

# 8 Series

## Toggle Switches

### ■ Introduction

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The 8 Series Toggles is Copal Electronics' high-reliability miniature switch product offering. This product line meets and exceeds all basic international switch standards.

With 8 toggle options, PC and solder lug terminals, power and logic level current ratings, 1-4 pole and many circuit offerings these switches can be used in many industries and various applications within these industries.

Four of the 8 Series lines are washable. Specifically designed for PC applications with automated solder and cleaning methods.

The 8 Series is available with UL Recognition and CSA Certification upon request from the customer.

### ■ Applications

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- Communication equipment
- Computer peripheral equipment
- Measuring instruments
- Medical equipment
- Automotive diagnosis




























The switches can be used in a wide range of fields from industrial to consumer equipment.

### ■ Features of 8 Series Toggles

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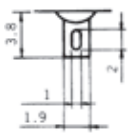
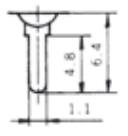
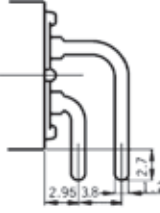
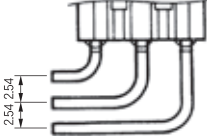
- 1. Terminal style :**  
Solder, Straight, Right angle and vertical mount PC terminals.
  - 2. Contacts :**  
Silver or gold.
  - 3. Epoxy resin case :**  
UL94V-0 self-extinguishing epoxy.
  - 4. Actuator styles :**  
Over 30 actuator variations.
  - 5. Insulation between terminal and ground :**  
4 mm minimum.
  - 6. Prevention of flux entry**  
The epoxy resin seal on bottom of the switch helps prevent the entry of solder and flux.
  - 7. Insulation barrier :**  
Insulation barrier design between poles helps prevent short-circuiting between poles ensuring high reliability.
  - 8. UL Recognized product**      **File No.E43275**
  - 9. CSA Certified product**      **File No.LR38341**
  - 10. For the UL Recognized and CSA Certified products please see page 409.**
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## 8 Series Toggles Selection Table

| Part No.        | Name                | Actuator shape  | Number of poles | Switching function  | Terminals   | Page  |
|-----------------|---------------------|---|-----------------|---|---|---|
| <b>8A</b>       | Standard toggle     |    | 1•2•3•4         | ON - ON<br>ON - OFF - ON<br>(ON) - OFF - (ON)<br>ON - OFF - (ON)<br>ON - (ON)<br>1/2 Poles<br>ON - ON<br>ON - OFF - ON<br>3/4 Poles<br>ON - ON - ON<br>8A Type 4 Poles only |  <br>Solder Lug Straight PC   | 386<br>}<br>388   |
| <b>8B</b>       | Mustang Toggle      |    | 1•2•3•4         |   |  <br>Solder Lug Straight PC   | 389<br>}<br>390   |
| <b>8C</b>       | Flatted Toggle      |    | 1•2•3•4         |   |  <br>Solder Lug Straight PC   | 391<br>}<br>392   |
| <b>8D</b>       | Long Toggle         |    | 1•2•3•4         |   |  <br>Solder Lug Straight PC   | 393<br>}<br>394   |
| <b>8E</b>       | Lever Lock Toggle   |    | 1•2•3•4         |   |  <br>Solder Lug Straight PC   | 395<br>}<br>396   |
| <b>8F</b>       | Splash Proof Toggle |   | 1•2•3•4         |   |  <br>Solder Lug Straight PC   | 397<br>}<br>398   |
| <b>8J</b>       | Short Toggle        |  | 1•2•3•4         |   |  <br>Solder Lug Straight PC   | 399<br>}<br>400   |
| <b>Washable</b> | <b>8G</b>           | Short Toggle Washable   | 1•2             |   | ON - ON<br>ON - OFF - ON<br>(ON) - OFF - (ON)<br>ON - (ON)  |   <br>Straight PC Right Angle Vertical |
|                 | <b>8GA</b>          | Standard Toggle Washable  | 1•2             | ON - ON<br>ON - OFF - ON<br>(ON) - OFF - (ON)<br>ON - (ON)  |   <br>Straight PC Right Angle Vertical | 405   |

