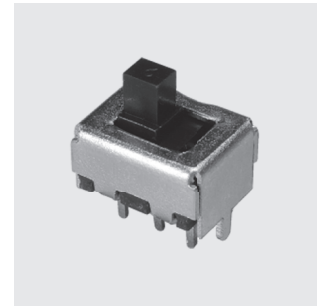


MFS

Sub-miniature Switches

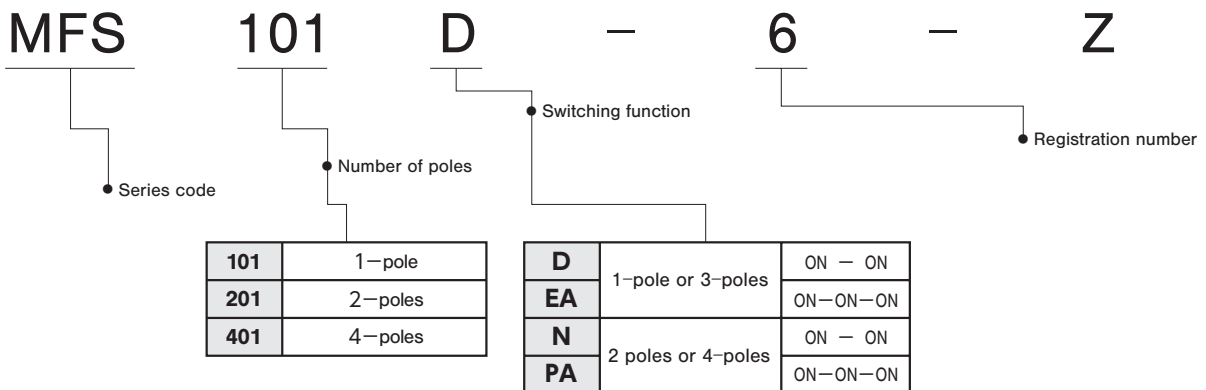


RoHS Compliant

Common Specifications

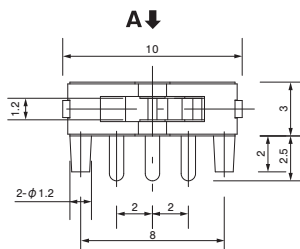
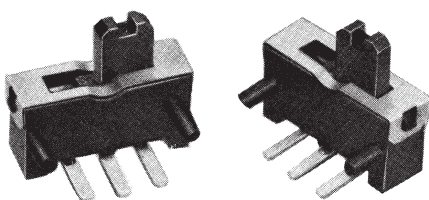
- **Initial contact resistance**
Measured at 1.5mA 200 μ VAC 1kHz
- **Dielectric strength**
Measurement at 500 VAC.
- **Insulation Resistance**
Measured at 500VDC
- **Operating temperature range**
-10°C ~ +70°C

Part Numbering



MFS101D-6-Z

Non-shorting

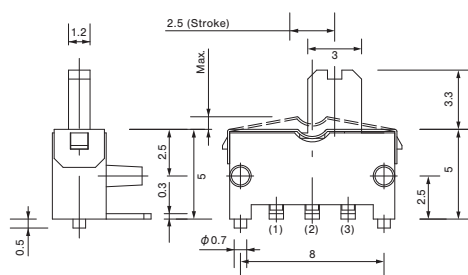
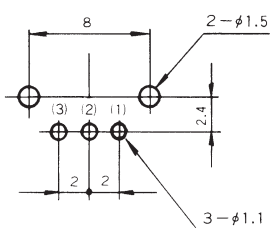


Specifications

| | | |
|----------------------------|--------------------|-----------------------------|
| Rating | Max. | DC10V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20m Ω Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100M Ω Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 0.98~2.94N | |
| Switch timing | Non-shorting | |

PC Hole Layouts

(Top view)



