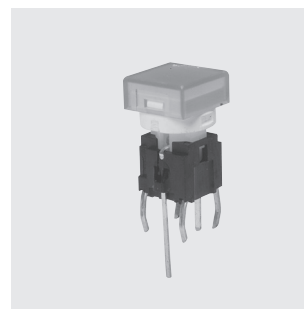


# LTR1.2 & LTM1.2

## Ultra-Miniature Illuminated Pushbutton Switches



RoHS Compliant

### Series

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

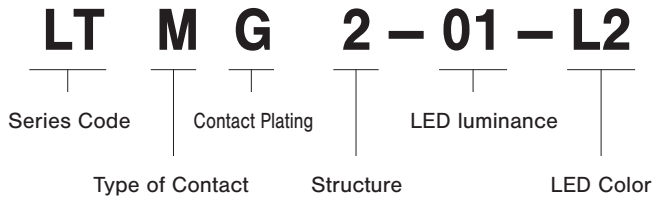
### Features

- 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).
- Two Types of Contacts**  
LTR series: Conductive rubber contact for soft tactile feel. LTM/LTMG series: Metal contact for sharp tactile feel.
- 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.
- 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.

### Specifications

Rating	<b>LTR</b> : 10 mA 12 VDC Max. 10 $\mu$ A Min.
	<b>LTM</b> : 1 VA Max. (50 mA Max. 48 VDC Max) 0.5 mA Min.
	<b>LTMG</b> : 1 VA Max. (50 mA Max. 48 VDC Max.) 10 $\mu$ A Min.
Initial Contact Resistance	<b>LTR</b> : 500 $\Omega$ Max. (1mA 2 VDC at 1.47 N {150 gf}) <b>LTM</b> : 100 m $\Omega$ max. (1.5 mA 200 $\mu$ VAC at 1.96 N {200 gf})
Dielectric Strength	250 VAC 1 minute
Insulation Resistance	100 M $\Omega$ Min. (100 VDC)
Electrical Life	<b>LTR</b> : 100,000 operations <b>LTM</b> : 300,000 operations
Contact Bounce	<b>LTR</b> : 3 msec. Max. (Initial value) <b>LTM</b> : 10 msec. Max. (Initial value)
Travel	<b>LTR</b> : 1 mm <b>LTM</b> : 0.25 mm
Operating Force (at peak force)	<b>LTR</b> : 0.98 $\pm$ 0.39 N <b>LTM</b> : 1.37 $\pm$ 0.39 N
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	25mA	2.0V	2.6V	DC5V
L5	Green		25mA	3.2V	3.8V	DC5V
L8	Yellow		25mA	2.0V	2.6V	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**

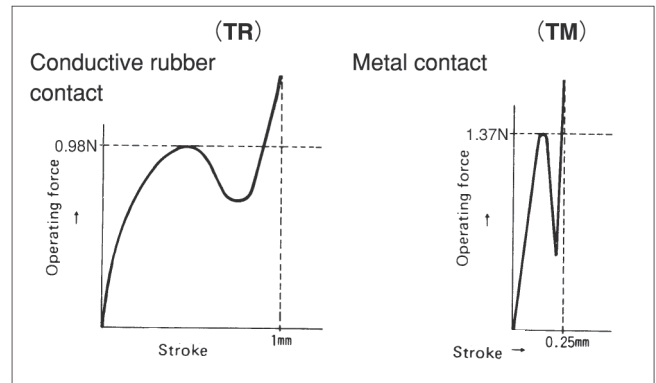


Fig.A

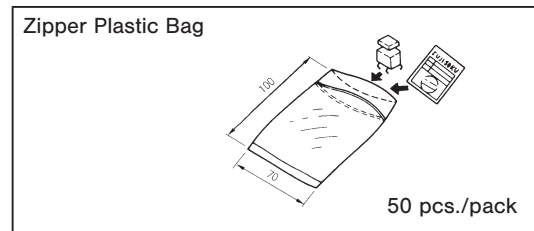
**PC Hole Layouts**

Type	LTR1/LTM1	LTR2/LTM2
Dimensions (Top view)		

**LED luminance**

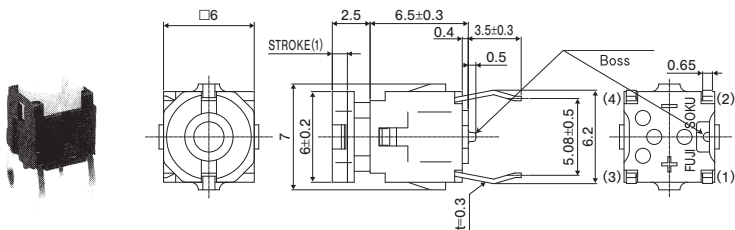
Symbol	LED luminance
01	Normal luminance
31	High luminance

**Packaging Specifications**



**LTR1**

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

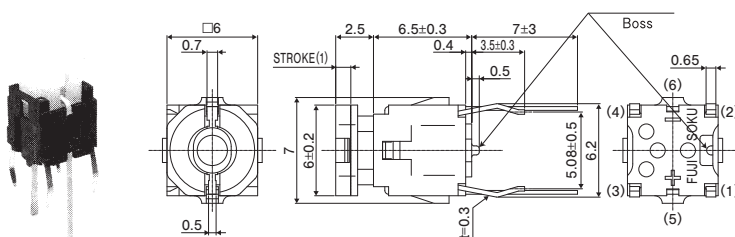


Terminal numbers are not shown on the switch.