( ) indicates momentary actuation

### ■ Terminals

| Solder Terminal (Style:1)  | PC Straight (Style:2)  | Right Angle (Style:4)  | Vertical Mount (Style:6)   |
|--|--|--|--|
| t=0.8<br> | t=0.8<br>PC<br> | t=0.8<br>R/A<br> | t=0.8<br>w=1.2<br>V/M<br> |

## Part Numbering

|             |                |                 |                    |           |                                      |
|-------------|----------------|-----------------|--------------------|-----------|--------------------------------------|
| <b>8</b>    | <b>A</b>       | <b>1</b>        | <b>01</b>          | <b>1</b>  | <b>C - Z</b>                         |
| Series code | Actuator shape | Number of poles | Switching function | Terminals | Contact material and plating<br>(※1) |

| Code     | Type                | Fig.     | Number of poles | Code       | Switching function | Fig.     | Terminals         | Code     | Contact material | Plating |
|----------|---------------------|----------|-----------------|------------|--------------------|----------|-------------------|----------|------------------|---------|
| <b>A</b> | Standard Toggle     | <b>1</b> | 1 pole          | <b>01</b>  | ON — ON            | <b>1</b> | Solder Terminal   | None     | Bs+Ag or Cu+Ag   | Ag      |
| <b>B</b> | Mustang Toggle      | <b>2</b> | 2 poles         | <b>02</b>  | ON — OFF — ON      | <b>2</b> | PC Straight       | <b>C</b> | Bs+Ag or Cu+Ag   | Ni+Au   |
| <b>C</b> | Flatted Toggle      | <b>3</b> | 3 poles         | <b>04</b>  | (ON) — OFF — (ON)  | <b>4</b> | Right Angle       |          |                  |         |
| <b>D</b> | Long Toggle         | <b>4</b> | 4 poles         | <b>05</b>  | ON — OFF — (ON)    | <b>6</b> | Vertical Mounting |          |                  |         |
| <b>E</b> | Lever-lock Toggle   |          |                 | <b>06</b>  | ON — (ON)          |          |                   |          |                  |         |
| <b>F</b> | Splash Proof Toggle |          |                 | <b>※10</b> | ON — ON — ON       |          |                   |          |                  |         |
| <b>J</b> | Short Toggle        |          |                 |            |                    |          |                   |          |                  |         |
| <b>G</b> | Washable            |          |                 |            |                    |          |                   |          |                  |         |

※8A Type only.

Bs=Brass  
Cu=Copper  
Ag=Silver  
Ni=Nickel  
Au=Gold

(※1) : Switches with gold-plated contacts ("C") are made-to order products.  
MOQ is 25 pcs.

Note : Some combinations may not be available. Please check the "Table of Part Numbers" for each series.

## 8 Series Toggles Common Specifications

| Contact specs.                |                | Silver                             | Gold                                 |
|-------------------------------|----------------|------------------------------------|--------------------------------------|
| Rating                        | Max.           | AC125V 6A<br>AC250V 3A<br>DC30V 4A | AC125V 6A<br>AC250V 3A<br>DC20V 25mA |
| Initial contact resistance    |                | 10mΩ Max.<br>(DC2~4V 1A)           | 20mΩ Max.<br>(AC200μV 1.5mA)         |
| Initial dielectric strength   |                | AC1500V 1 minute                   |                                      |
| Initial insulation resistance |                | 1000MΩ Min. (DC500V)               |                                      |
| Electrical life               | Alternate type | 50,000 cycles                      |                                      |
|                               | Momentary type | 25,000 cycles                      |                                      |
| Operating temperature range   |                | -30~+85°C                          |                                      |
| Storage temperature range     |                | -40~+85°C                          |                                      |

(ON) : Momentary.