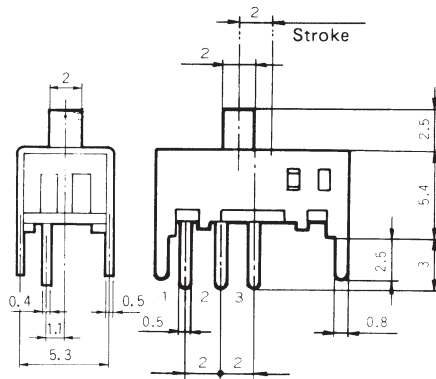
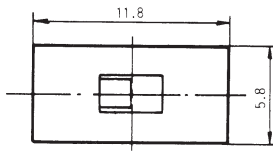
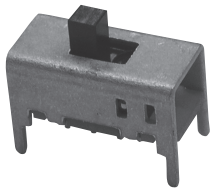
| Switching function (Viewed from A) | Circuit diagram | No. of terminals |
|------------------------------------|-----------------|------------------|
| | | 3 |
| 2-3 | 2-1 | |

Terminal numbers are not shown on the switch.

MFS

MFS101D-8-Z

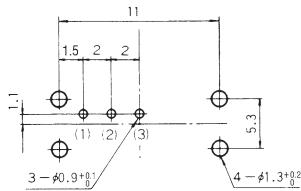
shorting



Terminal numbers are not shown on the switch.

PC Hole Layouts

(Top view)



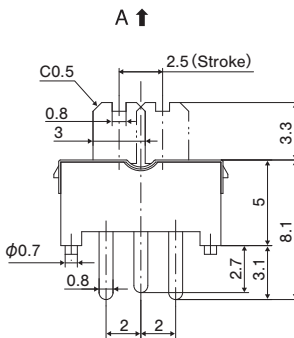
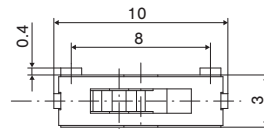
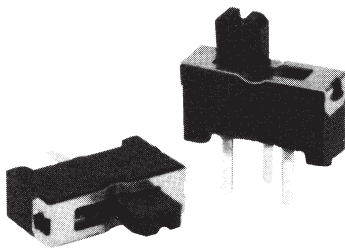
Specifications

| | | |
|----------------------------|---|---|
| Rating | Max. | DC30V 0.3A AC30V 2A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles at DC30V 0.3A 100cycles at AC30V 2A | |
| Operating force | 2.45±0.98 N | |
| Switch timing | Shorting | |

| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | 3 |
| 2-1 | 2-3 | | |

MFS101D-9-Z

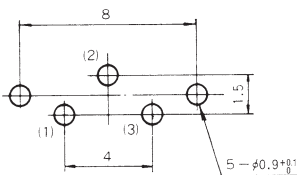
Non-shorting



Terminal numbers are not shown on the switch.

PC Hole Layouts

(Top view)



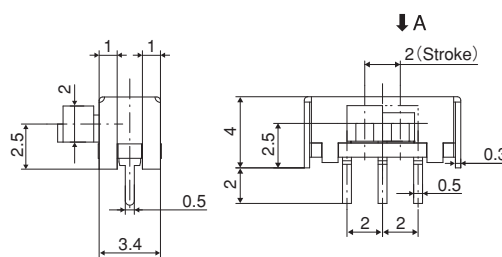
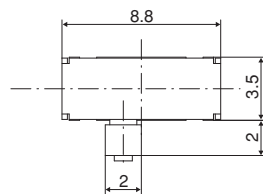
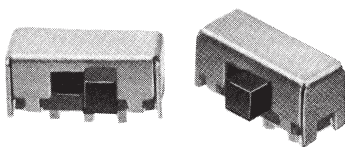
Specifications

| | | |
|----------------------------|-----------------|-----------------------------|
| Rating | Max. | DC12V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 0.98±2.94N | |
| Switch timing | Non-shorting | |

| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | 3 |
| 2-1 | 2-3 | | |

☆ MFS101D-10-Z

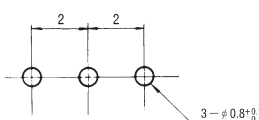
Non-shorting



Terminal numbers are not shown on the switch.

