Ultra Subminiature Basic Switch (Non-Sealed) – D2F

A variety of D2F Models including Models Incorporating Simulated Hinge Lever and Hinge Roller Lever

- ROHS Compliant.
- Ultra sub-miniature switch (12.8 x 6.5 x 5.8 [W x H x D]) ideal for PCB mounting.
- Incorporating a snapping mechanism made with two highly precise split springs which ensures a long service life (1,000,000 operations).
- Two-stage bottom different in level and insertion moulded terminals prevents flux penetration.
- PCB, self-clinching, solder, and right-angle terminals are available.
- Ideal for home appliances, audio equipment, office machines, and communications equipment.

Ordering Information

Model Number Legend

D2F-

1. Ratings
   - Note: General bad models
   - Models incorporating simulated hinge lever and hinge roller lever

2. Operating Force max.
   - Note: These values are for pin plunger model.

3. Actuator
   - Note: Pin plunger
   - 1: Hinge lever
   - 2: Hinge roller lever
   - 3: Simulated roller lever

Specifications

- Ratings

<table>
<thead>
<tr>
<th>Item</th>
<th>1.47 N (150gf)</th>
<th>0.74 N (75gf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D2F models</td>
<td>Low operating</td>
<td>Low operating</td>
</tr>
<tr>
<td>1.47 N (150gf)</td>
<td>Low operating</td>
<td>Low operating</td>
</tr>
<tr>
<td>D2F-4T models</td>
<td>Low operating</td>
<td>Low operating</td>
</tr>
</tbody>
</table>

Note: Consult your OMRON representative before using the switch with inductive or inductive loads.

1. Refer to the following test conditions:
   - Ambient temperature: 25°C
   - Ambient humidity: 60%RH
   - Operating frequency: 30 operations/minute

<table>
<thead>
<tr>
<th>Actuator</th>
<th>General loads</th>
<th>Micro loads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin plunger</td>
<td>PCB terminals</td>
<td>Solder terminals</td>
</tr>
<tr>
<td>Force</td>
<td>0.74 N (75gf)</td>
<td>0.74 N (75gf)</td>
</tr>
<tr>
<td>D2F</td>
<td>D2F-D</td>
<td>D2F-D</td>
</tr>
<tr>
<td>D2F-T</td>
<td>D2F-T</td>
<td>D2F-T</td>
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<tr>
<td>D2F-A</td>
<td>D2F-A</td>
<td>D2F-A</td>
</tr>
<tr>
<td>Compact solder</td>
<td>D2F-D</td>
<td>D2F-D</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hinge lever</th>
<th>PCB terminals</th>
<th>Solder terminals</th>
<th>PCB terminals</th>
<th>Solder terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force</td>
<td>0.74 N (75gf)</td>
<td>0.74 N (75gf)</td>
<td>0.74 N (75gf)</td>
<td>0.74 N (75gf)</td>
</tr>
<tr>
<td>D2F</td>
<td>D2F-D</td>
<td>D2F-D</td>
<td>D2F-D</td>
<td>D2F-D</td>
</tr>
<tr>
<td>D2F-T</td>
<td>D2F-T</td>
<td>D2F-T</td>
<td>D2F-T</td>
<td>D2F-T</td>
</tr>
<tr>
<td>D2F-A</td>
<td>D2F-A</td>
<td>D2F-A</td>
<td>D2F-A</td>
<td>D2F-A</td>
</tr>
<tr>
<td>Compact solder</td>
<td>D2F-D</td>
<td>D2F-D</td>
<td>D2F-D</td>
<td>D2F-D</td>
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<table>
<thead>
<tr>
<th>Simulated roller lever</th>
<th>PCB terminals</th>
<th>Solder terminals</th>
<th>PCB terminals</th>
<th>Solder terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force</td>
<td>0.74 N (75gf)</td>
<td>0.74 N (75gf)</td>
<td>0.74 N (75gf)</td>
<td>0.74 N (75gf)</td>
</tr>
<tr>
<td>D2F</td>
<td>D2F-D</td>
<td>D2F-D</td>
<td>D2F-D</td>
<td>D2F-D</td>
</tr>
<tr>
<td>D2F-T</td>
<td>D2F-T</td>
<td>D2F-T</td>
<td>D2F-T</td>
<td>D2F-T</td>
</tr>
<tr>
<td>D2F-A</td>
<td>D2F-A</td>
<td>D2F-A</td>
<td>D2F-A</td>
<td>D2F-A</td>
</tr>
<tr>
<td>Compact solder</td>
<td>D2F-D</td>
<td>D2F-D</td>
<td>D2F-D</td>
<td>D2F-D</td>
</tr>
</tbody>
</table>
Ultra Subminiature Basic Switch (Non-Sealed) – D2F

