

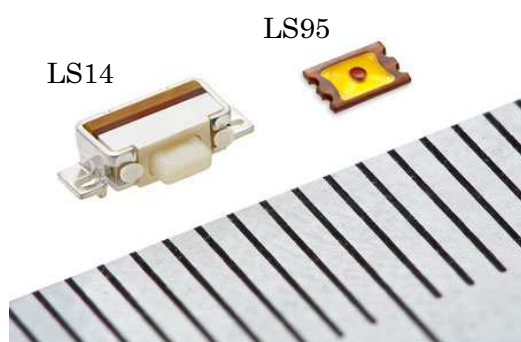
Development of two types of compact tactile switches for smartphones
– These switches have achieved a world top-class thinness and miniaturization. –

Citizen Electronics Co., Ltd. (Head Office: Fujiyoshida City, Yamanashi Prefecture. President: Yoshihiro Gohta) has developed two types of surface-mounted tactile switches for smartphones that have achieved a world top-class thinness and miniaturization. Shipment of samples of the switches will start in April 2015.

Our company started manufacturing switches in 1989 and they have been applied to a variety of products such as car audio systems and cellular phones. Currently, Citizen Electronics has a world top-class share of side switches used for smartphones as power switches or to adjust volume.

There is a variety of products such as high-end, middle range, and low-end models on the smartphone market that has been expanding, however, pursuing further reduction in thickness and weight is seen as a common goal. The wearable device market has been also expanding recently. Products tend to have multiple functions and the number of parts installed in a product increases simultaneously. Therefore, reduction in size and thickness of parts has been important.

In response to these market needs, Citizen Electronics has developed two types of switches, side-push and top-push types. As high reliability is required for switches, these switches have achieved thinness and miniaturization while maintaining existing achievements such as the sensation of clicking, and waterproof and dust-proof properties. Moreover, their reliability in the areas of strength and service life has been improved. These two products contribute to reduction in size, thickness and weight of high-end to low-end models of smartphones and wearable devices.



| | | |
|--------------|---|----------|
| Product name | Tactile switches | |
| Type | Side-push | Top-push |
| Part No. | LS14 | LS95 |
| Samples | Shipment of samples will start in April 2015. | |

■LS14 (Side-push type)

1. Thickness has been reduced by about 13 % over that of the current model and a world top-class thinness of 1.35 mm has been achieved.

The developed product has achieved a world top-class thinness of 1.35 mm as a side switch that adopts the 'direct system' *1 through optimization of internal springs, and contributes to the thinness of smartphones.

Most side switches adopt the 'conversion system' which converts a force applied from the side and transmits it to the internal spring. However, Citizen Electronics adopts the 'direct system' which transmits a force applied from the side to the internal spring. As the 'direct system' can transmit the force to the internal spring with less loss of the force, the 'direct system' provides better operational feeling such as a sensation of applied force or clicking.

LS14 (New product): 5.5 mm (width) × 2.7 mm (length) × 1.35 mm (height)
LS12 (Current model): 3.9 mm (width) × 2.9 mm (length) × 1.55 mm (height)
[about 13 % reduction]

2. Strength against lateral pressure has been increased by 25 %

As most side switches installed on smartphones protrude from the body of the smartphone to make operability better, a large load may be applied to the switch if the smartphone is dropped. Therefore, importance is placed on soldering strength in order to withstand a strong force from the side. The new product has achieved the ability to withstand a force of 75 N, an increase of 25 % over the 60 N of the current model, through improvement in the shape of the metal cover and increase in the soldered joint area.

3. High dust-proofing and waterproofing properties

The switches comply with the dust-proofing and waterproofing standard (IP 57) by hermetically sealing the periphery of the spring.

4. Good sensation of clicking has been achieved.

The switches have achieved both a world top-class thinness and a good sensation of clicking when the switch is used.

■ LS95 (Top-push type)

1. Size has been reduced by about 8 % over that of the current model and a world top-class miniaturization has been achieved.

Citizen Electronics has achieved miniaturization of the switch by making the shape of the internal spring smaller. The switch contributes to the thinness of products when used as a side switch.

LS95 (New product): 2.8 mm (width) × 1.75 mm (length) × 0.53 mm (height)
LS75 (Current model): 2.8 mm (width) × 1.9 mm (length) × 0.53 mm (height)
[about 8 % reduction]

2. Long service life, being twice that of the current model, is guaranteed.

We guarantee the number of times of operation in the operating life test to be 500,000, while that of the current model is 200,000 to 300,000.

3. High dust-proofing and waterproofing properties

The switches comply with the dust-proofing and waterproofing standard (IP 57) by hermetically sealing the periphery of the spring.

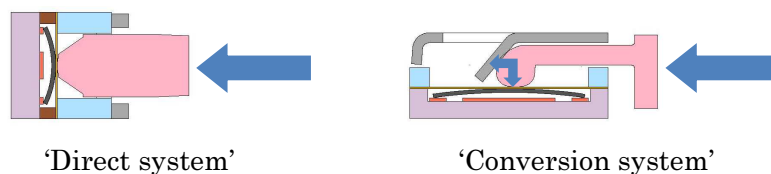
4. Good sensation of clicking has been achieved.

The switches have achieved both a world top-class miniaturization and a good sensation of clicking when the switch is used.

◆Main specifications

| Product name | LS14 | LS95 |
|-------------------|--|----------------------------|
| Size | 5.5 mm × 2.7 mm × 1.35 mm | 2.8 mm × 1.75 mm × 0.53 mm |
| Operating force | 1.6 N / 2.0 N | 1.57 N / 2.3 N |
| Stroke | 0.12 mm | 0.12 mm |
| Operating life | 200,000 times | 500,000 times |
| Main applications | Volume adjusting keys or power-on/off keys used in mobile devices such as smartphones and tablets, and wearable devices such as smartwatches | |

*1: Structures of the 'direct system' and 'conversion system'



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