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

**LTR2**

**SPST  
With LED**



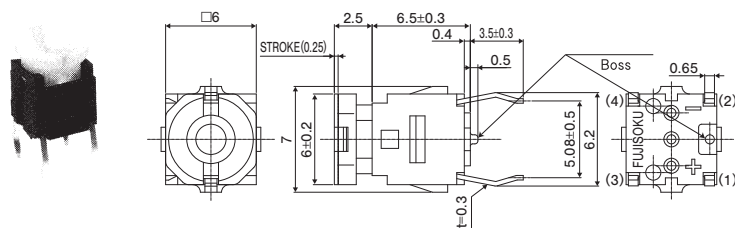
Terminal numbers are not shown on the switch.

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

**LTM (Metal Contact)**

**LTM1**

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

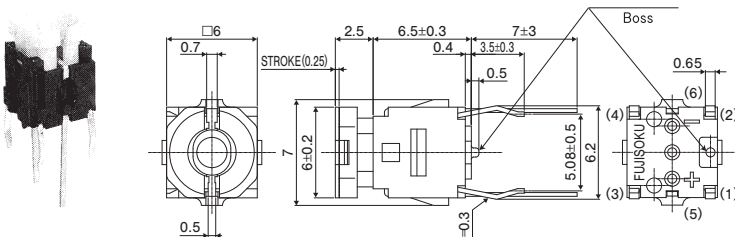


Terminal numbers are not shown on the switch.

Part No.	Switching function		Circuit diagrams
<b>LTM1-01</b> <b>LTMG1-01</b>	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
<b>LTM2-01-L</b> <b>LTMG2-01-L</b> <b>LTM2-31-L</b>	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.

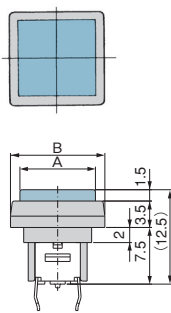
- Preheating in the flow line should be 80~120°C , 120 sec. max.
- Do not dip solder the switches with color buttons or mounting frames attached. Soldering heat may deform the accessories or cause ingress of flux.

**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
10mm sq.	10mm sq.	12.5mm sq.
10mm dia.	10mm dia.	12.5mm dia.
7.5mm sq.	7.5mm sq.	10mm sq.
7.5mm dia.	7.5mm dia.	10mm dia.



**Ambient Conditions**

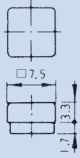
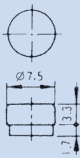
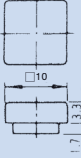
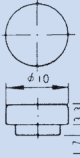
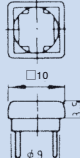
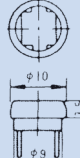
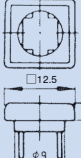
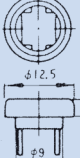
- (1) In case of switches with silver-plated contacts, do not use in an environment where there is corrosive gas such as sulfuric or ammonia gas which may affect the silver plating.
- (2) LTM and LTR series are open-structure switches and should not be used in a dusty environment.

**Precautions**

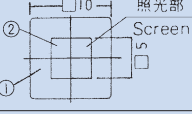
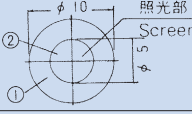
LED circuit	<p>Current to be applied to the LED must be lower than the forward current (IF) indicated in the LED Specifications of each switches. Resistance value R should be calculated using the formula on the right.</p>		<p>Example : E=5V, IF=10mA</p> $R = \frac{E - V_F}{I_F} = \frac{5 - 2.0}{0.01} = 300\Omega$ <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	—	
	Red	140007480172	—	140007480192	140007480202	
	Green	140007480174	—	140007480194	140007480204	
	Blue	140007480173	—	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	—	140007480213	—
	High luminance	Clear	140007480554	—	—	—
		Green clear	140007480552	—	140007480560	—
		Yellow clear	140007480553	—	140007480561	—
Part Name		Mounting Frame				
Dimensions						
Dark gray		140000340170	140000340171	140000340168	140000340169	
Gray		140000340179	140000340182	140000340173	140000340176	
Light gray		140000340180	140000340183	140000340174	140000340177	
Ivory		140000340181	—	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
	②Screen color	Clear	Clear
	①Color	Dark gray	140007480459
		Gray	140007480453
	Light gray	140007480454	140007480461

## Switch Operation

- Operating force should be 9.8 N or less.
- Do not operate the switch right after soldering.
- Do not solder the switch with the actuator pressed down.