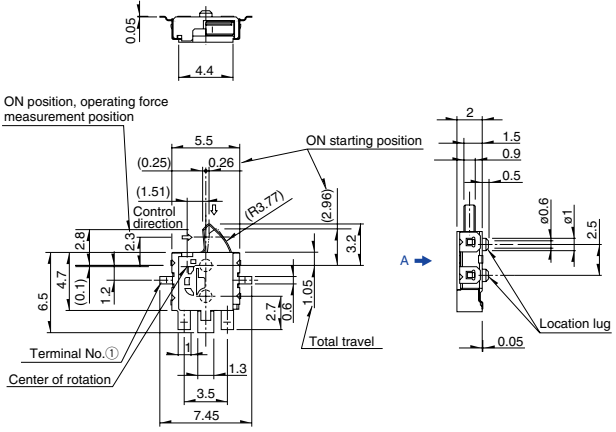
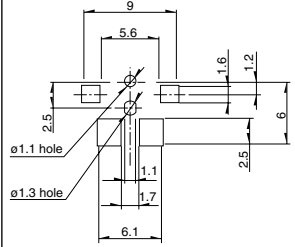

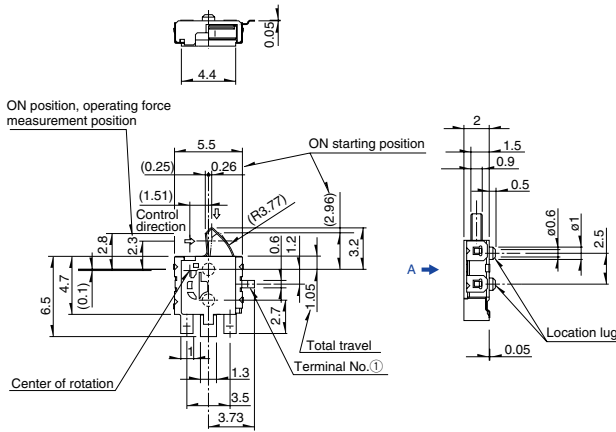
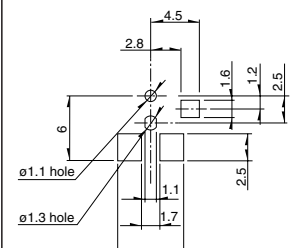

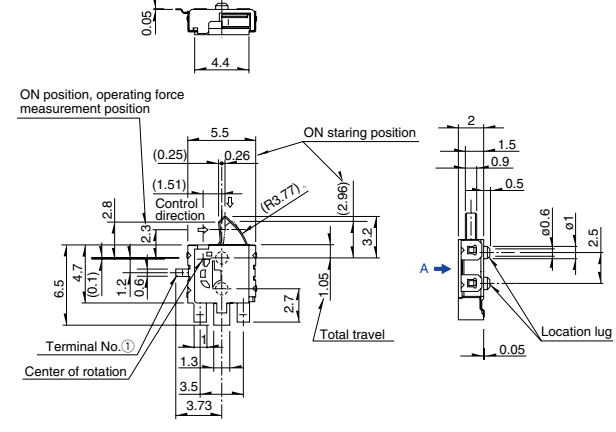
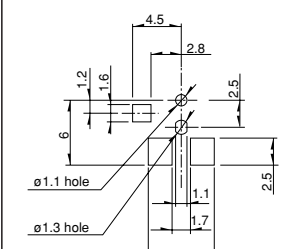
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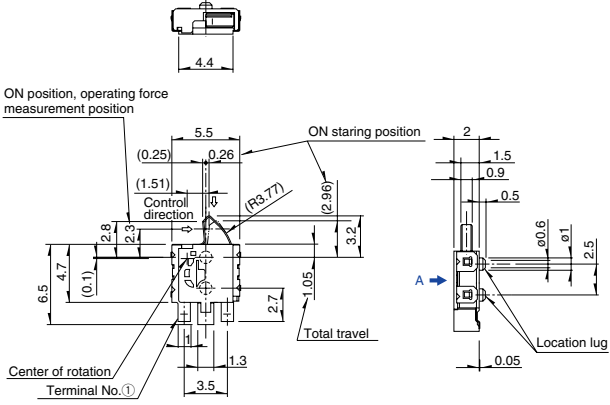
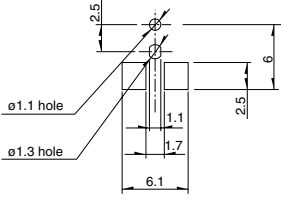

