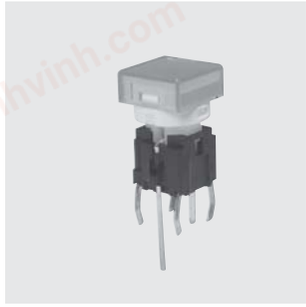
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LTR1•2 & LTM1•2

Ultra-Miniature Illuminated Pushbutton Switches



RoHS Compliant

■Series

Conductive Rubber Contact（**LTR** type）
Mettal 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 μA Min.
	LTM：1VA max.（50mA max.48VDC max） 0.5mA min.
	LTMG：1VA Max.（50mA max.48VDC max.） 10 μA 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	100MΩ 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±0.39N
	LTM：1.37±0.39N
Operating Temperature Range	−25～+70℃
Storage Temperature Range	−40～+70℃

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■Part Numbering

LT M G 2 — 01 — L2

- LT — Series Code
- M — Type of Contact
- G — Contact Plating
- 2 — Structure
- 01 — LED luminance
- L2 — LED Color

■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

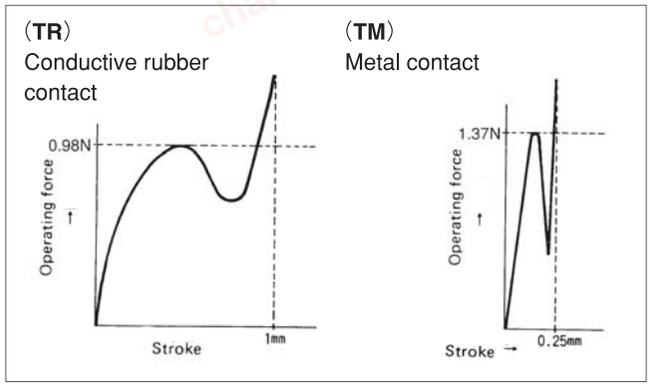
Fig.	1	2
Structure	 Without LED (Non-illuminated)	 With LED

■LED Specifications

LTR2 • LTM2 • LTMG2

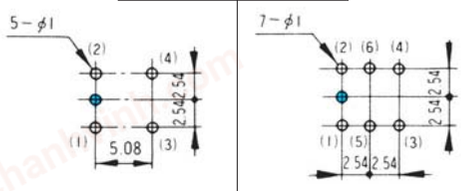
Code	Color	Luminance	Forward Current (IF)	Forward V (VF) nom.	Forward V (VF) max.	Reverse Voltage (VR)
L2	Red	Normal	30mA	2.0V	2.5V	DC5V
L5	Green		25mA	2.2V	2.5V	DC5V
L6	Bule		30mA	3.8V	4.5V	DC5V
L8	Yellow		30mA	2.1V	2.5V	DC5V
L2	Red	High	30mA	1.95V	2.5V	DC5V
L5	Green		30mA	3.2V	4.0V	DC5V
L8	Yellow		30mA	2.0V	2.5V	DC5V

■Operating Force vs. Stroke Characteristics



A図/Fig.A

■PC Hole Layouts

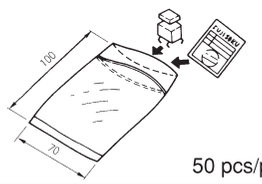
Type	LTR1/LTM1	LTR2/LTM2
Dimensions (Top view)	● : For positioning boss 	

■LLED liminance

Symbol	LED luminance
01	Normal luminance
31	High luminance

■Packaging Specifications

Zipper Plastic Bag



50 pcs/pack

■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**
	Bule	**★LTM2−01−L6**	—	**▲LTMG2−01−L6**	**★LTR2−01−L6**	—
	Yellow	**LTM2−01−L8**	**LTM2−31−L8**	**★LTMG2−01−L8**	**LTR2−01−L8**	**LTR2−31−L8**

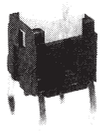
▲ : Inquiry products. ★: Made to order products.

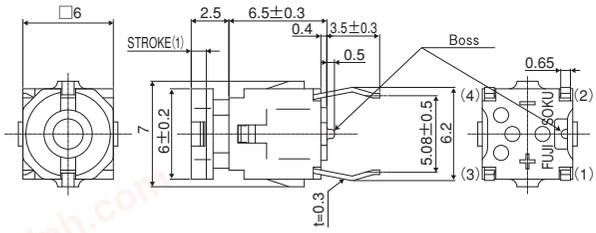
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LTR (Conductive Rubber Contact)

LTR1

SPST
Without LED (Non-illuminated)





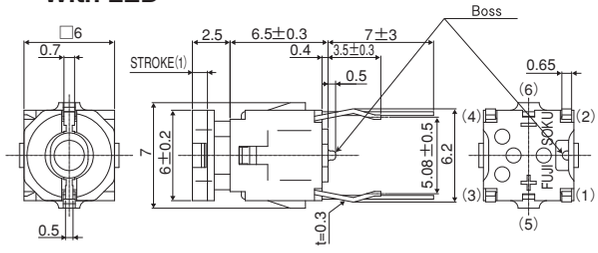
Terminal numbers are not shown on the switch.

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

LTR2

SPST
With LED





Terminal numbers are not shown on the switch.

