To:

Light touch switch and Detector switch Product Introduction for Earphone and Hearing aid

April/2025

Panasonic INDUSTRY

IN Your Innovation

Light touch switch for Earphone and Hearing aid

Light touch switch for earphone and hearing aid

Volume・Power key

IP67

EVPBB

2.6mmx1.6mm
h=0.5mm, 0.53mm,
0.55mm, 0.57mm
Travel: 0.08mm,0.11mm
Life: 200K,500K cycles

EVPAA

3.5mmx2.9mm
h=1.7mm
Travel: 0.15mm
Life: 100K～1000K cycles

EVPAV

2.8mmx2.3mm
h=1.95mm
Travel: 0.13mm
Life: 300K cycles

IP67

EVPBL

2.8mmx1.9mm
h=0.53mm, 0.57mm, 0.6mm
Travel: 0.15mm
Life: 300K cycles

IP67

EVPAW

3.0mmx2.0mm
h=0.6mm
Travel: 0.13mm,0.15
Life: 300K,500K cycles

IP67

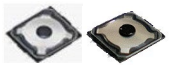
EVPAT

3.4mmx1.7mm
h=1.65mm
Travel: 0.08mm,0.11mm
Life: 500K cycles

Others

IP67

EVPBK



4.9mmx4.0mm
h=0.63mm , 0.7mm
Travel: 0.2mm,0.23mm
Life: 1000K cycles

IP67

EVPAY

3.4mmx2.9mm
h=0.7mm
Travel: 0.15mm
Life: 500K cycles

EVPAX

3.0mmx2.6mm
h=0.7mm
Travel: 1st 0.07mm
2nd 0.16mm
Life: 100Kcycles

IP67

EVPAK

3.9mmx2.05mm
h=1.6mm
Travel: 0.12mm
Life: 500K cycles

Needs trend for earphone, hearing aid and the features of light touch switches

Small size, good click feel, and high reliability such as dustproof, waterproof, and flux resistance

Hearing aid
Volume・Power key etc.

- ✓ Small size
- ✓ Dustproof and waterproof
- ✓ Flux resistance and quiet operation
- ✓ Good operability and click feel

Wireless earphone and Headphone
Volume・Power key etc.

- ✓ Small size
- ✓ Dustproof and waterproof
- ✓ Flux resistance and quiet operation
- ✓ Good operability and click feel

Intermediate remote control and other applications
Volume・Power key etc.

- ✓ Dustproof and waterproof
- ✓ Flux resistance and quiet operation
- ✓ Good operability and click feel

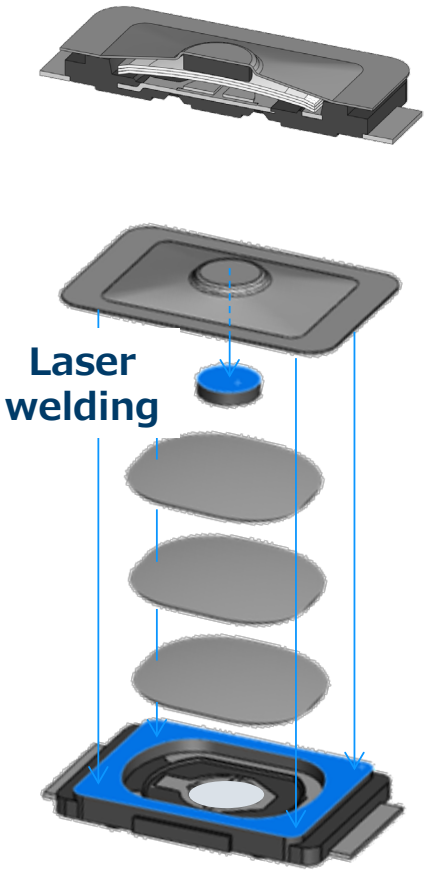
1. Dustproof, Waterproof, Flux resistant
- High waterproofness due to the sealing structure by laser welding.
- High flux resistance due to terminal surface treatment.

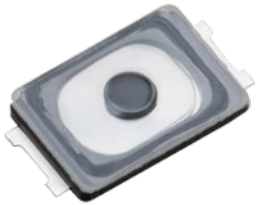
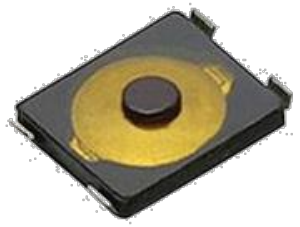
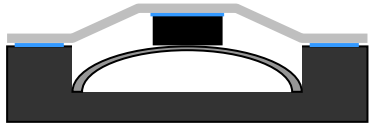
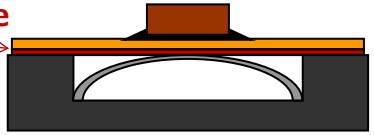
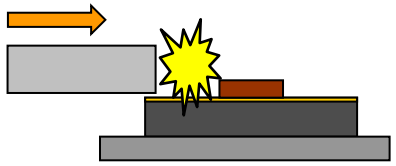
2. Quiet operation, High strength, Design appeal
- Control the operation sound while maintaining the click feel.
- High peel strength due to edge-mounted construction. (substrate delamination)

3. Good operability, Click feel
- Good operability and click feel due to the structure with push plate.
- Good operability and click feel due to the in-house metal dome.

Dustproof, Waterproof | Laser Welding Technology

Laser welded push plate-film & film-molding case

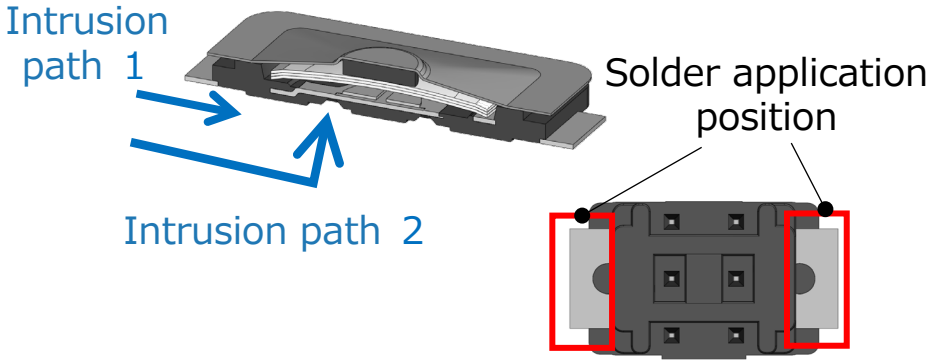


Feature	Laser welding	Film adhesive
Water-proof / Oil resistance		
Good click feeling	Switch click feeling ≒ Metal dome click feeling 	Switch click feeling ≒ Metal dome click feeling +adhesive influence 
Easy assembling	Inner actuator (The actuator is under the cover film) 	The actuator is sticking out on the surface 

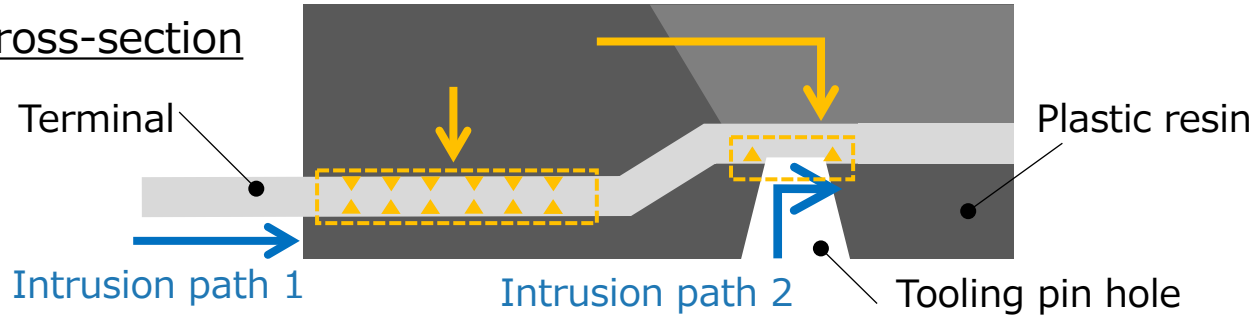
Flux resistant | Blast Treatment Technology

Improved waterproofing and flux ingress resistance to reduce defects during mounting

Switch



Cross-section



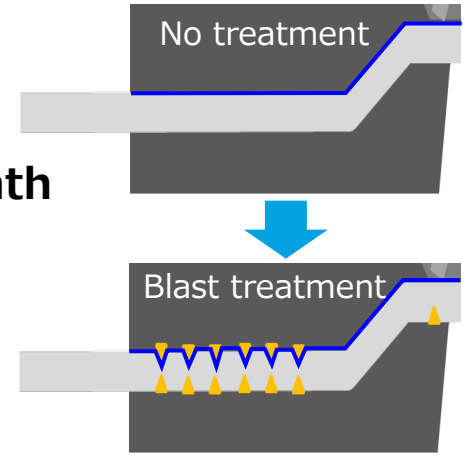
Effect of blast treatment

1. Strong adhesive between terminal & plastic resin

Higher adhesive
by anchor effect.

