

# Compact Two-way Operation Type Detector Switch

SPVM Series

**Compact detector switch. 2-direction-press, horizontal and vertical pressings, available. Measures only 3.5×2.8mm and 1.5mm high.**

Power

Push

Slide

Rotary

Encoders

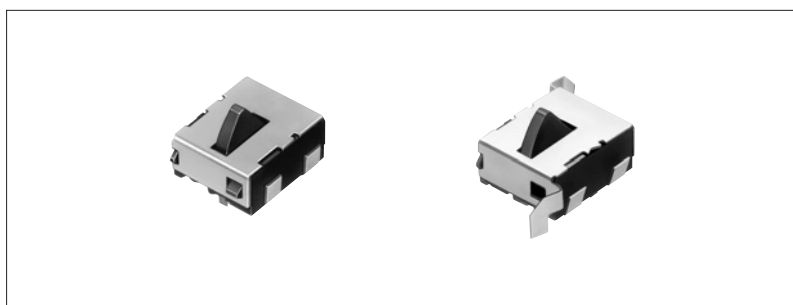
**Detector**

Dual-in-line  
Package Type

Multi Control  
Devices

TACT

Custom-  
Products



Car Use

## Features

- Double-sided sliding contact provides high reliability.
- Suitable for reflow-soldering.

## Applications

- For detecting lids of mobile phones, PDAs and DSCs
- For detection mechanisms in devices, including DVD players, portable CD/MD players, and digital camcorders
- For switching modes of mobile phones and DSCs
- For detecting the insertion of IC cards
- For detecting media including CD-ROMs and Floppy disk drives

## Typical Specifications

| Items                                                      |              | Specifications            |
|------------------------------------------------------------|--------------|---------------------------|
| Rating (max.) (Resistive load.)                            |              | 1mA 5V DC                 |
| Contact resistance<br>(Initial performance/After lifetime) |              | 2Ω max./5Ω max.           |
| Operating force                                            |              | 0.4N max.                 |
| Operating life                                             | Without load | 50,000 cycles             |
|                                                            | With load    | 50,000 cycles (1mA 5V DC) |

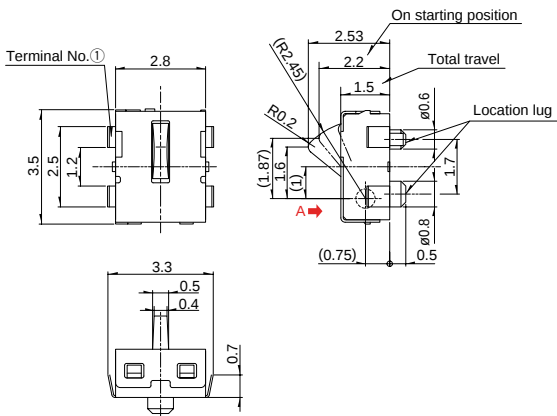
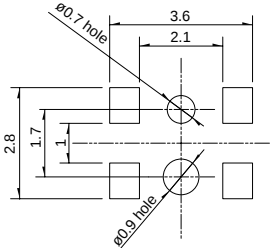
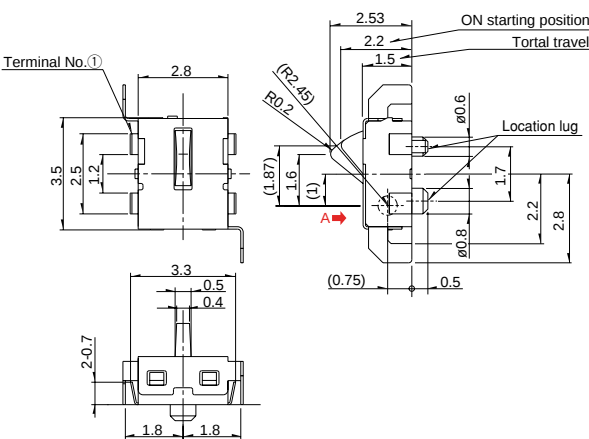
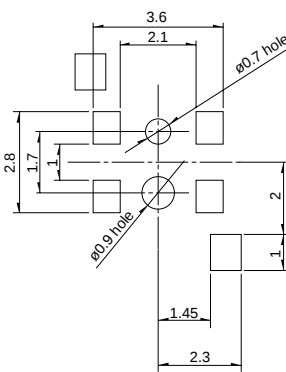
## Products Line