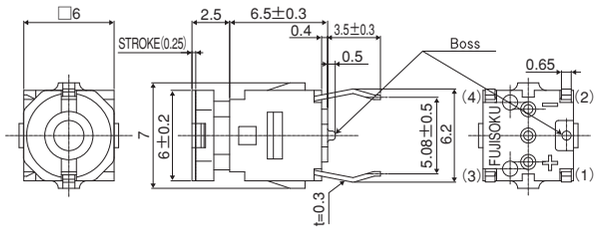
Part No.	Switching function		Circuit diagrams
	■	Push ■	
LTR2−01−L■ **LTR2−31−L■**	OFF	(ON)	
Connecting terminals	——	1 — 3 2 — 4	
LED circuit	5 (+) 6 (−)		

LTM (Metal Contact)

LTM1

SPST
Without LED (Non-illuminated)





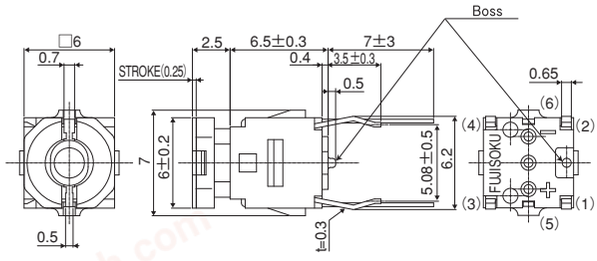
Terminal numbers are not shown on the switch.

Part No.	Switching function		Circuit diagrams
	■	Push ■	
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
	■	Push ■	
LTM2−01−L■ **LTMG2−01−L■** **LTM2−31−L■**	OFF	(ON)	
Connecting terminals	——	1 — 3 2 — 4	
LED circuit	5 (+) 6 (−)		

(ON) : Momentary

LED color to be specified in ■.

■ : Refer to "Table of Part Numbers" on P.171.

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■Soldering

Series	LTM	LTR
Manual soldering	380℃ Max. 3sec. Max.	380℃ Max. 3sec. Max.
Auto soldering	275℃ Max. 6sec. Max.	265℃ Max. 6sec. Max.

・ Preheating in the flow line should be 80~120℃ , 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

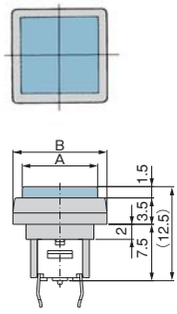
(1)Solvents : Fluorine or Alcohl type

(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℃ 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.
ϕ10 10mm dia.	ϕ10 10mm dia.	ϕ12.5 12.5mm dia.
□7.5 7.5mm sq.	□7.5 7.5mm sq.	□10 10mm sq.
ϕ7.5 7.5mm dia.	ϕ7.5 7.5mm dia.	ϕ10 10mm dia.



■Ambient Conditions

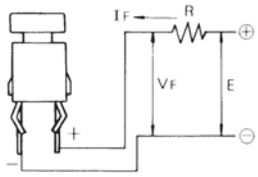
(1)In case of switches with silver-plated contacts, do not use in an environment where there is corrosive gas such as sulfuric or ammonia gas which may affect the silver plating.

(2)**LTM** and **LTR** series are open-structure switches and should not be used in a dusty environment.

■Precautions

LED circuit

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.



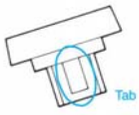
Example : **E**=5V,

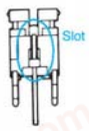
I_F=10mA

$$R=\frac{E-V_F}{I_F} \quad R=\frac{5-2.0}{0.01}=300\Omega$$

Use V_F=2.0V to calculate.

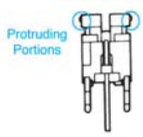
Accessories mounting





1.Installing the Mounting Frame
Install the mounting frame so that the tab on the frame is in the same direction as the slot on the switch.



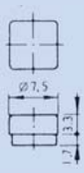
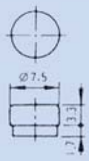
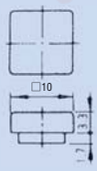
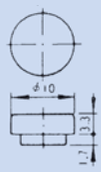
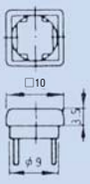
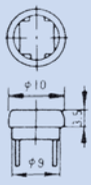
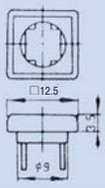
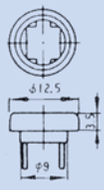


2. Installing the Button
Install the button so that the protrusions on the switch fit into the square holes on the button.
The mounting frame cannot be installed with the switch button installed.

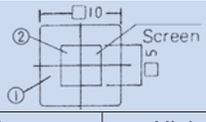
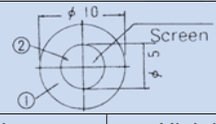
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■Optional Accessories

《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
Illuminated type / High luminance	Clear	140007480554	140007480558	140007480562	140007480566
	Red clear	140007480551	140007480555	140007480559	140007480563
	Green clear	140007480552	140007480556	140007480560	140007480564
	Yellow clear	140007480553	140007480557	140007480561	140007480565
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	High luminance	Normal luminance	High luminance
	①Color / ②Screen color	Clear		Clear	
	Dark gray	140007480452	140007480567	140007480459	140007480574
	Gray	140007480453	140007480568	140007480460	140007480575
	Light gray	140007480454	140007480569	140007480461	140007480576
	Ivory	140007480455	140007480570	140007480462	140007480577
	Red	140007480456	140007480571	140007480463	140007480578
	Green	140007480457	140007480572	140007480464	140007480579
	Blue	140007480458	140007480573	140007480465	140007480580

：Optional Accessories