# 8F

## Splash Proof Toggle Switch

Panel Seal

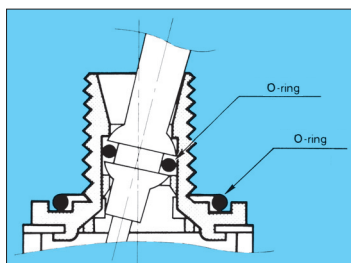


RoHS Compliant

### ■ Features

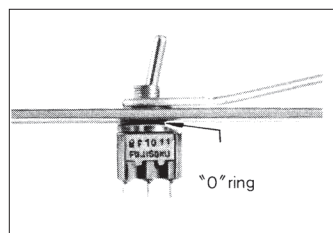
The **8F** series is a panel seal toggle switch with an **O-ring** to provide drip-proof and dust proof effect (corresponding to IP67 rating). Since a locking ring cannot be used because the panel seal is required, “**D-cutting**” is provided to the sleeve to prevent the switch from rotating. Note that the switch itself is not waterproof.

● The **8F** series is intended for panel seal and is not designed for use in water.



### ■ Mounting Method

The **8F** series should be mounted so that the **O-ring** has direct contact with the panel.



### ■ Table of Part Numbers

| Terminal Style  | Number of poles    |              | 1 pole                                | 2 poles           | 4 poles           |
|-----------------|--------------------|--------------|---------------------------------------|-------------------|-------------------|
|                 | Switching Function |              |                                       |                   |                   |
| Solder Terminal | ON                 | — ON         | <b>8F1011-Z</b><br>★ <b>8F1011C-Z</b> | ☆ <b>8F2011-Z</b> | ★ <b>8F4011-Z</b> |
|                 | (ON)               | — OFF — (ON) | ★ <b>8F1041-Z</b>                     | ★ <b>8F2041-Z</b> | —                 |
|                 | ON                 | — (ON)       | ★ <b>8F1061-Z</b>                     | —                 | —                 |
| PC Straight     | ON                 | — ON         | ★ <b>8F1012-Z</b>                     | ★ <b>8F2012-Z</b> | —                 |

■ **PC Hole Layouts** ..... Page 411.

■ **Panel Cut-Out Dimensions** ..... Page 411.

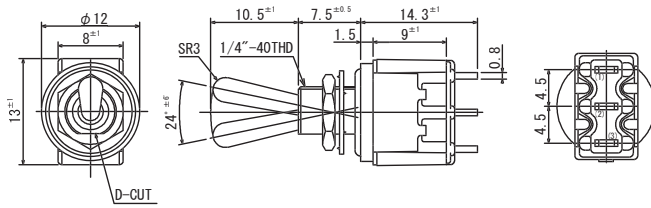
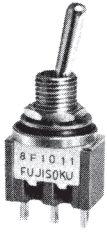
■ **Terminal Styles** ..... Page 384.

■ **Standard Accessories** ..... Page 411.

■ **Optional Accessories** ..... Page 412.

# 8F

## SPDT

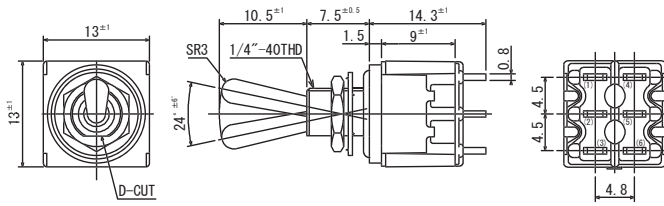
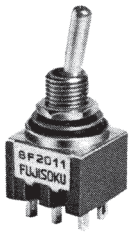


Terminal numbers are not shown on the switch.

| Switching function   | D cut | D cut | D cut |
|----------------------|-------|-------|-------|
| Part No.             |       |       |       |
| 8F101 ■-Z            | ON    | —     | ON    |
| 8F104 ■-Z            | (ON)  | OFF   | (ON)  |
| 8F106 ■-Z            | ON    | —     | (ON)  |
| Connecting terminals | 2-3   | —     | 2-1   |

■ : Please refer to "Table of Part Numbers" on P.397 for a list of full part numbers.

