

**A Wide Range of Models:
6 x 6 mm, 12 x 12 mm, Vertical, and
High-force.**

- A positive click action plus a long life equal to that of a no-contact switch.
- Available in stick packaging for automatic mounting to PCBs.
- Radial models (taping specifications) that allow the use of general-purpose radial taping parts insertion machines have been added to the series.



Ordering Information

Model Number Legend:

B3F-□□□□□
1 2 3 4 5

1. Appearance

- 1: Flat 6 mm x 6 mm
- 3: Vertical, 6 mm x 6 mm
- 4: Flat 12 mm x 12 mm
- 5: Long life expectancy/high reliability model, 12 x 12 mm
- 6: Radial, 6 x 6 mm
- 9: Illumination, 12 x 12 mm
followed by 1: Red
followed by 2: Green
followed by 3: Yellow

2. Ground terminal

- 0: Without ground terminal
- 1: With ground terminal

3. Plunger height

- 0: 4.3 mm
- 1: 5 mm (terminal pitch 7.5 mm)
- 2: 5 mm
- 5: 7.3 mm
- 6: 7 mm
- 7: 9.4 mm

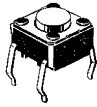
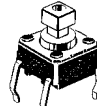

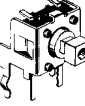
4. Operating Force (OF)

- 0: B3F-1, -3, -6 models: 0.98 N {100 gf}
B3F-4, -5 (long life mode), -9: 1.27 N {130 gf}
- 2: 1.47 N {150 gf}
- 5: 2.55 N {260 gf}
- 1: B3F-5 high reliability model: 1.27 N {130 gf}

5. Shipment package

- None: Bag
- S: Stick

6 x 6 mm Models

Type	Plunger	Height x pitch	Operating force (OF)	Without ground terminal		With ground terminal	
				Bags	Sticks (90/stick)	Bags	Sticks (75/stick)
Horizontal (B3F-1□□□)		4.3 x 6.5 mm	0.98 N {100 gf}	B3F-1000	B3F-1000S	B3F-1100	B3F-1100S
			1.47 N {150 gf}	B3F-1002	B3F-1002S	B3F-1102	B3F-1102S
			2.55 N {260 gf}	B3F-1005	B3F-1005S	B3F-1105	B3F-1105S
		5.0 x 6.5 mm	0.98 N {100 gf}	B3F-1020	B3F-1020S	B3F-1120	B3F-1120S
			1.47 N {150 gf}	B3F-1022	B3F-1022S	B3F-1122	B3F-1122S
			2.55 N {260 gf}	B3F-1025	B3F-1025S	B3F-1125	B3F-1125S
		5.0 x 7.5 mm	0.98 N {100 gf}	---	---	B3F-1110	B3F-1110S
		7.0 x 6.5 mm	0.98 N {100 gf}	B3F-1060	---	B3F-1160	---
			1.47 N {150 gf}	B3F-1062	---	B3F-1162	---
	2.55 N {260 gf}		B3F-1065	---	B3F-1165	---	
	9.5 x 6.5 mm	0.98 N {100 gf}	B3F-1070	---	B3F-1170	---	
		1.47 N {150 gf}	B3F-1072	---	B3F-1172	---	
		2.55 N {260 gf}	B3F-1075	---	B3F-1175	---	
		7.3 x 6.5 mm	0.98 N {100 gf}	B3F-1050	B3F-1050S	B3F-1150	B3F-1150S
			1.47 N {150 gf}	B3F-1052	B3F-1052S	B3F-1152	B3F-1152S
2.55 N {260 gf}			B3F-1055	B3F-1055S	B3F-1155	B3F-1155S	
Vertical (B3F-3□□□)		3.15 mm	0.98 N {100 gf}	---	---	B3F-3100	---
			1.47 N {150 gf}	---	---	B3F-3102	---
			2.55 N {260 gf}	---	---	B3F-3105	---
		3.85 mm	0.98 N {100 gf}	---	---	B3F-3120	---
			1.47 N {150 gf}	---	---	B3F-3122	---
			2.55 N {260 gf}	---	---	B3F-3125	---
		6.15 mm	0.98 N {100 gf}	---	---	B3F-3150	---
			1.47 N {150 gf}	---	---	B3F-3152	---
			2.55 N {260 gf}	---	---	B3F-3155	---

Note: Orders for stick types must be made in multiples of the quantity per stick values (75 or 90) indicated above.