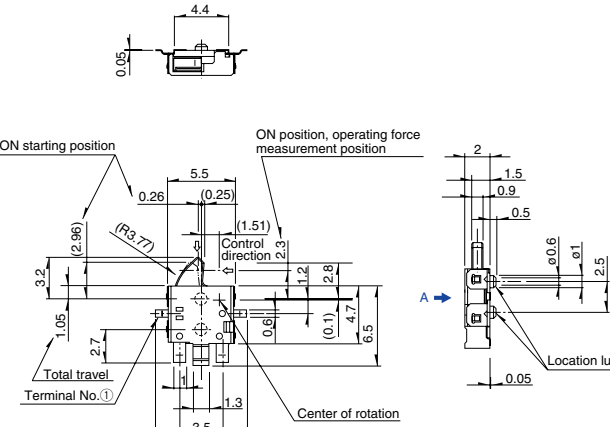
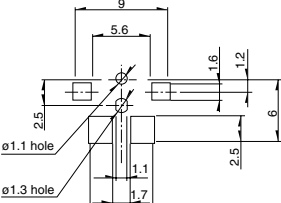

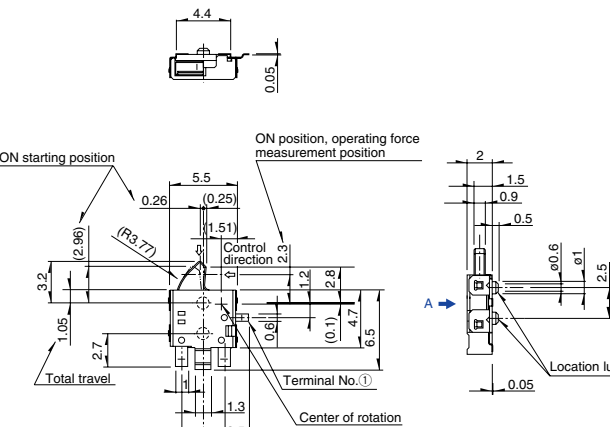
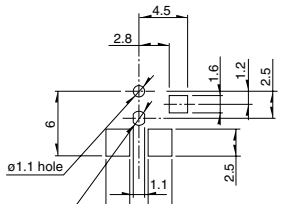
| | Dimensions | | | Unit:mm |
|-----|---|--|---|---------|
| No. | Photo | Style | PC board mounting hole dimensions | |
| 1 |  |  |  | |
| 2 |  |  |  | |
| 3 |  |  |  | |

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Dimensions

Unit:mm

| No. | Photo | Style | PC board mounting hole dimensions |
|-----|---|---|---|
| 4 | <p>Right operation type</p>  |  <p>ON position, operating force measurement position</p> <p>ON starting position</p> <p>Control direction</p> <p>Total travel</p> <p>Center of rotation</p> <p>Terminal No.①</p> <p>Location lug</p> |  <p>ø1.1 hole</p> <p>ø1.3 hole</p> |
| 5 | <p>Left operation type</p>  |  <p>ON starting position</p> <p>ON position, operating force measurement position</p> <p>Control direction</p> <p>Total travel</p> <p>Terminal No.①</p> <p>Center of rotation</p> <p>Location lug</p> |  <p>ø1.1 hole</p> <p>ø1.3 hole</p> |
| 6 | <p>Left operation type</p>  |  <p>ON starting position</p> <p>ON position, operating force measurement position</p> <p>Control direction</p> <p>Total travel</p> <p>Terminal No.①</p> <p>Center of rotation</p> <p>Location lug</p> |  <p>ø1.1 hole</p> <p>ø1.3 hole</p> |

