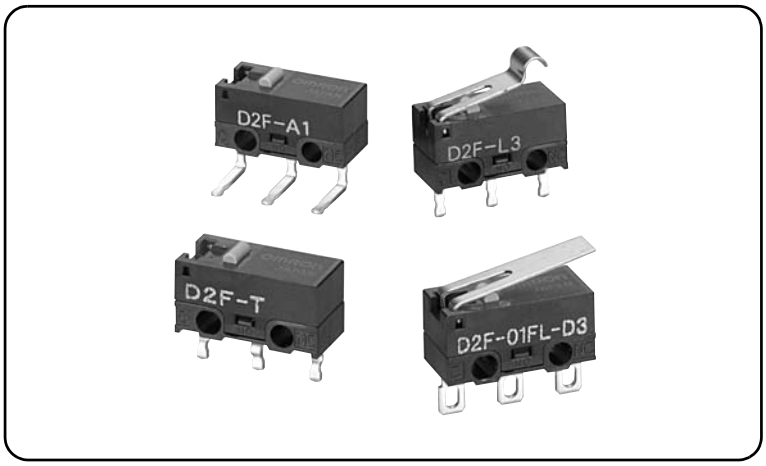
D2F-AQ

Ultra Subminiature Basic Switch

Ultra Subminiature Basic Switch with plenty of terminal variations

- **Incorporating a snapping mechanism made with two highly precise split springs that ensures long durability.**
- **Using insertion molded terminals that prevents flux penetration.**
- **In addition to self-clinching PCB, left-angled, right-angled terminals, 2 types of soldering terminals are available.**

RoHS Compliant



Model Number Legend

D2F - 1 2 3 -AQ

1. Ratings
- None : 125 VAC 3A
- 01 : 30 VDC 0.1A

2. Actuator
- None : Pin plunger
- L : Hinge lever
- L3 : Simulated roller lever (R1.3)
- L30 : Simulated roller lever (R2.5)

3. Terminals
- None : PCB terminals (Straight)
- -T : Self-clinching PCB terminals
- -A : PCB terminals (Right-angled)
- -A1 : PCB terminals (Left-angled)
- -D3 : Solder terminals
- -D : Compact solder terminals

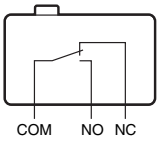
List of Models

Due to the idiosyncrasies of the automotive parts industry, a business decision is required on individual items to determine when to start supply. Contact your OMRON representative for information on individual models.

Actuator	Terminals \ Ratings	3 A	0.1 A
Pin plunger 	PCB terminals (Standard)	**D2F-AQ**	**D2F-01-AQ**
	Self-clinching PCB terminals	**D2F-T-AQ**	**D2F-01-T-AQ**
	PCB terminals (Right-angled)	**D2F-A-AQ**	**D2F-01-A-AQ**
	PCB terminals (Left-angled)	**D2F-A1-AQ**	**D2F-01-A1-AQ**
	Solder terminals	**D2F-D3-AQ**	**D2F-01-D3-AQ**
	Compact solder terminals	**D2F-D-AQ**	**D2F-01-D-AQ**
Hinge lever 	PCB terminals (Standard)	**D2F-L-AQ**	**D2F-01L-AQ**
	Self-clinching PCB terminals	**D2F-L-T-AQ**	**D2F-01L-T-AQ**
	PCB terminals (Right-angled)	**D2F-L-A-AQ**	**D2F-01L-A-AQ**
	PCB terminals (Left-angled)	**D2F-L-A1-AQ**	**D2F-01L-A1-AQ**
	Solder terminals	**D2F-L-D3-AQ**	**D2F-01L-D3-AQ**
	Compact solder terminals	**D2F-L-D-AQ**	**D2F-01L-D-AQ**
Simulated roller lever (R1.3) 	PCB terminals (Standard)	**D2F-L3-AQ**	**D2F-01L3-AQ**
	Self-clinching PCB terminals	**D2F-L3-T-AQ**	**D2F-01L3-T-AQ**
	PCB terminals (Right-angled)	**D2F-L3-A-AQ**	**D2F-01L3-A-AQ**
	PCB terminals (Left-angled)	**D2F-L3-A1-AQ**	**D2F-01L3-A1-AQ**
	Solder terminals	**D2F-L3-D3-AQ**	**D2F-01L3-D3-AQ**
	Compact solder terminals	**D2F-L3-D-AQ**	**D2F-01L3-D-AQ**
Simulated roller lever (R2.5) 	PCB terminals (Standard)	**D2F-L30-AQ**	**D2F-01L30-AQ**
	Self-clinching PCB terminals	**D2F-L30-T-AQ**	**D2F-01L30-T-AQ**
	PCB terminals (Right-angled)	**D2F-L30-A-AQ**	**D2F-01L30-A-AQ**
	PCB terminals (Left-angled)	**D2F-L30-A1-AQ**	**D2F-01L30-A1-AQ**
	Solder terminals	**D2F-L30-D3-AQ**	**D2F-01L30-D3-AQ**
	Compact solder terminals	**D2F-L30-D-AQ**	**D2F-01L30-D-AQ**

