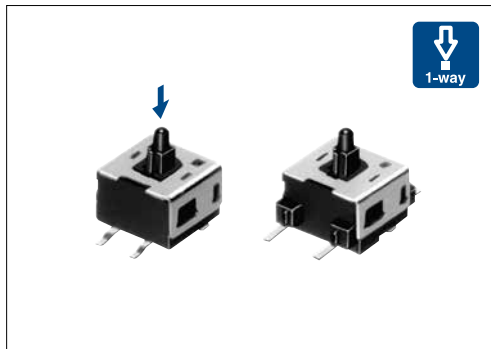


Applicable for use in compact digital devices. One of the smallest detector switches in the industry with a size of 3.4×3.0mm



■ Typical Specifications



| Items                                                  |              | Specifications             |
|--------------------------------------------------------|--------------|----------------------------|
| Rating (max.)/(min.)<br>(Resistive load)               |              | 0.1A 30V DC / 50μA 3V DC   |
| Contact resistance<br>(Initial / After operating life) |              | 500mΩ max. / 1Ω max.       |
| Operating force                                        |              | 0.3N max.                  |
| Operating life                                         | Without load | 50,000cycles               |
|                                                        | With load    | 50,000cycles (0.1A 30V DC) |

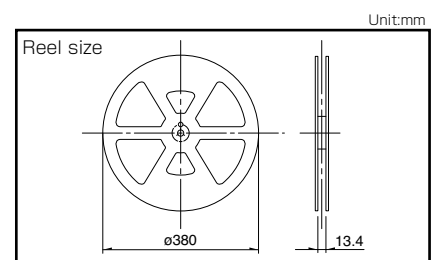
■ Product Line

| Poles | Positions | Terminal type         | Slider height (mm) | ON start position (mm) | Total travel position (mm) | Style       | Location lug | Minimum order unit (pcs) |        | Product No. | Drawing No. |
|-------|-----------|-----------------------|--------------------|------------------------|----------------------------|-------------|--------------|--------------------------|--------|-------------|-------------|
|       |           |                       |                    |                        |                            |             |              | Japan                    | Export |             |             |
| 1     | 1         | For PC board (Reflow) | h=3.8              | h <sub>1</sub> =3.5    | h <sub>2</sub> =2.5        | Standard    | Without      | 2,800                    | 22,400 | SPVE110100  | 1           |
|       |           |                       |                    |                        |                            |             | With         |                          |        | SPVE110600  |             |
|       |           |                       | h=4.1              | h <sub>1</sub> =3.8    | h <sub>2</sub> =2.9        |             | Without      |                          |        | SPVE110401  |             |
|       |           |                       |                    |                        |                            |             | With         |                          |        | SPVE110801  |             |
|       |           |                       | h=4.8              | h <sub>1</sub> =4.5    | h <sub>2</sub> =3.6        |             | Without      | 2,200                    | 17,600 | SPVE110200  |             |
|       |           |                       |                    |                        |                            |             | With         |                          |        | SPVE110900  |             |
|       |           |                       | h=5.2              | h <sub>1</sub> =4.9    | h <sub>2</sub> =4.0        | Low-profile | —            | 2,000                    | 16,000 | SPVE111300  |             |
|       |           |                       | h=5.5              | h <sub>1</sub> =5.2    | h <sub>2</sub> =4.3        |             |              |                          |        | SPVE111200  |             |
|       |           |                       | 3.3                | 3.0                    | 2.0                        | Low-profile | —            | 2,800                    | 22,400 | SPVE210100  | 2           |