PC Hole Layouts

(Top view)



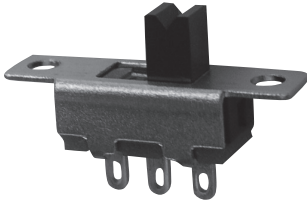
Specifications

| | | |
|----------------------------|-----------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 2.94±1.96N | |
| Switch timing | Non-shorting | |

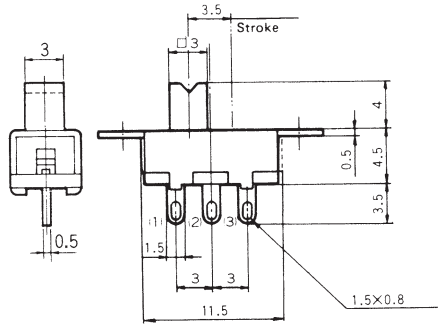
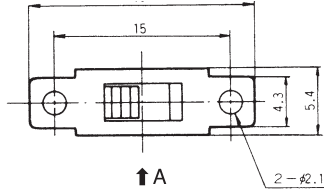
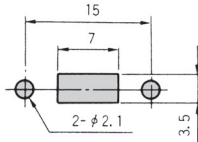
| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | 3 |
| 2-3 | 2-1 | | |

MFS101D-14-Z

Non-shorting



Panel Cut-Out Dimensions
(Top view)



Terminal numbers are not shown on the switch.

Specifications

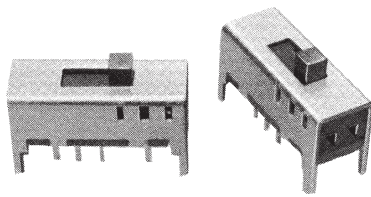
| | | |
|----------------------------|-----------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 1.96±0.98N | |
| Switch timing | Non-shorting | |

| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | 3 |
| ON | ON | | |
| 2-1 | 2-3 | | |

MFS

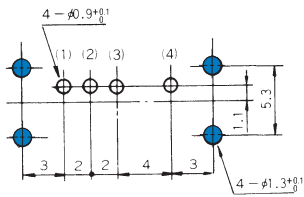
☆ MFS101EA-Z

※[Note] See below.



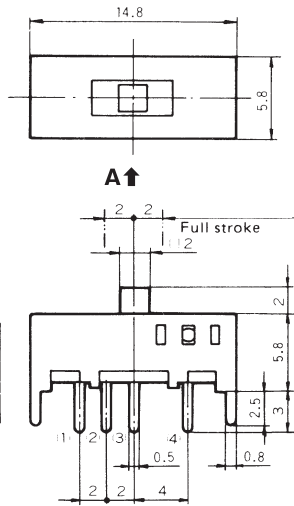
PC Hole Layouts

(Top view)



Specifications

| | | |
|----------------------------|---|---|
| Rating | Max. | DC30V 0.3A AC30V 2A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles at DC30V 0.3A 100cycles at AC30V 2A | |
| Operating force | ← ↔ → ← ↔ → ← 2.45±0.98N 1.47±0.98N | |
| Switch timing | Undefined | |



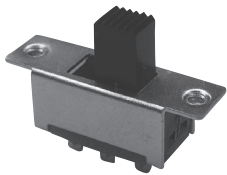
| Switching function (Viewed from A) | | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----|-----------------|------------------|
| | | | | 4 |
| ON | ON | ON | | |
| 3-1 | 3-2 | 3-4 | | |

Terminal numbers are not shown on the switch.

← ↔ → ← ↔ → ← : Operating force from the center to the outer side (right or left).
← ↔ → ← ↔ → ← : Operating force from the outer side (right or left) to the center.

