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MFS

Sub-miniature Switches



RoHS Compliant

■Common Specifications

●Initial contact resistance

Measured at 1.5mA 200 μVAC 1kHz

●Dilectric strength

Measurement at 500 VAC.

●Insulation Resistance

Measured at 500VDC

●Operating temperature range

−10℃～+70℃

■Part Numbering

MFS 101 D − 6 − Z

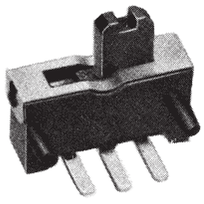
- MFS: Series code
- 101: Number of poles
- D: Switching function
- 6: Registration number

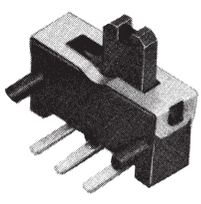
101	1−pole
201	2−poles
401	4−poles

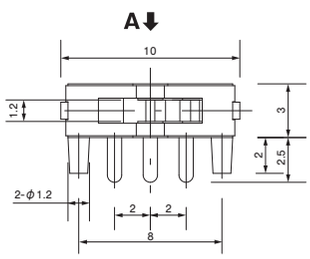
D	1−pole or 3−poles	ON − ON
EA		ON−ON−ON
N	2 poles or 4−poles	ON − ON
PA		ON−ON−ON

MFS101D−6−Z

Non-shorting

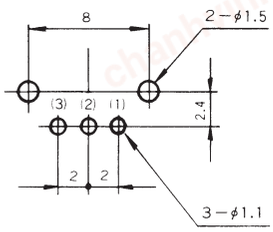


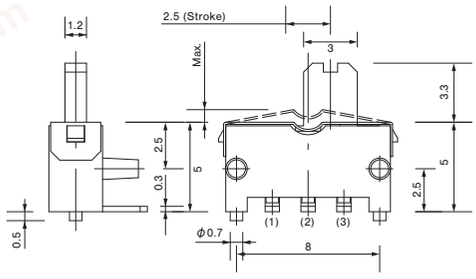




■PC Hole Layouts

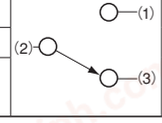
(Top view)





■Specifications

Rating	Max.	DC10V 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
ON	ON		
2−3	2−1		

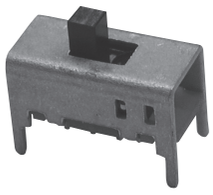
Terminal numbers are not shown on the switch.

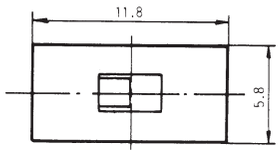
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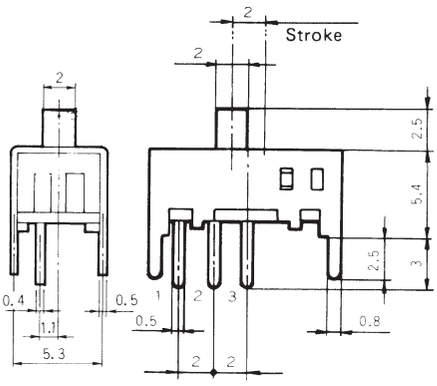
MFS

MFS101D-8-Z

shorting

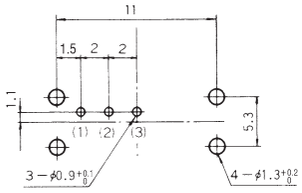






PC Hole Layouts

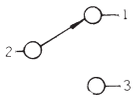
(Top view)



Terminal numbers are not shown on the switch.