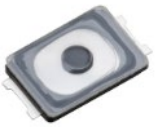
2. Extended length of intrusion path

Longer path
by rough surface.



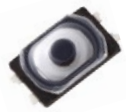
Products with blast treatment

3.0mm x 2.0 mm SMD LTSW



2.8mm x 1.9 mm SMD LTSW

2.6mm x 1.6 mm SMD LTSW



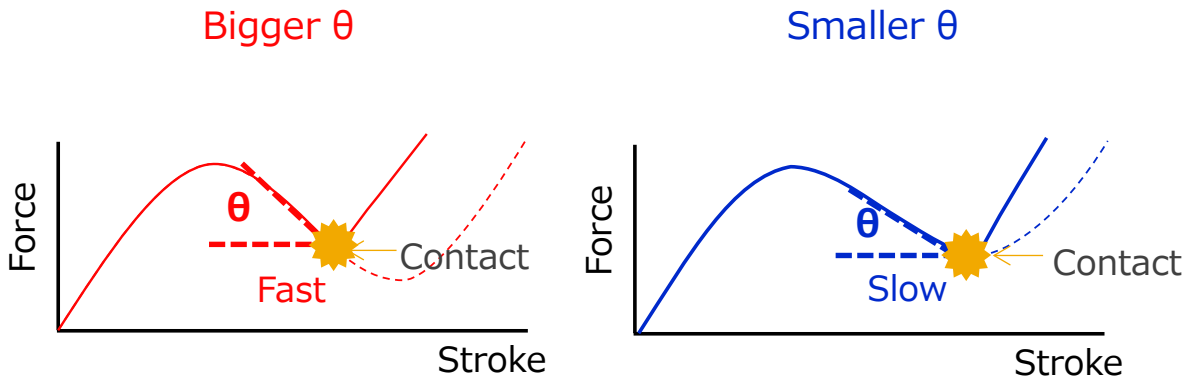
Dustproof, Water-proof, Flux resistant

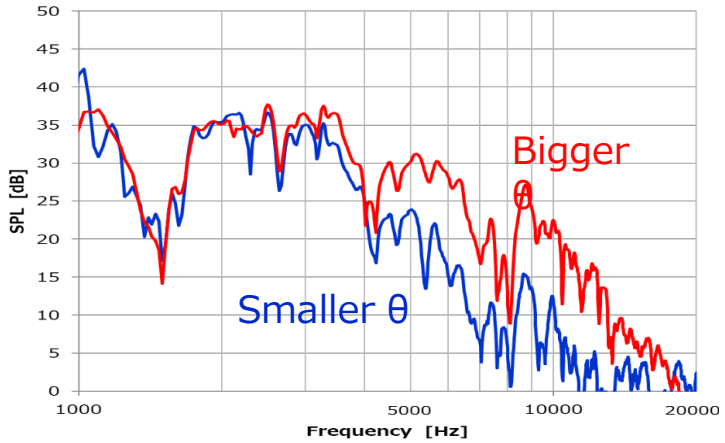
Higher waterproof performance compared IP67

Dustproof / Water-proofing	IP6x	IPx7	Resist-Flux /UF intrusion
Condition	• Dust : Talc (Type 4) • Density: 2kg/m^3 • Duration of test: 8h • No switch push	• Test agent: Water • Submerged depth: 1.0m • Submerged time: 30 min. • No switch push in water	• Solder paste: Indium 8.9HF • Solder volume : 0.324mm^3 ※4 x Panasonic recommendation • UF coating : UF3808 • Volume : 1.5 mg
Criteria	• No dust ingress to the inside of switch	• Mechanical & Electrical characteristic met spec	• Flux intrusion • UF intrusion
3.0mm x 2.0 mm SMD LTSW	**OK**	**OK**	**OK**
2.8mm x 1.9 mm SMD LTSW			
2.6mm x 1.6 mm SMD LTSW			

Operational sound evaluation technology

Control the operational sound while maintaining the click feeling

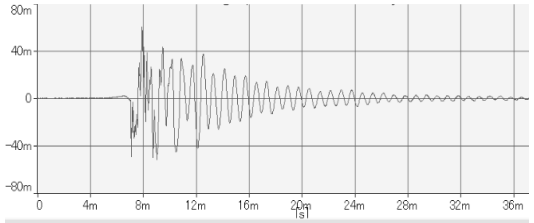




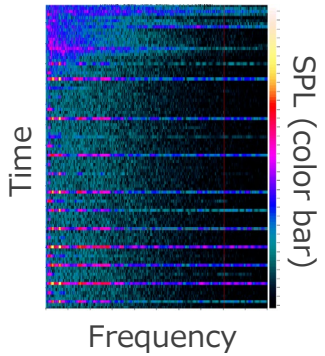
Sound measurement environment and analysis


Anechoic room(<NC20)

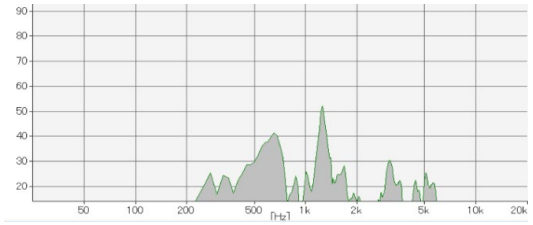
SPL-Time characteristics


time [ms]

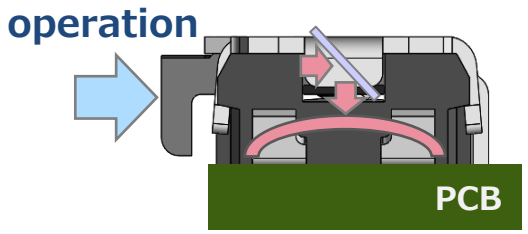
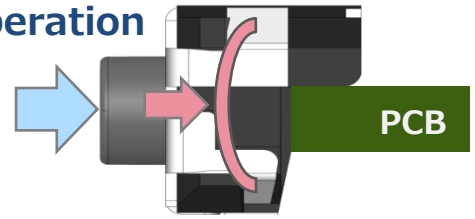
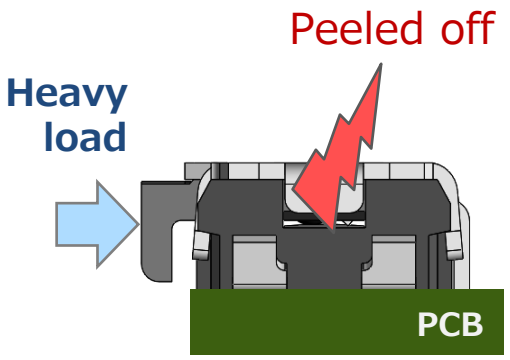
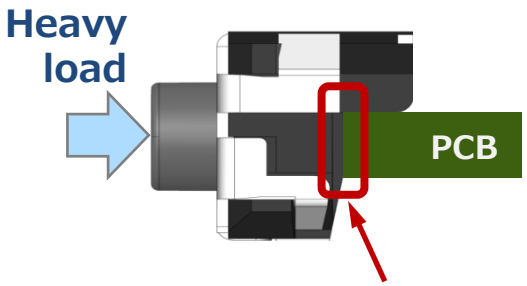
FFT



