

# D2FP

## Ultra Subminiature Basic Switch

### Optical Ultra Subminiature Basic Switches for operations with rapid response and high reliability

- Rapid, chattering-free response due to contactless operation using photosensors
- High reliability achieved by improved resistance against environment change
- Long durability achieved using a stable spring structure
- Easy mounting achieved by integrating the sensors inside the switch
- Clear click feeling



Refer to "Precautions" on page 4.

### Model Number Legend

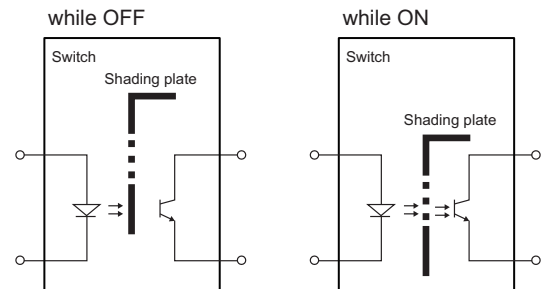
D2FP-□□  
(1) (2)

(1) Operating Force (OF)  
F: 0.59±0.15 N

(2) Output Type  
N2: 1 output type

### Contact Form

SPST-NO



### List of Models

Operating Force (OF)	Durability	Button color	Model	Minimum packing unit
0.59 N	70,000,000 operations min.	WHITE	D2FP-FN2	500 pcs.

## D2FP

### Characteristics/Ratings/Electrical Characteristics

#### Characteristics

		D2FP-FN2
Operating speed		1 to 500 mm/s
Operating frequency	Mechanical/ Electrical	300 operations/1 min. max.
Vibration resistance	Malfunction	10 to 55 Hz, 1.5 mm double amplitude
Shock resistance	Destruction	1,000 m/s <sup>2</sup> max.
	Malfunction	300 m/s <sup>2</sup> max.
Durability		70,000,000 operations min. (at 300 ops./1 min.)
Ambient operating temperature		+5 to +40°C (at 60% RH max.) (with no icing or condensation)
Weight		Approx. 0.54 g

#### Absolute Maximum Ratings (Ta = 25°C)

Item		Symbol	Max. rating	Unit
Input	Forward current	I <sub>F</sub>	40	mA
	Peak surge forward current (tp = 100 μs)	I <sub>FSM</sub>	200	mA
	Reverse voltage	V <sub>R</sub>	5	V
Output	Collector dissipation	P <sub>C</sub>	75	mW
	Collector current	I <sub>C</sub>	20	mA
	Collector-emitter voltage	V <sub>CEO</sub>	30	V

#### Electrical Characteristics (Ta = 25°C)

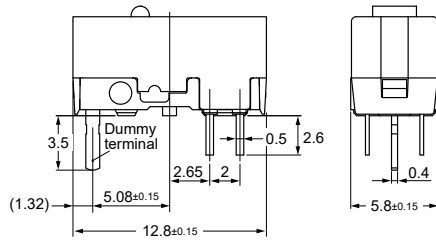
Item		Symbol	Min.	Typ.	Max.	Unit	Condition
Input	Forward voltage	V <sub>F</sub>		1.16	1.4	V	I <sub>F</sub> =5 mA
	Reverse current	I <sub>R</sub>			10	μA	V <sub>R</sub> =5 V
Output	Dark current	I <sub>CEO</sub>			100	nA	V <sub>CE</sub> =10 V
	Collector-emitter saturated voltage	V <sub>CE(SAT)</sub>			0.4	V	I <sub>C</sub> =100 μA E <sub>e</sub> =1 mW/cm <sup>2</sup>
Transmission characteristics	Collector current while ON	I <sub>C(ON)</sub>	0.75	1.07	1.35	mA	V <sub>ce</sub> =5 V, E <sub>e</sub> =1 mW/cm <sup>2</sup>
	Rising time	T <sub>r</sub>		100		μs	V <sub>CE</sub> =2 V I <sub>C</sub> =1 mA
	Falling time	T <sub>f</sub>			21	μs	I <sub>F</sub> =5 mA (Pulse drive: 30 μs ON, 970 μs OFF)
	Collector-emitter voltage while ON	V <sub>ce ON</sub>			0.4	V	Ambient temperature: 20 ± 15°C Ambient humidity: 65 ± 20%RH
	Collector-emitter voltage while OFF	V <sub>ce OFF</sub>	1.5			V	Operating frequency: 300 operations/1 min.

# Dimensions (Unit: mm) / Operating Characteristics

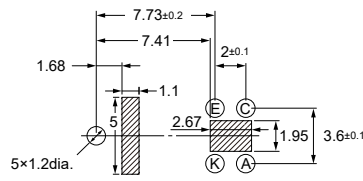
**CAD Data** marked products, 2D drawings and 3D CAD models are available.  
For CAD information, please visit our website, which is noted on the last page.

D2FP-FN2

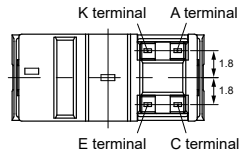
**CAD Data**



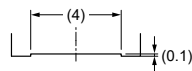
<PCB pad dimensions (reference)>



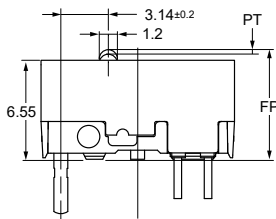
Do not connect the dummy terminal to the circuit.  
Wiring is prohibited in the shaded areas.



Recommended shape for proper stroke operation



Internal circuit



Terminal No.	Name
A	Anode
K	Cathode
C	Collector
E	Emitter

		D2FP-FN2
Operating Force	OF	0.59±0.15 N
Releasing Force	RF	0.24 N min.
Pretravel	PT	0.3±0.2 mm
Free Position	FP	7.35 +0/-0.4

**Note:** Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

## Precautions

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★ Refer to General Information.

<b>Cautions</b>
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### Electrical Ratings

- Use the Switch within the rated voltage and current ranges, otherwise the Switch may have a shortened durability, radiate heat, or burn out. This particularly applies to the instantaneous voltages and currents when switching.

<b>Correct Use</b>
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### Soldering

- Before soldering the Switch on a multilayer PCB, test to confirm that soldering can be performed properly. Switch may experience deformation due to heat, depending on the PCB type, the pattern and lands that are used, etc.
- When using an automatic solder bath, it is recommended to pre-heat to 100°C within 60 seconds, and heat to 230 to 260°C within 5 seconds (single-sided board) or within 3 seconds (double-sided board). In addition, ensure that the liquid surface level of the solder and flux do not exceed the board.
- For manual soldering, ensure that the heating time is within 3 seconds using a soldering iron with a tip temperature of 350°C or less, and be sure not to apply external force for around one minute after soldering. In addition, supply the solder away from the switch case and ensure that the solder and flux do not flow to the case side. If flux enters inside the switches they may malfunction.
- Solder within 72 hours after opening the moisture-proof packaging. For products for which over 72 hours have elapsed, perform baking for 24 hours at 80°C before soldering.

### Washing

- The Switch is not sealed, and cannot be washed. Doing so will cause the washing agent, together with flux or dust particles on the PCB, to enter the Switch, resulting in malfunction.

### Application Environment

- Do not use the Switch in locations that are subject to toxic gas, silicon, excessive dust, excessive dirt, high temperatures, high humidity, sudden temperature changes, water splashes, or oil splashes. Otherwise, functional damage resulting from damage due to defective characteristics or corrosion may occur.

### Other Precautions

- When using this product, antistatic measures are required.
- Storing it in a container sealed with nitrogen flush packaging or with a desiccant is recommended.



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