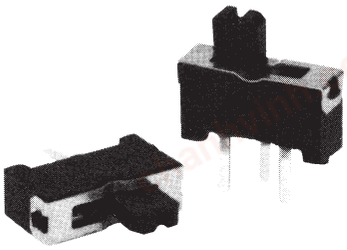
Specifications

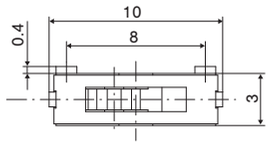
Rating	Max.	DC30V 0.3A AC30V 2A (Resistive load)
	Min.	DC5V 10mA (Resistive load)
Initial contact resistance		20mΩ Max.
Dielectric strength		AC500V 1 minute
Insulation resistance		100MΩ Min.
Electrical life		5,000 cycles at DC30V 0.3A 100cycles at AC30V 2A
Operating force		2.45±0.98 N
Switch timing	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

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

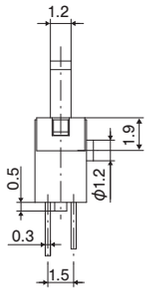
MFS101D-9-Z

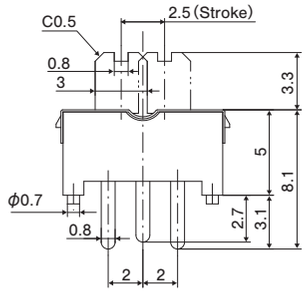
Non-shorting





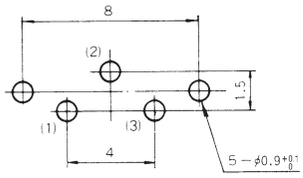
A ⬆





PC Hole Layouts

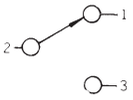
(Top view)



Terminal numbers are not shown on the switch.

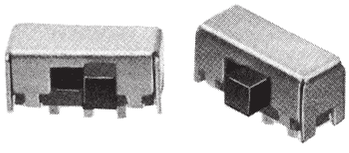
Specifications

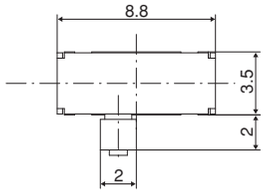
Rating	Max.	DC12V 0.3A (Resistive load)
	Min.	DC5V 10mA (Resistive load)
Initial contact resistance		20mΩ Max.
Dielectric strength		AC500V 1 minute
Insulation resistance		100MΩ Min.
Electrical life		5,000 cycles
Operating force		0.98±2.94N
Switch timing		Non-shorting

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

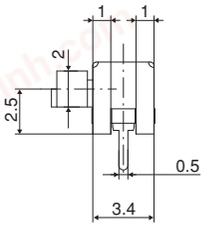
☆ MFS101D-10-Z

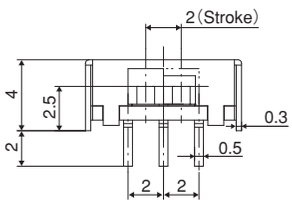
Non-shorting





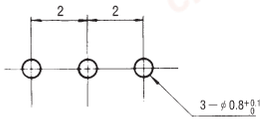
⬇A





PC Hole Layouts

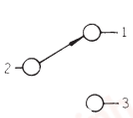
(Top view)



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		2.94±1.96N
Switch timing		Non-shorting

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

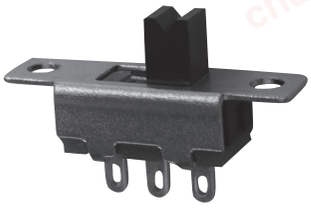
shorting →Page 531.

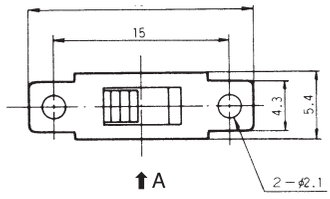
☆ : Semi-standard products.

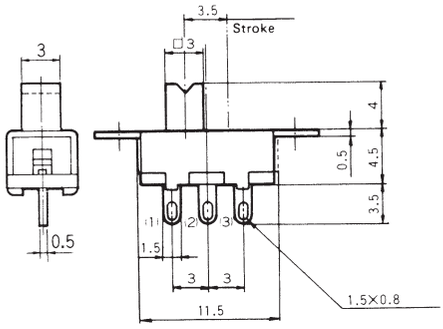
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MFS101D-14-Z

Non-shorting

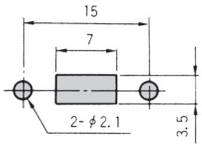






Panel Cut-Out Dimensions

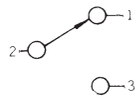
(Top view)



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		

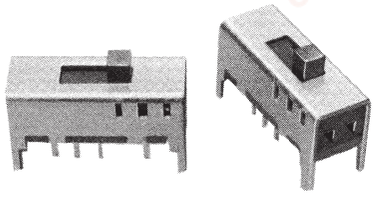
☆ : Semi-standard products.