SPL-Frequency characteristics

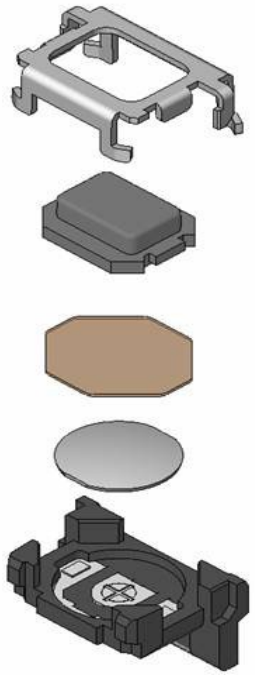

frequency [Hz]

High peel strength due to edge-mounted construction (substrate delamination)

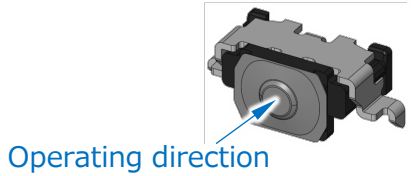
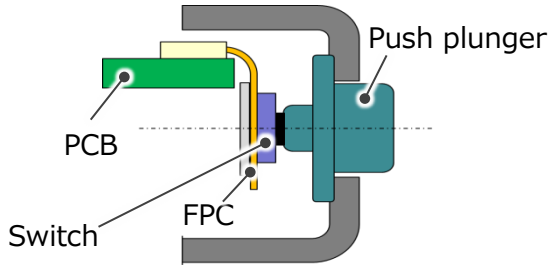
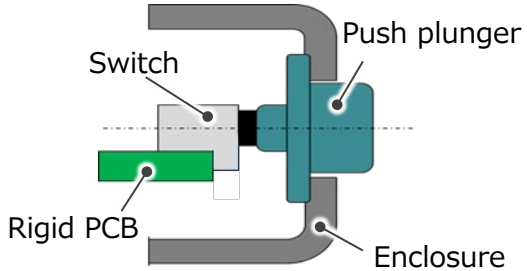
	Past	Edge-mount Type
Good feeling Long life	Converts force direction 90° (friction occurs)  Bad feeling due to friction	 Directly push the movable contactor (without any influence of friction, etc.) Good feeling
High peel-off strength		 Edge of PCB stops switch from peeled off

EVPAE

4.5mmx2.2mm
h=2.9mm
Travel: 0.13mm,0.15mm
Life: 200K cycles

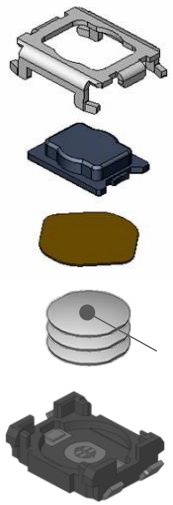


Rigid PCB mounting is possible for button placement on the side of the Enclosure

	Top push	Side push
Operating direction	Operating direction is **perpendicular** to PCB 	Operating direction is **horizontal** to PCB 
Structure around button for side key		
Advantage	✓ A lot of flexibility in device design, ✓ Higher peeling off strength.	✓ Can design thinner device thickness, ✓ Cost-competitive because of no FPC.
Dis-advantage	✓ XY dimension of switch influences on device thickness. ✓ Not so cost-competitive because of FPC.	✓ Limited flexibility because of PCB position. ✓ Concerning about peeling off switch from rigid PCB.

Ensure reliability by optimal number of metal dome／our plating technology

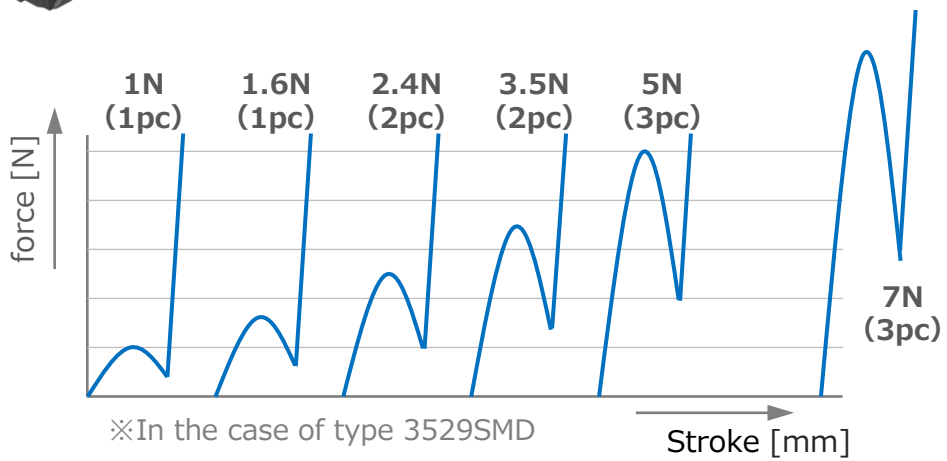
Metal dome



Multiple metal dome

Adjust the number of metal domes based on required operation force and life cycle

Achieve high operation force/ long life by dispersing stress with multiple metal dome structure.

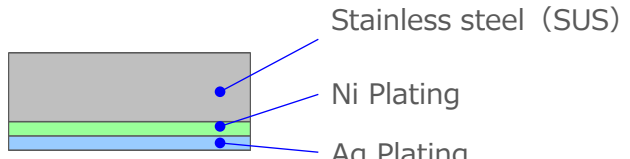
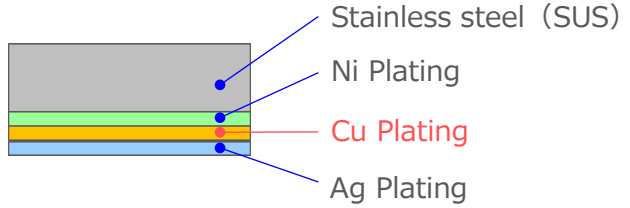


※In the case of type 3529SMD

Plating

Our plating is more difficult to be worn down from high operation force and long push.

Plating Structure

	Plating
General	
Panasonic	

Prevents plating worn-down by improves adhesion of plating by inserting Cu plating between Ag and Ni.

Detector switch for Earphone and Hearing aid

Detector switch for earphone, Rechargeable hearing aid and headphone

Earphone or Rechargeable hearing aid insertion detection

・Insertion detection of earphones
or Rechargeable hearing aid into charging case
・Space-saving arrangement by small switch

ESE13

4.2mmx3.6mm
h=1.2mm

ESE16

2.2mmx3.35mm
h=1.5mm

・Detection of movement and position of the set

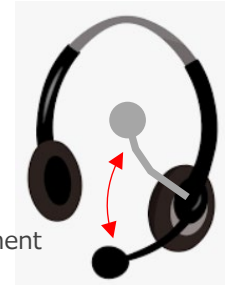
ESE13

4.2mmx3.6mm
h=1.2mm

ESE18

4.0mmx4.4mm
h=1.2mm

Microphone position detection



・Space-saving arrangement
by small switch

ESE16

2.2mmx3.35mm
h=1.5mm

ESE58

3.5mmx3.0mm
h=0.9mm

Cover open/close detection

・Space-saving placement with small switches
・Normally closed specifications reduce power

ESE13

4.2mmx3.6mm
h=1.2mm

ESE16

2.2mmx3.35mm
h=1.5mm

ESE58

3.5mmx3.0mm
h=0.9mm

Others

・As an operation switch (input device),
detection for function and mode switching
・Space-saving detection of special operations
such as slide, seesaw and rotation

・Two-way automatic return type

ESE23

4.4mmx5.0mm
h=1.5mm

・Space-saving arrangement by small switch

ESE16

2.2mmx3.35mm
h=1.5mm

ESE58

3.5mmx3.0mm
h=0.9mm

Needs trend for earphone and the features of Detector switches

Detector switches supports a variety of applications

Wireless earphone
or
Rechargeable hearing aid

Insertion detection
Cover open/close detection

- ✓ Small and thin
- ✓ Lightweight
- ✓ Light operation force

1. Designability

- Compatible with various operation modes
- Plenty of substrate mounting modes

- ✓ Reduction of power consumption
- ✓ High reliability

2. Reduction of power consumption

- Reduce power consumption of sets by using normal close specifications

Headphone

Microphone position detection
Detection of various operations

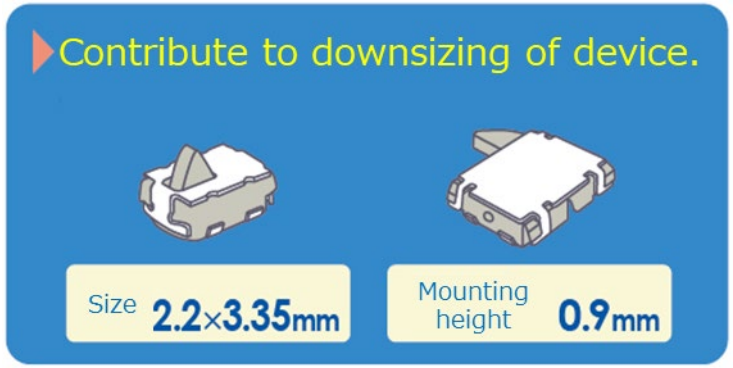
- ✓ Improved operability

3. Proposal of various operation switches

- Realization of various operation switches such as rotation operation, slide operation, seesaw operation, etc.