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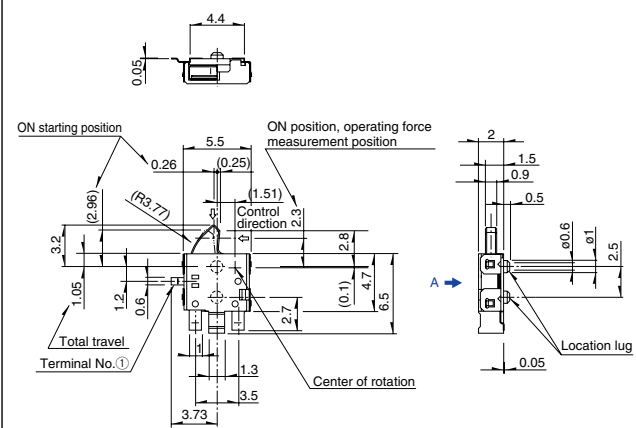
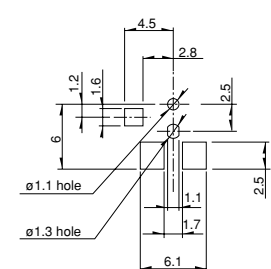

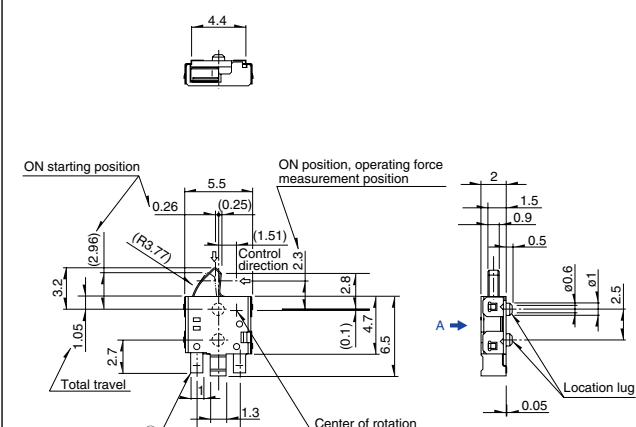
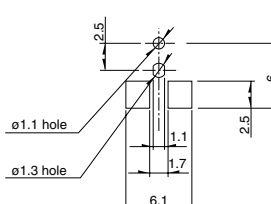

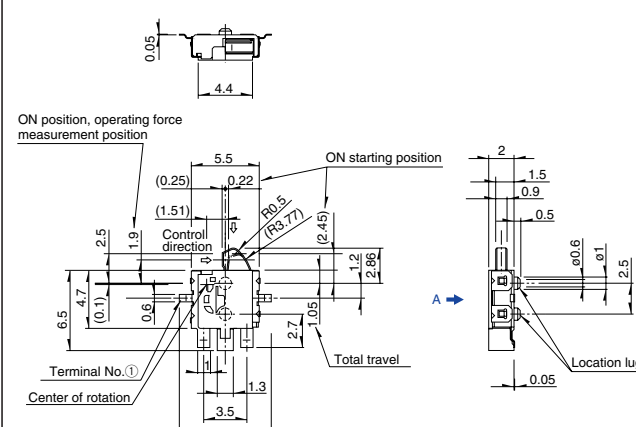
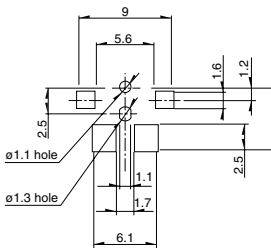
Power