Contact Form

●**SPDT**



Contact Specifications

Item	Model	D2F models	D2F-01 models
Contact	Specifications	Crossbar	
	Material	Silver alloy	Gold alloy
	Gap (standard value)	0.25 mm	
Minimum applicable load (see note) *		100 mA at 5 VDC	1 mA at 5 VDC

* Please refer to "**Using Micro Loads**" in "**Precautions**" for more information on the minimum applicable load.

Ratings

Model / Rated voltage	D2F models	D2F-01 models
	Resistive load	
125 VAC	3 A	-
30 VDC	2 A	0.1 A

Note. The above rating values apply under the following test conditions.
(1) Ambient temperature: 20±2°C
(2) Ambient humidity: 65±5%
(3) Operating frequency: 30 operations/min

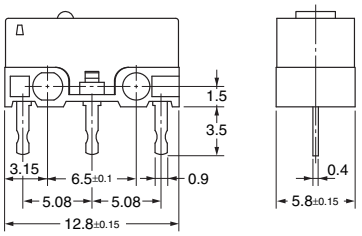
Characteristics

Item \ Model		D2F-01 models	D2F models
Permissible operating speed		Pin plunger models: 1 mm to 500 mm/s, Lever models: 5 mm to 500 mm/s	
Permissible operating frequency	Mechanical	Pin plunger models: 200 operations/min, Lever models: 100 operations/min	
	Electrical	30 operations/min	
Insulation resistance		100 MΩ min. (at 500 VDC with insulation tester)	
Contact resistance (initial value)		100 mΩ max.	30 mΩ max.
Dielectric strength	Between terminals of the same polarity	600 VAC 50/60 Hz for 1min	
	Between current-carrying metal parts and ground	1,500 VAC 50/60 Hz for 1min	
	Between each terminal and non-current-carrying metal parts	1,500 VAC 50/60 Hz for 1min	
Vibration resistance * 1	Malfunction	10 to 55 Hz, 1.5-mm double amplitude	
Shock resistance	Durability	1,000 m/s² {approx. 100G} max.	
	Malfunction * 1	300 m/s² {approx. 30G} max.	
Durability * 2	Mechanical	1,000,000 operations min. (60 operations/min)	
	Electrical	100,000 operations min. (30 operations/min)	30,000 operations min. (30 operations/min)
Degree of protection		IEC IP40	
Ambient operating temperature		-25°C to +85°C (at ambient humidity 60% max.) (with no icing or condensation)	
Ambient operating humidity		85% max. (for +5°C to +35°C)	
Weight		Approx. 0.5 g (pin plunger models)	

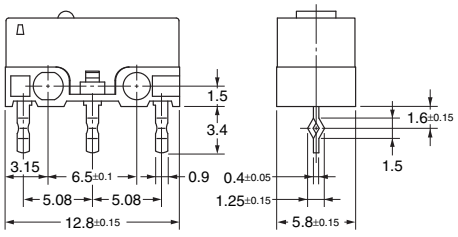
Note. The data given above are initial values.
*1. The values are at Free Position and Total Travel Position values for pin plunger, and Total Travel Position value for lever. Close or open circuit of the contact is 1ms max.
*2. For testing conditions, consult your OMRON sales representative.