12 x 12 mm Models

Type	Plunger (or LED color)	Height x pitch	Operating force (OF)	Without ground terminal		With ground terminal	
				Bags	Sticks (45/stick)*	Bags	Sticks (40/stick)
Standard (B3F-4□□□)	Flat	4.3 x 12.5 mm	1.27 N {130 gf}	B3F-4000	B3F-4000S	B3F-4100	B3F-4100S
			2.55 N {260 gf}	B3F-4005	B3F-4005S	B3F-4105	B3F-4105S
	Projected	7.3 x 12.5 mm	1.27 N {130 gf}	B3F-4050	B3F-4050S	B3F-4150	B3F-4150S
			2.55 N {260 gf}	B3F-4055	B3F-4055S	B3F-4155	B3F-4155S
Long life expectancy (B3F-5□□□)	Flat	4.3 x 12.5 mm	1.27 N {130 gf}	B3F-5000	B3F-5000S	B3F-5100	B3F-5100S
	Projected	7.3 x 12.5 mm		B3F-5050	B3F-5050S	B3F-5150	B3F-5150S
High reliability gold-plated (B3F-5□□□1)	Flat	4.3 x 12.5 mm	1.27 N {130 gf}	B3F-5001	B3F-5001S	B3F-5101	B3F-5101S
	Projected	7.3 x 12.5 mm		B3F-5051	B3F-5051S	B3F-5151	B3F-5151S
Surface illumination (B3F-9□□□)	Red LED	7.3 x 12.5 mm	1.27 N {130 gf}	---	B3F-9100	---	---
	Green LED			---	B3F-9200	---	---
	Yellow LED			---	B3F-9300	---	---

*36 per stick for B3F-9□□□. Orders for stick types must be made in multiples of the quantity per stick values (36, 40, or 45) indicated above.

6 x 6 mm Radial Models (Taping Specifications)

Type	Plunger	Height x pitch	Operating force: 0.98 N {100 gf}		Operating force: 1.47 N {150 gf}	
			Without ground terminal	With ground terminal	Without ground terminal	With ground terminal
Radial models (B3F-6□□□)	Flat	4.3 x 5.0 mm	B3F-6000	B3F-6100	B3F-6002	B3F-6102
		5.0 x 5.0 mm	B3F-6020	B3F-6120	B3F-6022	B3F-6122
	Projected	7.3 x 5.0 mm	B3F-6050	B3F-6150	B3F-6052	B3F-6152

Note: Orders must be made in units of 1,000 pieces.

■ Accessories (Order Separately)

Special Key Tops are available for projected plunger models. See page 52.

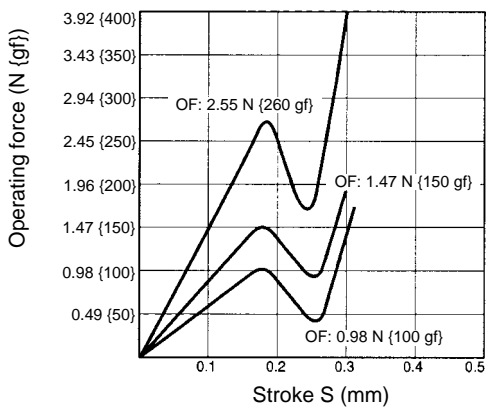
Specifications

■ Ratings/Characteristics

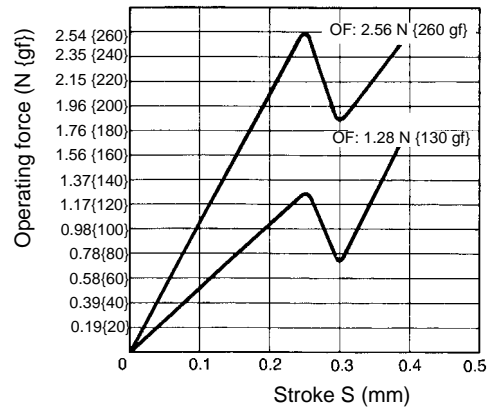
Switching capacity	1 to 50 mA, 5 to 24 VDC (resistive load)
Contact form	SPST-NO
Contact resistance	100 mΩ max. (initial value) (rated: 1 mA, 5 VDC)
Insulation resistance	100 MΩ min. (at 250 VDC)
Dielectric strength	500 VAC, 50/60 Hz for 1 min
Bounce time	5 ms max.
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5 mm double amplitude
Shock resistance	Destruction: 1,000 m/s ² {approx. 100G} max. Malfunction: 100 m/s ² {approx. 10G} max.
Life expectancy	B3F-1□□□, -3□□□, -6□□□: 0.98 N {100 gf} OF: 1,000,000 operations min. 1.47 N {150 gf} OF: 300,000 operations min. 2.55 N {260 gf} OF: 100,000 operations min. B3F-4□□□: 1.28 N {130 gf} OF: 3,000,000 operations min. 2.56 N {260 gf} OF: 1,000,000 operations min. B3F-5□□□: 10,000,000 operations min. B3F-9□□□: 1,000,000 operations min.
Ambient temperature	-25°C to 70°C (with no icing)
Ambient humidity	35% to 85%
Weight	6 x 6 mm models: approx. 0.25 g 12 x 12 mm models: approx. 0.85 g Radial models: approx. 0.25 g