Detector switches | Designability

- Small and abundant detection direction, operation mode and mounting method improve design freedom.
- Overstroke (through operation) allows detection of large movement amount even though it is small SW.

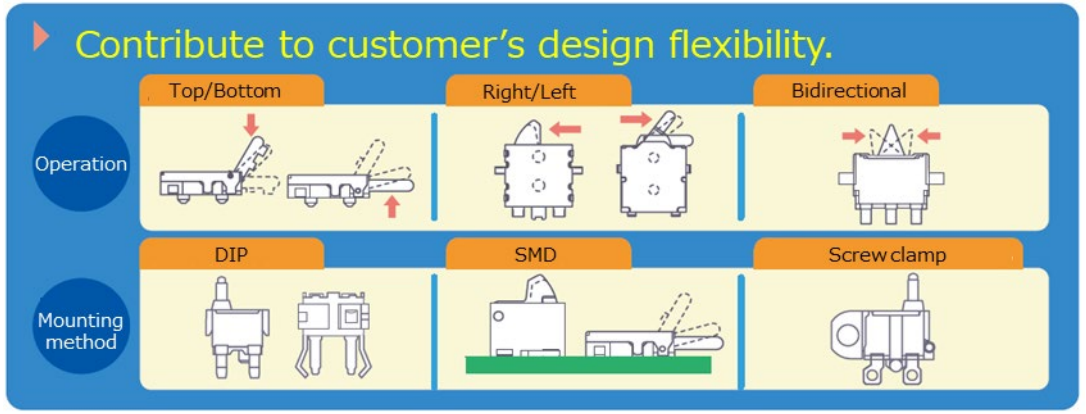


ESE16type

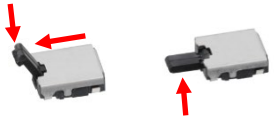
circuits: N.O circuits
direction of operation:
vertical, horizontal
(Horizontal can be operated through)

ESE58type

Circuit: N.O & N.C Circuit
Operating direction: Horizontal, each two directions
(Horizontal operation can be performed through)

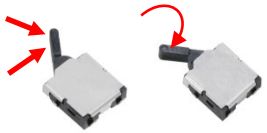


ESE13type



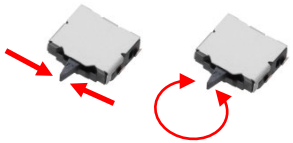
Vertical detection on PCB

ESE18type



Horizontal detection on PCB

ESE23type

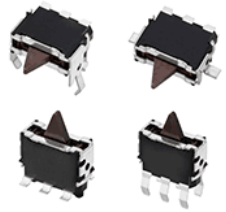


Two-way detection

ESE11type

ESE22type

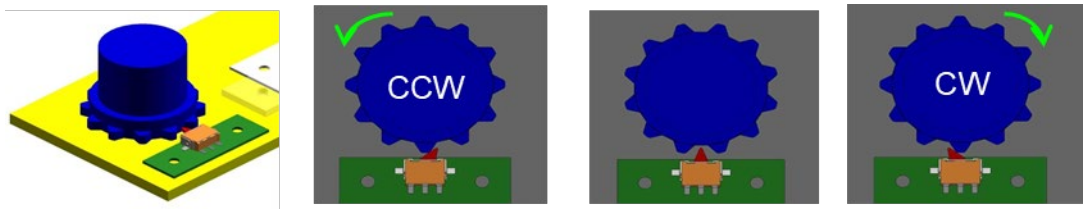
ESE24type



N.O= Normally open type, N.C= Normally Closed Type

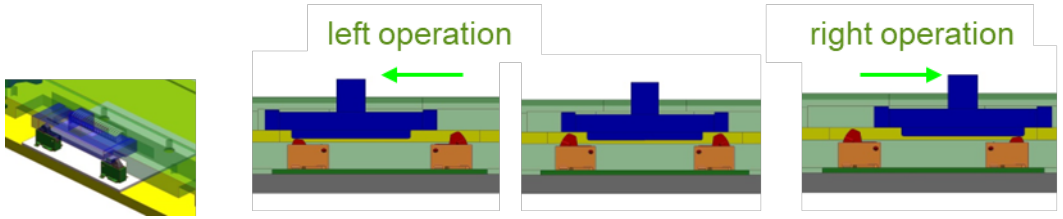
Enables set rotation, sliding, and seesaw operations

rotational operation

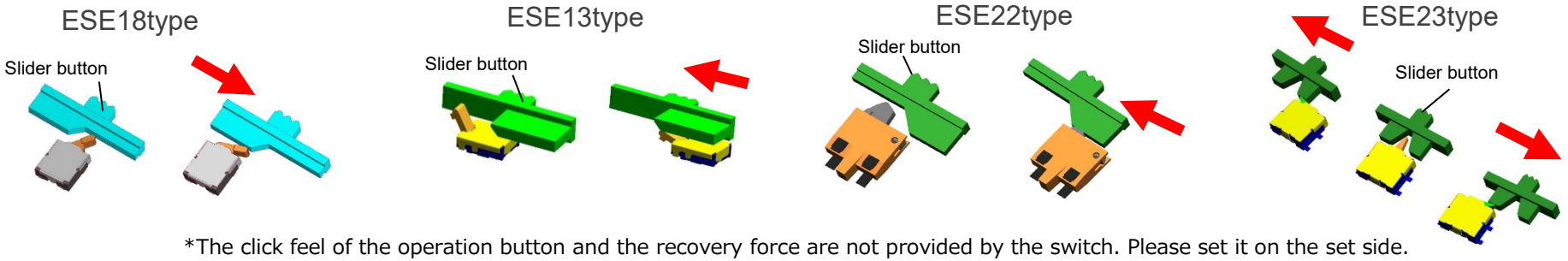


seesaw operation

slide operation

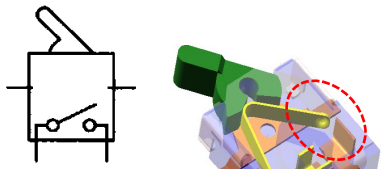
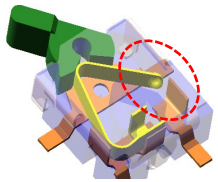
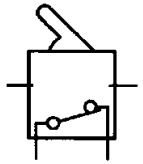
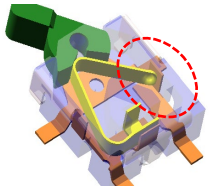
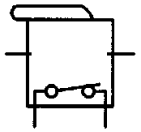
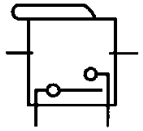


Slide operations (example)

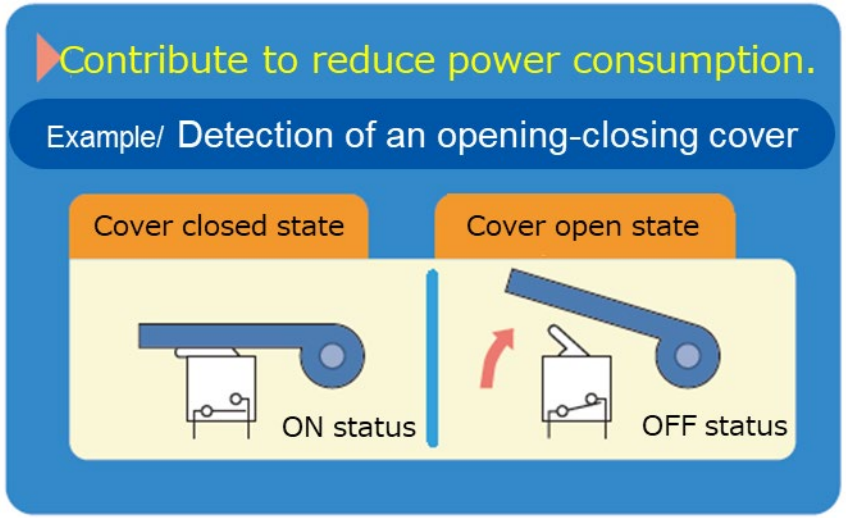


*The click feel of the operation button and the recovery force are not provided by the switch. Please set it on the set side.
*The switch is not dustproof or waterproof. Please set it on the set side.