Terminals/Appearances (Unit: mm)

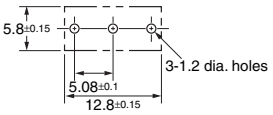
●PCB terminals (Straight)



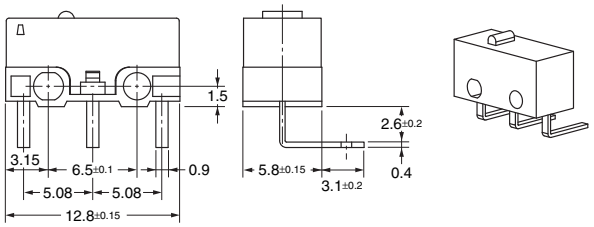
●Self-clinching PCB terminals



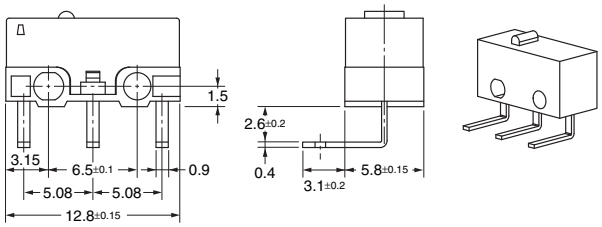
<PCB Mounting Dimensions (Reference)>



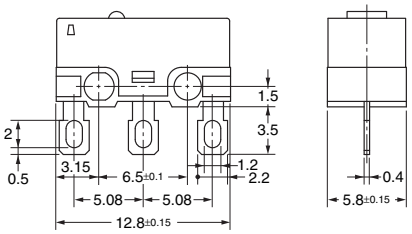
●PCB terminals (Right-angled)



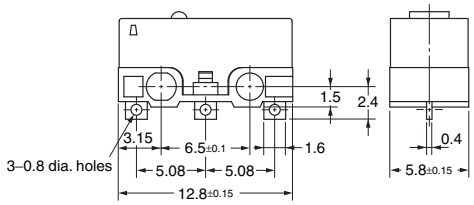
●PCB terminals (Left-angled)



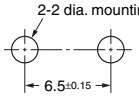
●Solder terminals



●Compact solder terminals



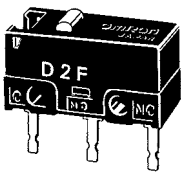
Mounting Holes (Unit: mm)

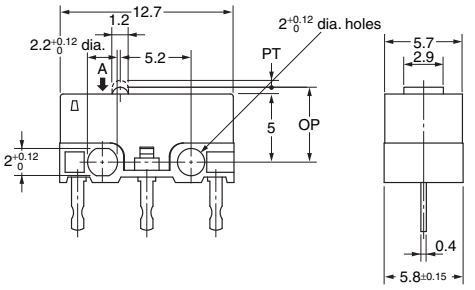


Dimensions (Unit: mm) /Operating Characteristics

The following illustrations and drawings are for D2F models with PCB terminals (straight). Self-clinching, solder, compact solder, and right-angled, left angled terminals are omitted from the following drawings. Refer to the **previous page** for these terminals.
When ordering, replace □ with the code for the terminal that you need. See the "**List of Models**" for available combinations of models.

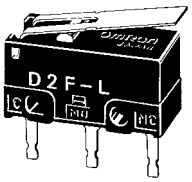
●Pin Plunger Models
D2F□-AQ
D2F-01□-AQ

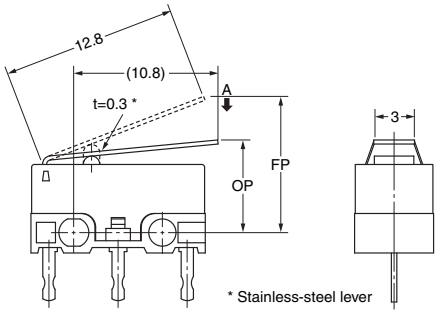




Operating Characteristics		Model	D2F-□-AQ D2F-01□-AQ
Operating Force	OF	Max.	1.47 N {150 gf}
Releasing Force	RF	Min.	0.20 N {20 gf}
Pretravel	PT	Max.	0.5 mm
Overtravel	OT	Min.	0.25 mm
Movement Differential	MD	Max.	0.12 mm
Operating Position	OP		5.5±0.3 mm

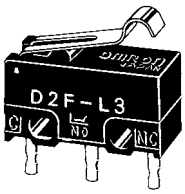
●Hinge Lever Models
D2F-L□-AQ
D2F-01L□-AQ

