# 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)**

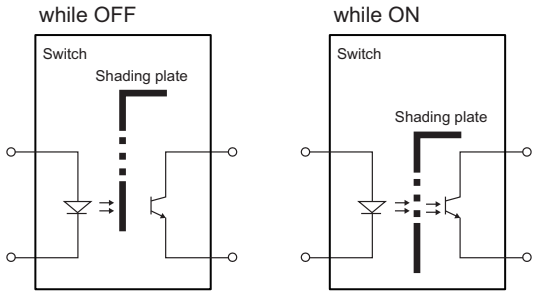
F: 0.59±0.15 N

**(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. |

# 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$^2$ max. |
| | **Malfunction** | 300 m/s$^2$ 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** | $I_F$ | 40 | mA |
| | **Peak surge forward current (tp = 100 µs)** | $I_{FSM}$ | 200 | mA |
| | **Reverse voltage** | $V_R$ | 5 | V |
| **Output** | **Collector dissipation** | $P_C$ | 75 | mW |
| | **Collector current** | $I_C$ | 20 | mA |
| | **Collector-emitter voltage** | $V_{CEO}$ | 30 | V |

## Electrical Characteristics (Ta = 25°C)

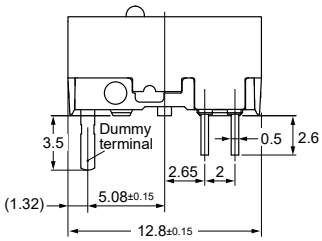
| Item | | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|---|
| **Input** | **Forward voltage** | $V_F$ | | 1.16 | 1.4 | V | $I_F$=5 mA |
| | **Reverse current** | $I_R$ | | | 10 | µA | $V_R$=5 V |
| **Output** | **Dark current** | $I_{CEO}$ | | | 100 | nA | $V_{CE}$=10 V |
| | **Collector-emitter saturated voltage** | $V_{CE(SAT)}$ | | | 0.4 | V | $I_C$=100 µA<br>$E_e$=1 mW/cm$^2$ |
| **Transmission characteristics** | **Collector current while ON** | $I_{C(on)}$ | 0.75 | 1.07 | 1.35 | mA | Vce=5 V,<br>Ee=1 mW/cm$^2$ |
| | **Rising time** | Tr | | 100 | | µs | $V_{CE}$=2 V<br>$I_C$=1 mA<br>$I_F$=5 mA<br>(Pulse drive: 30 µs ON, 970 µs OFF)<br>Ambient temperature: 20 ± 15°C<br>Ambient humidity: 65 ± 20%RH<br>Operating frequency:<br>300 operations/1 min. |
| | **Falling time** | Tf | | | 21 | µs | |
| | **Collector-emitter voltage while ON** | Vce ON | | | 0.4 | V | |
| | **Collector-emitter voltage while OFF** | Vce OFF | 1.5 | | | V | |

# Dimensions (Unit: mm) / Operating Characteristics

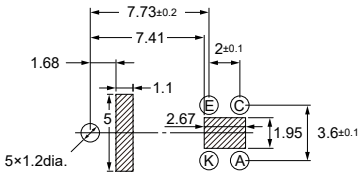
CAD Data marked products, 2D drawings and 3D CAD models are available.
For CAD information, please visit our website, which is noted on the last page.

## D2FP-FN2

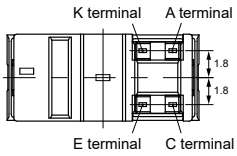
CAD Data



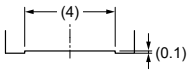

<PCB pad dimensions (reference)>



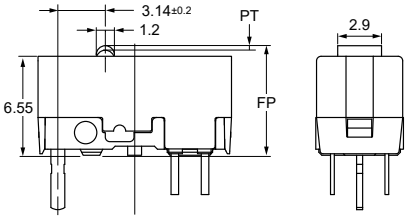

Do not connect the dummy terminal to the circuit.
Wiring is prohibited in the shaded areas.




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

★Refer to General Information.

## Cautions

### 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.

## Correct Use

### 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.

**MEMO**

Please check each region's Terms & Conditions by region website.


## OMRON Corporation
**Device & Module Solutions Company**

### Regional Contact

**Americas**
https://components.omron.com/us

**Europe**
https://components.omron.com/eu

**Asia-Pacific**
https://components.omron.com/ap

**China**
https://components.omron.com.cn

**Korea**
https://components.omron.com/kr

**Japan**
https://components.omron.com/jp





**Cat. No. B153-E1-01**
0523