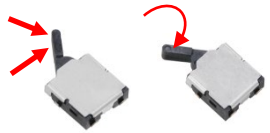
Switch with several circuit choices helps save power to the set

	N.O. (Normally Open type)	N.C. (Normally Closed type)
Normal position	 OFF 	 ON 
Lever Pressing	 ON	 OFF

<Compatible with normally closed (N.C.) specification>
Type that **turns ON when operated (Normally open)**
Type that **turns OFF when operated (Normally closed)**



ESE18type



Body Size (mm) : 4.0×4.4×H1.2

ESE58ype

Body Size (mm) : 3.5×3.0×H0.9

Circuit: N.O Circuit & N.C Circuit
Operation direction: PCB in two horizontal directions
(through operation is possible for horizontal operation)

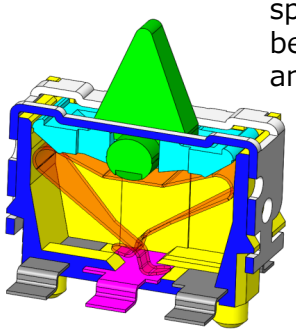
Self-cleaning structure ensures high reliability of contacts

Ensure high contact reliability with Original structure of plate spring wiping contacts.

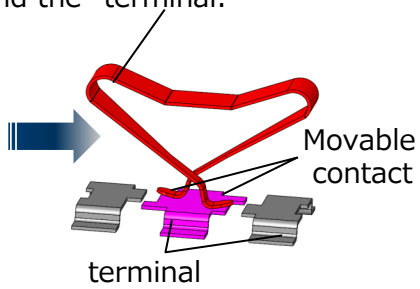
- Quality stability with simple structure
- Long life
- Stable manufacturing

Structure (example)

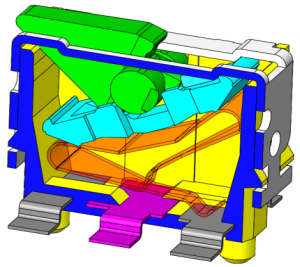
ESE24type
normal state



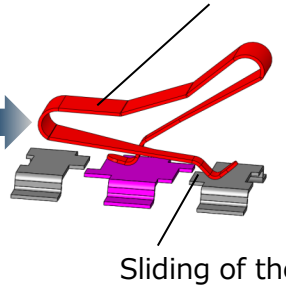
The spring force of the leaf spring makes stable contact between the "movable contact" and the "terminal."



Example of lever left operation



The "movable contact" of the operated leaf spring slides on the "terminal" and makes stable contact

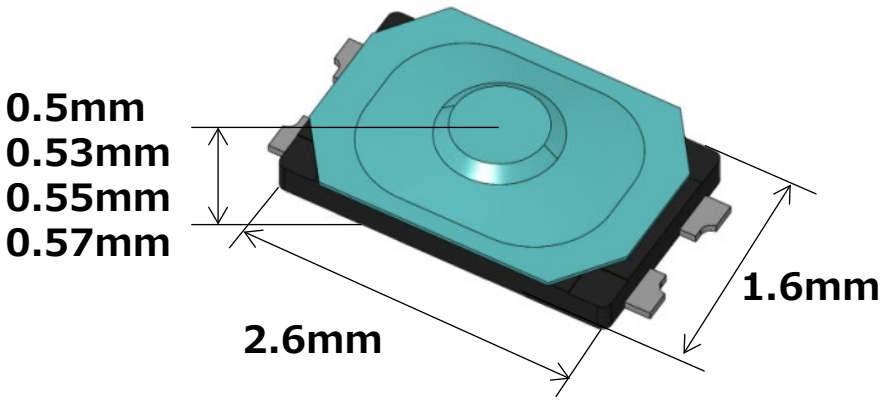


Leaf springs (movable contacts) provide stable quality and manufacturing through integrated automatic assembly from mold processing to assembly of raw materials.

Product leaflet

Top operational switch with small width dimension (1.6mm)

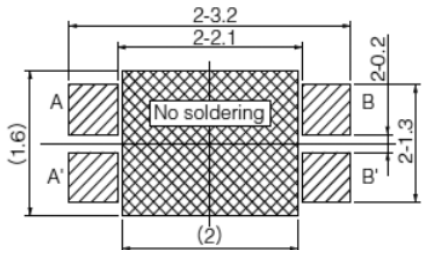
Dimension



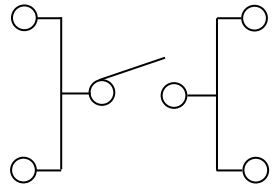
Features

* Small width dimension (1.6mm)
* Good feeling
  (Click ratio ability target 50%)
* High resistance against coating
  by laser welding

Land Pattern



Circuit diagram

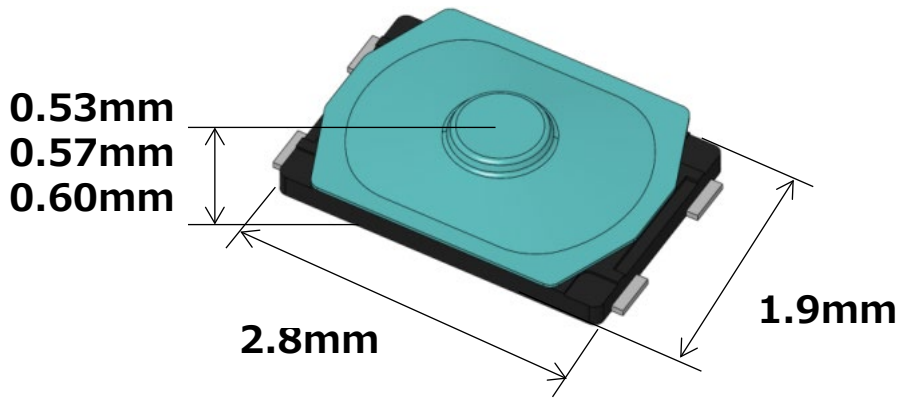


Major specifications

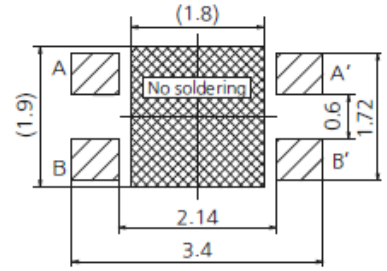
* Operating force : 0.7N, 1.0N, 1.6N, 2.4N, 3.0N
* Click ratio : 30% min.(0.7N,1.0N,3.0N),
  40% min.(1.6N,2.4N)
* Travel : 0.08mm(0.7N,1.0N),
  0.11mm(1.6N,2.4N,3.0N)
* Life cycle : 500K(1.0N,1.6N,2.4N,3.0N),
  200K(0.7N)
* IP67

Top operational switch with small width dimension (1.9mm)

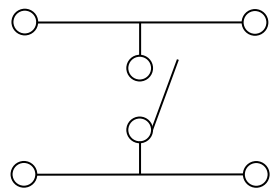
Dimension



Land Pattern



Circuit diagram



Features

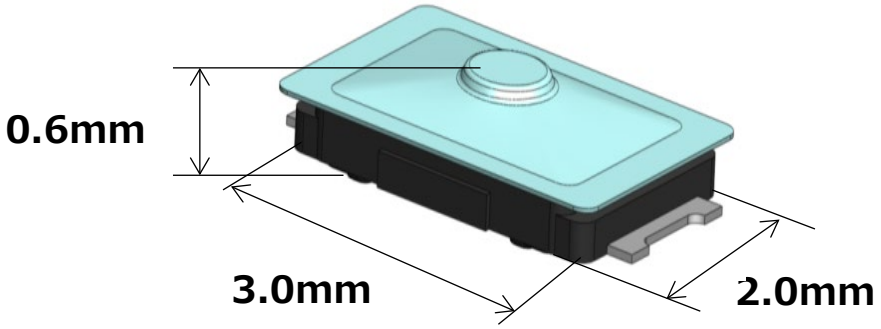
* Small width dimension
* Good feeling
  (Click ratio ability target 50%)
* High resistance against coating
  by laser welding