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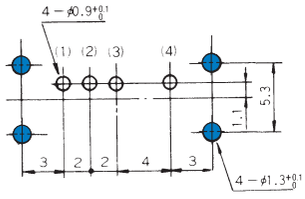
☆MFS101EA-Z

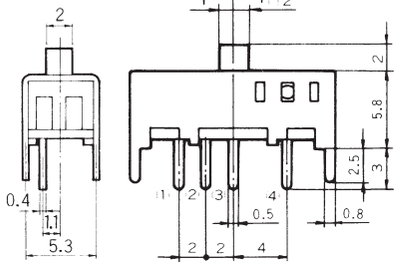
※[Note] See below.



■PC Hole Layouts

(Top view)

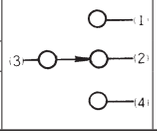




Terminal numbers are not shown on the switch.

■ Specifications

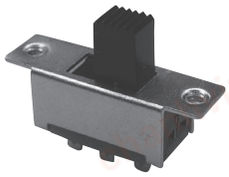
Rating	Max.	DC30V 0.3A AC30V 2A (Resistive load)
	Min.	DC5V 10mA (Resistive load)
Initial contact resistance		20mΩ Max.
Dielectric strength		AC500V 1 minute
Insulation resistance		100MΩ Min.
Electrical life		5,000 cycles at DC30V 0.3A 100cycles at AC30V 2A
Operating force		←●→ 2.45±0.98N →●← 1.47±0.98N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

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

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

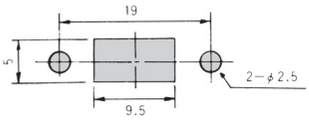
MFS201N-Z

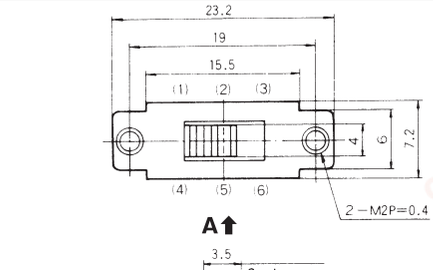
Non-shorting



■Panel Cut-Out Dimensions

(Top view)

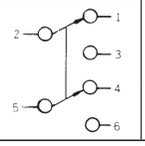




Terminal numbers are not shown on the switch.

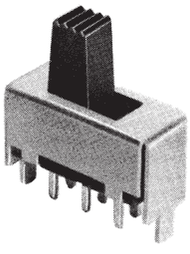
■ Specifications

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 5−4	2−3 5−6		

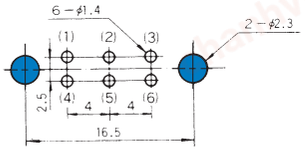
MFS201N-4-Z

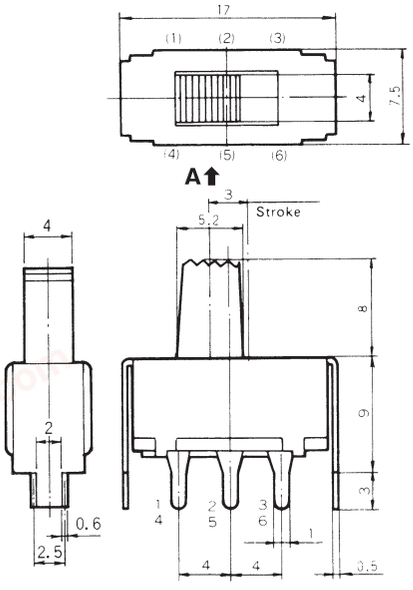
Non-shorting



■PC Hole Layouts

(Top view)

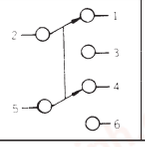




Terminal numbers are not shown on the switch.