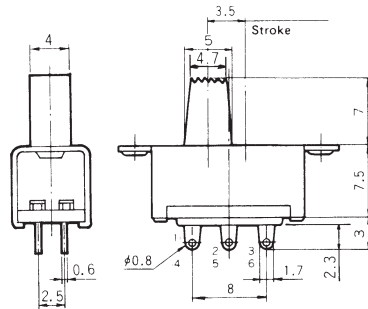
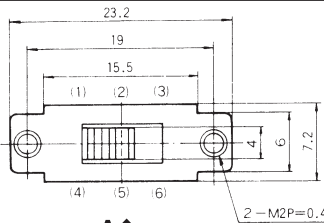
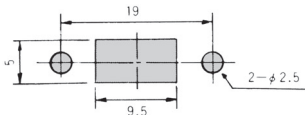
MFS201N-Z

Non-shorting



Panel Cut-Out Dimensions

(Top view)



Terminal numbers are not shown on the switch.

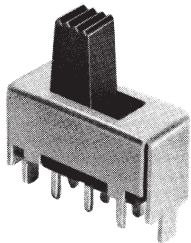
Specifications

| | | |
|----------------------------|-----------------|----------------------------|
| Rating | Max. | AC125V 1A · DC30V 1A |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 30mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 300MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 0.98~4.9N | |
| Switch timing | Non-shorting | |

| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | 6 |
| ON | ON | | |
| 2-1 | 2-3 | | |
| 5-4 | 5-6 | | |

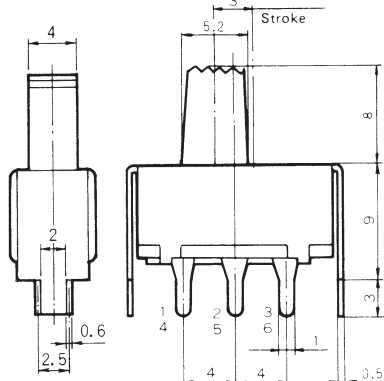
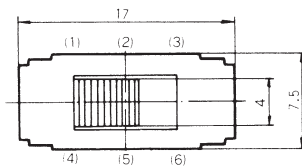
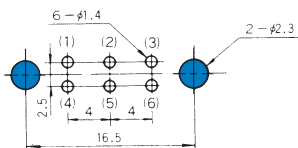
MFS201N-4-Z

Non-shorting



PC Hole Layouts

(Top view)



Terminal numbers are not shown on the switch.

Specifications

| | | |
|----------------------------|-----------------|----------------------------|
| Rating | Max. | AC125V 1A · DC30V 1A |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 300MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 1.47~4.41N | |
| Switch timing | Non-shorting | |

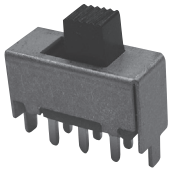
| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | 6 |
| ON | ON | | |
| 2-1 | 2-3 | | |
| 5-4 | 5-6 | | |

☆ : Semi-standard products.

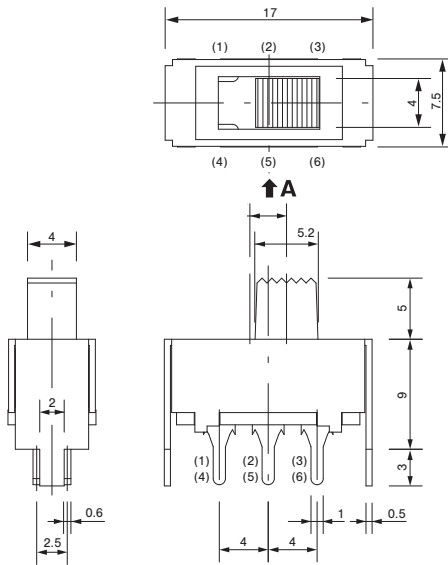
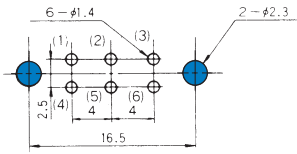
※ : Please note that MFS101EA-Z can be either Shorting or Non-shorting.

MFS201N-9-Z

Non-shorting



PC Hole Layouts
(Top view)



Terminal numbers are not shown on the switch.