Major specifications

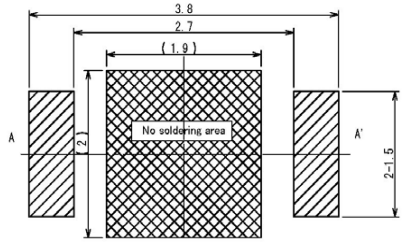
* Operating force : 0.7N, 1.6N, 2.25N, 3.0N
* Click ratio : 30% min.
* Travel : 0.11mm(0.7N)
  0.15mm(1.6N,2.25N,3.0N)
* Life cycle : 300K
* IP67

Top operational switch with small width dimension (2.0mm)

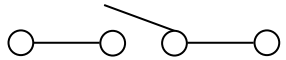
Dimension



Land Pattern



Circuit diagram



Features

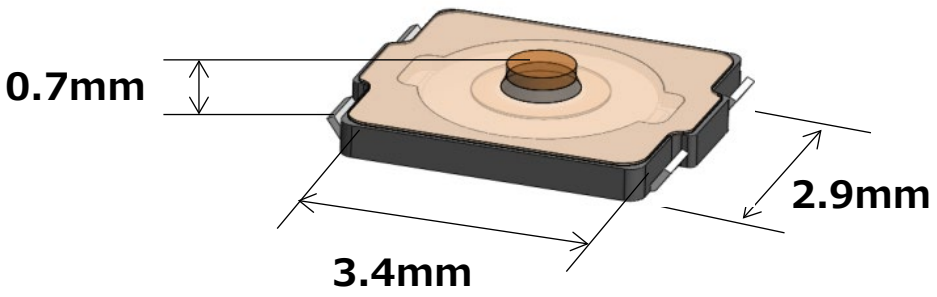
* Small width dimension (2.0mm)
* Good feeling
  (Click ratio ability target 50%)
* High resistance against coating
  by laser welding

Major specifications

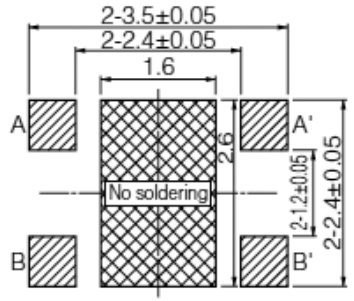
* Operating force : 1.6N, 2.4N, 3.0N,3.3N
* Click ratio : 40% min.
* Travel : 0.13mm (1.6N,2.4N), 0.15mm (3.0N,3.3N)
* Life cycle : 500K(1.6N,2.4N),300K(3.0N,3.3N)
* IP67

Top operational switch with small depth dimension (2.9mm)

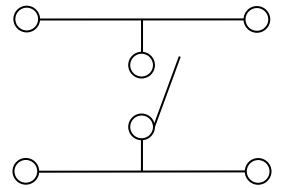
Dimension



Land Pattern



Circuit diagram



Features

*Small width dimension

*Good click feeling by spacer film
(only for 1.6N)

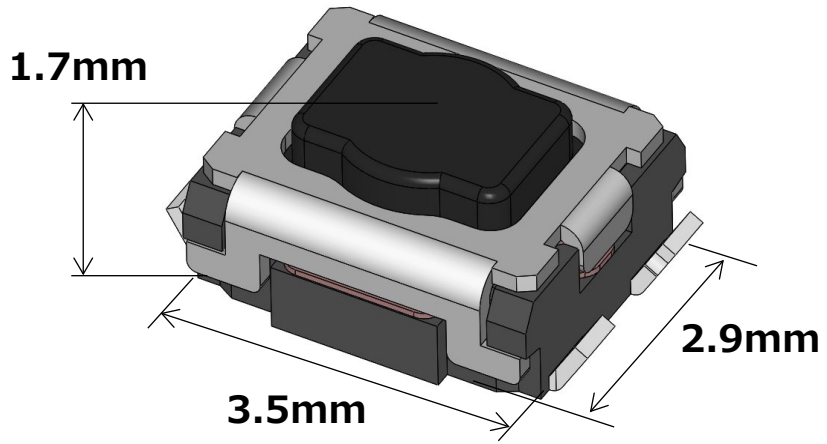
*Good click feeling by actuator

Major specifications

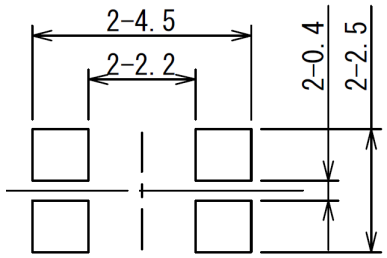
* Operating force : 1.6N, 2.4N
* Click ratio : 30% min.
* Travel : 0.15mm
* Life cycle : 500K
* IP67

High operation force switch(Max. : 7.0N)

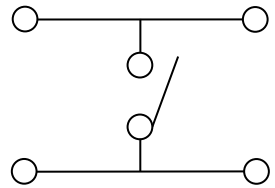
Dimension



Land Pattern



Circuit diagram



Features

* High operation force is available (Max. : 7.0N)
* With ground terminal type is available
* Vehicle compatible products

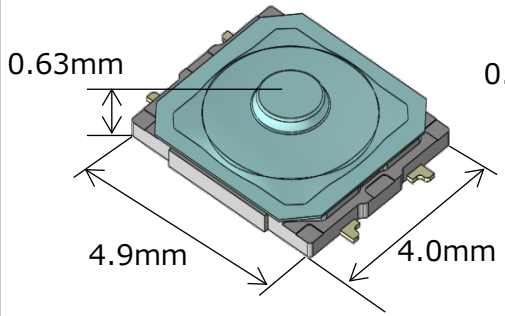
Major specifications

* Operating force : 1.0N, 1.6N, 2.4N, 3.5N, 5.0N, 7.0N
* Click ratio : 35% min.(3.5N,5.0N), 30±20%.(7.0N)
* Travel : 0.15mm
* Life cycle :1,000K(1.0N),
  200K(1.6N,2.4N,3.5N, 5.0N(High load type)),
  100K(5.0N,7.0N)

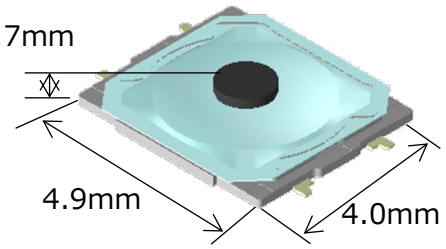
Top operational switch with small height dimension

Dimension

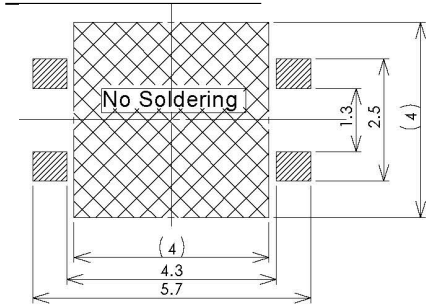
Inner actuator



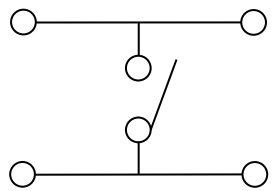
Outer actuator



Land Pattern



Circuit diagram



Features

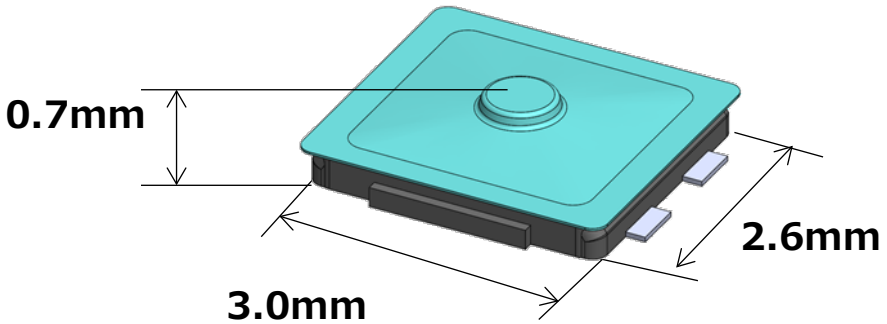
* Small height dimension
* Good feeling
  (Click ratio ability target 50%)
* High resistance against coating
  by laser welding

