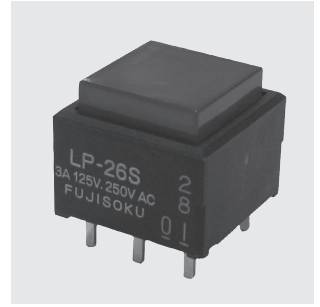


# LP

## Illuminated Pushbutton Switches



UL CSA

TELLTY

RoHS Compliant

### ■ Features

#### 1. Low Profile

Ideal for low profile PC mounting or snap-in mounting with tight behind panel dimensions.

#### 2. Full Face Illumination

Bright LED provides excellent illumination

#### 3. Two Mounting Methods

PC board mount or snap-in panel mount.

#### 4. Snap-Action Mechanism

Snap-action mechanism provides tactile feel.

#### 5. UL Recognized and CSA Certified

Switches are UL recognized and CSA certified.

### ■ Specification

|                             |   |  |
|-----------------------------|---|--|
| Rating                      | Gold plated contact                               | (Max.) 0.4VA AC/DC<br>• Voltage 20mV~48V<br>• Current 0.1mA~50mA<br>(Min.) 20mVAC/DC 0.1mA |
| Initial contact resistance  | Gold plated contacts ; 100mΩ max. (1.5mA 200μVAC) |  |
| Dielectric strength         | 1,500VAC 1 minute                                 |  |
| Insulation resistance       | 100MΩ min. (500VDC)                               |  |
| Contact Bounce              | 10 msec. max.                                     |  |
| Electrical life             | Gold plated contact                               | 50,000 operations (50mA 48VAC/DC)<br>200,000 operations (0.4VA AC/DC)                      |
| Operating force             | 1 pole  | 1.47±0.98N   |
|                             | 2 poles   | 2.26±0.98N   |
| Travel                      | Total travel                                      | 2.3mm  |
|                             | Lock travel alternate                             | 1.5mm  |
| Operating temperature range | -15~+60°C   |  |
| Storage temperature range   | -25~+70°C   |  |

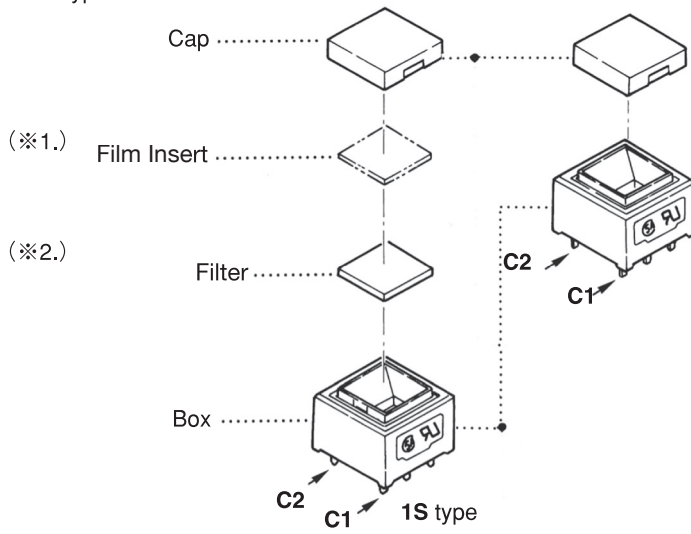
### ■ Approvals

UL File No.E43275

CSA File No.LR38341

■Component

LP1S type



(※1.) : Optional film insert is provided by the customer.

(※1.) (※2.) : Legending instructions shown on Page 215.