■ 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 5−4	2−3 5−6		

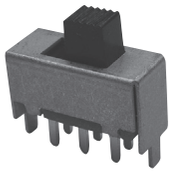
☆ : Semi-standard products.

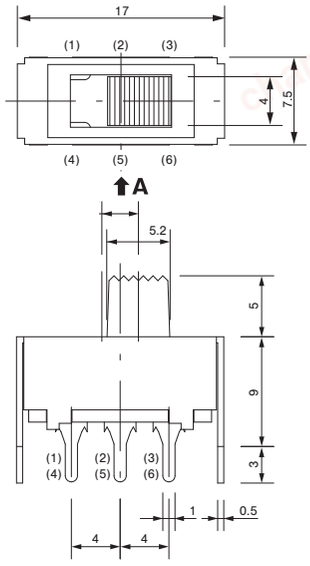
※ : Please note that **MFS101EA-Z** can be either Shorting or Non-shorting.

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MFS201N-9-Z

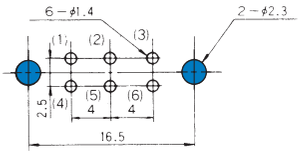
Non-shorting





PC Hole Layouts

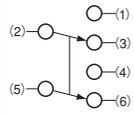
(Top view)



Terminal numbers are not shown on the switch.

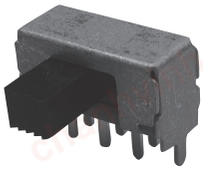
Specifications

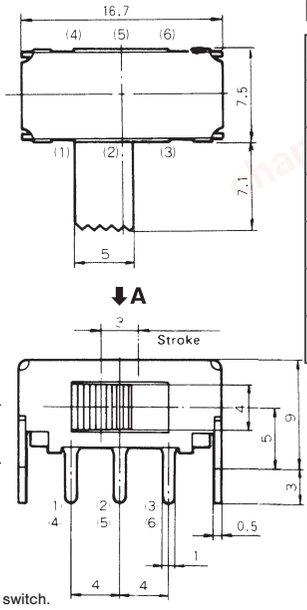
Rating	Max.	AC125V 1A • DC30V 1A
	Min.	DC5V 10mA (Resistive load)
Initial contact resistance		20mΩ Max.
Dielectric strength		AC500V 1 minute
Insulation resistance		300MΩ Min.
Electrical life		5,000 cycles
Operating force		1.47～4.41N
Switch timing		Non-shorting

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

MFS201N-16-Z

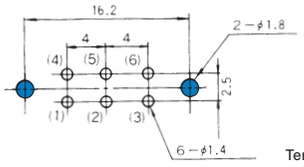
Non-shorting





PC Hole Layouts

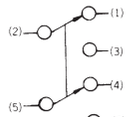
(Top view)



Terminal numbers are not shown on the switch.

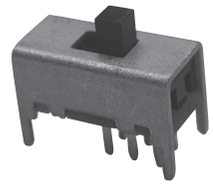
Specifications

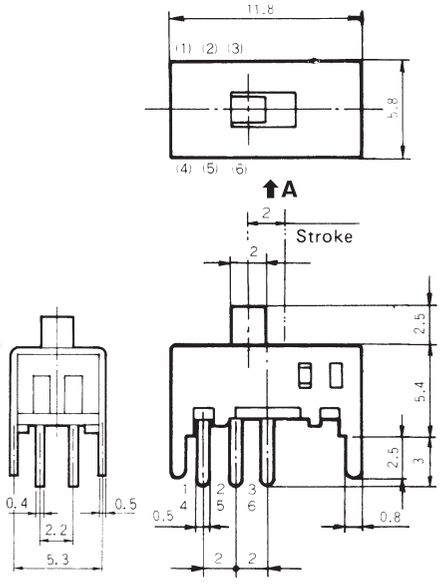
Rating	Max.	AC125V 1A • DC30V 1A
	Min.	DC5V 10mA (Resistive load)
Initial contact resistance		20mΩ Max.
Dielectric strength		AC500V 1 minute
Insulation resistance		100MΩ Min.
Electrical life		5,000 cycles
Operating force		2.94±1.47N
Switch timing		Non-shorting