## DPDT

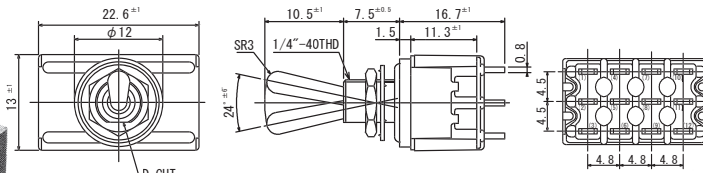
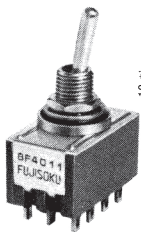


Terminal numbers are not shown on the switch.

| Switching function   | D cut      | D cut | D cut      |
|----------------------|------------|-------|------------|
| Part No.             |            |       |            |
| 8F201 ■-Z            | ON         | —     | ON         |
| 8F204 ■-Z            | (ON)       | OFF   | (ON)       |
| Connecting terminals | 2-3<br>5-6 | —     | 2-1<br>5-4 |

■ : Please refer to "Table of Part Numbers" on P.397 for a list of full part numbers.

## 4PDT



Terminal numbers are not shown on the switch.

| Switching function   | D cut                | D cut | D cut                |
|----------------------|----------------------|-------|----------------------|
| Part No.             |                      |       |                      |
| 8F401 ■-Z            | ON                   | —     | ON                   |
| Connecting terminals | 2-3 5-6<br>8-9 11-12 | —     | 2-1 5-4<br>8-7 11-10 |

■ : Please refer to "Table of Part Numbers" on P.397 for a list of full part numbers.

# UL and CSA Listed (Toggle Switches)

## Table of 8 Series Toggles UL and CSA Listed

### 8 Series Toggles

| Poles   | Switching Function |      |   | UL (※1.) |    |      |    |    |    |    |    | CSA (※2.) |    |    |    |    |    |
|---------|--------------------|------|---|----------|----|------|----|----|----|----|----|-----------|----|----|----|----|----|
|         |                    |      |   | 8A       | 8B | 8C   | 8D | 8E | 8F | 8J | 8A | 8B        | 8C | 8D | 8E | 8F | 8J |
| 1 pole  | 101□               | ON   | — | ON       | ○  | ○    | ○  | ○  | ○  | ○  | ○  | ○         | ○  | ○  | ○  | ○  | ○  |
|         | 102□               | ON   | — | OFF      | —  | ON   | ○  |    | ○  |    | ○  |           | ○  |    | ○  |    | ○  |
|         | 104□               | (ON) | — | OFF      | —  | (ON) | ○  | ○  | ○  |    |    | ○         |    |    |    | ○  |    |
|         | 105□               | ON   | — | OFF      | —  | (ON) | ○  |    |    |    |    | ○         |    |    |    |    | ○  |
|         | 106□               | ON   | — | (ON)     |    |      | ○  |    |    | ○  |    |           |    |    |    | ○  |    |
| 2 poles | 201□               | ON   | — | ON       | ○  | ○    | ○  | ○  | ○  | ○  | ○  | ○         | ○  | ○  | ○  | ○  | ○  |
|         | 202□               | ON   | — | OFF      | —  | ON   | ○  | ○  | ○  |    | ○  |           | ○  |    | ○  |    | ○  |
|         | 204□               | (ON) | — | OFF      | —  | (ON) | ○  |    | ○  |    |    | ○         |    |    |    | ○  |    |
|         | 205□               | ON   | — | OFF      | —  | (ON) | ○  |    |    |    |    | ○         |    |    |    |    |    |
|         | 206□               | ON   | — | (ON)     |    |      | ○  |    |    | ○  |    |           |    |    | ○  |    |    |
| 3 poles | 301□               | ON   | — | ON       | ○  | ○    | ○  |    | ○  |    | ○  | ○         | ○  |    | ○  |    | ○  |
|         | 302□               | ON   | — | OFF      | —  | ON   | ○  |    |    |    | ○  |           |    |    |    |    | ○  |
| 4 poles | 401□               | ON   | — | ON       | ○  | ○    |    |    | ○  | ○  | ○  | ○         |    |    | ○  | ○  | ○  |
|         | 402□               | ON   | — | OFF      | —  | ON   | ○  |    |    |    |    | ○         |    |    |    |    |    |
|         | 410□               | ON   | — | ON       | —  | ON   | ○  |    |    |    |    | ○         |    |    |    |    |    |