Major specifications

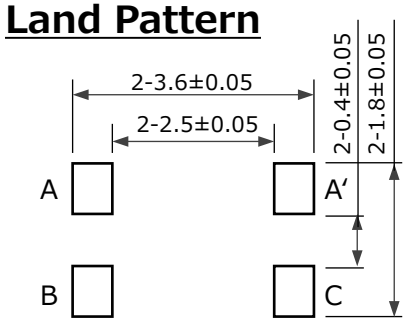
* Operating force : 1.65N, 2.5N
* Click ratio : 40% min.
* Travel : 0.2mm(1.65N),0.23mm(2.5N)
* Life cycle : 1,000K
* IP67

Double Action switch with small width dimension (2.6mm)

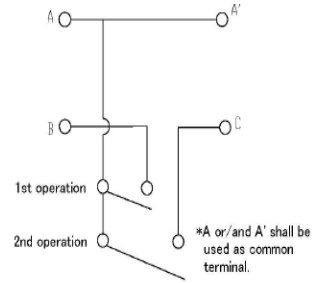
Dimension



Land Pattern



Circuit diagram



Features

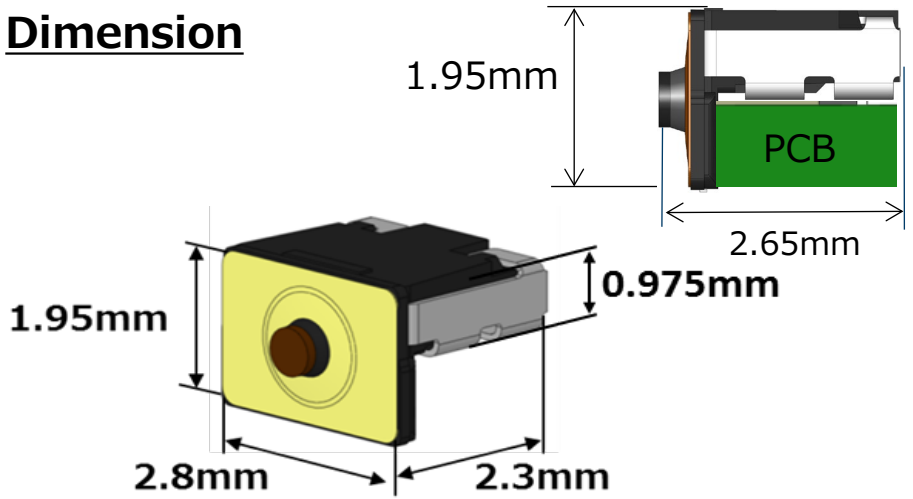
* Small width dimension
* Double Action functionality
* High peel strength by laser welding

Major specifications

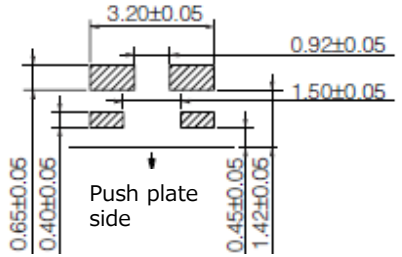
* Operating force : 1st 0.7N, 2nd 2.0N
* Travel : 1st 0.07mm, 2nd 0.16mm
* Life cycle : 100K

High soldering strength with depth dimension(2.3mm)

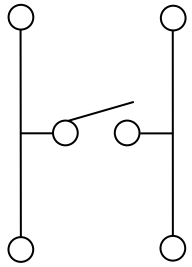
Dimension



Land Pattern



Circuit diagram



Features

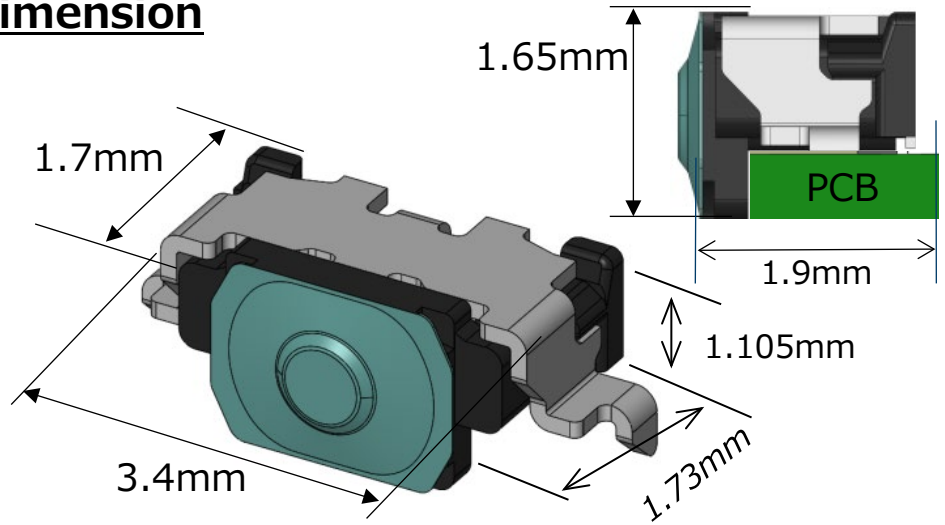
* FPC less: Cost reduction of the set
* High solder strength
* Good click feeling by actuator

Major specifications

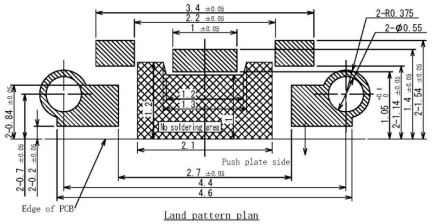
* Operating force : 1.6N
* Travel : 0.13mm
* Life cycle : 300K

Side operational switch with small depth dimension (1.7mm)

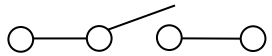
Dimension



Land Pattern



Circuit diagram



Features

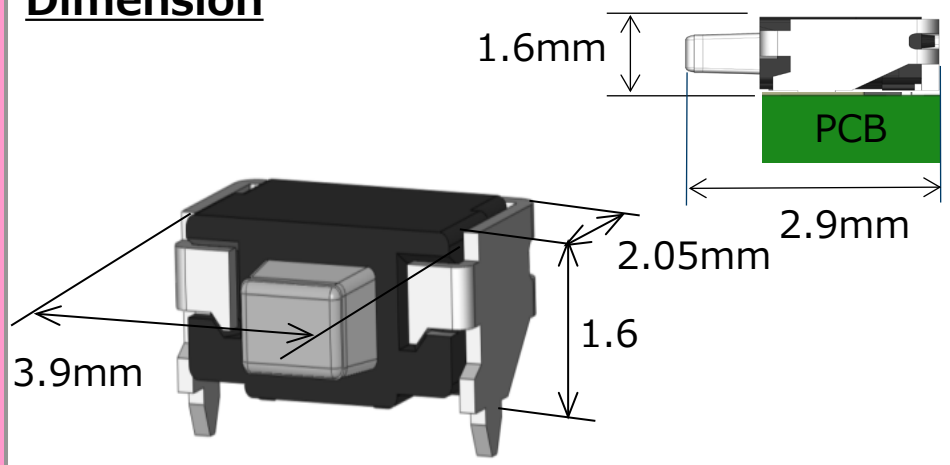
* Small size contributes smaller set design
* High peel-off strength by edge mount structure and insertion mounting metal
* High resistance against coating by laser welding

Major specifications

* Operating force : 1.0N, 1.6N, 2.4N
* Click ratio : 30% min.(1.0N)
  40% min.(1.6N, 2.4N)
* Travel : 0.08mm(1.0N), 0.11 mm(1.6N, 2.4N)
* Life cycle : 500K
* IP67

High soldering strength with depth dimension(2.05mm)

Dimension



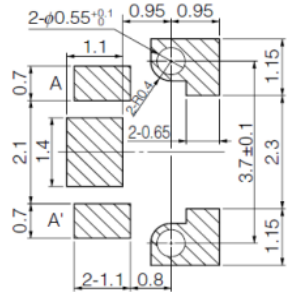
Features

* Small size contributes smaller set design

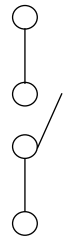
* High solder peeling-off strength
  by the terminal insertion

* Water-proofing with special sticking film

Land Pattern



Circuit diagram



Major specifications

* Operating force : 1.6N

* Click ratio : 40% min.