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| | Dimensions | | Unit:mm |
|-----|--|---|---|
| No. | Photo | Style | PC board mounting hole dimensions |
| 7 |  <p style="text-align: center;">Left operation type</p> |  <p style="text-align: center;">Left operation type</p> |  |
| 8 |  <p style="text-align: center;">Left operation type</p> |  <p style="text-align: center;">Left operation type</p> |  |
| 9 |  <p style="text-align: center;">Right operation type</p> |  <p style="text-align: center;">Right operation type</p> |  |

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外形図

Unit:mm

Detector

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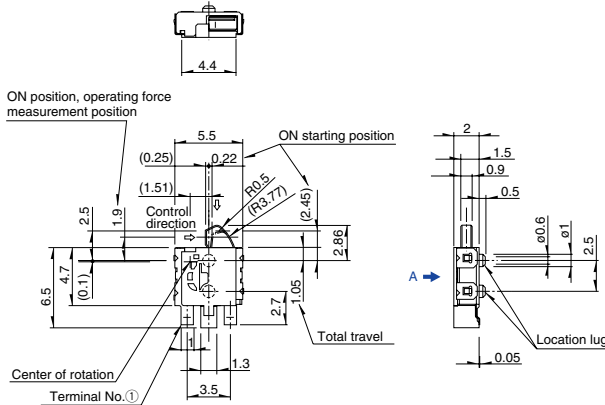
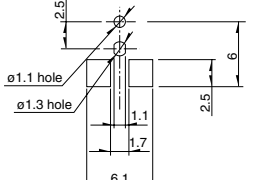

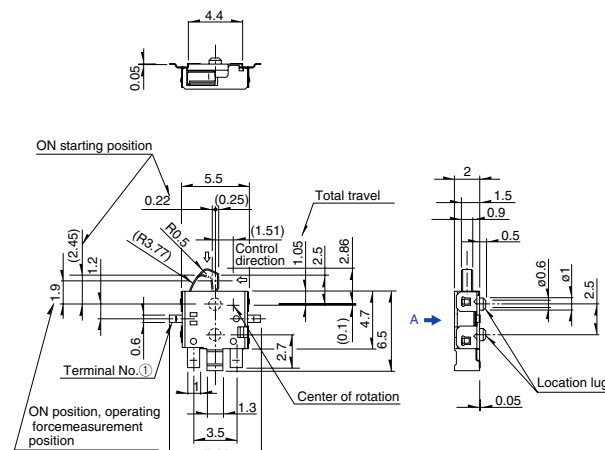
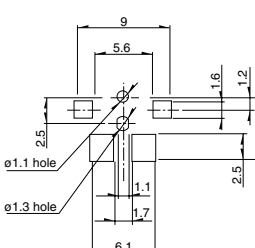

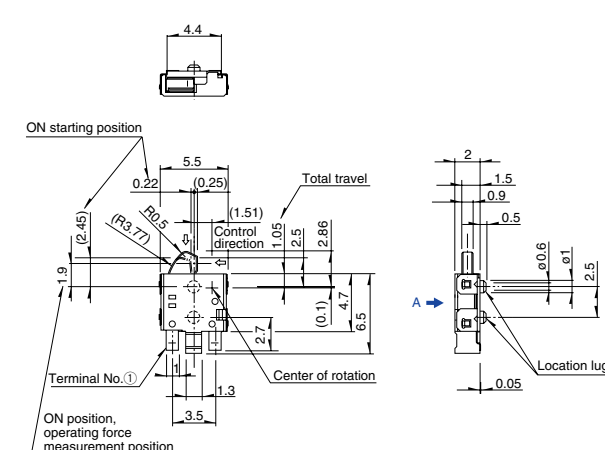
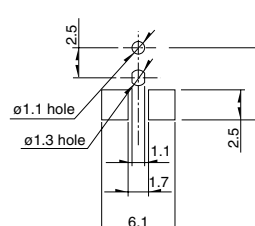
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| No. | Photo | Style | PC board mounting hole dimensions |
|-----|---|---|---|
| 10 |  |  <p>ON position, operating force measurement position</p> <p>ON starting position</p> <p>Control direction</p> <p>Total travel</p> <p>Center of rotation</p> <p>Terminal No.①</p> |  <p>ø1.1 hole</p> <p>ø1.3 hole</p> |
| 11 |  |  <p>ON starting position</p> <p>ON position, operating force measurement position</p> <p>Control direction</p> <p>Total travel</p> <p>Center of rotation</p> <p>Terminal No.①</p> |  <p>ø1.1 hole</p> <p>ø1.3 hole</p> |
| 12 |  |  <p>ON starting position</p> <p>ON position, operating force measurement position</p> <p>Control direction</p> <p>Total travel</p> <p>Center of rotation</p> <p>Terminal No.①</p> |  <p>ø1.1 hole</p> <p>ø1.3 hole</p> |

