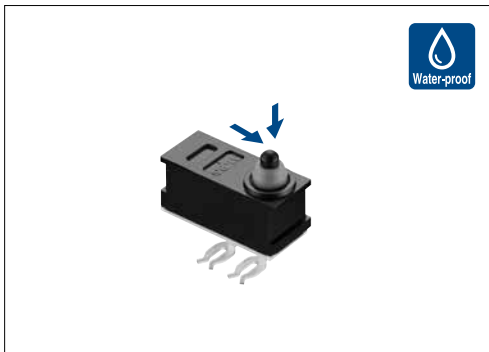




### Typical Specifications

| Items                                                  |              | Specifications              |
|--------------------------------------------------------|--------------|-----------------------------|
| Rating (max.)/(min.)<br>(Resistive load)               |              | 0.1A 12V DC / 50μA 5V DC    |
| Contact resistance<br>(Initial / After operating life) |              | 500mΩ max. / 1Ω max.        |
| Operating force                                        |              | 1±0.5N                      |
| Operating life                                         | Without load | 300,000cycles               |
|                                                        | With load    | 300,000cycles (0.1A 12V DC) |

### Product Line

| Poles | Positions | Change over timing | Operating part shape | Terminal type                        | Main body form      | Minimum order unit (pcs) |        | Product No. | Drawing No. |  |
|-------|-----------|--------------------|----------------------|--------------------------------------|---------------------|--------------------------|--------|-------------|-------------|--|
|       |           |                    |                      |                                      |                     | Japan                    | Export |             |             |  |
| 1     | 1         | Non shorting       | Push                 | Press fit (Without terminal No.3)    | Without boss L type | 1,200                    | 4,800  | SPVQA10103  | 1           |  |
|       |           |                    |                      |                                      | Without boss R type |                          |        | SPVQA10203  | 2           |  |
|       |           |                    |                      | Press fit (Without terminal No.2)    | Without boss L type |                          |        | SPVQA10302  | 3           |  |
|       |           |                    |                      |                                      | Without boss R type |                          |        | SPVQA10402  | 4           |  |
|       | 2         |                    |                      | Press fit                            | Without boss L type |                          |        | SPVQA10504  | 5           |  |
|       |           |                    |                      |                                      | Without boss R type |                          |        | SPVQA10604  | 6           |  |
|       | 1         |                    |                      | For PC board (Without terminal No.3) | Without boss        |                          |        | SPVQA20103  | 7           |  |
|       | 2         |                    |                      | For PC board                         |                     |                          |        | SPVQA20203  | 8           |  |

### Note

This unit cannot be used in water (IP67 rating, except for terminal).

### Packing Specifications

#### Tray

| Number of packages (pcs.) |                        | Export package measurements<br>(mm) |
|---------------------------|------------------------|-------------------------------------|
| 1 case /Japan             | 1 case /export packing |                                     |
| 1,200                     | 4,800                  | 540×360×270                         |

### Dimensions

Unit:mm

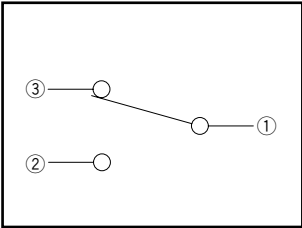
| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 1   |       | 2   |       |

■ Dimensions

Unit:mm

| No. | Style | No. | Style |
|-----|-------|-----|-------|
| 3   |       | 6   |       |
| 4   |       | 7   |       |
| 5   |       | 8   |       |