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

MFS201N-19-Z

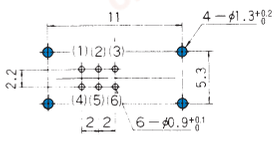
Shorting





PC Hole Layouts

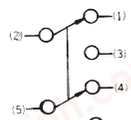
(Top view)



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
			6
ON	ON		
2–1 5–4	2–3 5–6		

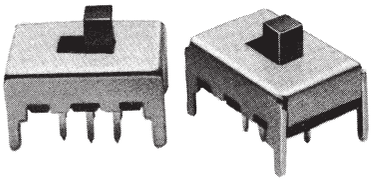
shorting →Page 506.

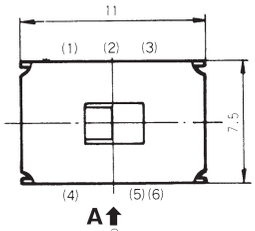
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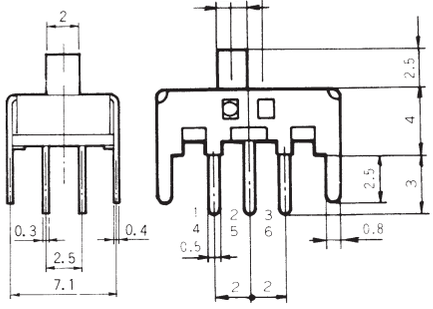
MFS

★ MFS201N-20-Z

Shorting

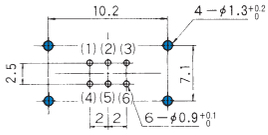






■PC Hole Layouts

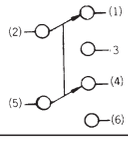
(Top view)



Terminal numbers are not shown on the switch.

■ Specifications

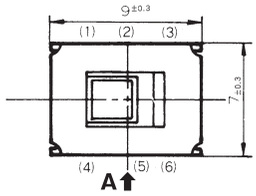
Rating	Max.	DC30V 0.3A (Resistive load)
	Min.	DC5V 10mA (Resistive load)
Initial contact resistance		20mΩ Max.
Dielectric strength		AC500V 1 minute
Insulation resistance		100MΩ Min.
Electrical life		5,000 cycles
Operating force		4.41±1.47N
Switch timing		Shorting

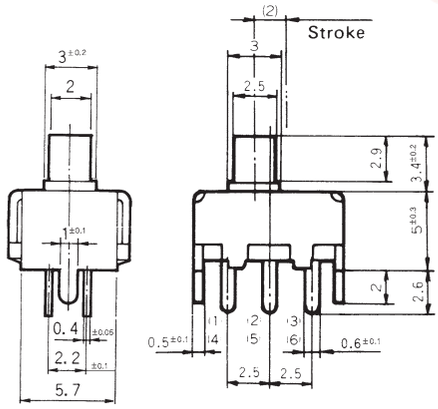
Switching function (Viewed from **A**)		Circuit diagram	No. of terminals
			6
ON	ON		
2-1 5-4	2-3 5-6		

MFS201N-21-Z

Non-shorting

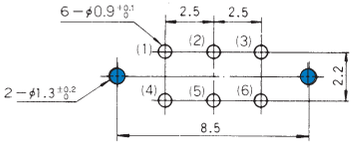






■PC Hole Layouts

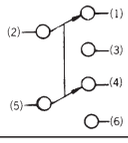
(Top view)



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

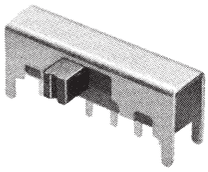
Switching function (Viewed from **A**)		Circuit diagram	No. of terminals
			6
ON	ON		
2-1 5-4	2-3 5-6		

