

Part number **SPEF220200** 1.5mm-travel Vertical Type SPEF Series

Standard ?

Basic information



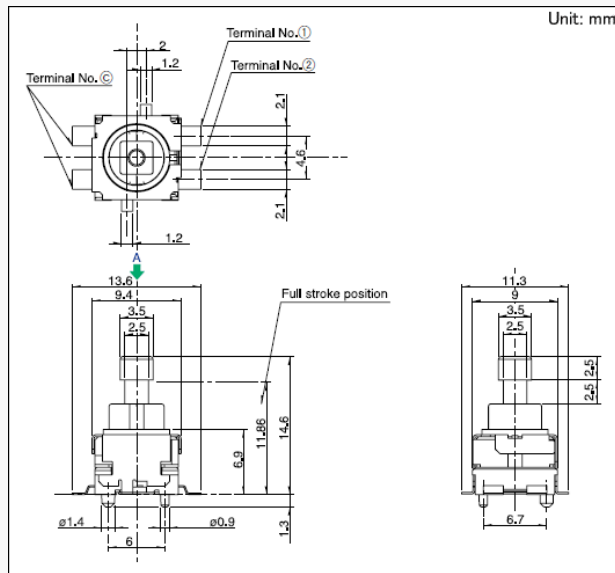
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Changeover timing	Non shorting
Total travel	2.7mm
Operating force	5N
Mounting method	PC board
Poles	1
Positions	2
Operation	Alternate
Terminal type	Reflow
Dimensions (W×D×H)	9.4×9.0×6.9mm

Specifications

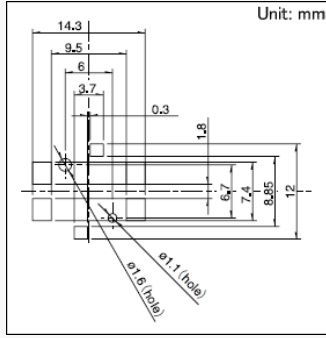
Operating temperature range		-40°C to +85°C	
Rating (max.)/(min.) (Resistive load)		1A 14.5V DC/50μA 3V DC	
Electrical performance	Contact resistance (Initial performance/After lifetime)	100mΩ max./1Ω max.	
	Insulation resistance	3MΩ min. 100V DC	
	Voltage proof	100V AC for 1 minute	
Mechanical performance	Actuator strength	Operating direction	90N
		Pulling direction	30N
Durability	Operating life with load (at max. rated load)	30,000 cycles 100mΩ max.	
Environmental performance	Cold	-40°C 96h	
	Dry heat	85°C 96h	
	Damp heat	40°C, 90 to 95%RH 96h	
Minimum order unit(pcs.)	Japan	660	
	Export	1,320	

Dimensions



[Open an expandable image in a separate window](#)

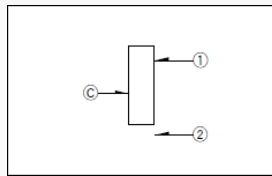
Land Dimensions



[Open an expandable image in a separate window](#)

Viewed from direction A in the dimensions.

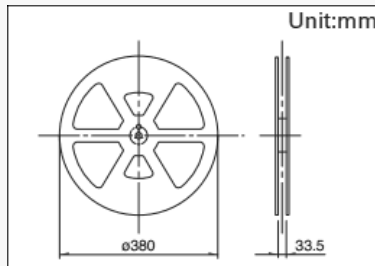
Circuit Diagram



[Open an expandable image in a separate window](#)

Packing Specifications

Taping



Number of packages (pcs.)

1 reel	165
1 case / Japan	660
1 case / export packing	1,320

Tape width (mm)

32

Export package measurements (mm)

403×403×360

Soldering Conditions

Example of Reflow Soldering Condition

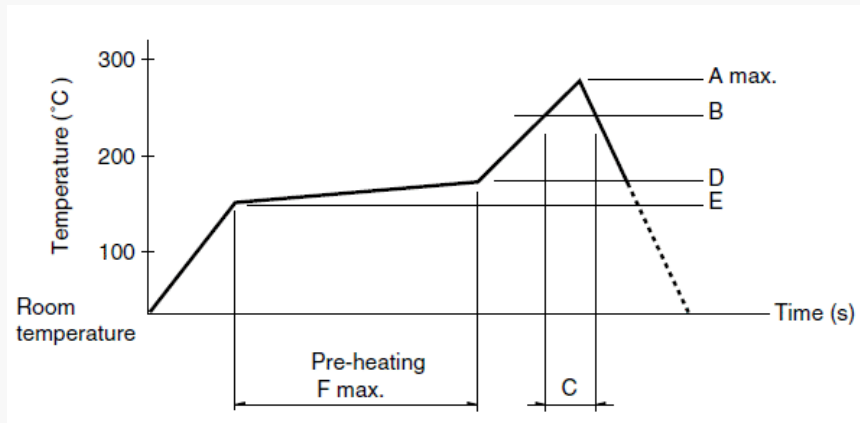
1. Heating method

Double heating method with infrared heater.

