

SPECIFICATIONS OF LUMISWITCH

1. General items

- 1-1. Scope : This specifications apply to Citizen Electronics' Lumiswitch, model LS10N2-T.
- 1-2. Dimensions : As per drawing attached
- 1-3. Circuit system : Single-pole, Single-throw
- 1-4. Operating temperature : -30 ~ +80°C
- 1-5. Storage temperature : -40 ~ +90°C
- 1-6. Parts code :



- Common code
- Height of switch
N : 3.5mm
- Operating force
2 : 1.57N(160gf)
- Packing mode
T : Taping
Non-code : bulk

2. Rating

Maximum Rating for Switches : DC 12V, 20mA

△			Approved	Checked	Drawn	Symbol	LUMISWITCH
△			電子部品技術 12.5.11 赤池	電子部品技術 12.5.11 宮下	電子部品技術 12.5.11 小俣	Name	LS10N2
△						Drawing No.	
Mark	Date	Description	APPROVED CITIZEN ELECTRONICS CO., LTD.				

SPECIFICATIONS OF LUMISWITCH

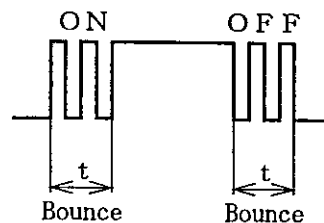
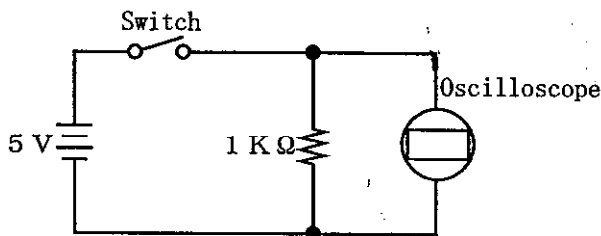
3. Initial characteristics




3-1. Mechanical characteristics

No.	Item	Performance	Test conditions
1	Operating force	$1.57 \pm 0.49\text{N}$ ($160 \pm 50\text{gf}$)	Measure maximum operating force by vertically pressing down the center of push button gradually until it stops.
2	Operating stroke	$0.2 \pm 0.1\text{mm}$	Measure stroke by adding static force which is two times of standard value vertically to the center of push button until it stops.
3	Recovery force	More than 0.29N (More than 30gf)	Measure recovery force after vertically pressing down the center of push button to the extent of full stroke.

3-2. Electrical characteristics

No.	Item	Performance	Test conditions
1	Contact resistance	100m ohm or less	Add static force which is two times of standard value vertically to the center of push button and measure with 1000Hz micro-current measuring instrument.
2	Insulation resistance	100M ohm or more	Apply DC 100V to the terminals (except terminals for LED), or there is a metal cover, between terminal and the cover.
3	Withstanding voltage	No insulation breakdown is observed	Apply AC 250V (50Hz or 60Hz) between the terminals (except terminals of LED), or if there is a metal cover, between terminals and cover.
4	Bounce strength	20ms or less	Push the center of push button 2 times per seconds. With the same speed, measure bounce at time of ON and OFF as below illustrated.



△			Approved	Checked	Drawn	Symbol	LUMISWITCH
△						Name	LS10N2
△						Drawing No.	
Mark	Date	Description	Appr.	CITIZEN ELECTRONICS CO., LTD.			

