



Typical Specifications

| Items   |              | Specifications           |
|---|--------------|--------------------------|
| Rating (max.)/(min.) (Resistive load)               |              | 1mA 5V DC / 50μA 3V DC   |
| Contact resistance (Initial / After operating life) |              | 2Ω max. / 5Ω max.        |
| Operating force                                     |              | 0.35N max.               |
| Operating life                                      | Without load | 50,000cycles             |
|   | With load    | 50,000cycles (1mA 5V DC) |

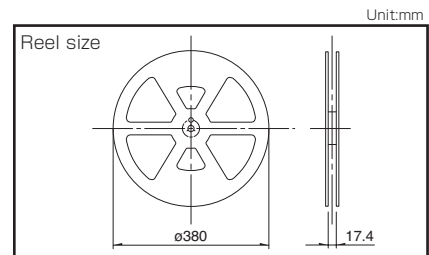
Product Line

| Poles | Positions | Terminal type         | Lever length | Operating direction | Location lug | Minimum order unit (pcs) |        | Product No.       | Drawing No. |
|-------|-----------|-----------------------|--------------|---------------------|--------------|--------------------------|--------|-------------------|-------------|
|       |           |                       |              |                     |              | Japan                    | Export |                   |             |
| 1     | 1         | For PC board (Reflow) | Standard     | Right               | With         | 5,000                    | 20,000 | <b>SPVN110107</b> | 1           |
|       |           |                       |              |                     | Without      |                          |        | <b>SPVN120104</b> |             |
|       |           |                       |              | Left                | With         |                          |        | <b>SPVN210106</b> | 2           |
|       |           |                       |              |                     | Without      |                          |        | <b>SPVN220103</b> |             |
|       |           |                       | Long         | Right               | With         |                          |        | <b>SPVN310101</b> | 3           |
|       |           |                       |              |                     | Without      |                          |        | <b>SPVN320101</b> |             |
|       |           |                       |              | Left                | With         |                          |        | <b>SPVN410101</b> | 4           |
|       |           |                       |              |                     | Without      |                          |        | <b>SPVN420101</b> |             |

Packing Specifications

Taping

| Number of packages (pcs.) |               |                        | Tape width (mm) | Export package measurements (mm) |
|---------------------------|---------------|------------------------|-----------------|----------------------------------|
| 1 reel                    | 1 case /Japan | 1 case /export packing |                 |                                  |
| 5,000                     | 10,000        | 20,000                 | 16              | 417×409×139                      |

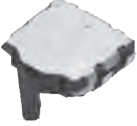
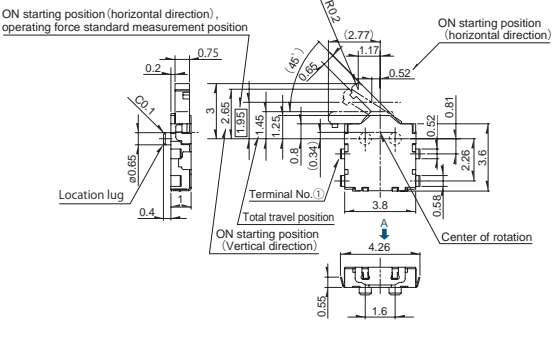
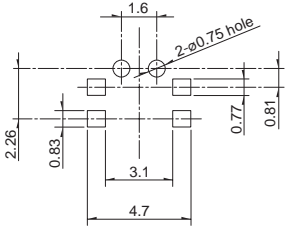

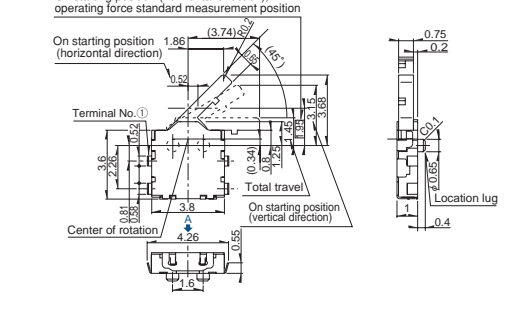

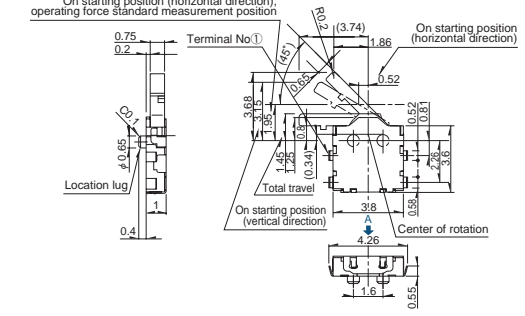


Dimensions

| No. | Photo | Style | PC board mounting hole and land dimensions (Viewed from direction A) |
|-----|-------|-------|--|
| 1   |       |       |  |

