

Applications & Cases

SAW components

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Enhancing mobility



BENEFITS	QC PACKAGE
<ul style="list-style-type: none"> • Wide temperature range from -40 to +125 °C • Low temperature drift thanks to quartz substrates • Low sensitivity to vibration, shock and high acceleration forces thanks to ceramic packages • Hermetically sealed • Available for all common frequencies worldwide 	

Fumbling with a car key in the dark and ice-cold weather is now a thing of the past. Thanks to remote keyless entry (RKE), the doors of most car models can today be conveniently unlocked at a distance by operating a radio remote control integrated into the car key. In the latest generation of RKE systems, the driver does not even have to press a button on the key - merely approaching the vehicle is sufficient to unlock the doors. All these open sesame systems are based on SAW filters and resonators. Karlheinz Rott, Vice President of the Automotive Electronics Business Line, is well aware of the performance demanded from these filters: "They must operate reliably over an ambient temperature range from -40 to +85 °C, often at even up to +125 °C. High resistance to shock, vibration and other environmental hazards is demanded at the same time, plus very low drift and a long service life."



„SAW filters of the new generation are the result of progressive miniaturization. We have also managed to improve electrical properties.“

KARLHEINZ ROTT

Vice President, Automotive Electronics Business Line

The automobile industry obviously makes the toughest quality demands. Resonators should also be able to withstand high centrifugal forces with ease, as they are increasingly being used in tire pressure sensors. SAW components transfer the pressure data and ensure that the driver is alerted of any significant deflation and associated temperature rise while the vehicle is in motion. A display then warns drivers in good time of potential tire bursts so that serious accidents can be avoided. And even if no critical values are exceeded, an indication of variation from the specified pressure is helpful because even 10% too much or too little will shorten tire service life by 15%.

Two key measures enable EPCOS to meet the automotive electronics industry's demands for rugged SAW components of high selectivity:

- First, EPCOS uses a quartz substrate with a very low temperature drift of only 0.03 ppm/K.

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- Second, after surface passivation, the chips are encapsulated in rugged, hermetically sealed ceramic packages to ensure high mechanical stability.

"Previous designs of narrowband filters required an area of 5×5 mm. We have succeeded in shrinking these dimensions by a factor of 1.7. The new generation now has a footprint of only 3.8×3.8 mm", explains Karlheinz Rott.

EPCOS has also shrunk broadband filters on lithium tantalate substrates in the range from 300 to 400 MHz. "Here too, we have taken a major step forward in miniaturization", says Rott. These filters are now offered in the DCC6C package, which has a footprint of only 3×3 mm. In comparison, the previous solution measured 3.8×3.8 mm. A new product family of single-port resonators for all standard frequencies is currently being developed for the 3×3 mm package. Even greater success in miniaturization has been achieved here: the footprint was almost halved in comparison with the predecessor model's 5×3.5 mm.

The customer benefits are obvious and go beyond space savings. Karlheinz Rott puts it in a nutshell: "The new filter generations also enable costs to be cut significantly. Standardized pinning in each product family also facilitates design. And despite considerable miniaturization of the chips, electrical performance is at least as good as before and has even been improved in some parameters such as insertion loss."