SPECIFICATIONS OF LUMISWITCH

4. Withstanding characteristics

4-1. Test conditions

No.	Item	Tests conditions
1	Operating life	100,000 times under the same condition of above but, rated operating force is to be 1.57N.
2	Anti-heat	After exposure to the ambient condition of $85 \pm 2^\circ\text{C}$ for 96 hours, the test pieces are returned to room temperature and humidity and left for one hour. Then measurement is made in standard environment.
3	Anti-coldness	After exposure to the ambient condition of $-40 \pm 2^\circ\text{C}$ for 96 hours, the test pieces are returned to room temperature and humidity, and left for 1 hour, then measurement is made in standard environment, but, condensed water to be wiped off.
4	Anti-humidity	After exposure to the ambient condition of $60 \pm 2^\circ\text{C}$ and 90 to 95% RH for 96 hours, the test pieces are returned to the room temperature and humidity, and left there for about 1 hour. Then measurement is made in the standard environment, but condensed water is to be wiped off.
5	Temperature cycle	<p>After the test pieces are exposed to the following heat cycle for 10 times, then measurement is made standard environment but, condensed water is to be wiped off.</p> <div style="text-align: center;"> <p style="font-size: small;">Temperature cycle</p> </div>
6	Anti-vibration	Vibration of total amplitude of 1.5mm and frequency of 10 to 55Hz is applied. The sweep of 10-55-10Hz is about one(1) minute. The direction of the vibration is in X, Y and Z axes and the duration is two(2) hours for each direction for a total of six(6) hours.
7	Anti-shock	The accelerated velocity of the shock applied is 30G. The direction of shock is in X, Y and Z axes. The shock is applied three(3) times for each direction, a total of nine(9) times.
8	Stopper strength	Add static force of 29.4N (3Kgf) vertically to the center of push button for 15 seconds.

4-2. Norm of judging failure of switch portion

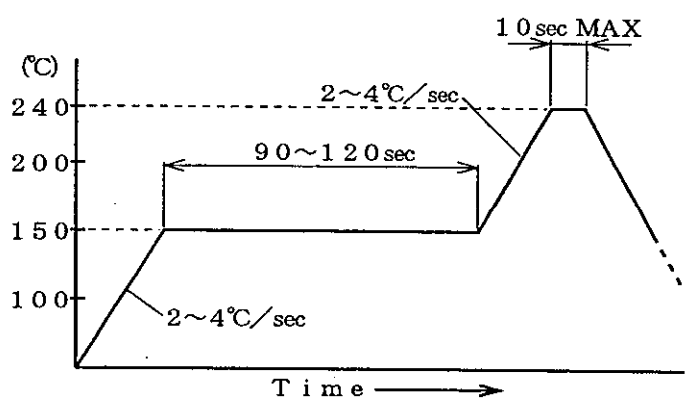
No.	Measuring item	Measuring condition	Norm for failure
1	Operating force	Same as for initial characteristics	$\pm 30\%$ or more of the initial value
2	Contact resistance	do	1000m Ω or more
3	Insulation resistance	do	10M Ω or less
4	Bounce	do	30ms or more

△			Approved	Checked	Drawn	Symbol	LUMISWITCH
△						Name	LS10N2
△						Drawing No.	
△							
Mark	Date	Description	CITIZEN ELECTRONICS CO., LTD.				

5. Condition for soldering

5-1. Reflow soldering

- 1)The solder paste is to be applied to the soldering pads by the dispenser or screen printing.
- 2)In the case of screen printing the use of the metal mask of 0.2mm thick is recommended.
- 3)The use of the reflow furnace of upper and lower heaters type is recommended.
- 4)The temperature of the reflow furnace is to be set in accordance with the following temperature profile for the pre-heating and main heating. Care must be taken not to have the temperature at peak rise higher than 240°C. The temperatures in the following profile are the ones on the top surface of LUMISWITCH. As a difference in temperature between the top surface if LUMISWITCH and reflow furnace, close check is recommended.
- 5)Care must be taken that LUMISWITCH be handled after its temperature has dropped down to the normal temperature after soldering.



5-2. Manual soldering

- 1)The use of 6/4 solder or solder with silver (Ag) content is recommended.
- 2)The use of the soldering iron of less than 20W is recommended and the temperature of the within three(3) seconds.
- 3)Care must be taken that LUMISWITCH be handled after temperature has dropped down to the normal temperature after soldering.

6. Definition of wording

6-1. " The standard environment " means the following. The tests and measurements are performed in the standard environment, unless otherwise stipulated.

- 1) Temperature ... $20 \pm 15^\circ\text{C}$
- 2) Humidity $65 \pm 20\%$
- 3) Atmospheric pressure ... 860~1060hPa.

