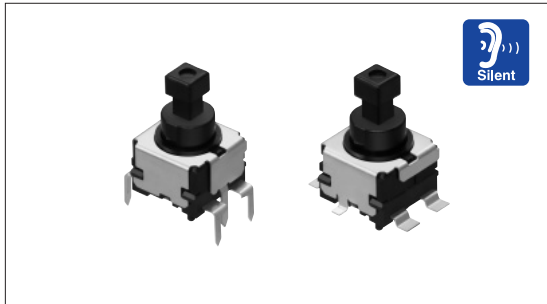


# Push Switch Surface Mount Type Push Switch

SPEF Series

Surface mountable lead-free soldering push switch.



## Typical Specifications

Items	Specifications
Rating (max) (Resistive load)	1A 14.5V DC
Initial contact resistance	100mΩ max.
Operating force	3N, 5N
Operating life (Without load)	30,000cycles
Poles-Positions	1-pole,2-positions

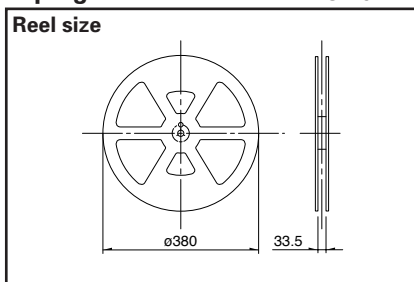
## Product Line

Changeover timing	Travel (mm)	Total travel (mm)	Operating force	Mounting method	Operating	Terminal type	Minimum order unit (pcs.)	Product No.	Drawing No.	
Non shorting	1.5	2.7	3N	PC board	Latching	Reflow	165	SPEF210101	1	
						Dip	150	SPEF110100	2	
			Reflow			165	SPEF210200	1		
			Dip			150	SPEF110200	2		
	—		—		3N	Alternate	Reflow	165	SPEF220100	1
							Dip	150	SPEF120100	2
					Reflow		165	SPEF220200	1	
					Dip		150	SPEF120200	2	

## Packing Specifications

### Taping

Unit:mm



Number of packages (pcs.)	Number of packages (pcs.)			Tape width (mm)	Export package measurements (mm)
	1 reel	1 case /Japan	1 case /export packing		
SPEF210101 SPEF210200 SPEF220100 SPEF220200	165	660	1,320	32	403×403×360

### Bulk

Product No.	Number of packages (pcs.)		Export package measurements (mm)
	1 case /Japan	1 case /export packing	
SPEF110100 SPEF110200 SPEF120100 SPEF120200	1,050	4,200	540×360×230

### Note

Please place purchase orders per minimum order unit N (integer).

Detector

Push

Slide

Rotary

Encoders

Power

Dual-in-line  
Package Type

TACT Switch™

Custom-  
Products

Horizontal  
Type

Vertical  
Type



Automotive  
Use

**Dimensions**

Unit:mm

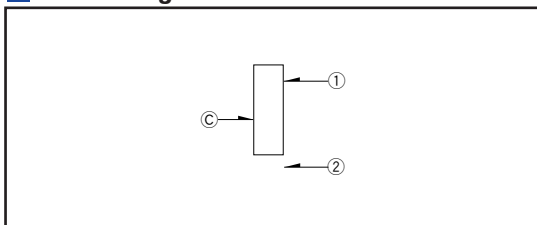
No.	Style	PC board mounting hole dimensions
1	<p><b>Reflow Soldering Type</b></p>	
	<p><b>Dip Soldering Type</b></p>	

- Detector
- Push**
- Slide
- Rotary
- Encoders
- Power
- Dual-in-line Package Type
- TACT Switch™
- Custom-Products