A variety of D2F Models including Models Incorporating Simulated Hinge Lever and Hinge Roller Lever

■ RC/HS Compliant.
■ Ultra sub-miniature switch (12.8 x 6.5 x 5.8 [W x H x D]) ideal for PCB mounting.
■ Incorporating a snapping mechanism made with two highly precise split springs which ensures a long service life (1,000,000 operations).
■ Two-stage bottom different in level and insertion moulded terminals prevents flux penetration.
■ PCB, self-clinching, solder, and right-angle terminals are available.
■ Ideal for home appliances, audio equipment, office machines, and communications equipment.

Ordering Information

■ Model Number Legend

D2F-xxxxx

1. Ratings
   - Note: General bad
   - 01: Micro loads (0.1A at 25VDC)

2. Operating Force max.
   - Note: 1.47 N (150gf)
   - F1: 0.74 N (75gf)

3. Actuator
   - Note: These values are for the pin plunger model
   - 1: Pin plunger
   - 2: Hinge lever
   - 3: Hinge roller lever
   - 4: Simulated roller lever

List of Models

<table>
<thead>
<tr>
<th>Actuator</th>
<th>Ratings</th>
<th>General loads</th>
<th>Mic loads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OF max. (see note)</td>
<td>General purpose</td>
<td>Low-operating</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Force 0.14N (15gf)</td>
<td>Force 0.74N (75gf)</td>
</tr>
<tr>
<td>3A</td>
<td>1A</td>
<td>Solder</td>
<td>Solder</td>
</tr>
<tr>
<td>0.1A</td>
<td></td>
<td>Solder</td>
<td>Solder</td>
</tr>
</tbody>
</table>

Pin plunger

PCB terminals
- 3A: D2F-00 D2F-01 D2F-01F
- 1A: D2F-01-D D2F-01-D D2F-01F
- 0.1A: D2F-01-A D2F-01-A D2F-01-A

Solder terminals
- 3A: D2F-D3 D2F-D3 D2F-D3
- 1A: D2F-D1 D2F-D1 D2F-D1
- 0.1A: D2F-D1-A D2F-D1-A D2F-D1-A

Hinge lever

PCB terminals
- 3A: D2F-J D2F-J D2F-J
- 1A: D2F-J-A D2F-J-A D2F-J-A
- 0.1A: D2F-J-A1 D2F-J-A1 D2F-J-A1

Solder terminals
- 3A: D2F-L3 D2F-L3 D2F-L3
- 1A: D2F-L1 D2F-L1 D2F-L1
- 0.1A: D2F-L1-A D2F-L1-A D2F-L1-A

Simulated roller lever

PCB terminals
- 3A: D2F-L D2F-L D2F-L
- 1A: D2F-L-A D2F-L-A D2F-L-A
- 0.1A: D2F-L-A1 D2F-L-A1 D2F-L-A1

Solder terminals
- 3A: D2F-L3 D2F-L3 D2F-L3
- 1A: D2F-L1 D2F-L1 D2F-L1
- 0.1A: D2F-L1-A D2F-L1-A D2F-L1-A

Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>OF max</th>
<th>D2F models</th>
<th>D2F-AT models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.47 N (15gf)</td>
<td>(Low-operating)</td>
<td>(Low-operating)</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>125V AC</td>
<td>30V DC</td>
<td>5,1</td>
</tr>
<tr>
<td>5,1</td>
<td>30V DC</td>
<td>2,3</td>
<td>2,3</td>
</tr>
<tr>
<td>1,1</td>
<td>30V DC</td>
<td>1,1</td>
<td>1,1</td>
</tr>
</tbody>
</table>

Note:
- 1: Consult your Omron representative before using the switch with inductive or rotary loads.
- 2: Permissible values apply under the following test conditions:
  - Ambient temperature: 30°C
  - Ambient humidity: 85%RH
  - Operating frequency: 50 operations/minute.
Ultra Subminiature Basic Switch (Non-Sealed) – D2F

**Characteristics**

- **Operating speed**: 1 to 500 mm/s (on pin plunger models)
- **Operating frequency**: Mechanical: 250 operations/min
  Electrical: 30 operations/min
- **Insulation resistance**: 100 MQ min. (at 30°C)
- **Contact resistance (initial value)**:
  - D2F models: 50 μΩ max.
  - D2F-1 models: 50 μΩ max.
  - D2F-01 models: 100 μΩ max.
- **Dielectric strength**: 600 Vac / 500 Vac for 1 min between terminals of the same polarity
  1000 Vac / 500 Vac for 1 min between contact carrying metal parts and ground (see note 1), and
  between each terminal and non-current carrying metal part.
- **Vibration resistance (see note 2)**:
  - Mechanical: 15 to 55 Hz, 1.5 mm double amplitude
- **Shock resistance (see note 2)**:
  - Mechanical: 1,000 m/s² (approx. 1000G) max.
  - Mechanical: 300 m/s² (approx. 30G) max.
- **Life expectancy**: Electric: D2F, 30,000 operations min. (Refer to Engineering Data).
  D2F-01, 100,000 operations min.
- **Degree of protection**: IP4X
- **Degree of protection against electric shock**: Class I
- **Proof testing index (PTI)**: 115
- **Ambient temperature**: Operating: -25°C to 85°C at ambient humidity of 90% max. (with cooling)
- **Ambient humidity**: Operating: 85% max. (for 5°C to 35°C)
- **Weight**: Approx. 0.5 g (pin plunger models)

**Notes:**
1. The data given are initial values.
2. For the pin plunger models, the values are at the free position and total travel position. For the lever models, they are at the total travel position.
3. For testing conditions, consult your OMRON sales representative.

**Approved Standards**

- UL/CUL (File No. R001015)
- IEC 61058 (File No. 41013)

**Contact Specifications**

- **Rated voltage**: 125 Vac, 250 Vac
- **Rated current**: 1 A, 2 A

**Dimensions**

**Terminals**

- **PCB Terminals (Standard)**
- **Solder Terminals**
- **Self-clinching PCB Terminals**
- **Solder Terminals**

**Engineering Data**

- **Mechanical Life Expectancy (D2F, D2F-01)**
- **Electrical Life Expectancy (D2F)**

- **Switching current (A)**
- **Number of operations (min.)**

**Ultra Subminiature Basic Switch (Non-Sealed) – D2F**
Ultra Subminiature Basic Switch (Non-Sealed) – D2F

**Characteristics**

- **Operating speed**: 1 to 100 kips/hr (for pin plunger models).
- **Contact resistance (Initial value)**: 50 μΩ min. (at 300 VDC).
- **Dielectric strength**: 80 VAC, 500 VDC for 1 min between terminals of the same polarity, 1,500 VDC, 3,000 VDC for 1 min between contact carrying metal parts and ground (see note 1), and between each terminal and non-current carrying metal part.
- **Vibration resistance (see note 2)**: Non-ferromagnetic: 1,500 g/kg, (approx. 15 g/cm²).
- **Life expectancy**: Electronic: D2F, 10,000 operations min. (Refer to Engineering Data). D2F-01, 100,000 operations min.

