

Applications & Cases

SAW components

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One size smaller



PROFILE CERAMIC PACKAGES

SAW filters for automotive applications are exposed to high mechanical and thermal stresses. To ensure that they operate reliably throughout the entire life of the vehicle, they are hermetically sealed in ceramic packages that can withstand temperatures from -40 to +125 °C.



SAW filters are indispensable to modern motor vehicles. As well as high thermal and mechanical strength, miniaturization is a key design demand here. EPCOS has therefore developed new SAW filters in significantly smaller packages.

More and more communication processes in and around automobiles now dispense with wires completely. The traditional mechanical key has long been consigned to history. Remote keyless entry systems open car doors at the press of a button while GPS navigation systems guide the driver reliably to the most remote locations. Underinflation or overheating of tires is measured and transmitted contactlessly to the dashboard. In all these functions, SAW filters and resonators literally play a key role.

SAW filters represent the most effective way of protecting the front ends of RF receivers from being overdriven by strong adjacent signals. Useful signals in the filter passband reach the receiver almost unattenuated, while noise signals on other frequencies are strongly suppressed. As miniaturization progresses, customers manufacturing short range devices (SRDs) are calling for even more compact SAW front-end filters.

SAW filters on quartz substrate

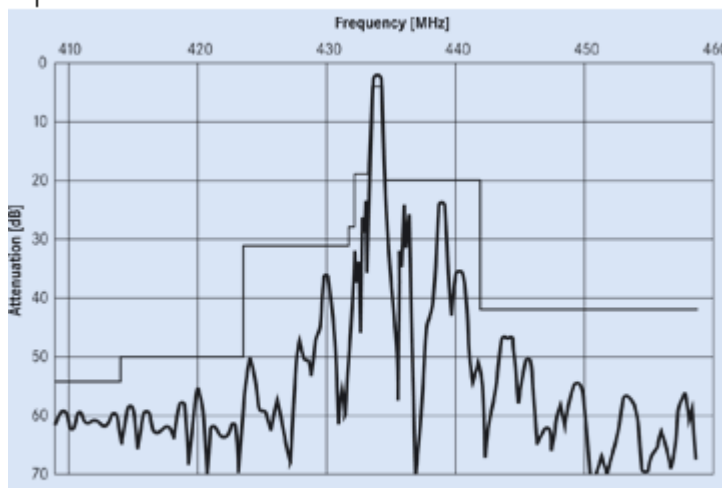
EPCOS has been offering SAW filters based on quartz substrates for these applications for years. Quartz is characterized by low temperature drift. So the filters can be used without any deterioration of their properties in the temperature range from -40 to +125 °C. This thermal stability is the only way of achieving good filter performance and thus high selectivity and sensitivity in the receiver. Quartz is also ideal as a filter substrate for remote control radio systems with a system bandwidth of less than 400 kHz, as normally found in SAW- or PLL-stabilized SRD transmitters.

Thanks to improved design techniques, more powerful simulation software and major advances in surface passivation,

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EPCOS has leaped ahead in miniaturization and managed to shrink its tried and tested narrowband SAW front-end filters on a quartz substrate by a whole package size while simultaneously improving electrical and mechanical properties. Highlights include low insertion loss in the passband → 1 and excellent attenuation in the stop band, especially at the image frequencies of typical superhet systems with intermediate frequencies of 10.7 and 1 MHz.

1 Attenuation curve of the new QCC8B filter

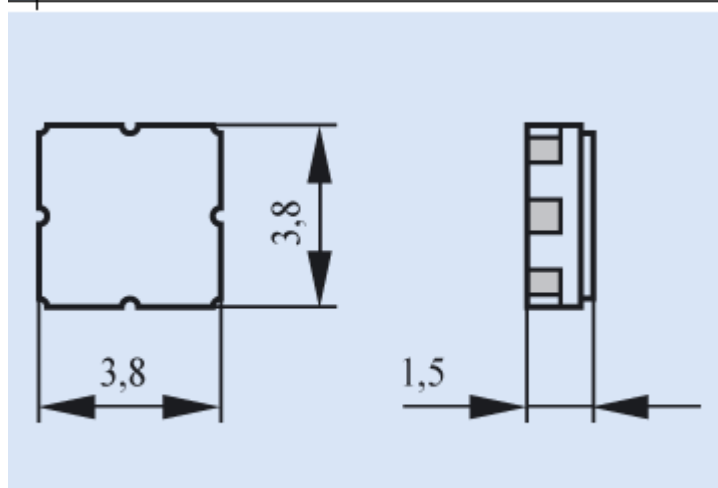


- 1 Insertion loss in the passband is typically 1.9 dB. Expenditure for RF gain is therefore significantly reduced.

Smaller footprint

The filters previously encapsulated in the QCC8C package (5 × 5 mm, 8 pins) for SMDs now come in the QCC8B package (3.8 × 3.8 mm, 8 pins), which is manufactured in large volumes for SMDs. Full dimensions for the new package are shown in → 2.

2 Dimensions of the new QCC8B filter package



- 2 Space requirements reduced by a factor of 1.73.

It cuts space requirements by a factor of 1.73. Filter types and key technical data are listed in → 3 and → 4.

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3 | New SAW filters in QCC8B packages

Type	Center frequency (MHz)	Market
B3761	315.00	USA, Japan
B3763	315.15	China
B3765	315.50	China
B3760	433.92	Europe
B3766	447.25	Korea
B3762	868.30	Europe

4 | Technical data in comparison

Type	B3760 (3.8 × 3.8 mm)	B3550 (5 × 5 mm)
Insertion loss, typ./max.	1.9/3.0 dB	2.0/4.0 dB
Absolute bandwidth, 3 dB min.	620 kHz	670 kHz
Available bandwidth (-40 to +95°C), min.	360 kHz	360 kHz
Impedance: input output	240 Ω/2.4 pF 240 Ω/2.4 pF	270 Ω/2.7 pF 250 Ω/3.2 pF
Attenuation in dB (min)		
10 to 414 MHz	52	45
414 to 423.5 MHz	48	40
431.72 to 432.12 MHz	26	15
434.92 to 442 MHz	18	10
442 to 500 MHz	40	35
550 to 1000 MHz	45	45

As for all SAW filters from EPCOS, test results based on the automotive environmental standard AEC Q200 and complete Level 3 PPAP documentation have been available since volume production started.