(1) Terminal types:  Solder terminal;  Straight terminal

(2) **UL**-recognized switches: Solder terminals and straight terminals available for Single/Double/Three/Four Pole

(3) **CSA**-certified switches: Solder terminals and straight terminals available for Single Pole. Straight terminals available for Double/Three/Four Pole.

(4) UL, CSA marked switches available with additional charge.

(5) (※1.) **UL File No.E43275**  
(※2.) **CSA File No.JR38341**

(6) As shown in the above chart, not all products are **UL**-recognized or **CSA**-certified. Please check with your local sales representative if you have any questions.

## 8 series

### ■8 Series Toggles

| Poles   | Switching function |                   | UL (※1.) |     | CSA (※2.) |     |
|---------|--------------------|-------------------|----------|-----|-----------|-----|
|         |                    |                   | 8G       | 8GA | 8G        | 8GA |
| 1 pole  | 101□               | ON – ON           | ○        | ○   | ○         | ○   |
|         | 102□               | ON – OFF – ON     | ○        |     | ○         |     |
|         | 104□               | (ON) – OFF – (ON) | ○        |     | ○         |     |
|         | 106□               | ON – (ON)         | ○        |     | ○         |     |
| 2 poles | 201□               | ON – ON           | ○        | ○   | ○         | ○   |

UL, CSA marked switches are available upon request.

(※1.) UL File No.E43275 FUJISOKU

(※2.) CSA File No.LR38341 FUJISOKU

### ■Precautions (8A • 8B • 8C • 8D • 8E • 8F • 8J • 8SS)

#### 1. Soldering Specifications

(1)Manual soldering

Device : Solder iron

①420°C Max. 3 sec. Max.

(2)Auto soldering

②275°C Max. 6 sec. Max.

The above-stated soldering conditions shall apply only to switches with straight terminals. Auto soldering is not possible with right-angle terminals. Switches with right-angle terminals should be soldered manually according to the conditions specified in (1) above.

(3)When soldering two or more terminals to the common land, use the solder resist to isolate the terminals.

#### 2.Flux Cleaning

(1)Solvent : Fluorine or Alcohol type.

(2)8A/B/C/D/E/F/J series are not washable. To wash the PC board, clean the soldering surface of the PC board with a brush so that the switch is not exposed to the cleaning solution.

(3)Cleaning after soldering should be done after the terminal temperature falls to 90°C or below, or after leaving the switch for five minutes or longer at room temperature.

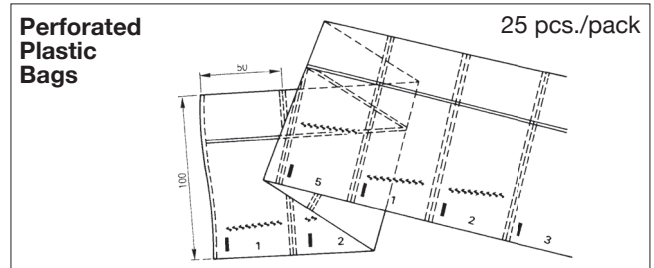
#### 3. Mounting

●Do not bend the terminals before mounting the switch on the PC board.

●After mounting the switch, do not place the device in such a way that the device weight will be applied on to the actuator of the switch.

●For switches with straight terminals, solder the switch on the PC board after fixing the switch on the panel with a nut.