Engineering Data

Operating Force vs. Stroke (Typical)
B3F-1□□□, -3□□□, -6□□□

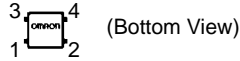


B3F-4□□□, -5□□□, -9□□□



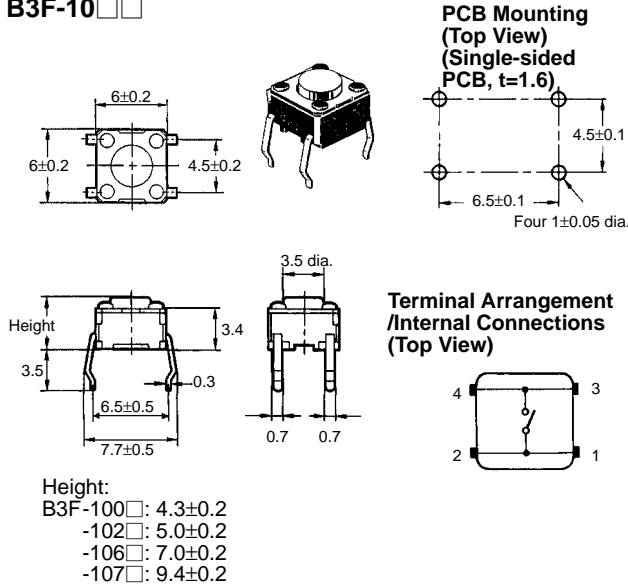
Dimensions

- Note:** 1. All units are in millimeters unless otherwise indicated. Unless otherwise specified, a tolerance of ± 0.4 mm applies to all dimensions.
 2. No terminal numbers are indicated on the Switches. The numbers used for terminals in the following graphics are indicated in the "Bottom View" diagram below. In this diagram, the Switch is rotated so that the terminals are on the right and left-hand sides, and the OMRON logo appears the right way up.

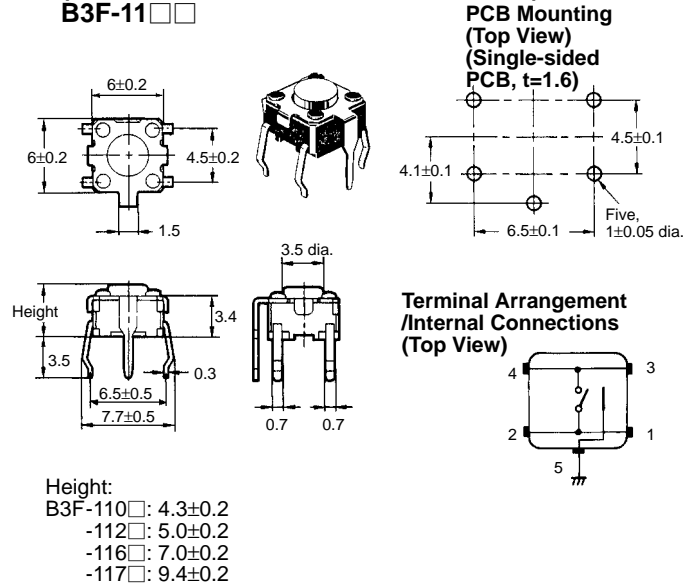


6 x 6 mm Models

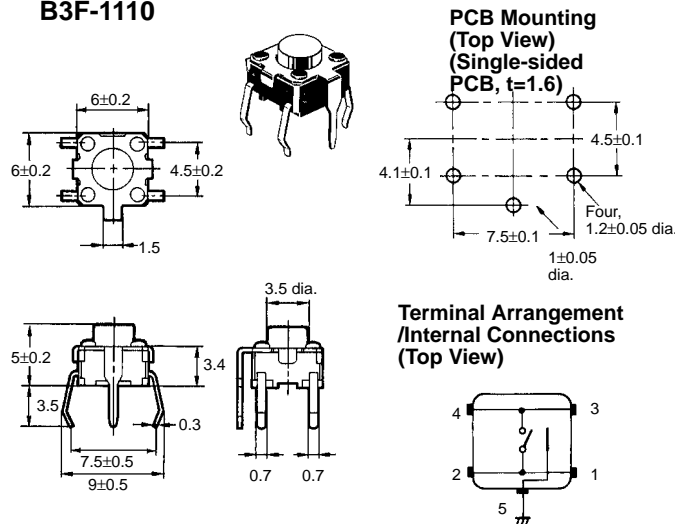
Horizontal, Flat Plunger Type (without Ground Terminal) B3F-10□□



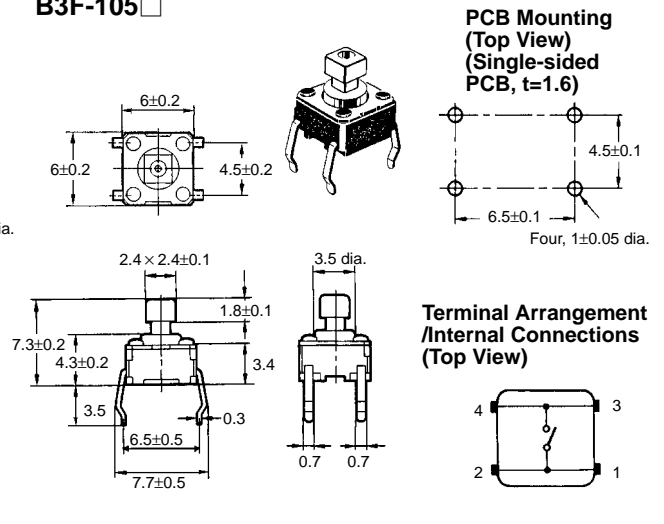
Horizontal, Flat Plunger Type (with Ground Terminal, Pitch: 6.5 mm) B3F-11□□



