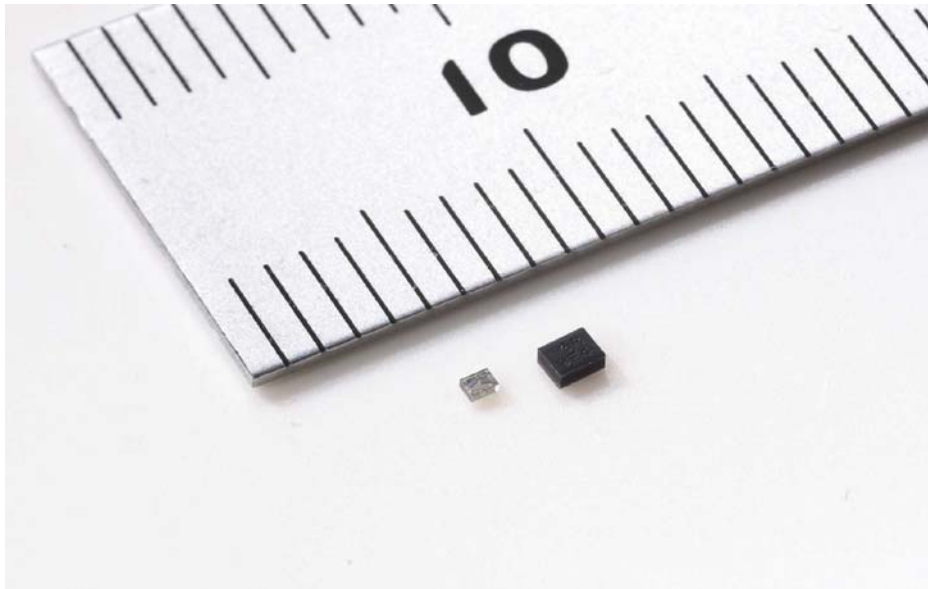


**Commercialization of the
World's Smallest Boundary Acoustic Wave Filter
- SAFAM Series -**



[Main text]

Murata Manufacturing Co., Ltd. has recently succeeded in developing the SAFAM series, the world's smallest single filter.

By adapting the Boundary Acoustic Wave as the propagating wave, we have achieved successful commercialization of a downsized, simple planar-type (flat panel, thin-film multilayer structure) device without the need for the surface cavity type structure used in SAW filter technology.

The size of the product is 0.8mm x 0.6mm x 0.365mm, which is a 69% reduction in surface area compared to other conventional products..

An issue of reliability can result from having no cavity structure, therefore the tolerance of the mold (Note 1) was improved so it can be guaranteed that the thermal-shock tolerance is equivalent to that of the IC can be guaranteed. As for the terminal area, lead-free solder BGA (Ball Grid Array) is used since it is most suitable for high-density packaging.

When mounting the conventional SAW filter on the IC embedded module, module inspections such as addition of an under fill (Note 2) were required in order to achieve as high reliability as the IC. However, as this filter is a highly-reliable device, the module inspection process can be simplified and the development period may be shortened.

This filter is compliant with GSM850, GSM900 (EGSM), GSM1800 (DCS) and GSM1900 (PCS). The product will be further developed to be used for wireless communication purposes other than mobile phone.

[Background]

In the mobile phone market, modularization of RF (radio frequency) components is continually progressing including filters. Currently, a multi-package module containing RF-IC plus and filter is under development. In order to support such modules, the mold must be of a high tolerance and the device must have as high a reliability as the IC. By its very nature, the SAW filter requires a structure to maintain the cavity space and therefore it is considerably difficult to achieve downsizing and low-profiling of such a device whilst fulfilling all the above requirements. In an effort to overcome this challenge, the industry has been engaged in the development of a filter utilizing FBAR (Film Bulk Acoustic Resonator), however, there exists many issues with this technology. For instance, the difficulty to realizing an unbalanced-input/balanced-output type filters (Note 3).

Now however, Murata Manufacturing Co., Ltd. has successfully developed a simple, planar-type device by adopting the Boundary Acoustic Wave. High tolerance and high reliability of the mold and IC have been achieved and commercialized into a small, low profile filter with all the characteristics to those of a SAW filter.

