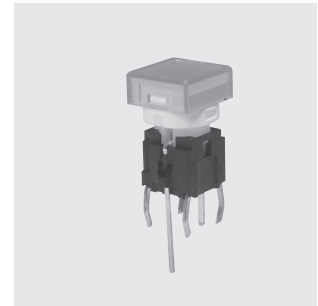


LTR1•2 & LTM1•2

Ultra-Miniature Illuminated Pushbutton Switches



RoHS Compliant

Series

Conductive Rubber Contact (LTR type)
Metal Contact (LTM type)

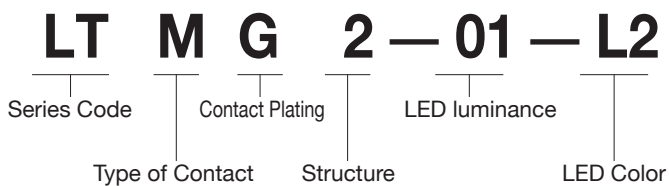
Features

- 1. Full Surface Illumination (LTM2, LTMG2, LTR2 Series)**
Miniature, low-cost switch with full surface illumination by LED. Buttons available in square shape (7.5/10mm sq.) and round shape (7.5/10mm dia.) in 3 colors (Red, Green, Yellow). Non-illuminated switches also available (LTM1, LTMG1, LTR1 series).
- 2. Two Types of Contacts**
LTR series: Conductive rubber contact for soft tactile feel.
LTM/LTMG series: Metal contact for sharp tactile feel.
- 3. PC Board Mount**
Terminal pitch is in inches (multiples of 2.54 mm) for all models. The unique terminal shape prevents the terminals from coming loose from the PC board during dip soldering.
- 4. Enhanced Resistance to Soldering Heat**
Improved terminal structure protects the contacts from soldering heat. In addition, each pole has two terminals which can be used as a jumper wire.
- 5. Compatible With Lead-Free Soldering (LTM Series)**
Heat-resistance resin for lead-free soldering.

Specifications

| | |
|---------------------------------|--|
| Rating | LTR : 10mA 12VDC max. 10 μ A Min. |
| | LTM : 1VA max. (50mA max.48VDC max) 0.5mA min. |
| | LTMG : 1VA Max. (50mA max.48VDC max.) 10 μ A min. |
| Initial Contact Resistance | LTR : 500 Ω max. (1mA 2VDC at 1.47N {150gf}) LTM : 100m Ω max (1.5mA 200 μ VAC at 1.96N {200gf}) |
| Dielectric Strength | 250VAC 1 minute |
| Insulation Resistance | 100M Ω min (100VDC) |
| Electrical Life | LTR : 100,000 operations LTM : 300,000 operations |
| Contact Bounce | LTR : 3 msec. max. (Initial value) LTM : 10 msec. max. (Initial value) |
| Travel | LTR : 1 mm LTM : 0.25 mm |
| Operating Force (at peak force) | LTR : 0.98 \pm 0.39N LTM : 1.37 \pm 0.39N |
| Operating Temperature Range | -25~+70°C |
| Storage Temperature Range | -40~+70°C |

Part Numbering





Type of Contacts and Contact Plating

| Code | Type of Contact | Contact Plating |
|-----------|---------------------------|-----------------|
| R | Conductive rubber contact | Gold plated |
| M | Metal contact | Silver plated |
| MG | Metal contact | Gold plated |

Note : The contacts of LTR series are all gold-plated.

Structure

| Fig. | 1 | 2 |
|-----------|--|--|
| Structure |  |  |
| | Without LED (Non-illuminated) | With LED |