■Part Numbering

1. Nonilluminated

**LP 1 S - 2 6 G - W - Z**

Series code

| Code | Box & Terminal style         |
|------|------------------------------|
| 1    | Without Flange & PC Terminal |
| 2    | With Flange & Solder Lug     |

| Code | Poles   |
|------|---------|
| 1    | 1 pole  |
| 2    | 2 poles |

| Code | Cap color |
|------|-----------|
| W    | White     |
| R    | Red       |
| K    | Black     |
| G    | Gray      |

| Code | Cap size |
|------|----------|
| S    | 12×12    |

| Code | Circuit Function |
|------|------------------|
| 6    | ON - (ON)        |
| 7    | ON - ON          |

■ Part Numbering

2. Illuminated

**LP 1 S - 2 6 G - 2-2 9 - Z**

Series code

| Code | Box & Terminal style         |
|------|------------------------------|
| 1    | Without Flange & PC Terminal |
| 2    | With Flange & Solder Lug     |

| Code | Poles   |
|------|---------|
| 1    | 1 pole  |
| 2    | 2 poles |

| Code | Cap size |
|------|----------|
| S    | 12×12    |

| Code | Circuit Function |
|------|------------------|
| 6    | ON - (ON)        |
| 7    | ON - ON          |

| Code | Filter      |
|------|-------------|
| 9    | White clear |
| 2    | Red clear   |
| 5    | Green clear |

| Combination | LED color | Cap color      |
|-------------|-----------|----------------|
| 22          | 2 Red     | 2 Red clear    |
| 20          |           | 0 Clear        |
| 55          | 5 Green   | 5 Green clear  |
| 50          |           | 0 Clear        |
| 88          | 8 Yellow  | 8 Yellow clear |
| 80          |           | 0 Clear        |

Terminal Style

|                    | LP1 | LP2 |
|--------------------|-----|-----|
| Terminal style     |     |     |
| LED terminal style |     |     |

LED Specification

| Type         | LED Q'ty | Internal LED wiring |
|--------------|----------|---------------------|
| LP1S<br>LP2S | Single   |                     |

| Symbol | Color  | I <sub>F</sub> | V <sub>F</sub> |      | V <sub>R</sub> |
|--------|--------|----------------|----------------|------|----------------|
|        |        |                | Nom.           | Max. |                |
| 2      | Red    | 30mA           | 2.0V           | 2.8V | DC4V           |
| 5      | Green  | 25mA           | 2.1V           | 2.8V | DC4V           |
| 8      | Yellow | 30mA           | 2.2V           | 2.8V | DC4V           |

Current to be applied to the LED must be lower than the forward current (I<sub>F</sub>) indicated in the LED Specifications of each switches. Resistance value R should be calculated using the following formula.

- Case of static lighting system.

$$R = \frac{E - V_F}{I_F}$$

- Case of dynamic lighting system.

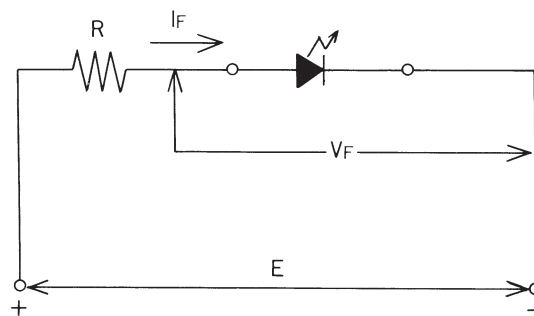
$$R = \frac{E - V_F}{I_{FM}}$$

- When LEDs are used by a pulse lighting system

- P<sub>w</sub> : 0.1 msec.
- D<sub>r</sub> : 1/10
- I<sub>FM</sub> : 50mA (All colors)
- E : 5V
- V<sub>F</sub> : 2V

- Calculation Example

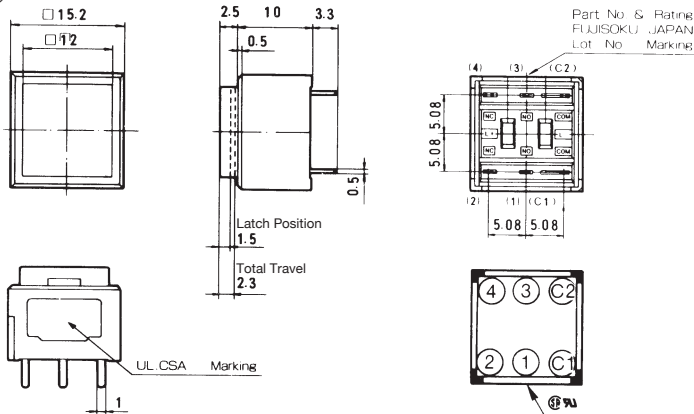
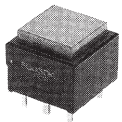
$$R = \frac{5 - 2}{0.05} = 60(\Omega)$$