Note

Only the configurations with location lug are indicated in the dimensions.

Detector

Push

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Power

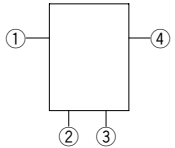
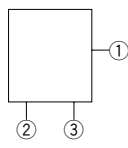
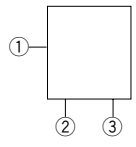
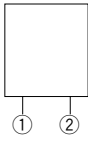
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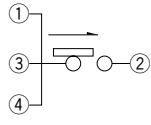
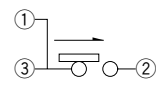
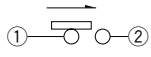
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Terminal Layout (Viewed from Direction A)

| | |
|---|--|
| <p>Drawing No. : 1, 5, 9, 11</p>  | <p>Drawing No. : 2, 6</p>  |
| <p>Drawing No. : 3, 7</p>  | <p>Drawing No. : 4, 8, 10, 12</p>  |

Circuit Diagram

| | |
|--|--|
| <p>Drawing No. : 1, 5, 9, 11</p>  | <p>Drawing No. : 2, 3, 6, 7</p>  |
| <p>Drawing No. : 4, 8, 10, 12</p>  | |

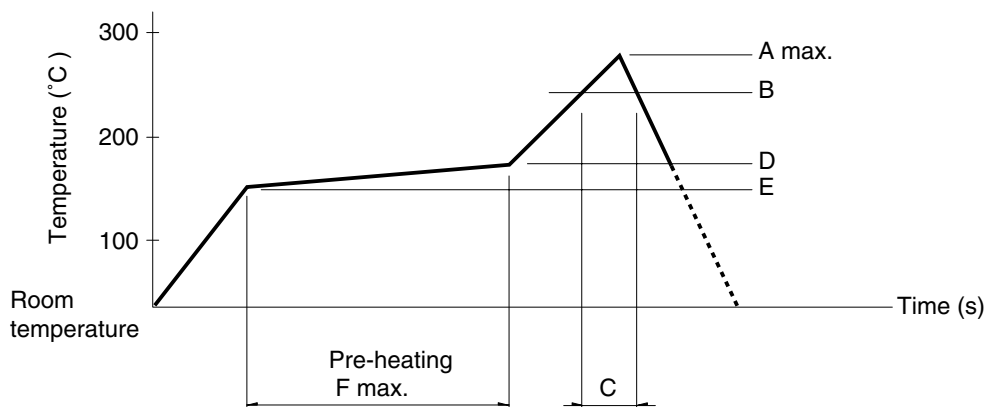
Products Specifications

| Items | | Series | | | | | | | | | | | |
|---------------------------|--------------------------------|----------------------------|--|--|---|------------------|--|--|---|--|--|--|--|
| | | SPVP | SPVC1 | SPVN | SPVS | SPVG | SSCW | SPVL | SPVQ1 | SPVQ3 | SPVQ4 | SSCN | |
| Detector | Operating temperature range | -10°C to +60°C | | | | | -40°C to +85°C | -10°C to +60°C | -40°C to +85°C | | | | |
| | Rating (max.) (Resistive load) | 1mA 5V DC | 10mA 16V DC | 1mA 5V DC | | 50mA 20V DC | 0.1A 12V DC | 1mA 5V DC | 0.1A 12V DC | | | | |
| Push | Electrical performance | Initial contact resistance | | 5 Ω max. | 1 Ω max. | 2 Ω max. | | 500mΩ max. | | 2 Ω max. | | 500mΩ max. | |
| Slide | | Insulation resistance | | 100MΩ min. 100V DC | | | | 100MΩ min. 250V DC | 100MΩ min. 100V DC | 100MΩ min. 500V DC | | | |
| Rotary | | Voltage proof | | 100V AC for 1 min. | | | | 250V AC for 1 min. | 100V AC for 1 min. | 500V AC for 1 min. | | | |
