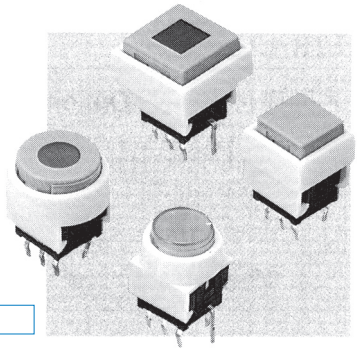
TP&TPL

Ultra-Miniature Pushbutton Switches



RoHS Compliant

■Features

1. Long Travel
DPDT ultra-miniature switch with long travel (latch position: 1 mm, total travel: 1.5 mm).

2. High Contact Reliability
Clip type contact mechanism ensures high reliability.

3. PC Board Mount
Terminal pitch is in inches (multiples of 2.54 mm) for all models. The unique terminal shape prevents the terminal pins from coming loose from the PC board during dip soldering.

4. Epoxy Sealed Terminals
Epoxy sealed terminals prevent ingress of flux.

5. Wide Variety of Accessories
Wide selection of accessories including color buttons, mounting frames, and LED illuminations are available.

6. Unified Mounting Height
The mounting height of the TP/TPL series is the same as the LTR/LTM series which makes it convenient to design into the same panel.

■ Specifications

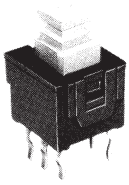
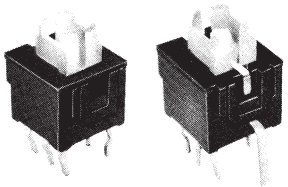
Rating	Silver plated contacts	0.1A 30 VDC max.	
	Gold plated contacts	0.1A 30 VDC max. 1 μA min.	
Initial contact resistance		Silver plated contacts : 50 mΩ max. Gold plated contacts : 100 mΩ max.	(1.5 mA 200μ VAC)
Dielectric strength		500 VAC 1 minute	
Insulation resistance		100 MΩ min.	(500 VDC)
Electrical life		10,000 operations	
Operating force	TP	1.47±0.98N	(Momentaly)
	TPL	2.45±0.98N	(Push to lock)
Operating temperature range		−10～+70℃	
Storage temperature range		−25～+85℃	

■ Part Numbering

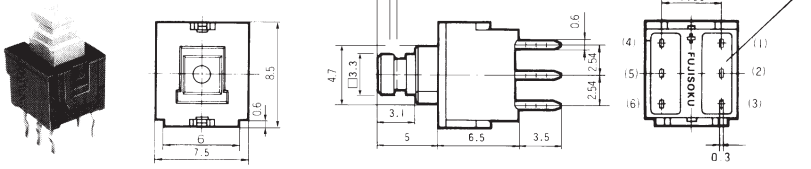
T P L 1 – 01 G – L2

- T: Series code
- P: Timing of switching — P: Non-shorting
- L: Operation type — None: Momentary; L: Push to lock
- 1: Structure
- 01: Registration No.
- G: Contact plating — None: Silver; G: Gold
- L2: LED color — None: Without LED; L2: Red; L5: Green; L8: Yellow

■Construction

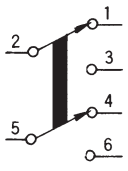
Fig.	1	2
Construction		
		Without LED / With LED

TP1•TPL1 (Without LED)

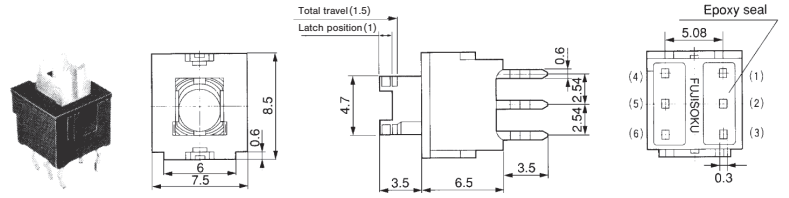


Neither the button nor the mounting frame can be mounted.

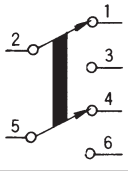
Terminal numbers are not shown on the switch.