# LP (Nonilluminated)

TELLTY

## LP1S (SPDT·DPDT)



**PC Mount**

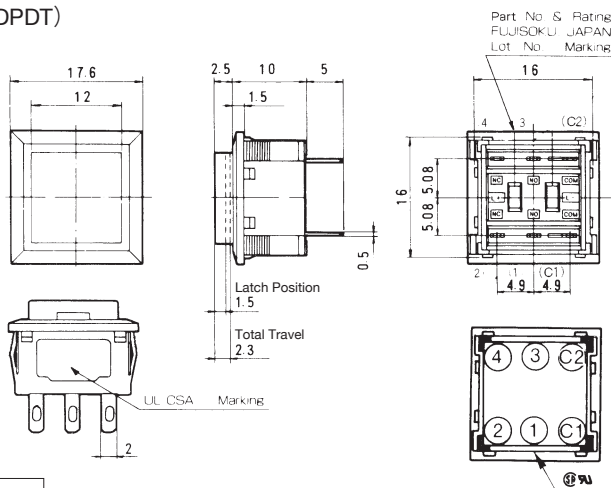
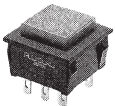
● 1 pole versions do not have terminals (3), (4), and (C2).

| Part No.            | Switching function       |                          |
|---------------------|--------------------------|--------------------------|
|                     |                          |                          |
| LP1S-16G-□-Z        | ON                       | (ON)                     |
| LP1S-17G-□-Z        | ON                       | ON                       |
| Connected Terminals | (C1) - (2)               | (C1) - (1)               |
| LP1S-26G-□-Z        | ON                       | (ON)                     |
| Connected Terminals | (C1) - (2)<br>(C2) - (4) | (C1) - (1)<br>(C2) - (3) |

### Table of Part Numbers

| Cap color | Gold contacts |              |
|-----------|---------------|--------------|
|           | 1 pole        | 2 poles      |
| White     | ☆LP1S-16G-W-Z | LP1S-26G-W-Z |
| Red       | ☆LP1S-16G-R-Z | —            |
| Black     | ☆LP1S-16G-K-Z | —            |
| Gray      | ☆LP1S-16G-G-Z | —            |
| Black     | ☆LP1S-17G-K-Z | —            |

## LP2S (SPDT·DPDT)



**Snap-in Mount**

● 1 pole versions do not have Terminals (3), (4), and (C2).

| Part No.            | Switching function       |                          |
|---------------------|--------------------------|--------------------------|
|                     |                          |                          |
| LP2S-16G-□-Z        | ON                       | (ON)                     |
| Connected Terminals | (C1) - (2)               | (C1) - (1)               |
| LP2S-26G-□-Z        | ON                       | (ON)                     |
| LP2S-27G-□-Z        | ON                       | ON                       |
| Connected Terminals | (C1) - (2)<br>(C2) - (4) | (C1) - (1)<br>(C2) - (3) |