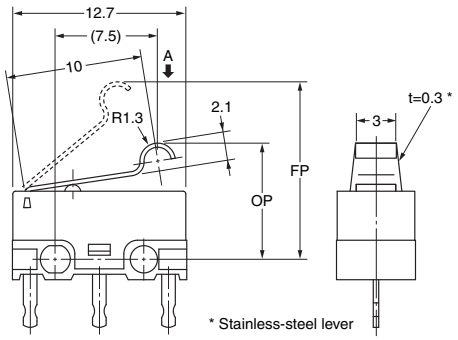




Operating Characteristics		Model	D2F-L□-AQ D2F-01L□-AQ
Operating Force	OF	Max.	0.78 N {80 gf}
Releasing Force	RF	Min.	0.05 N {5 gf}
Overtravel	OT	Min.	0.55 mm
Movement Differential	MD	Max.	0.5 mm
Free Position	FP	Max.	10 mm
Operating Position	OP		6.8±1.5 mm

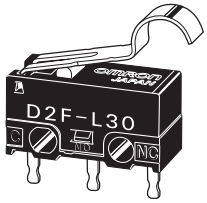
●Simulated Roller Lever Models (R1.3)
D2F-L3□-AQ
D2F-01L3□-AQ

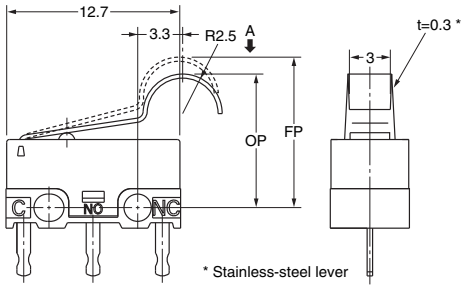




Operating Characteristics		Model	D2F-L3□ -AQ D2F-01L3□-AQ
Operating Force	OF	Max.	0.78 N {80 gf}
Releasing Force	RF	Min.	0.05 N {5 gf}
Overtravel	OT	Min.	0.5 mm
Movement Differential	MD	Max.	0.45 mm
Free Position	FP	Max.	13 mm
Operating Position	OP		8.5±1.2 mm

●Simulated Roller Lever Models (R2.5)
D2F-L30□-AQ
D2F-01L30□-AQ





Operating Characteristics		Model	D2F-L30□-AQ D2F-01L30□-AQ
Operating Force	OF	Max.	0.54 N {55 gf}
Releasing Force	RF	Min.	0.04 N {4 gf}
Overtravel	OT	Min.	0.5 mm
Movement Differential	MD	Max.	0.5 mm
Free Position	FP	Max.	12.6 mm
Operating Position	OP		9.5±1.0 mm

Note 1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
Note 2. The operating characteristics are for operation in the A direction (⬇).

Precautions

Please refer to "**Safety Precautions for All Detection Switches**" on page 15 for correct use.

Cautions

●Soldering

- Terminal connection
  When soldering, make sure that the temperature of the soldering iron tip is not higher than 300°C, and complete the soldering within 3 seconds. Do not apply any external force for 1 minute after soldering. Soldering at an excessively high temperature or soldering for more than 3 seconds may deteriorate the characteristics of the Switch.
- Connecting to PCB terminal Boards
  When using automatic soldering baths, we recommend soldering at 260°C ±5°C within 5 seconds. Make sure that the liquid surface of the solder does not flow over the edge of the board.
  When soldering terminals manually, perform soldering within 3 seconds at iron tip temperature not higher than 350°C. Do not apply any external force for at least 1 minute after soldering.
  When applying solder, keep the solder away from the case of the Switch and do not allow solder or flux to flow into the case.

Correct Use

●Mounting

Use M2 mounting screws with plane washers or spring washers to securely mount the Switch. Tighten the screws to a torque of 0.08 to 0.1 N·m {0.8 to 1 kgf·cm}.

●Using Micro Loads

Using a model for ordinary loads to open or close the contact of a micro load circuit may result in faulty contact. Use models that operate in the following range. However, even when using micro load models within the following operating range, if inrush current occurs when the contact is opened or closed, it may increase the contact wear and so decrease durability. Therefore, insert a contact protection circuit where necessary. The minimum applicable load is the N-level reference value. This value indicates the malfunction reference level for the reliability level of 60% (λ_{60}).

(JIS C5003)

The equation, $\lambda_{60}=0.5\times10^{-6}$/operation, indicates that the estimated malfunction rate is less than $\frac{1}{2{,}000{,}000}$ operations with a reliability level of 60%.