- Horizontal Type
- Vertical Type**



**Circuit Diagram (Viewed from Direction A)**



## List of Varieties

Series		SPPH2	SPPH4	SPPH1	SPEC	SPED2	SPED3	SPED4	SPED5	SPEF		
Photo												
Travel (mm)		1	2.2	1.5	2.5	—				1.5		
Total travel (mm)		1.5	3	2.5	3.4	4.5	3.8			2.7		
Number of poles		2					1					
Dimensions (mm)	W	6.5	8.5	10	12	14			13.5	9.4		
	D	6	6.5	10		16.8	18		18.2	9		
	H	6.5	8.5		12.5	26.7	20.7			6.9		
Operating temperature range		-10°C to +60°C			-40°C to +85°C							
Rating (max.) (Resistive load)		0.1A 12V DC	0.1A 30V DC			1A 14.5V DC						
Rating (min.) (Resistive load)		50μA 3V DC					100mΩ max.					
Electrical performance	Initial contact resistance	30mΩ max.	100mΩ max.	20mΩ max.	30mΩ max.	100mΩ min. 500V DC						
	Insulation resistance	100MΩ min. 500V DC				3MΩ min. 500V DC			3MΩ min. 100VDC			
	Voltage proof	500V AC for 1minute				100V AC for 1minute						
Mechanical performance	Terminal strength	5N for 1minute			3N for 1minute	—						
	Actuator strength	Operating direction	30N		50N				90N			
		Pulling direction	—	10N	—	50N	—			30N		
Durability	Operating life without load	10,000cycles	10,000cycles	10,000cycles	10,000cycles	30,000cycles 100mΩ max.						
	Operating life without load Load:as rating	50mΩ max.	100mΩ max.	40mΩ max.	50mΩ max.	—						
Environmental performance	Cold	-20±2°C for 96h				-40±2°C for 96h						
	Dry heat	85±2°C for 96h										
	Damp heat	40±2°C, 90 to 95%RH for 96h										
Soldering	Manual soldering	350°C max. 3s max.	350±10°C 3 <sup>+1</sup> s			350±10°C 3±0.5s ※3	—	350±10°C 3±0.5s	—	350±5°C 3s max.		
	Dip soldering	260±5°C 5±1s		260±5°C 10±1s	260°C max. 5s max.	260±5°C 10±1s ※3	—	260±5°C 10±1s	—	260±5°C 10±1s ※4		
	Reflow soldering	—									Please see P.135	
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Detector

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Rotary

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Power

Dual-in-line Package Type

TACT Switch™

Custom-Products

Horizontal Type

Vertical Type

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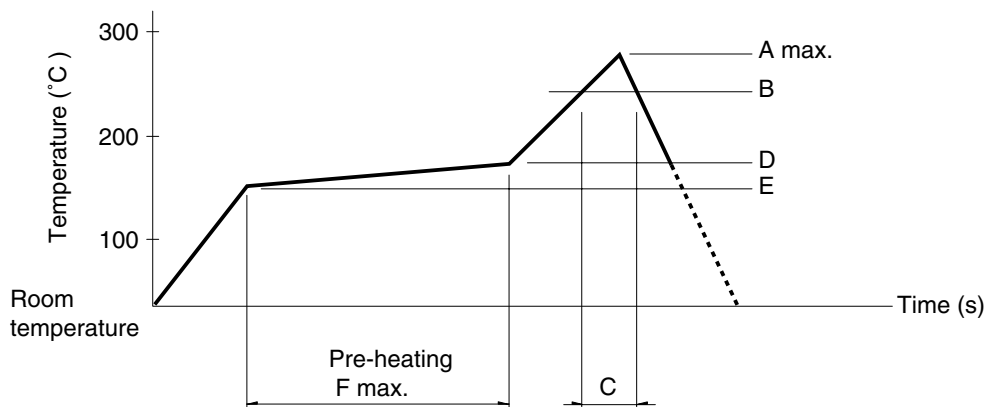
### Notes

- ※3. Applicable to SPED220200 (PC board type) only.
- ※4. Applicable to SPEF110100 SPEF110200.

## 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)
SPEE	260	230	40	180	150	120
SPEF, SPEG, SPEJ						

#### 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. Soldering conditions differ depending on reflow soldering machines. Prior verification of soldering condition is highly recommended.

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