| Encoders | Mechanical performance | Robustness of terminal | | 0.5N for 1 min. | 3N for 1 min. | 0.5N for 1 min. | | — | 1N for 1 min. | 3N for 1 min. | | | |
| Power | | Robustness of actuator | | 5N | 10N | 5N | 10N | 20N | 5N | 20N | | 10N | |
| Dual-in-line Package Type | | Vibration | | 10 to 55 to 10Hz/min., the amplitude is 1.5mm for all the frequencies, in the 3 direction of X, Y and Z for 2 hours respectively | | | | | | | | | |
| Multi Control Devices | Resistance to soldering heat | Manual soldering | | 350±5°C, 3s max. | 350±10°C, 3 ⁺¹ s | 350±5°C, 3s max. | | — | 350±5°C, 3s max. | 300±10°C, 3 ⁺¹ s | | | |
| TACT Switch™ | | Dip soldering | | — | 260±5°C, 3s max. | — | | — | — | 260±5°C, 5±1s | | — | |
| Custom-Products | | Reflow soldering | | Please see P.72 | — | Please see P.72 | | — | Please see P.72 | — | | | |
| Durability | Operating life without load | | 50,000 cycles 10Ω max. | 25,000 cycles 2Ω max. | 50,000 cycles 5Ω max. | | 100,000 cycles 1Ω max. | | 50,000 cycles 5Ω max. | 300,000 cycles 1Ω max. | 300,000 cycles or 1,000,000 cycles 1Ω max. | 300,000 cycles 1Ω max. | 100,000 cycles 1Ω max. |
| | Operating life with load | | (1mA 5V DC) 50,000 cycles 10Ω max. | (10mA 16V DC) 25,000 cycles 2Ω max. | (1mA 5V DC) 50,000 cycles 5Ω max. | | (50mA 20V DC) 100,000 cycles 1Ω max. | (0.1A 12V DC) 100,000 cycles 1Ω max. | (1mA 5V DC) 50,000 cycles 5Ω max. | (0.1A 12V DC) 300,000 cycles 1Ω max. | (0.1A 12V DC) 300,000 cycles or 1,000,000 cycles 1Ω max. | (0.1A 12V DC) 300,000 cycles 1Ω max. | (0.1A 12V DC) 100,000 cycles 1Ω max. |
| Environmental performance | Cold | | -20±2°C for 96h | | | | -40±2°C for 96h | -40±2°C for 500h | -20±2°C for 96h | -40±2°C for 500h | | | |
| | Dry heat | | 85±2°C for 96h | | | | 85±2°C for 500h | | 85±2°C for 96h | 85±2°C for 500h | | | |
| | Damp heat | | 40±2°C, 90 to 95%RH for 96h | | | | 60±2°C, 90 to 95%RH for 500h | 40±2°C, 90 to 95%RH for 96h | 60±2°C, 90 to 95%RH for 500h | | | | |