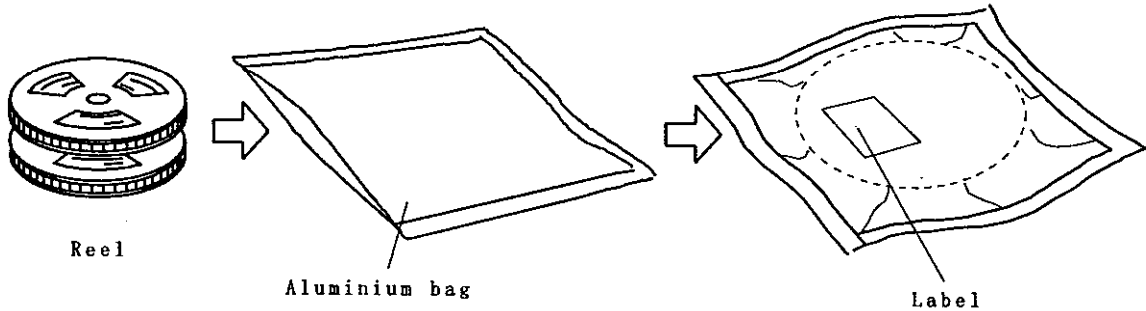
6-2. " No abnormality shall be observed in mechanical and electrical functions " means that the test piece satisfies the level for judgement of failure as specified in 4-2.

△			Approved	Checked	Drawn	Symbol	ISWITCH
△			電子部品技術 12.5.11 赤池	電子部品技術 12.5.11 宮下	電子部品技術 12.5.11 小俣	Name	LS10N2
△						Drawing No.	
Mark	Date	Description	Appro. CITIZEN ELECTRONICS CO., LTD.				

7. Packing

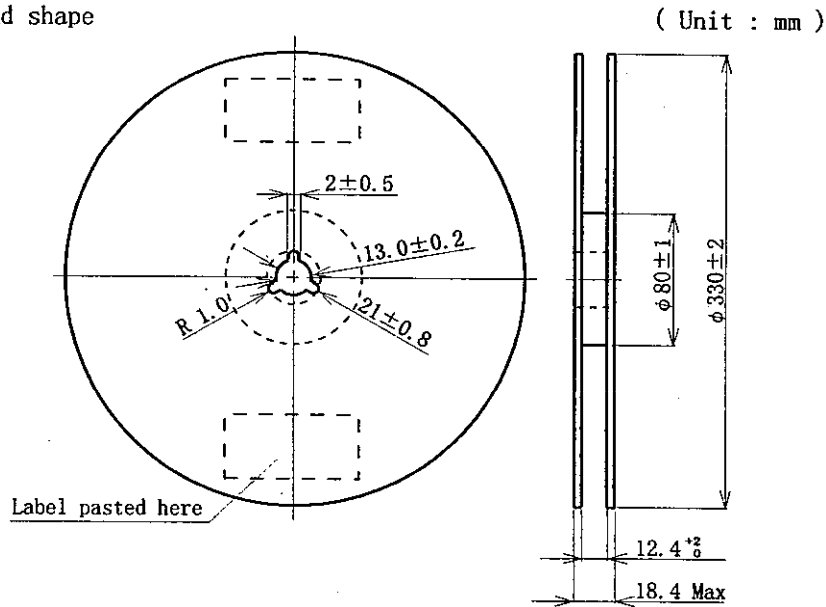
7-1. Moisture-proof packing

In order to avoid the absorption of moisture during transportation and storage, LUMISWITCH are packed in the aluminium envelope.