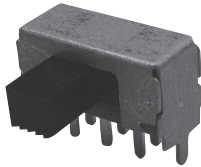
Specifications

| | | |
|----------------------------|-----------------|----------------------------|
| Rating | Max. | AC125V 1A • DC30V 1A |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 300MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 1.47~4.41N | |
| Switch timing | Non-shorting | |

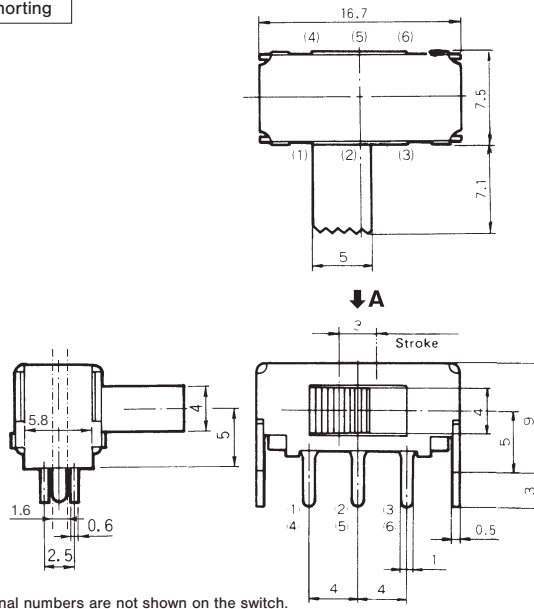
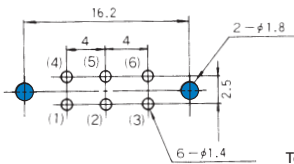
| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | |
| 2-1 | 2-3 | | |
| 5-4 | 5-6 | | |

MFS201N-16-Z

Non-shorting



PC Hole Layouts
(Top view)



Terminal numbers are not shown on the switch.

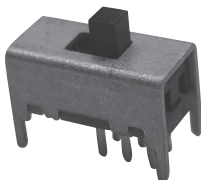
Specifications

| | | |
|----------------------------|-----------------|----------------------------|
| Rating | Max. | AC125V 1A • DC30V 1A |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 2.94 ± 1.47N | |
| Switch timing | Non-shorting | |

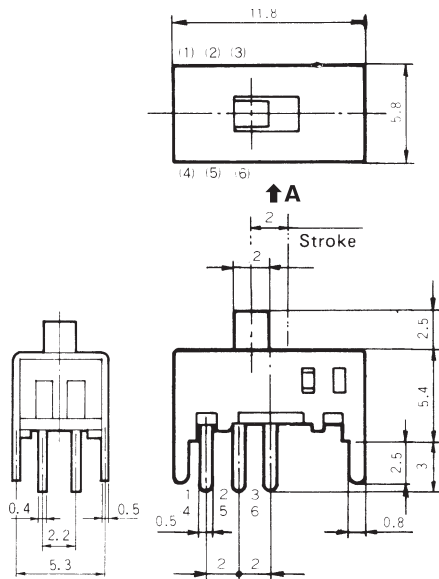
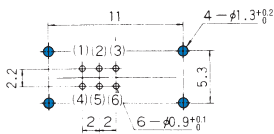
| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | |
| 2-3 | 2-1 | | |
| 5-6 | 5-4 | | |

MFS201N-19-Z

Shorting



PC Hole Layouts
(Top view)



Terminal numbers are not shown on the switch.

Specifications

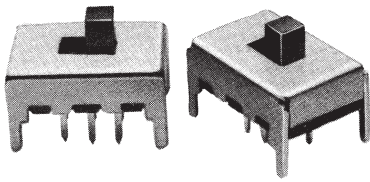
| | | |
|----------------------------|-----------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 2.45 ± 0.98N | |
| Switch timing | Shorting | |

| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | |
| 2-1 | 2-3 | | |
| 5-4 | 5-6 | | |