LED Specifications

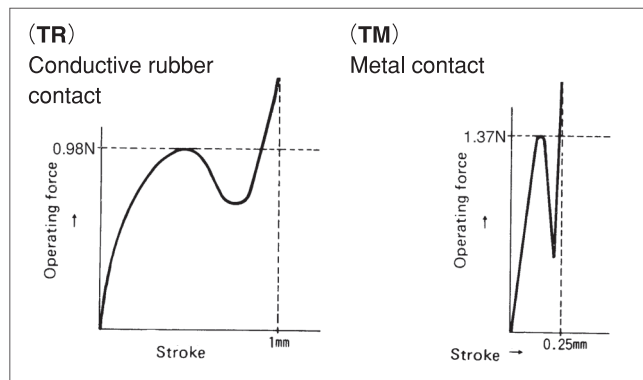
LTR2 • LTM2 • LTMG2

| Code | Color | Luminance | Forward Current (If) | Forward V (Vf) | | Reverse Voltage (Vr) |
|-----------|--------|-----------|----------------------|----------------|------|----------------------|
| | | | | nom. | max. | |
| L2 | Red | Normal | 30mA | 2.0V | 2.5V | DC5V |
| L5 | Green | | 25mA | 2.2V | 2.5V | DC5V |
| L8 | Yellow | | 30mA | 2.1V | 2.5V | DC5V |
| L2 | Red | High | 30mA | 1.95V | 2.5V | DC5V |
| L5 | Green | | 30mA | 3.2V | 4.0V | DC5V |
| L8 | Yellow | | 30mA | 2.0V | 2.5V | DC5V |

Table of Part Numbers

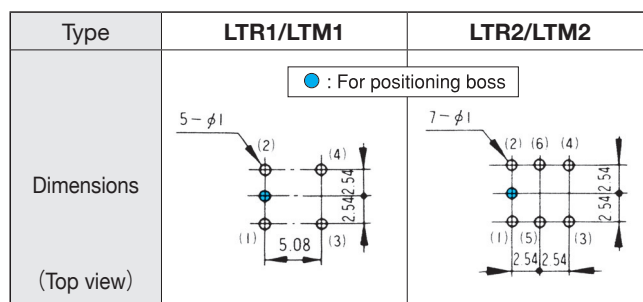
| Series | | LTM | | | LTR | |
|-----------------|--------|-------------------|-------------------|----------------------|-------------------|-------------------|
| Contact plating | | Silver Plated | | Gold Plated | Gold Plated | |
| Non-illuminated | | LTM1-01 | — | LTMG1-01 | LTR1-01 | — |
| LED color | Red | LTM2-01-L2 | LTM2-31-L2 | ★ LTMG2-01-L2 | LTR2-01-L2 | LTR2-31-L2 |
| | Green | LTM2-01-L5 | LTM2-31-L5 | ★ LTMG2-01-L5 | LTR2-01-L5 | LTR2-31-L5 |
| | Yellow | LTM2-01-L8 | LTM2-31-L8 | ★ LTMG2-01-L8 | LTR2-01-L8 | LTR2-31-L8 |

Operating Force vs. Stroke Characteristics



A₁/Fig.A

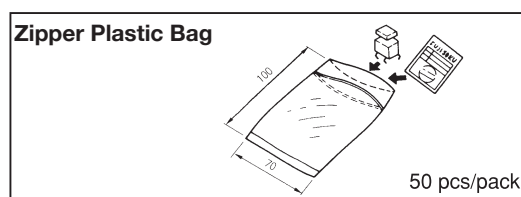
PC Hole Layouts



LED luminance

| Symbol | LED luminance |
|--------|------------------|
| 01 | Normal luminance |
| 31 | High luminance |

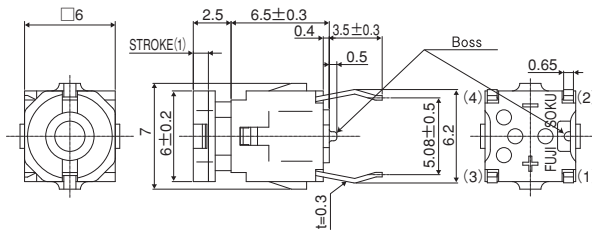
Packaging Specifications



LTR (Conductive Rubber Contact)