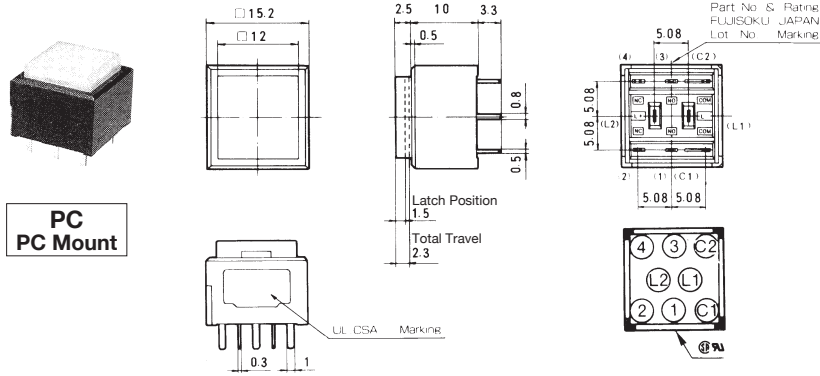
### Table of Part Numbers

| Cap color | Gold contacts |               |
|-----------|---------------|---------------|
|           | 1 pole        | 2 poles       |
| White     | LP2S-16G-W-Z  | ☆LP2S-26G-W-Z |
| Red       | ☆LP2S-16G-R-Z | —             |
| White     | —             | ☆LP2S-27G-W-Z |

# LP (Nonilluminated)

TELLTY

## LP1S (SPDT·DPDT)



PC  
PC Mount

| Part No.            | Switching function       |                          |
|---------------------|--------------------------|--------------------------|
|                     |                          |                          |
| LP1S-16G-■■■■-Z     | ON                       | (ON)                     |
| Connected Terminals | (C1) - (2)               | (C1) - (1)               |
| LED circuit         |                          |                          |
| LP1S-26G-■■■■-Z     | ON                       | (ON)                     |
| LP1S-27G-■■■■-Z     | ON                       | ON                       |
| Connected Terminals | (C1) - (2)<br>(C2) - (4) | (C1) - (1)<br>(C2) - (3) |
| LED circuit         |                          |                          |

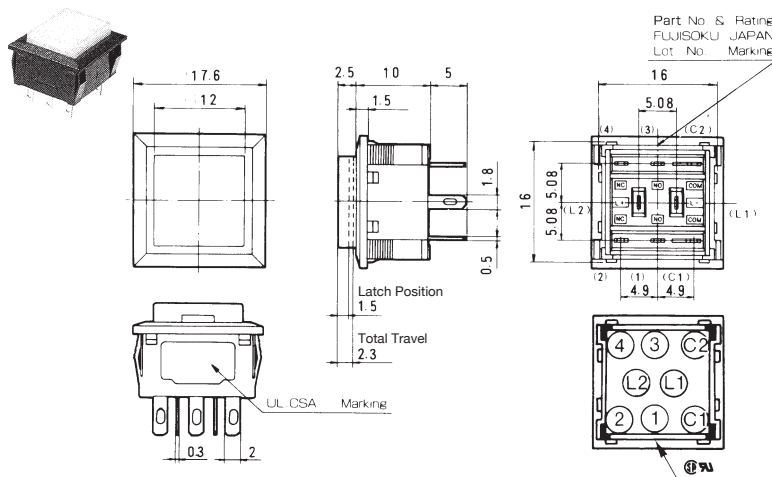
● 1 pole versions do not have Terminals (3), (4), and (C2).

### Table of Part Numbers

| LED and Cap color |         | Red             |
|-------------------|---------|-----------------|
| Gold contacts     | 2 Poles | ☆LP1S-27G-229-Z |

| LED color     |         | Red             | Green           | Yellow          | Red             | Green           |
|---------------|---------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Cap color     |         | clear           |                 |                 |                 |                 |
| Filter color  |         | White clear     | White clear     | White clear     | Red clear       | Green clear     |
| Gold contacts | 1 Pole  | —               | ★LP1S-16G-509-Z | ★LP1S-16G-809-Z | ★LP1S-16G-202-Z | —               |
|               | 2 Poles | ★LP1S-27G-209-Z | —               | —               | —               | ★LP1S-26G-505-Z |

## LP2S (SPDT·DPDT)



Snap-in Mount

● 1 pole versions do not have Terminals (3), (4), and (C2).