■ Packing Specifications

Taping

| Product No.                                          | Number of packages (pcs.) |                |                         | Tape width (mm) | Export package measurements (mm) |
|------------------------------------------------------|---------------------------|----------------|-------------------------|-----------------|----------------------------------|
|                                                      | 1 reel                    | 1 case / Japan | 1 case / export packing |                 |                                  |
| SPVE110100<br>SPVE110600<br>SPVE110401<br>SPVE110801 | 2,800                     | 5,600          | 22,400                  | 12              | 406×406×190                      |
| SPVE110200<br>SPVE110900                             | 2,200                     | 4,400          | 17,600                  |                 |                                  |
| SPVE111300<br>SPVE111200                             | 2,000                     | 4,000          | 16,000                  |                 |                                  |
| SPVE210100                                           | 2,800                     | 5,600          | 22,400                  |                 |                                  |



## ■ Dimensions

Unit:mm

| No. | Style                            | PC board mounting hole and land dimensions (Viewed from direction A) |
|-----|----------------------------------|----------------------------------------------------------------------|
| 1   | <b>Standard type (With boss)</b> | <b>Reflow pattern</b>                                                |
| 2   | <b>Low-profile type</b>          |                                                                      |

## ■ Note

Dimensions drawing is for type with location lugs.

## ■ Terminal Layout (Viewed from Direction A)

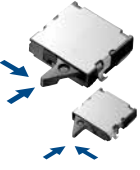
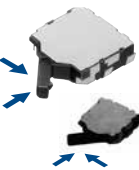
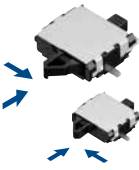
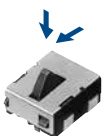
| Standard type | Low-profile type |
|---------------|------------------|
|               |                  |

## ■ Circuit Diagram

| Standard type | Low-profile type |
|---------------|------------------|
|               |                  |

# 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                                                                                  |

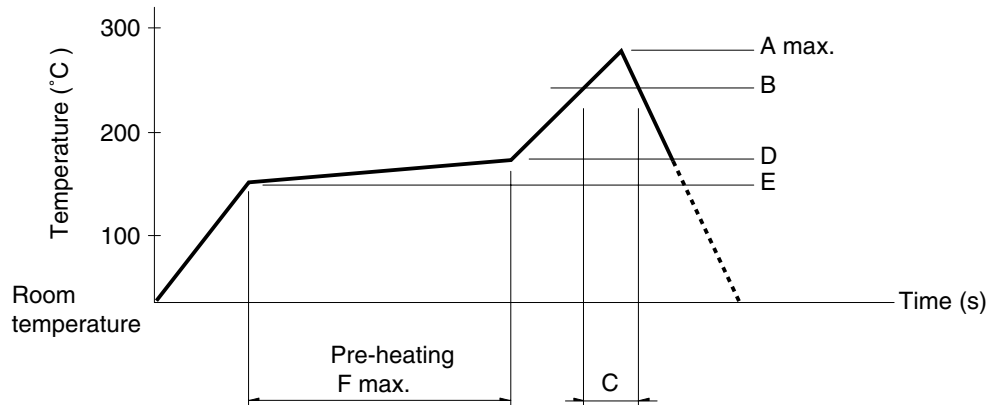
|                                        |    |
|----------------------------------------|----|
| Detector Switches Soldering Conditions | 66 |
| Detector Switches Cautions             | 67 |

### Note

● Indicates applicability to all products in the series.

## 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) |
|----------------------|----------------|--------|-------|--------|--------|-------|
| SPPB                 | 250            | 230    | 40    | 180    | 150    | 120   |
| SPVE                 | 260            |        | 40    |        |        |       |
| SPVL                 |                |        |       |        |        |       |
| SPVM                 |                |        |       |        |        |       |
| SPVN                 |                |        |       |        |        |       |
| SPVR                 |                |        |       |        |        |       |
| SPVS                 |                |        |       |        |        |       |
| SPVT                 |                |        |       |        |        |       |
| SSCM                 |                |        |       |        |        |       |
| SSCQ                 |                |        |       |        |        |       |
| SPVQC                | 250            |        |       |        |        |       |

### 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>SPVQ1, 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, SPVQ1, 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                  |

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