| Poles | Positions | Terminal style        | Housing          | Location lug | Minimum packing unit (pcs.) | Products No. | Drawing No. |
|-------|-----------|-----------------------|------------------|--------------|-----------------------------|--------------|-------------|
| 1     | 1         | For PC board (Reflow) | Without terminal | With         | 3,000                       | SPVM110100   | 1           |
|       |           |                       |                  | Without      |                             | SPVM110200   |             |
|       |           |                       | With terminal    | With         |                             | SPVM210100   | 2           |
|       |           |                       |                  | Without      |                             | SPVM210200   |             |

## Note

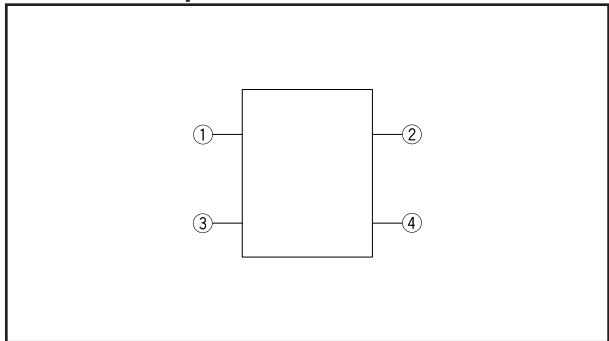
If you are using the solder terminals on the frame as earth terminals, please place the 3rd and 4th terminals on the same ground.

For other detailed specifications, see **P.303**  
For specifications for the taping package, see **P.307**

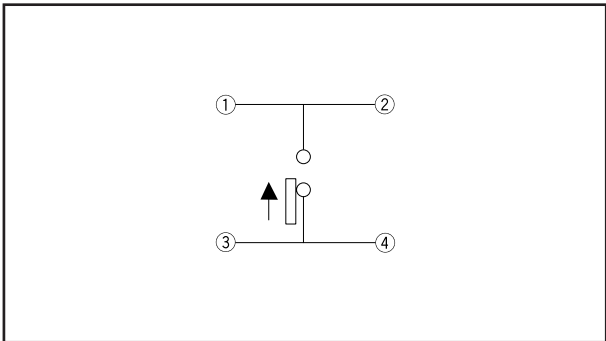
| Dimensions |                                                                                     |                                                                                       | Unit:mm |
|------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------|
| No.        | Style                                                                               | PC board mounting hole dimensions<br>(Viewed from switch mounting face )              |         |
| 1          |    |    |         |
| 2          |  |  |         |

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

Terminal Layout (Viewed from Direction A)



Circuit Diagram



- Power
- Push
- Slide
- Rotary
- Encoders
- Detector**
- Dual-in-line Package Type
- Multi Control Devices
- TACT
- Custom-Products