MFS

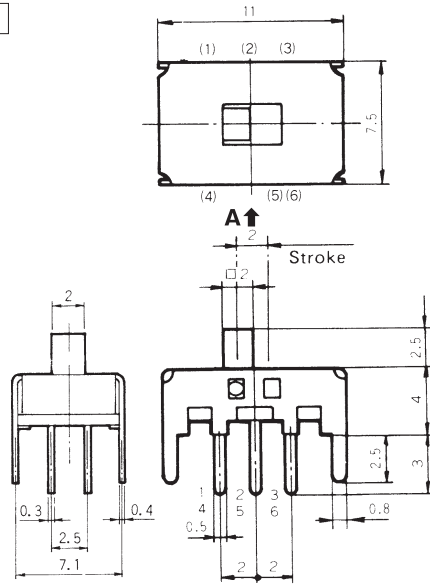
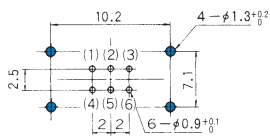
★ MFS201N-20-Z

Shorting



PC Hole Layouts

(Top view)



Terminal numbers are not shown on the switch.

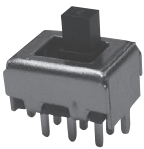
Specifications

| | | |
|----------------------------|-----------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 4.41 ± 1.47N | |
| Switch timing | Shorting | |

| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | 6 |
| 2-1 | 2-3 | | |
| 5-4 | 5-6 | | |

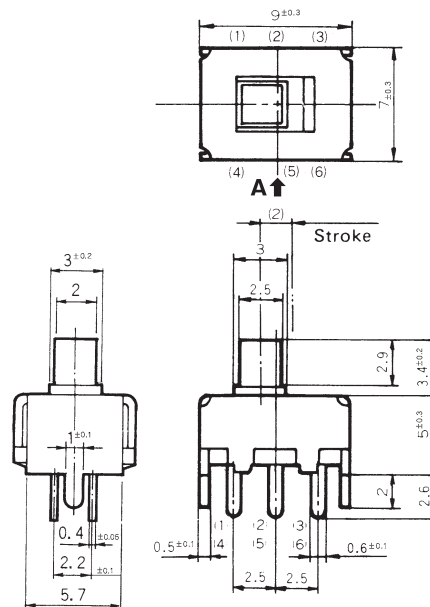
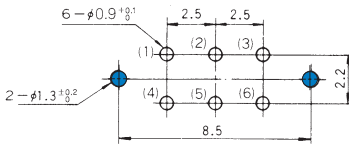
MFS201N-21-Z

Non-shorting



PC Hole Layouts

(Top view)



Terminal numbers are not shown on the switch.

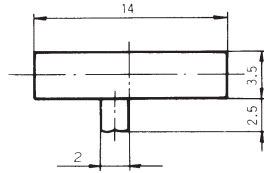
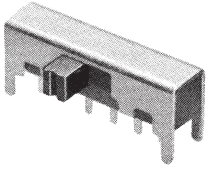
Specifications

| | | |
|----------------------------|-----------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 2.45 ± 0.98N | |
| Switch timing | Non-shorting | |

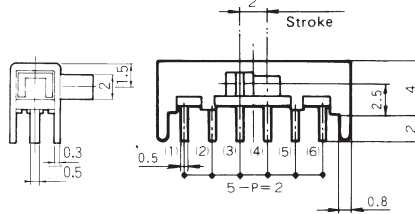
| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | 6 |
| 2-1 | 2-3 | | |
| 5-4 | 5-6 | | |

MFS201N-23-Z

Non-shorting

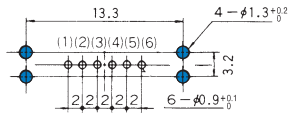


↓ A



PC Hole Layouts

(Top view)



Terminal numbers are not shown on the switch.