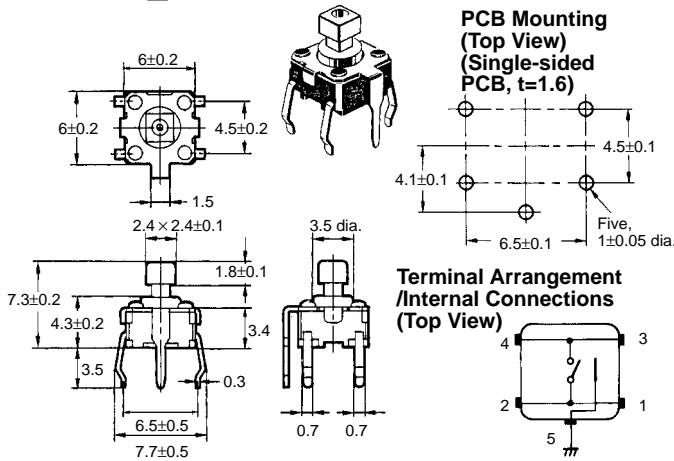
Horizontal, Flat Plunger Type (with Ground Terminal, Pitch: 7.5 mm) B3F-1110



Horizontal, Projected Plunger Type (without Ground Terminal) B3F-105□



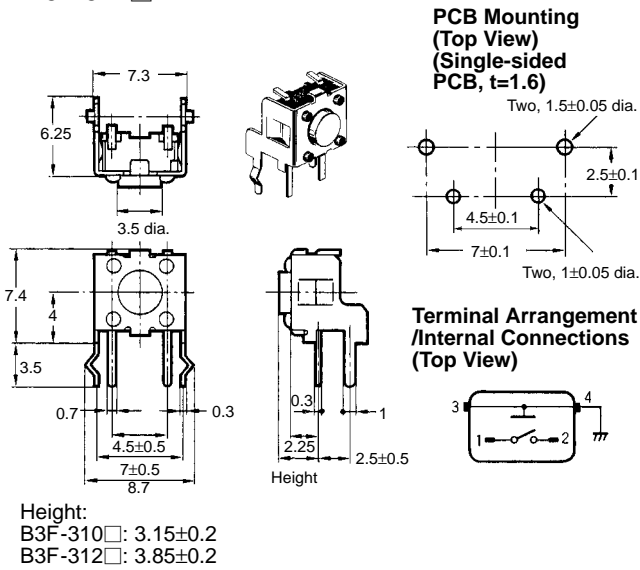
**Horizontal, Projected Plunger Type
(with Ground Terminal)
B3F-115□**



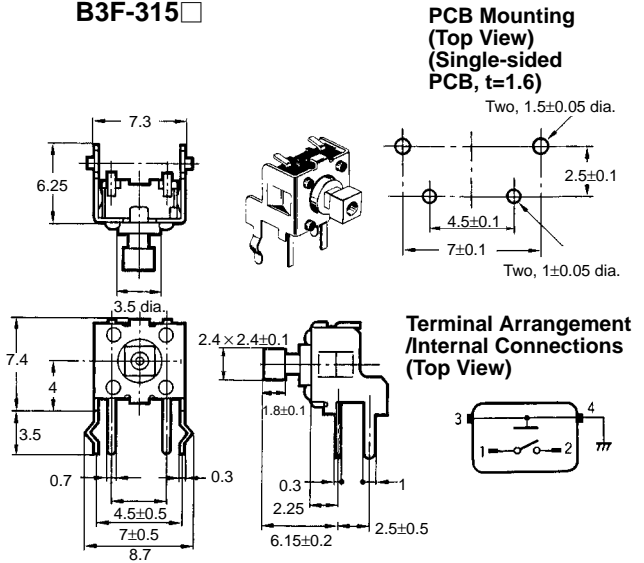
■ Operating Characteristics

Item	B3F-1□□0	B3F-1□□2	B3F-1□□5
Operating force (OF)	0.98±0.29 N {100±30 gf}	1.47±0.49 N {150±50 gf}	2.55±0.69 N {260±70 gf}
Releasing force (RF)	0.2 N {20 gf} min.	0.49 N {50 gf} min.	0.49 N {50 gf} min.
Pretravel (PT)	0.25 ^{+0.2} / _{-0.1} mm		