## Dimensions

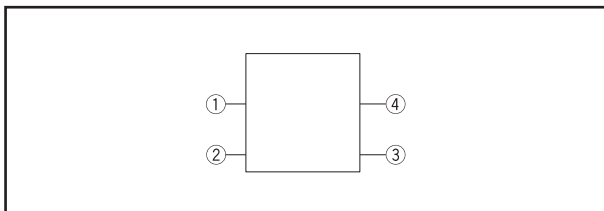
Unit:mm

| No. | Photo   | Style  | PC board mounting hole and land dimensions (Viewed from direction A)                |
|-----|---|--|---|
| 2   |    |    |  |
| 3   |    |   |   |
| 4   |  |  |   |

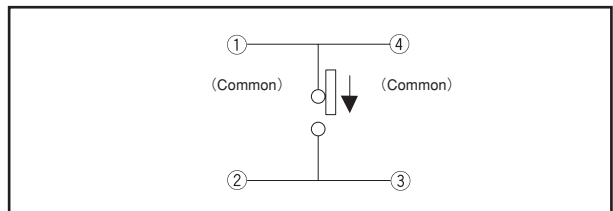
### Note

Dimensions drawing is for type with location lugs.

### Terminal Layout (Viewed from Direction A)

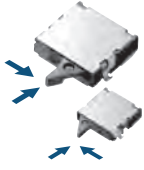

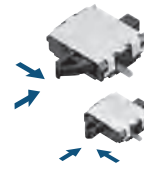


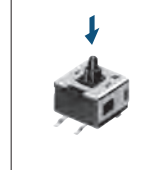








### Circuit Diagram



# Detector Switches

## List of Varieties

| Series                         |   | General-purpose Type  |   |   |  |   |   |
|--------------------------------|---|---|---|---|--|---|---|
|                                |   | SPVS  | SPVN  | SPVT  | SPVM   | SPVR  | SPVE  |
| Photo                          |   |  |  |  |  |  |  |
| Operation type                 |   | Two-way   |   |   |  |   | One-way   |
| Dimensions (mm)                | W   | 3.5   | 3.8   | 5.6   | 2.8  | 3.6   | 3.4   |
|                                | D   | 3.3   | 3.6   | 4.7   | 3.5  | 4.2   | 3   |
|                                | H   | 1   |   | 1.9   | 1.5  | 1.2   | 2.3   |
| Operating temperature range    |   | -40°C to +85°C  |   |   |  |   | -10°C to +60°C  |
| Automotive use                 |   | ●   | ●   | ●   | ●  | ●   | —   |
| Life cycle (availability)      |   |  |  |  |  |  |  |
| Poles / Positions              |   | 1/1   |   |   |  |   |   |
| Rating (max.) (Resistive load) |   | 1mA 5V DC   |   | 50mA 20V DC   | 1mA 5V DC  |   | 0.1A 30V DC   |
| Rating (min.) (Resistive load) |   | 50μA 3V DC  |   | 100μA 3V DC   | 50μA 3V DC   | 100μA 3V DC   | 50μA 3V DC  |
| Durability                     | Operating life without load                             | 50,000cycles 5Ω max.  |   | 100,000cycles 1Ω max.   | 50,000cycles 5Ω max.   |   | 50,000cycles 1Ω max.  |
|                                | Operating life with load Rating (max.) (Resistive load) | 50,000cycles 5Ω max.  |   | 100,000cycles 1Ω max.   | 50,000cycles 5Ω max.   |   | 50,000cycles 1Ω max.  |
| Electrical performance         | Initial contact resistance                              | 2Ω max.   |   | 500mΩ max.  | 2Ω max.  | 3Ω max.   | 500mΩ max.  |
|                                | Insulation resistance                                   | 100MΩ min. 100V DC  |   |   |  |   |   |
|                                | Voltage proof   | 100V AC for 1 minute  |   |   |  |   |   |
| Mechanical performance         | Terminal strength                                       | 0.5N for 1minute  |   |   | 1N for 1minute   | 0.5N for 1minute  |   |
|                                | Actuator strength                                       | 5N  |   | 10N   | 5N   | 2N  | 5N  |
| Environmental performance      | Cold  | -40°C 96h   |   |   |  |   | -20°C 96h   |
|                                | Dry heat  | 85°C 96h  |   |   |  |   |   |
|                                | Damp heat   | 40°C, 90 to 95%RH 96h   |   |   |  |   |   |
| Operation force                |   | 0.35N max.  |   | 0.4N max.   |  | 0.35N max.  | 0.3N max.   |
| Page                           |   | 16  | 19  | 21  | 24   | 26  | 27  |

|  |    |
|--|----|
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| Detector Switches Cautions             | 69 |