LTR1

**SPST
Without LED (Non-illuminated)**

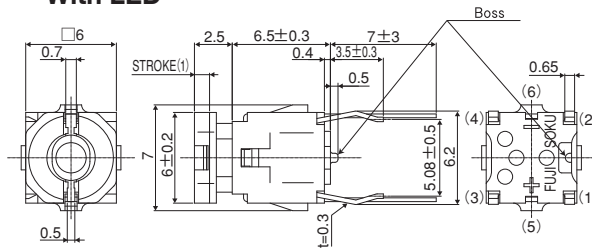


Terminal numbers are not shown on the switch.

| Part No. | Switching function | | Circuit diagrams |
|----------------------|--------------------|----------------|------------------|
| | | | |
| LTR1-01 | OFF | (ON) | |
| Connecting terminals | — | 1 — 3 2 — 4 | |

LTR2

**SPST
With LED**



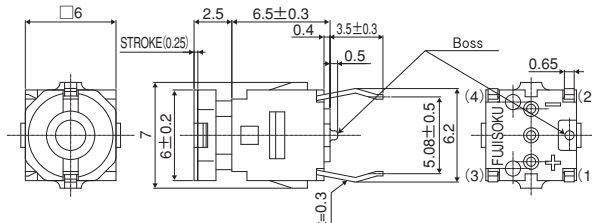
Terminal numbers are not shown on the switch.

| Part No. | Switching function | | Circuit diagrams |
|--------------------------------------|--------------------|----------------|------------------|
| | | | |
| LTR2-01-L LTR2-31-L | OFF | (ON) | |
| Connecting terminals | — | 1 — 3 2 — 4 | |
| LED circuit | | | |

LTM (Metal Contact)

LTM1

**SPST
Without LED (Non-illuminated)**

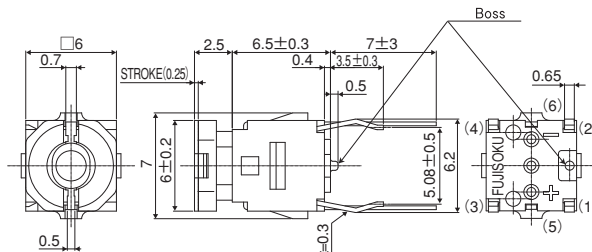


Terminal numbers are not shown on the switch.

| Part No. | Switching function | | Circuit diagrams |
|-----------------------------------|--------------------|----------------|------------------|
| | | | |
| LTM1-01 LTMG1-01 | OFF | (ON) | |
| Connecting terminals | — | 1 — 3 2 — 4 | |

LTM2

**SPST
With LED**



Terminal numbers are not shown on the switch.

| Part No. | Switching function | | Circuit diagrams |
|---|--------------------|----------------|------------------|
| | | | |
| LTM2-01-L LTMG2-01-L LTM2-31-L | OFF | (ON) | |
| Connecting terminals | — | 1 — 3 2 — 4 | |
| LED circuit | | | |

Soldering

| Series | LTM | LTR |
|------------------|--------------------------|--------------------------|
| Manual soldering | 380°C Max. 3sec. Max. | 380°C Max. 3sec. Max. |
| Auto soldering | 275°C Max. 6sec. Max. | 265°C Max. 6sec. Max. |

• Preheating in the flow line should be 80~120°C , 120 sec. max.

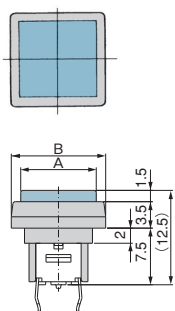
- Do not dip solder the switches with **color buttons** or **mounting frames** attached. Soldering heat may deform the accessories or cause ingress of flux.

Flux Cleaning

- (1) Solvents : Fluorine or Alcohol type
- (2) LTM and LTR 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.