**Vertical, Flat Plunger Type
B3F-310□
B3F-312□**



**Vertical, Projected Plunger Type
B3F-315□**

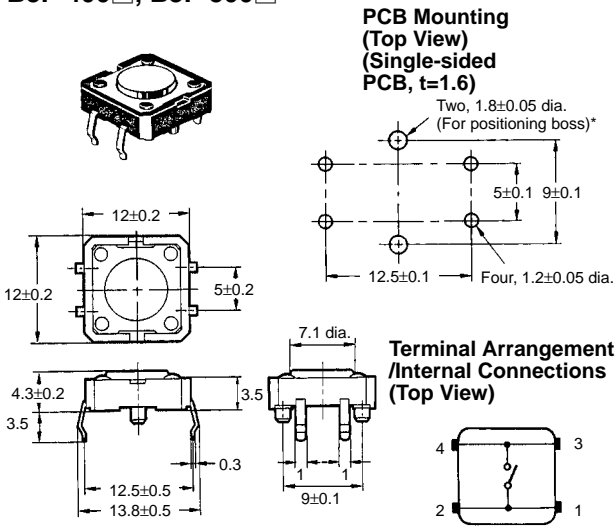


■ Operating Characteristics

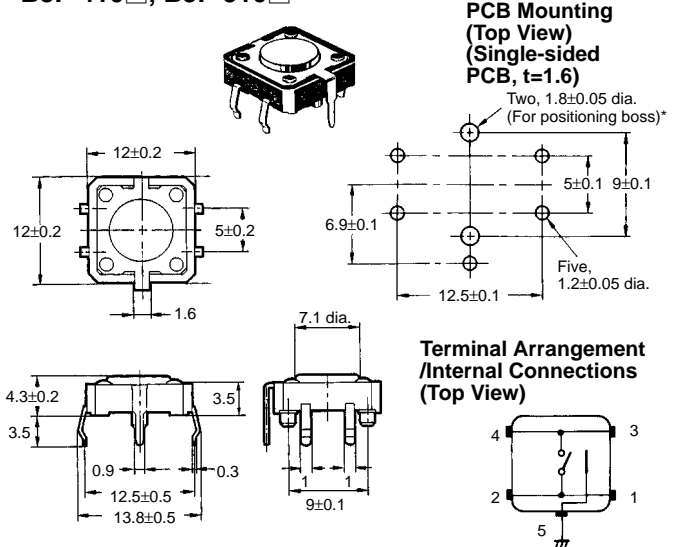
Item	B3F-3□□0	B3F-3□□2	B3F-3□□5
Operating force (OF)	0.98±0.29 N {100±30 gf}	1.47±0.49 N {150±50 gf}	2.55±0.69 N {260±70 gf}
Releasing force (RF)	0.2 N {20 gf} min.	0.49 N {50 gf} min.	0.49 N {50 gf} min.
Pretravel (PT)	0.25 ^{+0.2} / _{-0.1} mm		

12 x 12 mm Models

Flat Plunger Type (without Ground Terminal)
B3F-400□, B3F-500□

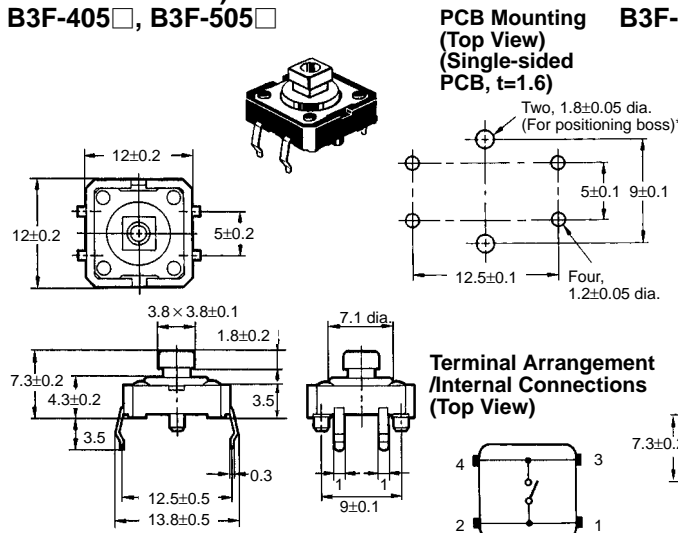


Flat Plunger Type (with Ground Terminal)
B3F-410□, B3F-510□

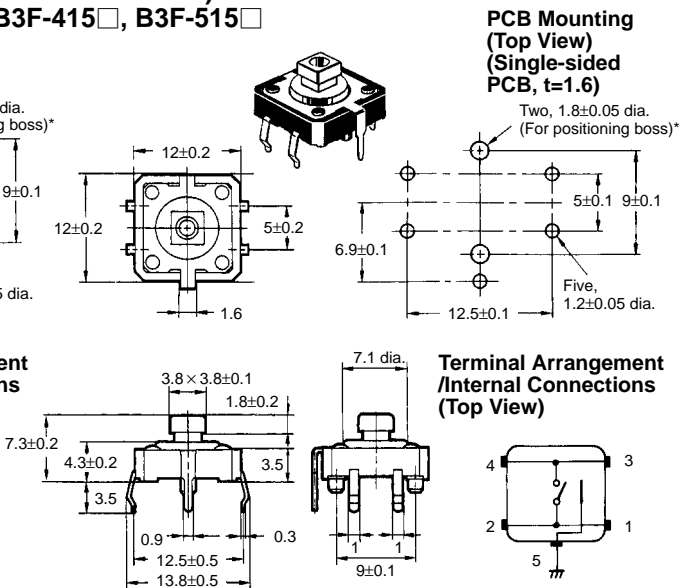


* Fit the projection of the Switch into this hole to secure the Switch.

Projected Plunger Type (without Ground Terminal)
B3F-405□, B3F-505□



Projected Plunger Type (with Ground Terminal)
B3F-415□, B3F-515□



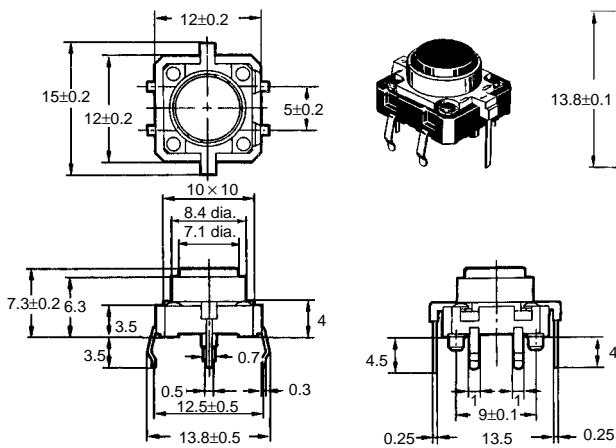
* Fit the projection of the Switch into this hole to secure the Switch.