2. Temperature measurement

Thermocouple 0.1 to 0.2 Φ CA (K) or CC (T) at soldering portion (copper foil surface). A heat resisting tape should be used for fixed measurement.

3. Temperature profile



A(°C) 3s max.	B(°C)	C(s)	D(°C)	E(°C)	F(s)
260	230	40	180	150	120

(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.

Reference for Hand Soldering

Soldering temperature

350±5°C

Soldering time

3s max.

Notes are common to this series/models

1. This site catalog shows only outline specifications. When using the products, please obtain formal specifications for supply.
2. Please place purchase orders per minimum order unit (integer).
3. This products can be used in vehicles.
Although these products are designed to perform over a wide operating temperature range, please ensure that you receive and read the formal delivery specifications before use.

Cautions

1. Applying load to terminals during soldering under certain conditions may cause deformation and electrical property degradation.
2. Avoid use of water-soluble soldering flux, since it may corrode the switches.
3. Check and conform to soldering requirements under actual mass production conditions.
4. When soldering twice, wait until the first soldered portion cools to normal temperature. Continuous heating will deform the external portions, loosen or dislodge terminals, or may deteriorate their electrical characteristics.
5. Flux from around and above the PC board should not adhere to the switches.
6. After mounting the switches, if you intend to put the board into an oven in order to harden adhesive for other parts, please consult with us.

7. Before soldering switches with locking mechanism, release the locks. If they are soldered without releasing the locks, the soldering heat may deform the locking mechanism.
8. If you use a through-hole PC board or a PC board thinner or thicker than the recommendation, there may be greater heat stress. Verify the soldering conditions thoroughly before use.
9. Solder the switches with detent at the detent position. Soldering switches fixed at the center of the detent may deform the detent mechanisms.
10. No cleaning.
11. Protect small and thin switches from external forces in the set mounting process.
12. Tighten the mounting screws by applying the specified torque. Tightening with larger torque than the specified one will result in malfunction or breakage of screws.
13. The products are designed and manufactured for direct current resistance. Contact us for use of other resistances such as inductive (L) or capacitive (C).
14. The switch will break if you apply a greater stress than that specified. Take great care not to let the switch be subject to greater stress than specified.
15. Be sure to release the locks before removing the knobs. Otherwise, the locking mechanism may be deformed.
16. Be sure to use the forced travel close to the position of the whole travel as much as possible.
17. Insert these switches to the specified mounting surface and mount them horizontally. If not mounted horizontally, these switches will malfunction.
18. Use of the switches in a dusty environment may lead to dusts entering through the openings and cause imperfect contact or malfunction. Take this into account for set design.
19. Corrosive gas if generated by peripheral parts of a set, malfunction such as imperfect contact may occur. Thorough investigation shall be required beforehand.
20. Storage

Store the products as delivered at normal temperature and humidity, out of direct sunlight and away from corrosive gases. Use them as soon as possible and no later than six months after delivery.

Once the seal is broken, use them as soon as possible.

Measurement and Test Methods

Rotational Torque (Operating Force)

Measures the torque (operating force) necessary to rotate (move) the shaft (lever). Unless otherwise specified, measurement shall be made at ambient temperatures of 5 to 35°C, the shaft rotational speed shall be 60° per second, and the lever traveling speed shall be 20mm per second.

Shaft Wobble

Measures the amount of deflection at the specified position from the reference plane, with the specified bending moment, applied perpendicularly to the shaft from directions 180 degrees with respect to each other.

Withstand Voltage

Applies AC voltage to the specified spot for a minute and then checks for arc, burning, dielectric breakdown and other abnormalities. Respective terminals may be tested as a group. The sections described below shall be tested unless otherwise specified. However, if the section concerned is so constructed as to conduct, that particular part shall not be tested.

Insulation Resistance

Applies specified voltage to the specified locations and then measures the insulation resistance with a megger. The locations described below shall be tested unless otherwise specified. However, if the section concerned is so constructed as to conduct, that particular part shall not be tested.

Sections to be Tested for Withstand Voltage and Insulation Resistance

- Between terminal and shaft (lever).
- Between terminal and metal cover (frame).

Shaft (Lever) Strength against Push/Pull Actions

Applies a specified force in the axial direction of the shaft (lever) for 19 seconds and then checks the operating part and other sections for deformation, breakage, operating conditions, etc.