Part No.	Switching function		Circuit diagrams
	■	↓Push	
TP1-01□	ON	(ON)	
TPL1-01	ON	ON	
Connecting terminals	2-1 5-4	2-3 5-6	

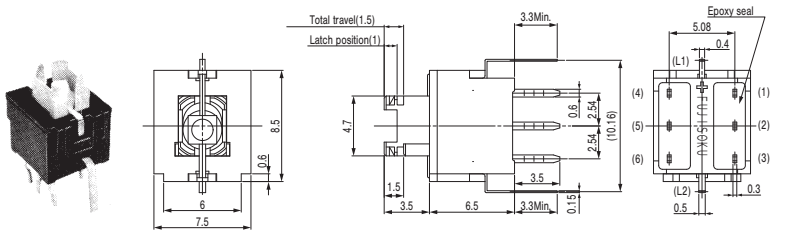
TP2•TPL2 (Without LED)



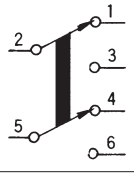
Terminal numbers are not shown on the switch.

Part No.	Switching function		Circuit diagrams
	■	↓Push	
TP2-01□	ON	(ON)	
TPL2-01□	ON	ON	
Connecting terminals	2-1 5-4	2-3 5-6	

TP2•TPL2 (With LED)



Terminal numbers are not shown on the switch.

Part No.	Switching function		Circuit diagrams
	■	↓Push	
TP2-01□-L■	ON	(ON)	
TPL2-01□-L■	ON	ON	
Connecting terminals	2-1 5-4	2-3 5-6	
LED circuit	L1 (+) (−) L2		

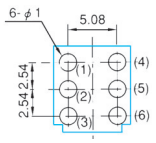
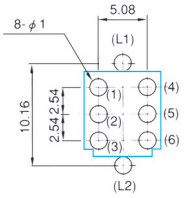
□ : Contact plating code (Silver/Gold) ■ : LED color code

■LED Specifications (TP2 •TPL2)

Symbol	Color	Forward Current (I_F)	Forward V (V_F)		Reverse Voltage (V_R)
			nom.	max.	
L2	Red	30mA	2.0V	2.5V	DC5V
L5	Green	25mA	2.2V	2.5V	DC5V
L8	Yellow	30mA	2.1V	2.5V	DC5V

■PC Hole Layouts

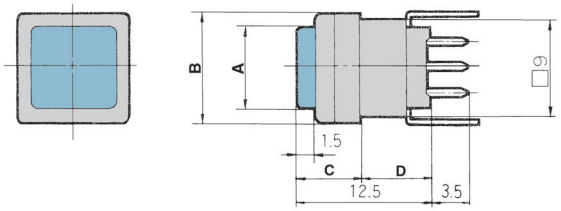
(Top view)

Type	(without LED)	(with LED)
Dimensions		

The blue line represents the switch outline.

■Dimensions with color button and mounting frame

(TP2 / TPL2)



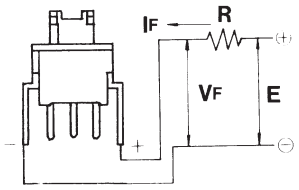
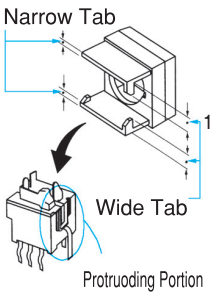
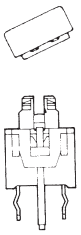
Button	Dimension A	Dimension B	Dimension C	Dimension D
□10	□10	□12.5	6	6.5
φ10	φ10	φ12.5	6	6.5
□7.5	□7.5	□10	6	6.5
φ7.5	φ7.5	φ10	5.3	7.2

Note: Neither the button nor the mounting frame can be mounted on to TP1 and TPL1.

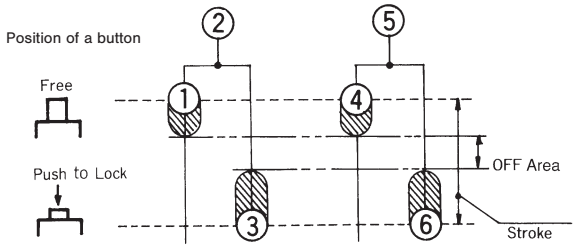
(ON) : Momentary

□■ : Refer to “Table of Part Numbers” for a full list of part numbers.

■Handling Precautions

LED circuit	Current to be applied to the LED must be lower than the forward current (IF) indicated in the LED Specifications of each switches. Resistance value R should be calculated using the formula on the right.  Calculation Example : E=6 V, IF=10mA $R=\frac{E-V_F}{I_F}$ $R=\frac{6-2.1}{0.01}=390\Omega$ VF=2.0V Use VF=2.1V to calculate.
Accessories mounting	 1.Installing the mounting frame Install the mounting frame so that the tab on the frame is in the same direction as the switch groove. 2.Installing the color button Install the color button so that the protrusions on the switch actuator fit in the square buttonhole.  ● The mounting frame cannot be installed when the color button is already mounted on the switch. Do not remove the button when a switch is locked.