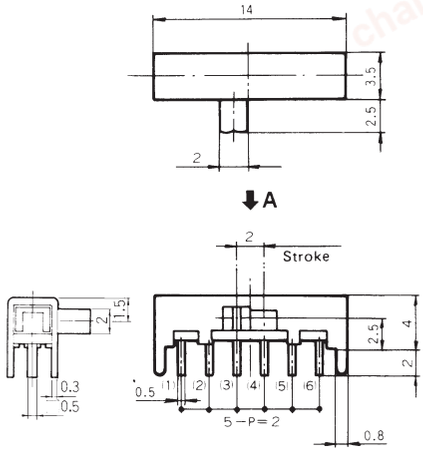
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MFS201N-23-Z

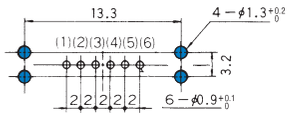
Non-shorting





PC Hole Layouts

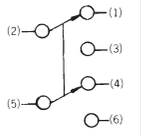
(Top view)



Terminal numbers are not shown on the switch.

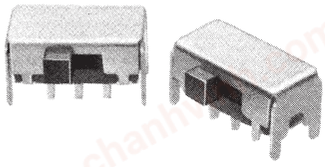
Specifications

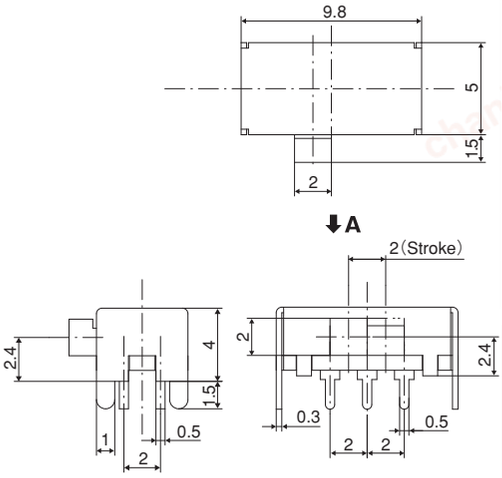
Rating	Max.	DC30V 0.3A (Resistive load)
	Min.	DC5V 10mA (Resistive load)
Initial contact resistance		20mΩ Max.
Dielectric strength		AC500V 1 minute
Insulation resistance		100MΩ Min.
Electrical life		5,000 cycles
Operating force		3.92±2.45N
Switch timing		Non-shorting

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

MFS201N-24-Z

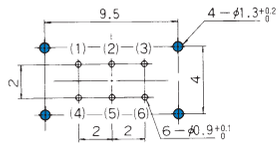
Non-shorting





PC Hole Layouts

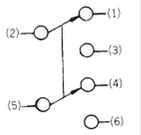
(Top view)



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		1.96±0.98N
Switch timing		Non-shorting

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

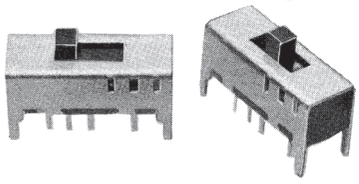
shorting →Page 506.

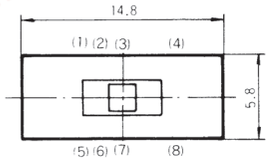
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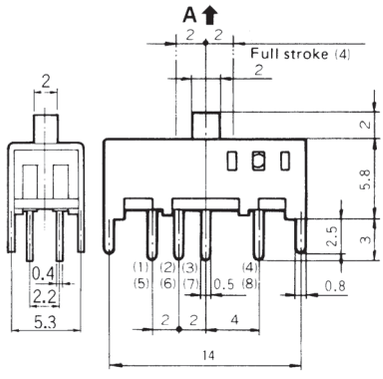
MFS

★MFS201PA-4-Z

※[Note] See below.

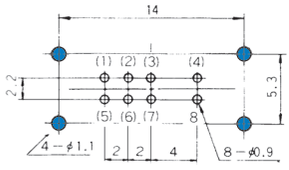






■PC Hole Layouts

(Top view)



Terminal numbers are not shown on the switch.