■ Circuit Diagram





| Series                            |                                                               | Water-proof Type                                                                  |                                                                                   |                                                                                   | Fast Switching Type                                                                 |                                                                                     |
|-----------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |                                                               | SPVQ8                                                                             | SPVQA                                                                             | SSCN                                                                              | SPVQ9                                                                               | SPVQC                                                                               |
| Photo                             |                                                               |  |  |  |  |  |
| Operation type                    |                                                               | Two-way                                                                           |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Dimensions<br>(mm)                | W                                                             | 8.3                                                                               | 15.2                                                                              | 13                                                                                | 15.4                                                                                | 15.4                                                                                |
|                                   | D                                                             | 5.3                                                                               | 6.4                                                                               | 5                                                                                 | 8.4                                                                                 | 7.4                                                                                 |
|                                   | H                                                             | 6.5                                                                               | 7.95                                                                              | 15                                                                                | 7.5                                                                                 |                                                                                     |
| Operating temperature range       |                                                               | -40℃ to +85℃                                                                      |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Automotive use                    |                                                               |  |  |  |  |  |
| Life cycle (availability)         |                                                               |  |  |  |  |  |
| Poles / Positions                 |                                                               | 1/1                                                                               | 1/1<br>1/2                                                                        | 1/2                                                                               | 2/2                                                                                 |                                                                                     |
| Rating (max.)<br>(Resistive load) |                                                               | 0.1A 12V DC                                                                       |                                                                                   |                                                                                   | 50mA 26V DC                                                                         | 50mA 18V DC                                                                         |
| Rating (min.)<br>(Resistive load) |                                                               | 50μA 5V DC                                                                        |                                                                                   | 100μA 5V DC                                                                       | 50μA 5V DC                                                                          |                                                                                     |
| Durability                        | Operating life without load                                   | 300,000cycles<br>1Ω max. or<br>1,000,000cycles<br>3Ω max.                         | 300,000cycles<br>1Ω max.                                                          | 100,000cycles<br>1Ω max.                                                          | 300,000cycles<br>200mΩ max.                                                         | —                                                                                   |
|                                   | Operating life with load<br>Rating (max.)<br>(Resistive load) | 300,000cycles<br>1Ω max. or<br>1,000,000cycles<br>3Ω max.                         | 300,000cycles<br>1Ω max.                                                          | 100,000cycles<br>1Ω max.                                                          | 300,000cycles<br>200mΩ max.                                                         |                                                                                     |
| Electrical<br>performance         | Initial contact resistance                                    | 500mΩ max.                                                                        |                                                                                   |                                                                                   | 75mΩ max.                                                                           |                                                                                     |
|                                   | Insulation resistance                                         | 100MΩ min. 500V DC                                                                |                                                                                   |                                                                                   |                                                                                     | 100MΩ min.<br>250V DC                                                               |
|                                   | Voltage proof                                                 | 500V AC for 1minute                                                               |                                                                                   |                                                                                   |                                                                                     | 250V AC<br>for 1minute                                                              |
| Mechanical<br>performance         | Terminal strength                                             | 3N for 1minute (with terminal)<br>Wire strength 30N for 1minute<br>(with wire)    |                                                                                   | 3N for 1minute                                                                    |                                                                                     |                                                                                     |
|                                   | Actuator strength                                             | 20N                                                                               |                                                                                   | 10N                                                                               | 20N                                                                                 |                                                                                     |
| Environmental<br>performance      | Cold                                                          | -40℃ 500h                                                                         |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|                                   | Dry heat                                                      | 85℃ 500h                                                                          |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
|                                   | Damp heat                                                     | 60℃, 90 to 95% RH 500h                                                            |                                                                                   |                                                                                   |                                                                                     |                                                                                     |
| Operation force                   |                                                               | 1±0.5N                                                                            |                                                                                   | 2N max.                                                                           | 1±0.5N                                                                              |                                                                                     |
| Page                              |                                                               | 55                                                                                | 60                                                                                | 63                                                                                | 64                                                                                  | 65                                                                                  |

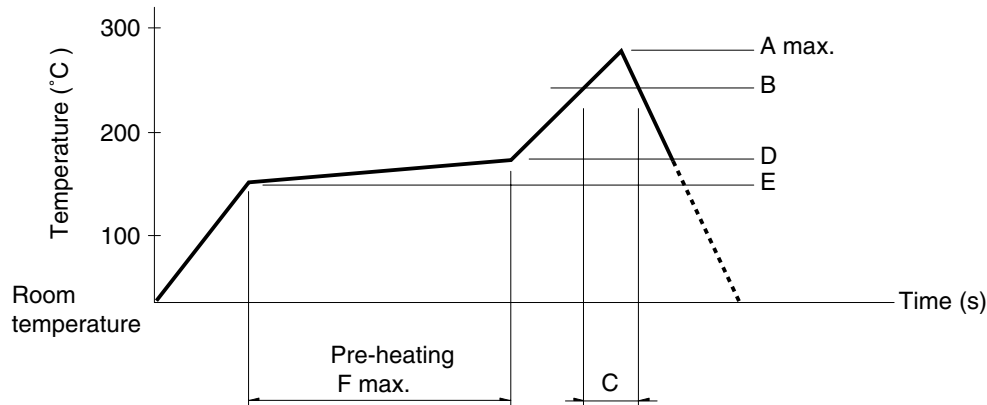
|                                        |    |
|----------------------------------------|----|
| Detector Switches Soldering Conditions | 66 |
| Detector Switches Cautions             | 67 |

#### 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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