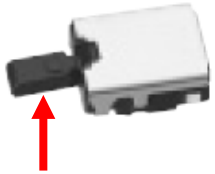
* Travel : 0.12mm

* Life cycle : 500K

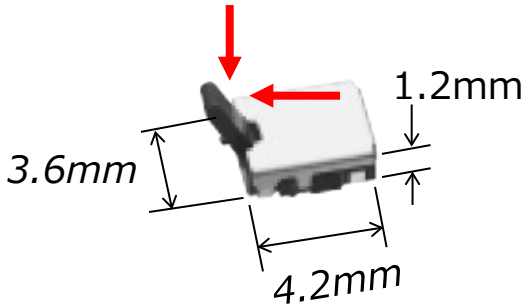
* IP67

Thin and Long Stroke

Dimension



The ESE13H type is
Panasonic Industry only
(Down to Up operation)



Features

* Compact and Thin Compatible
  (Body Thickness 1.2 mm)
* Plenty of Operation Forms
  (Only Panasonic can handle ESE13H type operations)
* Halogen Free Compatible

Major specifications

* Rated: 50 µA 3 V DC to 10 mA 5 V DC
  (resistive load)

* Full stroke (indentation):
  ESE13V Type 0.95 mm (2.1 mm)
  ESE13H Type 3.05 mm (2.1 mm)

* Operating force: 300 mN or less

* Life: 50 k or more

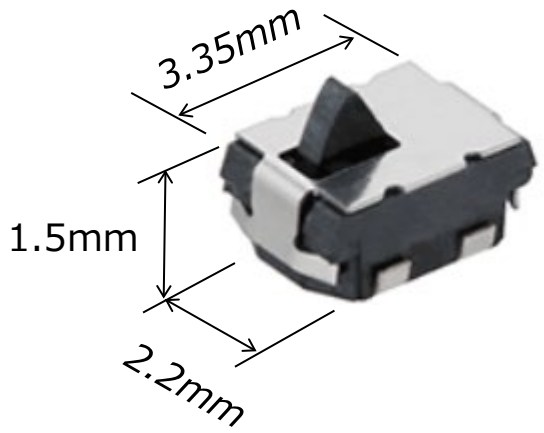
* Number of circuits and contacts:
  1 circuit 1 contact

* Circuit type: Normally open type (N.O.)

Detector switch | ESE16 type

Small

Dimension



Features

* Compact and Thin Compatible
  (Body Thickness 1.2 mm)
* Plenty of Operation Forms
  (Only Panasonic can handle ESE13H type operations)
* Halogen Free Compatible

Major specifications

* Rated: 50 µA 3 V DC to 10 mA 5 V DC
  (resistive load)

* Full stroke (indentation):
  1.5 mm (1.0 mm)

* Operating force: 250 mN or less

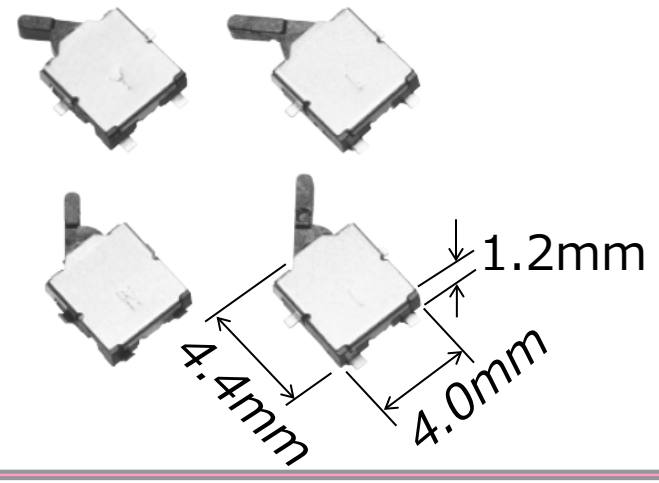
* Life: 50 k or more

* Number of circuits and contacts:
  1 circuit 1 contact

* Circuit type: Normally open type (N.O.)

Thin and N.O./N.C. compatible

Dimension



Features

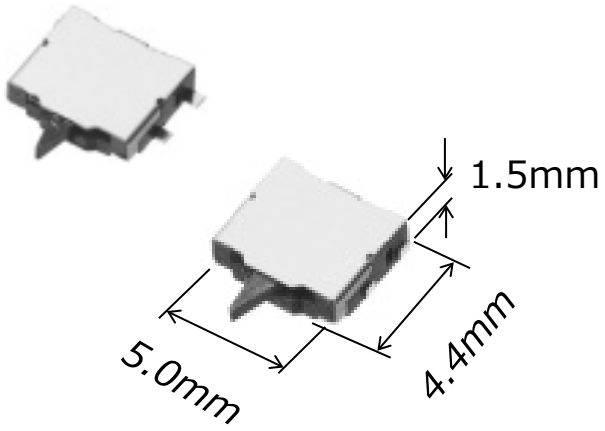
* Compact and Thin Compatible
  (Body Thickness 1.2 mm)
* Plenty of Variations (Right or left operation, N.O. or N.C. circuit compatible, lever length (Standard or Long), Terminal type)
* Halogen Free Compatible

Major specifications

* Rated: 50 µA 3 V DC to 10 mA 5 V DC
  (resistive load)
* Full stroke (indentation):
  ・Standard stroke type
  With boss 1.4 mm (1.5 mm)
  Without boss 2.1 mm (1.5 mm)
  ・Long stroke type
  With boss 1.4 mm (2.15 mm)
  Without boss 2.1 mm (2.15 mm)
* Working force: 300 mN or less
* Life: 50 K or more
* Number of circuits and contacts:
  1 circuit 1 contact
* Circuit type: Normally open type (N.O.)
  Normally closed type (N.C.)

A switch that can detect in two directions with a single switch

Dimension



Features

* Compact and Thin Compatible
(Body Thickness 1.5 mm)
* Long Overstroke
* Thin, Two-Way Operation, and
Automatic Midway Return Type
* Halogen Free Compatible

Major specifications

* Rated: 50 μA 3 V DC to 10 mA5V DC
(resistive load)

* Full stroke (indentation):
With boss 1.0 mm (1.5 mm)
Without boss 2.2 mm (1.5 mm)

* Working force: 300 mN or less

* Life: 50 K or more

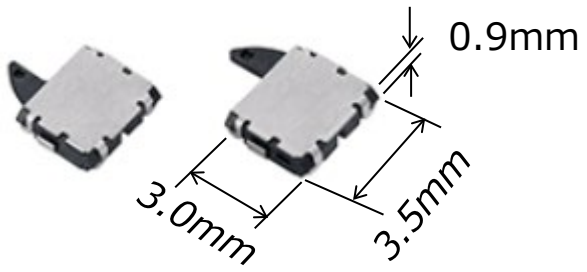
* Number of circuits and contacts:
1 circuit 2 contacts (midpoint OFF)

* Circuit type: Normally open type (N.O.)

Industry's Thinnest Level *

(* According to our own research, as of March 2025)

Dimension



Features

* Compact and Thin Compatible
(Body Thickness 0.9 mm)
* Right or left operation, N.O. or N.C. circuit,
With Boss or Without Boss
* Allows horizontal and vertical manipulation

Major specifications

* Rated: 50 µA 3 V DC to 10 mA5V DC
(resistive load)

* Full stroke (indentation):
With boss 1.5 mm (1.4 mm)
Without boss 1.25 mm (1.4 mm)

* Working force: 300 mN or less

* Life: 50 K or more

* Number of circuits and contacts:
1 circuit 2 contacts (midpoint OFF)

* Circuit type: Normally open type (N.O.)
Normally closed type (N.C.)

Panasonic
INDUSTRY