■ **Operating Characteristics**

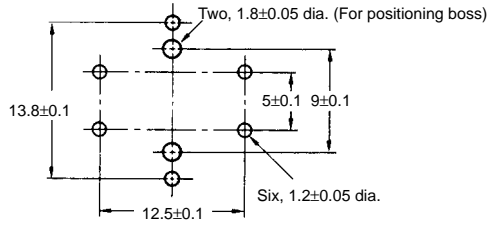
Item	B3F-4□□0, -5□□0, -5□□1	B3F-4□□5
Operating force (OF)	1.27±0.49 N {130±50 gf}	2.55±0.69 N {260±70 gf}
Releasing force (RF)	0.29 N {30 gf} min.	0.49 N {50 gf} min.
Pretravel (PT)	0.3 ^{+0.2} / _{-0.1} mm	

Surface Illumination Type

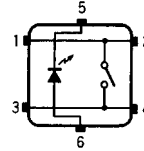
B3F-9□□□



PCB Mounting (Top View)



Terminal Arrangement / Internal Connections (Top View)



Operating Characteristics

Operating force (OF)	1.27±0.49 N {130±50 gf}
Releasing force (RF)	0.29 N {30 gf} min.
Pretravel (PT)	0.3 ^{+0.2} / _{-0.1} mm

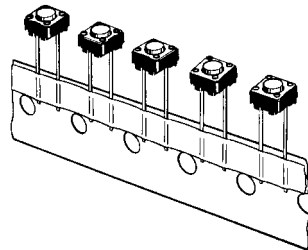
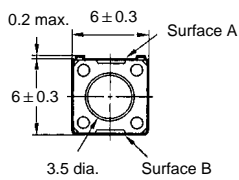
Built-in LED Performance

Item		Red	Yellow	Green
Forward voltage V _F	Standard value (V)	2.0	1.9	1.95
Forward current I _F	Standard value (mA)	20	10	10
Permissible loss P	Absolute maximum value (mW)	85	50	50
Reverse voltage V _R	Absolute maximum value (V)	5	5	5

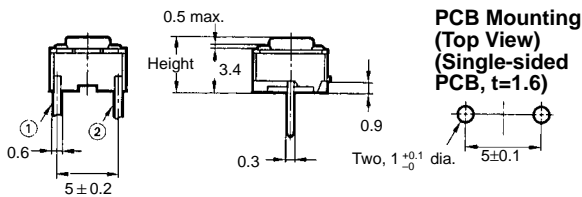
Note: Since the built-in LED doesn't contain any limiting resistors, externally connect limiting resistors within the limits shown in the above table.

Flat Plunger Type (without Ground Terminal)

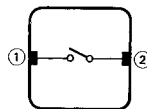
B3F-600□, 602□



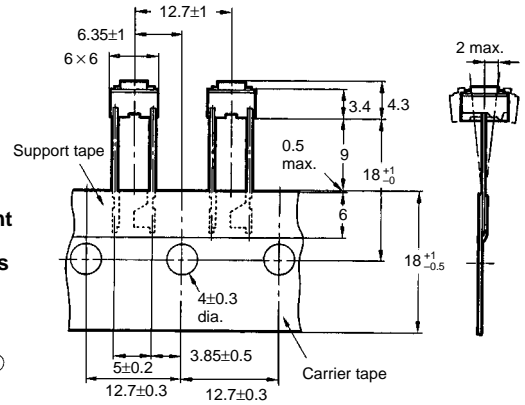
PCB Mounting (Top View) (Single-sided PCB, t=1.6)



Terminal Arrangement / Internal Connections (Top View)



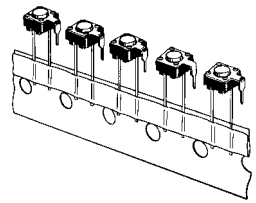
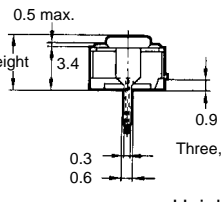
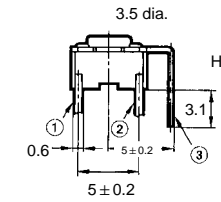
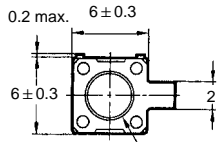
Tape-packaging Dimensions



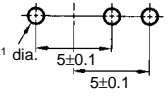
Note: The tape is random between surface A and surface B.

