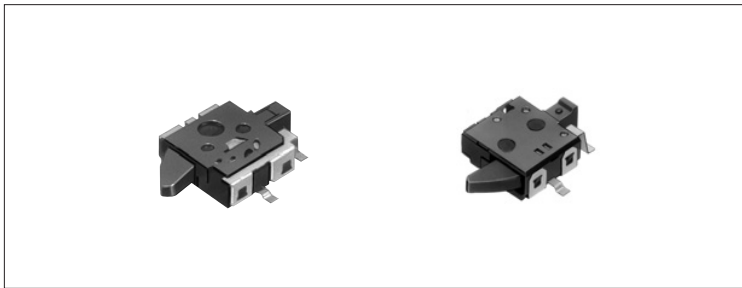


# 2mm-thick Two-way Operation Type Detector Switch

SPVG Series

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

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



Car Use

## 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, portable MD/CD players, CD-RW drives, and CD-ROM drives
- For detecting the position of lids of laptop PCs and PDAs
- For detecting the position of camera shutters of mobile phones and DSCs

## Typical Specifications

Items		Specifications
Rating (max.) (Resistive load)		50mA 20V 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	Control direction	ON start position (mm)	Location lug	Side terminal	Minimum packing unit (pcs.)	Products No.	Drawing No.
1	1	For PC board (Reflow)	Right	2.96	With	With both sides.	2,500	SPVG110301	1
						With a right side.		SPVG111500	2
						With a left side.		SPVG111400	3
				Without	SPVG120302	4			
				4.16	Without	With both sides.		SPVG130200	1
						With a right side.		SPVG210302	5
			With a left side.			SPVG211200		6	
			Left	2.96	With	With a left side.		SPVG211300	7
						Without		SPVG220300	8
						Without		SPVG230200	5
				4.16	Without	With both sides.		SPVG310300	9
						With both sides.		SPVG320200	10
Without	SPVG330200	9							
Right	2.45	With	With both sides.	SPVG410300	11				
			Without	SPVG420200	12				
	3.65	Without	With both sides.	SPVG430200	11				
			Without						
Left	2.45	With	With both sides.						
			Without						

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
1	<p><b>Right operation type</b></p> <p>ON position, operating force measurement position</p> <p>ON starting position</p> <p>Control direction</p> <p>Terminal No.①</p> <p>Center of rotation</p> <p>Total travel</p> <p>Location lug</p>	<p>9</p> <p>5.6</p> <p>1.6</p> <p>1.2</p> <p>6</p> <p>2.5</p> <p>2.5</p> <p>6.1</p> <p>1.1</p> <p>1.7</p> <p>ø1.1 hole</p> <p>ø1.3 hole</p>
2	<p><b>Right operation type</b></p> <p>ON position, operating force measurement position</p> <p>ON starting position</p> <p>Control direction</p> <p>Terminal No.①</p> <p>Center of rotation</p> <p>Total travel</p> <p>Location lug</p>	<p>4.5</p> <p>2.8</p> <p>1.6</p> <p>1.2</p> <p>2.5</p> <p>6</p> <p>2.5</p> <p>6.1</p> <p>1.1</p> <p>1.7</p> <p>ø1.1 hole</p> <p>ø1.3 hole</p>
3	<p><b>Right operation type</b></p> <p>ON position, operating force measurement position</p> <p>ON starting position</p> <p>Control direction</p> <p>Terminal No.①</p> <p>Center of rotation</p> <p>Total travel</p> <p>Location lug</p>	<p>4.5</p> <p>2.8</p> <p>1.2</p> <p>1.6</p> <p>2.5</p> <p>6</p> <p>2.5</p> <p>6.1</p> <p>1.1</p> <p>1.7</p> <p>ø1.1 hole</p> <p>ø1.3 hole</p>

Power

Push

Slide

Rotary

Encoders

**Detector**

Dual-in-line  
Package Type

Multi Control  
Devices

TACT

Custom-  
Products

Dimensions

Unit:mm

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No.	Style	PC board mounting hole dimensions
4	<p><b>Right operation type</b></p>	
5	<p><b>Left operation type</b></p>	
6	<p><b>Left operation type</b></p>	

Dimensions

Unit:mm

No.	Style	PC board mounting hole dimensions
7	<p><b>Left operation type</b></p>	
8	<p><b>Left operation type</b></p>	
9	<p><b>Right operation type</b></p>	

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Custom-  
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Dimensions

Unit:mm

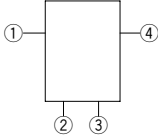
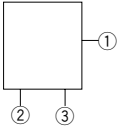
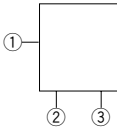
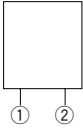
- Power
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No.	Style	PC board mounting hole dimensions
10	<p><b>Right operation type</b></p>	
11	<p><b>Left operation type</b></p>	
12	<p><b>Left operation type</b></p>	

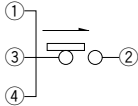
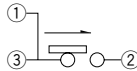
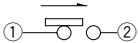
Note

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

**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> 	

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# Products Specifications

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

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Devices

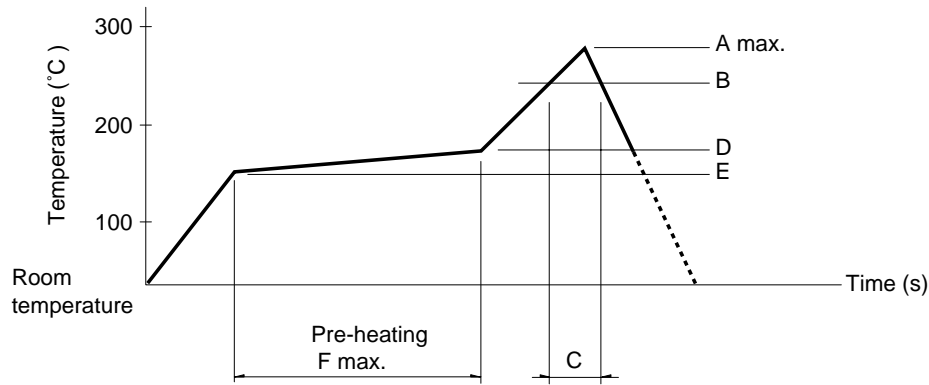
TACT

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  $\phi$  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			
SPVE	260					
SPPW8	250	200	20	180	150	120
SPVM						
SPVR						
SPVP						
SPVN	260	230	40			
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.

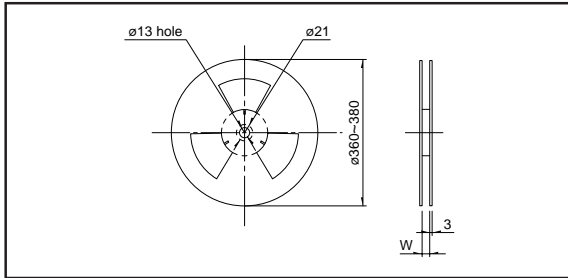


# Taping Specifications

## Taping Packaging

Reel Size

Unit:mm



Series		Number of packages (pcs.)			Reel width 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		
SPVE	Standard	h=3.8	2,800	5,600	12.4	12
		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		
h=4.75		2,000	4,000			
SPPW81	h = 6.1 (Reflow)	1,000	2,000	4,000	24.4	24
	h = 6.55 (Reflow)					
	h = 7.6 (Reflow)					
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		

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**Note**

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