■ Specifications

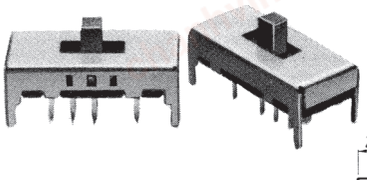
Rating	Max.	DC30V 0.3A (Resistive load)
	Min.	DC5V 10mA (Resistive load)
Initial contact resistance		20mΩ Max.
Dielectric strength		AC500V 1 minute
Insulation resistance		100MΩ Min.
Electrical life		5,000 cycles
Operating force		←●→ 2.45±0.98N　→●← 1.47±0.98N
Switch timing		Undefined

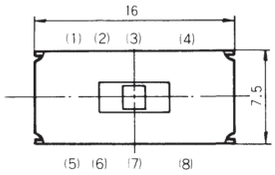
Switching function (Viewed from **A**)			Circuit diagram	No. of terminals
ON	ON	ON		8
3−1 7−5	3−2 7−6	3−4 7−8		

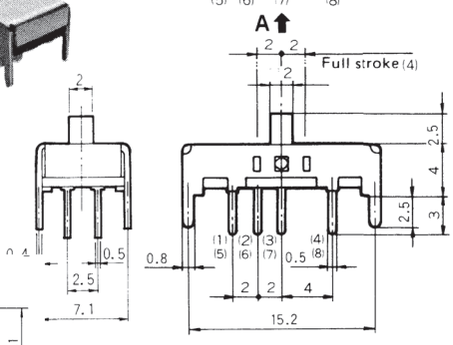
←●→ : Operating force from the center to the outer side (right or left).
→●← : Operating force from the outer side (right or left) to the center.

★MFS201PA-5-Z

※[Note] See below.

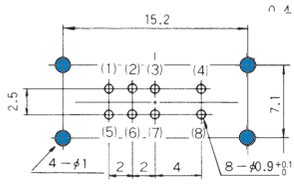






■PC Hole Layouts

(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 $^{+1.67}_{-2.16}$N
Switch timing		Undefined

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

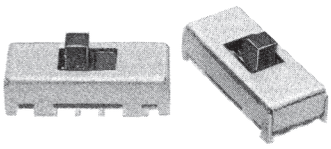
※ : Please note that **MFS201PA-4-Z** and **MFS201PA-5-Z** can be either Shorting or Non-shorting (See page 506).

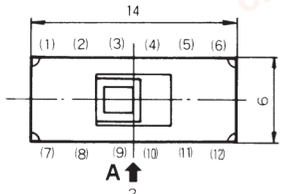
★ : Made to order products.

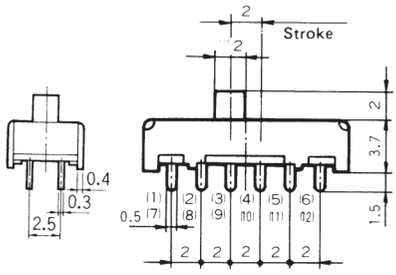
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★MFS401N-2-Z

Shorting



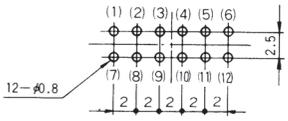




Terminal numbers are not shown on the switch.

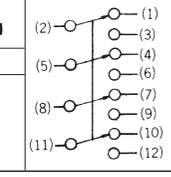
■PC Hole Layouts

(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		1.57 N Max. (No detent)
Switch timing		Shorting

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

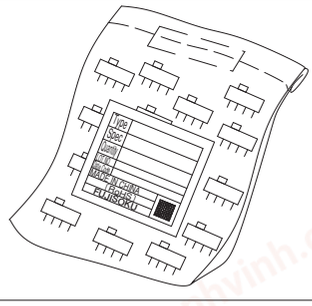
If the switch is not likely to be operated frequently (e.g. two or three operations a year) in the dry circuit area, a sulfide film is likely to be formed on the contacts, resulting in contact failure. If this is the case, gold-plated products are recommended. Please contact your local Nidec Copal Electronics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

■MFS series heat-resistant table

Resin board	MFS101D-6-Z	270℃ MAX. 3sec MAX.
	MFS101D-9-Z	
	MFS101D-11-Z	
Phenol board	MFS101D-8-Z	360℃ 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

Plastic Bag



★ : Made to order products.

shorting →Page 506.