Height
 B3F-600□: 4.3 mm
 B3F-602□: 5.0 mm

**Flat Plunger Type
(with Ground Terminal)**
B3F-610□, -612□

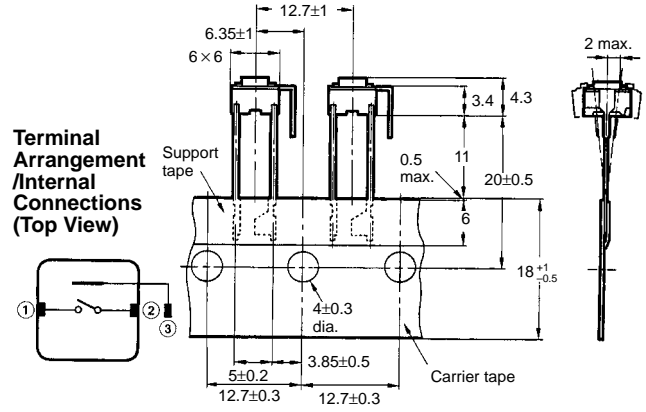


**PCB Mounting
(Top View)
(Single-sided
PCB, t=1.6)**

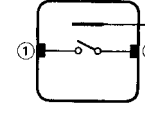


Height
B3F-610□: 4.3 mm
B3F-612□: 5.0 mm

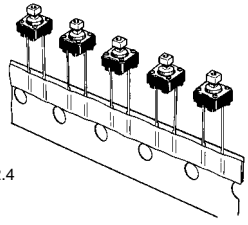
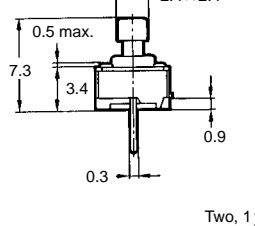
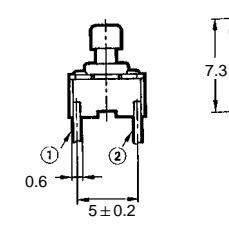
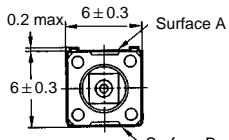
Tape-packaging Dimensions



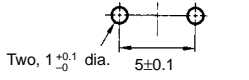
**Terminal
Arrangement
/Internal
Connections
(Top View)**



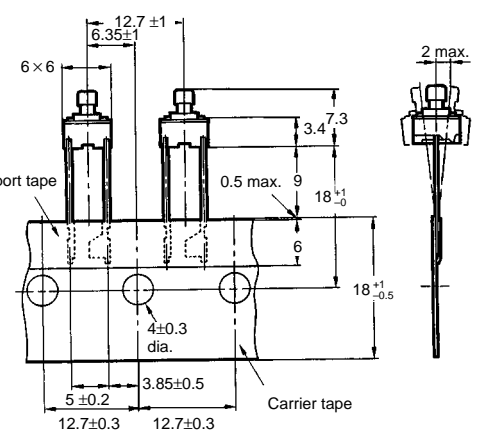
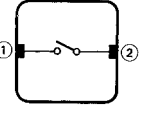
**Projected Plunger Type
(without Ground Terminal)**
B3F-605□



**PCB Mounting
(Top View)
(Single-sided
PCB, t=1.6)**

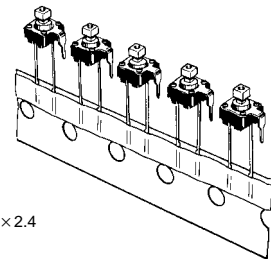
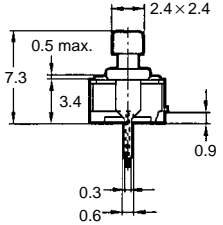
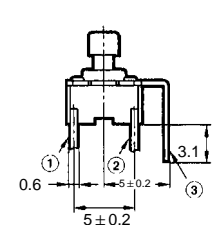
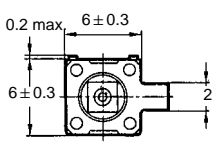


**Terminal
Arrangement
/Internal
Connections
(Top View)**

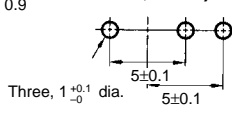


Note: The tape is random between surface A and surface B.

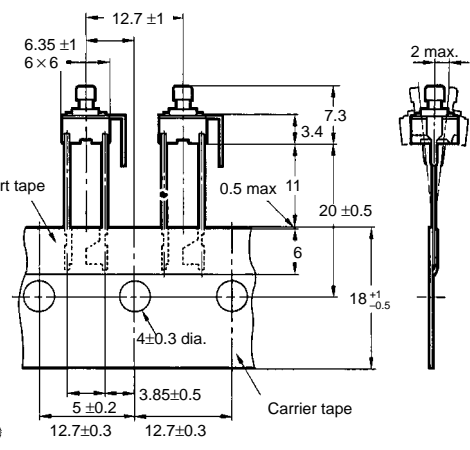
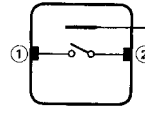
**Projected Plunger Type
(with Ground Terminal)**
B3F-615□



**PCB Mounting
(Top View)
(Single-sided
PCB, t=1.6)**



**Terminal
Arrangement
/Internal
Connections
(Top View)**



Operating Characteristics

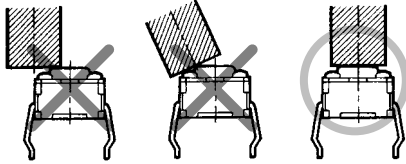
Item	B3F-6□□0	B3F-6□□2
Operating force (OF)	0.98±0.29 N {100±30 gf}	1.47±0.49 N {150±50 gf}
Reset force (RF min.)	0.2 N {20 gf}	0.49 N {50 gf}
Pretravel (PT)	0.25 ^{+0.2} / _{-0.1} mm	

Precautions

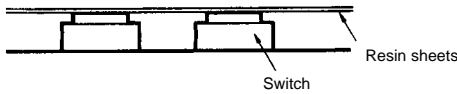
Operation

Do not repeatedly operate the Switch with excessive force. Applying excessive pressure or applying additional force after the plunger has stopped may deform the disc spring of the Switch, resulting in malfunction.