| Part No.            | Switching function       |                          |
|---------------------|--------------------------|--------------------------|
|                     |                          |                          |
| LP2S-16G-■■■■-Z     | ON                       | (ON)                     |
| Connected Terminals | (C1) - (2)               | (C1) - (1)               |
| LED circuit         |                          |                          |
| LP2S-26G-■■■■-Z     | ON                       | (ON)                     |
| LP2S-27G-■■■■-Z     | ON                       | ON                       |
| Connected Terminals | (C1) - (2)<br>(C2) - (4) | (C1) - (1)<br>(C2) - (3) |
| LED circuit         |                          |                          |

### Table of Part Numbers

#### <LP2S>

| LED and Cap color |         | Red             |
|-------------------|---------|-----------------|
| Gold contacts     | 2 Poles | ☆LP2S-26G-229-Z |

| LED color     |         | Green           | Red             | Green           |
|---------------|---------|-----------------|-----------------|-----------------|
| Cap color     |         | clear           |                 |                 |
| Filter color  |         | White clear     | Red clear       | Green clear     |
| Gold contacts | 1 Pole  | —               | —               | ★LP2S-16G-505-Z |
|               | 2 Poles | ★LP2S-27G-509-Z | ★LP2S-26G-202-Z | —               |

● Terminal numbers are shown on the bottom of the switch.

(ON) : Momentary

☆ : Semi-standard products. ★ : Made to order products.

PC Hole Layouts

(Top view)

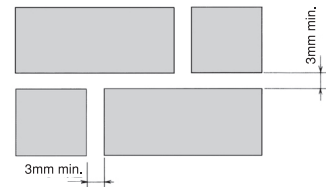
| Part No. | No. of pole | Single | Pilot Light | Series |
|----------|-------------|--------|-------------|--------|
| LP1S     | 1 pole      |        |             |        |
|          | 2 poles     |        |             |        |

The blue line represents the switch outline.

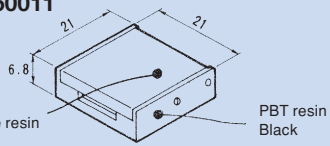
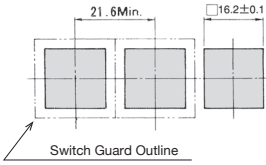
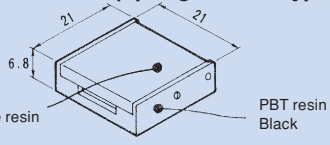
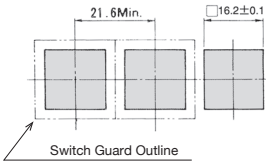
Panel Cut-Out Dimensions

| Part No. | Single | Side by Side Mounting | Panel thickness |
|----------|--------|-----------------------|-----------------|
| LP2S     |        |                       | 1~2.5mm         |

Note) When the switches are mounted in two or more blocks, the spacing of the cutout hole between each block should be 3 mm minimum.

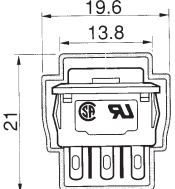


■ Optional Accessories

| Part Name    | Type      | Dimensions   | Panel cut out dimensions   | Panel thickness |
|--------------|-----------|--|--|-----------------|
| Switch Guard | LP2S type | <b>140007250011</b><br>                             |  | 1~1.9mm         |
|              |           | <b>Switch guard LP-2S (Spring reverse type)</b><br> |  |                 |

● The switch guard cannot be used with the PC mount versions.

■ Packaging Specifications

| Stick |  |             |              |
|-------|---|-------------|--------------|
|       | Series  | (pcs/stick) | Stick Length |
|       | LP1S  | 25          | 400          |
| LP2S  | 25  | 460         |              |

● If the order quantity is below the above packaging quantities, the packing style may be in trays.



## ■ Precautions

### 1. Soldering

- (1) Manual soldering  
Device : Solder iron
    - ① 270°C max. 5 sec. max.
  - (2) Auto soldering  
Device : Jet wave or dip type
    - ① 245 ± 10°C 5 sec. max.
- Preheat time shall be 30 seconds max. at 100°C max.
  - For the alternate action switches, soldering should be done with the switch in the up position.