**Notes:**
1. The data given are initial values.
2. For the pin plunger models, the values are at the free position and travel position. For the lever models, the values are at the total travel position.
3. For testing conditions, consult your OMRON sales representative.

**Approved Standards**

- UL/cUL (Nos. 1013, 4013)

<table>
<thead>
<tr>
<th>Rating voltage</th>
<th>D2F (general purpose)</th>
<th>D2F-01 (general purpose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 VAC</td>
<td>5 A</td>
<td>3 A</td>
</tr>
<tr>
<td>30 VDC</td>
<td>2 A</td>
<td>1 A</td>
</tr>
</tbody>
</table>

**Contact Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>D2F model</th>
<th>D2F-01 model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact resistance</td>
<td>50 μΩ min. (at 300 VDC)</td>
<td></td>
</tr>
<tr>
<td>Gap (standard value)</td>
<td>0.25 mm</td>
<td></td>
</tr>
</tbody>
</table>

**Dimensions**

**Terminals**

- **PCB Terminals (Standard)**
  - D2P
- **Solder Terminals**
  - D2F-O
- **Self-cinching PCB Terminals**
  - D2P
- **Solder Terminals**
  - D2F-JN
Ultra Subminiature Basic Switch (Non-Sealed) – D2F

Dimensions and Operating Characteristics

Note: 1. All units are in millimeters unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
3. The following illustrations and drawings are for D2F models with PCB terminals. Soldering, solder, and right-angle terminals are omitted from the following drawings. When ordering, replace □ with the code for the terminal that you need.

PCB left-angle terminal
D2F-A1

PCB right-angle terminal
D2F-A

Note: Angled terminal directions are shown below.

Left-angled terminal Right-angled terminal

Mounting Holes

Mounting Dimensions

Note: Dimed Vector Isometric view.

Simulated Roller Lever
D2F-LC
D2F-LC-2
D2F-LC-L5
D2F-LC-15

Hinge Roller Lever
D2F-HL
D2F-HL-1
D2F-HL-2
D2F-HL-3

Ultra Subminiature Basic Switch (Non-Sealed) – D2F

Dimensions and Operating Characteristics

Note:
1. All units are in millimeters unless otherwise indicated.
2. Unless otherwise specified, a tolerance of ±0.2 mm applies to all dimensions.
3. The following illustrations and drawings are for D2F models with PCB terminals. Self-clamping, solder, and right-angle terminals are illustrated from the following drawings. Where ordinating, replace D2F-A with the code for the terminal that you need.

Pie Plunger

<table>
<thead>
<tr>
<th>Model</th>
<th>D2F-A1</th>
<th>D2F-A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF max.</td>
<td>1.47 H</td>
<td>0.74 H</td>
</tr>
<tr>
<td>GF min.</td>
<td>0.53 H</td>
<td>0.29 H</td>
</tr>
<tr>
<td>PP max.</td>
<td>0.6 mm</td>
<td>0.3 mm</td>
</tr>
<tr>
<td>FP max.</td>
<td>0.25 mm</td>
<td>0.17 mm</td>
</tr>
<tr>
<td>DP</td>
<td>8.5x3.3 mm</td>
<td>4.8x3.3 mm</td>
</tr>
</tbody>
</table>

Hinge Lever

<table>
<thead>
<tr>
<th>Model</th>
<th>D2F-A1</th>
<th>D2F-A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF max.</td>
<td>0.78 N</td>
<td>0.39 N</td>
</tr>
<tr>
<td>GF min.</td>
<td>0.26 N</td>
<td>0.13 N</td>
</tr>
<tr>
<td>DT max.</td>
<td>0.5 mm</td>
<td>0.5 mm</td>
</tr>
<tr>
<td>DP</td>
<td>12 mm</td>
<td>4.8x3.3 mm</td>
</tr>
</tbody>
</table>