Dimensions of Assembled Switch

| Button | size A | size B |
|---------------------|---------------------|-----------------------|
| □10 10mm sq. | □10 10mm sq. | □12.5 12.5mm sq. |
| φ 10 10mm dia. | φ 10 10mm dia. | φ 12.5 12.5mm dia. |
| □7.5 7.5mm sq. | □7.5 7.5mm sq. | □10 10mm sq. |
| φ 7.5 7.5mm dia. | φ 7.5 7.5mm dia. | φ 10 10mm dia. |



Ambient Conditions

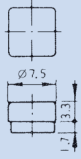
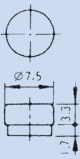
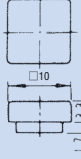
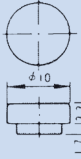
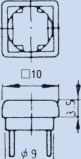
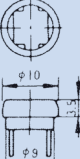

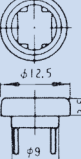
- (1) In case of switches with silver-plated contacts, do not use in an environment where there is corrosive gas such as sulfuric or ammonia gas which may affect the silver plating.
- (2) LTM and LTR series are open-structure switches and should not be used in a dusty environment.

Precautions

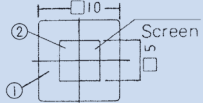
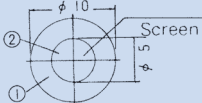
| | | | |
|----------------------|---|--|--|
| LED circuit | <p>Current to be applied to the LED must be lower than the forward current (IF) indicated in the LED Specifications of each switches. Resistance value R should be calculated using the formula on the right.</p> | | <p>Example : E=5V, IF=10mA</p> $R = \frac{E - V_F}{I_F} \quad R = \frac{5 - 2.0}{0.01} = 300\Omega$ <p>Use VF=2.0V to calculate.</p> |
| Accessories mounting | <p>1. Installing the Mounting Frame Install the mounting frame so that the tab on the frame is in the same direction as the slot on the switch.</p> | <p>2. Installing the Button Install the button so that the protrusions on the switch fit into the square holes on the button. The mounting frame cannot be installed with the switch button installed.</p> | |

■Optional Accessories

《Sold separately》

| Part Name | | Color Button | | | | |
|----------------------|------------------|---|---|---|---|--------------|
| Dimensions | |  |  |  |  | |
| Non-illuminated type | Dark gray | 140007480168 | 140007480178 | 140007480188 | 140007480198 | |
| | Gray | 140007480169 | 140007480179 | 140007480189 | 140007480199 | |
| | Light gray | 140007480170 | 140007480180 | 140007480190 | 140007480200 | |
| | Ivory | 140007480171 | 140007480181 | 140007480191 | 140007480201 | |
| | Red | 140007480172 | 140007480182 | 140007480192 | 140007480202 | |
| | Green | 140007480174 | 140007480184 | 140007480194 | 140007480204 | |
| | Blue | 140007480173 | 140007480183 | 140007480193 | 140007480203 | |
| Illuminated type | Normal luminance | Clear | 140007480422 | 140007480451 | 140007480505 | 140007480506 |
| | | Red clear | 140007480205 | 140007480208 | 140007480211 | 140007480214 |
| | | Green clear | 140007480206 | 140007480209 | 140007480212 | 140007480215 |
| | | Yellow clear | 140007480207 | 140007480210 | 140007480213 | 140007480216 |
| | High luminance | Clear | 140007480554 | — | 140007480562 | — |
| | | Red clear | 140007480551 | — | 140007480559 | — |
| | | Green clear | 140007480552 | — | 140007480560 | — |
| | | Yellow clear | 140007480553 | — | 140007480561 | — |
| Part Name | | 取付枠/Mounting Frame | | | | |
| Dimensions | |  |  |  |  | |
| Dark gray | 140000340170 | 140000340171 | 140000340168 | 140000340169 | | |
| Gray | 140000340179 | 140000340182 | 140000340173 | 140000340176 | | |
| Light gray | 140000340180 | 140000340183 | 140000340174 | 140000340177 | | |
| Ivory | 140000340181 | 140000340184 | 140000340175 | 140000340178 | | |

Mounting frame is common to both illuminated and non-illuminated switches.

| Part Name | | Color Button | |
|------------------|------------------------|---|---|
| Dimensions | |  |  |
| Illuminated type | LED luminance | Normal luminance | Normal luminance |
| | ①Color / ②Screen color | Clear | Clear |
| | Dark gray | 140007480452 | 140007480459 |
| | Gray | 140007480453 | 140007480460 |
| Light gray | 140007480454 | 140007480461 | |