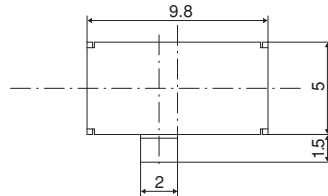
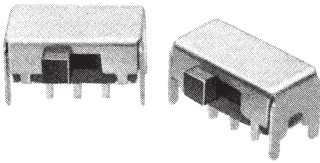
Specifications

| | | |
|----------------------------|-----------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 3.92±2.45N | |
| Switch timing | Non-shorting | |

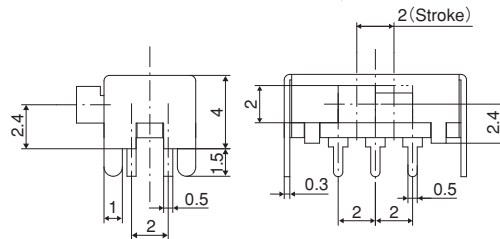
| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | |
| 2-3 | 2-1 | | |
| 5-6 | 5-4 | | |

MFS201N-24-Z

Non-shorting

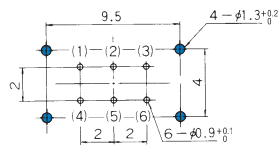


↓ A



PC Hole Layouts

(Top view)



Terminal numbers are not shown on the switch.

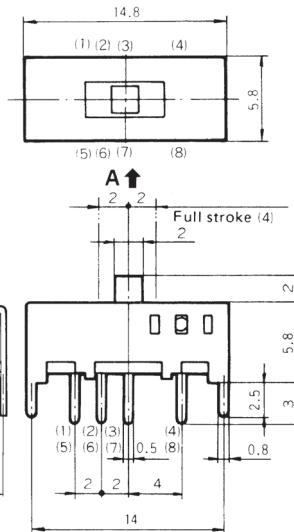
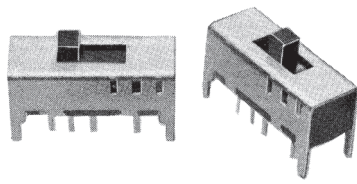
Specifications

| | | |
|----------------------------|-----------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 1.96±0.98N | |
| Switch timing | Non-shorting | |

| Switching function (Viewed from A) | | Circuit diagram | No. of terminals |
|------------------------------------|-----|-----------------|------------------|
| | | | |
| 2-3 | 2-1 | | |
| 5-6 | 5-4 | | |

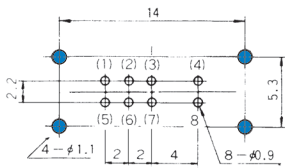
★MFS201PA-4-Z

※[Note] See below.



■PC Hole Layouts

(Top view)



Terminal numbers are not shown on the switch.

■ Specifications

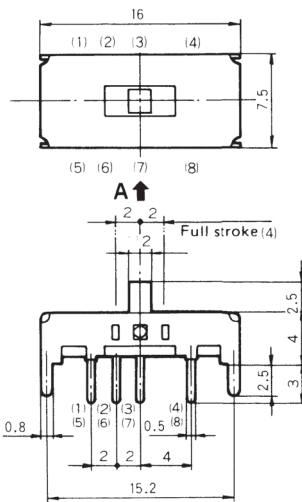
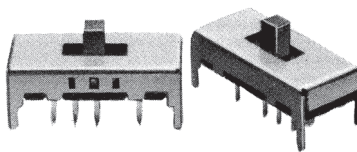
| | | |
|----------------------------|-----------------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 2.45±0.98N 1.47±0.98N | |
| Switch timing | Undefined | |

| Switching function (Viewed from A) | | | Circuit diagram | No. of terminals |
|------------------------------------|------------|------------|-----------------|------------------|
| | | | | |
| 3-1 7-5 | 3-2 7-6 | 3-4 7-8 | | |

↔ : Operating force from the center to the outer side (right or left).
 →← : Operating force from the outer side (right or left) to the center.

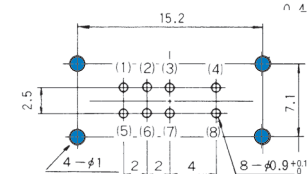
★MFS201PA-5-Z

※[Note] See below.



■PC Hole Layouts

(Top view)



Terminal numbers are not shown on the switch.