# Products Specifications

| Series                            |                              | SPPB                                      | SPVE                                                                                                                             | SPPW8                                      | SPVM                                    | SPVR               | SPVP                                     | SPVN                                    | SPVG                                       | SPVL                                    | SSCM               |  |
|-----------------------------------|------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------|--------------------|------------------------------------------|-----------------------------------------|--------------------------------------------|-----------------------------------------|--------------------|--|
| Items                             |                              |                                           |                                                                                                                                  |                                            |                                         |                    |                                          |                                         |                                            |                                         |                    |  |
| Operating temperature range       |                              | -10℃ to +60℃                              |                                                                                                                                  |                                            |                                         |                    |                                          |                                         |                                            |                                         |                    |  |
| Rating (max.)<br>(Resistive load) |                              | 0.1A<br>30V DC                            | 0.1A<br>12V DC                                                                                                                   | 0.1A<br>30V DC                             | 1mA 5V DC                               |                    |                                          |                                         | 50mA<br>20V DC                             | 1mA 5V DC                               |                    |  |
| Electrical performance            | Initial contact resistance   | 1 Ω max.                                  | 500mΩ max.                                                                                                                       | 1 Ω max.                                   | 2 Ω max.                                | 3 Ω max.           | 5 Ω max.                                 | 2 Ω max.                                | 500mΩ max.                                 | 2 Ω max.                                |                    |  |
|                                   | Insulation resistance        | 100MΩ min.<br>100V DC                     |                                                                                                                                  |                                            |                                         |                    |                                          |                                         |                                            |                                         |                    |  |
|                                   | Voltage proof                | 100V AC<br>for 1 min.                     |                                                                                                                                  |                                            |                                         |                    |                                          |                                         |                                            |                                         |                    |  |
| Mechanical performance            | Robustness of terminal       | 3N<br>for 1 min.                          | 0.5N<br>for 1 min.                                                                                                               | 3N<br>for 1 min.                           | 1N<br>for 1 min.                        | 0.5N<br>for 1 min. |                                          |                                         |                                            | 1N<br>for 1 min.                        | 0.5N<br>for 1 min. |  |
|                                   | Robustness of actuator       | 10N                                       | 5N                                                                                                                               | 10N                                        | 5N                                      | 2N                 | 5N                                       |                                         | 10N                                        | 5N                                      | 0.5N               |  |
|                                   | 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 |                                            |                                         |                    |                                          |                                         |                                            |                                         |                    |  |
|                                   | Resistance to soldering heat | Manual soldering                          | 300±5℃,<br>5s max.                                                                                                               | 350±5℃,<br>3s max.                         |                                         |                    |                                          |                                         |                                            |                                         |                    |  |
|                                   |                              | Dip soldering                             | 260±5℃,<br>5±1s                                                                                                                  | —                                          | 255±5℃,<br>5±1s                         | —                  |                                          |                                         |                                            |                                         |                    |  |
|                                   |                              | Reflow soldering                          | Please see P.306                                                                                                                 |                                            |                                         |                    |                                          |                                         |                                            |                                         |                    |  |
| Durability                        | Operating life without load  | 50,000 cycles<br>2Ω max.                  | 50,000 cycles<br>1Ω max.                                                                                                         | 100,000 cycles<br>2Ω max.                  | 50,000 cycles<br>5Ω max.                |                    | 50,000 cycles<br>10Ω max.                | 50,000 cycles<br>5Ω max.                | 100,000 cycles<br>1Ω max.                  | 50,000 cycles<br>5Ω max.                |                    |  |
|                                   | Operating life with load     | (0.1A 30V DC)<br>50,000 cycles<br>2Ω max. | (0.1A 12V DC)<br>50,000 cycles<br>1Ω max.                                                                                        | (0.1A 30V DC)<br>100,000 cycles<br>2Ω max. | (1mA 5V DC)<br>50,000 cycles<br>5Ω max. |                    | (1mA 5V DC)<br>50,000 cycles<br>10Ω max. | (1mA 5V DC)<br>50,000 cycles<br>5Ω max. | (50mA 20V DC)<br>100,000 cycles<br>1Ω max. | (1mA 5V DC)<br>50,000 cycles<br>5Ω max. |                    |  |
| Environmental performance         | Cold                         | -20±2℃<br>for 96h                         | -25±2℃<br>for 96h                                                                                                                | -20±2℃<br>for 96h                          |                                         |                    |                                          |                                         | -40±2℃<br>for 96h                          | -20±2℃<br>for 96h                       |                    |  |
|                                   | Dry heat                     | 85±2℃ for 96h                             |                                                                                                                                  |                                            |                                         |                    |                                          |                                         |                                            |                                         |                    |  |
|                                   | Damp heat                    | 40±2℃, 90 to 95%RH for 96h                |                                                                                                                                  |                                            |                                         |                    |                                          |                                         |                                            |                                         |                    |  |