#### ■Packaging Specification



## ◆ 8 Series Toggles ◆

### ■ Panel Cut-Out Dimensions

| Series          | 8A·8D·8J   | 8C          | 8E          | 8A·8D·8J  | 8C          | 8E          | 8F        |
|-----------------|--|-------------|-------------|---|-------------|-------------|-----------|
| Panel thickness | 2.5 mm Max.  | 2.4 mm Max. | 1.5 mm Max. | 3.5 mm Max.   | 3.4 mm Max. | 2.5 mm Max. | 5 mm Max. |
| Dimensions      | <p style="text-align: center;">With Locking Ring</p> |             |             | <p style="text-align: center;">Without Locking Ring</p> |             |             |           |
| Series          | <b>8B</b>  |             |             |   |             |             |           |
| Panel thickness | 5.9 mm Max.  |             |             | 6.9 mm Max.   |             |             |           |
| Dimensions      | <p style="text-align: center;">With Locking Ring</p> |             |             | <p style="text-align: center;">Without Locking Ring</p> |             |             |           |

### ■ PC Hole Layouts

| Series     | 8A · 8B · 8C · 8D · 8E · 8F · 8J  |
|------------|---|
| Dimensions | <p style="text-align: center;">1-pole<br/>2-poles<br/>3-poles<br/>4-poles</p> |

### ■ Standard Accessories

| Part Name  | (Q'ty / switch) |              |              |              |                        |               |              |              |
|------------|-----------------|--------------|--------------|--------------|------------------------|---------------|--------------|--------------|
|            | Dress Nut       | Hex Nut      | Lockwasher   | Locking Ring | O-Ring                 | Hex Nut       | Lockwasher   | Locking Ring |
| Part No.   | 140008010253    | 140008010241 | 140008030051 | 140008020062 | 140000610076           | 140008010243  | 140008030055 | 140008020065 |
| Dimensions |                 |              |              |              |                        |               |              |              |
| Finish     | Nickel plated   |              | Zinc plated  |              | Nitrile rubber (Black) | Nickel plated | Zinc plated  |              |
| 8A         |                 | 2            | 1            | 1            |                        |               |              |              |
| 8B         |                 |              |              |              |                        | 2             | 1            | 1            |
| 8C         | 1               | 1            | 1            | 1            |                        |               |              |              |
| 8D         |                 | 2            | 1            | 1            |                        |               |              |              |
| 8E         |                 | 2            | 1            | 1            |                        |               |              |              |
| 8F         |                 | 1            | 1            |              | 1                      |               |              |              |
| 8J         |                 | 2            | 1            | 1            |                        |               |              |              |

● Numbers in the above chart show the quantities of each accessories enclosed with the switch.



■ **Optional Accessories**

《Sold separately》

| Type       | 8A · 8F · 8GA<br>BT                                     | 8A · 8F · 8GA<br>BT                                     | 8B  | 8E  |
|------------|---|---|---|---|
| Part Name  | <b>Color Cap</b>  |   |   |   |
| Dimensions | <p style="text-align: center;">Vinyl chloride resin</p> | <p style="text-align: center;">Vinyl chloride resin</p> | <p style="text-align: center;">Vinyl chloride resin</p> | <p style="text-align: center;">Aluminum alloy</p> |
| Silver     | —   | —   | —   | <b>140000470058</b>                               |
| White      | <b>140000470030</b>                                     | <b>140000470038</b>                                     | <b>140000470063</b>                                     | —   |
| Red        | <b>140000470098</b>                                     | <b>140000470100</b>                                     | <b>140000470108</b>                                     | <b>140000470060</b>                               |
| Black      | <b>140000470031</b>                                     | <b>140000470039</b>                                     | <b>140000470064</b>                                     | <b>140000470059</b>                               |
| Gray       | <b>140000470037</b>                                     | <b>140000470077</b>                                     | <b>140000470102</b>                                     | —   |

| Type       | 8A  | 8B   |  |
|------------|---|--|--|
| Part Name  | <b>Boot</b>   | <b>Plate</b>                               | <b>Plate</b>                             |
| Part No.   | <b>140000470422</b>   | <b>140008040021</b>                        | <b>140008040025</b>                      |
| Dimensions | <p style="text-align: center;">With Nut<br/>(1/4" -40THD)</p> | <p style="text-align: center;">t = 0.5</p> | <p style="text-align: center;">t = 1</p> |

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