■ Specifications

| | | |
|----------------------------|-----------------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 4.41 +1.67N -2.16N | |
| Switch timing | Undefined | |

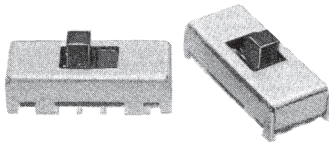
| Switching function (Viewed from A) | | | Circuit diagram | No. of terminals |
|------------------------------------|------------|------------|-----------------|------------------|
| | | | | |
| 3-1 7-5 | 3-2 7-6 | 3-4 7-8 | | |

※ : Please note that MFS201PA-4-Z and MFS201PA-5-Z can be either Shorting or Non-shorting (See page 506).

★ : Made to order products.

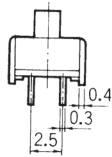
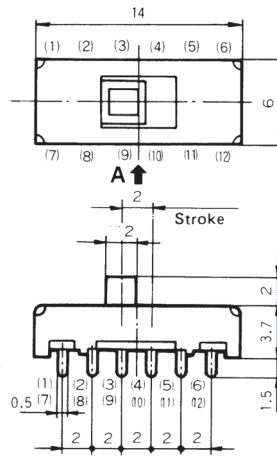
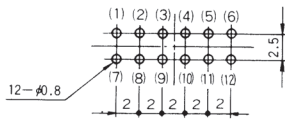
★MFS401N-2-Z

Shorting



■PC Hole Layouts

(Top view)



Terminal numbers are not shown on the switch.

■ Specifications

| | | |
|----------------------------|-------------------------|-----------------------------|
| Rating | Max. | DC30V 0.3A (Resistive load) |
| | Min. | DC5V 10mA (Resistive load) |
| Initial contact resistance | 20mΩ Max. | |
| Dielectric strength | AC500V 1 minute | |
| Insulation resistance | 100MΩ Min. | |
| Electrical life | 5,000 cycles | |
| Operating force | 1.57 N Max. (No detent) | |
| Switch timing | Shorting | |

| Switching function (Viewed from A) | Circuit diagram | No. of terminals |
|------------------------------------|-----------------|------------------|
| | | 12 |
| ON | ON | |
| 2-1 | 2-3 | |
| 5-4 | 5-6 | |
| 8-7 | 8-9 | |
| 11-10 | 11-12 | |

■Soldering

(1) Manual Soldering

Device : Soldering iron

Please refer to “MFS Series Heat-resistant Table” shown below.

(2) Auto Soldering

MFS series are not compatible with auto soldering. Soldering should be done manually.

(3) When soldering two or more terminals to the common land, use solder resist to solder them independently.

■Flux Cleaning

(1) Solvent : Fluorine or Alcohol type.

(2) MSF Series are not process sealed. If the PC board is to be cleaned, clean the soldering surface of substrate with a brush so that the switch is not exposed to the cleaning solution.

■Frequency of switch use

If the switch is not likely to be operated frequently (e.g. two or three operations a year) in the dry circuit area, a sulfide film is likely to be formed on the contacts, resulting in contact failure. If this is the case, gold-plated products are recommended. Please contact your local Nidec Copal Electronics sales representative.

■MFS series heat-resistant table

| Resin board | Model | Temperature |
|--------------|--------------|----------------------|
| Resin board | MFS101D-6-Z | 270°C MAX. 3sec MAX. |
| | MFS101D-9-Z | |
| | MFS101D-11-Z | |
| Phenol board | MFS101D-8-Z | 360°C MAX. 3sec MAX. |
| | MFS201N-19-Z | |
| | MFS201N-20-Z | |
| | MFS101D-10-Z | |
| | MFS101D-14-Z | |
| | MFS201N-Z | |
| | MFS201N-4-Z | |
| | MFS201N-9-Z | |
| | MFS201N-16-Z | |
| | MFS201N-21-Z | |
| | MFS201N-23-Z | |
| | MFS201N-24-Z | |
| | MFS201PA-4-Z | |
| | MFS101EA-Z | |
| | MFS201PA-5-Z | |
| | MFS401N-2-Z | |

■Packaging Specifications