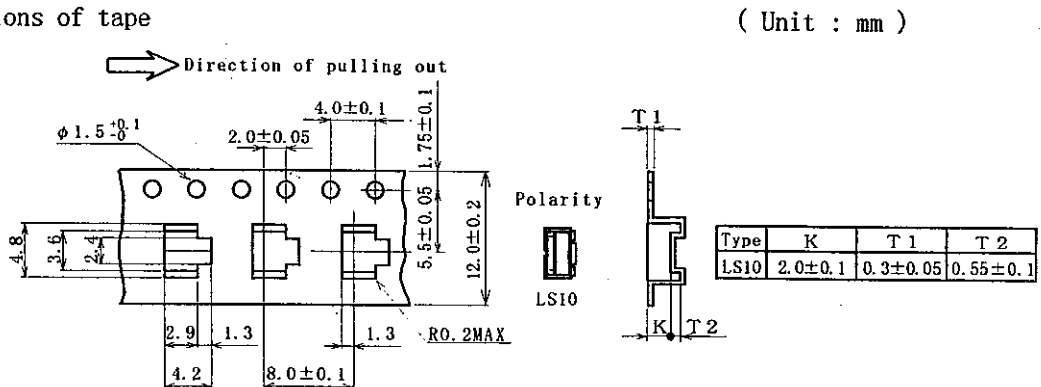


8. Taping specifications (In accordance with JIS C 0806)

8-1. Dimensions and shape



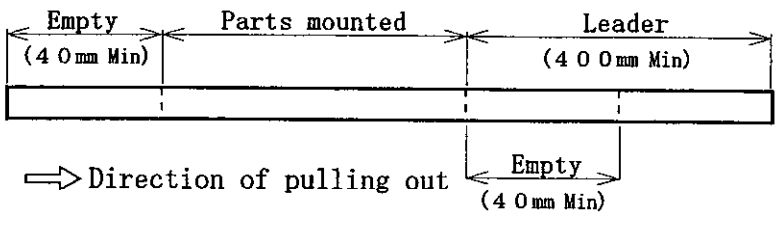
8-2. Dimensions of tape



△			Approved	Checked	Drawn	Symbol	LUMISWITCH
△			電子部品技術 12.5.11 赤池	電子部品技術 12.5.11 宮下	電子部品技術 12.5.11 小俣	Name	LS10N2
△						Drawing No.	
Mark	Date	Description	Appro.	CITIZEN ELECTRONICS CO., LTD.			