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Devices

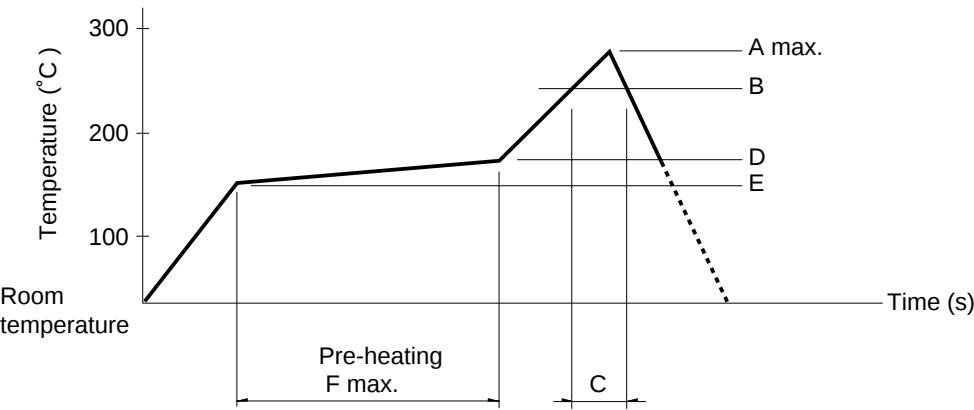
TACT

Custom-  
Products

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)<br>3s max. | B (°C) | C (s) | D (°C) | E (°C)           | F (s) |
|----------------------|-------------------|--------|-------|--------|------------------|-------|
| SPPB                 | 250               | 230    | 40    | 180    | 150              | 120   |
| SPVE                 | 260               |        |       |        |                  |       |
| SPPW8                | 250               | 200    | 20    |        |                  |       |
| SPVM                 | 260               | 230    | 40    |        |                  |       |
| SPVR                 |                   |        |       |        |                  |       |
| SPVP                 |                   |        |       |        |                  |       |
| SPVN                 |                   |        |       |        |                  |       |
| SPVG                 |                   |        |       |        |                  |       |
| SPVL                 |                   |        |       |        |                  |       |
| SSCM                 |                   |        |       |        |                  |       |
| SPPY5                | 240               |        | 20    | 150    | Room Temperature | 180   |

Notes

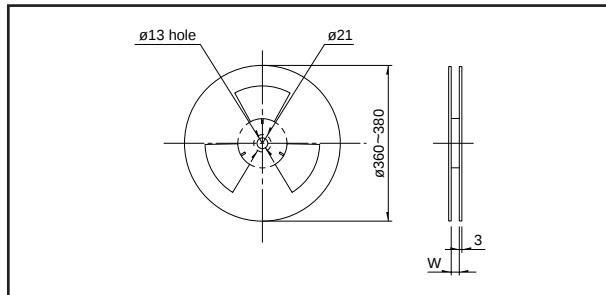
1. The condition mentioned above is the temperature on the mounting surface of a PC board. There are cases where the PC board's temperature greatly differs from that of the switch, depending on the PC board's material, size, thickness, etc. The above-stated conditions shall also apply to switch surface 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.

# Taping Specifications

## Taping Packaging

Reel Size

Unit:mm



| Series            |                 |                  | Number of packages (pcs.) |                 |                       | Reel width<br>W (mm) | Tape width<br>(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                 |                      |                    |
| SPVE              | Standard        | h=3.8            | 2,800                     | 5,600           | 22,400                | 12.4                 | 12                 |
|                   |                 | h=4.1            |                           |                 |                       |                      |                    |
|                   |                 | h=4.8            | 2,200                     | 4,400           | 17,600                |                      |                    |
|                   |                 | h=5.2            | 2,000                     | 4,000           |                       |                      |                    |
|                   |                 | h=5.5            |                           |                 |                       |                      |                    |
|                   | Low-profile     | h=3.3            | 2,800                     | 5,600           | 22,400                |                      |                    |
|                   |                 | h=4.75           | 2,000                     | 4,000           | 16,000                |                      |                    |
|                   | SPPW81          | h = 6.1 (Reflow) |                           | 1,000           | 2,000                 |                      |                    |
| h = 6.55 (Reflow) |                 |                  |                           |                 |                       |                      |                    |
| h = 7.6 (Reflow)  |                 | 850              | 1,700                     | 3,400           |                       |                      |                    |
| SPVM              |                 |                  | 3,000                     | 6,000           | 12,000                | 16.4                 | 16                 |
| SPVR              |                 |                  | 2,500                     | 5,000           | 10,000                |                      |                    |
| SPVP              |                 |                  | 4,500                     | 9,000           | 18,000                |                      |                    |
| SPVN              |                 |                  | 5,000                     | 10,000          | 20,000                |                      |                    |
| SPVG              |                 |                  | 2,500                     | 5,000           | 10,000                |                      |                    |
| SPVL              |                 |                  | 5,000                     | 10,000          | 20,000                |                      |                    |
| SSCM              |                 |                  | 3,000                     | 6,000           | 12,000                |                      |                    |
| SPPY5             |                 |                  | 550                       | 1,650           | 3,300                 | 44.4                 | 44                 |

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### Note

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