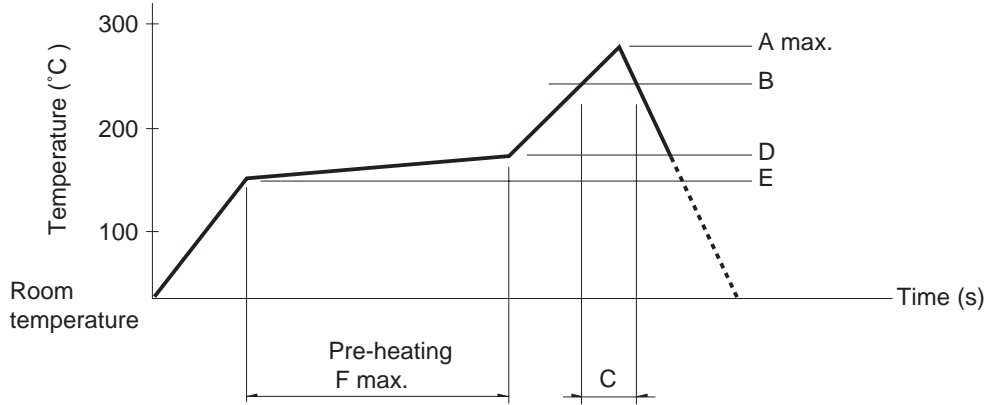
### Note

- Indicates applicability to all products in the series.

# Detector Switches / Soldering Conditions

## Example of Reflow Soldering Condition

1. Heating method: Double heating method with infrared heater.
2. Temperature measurement: Thermocouple  $\phi 0.1$  to  $0.2$  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) |
|----------------------|----------------|--------|-------|--------|--------|-------|
| <b>SPPB</b>          | 250            | 230    | 40    | 180    | 150    | 120   |
| <b>SPVE</b>          |                |        |       |        |        |       |
| <b>SPVL</b>          |                |        |       |        |        |       |
| <b>SPVM</b>          |                |        |       |        |        |       |
| <b>SPVN</b>          |                |        |       |        |        |       |
| <b>SPVR</b>          | 260            | 230    | 40    | 180    | 150    | 120   |
| <b>SPVS</b>          |                |        |       |        |        |       |
| <b>SPVT</b>          |                |        |       |        |        |       |
| <b>SSCM</b>          | 250            | 230    | 40    | 180    | 150    | 120   |
| <b>SSCQ</b>          |                |        |       |        |        |       |
| <b>SPVQC</b>         | 250            | 230    | 40    | 180    | 150    | 120   |

### 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, surface depending on the PC board's material, size, thickness, etc. The above-stated conditions shall also apply to switch surface temperatures.
2. Soldering conditions differ depending on reflow soldering machines. Prior verification of soldering condition is highly recommended.

### Reference for Hand Soldering

| Series   | Soldering temperature | Soldering time |
|--|-----------------------|----------------|
| <b>SPVS, SPVN, SPVT, SPVM, SPVR, SPVE, SSCQ, SSCM, SPVL, SSCT, SPVQC</b> | 350±5°C               | 3s max.        |
| <b>SPVQ3, SPVQ6, SPVQ7, SPVQ8, SPVQ9, SSCN, SPVQA</b>                    | 300±10°C              | 3 + 1 / 0s     |
| <b>SPPB (Reflow)</b>   | 300±5°C               | 5s max.        |
| <b>SSCF, SPPB (For Lead, Dip)</b>  | 350±10°C              | 3 + 1 / 0s     |

### Reference for Dip Soldering

(For PC board terminal types)

| Series  | Items                  |                 | Dip soldering         |                       |
|---|------------------------|-----------------|-----------------------|-----------------------|
|   | Preheating temperature | Preheating time | Soldering temperature | Duration of immersion |
| <b>SSCT, SPVQ3, SPVQ6, SPVQ7, SPVQ8, SPVQ9, SPVQA</b> | 100±10°C               | 60s max.        | 260±5°C               | 5±1s                  |
| <b>SPPW8, SPPB</b>                                    | 100°C max.             | 60s max.        | 255±5°C               | 5±1s                  |
| <b>SSCF</b>   | —                      |                 | 260±5°C               | 5±1s                  |