SPECIFICATIONS OF LUMISWITCH

8-3. Configuration of tapes



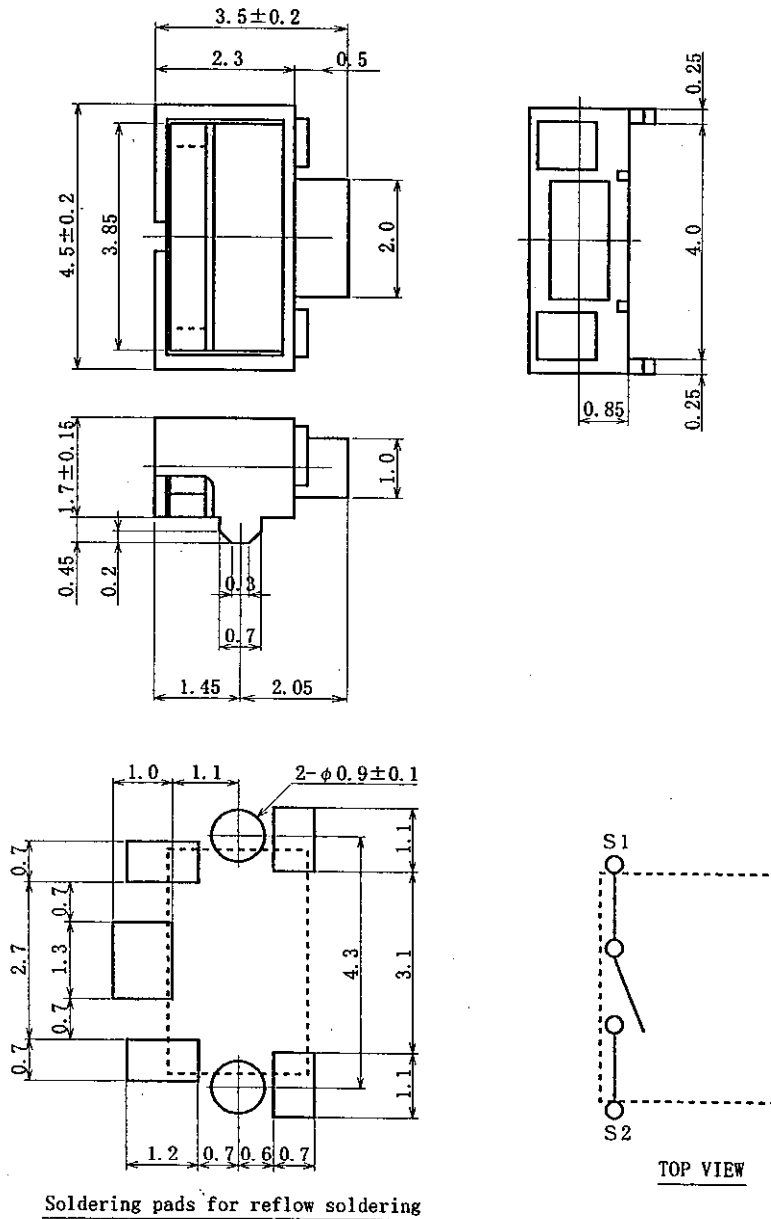
8-4. Quantity

3,000 pcs. per reel.

△			Approved	Checked	Drawn	Symbol	LUMISWITCH
△			電子部品技術 12.5.11 赤池	電子部品技術 12.5.11 宮下	電子部品技術 12.5.11 小俣	Name	LS10N2
△							
Mark	Date	Description	APPRO. CITIZEN ELECTRONICS CO., LTD.				

9. Outline drawing

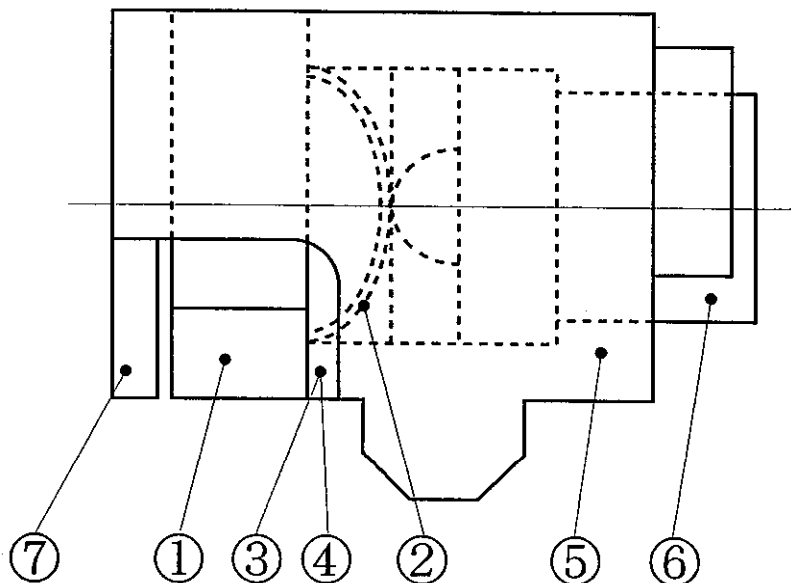
Unit:mm
Tolerance:±0.3



- Note 1) The metal-mask thickness is to be designed with 0.2mm.
 - Note 2) Dimensions of the resist pattern are to be designed based on outer dimensions of soldering pattern plus 0.15mm.
 - Note 3) Positioning tolerance of switch portion : 0.2 MAX.
- ※ Finish of the pattern is Au-plating.

△			Approved	Checked	Drawn	Symbol	LUMISWITCH
△						Name	LS10N2
△							
△							
Mark	Date	Description	Appro.	CITIZEN ELECTRONICS CO., LTD.			

10. Sectional plan



No.	Parts	Material/Specification	UL grade
1	Circuit board	FR-4	94V-0
2	Tactile spring	Stainless steel strip	—
3	Adhesive sheet	Anti-heat polyimide sheet	94V-0
4	Waterproof sheet	Anti-heat polyimide sheet	94V-0
5	case	Polyphthalamide resin	94HB equivalent
6	Plunger	Polyphthalamide resin	94HB equivalent
7	Metal cover	—	—

△			Approved	Checked	Drawn	Symbol	LUMISWITCH
△						Name	LS10N2
△		Drawing No.					
△							
Mark	Date	Description	Appro. CITIZEN ELECTRONICS CO., LTD.				