■Contact method

Code	Item	Contact method
P	Non-shorting	 There is a range of complete OFF time in the transit process from Terminal ① (or ④) to ③ (or ⑥).

▨ : ON area

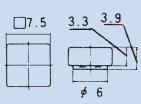
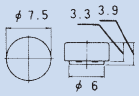
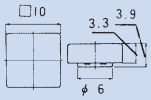
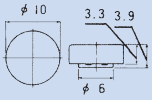
■Table of Part Numbers

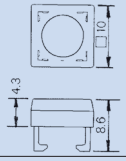
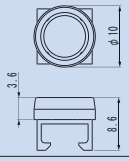
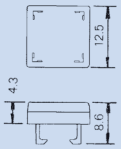
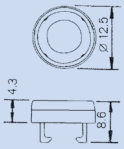
Contactt plating \ Series			TP1	TPL1	TP2	TPL2
Non-illuminated	Silver		TP1-01	TPL1-01	TP2-01	TPL2-01
	Gold		★TP1-01G	—	★TP2-01G	★TPL2-01G
Illuminated	Series		TP2		TPL2	
	Silver	Red	☆TP2-01-L2		☆TPL2-01-L2	
		Green	TP2-01-L5		TPL2-01-L5	
		Yellow	☆TP2-01-L8		☆TPL2-01-L8	
	Gold	Red	★TP2-01G-L2		★TPL2-01G-L2	
		Green	★TP2-01G-L5		★TPL2-01G-L5	
		Yellow	★TP2-01G-L8		★TPL2-01G-L8	

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

■Optional Accessories

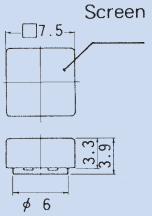
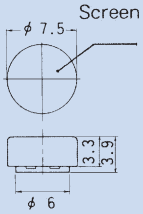
《Sold separately》

Part Name	Color Button (Non-illuminated)			
Dimensions				
Dark gray	**140007480234**	**140007480272**	**140007480244**	**140007480282**
Gray	**140007480235**	**140007480273**	**140007480245**	**140007480283**
Wite	**140007480236**	**140007480274**	**140007480246**	**140007480284**
Ivory	**140007480237**	—	**140007480247**	**140007480285**
Red	**140007480231**	**140007480269**	**140007480241**	**140007480279**

Part Name	Mounting Frame			
Dimensions				
Dark gray	**140000340191**	**140000340195**	**140000340187**	**140000340199**
Gray	**140000340192**	**140000340196**	**140000340188**	**140000340200**
Wite	**140000340193**	**140000340197**	**140000340189**	**140000340201**
Ivory	**140000340194**	—	—	**140000340202**

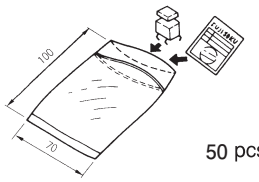
■Optional Accessories

《Sold separately》

Color Button (Illuminated)		
Dimensions		
Clear	**140007480466**	**140007480467**
Red Clear	**140007480238**	**140007480276**
Green Clear	**140007480239**	**140007480277**
Yellow clear	**140007480240**	**140007480278**

■Packaging Specifications

Zipper Plastic Bag



50 pcs/pack

■Soldering Specifications

(1)Manual Soldering
Device: Soldering iron
①380°C, Max.; 3 seconds, Max.
(2)Wave Soldering
Device: Jet wave type or dip type
①245°C; 3 seconds, Max.
- Pre-heating should be done at temperatures below 80°C to 120°C and within 120 seconds.
- For TPL type, soldering should be done with the lock released.
- Do not dip solder the switches with color buttons or mounting frames attached. Soldering heat may deform the accessories or cause ingress of flux.

■Flux Cleaning

(1)Solvents : Fluorine or Alcohl type
(2)The TP/TPL 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℃ or below or until the parts are exposed to room temperature for more than 5 min. before washing.

■Switch Operation

(1) Operating force should be 9.8 N or less.
(2) Do not operate the switch right after soldering.
(3) Do not solder the switch with the actuator pressed down.