(Note 1) In the forming process of transfer molding, preheated plastic is injected at high pressure into a mold cavity. Accordingly, embedded elements are required to tolerate for a prolonged period of time the high-temperatures and pressures of over 160 degrees Celsius and tens of atms respectively.

(Note 2) Underfill is the resin applied to protect the embedded elements before transfer molding takes place.

(Note 3) Unbalanced /balanced type filter

In recent RF-IC, the input terminal of the receiver side has a balanced input and the antenna side has an unbalanced input. In order to connect these input terminals, a transformer such as a balun or SAW filter with a conversion function must be used. In recent years, the balance type SAW filter has mostly been used.

[Feature]

1. Small and low-profile
2. Unbalanced-input/balanced-output type
3. High tolerance mold
4. High reliability
5. Characteristics equivalent to the SAW filter

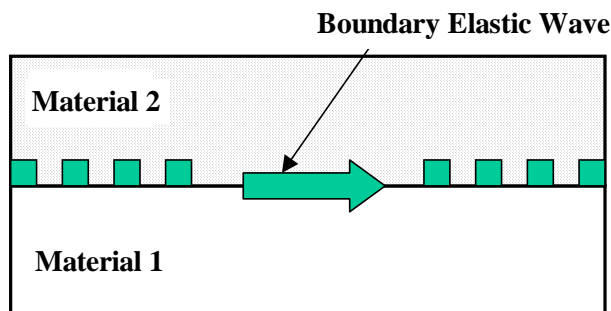
[Application]

GSM850, GSM900 (EGSM), GSM1800 (DCS), GSM1900 (PCS)

[Explanation of terms]

Boundary Acoustic Wave

It is a wave that travels the interface of two adhered materials. (See illustration 1)
As in the case of Surface Acoustic Wave, it can be excited by the comb-shaped electrode. The cavity structure is required for the Surface Acoustic Wave since it travels the surface of materials, but not for the Boundary Acoustic Wave

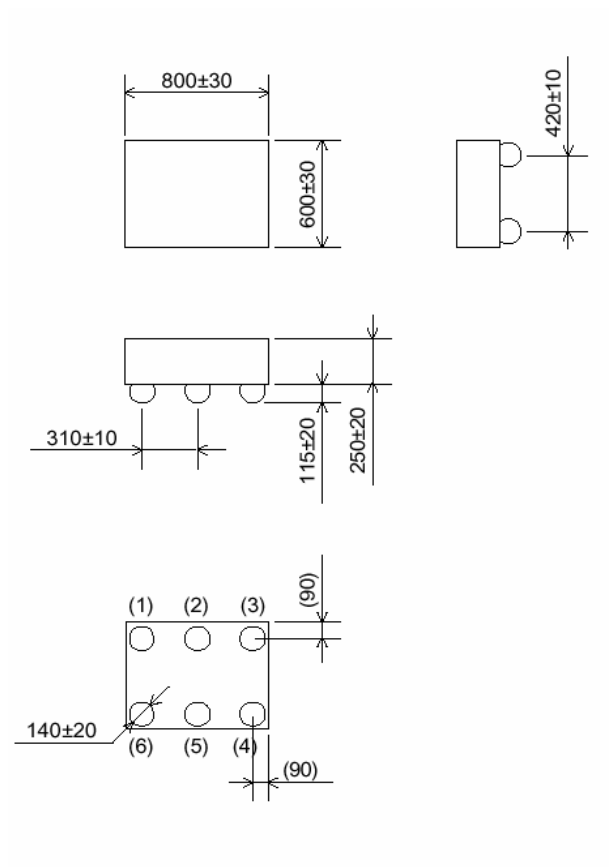


(Illustration 1) Boundary Acoustic Wave

PCS	Abbreviation for Personal Communications Service. (North American Digital Cellular Communication System) Also referred to as GSM1900 or CDMA1900.
DCS	Abbreviation for Digital Communication System. (European Digital Mobile Communication System) Also referred to as GSM1800.
GSM	Abbreviation for Global System for Mobile communication. (European Digital Mobile Communication System)

[Sample Price] ¥5,000 (per unit)

[Dimensional Outline Drawing]



(Unit: μ m)