Soldering Conditions

Example of Reflow Soldering Condition

1. Heating method: Double heating method with infrared heater.
2. Temperature measurement: Thermocouple 0.1 to 0.2 φ CA (K) or CC (T) at soldering portion (copper foil surface). A heat resisting tape should be used for fixed measurement.
3. Temperature profile



| Series (Reflow type) | A (°C) 3s max. | B (°C) | C (s) | D (°C) | E (°C) | F (s) |
|----------------------|-------------------|--------|-------|--------|--------|-------|
| SPPB | 250 | 230 | 40 | | | |
| SPPW8 | | 200 | 20 | | | |
| SPVE | 260 | 230 | 40 | 180 | 150 | 120 |
| SPVG | | | | | | |
| SPVL | | | | | | |
| SPVM | | | | | | |
| SPVN | | | | | | |
| SPVP | | | | | | |
| SPVR | | | | | | |
| SPVS | | | | | | |
| SSCM | | | | | | |
| SPPY5 | | | | | | |

Notes

1. The condition mentioned above is the temperature on the mounting surface of a PC board. There are cases where the PC board's temperature greatly differs from that of the switch, depending on the PC board's material, size, thickness, etc. The above-stated conditions shall also apply to switch surface temperatures.
2. As the conditions vary some how depending on the kind of reflow soldering equipment, please make sure you have the right one before use.

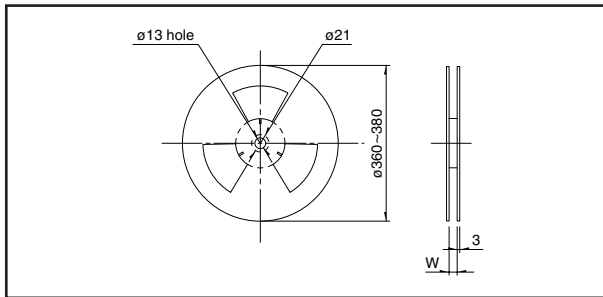
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Taping Specifications

Taping Packaging

Reel Size

Unit:mm



| Series | | Number of packages (pcs.) | | | Reel width W (mm) | Tape width (mm) |
|--------|-------------------|---------------------------|------------------|------------------------|-------------------|-----------------|
| | | 1 reel | 1 case/ domestic | 1 case/ export packing | | |
| SPPB | 53 (Horizontal) | 1,500 | 3,000 | 6,000 | 24.4 | 24 |
| | 53 (Vertical) | 600 | 1,200 | 2,400 | | |
| | 63, 64 | 1,300 | 2,600 | 5,200 | | |
| SPPW81 | h = 6.1 (Reflow) | 1,000 | 2,000 | 4,000 | 12.4 | 12 |
| | h = 6.55 (Reflow) | | | | | |
| | h = 7.6 (Reflow) | 850 | 1,700 | 3,400 | | |
| SPVE | Standard | h=3.8 | 2,800 | 5,600 | 16.4 | 16 |
| | | h=4.1 | | | | |
| | | h=4.8 | 2,200 | 4,400 | | |
| | | h=5.2 | 2,000 | 4,000 | | |
| | | h=5.5 | | | | |
| | Low-profile | h=3.3 | 2,800 | 5,600 | | |
| SPVG | | 2,500 | 5,000 | 10,000 | 44.4 | 44 |
| SPVL | | 5,000 | 10,000 | 20,000 | | |
| SPVM | | 3,000 | 6,000 | 12,000 | | |
| SPVN | | 5,000 | 10,000 | 20,000 | | |
| SPVP | | 4,500 | 9,000 | 18,000 | | |
| SPVR | | 2,500 | 5,000 | 10,000 | | |
| SPVS | | 5,000 | 10,000 | 20,000 | | |
| SSCM | | 3,000 | 6,000 | 12,000 | | |
| SPPY5 | | 550 | 1,650 | 3,300 | | |

Note

Order products in N minimum packing units (1 reel or 1 case).

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