Be sure to set up the Switch so that the plunger will operate in a straight vertical line. A decrease in the life of the Switch may result if the plunger is pressed off-center or from an angle.



The Switches are not sealed and should be protected with a resin sheet as shown below when used in dust-prone environments.



PCB

The Switch is designed for a 1.6-mm-thick, single-sided PCB. Using PCBs that are different in thickness or using double-sided, through-hole PCBs may result in loose mounting, improper insertion, or poor heat resistance in soldering. Whether these problems arise or not will depend on the type of holes, patterns, etc. Therefore, it is recommended that a verification test is conducted before use.

Soldering

The Switch can be soldered automatically or manually.

The automatic soldering of the Switch on a 1.6-mm-thick, single-sided PCB must be completed within five seconds at a soldering temperature of 260°C maximum.

The manual soldering of the Switch on a 1.6-mm-thick, single-sided PCB must be completed within three seconds at a soldering iron tip temperature of 350°C maximum.

When using a multi-layer PCB, test the PCB in advance because the Switch mounted to the PCB may be deformed by heat if the pattern or land design is improper.

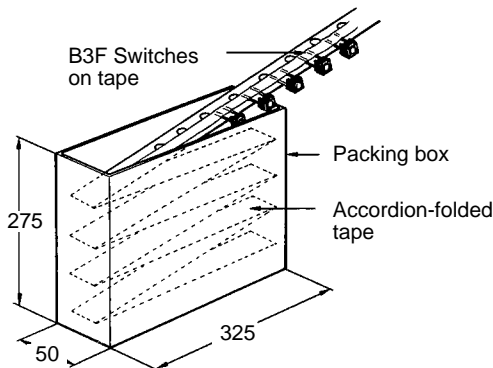
Soldering may be repeated only once at a minimum interval of five minutes if the Switch is not soldered properly.

Make sure that no flux will rise on the mounting surface of the PCB.

The flux should not be removed or rinsed off after soldering. Doing so may cause flux or dust on PCBs to get inside the Switch, resulting in malfunction.

Switch Packing (Taping Specification Models)

Switches with taping specifications are packed on tape as shown below.



Do not press strongly, vibrate, or drop the package, otherwise the terminals of the Switches may deform.

Pull out the tape slowly. Make sure that the tape is not entangled while pulling it out, otherwise the terminals of the Switches may deform.

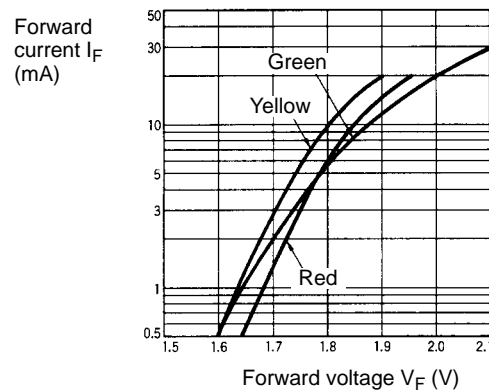
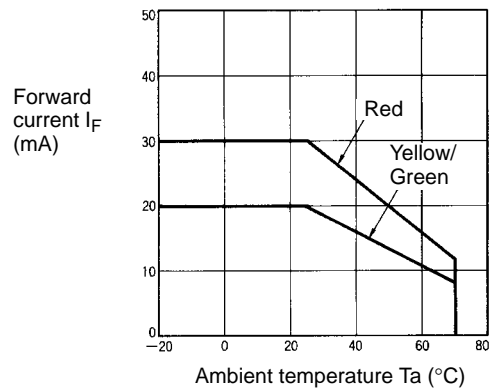
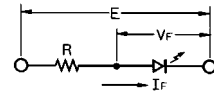
Do not store the package in locations with high temperature or high humidity. Use the Switches as soon as possible. The package made of paper is not tightly sealed. Storing the package in locations with high temperature or high humidity for a long time may result in the discoloration of the Switch terminals.

Indicators

Be careful with the polarity of the indicator. No polarity indication is given on the Switch. The side without the OMRON mark on the back surface of the Switch is the positive side.

Connect a limiting resistor to the indicator. Since the Switch does not contain any limiting resistor, obtain a limiting resistance according to the following formula depending on the voltage to be used so as to satisfy indicator characteristics.

$$\text{Limiting resistance [R]} = \frac{\text{Voltage used [E]} - \text{Indicator forward voltage [V}_F\text{]}}{\text{Indicator forward current [I}_F\text{]}} \text{ (\Omega)}$$



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. A070-E1-4A