Simulated Roller Lever

<table>
<thead>
<tr>
<th>Model</th>
<th>D2F-A1</th>
<th>D2F-A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF max.</td>
<td>0.78 N</td>
<td>0.39 N</td>
</tr>
<tr>
<td>GF min.</td>
<td>0.26 N</td>
<td>0.13 N</td>
</tr>
<tr>
<td>DT max.</td>
<td>0.3 mm</td>
<td>0.2 mm</td>
</tr>
<tr>
<td>DP</td>
<td>6.5x2.5 mm</td>
<td>4.8x3.3 mm</td>
</tr>
</tbody>
</table>

Hinge Roller Lever

<table>
<thead>
<tr>
<th>Model</th>
<th>D2F-A1</th>
<th>D2F-A2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF max.</td>
<td>0.78 N</td>
<td>0.39 N</td>
</tr>
<tr>
<td>GF min.</td>
<td>0.26 N</td>
<td>0.13 N</td>
</tr>
<tr>
<td>DT max.</td>
<td>0.3 mm</td>
<td>0.3 mm</td>
</tr>
<tr>
<td>DP</td>
<td>3.5x0.7 mm</td>
<td>4.8x3.3 mm</td>
</tr>
</tbody>
</table>

Note: Angled terminal directions are shown below.

Mounting Holes

Two: 3 dia. mounting holes

Mounting Dimensions

Length: 2.54
Width: 2.54
Height: 6.5 x 0.15

Note: Dimensions shown.
**Surface Mount Detection Switch D3SH**

The smallest detection switch in the world. (OMRON's data as of June 2006.)

- Ultra small size and ultra low profile contributing to down-sizing of sets devices. (3.0 x 3.4 x 0.9 mm (W x D x H))
- A unique mechanism enables high contact reliability and high precision operation.
- Horizontal 2-way detection and long stroke for easy installation are available.
- Meet a variety of applications by contact and lever variations.

**Ordering Information**

**Model Number Legend**

<table>
<thead>
<tr>
<th>D3SH-</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: SPST-NO</td>
<td>D: without Boss</td>
<td>B: Right operating with standard lever</td>
<td></td>
</tr>
<tr>
<td>0: without Boss</td>
<td>L: Left operating with standard lever</td>
<td>R: Right operating with long lever</td>
<td></td>
</tr>
<tr>
<td>1: with Boss</td>
<td>L1: Left operating with long lever</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**List of Models**

<table>
<thead>
<tr>
<th>Standard Lever Models</th>
<th>Contact Form</th>
<th>Direction of Operation</th>
<th>Box of Positioning</th>
<th>Model</th>
<th>Packing Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPST-NO</td>
<td>Right</td>
<td>With-Boss</td>
<td>D3SH-A1R</td>
<td>Embossed tape (see note)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td>With-Boss</td>
<td>D3SH-A1L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPST-NC</td>
<td>Right</td>
<td>With-Boss</td>
<td>D3SH-B1R</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td>With-Boss</td>
<td>D3SH-B1L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Minimum packing unit is 1,000 pcs./reel.

---

**Ultra Subminiature Basic Switch (Non-Sealed) – D2F**

**Precautions**

- **Mounting Dimensions**
  - Turn OFF the power supply before mounting or removing the switch, rating or performing maintenance or inspection. Failure to do so may result in electric shock or burning.
  - Use M325 mounting screws with plain or spring washers to mount the switch. Tighten the screws to a torque of 0.78 to 0.94 N.m (0.8 to 1 kgf • cm).
  - Mount the switch onto a flat surface. Mounting on an uneven surface may cause deformation of the switch, resulting in faulty operation or breakdown in the housing.

- **Using Micro Loads**
  - Using a model for ordinary loads to open or close the contact of a microload circuit may result in faulty contact. Use models that operate in the following range. However, even when using microload models within the operating range shown below, if a fault current occurs when the contact is opened or closed, it may cause contact wear and reduce its 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 50% (λ). The equation, \( \lambda = 0.5 \times 10^{-6} \text{operations} \), indicates that the estimated malfunction rate is less than 1/2,000,000 operations with a reliability level of 60%.