### 3. Acuator(Cap)

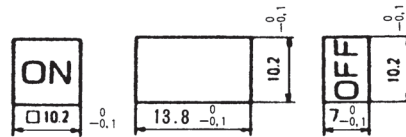
- To activate the switch, press the **cap** as far as it goes. If the **cap** is not fully actuated, switching and/or locking may not occur. The pressing force of the **cap** should be 9.8 N or less.
- Use a soft cloth with alcohol to clean the **cap** surface. Do not allow the liquid to enter the switch body. Do not use thinner, acid, organic solvent, etc., since the **caps** and **filter** are made of a polycarbonate resin.
- Engraving or printing is possible on the cap and the filter. The engraving depth should be 0.3 mm maximum and the enamel-based paint should be within the coating thickness of 0.1 mm maximum.
- A **film insert** should be the size of the dimensions as shown in the figure on the left (t=0.1mm).  
The **film inserts** are provided by the customer.
- The **cap** and the **filter** are two distinct parts. **Removal of the cap should be done with the in the up position to avoid damages to the switch.**

### 2. Flux Cleaning

- (1) Solvent : Fluorine or Alcohol type.
- (2) The **LP** 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) After soldering, wait until the temperature of the terminals cool down to 90°C or below or until the parts are exposed to room temperature for more than 5 min. before washing.

### 4. LED's

- The polarity of the LED is marked on the bottom of the switch. Connection should be made as marked.
- Protective resistors are not built into illuminated switches. Protective resistors must be integrated by the customer.
- LED specifications are shown on Page 206.



Legend sheet dimensions

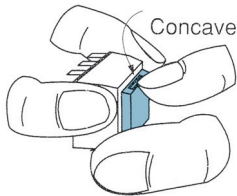
(Fig.1)

■ Precautions

5. Mounting Procedures

(1) Removal of the **cap**

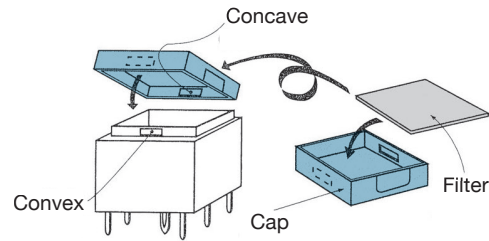
Use the notch on the side of the cap and pull up.  
Remove the cap with the switch in the up position.



(Fig.2)

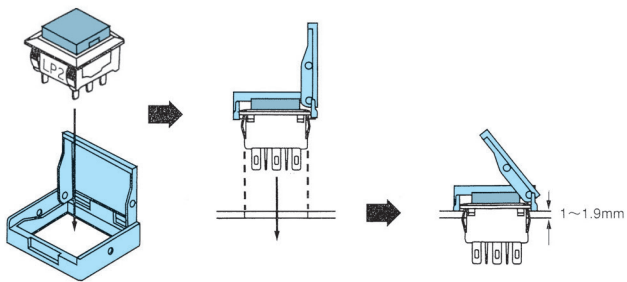
(2) Mounting the **cap**

- A) Insert the **filter** into the **cap**. The **filter** is reversible.
- B) Mate and snap in the two recesses on the inner side of the **cap** to the tabs on the side of the actuator of the switch.



(Fig.3)

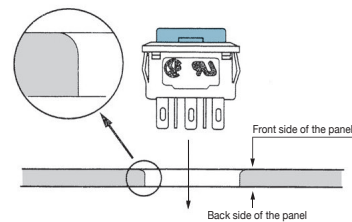
(3) Mounting the **Switch Guard**



(Fig.5)

(4) Panel cutout

When cutting out the panel, press through the panel from the front side. Also make sure to mount the switch from the front side of the panel as shown in the figure below. This will help the mount spring on both sides of the switch latch on to the edge of the hole. Note that the vertical play of the switch when mounted is 0.3 mm max..



(Fig.6)